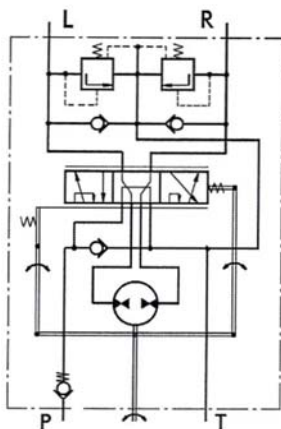


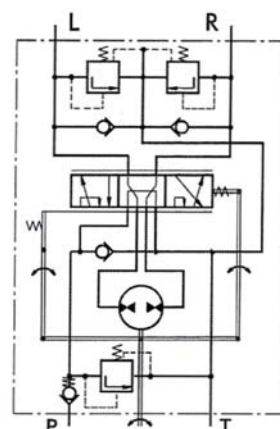
XY Orbitrol

De M+S orbitrols worden gebruikt voor machines met een snelheid tot 60km zoals bouwmachines, heftrucks, rooimachines etc.

De XY orbitrol heeft inwendig een axiaal verplaatsende zoekklep en een metende pomp in één huis. De oliestroom naar de stuercilinders wordt geleverd door een afgescheiden pomp die aangestuurd wordt door de metende pomp. De XY orbitrol is uitgerust met een terugslag ventiel en er is een mogelijkheid voor een overdrukventiel



Open center – Load reaction
Versie 1-XY...-0/1



Open center – Load reaction
Versie 1-XY...-...1

Technische informatie

Parameters		Type			
		XY 85.../1	XY 120.../1	XY 145.../1	
Displacement	cm ³ /rev	84	120	144	
	[in ³ /rev]	[5.13]	[7.32]	[8.79]	
Rated Flow*	lpm	9	12	15	
	[GPM]	[2.4]	[3.2]	[4.0]	
Rated Pressure	bar	150			
	[PSI]	[2175]			
Relief Valve Pressure		80	100	125	150
Settings**	bar [PSI]	[1160]	[1450]	[1810]	[2175]
Shock Valves Pressure		200			
Settings***	bar [PSI]	[2900]			
Max. Cont. Pressure		20			
in Line T	bar [PSI]	[290]			
Max. Torque at		3,5			
Servoamplifying	Nm [lb - in]	[31]			
Max. Torque w/o		120			
Servoamplifying	Nm [lb - in]	[1065]			
Weight	kg	6,4	6,6	6,8	
	[lb]	[14.1]	[14.6]	[15.0]	
Dimension A	mm	136,3	141.5	144.5	
	[in]	[5.37]	[5.57]	[5.69]	

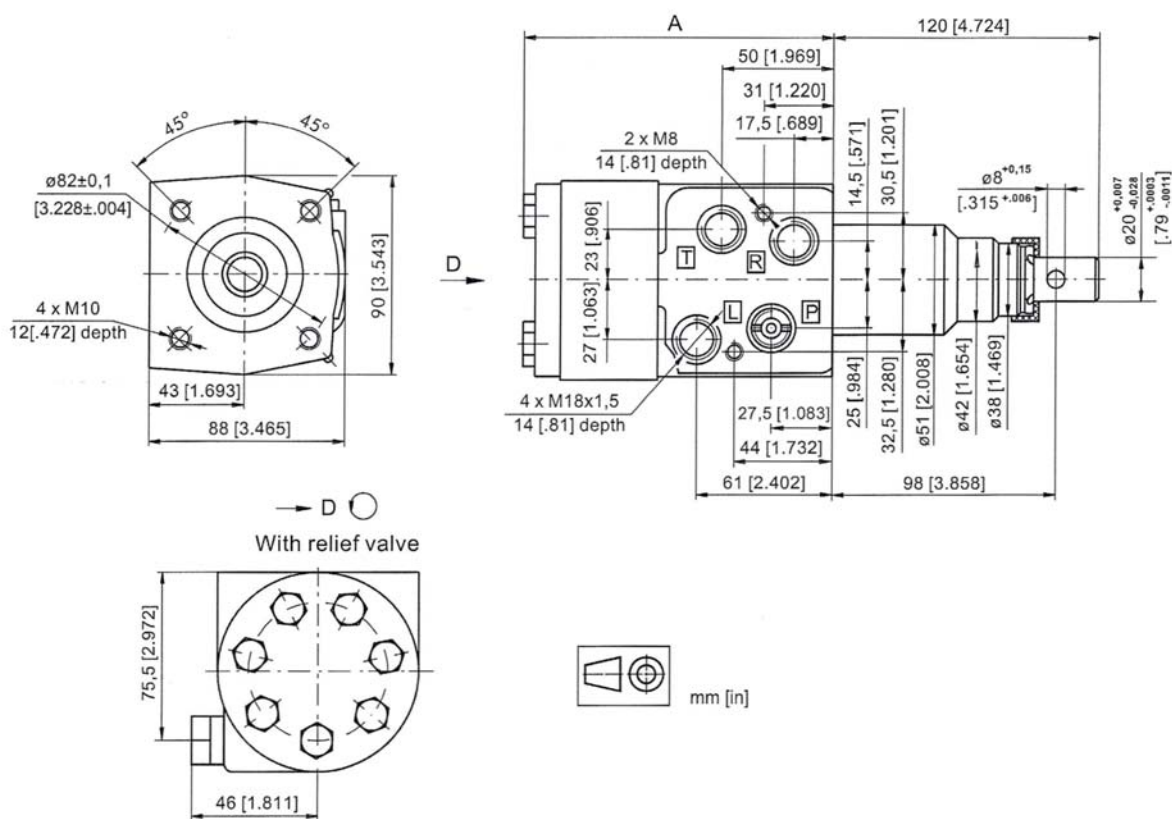
* Rated Flow at 100 RPM.

** Pressure Settings are at Rated Flow (as in the table) and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

***Pressure Settings are at flow rate of 4 lpm [1.06 GPM] and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

XY Orbitrol

Afmetingen en uitvoeringen



ORDER CODE

1	2	3	4	5
XY	-	/	1	

Pos.1 - Displacement code

85	-	84,0 [5.13]	cm ³ /rev [in ³ /rev]
120	-	120,0 [7.32]	cm ³ /rev [in ³ /rev]
145	-	144,0 [8.79]	cm ³ /rev [in ³ /rev]

Pos.2 - Relief Valve Pressure Settings

8	-	80 [1160]	bar [PSI]
10	-	100 [1450]	bar [PSI]
12,5	-	125 [1810]	bar [PSI]
15	-	150 [2175]	bar [PSI]
0	-	without Relief Valve	

Pos.3 - Versions

1	-	Version 1 "Open Center - Load Reaction"
---	---	---

Pos.4 - Option (Paint)*

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

Pos.5 - Design Series

omit	-	Factory specified
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NOTES:

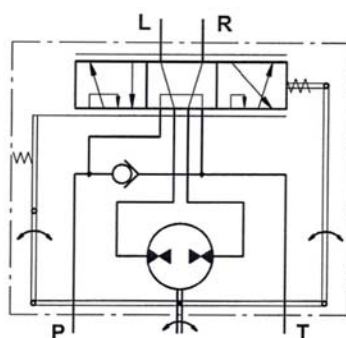
* Colour at customer's request.

The steering units are mangano-phosphatized as standard.

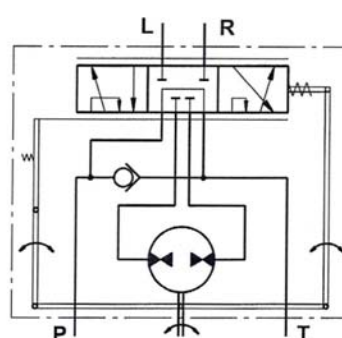
HKU.../ 3, 4

Orbitrol

De nieuw ontwikkelde HKU orbitrol, met radiale verplaatsingen, bevat twee draaiende zoekkleppen die de metende pomp aanzetten.



"Open Center - Load Reaction"
Version 3 - HKU.../3



"Open Center - Non Load Reaction"
Version 4 - HKU.../4

Technische informatie

Parameters		Type														
		HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU				
		40/3	50/3	63/3	80/3	100/3	125/3	160/3	200/3	250/3	320/3	400/3				
		HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU	HKU
		40/4	50/4	63/4	80/4	100/4	125/4	160/4	200/4	250/4	320/4	400/4	500/4	630/4	800/4	1000/4
Displacement	cm³/rev	39,6	49,5	65,6	79,2	99,0	7.56	9.67	198	247,5	316,8	396	495	623,6	793	990
	[in³/rev]	[2.42]	[3.0]	[4.0]	[4.83]	[6.04]	[123,8]	[158,4]	[12.1]	[15.1]	[19.3]	[24.2]	[30.2]	[38.05]	[48.4]	[60.4]
Rated Flow*	lpm	4	5	6	8	10	13	16	20	25	32	40	50	63	70	
	[GPM]	[1.1]	[1.3]	[1.6]	[2.1]	[2.6]	[3.4]	[4.2]	[5.3]	[6.6]	[8.4]	[10.6]	[13.2]	[16.6]	[18.5]	
Rated Pressure	bar	140	170											140	100	
	[PSI]	[2030]	[2465]											[2030]	[1450]	
Max. Cont. Pressure																
in Line T	bar [PSI]															
- standard		25 [363]														
- high pressure (H option)		40 [580]														
Max. Torque at																
Servoamplifying	Nm [lb - in]															
-with standard springs		3,0 [26]														
-with soft springs (LT option)		1,8 [16]														
Max. Torque w/o		120														
Servoamplifying	Nm [lb - in]	[1065]														
Weight	kg	5,3	5,4	5,5	5,6	5,7	5,8	6,0	6,3	6,5	7,0	7,4	8,0	8,7	9,6	10,6
	[lb]	[11.7]	[11.9]	[12.2]	[12.4]	[12.6]	[12.8]	[13.2]	[13.9]	[14.3]	[15.4]	[16.3]	[17.6]	[19.2]	[21.2]	[23.4]
Dimension A	mm	5.15	5.20	5.27	5.36	5.47	5.60	5.78	5.99	6.25	6.62	7.04	7.56	8.24	9.14	10.18
	[in]	[130,8]	[132,2]	[133,9]	[136,2]	[138,8]	[142,2]	[146,8]	[152,2]	[158,8]	[168,2]	[178,8]	[192]	[209,3]	[232,2]	[258,6]

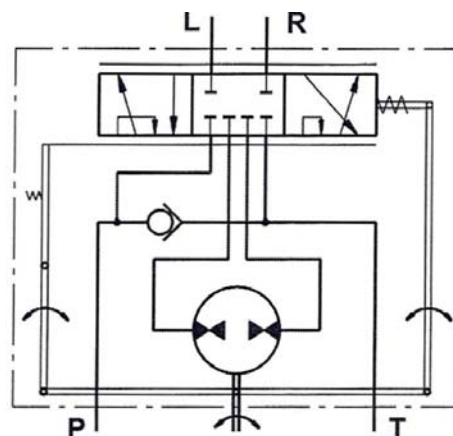
* Inlet flow providing maximum speed of rotation:
- 100 RPM - from HKU40 to HKU630;
- 87 RPM - for HKU800;
- 70 RPM - for HKU1000.

HKU.../7

Orbitrol



De HKU.../7 is een orbitrol "closed center – non load reaction", gemaakt voor integratie in systemen met een ingebouwde accumulator, ter voorkoming van teveel energieverlies.



"Closed Center - Non Load Reaction"
Version 7 - HKU.../7

Algemene informatie

Parameters		Type													
		HKU 40/7	HKU 50/7	HKU 63/7	HKU 80/7	HKU 100/7	HKU 125/7	HKU 160/7	HKU 200/7	HKU 250/7	HKU 320/7	HKU 400/7	HKU 500/7	HKU 630/7	HKU 800/7
Displacement	cm ³ /rev	39,6	49,5	65,6	79,2	99,0	123,8	158,4	198	247,5	316,8	396	495	623,6	793
	[in ³ /rev]	[2.42]	[3.0]	[4.0]	[4.83]	[6.04]	[7.56]	[9.67]	[12.1]	[15.1]	[19.3]	[24.2]	[30.2]	[38.05]	[48.4]
Rated Flow*	lpm	4	5	6	8	10	13	16	20	25	32	40	50	63	80
	[GPM]	[1.1]	[1.3]	[1.6]	[2.1]	[2.6]	[3.4]	[4.2]	[5.3]	[6.6]	[8.4]	[10.6]	[13.2]	[16.6]	[21.1]
Rated Pressure	bar	1810	2030	2540											
	[PSI]	[125]	[140]	[175]											
Max. Cont. Pressure in Line T bar [PSI]		25 [363] 40 [580]													
- standard															
- high pressure (H option)															
Max. Torque at Servoamplifing Nm [in - lb]	3,0 [26] 1,8 [16]														
															-with standard springs
															-with soft springs (LT option)
Max. Torque w/o Servoamplifing Nm [in - lb]		120 [1065]													
Weight	kg	5,3	5,4	5,5	5,6	5,7	5,8	6,0	6,3	6,5	7,0	7,4	8,0	8,7	9,6
	[lb]	[11.7]	[11.9]	[12.2]	[12.4]	[12.6]	[12.8]	[13.2]	[13.9]	[14.3]	[15.4]	[16.3]	[17.6]	[19.2]	[21.2]
Dimension A	mm	130,8	132,2	133,9	136,2	138,8	142,2	146,8	152,2	158,8	168,2	178,8	192	209,3	232,2
	[in]	[5.15]	[5.20]	[5.27]	[5.36]	[5.47]	[5.60]	[5.78]	[5.99]	[6.25]	[6.62]	[7.04]	[7.56]	[8.24]	[9.14]

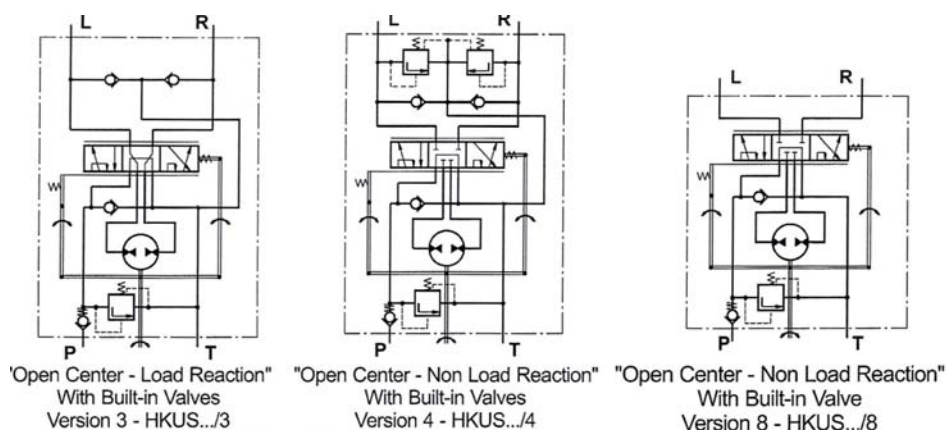
* Inlet flow providing maximum speed of rotation:
- 100 RPM - from HKU40 to HKU630;
- 87 RPM - for HKU800.

HKUS.../3, 4, 8

Orbitrol



De HKUS orbitrols zijn gebaseerd op de HKU maar met ingebouwde terugslagkleppen en overdruk. M+S heeft een compacte orbitrol ontwikkeld waarbij geen extra componenten nodig zijn.



