Huco - Pol Plastic Universal Joints

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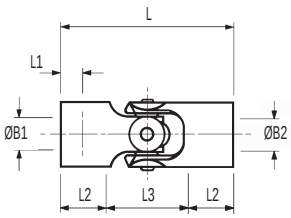
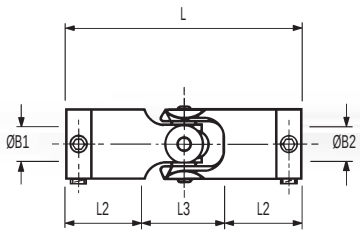


Type 101, 105, 601



Type 103, 603

SINGLE JOINTS - DIMENSIONS & ORDER CODES

Size	1 Brass Cross-piece	2 Plastic Cross-piece	Dimensions								Fasteners		
	Hub Ref		OD	L	L1	L2	L3	B1, B2 Max	Moment of inertia kgm2 x 10-8	Mass kg x 10-3	Size	Torque (Nm)	A/F (mm)
06	101.06	-	7.1	19.1	3.3	5.3	8.6	4.76	0.3	0.7	-	-	-
	-	601.06							0.2	0.4			
	103.06	-		27.2	-	9.3		3.18	1.1	3.1	M3	0.94	1.5
	-	603.06							1.0	2.8			
09	101.09	-	11.1	28.5	4.3	8.6	11.4	6.35	4.0	2.7	-	-	-
	-	601.09							4.0	1.5			
	103.09	-		37.6	-	13.1		5.0	13.5	9.3	M3	0.94	1.5
	-	603.09							12.6	8.1			
13	101.13	-	14.3	35.6	5.6	10.4	14.8	8.0	14.3	5.7	-	-	-
	-	601.13							11.9	3.6			
	103.13	-		46.2	-	15.7		6.35	44.6	17.7	M3	0.94	1.5
	-	603.13							38.0	15.6			
16	101.16	-	17.5	53.3	8.9	15.2	23.0	11.0	32.3	12.2	-	-	-
	-	601.16							18.3	5.0			
	103.16	-		67.6	-	22.3		10.0	136	35.0	M4	2.27	2.0
	-	603.16							122	31.4			
20	105.20	-	23.0	62.0	8.0	17.0	28.0	12.7	147	25.7	-	-	-
25	105.25	-	28.5	74.0	10.0	20.0	34.0	14	463	56	-	-	-
32	105.32	-	36.5	86.0	10.0	21.0	44.0	20	1339	103	-	-	-

SINGLE JOINTS - PERFORMANCE (at 20ºC)

Size	Brass Cross-piece 101, 103, 105				Plastic Cross-piece 601, 603				Max angular compensation @ 1000 rev/min	Max axial loading N
	Peak Torque Nm	Static Break Torque Nm	Torsional Rate deg/Nm	Torsional Stiffness Nm/Rad	Peak Torque Nm	Static Break Torque Nm	Torsional Rate deg/Nm	Torsional Stiffness Nm/Rad		
06	0.11	0.45	19.7	2.9	0.09	0.3	22	2.6	45	18
09	0.36	1.9	6.8	8.4	0.6	1.5	6.8	8.4	45	38
13	0.85	4.5	3.2	18	0.7	2.5	3.6	16.0	45	67
16	1.6	6.8	1.7	34	1.0	5.0	2.8	20.0	45	98
20	2.8	17	0.94	61	-	-	-	-	40	138
25	5.6	34	0.51	112	-	-	-	-	40	222
32	10.7	72	0.25	229	-	-	-	-	40	334

FOR STANDARD BORES SEE FACING PAGE

Materials & Finishes

Bodies: Acetal

Cross-pieces: Brass BS 2874 CZ121 (101, 103, 109, 111)
Nylon Glass filled (601, 603, 609, 611)

Bore Inserts: Brass BS 2874 CZ121 (103, 111, 603, 611)
Al. Alloy 2014A T6 or AIECO 62 Sn T9 (105)

Fasteners: Alloy steel, black oiled

Operating Temperature Range

- 20ºC to +60ºC

Maximum Rotational Speed

1000 rev/min

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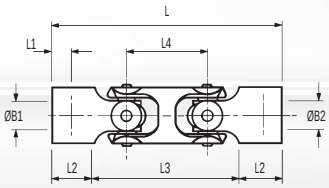
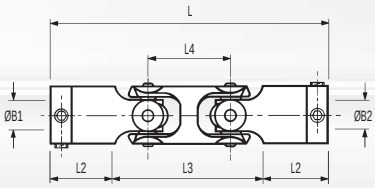


