

H K M PowerHub™

Harmonic Drive Servo Actuator



harmonic drive gearing
Precision Gearing & Motion Control

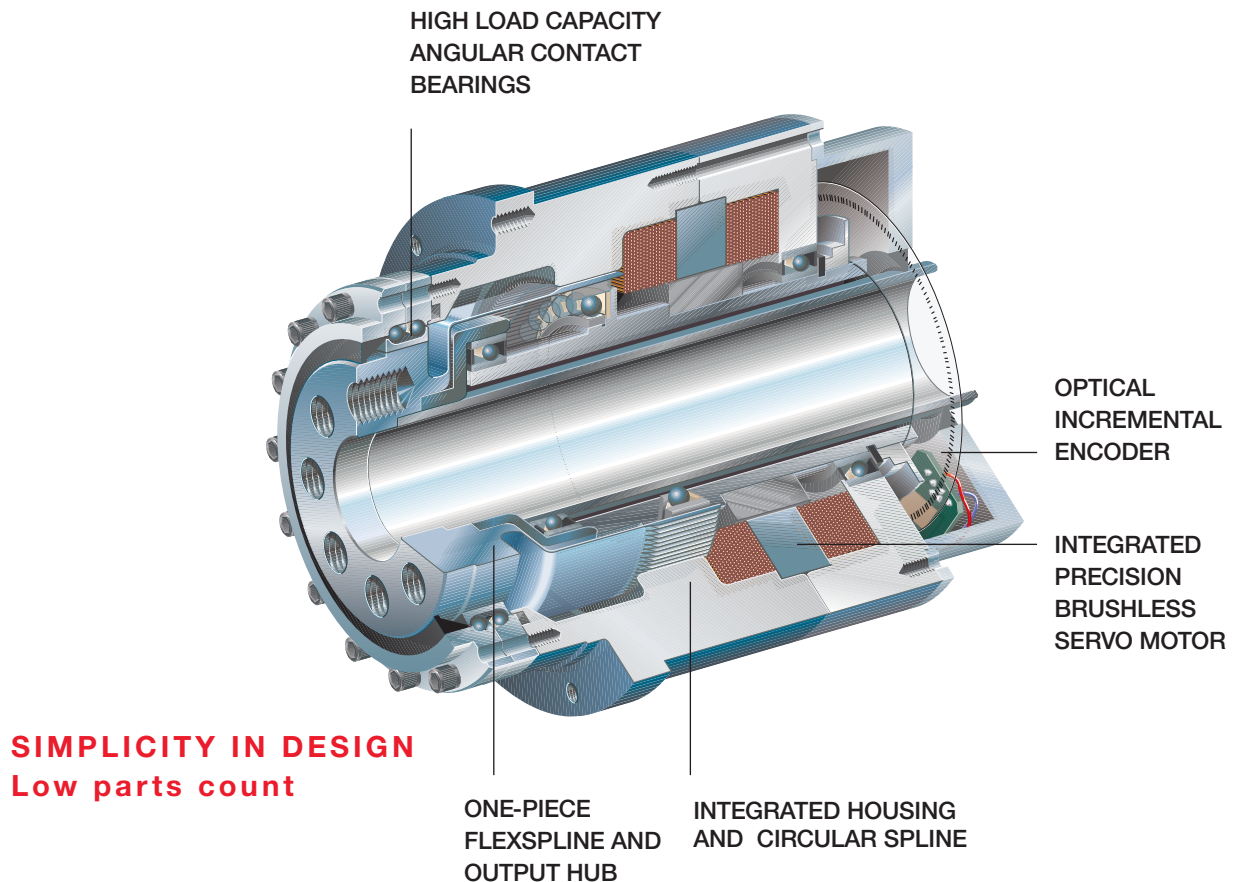
PowerHub™ Hollow Shaft Servo Actuator

Introducing the PowerHub hollow shaft servo actuator, one of the industry's most compact axis drives for wafer handling. Despite its small size, the PowerHub actuator handles large loads and offers high torque, controllability and repeatability. With its hollow shaft for passing through everything from vacuum lines to lasers, the PowerHub actuator is an ideal, cost-effective solution for robotics and automation machinery.

