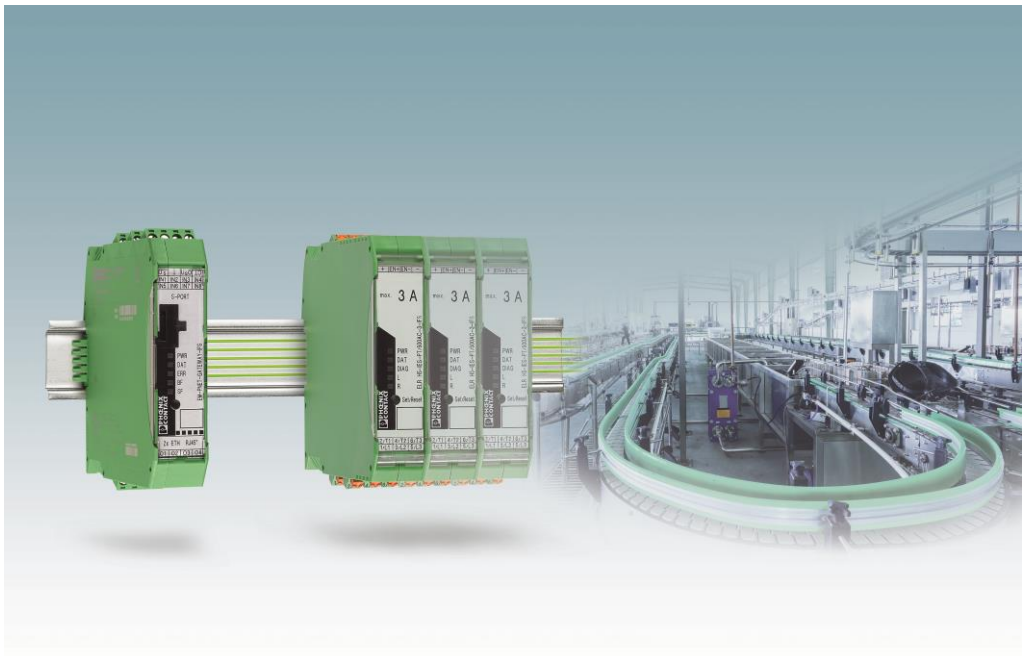
Contactron networkable hybrid motor starter

Cost-effective solutions for future-proof systems

In automation technology, processes and movements are commonly implemented using three-phase asynchronous motors. Often these processes are complex, and it must also be possible to shut them down in certain safety-related conditions. With Contactron hybrid motor starters, these requirements can be implemented with a solution that is space-saving, quick, and can also be networked consistently in the context of Industrie 4.0 (lead image).



Lead Image - Station with networkable hybrid motor starters

Particularly in machine building and systems manufacturing, there are many industrial applications which are driven by an electrical motor. The performance class of such motors usually ranges from a few watts to 3.5 kilowatts. Depending on the application, different requirements are placed on the associated motor control. For example, up to two mechanical switching elements are required to integrate the application into the safety circuit, one each for the direct and reversing start and another for motor protection, a total of five components. In a conventional motor control, these tasks are performed by so-called contactors and a motor protection relay, which must be planned, wired and connected accordingly. This is why the hybrid motor starters of the Contactron product family combine up to four functions in one device: emergency stop, motor starter, reversing function and motor protection against overload (Fig. 1).

Significantly less space required with longer service life

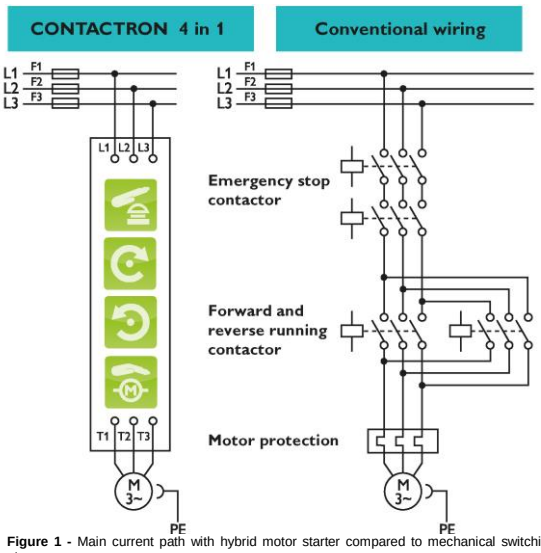


Figure 1 - Main current path with hybrid motor starter compared to mechanical switching elements

The combination of the four functions in one electronic switching device offers numerous advantages. The compact design of the hybrid motor starter saves the user up to 89 percent of the space in the control cabinet that would be required by a conventional circuit combination. In addition, the wiring complexity is reduced and so is the susceptibility to errors during commissioning of the system. Due to the variance of the available Contactron devices, a module with a suitable range of functions can be selected for each application.

The special hybrid technology of the Contactron family offers a further benefit. Due to the microprocessor-controlled combination of robust relay technology and wear-free semiconductor technology, which carries out the wear-prone switch-on and switch-off process when the motor is started or stopped, the relay can be switched load-free and conduct the current with low loss. This process minimizes wear on the relay contact surfaces. As a result, the motor starter attains a service life up to ten times that of a mechanical contactor. The user receives a simple and cost-effective solution for future-proof systems in which a robust, reliable and durable motor control is required.

