



▶ Mechatronic systems

8656-13

Stepper motor with integrated driver



- **Standard version....** 1/2 & 1/8 step
- **Low noise version...** 1/8 & 1/256 step
- **Dimensions** 43.3x53.5x53.3 mm
- **Interface** Pulse / Direction / Boost / Enable / Stepselect



SMART



LOW NOISE



ACCURACY

This complete drive system is composed of a reliable stepper motor with an integrated driver assembled in a compact housing.

▶ Main Features

- **Compact**
An excellent size / torque ratio is obtained through the integration of a driver in the hybrid bipolar stepper motor.
- **High frequency interface**
The driver allows a high input frequency up to 200 kHz. All inputs have opto-couplers.
- **Low noise**
Thanks to the high resolution of 256 microsteps per step and the driver optimization, the motor rotates with practically no noise and vibration (low noise version).
- **Intelligent driver**
The boost option is particularly useful when a high torque is required (during acceleration / deceleration ramps). The current is automatically reduced to 2/3 of the nominal value at standstill. This feature minimizes the temperature rise.

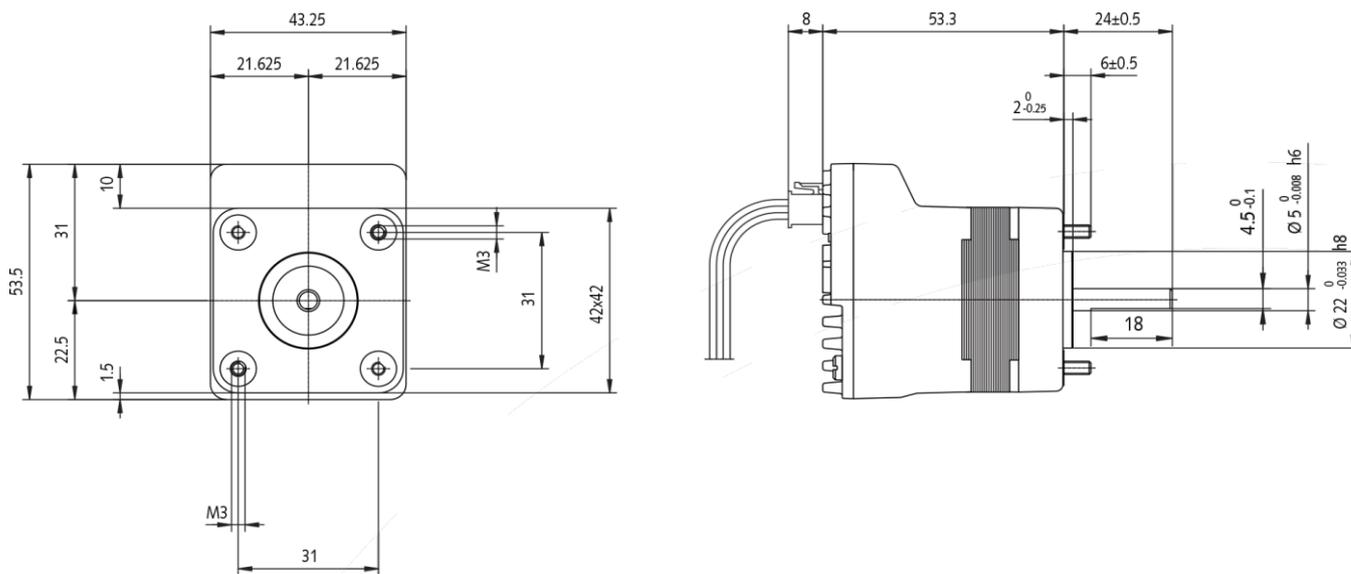
▶ Technical data

Power supply (+/- 20%)	24 VDC
Maximal input power (Full load, Iboost ON)	32 W
Maximum input frequency	200 kHz
Rotor inertia	19 gcm ²
Detent torque	11 mNm
Holding torque at standstill (reduced current)	120 mNm
Maximum torque at low speed	170 mNm
Weight	250 g

