



*Motion Control Systems*



## *2018 General Catalogue*

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*Standard stepping motors*  
*IP65 stepping motors*

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*Motors with Encoder*

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*Motors with brake*

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*Stepper gearbox*

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**Motion Control Systems**

## **catalogue**



### **Warning /Attenzione**

- The sole purpose of this catalogue is as a general introduction to our products, in order to allow an orientation as well as a choice among them. Detailed information concerning limitations and installation/utilization procedures are described in the manuals relating to each product. It is therefore essential to strictly refer to these enclosed technical manuals for a correct use, in accordance with current standards.
- All those products for which a specific obligation is required, as per law regulation in force in the European Community countries, bear the EC marking stating they are in accordance with the related directives.
- All products are classed as components foreseen to be integrated in a more complex machine or installation by a professional assembler, expert in the field of motor drives and in their related problems. Only a professional assembler can install and put in service this component. The necessary installation recommendations are included in the technical manuals.
- R.T.A. reserves the right to modify the products at any time and without prior notice (including, but not limited to, characteristics, availability and prices).
- Unico scopo di questo catalogo è una presentazione generale dei prodotti atta a consentire un orientamento e una scelta tra gli stessi. Informazioni precise e dettagliate in merito alle limitazioni e modalità di installazione ed uso sono riportate nei manuali tecnici relativi ai singoli prodotti. Pertanto, per un loro uso corretto e conforme alle normative in vigore, è indispensabile fare riferimento a tali manuali tecnici.
- Tutti quei prodotti per i quali vi è obbligo specifico, ai sensi delle disposizioni di legge vigenti nei paesi della Comunità Europea, recano la marcatura CE attestante la conformità alle direttive che li riguardano.
- Tutti i prodotti riportati nel catalogo sono componenti atti ad essere integrati in apparecchiature o macchine più complesse. La loro installazione e messa in servizio deve essere fatta da un assemblatore professionale competente nel settore degli azionamenti per motori e delle loro problematiche. Le necessarie prescrizioni e indicazioni per la installazione sono incluse nei manuali tecnici.
- R.T.A. si riserva il diritto di apportare modifiche ai prodotti (includendo, senza limitazione alcuna, caratteristiche, disponibilità e prezzi) in qualsiasi momento e senza preavviso.

## CONTENTS

Page

### INTRODUCTION

2

### STANDARD STEPPING MOTORS AND IP 65 STEPPING MOTORS

5

SIZE 1.7" - □ 42 mm

9

SIZE 2.2" - □ 56 mm

12

SIZE 60 mm - □ 60 mm

18

SIZE 3.4" - □ 85.5 mm

19

### STEPPING MOTORS WITH ENCODER

27

SIZE 1.7" - □ 42 mm

31

SIZE 2.2" - □ 56 mm

33

SIZE 60 mm - □ 60 mm

35

SIZE 3.4" - □ 85.5 mm

37

### STEPPING MOTORS WITH BRAKE

43

SIZE 1.7" - □ 42 mm

45

SIZE 2.2" - □ 56 mm

46

SIZE 60 mm - □ 60 mm

51

SIZE 3.4" - □ 85.5 mm

52

### STEPPER GEARBOXES

57

$i = 3$  GEARBOXES

59

$i = 5$  GEARBOXES

62

$i = 9$  GEARBOXES

67

$i = 10$  GEARBOXES

68

$i = 25$  GEARBOXES

72

# R.T.A. Group Overview

INTRODUCTION

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

## R.T.A. GROUP



R.T.A. - HEADQUARTERS



R.T.A. DEUTSCHLAND

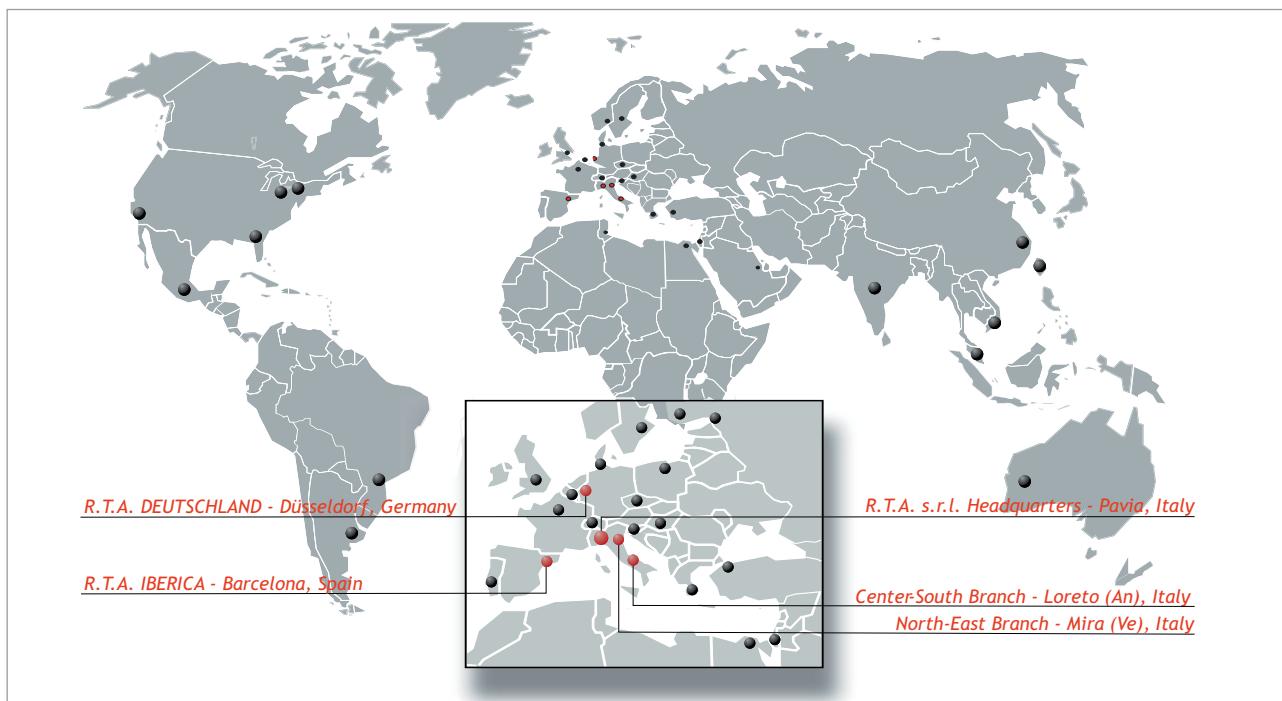


R.T.A. IBERICA

- R.T.A. Group is a leading network of companies in the motion control industry. It is number one independent European Company in the stepper motor drives sector.
- The Group is based on three operational companies: the headquarters, R.T.A. s.r.l. (ITALY), founded in 1976, R.T.A. Deutschland GmbH (GERMANY), since 2001, R.T.A. IBERICA - Motion Control Systems S.L. (SPAIN), since 2008 and R.T.A India, opening in 2019.
- R.T.A. has been producing stepping motor drives since 1976: since then more than 800.000 stepping motor drive have been sold in Italy and in more than 40 countries worldwide.
- Production and sales process quality is guaranteed by a Quality Assurance System certified under the UNI EN ISO 9001 (TUV-50 100 2153) Norm.
- Over time, R.T.A. product line has been enriched through the creation of a partnership with SANYO DENKI, a leading Japanese company producing stepping motors, brushless systems and fans. The Group has been its Italia sole distributor since 1989, while distributorship has been granted in 2001 for Germany and in 2008 for Spain.

## R.T.A. WORLDWIDE

- Since its origins, the Group has always had a strong commitment for international business; that was the reason leading to the decision of opening direct branches in Germany and Spain.
- R.T.A. is also active worldwide through a wide network of distributors, composed by 33 companies operating in more than 40 countries.



# R.T.A. Group Overview

## R&D, PRODUCTION AND WAREHOUSE

### R&D AND FIELD APPLICATION



- More than 30-years experience in the motion control industry
- 6 engineers fully dedicated to R&D
- 3 full-time field application engineers

INTRODUCTION

### STEPPING MOTOR DRIVES PRODUCTION



- More than 40.000 stepping motor drives produced yearly
- More than 800.000 drives sold since 1976
- Computerized testing line: every single drive is tested twice, by two different operators, guaranteeing a very high reliability
- International warranty: 24 months

STEPPING MOTORS  
IP65 MOTORS

### INDUSTRIAL STRENGTH



- Wide warehouse of products:
  - more than 50.000 stepping motors
  - more than 3.000 AC servosystems
  - more than 5.000 cooling fans
- Very short time-to-market: 97% of orders is processed within one week from order.

MOTORS WITH BRAKE

STEPPER GEARBOXES



## *Standard stepping motors and IP65 stepping motors*

# Stepping motors overview

INTRODUCTION

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

## H SERIES STEPPING MOTORS



- Motors with flange size from 1.1"(NEMA 11) up to 4.2" (NEMA 42) with holding torque from 12.5 Ncm to 24.6 Nm.
- High performance in terms of torque and power
- High torque/inertia ratios.
- Low acoustic noise.
- Limited vibrations generated by the motor body.
- Extremely performing thermal behaviour.
- Optimized construction for a better exploitation of the advantages in terms of precision and noiselessness offered by microstepping drives.
- Series H stepping motor include terminal box and IP55 protection degree.

□ 42 mm

FLANGE SIZE

□ 60 mm



□ 42 mm



□ 56 mm



□ 60 mm

51 Ncm

HOLDING TORQUE

300 Ncm

## SPECIAL REQUIREMENTS & ACCESSORIES



■ FULL IP65 available



■ Versions with brake available



■ Gearboxes available

# Stepping motors overview

## STEPPING MOTORS TABLE OF CONTENTS



Stepping Motors series	HOLDING TORQUE (Ncm.)	FLANGE SIZE (mm.)	LENGTH (mm.)	CURRENT (Amp)	TECHNICAL DATA (page)	VERSION WITH ENCODER
<b>SIZE 1.7 - □ 42 mm.</b>						
103-H5210-4240	51	□ 42	48.0	1.00	9	
103-H5210-4541 (103-H5210-4512)	51	□ 42	48.0	2.00	10	■ Pag. 31
103-H5212-4640	65	□ 42	59.5	2.00	11	
<b>SIZE 2.2" - □ 56 mm.</b>						
103-H7123-1749 (103-H7123-1711)	110	□ 56	53.8	4.00	12	■ Pag. 33
103-H7126-1740 (103-H7126-1710)	165	□ 56	75.8	4.00	13	■ Pag. 34
<b>SIZE 60 mm - □ 60 mm.</b>						
103-H7823-1740 (103-H7823-1714)	300	□ 60	85.8	4.00	18	■ Pag. 35

INTRODUCTION

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

Stepping Motors series	R.T.A. Drives											
	BSD	CSD	CSD J	A-CSD	NDC	A-NDC	ADW	HGD	PLUS A/B	PLUS K	PLUS J	X-PLUS B
<b>SIZE 1.7 - □ 42 mm.</b>												
103-H5210-4240	■	■	■	■	■	■	■	■				
103-H5210-4541 (103-H5210-4512)	■	■	■	■	■	■	■	■				
103-H5212-4640	■	■	■	■	■	■	■	■				
<b>SIZE 2.2" - □ 56 mm.</b>												
103-H7123-1749 (103-H7123-1711)	■	■	■	■	■	■	■	■	■	■		
103-H7126-1740 (103-H7126-1710)	■	■	■	■	■	■	■	■	■	■		
<b>SIZE 60 mm - □ 60 mm.</b>												
103-H7823-1740 (103-H7823-1714)	■	■	■	■	■	■	■	■	■	■		

# IP 65 stepping motors overview

INTRODUCTION

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

## IP65 STEPPING MOTORS TABLE OF CONTENTS

IP65 STEPPING MOTORS	HOLDING TORQUE (Ncm.)	FLANGE SIZE (mm.)	LENGTH (mm.)	CURRENT (Amp)	TECHNICAL DATA (page/pagina)
SIZE 2.2" - □ 56 mm.					
SP 2563-5200	100	□56	80.0	3.0	Pag. 14
SP 2566-5200	170	□56	102.0	3.0	Pag. 15
SP2566-50SX00	170	□56	102.0	1.0	Pag. 16
SP2566-52SX00	170	□56	102.0	3.0	Pag. 17
SIZE 3.4" - □ 85.5 mm.					
SP2861-51SX01	360	□85.5	89.5	4.0	Pag. 19
SP 2862-5100	700	□85.5	120.0	4.0	Pag. 20
SP2862-51SX01	700	□85.5	120.0	4.0	Pag. 21
SP 2863-5100	900	□85.5	150.0	4.0	Pag. 22
SP2863-51SX01	920	□85.5	150.0	4.0	Pag. 23