Algemene informatie

Parameters		Type											
		HKUS 40/3,4,8	HKUS 50/3,4,8	HKUS 63/3,4,8	HKUS 80/3,4,8	HKUS 100/3,4,8	HKUS 125/3,4,8	HKUS 160/3,4,8	HKUS 200/3,4,8	HKUS 250/3,4,8	HKUS 320/3,4,8	HKUS 400/3,4,8	HKUS 500/3,4,8
Displacement	cm ³ /rev	39,6	49,5	65,6	79,2	99,0	123,8	158,4	198	247,5	316,8	396	495
	[in ³ /rev]	[2.42]	[3.0]	[4.0]	[4.83]	[6.04]	[7.56]	[9.67]	[12.1]	[15.1]	[19.3]	[24.2]	[30.2]
Rated Flow*	lpm	4	5	6	8	10	13	16	20	25	32	40	50
	[GPM]	[1.1]	[1.3]	[1.6]	[2.1]	[2.6]	[3.4]	[4.2]	[5.3]	[6.6]	[8.4]	[10.6]	[13.2]
Rated Pressure	bar	140		170									
	[PSI]	[2030]		[2465]									
Relief Valve Pressure		80				100		125		150		170	
Settings**	bar [PSI]	[1160]				[1450]		[1810]		[2175]		[2465]	
Shock Valves Pressure		140				160		180		200		220	
Settings***	bar [PSI]	[2030]				[2320]		[2610]		[2900]		[3190]	
Max. Cont. Pressure in Line T	bar [PSI]	25 [363] (50 [725] by HKUS.../8) 40 [580]											
- standard													
- high pressure (H option)													
Max. Torque at Servoamplifying	Nm [lb - in]	3,0 [26] 1,8 [16]						3,0 [26] -					
-with standard springs													
-with soft springs (LT option)													
Max. Torque w/o Servoamplifying	Nm [lb - in]	120 [1065]											
Weight	kg [lb]	5,3 [11.7]	5,4 [11.9]	5,5 [12.2]	5,6 [12.4]	5,7 [12.6]	5,8 [12.8]	6,0 [13.2]	6,3 [13.9]	6,5 [14.3]	7,0 [15.4]	7,4 [16.3]	8,0 [17.6]
Dimension A	mm [in]	130,8 [5.15]	132,2 [5.20]	133,9 [5.27]	136,2 [5.36]	138,8 [5.47]	142,2 [5.60]	146,8 [5.78]	152,2 [5.99]	158,8 [6.25]	168,2 [6.62]	178,8 [7.04]	192 [7.56]

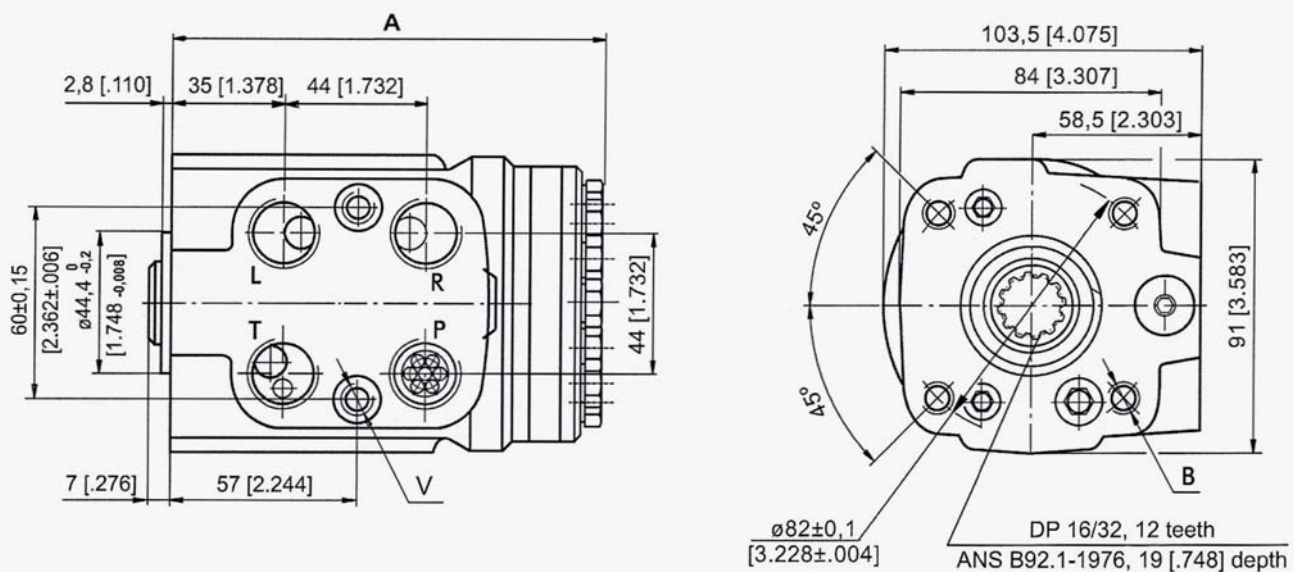
* Rated Flow at 100 RPM.

** Pressure Settings are at Rated Flow (as in the table) and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

***Pressure Settings are at flow rate of 2 lpm [.53 GPM] and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

HKUS.../3, 4, 8 Orbitrol

Afmetingen en uitvoeringen



Code	Ports - P*, T, R, L Thread	Column Mounting Thread - B	Valve Mounting Thread - V
-	G1/2 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
M	M22x1,5 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
A	3/4 - 16 UNF O-ring 17 [.67] depth	4 x 3/8 - 16 UNC 15,7 [.62] depth	2 x 3/8 - 24 UNF 14,2 [.56] depth

*Threaded Ports P min 16 [.63] depth for pipe mounting.

HKU, HKUS Orbitrol

Bestelgegevens

1	2	3	4	5	6	7	8
HKU	/	-					

Pos.1 - Displacement code (see Specification Data)

40	-	39,6	[2.42]	cm ³ /rev	[in ³ /rev]
50	-	49,5	[3.00]	cm ³ /rev	[in ³ /rev]
63	-	65,6	[4.00]	cm ³ /rev	[in ³ /rev]
80	-	79,2	[4.83]	cm ³ /rev	[in ³ /rev]
100	-	99,0	[6.04]	cm ³ /rev	[in ³ /rev]
125	-	123,8	[7.56]	cm ³ /rev	[in ³ /rev]
160	-	158,4	[9.67]	cm ³ /rev	[in ³ /rev]
200	-	198,0	[12.10]	cm ³ /rev	[in ³ /rev]
250	-	247,5	[15.10]	cm ³ /rev	[in ³ /rev]
320	-	316,8	[19.30]	cm ³ /rev	[in ³ /rev]
400	-	396,0	[24.20]	cm ³ /rev	[in ³ /rev]
500	-	495,0	[30.20]	cm ³ /rev	[in ³ /rev]
630	-	623,6	[38.05]	cm ³ /rev	[in ³ /rev]
800	-	793,0	[48.40]	cm ³ /rev	[in ³ /rev]
1000	-	990,0	[60.40]	cm ³ /rev	[in ³ /rev]

Pos.2 - Versions

3	-	Version 3 "Open Center - Load Reaction"
4	-	Version 4 "Open Center - Non Load Reaction"
7	-	Version 7 "Closed Center - Non Load Reaction"

Pos.3 - Ports

omit	-	BSPP (ISO 228)
M	-	Metric (ISO 262)
A	-	SAE (ANSI B 1.1 - 1982)
BA*	-	SAE (ANSI B 1.1 - 1982)

Pos.4 - Max. Cont. Pressure in line T

omit	-	Standard
H	-	High pressure

Pos.5 - Input torque

omit	-	Standard
LT*	-	Low

Pos.6 - Noise level

omit	-	Standard
LN**	-	Low

Pos.7 - Option (Paint)***

omit	-	No Paint
P	-	Painted Low Gloss Color
PC	-	Corrosion Protected Paint

Pos.8 - Design Series

omit	-	Factory specified
------	---	-------------------

Notes: * Available only for displacement from 40 to 200.
 ** Available only for versions 3 and 4 with displacements from 40 to 200.
 *** Colour at customer's request.
 The steering units are mangano-phosphatized as standard.

1	2	3	4	5	6	7	8	9
HKUS	/	-	-					

Pos.1 - Displacement code (see Specification Data)

40	-	39,6	[2.42]	cm ³ /rev	[in ³ /rev]
50	-	49,5	[3.00]	cm ³ /rev	[in ³ /rev]
63	-	65,6	[4.00]	cm ³ /rev	[in ³ /rev]
80	-	79,2	[4.83]	cm ³ /rev	[in ³ /rev]
100	-	99,0	[6.04]	cm ³ /rev	[in ³ /rev]
125	-	123,8	[7.56]	cm ³ /rev	[in ³ /rev]
160	-	158,4	[9.67]	cm ³ /rev	[in ³ /rev]
200	-	198,0	[12.10]	cm ³ /rev	[in ³ /rev]
250	-	247,5	[15.10]	cm ³ /rev	[in ³ /rev]
320	-	316,8	[19.30]	cm ³ /rev	[in ³ /rev]
400	-	396,0	[24.20]	cm ³ /rev	[in ³ /rev]
500	-	495,0	[30.20]	cm ³ /rev	[in ³ /rev]

Pos.2 - Versions

3	-	Version 3 "Open Center - Load Reaction"
4	-	Version 4 "Open Center - Non Load Reaction"
8	-	Version 8 "Open Center - Non Load Reaction"

Pos.3 - Relief Valve Pressure Settings, bar

80, 100, 125, 150, 170

Pos.4 - Ports

omit	-	BSPP (ISO 228)
A	-	SAE (ANSI B 1.1 - 1982)
M	-	Metric (ISO 262)

Pos.5 - Max. Cont. Pressure in line T

omit	-	Standard
H	-	High pressure

Pos.6 - Input torque

omit	-	Standard
LT*	-	Low

Pos.7 - Noise level

omit	-	Standard
LN*	-	Low

Pos.8 - Option (Paint)**

omit	-	No Paint
P	-	Painted Low Gloss Color
PC	-	Corrosion Protected Paint

Pos.9 - Design Series

omit	-	Factory specified
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Version	Manual Steering Check Valve	Relief Valve	Inlet Check Valve	Cylinder Relief Valve	Anti-Cavitation Valve
3	•	•	•		•
4	•	•	•	•	•
8	•	•	•		

Notes: * Available only for displacement from 40 to 200.
 ** Colour at customer's request.
 The steering units are mangano-phosphatized as standard.

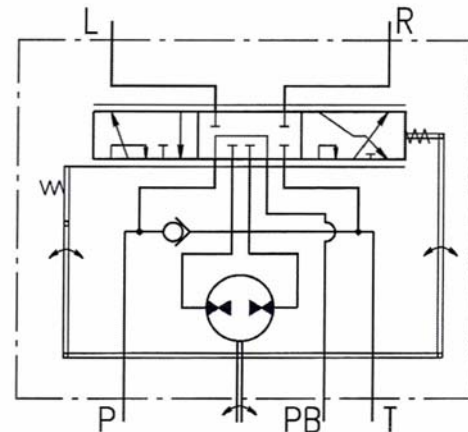
HKU.../4PB

Orbitrol



De orbitrol is geschikt voor gemiddelde en grote machines. De HKU.../4pb werkt als een standaard orbitrol, maar met uitwendige poorten voor het bedienen van andere functies op de machine. Als het stuurwiel niet wordt gedraaid, loopt de olie

via poort PB terug in het systeem. Als het stuurwiel wordt gedraaid zal een gedeelte van de olie gebruikt worden voor het sturen. Het is daarom niet aan te bevelen om de orbitrol te gebruiken in functies die tegelijk met het sturen bediend worden.



"Open Center - Non Load Reaction"
HKU.../4PB - Power Beyond

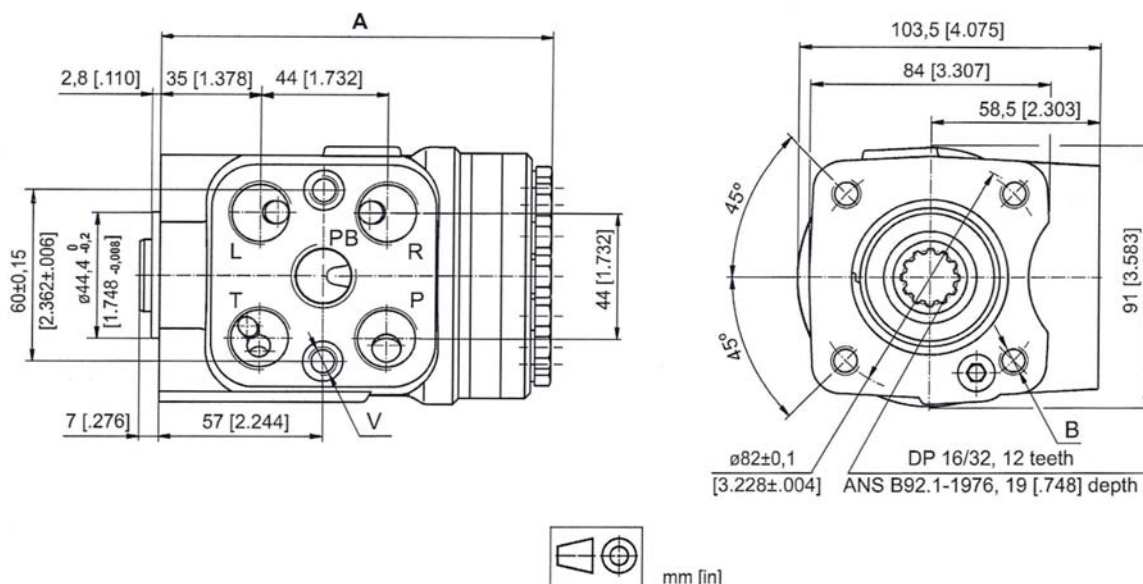
Algemene informatie

Parameters		Type					
		HKU 40/4PB	HKU 50/4PB	HKU 63/4PB	HKU 80/4PB	HKU 100/4PB	HKU 125/4PB
Displacement	cm ³ /rev [In ³ /rev]	39,6 [2.42]	49,5 [3.0]	65,6 [4.0]	79,2 [4.83]	99,0 [6.04]	123,8 [7.56]
Rated Flow-5 Port (Power Beyond)	lpm [GPM]	15 [3.96]					
Rated Pressure	bar [PSI]	125 [1813]					
Max. Pressure in line PB,	bar [PSI]	125 [1813]					
Max. Cont. Pressure in Line T - P _T	bar [PSI]	10 [145]					
Max. Torque at Servoamplifying	Nm [lb - in]	2,8 (by PT max) [25]					
Max. Torque w/o Servoamplifying	Nm [lb - in]	135 [1195]					
Weight	kg [lb]	5,3 [11.7]	5,4 [11.9]	5,5 [12.2]	5,6 [12.4]	5,7 [12.6]	5,8 [12.8]
Dimension A	mm [in]	130,8 [5.15]	132,2 [5.20]	133,9 [5.27]	136,2 [5.36]	138,8 [5.47]	142,2 [5.60]

HKU.../4PB

Orbitrol

Afmetingen en uitvoeringen



code	Ports - P, T, R, L, PB Thread	Column Mounting Thread - B	Valve Mounting Thread - V
-	G3/8 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
A	9/16 - 18 UNF O-ring 17 [.67] depth	4x 3/8 - 16 UNC 15,7 [.62] depth	2 x 3/8 - 24 UNF 14,2 [.56] depth

ORDER CODE for HKU.../4PB

1	2	3	4	5
HKU	/	4PB	-	

Pos.1 - Displacement code (see Specification Data)

40	-	39,6 [2.42]	cm ³ /rev [in ³ /rev]
50	-	49,5 [3.00]	cm ³ /rev [in ³ /rev]
63	-	65,6 [4.00]	cm ³ /rev [in ³ /rev]
80	-	79,2 [4.83]	cm ³ /rev [in ³ /rev]
100	-	99,0 [6.04]	cm ³ /rev [in ³ /rev]
125	-	123,8 [7.56]	cm ³ /rev [in ³ /rev]

Pos.2 - Versions

4PB	-	Version 4 "Open Center - Non Load Reaction" with 5 ports (Power Beyond)
-----	---	---

Pos.3 - Ports

omit	-	BSPP (ISO 228)
A	-	SAE (ANSI B 1.1 - 1982)

Pos.4 - Option (Paint)*

omit	-	No Paint
P	-	Painted Low Gloss Color
PC	-	Corrosion Protected Paint

Pos.5 - Design Series

omit	-	Factory specified
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NOTES:

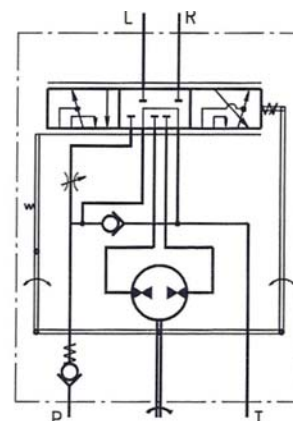
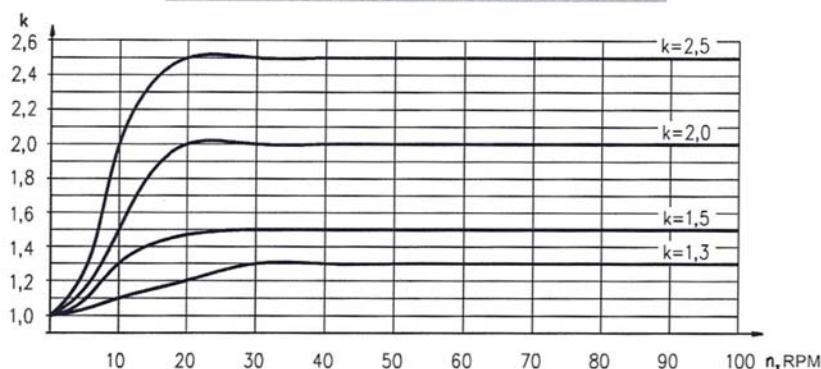
* Colour at customer's request.

