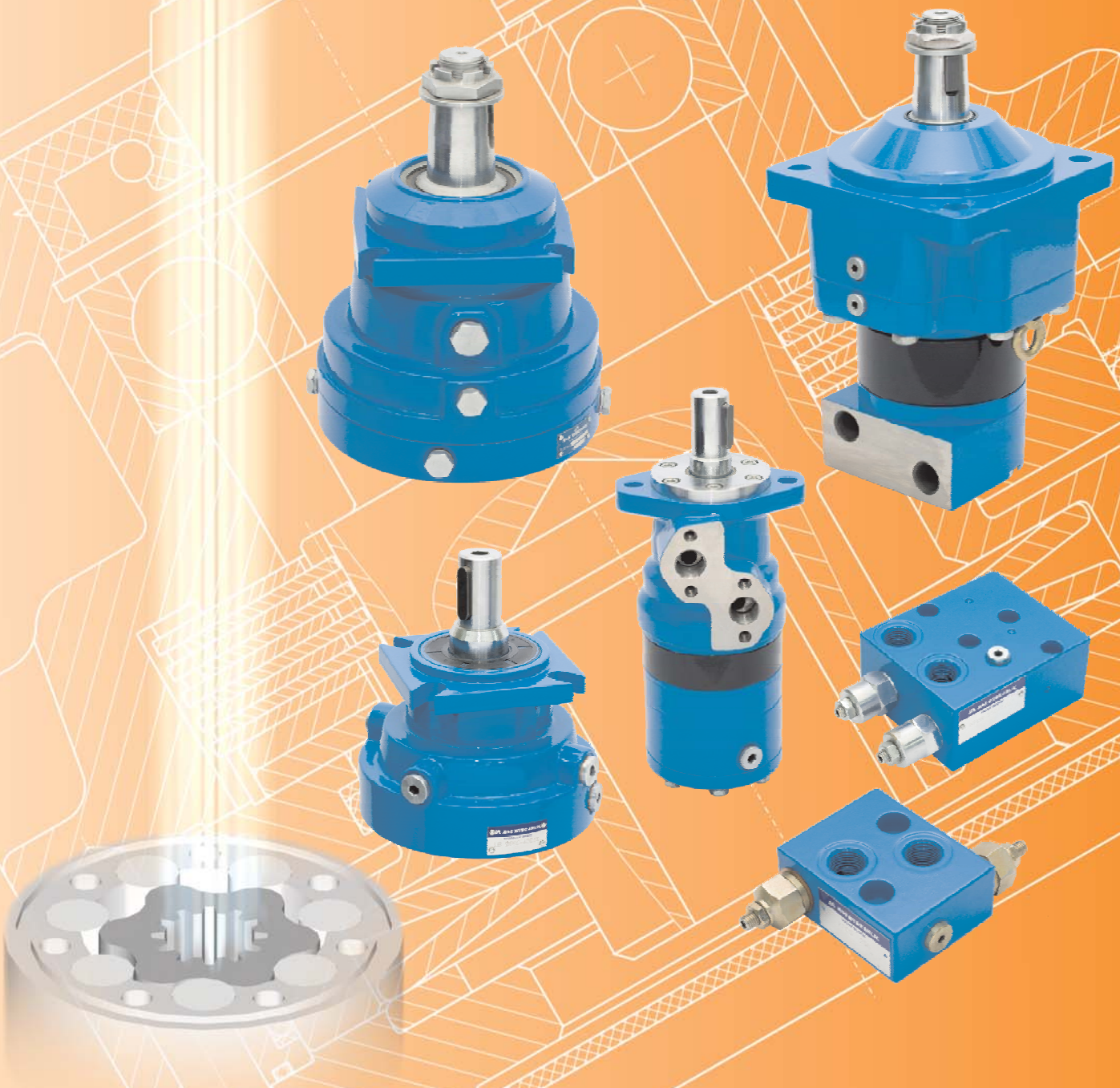
HYDRAULIC BRAKES
MOTOR-BRAKES &
VALVE BLOCKS



ACCESSORIES and MOTOR-BRAKES

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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

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

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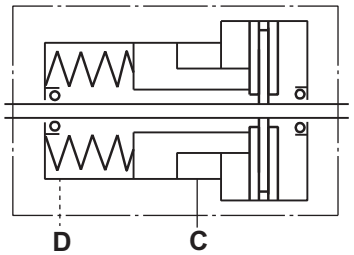
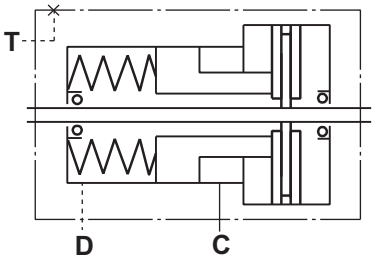
LB, LBS

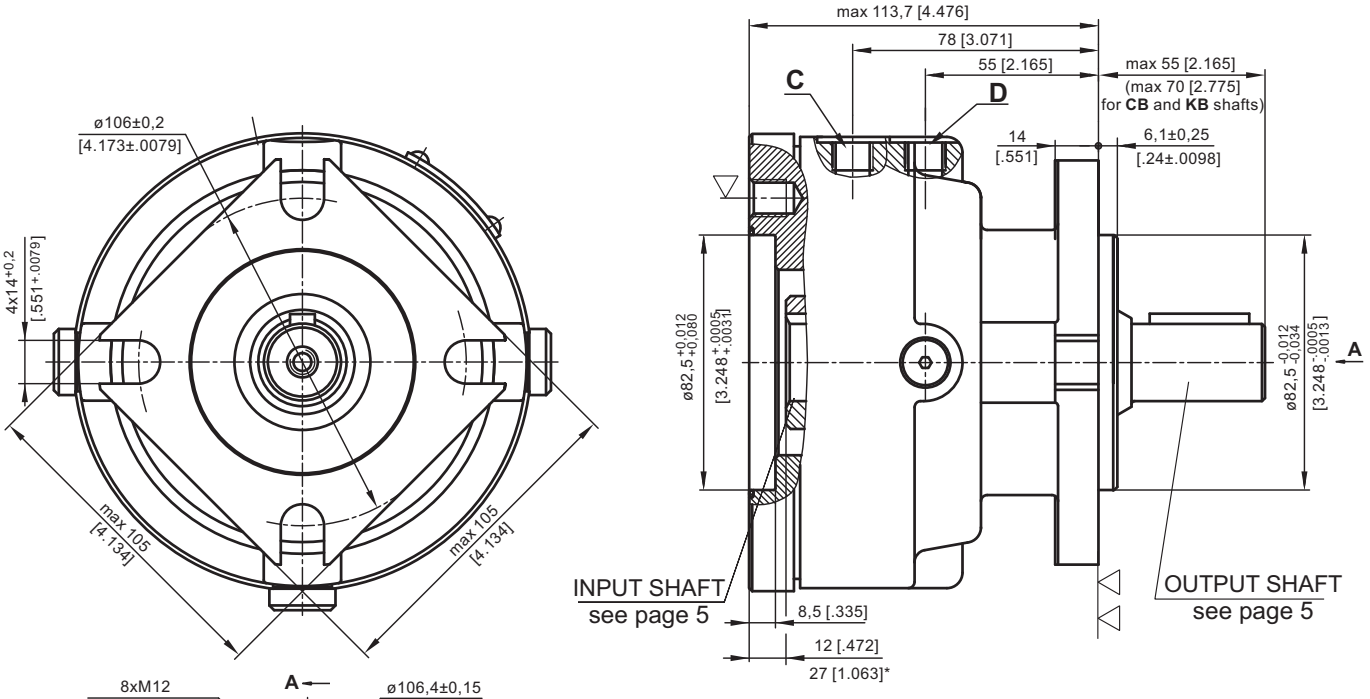


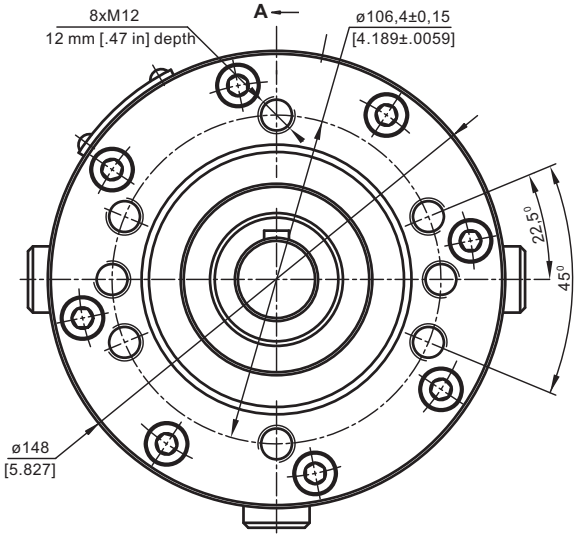
LBV



HYDRAULIC DISC BRAKE FOR FLANGE ATTACHMENT TO MP, MR AND MS HYDRAULIC MOTORS

TYPE LB/288





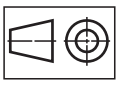
▽- Place for attachment (tightening torque for screw M12x30 - 8.8 DIN 912 - 7 daNm [620 in-lb])

▽▽- Place for attachment

C : Brake release Port - G¼, 9 mm [.35 in] depth

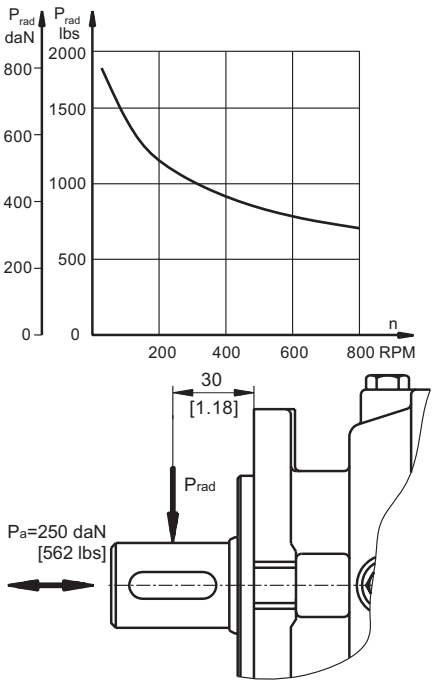
D : Drainage tap - G¼, 9 mm [.35 in] depth

* - For Input Shaft Hole Versions **SH** and **SB**.



mm [in]

LOAD CURVE



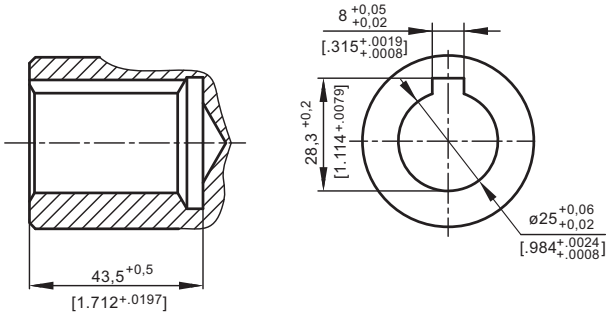
SPECIFICATION DATA

Description **LB/288...**	7	14	21	32	43	63
*Min. Static Torque, daNm [lb-in]	6-8 [531-708]	13-15 [1150-1327]	20-22 [1770-1947]	31-34 [2743-3009]	41-45 [3628-3982]	61-64 [5399-5665]
Opening Pressure, min bar [PSI]	4-8 [58-116]	9-16 [130-232]	12-13 [174-188]	18-20 [260-290]	24-26 [348-377]	38-39 [550-565]
max	300 [4350]					
Min. oil quantity for brake releasing, cm^3 [in^3]	7 - 8 [.427 - .488]					
Oil volume cm^3 [in^3]	50 - 120 [3.5 - 7.35]					
Max. Pressure in drain space, bar [PSI]	0,5 [7.25]					
Weight, kg [lb]	9 [19.8]					

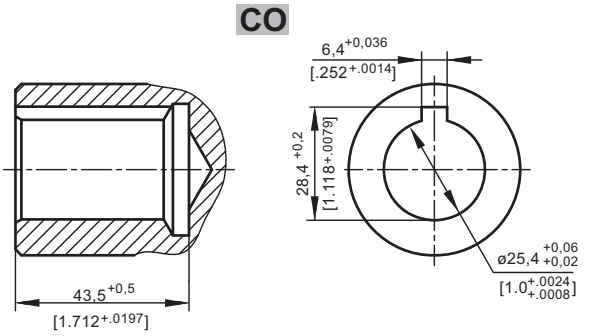
*Static torque is obtained at working pressure - 0 bar [0 PSI].

INPUT SHAFT HOLES

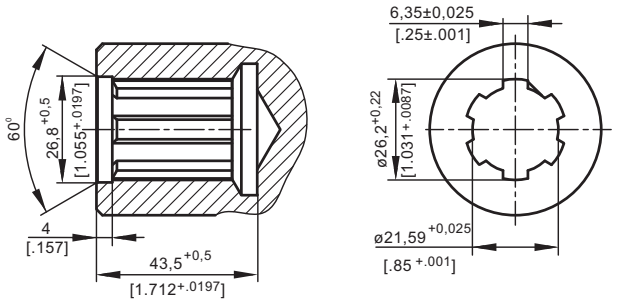
C



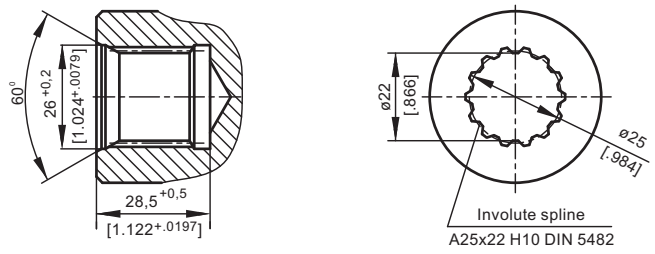
CO



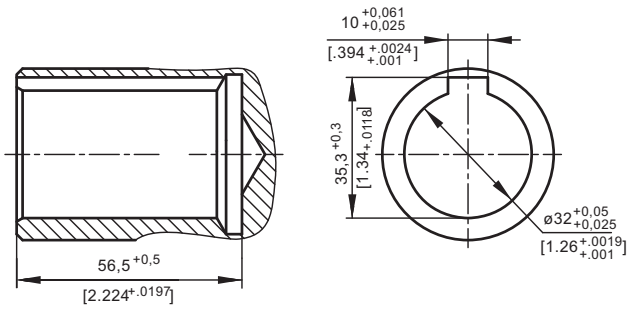
SH



SB



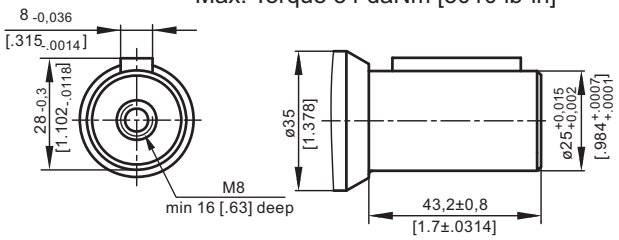
CB



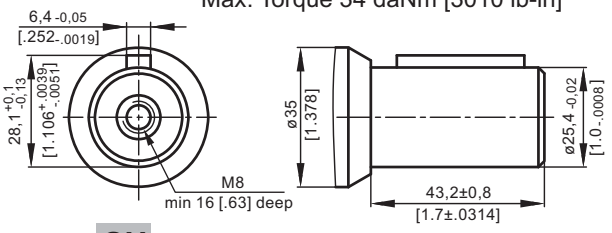
mm [in]

OUTPUT SHAFT EXTENSIONS

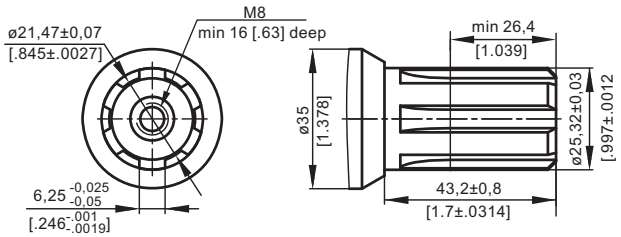
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 34 daNm [3010 lb-in]



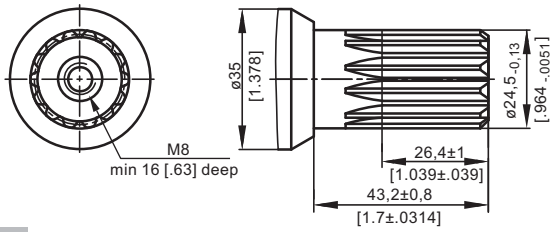
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 34 daNm [3010 lb-in]



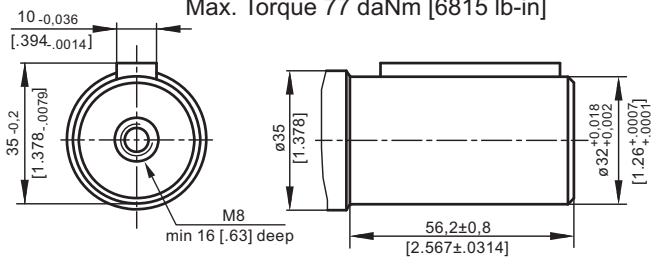
SH - splined, BS 2059 (SAE 6B)
Max. Torque 40 daNm [3540 lb-in]



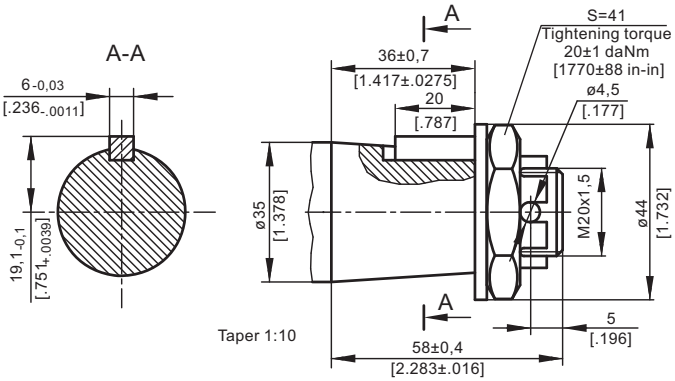
SA - splined, B25x22h9 DIN 5482
Max. Torque 40 daNm [3540 lb-in]



CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm [6815 lb-in]

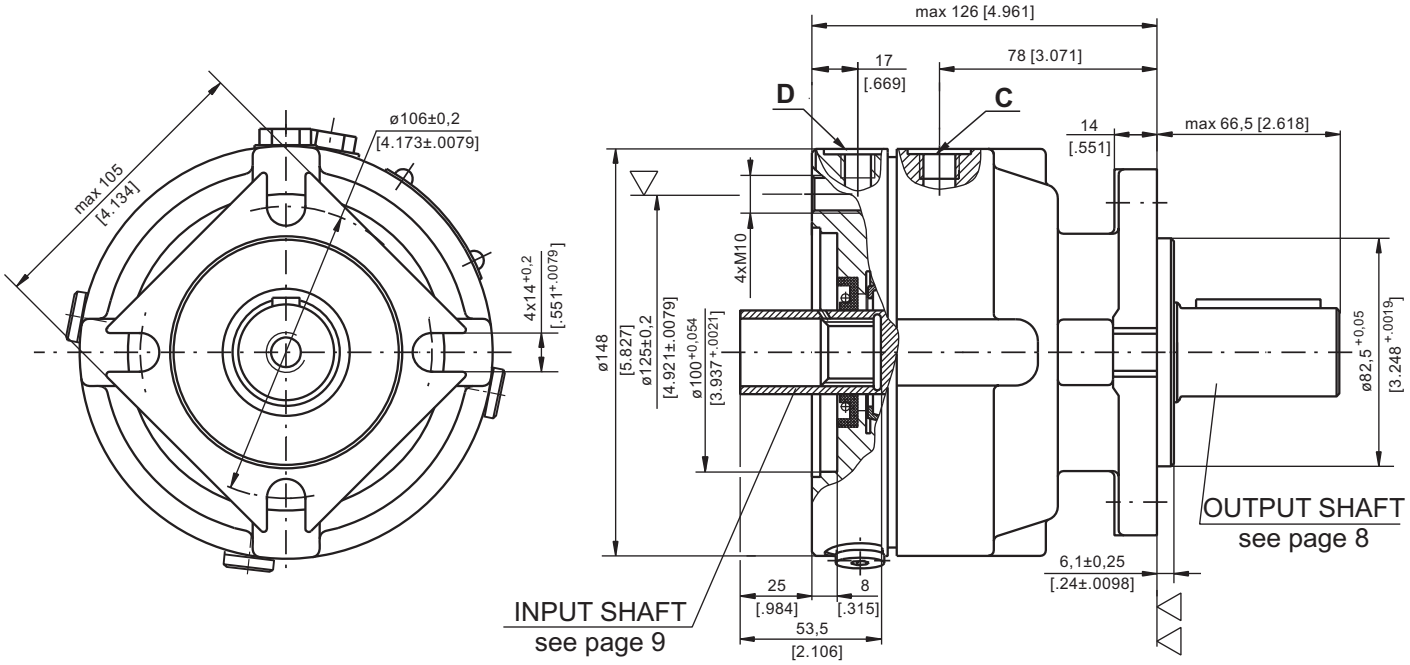


KB - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 95 daNm [8400 lb-in]



HYDRAULIC DISC BRAKE FOR FLANGE ATTACHMENT TO MSS AND MSV HYDRAULIC MOTORS

TYPE LBS/289

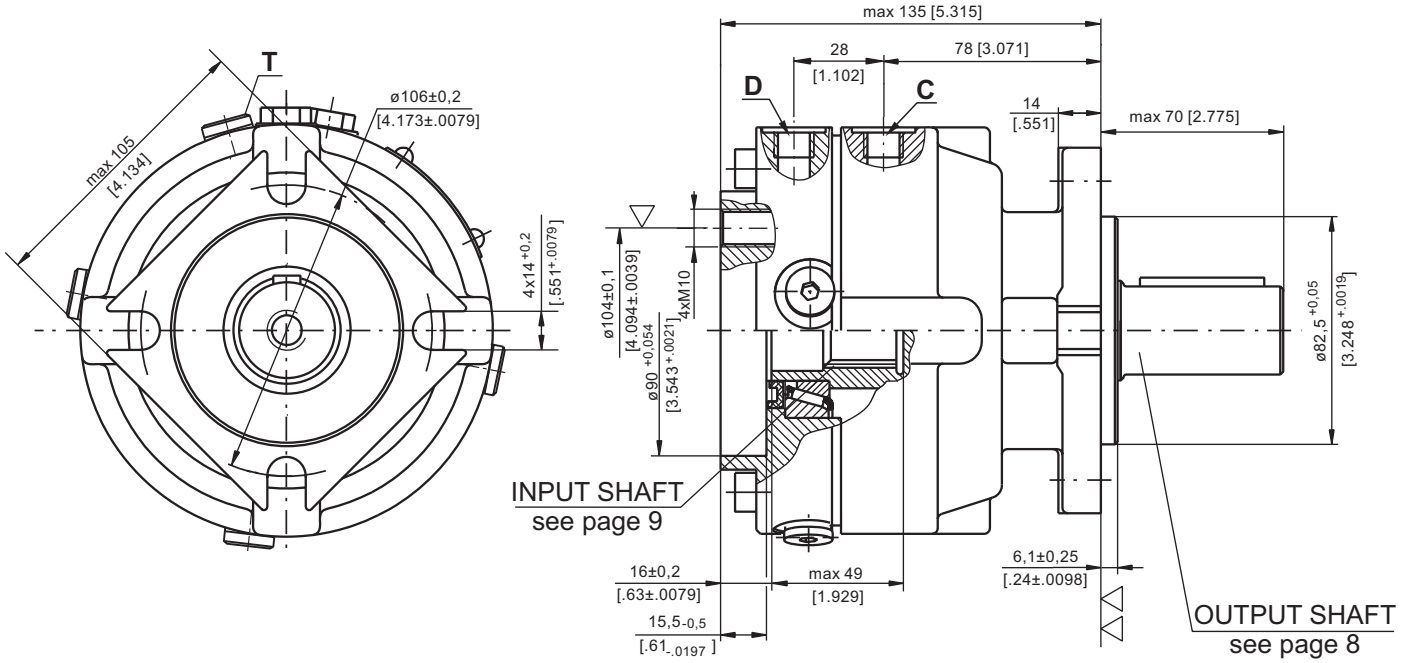


▽ - Place for attachment
(tightening torque for screw M10x35 - 8.8 DIN 912 - 5 daNm [440 lb-in])

▽▽ - Place for attachment

mm [in]

TYPE LBV/289



▽ - Place for attachment
(tightening torque for screw M10 - 8.8 DIN 912 - 5 daNm [440 lb-in])

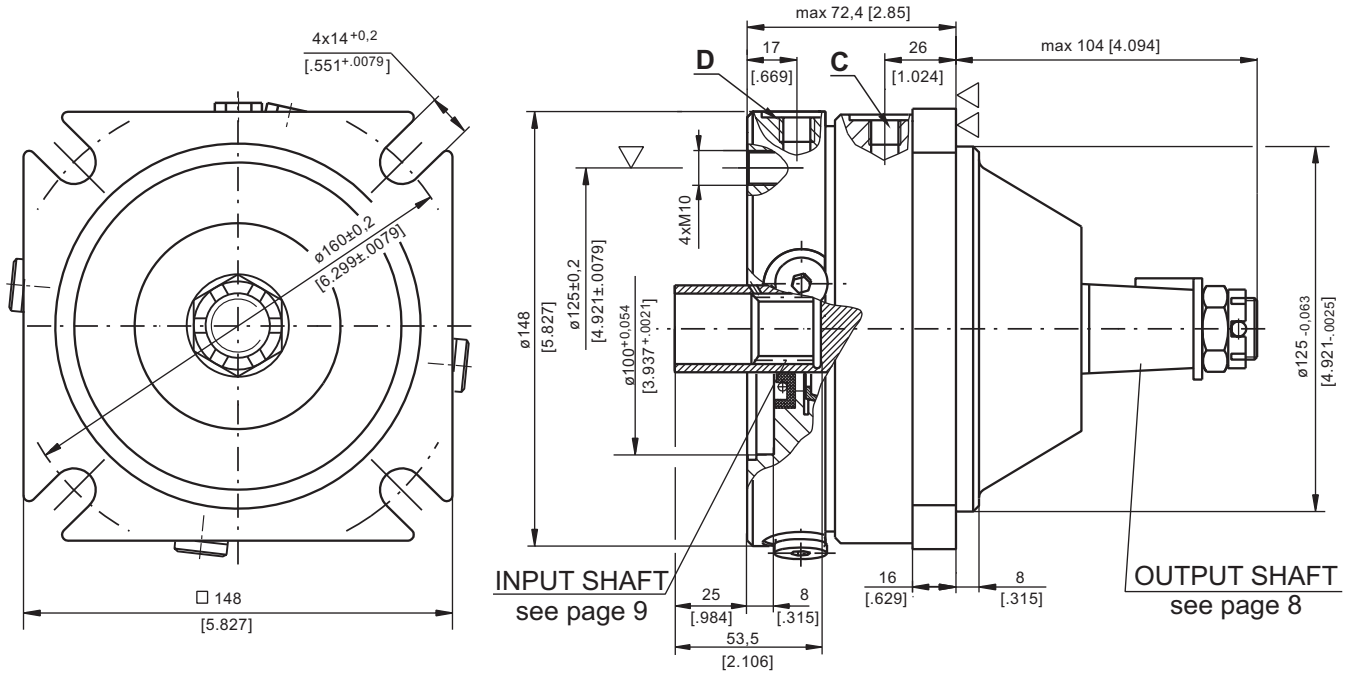
▽▽ - Place for attachment

C : Brake release Port - G¼, 9 mm [.35 in] depth

D, T: Drainage tap - G¼, 9 mm [.35 in] depth

HYDRAULIC DISC BRAKE FOR FLANGE ATTACHMENT TO MSS AND MSV HYDRAULIC MOTORS

TYPE LBS/290

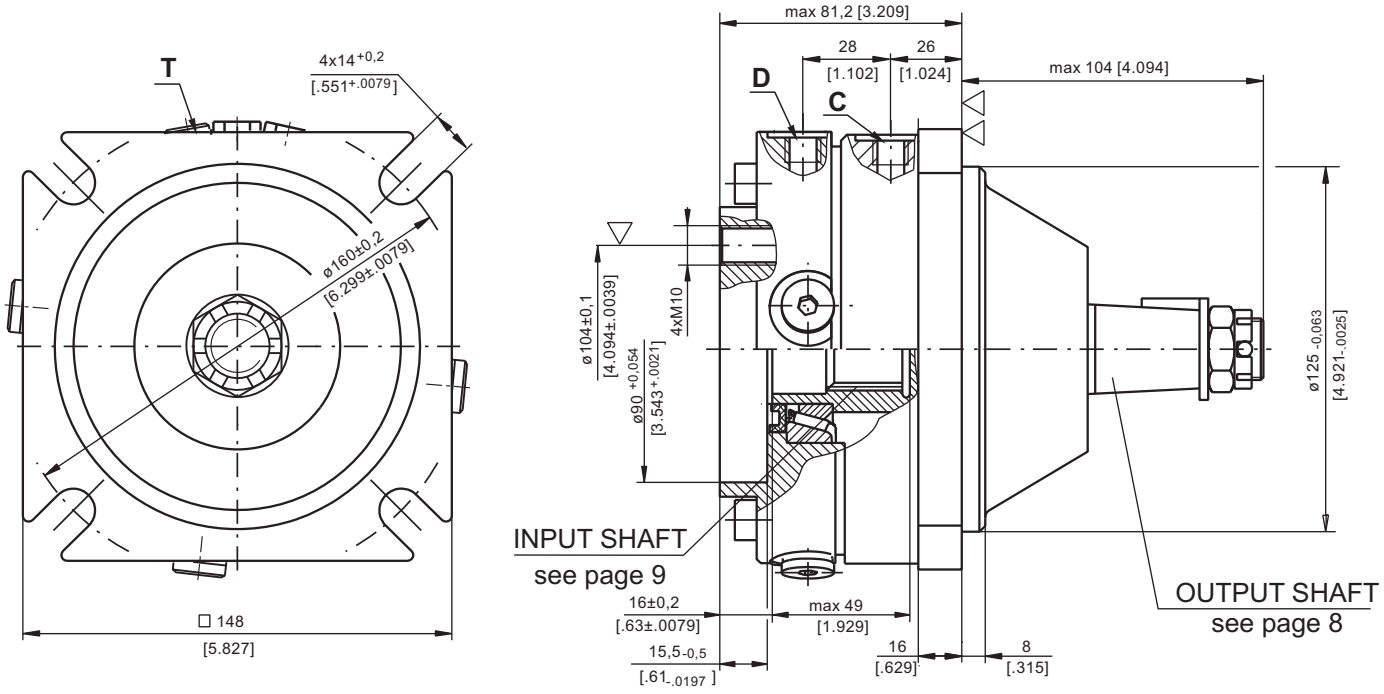


▽ - Place for attachment
(tightening torque for screw M10x35 - 8.8 DIN 912 - 5 daNm [440 lb-in])

▽▽ - Place for attachment

mm [in]

TYPE LBV/290



▽ - Place for attachment
(tightening torque for screw M10 - 8.8 DIN 912
- 5 daNm [440 lb-in])

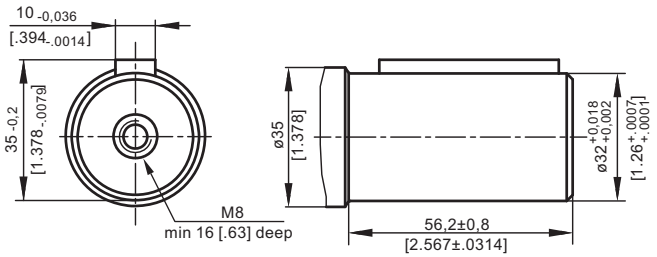
▽▽ - Place for attachment

C : Brake release Port - G¼, 9 mm [.35 in] depth

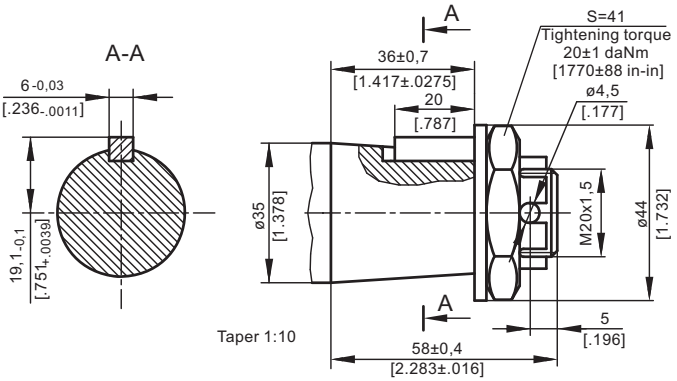
D, T: Drainage tap - G¼, 9 mm [.35 in] depth

OUTPUT SHAFT EXTENSIONS

CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm [6815 lb-in]



KB - tapered 1:10, Parallel key B6x6x20 DIN 6885
Max. Torque 95 daNm [8400 lb-in]



mm [in]

SPECIFICATION DATA

Description **LBS/289(290) LBV/289(290)**		21	32	43	63
*Min. Static Torque, daNm [lb-in]		20-22 [1770-1947]	31-34 [2743-3009]	41-45 [3628-3982]	61-64 [5399-5665]
Opening Pressure bar [PSI]	min	12-13 [174-188]	18-20 [260-290]	24-26 [348-377]	38-39 [550-565]
	max	300 [4350]			
Min. oil quantity for brake releasing	cm^3 [in^3]	7 - 8 [.427 - .488]			
Oil volume	cm^3 [in^3]	50 - 120 [3.05 - 7.35]			
Max. Pressure in drain space	bar [PSI]	5 [72]			
Weight	kg [lb]	9 [19.8]			

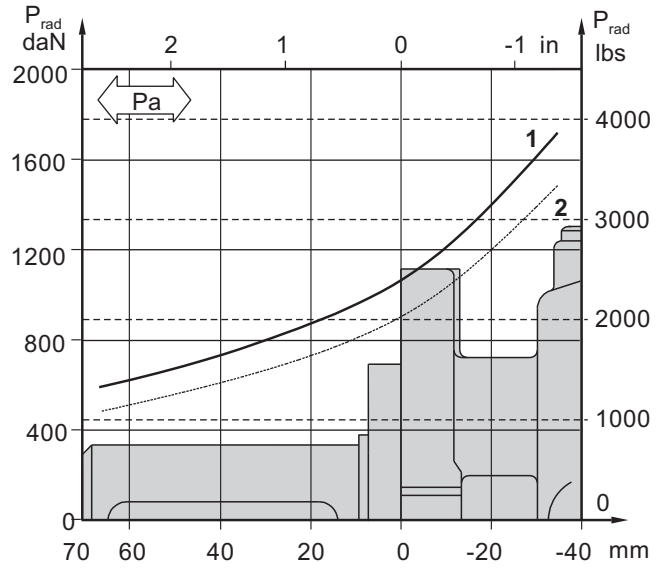
*Static torque is obtained at working pressure - 0 bar [0 PSI].

