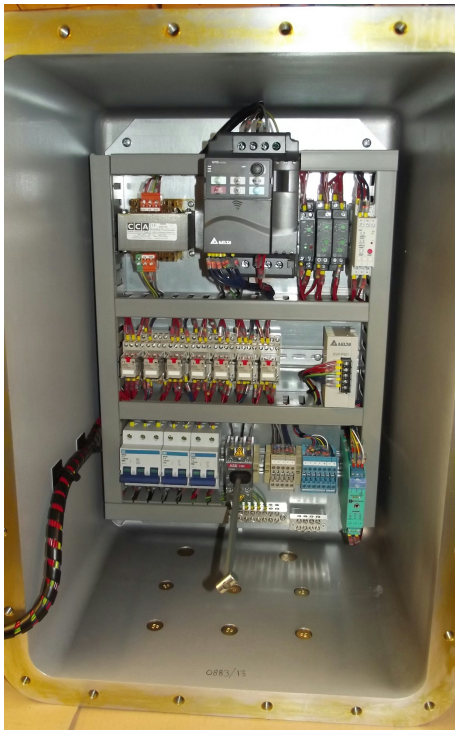
Miners go soft on starting

A Russian coal mine is set to become one of the most technologically advanced in the world as it prepares to install an explosion proof soft starter for its massive conveyor system.

Built in the UK, the ATEX certified explosion proof soft starter unit is rated at 6kV, 800kW and effectively makes the conveyor fully automatic. It is designed to start three motors simultaneously, each rated at 400kW, and to run the mine's main gate conveyor which carries coal from the working face to the mine shaft.

World's first MV explosionproof soft starter enclosure



It was designed and built by Sheffield-based Baldwin & Francis, which specialises in electrical systems for extreme environments, from an OEM kit of parts supplied by Softstart (UK) of Great Yarmouth. The kit consisted of thyristor power modules, a fibre optic EPT for firing the thyristors and an electronic control module and user interface.

Baldwin & Francis took these components, built them onto a chassis which was then enclosed in an ExD housing. The whole system was custom designed for this particular installation. For instance, it had to be compact, as space was limited and this required that the thyristors be supplied with specially-made right angled couplings rather than conventional in-line ones. The use of fibre optics electrically isolates the high and low voltage parts of the soft starter and eliminates the possibility of flashovers.

Cooling of the soft starter was a major design consideration in order that the electronic components could be used with confidence in such an aggressive environment. Several options were considered, with forced draught being chosen because it would be the most reliable over the expected long working life of the equipment.

Mark Ramsden of Baldwin & Francis explains: "The worldwide mining industry is still fairly new to electronic solutions to do with starting motors underground and we are doing a lot of pioneering work in this respect. Electronics tend not to like the heat and gases typically found underground, and the thought that they may cause a spark is an anathema to mining engineers the world over. It is our job to show that electronics are robust enough and that sparking isn't a problem."

APPLICATION BENEFITS

- Starts 3 motors together
- Controlled take-up of loaded conveyor
- Controlled acceleration to full speed
- By-pass to mains for efficient running
- ATEX certified for hazardous environments
- Supplied as a kit for bespoke panel construction

Until four or five years ago all mine-based conveyor starting would have been via a fluid coupling, but there is now a definite trend to more modern methodologies. Baldwin & Francis is at the forefront of this, often transferring technologies developed in other markets such as oil, process and marine.

Similarly, Softstart UK is riding a wave of interest in medium voltage soft starters, particularly from the heavy and harsh environment industries such as quarrying, groundwater pumping, offshore, waste management and recycling. The majority of its installations are bespoke and include considerable design input. Often this leads to specials parts being sourced or made for particular jobs.

Ramsden again: "Starting large motors direct-on-line underground is challenging. Often weak reticulation supplies preclude this from happening. Soft starting is essential in situations like this, and the expertise we can tap into at Softstart UK is invaluable."

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