The steering units are mangano-phosphatized as standard.

HKUQ.../.../4 Orbitrol



VARIABLE AMPLIFYING FACTOR



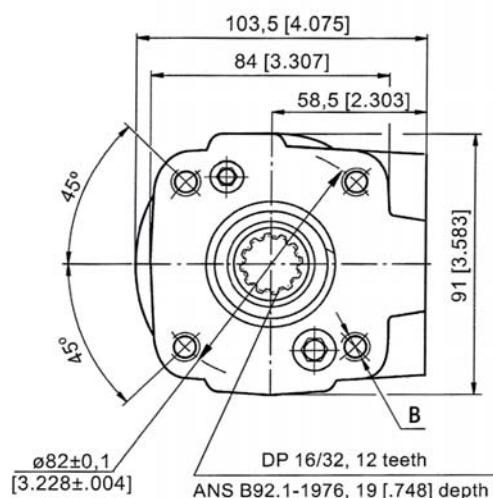
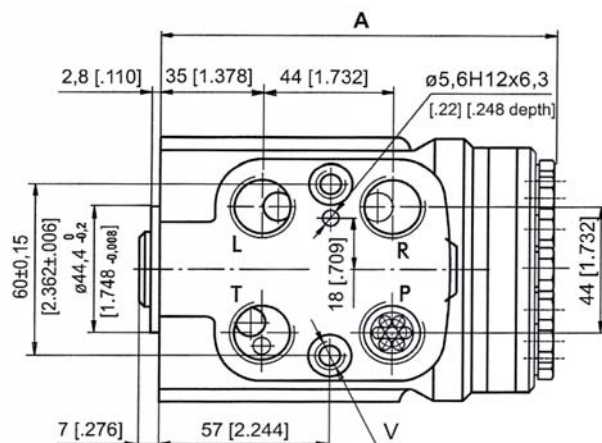
"Open Center - Non Load Reaction"
HKUQ.../4

SPECIFICATION DATA

Parameters	Type																			
	HKUQ 80/.../4				HKUQ 100/.../4				HKUQ 125/.../4				HKUQ 160/.../4				HKUQ 200/.../4			
Displacement - without servo-amplifying (in emergency mode) cm³/rev - with servo-amplifying [in³]	79,2 [4.83]				99,0 [6.04]				123,8 [7.56]				158,4 [9.67]				198 [12.08]			
	100 [6.10]	125 [7.62]	160 [9.76]	200 [12.2]	125 [7.62]	160 [9.76]	200 [12.2]	250 [15.25]	160 [9.76]	200 [12.2]	250 [15.25]	320 [19.52]	200 [12.2]	250 [15.25]	320 [19.52]	400 [24.4]	250 [15.25]	320 [19.52]	400 [24.4]	500 [30.5]
Rated Flow* l/min [GPM]	10 [2.64]	12,5 [3.30]	16 [4.22]	20 [5.28]	12,5 [3.30]	16 [4.22]	20 [5.28]	25 [6.60]	16 [4.22]	20 [5.28]	25 [6.60]	32 [8.45]	20 [5.28]	25 [6.60]	32 [8.45]	40 [10.57]	25 [6.60]	32 [8.45]	40 [10.57]	50 [13.2]
Amplifying Factor (at shaft revolution over 20 min⁻¹)	1,3	1,5	2,0	2,5	1,3	1,5	2,0	2,5	1,3	1,5	2,0	2,5	1,3	1,5	2,0	2,5	1,3	1,5	2,0	2,5
Rated Pressure bar [PSI]	170 [2465]																			
Max. Cont. Pressure in Line T bar [PSI]	25 [363]																			
Max. Torque at Servoamplifying Nm [lb - in]	3 [26]																			
Max. Torque w/o Servoamplifying Nm [lb - in]	120 [1065]																			
Weight, avg. kg [lb]	5,6 [12.4]				5,7 [12.6]				5,8 [12.8]				6,0 [13.2]				6,3 [13.9]			
Dimension A mm [in]	136,2 [5.36]				138,8 [5.47]				142,2 [5.60]				146,8 [5.78]				152,2 [5.99]			

HKUQ.../.../4 Orbitrol

Afmetingen en uitvoeringen



Code	Ports - P*, T, R, L Thread	Column Mounting Thread - B	Valve Mounting Thread - V
-	G1/2 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
M	M22x1,5 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
A	3/4 - 16 UNF O-ring 17 [.67] depth	4 x 3/8 - 16 UNC 15,7 [.62] depth	2 x 3/8 - 24 UNF 14,2 [.56] depth



*Threaded Ports P min 16 [.63] depth for pipe mounting.

ORDER CODE for HKUQ...

1	2	3	4	5	6
HKUQ	/	/	4	-	

Pos.1 - Displacement code

80	-	79,2 [4.83]	cm ³ /rev [in ³ /rev]
100	-	99,0 [6.04]	cm ³ /rev [in ³ /rev]
125	-	123,8 [7.56]	cm ³ /rev [in ³ /rev]
160	-	158,4 [9.67]	cm ³ /rev [in ³ /rev]
200	-	198,0 [12.10]	cm ³ /rev [in ³ /rev]

Pos.2 - Displacement with amplifying factor 1,3; 1,5; 2,0 or 2,5

	80	100	125	160	200
100	■				
125	■	■			
160	■	■	■		
200	■	■	■	■	
250	■	■	■	■	■
320	■	■	■	■	■
400	■	■	■	■	■
500	■	■	■	■	■

■ k=1,3
■ k=1,5
■ k=2,0
■ k=2,5

Pos.3 - Versions

4	-	Version 4 "Open Center - Non Load Reaction"
---	---	---

Pos.4 - Ports

omit	-	BSPP (ISO 228)
A	-	SAE (ANSI B 1.1 - 1982)
M	-	Metric (ISO 262)

Pos.5 - Option (Paint)**

omit	-	No Paint
P	-	Painted Low Gloss Color
PC	-	Corrosion Protected Paint

Pos.6 - Design Series

omit	-	Factory specified
------	---	-------------------

NOTES:

- * Exemplary designation of steering unit with displacement 200 cm³ and amplifying factor 2,5: HKUQ 200/500/4
- ** Colour at customer's request.

The steering units are mangano-phosphatized as standard.

HKU(S).../5(D)(T)(TU)

Orbitrol



Deze serie orbitrols is een uitbreiding op de range "closed center – non reaction and load Sensing outlet" (statische en dynamische verbinding met de prioriteitsklep) De range is ontwikkeld in twee versies; modulair en leidingmontage en daarvoor zijn twee versies overdruk (tracing) kleppen ontwikkeld: PRD... en PRT...

HKU.../5 is ontwikkeld om zo weinig mogelijk energie te gebruiken in verschillende hydraulische systemen zoals een heftruck,

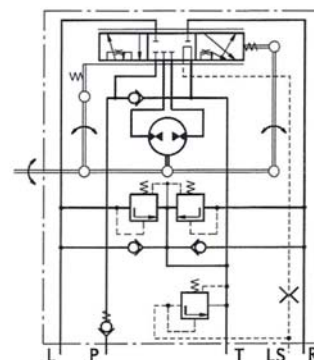
landbouwmachines en constructie machines.

De HKU.../5TU is een orbitrol waarbij de poorten R en L in neutrale positie zijn verbonden met de retourleiding T. Dit draagt bij voor het snel verlagen van de restdruk in R en L dat normaal "locked" als het stuurwiel is teruggebracht in de neutrale positie. Deze orbitrol sturen niet direct de stuurcilinders aan, maar zijn aangesloten op het hydraulische systeem om flow amplificers te bekrachtigen.

HKUS.../5D(DT).. is een nieuwe generatie orbitrol waarbij de dynamische flow naar de LS leiding een snelle en gelijkmatige controle tijdens het begin van het sturen mogelijk maakt. De algemene kenmerken zijn; Lage torque van het stuurwiel 0.5÷2.0 Nm (4.5÷18 lb-in) in normale werk condities; hoge stuursnelheid, alleen begrenst door de werkdruk en flow van de toevoerpomp; constante olieflow in LS leiding in neutrale positie 0.45÷0.9 lpm. De eenheid werkt in een systeem met een dynamisch prioriteitsventiel en is geschikt om de energievraag van de machine te verlagen.

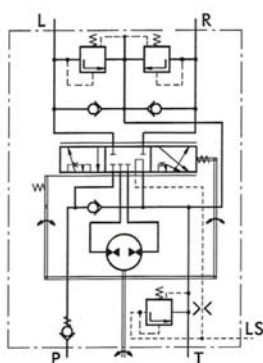
M+S produceert ook de orbitrol HKUS.../5E(5TE). Dit is een orbitrol met een EL poort, zodat een elektrisch hydraulisch relay, gemonteerd in de poort, het hydraulische systeem kan aansturen.

Modulary Mounting

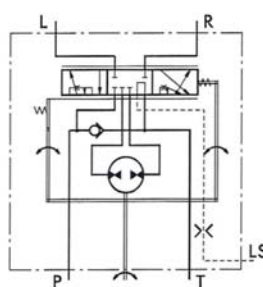


HKUS.../5

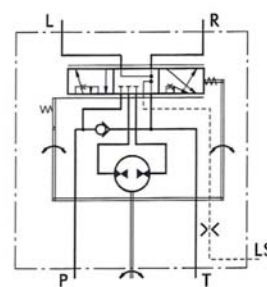
Leiding montage



HKUS.../5T



HKU.../5T



HKU.../5TU

HKUS.../5

Orbitrol

Algemene informatie

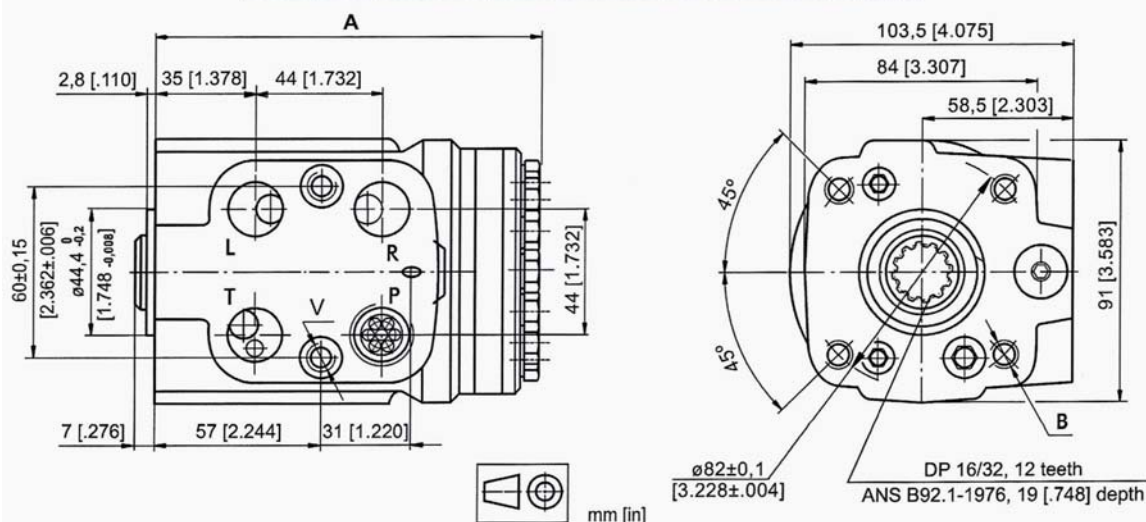
Parameters		Type													
		HKU 40/5T	HKU 50/5T	HKU 63/5T	HKU 80/5T	HKU 100/5T	HKU 125/5T	HKU 160/5T	HKU 200/5T	HKU 250/5T	HKU 320/5T	HKU 400/5T	HKU 500/5T	HKU 630/5T	
		HKUS	HKUS	HKUS	HKUS	HKUS	HKUS	HKUS	HKUS	HKUS	HKUS	HKUS			
		40/5...	50/5...	63/5...	80/5...	100/5...	125/5...	160/5...	200/5...	250/5...	320/5...	400/5...			
Displacement	cm ³ /rev [in ³ /rev]	39,6 [2.42]	49,5 [3.0]	65,6 [4.0]	79,2 [4.83]	99,0 [6.04]	123,8 [7.56]	158,4 [9.67]	198 [12.1]	247,5 [15.1]	316,8 [19.3]	396 [24.2]	495 [30.2]	623,6 [38.05]	
Rated Flow*	lpm [GPM]	4 [1.1]	5 [1.3]	6 [1.6]	8 [2.1]	10 [2.6]	13 [3.4]	16 [4.2]	20 [5.3]	25 [6.6]	32 [8.4]	40 [10.6]	50 [13.2]	63 [16.6]	
Rated Pressure	bar [PSI]	125 [1810]	150 [2175]	175 [2540]											
LS-Valve Pressure Settings**	bar [PSI]	80 [1160] 100 [1450] 125 [1810] 150 [2175] 175 [2540]													
Shock Valves Pressure Settings***	bar [PSI]	140 [2030] 160 [2320] 180 [2610] 200 [2900] 240 [3480]													
Max. Cont. Pressure in Line T - standard - high pressure (H option)	bar [PSI]	20 [290] 40 [580]													
Max. Torque at Servoamplifying -with standard springs -with soft springs (LT option)	Nm [lb-in]	3,0 [26] 1,8 [16]									3,0 [26] -				
Max. Torque w/o Servoamplifying	Nm [lb-in]	120 [1065]													
Weight	kg [lb]	5,3 [11.7]	5,4 [11.9]	5,5 [12.2]	5,6 [12.4]	5,7 [12.6]	5,8 [12.8]	6,0 [13.2]	6,3 [13.9]	6,5 [14.3]	7,0 [15.4]	7,4 [16.3]	8,0 [17.6]	8,7 [19.2]	
Dimension A	mm [in]	130,8 [5.15]	132,2 [5.20]	133,9 [5.27]	136,2 [5.36]	138,8 [5.47]	142,2 [5.60]	146,8 [5.78]	152,2 [5.99]	158,8 [6.25]	168,2 [6.62]	178,8 [7.04]	192 [7.56]	209,3 [8.24]	

* Rated Flow at 100 RPM.