LOAD CURVE

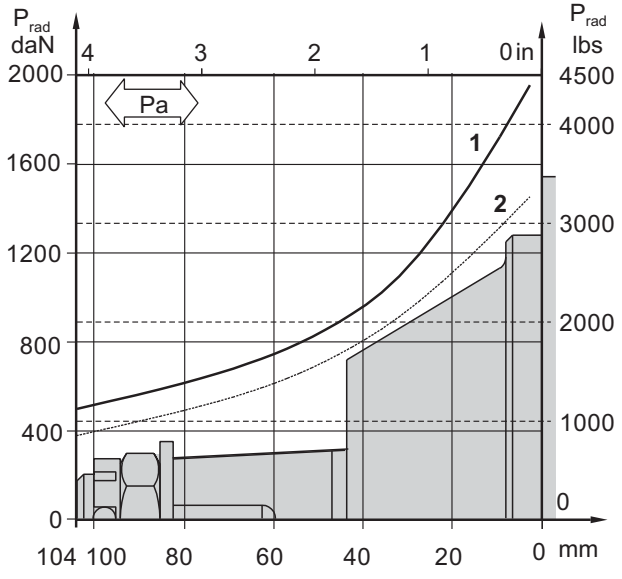
The curve applies to a B10 bearing life of 3000 hours at 200 RPM.

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

LBS(V)/289



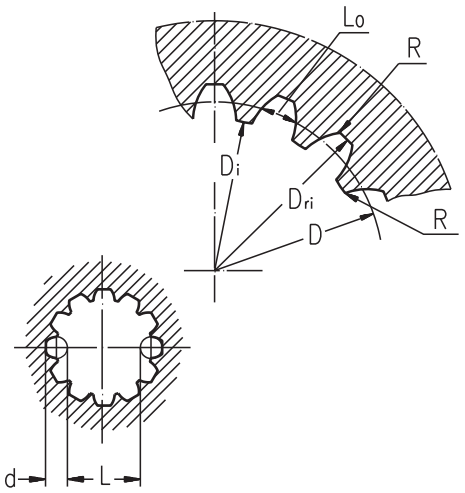
LBS(V)/290



INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANS B92.1-1970, class 5
[m=2.1166]

Fillet Root Side Fit		LBS(V)/289 LBS(V)/290		LBS(V)/314 LBS(V)/315	
		mm	inch	mm	inch
Number of Teeth	z	12	12	16	16
Diametral Pitch	DP	12/24	12/24	12/24	12/24
Pressure Angle		30°	30°	30°	30°
Pitch Dia.	D	25,4	1	33,8656	1.3333
Major Dia.	Dri	$28,0_{-0,1}$	1.1 ÷ 1.098	$38,4^{+0,4}$	1.5118÷1.5275
Minor Dia.	Di	$23,0^{+0,033}$	.907 ÷ .905	$32,15^{+0,06}$	1.2657÷1.2673
Space Width [Circular]	Lo	4,308±0,020	.1704 ÷ .1688	4,516±0,037	.1763÷.1791
Fillet Radius	R	0,2	.008	0,5	.02
Max. Measurement between Pins	L	$17,62^{+0,15}$	.699 ÷ .694	$26,9^{+0,10}$	1.063÷1.059
Pin Dia.	d	4,835±0,001	.19039÷.19031	4,835±0,001	.19026÷.19034
Corrected	x.m	+0,8	+.031	+1,0	+.039



ORDER CODE - LB/288

	1		2	3	4	5
LB/288		-				

Pos.1 - Input Shaft Hole

C, CO, SH, CB, SB

Pos.2 - Static Torque code (See Specification data)

7, 14, 21, 32, 43, 63

Pos.3 - Output Shaft Extensions*

C	- ø25 straight, Parallel key A8x7x32 DIN 6885
CO	- ø1" straight, Parallel key ¼"x¼"x1¼" BS46
SH	- ø25,32 splined BS 2059 (SAE 6B)
SA	- ø24,5 splined B25x22 DIN 5482
CB	- ø32 straight, Parallel key A10x8x45 DIN 6885
KB	- ø35 tapered 1:10, Parallel key B6x6x20 DIN6885

Pos.4 - Option (Paint)**

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos.5 - Design Series

omit - Factory specified

ORDER CODE - LBS, LBV

	1		2		3	4	5	6
LB		/		-				

Pos.1 - Type

S	- Disc Brake for short motor S- MSS
V	- Disc Brake for very short motor V- MSV

Pos.2 - Design code

289	- for MSS and MSV Motors
290	- for MSS and MSV Motors (Wheel Mount)

Pos.3 - Static Torque code (See Specification data)

21, 32, 43, 63

Pos.4 - Output Shaft Extensions*

CB	- ø32 straight, Parallel key A10x8x45 DIN 6885
KB	- ø35 tapered 1:10, Parallel key B6x6x20 DIN6885

Pos.5 - Option (Paint)**

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos.6 - Design Series

omit - Factory specified

NOTES:

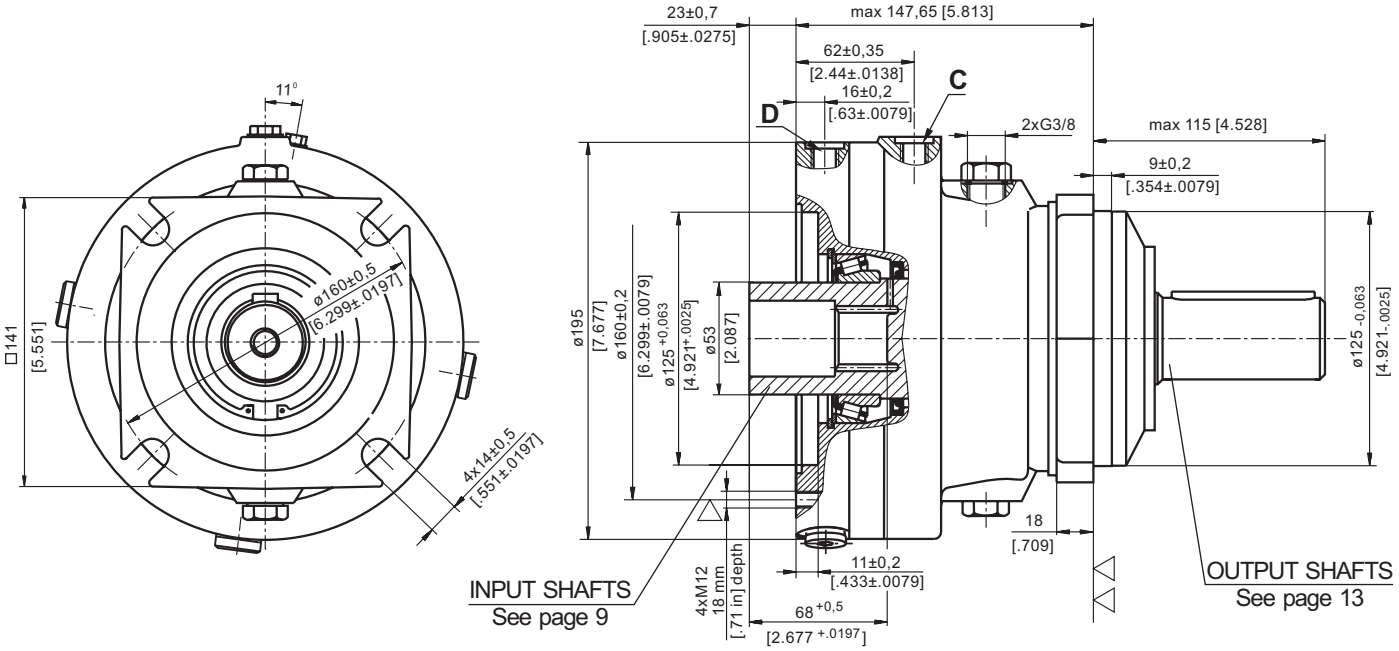
* The permissible output torque for shafts must not be exceeded! For Max. Torque values see data on page 5 and 8.
** The color is by customer's request.

The Disc Brakes are mangano-phosphatized as standard.

ATTENTION:
1. Hydraulic brake is delivered without oil (it is lubricated only).
2. In all brakes, friction discs and separators should be lubricated. Space is filled with 50 ÷ 120 cm^3 [3.05÷7.32 in^3] mineral oil HLP (DIN 51524) or HM (ISO 6743/4). For LB/288 fill oil after hydraulic motor assembly.

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO MTS AND MTV HYDRAULIC MOTORS

TYPE LBS/314



▽ - Place for attachment
(tightening torque for screw M12x30- 8.8 DIN 912,
7 daNm [620 lb-in])

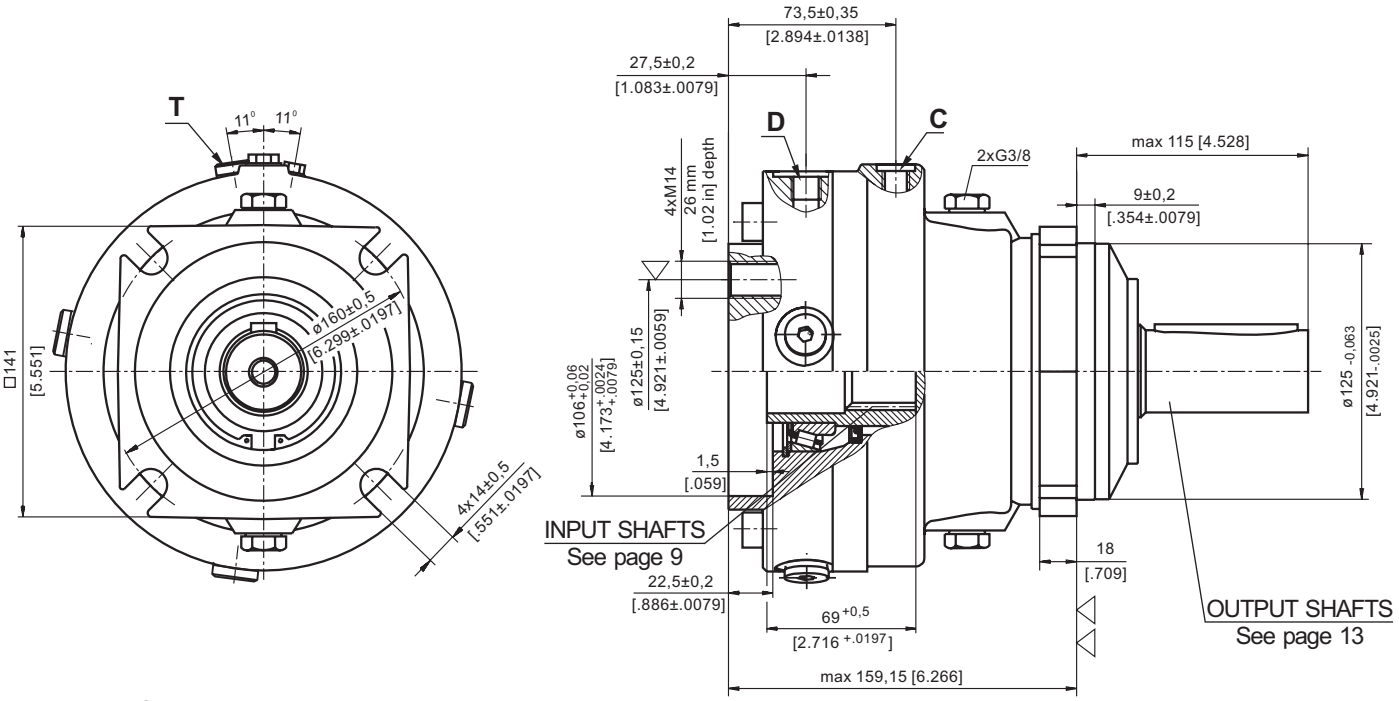
▽▽- Place for attachment

C : Brake release Port - G¼, 12 mm [.47 in] depth

D : Drainage tap - G¼, 12 mm [.47 in] depth

mm [in]

TYPE LBV/314



▽- Place for attachment
(tightening torque for screw M14 - 8.8 DIN 912,
11,5 da Nm [1020 lb-in])

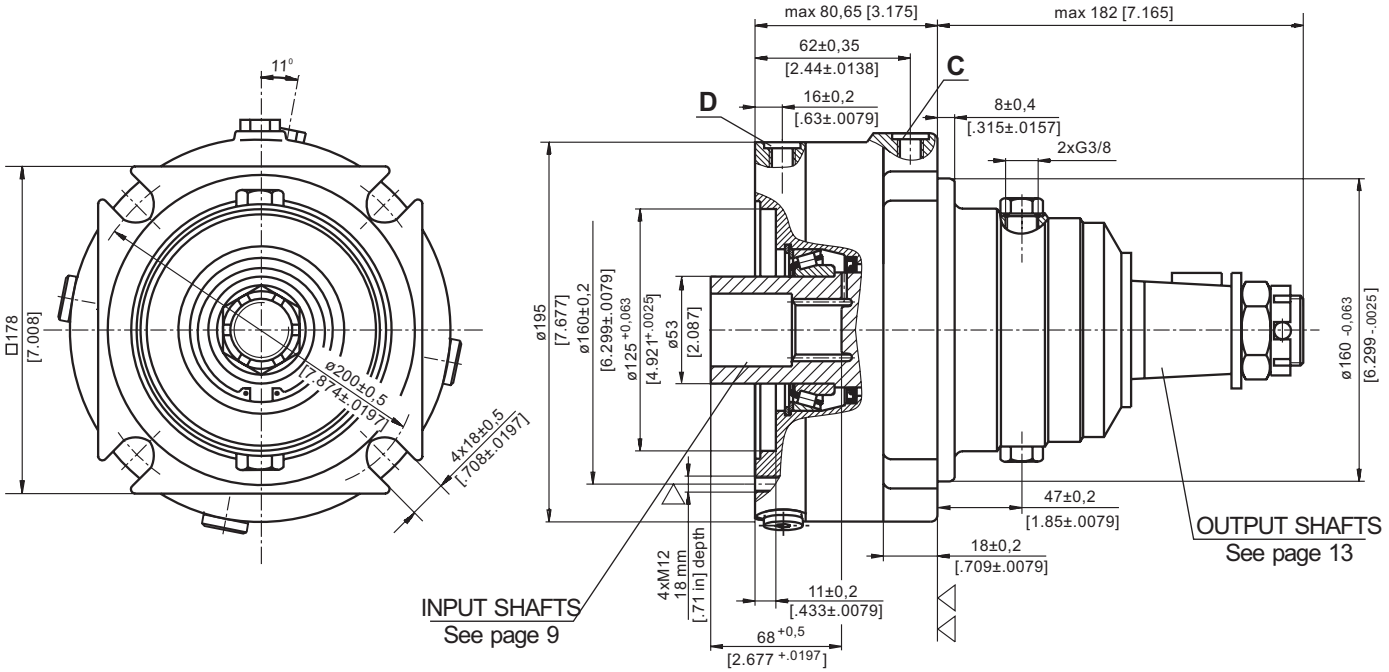
▽▽- Place for attachment

C : Brake release Port - G¼, 12 mm [.47 in] depth

D,T : Drainage tap - G¼, 12 mm [.47 in] depth

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO MTS AND MTV HYDRAULIC MOTORS

TYPE LBS/315



▽ - Place for attachment
(tightening torque for screw M12x30- 8.8 DIN 912, 7 daNm [620 lb-in])

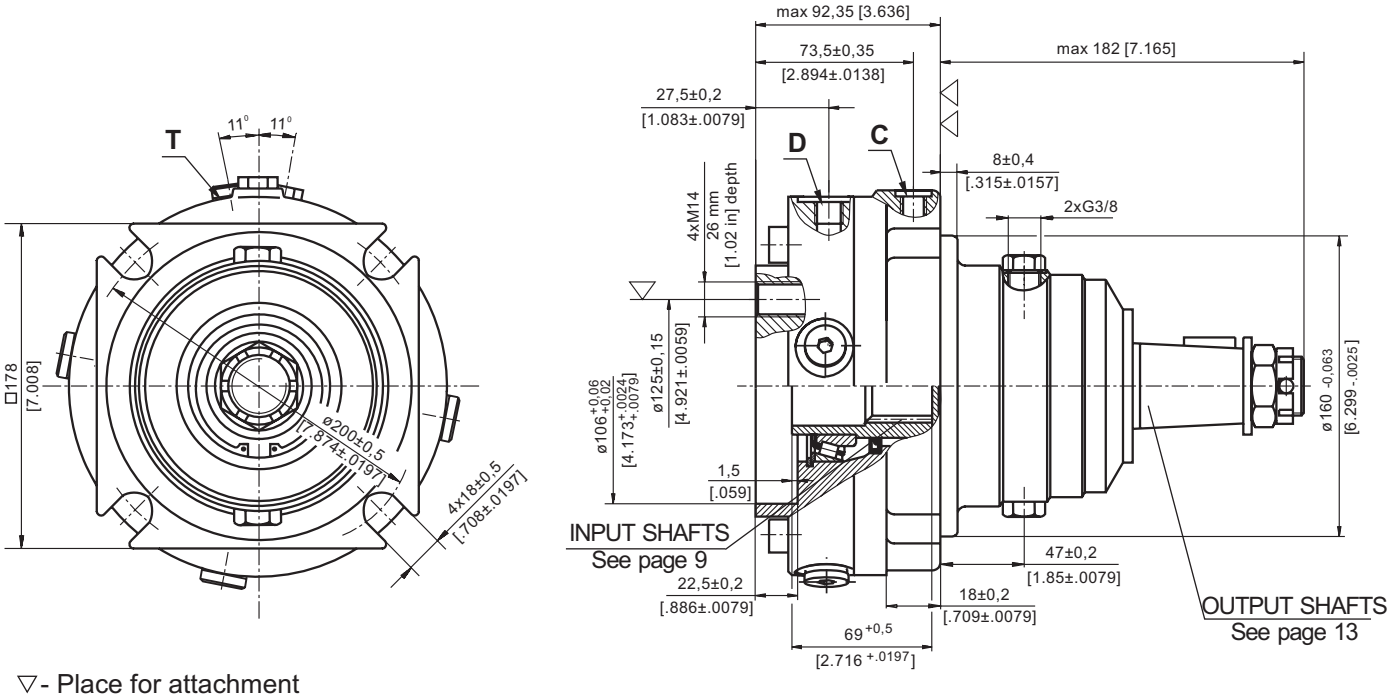
▽▽- Place for attachment

C : Brake release Port - G¼, 12 mm [.47 in] depth

D : Drainage tap - G¼, 12 mm [.47 in] depth

mm [in]

TYPE LBV/315



▽- Place for attachment
(tightening torque for screw M14 - 8.8 DIN 912, 11,5 da Nm [1020 lb-in])

▽▽- Place for attachment

C : Brake release Port - G¼, 12 mm [.47 in] depth

D,T : Drainage tap - G¼, 12 mm [.47 in] depth

SPECIFICATION DATA

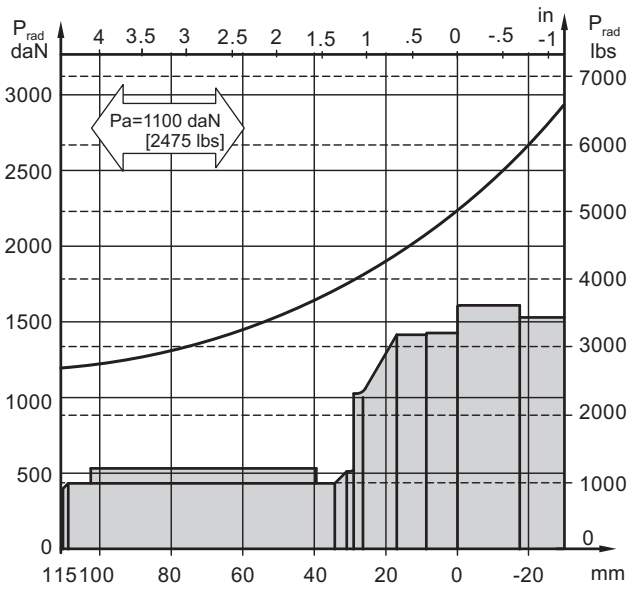
Description **LBS/314,315**	**21**	**29**	**43**	**65**	**85**	**110**	**130**
*Min. Static Torque, daNm [lb-in]	18-23 [1593-2036]	28-33 [2478-2921]	42-46 [3717-4071]	61-70 [5399-6196]	83-92 [7346-8143]	108-118 [9559-10444]	126-136 [11152-12037]
Opening Pressure min** bar [PSI]	4-5 [58-72]	6-7 [87-101]	9-10 [130-145]	13-15 [188-217]	18-20 [261-290]	23-25 [333-362]	27-29 [391-420]
max	300 [4350]						
Min. oil quantity for brake releasing cm³ [in³]	8- 9 [.488-.549]						
Oil volume cm³ [in³]	250						
Max. Pressure in drain space bar [PSI]	5 [72]						
Weight for .../314 kg [lb] .../315	24 [52.9 25 [55.1]						

*Static torque is obtained at working pressure - 0 bar.

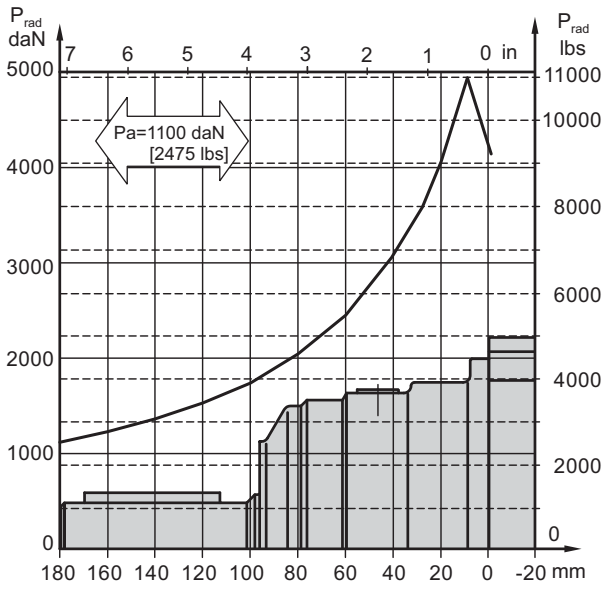
**The indicated value is a difference between the inlet pressure for driving of the brake and the drain pressure.
Brakes must always have a drain line

LOAD CURVE

LBS(V) ... /314

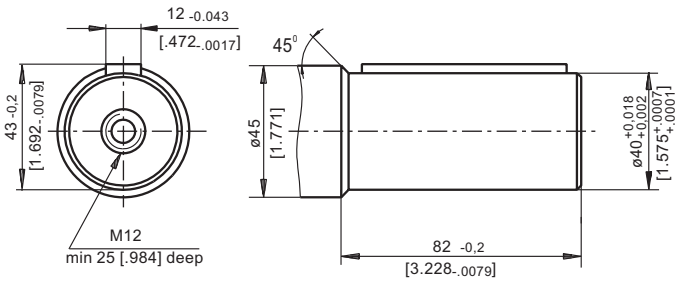


LBS(V) ... /315

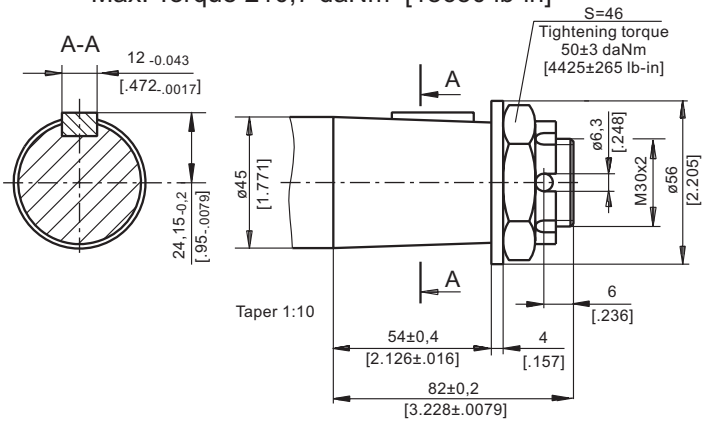


OUTPUT SHAFT EXTENSIONS

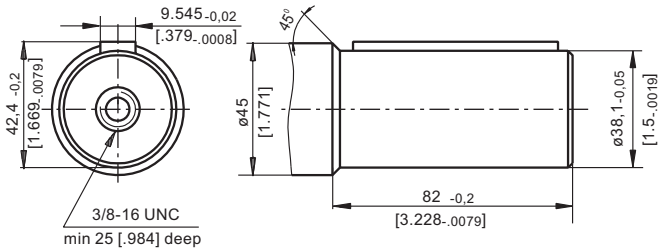
C -ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 132,8 daNm [11755 ln-in]



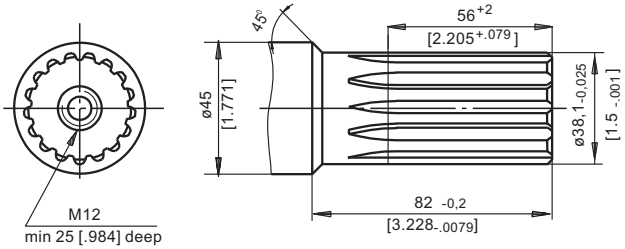
K -tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210,7 daNm [18650 lb-in]



CO-ø1½" straight, Parallel key ⅜"x ⅜"x 2¼" BS46
Max. Torque 132,8 daNm [11755 ln-in]



SH -ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 132,8 daNm [11755 ln-in]



mm [in]

ORDER CODE

1	2	3	4	5	6
LB		/		-				

Pos.1 - **Type**

S	- Disc Brake for short motor **S** - MTS
V	- Disc Brake for very short motor **V** - MTV

Pos.2 - **Design code**

314	- for MTS and MTV Motors
315	- for MTS and MTV Motors (Wheel Mount)

Pos.3 - **Static Torque code** (See Specification data)

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

Pos. 4 - **Output Shaft Extensions***

C	- ø40 straight, Parallel key A12x8x70 DIN 6885
CO	- ø1½" straight, Parallel key $^3/_8$"x$^3/_8$"x2$^1/_4$" BS46
SH	- ø1½" splined 17T, ANSI B92.1-1976
K	- ø45 tapered 1:10, Parallel key B12x8x28 DIN6885

Pos. 5 - **Option** (Paint)**

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

Pos. 6 - **Design Series**

omit - Factory specified

NOTES:

* The permissible output torque for shafts must not be exceeded!

** The color is by customer's request.

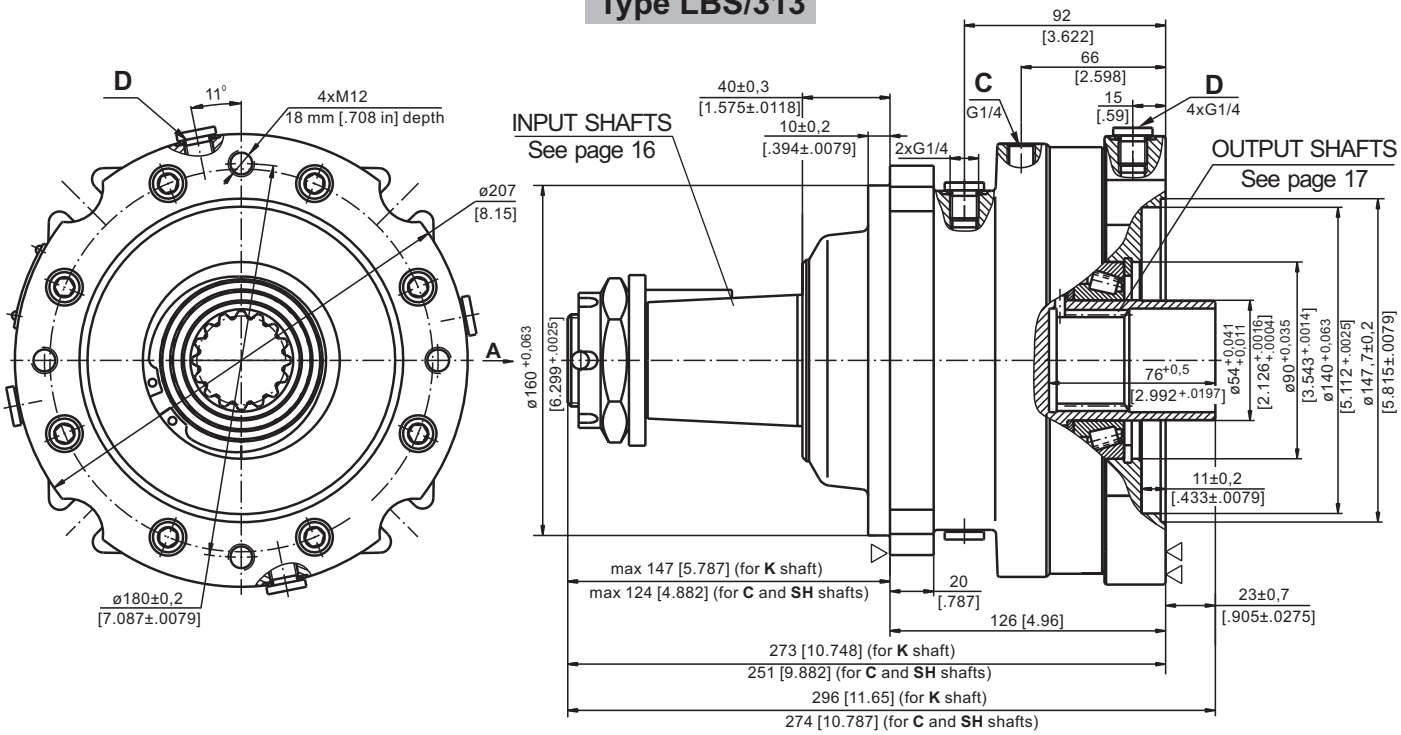
The Disc Brakes are mangano-phosphatized as standard.