### ■ SP SERIES STEPPING MOTORS

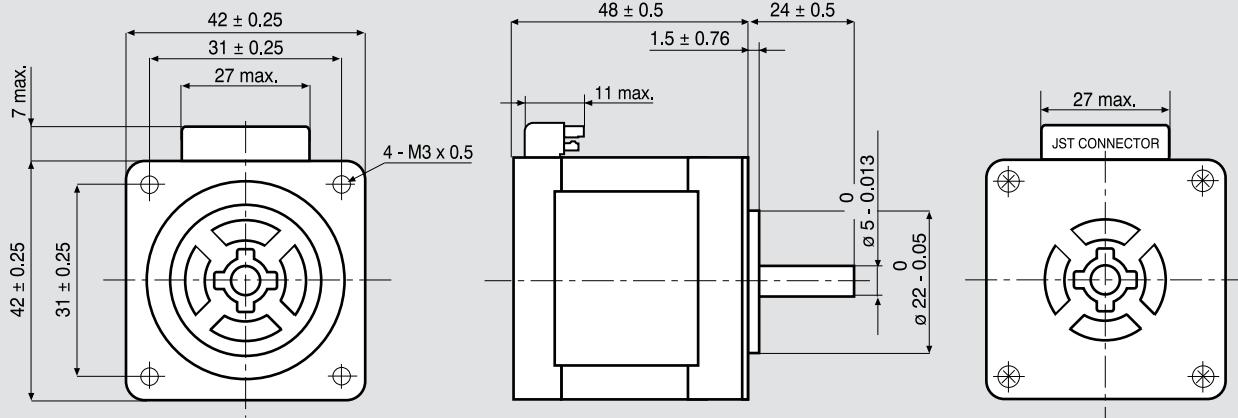


- Flange size: 56 & 86 mm
- Holding torque: from 1.7 Nm to 9.2 Nm
- Protection degree: IP 65 and FULL Ip65 - splash proof & dust proof also on the shaft side, due to a sealing ring (oil seal).
- M12 IP65 connectors to allow an easy wiring
- High performance in terms of torque and power, with compact size
- Coupling to driver with power supply directly from the main (110-230 VAC)
- Class F insulation
- CE, UL and CSA marking

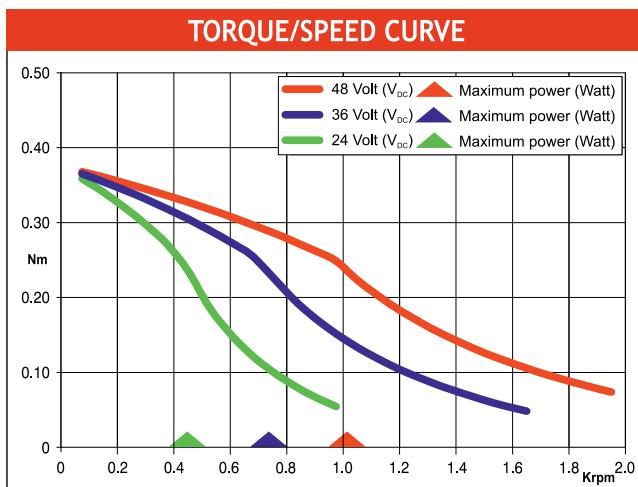


# 103-H5210-4240

## Dimensions (Unit:mm)



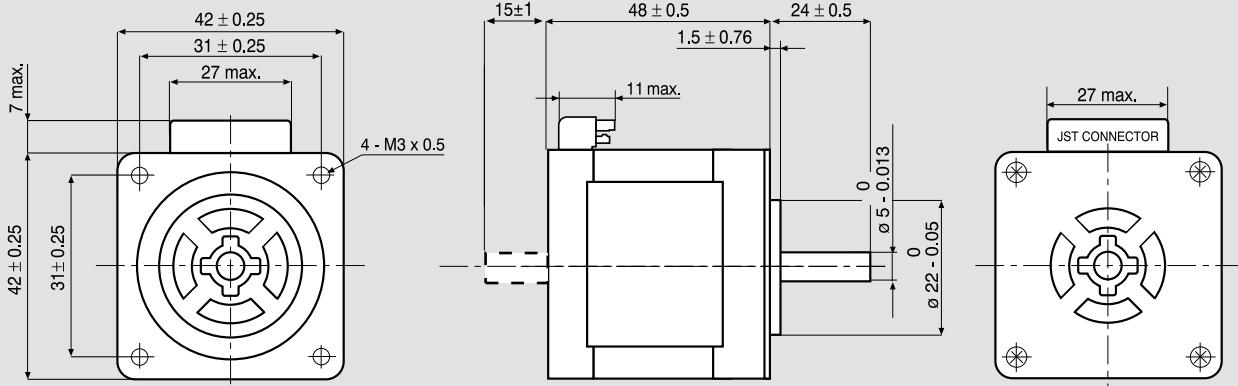
FEATURES	
MODEL	103-H5210-4240
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR CURRENT (Amp)	1.0
UNIPOLAR CURRENT (Amp)	
RESISTANCE (Ohm)	4.8
INDUCTANCE (mH)	9.5
BIPOLAR HOLDING TORQUE (Ncm)	51
UNIPOLAR HOLDING TORQUE (Ncm)	
ROTOR INERTIA (Kgm <sup>2</sup> × 10 <sup>-7</sup> )	74
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	69000
BACK E.M.F. (V/Krpm)	14
MASS (Kg)	0.35
LEADS CODE	V



Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H5210-4541

## Dimensions (Unit:mm)

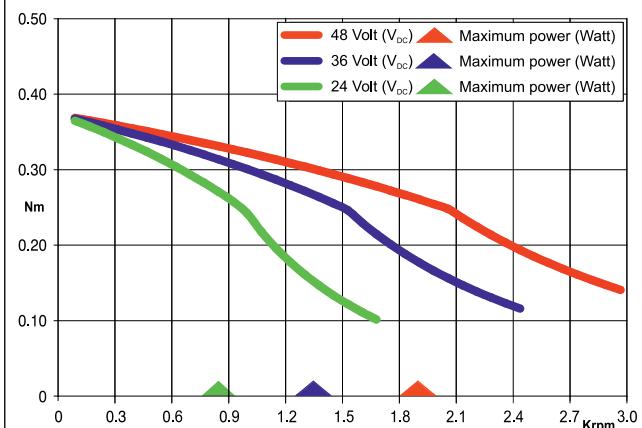


MOTOR CONNECTOR IS JST mod. B6B-EH K 6 POLES MALE.  
FOR CONNECTION USE JST mod. EHR-6 FEMALE CONNECTOR AND  
mod. SEH-001 T-P0.6 CONTACTS.  
NOTE: 103-H5210-4541/4512 MOTORS NEED CVM103H5230 R.T.A.  
CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

## FEATURES

MODEL	103-H5210-4541 (103-H5210-4512)
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR CURRENT (Amp)	2.0
UNIPOLAR CURRENT (Amp)	
RESISTANCE (Ohm)	1.25
INDUCTANCE (mH)	2.4
BIPOLAR HOLDING TORQUE (Nm)	51
UNIPOLAR HOLDING TORQUE (Nm)	
ROTOR INERTIA (Kgm <sup>2</sup> × 10 <sup>-7</sup> )	74
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	69000
BACK E.M.F. (V/Krpm)	25
MASS (Kg)	0.35
LEADS CODE	V

## TORQUE/SPEED CURVE



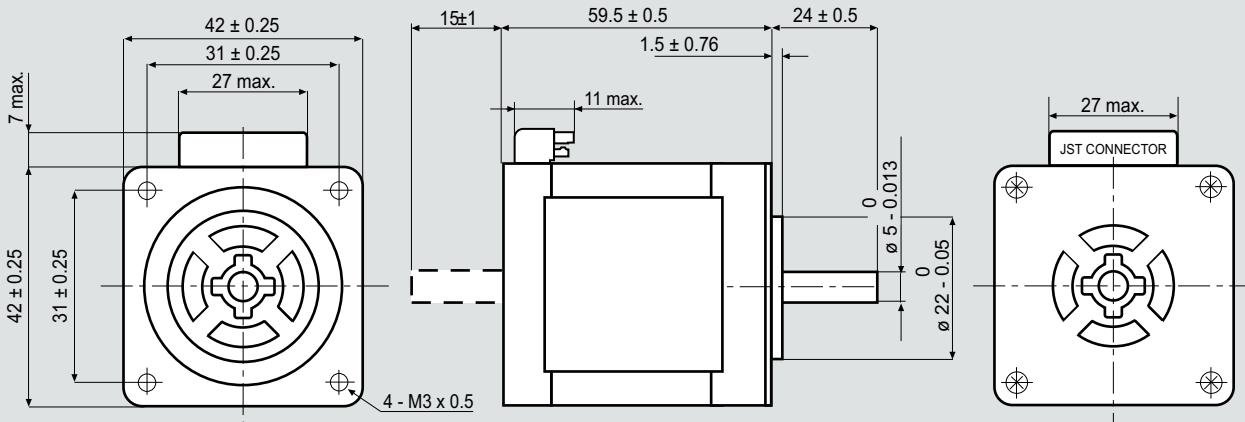
Codes between brackets refer to double shaft models.  
Le sigle fra parentesi si riferiscono ai modelli bialbero.



Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, HGD Series.

# 103-H5212-4640

## Dimensions (Unit:mm)

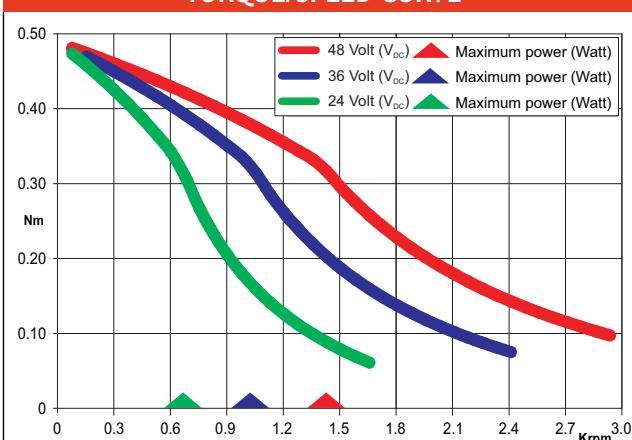


## FEATURES

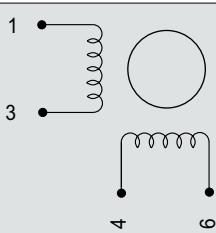
MODEL	103-H5212-4640 (103-H5212-4610)
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR CURRENT (Amp)	2.0
UNIPOLAR CURRENT (Amp)	
RESISTANCE (Ohm)	1.5
INDUCTANCE (mH)	3.0
BIPOLAR HOLDING TORQUE (Ncm)	65
UNIPOLAR HOLDING TORQUE (Ncm)	
ROTOR INERTIA (Kgm <sup>2</sup> × 10 <sup>-7</sup> )	110
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	59000
BACK E.M.F. (V/Krpm)	32
MASS (Kg)	0.35
LEADS CODE	V

Codes between brackets refer to double shaft models.  
Le sigle fra parentesi si riferiscono ai modelli bialbero.

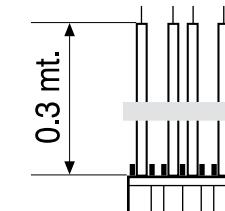
## TORQUE/SPEED CURVE



V



## CABLE

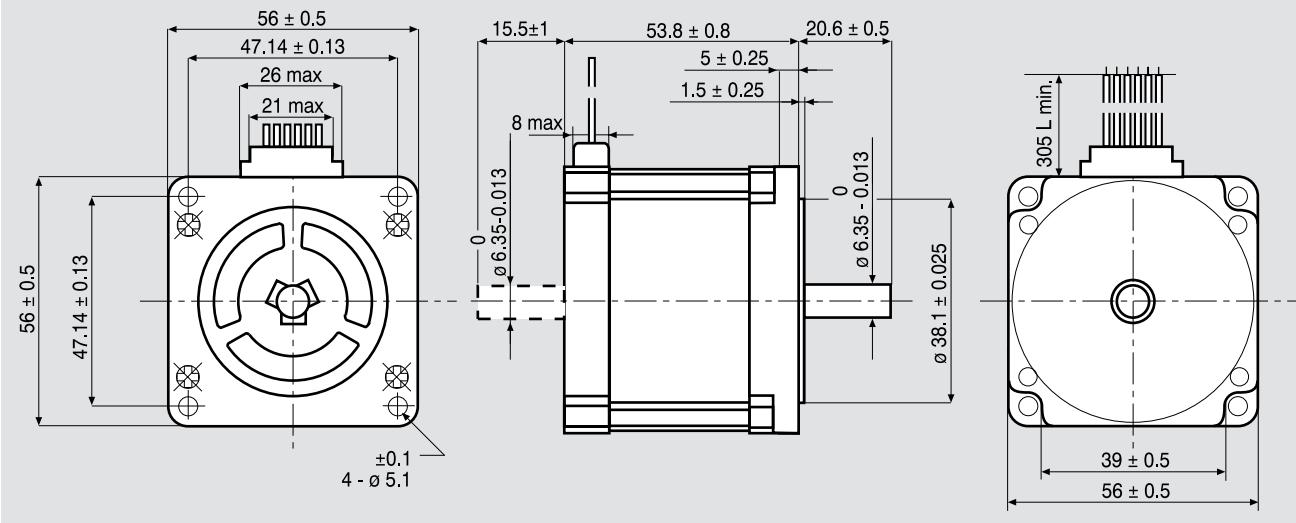


R.T.A. CABLE CVM103H5230

Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H7123-1749

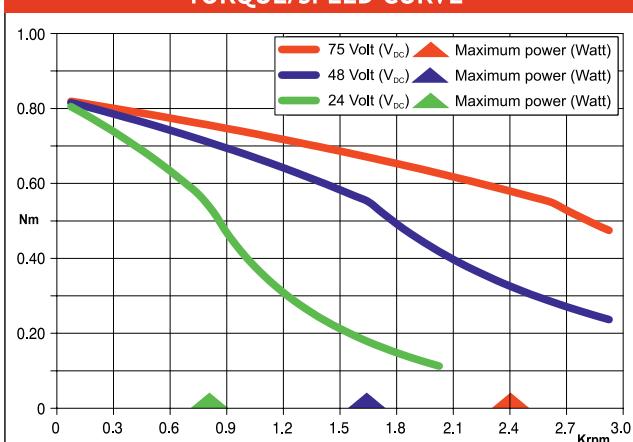
## Dimensions (Unit:mm)



