

Ameridrives

Bauer Gear Motor

Bibby Turboflex

Boston Gear

Delroyd Worm Gear

Formsprag Clutch

Guardian Couplings

Huco

Industrial Clutch

Inertia Dynamics

Kilian

Lamiflex Couplings

Marland Clutch

Matrix

Nuttall Gear

Stieber

Stromag

Svendborg Brakes

TB Wood's

Twiflex

Warner Electric

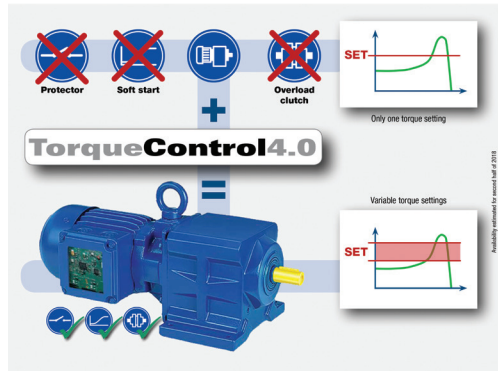
Warner Linear

Wichita Clutch

Digital Torque Monitoring for The Age Of Industry 4.0



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Bauer TorqueControl 4.0

Industry 4.0 describes the intelligent networking of machines and processes in industry with the help of communication technology. Bauer Gear Motor's award winning TorqueControl 4.0 offers greater precision than mechanical torque limiters so that overload limitation is applied effectively and quickly.

As Industry 4.0 solutions continue to expand, more and more components are being integrated into the "Smart Factory." By collecting data, which is captured centrally, it is possible to obtain a real-time status of the complete production line, eradicating inefficiencies and identifying potential failures before they occur. How can a simple geared motor be integrated into Industry 4.0 networks in the future?

Bauer Gear Motor, part of Altra Industrial Motion Corp, has extended its product portfolio with the development of TorqueControl 4.0, so that a standard mains-driven geared motor can be integrated into the standardized, non-fieldbus-dependent, Industry 4.0 communication technology. The technology was developed by Bauer engineers after they were tasked with finding an alternative to mechanical overload clutches.

Development engineer Simon Seybold explains: "A long-standing Bauer customer asked us to investigate a more efficient solution for torque monitoring and control for conveyor systems that could offer improved performance during operations and reduced reaction times in the event of torque overload. We evaluated alternative mechanical solutions but quickly realized that an electronic solution was the best way to go."

TorqueControl 4.0

Developed under the slogan "Geared Motors Go Online," a mains-powered geared motor can be fitted with the integrated electronic TorqueControl 4.0 and connected via IO-Link into an Industry 4.0 network.

The innovation from Bauer also offers the functionality of a soft start and an overload clutch as well as the ability to capture operational data and share it with the control network. It can be used to protect the powertrain from overloading and can optimize the magnetization of the motor independently from the load, significantly increasing the efficiency of the motor under partial load conditions. The integrated electronics are housed in the terminal box of the motor to provide a compact solution in a protected environment.

TorqueControl 4.0 allows monitoring of the operational status and independent shutdown of the torque while providing status data such as power, voltage or active power. Parameters can be set to shut down

the drive in the event of an overload, preventing any damage to the drivetrain. At the same time, TorqueControl 4.0 can limit the starting current in the same way as a conventional soft start.

Furthermore, the continuous load-point monitoring enables TorqueControl 4.0 to alter the motor's magnetization by adjusting the voltage. This increases the motor's efficiency under partial-load conditions by up to 25%.

This makes it possible for all mains-driven Bauer geared motors to be integrated into an Industry 4.0 network cost effectively without the need for a frequency inverter. Crucially, the system identifies and communicates the load data from the geared motor in real-time and sends this information to a central control unit. This data can then be processed centrally. The operating mode can be switched on and off electronically over the network. This means that efficiency can be improved throughout the production line.

Benefits in Action

Mechanical torque limiter designs, such as overload clutches, rely on a drive to fail at a given torque load in order to protect the drivetrain. This is an effective, if simple, means of protection for applications such as conveyors, where a foreign object could obstruct the drivetrain and generate unexpected loads. In this example, the overload clutch is fitted with a sensor, which is used to detect when the clutch is responding to an overload so that operators can be notified.

While the solution was effective and met its primary target of protecting the conveyor, the customer identified a number of drawbacks that they wanted to overcome. First, the mechanical clutch was a source of energy loss, so removing it from the drive train would improve the energy efficiency of the system. Next, in the event of an overload, the mechanical clutch needs to be partly disassembled and then reengaged, which prolongs any downtime encountered by the operator. Finally, the mechanical system is self-contained and only allows for binary control, i.e. engaged or disengaged.

By adopting an intelligent electronic control, it's possible for the operator to set a flexible, yet precise overload torque and constantly monitor performance. This allows for preventive maintenance measures to take place should irregularities occur. Further, should an overload be detected, the central controller can communicate the information to the production line and put all equipment on hold while the overload situation is resolved. Then, once the issue has been addressed, it is a simple process to restart the system over the network.



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Being integrated within the motor terminal box, TorqueControl 4.0 is ingress-protected up to IP65 and has been designed for a wide range of applications with power requirements up to 3 kW. It is particularly suited to operations involving material handling, intralogistics or processes that start under load and require excellent energy efficiency and gentle power delivery. With continuous data gathering, it is the perfect fit for the Smart Factory of the future.

Excellence in Innovation

In July of 2018, Bauer Gear Motor joined leading German innovators when it was recognized as a leader in the implementation of Industry 4.0 by the Allianz Industrie 4.0 Baden-Württemberg – a networking initiative aiming to join key innovators and support businesses who are pursuing developments in Industry 4.0. The award was presented by Katrin Schütz, State Secretary at the Ministry of Economic Affairs, Labor and Housing of the state of Baden-Württemberg.

Simon Seybold joined Bauer Gear Motor Managing Director, Karl-Peter Simon in accepting the award. Karl-Peter commented: “Industry 4.0 is not a fad or a temporary solution. It is the next crucial step in the evolution of manufacturing. We have been pioneering gear motor technology for almost 100 years with reliability and efficiency our primary goals. TorqueControl 4.0 is the latest step in our journey and our first step into this exciting new paradigm of engineering.”



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