



Gripper actuation by electric actuator with RACOMATIC®

Large grabs such as tong grabs are used on crane systems for handling a wide variety of goods such as building blocks, pallet goods, coils, structural steel mats. Depending on the type of goods to be gripped, a distinction is made between form fit and force fit grippers.

For form fit gripping, the goods are "undergripped" by correspondingly pronounced gripping pliers. The grippers are moved to a predetermined closing position and normally only the friction forces of the gripper kinematics have to be overcome.

During force fit gripping, the gripper tongs come into contact with the goods at the gripping surfaces and apply a force which is sufficient to hold the load in the gripper tongs by frictional force.

Up to now, mainly hydraulic cylinders have been used to actuate such grippers, which were either actuated within the cylinder end positions or controlled via a pressure relief valve to limit the force.

RACO electric actuators implement these functions in equal measure by means of position limit switches and/or a displacement sensor system that detects any intermediate position, as well as force limitation via the power consumption of the motor. Thus, more and more electromechanical actuators are becoming more popular, which can handle these tasks easily and reliably by means of modern motor control systems. In addition, advantages such as high energy efficiency, low maintenance, clean and environmentally friendly solutions, as there are no leaks.



The application example shows a RACO electric actuator type M1M7 with adapted RACOMATIC®, which applies an actuating force of up to 50kN. The rough operating conditions require the equipment with a special corrosion protection package and special seals for "outdoor" use. The RACOMATIC® and the actuator motor are selected in protection class IP65/IP66.



Heavy Duty Electric Actuator type M1M7

- Due to the different formats and protrusions of the stacked structural steel mats, it is not possible to switch off in position when gripping, but must be switched off after a specified maximum gripping force has been built up.
- The required actuating force is on average < 30 kN, for a short time also 40 kN. The force build-up on contact with the structural steel mat is by pressure. The cylinder stroke is 1000 mm for symmetrical actuation of the two grippers with 500 mm each.
- The application takes place outdoors all year round. In wind and weather temperatures range from -25 °C to +50 °C
- With 30 loading cycles per day on 250 days per year, at least 150,000 cycles (gripping & releasing) were required. This corresponds to 10 years expected operation time.

The force adjustment to the limit value in the range $F = 0-40$ kN is carried out via an analogue set value 4-20 mA. The feedback of the current gripping force is also provided via an analogue feedback 4-20 mA. This allows the customer to determine the "gripped" condition and to switch off the motor so that it does not overheat.

Possible shock loads due to collisions during gripping and loading are disadvantageous for a ball screw drive due to the punctual loads in the thread. A trapezoidal screw drive is very robust but has a much lower efficiency and a shorter service life due to the friction during loading.

The push-pull unit of the electric cylinder is equipped with a multi-trapezoidal spindle, which is correspondingly robust due to the surface contact in the thread and with its ground profile has a higher efficiency than a trapezoidal thread. This also increases reliability and service life.

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