Type 109, 609



Type 111, 611

DOUBLE JOINTS - DIMENSIONS & ORDER CODES

Size	1 Brass Cross-piece / Hub Ref	2 Plastic Cross-piece / Hub Ref	Dimensions OD	L	L1	L2	L3	L4	B1, B2 Max	Moment of inertia kgm2 x 10-8	Mass kg x 10-3	Fasteners Size	Torque (Nm)	A/F (mm)
06	109.06	-	7.1	27.2	3.3	5.3	16.7	8.1	4.76	0.6	1.1	-	-	-
	-	609.06								0.4	0.6			
	111.06	-		35.3	-	9.3			3.18	1.3	3.5	M3	0.94	1.5
	-	611.06								1.1	3.0			
09	109.09	-	11.1	41.7	4.3	8.6	24.6	13.2	6.35	5.9	4.5	-	-	-
	-	609.09								5.8	2.0			
	111.09	-		50.8	-	13.1			5.0	15.3	11.1	M3	0.94	1.5
	-	611.09								14.0	8.6			
13	109.13	-	14.3	51.4	5.6	10.4	30.7	15.9	8.0	23.7	9.6	-	-	-
	-	609.13								21.5	7.5			
	111.13	-		62.1	-	15.7			6.35	50.4	21.6	M3	0.94	1.5
	-	611.13								50.4	15.6			
16	109.16	-	17.5	75.5	8.9	15.2	45.2	22.2	11.0	63.5	19.7	-	-	-
	-	609.16								35.5	12.5			
	111.16	-		89.8	-	22.3			10.0	178.0	42.4	M4	2.27	2.0
	-	611.16								150.0	35.2			

SINGLE JOINTS - PERFORMANCE (at 20ºC)

Size	Brass Cross-piece 109, 111 Peak Torque Nm	Static Break Torque Nm	Torsional Rate deg/Nm	Torsional Stiffness Nm/Rad	Plastic Cross-piece 609, 611 Peak Torque Nm	Static Break Torque Nm	Torsional Rate deg/Nm	Torsional Stiffness Nm/Rad	Max angular compensation @ 1000 rev/min	Max radial compensation mm
06	0.08	0.34	81.9	0.7	0.08	0.3	115	0.5	90	5.6
09	0.16	1.9	13.3	4.3	0.16	1.5	17.3	3.3	90	9.1
13	0.59	3.4	8.1	7.1	0.59	2.5	10.4	5.5	90	10.9
16	1.3	6.8	4.5	12.6	1.0	5.0	7.5	7.6	90	15.5

STANDARD BORES

Size	Bore tolerences 101, 601, 109, 609 = +0.04/-0.0mm • 103, 603, 111, 611 = +0.03/-0.0mm																		
	3	3.175	4	4.763	5	6	6.350	8	9.525	10	12	12.700	14	15.875	16	18	19	19.050	20
06	●	●	●	●															
09	○	○	●	●	●	●	●												
13			○	○	○	●	●	●											
16						○	○	●	●	●									
20								○	○	○		○							
25										○	○	○							
32													○	○	○	○	○	○	○
Bore Ref	14	16	18	19	20	22	24	28	31	32	35	36	38	41	42	45	46	47	48

● Moulded bores only ○ Sleeved bores only ● Moulded or sleeved bores available

Constant velocity

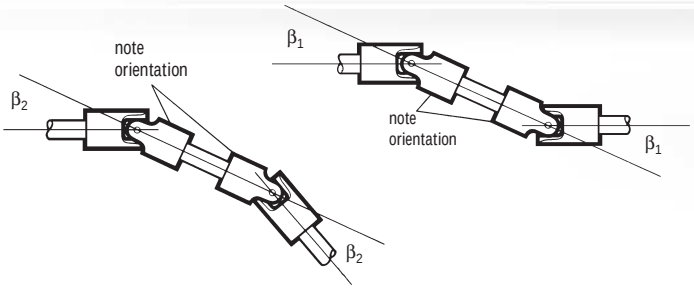
The velocity ratio of single universal joints is not constant when the working angle is greater than zero. Their geometry gives rise to sinusoidal fluctuations at the output that increase with the working angle and which vary between:

$\omega \cos \beta$ and $\omega \sec \beta$

where ω = angular velocity
and β = operating angle

For example, when the operating angle is 5°, the maximum error is ±0.4%; at 7° it is ±0.8%, and at 10° it is ±1.5%. A motor shaft turning at a constant 1000 rpm, driving through a single universal joint set at an operating angle of 5°, produces an output that fluctuates between 996 rpm and 1004 rpm twice each revolution.

The fluctuations are cancelled out when using a double joint or two single joints connected back to back.



To maintain constant velocity ratio, ensure that:

a) The orientation of two single joints is correct; the inboard forks should align as in double joints.

b) The working angle of both joints, or both halves of a double joint, is the same.

ADJUSTED TORQUE

Peak torque values apply when the working angle is zero. Adjusted torque takes account of dynamic loading at the bearings. To find adjusted torque, determine application speed, torque and operating angle,

Then:

a) multiply speed x working angle
b) subtract the result from 10000
c) divide the answer into 10000
d) apply the result to the application torque.

eg. speed = 400 rpm
application torque = 0.1Nm
working angle = 20°

Accordingly:

a) 400 rpm x 20° = 8000
b) 10000 – 8000 = 2000
c) 10000 / 2000 = 5
d) 5 x 0.1Nm = 0.5Nm

Select a joint where Peak Torque exceeds 0.5Nm, ie., size 13 or larger.

Note: To remain within the capacity of the joint, the result of speed x working angle must be less than 10000.