Conveyor Belts

Application support for DG1

Powering Business Worldwide

Save transport on conveyor belts

To run a conveyour belt at ist optimum the sensorless vector controll is used, even at load peaks speed remains best possible constant. During run it is normal to get load peaks, therefore dimensioning is done with 150% overload rating and a linear V/f curve.

Robust

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

Fast

- 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
- Best-in-class on-board inputs and outputs reduce PLC I/O requirements and option cards
- 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

- **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 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.
- **Even load distribution –** If more than one motor is being used to drive a conveyor belt, the master drive will be operated in a speed-controlled manner, while the slaves will be run based on a torque set point from the master or with the use of droop speed control.
- **Second parameter set –** To continue after distribution points most soft to the next conveyor belt, a second parameter set is available.
- **FTT Logic –** Logic for Inputs (function to terminal) - Makes it possible to assign multiple functions to the same input, reducing I/O complexity.
- **Joystick –** Operate a material handling system via a joystick with relative voltage references to indicate direction and speed or to position into a start-position.

Application protection

- **STO –** Designed in Safety typical yellow, simplifies integration in the required safety system according to the machine directive.
- **Skip frequencies -** Reduce vibration and noise of the convyor-belt by preventing operation in resonance causing speeds.
- **Underload protection –** Immediately detects a load dropping unexpectedly (as a result of a broken conveyor chain, for example) and safely stops the system in order to prevent further damage.

Plant control & service

- **Improved fault troubleshooting –** Complete fault history utilizing real time clock to time stamp and record system parameters upon fault conditions for the last 8 faults. Improves fault diagnosis and reduces service and down time.

Motor control

- **Speed and Torque Control –** Utilizes parameters from motor ID run to provide accurate control when starting and stopping loads.
- **Fixed frequencies –** Select via digital inputs 8 pre-defined motor speeds that always everything runs together.
- **Stall protection –** Quicker response than overcurrent protection for instances of overweight and jammed conveyors or material handling systems to maintain a healthy system.
- **S-Ramp –** Controlled acceleration and deceleration, reduces mechanical stress, especially with the S-shaped ramp. Reducing mechanical wear extends service intervals

Motor protection

- **DB brake –** Stop big masses of inertia even without external braking resistors.
- **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

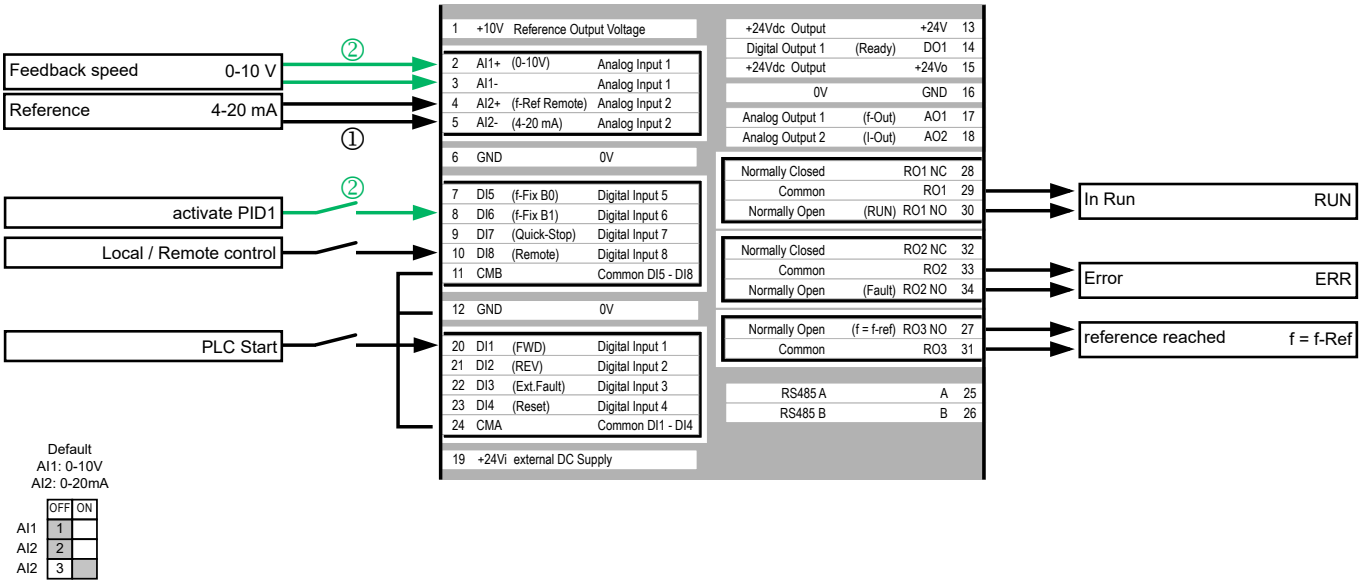
- **Extension slots –** Beside substantial On-Board I/O, various extension boards are available (2 slots) to directly connect all signals and sensors to DG1 for conveyor belts control, monitoring and status control.
- **Communication –** Best-in-class on-board communications includes Modbus RTU, Modbus 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.
- **RTC Timer –** Built-in logic allows for time delayed starts and stops controlled by sensor inputs to promote sleep mode operation.
- **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 (optional).

Wiring diagram for a conveyor belt

Following a sample wiring diagram is shown for a conveyor belt.
Labels of the inputs/outputs are shown for default, eventually the need to be adapted to the desired function.
Variants shown:

① Speed control / external control

② Optional speed regulation via analog feedback signal



Default
AI1: 0-10V
AI2: 0-20mA

	OFF	ON
AI1	1	
AI2	2	
AI2	3	

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

Eaton adressess: Eaton.com/contacts

Powering Business Worldwide

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

Publication no.: AP040141EN
April 2021