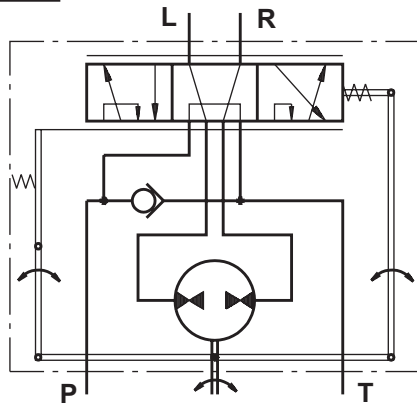


HYDROSTATIC STEERING UNITS TYPE HKU.../3, 4

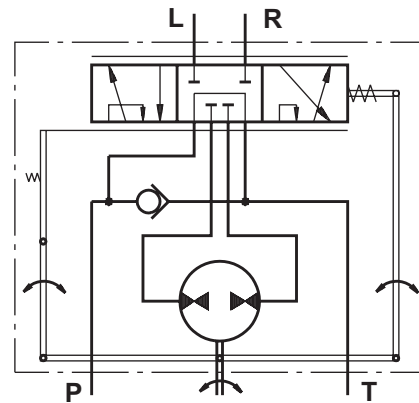


The M+S Hydraulic Hydrostatic Steering units are used in low-speed vehicles which driving speed does not exceed 37 mph [60 km/h] - such as: building machines, fork-lift trucks, harvesting machines, off-highway equipment and others. These hydraulic units amplify the torque to the steering wheels, with no need of hard mechanical connection.

The newly designed HKU steering units, with radial distribution, incorporate two rotary tracing valves in the housing which turn on the metering pump.



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



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

SPECIFICATION DATA

Parameters	Type																
	HKU 40/3	HKU 50/3	HKU 63/3	HKU 80/3	HKU 100/3	HKU 125/3	HKU 160/3	HKU 200/3	HKU 250/3	HKU 320/3	HKU 400/3						
	HKU 40/4	HKU 50/4	HKU 63/4	HKU 80/4	HKU 100/4	HKU 125/4	HKU 160/4	HKU 200/4	HKU 250/4	HKU 320/4	HKU 400/4	HKU 500/4	HKU 630/4	HKU 800/4	HKU 1000/4		
Displacement	in. ³ /rev. [cm. ³ /rev.]	2.42 [39,6]	3.0 [49,5]	4.0 [65,6]	4.83 [79,2]	6.04 [99,0]	7.56 [123,8]	9.67 [158,4]	12.08 [198]	15.1 [247,5]	19.3 [316,8]	24.17 [396]	30.2 [495]	38.05 [623,6]	48.4 [793]	60.4 [990]	
Rated Flow*	GPM [lpm]	1.1 [4]	1.3 [5]	1.6 [6]	2.1 [8]	2.6 [10]	3.4 [13]	4.2 [16]	5.3 [20]	6.6 [25]	8.4 [32]	10.6 [40]	13.2 [50]	16.6 [63]	21.1 [80]		
Rated Pressure	PSI [bar]	2030 [140]		2465 [170]								2030 [140]		1450 [100]			
Max. Cont. Pressure in Line T	PSI [bar]																
- standard		363 [25]															
- high pressure (H option)		580 [40]															
Max. Torque at Servoamplifying in - lb [Nm]												26 [3,0]		26 [3,0]			
-with standard springs												16 [1,8]		-			
-with soft springs (LT option)																	
Max. Torque w/o Servoamplifying in - lb [Nm]		1065 [120]															
Weight	lb [kg]	11.7 [5,3]	11.9 [5,4]	12.2 [5,5]	12.4 [5,6]	12.6 [5,7]	12.8 [5,8]	13.2 [6,0]	13.9 [6,3]	14.3 [6,5]	15.4 [7,0]	16.3 [7,4]	17.6 [8,0]	19.2 [8,7]	21.2 [9,6]	23.4 [10,6]	
Dimension A	in. [mm]	5.15 [130,8]	5.20 [132,2]	5.27 [133,9]	5.36 [136,2]	5.47 [138,8]	5.60 [142,2]	5.78 [146,8]	5.99 [152,2]	6.25 [158,8]	6.62 [168,2]	7.04 [178,8]	7.56 [192]	8.24 [209,3]	9.14 [232,2]	10.18 [258,6]	

