

# Clutch Increases Efficiency

Eye doctors using a spring-applied clutch can achieve finer control.

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**A**t an ophthalmologist or optometrist's office, they have various types of vision testing equipment. Sometimes, the equipment is mounted with counter balances like a spring or a counter weight so a doctor can simply push or pull it to its proper position. With this type of equipment there is also a mechanical lock (brake) that will hold it once the proper position is achieved. But many times, the equipment is too cumbersome for continuous manual operation, so a motor-driven positioning system is used. A motor-driven system is sometimes slow and may lack the ability to fine-tune the vision testing equipment position. To help give the doctor an option between a manual and motor-driven system, Ogura's spring-actuated clutch, model MCSC, is now being used in some of these automatic vision inspection stations.

Most of the time, larger workstations are motor-driven into position for a patient by a push of a button by the doctor. However, in some cases, the ophthalmologist or optometrist may want to manually slide the table to a different position depending upon the type of examination required or based on the height of the patient. The MCSC clutch is mounted between the motor/speed reducer and the drive gears controlling the positioning of the table. The MCSC is a spring-applied clutch, when there is no power going to the clutch; the motor/gearbox drives through the clutch and controls the positioning of the table. When manual operation is required, power is applied to the clutch, disengaging it, allowing free movement.

If this were a typical application, a power-on electromagnetic clutch would be used to disengage the motor/reducer, but a power-on clutch would be on all the time the motor/gearbox is driving and would only be released when power was removed. But, for a vision inspection table, this type of clutch would not work because when power is lost or turned off, the MCSC is still required to hold. If a power-on clutch were used, the load would be free and not held in place.

The MCSC operates by having one electromagnetic 24V DC coil and a series of springs. Both the springs and the coil act on a pressure plate between the rotor and friction disc. When no power is applied, the springs put pressure on the pressure plate, squeezing the friction disc and engaging the output hub. When power is applied, the coil pulls the pressure plate back, compressing the spring and allowing free movement of the friction disc, disengaging the output hub.

When the equipment needs to be moved manually, the doctor simply grabs a handle located on the back of the table. This handle is connected to a switch, which runs electrically to the coil of the clutch. Once this switch is tripped, power is applied to the clutch, disconnecting the clutch and allowing free movement of the vision examination table. The handle is located toward the doctor and away from the patient to prevent



Ogura's spring-applied clutch allows eye doctors to get the fine adjustment needed for proper patient diagnosis.

the patient from accidentally engaging the clutch and disconnecting the motor/gearbox. With the table disconnected, the doctor is free to move it into any position. The table is counter-balanced so the doctor does not have to fully support or move its full weight. To reconnect the motor/gear reducer, the doctor simply releases the handle, which disengages electrical power to the clutch. Any time power is released and the motor drive is stopped, the table is locked. The reducer/motor has a high reduction built in, and the resistive torque is enough to hold the table in position. This is why the system does not need a separate holding brake. So, with one spring-applied clutch, both the clutch function and a holding (brake) function are achieved.

Large vision testing tables have been conventionally driven by a motor/reducer with no type of disconnect and/or manual adjustment. By adding the spring-applied clutch, the doctor not only gets a finer control for positioning, but can also use the manual operation to either move the equipment in and/or out at a much faster rate. This helps to speed up the time that the patient is in front of the vision examining equipment, allowing more efficient use of both the doctor's and the patient's time.

Another benefit of having the spring-applied clutch is safety. There are multiple sensors on the table which, when activated, would disengage the clutch, stopping the table's motion. This safety feature can protect either the patient or the equipment, depending upon which sensor is activated.

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