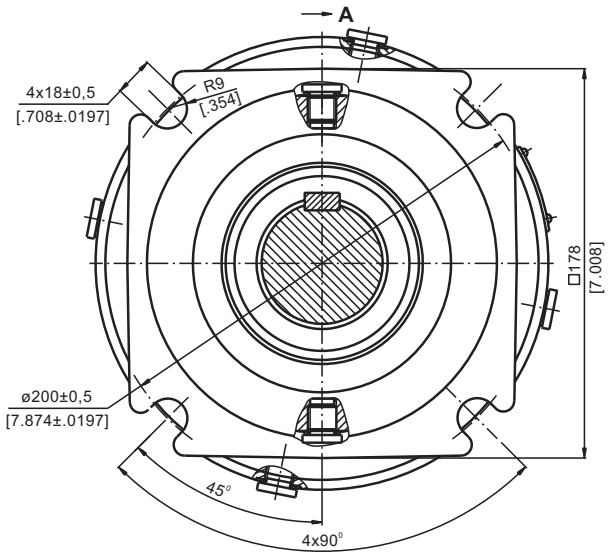
ATTENTION:

1. Hydraulic brake is delivered without oil (it is lubricated only).
2. In all brakes, friction discs and separators should be lubricated. Space is filled with 150÷300 cm^3 [9.15÷18.3 in^3] mineral oil HLP (DIN 51524) or HM (ISO 6743/4).

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO MVS HYDRAULIC MOTORS

Type LBS/313





C : Brake release Port - G¼, 12 mm [.47 in] depth

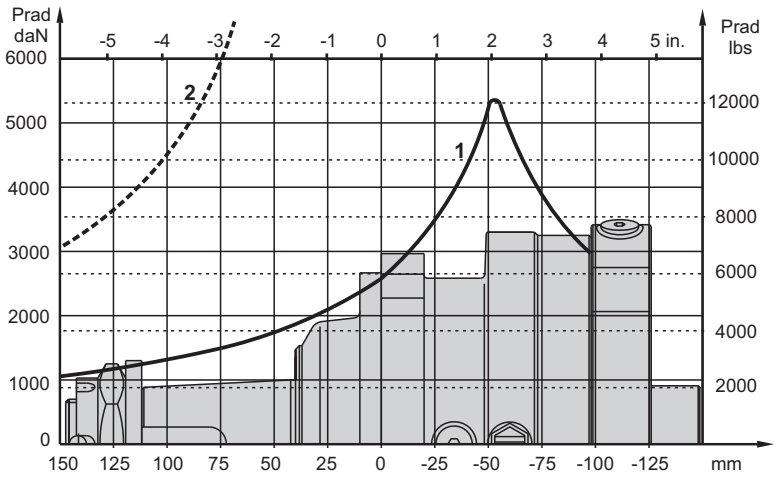
D : Drainage tap - G¼, 12 mm [.47 in] depth

▽- Place for attachment

▽▽- Place for attachment
(tightening torque for screw M12x35 - 8.8 DIN 912, 7 daNm [620 lb-in])

mm [in]

PERMISSIBLE SHAFT LOADS

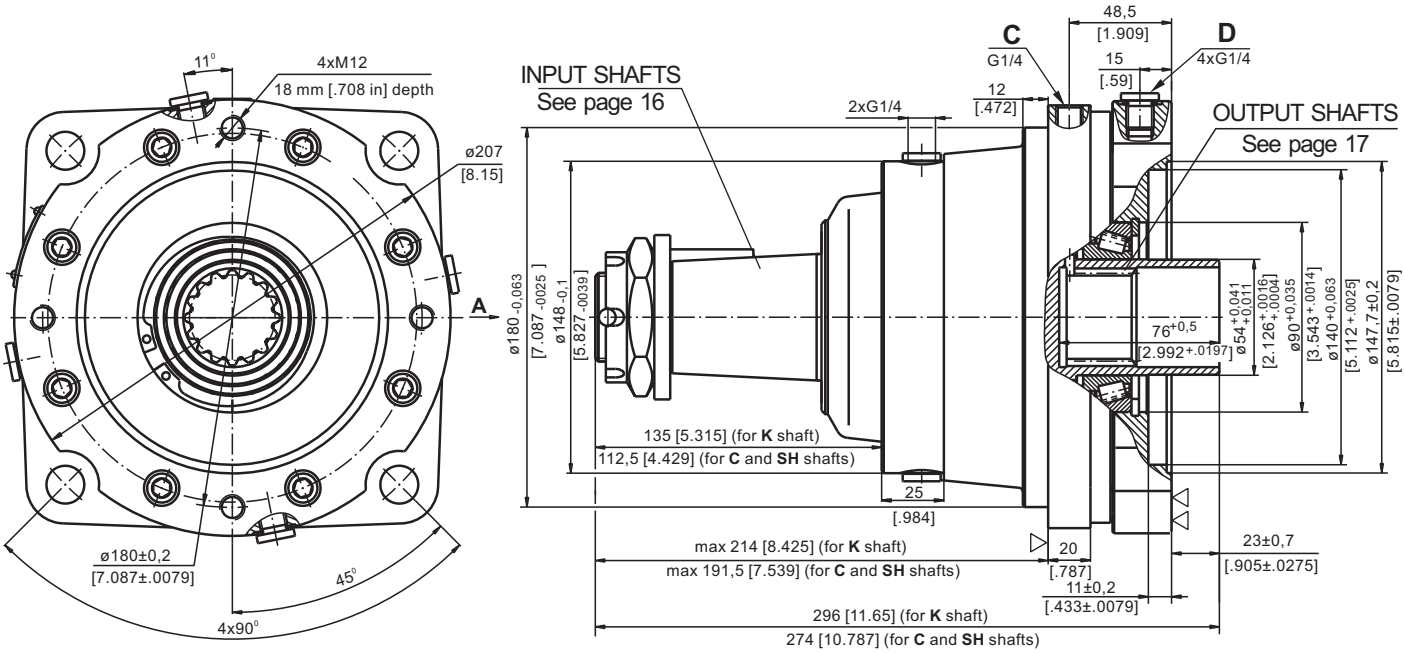


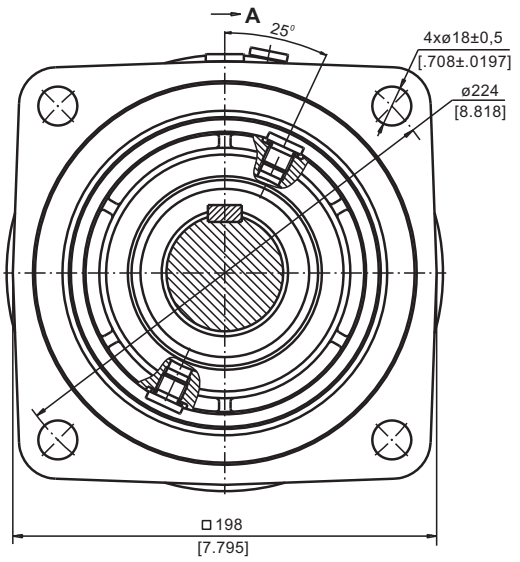
1 - Bearing curve: The curve applies to a B10 bearing life of 3000 hours at 200 RPM.

2 - Shaft curve: The curve represents Max. permissible radial shaft load with safety factor 3:1.

HYDRAULIC DISC BRAKES
FOR FLANGE ATTACHMENT TO MVS HYDRAULIC MOTORS

Type LBS/316





C : Brake release Port - G¼, 12 mm [.47 in] depth

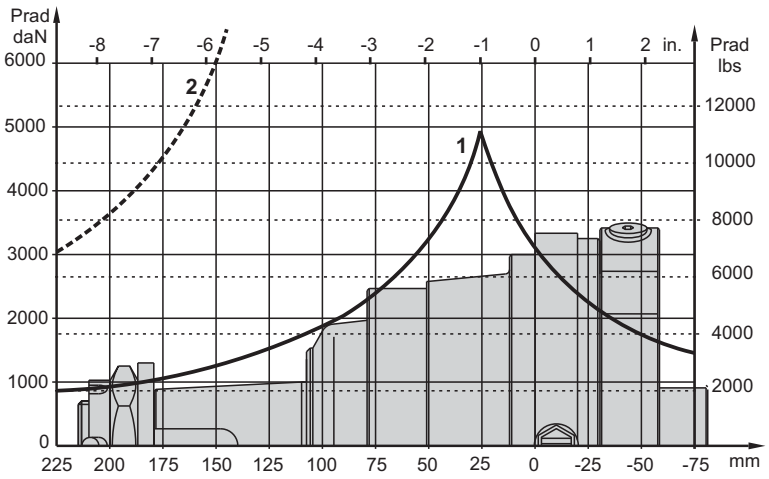
D : Drainage tap - G¼, 12 mm [.47 in] depth

▽- Place for attachment

▽▽- Place for attachment
(tightening torque for screw M12x35 - 8.8 DIN 912,
7 daNm [620 lb-in])

mm [in]

PERMISSIBLE SHAFT LOADS



1 - Bearing curve: The curve applies to a B10 bearing life of 3000 hours at 200 RPM.

2 - Shaft curve: The curve represents Max. permissible radial shaft load with safety factor 3:1.

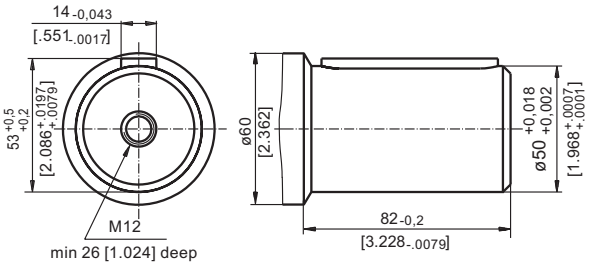
SPECIFICATION DATA

Description **LBS/313,316**	21	29	43	65	85	110	130
*Min. Static Torque, daNm [lb-in]	18-23 [1593-2036]	28-33 [2478-2921]	42-47 [3717-4160]	61-71 [5399-6285]	83-94 [7346-8320]	108-118 [9559-10444]	127-137 [11240-12125]
Opening Pressure min** bar [PSI]	4-5 [58-72]	6-7 [87-101]	9-10 [130-145]	13-15 [188-217]	18-20 [261-290]	23-25 [333-362]	27-29 [391-420]
max	300 [4350]						
Min. oil quantity for brake releasing cm^3 [in^3]	8 ÷ 9 [.488 ÷ .549]						
Oil volume cm^3 [in^3]	250 [15.25]						
Max. Pressure in drain space bar [PSI]	5 [72]						

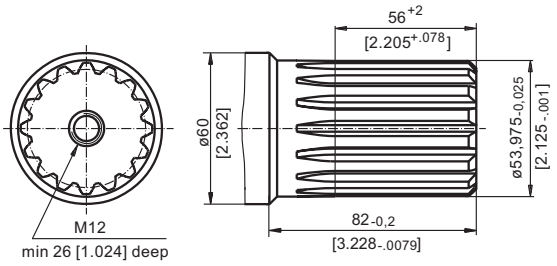
*Static torque is obtained at working pressure - 0 bar.
**The indicated value is a difference between the inlet pressure for driving of the brake and the drain pressure.
Brakes must always have a drain line

SHAFT EXTENSIONS

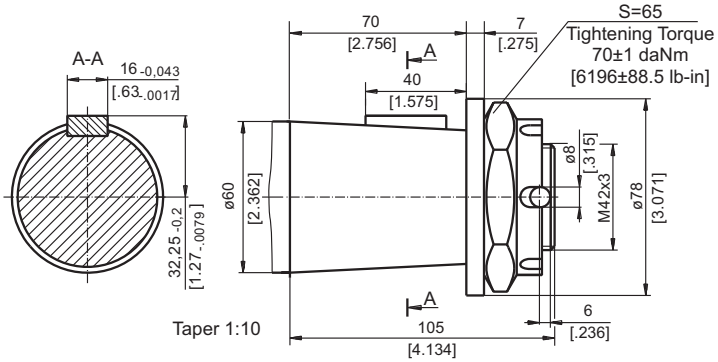
C - ø50 straight, Parallel key A14x9x70 DIN 6885



SH -ø2 1/8"splined, 16 DP 8/16 ANS B92.1-1976



K -tapered 1:10, Parallel key B16x10x32 DIN 6885

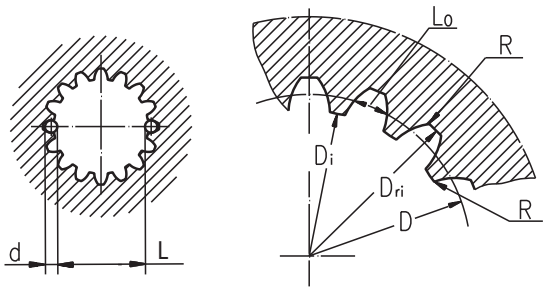


mm [in]

INTERNAL SPLINE DATA FOR THE ATTACHED COMPONENT

Standard ANS B92.1-1970, class 5
[m=2.54; corrected x.m=+1,0]

Fillet Root Side Fit		mm	inch
Number of Teeth	z	16	16
Diametral Pitch	DP	10/20	10/20
Pressure Angle		30^0	30^0
Pitch Dia.	D	40,640	1.6
Major Dia.	Dri	$45{,}2^{+0{,}4}$	1.796÷1.780
Minor Dia.	Di	$38{,}5^{+0{,}039}$	1.5175÷1.516
Space Width [Circular]	Lo	5,18±0,037	.2055÷.2025
Fillet Radius	R	0,4	.015
Max. Measurement between Pins	L	$32{,}47^{+0{,}15}$	1.284÷1.278
Pin Dia.	d	5,6±0,001	.22051÷.22043



Hardening Specification:
HV=750±50 on the surface.
HV=560 at 0,7±0,2 mm [.035±.019in] case depth
Material: 20 MoCr4 EN 10084 or better.

ORDER CODE

	1		2	3	4	5
LBS/		-				

Pos.1 - Designe code

313	- for MVS Motors
316	- for MVS Motors (Wheel mount)

Pos.2 - Static Torque code (See Specification data)

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

Pos.3 - Output Shaft Extensions*

C	- ø50 straight, Parallel key A14x9x70 DIN6885
SH	- ø2 1/8" splined, ANSI B92.1-1976
K	- ø60 tapered 1:10, Parallel key B16x10x32 DIN6885

Pos.4 - Option (Paint)**

omit - no Paint

P	- Painted
PC	- Corrosion Protected Paint

Pos.5 - Design Series

omit - Factory specified

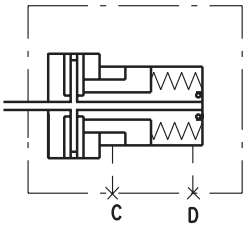
NOTES:

* The permissible output torque for shafts must be not exceeded!
** The color is by customer's request.

The Disc Brakes are mangano-phosphatized as standard.

ATTENTION:
1. Hydraulic brake is delivered without oil (it is lubricated only).
2. In all brakes, friction discs and separators should be lubricated. Space is filled with 150 ÷ 300 cm^3 [9.15 ÷ 18.3 in^3] mineral oil HLP (DIN 51524) or HM (ISO 6743/4).

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

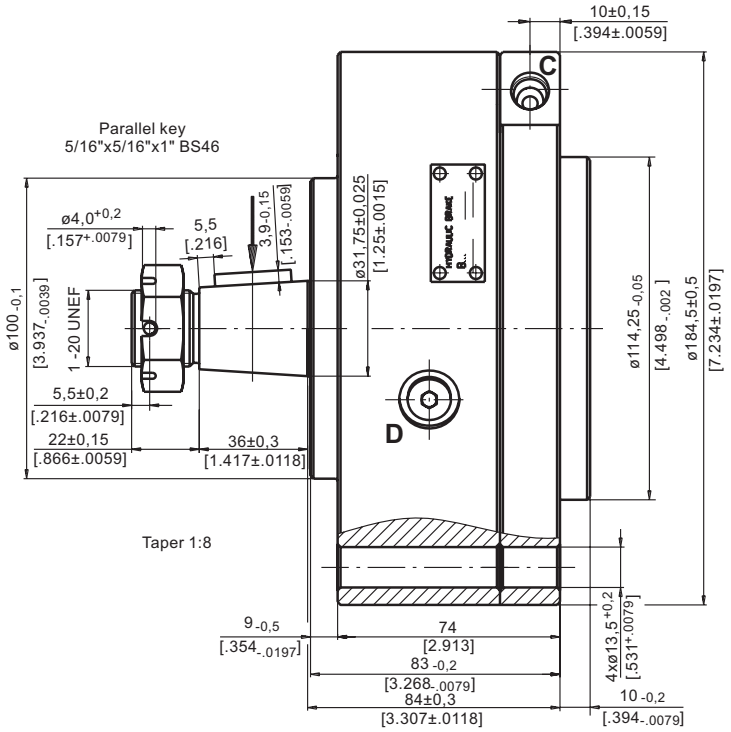
Type	B35R	B55R
Static Torque of Brake, daNm [lb-in]*	35 [3100]	55 [4870]
Initial Release Pressure, bar [PSI]	16 [232]	16 [232]
Full Release Pressure, bar [PSI]	19 [275]	19 [275]
Max. Operating Pressure, bar [PSI]	240 [3480]	240 [3480]
Max. Speed, RPM	90	90
Cont. Radial Shaft Load daN [lbs]**	500 [1125]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

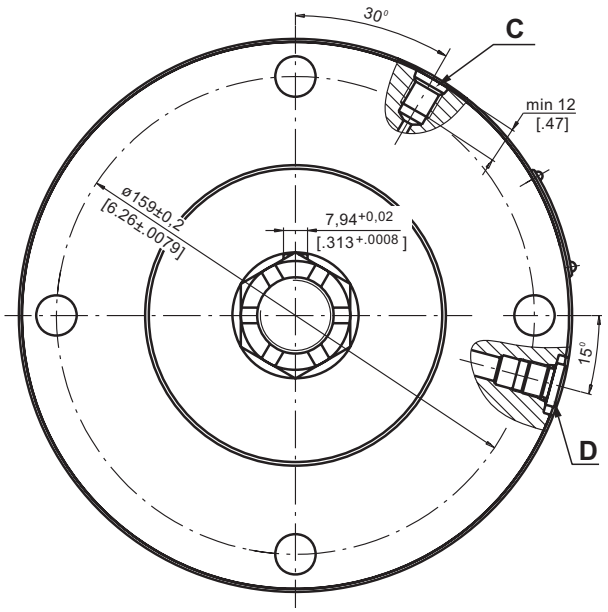
* At 0 bar [0 PSI] back pressure

** At radial shaft load of 500 daN [1125 lbs], 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

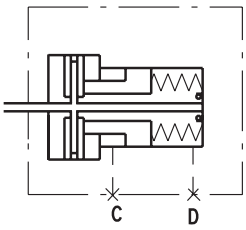
D : Drainage Tap - 7/16-20 UNF

mm [in]

HYDRAULIC DISC BRAKES B...T- Wet

B..T 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

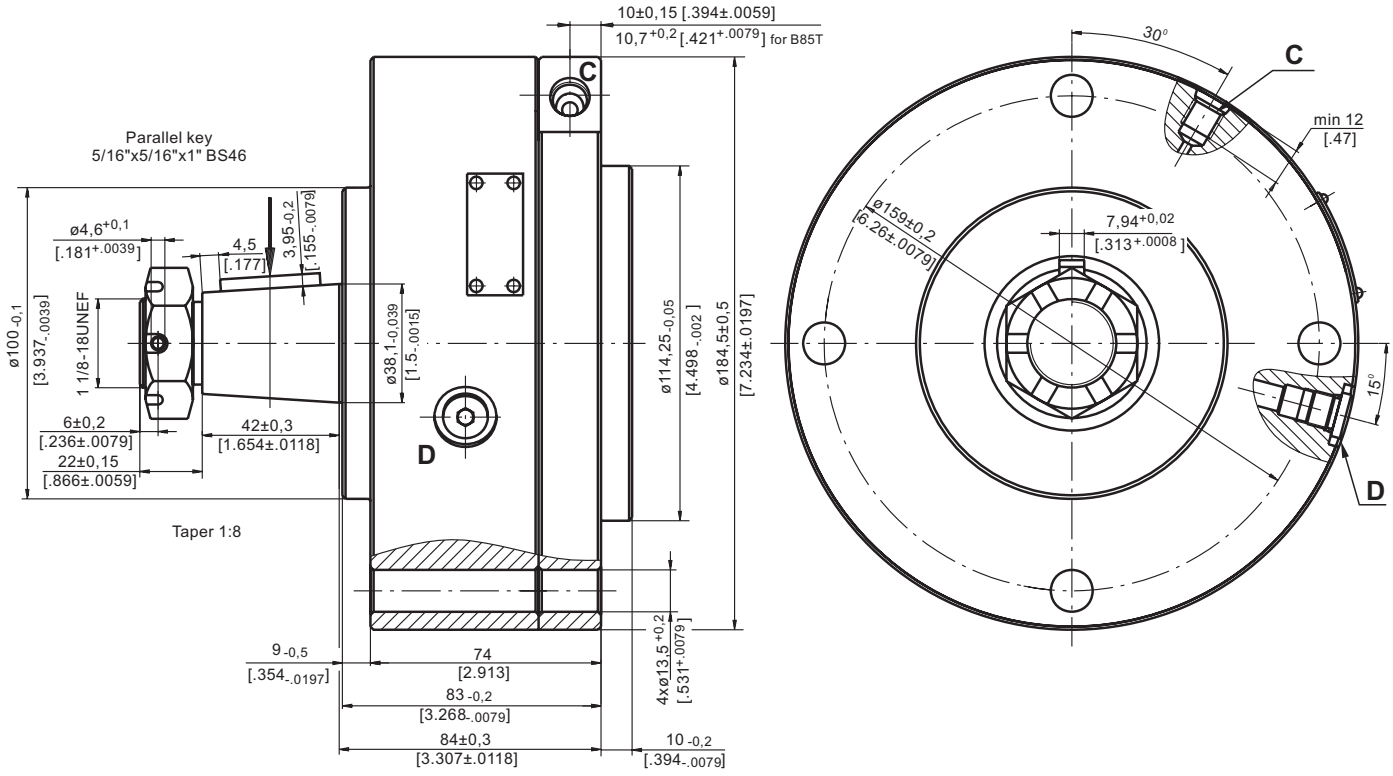
Type	B50T	B55T	B60T	B65T	B85T
Static Torque of Brake, daNm [lb-in]*	50 [4425]	55 [4870]	60 [5310]	65 [5750]	85 [7525]
Initial Release Pressure, bar [PSI]	16 [232]	16 [232]	16 [232]	17 [246]	18 [260]
Full Release Pressure, bar [PSI]	19 [275]	19 [275]	19 [275]	20 [290]	22 [320]
Max. Operating Pressure, bar [PSI]	240 [3480]	240 [3480]	240 [3480]	240 [3480]	240 [3480]
Max. Speed, RPM	60	60	60	60	60
Cont. Radial Shaft Load daN [lbs]**	1000 [2250]	1000 [2250]	1000 [2250]	1000 [2250]	1500 [3370]
Max. Radial Shaft Load daN [lbs]***	2150 [4830]	2150 [4830]	2150 [4830]	2150 [4830]	2250 [5060]

* At 0 bar [0 PSI] back pressure

** At radial shaft load of 1000 daN [2250 lbs], applied at center-line of the key and speed of rotation 60 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

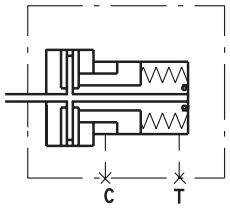
D : Drainage Tap - 7/16-20 UNF

mm [in]

HYDRAULIC DISC BRAKES B130K...- Wet

This 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.

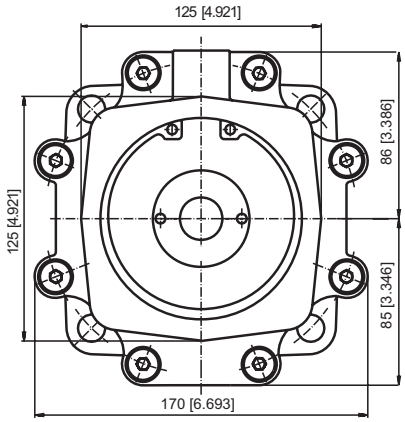


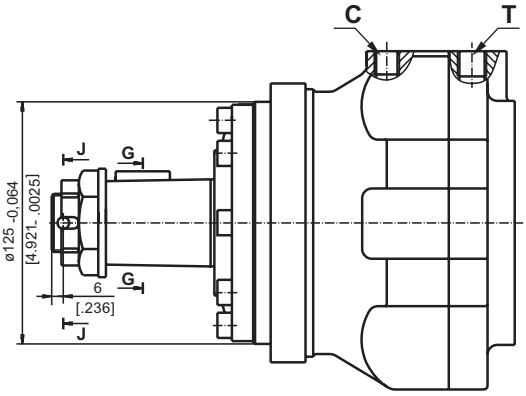
SPECIFICATION DATA

Type	B130K
Static Torque of Brake, daNm [lb-in]*	143 [12565]
Min. Brake Release Pressure, bar [PSI]	31-33 [119-478]
Max. Opening Pressure, bar [PSI]	280 [4060]
Max. Permissible Pressure in Drain Line, bar [PSI]	5 [72]
Weight, kg [lb]]	18,5 [40.8]

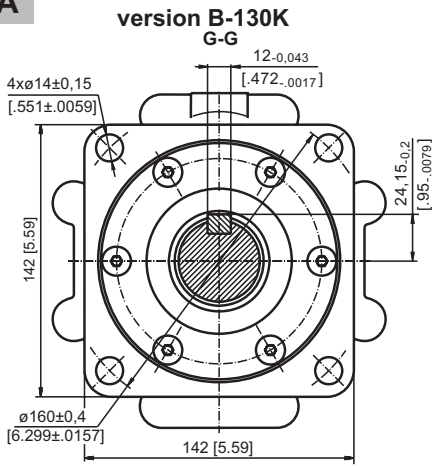
* At 0 bar [0 PSI] back pressure

DIMENSIONS AND MOUNTING DATA

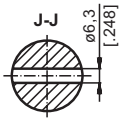




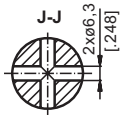
version B-130K



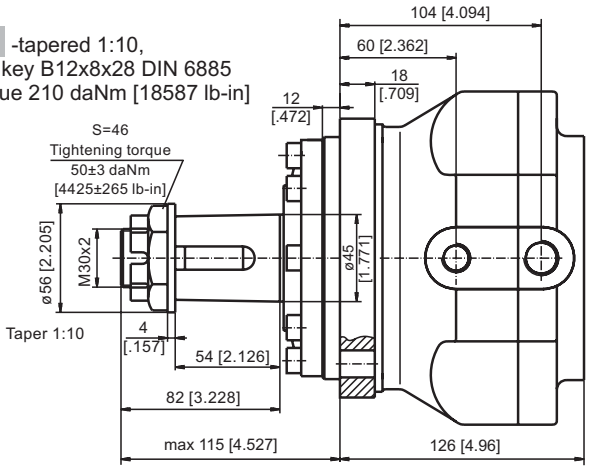
version B-130K



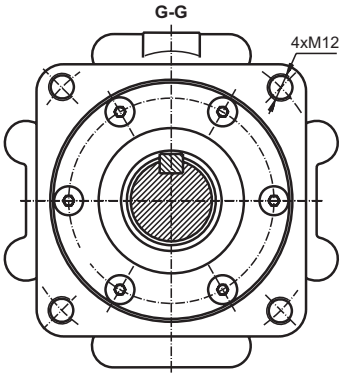
version B-130K-P



K -tapered 1:10,
Parallel key B12x8x28 DIN 6885
Max. Torque 210 daNm [18587 lb-in]



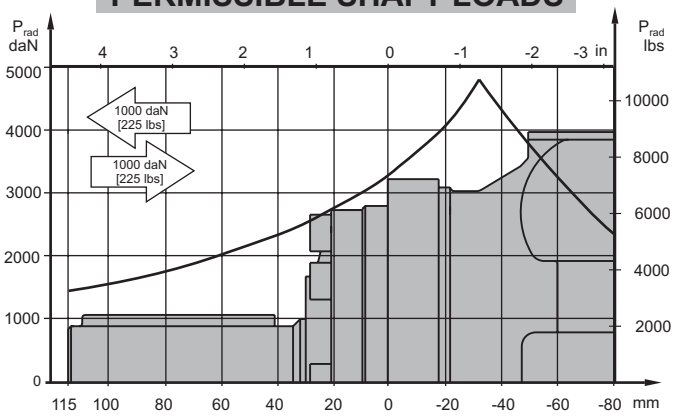
version B-130K-P

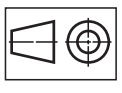


C - Brake release port, G1/4,
12 mm [.472 in] depth

D - Drainage tap, G3/8,
13 mm [.512] depth

PERMISSIBLE SHAFT LOADS





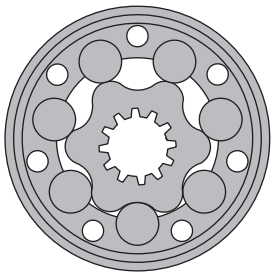
mm [in]

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

HYDRAULIC MOTOR-BRAKE B/MR

APPLICATION

» Conveyors
» Feeding mechanism of robots and manipulators
» Metal working machines
» Textile machines
» Agricultural machines
» Food industries
» Mining machinery etc.