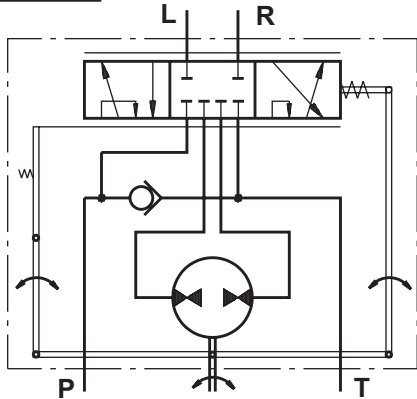
* Rated Flow at 100 RPM.

HYDROSTATIC STEERING UNIT TYPE HKU.../7



The HKU.../7 is a "Closed Center - Non Load Reaction" hydrostatic steering unit, designed for integration into systems with built-in hydroaccumulator, achieving minimal energy losses.

When connecting to a differential cylinder the L and R ports of the steering unit must be connected as follows: L to the greater piston area, and R - to the smaller one.



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

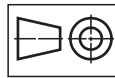
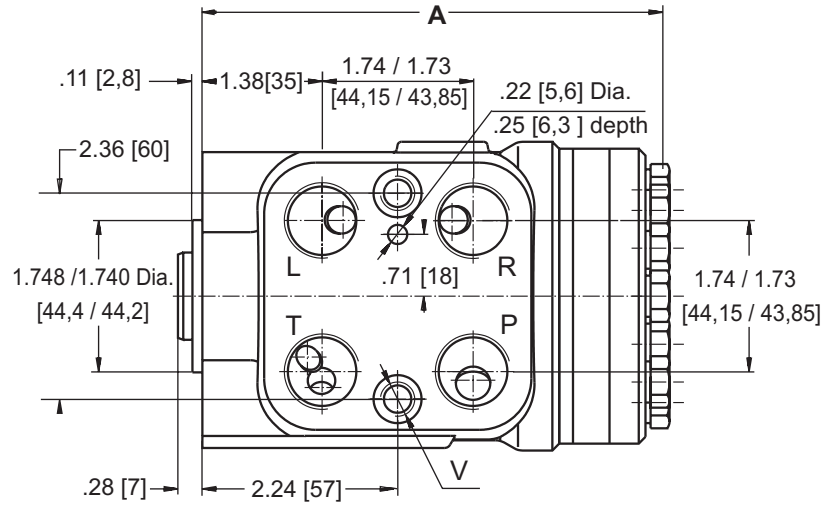
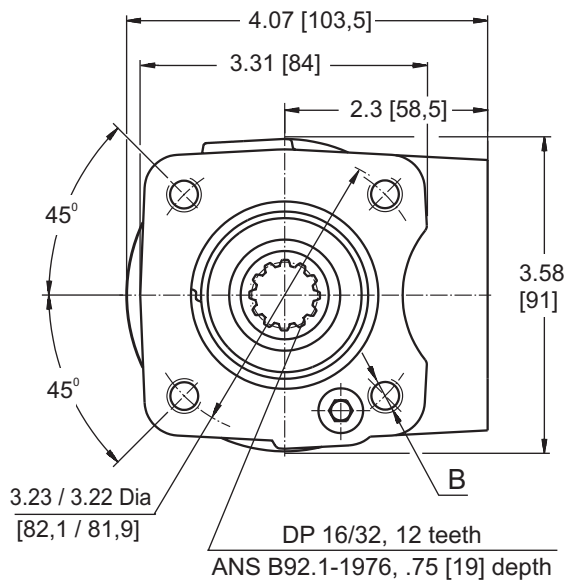
For the "Closed Center - Non Load Reaction" and "Closed Center - Non Reaction and Load Sensing" steering units it is possible to observe Thermal Shock - condition caused when the hydraulic system has operated for some time without turning the steering wheel, causing the fluid in the reservoir and the system to heat up while the steering unit is relatively cool (i.e. there is more than 50°F [10°C] difference in the temperature). If, under the condition of Thermal Shock, the steering wheel is turned very quickly, it is possible to experience temporary seizure and have the internal parts of the steering unit damaged. The temporary seizure may be followed by a total free wheeling.

