

Direct detection of equipment movement

Detection of slight stroke changes (about 1 mm) in NC rotary tables and brake mechanisms, with easy setup, vol. 2



Product	Discrete sensor Adjustable Proximity Sensor
Model	H3C

Process/
Equipment

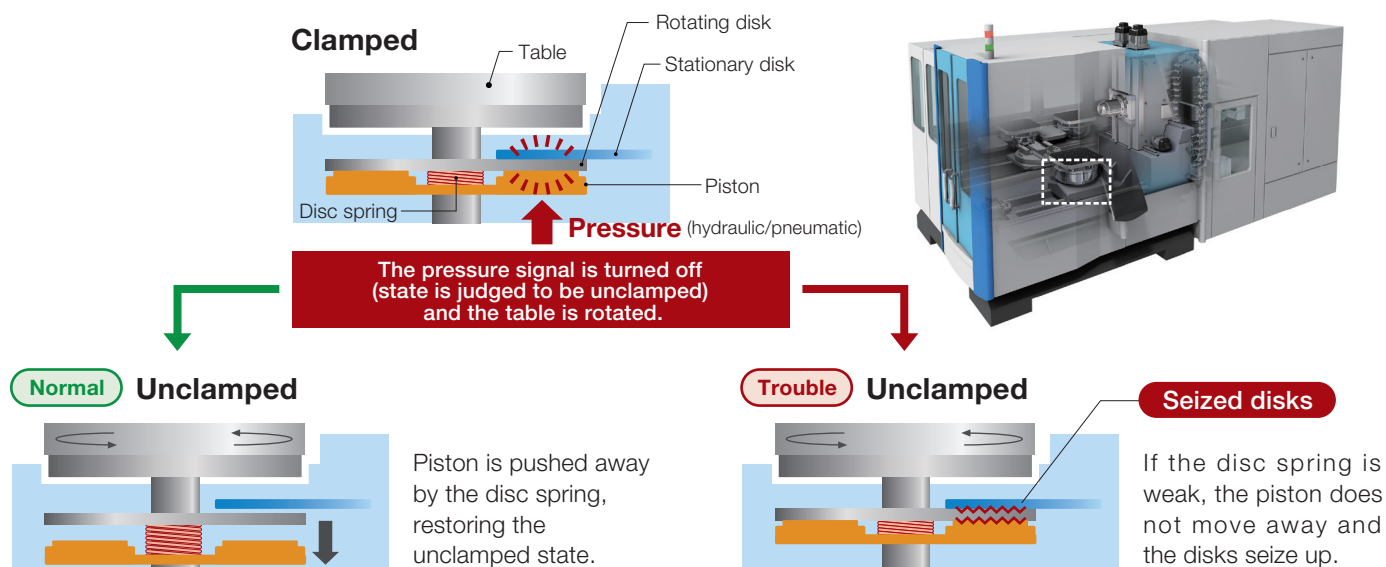
Machining center,
NC rotary table
(rotary & DD motor)

Current Situation

- The brake is used to stop and hold the rotary table (clamped state) to process the workpiece. After the brake is released (unclamped state), the table is rotated to change the posture of the workpiece.
- When the piston is hydraulically or pneumatically pressurized, it moves to press the rotating and stationary disks to clamp the table. When the pressure is reduced, the force of the disc spring separates the piston from the rotating and stationary disks, unclamping the table. The state is judged based on the presence of the pressure signal.

Current Problems

- Once the disc spring has worn out, the piston does not separate from the rotating and stationary disks even when the pressure is reduced. If the table is rotated under these circumstances, the disks will seize.
- The piston stroke is very short, so direct detection is difficult for conventional proximity switches.



Avoid seized disks

Solution 1

Direct detection of the brake piston's position allows an accurate judgment of the clamped/unclamped state under normal conditions. In addition, when pressure on the piston is reduced, the abnormal unclamped state caused by a worn-out disc spring (when the piston's position is the same as in the clamped state) can be identified and seizing of the disks can be avoided, greatly improving reliability.

Solution 2

Easy adjustment, and monitoring of warning signs

Teaching in the clamped and unclamped states sets a threshold at the midpoint of their detection levels. In addition, adjusting the settings in 3-Point Operate mode makes it possible to monitor for stopping of the piston in an intermediate position (between clamped and unclamped states under normal conditions), which can be used to predict weakening of the disc spring.

Solution 3

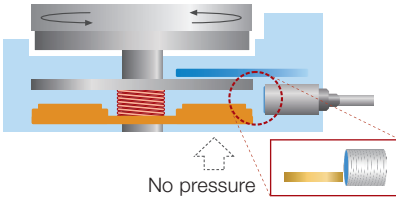
Special Configuration Tool software visualizes detection levels

This software tool makes it possible to monitor the safety margins for sensing, allowing you to always check the recommended threshold and make optimum adjustments. In addition, using 3-Point Operate mode can set a warning-sign management zone between the clamped and unclamped states.

Solution 1 Sample proximity switch installation

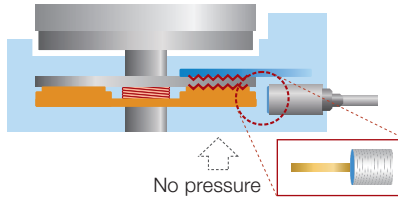
Normal Unclamped

Direct detection of piston separation by the disc spring: **OK to rotate**



Trouble Unclamped (but position = clamped)

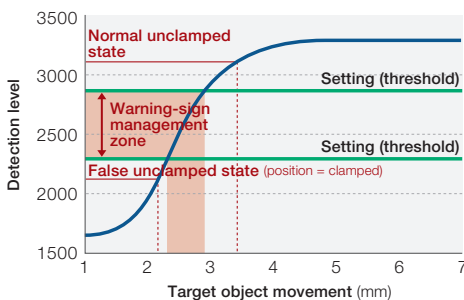
Direct detection that piston has not separated because of weak disc spring: **Don't rotate!**



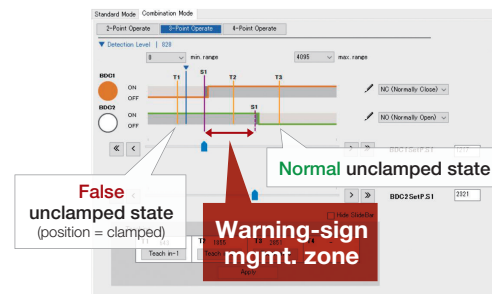
	False Unclamped (position = clamped)	Warning-Sign Mgmt. Zone (spring problem prediction)	Normal Unclamped
Output 1	OFF	ON	ON
Output 2	ON	ON	OFF

Note: There is no guarantee that this detection method can be used. The feasibility and accuracy of detection depend on the actual service conditions and environment. Conduct an operation check and evaluate the results before actual use.

Solution 2 Set by auto-tuning



Solution 3 Configuration Tool



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