Energy measurement & Logging of Data for single & three-phase loads

The KL3403 power measurement terminal allows industrial machinery users to incorporate measurement and control of their three-phase motors/pumps into the Beckhoff bus terminal I/O system.

The cost of power is becoming more and more of an issue within industrial applications, and engineers are being asked to monitor and control this increasingly expensive element.

But the tools to do this are still expensive and/or complex to set up.

With the BECKHOFF **KL3403** power measurement terminal coupled with a Ethernet embedded Controller **CX90xx** or **BC90xx**, industrial machinery users can now easily incorporate measurement and control of their three-phase motors into the Beckhoff bus terminal I/O system.

Preprocessing within the KL3403 provides RMS values in the process image, without requiring high computing capacity on the controller.

Phase Connections   CT Connections
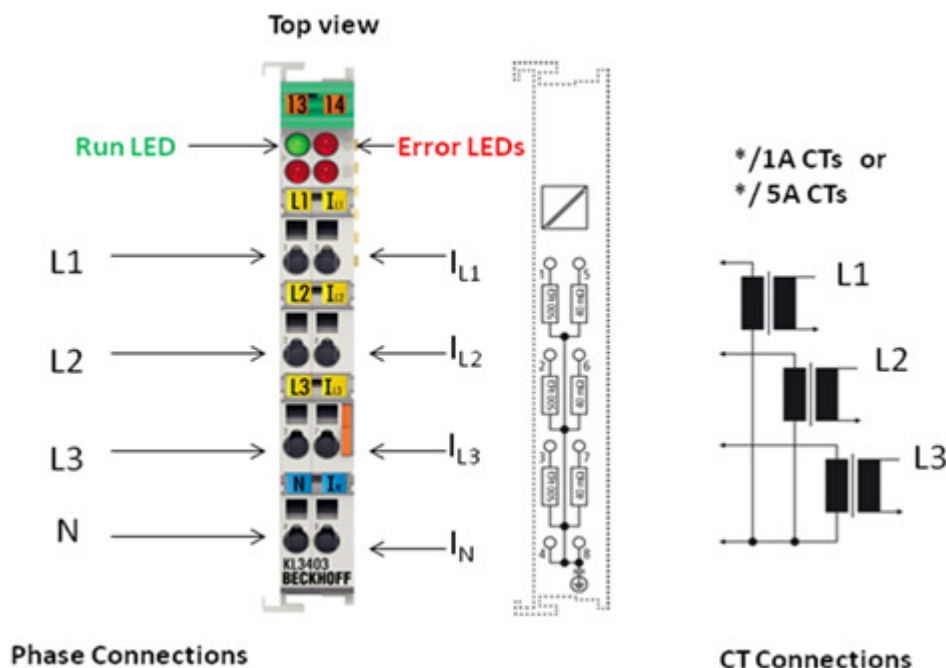
From the RMS value for voltages (U) and currents (I), the KL3403 calculates the effective power (P) and the energy consumption (W) for each phase.
By relating this RMS value to the effective power, the apparent power (S) and the power factor (COS Ǿ) can be derived.

Measuring principle
The KL3403 works with 6 analog/digital converters for recording the current and voltage values of all 3 phases. The values are sampled with a time grid of approximately 16 µs.
Recording and processing is synchronous and identical for the 3 phases. The signal processing for one phase is described below. This description applies correspondingly for all 3 phases. The total power and the total energy consumption represent the sum of the 3 phases, the mean current represents the average.

