

1:1 Differential Gearing



harmonic drive gearing

Precision Gearing & Motion Control

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Toll Free Phone (877) SERV098
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FEATURES: • HIGH POSITIONAL ACCURACY • COMPACT DESIGN • LOW BACKLASH

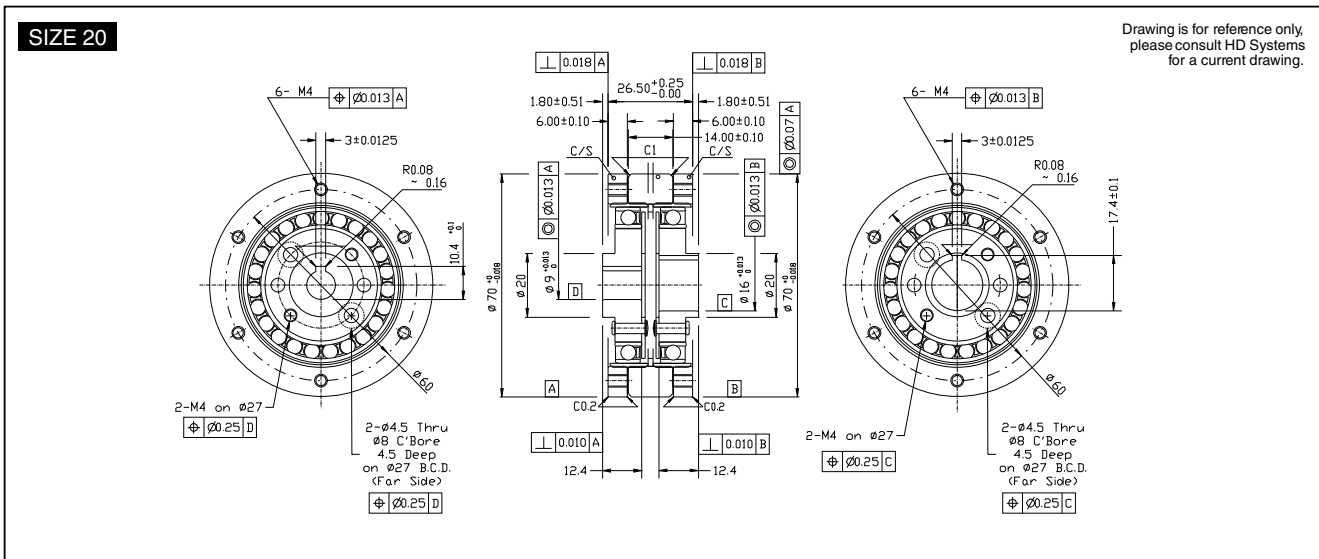
The harmonic drive differential 1:1 transmissions allow dynamic phasing of rotating gearing elements. This series offers high positional accuracy and low backlash in a compact design which make them an excellent choice for web registration or other machinery which requires constant monitoring and adjustment. These gearing components can be easily incorporated into roller assemblies. Trim ratios are available from 80:1 to 160:1. Rated torques from 120 in-lb thru 1125 in-lb are available. Other ratios are available as a custom order.

RATING TABLE

1:1 Differential Transmission	Ratio	Torque Rating***								Max.** Output Torque	Max. Speed rpm	Wave Generator Inertia	Backlash arc min.***							
		3500rpm		3000rpm		2500rpm		2000rpm						1000rpm		500rpm				
Size		Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Nm	lb-in	Oil Lub	Grease SK-1	kg-cm ²	lb-in ²	Available Options
20	80	14	120	14	120	15	130	16	147	20	180	20	180	26	230	6000	3600	0.14	0.048	6 12 60
	100	17	156	18	156	20	174	21	190	24	210	24	210	34	300					
	128	20	174	20	174	21	190	23	210	24	210	24	210	43	380					
	160	20	174	21	174	21	190	23	210	24	210	24	210	50	440					
25	80	26*	230*	26	230	28	250	28	250	29	350	39	350	51	450	5000	3600	0.36	0.12	6 12 60
	100	29*	256*	33	295	36	320	36	320	49	430	52	460	68	600					
	120	29*	256*	33	295	36	320	36	320	49	430	61	540	80	710					
	160	29*	256*	33	295	36	320	36	320	49	430	61	540	86	760					
32	78	58*	513*	58*	513*	58	510	63	550	75	670	75	670	98	870	4500	3600	1.3	0.44	6 12 60
	100	59*	522*	59*	522*	75	670	82	730	98	870	98	870	127	1130					
	131	59*	522*	59*	522*	75	670	82	730	98	870	117	1040	186	1650					
	157	59*	522*	59*	522*	75	670	82	870	98	870	117	1040	215	1910					
40	80	117*	1040*	117*	1040*	117*	1040*	117	1040	147	1300	147	1300	196	1940	4500	3300	3.4	1.2	6 12 60
	100	127*	1125*	127*	1125*	127*	1125*	157	1390	186	1650	186	1650	255	2250					
	128	127*	1125*	127*	1125*	127*	1125*	166	1470	206	1820	235	2080	314	2880					
	160	127*	1125*	127*	1125*	127*	1125*	166	1470	206	1820	274	2430	353	3120					