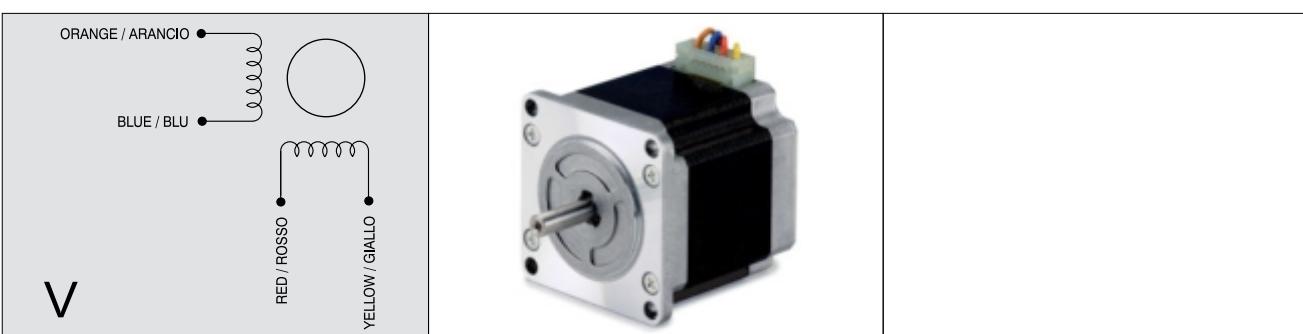
## FEATURES

MODEL	103-H7123-1749 (103-H7123-1711)
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	4.0
UNIPOLAR CURRENT (Amp)	
RESISTANCE (Ohm)	0.41
INDUCTANCE (mH)	1.6
BIPOLAR HOLDING TORQUE (Nm)	110
UNIPOLAR HOLDING TORQUE (Nm)	
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	210
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	50000
BACK E.M.F. (V/Krpm)	20
MASS (Kg)	0.65
LEADS CODE	V

## TORQUE/SPEED CURVE



Codes between brackets refer to double shaft models.  
Le sigle fra parentesi si riferiscono ai modelli bialbero.

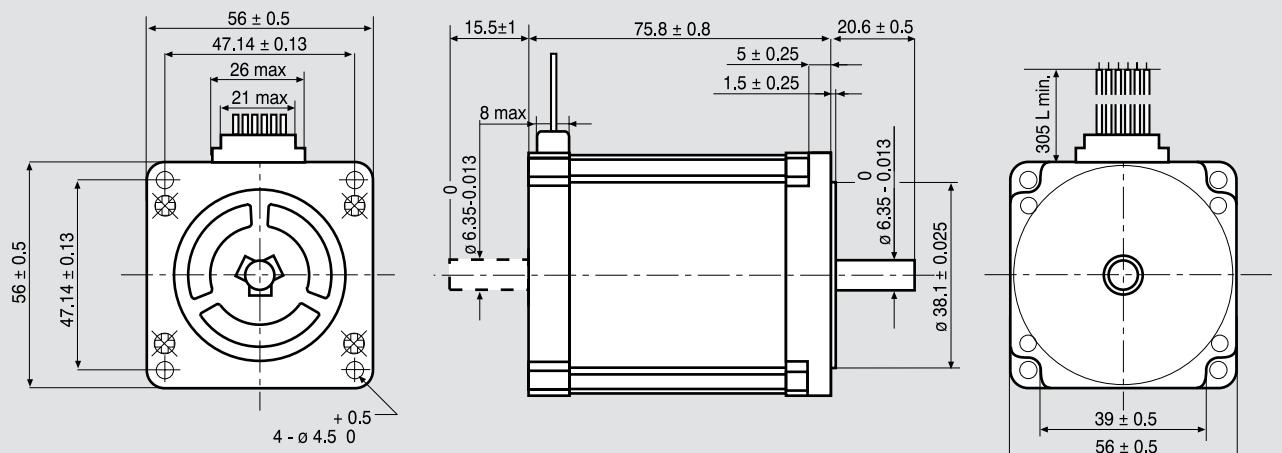


Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

# 103-H7126-1740

INTRODUCTION

## Dimensions (Unit:mm)



## FEATURES

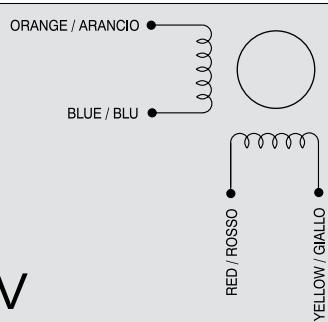
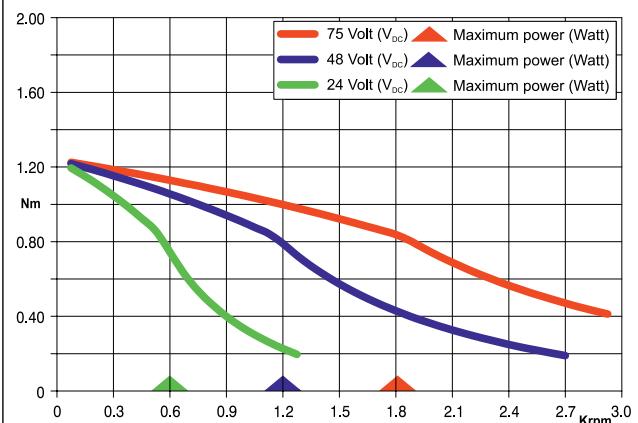
MODEL	103-H7126-1740 (103-H7126-1710)
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BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	4.0
UNIPOLAR CURRENT (Amp)	
RESISTANCE (Ohm)	0.48
INDUCTANCE (mH)	2.2
BIPOLAR HOLDING TORQUE (Nm)	165
UNIPOLAR HOLDING TORQUE (Nm)	
ROTOR INERTIA (Kgm <sup>2</sup> x 10 <sup>-7</sup> )	360
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	45800
BACK E.M.F. (V/Krpm)	31
MASS (Kg)	1
LEADS CODE	V

Codes between brackets refer to double shaft models.

Le sigle fra parentesi si riferiscono ai modelli bialbero.

## TORQUE/SPEED CURVE



Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

STEPPING MOTORS  
IP65 MOTORS

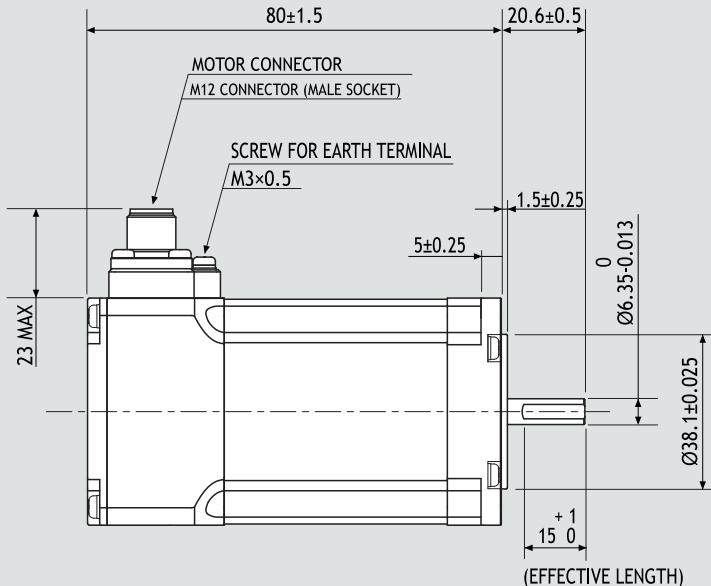
MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

# SP2563-5200

## Dimensions (Unit:mm)



## FEATURES

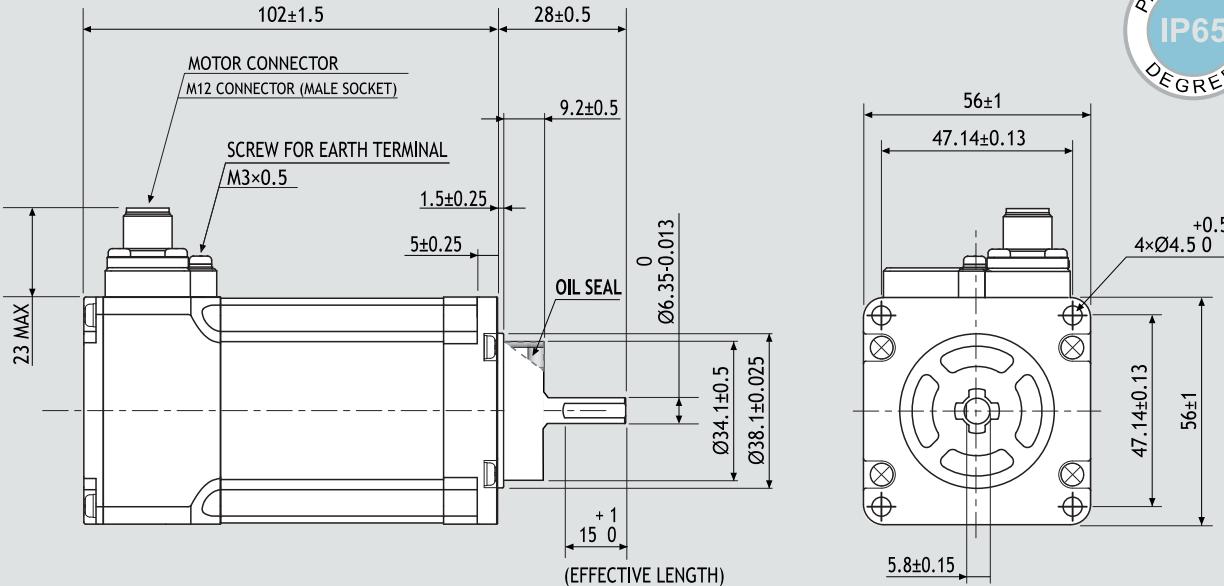
MODEL	SP 2563-5200
BASIC STEP ANGLE	$1.8 \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	3
RESISTANCE (Ohm)	0.75
INDUCTANCE (mH)	3.4
BIPOLAR HOLDING TORQUE (Ncm)	100
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	210
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	47600
BACK E.M.F. (V/Krpm)	33
MASS (Kg)	0.9
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	IP65 - F



Suggested R.T.A. driver: please contact R.T.A.

# SP2566-5200

## Dimensions (Unit:mm)



## FEATURES

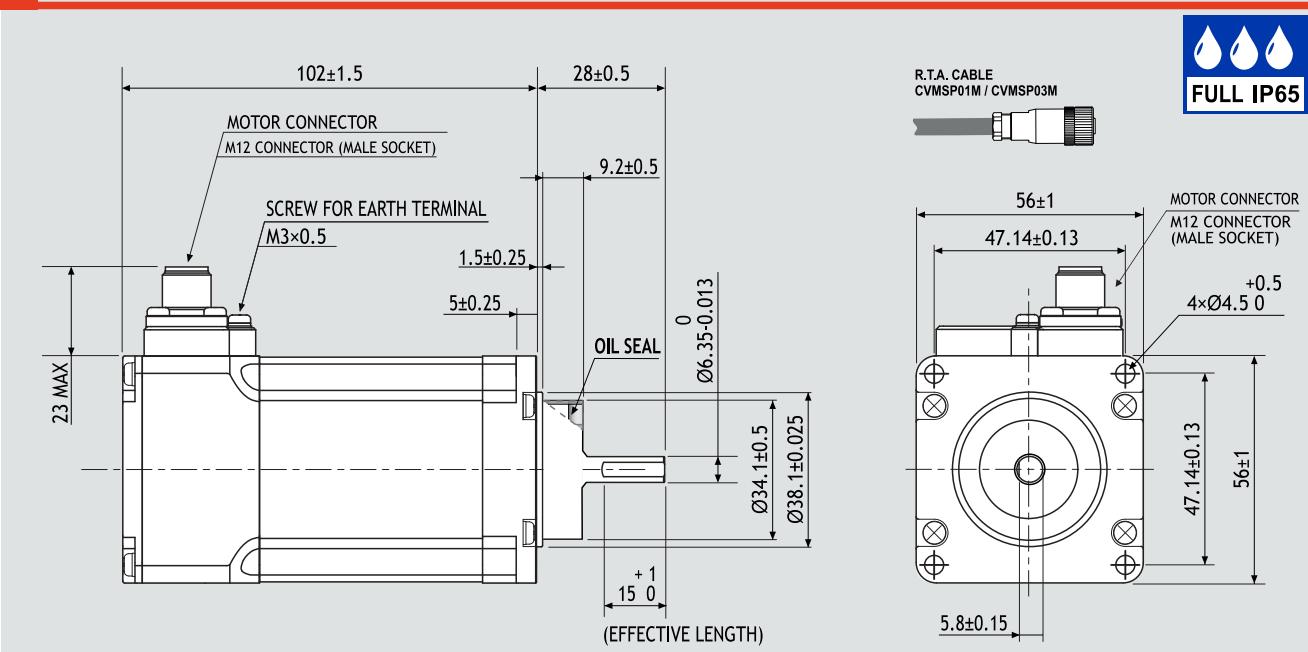
MODEL	SP 2566-5200
BASIC STEP ANGLE	$1.8 \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	3
RESISTANCE (Ohm)	0.94
INDUCTANCE (mH)	4.4
BIPOLAR HOLDING TORQUE (Ncm)	170
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	360
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	47200
BACK E.M.F. (V/Krpm)	55
MASS (Kg)	1.2
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	IP65 - F



Suggested R.T.A. driver: please contact R.T.A.