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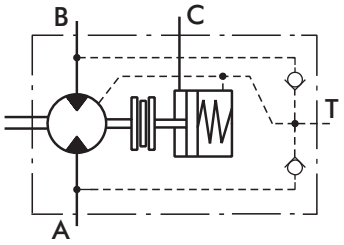
Shaft extensions 25
Permissible shaft loads 26
Order code 26



OPTIONS

» Model - Spool valve, roll-gerotor
» Fully integrated friction disk brake
» Side port
» Shaft - straight
» BSPP ports

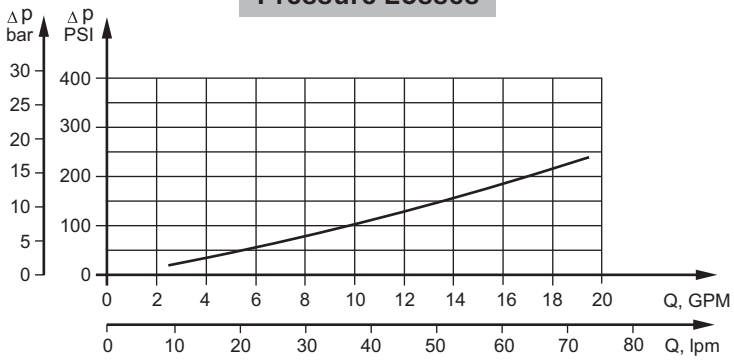
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	397 [24.4]
Max. Speed, [RPM]	600
Max. Torque, daNm [lb-in]	cont.: 61 [5400] int.: 57 [5045]
Max. Output, kW [HP]	14,5 [19.5]
Max. Pressure Drop, bar [PSI]	cont.: 175 [2540] int.: 200 [2900]
Max. Oil Flow, lpm [GPM]	75 [19.8]
Min. Speed, [RPM]	10
Permissible Shaft Loads, daN [lb-in]	P_a=200 [450]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^{O}C [^{O}F]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 microns)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
100 [1450]	20 [98]	2,5 [.660]
	35 [164]	1,8 [.476]
140 [2030]	20 [98]	3,5 [.925]
	35 [164]	2,8 [.740]

Pressure Losses



SPECIFICATION DATA

Type		B/MR 80	B/MR 100	B/MR 125	B/MR 160	B/MR 160 CB	B/MR 200	B/MR 200 CB
Displacement, cm^3/rev		80,3	99,8	125,7	159,6		199,8	
[in^3/rev]		[4.90]	[6.09]	[7.67]	[9.74]		[12.19]	
Max. Speed,	Cont.	500	500	475	375		300	
[RPM]	Int.*	600	600	600	470		375	
Max. Torque	Cont.	19,5[1725]	24[2125]	30[2655]	30[2655]	39[3450]	30[2655]	45[3980]
daNm [lb-in]	Int.*	22[1947]	28[2480]	34[3010]	39[3450]	43[3805]	39[3450]	50[4425]
	Peak**	27[2390]	32[2832]	37[3275]	46[4070]	46[4070]	56[4960]	56[4955]
Max. Output	Cont.	8,4[11.2]	10,8[14.5]	12,5[16.8]	10 [13.5]	11,5[11.5]	7,8[10.5]	11[14.75]
kW [HP]	Int.*	9,6[12.9]	12[16.1]	14,5[19.5]	12,5[16.8]	14[18.8]	12,4[16.6]	13[17.4]
Max. Pressure	Cont.	175[2540]	175[2540]	175[2540]	135[1960]	175[2540]	105[1523]	175[2540]
Drop,	Int.*	200[2900]	200[2900]	200[2900]	175[2540]	200[2900]	145[2103]	200[2900]
bar [PSI]	Peak**	225[3263]	225[3263]	225[3263]	225[3263]	225[3263]	225[3263]	225[3263]
Max. Oil Flow	Cont.	40 [10.5]	50 [13.2]	60 [15.9]	60 [15.9]		60 [15.9]	
l/min [GPM]	Int.*	48 [12.7]	60 [15.9]	75 [19.8]	75 [19.8]		75 [19.8]	
Max. Inlet	Cont.	175 [2540]						
Pressure	Int.*	200 [2900]						
bar [PSI]	Peak**	225 [3260]						
Max. Starting Pressure bar [PSI]		10 [145]	10 [145]	9 [130]	7 [102]		5 [73]	
Min. Starting	At max.press.drop Cont	15 [1330]	20 [1770]	25 [2215]	24 [2124]	32 [2832]	26 [2301]	41 [3628]
Torque, daNm [lb-in]	At max.press.drop Int.*	17 [1505]	23 [2035]	28 [2480]	32 [2832]	37 [3275]	33 [2920]	46 [4071]
Min. Speed***, [RPM]		10	10	10	10	10	10	10
Static Torque of Brake, daNm [lb-in]		55 [4868]						
Min. Brake Release Pressure****, bar [PSI]		13 [190]						
Max.Opening Pressure, bar [PSI]		200 [2900]						
Weight, kg [lb]		11,0 [24.3]	11,2 [24.7]	11,4 [25.2]	11,6 [25.6]	11,7 [25.8]	12,2 [26.9]	12,3 [27.12]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.
**** Motor-brakes must always have a drain line. The brake release pressure is the difference between the pressure in the brake release line and the pressure in the drain line.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

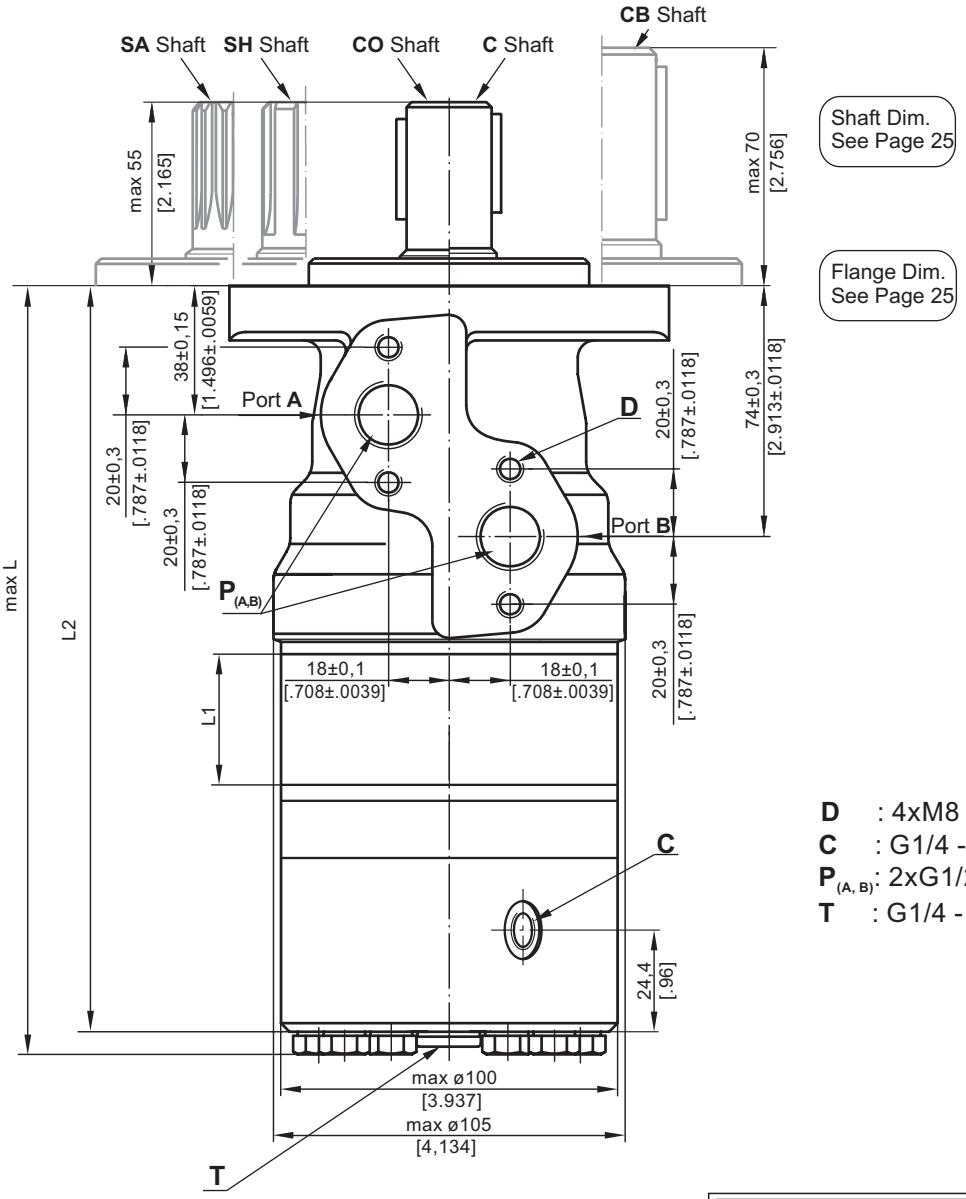
SPECIFICATION DATA (continued)

Type		B/MR 250	B/MR 250 CB	B/MR 315	B/MR 315 CB	B/MR 400	B/MR 400 CB
Displacement, cm^3/rev		250,1		315,7		397	
[in^3/rev]		[15.26]		[19.26]		[24.4]	
Max. Speed,	Cont.	240		190		150	
[RPM]	Int.*	300		240		190	
Max. Torque	Cont.	30 [2655]	54 [4780]	30 [2655]	55 [4868]	30 [2655]	55 [4868]
daNm [lb-in]	Int.*	39 [3450]	57 [5045]	42 [3717]	57 [5045]	43 [3805]	57 [5045]
	Peak**	60 [5310]	71 [6285]	61 [5400]	71 [6285]	60 [5310]	70 [6195]
Max. Output	Cont.	6,2 [8.3]	10 [13.4]	4,5 [6.1]	9 [12.1]	2,2 [2.9]	7 [9.4]
kW [HP]	Int.*	9,5 [12.7]	11 [14.7]	7,5 [10.1]	10 [13.4]	5,6 [7.5]	8,7 [11.7]
Max. Pressure	Cont.	85 [1233]	175 [2538]	65 [942]	135 [1958]	45 [652]	105 [1523]
Drop,	Int.*	115 [1668]	185 [2683]	90 [1305]	145 [2103]	75 [1087]	115 [1668]
bar [PSI]	Peak**	200 [2900]	225 [3263]	150 [2175]	180 [2610]	120 [1740]	140 [2030]
Max. Oil Flow	Cont.	60 [15.9]					
l/min [GPM]	Int.*	75 [19.8]					
Max. Inlet	Cont.	175 [2540]					
Pressure	Int.*	200 [2900]					
bar [PSI]	Peak**	225 [3260]					
Max. Starting Pressure bar [PSI]		5 [73]		5 [73]		5 [73]	
Min. Starting	At max.press.drop Cont	24 [2125]	50 [4425]	26 [2300]	50 [4425]	24 [2125]	44 [3895]
Torque, daNm [lb-in]	At max.press.drop Int.*	31 [2745]	51,5 [4560]	35 [3100]	51,8 [4585]	38 [3364]	50 [4425]
Min. Speed***, [RPM]		10	10	10	10	10	10
Static Torque of Brake, daNm [lb-in]		55 [4868]					
Min. Brake Release Pressure****, bar [PSI]		13 [190]					
Max.Opening Pressure, bar [PSI]		200 [2900]					
Weight, kg [lb]		12,6[27.8]	12,7 [28]	13,3[29.3]	13,4[29.5]	14 [30.9]	14,1[31.1]

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** Peak load: the permissible values may occur for max. 1% of every minute.
*** For speeds lower than given, consult factory or your regional manager.
**** Motor-brakes must always have a drain line. The brake release pressure is the difference between the pressure in the brake release line and the pressure in the drain line.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

DIMENSIONS AND MOUNTING DATA



D : 4xM8 - 13 mm [.51 in] depth
C : G1/4 - 12 [.47 in] mm depth
$P_{(A, B)}$: 2xG1/2 - 15 [.59 in] mm depth
T : G1/4 - 10 mm [.393 in] depth

Type	L1, mm [in]	L2, mm [in]	L , mm [in]
B/MR 80	14,0 [.551]	205,5 [8.091]	213,5 [8.405]
B/MR 100	17,4 [.685]	209,0 [8.228]	217,0 [8.543]
B/MR 125	21,8 [.858]	213,5 [8.405]	221,5 [8.720]
B/MR 160	27,8 [1.095]	219,5 [8.642]	227,5 [8.957]
B/MR 200	34,8 [1.37]	226,5 [8.917]	234,5 [9.232]
B/MR 250	43,5 [1.713]	235,0 [9.252]	243,0 [9.567]
B/MR 315	54,8 [2.157]	246,5 [9.705]	254,5 [10.02]
B/MR 400	69,4 [2.732]	261,0[10.275]	269,0 [10.59]

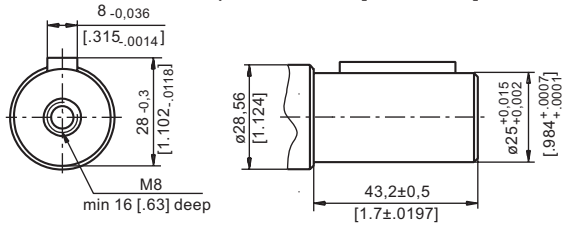
Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

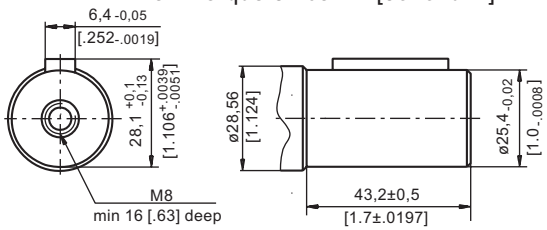
mm [in]

SHAFT EXTENSIONS

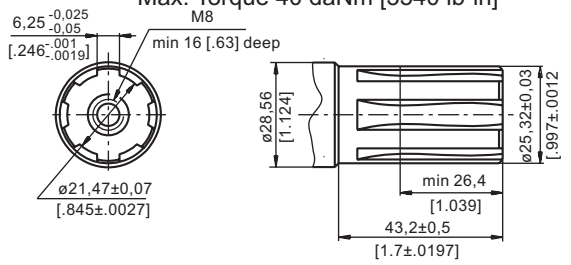
C - ø25 straight, Parallel key A8x7x32 DIN 6885
Max. Torque 34 daNm [3010 lb-in]



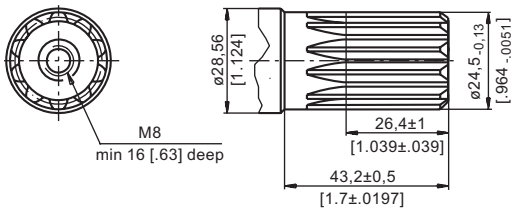
CO - ø1" straight, Parallel key ¼"x¼"x1¼" BS46
Max. Torque 34 daNm [3010 lb-in]



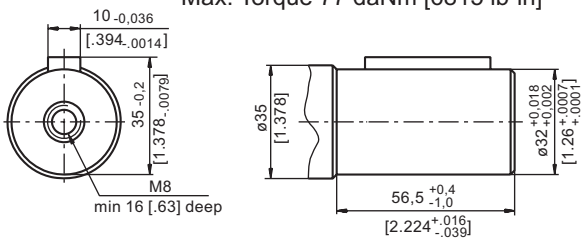
SH - splined, BS 2059 (SAE 6B)
Max. Torque 40 daNm [3540 lb-in]



SA - splined, B25x22h9 DIN 5482
Max. Torque 40 daNm [3540 lb-in]

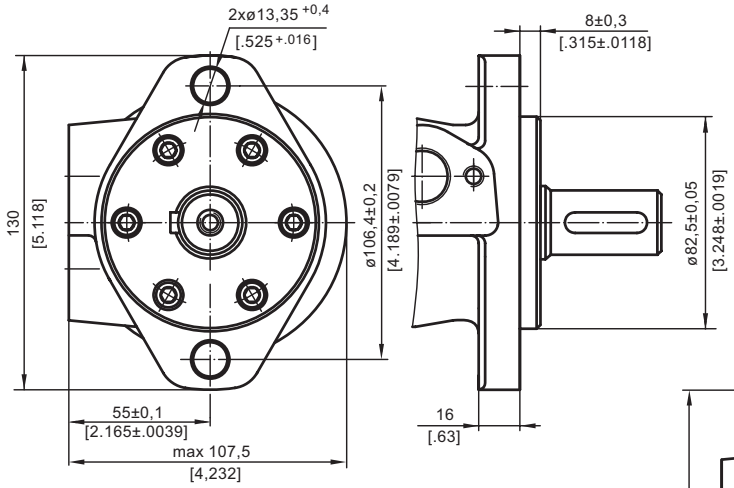


CB - ø32 straight, Parallel key A10x8x45 DIN 6885
Max. Torque 77 daNm [6815 lb-in]

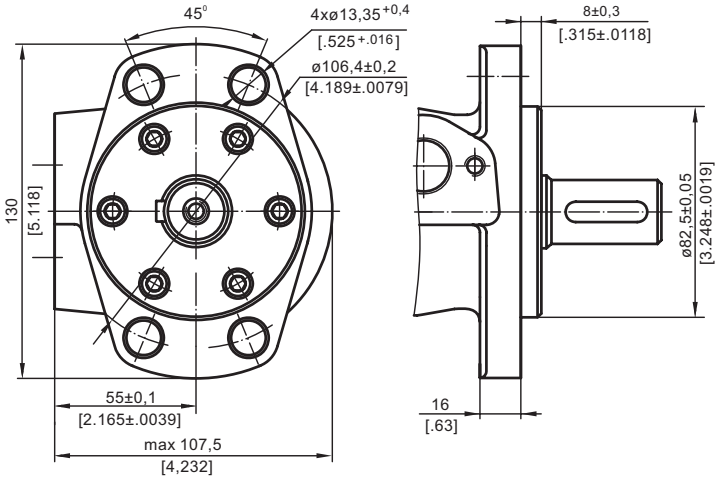


MOUNTING

Oval Mount (2 Holes)



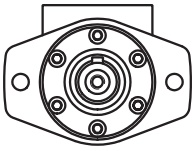
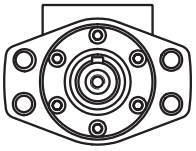
F - Oval Mount (4 Holes)



mm [in]

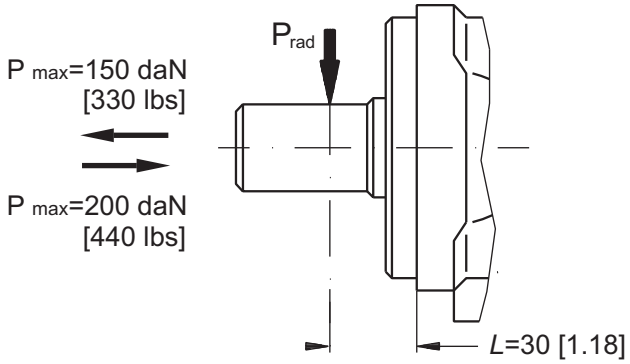
PERMISSIBLE SHAFT LOADS

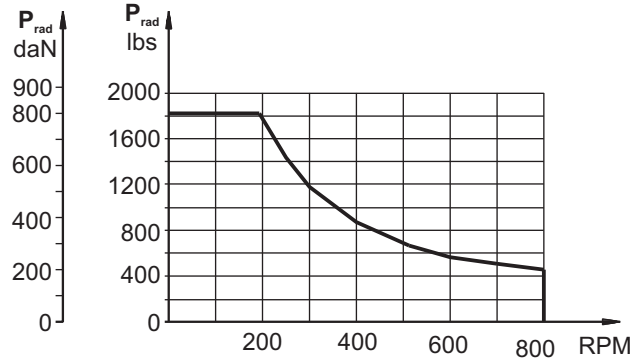
The permissible radial shaft load **P_{rad}** depends on the speed **n**, RPM , distance **L** from the point of load to the mounting flange and shaft version.

Mounting Flange		
Shaft Version	**cylindrical - C, CO splined - SH, SA**	**cylindrical - CB**
Radial Shaft Load P_{rad},in mm	$\frac{800}{n} \times \frac{25000}{95+L}$, daN*	$\frac{800}{n} \times \frac{18750}{95+L}$, daN*
Radial Shaft Load P_{rad},in inch	$\frac{800}{RPM} \times \frac{2215}{3.74+L}$,lbs*	$\frac{800}{RPM} \times \frac{1660}{3.74+L}$,lbs*

* n ≤ 200 RPM; max Prad=800 daN [1800 lbs] n ≥200 RPM; L < 55 mm [2.2 in]

Radial Shaft Load P_{rad} for C, CO Shaft Extensions by L=30 mm [1.18 in]





ORDER CODE

	1	2	3	4	5
B / M R					

Pos.1 - Mounting Flange

omit - Oval mount, two holes

F - Oval mount, four holes

Pos.2 - Displacement code

80	- 80,3 cm^3/rev [4.90 in^3/rev]
100	- 99,8 cm^3/rev [6.09 in^3/rev]
125	- 125,7 cm^3/rev [7.67 in^3/rev]
160	- 159,6 cm^3/rev [9.74 in^3/rev]
200	- 199,8 cm^3/rev [12.19 in^3/rev]
250	- 250,1 cm^3/rev [15.26 in^3/rev]
315	- 315,7 cm^3/rev [19.26 in^3/rev]
400	- 397,0 cm^3/rev [24.40 in^3/rev]

Pos.3 - Shaft Extensions*

C	- ø25 straight, Parallel key A8x7x32 DIN6885
CO	- ø1" straight, Parallel key ¼"x¼"x1¼" BS46
SH	- ø25,32 splined BS 2059 (SAE 6B)
SA	- ø24,5 splined B 25x22 DIN 5482
CB	- ø32 straight, Parallel key A10x8x45 DIN 6885

Pos.4 - Special Features (see page 59)

Pos.5 - Design Series

omit - Factory specified

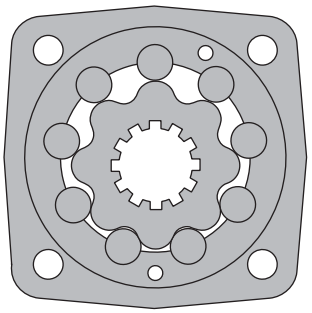
NOTES:

* The permissible output torque for shafts must not be exceeded!
The hydraulic motors are mangano phosphatized as standard.

HYDRAULIC MOTOR-BRAKE MT/B

APPLICATION

» Conveyors
» Metal working machines
» Agricultural machines
» Road building machines
» Mining machinery
» Food industries
» Special vehicles
» Plastic and rubber machinery etc.



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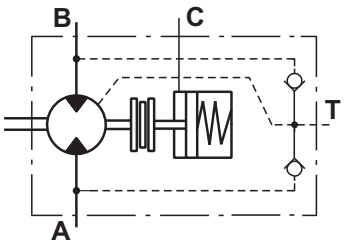


OPTIONS

» Model - Disc valve, roll-gerotor;
» Fully integrated friction disk brake;
» Side ports;
» Shafts - straight, splined and tapered;
» BSPP ports
» Other special features

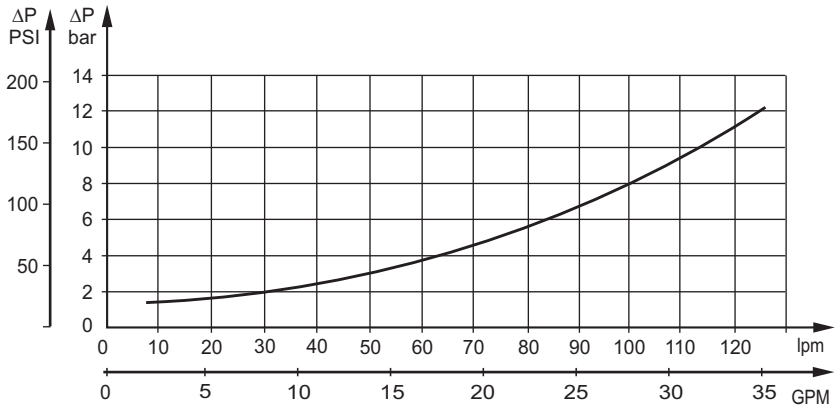
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	523,6 [31.95]
Max. Speed, [RPM]	780
Max. Torque, daNm [lb-in]	cont.: 122 [10780] int.: 137 [12125]
Max. Output, kW [HP]	40 [54]
Max. Pressure Drop, bar [PSI]	cont.: 200 [2900] int.: 240 [3450]
Max. Oil Flow, lpm [GPM]	150 [40]
Min. Speed, [RPM]	5
Permissible Shaft Loads, daN [lbs]	P_a=1000 [2248]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, °C [°F]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 microns)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	2,5 [.66]
	35 [164]	1,5 [.39]
210 [3045]	20 [98]	5 [1.32]
	35 [164]	3 [.79]

Pressure Losses



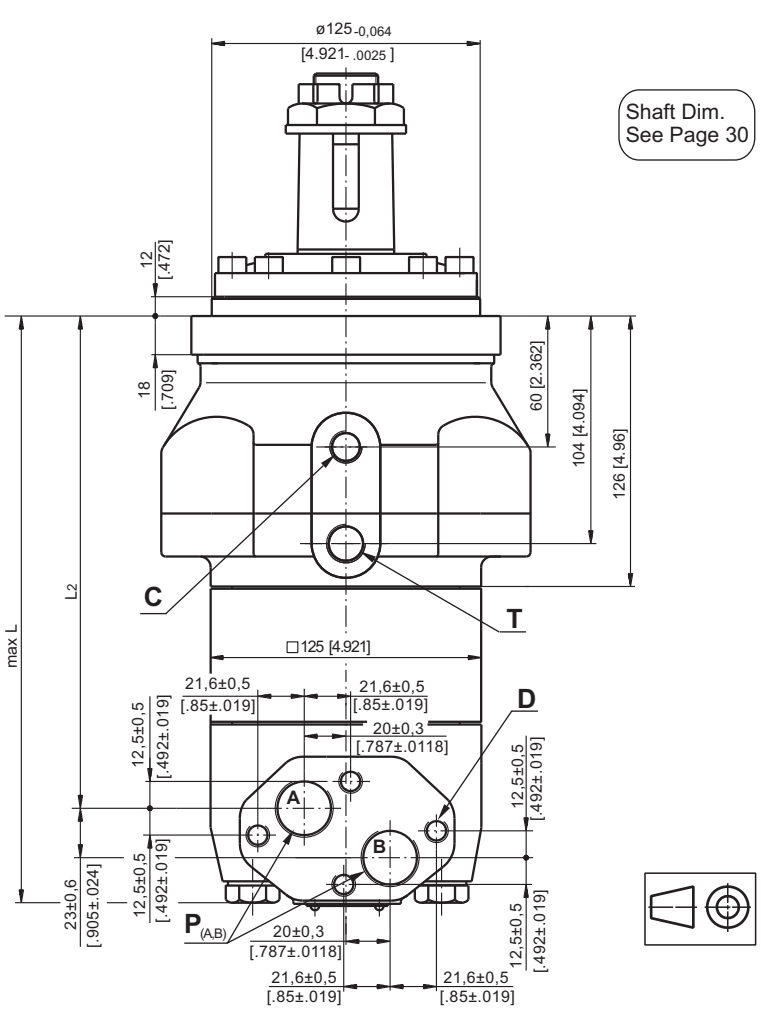
SPECIFICATION DATA

Type		MT/B 160	MT/B 200	MT/B 250	MT/B 315	MT/B 400	MT/B 500
Displacement, cm^3/rev [in^3/rev]		161,1 [9.83]	201,4 [12.29]	251,8 [15.36]	326,3 [19.90]	410,9 [25.06]	523,6 [31.95]
Max. Speed,	Cont.	625	625	500	380	305	240
[RPM]	Int.*	780	750	600	460	365	285
Max. Torque	Cont.	47 [4160]	59 [5220]	73 [6460]	95 [8410]	108 [9560]	122 [10800]
daNm [lb-in]	Int.*	56 [4960]	71 [6285]	88 [7790]	114 [10090]	126 [11150]	137 [12125]
Max. Output	Cont.	26,5 [36]	33,5 [45]	33,5 [45]	33,5 [45]	30 [40]	26,5 [36]
kW [HP]	Int.*	32 [43]	40 [54]	40 [54]	40 [54]	35 [45]	30 [40]
Max. Pressure Drop	Cont.	200 [2900]	200 [2900]	200 [2900]	200 [2900]	180 [2600]	160 [2300]
bar [PSI]	Int.*	240 [3450]	240 [3450]	240 [3450]	240 [3450]	210 [3050]	180 [2600]
Max. Oil Flow	Cont.	100 [26.5]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]
lpm [GPM]	Int.*	125 [33]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
Max. Inlet Pressure	Cont.	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
bar [PSI]	Int.*	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]
Max. Return Pressure	Cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
with Drain Line,bar [PSI]	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]
Min. Starting Torque	At max. press. drop Cont.	34 [3010]	43 [3800]	53 [4690]	74 [6550]	84 [7435]	95 [8410]
daNm [lb-in]	At max. press. drop Int.*	41 [3630]	52 [4600]	63 [5580]	89 [7880]	97 [8585]	106 [9380]
Min. Speed, [RPM]**		10	9	8	7	6	5
Static Torque of Brake, daNm [lb-in]		143 [12657]	143 [12657]	143 [12657]	143 [12657]	143 [12657]	143 [12657]
Min. Brake Release Pressure*, bar [PSI]**		32-35 [2832-3098]	32-35 [2832-3098]	32-35 [2832-3098]	32-35 [2832-3098]	32-35 [2832-3098]	32-35 [2832-3098]
Max. Opening Pressure, bar [PSI]		280 [24782]	280 [24782]	280 [24782]	280 [24782]	280 [24782]	280 [24782]
Max. Pressure in Drain Line, bar [PSI]		5 [443]	5 [443]	5 [443]	5 [443]	5 [443]	5 [443]
Weight, kg [lb]		27,5 [60.6]	28 [61.7]	28,5 [62.8]	29,5 [65]	30,5 [67.2]	31,5 [69.4]

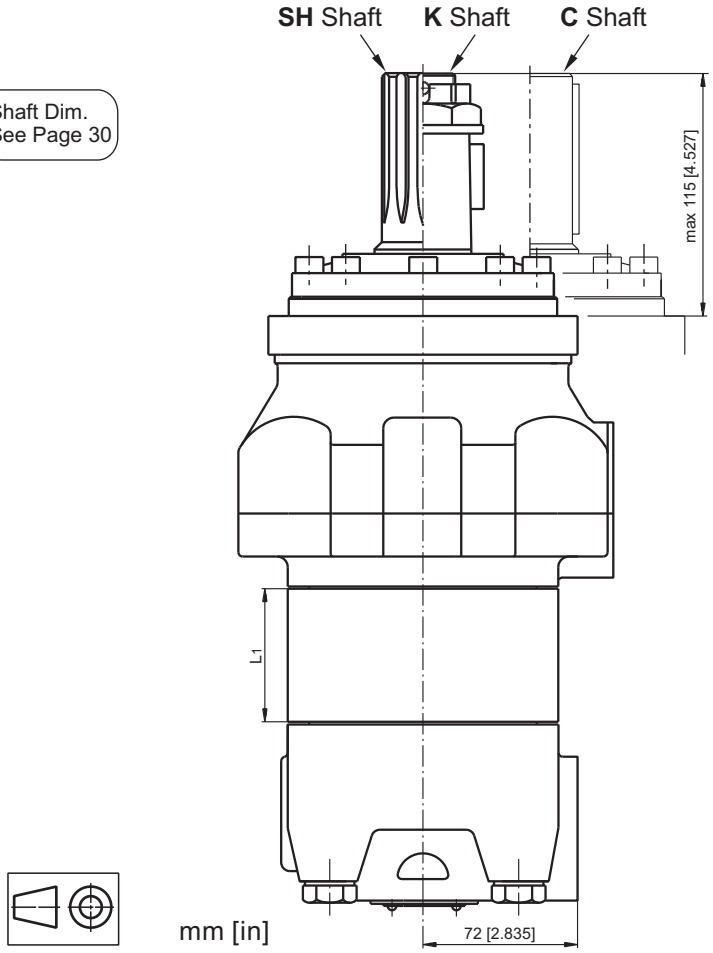
* Intermittierent operation: the permissible values may occur for max. 10% of every minute.
** For speeds lower than given, consult factory or your regional manager.
*** Motor-brakes must always have a drain line. The brake release pressure is the difference between the pressure in the brake release line and the pressure in the drain line.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

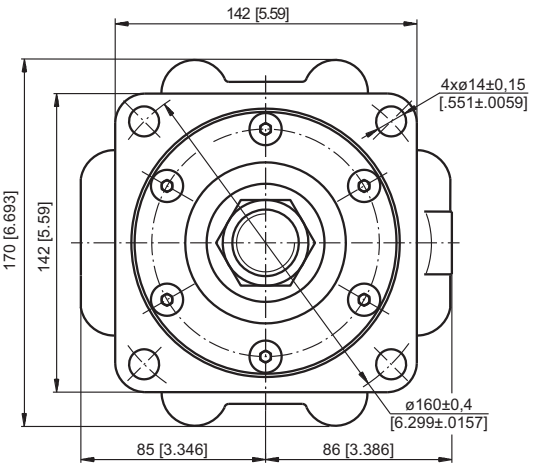
DIMENSIONS AND MOUNTING DATA



Shaft Dim.
See Page 30



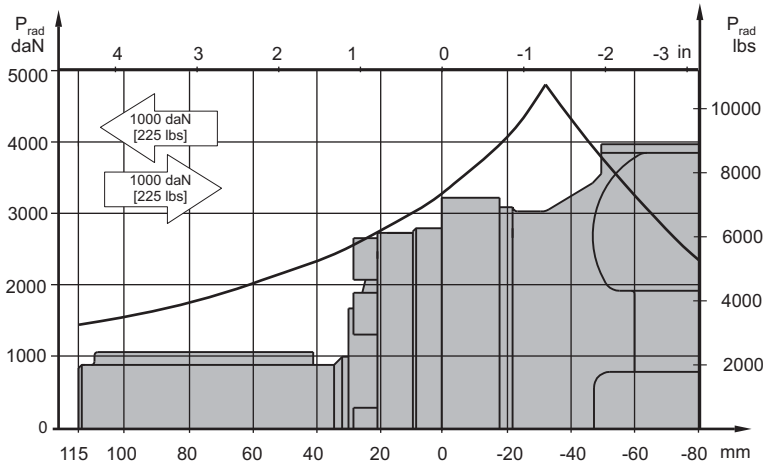
mm [in]



$P_{(A,B)}$ - 2xG3/4, 17 mm [.669] depth
C - Brake release port, G1/4, 12 mm [.472 in] depth
T - Drainage tap, G3/8, 13 mm [.512] depth
D - 2xM10, 10 mm [.394] depth

PERMISSIBLE SHAFT LOADS

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



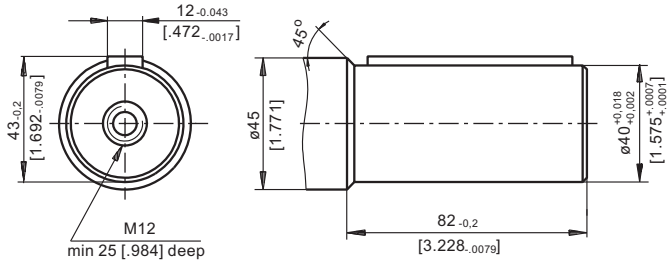
Warning: Drain line should always be used.

Type	*L1,mm [in]	L2,mm [in]	L,mm [in]
MT/B 160	16,5 [.65]	178 [7.01]	228 [8.98]
MT/B 200	21,5 [.85]	183 [7.21]	233 [9.17]
MT/B 250	27,8 [1.09]	189,3 [7.45]	239 [9.41]
MT/B 315	37,0 [1.46]	198,5 [7.81]	248 [9.76]
MT/B 400	47,5 [1.87]	209 [8.23]	259 [10.2]
MT/B 500	61,5 [2.42]	223 [8.78]	273 [10.8]

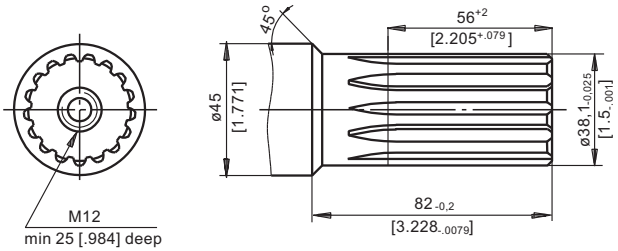
* The width of the gerotor is 3,5 mm [.138 in] greater than L_1.