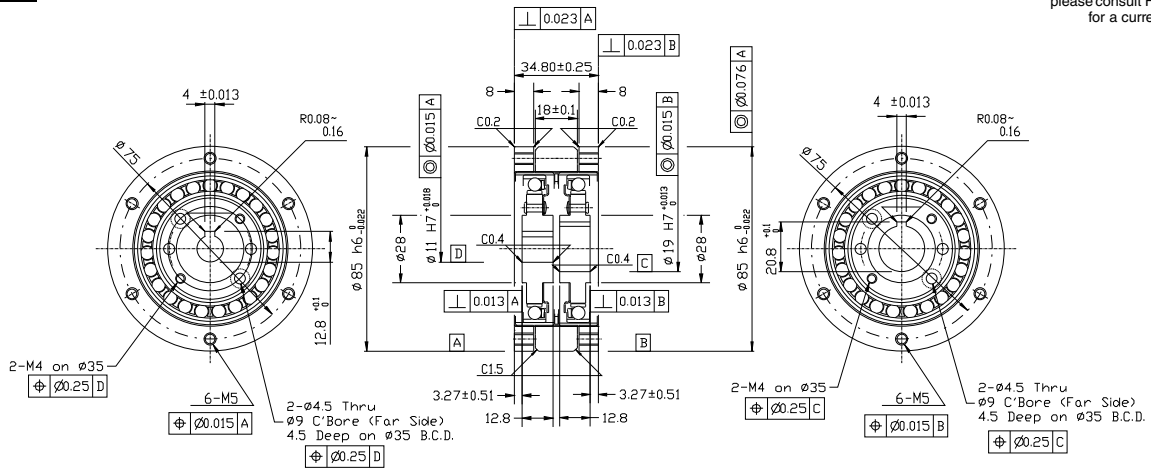
* Thermal limited—50% duty cycle with on time not exceeding 15 minutes.
 ** This torque is not to be exceeded under any circumstances.

*** Rating at input speed below 500 rpm is same as for 500 rpm.
 **** Backlash measured at output with the input locked, maximum value.