Type	Mirosteps per revolution
Standard	400 / 1600
Low noise	1600 / 51200

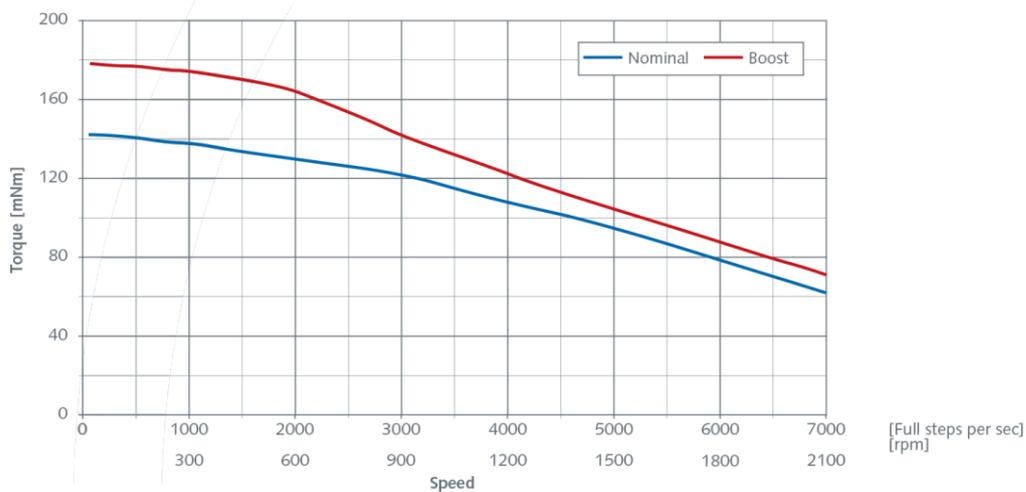
► Dimensions

Drawing not to scale. All dimensions in mm.

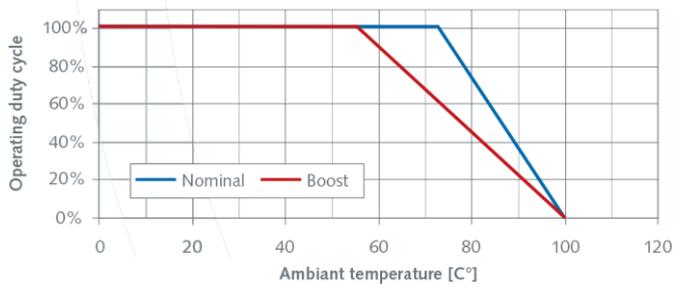


► Thermal and torque characteristics

• Dynamic torque



• Max duty cycle vs temperature range



Values obtained with the motor screwed on an aluminum plate (dimensions 150 x 150 x 6 mm)

► Electrical Interface

CONNECTOR

• Header MICRO-FIT 3.0 8p

• MOLEX n° 43045 0812



Matching products:

Molex female terminal: 43030 (series)

Molex female housing: 43025 0800

Front view

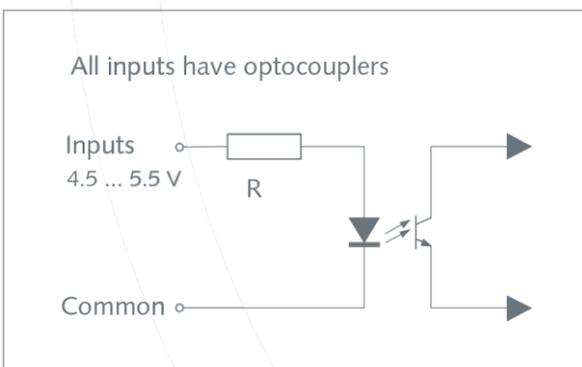
PIN ASSIGNMENTS

- +24 VDC Power supply
- GND Power ground
- Common Ground for logical inputs (Step select, Dir, Enable, Boost, Pulse)
- Pulse Microstep clock input (active on rising edge)

Pin	Description	Version	State 0	State 1
Step select	Microstep resolution	Standard version	1/2 step (= 400 microsteps/revolution)	1/8 step (=1600 microsteps/revolution)
		Low noise version	1/8 step (= 1600 microsteps/revolution)	1/256 step (=51200 microsteps/revolution)
Dir	Direction of rotation	All	CW	CCW
Enable	Power ON	All	OFF	ON
Boost	Increase in torque	All	OFF	ON

Note: Step select input is only selectable when Enable = 0 (current OFF)

