



Plastic Universal Joints and Teleshafts

- Backlash-free up to 10^8 turns
- Low mass
- Low inertia
- Corrosion resistant
- Electrically isolating
- No maintenance

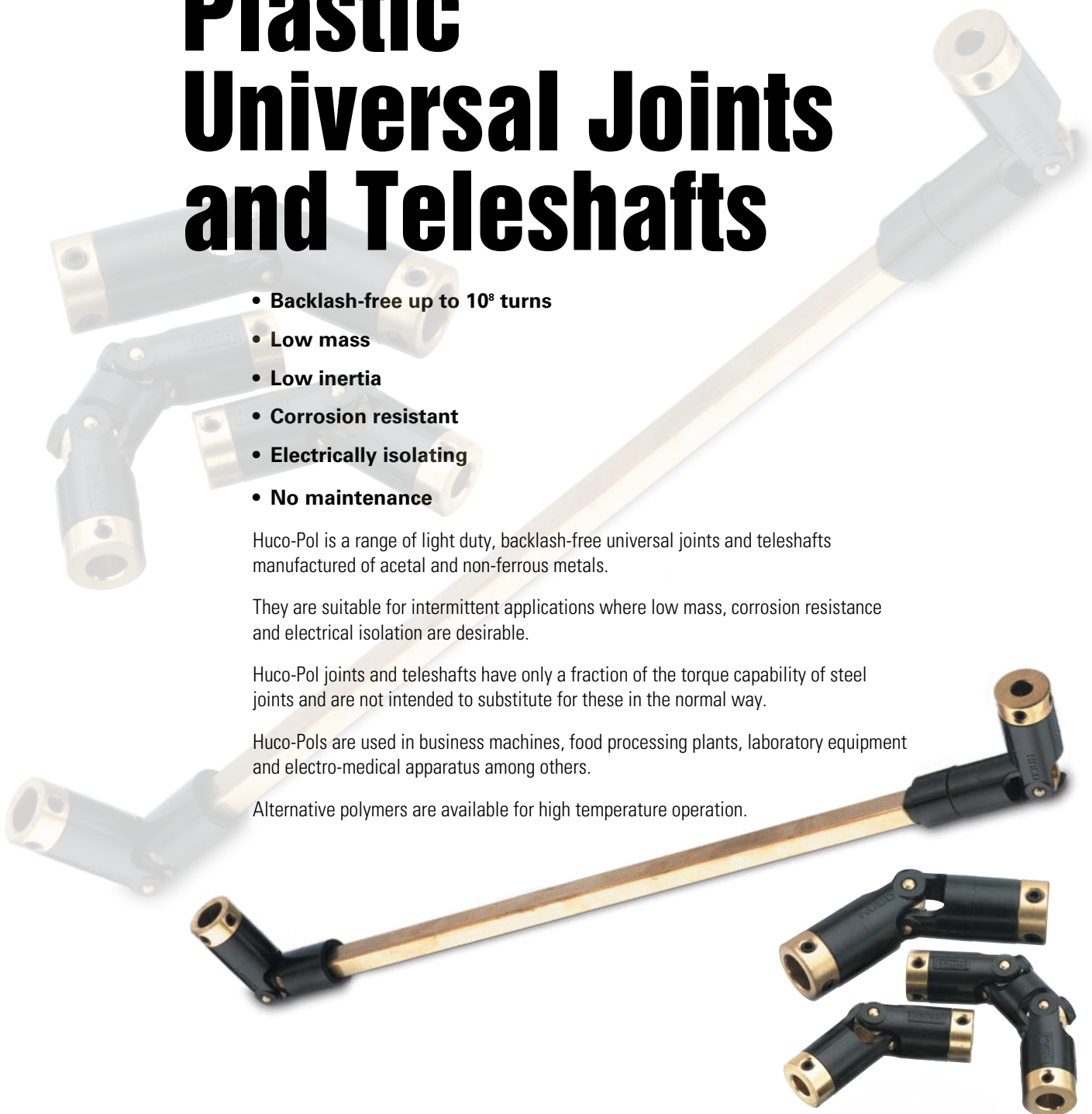
Huco-Pol is a range of light duty, backlash-free universal joints and teleshafts manufactured of acetal and non-ferrous metals.

They are suitable for intermittent applications where low mass, corrosion resistance and electrical isolation are desirable.

Huco-Pol joints and teleshafts have only a fraction of the torque capability of steel joints and are not intended to substitute for these in the normal way.

Huco-Pols are used in business machines, food processing plants, laboratory equipment and electro-medical apparatus among others.

Alternative polymers are available for high temperature operation.



Plastic Universal Joints

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:

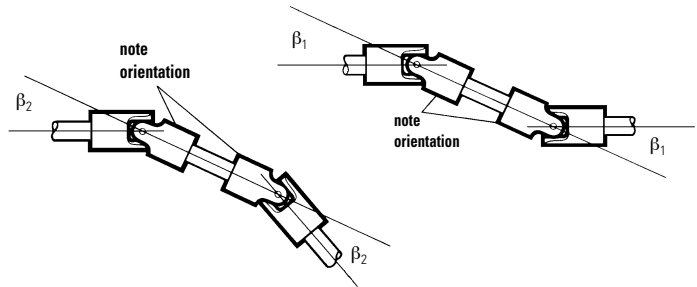
$$\omega \cos \beta \text{ and } \omega \sec \beta$$

where ω = angular velocity

and β = operating angle

For example, when the operating angle is 5° , the maximum error is $\pm 0.4\%$; at 7° it is $\pm 0.8\%$, and at 10° it is $\pm 1.5\%$. 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:

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

- multiply speed x working angle
- subtract the result from 10000
- divide the answer into 10000
- apply the result to the application torque.