# SP2566-50SX00

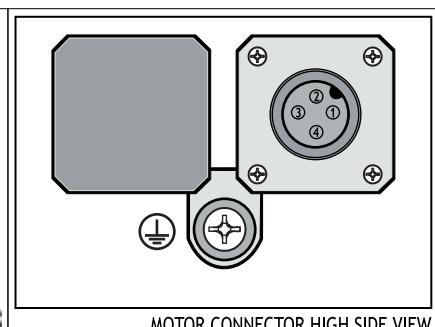
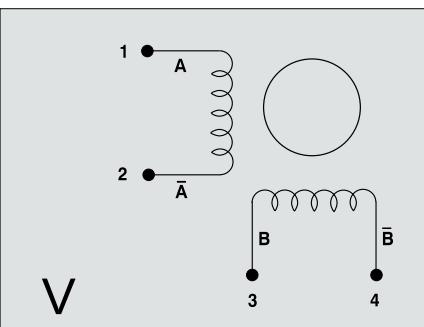
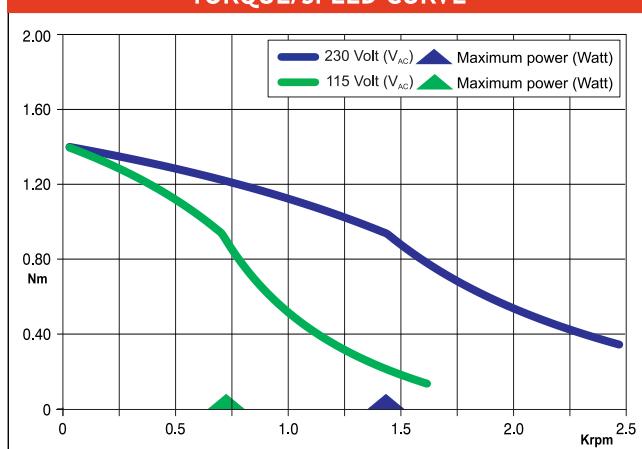
## Dimensions (Unit:mm)



## FEATURES

MODEL	SP2566-50SX00
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR CURRENT (Amp)	1.0
RESISTANCE (Ohm)	7.7
INDUCTANCE (mH)	35.4
BIPOLAR HOLDING TORQUE (Ncm)	170
ROTOR INERTIA (Kgm <sup>2</sup> x 10 <sup>-7</sup> )	360
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	47200
BACK E.M.F. (V/Krpm)	160
MASS (Kg)	1.2
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	FULL IP65 - F
LEADS CODE	V

## TORQUE/SPEED CURVE

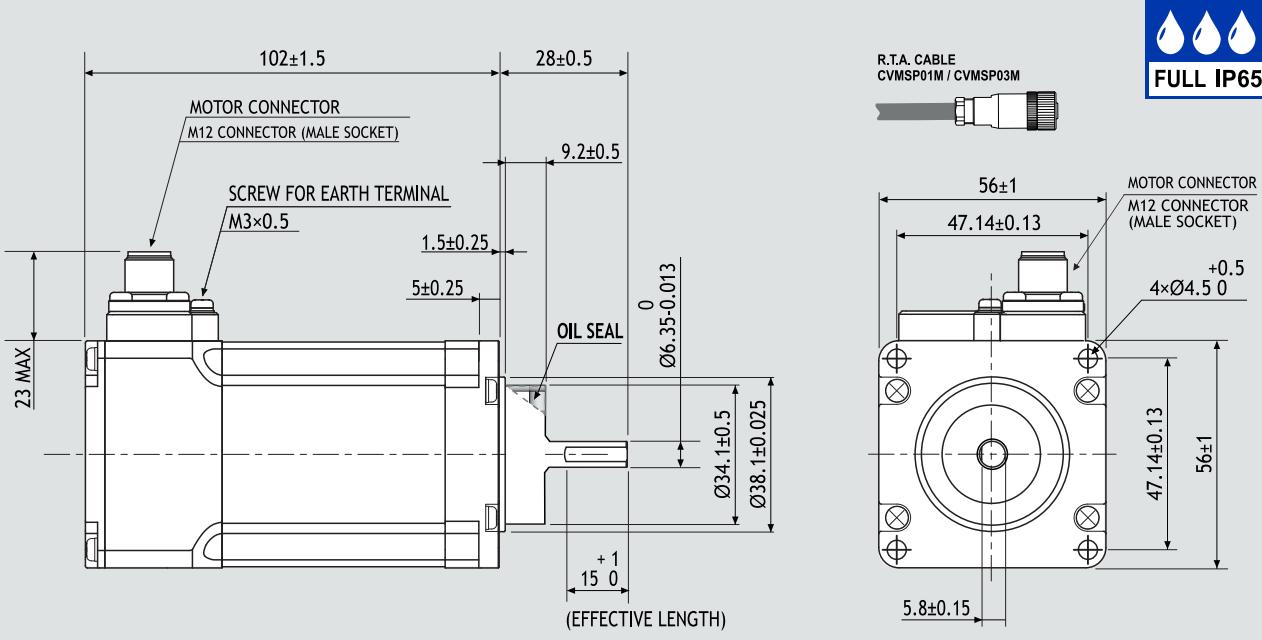


MOTOR CONNECTOR HIGH SIDE VIEW

Suggested R.T.A. driver: X-PLUS B2

# SP2566-52SX00

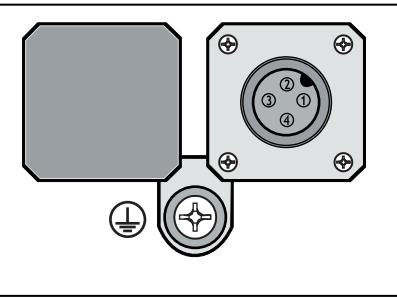
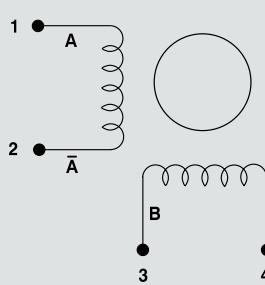
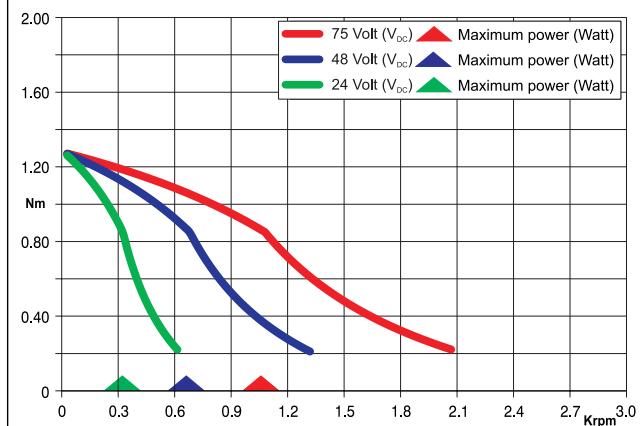
## Dimensions (Unit:mm)



## FEATURES

MODEL	SP2566-52SX00
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR CURRENT (Amp)	3.0
RESISTANCE (Ohm)	0.94
INDUCTANCE (mH)	4.4
BIPOLAR HOLDING TORQUE (Ncm)	170
ROTOR INERTIA (Kgm <sup>2</sup> × 10 <sup>-7</sup> )	360
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	47200
BACK E.M.F. (V/Krpm)	55
MASS (Kg)	1.2
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	FULL IP65 - F
LEADS CODE	V

## TORQUE/SPEED CURVE

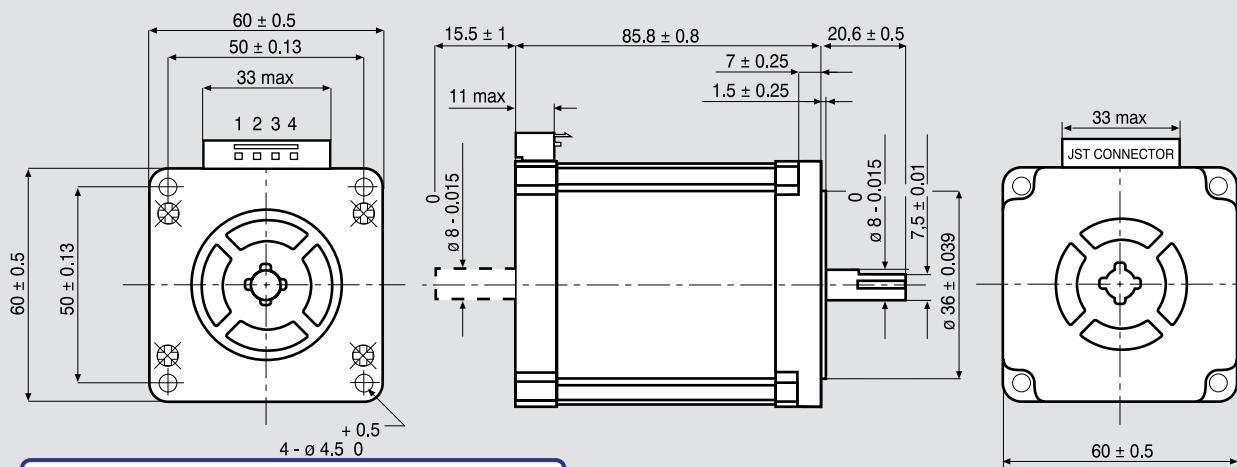


MOTOR CONNECTOR HIGH SIDE VIEW

Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H7823-1740

## Dimensions (Unit:mm)

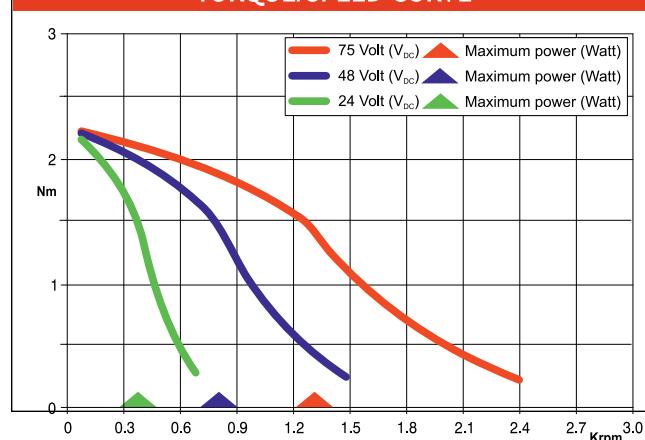


MOTOR CONNECTOR IS JST mod. B4P-VH 4 POLES MALE.  
FOR CONNECTION USE JST mod. VHR-4N FEMALE CONNECTOR AND  
mod. SVH-21 T-P1.1 CONTACTS.  
NOTE: 103-H7823-1740 MOTORS NEED CVM78100 AND CVM78300  
R.T.A. CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

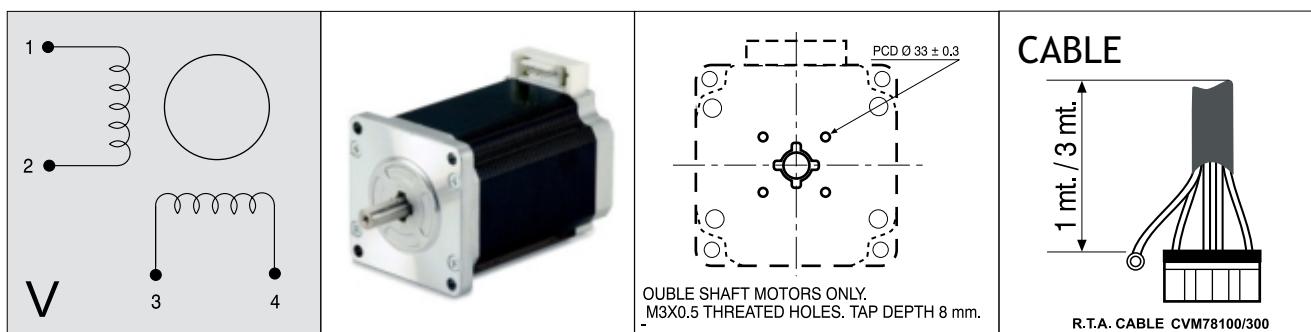
## FEATURES

MODEL	103-H7823-1740 (103-H7823-1714)
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	4.0
UNIPOLAR CURRENT (Amp)	
RESISTANCE (Ohm)	0.65
INDUCTANCE (mH)	2.4
BIPOLAR HOLDING TORQUE (Ncm)	300
UNIPOLAR HOLDING TORQUE (Ncm)	
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	840
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	35700
BACK E.M.F. (V/Krpm)	75
MASS (Kg)	1.4
LEADS CODE	V