Voltage u and current i curves
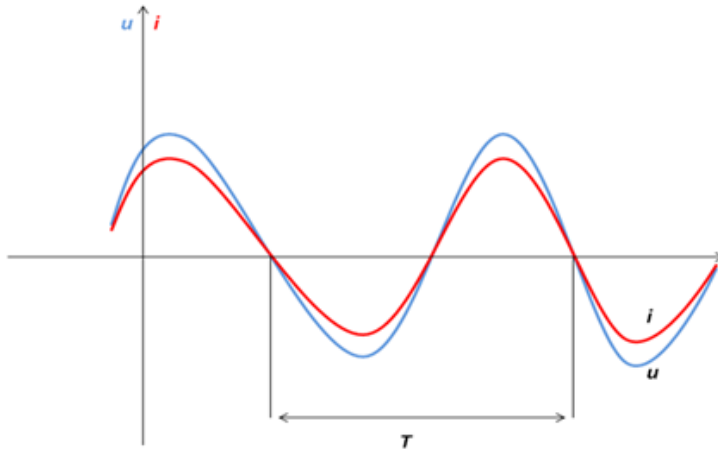
The KL3403 thus enables a comprehensive energy consumption analysis to be carried out over a communications network since the module works with any of Beckhoff's bus couplers (DeviceNet, Profibus, Ethernet, CANopen, Interbus etc).
Based on the values for voltage, current, effective power, apparent power and loading condition, the plant operator can optimize the supply of a drive or a machine and protect the plant from damage and downtime.

Industry needs to monitor the power eaters & control input costs:

- Monitoring Input Power at Main HT Incomer Feeder & the connected Loads on individual LV Outgoing Feeders to plant is essential to track the power flow & associated cost.

- Power consumption Monitoring of HVAC plant helps to implement energy saving techniques with appropriate energy data

- Predictive maintenance of Electric Motors & Pumps is a possibility by monitoring Power Consumption Pump Houses, Boilers, Compressors coupler with condition monitoring inputs.

- Monitoring data on Power consumption of Plastic Extrusion Machines & / Injection & Blow Molding Machines/ Rolling Mills & heavy machinery with linking them to machine output can help control product costs
 The KL3403 provides an economical way of managing three-phase power devices.

Operation & Management Engineers also need events & data information on call to take timely decisions

TwinCAT Event logger

With the TwinCAT Eventlogger an alarm and diagnostics system is available that can be installed in all TwinCAT-based controllers with very little programming effort. The TwinCAT Eventlogger has the task of managing all messages (events) appearing in the TwinCAT system; to forward them and, where necessary, to write them into the TwinCAT log file.

In this context 'events' are understood to comprise alarms, warnings, notes or instructions. Messages can be acknowledged. The Eventlogger has COM/DCOM interfaces. The Message Formatter produces the connection between the actual event and its message text. It fetches the appropriate message string from an external data bank (usually XML-based) containing the message texts, and returns the complete message, including all its parameters, to the visualization system.

The Event Viewer implements the visualization of the resulting messages. In this manner the automatic display of all important information concerning an event is possible. It is also possible to create a customized message display by linking the TcEventViewer Type Library. The message texts are comfortably configured with the TcEvent configurator.
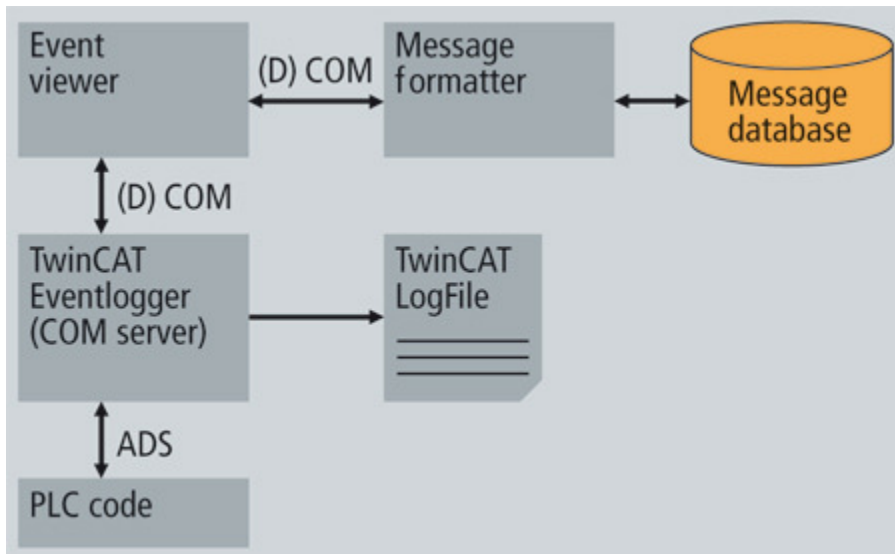
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