Benefits of the PowerHub include:

- High torque
- Positional accuracy
- Fast response
- Smooth, repeatable performance
- More compact than competitive products
- Handles large thrust and moment loads

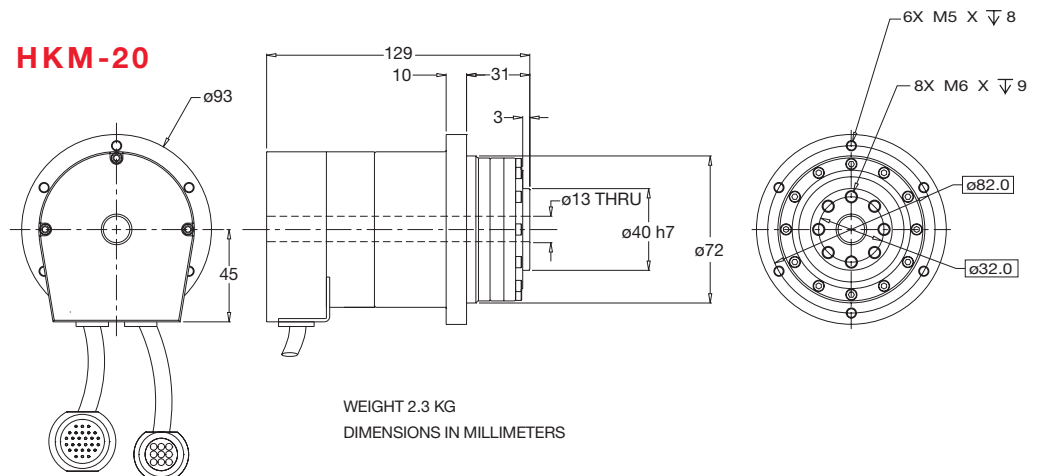
The PowerHub actuator is the kind of innovation customers have come to expect from Harmonic Drive LLC, one of the world's leading manufacturers of harmonic drive gearheads, component gear sets, and complete harmonic drive actuators. The PowerHub exemplifies Harmonic Drive LLC's dedication to developing and manufacturing lighter, smaller and stronger precision positioning products which provide maximum reliability, power and utility in the least amount of space.



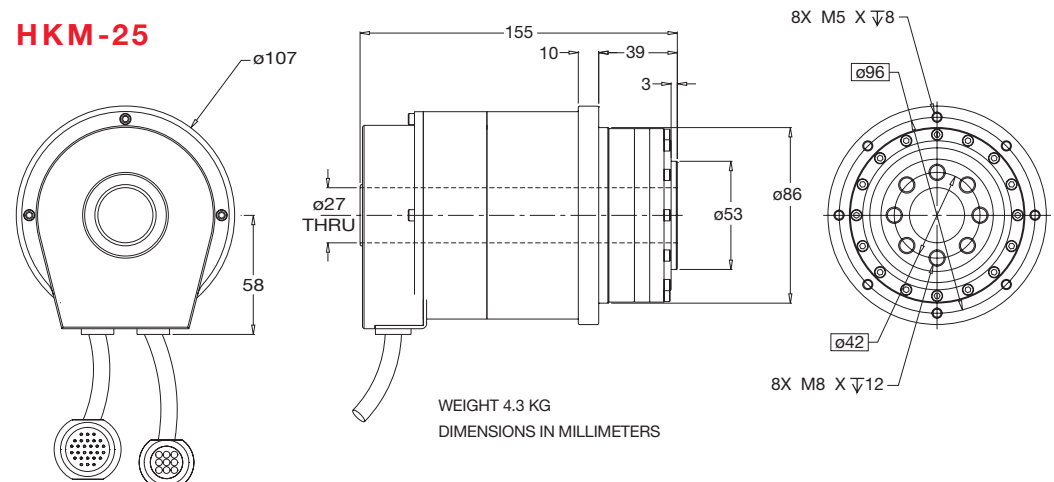
PowerHub Dimensions

The PowerHub hollow shaft actuator is currently available in two sizes. Be on the lookout for three new PowerHub sizes to be introduced in the near future.