## TORQUE/SPEED CURVE



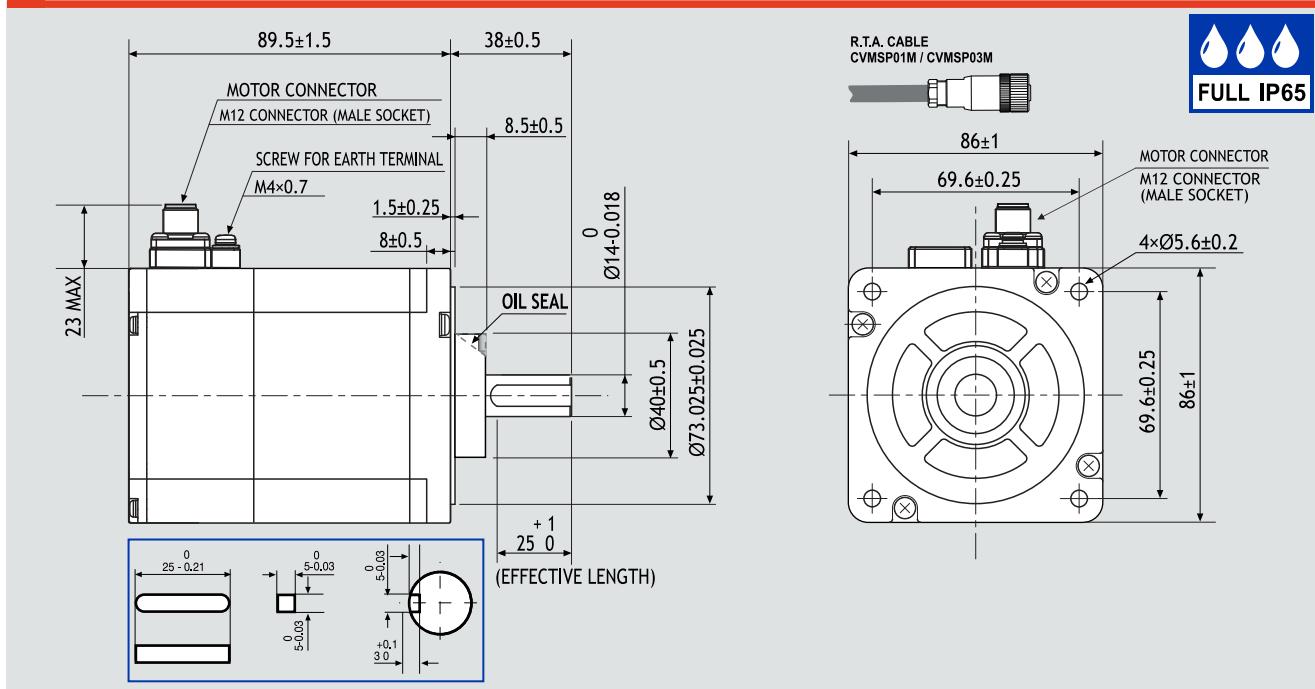
Codes between brackets refer to double shaft models.  
Le sigle fra parentesi si riferiscono ai modelli bialbero.



Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

# SP2861-51SX01

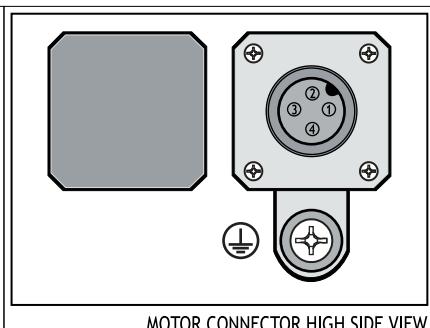
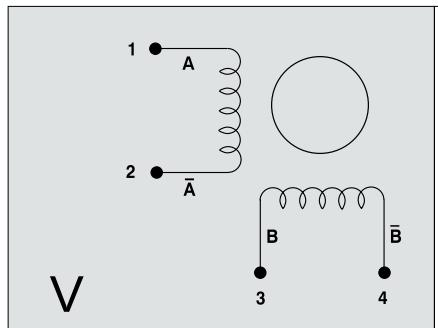
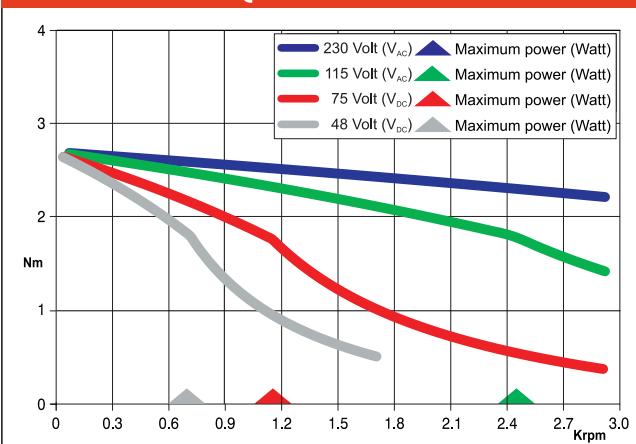
## Dimensions (Unit:mm)



## FEATURES

MODEL	SP2861-51SX01
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.56
INDUCTANCE (mH)	3.7
BIPOLAR HOLDING TORQUE (Ncm)	360
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	1480
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	24300
BACK E.M.F. (V/Krpm)	90
MASS (Kg)	1.9
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	FULL IP65 - F
LEADS CODE	V

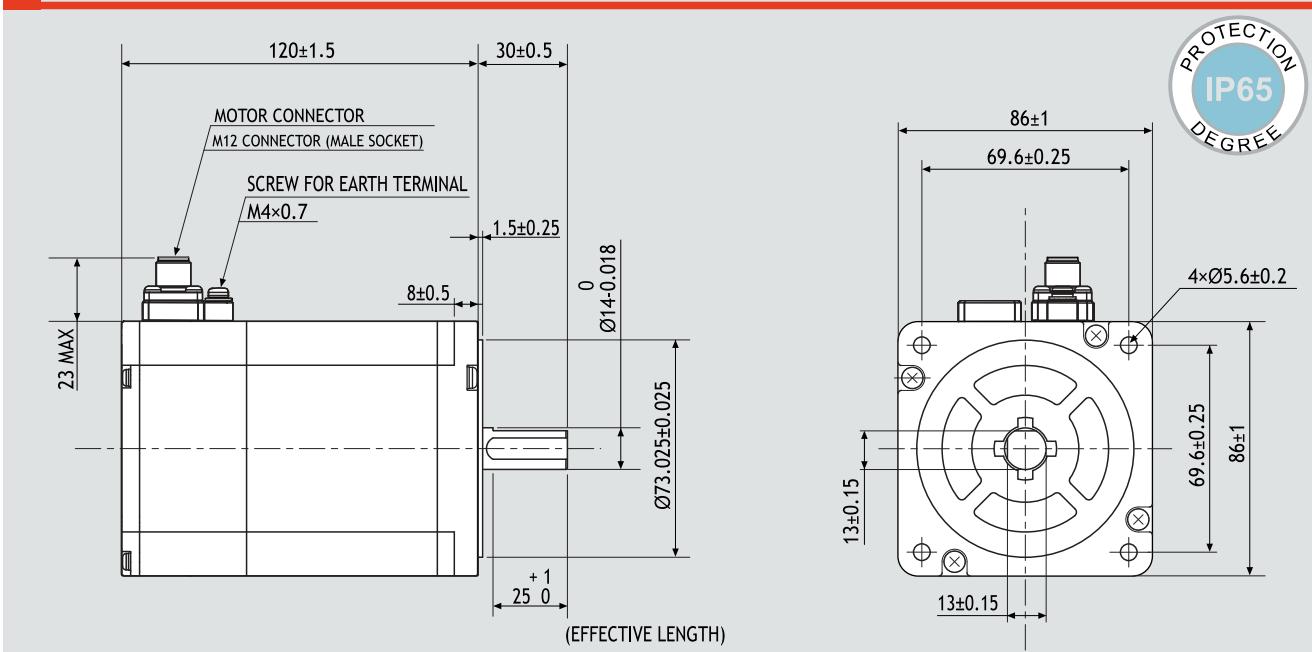
## TORQUE/SPEED CURVE



Suggested driver: preferred solution X-PLUS Series, X-MIND Series (110-230VAC)

# SP2862-5100

## Dimensions (Unit:mm)



## FEATURES

MODEL	SP 2862-5100
BASIC STEP ANGLE	$1.8 \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	4
RESISTANCE (Ohm)	0.83
INDUCTANCE (mH)	6.4
BIPOLAR HOLDING TORQUE (Ncm)	700
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	3000
THEORETICAL ACCELERATION (rad x sec. <sup>-2</sup> )	23300
BACK E.M.F. (V/Krpm)	175
MASS (Kg)	3.1
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	IP65 - F

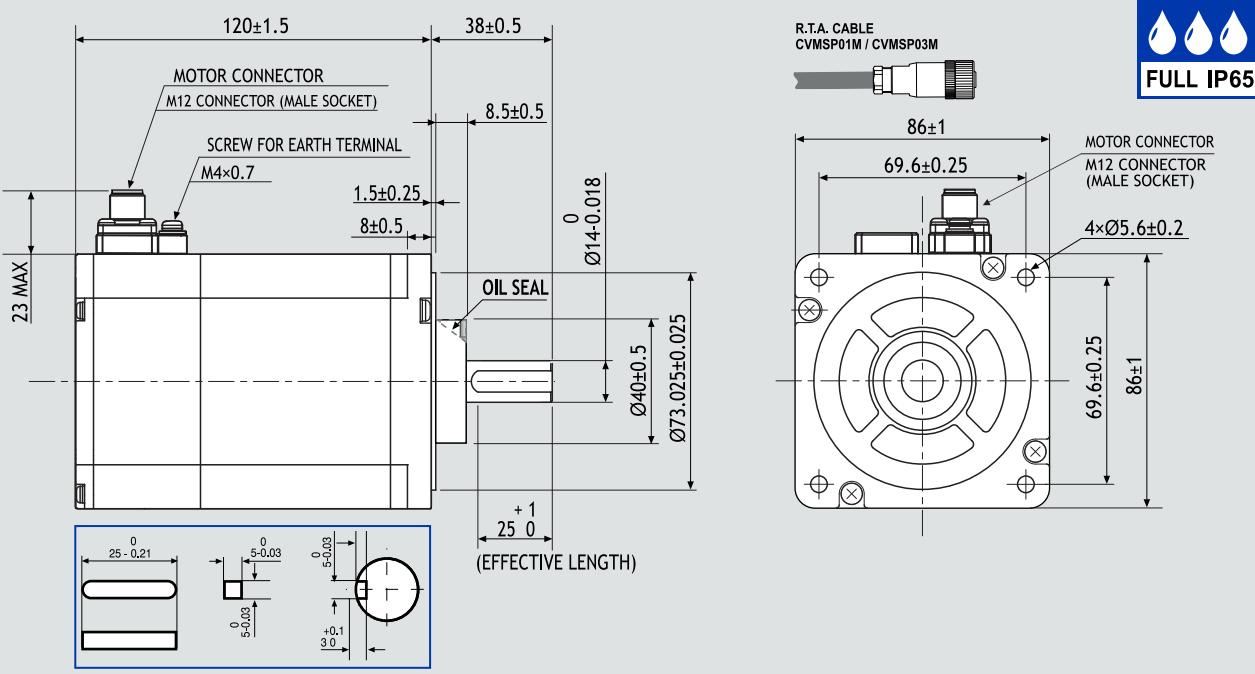


Suggested driver: preferred solution X-PLUS Series, X-MIND Series, X-PLUS ET Series.