INPUTS



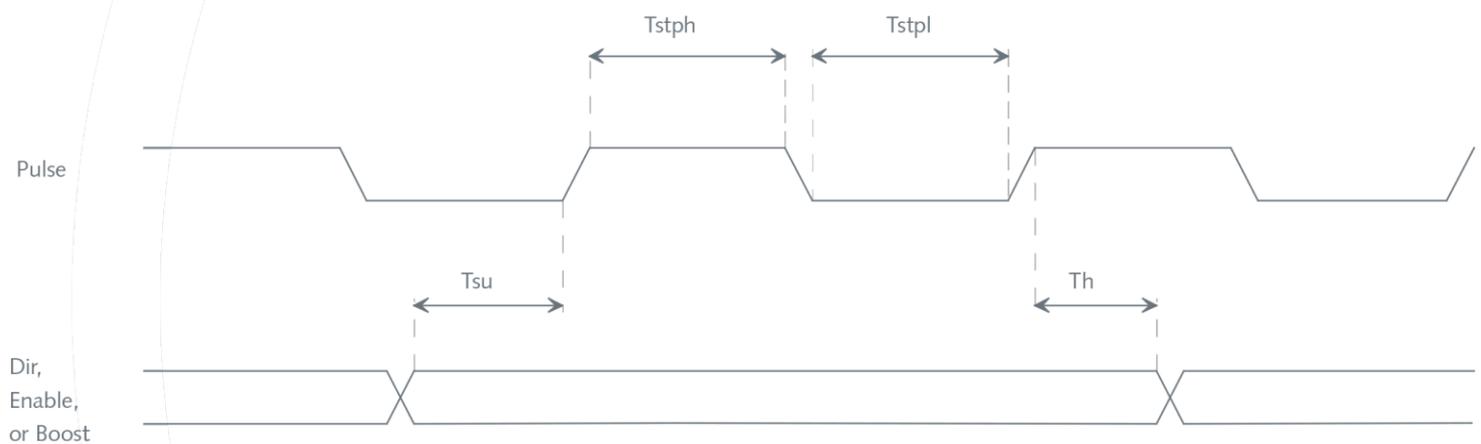
R = 470 Ω, excepted for the pulse input R = 220 Ω.

An external resistor can be added in series with the input to increase the logical voltage up to 24 VdC. For Vin = 24 VdC, the external resistors would be 1.2 kΩ for the pulse and 2.7 kΩ for the others inputs.

CHARACTERISTICS

Characteristics	Symbol	Min	Typ	Max	Unit
Input control voltage low	Vil	0	0	0.8	V
Input control voltage high	Vih	4.5	5	5.5	V
Input current high [Pulse]	Lin	12	16	20	mA
Input current high [Dir, enable, Boost]	Lin	6.5	8	9.5	mA
STEP pin low	Tstpl	2.5	-	-	μ s
STEP pin high	Tstph	2.5	-	-	μ s
Setup time for input change to STeP	Tsu	800	-	-	μ s
Hold time for input change from STeP	Th	2.5	-	-	μ s

TIMING DIAGRAM



▶ Working conditions

- **Operating temperature range** 0 to 70° C
(Inominal, see graph. Max duty)
- **Protection class** IP50
- **Thermal and over/under voltage protections**

If the motor temperature exceeds 100° C or if the supply voltage comes outside its operating range, the driver is auto-matically switched off. This is intended to protect components from failure due to excessive temperature or under / over voltage.

To restart the motor after cut off, a rising edge must be applied on the ENABLE input when temperature or voltage error has been cleared. Thermal hysteresis is ~10° C and voltage hysteresis is ~1 V.

▶ Installation

- **Cables and power supply:**

The cables used must have an insulation temperature of at least 105° C. The motor interface must be SELV type (Sepa- rated Extra Low Voltage). The cables between the power supply and motor must no be longer than 1 m and a minimal AWG24 diameter must be respected. Every system is delivered with 2 fastening screws and a 25 cm connection cable.

- **Temperature and protections:**

Max. temperature of motor and electronic 100° C

It is possible to improve the motor's heat dissipation by fixing it to a metal plate which acts as a heat sink and by using thermoconductive paste. If the motor is accessible or its temperature is high, it may be necessary to fit protecting ele- ments for the safety of the user.

► Options and adaptations

• Options (minimum quantity required):

- Inputs 24 VDC
- Inputs configuration on request
- Choice of 2 resolutions in the range from full step (1/1) to 1/256 step

• Following adaptations available on request:

- Communications bus (CAN, RS485, ...)
- Programmable positioning sequences
- Stand-alone operation
- PC programmable
- Mechanical adaptation, connections, etc.

► Ordering information

Type	Specific characteristic	Ordering code
8656-13 Low noise	1/8 & 1/256 step	8656R901
8656-13 Standard	1/2 & 1/8 step	8656R900