** Pressure Settings are at flow rate of 25 lpm [6.6 GPM] and viscosity 21 mm²/s [105 SUS] at 50° C [122°F], supplied through priority valve.

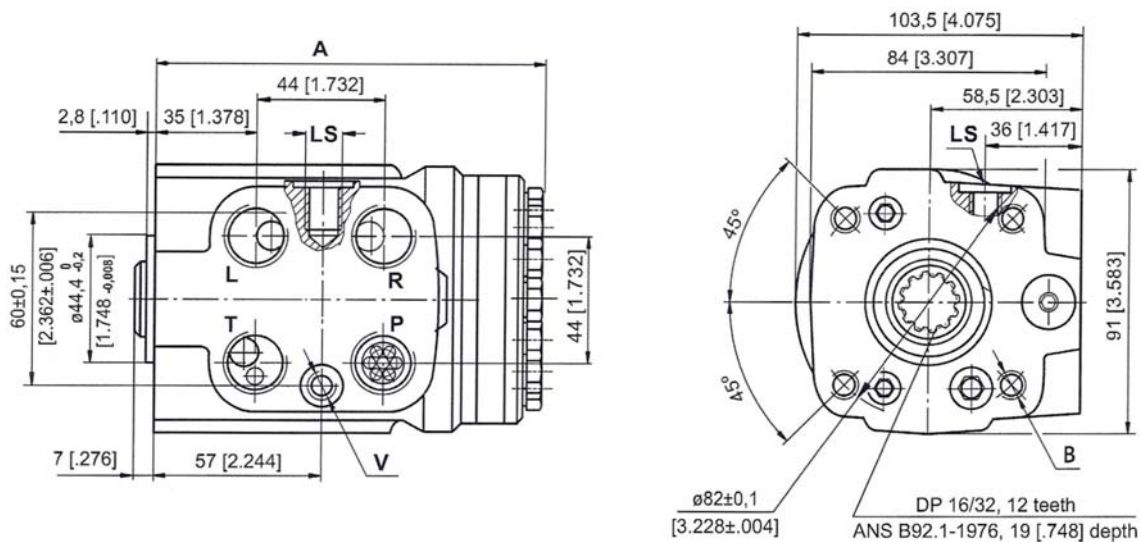
***Pressure Settings are at flow rate of 2 lpm [.53 GPM] and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

DIMENSIONS AND MOUNTING DATA - HKUS.../5(D)

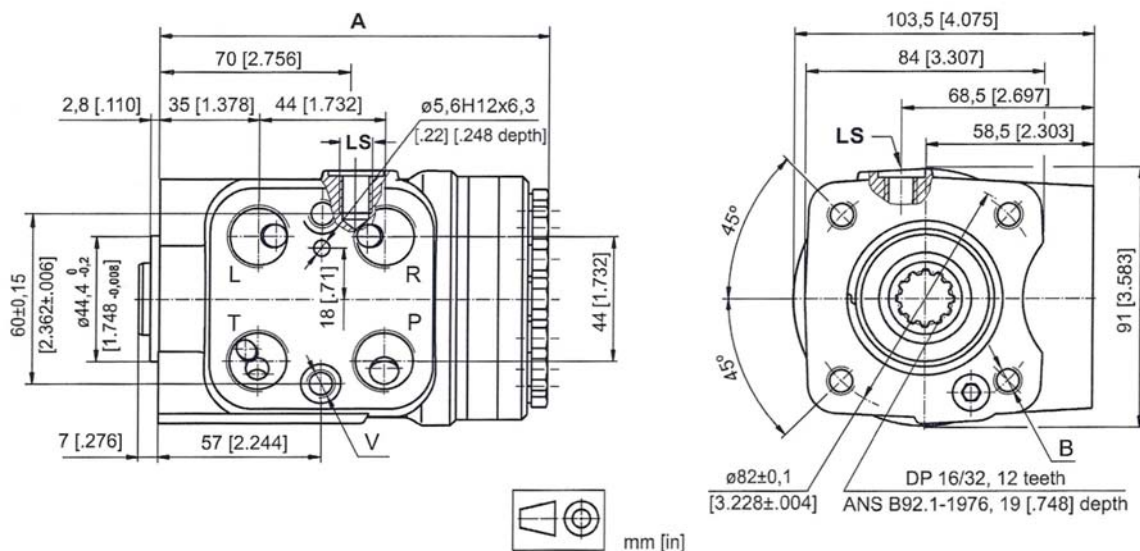


HKU(S).../5T Orbitrol

Afmetingen en uitvoeringen



DIMENSIONS AND MOUNTING DATA - HKU.../5T(TU)



code	Ports - P*, T, R, L Thread	Column Mounting Thread - B	Valve Mounting Thread - V	LS - Port
-	G1/2 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth	G1/4 14 [.55] depth
M	M22x1,5 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth	G1/4 14 [.55] depth
A	3/4 - 16 UNF O-ring 17 [.67] depth	4 x 3/8 - 16 UNC 15,7 [.62] depth	2 x 3/8 - 24 UNF 14,2 [.56] depth	7/16 - 20 UNF O-ring 12,7 [.50] depth

*Threaded Ports P min 16 [.63] depth for pipe mounting.

HKUS.../5...

Orbitrol

Bestelgegevens

1	2	3	4	5	6	7	8	9	10	11
HKUS	/	5			-					

Pos.1 - Displacement code (see Specification Data)

40	-	39,6	[2.42]	cm ³ /rev	[in ³ /rev]
50	-	49,5	[3.00]	cm ³ /rev	[in ³ /rev]
63	-	65,6	[4.00]	cm ³ /rev	[in ³ /rev]
80	-	79,2	[4.83]	cm ³ /rev	[in ³ /rev]
100	-	99,0	[6.04]	cm ³ /rev	[in ³ /rev]
125	-	123,8	[7.56]	cm ³ /rev	[in ³ /rev]
160	-	158,4	[9.67]	cm ³ /rev	[in ³ /rev]
200	-	198,0	[12.10]	cm ³ /rev	[in ³ /rev]
250	-	247,5	[15.10]	cm ³ /rev	[in ³ /rev]
320	-	316,8	[19.30]	cm ³ /rev	[in ³ /rev]
400	-	396,0	[24.20]	cm ³ /rev	[in ³ /rev]

Pos.2 - Versions

5	-	Version 5 "Closed Center - Non Reaction and Load Sensing Outlet"
---	---	--

Pos.3 - Signal Type

omit - Static Load Signal
D - Dynamic Load Signal

Pos.4 - Priority Valve Connection

omit - Modular Mounting
T - Pipe Mounting

Pos.6 - LS - Valve Pressure Settings, bar

80	100	125	150	175
----	-----	-----	-----	-----

Pos.7 - Ports

omit - BSPP (ISO 228)
M - Metric (ISO 262)
A - SAE (ANSI B 1.1 - 1982)

Pos.8 - Max. Cont. Pressure in line T

omit - Standard
H - High pressure

Pos.9 - Input torque

omit - Standard
LT* - Low

Pos.10 - Option (Paint)**

omit - No Paint
P - Painted Low Gloss Color
PC - Corrosion Protected Paint

Pos.11 - Design Series

omit - Factory specified

Notes:
 * Available only for displacement from 40 to 200.
 ** Colour at customer's request.
 The steering units are mangano-phosphatized as standard.

ORDER CODE for HKU.../5T...

1	2	3	4	5	6	7	8
HKU	/	5	T	-			

Pos.1 - Displacement code (see Specification Data)

40	-	39,6	[2.42]	cm ³ /rev	[in ³ /rev]
50	-	49,5	[3.00]	cm ³ /rev	[in ³ /rev]
63	-	65,6	[4.00]	cm ³ /rev	[in ³ /rev]
80	-	79,2	[4.83]	cm ³ /rev	[in ³ /rev]
100	-	99,0	[6.04]	cm ³ /rev	[in ³ /rev]
125	-	123,8	[7.56]	cm ³ /rev	[in ³ /rev]
160	-	158,4	[9.67]	cm ³ /rev	[in ³ /rev]
200	-	198,0	[12.10]	cm ³ /rev	[in ³ /rev]
250	-	247,5	[15.10]	cm ³ /rev	[in ³ /rev]
320	-	316,8	[19.30]	cm ³ /rev	[in ³ /rev]
400	-	396,0	[24.20]	cm ³ /rev	[in ³ /rev]
500	-	495,0	[30.20]	cm ³ /rev	[in ³ /rev]
630	-	623,6	[38.05]	cm ³ /rev	[in ³ /rev]

Pos.2 - Versions

5	-	Version 5 "Closed Center - Non Reaction and Load Sensing Outlet"
---	---	--

Pos.3 - Priority Valve Connection

T - Pipe Mounting (only)
TU - Pipe Mounting (ports R and L in neutral position are connected to the drain line T)

Pos.4 - Ports

omit - BSPP (ISO 228)
A - SAE (ANSI B 1.1 - 1982)
M - Metric (ISO 262)

Pos.5 - Max. Cont. Pressure in line T

omit - Standard
H - High pressure

Pos.6 - Input torque

omit - Standard
LT* - Low

Pos.7 - Option (Paint)**

omit - No Paint
P - Painted Low Gloss Color
PC - Corrosion Protected Paint

Pos.8 - Design Series

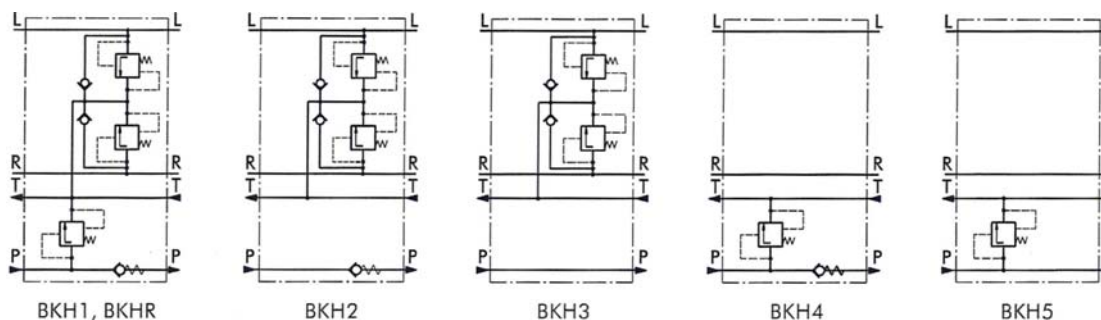
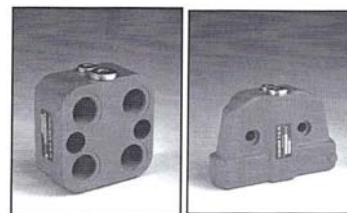
omit - Factory specified

Notes: * Available only for displacement from 40 to 200.
 ** Colour at customer's request.
 The steering units are mangano-phosphatized as standard.

BKH...

Stuurklep

De BKH kleppen zijn ontwikkeld om de componenten in een hydraulisch circuit te beschermen: pomp, orbitrol en cylinders – voor overbelasting, implosie en stoten. Sommige voordelen zijn; makkelijk te integreren in een hydraulisch systeem, makkelijk te monteren op een orbitrol en het is snel en gemakkelijk om slangen te monteren. Afhankelijk van het ontwerp en de ingebouwde kleppen kan de BKH gemonteerd worden in 6 types: BKH1 ... BKH5 en BKHR. De BKH5 is speciaal ontwikkeld voor de XY. De maximale flow is gelijk aan de range van de XY en HKU maar nooit meer dan 80 l/min. De druk instelling van de ontlastklep en het prioriteitsventiel zijn weergegeven in de tabel.



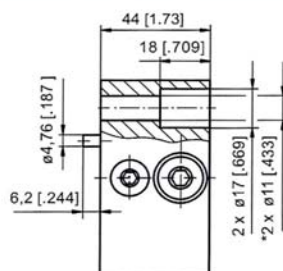
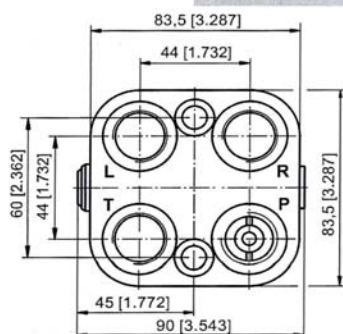
Algemene informatie

Parameters		Type									
		BKH1, BKHR		BKH2	BKH3	BKH4, BKH5					
Rated Flow	lpm [GPM]	80 [21.1]									
Rated Pressure	bar [PSI]	160 [2320]									
Relief Valve Pressure Settings*	bar [PSI]	80 [1160]	100 [1450]	125 [1810]	150 [2175]	-	-	80 [1160]	100 [1450]	125 [1810]	150 [2175]
Shock Valves Pressure Settings**	bar [PSI]	140 [2030]	160 [2320]	180 [2610]	200 [2900]	200 [2900]	240 [3480]	-	-	-	-
Weight	kg [lb]	1,8 , 2,3 [4.0] , [5.1]				1,8 [4.0]		1,8 [4.0]			

* Pressure Settings are at flow rate of 30 lpm [7.92 GPM] and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

** Pressure Settings are at flow rate of 2 lpm [.53 GPM] and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

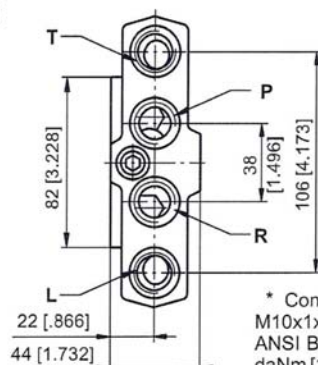
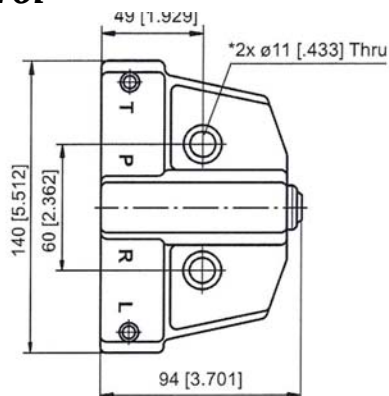
DIMENSIONS AND MOUNTING DATA - BKH1, 2, 3, 4



Code	Ports - P, T, R, L Thread
-	G1/2 20 [.80] depth
M	M22x1,5 20 [.80] depth
A	3/4 - 16 UNF O-ring 20 [.80] depth

* Connection to the HKU is done with 2 screws M10x1x40 -8.8 DIN 912 or with 2 screws 3/8-24 UNF ANSI B18.3-76, long 1.5". Tightening torque: 2,5±0,5 daNm [177±265 lb - in].