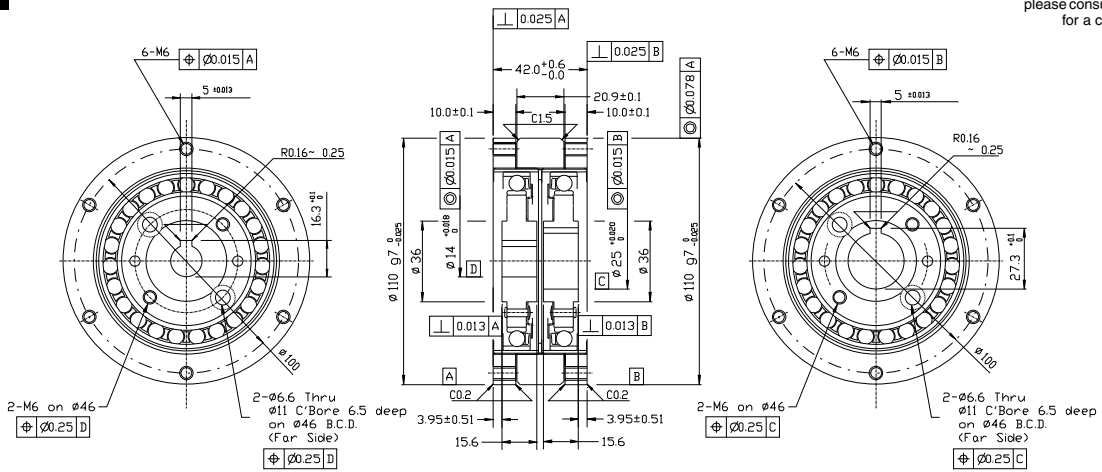
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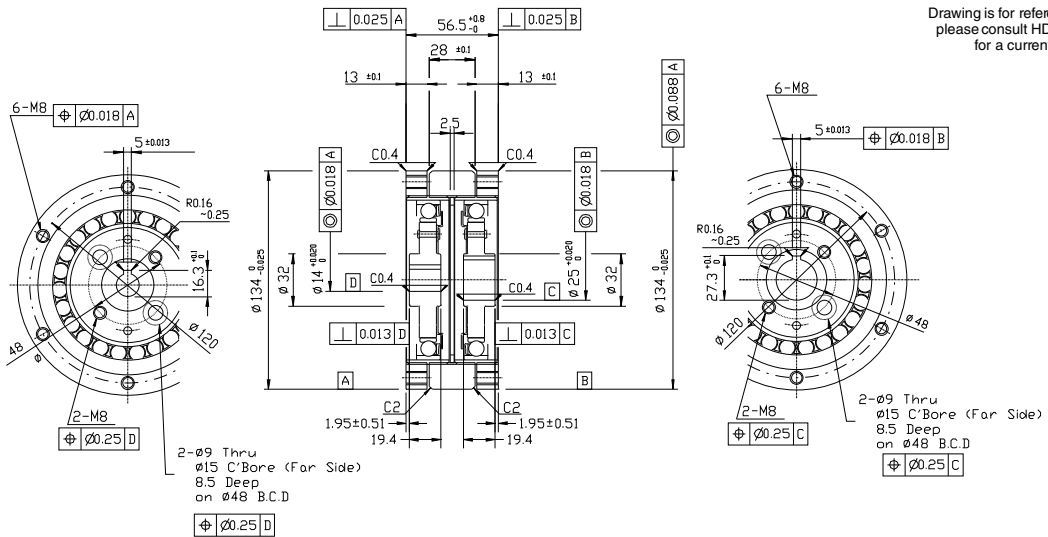
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SIZE 40

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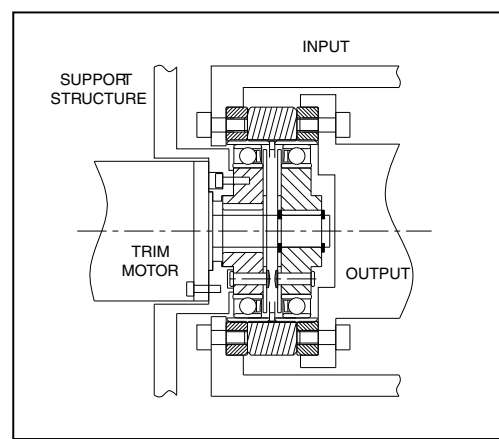
DESIGN CONCEPT

The sketch at the right shows a typical installation of the 1:1 components. This arrangement is similar to that within a roll drive mechanism. With the trim motor shaft stationary the input and output rotate with a gear ratio of 1:1. The relative phasing of the input and output can be changed dynamically by rotating the trim motor shaft.

The following relations can be used for phase adjustment:

$$\text{Speed: } N_{\text{output}} = N_{\text{input}} \pm \left[\frac{N_{\text{trim}}}{\text{Ratio} + 1} \right]$$

$$\text{Torque: } T_{\text{trim}} = \frac{T_{\text{input (or output)}}}{\text{Ratio} \times 0.5}$$



ORDERING CODE

Harmonic Drive Product Type	Size	Ratio	Backlash Option	Options						
1:1	20	80 100 128 160	BL6	Our technical team will be pleased to assist you with special options and their ordering code.						
Differential	25	80 100 120 160	BL12							
Transmission	32	78 100 131 157	BL60							
Unit	40	80 100 128 160								
HDUF	—	25	—	100	—	2	—	BL12	—	SP

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HDUF
HDUR
HDUA
RHS/RFS-CC
CP/HP

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Hollow Shaft Gearheads and Components
Pancake Type Component Set
Heavy Duty Pancake Components
Harmonic Drive Differential Gearing
Precision Close Couple Gearheads
Precision Planetary Gearheads

Motion Control

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RHS/RFS
RS Mini series
RSS/RKS
FHA
LA
HS
HA

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High Torque DC Servo Actuators
Miniature Brushless Servo Actuators
High Torque Brushless Servo
Hollow Shaft Brushless Servo Actuators
High Precision Linear Servo Actuators
DC Servo Controller
Brushless DC Servo Controller



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