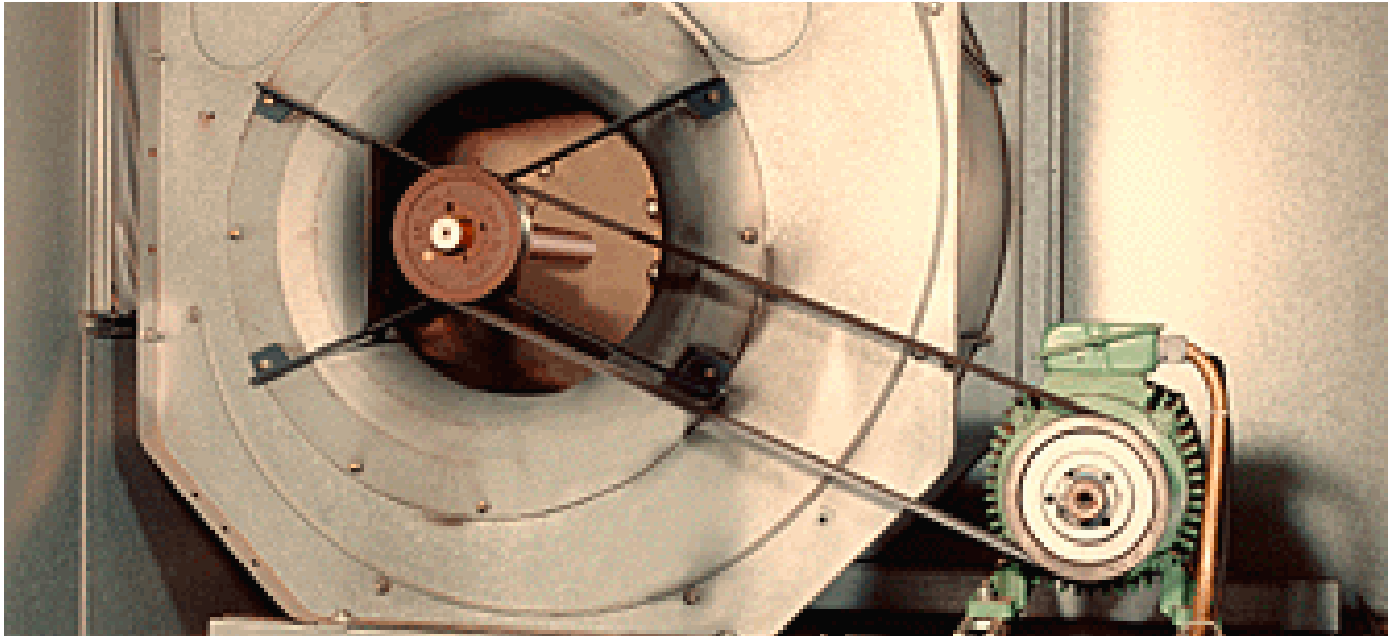# Inlet and Exhaust Fans

Application support for DM1 Pro

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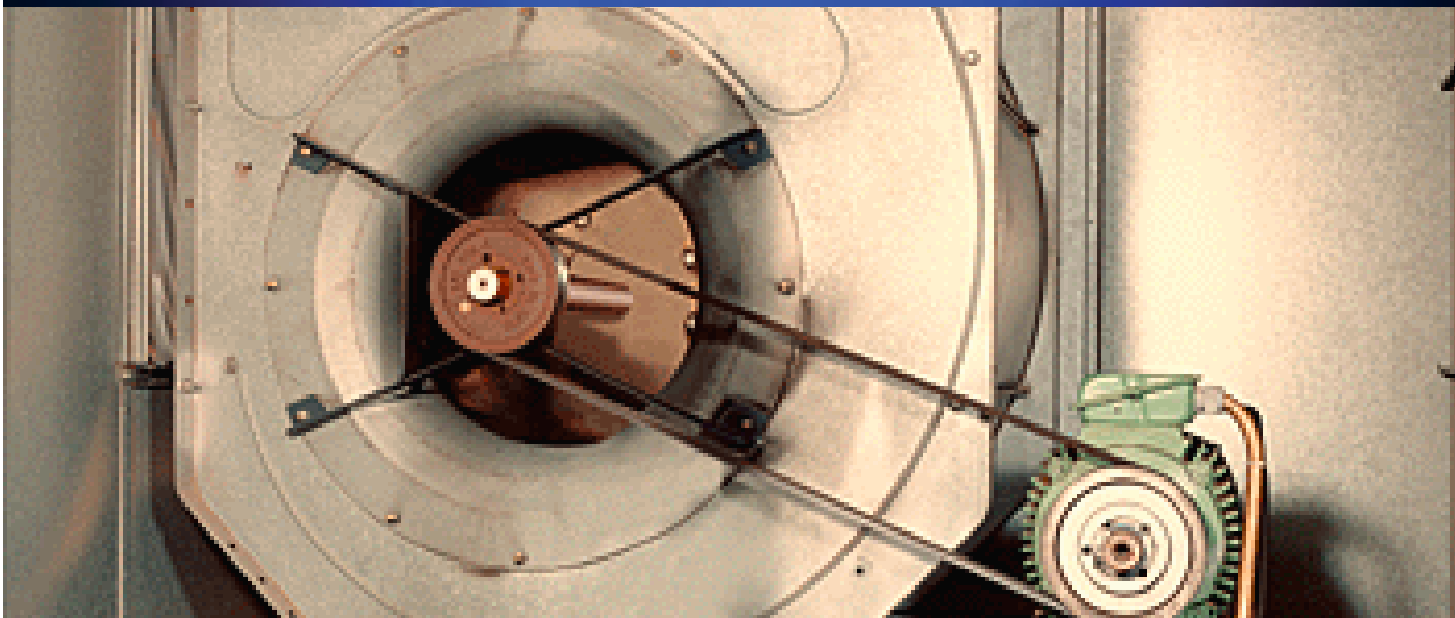
Powering Business Worldwide