# SP2862-51SX01

INTRODUCTION

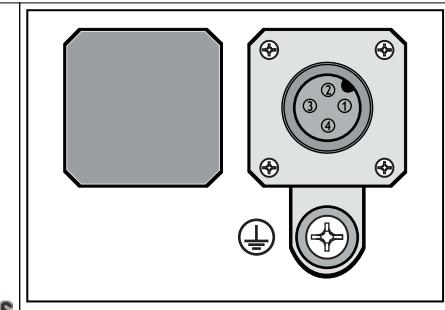
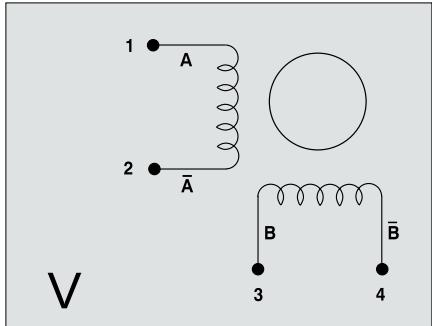
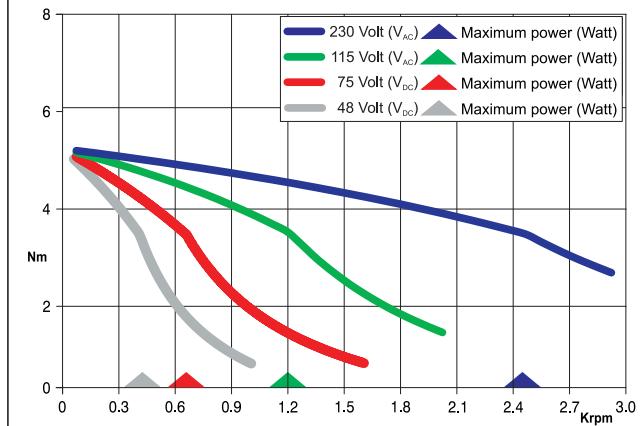
## Dimensions (Unit:mm)



## FEATURES

MODEL	SP2862-51SX01
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.83
INDUCTANCE (mH)	6.4
BIPOLAR HOLDING TORQUE (Ncm)	700
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	3000
THEORETICAL ACCELERATION (rad $\text{s sec.}^{-2}$ )	23300
BACK E.M.F. (V/Krpm)	175
MASS (Kg)	3.1
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	FULL IP65 - F
LEADS CODE	V

## TORQUE/SPEED CURVE



MOTOR CONNECTOR HIGH SIDE VIEW

Suggested driver: preferred solution X-PLUS Series, X-MIND Series (110-230VAC)

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

# SP2863-5100

INTRODUCTION

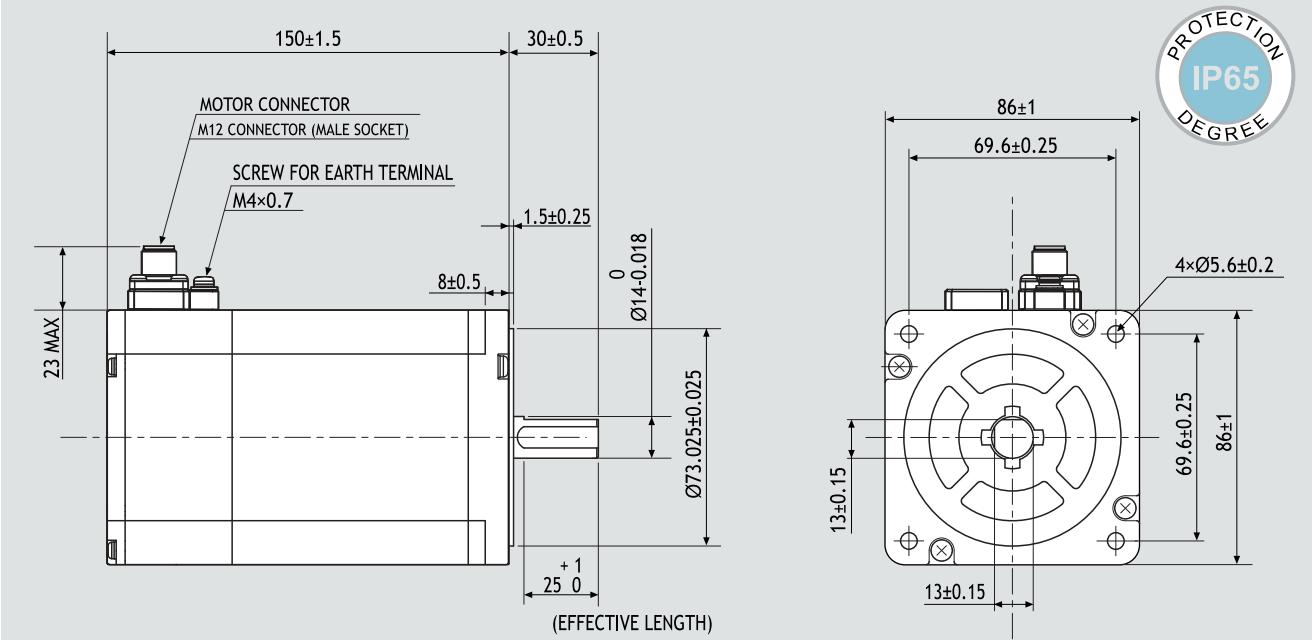
STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

## Dimensions (Unit:mm)



## FEATURES

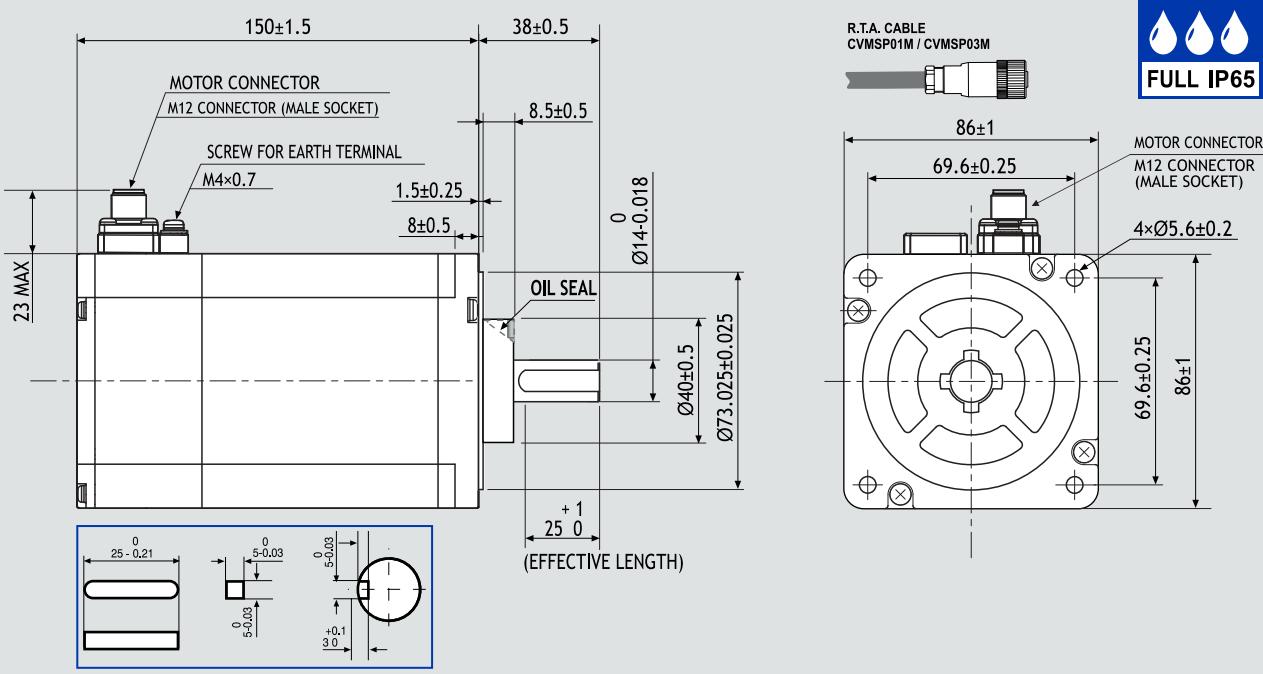
MODEL	SP 2863-5100
BASIC STEP ANGLE	$1.8 \pm 0.09^\circ$
BIPOLAR CURRENT	(Amp) 4
RESISTANCE	(Ohm) 1
INDUCTANCE	(mH) 7.9
BIPOLAR HOLDING TORQUE	(Ncm) 900
ROTOR INERTIA	(Kgm <sup>2</sup> x 10 <sup>-7</sup> ) 4500
THEORETICAL ACCELERATION	(rad x sec. <sup>-2</sup> ) 20000
BACK E.M.F.	(V/Krpm) 225
MASS	(Kg) 4.2
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE	(V) 250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	IP65 - F



Suggested driver: preferred solution X-PLUS Series, X-MIND Series, X-PLUS ET Series.

# SP2863-51SX01

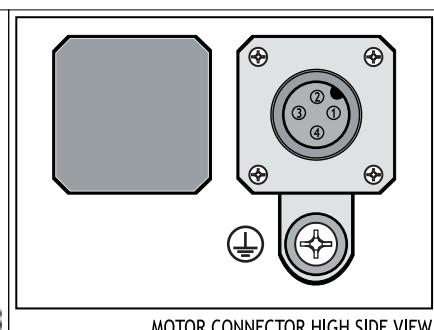
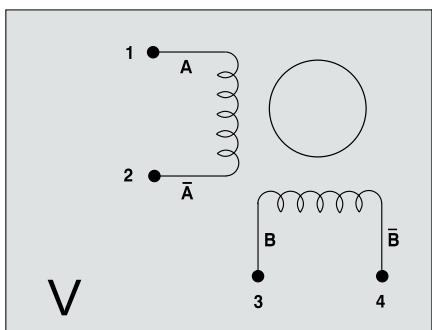
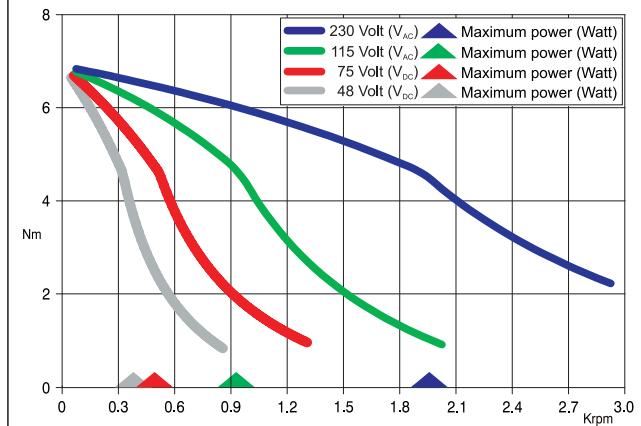
## Dimensions (Unit:mm)



## FEATURES

MODEL	SP2863-51SX01
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR CURRENT (Amp)	4.0
RESISTANCE (Ohm)	1.0
INDUCTANCE (mH)	7.9
BIPOLAR HOLDING TORQUE (Ncm)	920
ROTOR INERTIA (Kgm² x 10⁻⁷)	4500
THEORETICAL ACCELERATION (rad x sec.⁻²)	20500
BACK E.M.F. (V/Krpm)	241
MASS (Kg)	4.2
INTERNATIONAL STANDARDS	UL, CSA, CE, RoHS
INSULATION VOLTAGE (V)	250 V <sub>AC</sub> (350 V <sub>DC</sub> )
PROTECTION DEGREE - INSULATION CLASS	FULL IP65 - F
LEADS CODE	V

## TORQUE/SPEED CURVE



Suggested driver: preferred solution X-PLUS Series, X-MIND Series (110-230VAC)

## Connection schematics of R.T.A. drives with stepping motors

LEADS CODE	PARALLEL BIPOLAR CONNECTION	SERIES BIPOLAR CONNECTION	UNIPOLAR CONNECTION
I			
II			
III			
IV			
V			
VI			

## CONVERSION FACTORS

**LENGTH** $1 \text{ mm} = 3.937 \times 10^{-2} \text{ inch}$ **MASS** $1 \text{ Kg} = 2.205 \times \text{lb force}$ **INERTIA** $10^7 \text{ g cm}^2 = 1 \text{ Kg m}^2 = 5.467 \times 10^4 \text{ oz in}^2 = 3.417 \times 10^3 \text{ lb in}^2$ **TORQUE** $1 \text{ Nm} = 1.416 \times 10^2 \text{ oz in} = 0.738 \text{ ft lb} = 8.85 \text{ in lb}$   
 $1 \text{ Ncm} = 1.416 \text{ oz in} = 7.38 \times 10^{-3} \text{ ft lb} = 8.85 \times 10^{-2} \text{ in lb}$ **POWER** $1 \text{ KW} = 1.34 \text{ hp}$   
 $1 \text{ W} = 1.34 \times 10^{-3} \text{ hp}$



## *Stepping motors with Encoder*

# Stepping motors with encoder overview

INTRODUCTION

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

## MOTORS WITH ENCODER OVERVIEW



- All based on SANYO DENKY stepping motors.
- Flange size: 42, 56, 60 & 85,5 mm
- Holding torque: from 0,5 to 9.0 Nm
- Standard signal: DIFFERENTIAL (SINGLE-ENDED version available)
- High flexibility in coupling with R.T.A. drives
- All motors with encoder are mounted and tested by R.T.A., following rigorous standards in accordance with R.T.A. best practices developed over more than 30 years of activity.

