Beam Fans

Application support for DM1 Pro

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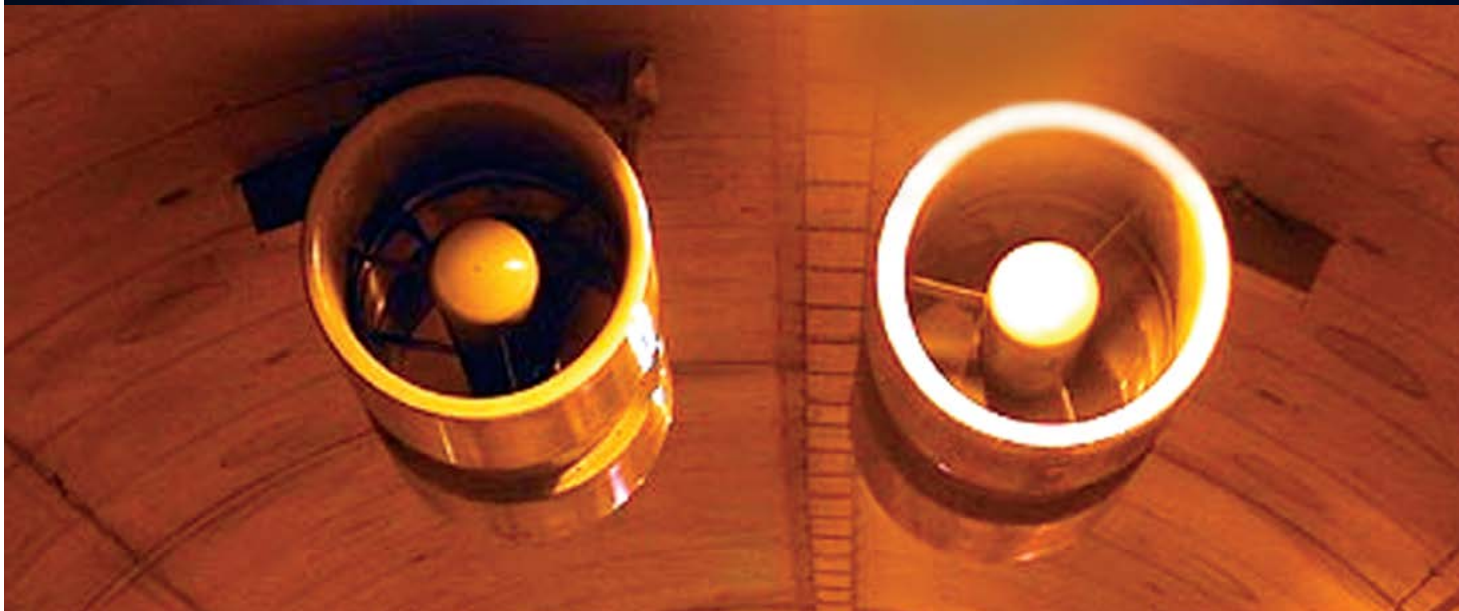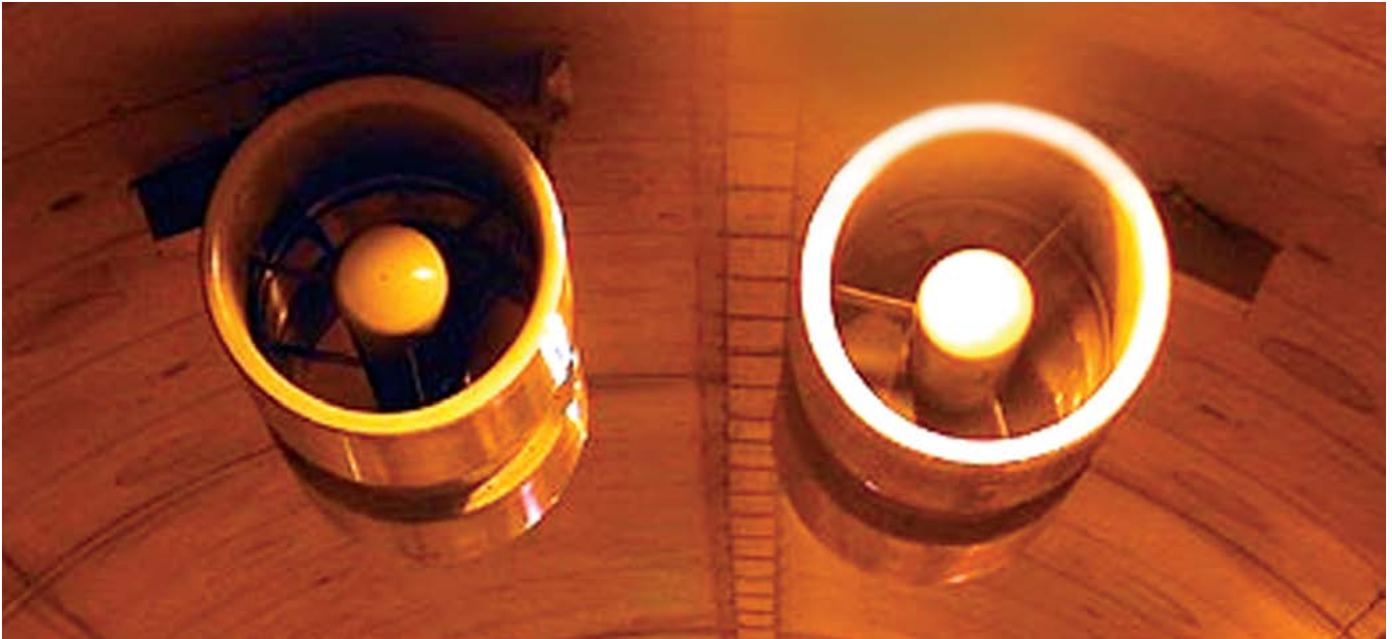
Fresh Air even underground