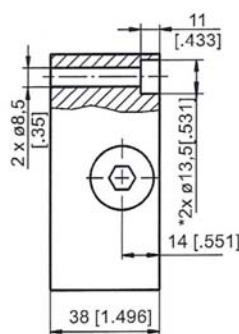
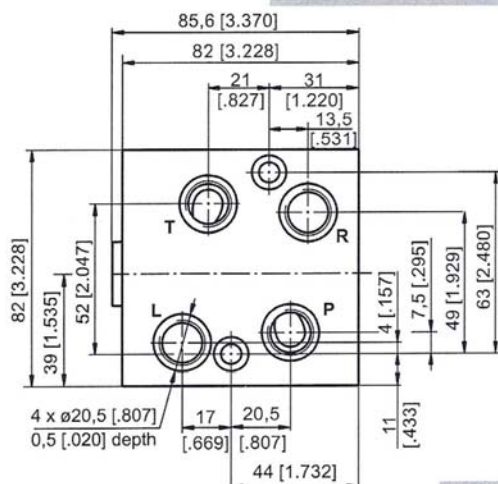
BKH1...5,R Orbitrol



Code	Ports - P, T, R, L Thread
M	M18x1,5 22 [.87] depth
A	3/4 - 16 UNF O-ring 22 [.87] depth

* Connection to the HKU is done with 2 screws M10x1x40 -8.8 DIN 912 or with 2 screws 3/8-24 UNF ANSI B18.3-76, long 1.5". Tightening torque: 2,5±0,5 daNm [177+265 lb-in].

DIMENSIONS AND MOUNTING DATA - BKH5



Code	Ports - P, T, R, L Thread
M	M16x1,5 14 [.55] depth

* Connection to the XY is done with 2 screws M8x1x40 -8.8 DIN 912. Tightening torque: 2,5±0,5 daNm [177+265 lb-in].

ORDER CODE

1	2	3	4	5
B K H	-	-	-	-

Pos.1 - Versions*

R	1	2	3	4
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

with built-in valves:
 • - Input relief valve on line "P"
 • - Input check (non-return) valve on line "P"
 • - Shock valves on lines "R" and "L"
 • - Anti-cavitation valves on lines "R" and "L"

Pos.2 - Relief Valve Pressure Settings, bar**

80	100	125	150
----	-----	-----	-----

Pos.3 - Ports***

omit	- BSPP (ISO 228)
A	- SAE (ANSI B 1.1 - 1982)
M	- Metric (ISO 262)

Pos.4 - Option (Paint)****

omit	- No Paint
P	- Painted Low Gloss Color
PC	- Corrosion Protected Paint

Pos.5 - Design Series

omit	- Factory specified
------	---------------------

Notes: * Versions R, 1, 2, 3, 4 -for HKU; 5 - for XY.
 ** That does not concern version 2 and 3.
 *** For Port size see drawings on page 19 and 20.
 **** Colour at customer's request.

The valve blocks are mangano-phosphatized as standard.

PR Prioriteitsventiel

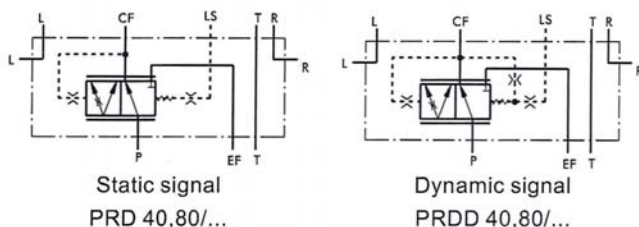


The Priority Valves distribute and trace the hydraulic flow from the supply pump of the hydraulic system to the hydraulic components which control and run the vehicle. The Priority Valves are used only with the HKUS.../5(D)(T) hydrostatic steering units. When connected, the steering unit and the priority valve represent sophisticated hydraulic tracing system that controls the flow in both main pipelines of the hydraulic system (the working and control one) at any time of its operation.

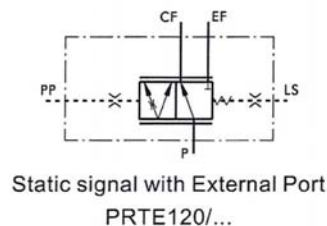
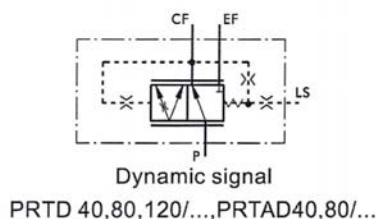
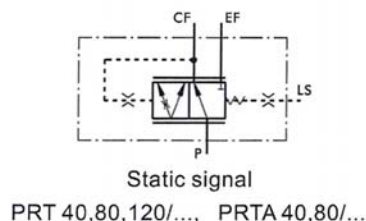
As a static signal, the "LS" signal must be used in systems with circuit stability. The connection between the PRT, PRTA priority valves and the HKUS.../5T steering units has to be as short as possible, but should not exceed 1,5 m [4.92 ft] (for iron pipe with 4 mm [.157 in.] internal diameter). When a rubber hose is used this length have to be even shorter.

Priority valves with dynamic signal work in a system with dynamic hydrostatic steering units type HKUS.../5D (5DT).

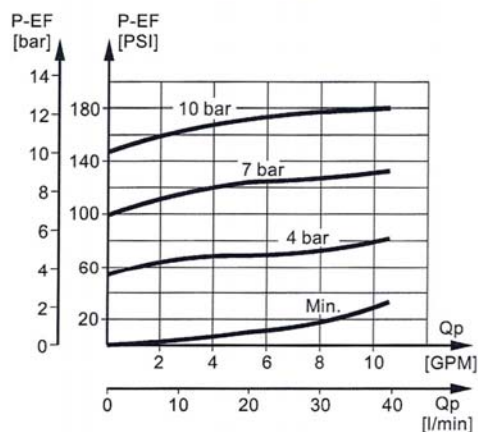
Modulary Mounting



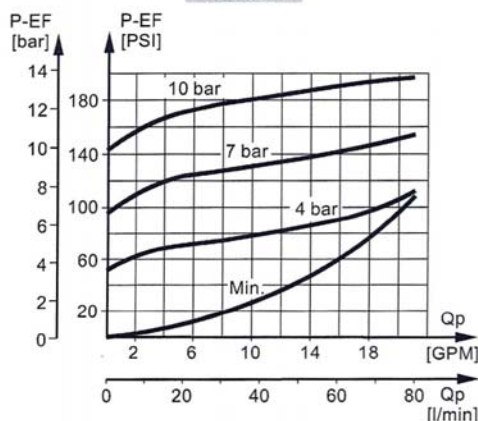
Pipe Mounting



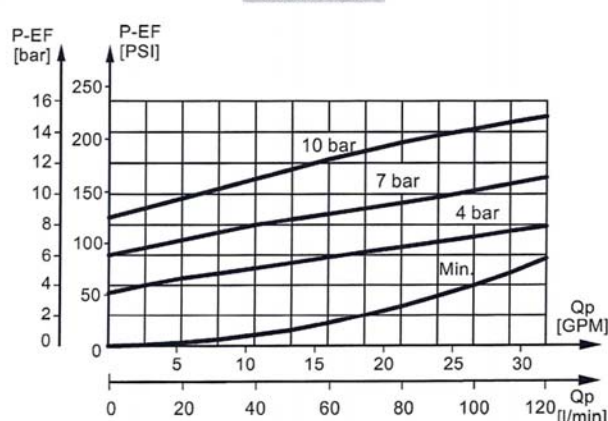
PR...40



PR...80



PRT...120

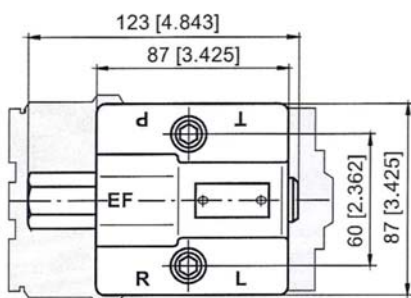
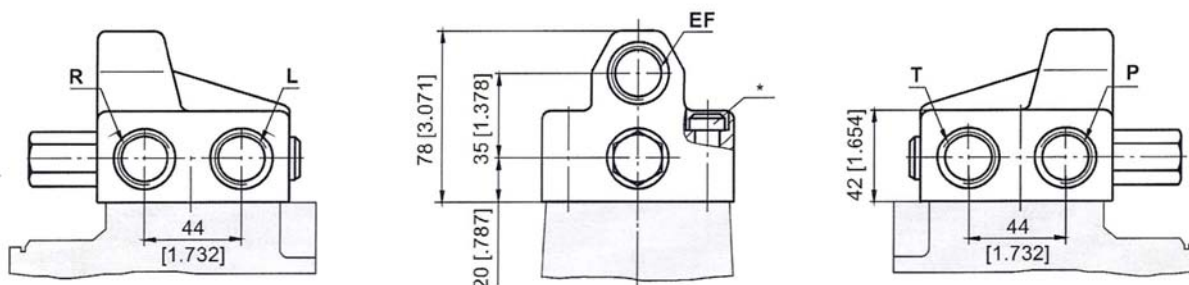


PR Prioriteitsventiel

Parameters		Type								
		PRD(D), PRT(D)			PRTA(D)			PRT(D)(E)		
Rated Flow	lpm [GPM]	40 [10.6]			80 [21.1]			120 [31.7]		
Control Spring Pressure	bar [PSI]	4 [58]	7 [101.5]	10 [145]	4 [58]	7 [101.5]	10 [145]	4 [58]	7 [101.5]	10 [145]
Max. Pressures in Oil Ports:	P, EF	250 [3625]								
	CF	210 [3045]								
	R, L	280 [4061]								
	LS	210 [3045]								
	PP							210 [3045]		
	T	20 [290]								
Weight	kg [lb]	2,25 [4.96]			1,3 [2.87]			2,1 [4.6]		

P - pump, EF - excess flow, CF - control flow (first priority oil flow),
L - left, R - right, LS - load sensing, T - tank, PP - pilot pressure (L,R and T - for PRD(D) only).

DIMENSIONS AND MOUNTING DATA - PRD(D) 40, 80/...



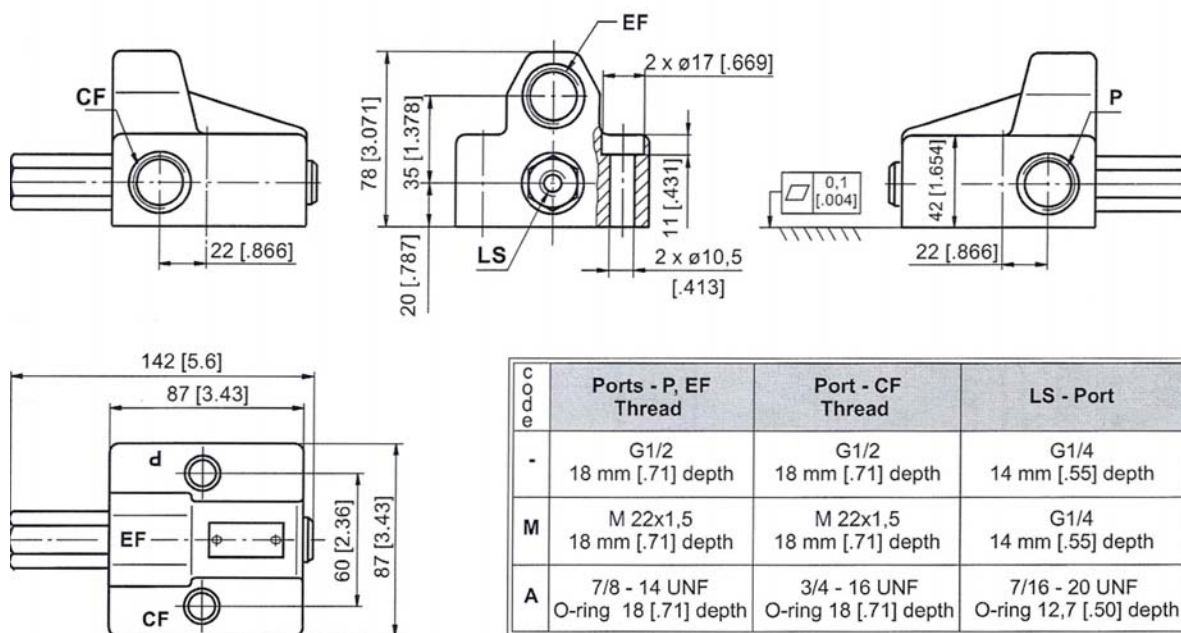
Code	Ports - P, EF Thread	Ports - T, R, L Thread
-	G1/2 18 [.71] depth	G3/8 18 [.71] depth
M	M22x1,5 18 [.71] depth	M18x1,5 18 [.71] depth
A	7/8 - 14 UNF O-ring 18 [.71] depth	3/4 - 16 UNF O-ring 18 [.71] depth



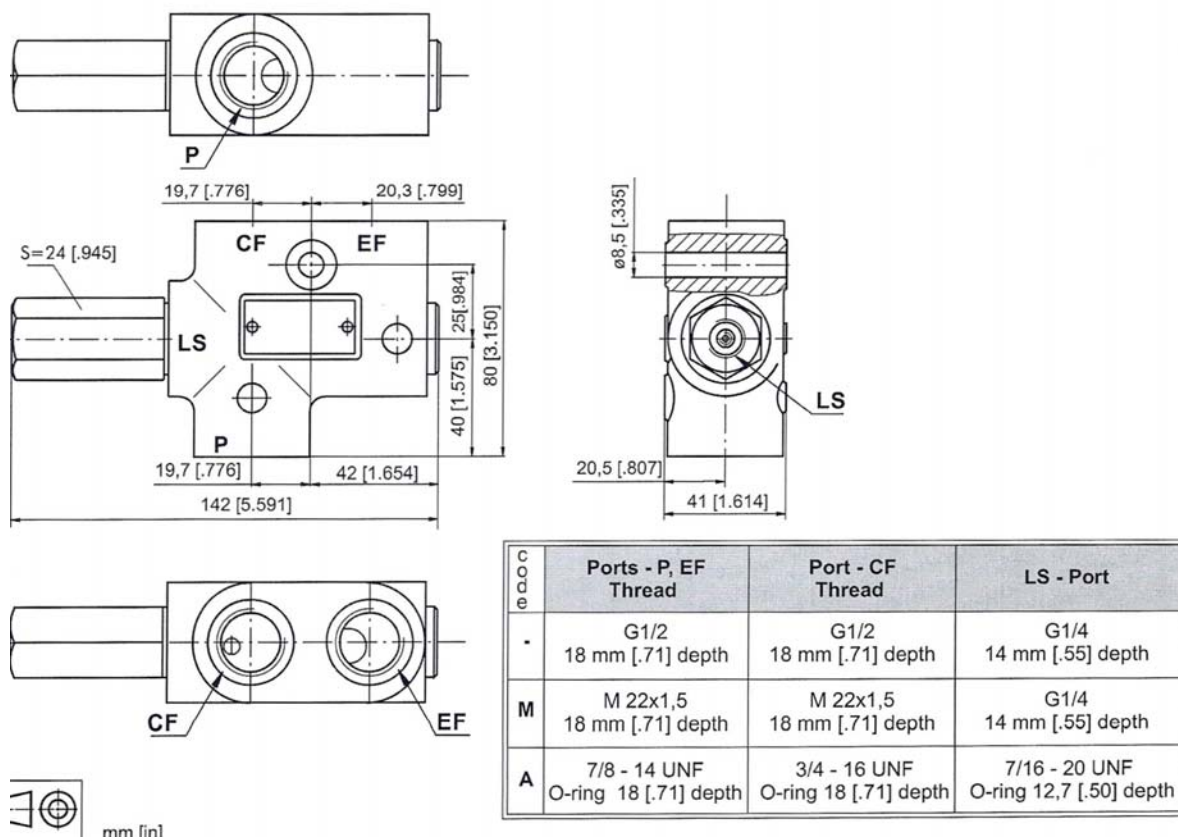
* Connection to the HKUS.../5(D)... is done with 2 screws M10x1x45 -10.9 DIN 912 or with 2 screws 3/8-24 UNF ANSI B18.3-76, 1.75" long.
Tightening torque: 4,5±0,5 daNm [360 ± 440 lb-in].

PR Prioriteitsventiel

DIMENSIONS AND MOUNTING DATA - PRT(D) 40, 80/...