SPECIFICATION DATA

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	in. ³ /rev. [cm. ³ /rev.]	2.42 [39,6]	3.0 [49,5]	4.0 [65,6]	4.83 [79,2]	6.04 [99,0]	7.56 [123,8]	9.67 [158,4]	12.08 [198]	15.1 [247,5]	19.3 [316,8]	24.17 [396]	30.2 [495]	38.05 [623,6]	48.4 [793]	
Rated Flow*	GPM [lpm]	1.1 [4]	1.3 [5]	1.6 [6]	2.1 [8]	2.6 [10]	3.4 [13]	4.2 [16]	5.3 [20]	6.6 [25]	8.4 [32]	10.6 [40]	13.2 [50]	16.6 [63]	21.1 [80]	
Rated Pressure	PSI [bar]	1810 [125]	2030 [140]	2540 [175]												
Max. Cont. Pressure in Line T	PSI [bar]															
- standard		363 [25]														
- high pressure (H option)		580 [40]														
Max. Torque at Servoamplifying	in - lb [Nm]							26 [3,0]			26 [3,0]					
-with standard springs								26 [3,0]			26 [3,0]					
-with soft springs (LT option)								16 [1,8]			-					
Max. Torque w/o Servoamplifying	in - lb [Nm]	1065 [120]														
Weight	lb [kg]	11.7 [5,3]	11.9 [5,4]	12.2 [5,5]	12.4 [5,6]	12.6 [5,7]	12.8 [5,8]	13.2 [6,0]	13.9 [6,3]	14.3 [6,5]	15.4 [7,0]	16.3 [7,4]	17.6 [8,0]	19.2 [8,7]	21.2 [9,6]	
Dimension A	in. [mm]	5.15 [130,8]	5.20 [132,2]	5.27 [133,9]	5.36 [136,2]	5.47 [138,8]	5.60 [142,2]	5.78 [146,8]	5.99 [152,2]	6.25 [158,8]	6.62 [168,2]	7.04 [178,8]	7.56 [192]	8.24 [209,3]	9.14 [232,2]	

* Rated Flow at 100 RPM.

DIMENSIONS AND MOUNTING DATA - HKU.../3, 4, 7



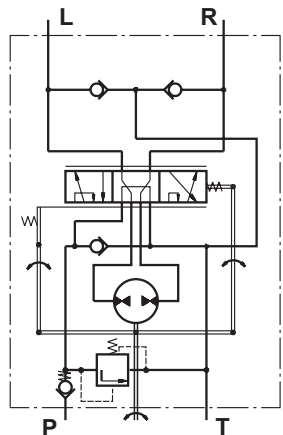
Code	Ports - P, T, R, L Thread	Column Mounting Thread - B	Valve Mounting Thread - V
A	3/4 - 16 UNF O-ring .67 [17] depth	4 x 3/8 - 16 UNC .62 [15,7] depth	2 x 3/8 - 24 UNF .56 [14,2] depth
BA*	9/16 - 18 UNF O-ring .67 [17] depth	4 x 3/8 - 16 UNC .62 [15,7] depth	2 x 3/8 - 24 UNF .56 [14,2] depth
-	G1/2 .67 [17] depth	4 x M10 .71 [18] depth	2 x M10x1 .63 [16] depth
M	M22x1,5 .67 [17] depth	4 x M10 .71 [18] depth	2 x M10x1 .63 [16] depth

* These threads are for displacements from HKU40 to HKU160 only.

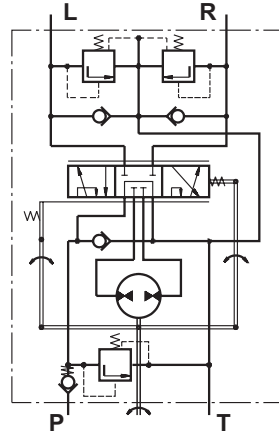
HYDROSTATIC STEERING UNITS TYPE HKUS.../3, 4, 8



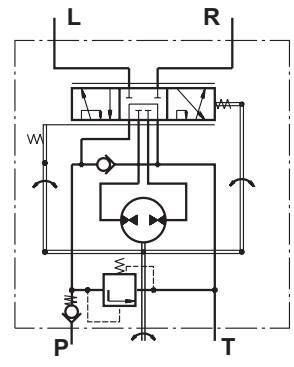
The HKUS Hydrostatic Steering unit is based on the HKU unit but has built-in relief and check valves. Thus M+S Hydraulic achieves one very compact steering unit which reduces the need for additional hydraulic components in the system.