The tunnel ventilation has two functions: the fresh air supply and simultaneous exhaust gas removal, and the smoke exhaust in the event of a fire. DM1 Pro can configure both operating modes independently and thus always ensure optimum operation.

| Robust	Fast	Simple	Service & Support
• IP20/IP21 designs provide increased environmental protections • Conformal coated boards protect against aggressive ambient • Best-in-Class ambient temperature range from -30°C to 50°C	• Group motor rated with fuses and breakers for reduction in labor and material costs • 14 basic parameters, Quick Start Wizard and PC Tools for simpler commissioning • Programming samples to include DM1 into common used PLC's (Codesys, STEP) • Ethernet/IP Assist Tool for easy tag integration into RSLogix 5000 software	• Pre-configured applications to simplify complex parameter sets, from standard to multi-pump configurations • Extensive on-board communications reduces cost and improves control capabilities	• Standard two-year warranty with extensions available through certified commissioning • Dedicated team of application engineers and technical resources available to provide pre-sales and aftersales support • Aftermarket program providing spare parts, service and training classes

Application control

- **PID controller –** The internal PID controller makes it possible to maintain a constant pressure in the system by continuously controlling the speed based on the process value delivered by the system.

- **Process variable representation in PID controller –** Makes things easier for operators by making it possible to directly show pressure / flow rate and monitor them in the motor menu.

- **Track changes –** The internal log helps during servicing to detect the root cause of a fault, minimizing down-time and diagnosis of accidental done changes.

- **I/O on-board –** Featuring 4 DI, 1AI, 1 AO, 2 RO, each I/O programmable with various functions. This I/O provides maximum flexibility when controlling the application at hand while simultaneously reducing the costs required for external controllers.

Application protection

- **Automatic restart –** Brings beam fans back online after a power failure in order to minimize downtimes and potential system faults.

- **Skip frequencies –** Reduce vibration and noise of the convyor-belt by preventing operation in resonance causing speeds.

- **Fault tolerant –** DM1 Pro variable frequency drives can be programmed to respond in a custom manner to most faults. These responses can range, for example, from shutdowns to warnings to simply ignoring the fault, minimizing downtimes as a result.

- **Flying start –** Smoothly start spinning beam fans in either direction to reduce stress on the impellers.

Motor control

- **Control of PM Motors –** The use of permanent magnet exited motors (PM) enables extra efficient machines because in part load they have significant lower losses. Additionally PM-motors run synchronous to the supply frequency and result in a extra precise speed control.

Energy Efficiency

- **Energy savings function –** Provides 2-10% energy savings over competitors "out of box" mode without motor tuning.