SHAFT EXTENSIONS

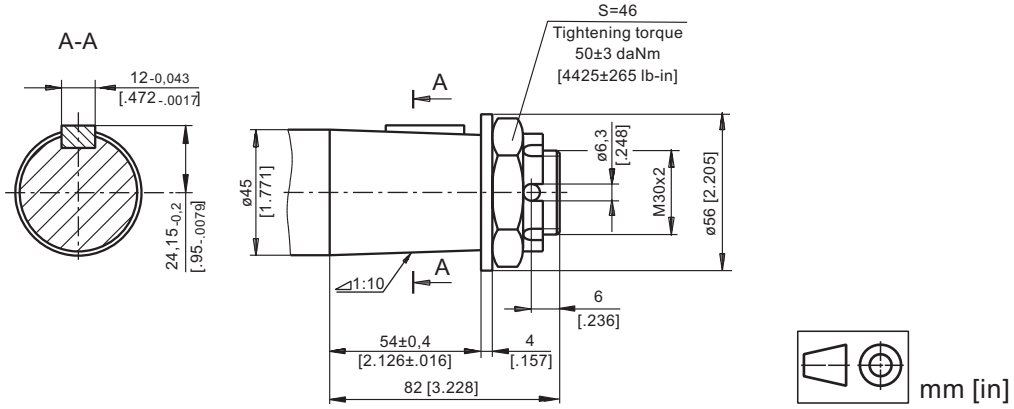
C -ø40 straight, Parallel key A12x8x70 DIN 6885
Max. Torque 123 daNm [10886 lb-in]



SH -ø1½" splined 17T, DP 12/24 ANSI B92.1-1976
Max. Torque 123 daNm [10886 lb-in]



K -tapered 1:10, Parallel key B12x8x28 DIN 6885
Max. Torque 210 daNm [18587 lb-in]



ORDER CODE

	1	2	3	4
M T / B				

Pos.1 - Displacement code

160	- 161,1 cm³/rev [9.83 in³/rev]
200	- 201,4 cm³/rev [12.29 in³/rev]
250	- 251,8 cm³/rev [15.36 in³/rev]
315	- 326,3 cm³/rev [19.9 in³/rev]
400	- 410,9 cm³/rev [25.06 in³/rev]
500	- 523,6 cm³/rev [31.95 in³/rev]

Pos.2 - Shaft Extensions**

C	- ø40 straight, Parallel key A12x8x70 DIN6885
SH	- ø1 ½" splined 17 DP12/24 ANS B922.1-76
K	- ø45 tapered 1:10, Parallel key B12x8x28 DIN 6885

Pos.3 - Special Features (see page 59)

Pos.4 - Design Series

omit - Factory specified

NOTES:

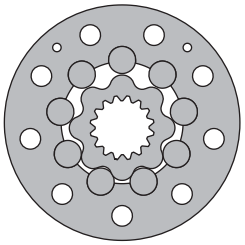
* The permissible output torque for shafts must not be exceeded!

The hydraulic motors are mangano phosphatized as standard.

HYDRAULIC MOTOR-BRAKE MTM/B

APPLICATION

» Skid Steer Loaders
» Metal working machines
» Trenchers
» Augers
» Agricultural machines
» Road building machines
» Special vehicles
» Mine machines
» Woodworking and sawmill machinery
» Conveyors etc.



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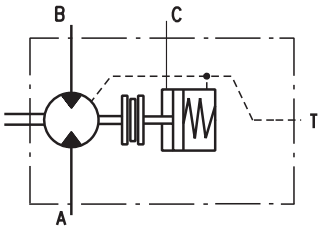
Dimensions and mounting 33
Shaft extensions 34
Permissible shaft loads 35
Order code 35



OPTIONS

» Model - Disc valve, roll-gerotor;
» Fully integrated friction disk brake;
» Side ports;
» Shafts - straight, splined and tapered;
» BSPP ports
» Other special features

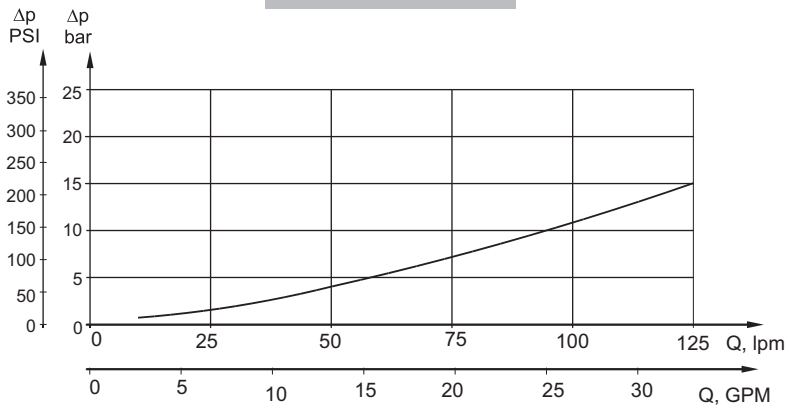
GENERAL

Max. Displacement, cm^3/rev [in^3/rev]	724,3 [44.2]
Max. Speed, [RPM]	750
Max. Torque, daNm [in-lb]	cont.: 175 [15490] int.: 215 [16030]
Max. Output, kW [HP]	70 [94]
Max. Pressure Drop, bar [PSI]	cont.: 250 [3600] int.: 350 [5080]
Max. Oil Flow, lpm [GPM]	150 [40]
Permissible Shaft Loads daN [lbs]	P_a=1000 [2250]
Pressure fluid	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
Temperature range, ^oC [^oF]	-40÷140 [-40÷284]
Optimal Viscosity range, mm^2/s [SUS]	20÷75 [98÷347]
Filtration	ISO code 20/16 (Min. recommended fluid filtration of 25 microns)

Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm^2/s [SUS]	Oil flow in drain line lpm [GPM]
200 [2900]	20 [98]	2,5 [.660]
	35 [164]	1,5 [.400]
275 [3990]	20 [98]	4 [1.057]
	35 [164]	2,5 [.660]

Pressure Losses



SPECIFICATION DATA

Type		MTM/B 200	MTM/B 250	MTM/B 315	MTM/B 400	MTM/B 470	MTM/B 500	MTM/B 630	MTM 725
Displacement, cm^3/rev [in^3/rev]		201,4 [12.29]	251,8 [15.36]	326,3 [19.9]	410,9 [25.06]	475 [28.97]	494,9 [30.17]	631,2 [38.5]	724 [44.2]
Max. Speed, [RPM]	Cont.	625	500	380	305	260	250	196	170
	Int.*	750	600	460	365	315	300	235	215
Max. Torque, daNm [lb-in]	Cont.	72 [6375]	90 [7965]	116 [10265]	147 [13010]	171 [15135]	172 [15225]	175 [15490]	160 [14160]
	Int.*	102 [9030]	128 [11330]	163 [14425]	206 [18232]	215 [16030]	215 [16030]	215 [16030]	192 [17000]
	Peak**	115 [10180]	144 [12745]	186 [16460]	235 [20800]	240 [21240]	240 [21240]	255 [22570]	240 [21240]
Max. Output, kW [HP]	Cont.	41 [55]	41 [55]	41 [55]	41 [55]	41 [55]	37,5 [50]	29 [39]	26 [35]
	Int.*	65 [87]	70 [94]	70 [94]	70 [94]	55 [74]	51 [68]	45 [60]	40 [54]
Max. Pressure Drop, bar [PSI]	Cont.	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	230 [3340]	185 [2680]	160 [2320]
	Int.*	350 [5080]	350 [5080]	350 [5080]	350 [5080]	315 [4570]	280 [4060]	225 [3260]	210 [3045]
	Peak**	400 [5800]	400 [5800]	400 [5800]	400 [5800]	350 [5080]	320 [4640]	270 [3985]	260 [3770]
Max. Oil Flow, lpm [GPM]	Cont.	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]
	Int.*	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
Max. Starting Pressure with Unloaded Shaft, bar [PSI]		6 [87]	6 [87]	6 [87]	6 [87]	6 [87]	6 [87]	6 [87]	6 [87]
Min. Starting Torque, daNm [lb-in]		60 [5310]	75 [6640]	97 [8585]	122 [10800]	142 [12570]	143 [12655]	144 [12745]	148 [13100]
Static Torque of Brake, daNm [lb-in]		200 [17700]							
Min. Brake Release Pressure*, bar [PSI]**		14 [203]							
Max. Opening Pressure, bar [PSI]		40 [580]							
Weight, kg [lb]		37,5 [82.7]	37,9 [83.6]	39,1 [86.2]	41,3 [91.1]	44,1 [97.2]	46,0 [101.4]	49,1 [108.2]	52,0 [114.6]

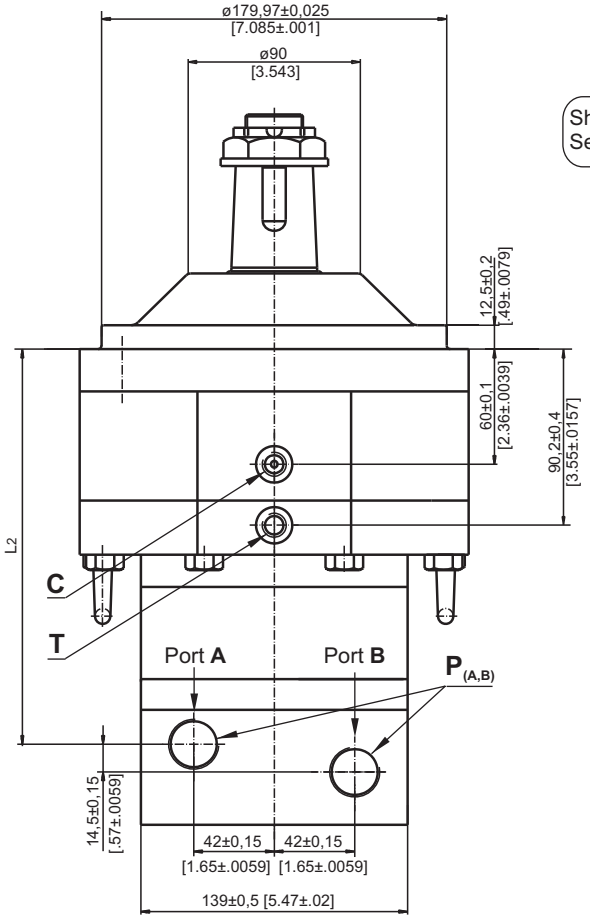
* Intermittent operation: the permissible values may occur for max. 10% of every minute.

** Peak load: the permissible values may occur for max. 1% of every minute.

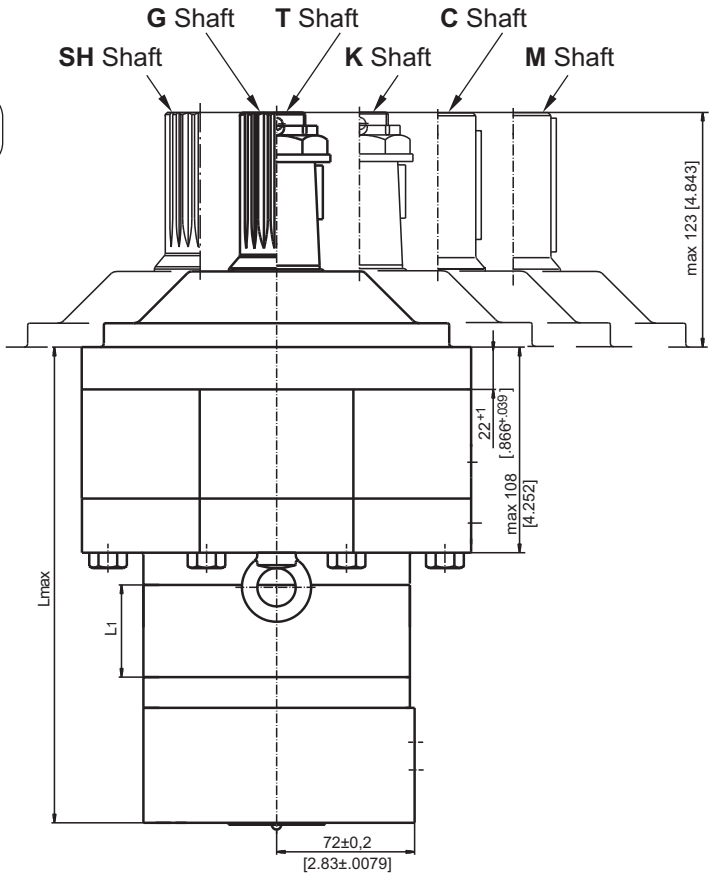
*** Motor-brakes must always have a drain line. The brake release pressure is the difference between the pressure in the brake release line and the pressure in the drain line.

1. Intermittent speed and intermittent pressure drop must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4). If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm^2/s [70 SUS] at 50ºC [122ºF].
5. Recommended maximum system operating temperature is 82ºC [180ºF].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

DIMENSIONS AND MOUNTING DATA



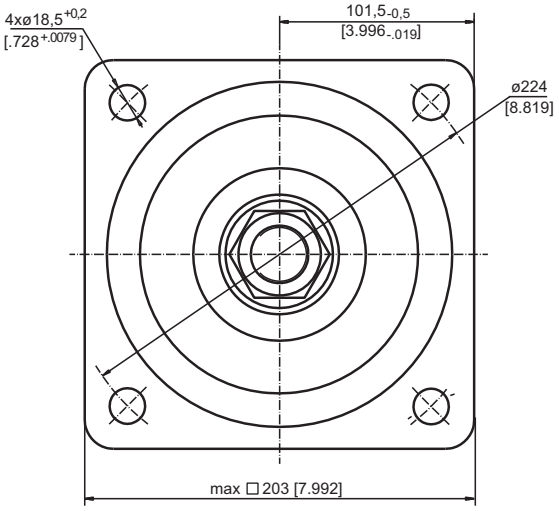
Shaft Dim.
See Page 34



Standard Rotation
Viewed from Shaft End
Port **A** Pressurized - **CW**
Port **B** Pressurized - **CCW**

Reverse Rotation
Viewed from Shaft End
Port **A** Pressurized - **CCW**
Port **B** Pressurized - **CW**

mm [in]



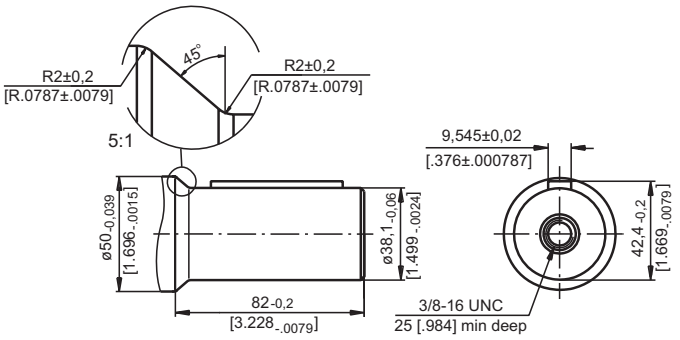
Type	L, mm [in]	L2, mm [in]	L1, mm [in]
MTM/B 200	226 [8.90]	184 [7.24]	25 [.98]
MTM/B 250	232,5 [9.15]	190 [7.48]	31,3 [1.23]
MTM/B 315	241,5 [9.51]	199,5 [7.85]	40,5 [1.59]
MTM/B 400	252 [9.92]	210 [8.27]	51 [2.01]
MTM/B 470	260 [10.24]	218 [8.58]	59 [2.32]
MTM/B 500	249 [9.80]	207 [8.15]	48 [1.89]
MTM/B 630	262 [10.32]	220 [8.66]	61 [2.40]
MTM/B 725	271 [10.67]	229 [9.02]	70 [2.76]

	Versions	
	2	4
P (A,B)	2xG¾	2x1 1/16-12UN
T	G¼	9/16-18 UNF
C	G¼	7/16 -20 UNF

SHAFT EXTENSIONS

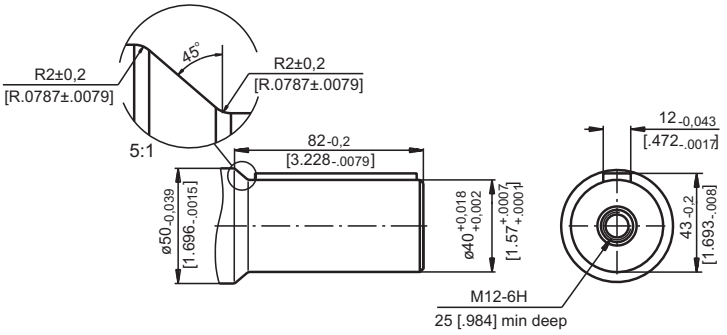
C

1½"[38,1] srtaight, Parallel key ⅜"x ⅜"x 2¼" BS46
Max. Torque 133 daNm [11750 lb-in]



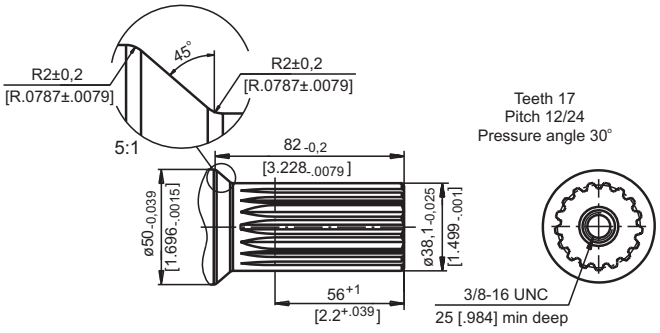
M

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



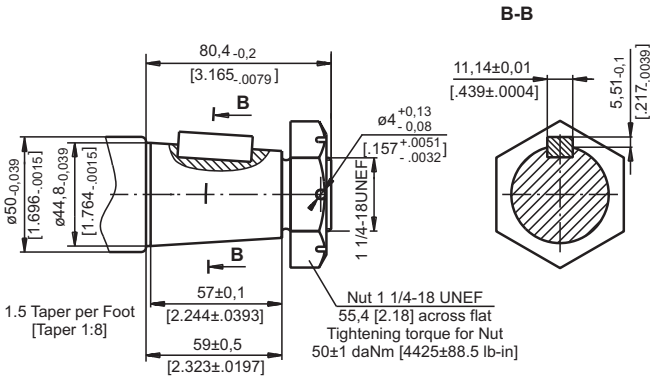
G

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



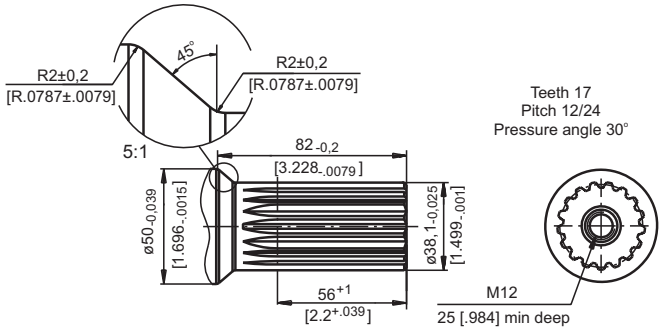
T

1 3/4" [44,5] SAE J501 Tapered 1:8
Parallel key 7⁄16"x7⁄16"x 1¼ " BS46
Max. Torque 210 daNm [18650 lb-in]



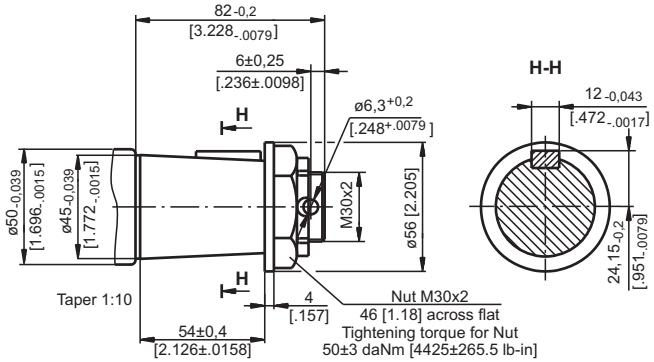
SH

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



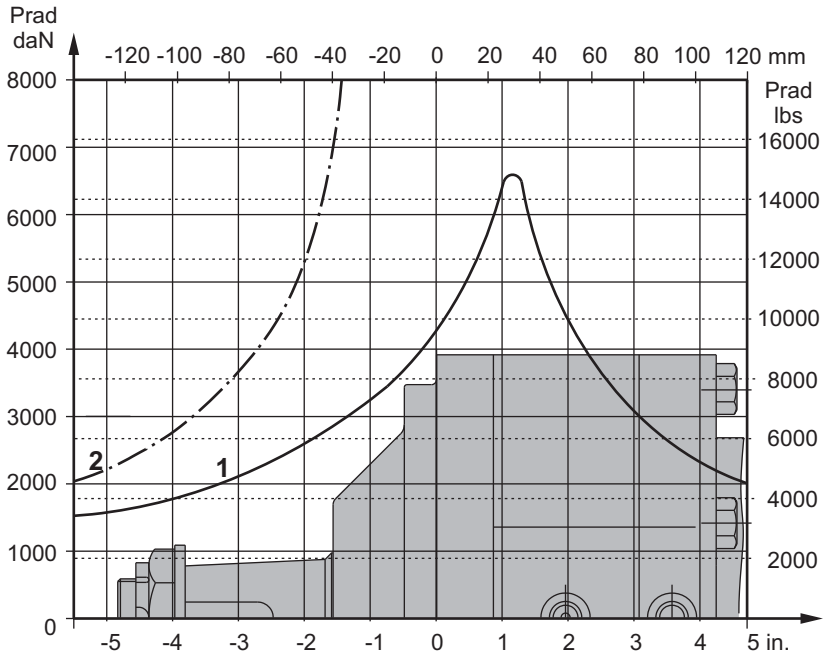
K

ø45 Tapered 1:10
Parallel key 12x8x28 DIN 6885
Max. Torque 211 daNm [18675 lb-in]



mm [in]

PERMISSIBLE RADIAL SHAFT LOADS



1 - Bearing curve: The curve applies to a B10 bearing life of 2000 hours at 100 RPM.

2 - Shaft curve: The curve represents Max. permissible radial shaft load with safety factor 2:1.

ORDER CODE

	1	2	3	4	5
M T M / B					

Pos.1 - **Displacement code**

200	- 201,4 cm^3/rev [12.29 in^3/rev]
250	- 251,8 cm^3/rev [15.36 in^3/rev]
315	- 326,3 cm^3/rev [19.90 in^3/rev]
400	- 410,9 cm^3/rev [25.06 in^3/rev]
470	- 475,0 cm^3/rev [28.97 in^3/rev]
500	- 523,6 cm^3/rev [31.95 in^3/rev]
630	- 631,2 cm^3/rev [38.52 in^3/rev]
725	- 724,3 cm^3/rev [44.20 in^3/rev]

Pos.2 - **Shaft Extensions***

C	- 1½" [38,1] straight, Parallel key 3/8x3/8x2 1/4"
G	- 1½" [38,1] 17T Splined (3/8-16 UNC)
M	- 40 mm straight, Parallel key 12x8x70
T	- 1:8 Tapered, Parallel key 7/16x7/16x1 1/4"
SH	- 1½" [38,1] 17T Splined (M12)
K	- 1:10 Tapered, Parallel key 12x8x28

Pos. 3 - **Ports**

2	- side ports, 2xG 3/4, G1/4, BSP thread, ISO 228
4	- side ports, 2x 1 1/16-12 UN, O-ring, 9/16-18 UNF, 7/16-20UNF

Pos. 4 - **Special Features** (see page 59)

Pos. 5 - **Design Series**

omit - Factory specified

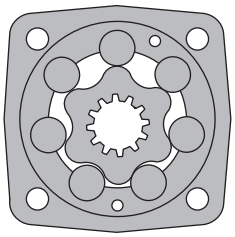
Notes: * The permissible output torque for shafts must not be exceeded!
** Color at customer's request.

The hydraulic motors are mangano phosphatized as standard.

HYDRAULIC MOTOR-BRAKES SW500B350V

APPLICATION

» Wheel drives
» Conveyors
» Rotators
» Positioners
» Winches
» Swing drives
» Door openers



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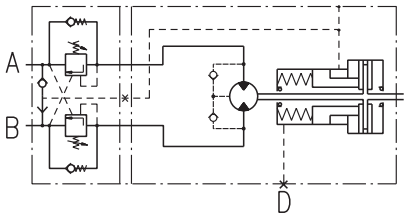
Function diagrams 38

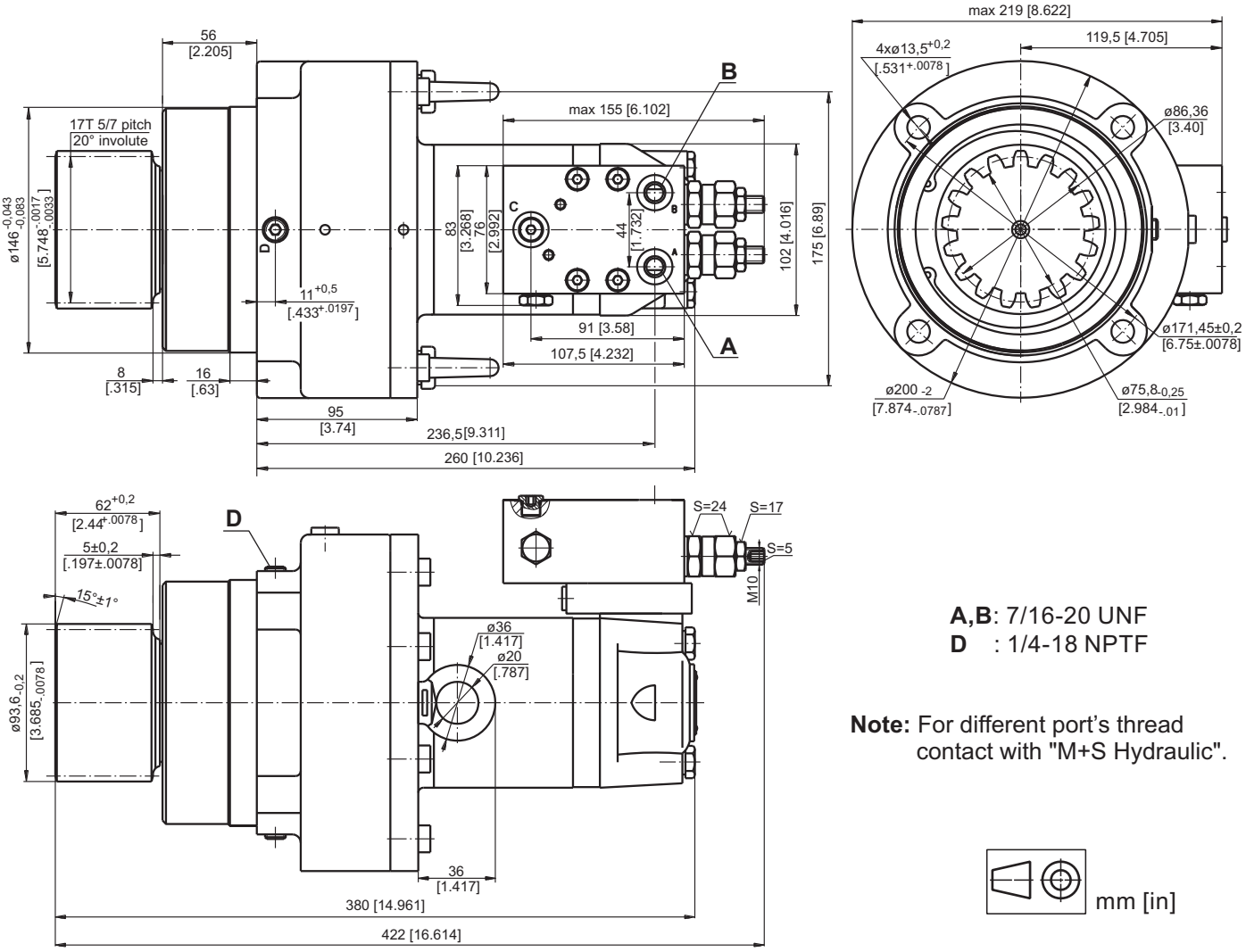


SPECIFICATION DATA

Type		SW500B350V
Displacement, cm^3/rev [in^3/rev]		475,3 [29]
Max. Speed,	Cont.	16
RPM	Int.*	25
Max. Torque,	Cont.	82 [7260]
daNm [lb-in]	Int.*	95 [8420]
Max. Output,	Cont.	0,9 [1.3]
kW [HP]	Int.*	2,4 [3.3]
Max. Pressure Drop,	Cont.	125 [1800]
bar [PSI]	Int.*	145 [2100]
Max. Oil Flow,	Cont.	8 [2]
lpm [GPM]	Int.*	12 [3]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, bar [PSI]		100 [1450]
Min. Starting Torque,	At max. press. drop Cont.	72 [6400]
daNm [lb-in]	At max. press. drop Int.*	75 [6650]
Min. Speed, RPM**		5
Static Torque for the Brake*, daNm [lb-in]**		164 [14 515]
Release Pressure ±10%,	initial	25...28 [363...406]
bar [PSI]	full	31 [449.6]
Max. Steering Pressure, bar [PSI]		245 [3553]
Max. Pressure in Drain Space for the Brake, bar [PSI]		0,5 [7]
Pilot Ratio for the Valve		4,25:1

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** For speeds of 5 RPM lower than given, consult factory or your regional manager.
*** Static torque is obtained at working pressure - 0 PSI [0 bar].

DIMENSIONS AND MOUNTING



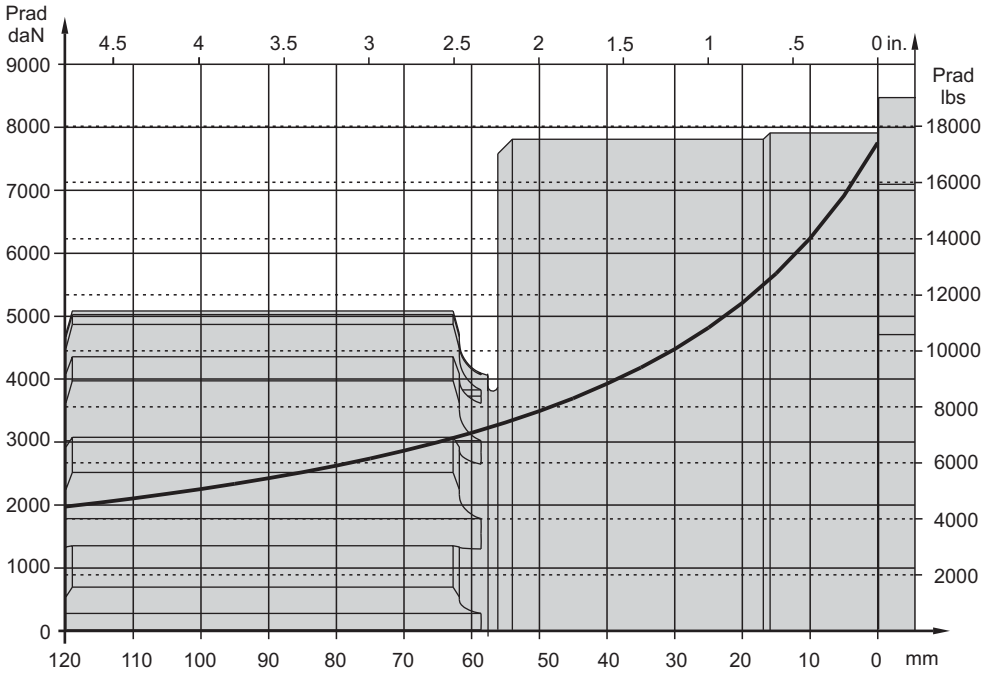
A,B: 7/16-20 UNF
D : 1/4-18 NPTF

Note: For different port's thread contact with "M+S Hydraulic".

mm [in]

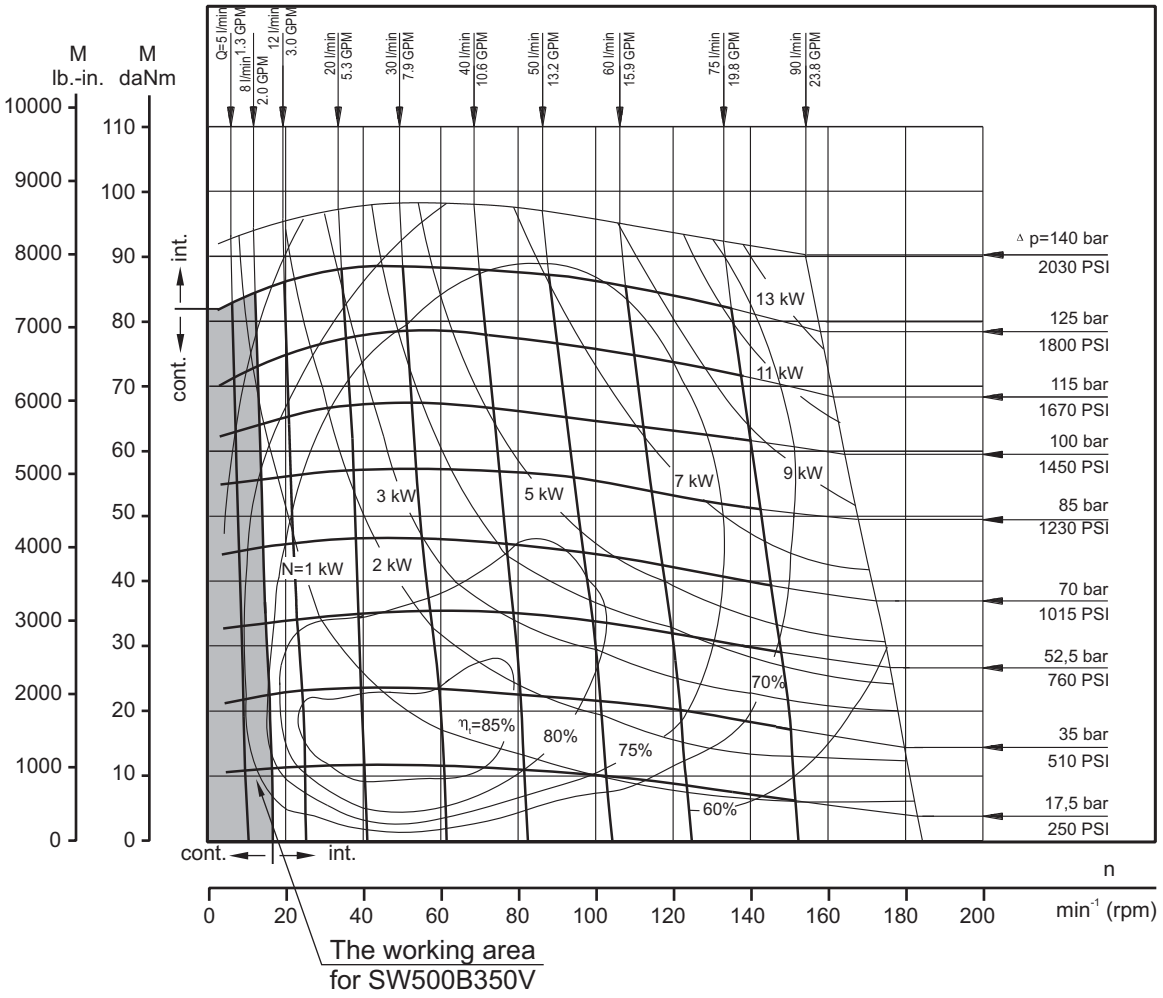
PERMISSIBLE SHAFT LOADS

The curve applies to a B10 bearing life of 3000 hours at 40 RPM.