HKM-20

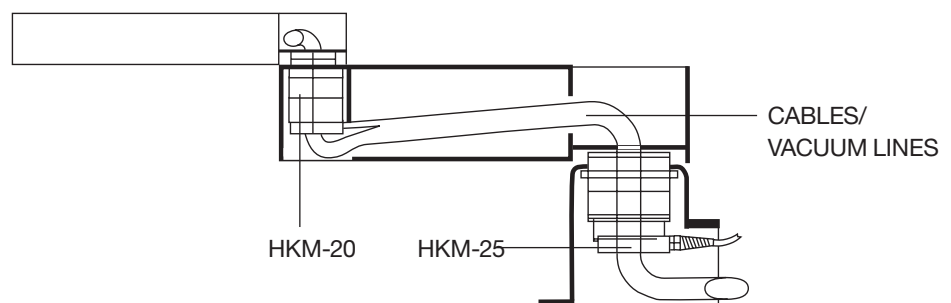


HKM-25



Powerhub Application Example – Robot Arm

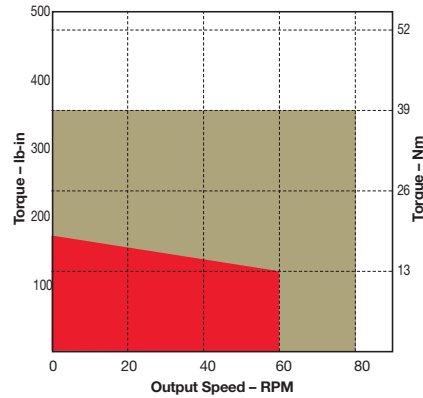
The PowerHub is one of the industry's most compact axis drives. Yet despite its small size, the PowerHub handles large loads and offers high torque and repeatability. It is ideally suited for industrial robotics applications.