## ENCODER FEATURES



- Standard encoder resolution: 400 CPR (also available upon request 500 & 1000 CPR)
- Standard signal: DIFFERENTIAL (SINGLE-ENDED version available)
- INDEX versions available upon request



# Stepping motors with encoder overview

## STEPPING MOTORS WITH ENCODER TABLE OF CONTENTS



STEPPING MOTORS WITH ENCODER (EM series motors)	SANYO DENKI MOTOR CODE CODICE MOTORE SANYO DENKI	HOLDING TORQUE COPPIA DI TENUTA (Nm.)	FLANGE SIZE DIMENSIONI FLANGIA (mm.)	LENGTH LUNGHEZZA (mm.)	CURRENT CORRENTE (Amp)	TECHNICAL DATA DATI TECNICI (page/pagina)
<b>SIZE 1.7" - □ 42 mm</b>						
EM 1H2H-04D0	103-H5210-4512	51	□ 42	48.0	2.0	31
EM 1H3H-04D0	103-H5212-4610	65	□ 42	59.5	2.0	32
<b>SIZE 2.2" - □ 56 mm</b>						
EM 2H1M-04D0	103-H7123-1711	110	□ 56	53.8	4.0	33
EM 2H2M-04D0	103-H7126-1710	165	□ 56	75.8	4.0	34
<b>SIZE 60 mm - □ 60 mm</b>						
EM 6H2M-04D0	103-H7823-1714	300	□ 60	85.8	4.0	35
EM 6H3H-04D0	103-H7826-1612	380	□ 60	103.8	6.0	36
<b>SIZE 3.4" - □ 85.5 mm</b>						
EM 3F1H-04D0	SM 2861-5225	360	□ 85.5	66.0	6.0	37
EM 3F2H-04D0	SM 2862-5225	700	□ 85.5	96.5	6.0	38
EM 3F3H-04D0	SM 2863-5225	920	□ 85.5	127.0	6.0	39
EM 3F1L-04D0	SM 2861-5025	360	□ 85.5	66.0	2.0	40
EM 3F2M-04D0	SM 2862-5125	700	□ 85.5	96.5	4.0	41
EM 3F3M-14D0	SM 2863-5126	920	□ 85.5	127.0	4.0	42

INTRODUCTION

STEPPING MOTORS  
IP65 MOTORS

MOTORS WITH ENCODER

MOTORS WITH BRAKE

STEPPER GEARBOXES

# Stepping motors with encoder overview

## SUGGESTED MOTOR WITH ENCODER/DRIVE COUPLING

- The following tables show suggested coupling between stepping motors with encoder and R.T.A. drives.
- R.T.A. suggests contacting its commercial personnel to verify and validate the optimal motor/drive coupling.

## STEPPING MOTORS WITH ENCODER / DRIVE COUPLING - ENCODER MANAGED BY CONTROL SYSTEM

STEPPING MOTORS WITH ENCODER (EM series motors)	R.T.A. Drives												
	BSD	CSD	CSD J	A-CSD	NDC	A-NDC	ADW	HGD	PLUS A/B	PLUS K	PLUS J	X-PLUS B	X-MIND B
SIZE 1.7" - □ 42 mm.													
EM 1H2H-04D0	■	■		■	■	■	■	■	■				
EM 1H3H-04D0	■	■		■	■	■	■	■	■				
SIZE 2.2" - □ 56 mm.													
EM 2H1M-04D0		■	■	■	■	■	■	■	■	■	■		
EM 2H2M-04D0		■	■	■	■	■	■	■	■	■	■		
SIZE 60 mm. - □ 60 mm.													
EM 6H2M-04D0	■	■	■	■	■	■	■	■	■	■			
EM 6H3H-04D0				■	■	■	■	■	■	■			
SIZE 3.4" - □ 85,5 mm.													
EM 3F1H-04D0				■	■	■	■	■	■	■			
EM 3F2H-04D0				■	■	■	■	■	■	■			
EM 3F3H-04D0				■	■	■	■	■	■	■			
EM 3F1L-04D0										■	■	■	
EM 3F2M-04D0									■	■	■		
EM 3F3M-14D0									■	■	■		

## STEPPING MOTORS WITH ENCODER / DRIVE COUPLING - ENCODER MANAGED BY R.T.A. DRIVE

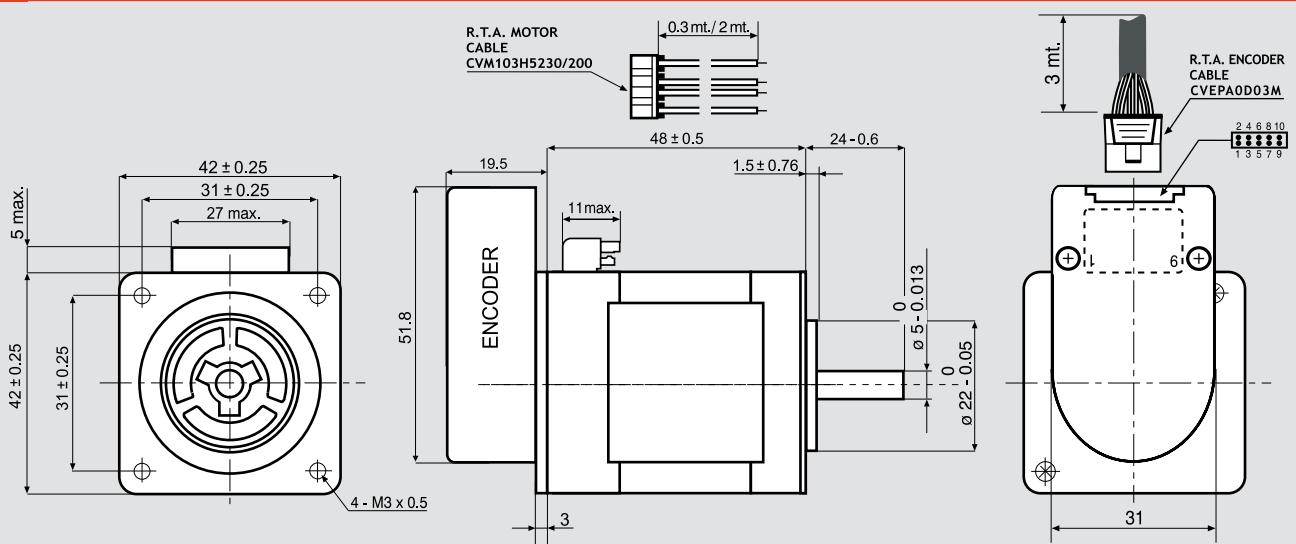
STEPPING MOTORS WITH ENCODER (EM series motors)	R.T.A. Drives			
	Standard signal : DIFFERENTIAL		Standard signal : SINGLE-ENDED	
	PLUS ET series	X-PLUS ET series	PLUS E series	PLUS L series
SIZE 2.2" - □ 56 mm				
EM 2H1M-04D0 ( 04S0 )	■		■	■
EM 2H2M-04D0 ( 04S0 )	■		■	■
SIZE 60 mm. - □ 60 mm.				
EM 6H2M-04D0 ( 04S0 )	■		■	■
SIZE 3.4" - □ 85,5 mm.				
EM 3F1H-04D0 ( 04S0 )	■		■	■
EM 3F2H-04D0 ( 04S0 )	■		■	■
EM 3F3H-04D0 ( 04S0 )	■		■	■
EM 3F1L-04D0		■		
EM 3F2M-04D0		■		
EM 3F3M-14D0		■		

NOTE: Codes between brackets refer to models with SINGLE ENDED standard signal.

\*For more info, please refer to [www.rta.it](http://www.rta.it)

# EM 1H2H-04DO

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

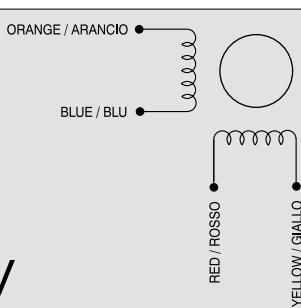
MODEL	EM 1H2H-04DO
SANYO DENKI MOTOR CODE	103-H5210-4512
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	2.0
RESISTANCE (Ohm)	1.25
INDUCTANCE (mH)	2.4
BIPOLAR HOLDING TORQUE (Ncm)	51
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	74
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	69000
BACK E.M.F. (V/Krpm)	14
MASS (Kg)	0.35
LEADS CODE	V

103-H5210-4512 MOTOR NEEDS CVM103H5230 OR CVM103H52200 R.T.A. CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

## ENCODER FEATURES

POWER SUPPLY VOLTAGE (Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION (mAmp)	50
HIGH LEVEL OUTPUT (Volt)	3.5 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =10 mA)
LOW LEVEL OUTPUT (Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =10 mA)
OUTPUT SIGNAL	Differential (SINGLE ENDED version available)
RESOLUTION	400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY (KHz)	100
INDEX VERSION	Available upon request

ENCODER NEEDS CVEPA0D03M R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.

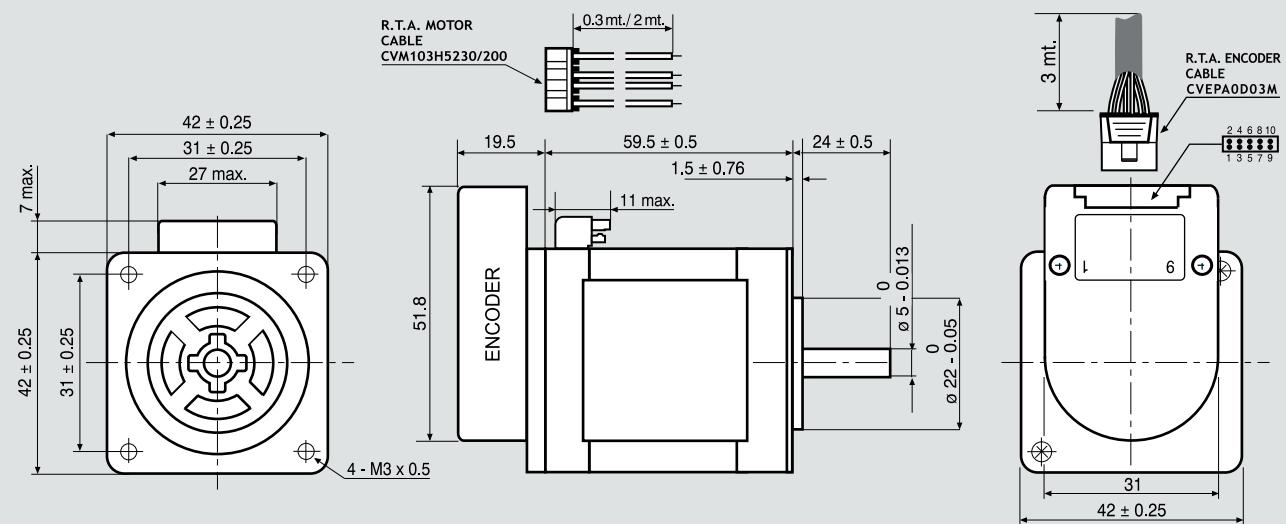


## ENCODER PIN-OUTS

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NO CONNECTION	6	CHANNEL A+
2	+ DC (5 V)	7	CHANNEL B-
3	GROUND	8	CHANNEL B+
4	NO CONNECTION	9	NO CONNECTION
5	CHANNEL A-	10	NO CONNECTION

# EM 1H3H-04D0

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	EM 1H3H-04D0
SANYO DENKI MOTOR CODE	103-H5212-4610
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	2.0
RESISTANCE (Ohm)	1.5
INDUCTANCE (mH)	3.0
BIPOLAR HOLDING TORQUE (Ncm)	65
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	110
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	59000
BACK E.M.F. (V/Krpm)	32
MASS (Kg)	0.50
LEADS CODE	V

103-H5212-4610 MOTOR NEEDS CVM103H5230 R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.

## ENCODER FEATURES

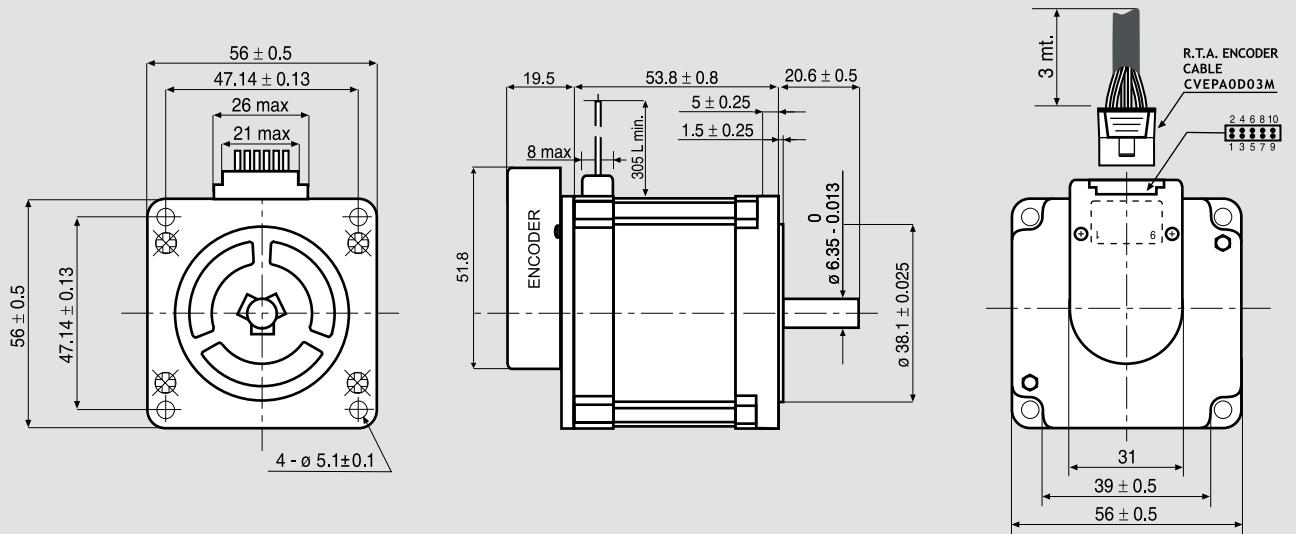
POWER SUPPLY VOLTAGE (Volt)	$5 \text{ V}_{\text{DC}} \pm 5\%$
CURRENT CONSUMPTION (mAmp)	50
HIGH LEVEL OUTPUT (Volt)	3.5 (TIP) - 2.4 (MIN) ( $I_{\text{MAX}}=10 \text{ mA}$ )
LOW LEVEL OUTPUT (Volt)	0.2 (TIP) - 0.4 (MAX) ( $I_{\text{MAX}}=10 \text{ mA}$ )
OUTPUT SIGNAL	Differential
RESOLUTION	400 cycles per revolution
MAXIMUM FREQUENCY (KHz)	100

ENCODER NEEDS CVEPA0D03M R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.