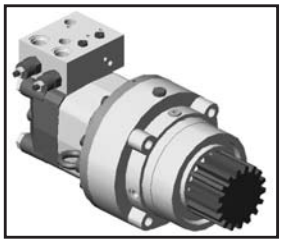


FUNCTION DIAGRAMS

SW 500

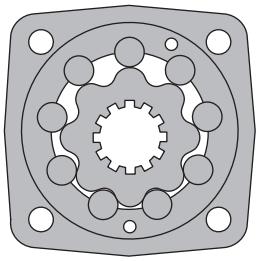


HYDRAULIC MOTOR-BRAKES TW500B350...V



APPLICATION

» Wheel drives
» Conveyors
» Rotators
» Positioners
» Winches
» Swing drives
» Door openers



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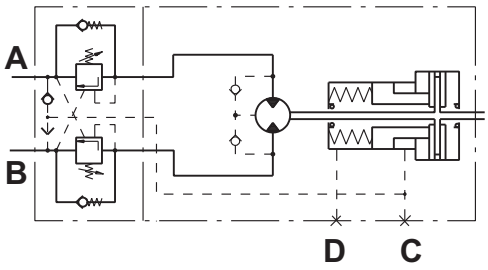
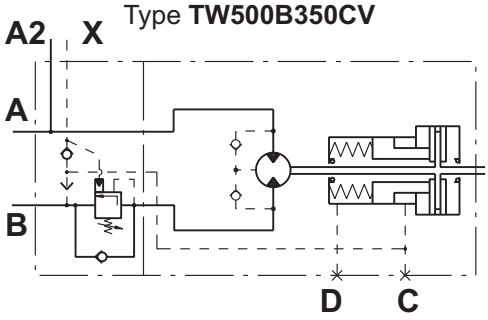
Motor-Brake
Type **TW500B350V**



Motor-Brake
Type **TW500B350CV**

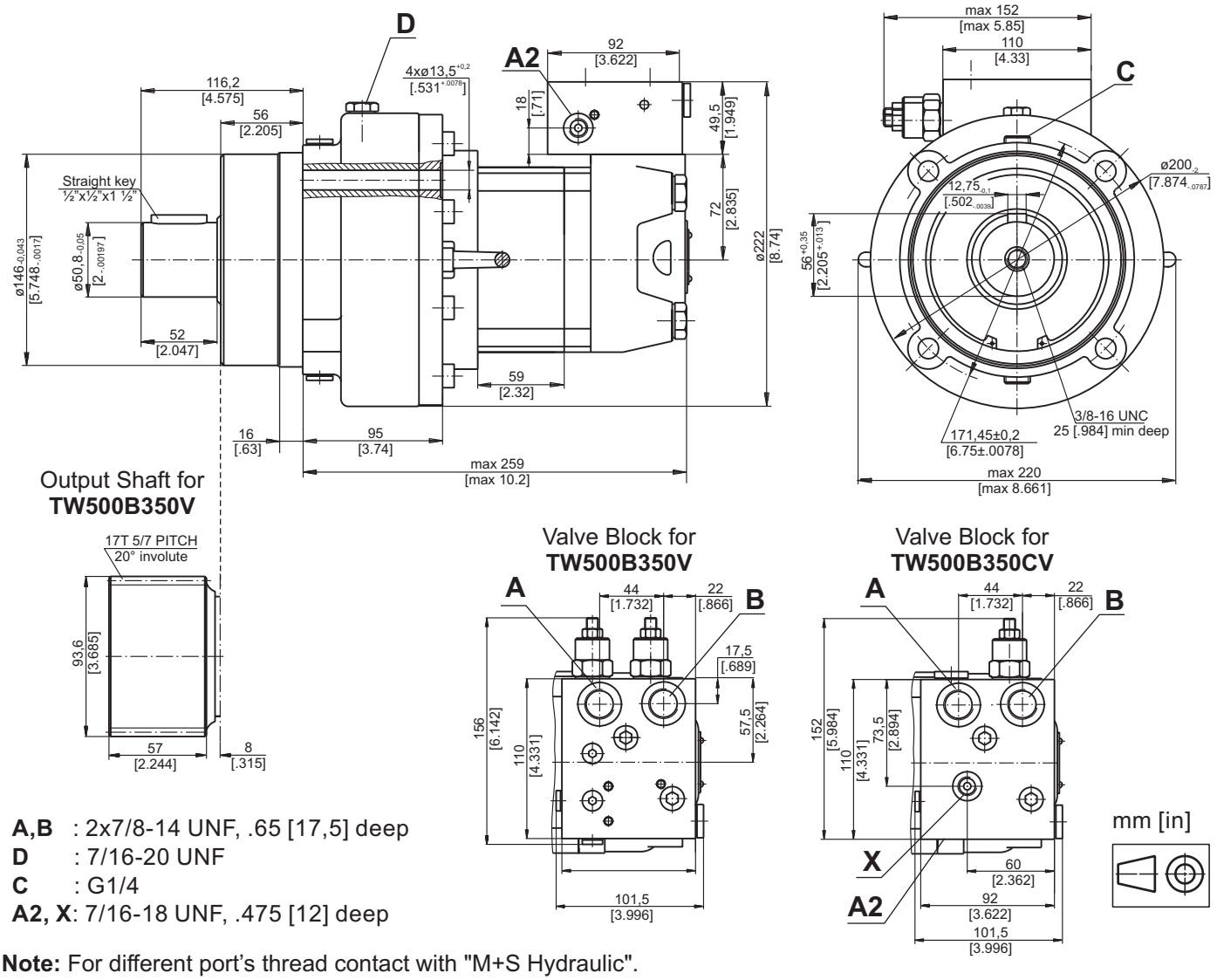


SPECIFICATION DATA

Type		TW500B350...V
Displacement, cm³/rev [in³/rev]		475 [29]
Max. Speed,	Cont.	40
RPM	Int.*	60
Max. Torque,	Cont.	114 [10 000]
daNm [in-lb]	Int.*	135 [12 000]
Max. Output,	Cont.	4,1 [5.4]
kW [HP]	Int.*	7,0 [9.39]
Max. Pressure Drop,	Cont.	170 [2500]
bar [PSI]	Int.*	200 [2900]
Max. Oil Flow,	Cont.	20 [5.3]
lpm [GPM]	Int.*	35 [9.2]
Max. Return Pressure without Drain Line or Max. Pressure in Drain Line, bar [PSI]		75 [1088]
Min. Starting Torque,	At max. press. drop Cont.	95 [8400]
daNm [in-lb]	At max. press. drop Int.*	112 [9940]
Min. Speed, RPM**		5
Static Torque for the Brake*, daNm [in-lb]**		164 [14515]
Release Pressure ±10%,	initial	22,5...27,5 [326...400]
bar [PSI]	full	28...34 [406...493]
Max. Steering Pressure, bar [PSI]		245 [3553]
Max. Pressure in Drain Space for the Brake, bar [PSI]		0,5 [7]
Pilot Ratio for the Valve		4,25:1

* Intermittent operation: the permissible values may occur for max. 10% of every minute.
** For speeds of 5 RPM lower than given, consult factory or your regional manager.
*** Static torque is obtained at working pressure - 0 bar [0 PSI].

DIMENSIONS AND MOUNTING



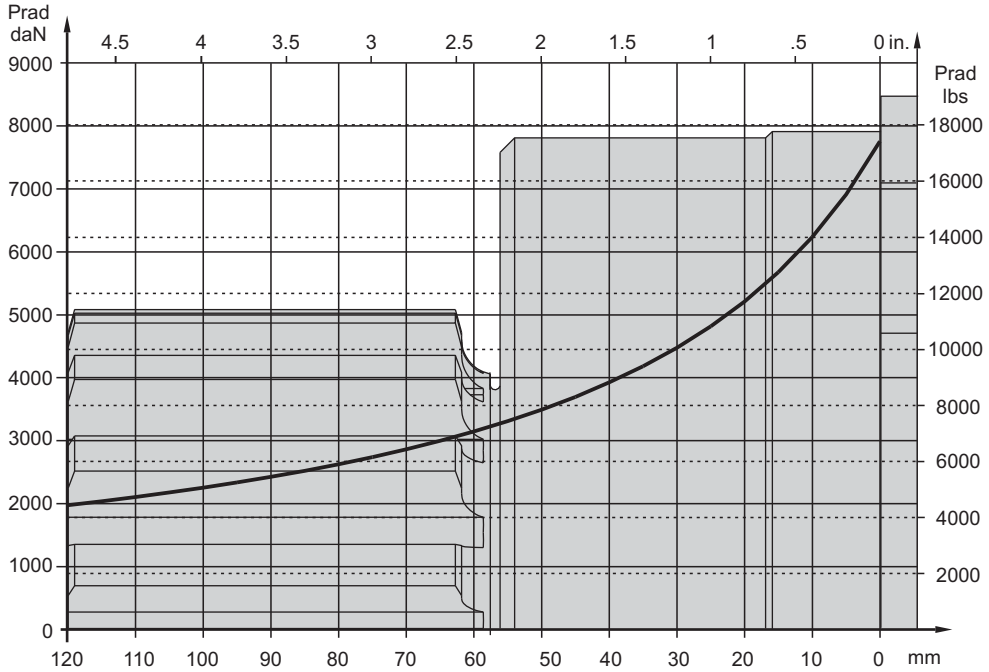
mm [in]

A,B : 2x7/8-14 UNF, .65 [17,5] deep
D : 7/16-20 UNF
C : G1/4
A2, X: 7/16-18 UNF, .475 [12] deep

Note: For different port's thread contact with "M+S Hydraulic".

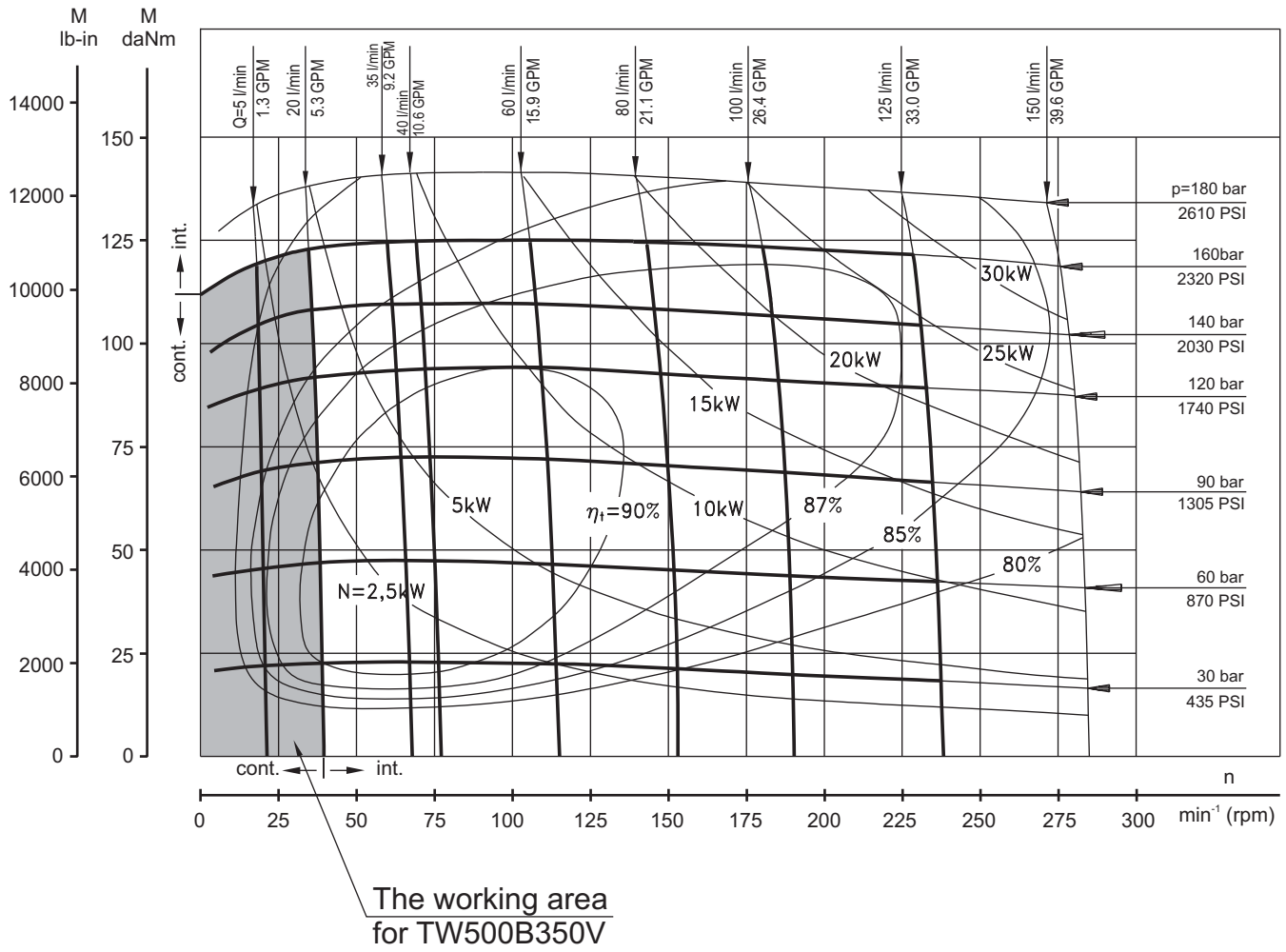
PERMISSIBLE SHAFT LOADS

The curve applies to a B10 bearing life of 3000 hours at 40 RPM.



FUNCTION DIAGRAMS

TW 500



ORDER CODE

				1		2
TW	500	B	350		V	

Pos.1 - **Shaft Extension***

omit - 17T 5/7 pitch 20° involute

C - Straight key ½"x½"x1 ½"

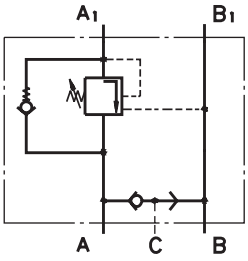
Pos.2 - **Design Series**

omit - Factory specified

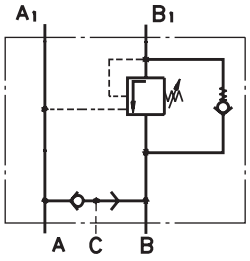
The hydraulic motor-brakes are mangano-phosphatized as standard.

VALVES FOR HYDRAULIC MOTORS

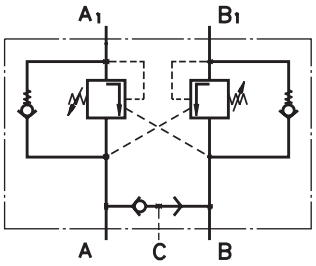
OVERCENTER VALVES WITH BRAKE CONTROL



Single Overcenter Valves with Brake Control type KPB … AE



Single Overcenter Valves with Brake Control type KPB … BE



Dual Overcenter Valves with Brake Control type KPB … D

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Valves for MV type KP...V 56
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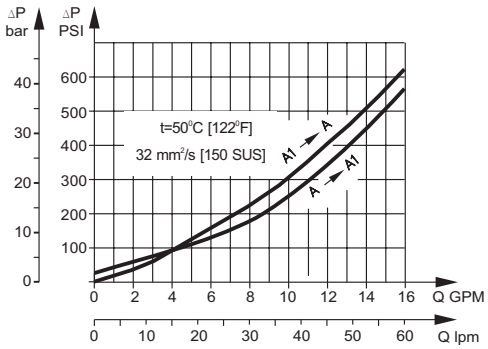
SPECIFICATION DATA

Parameters	Type									
	KPBR...E	KPBS...E	KPBW...E	KPBR...D	KPBS...D	KPBW...D	KPBT...E	KPBT...D	KPBV...E	KPBV...D
Flow Rate , l/min [GPM]	60 [15.85]						100 [26.4]		200 [52.8]	
Rated Pressure*, bar [PSI]	60÷280 [870÷4060]						70÷250 [1015÷3625]			
Pilot Ratio	4,25:1									
Weight , kg	3,020	2,900	3,350	3,060	2,920	3,400	5,400	5,800	9,200	9,750
[lb]	[6.658]	[6.393]	[7.385]	[6.746]	[6.437]	[7.496]	[11.905]	[12.787]	[20.283]	[21.495]

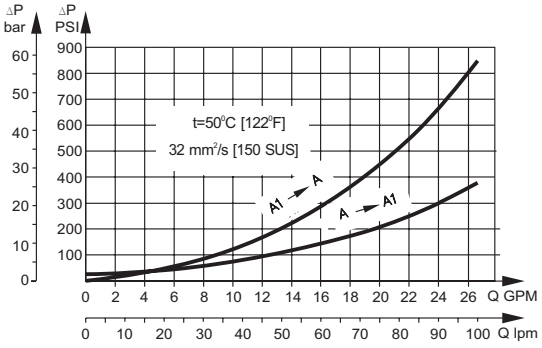
*Pressure Settings are at flow rate of 5 lpm [1.3 GPM] and viscosity 32 mm^2/s [150 SUS] at 50 ^{0}C [122^0 F].

PRESSURE LOSSES

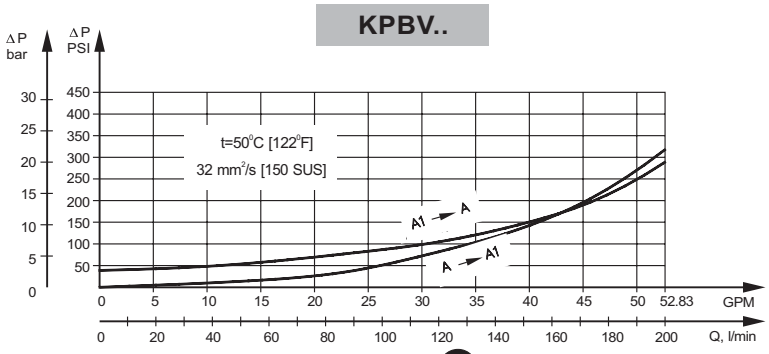
KPBR..., KPBS... and KPBW...



KPBT..

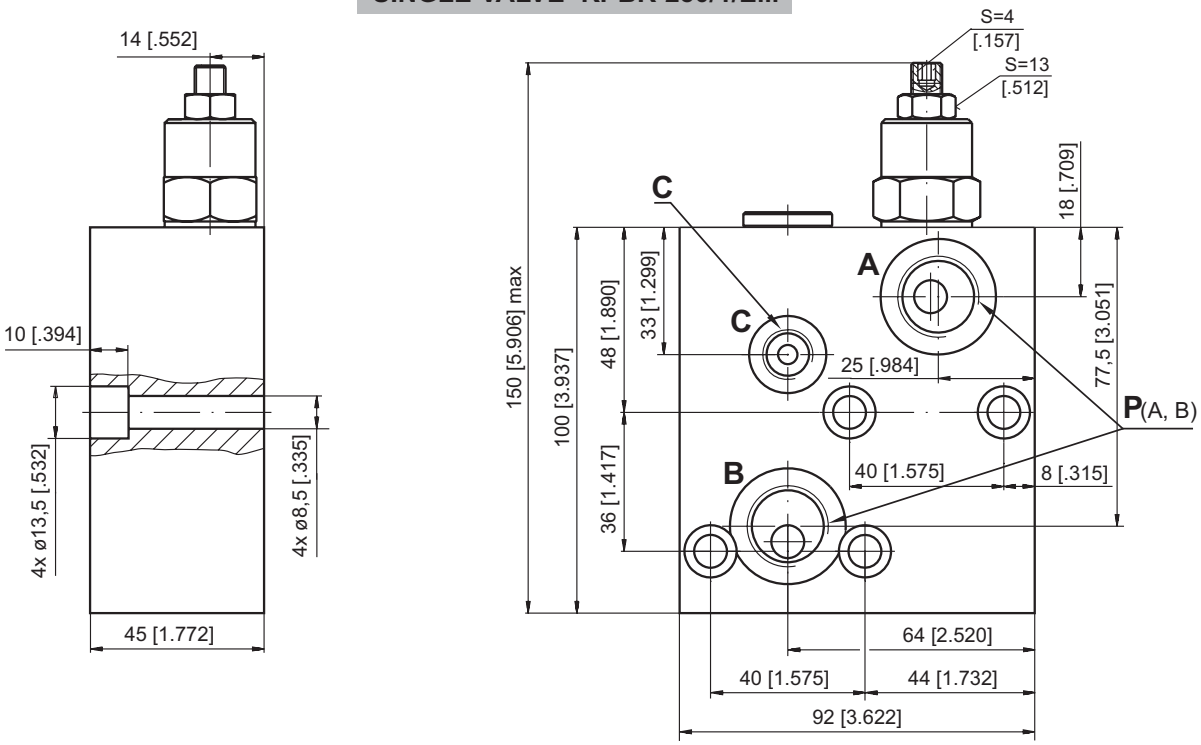


KPBV..

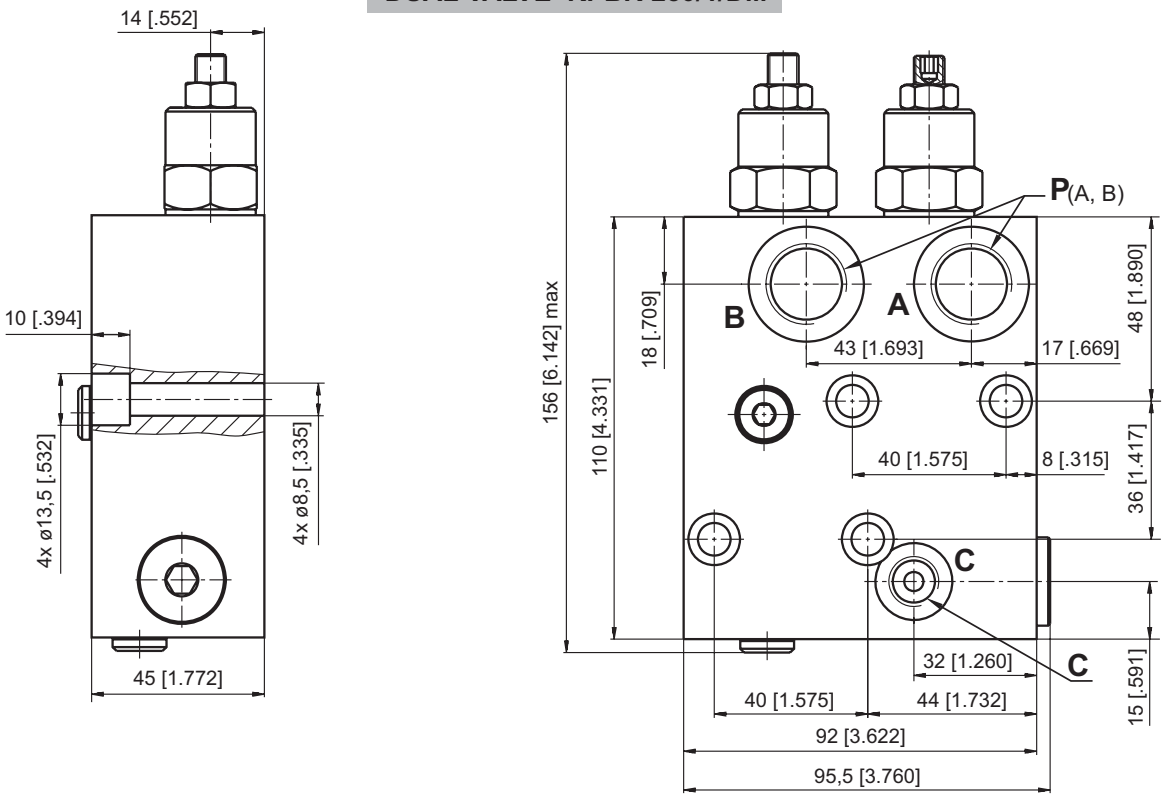


VALVES FOR MP, MR, MH HYDRAULIC MOTORS

SINGLE VALVE KPBR-250/1/E...



DUAL VALVE KPBR-250/1/D...



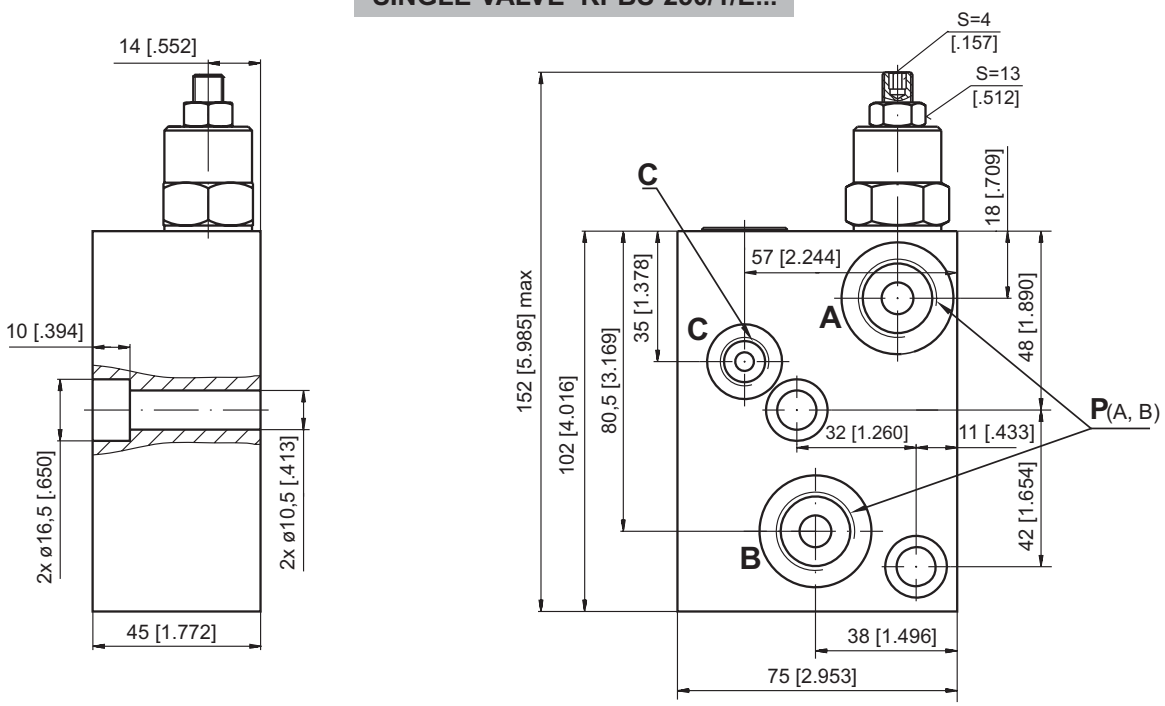
	Thread Ports - $P_{(A,B)}$	Thread Port - C
-	G1/2 16 [.63] depth	G1/4 12 [.47] depth
M	M22x1,5 16 [.63] depth	M14x1,5 12 [.47] depth
A	7/8 - 14 UNF O-ring 16 [.63] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth

mm [in]

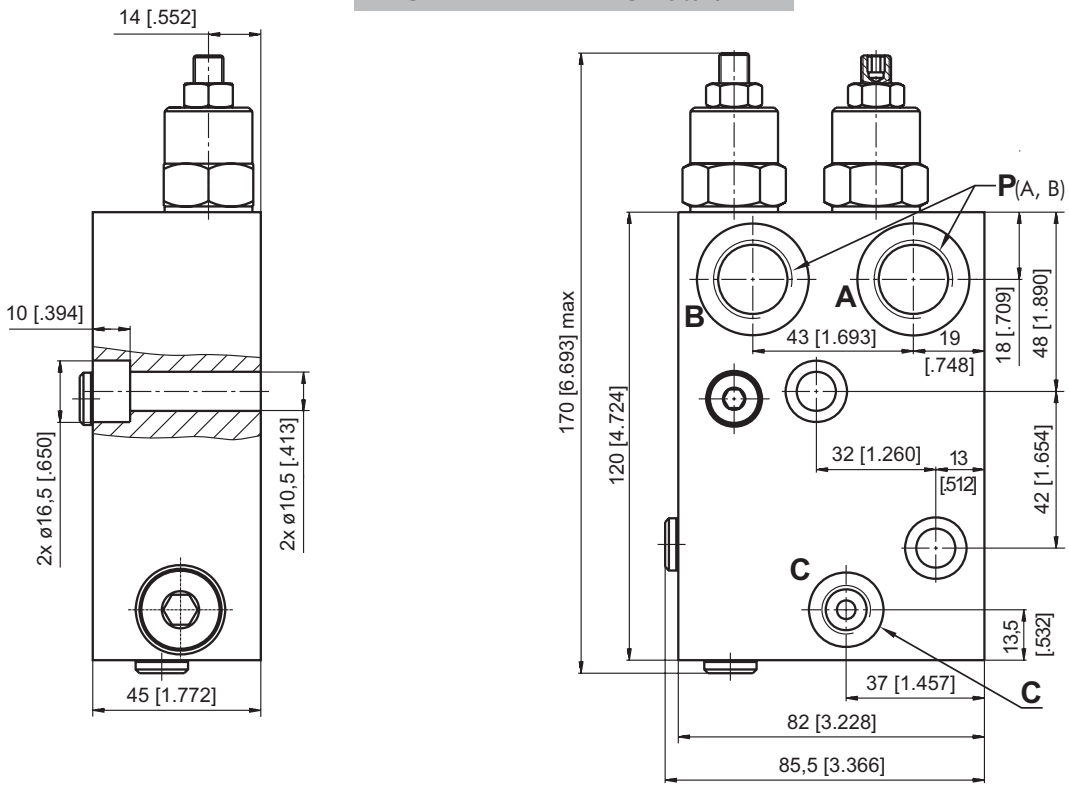
Note : KPBR Blocks are installed directly on MP, MR and MH Motors with four screws M8x45 - 8.8 DIN 912 or 5/16-18 UNC, 1.75 long ANSI B 18.3 . Tightening torque 1,8 daNm [160 lb-in].

VALVES FOR MS HYDRAULIC MOTORS

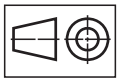
SINGLE VALVE KPBS-250/1/E...



DUAL VALVE KPBS-250/1/D...



