Stone-Crushers

Application support for DG1

Powering Business Worldwide

Withstand adverse conditions

Stone crushers always work in harsh environments, dust, cold and humidity, strong vibratons and high torque requirements are normal operating conditions. A robust and solid drives solution is required here to keep the machine running.

Robust

- Best-in-Class ambient temperature range from -30 °C up to +60 °C
- Conformal coated boards protect against aggressive ambient
- IP54 designs provide increased environmental protections

Fast

- Best-in-class on-board inputs and outputs reduce PLC I/O requirements and option cards
- Group motor rated with fuses and breakers for reduction in labor and material costs
- 18 basic parameters, Quick Start Wizard and PC Tools for simpler commissioning
- Programming samples to include DG1 into common used PLC's (Codesys, STEP)
- Ethernet/IP Assist Tool for easy tag integration into RSLogix 5000 software

Simple

- IP54 for distributed layouts. This degree of protection makes the system more modular, easy to expand, and saves control panel space
- Pre-configured applications to simplify complex parameter sets, from standard to multi-pump configurations
- Full text LCD keypad featuring copy/paste functionality and soft keys for faster navigation
- Extensive on-board communications reduces cost and improves control capabilities

Service & Support

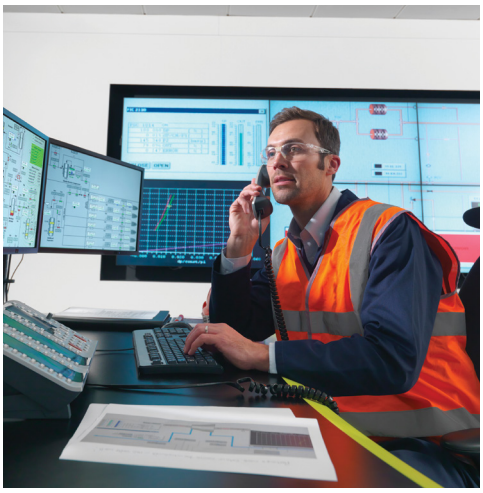
- Standard two-year warranty with extensions available through certified commissioning
- Dedicated team of application engineers and technical resources available to provide pre-sales and after-sales support
- Aftermarket program providing spare parts, service and training classes

Application control

- **150% Overload –** Overload requirement for machinery applications.
- **200% Torque –** Independently of the fact that a DG1 can work with a 150% overload for 60 seconds every 10 minutes, it also offers a peak torque of 200% (for 2 seconds every 20 seconds) for critical situations.
  This makes it possible to reliably overcome even the toughest overload requirements. And when even this is not enough to keep driving the application, the DG1 unit will detect this and shut down with a fault message before it or the motor is damaged.
- **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 8 DI, 1 DO, 2 AI, 2 AO and 3 relays, 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

- **STO –** Designed in Safety typical yellow, simplifies integration in the required safety system according to the Machine Directive.
- **Automatic restart –** Brings stone-crushers back online after a power failure in order to minimize downtimes and potential system faults.
- **Skip frequencies -** Reduce vibration and noise of the machine by preventing operation in resonance causing speeds.



Plant control & service

- **Cold weather mode –** Makes it possible to run machines even at extremely low temperatures inside the switch gear room without the need for external heating.
- **Deliberate robust –** All devices are able to perform at their full rating at ambient temperatures of up to 50 °C (IP21 and IP54) and feature an output that is short-circuit-proof up to 100 kA – that is what we call best-in-class.
  Fans with an exceptionally long service life, combined with a flexibly adjustable fan controller, result in greater reliability. The heavy-duty design behind these devices is also evident in their degree of protection: The DG1 devices with an output of up to 160 kW are available with degrees of protection of IP20 resp. IP21 and IP54.
  The sturdy metal enclosure for the power section and the design in general are engineered to keep working even when subjected to extreme loads. In order to guarantee this, we conducted numerous tests at ambient and operating conditions that far exceeded the rated conditions so as to identify and eliminate any potential weak spots. In other words, DG1 devices are the safe choice when it comes to underground work.
- **Resistant against dust and agressive gases –** All PCBs in DG1 variable frequency drives come with a conformal coating and are accordingly resistant to dust and aggressive gases. This eliminates the need for expensive, protected enclosures used to keep process-related dust at bay.

Motor control

- **Motor-ID Run –** Automatically determines the motor parameters required in order to maximize performance and efficiency as appropriate for the current pump configuration.

