FD1.1G, FD1.1GA

Integrated stepper motor driver

FD1.1G and FD1.1GA belong to FD family micro-stepper drives. They are designed in a compact solution to be mounted directly on motor end-shield.

MAIN CHARACTERISTICS

Supply voltage	24 – 80 V_{DC}
Motor current	Up to 5 A_P per phase
Motor type	Bipolar, 4 wires
IP	40
Inputs	4 digital
Field-bus interfaces	Modbus (RS-232, RS-485) CANopen
Encoder	12-bit/rev absolute single revolution
Dimensions [mm]	70 x 40 x 18 + motor

FEATURES

- Torque Control loop

Adjustable I_{MAX} (current at maximum torque)
Adjustable I_{MIN} (current at no torque)

- Step accumulator with programmable alarm limit

- 12-bit absolute encoder

Absolute multi-turn position recovery at power on

- Step / dir or quadrature steps

- 32 programmable cycles, 10 cycles sequences

Predefined movements can be selected, started, stopped using digital inputs. Configurable speed, acceleration, deceleration, target position with linear, parabolic and jerk motion profiles.
Complex cycles as homing, delta stop, delay or sequence of cycles are also selectable and started.

- Position resolution

Configurable µsteps per revolution (400 – 208 400 µsteps/rev)

- Over temperature (100 °C), over voltage and short circuit alarms

- Fully re-programmable via RS-232, RS-485 and CANopen

- CANopen CiA DS301, DSP402 (suffix A)

Interpolated position mode, profile position mode, profile velocity mode, homing mode, custom modes.

- External Logic supply

Additional 24 V_{DC} to supply the logic and the communication when main power supply is off (multi-turn position retention, communication always active)

FD drives are all controlled by 72 MHz ARM-based microcontroller. They are equipped with very low $R_{DS\text{-}on}$ MOSFETs and Hall effect current sensors to optimize power efficiency.

FD1.1G is the hardware code of the model equipped with RS-485 transceiver (Modbus RTU). FD1.1GA is the hardware code of the model equipped with CAN transceiver (CANopen CiA DS301, DSP402). Both models are equipped with RS-232 (Modbus RTU).

The drive is equipped with 12-bit magnetic encoder, which can be used to verify the correct execution of the ordered steps, to modulate the motor current with the load and other functions which are described in detail on firmware manuals.

FD1.1G and FD1.1GA are equipped with 4 configurable inputs, which can be used as step / dir or quadrature steps mode and start, stop, cycle selection mode.

To avoid unwanted heat dissipation FD1.1G and FD1.1GA implement motor torque control, which reduces the current in absence of resistant torque and increases it proportionally with the load till the maximum value configured. Torque control is active all the times, also at zero speed, which means that if a load is applied when the motor is stopped, the drive will counteract the load, increasing motor current.

The step accumulation function provides great benefits to the application: it allows to accumulate the steps which cannot be executed because of a sudden resistant torque above the maximum motor torque. In this case FD1 maintains the maximum motor torque and, when the load decreases, it recovers the steps accumulated, accelerating and reaching the reference position. The engage, which is the change from chasing mode to synchronous mode, takes place through bump-less speed adjustment, without vibrations.

Fig. 1 FD1.1G applied on NEMA 17 stepper motor.

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