	Thread Ports - $P_{(A,B)}$	Thread Port - C
-	G1/2 16 [.63] depth	G1/4 12 [.47] depth
M	M22x1,5 16 [.63] depth	M14x1,5 12 [.47] depth
A	7/8 - 14 UNF O-ring 16 [.63] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth

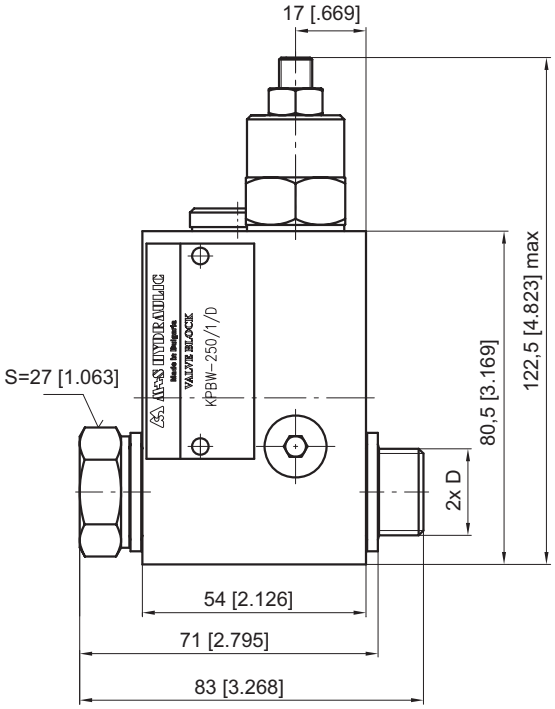


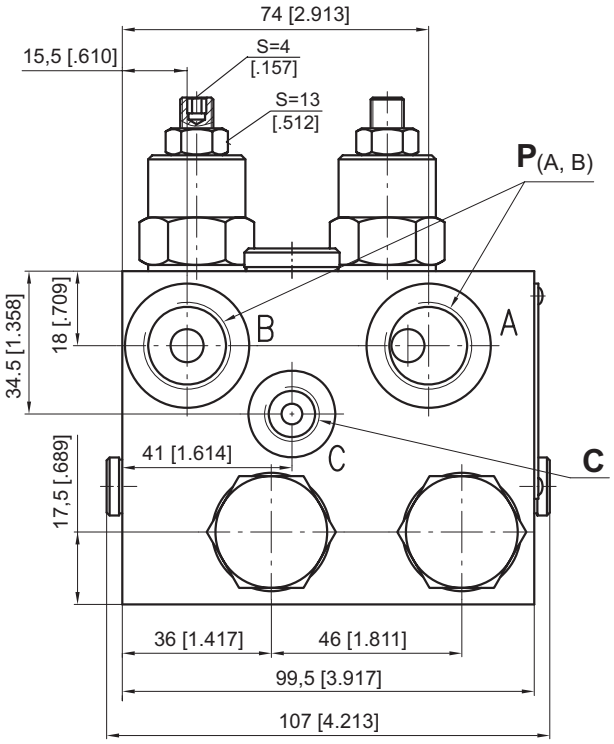
mm [in]

Note : KPBS Blocks are installed directly on MS Motors with two screws M10x45 - 8.8 DIN 912 or 3/8-16UNC, 1.75 long ANSI B 18.3 . Tightening torque 3,5 daNm [310 lb-in].

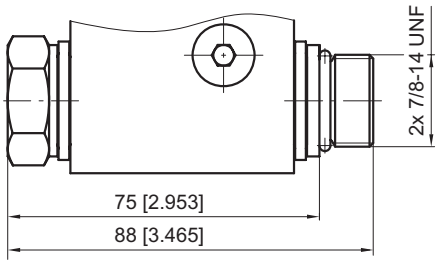
VALVES FOR RW and HW HYDRAULIC MOTORS

DUAL VALVE KPBW-250/1/D...

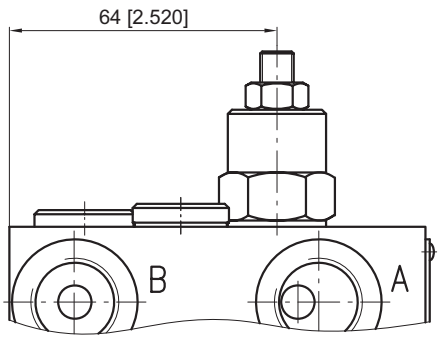




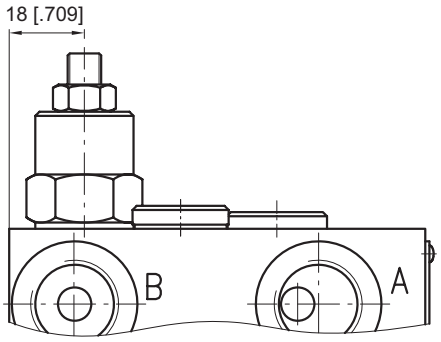
KPBW-...A



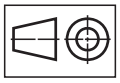
SINGLE VALVE KPBW-250/1/AE...



SINGLE VALVE KPBW-250/1/BE...



	Thread Ports - $P_{(A,B)}$	Thread Port - C	Thread Ports - D
-	G1/2 16 [.63] depth	G1/4 12 [.47] depth	G1/2 12 [.47] length
M	M22x1,5 16 [.63] depth	M14x1,5 12 [.47] depth	M22x1,5 12 [.47] length
A	7/8 - 14 UNF O-ring 16 [.63] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth	7/8 - 14 UNF O-ring 13 [.51] length

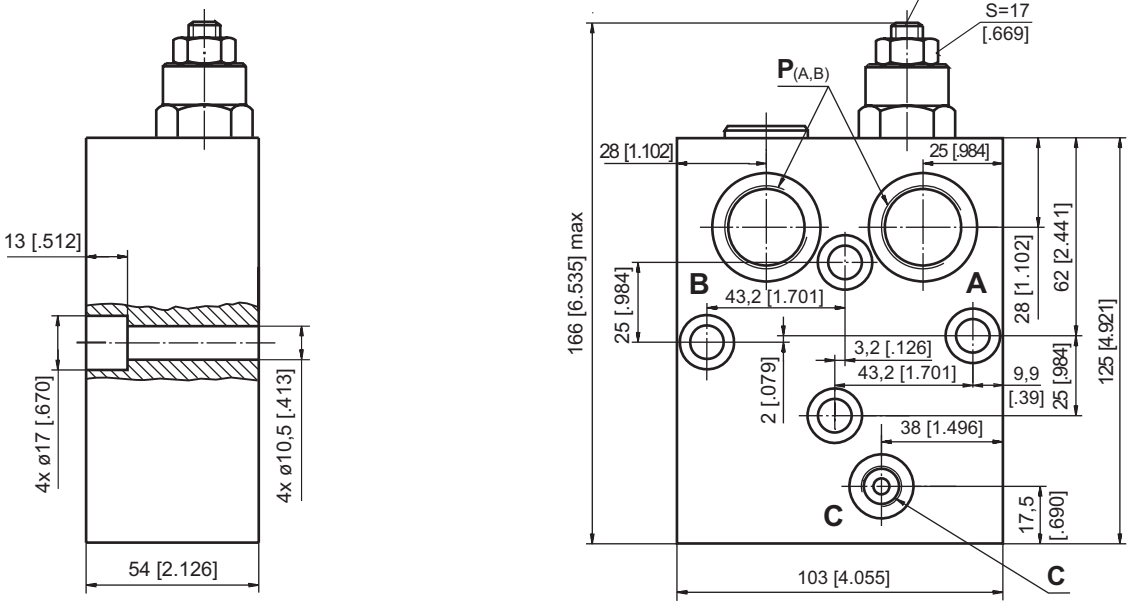


mm [in]

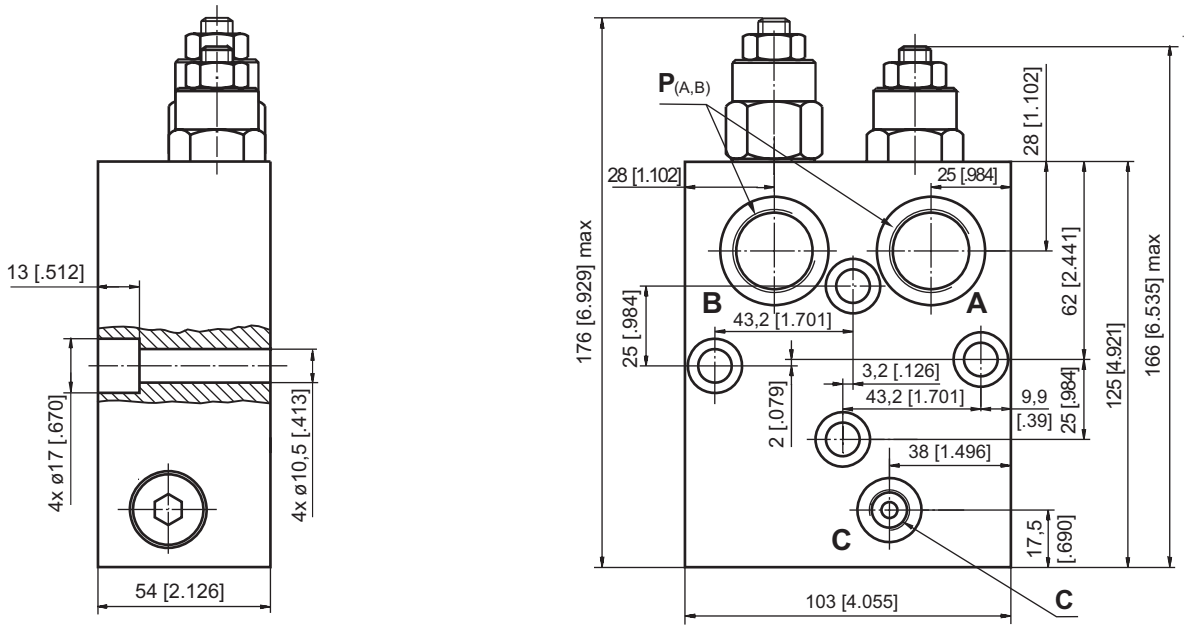
Note : KPBW Blocks assembly to RW or HW motors is done with two screws (thread D) included in the valve set. Tightening torque 8 daNm [710 lb-in].

VALVES FOR MT HYDRAULIC MOTORS

SINGLE VALVE KPBT-250/1/E...



DUAL VALVE KPBT-250/1/D...



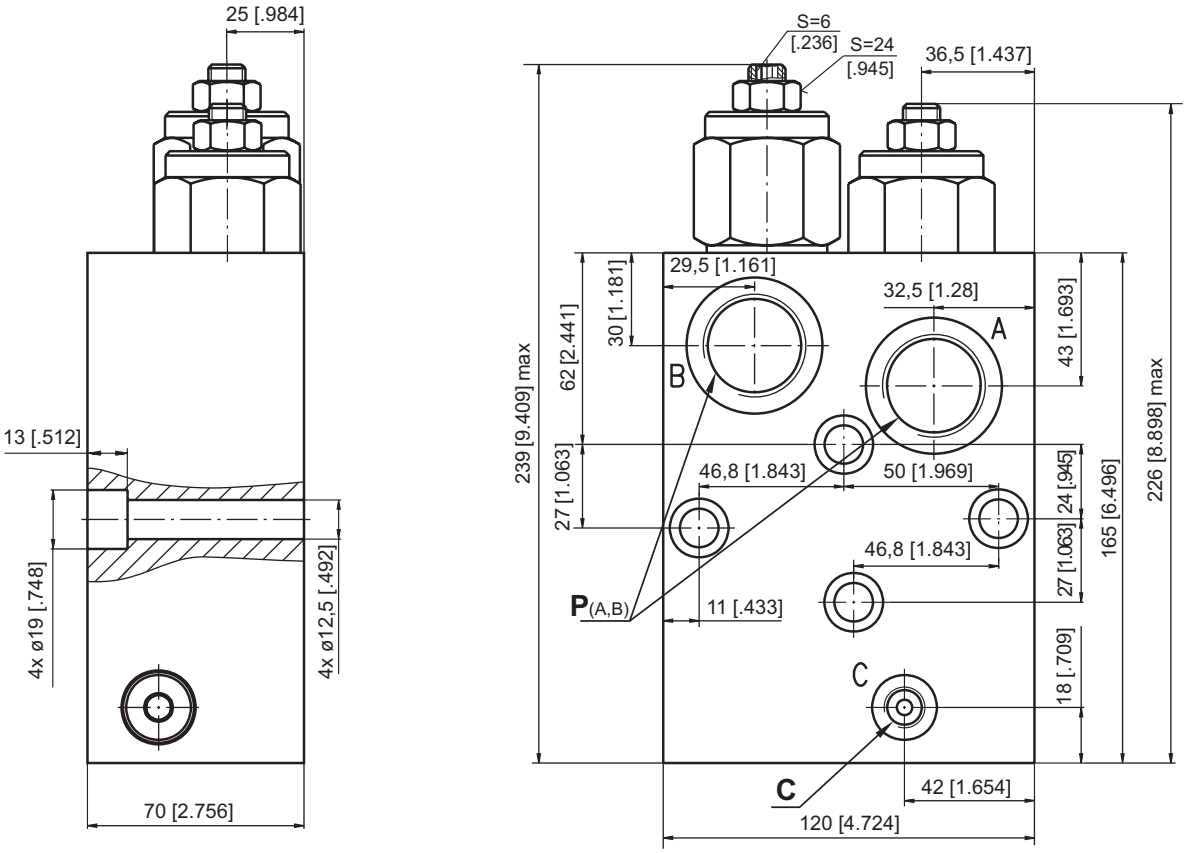
	Thread Ports - $P_{(A,B)}$	Thread Port - C
-	G3/4 17 [.67] depth	G1/4 14 [.55] depth
M	M27x2 17 [.67] depth	M14x1,5 14 [.55] depth
A	1 1/16-12 UN O-ring 17 [.67] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth

mm [in]

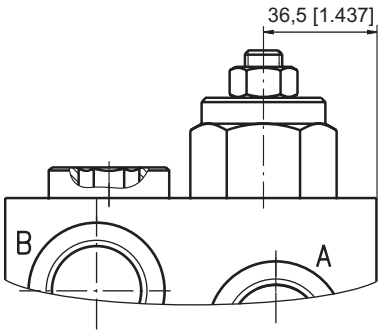
Note : KPBT Blocks are installed directly on MT Motors with four screws M10x50 - 8.8 DIN 912. Tightening torque 3,5 daNm [310 lb-in].

VALVES FOR MV HYDRAULIC MOTORS

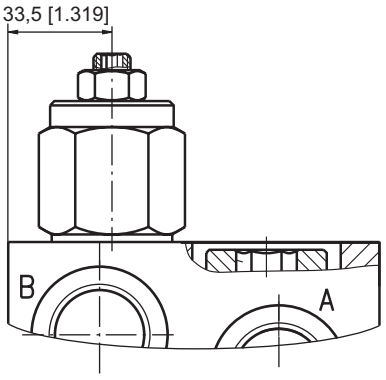
DUAL VALVE KPBV-250/1/D...



SINGLE VALVE KPBV-250/1/AE...



SINGLE VALVE KPBV-250/1/BE...

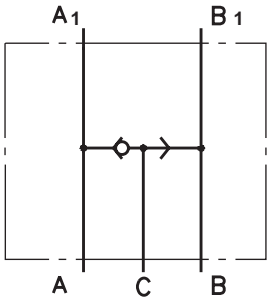


	Thread Ports - $P_{(A,B)}$	Thread Port - C
-	G 1 20 [.79] depth	G1/4 14 [.55] depth
M	M33x2 20 [.79] depth	M14x1,5 14 [.55] depth
A	1 5/16 - 12 UN O-ring 20 [.79] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth

mm [in]

Note : KPBV Blocks are installed directly on MV Motors with four screws M12x70 - 8.8 DIN 912. Tightening torque 6,5 daNm [575 lb-in].

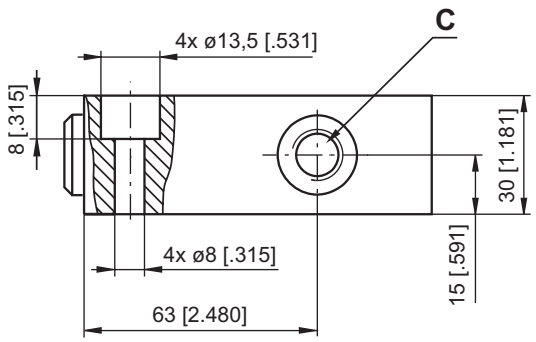
SWITCH VALVE

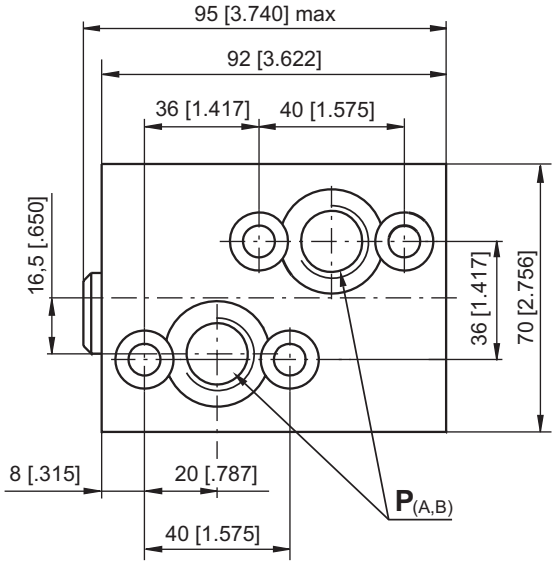


SPECIFICATION DATA

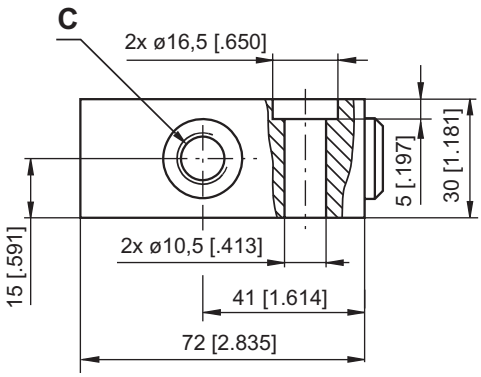
Parameters		Type	
		KPWR	KPWS
Flow Rate , l/min [GPM]		60 [15.85]	
Rated Pressure , bar [PSI]		250 [3625]	
Weight ,	kg	0,850	0,670
	[lb]	[1.874]	[1.477]

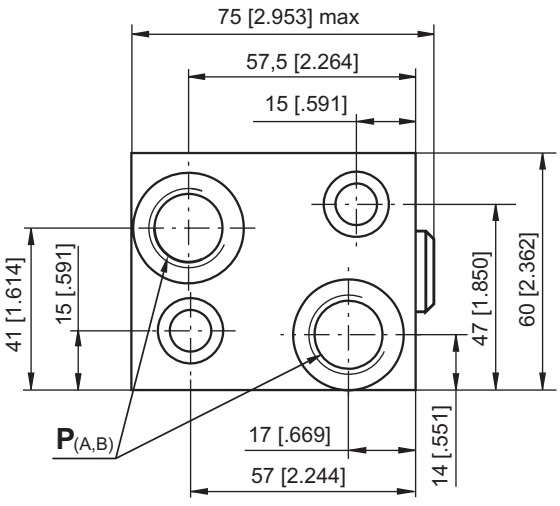
VALVE FOR MP, MR, MH HYDRAULIC MOTORS KPWR





VALVE FOR MS HYDRAULIC MOTORS KPWS





	Thread Ports - $P_{(A,B)}$	Thread Port - C
-	G1/2 17 [.67] depth	G1/4 14 [.55] depth
M	M22x1,5 17 [.67] depth	M14x1,5 14 [.55] depth
A	7/8 - 14 UNF O-ring 17 [.67] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth

mm [in]

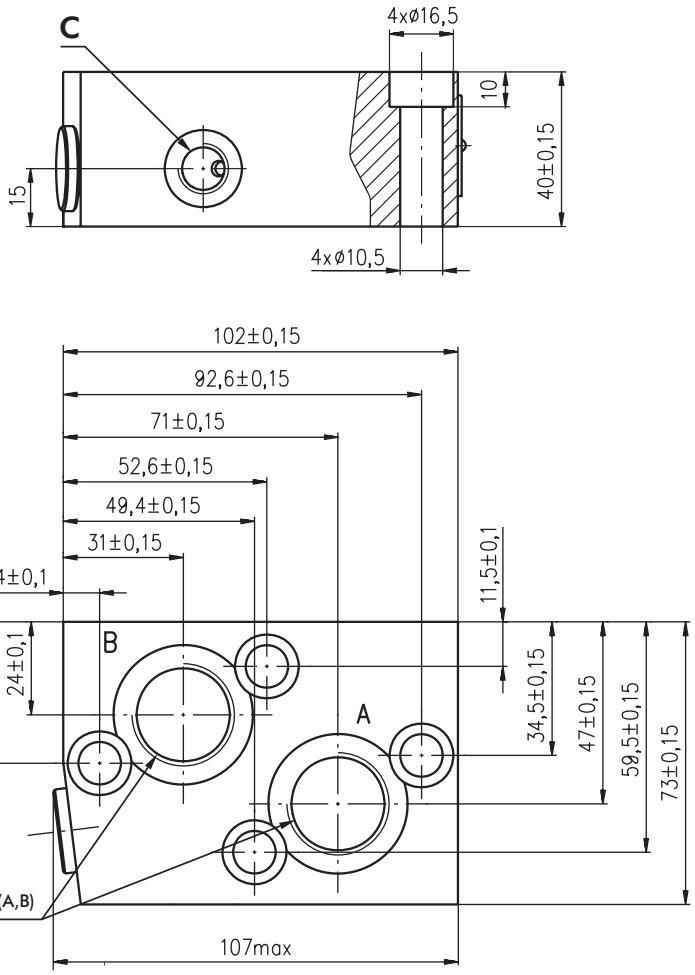
Note : KPWR Blocks are installed directly on MP, MR and MH Motors with four screws M8x35 - 8.8 DIN 912 or 5/16-18UNC, 1.5 long ANSI B 18.3 . Tightening torque 1,8 daNm [160 lb-in].
KPWS Blocks are installed directly on MS Motors with two screws M10x35 - 8.8 DIN 912 or 3/8-16UNC, 1.5 long ANSI B 18.3 . Tightening torque 3,5 daNm [336 lb-in].

SWITCH VALVE (continued)

SPECIFICATION DATA

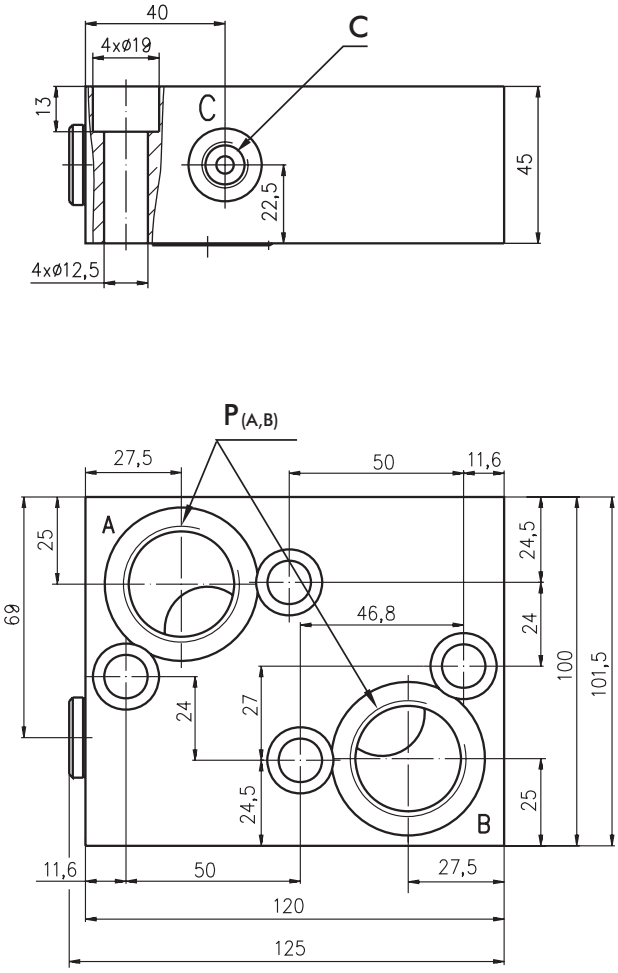
Parameters	Type	
	KPWT	KPWV
Flow Rate , l/min	100	200
Rated Pressure , bar	250	
Weight , kg	1,800	3,150

VALVE FOR MT HYDRAULIC MOTORS KPWT



P(A, B) **:** G3/4 (M27x2), 17 mm depth
C **:** G1/4 (M14x1,5), 14 mm depth

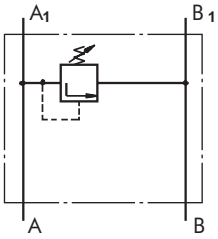
VALVE FOR MV HYDRAULIC MOTORS KPWV



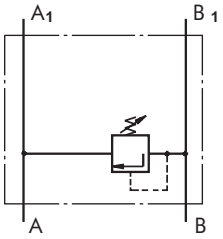
P(A, B) **:** G1-A (M33x2), 20 mm depth
C **:** G1/4 (M14x1,5), 14 mm depth

Note : KPWT Blocks are installed directly on MT Motors with four screws M10x40 - 8.8 DIN 912.
Tightening torque $3,5^{+0,3}$ daNm.
KPWV Blocks are installed directly on MV Motors with four screws M12x45 - 8.8 DIN 912.
Tightening torque $6,5^{+0,5}$ daNm.

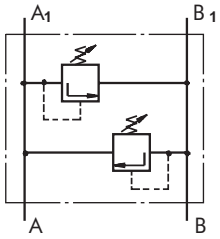
CROSSOVER RELIEF VALVES



Single Crossover
Relief Valve
type KPE …



Single Crossover
Relief Valve
type KPE …



Dual Crossover
Relief Valve
type KPD …

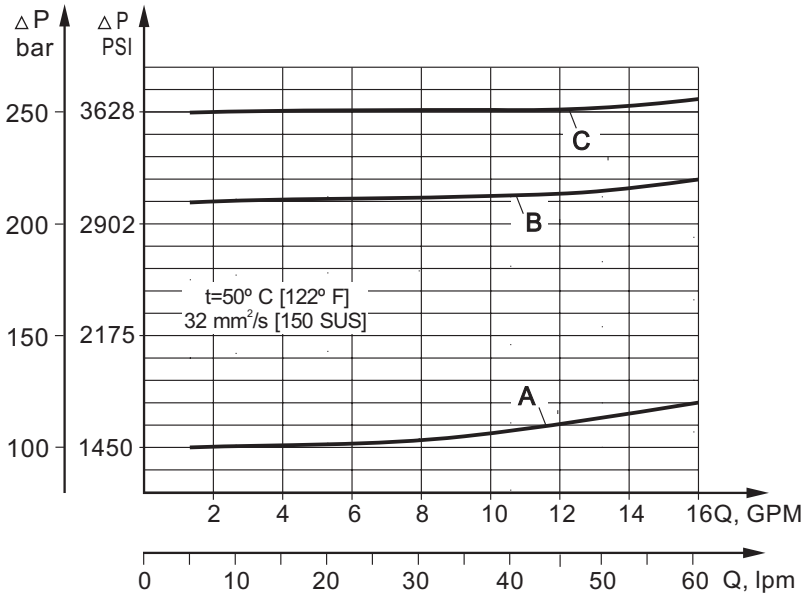
SPECIFICATION DATA

Parameters	Type			
	KPER	KPDR	KPES	KPDS
Flow Rate , lpm [GPM]	60 [15.85]			
Pressure Range* , bar [PSI]	30 ÷ 100; [435÷1450];	50 ÷ 210; [725÷3050];	80 ÷ 300 [1160÷4350]	
Weight , kg [lb]	1,55 [3.42]		1,50 [3.31]	

*Pressure Settings are at flow rate of 5 lpm [1.32 GPM] and viscosity 32 mm^2/s [150 SUS] (50 ^{0}C [122^0 F]).

Rated Pressure

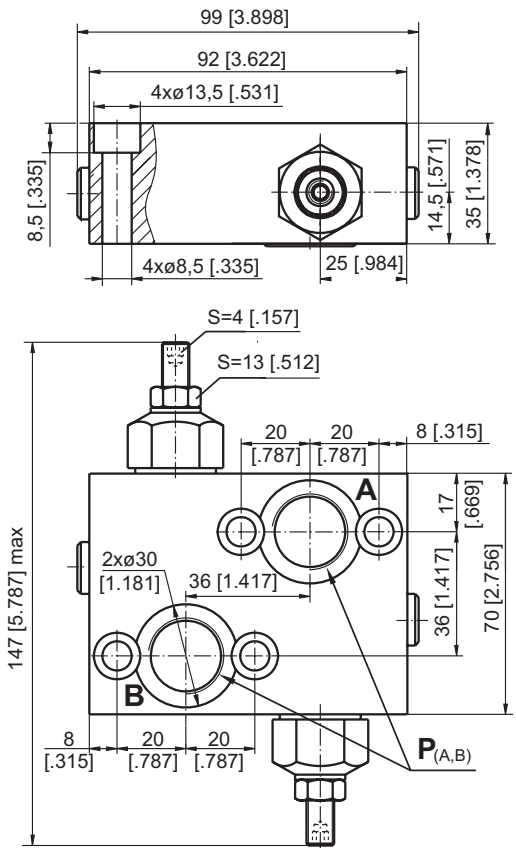
A → 100 bar [1450 PSI]
B → 210 bar [3050 PSI]
C → 250 bar [3625 PSI]



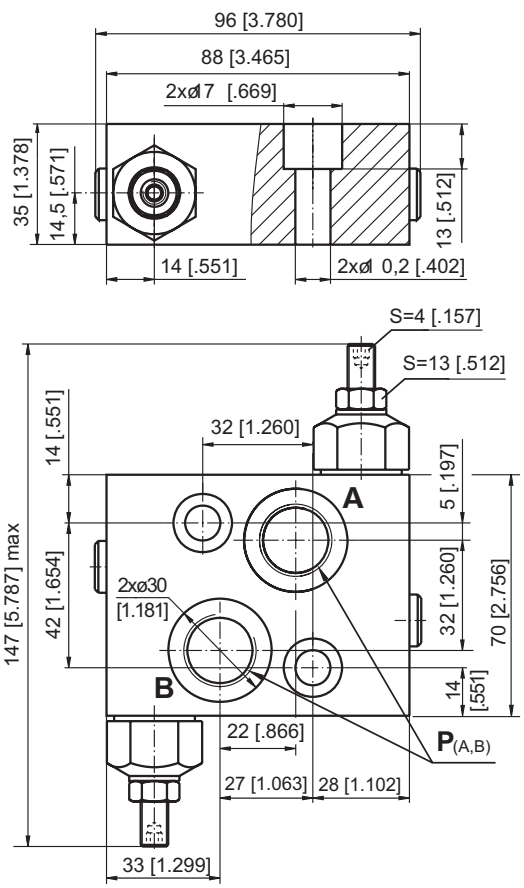
VALVES FOR MP, MR, MH HYDRAULIC MOTORS

VALVES FOR MS HYDRAULIC MOTORS

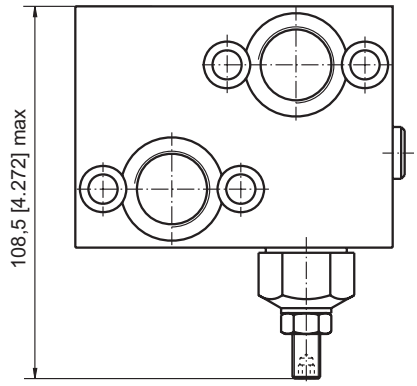
DUAL VALVE KPDR



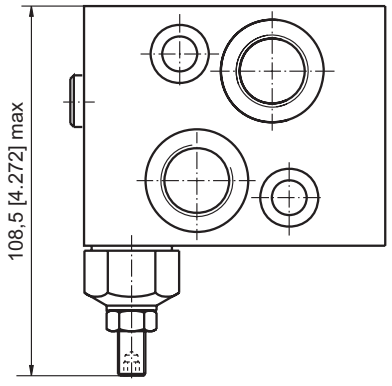
DUAL VALVE KPDS



SINGLE VALVE KPER



SINGLE VALVE KPES



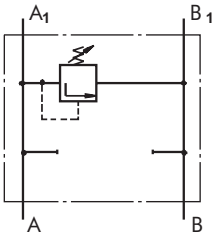
mm [in]

	Thread Ports - $P_{(A,B)}$
-	G1/2 20 [.79] depth
M	M22x1,5 20 [.79] depth
A	7/8 - 14 UNF O-ring 20 [.79] depth

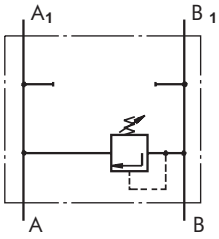
Note : KPDR and **KPER** Blocks are installed directly on MP, MR and MH Motors with four screws M8x35 - 8.8 DIN 912 or 5/16-18 UNC, 1.5 long ANSI B 18.3 . Tightening torque 1,8 daNm [160 lb-in].

