



TSUDAKOMA

HOW TO SELECT A ROTARY TABLE

Direct Drive Rotary Tables



VS



Worm Wheel / Worm Spindle Rotary Tables



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Worm Wheel / Worm Spindle System

Advantages	High Accuracy	Guaranteed mechanical positioning & repeatability accuracy is very good. Scale option is available for ultra precision. Customer has flexibility to choose according to the accuracy required and their budget.
	High Output Torque	Tsudakoma's high torque transfer efficient worm system & gear reduction creates high output torque from a compact servo motor.
	High Clamping Torque	Tsudakoma offers various types of advanced clamping technologies, with either a pneumatic or hydraulic supply, based on the table model.
	Compact Size	Thinner body design compared with Direct Drive motor system.
	Low Thermal Deformation	Chiller unit is not required for rotary table cooling.
	Maintenance	Routine maintenance - Easy adjustments. Repairs - Lower cost for replacement parts and labor.
	Interface Costs	Standard interface hardware & software required.
Disadvantages	Lower Speed	Up to 88.9 RPM (Maximum RPM)
	Mechanical Parts Wear	Periodic backlash adjustment may be required based on use and accuracy requirement.
	Reversal Error / Lower Finishing Capability	Lower surface finish can be expected due to gear train reversal error when contouring.

Direct Drive Motor System

Advantages	High Accuracy	Direct measuring scale feedback system is standard
	High Speed Rotation / Indexing	Up to 1,000 RPM Various speed options are available based on Direct Drive motor selection. Sharp acceleration / deceleration helps to shorten indexing time.
	No Reversal Error / Ideal for Finishing	No mechanical reversal error. Provides excellent surface finish when contouring.
	No Mechanical Parts Wear	Maintenance free.
Disadvantages	Low Output Torque	Large size Direct Drive motor required to handle heavy loads, unbalanced loads & heavy duty machining.
	Larger Size	Physical size of the rotary table is larger than the same size of a worm system rotary table.
	High Thermal Deformation	Direct Drive motors generate a lot of heat. A chiller unit is required based on the application and the accuracy requirement.
	Maintenance	Difficult to adjust or repair. Crashes may be catastrophic.
	Complex Tuning / Adjusting	Complex servo tuning and adjustment is required for different applications. Fine tuning is needed for each machining application.
	Higher Interface Costs	Special interface software is required for Direct Drive motor.

1. Are you looking for a high speed indexing table?

Work Sample

High volume automotive parts production, multi-face machining production with high speed machine such as a tapping center.

Worm System	Up to 88.9 RPM. Good choice if load is heavy and off-center such as a trunnion style application.
Direct Drive	Up to 150 RPM. Good choice if work piece is light and on-center.

2.) Are you looking for a high speed table for contour machining?

Work Sample

Aerospace parts such as an impeller, blisk, blade & medical parts.

Worm System	Roughing & finishing can be done with same table. Surface finish might not be of sufficient quality because of reversal error & limited rotational speed.
Direct Drive	Best surface finishing expected. Reduces cycle time for finishing, but it may take more time for roughing because of lower output torque. Fine tuning is required.

3.) Does your application have a heavy weight fixture / work piece, or does it have an off-center unbalanced fixture?

Work Sample

Trunnion style fixture.

Worm System	Tsudakoma's high torque transfer efficient worm system works great a handling heavy duty application with high driving torque.
Direct Drive	To avoid vibration & excessive heat generation, adjustment of the max. RPM & acceleration / deceleration parameters may be required for every application. Total cycle time may be even longer using the same size rotary table with worm system.

4.) Is your machine work space limited and require a compact rotary table?

Worm System	Motor cover design can be modified to fit in required space. Thinner body design with larger output torque compared to same size Direct Drive motor table gives customer more flexibility for different applications.
Direct Drive	Depending on application, a large size Direct Drive motor may be required on the rotary table. Then, the table size becomes larger and thicker. With tilting table design, center height of tilt axis needs to be higher due to rotary axis body height, and it will cause Z-axis travel limitation.



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