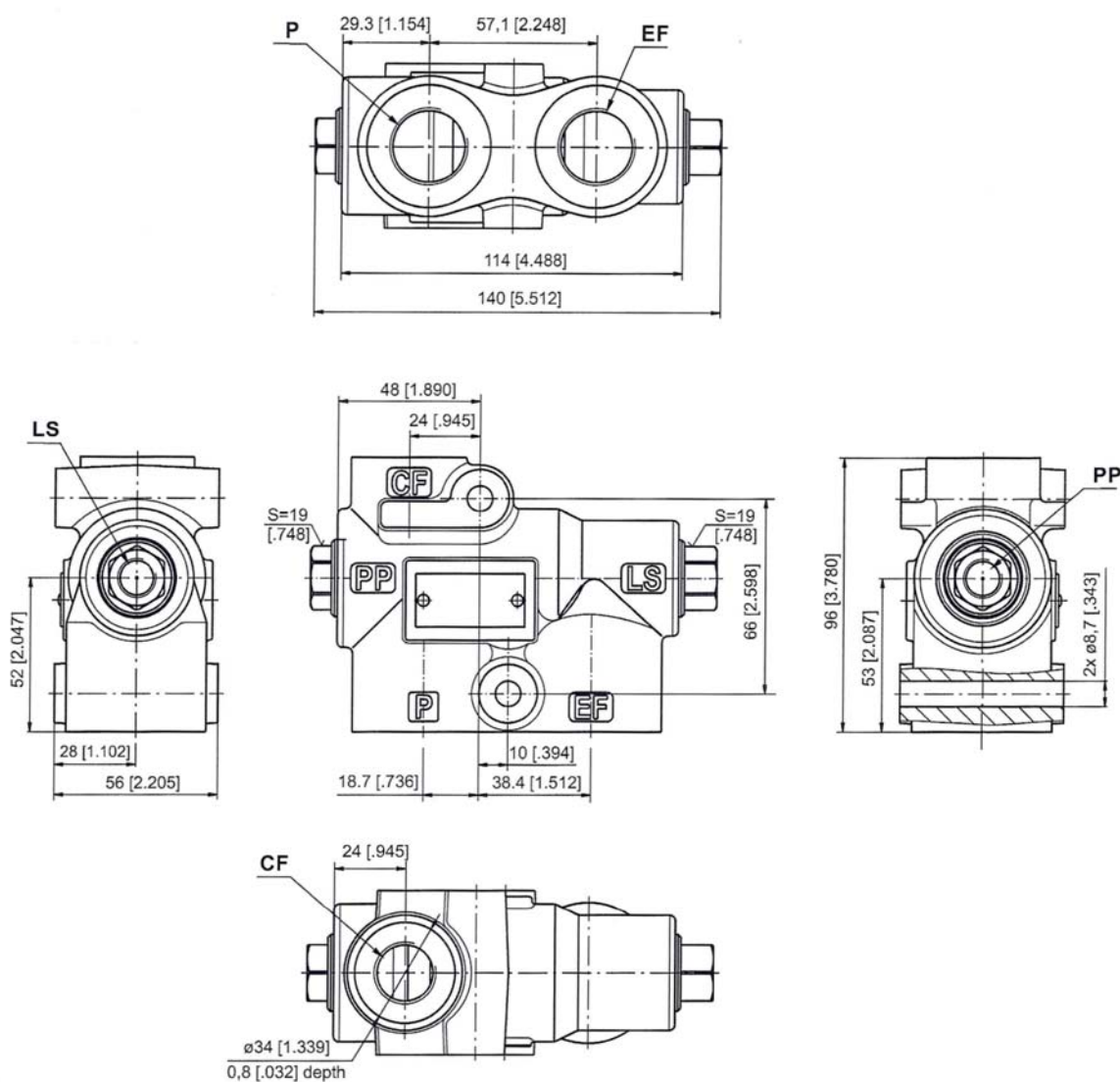


DIMENSIONS AND MOUNTING DATA - PRTA(D) 40, 80/...



PR Prioriteitsventiel

DIMENSIONS AND MOUNTING DATA - PRT...120/...



code	Ports - P, EF Thread	Port - CF Thread	LS, PP - Ports
-	G3/4 20,5 [0.81] depth	G1/2 18,5 [0.73] depth	G1/4 12,5 [0.49] depth
M	M27x2 20,5 [0.81] depth	M18x1,5 18,5 [0.73] depth	M12x1,5 12,5 [0.49] depth
A	1 1/16 - 12 UN O-ring 20,5 [0.81] depth	3/4 - 16 UNF O-ring 18,5 [0.73] depth	7/16 - 20 UNF O-ring 12,5 [0.49] depth



PRT...160/...

Prioriteitsventiel voor alleen HKU(S).../5T...



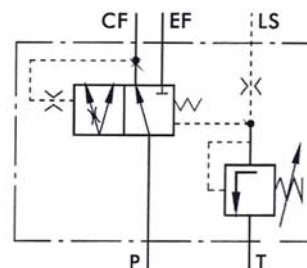
The Priority Valves PRT... 160 have built-in a pilot pressure relief valve, who protects the steering unit against excess pressure. The pilot pressure relief valve operates with the Shuttle of the Priority valve to limit the maximum steering pressure P-T measured across the steering units ports.

SPECIFICATION DATA

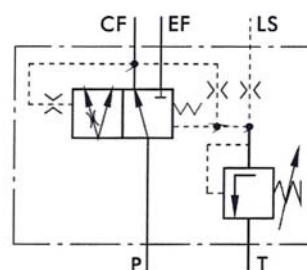
Parameters		Type		
		PRT(D), PRTE		
Rated Flow	lpm [GPM]	160 [42.3]		
Control Spring Pressure	bar [PSI]	4 [58]	7 [101.5]	10 [145]
Max. Pressures in Oil Ports:		350 [5076]		
bar [PSI]	P, EF	210 [3045]		
	CF	210 [3045]		
	LS	210 [3045]		
	PP	210 [3045]		
	T	15 [217]		
Standart Relief Valve Pressure Settings		175 [2540]		
Weight	kg [lb]	4,4 [9.70]		

* - Adjusted valve pressure from 80 bar [1160 PSI] till 210 bar [3045 PSI] upon customer request.

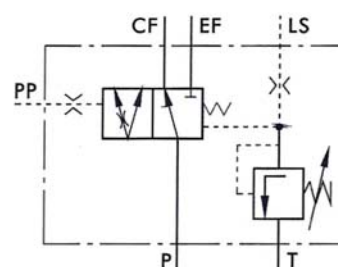
P - pump, EF - excess flow, CF - control flow (first priority oil flow), LS - load sensing, T - tank, PP - pilot pressure



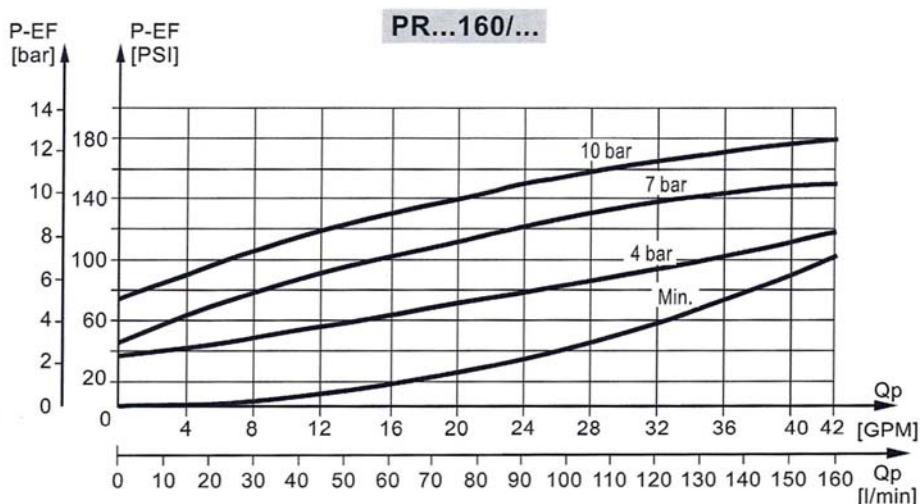
Static signal
PRT 160/...



Dynamic signal
PRTD 160/...



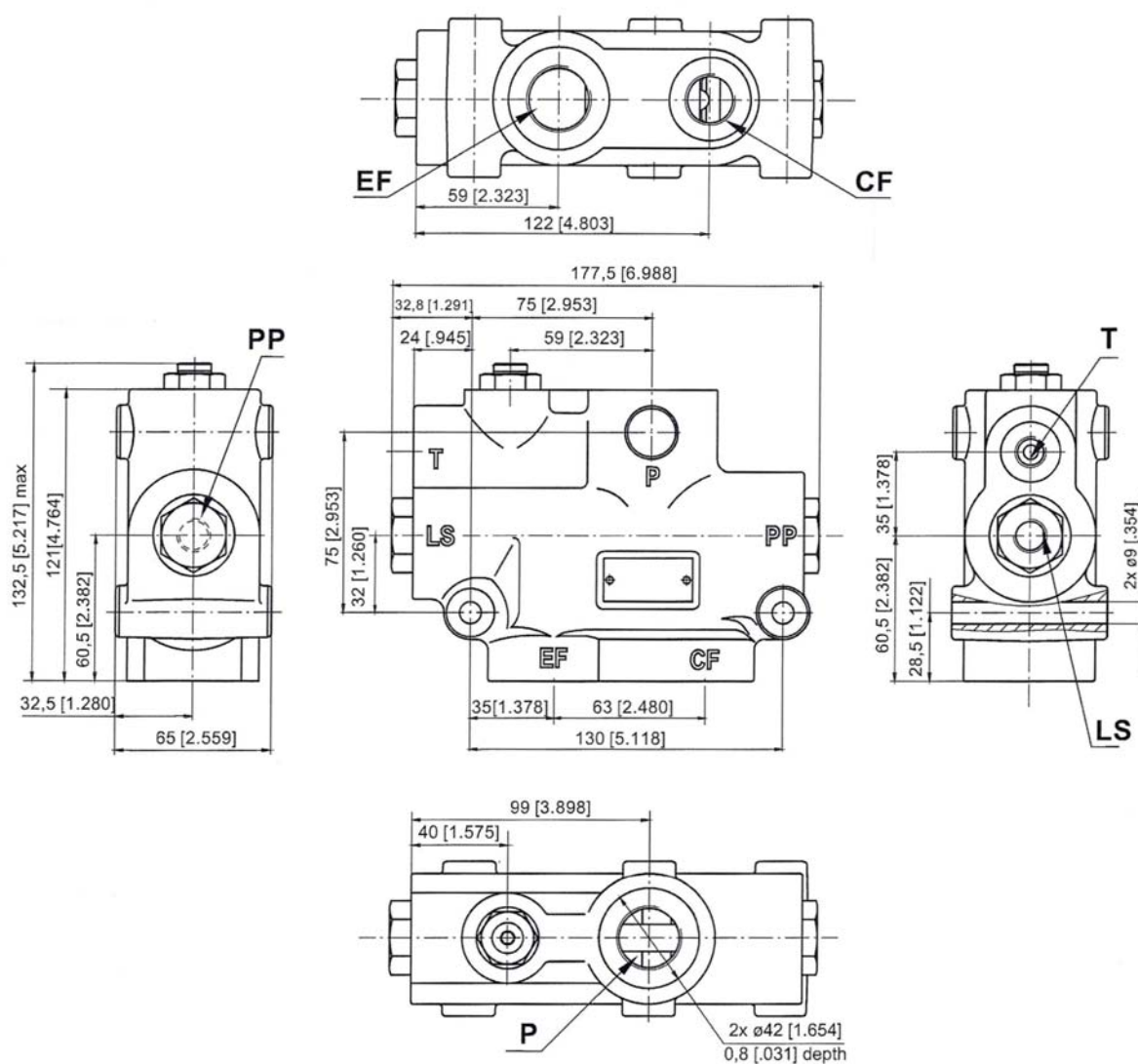
Static signal with External Pilot
PRTE 160/...



PRT(D)(E)160/...

Prioriteitsventiel

DIMENSIONS AND MOUNTING DATA - PRT(D)(E)160/...



Code	Ports - P, EF Thread	Port - CF Thread	LS, PP, T - Ports
-	G3/4 20,5 [.81] depth	G1/2 18,5 [.73] depth	G1/4 12,5 [.49] depth
M	M27x2 20,5 [.81] depth	M18x1,5 18,5 [.73] depth	M12x1,5 12,5 [.49] depth
A	1 1/16 - 12 UN O-ring 20,5 [.81] depth	3/4 - 16 UNF O-ring 18,5 [.73] depth	7/16 - 20 UNF O-ring 12,5 [.49] depth



mm [in]

PR Prioriteitsventiel

Bestelgegevens

	1	2	3	4	5	6	7
PR				/	-		

Pos.1 - Mounting

- D** - Modularly Mounting
- T** - Pipe Mounting (Model 1)
- TA** - Pipe Mounting (Model 2)

Pos.2 - Signal Type

- omit - with Static signal
- D** - with Dynamic signal
- E*** - with Static signal and External Pilot

Pos.3 - Rated Flow, l/min

40	80	120**	160**
----	----	-------	-------

Pos.4 - Control Spring Pressure , bar

4	7	10
---	---	----

Pos.5 - Ports

- omit - BSPP (ISO 228)
- M** - Metric (ISO 262)
- A** - SAE (ANSI B 1.1 - 1982)

Pos.6 - Option [Paint]***

- omit - No Paint
- P** - Painted Low Gloss Color
- PC** - Corrosion Protected Paint

Pos.7 - Design Series

- omit - Factory specified

Notes: * For PRT 120/... and PRT 160/... only
 ** For PRT only
 *** Colour at customer's request.

The priority valves are mangano-phosphatized as standard.

UVM versterker



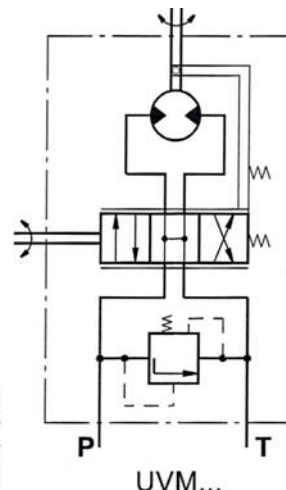
The M+S Hydraulic UVM Torque Amplifiers amplify the applied torque to the control shaft and thus ease the running of various transport vehicles such as:

- agricultural and wood working machines;
- road rollers and road cleaning machines;
- fork-lift trucks and construction machinery;

The totally transferred power in terms of output torque is up to 1,1 kW [1.47 HP].

The UVM torque amplifiers with their simple design, consisted of a pump and an amplifier, ensure 40 times higher output torque than the applied one. The amplifying is achieved as follows; by rotating the input shaft to the left or right the spool and the bushing are displaced, and the hydraulic flow enters the system turning the gerotor set, which transfers the already amplified torque to the output shaft.

One advantage of the UVM torque amplifier is that it allows manual steering in cases of engine (pump) failure.