"Open Center - Load Reaction"
With Built-in Valves
Version 3 - HKUS.../3



"Open Center - Non Load Reaction"
With Built-in Valves
Version 4 - HKUS.../4



"Open Center - Non Load Reaction"
With Built-in Valve
Version 8 - HKUS.../8

SPECIFICATION DATA

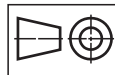
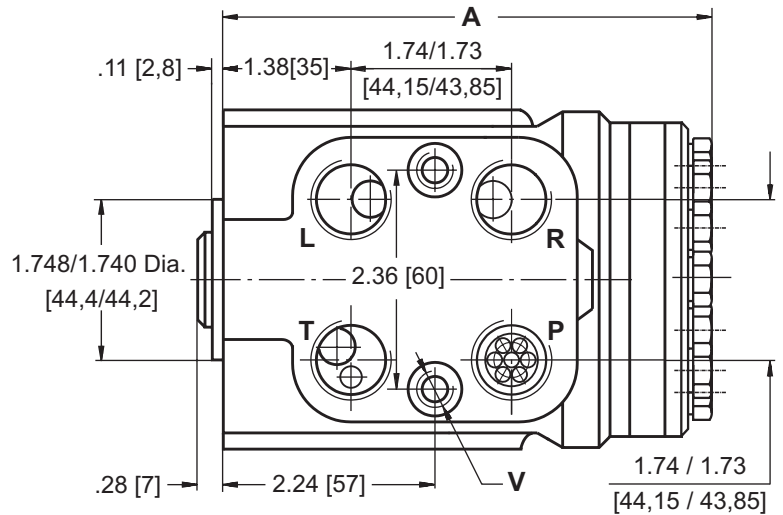
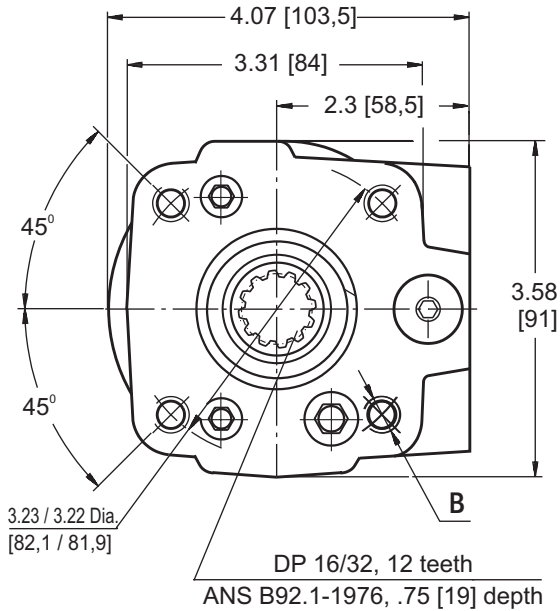
Parameters	Type	Type											
		HKUS 40/3,4,8	HKUS 50/3,4,8	HKUS 63/3,4,8	HKUS 80/3,4,8	HKUS 100/3,4,8	HKUS 125/3,4,8	HKUS 160/3,4,8	HKUS 200/3,4,8	HKUS 250/3,4,8	HKUS 320/3,4,8	HKUS 400/3,4,8	
Displacement	in. ³ /rev.	2.42	3.0	4.0	4.83	6.04	7.56	9.67	12.08	15.1	19.3	24.17	
	[cm. ³ /rev.]	[39,6]	[49,5]	[65,6]	[79,2]	[99,0]	[123,8]	[158,4]	[198]	[247,5]	[316,8]	[396]	
Rated Flow*	GPM	1.1	1.3	1.6	2.1	2.6	3.4	4.2	5.3	6.6	8.4	10.6	
	[lpm]	[4]	[5]	[6]	[8]	[10]	[13]	[16]	[20]	[25]	[32]	[40]	
Rated Pressure	PSI	2030			2465								
	[bar]	[140]			[170]								
Relief Valve Pressure		1160			1450	1810	2175	2465					
Settings**	PSI [bar]	[80]			[100]	[125]	[150]	[170]					
Shock Valves Pressure		2030			2320	2610	2900	3190					
Settings***	PSI [bar]	[140]			[160]	[180]	[200]	[220]					
Max. Cont. Pressure in Line T	PSI [bar]	363 [25] (725 [50] by HKUS.../8)											
	- standard												
	- high pressure (H option)	580 [40]											
Max. Torque at Servoamplifying	in - lb [Nm]	26 [3,0]								26 [3,0]			
	-with standard springs	16 [1,8]								-			
	-with soft springs (LT option)												
Max. Torque w/o Servoamplifying	in - lb [Nm]	1065 [120]											
Weight	lb	11.7	11.9	12.2	12.4	12.6	12.8	13.2	13.9	14.3	15.4	16.3	
	[kg]	[5,3]	[5,4]	[5,5]	[5,6]	[5,7]	[5,8]	[6,0]	[6,3]	[6,5]	[7,0]	[7,4]	
Dimension A	in.	5.15	5.20	5.27	5.36	5.47	5.60	5.78	5.99	6.25	6.62	7.04	
	[mm]	[130,8]	[132,2]	[133,9]	[136,2]	[138,8]	[142,2]	[146,8]	[152,2]	[158,8]	[168,2]	[178,8]	