KPDS and **KPES** Blocks are installed directly on MS Motors with two screws M10x35 - 8.8 DIN 912 or 3/8-16 UNC, 1.5 long ANSI B 18.3 . Tightening torque 3,5 daNm [310 lb-in].

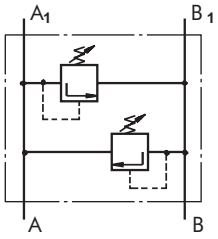
VALVES FOR RW and HW HYDRAULIC MOTORS



Single Crossover
Relief Valve
type KPEAW ...



Single Crossover
Relief Valve
type KPEBW ...



Dual Crossover
Relief Valve
type KPDW ...

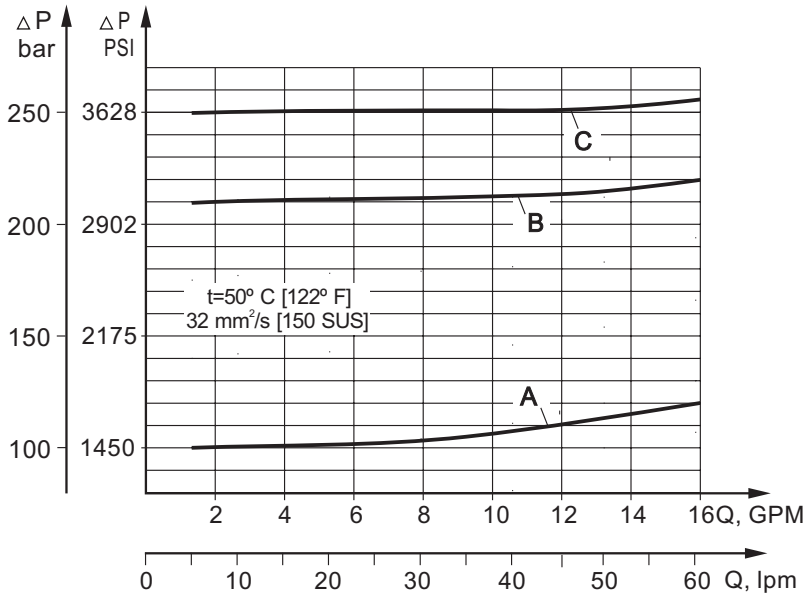
SPECIFICATION DATA

Parameters	Type	
	KPE...W	KPDW
Flow Rate , lpm [GPM]	60 [15.85]	
Pressure Range* , bar	5 ÷ 40; 30 ÷ 100; 80 ÷ 250	
[PSI]	[75÷580]; [435÷1450]; [1160÷3625]	
Weight , kg	1,80	2,90
[lb]	[3.97]	[6.39]

*Pressure Settings are at flow rate of 5 lpm [1.32 GPM] and viscosity 32 mm^2/s [150 SUS] (50 ^{0}C [122^0 F]).

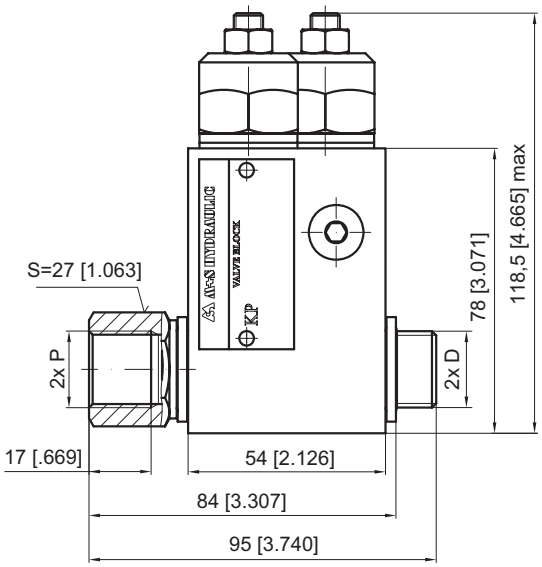
Rated Pressure

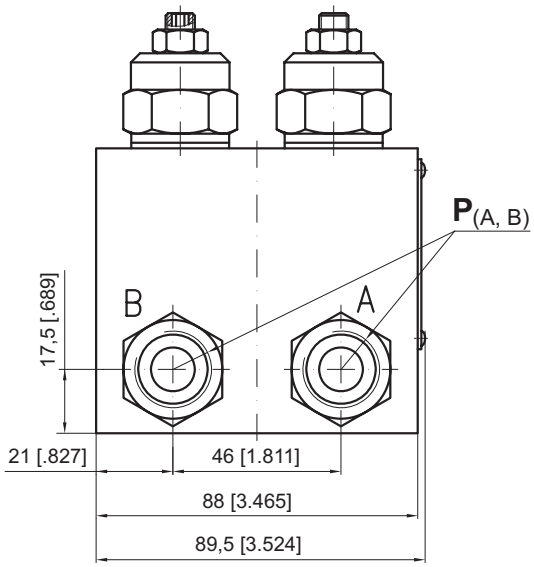
A → 100 bar [1450 PSI]
B → 210 bar [3050 PSI]
C → 250 bar [3625 PSI]



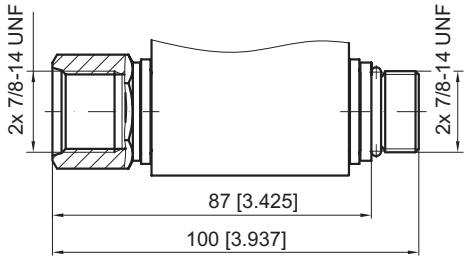
VALVES FOR RW and HW HYDRAULIC MOTORS

DUAL VALVE KPDW...

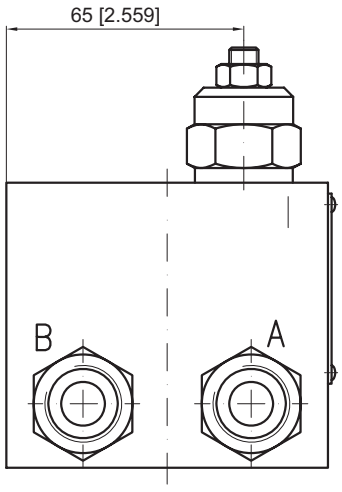




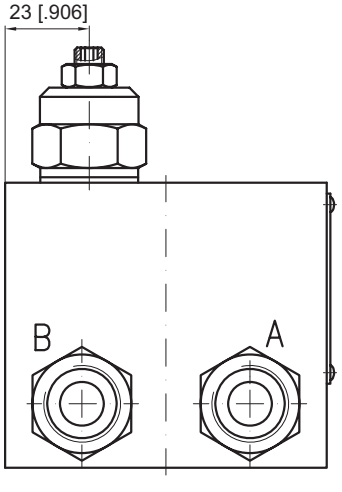
KPDW-...A



SINGLE VALVE KPEAW...



SINGLE VALVE KPEBW...

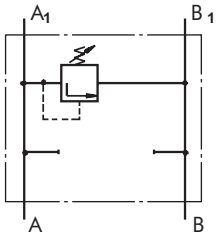


mm [in]

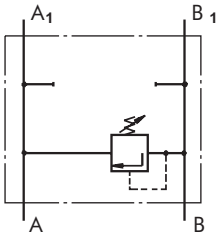
	Thread Ports - $P_{(A,B)}$	Thread Ports - D
-	G1/2 16 [.63] depth	G1/2 12 [.47] length
M	M22x1,5 16 [.63] depth	M22x1,5 12 [.47] length
A	7/8 - 14 UNF O-ring 16 [.63] depth	7/8 - 14 UNF O-ring 13 [.51] length

Note : KPDW and **KPE..W** Blocks assembly to RW or HW motors is done with two screws (thread **D**) included in the valve set. Tightening torque 8 daNm [710 lb-in].

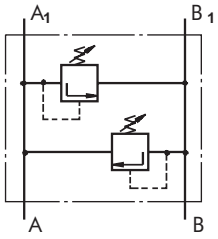
VALVES FOR MT HYDRAULIC MOTORS



Single Crossover
Relief Valve
type KPEAT ...



Single Crossover
Relief Valve
type KPEBT ...



Dual Crossover
Relief Valve
type KPDT ...

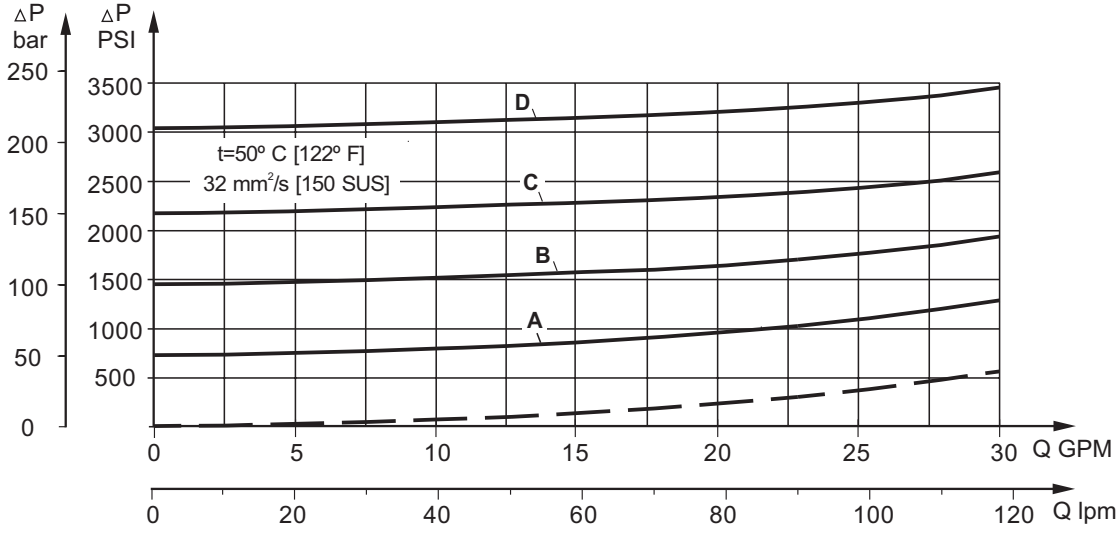
SPECIFICATION DATA

Parameters	Type	
	KPE...T	KPDT
Flow Rate , lpm [GPM]	120 [32]	
Pressure Range* , bar [PSI]	80÷210 [1160÷3050]	
Weight , kg [lb]	5,10 [11.24]	5,54 [12.21]

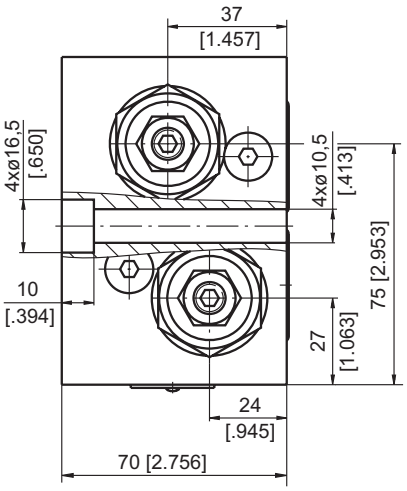
*Pressure Settings are at flow rate of 5 lpm [1.32 GPM] and viscosity 32 mm^2/s [150 SUS] (50 ^0C [122^0 F]).

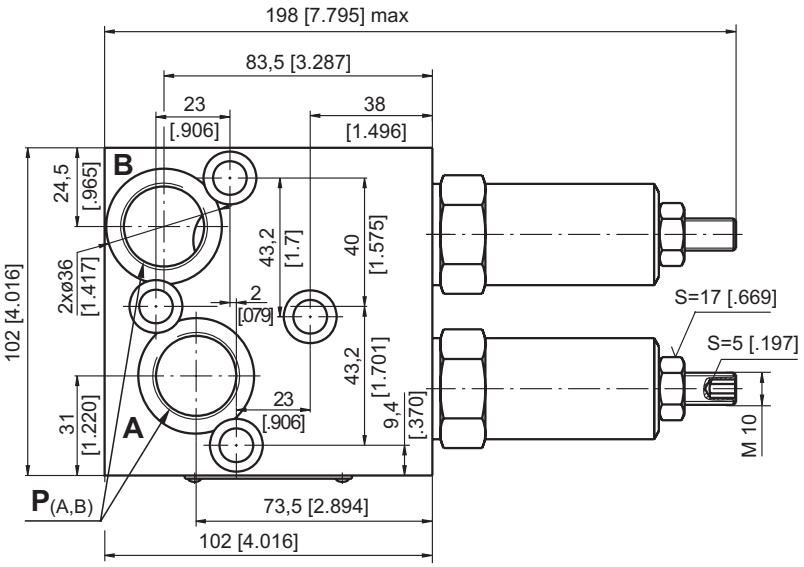
Rated Pressure

A → 50 bar [725 PSI]
B → 100 bar [1450 PSI]
C → 150 bar [2175 PSI]
D → 210 bar [3045 PSI]

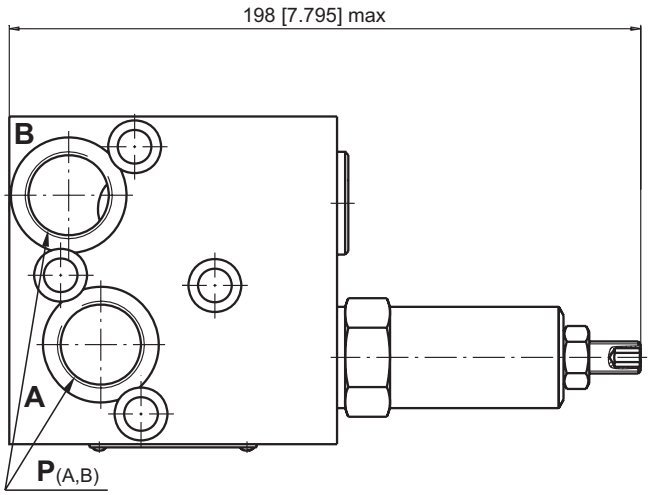


DUAL VALVE KPDT...

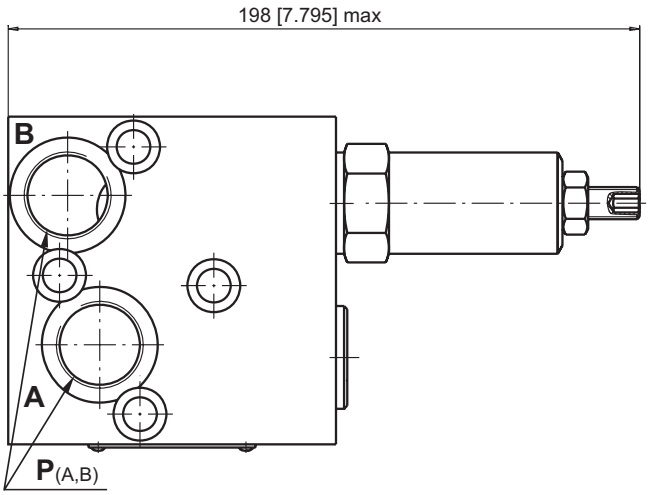




SINGLE VALVE KPEAT...



SINGLE VALVE KPEBT...

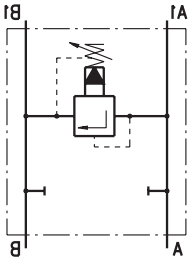


mm [in]

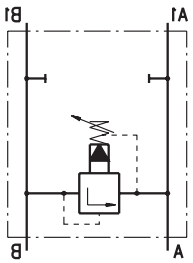
	Thread Ports - $P_{(A,B)}$
-	G3/4 20 [.79] depth
M	M27x2 20 [.79] depth
A	$1^{1}/_{16}$-12 UN O-ring 20 [.79] depth

Note : KPDT and **KPE...T** Blocks are installed directly on MT Motors with four screws M10x70 - 8.8 DIN 912. Tightening torque 3,5 daNm [310 lb-in].

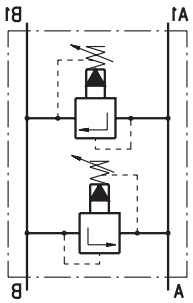
VALVES FOR MV HYDRAULIC MOTORS



Single Crossover
Relief Valve
type KPEAV ...



Single Crossover
Relief Valve
type KPEBV ...



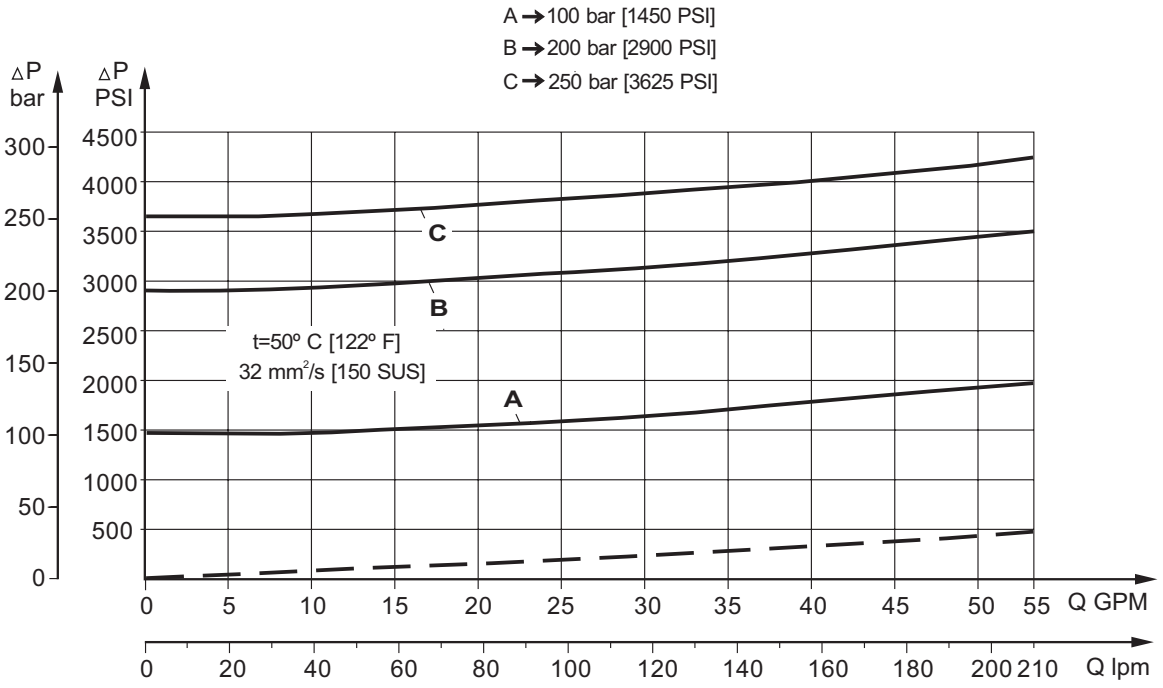
Dual Crossover
Relief Valve
type KPDV ...

SPECIFICATION DATA

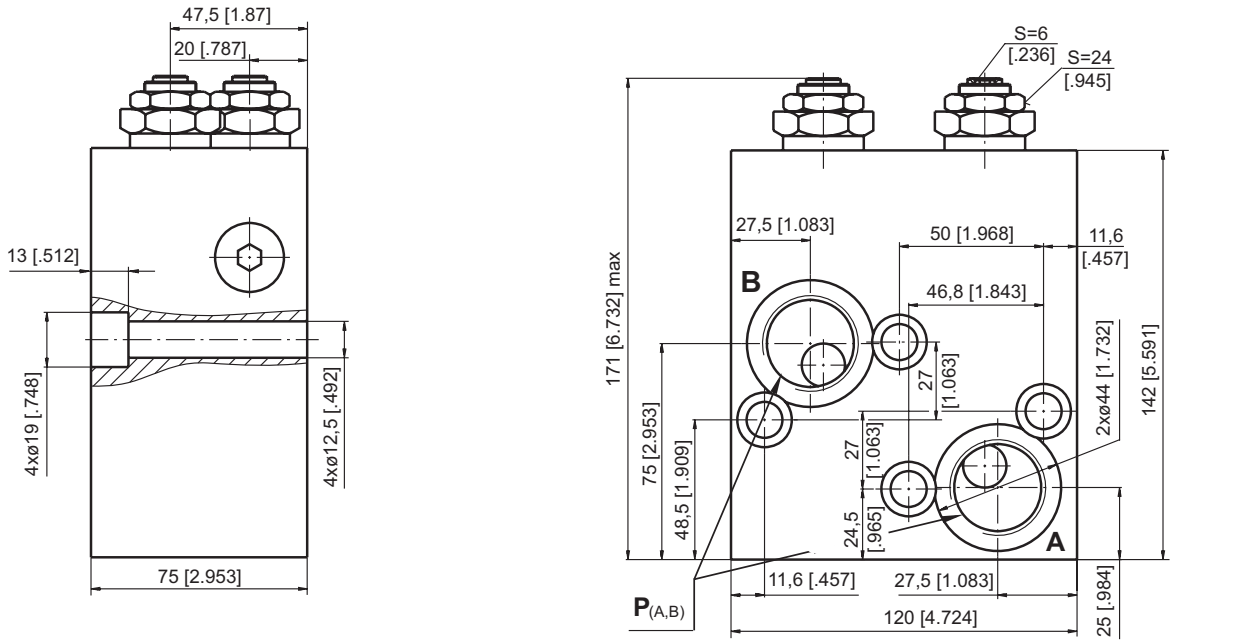
Parameters		Type		
		KPEAV	KPEBV	KPDV
Flow Rate , lpm [GPM]		200 [53]		
Pressure Range* , bar		10÷100; 20÷250		
[PSI]		[145÷1450]; [290÷3625]		
Weight ,	kg	4,90	7,10	8,00
	[lb]	[10.8]	[15.65]	[17.64]

*Pressure Settings are at flow rate of 5 lpm [1.3 GPM] and viscosity 32 mm^2/s [150 SUS] (50 ^{0}C [122^0 F]).

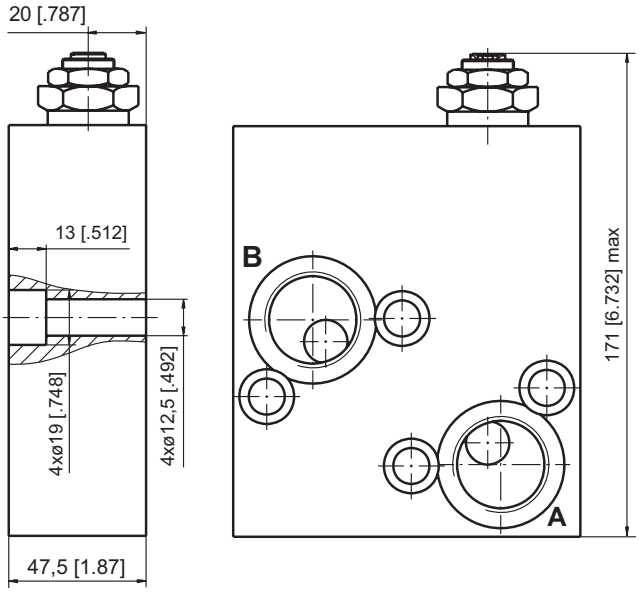
Rated Pressure



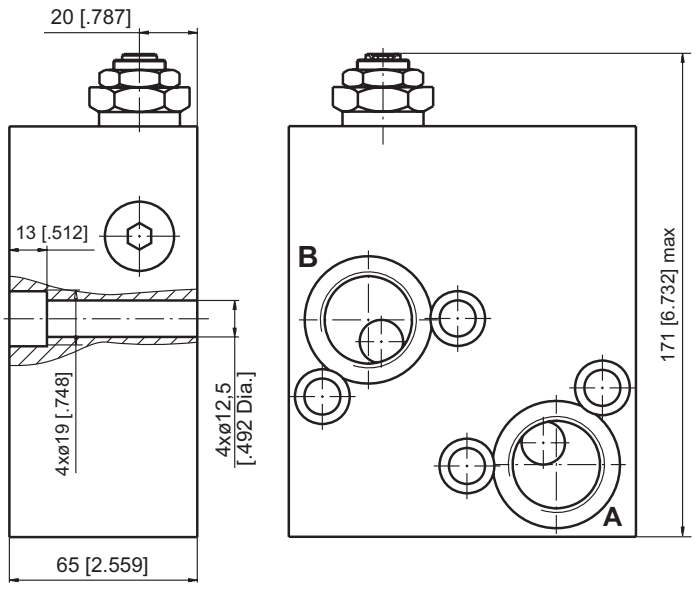
DUAL VALVE KPDV

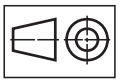


SINGLE VALVE KPEAV



SINGLE VALVE KPEBV





mm [in]

	Thread Ports - $P_{(A,B)}$
-	G1-A 20 [.79] depth
M	M33x2 20 [.79] depth
A	$1\,^{5}/_{16}$ -12 UN O-ring 20 [.79] depth

Note : KPDV Blocks are installed directly on MV Motors with four screws M12x75 - 8.8 DIN 912.
KPEAV Blocks are installed directly on MV Motors with four screws M12x50 - 8.8 DIN 912.
KPEBV Blocks are installed directly on MV Motors with four screws M12x65 - 8.8 DIN 912.
Tightening torque 7,5 daNm [665 lb-in].

KP VALVES

ORDER CODE - OVERCENTER VALVES WITH BRAKE CONTROL

1	2	3	4	5	6	7
K P B		-		/		/				

Pos.1 - Housing Type

R	- Valve block for MP, MR and MH Motors
S	- Valve block for MS Motors
W	- Valve block for RW and HW Motors
T	- Valve block for MT Motors
V	- Valve block for MV Motors

Pos.2 - Pressure Range, PSI [bar]

250	- 1015÷3625 [70÷250], Std Setting 250 bar@5 lpm

Pos.3 - Pilot Ratio

1	- 4,25:1

Pos.4 - Number of Valves

D	- Two Valves - Dual
E	- One Valve - Single (for **R** and **S** only)
AE	- One Valve on line A - Single (for **T, V** and **W** only)
BE	- One Valve on line B - Single (for **T, V** and **W** only)

Pos.5 - Threaded Ports

omit	- BSPP thread - ISO 228
M	- Metric thread - ISO 262
A	- Unified inch screw threads ANSI B 1.1 - 1982

Pos.6 - Option [Paint]**

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

Pos.7 - Design Series

omit - Factory specified

Notes: * Color at customer's request.

ORDER CODE - SWITCH VALVES

1	2	3	4
K P W				

Pos.1 - Housing Type

R	- Valve block for MP, MR and MH Motors
S	- Valve block for MS Motors
T	- Valve block for MT Motors
V	- Valve block for MV Motors

Pos.2 - Threaded Ports

omit	- BSPP thread - ISO 228
M	- Metric thread - ISO 262
A	- Unified inch screw threads ANSI B 1.1 - 1982

Pos.3 - Option [Paint]*

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

Pos.4 - Design Series

omit - Factory specified

Notes: * Color at customer's request.

ORDER CODE - CROSSOVER RELIEF VALVE

1	2	3	4	5	6
K P				/			

Pos.1 - Number of Valves

D	- Two Valves - Dual
E	- One Valve - Single (for **R** and **S** only)
EA	- One Valve on line A - Single (for **T, V** and **W** only)
EB	- One Valve on line B - Single (for **T, V** and **W** only)

Pos.2 - Housing Type

R	- Valve block for MP, MR and MH Motors
S	- Valve block for MS Motors
W	- Valve block for RW and HW Motors
T	- Valve block for MT Motors
V	- Valve block for MV Motors

Pos.3 - Pressure Range, bar [PSI]

100	- 30÷100 [435÷1450], Std Setting 100 bar@5 lpm
210	- 50÷210 [725÷3050], Std Setting 210 bar@5 lpm
250	- 20÷250 [290÷3625], Std Setting 250 bar@5 lpm
300*	- 80÷300 [1160÷4350], Std Setting 250 bar@5 lpm

Pos.4 - Threaded Ports

omit	- BSPP thread - ISO 228
M	- Metric thread - ISO 262
A	- Unified inch screw threads ANSI B 1.1 - 1982

Pos.5 - Option [Paint] **

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

Pos.6 - Design Series

omit - Factory specified

Notes: * Useful for types **R** and **S** only.
** Color at customer's request.

The Valve Blocks are mangano phosphatized as standard.

MOTOR-BRAKE SPECIAL FEATURES

Special Feature Description	Order Code	Motor type				
		B/MR	MT/B	MTM/B	SW	TW
Low Leakage	LL	O	-	O	-	-
Low Speed Valving	LSV	O	-	O	-	-
Free Running	FR	-	-	O	-	-
Reverse Rotation	R	O	O	O	-	-
Paint*	P	O	O	O	O	O
Corrosion Protected Paint*	PC	O	O	O	O	O
Check Valves		S	S	-	S	S

* color at customer's request.

O Optional
- Not applicable
S Standard

APPLICATION CALCULATION

VEHICLE DRIVE CALCULATIONS

1.Motor speed: n, RPM

$$n=\frac{2{,}65 \times v_{km} \times i}{R_m} \qquad n=\frac{168 \times v_{ml} \times i}{R_{in}}$$

v_{km} - vehicle speed, km/h;
v_{ml} - vehicle speed, mil/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, daN [lbs]
The resistance force resulted in wheels contact with different surfaces:

$$RR=G \times \rho$$

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

Table 1

Rolling resistance coefficient In case of rubber tire rolling on different surfaces	
Surface	ρ
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, daN [lbs]

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

α - gradient negotiation angle (Table 2)

Table 2

Grade %	α Degrees	Grade %	α 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, daN [lbs]
Force **FA** necessary for acceleration from 0 to maximum speed **v** and time **t** can be calculated with a formula:

$$FA=\frac{v_{km} \times G}{3{,}6 \times t}, [daN] \qquad FA=\frac{v_{ml} \times G}{22 \times t}, [lbs];$$

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

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

$$TE=1{,}1x(RR + GR + FA + DP)$$

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, daNm [lb-in]
Necessary torque moment for every hydraulic motor:

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

N- motor numbers;
η_M - mechanical gear efficiency (if it is available).

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

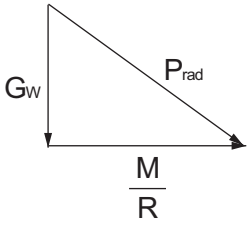
$$M_W=\frac{G_W \times f \times R_m[R_{in}]}{i \times h_M}$$

To avoid wheel slipping, the following condition should be observed $M_W > M$
f - frictional factor;
G_w - total weight over the wheels, daN [lbs].

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} , daN [lbs]
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.



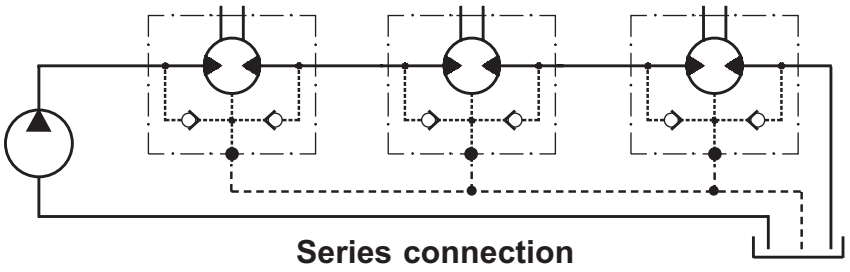
G_W - Weight held by wheel;
P_{rad} - Total radial loading of motor shaft;
M/R- Motion force.

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

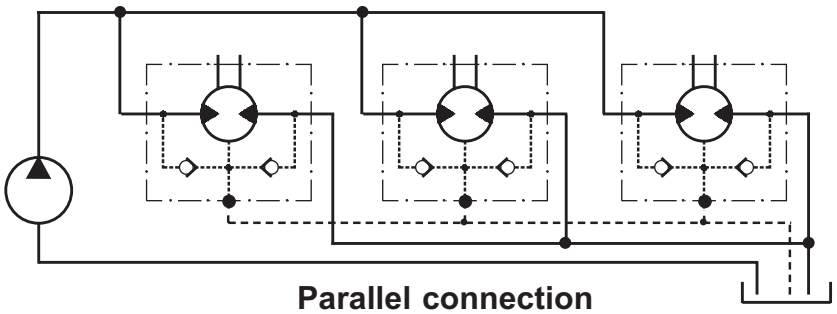
In accordance with calculated loadings the suitable motor from the catalogue is selected.

DRAINAGE SPACE AND DRAINAGE PRESSURE

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



Series connection



Parallel connection