- **Active Energy saving function –** On-board algorithm to dynamically adjust the volts per hertz curve to find the lowest possible power output to maintain the required pump output. Classical static procedures are less good as load peaks will influence the speed accuracy.

- **Sleep Mode –** Prevents the pump from continuing to rotate when the pressure falls below an adjustable value and no fluid is being pumped any more. By automatically stopping the pump, this mode lowers energy consumption, wear and costs.

- **Energy cost calculator –** The integrated energy cost savings calculator provides a direct comparison to conventional control systems (DOL). It can be used to immediately see how many Euros have been saved by using a DM1 Pro instead of a DOL solution, as well as the total costs accumulated while running the drive.

- **Harmonics Estimator –** PC tool to calculate the harmonic load on the supply mains.

Management and communication

- **Communication –** Best-in-class on-board communications includes Modbus RTU, Modubs TCP, Bacnet MSTP, Ethernet/IP to integrate into any desired network within a facility.

- **Password protection –** Lock access to parameter editing to prevent undesired user interaction in the field. For safety related applications like this mandatory.

- **Webserver –** With the internal webserver the drive can be parameterized without further software, only requirement is an Ethernet based connection and a web-browser.
  For the application this is a simple way without the need for additoinal software installations to access the drive. This can be a service or a commissioning. Simplifying processes this shortens time-/cost for the owner.

- **SmartWire-DT Integration –** Makes it possible to integrate virtually any number of modules via SmartWire-DT gateways, as each gateway requires only one single address.

Wiring example beam fan

The fan can run speed controled as well as closed loop with a pressure reference:

① Via analog input a speed reference is done, the drive runs in open loop control.

② Via analog input the pressure feedback is given. Reference control is via the internal potentiometer or via communcation. The internal PID controller will controll the closed loop pressure control.

Via the local/remote switch the user can select between remote control and manual control. For each mode the signal souce can be free configured (terminals, keypad, communication).
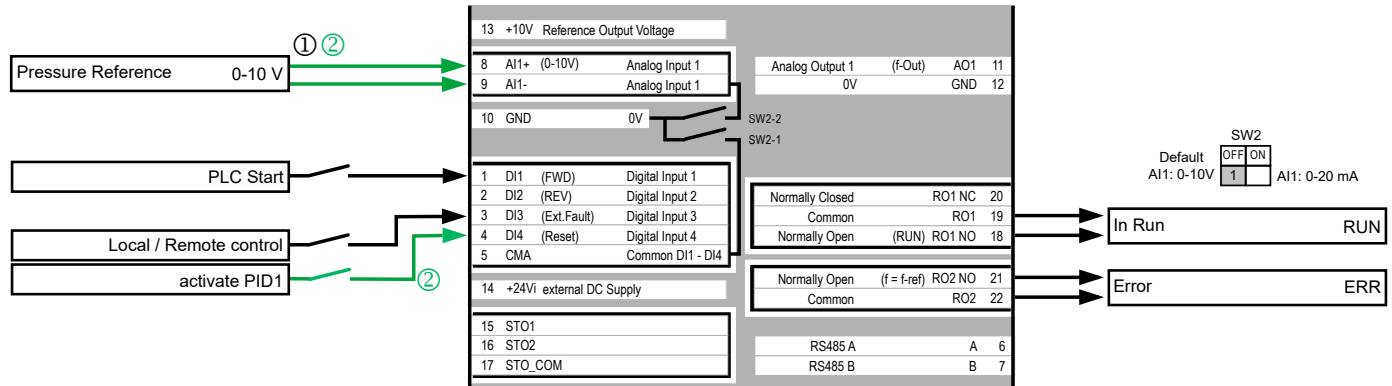
Further application notes

Common hints	
Electromagnetic compatibility (EMC)	AP040043EN
Dual Rating – What exactly does that mean?	AP040114EN
Connecting drives to generator supplies	AP040169EN

DM1 specific hints	
• Application Manual DM1	MN040049EN
• Communication Manual DM1	MN040051EN
• Webserver Manual	MN040055EN

- Following link will show you the Application notes for DM1: www.eaton.com/ap/overview/drives
- DM1 Pro-Manuals you can find at: Eaton.com/dm1

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