SPECIFICATION DATA

Parameters		Type	
		UVM 100	UVM 160
Displacement	cm ³ /rev [in ³ /rev]	99,0 [6.04]	158,4 [9.67]
Rated Flow*	lpm [GPM]	10 [2.6]	16 [4.2]
Rated Pressure**	bar [PSI]	70 [1015]	70 [1015]
Input Torque	daNm [lb-in]	0,35...0,5 [31...44]	0,35...0,5 [31...44]
Max. Input Torque	daNm [lb-in]	20 [178]	20 [178]
Torque Output at 70 bar [1015 PSI]	daNm [lb-in]	80 [708]	120 [1062]
Pressure Drop between P and T at Rated Flow	bar [PSI]	1... 2 [14.5...29]	1,6...2,5 [23.2...36.3]
Max. Speed of Rotation at Rated Flow and Pressure	RPM	100	100
Max. Continuous Pressure in Line T	bar [PSI]	20 [290]	20 [290]
Weight	kg [lb]	5,8 [12.8]	6,2 [13.7]

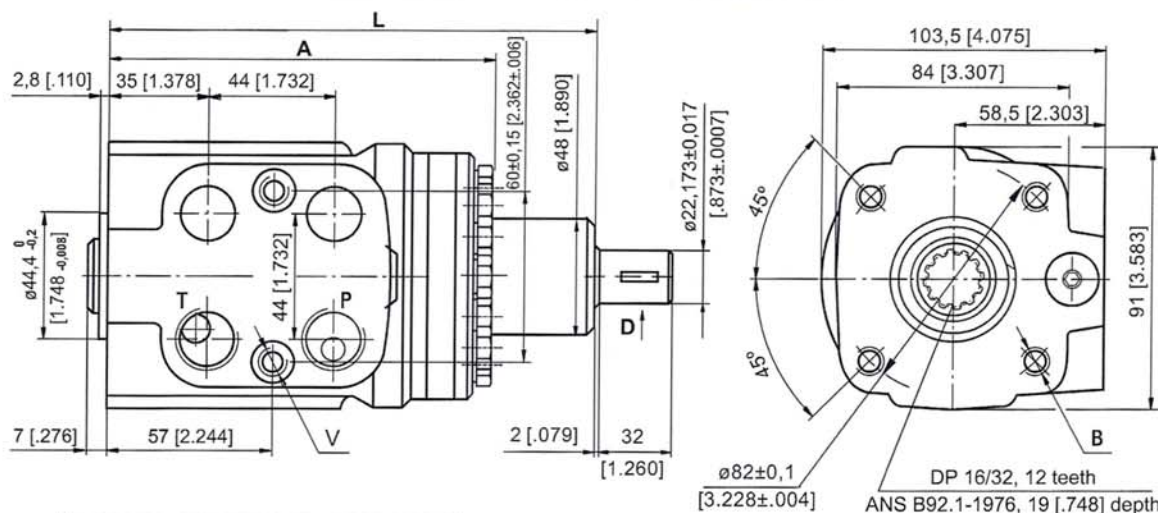
* Rated Flow at 100 RPM

** Pressure Settings are at Rated Flow (as in the table) and viscosity 21 mm²/s [105 SUS] at 50° C [122°F].

UVM

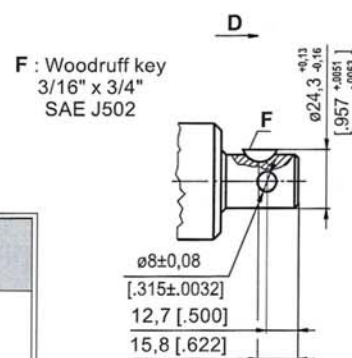


DIMENSIONS AND MOUNTING DATA



Dimensions		Type	
		UVM 100	UVM 160
A	mm [in]	143,3 [5.64]	151,3 [5.96]
L	mm [in]	181,2 [7.13]	189,2 [7.45]

C o d e	Ports - P, T Thread	Column Mounting Thread - B	Port Mounting Thread - V
-	G1/2 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
M	M22x1,5 17 [.67] depth	4 x M10 18 [.71] depth	2 x M10x1 16 [.63] depth
A	3/4 - 16 UNF O-ring 17 [.67] depth	4 x 3/8 - 16 UNC 15,7 [.62] depth	2 x 3/8 - 24 UNF 14,2 [.56] depth



ORDER CODE

	1	2	3	4
UVM				

Pos.1 - Displacement code

100	- 99,0	[6.04]	cm ³ /rev	[in ³ /rev]
160	- 158,4	[9.67]	cm ³ /rev	[in ³ /rev]

Pos.2 - Ports

	- BSPP (ISO 228)
M	- Metric (ISO 262)
A	- SAE (ANSI B 1.1 - 1982)

Pos.3 - Option (Paint)*

omit	- No Paint
P	- Painted Low Gloss Color
PC	- Corrosion Protected Paint

Pos.4 - Design Series

omit - Factory specified

Notes: * Colour at customer's request.

The steering units are mangano-phosphatized as standard.

KK...

Stuurstang

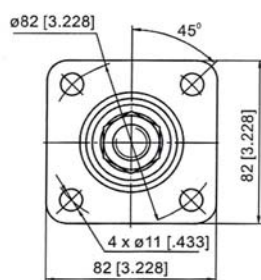
De KK stuurstang verplaatst de torque van het stuurwiel naar de HKU, HKUS of andere stuurseenheid van dezelfde klasse. De KK stuurstang bevat een pijp waarin de controle as is gecentreerd.; De maximaal toegestane belasting op de stuurkolom is;

Max. torque applied to the
steering wheel 24 daNm [2124 lb-in]
Max. bending moment 20 daNm [1770 lb-in]
Max. axial load 100 daN [225 lbs]

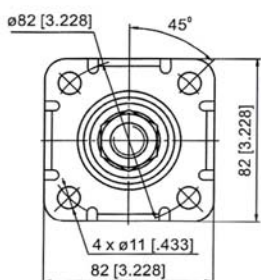
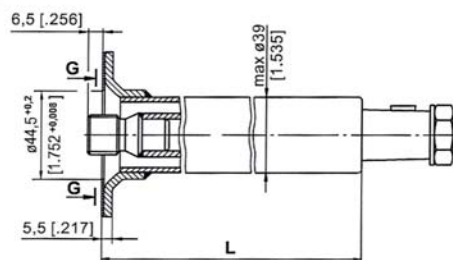
The steering column must be additionally supported when the length L exceeds 150 mm [5.91 in].



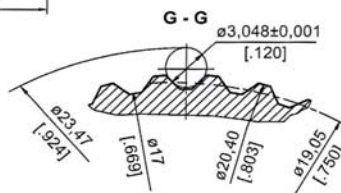
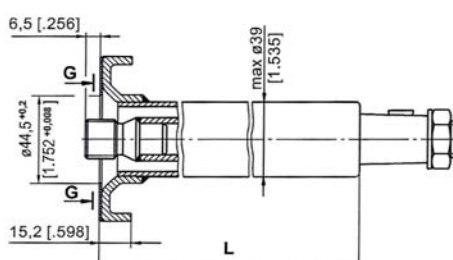
Afmetingen en montage data



Type KK



Type KKF



SPECIFICATION DATA

Involute Spline Data		
Modul	m	1.5875
Number of Teeth	z	12
Pressure Angle	α	30°
Diametral Pitch	DP	16/32

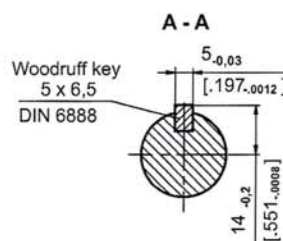
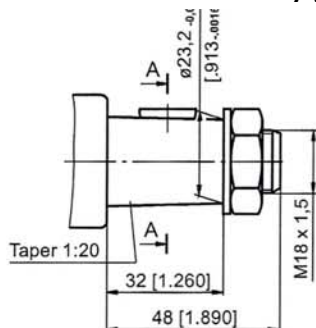
Parameters		Type				
		KK 75	KK 150	KK 390	KK 441	KK 750
L	mm [in]	78 [3.07]	168,2 [6.62]	393 [15.47]	441 [17.36]	777,8 [30.62]
Weight	kg [lb]	0,75 [1.65]	1,1 [2.43]	1,9 [4.19]	5,05 [11.13]	3,3 [7.28]

Note: The length L depends on the transport vehicle construction.
For more information regarding other lengths and shaft versions, please refer to M+S Hydraulic.

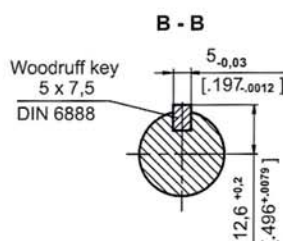
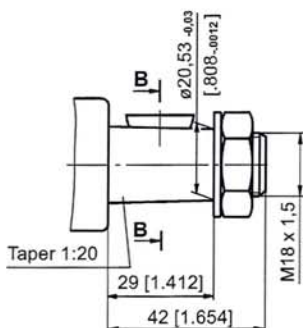
KK

As versies

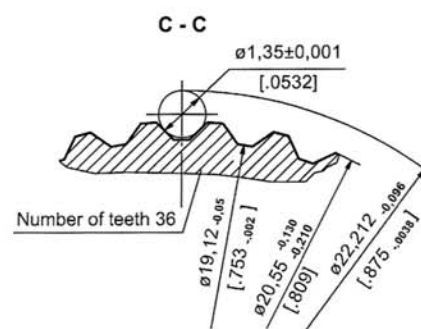
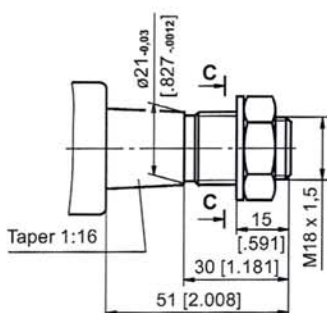
TYPE I



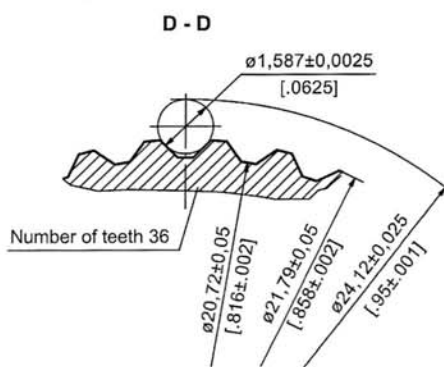
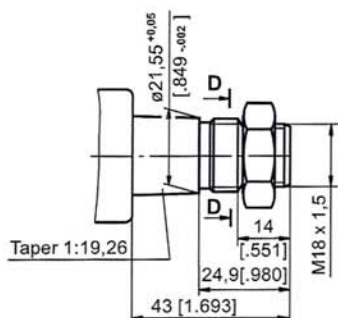
TYPE II



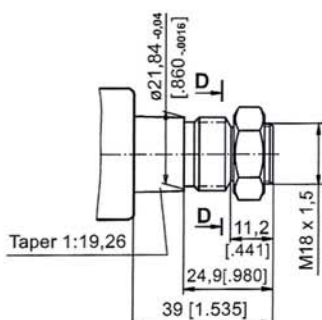
TYPE III



TYPE IV



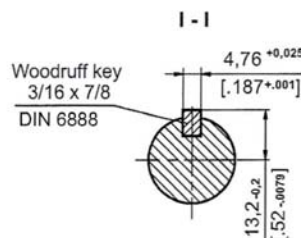
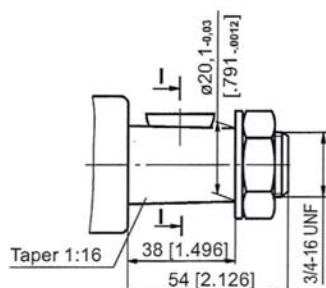
TYPE V



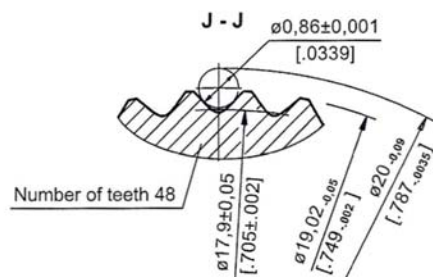
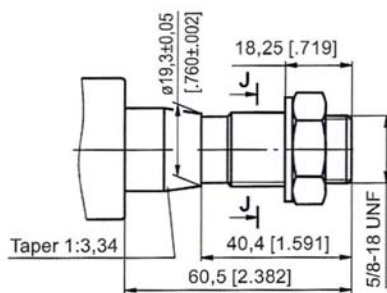
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As versies

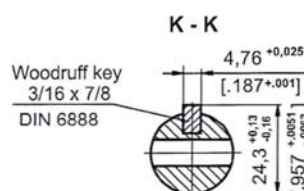
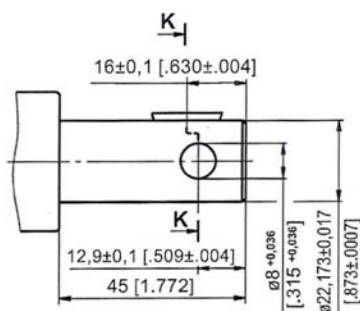
TYPE VI



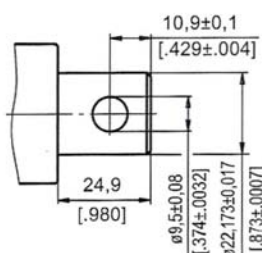
TYPE VII



TYPE VIII



TYPE IX

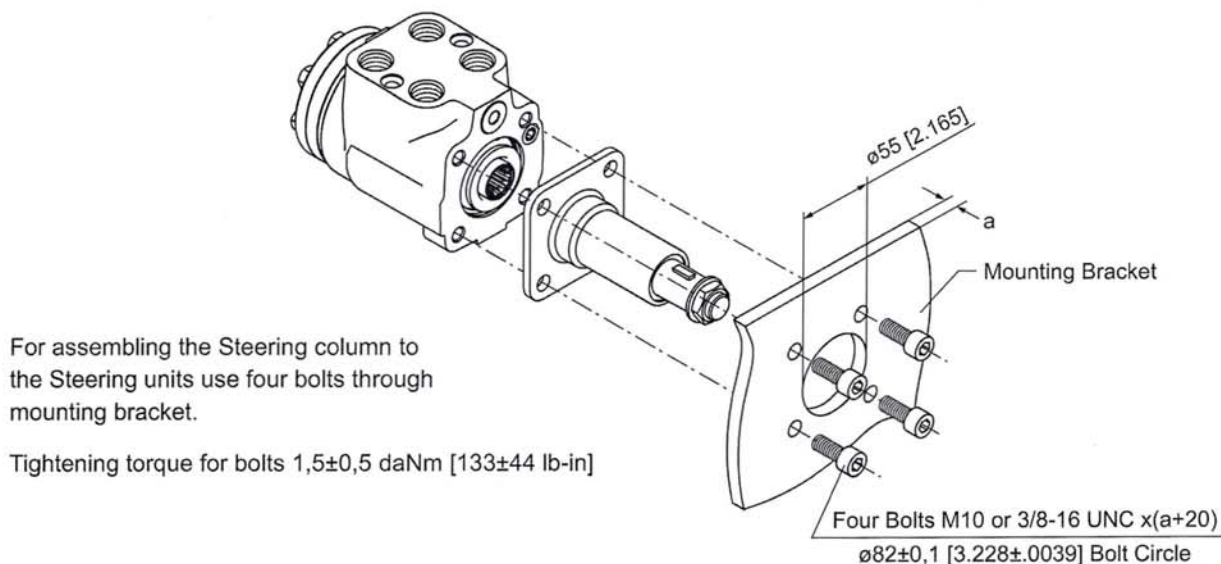


mm [in]