Energy efficiency for fans

While sizing with an overload of 150% is required for machine applications, 110% is more than adequate for fan applications. This means that the selected DM1.Pro device used can be one motor rating lower, reducing the corresponding acquisition costs as a result.

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

Application control

- **Hand-Automatic control –** Operators can switch between manual and automatic modes by means of control commands or with the keypad, enabling them to intervene in the control system at any time.
- **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.
- **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 inlet and exhaust fans back online after a power failure in order to minimize downtimes and potential system faults.
- **Belt-brake detection -** The underload detection function makes it possible to respond safely when a fan belt breaks. When the belt breaks, the application will cease to work correctly, but the motor will run at its maximum speed. DM1 Pro devices will detect this situation and safely shut down the motor, preventing unnecessary wear.
- **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 Inlet and exhaust fans in either direction to reduce stress on the impellers.
- **Skip frequencies –** Reduce vibration and noise of the impellers by preventing operation in resonance causing speeds.

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.

Motor protection

- **Electronic motor protection –** In order to efficiently prevent any motor damage, a perfect working motor protection is required. Accordingly, the protection function in DM1 Pro variable frequency drives can be programmed flexibly.

Energy Efficiency

- **Energy savings function –** In order to efficiently prevent any motor damage, a perfect working motor protection is required. Accordingly, the protection function in DM1 Pro variable frequency drives can be programmed flexibly.
- **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

- **Energy Savings Estimator –** PC tool to estimate your cost savings in advance.
- **Extension slots –** Beside substantial On-Board I/O, various extension boards are available (1 slot) to directly connect all signals and sensors to DM1 Pro for inlet and exhaust fans control, monitoring and status control.
- **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.
- **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 .
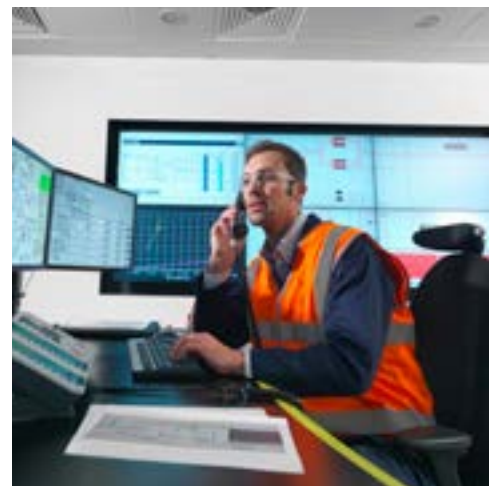
Wiring example inlet-/exhaust-fan

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).
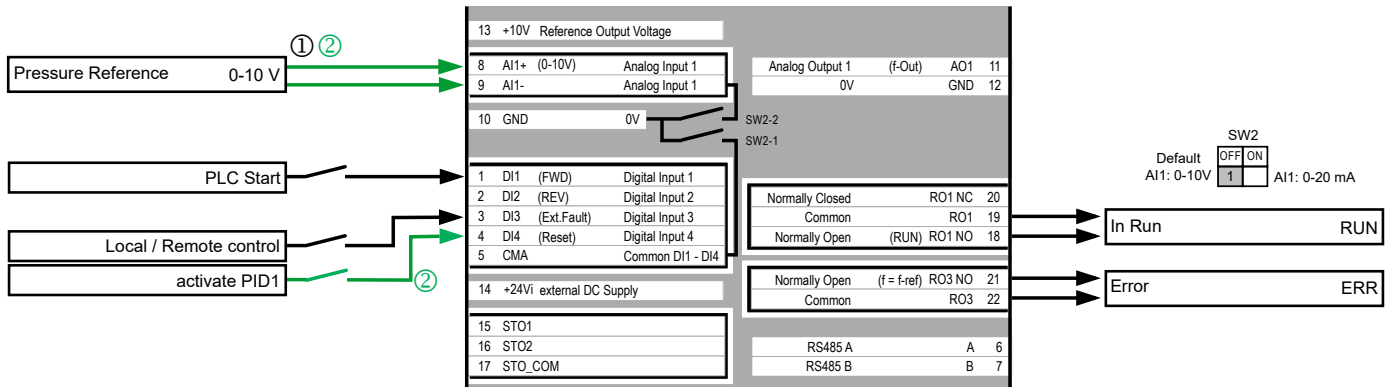
Further application notes

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 Pro:
Eaton.com/ap/overview/drives

DM1 Pro-Manuals you can find at: Eaton.com/dm1

Service
For service and support, please contact your local sales organisation.

Contact details: Eaton.com/contacts
Service page: Eaton.com/aftersales

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