* Rated Flow at 100 RPM.

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

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

DIMENSIONS AND MOUNTING DATA - HKUS.../3, 4, 8



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

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

ORDER CODE

	1	2	3	4	5	6	7
H K U		/	-				

Pos.1 - Displacement code (see Specification Data)

40	- 2.42 [39,6] in. ³ /rev. [cm ³ /rev]
50	- 3.00 [49,5] in. ³ /rev. [cm ³ /rev]
63	- 4.00 [65,6] in. ³ /rev. [cm ³ /rev]
80	- 4.83 [79,2] in. ³ /rev. [cm ³ /rev]
100	- 6.04 [99,0] in. ³ /rev. [cm ³ /rev]
125	- 7.56 [123,8] in. ³ /rev. [cm ³ /rev]
160	- 9.67 [158,4] in. ³ /rev. [cm ³ /rev]
200	- 12.08 [198,0] in. ³ /rev. [cm ³ /rev]
250	- 15.10 [247,5] in. ³ /rev. [cm ³ /rev]
320	- 19.30 [316,8] in. ³ /rev. [cm ³ /rev]
400	- 24.17 [396,0] in. ³ /rev. [cm ³ /rev]
500	- 30.20 [495,0] in. ³ /rev. [cm ³ /rev]
630	- 38.05 [623,6] in. ³ /rev. [cm ³ /rev]
800	- 48.40 [793,0] in. ³ /rev. [cm ³ /rev]
1000	- 60.40 [990,0] in. ³ /rev. [cm 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)
A	- SAE (ANSI B 1.1 - 1982)
BA	- SAE (ANSI B 1.1 - 1982)(for HKU 40÷160 only)
M	- Metric (ISO 262)

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

omit	- Standard
H	- High pressure

Pos.5 - Input torque

omit	- Standard
LT*	- Low

Pos.6 - Option (Paint)**

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

Pos.7 - 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

	1	2	3	4	5	6	7	8
H K U S		/	-	-				

Pos.1 - Displacement code (see Specification Data)

40	- 2.42 [39,6] in. ³ /rev. [cm ³ /rev]
50	- 3.00 [49,5] in. ³ /rev. [cm ³ /rev]
63	- 4.00 [65,6] in. ³ /rev. [cm ³ /rev]
80	- 4.83 [79,2] in. ³ /rev. [cm ³ /rev]
100	- 6.04 [99,0] in. ³ /rev. [cm ³ /rev]
125	- 7.56 [123,8] in. ³ /rev. [cm ³ /rev]
160	- 9.67 [158,4] in. ³ /rev. [cm ³ /rev]
200	- 12.08 [198,0] in. ³ /rev. [cm ³ /rev]
250	- 15.10 [247,5] in. ³ /rev. [cm ³ /rev]
320	- 19.30 [316,8] in. ³ /rev. [cm ³ /rev]
400	- 24.17 [396,0] in. ³ /rev. [cm 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 - Option (Paint)**

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

Pos.8 - Design Series

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

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.