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

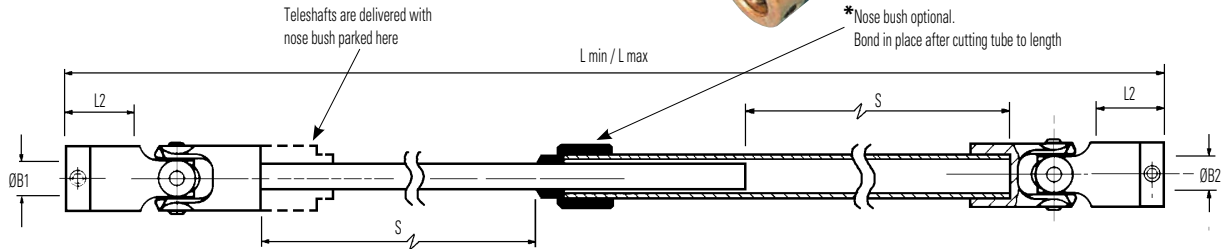
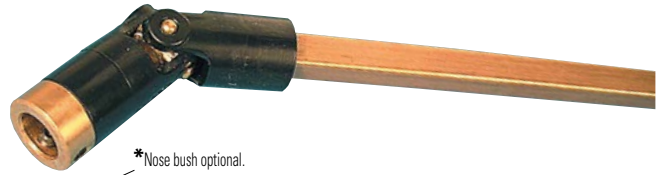
Accordingly:

- $400 \text{ rpm} \times 20^\circ = 8000$
- $10000 - 8000 = 2000$
- $10000 / 2000 = 5$
- $5 \times 0.1 \text{ Nm} = 0.5 \text{ Nm}$

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.

Plastic Universal Joints Brass Cross Pieces and Tubes

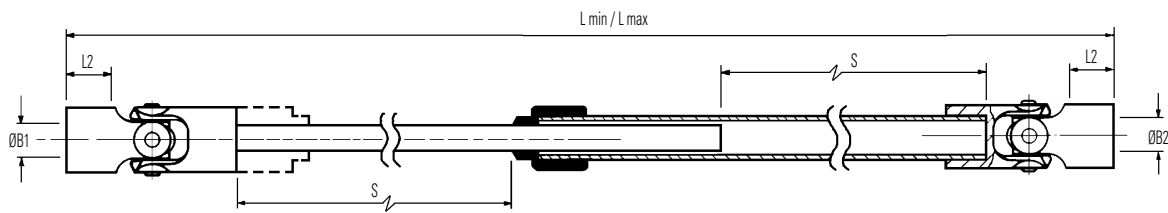


Refs. 128

**End A
(inner tube)**

Joints sleeved with headed brass inserts fitted 2 screws per end

**End B
(outer tube)**



Refs. 130

Joints sleeved with metal inserts. Attach to shafts by cross-pinning or bonding

Typical

DIMENSIONS & ORDER CODES

Teleshaf size	Teleshaf options	ØD mm	L mm ±1.0		Stroke mm	L2 mm	ØB1, ØB2 max	Mass kg x 10 ⁻³	Corresponding joints. For dimensions see
	Standard tubes self-colour brass		min	max					
09	128.09.240	11.1	240	389	149	13.1	5	36	103.09
13	128.13.300	14.3	300	484	184	15.7	6.35	58	103.13
16	128.16.450	17.5	450	730	280	22.3	10	168	103.16
20	130.20.464	23.0	464	745	281	17.0	12.70	241	105.20
25	130.25.500	28.5	500	784	284	20.0	14	457	105.25
32	130.32.564	36.5	564	868	304	21.0	20	827	105.32

- ① Max shaft penetration
- ② Values apply with max bores.

- A range of standard telescopes is available which can be shortened to achieve an infinite number of length/stroke requirements. The lengths L min shown in the table above are the longest of the standard range in each size. Specific lengths are produced by cutting an equal amount from both ends of the nearest standard size. See next page for recommended procedure.
- Custom Teleshaf assemblies can be factory made subject to minimum order quantities.
- *The nose bush eliminates any torsional free play that may be apparent in the tubes due to working clearances.
- Full details of the standard range and product order codes are available on request. Please ask for a Huco Teleshaf data sheet.

STANDARD BORES

Teleshaf size	ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0)														
	(1/8")	4	(3/16")	5	6	(1/4")	8	(3/8")	10	12	(1/2")	(5/8")	16	(3/4")	20
09	•	•	•	•											
13		•	•	•	•	•									
16					•	•	•	•	•						
20								•	•						
25										•	•				
32												•	•	•	•
Bore ref.	16	18	19	20	22	24	28	31	32	35	36	41	42	47	48
Corresponding bore adaptor				251		253	255		257		259		260		261

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes. See page 58 for details.