Motor protection

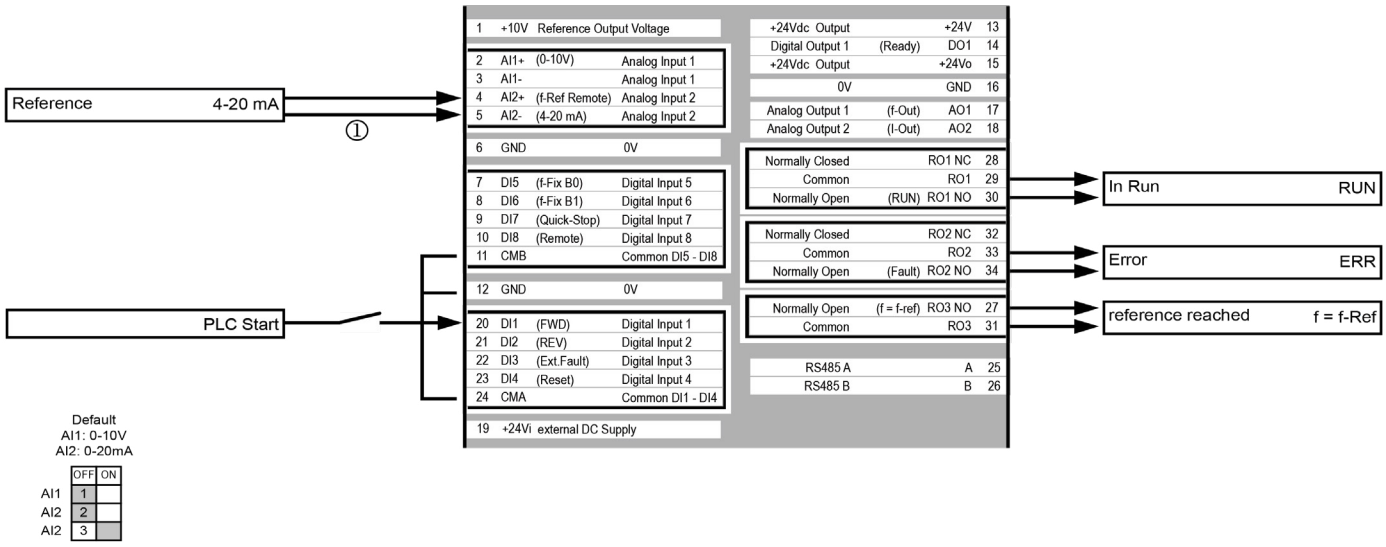
- **Electronic motor protection -** In order to efficiently prevent any motor damage, a perfect working motor protection is required. Accordingly, the protection function in DG1 variable frequency drives can be programmed flexibly.

Management and communication

- **Extension slots -** Beside substantial On-Board I/O, various extension boards are available (2 slots) to directly connect all signals and sensors to DG1 for stone-crushers control, monitoring and status control.
- **Communication -** Best-in-class on-board communications includes Modbus RTU, Modbus TCP, Ethernet/IP, BACnet MS/TP with additional option boards for Profibus, CANopen, DeviceNet and SmareWire-DT to integrate into any desired network within a facility.

Wiring diagram stone-crusher

Following a sample wiring diagram is shown for a simple speed control. Labels of the inputs/outputs are shown for default, eventually the need to be adapted to the desired function.



Further application notes

Common hints	
Electromagnetic compatibility (EMC)	AP040043EN
Dual Rating – What exactly does that mean?	AP040114EN
Connecting drives to generator supplies	AP040169EN
DG1 specific hints	
Application manual DG1	MN040004EN
Communication manual DG1	MN040010EN
Installation manual DG1 FR 0-6	MN040002EN
Operating at low temperatures	AP040058EN
DG1 in pump- and fan applications	AP040128EN
Real time clock and use of the timers	AP040172EN
Analog I/Os	AP040129EN
Digital I/Os	AP040132EN
Load balancing in multi motor applications	AP040168EN
Motordata and V/f curves	AP040177EN
PID controller	AP040164EN
Smoke mode and fire mode	AP040065EN
Starting, stopping and operation	AP040176EN
Smoke mode and fire mode	AP040065EN

Following link will show you the application notes for DG1:
Eaton.com/ap/overview/drives

Eaton Addressees:Eaton.com/contacts

Powering Business Worldwide

Eaton Industries GmbH
Hein Moeller Strasse 7-11
D- 53115 Bonn / Germany

Publication no.: AP040156EN
May 2021