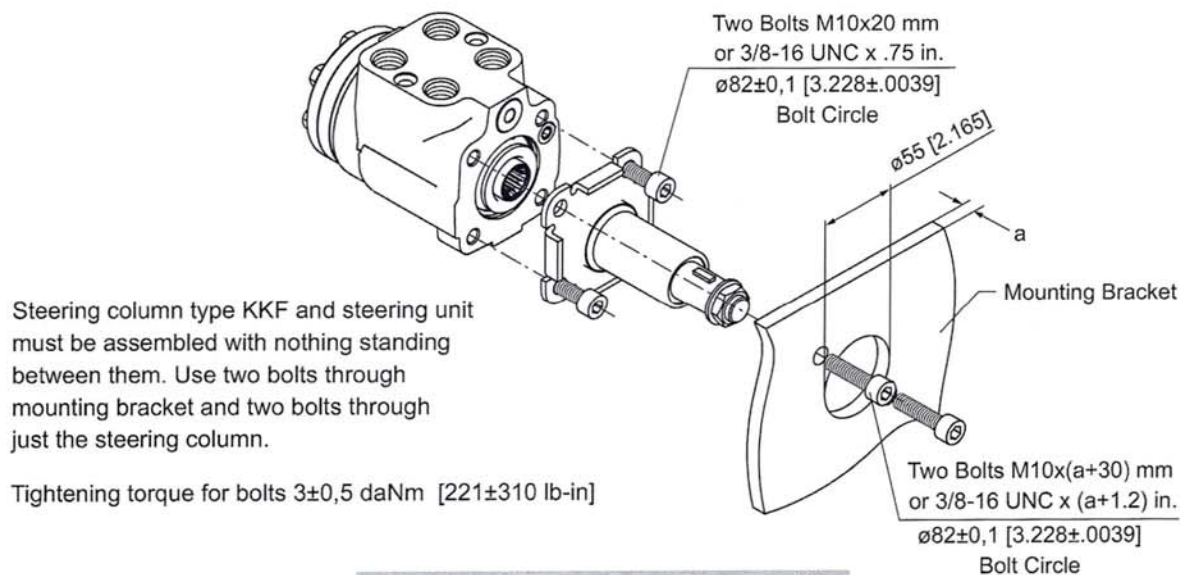
KK

Montagevoorschriften

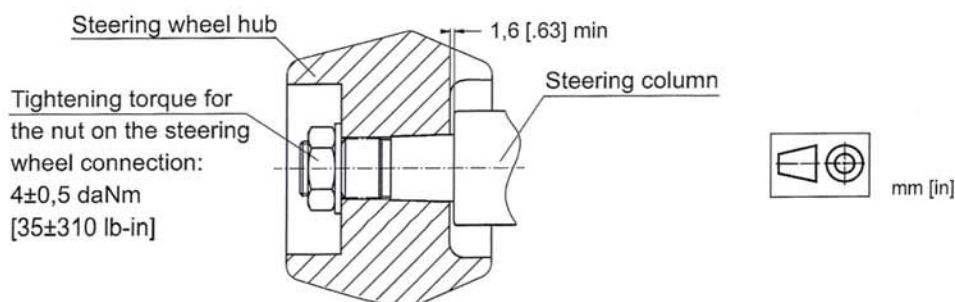
For column type KK



For column type KKF



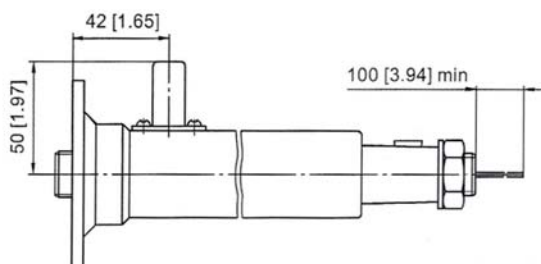
Minimum Clearance at Assembly



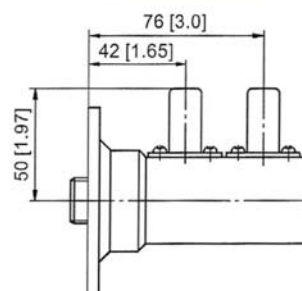
KK

Geluids signaal aansluiting

E Option



EE Option



ORDER CODE

	1	2	3	4	5	6
KK						

Pos.1 - Mounting Flange

- omit - Flange without Tabs
F - Flange with Tabs

Pos.2 - Length, mm (acc. to table)

Pos.3 - Shaft Extensions

I, II, III, IV, V, VI, VII, VIII, IX

Pos.4 - Signal Connection (Option)

- omit - without electric signal connection
E - with one electric signal connection
EE* - with two electric signal connection

Pos.5 - Option (Paint)**

- omit - No Paint
P - Painted Low Gloss Color
PC - Corrosion Protected Paint

Pos.6 - Design Series

- omit - Factory specified

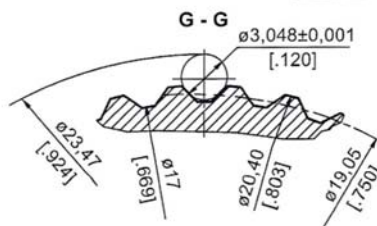
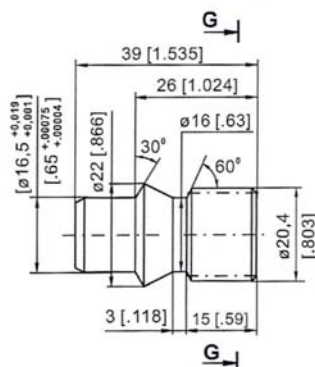
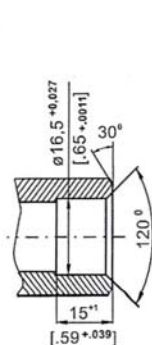
Notes: * For steering column's length 150 mm [L>5.9 in] only.

** Colour at customer's request.

The steering columns are yellow galvanized as standard.

Shaft End Part

Order No: 46415 001 00



Involute Spline Data

Modul	m	1.5875
Number of Teeth	z	12
Pressure Angle	α	30°
Diametral Pitch	DP	16/32



Orbitrol algemeen

GENERAL APPLICATION AND SPECIFICATION INFORMATION

APPLICATION

(SIZING AND STEERING SYSTEM DESIGN PROCESS)

STEP ONE:

Calculate approximate kingpin torque (M_L).

$$M_L = G \cdot \mu \cdot \sqrt{\frac{B^2}{8} + \ell^2}$$

Note: Double M_L if steered wheels are powered.

M_L = Kingpin torque in daNm [lb-in].

G = Vehicle weight on steered axle daN [lbs] (use maximum estimated overload weight).

μ = Coefficient of friction (use Chart № 1, dimensionless) determined by ℓ/B (see Diagram № 1).

B = Nominal width of tyre print, m [in] (see Diagram № 1).

ℓ = Kingpin offset. The distance between tyre centerline intersection at ground and kingpins centerline intersection at ground in, m [in] (see Diagram № 1).

Chart № 1

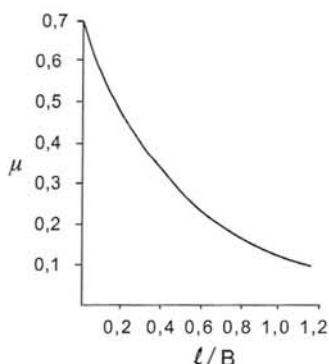


Diagram № 1

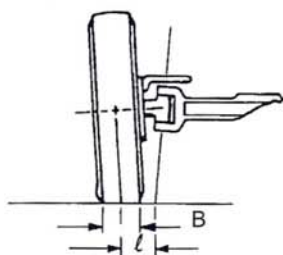
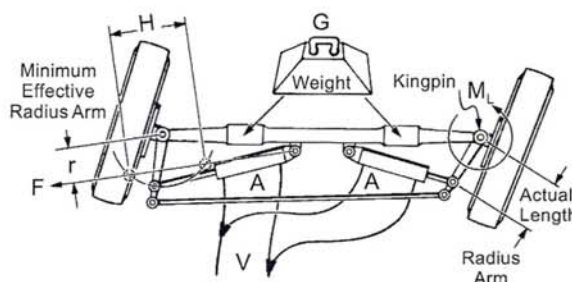


Diagram № 2



STEP TWO:

Calculate approximate cylinder; force-area-stroke-volume.

FORCE

$$F = \frac{M_L}{r}$$

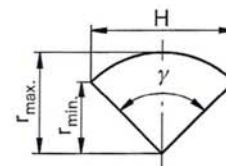
F = Force required daN [lbs] to steer axle.

M_L = Kingpin torque in daNm [lb-in] from step one. Double M_L if steered wheels are powered.

r = Effective radius Arm mm [in] is the minimum distance from the centerline of the cylinders minimum and maximum stroke points parallel to the kingpin center pivot. This is not the physical length of the radius Arm (see Diagram № 2 and Chart № 2).

Chart № 2

$$r_{\min.} = r_{\max.} \cdot \cos \frac{\gamma}{2}$$



STROKE

H = Stroke, cm [in].

Calculate stroke of cylinder using Diagram № 2 and Chart № 2 as shavt.

$$H = 2 r_{\max.} \cdot \sin \frac{\gamma}{2}$$

AREA

$$A = \frac{F}{\Delta P}$$

A = Cylinder area for axle cylinder set, cm^2 [in²].

F = Force required from step two force formula, daN [lbs].

ΔP = Hydraulic pressure bar [PSI] use following percentage of relief valve setting by amount of load on steered axle. Severe load 25% - medium load 55% - no load 75%.

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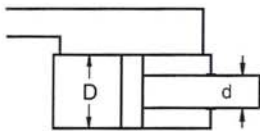
DIAMETER

After the cylinder set area is determined, the cylinder diameter can be calculated.

D = Inside diameter of cylinder, cm [in].
d = Rod diameter of cylinder, cm [in].

Choose type of cylinder arrangement and formula shown for that type.

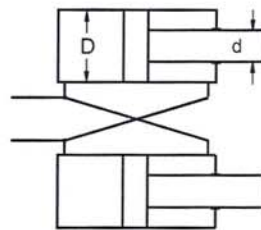
Differential Cylinder



$$D = \sqrt{\frac{4A}{\pi} + d^2}$$

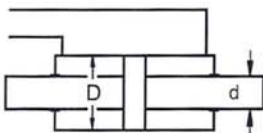
Note: $\left(\frac{d}{D}\right)^2 \leq 0,15$

Cross Connected Cylinders



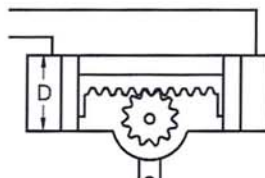
$$D = \sqrt{\frac{2A}{\pi} + \frac{d^2}{2}}$$

Balanced Cylinder



$$D = \sqrt{\frac{4A}{\pi} + d^2}$$

Opposed Cylinder



$$D = \sqrt{\frac{4A}{\pi}}$$

VOLUME $V = H \cdot A$

V = Volume. The total amount of oil required to move the cylinder rod(s) through the entire stroke, cm³ [in³].

H = Stroke, cm [in].

A = Area, cm² [in²].

Note: For differential cylinders it is important to calculate average cylinder volume for step three using below formula.

$$V_{avg.} = H \cdot \frac{\pi}{4} (2 \cdot D^2 - d^2)$$

STEP THREE:

Selecting displacement of hydrostatic steering unit.

At this point determine number of steering wheel revolutions desired for your application to steer the wheels from one side to the other (lock to lock). Depending on the type of vehicle and its use, this will vary from 3 to 5 turns.

DISPLACEMENT $V_D = \frac{V}{n}$

V_D = Displacement, cm³/rev [in³/rev].

V = Volume of oil, cm³ [in³].

n = Steering wheel turns lock to lock.

After completing the above displacement calculation, choose the closest standard hydrostatic steering unit in displacement size that incorporates circuitry you require. Recalculate the number of steering wheel turns using the displacement of selected standard hydrostatic steering unit outlined above. Use the formula shown below.

$$n = \frac{V}{V_D}$$

V = Volume of oil, cm³ [in³].

n = Steering wheel turns lock to lock.

Note: For differential cylinders applications the cylinder volume will be different for left and right turns - this means the value n (steering wheel turns lock to lock) will vary when turning to the left or right.

STEP FOUR:

Calculate approximate minimum and maximum steering circuit flow requirements.

$$Q = \frac{V_D \cdot N}{\text{Unit Conversion for Imperial or [1000] Metric}}$$

Q = Steering circuit flow, lpm [GPM].

V_D = Unit displacement, cm³/rev [in³/rev]

N = Steering wheel input speed, RPM.

Recommended steering speed is 50 to 100 RPM.

Many variables are involved in sizing the pump. We suggest that the manufacturer test and evaluate for desired performance.

GENERAL INFORMATION

FLUID DATA:

To insure maximum performance and life of the Hydrostatic steering units, use premium quality hydraulic oils. Fluids with effective quantities of anti-wear agents or additives are highly recommended. If using synthetic fluids consult the factory for alternative seal materials.

• Viscosity

Viscosity at normal operating temperature should be approx. 20 mm²/s [100 SUS]. Viscosity range 10 - 300 mm²/s [60 - 1500 SUS].

• Temperature

Normal operating temperature range from +30°C [+85°F] to +60°C [140°F].

Minimum operating temperature -40°C [-40°F].

Maximum operating temperature +80°C [+176°F].

Note: Extended periods of operation at temperature of 60°C and above will greatly reduce life of oil due to oxidation and shorten life of product.

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Filtration

The maximum degree of contamination per ISO 4406 or CETOP RP is:

- 20/17 open center units
- 19/16 closed center and load sensing
- 16/12 priority valves

Return line filtration of 25 μm nominal (40 - 50 μm absolute) or finer is recommended.

In extremely dusty conditions filtration of 10 μm absolute should be used.

START UP

All air must be purged from system before operating unit. It is extremely important that any external lines or units with load sensing or priority feature be completely bled. Lines going to and from cylinders as well as lines to and from pump be purged of all air. It is recommended that a 10-15 μm filter be used between pump and steering unit before start up.

MOUNTING UNITS

All hydrostatic steering units should be installed for ease of access. It is recommended that the steering unit be located outside the vehicle cabin.

It is important that no radial axial load be applied to the hydrostatic steering unit input shaft. Any or all radial and axial loads must be absorbed by the steering column or other operating device supplied by the vehicle manufacture. Ports on the steering cylinder(s) should face upward to prevent damage.

During installation of the hydrostatic steering unit, cleanliness is of the utmost importance. Pipe plugs should be left in place during mounting and only removed when hydraulic lines are to be connected.

CONVERSIONS

to convert inches and millimeters:

1 in = 25,4 mm
 1 mm = .03937 in

to convert gallons per minutes and liters per minutes:

1 GPM = 3,785 lpm
 1 lpm = .2642 GPM

to convert pounds per square inch and bar:

1 PSI = 0,0689 bar
 1 bar = 14,51 PSI

to convert pounds-inch and newton-meters:

1 in - lb = 0,113 Nm
 1 Nm = 8.85 lb - in

TORQUE TIGHTENING VALUES

Fluid connections

Fluid connection	Max. tightening torque daNm [lb - in]			
	metal edge	copper washer	aluminum washer	O - ring
G 1/4	4,0 [350]	3,5 [309]	3,5 [309]	
G 3/8	7,0 [620]	4,5 [398]	5,0 [442]	
G 1/2	10,0 [885]	5,5 [486]	8,0 [708]	
G 3/4	18,0 [1593]	9,0 [796]	13,0 [1150]	
M 10 x 1	4,0 [350]	2,0 [180]	3,0 [265]	
M 18 x 1,5	8,0 [708]	5,5 [486]	7,0 [620]	
M 22 x 1,5	10,0 [885]	6,5 [575]	8,0 [708]	
7/16 - 20 UNF				2,0 [180]
9/16 - 18 UNF				5,0 [442]
3/4 - 16 UNF				6,0 [531]
7/8 - 14 UNF				9,0 [796]
1 1/16 - 12 UN				12,0 [1062]

Mounting bolts

Mounting bolts	Tightening torque daNm [lb - in]
3/8 - 16 UNC	3,0 $\pm$ 0,5 [230 $\pm$ 310]
M 10 x 1	6,5 $\pm$ 0,5 [540 $\pm$ 620]
M 10	3,0 $\pm$ 0,5 [230 $\pm$ 310]