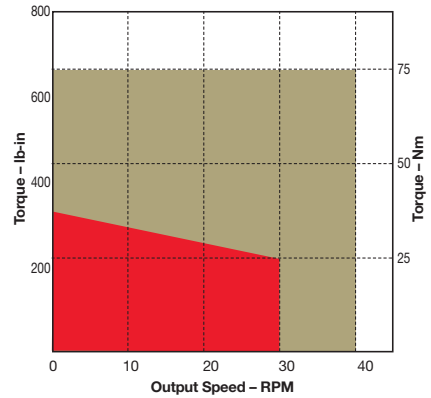
PowerHub Performance and Specifications

TORQUE/SPEED RANGE CHARTS

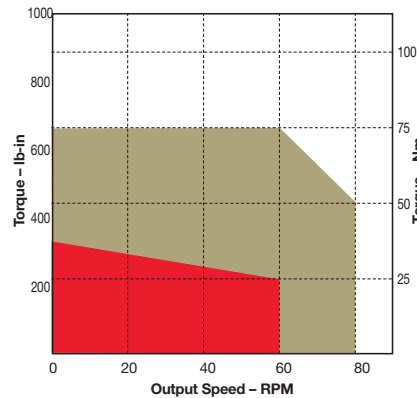
HKM-20-60



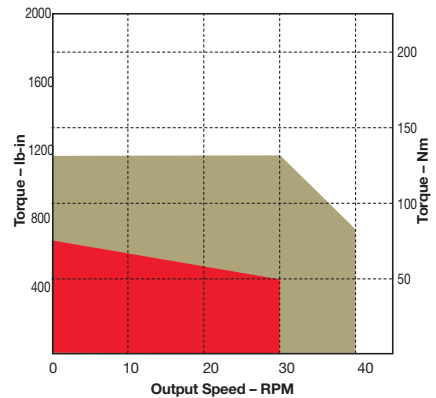
HKM-20-30



HKM-25-60



HKM-25-30



■ Maximum Continuous Torque
■ Intermittent Duty Zone

Actuator Specifications

	Units	HKM-20-60	HKM-20-30	HKM-25-60	HKM-25-30
Rated Power	Watts	100		200	
Rated Torque	in-lb	115	233	233	440
	N-m	13	26	26	50
Maximum Torque	in-lb	345	700	830	1330
	N-m	39	79	94	150
Rated Speed	r/min	60	30	60	30
Maximum Speed	r/min	80	40	80	40
Current, rated	A	1.8	1.4	4.8	3
Current, max.	A	5	4	14	9
Thermal Time Constant	min.	~25		~30	
Gear Reduction Ratio	R:1	50	100	50	100
Output Resolution	P/rev.	50,000	100,000	75,000	150,000
	arc sec	26	13	17	9
Absolute accuracy	± arc sec	75	40	60	40
Motor Type: 3 Phase Brushless					
Number of poles		8			
Torque Constant	in-lb/A	2.8		1.7	
Back EMF	V/kRPM	33.3		20.2	
Motor Resistance	Ohms	15.7		1.5	
Motor Inductance	mH	10.3		1.8	
Inertia	kg-cm ²	0.35		1.91	
Encoder Type: Optical Incremental					
Output Circuit		Type: Line Driver			
Resolution (Encoder Only)	P/rev.	1000		1500	
Output Signal	3 Channels	A - A B - B I - I			
Power		+5VDC ±10% & 250 mA Max.			
Drive Consult factory for options					

PowerHub Combined Axial and Moment Loads

The output flange of all PowerHub actuators is supported by precision bearings which allow combinations of axial and moment loads. The maximum allowable combination of these external loads is shown in Example 2. A moment load applied to the output flange will create a deflection as shown in Example 1. It is not recommended to exceed 1.5 arc minutes. Axial impact loads on the end of the shaft should be avoided.



FIGURE 1

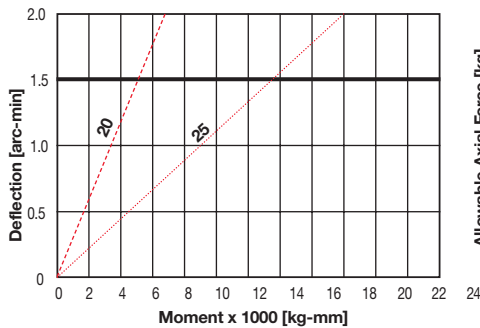
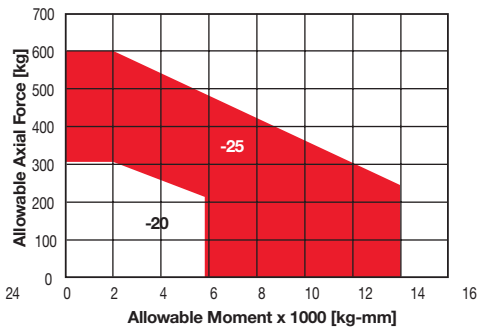
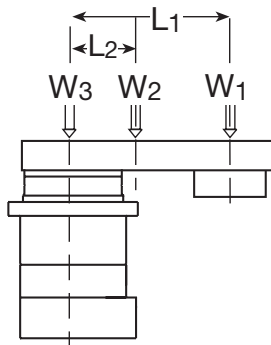