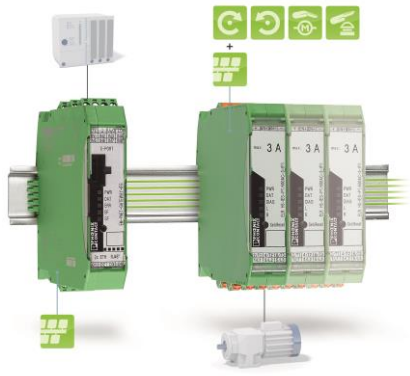


Figure 2 - Functions of networkable hybrid motor starters

Direct access to the motor data

There is a growing need in industry to read the large amount of data generated in applications in order to monitor and optimize processes. This allows conclusions to be drawn, for example, about an upcoming service visit to the plant which will result in shorter downtimes due to early planning. To implement this requirement, the first step is to provide the system data.

For this reason, the Contactron product family has been expanded to include a networkable variant of the hybrid motor starter. It offers the same functions as the classic Contactron switching devices, but with the option of networking it also provides a decentralized

approach. The user can access the motors directly via the existing fieldbus system (Fig. 2). In this way, important diagnostic data of the motors can be transmitted directly from the central control cabinet or the system peripherals to the system controller. Consequently, the user is always informed about the current status of his drives.

Further reduction in wiring costs

The basic structure of a solution with networkable hybrid motor starters is always the same: The switching devices are connected via a DIN rail bus adapter to the bus coupler suitable for the fieldbus level. The adapter supplies the connected motor starters with voltage and establishes communication with the bus coupler. In addition to the Profinet bus coupler, further variants are available for the Ethernet/IP, Modbus TCP/IP, Profibus, CAN, DeviceNet, RS232 and RS 485 transmission standards.

Control, diagnostic feedback and a reset of the hybrid motor starters are no longer performed via the I/O cards of the control system, but are implemented by signals via the fieldbus system. The user therefore saves I/O points on the control system. In addition, each IFS bus coupler has eight digital inputs and four digital outputs to which sensors or actuators can be connected. This eliminates the need for complex wiring to the controller, especially in decentralized applications. Since the time-consuming parallel wiring of the control, supply and signal levels of the Contactron modules is no longer necessary, the wiring work is reduced considerably. The safety-related functions of the motor starters are performed directly on the module via enable inputs. By using a safety controller or a safety relay, the required emergency stop function can be implemented in two channels and therefore meets the highest safety requirements (Fig. 3).

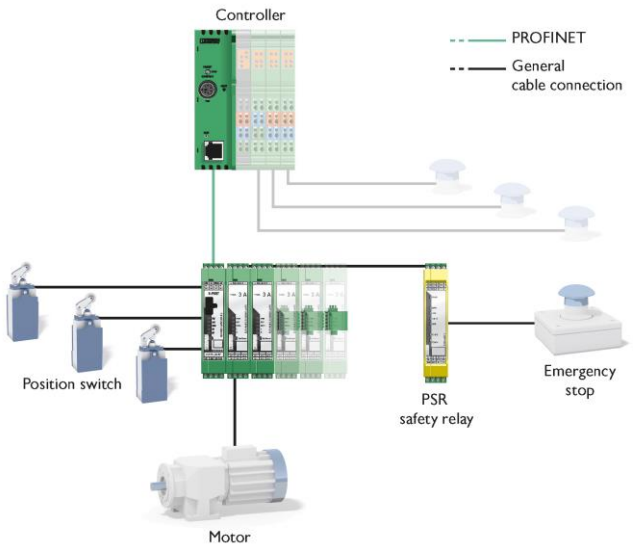


Figure 3 - Example topology of an application with networkable hybrid motor starters

Different types of configuration

A station that can consist of a Profinet bus coupler and up to 32 hybrid motor starters must be configured before use. The user can do this in three different ways. To be able to use up to 32 Contactron devices on one Profinet bus coupler, the configuration must be carried out via FDT/DTM. All of the motor starter functions can be used through this interface. In principle, the backplane bus, which is based on a single-wire CAN bus, allows the definition of a maximum of 64 process data to be exchanged between the bus coupler and the Contactron devices. A maximum of 16 process data are possible per connected module. A process data consisting of two bytes represents the input and output parameters of the motor starters which, for example, contain diagnostic data or control.

The defined process data can then be called up in the control system via a GSDML (Generic Station Description Markup Language) or FDCML (Field Device Configuration Markup Language) file and linked to corresponding program variables. The GSDML or FDCML file opens up an alternative configuration path. The required process data can be attached directly to the front module - the bus coupler - as a submodule in the automation software. In this way, the user can operate up to 15 devices on one bus coupler without having to familiarise themselves with additional software. This not only saves time, but also simplifies the handling of the station during maintenance.

As a third configuration alternative, the station can be put into operation by an installation wizard on a web server that can be accessed via an Internet browser under the IP address of the bus coupler. The user can choose between pre-defined profiles, which are then automatically loaded onto the station. Process data assignment is therefore performed with no action required from the operator.

Further modules can be networked via the interface system

In addition to hybrid motor starters, the Contactron product family also includes other modules that can be networked via the interface system. The electronic motor manager is available to protect sinusoidal consumers and to monitor all relevant load data. For non-sinusoidal consumers, such as frequency-controlled drives or complete systems, the machine manager assumes the task of monitoring energy data (Fig. 4).

Figure 4 - The portfolio of Phoenix Contact includes numerous switching devices

If more digital inputs and outputs are required than the bus coupler contains, another module is used in which eight digital inputs and four digital outputs are integrated. The modules are connected to the higher-level fieldbus system via the backplane bus using the same bus couplers. If IO-Link communication is already available in the systems, hybrid motor starters with IO-Link interfaces are the solution.

More information:
www.phoenixcontact.de/schalten

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