FIGURE 2



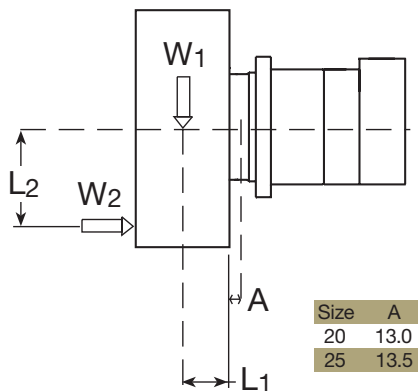
EXAMPLE 1



$$\text{Axial Force } F_a = W_1^{kg} + W_2^{kg} + W_3^{kg} + \dots$$

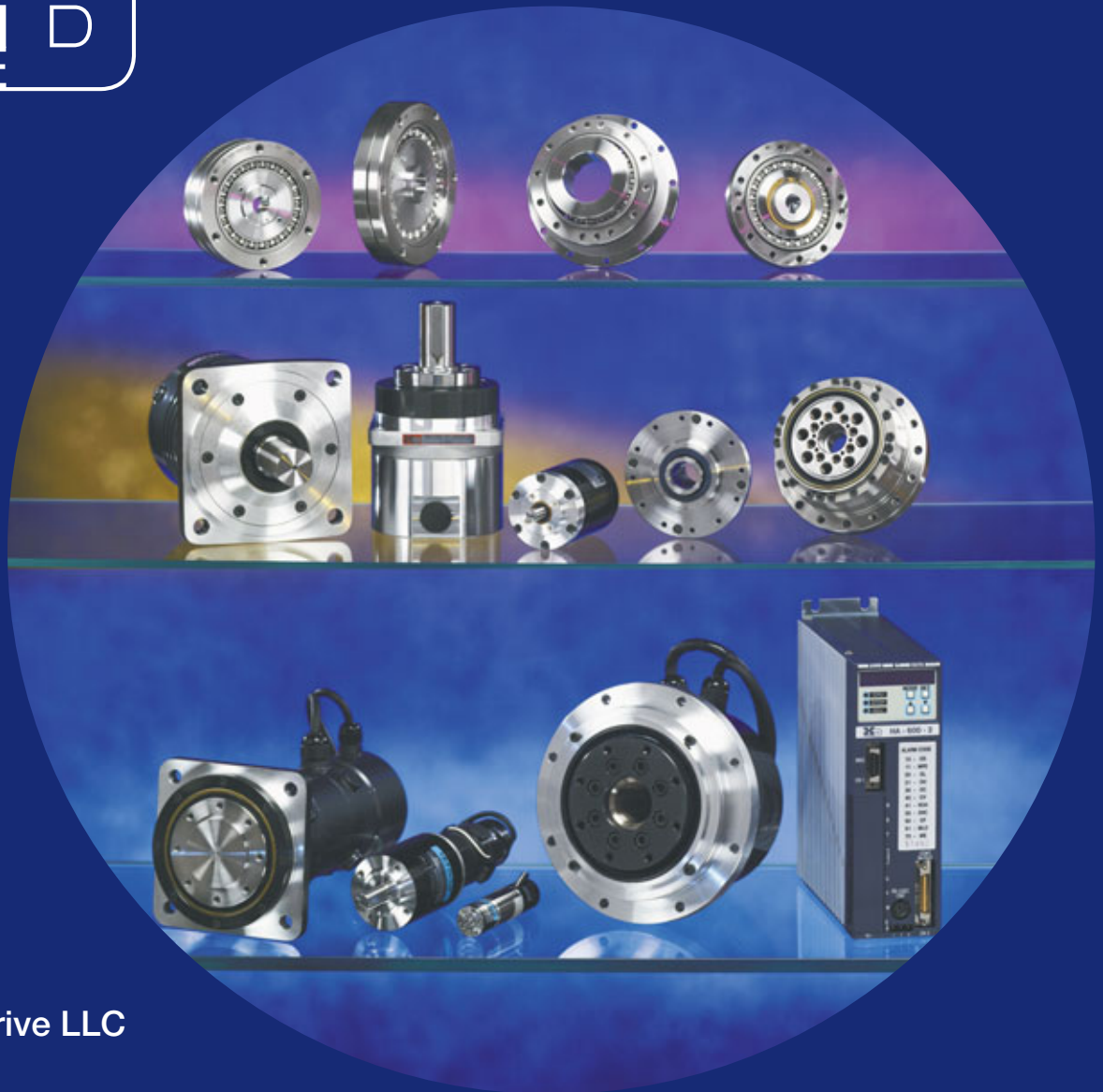
$$\text{Moment Load} = W_1^{kg} (L_1^{mm}) + W_2^{kg} (L_2^{mm}) + \dots$$

EXAMPLE 2



$$\text{Axial Force } F_a = W_2^{kg}$$

$$\text{Moment Load} = W_1^{kg} (L_1^{mm} + A^{mm}) + W_2^{kg} (L_2^{mm}) + \dots$$



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