	ENCODER PIN-OUTS	
	PIN	DESCRIPTION
	1	NO CONNECTION
	2	+ DC (5 V)
	3	GROUND
	4	NO CONNECTION
		5 CHANNEL A-
	PIN	DESCRIPTION
	6	CHANNEL A+
	7	CHANNEL B-
	8	CHANNEL B+
	9	NO CONNECTION
	10	NO CONNECTION

# EM 2H1M-04DO

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	EM 2H1M-04DO
SANYO DENKI MOTOR CODE	103-H7123-1711
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.41
INDUCTANCE (mH)	1.6
BIPOLAR HOLDING TORQUE (Ncm)	110
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	210
THEORETICAL ACCELERATION (rad $\times$ sec. $^{-2}$ )	50000
BACK E.M.F. (V/Krpm)	20
MASS (Kg)	0.65
LEADS CODE	V

## ENCODER FEATURES

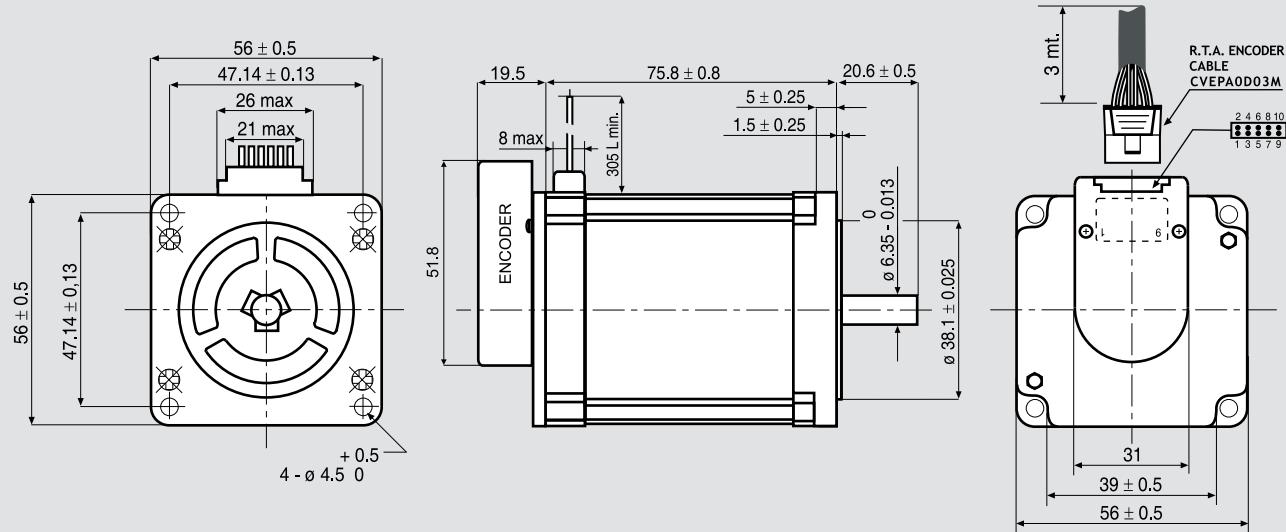
POWER SUPPLY VOLTAGE	(Volt)	$5 \text{ V}_{\text{DC}} \pm 5\%$
CURRENT CONSUMPTION	(mAmp)	50
HIGH LEVEL OUTPUT	(Volt)	3.5 (TIP) - 2.4 (MIN) ( $I_{\text{MAX}}=10 \text{ mA}$ )
LOW LEVEL OUTPUT	(Volt)	0.2 (TIP) - 0.4 (MAX) ( $I_{\text{MAX}}=10 \text{ mA}$ )
OUTPUT SIGNAL		Differential (SINGLE ENDED version available)
RESOLUTION		400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY	(KHz)	100
INDEX VERSION		Available upon request

ENCODER NEEDS CVEPA0D03M R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.

 <b>V</b>	ENCODER PIN-OUTS																								
	<table border="1"> <thead> <tr> <th>PIN</th><th>DESCRIPTION</th></tr> </thead> <tbody> <tr> <td>1</td><td>NO CONNECTION</td></tr> <tr> <td>2</td><td>+ DC (5 V)</td></tr> <tr> <td>3</td><td>GROUND</td></tr> <tr> <td>4</td><td>NO CONNECTION</td></tr> <tr> <td>5</td><td>CHANNEL A-</td></tr> </tbody> </table>	PIN	DESCRIPTION	1	NO CONNECTION	2	+ DC (5 V)	3	GROUND	4	NO CONNECTION	5	CHANNEL A-	<table border="1"> <thead> <tr> <th>PIN</th><th>DESCRIPTION</th></tr> </thead> <tbody> <tr> <td>6</td><td>CHANNEL A+</td></tr> <tr> <td>7</td><td>CHANNEL B-</td></tr> <tr> <td>8</td><td>CHANNEL B+</td></tr> <tr> <td>9</td><td>NO CONNECTION</td></tr> <tr> <td>10</td><td>NO CONNECTION</td></tr> </tbody> </table>	PIN	DESCRIPTION	6	CHANNEL A+	7	CHANNEL B-	8	CHANNEL B+	9	NO CONNECTION	10
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7	CHANNEL B-																								
8	CHANNEL B+																								
9	NO CONNECTION																								
10	NO CONNECTION																								

# EM 2H2M-04D0

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	EM 2H2M-04D0
SANYO DENKI MOTOR CODE	103-H7126-1710
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.48
INDUCTANCE (mH)	2.2
BIPOLAR HOLDING TORQUE (Ncm)	165
ROTOR INERTIA (Kgm² × 10⁻⁷)	360
THEORETICAL ACCELERATION (rad × sec.⁻²)	45800
BACK E.M.F. (V/Krpm)	31
MASS (Kg)	1.0
LEADS CODE	V

## ENCODER FEATURES

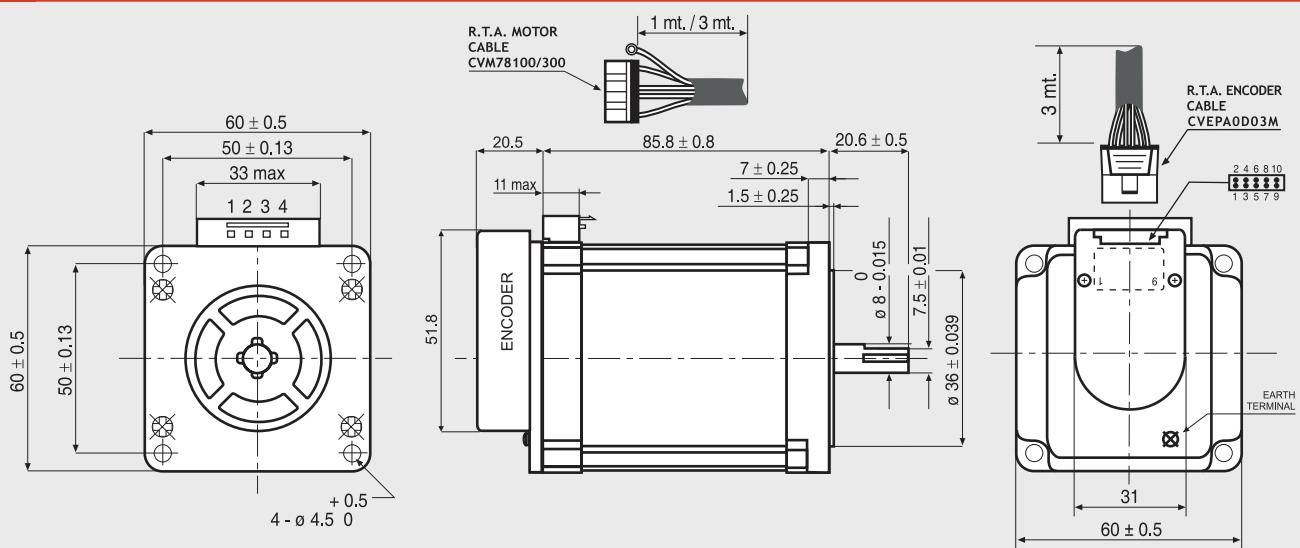
POWER SUPPLY VOLTAGE	(Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION	(mAmp)	50
HIGH LEVEL OUTPUT	(Volt)	3.5 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =10 mA)
LOW LEVEL OUTPUT	(Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =10 mA)
OUTPUT SIGNAL		Differential (SINGLE ENDED version available)
RESOLUTION		400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY	(KHz)	100
INDEX VERSION		Available upon request

ENCODER NEEDS CVEPA0D03M R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.

		ENCODER PIN-OUTS	
		PIN	DESCRIPTION
		1	NO CONNECTION
		2	+ DC (5 V)
		3	GROUND
		4	NO CONNECTION
		5	CHANNEL A-
		PIN	DESCRIPTION
		6	CHANNEL A+
		7	CHANNEL B-
		8	CHANNEL B+
		9	NO CONNECTION
		10	NO CONNECTION

# EM 6H2M-04DO

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

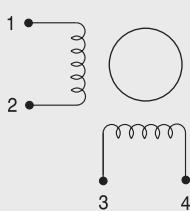
MODEL	EM 6H2M-04DO
SANYO DENKI MOTOR CODE	103-H7823-1714
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.65
INDUCTANCE (mH)	2.4
BIPOLAR HOLDING TORQUE (Ncm)	300
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	840
THEORETICAL ACCELERATION (rad $\times$ sec. $^{-2}$ )	35700
BACK E.M.F. (V/Krpm)	75
MASS (Kg)	1.4
LEADS CODE	V

103-H7823-1714 MOTOR NEEDS CVM78/100 OR CVM78/300 R.T.A. CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

## ENCODER FEATURES

POWER SUPPLY VOLTAGE	(Volt)	5 $V_{DC} \pm 5\%$
CURRENT CONSUMPTION	(mAmp)	50
HIGH LEVEL OUTPUT	(Volt)	3.5 (TIP) - 2.4 (MIN) ( $I_{MAX}=10$ mA)
LOW LEVEL OUTPUT	(Volt)	0.2 (TIP) - 0.4 (MAX) ( $I_{MAX}=10$ mA)
OUTPUT SIGNAL		Differential (SINGLE ENDED version available)
RESOLUTION		400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY	(KHz)	100
INDEX VERSION		Available upon request

ENCODER NEEDS CVEPA0D03M R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.



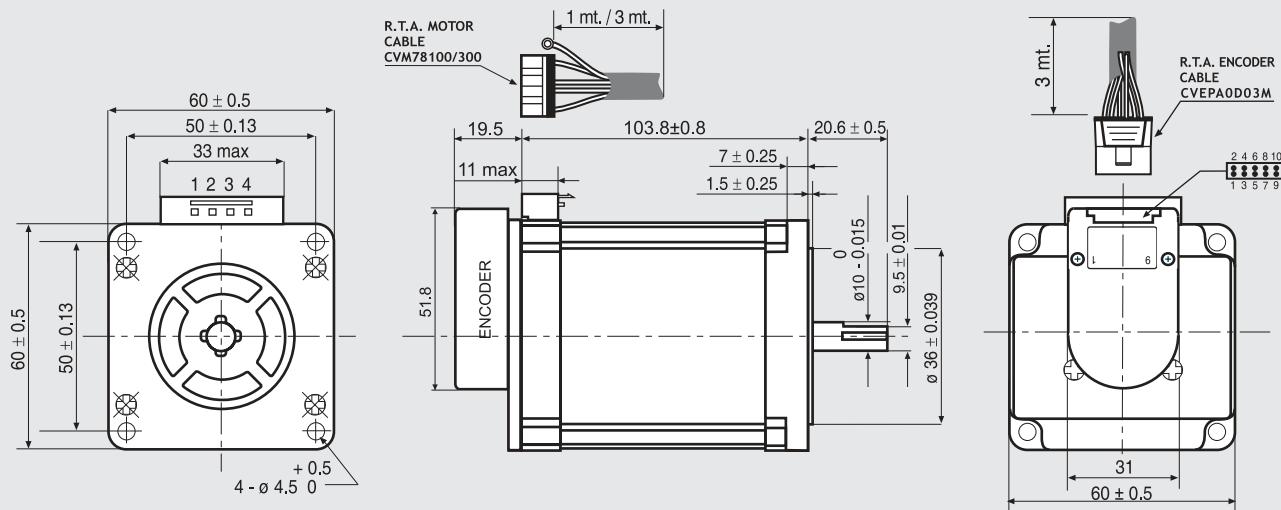
## ENCODER PIN-OUTS

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NO CONNECTION	6	CHANNEL A+
2	+ DC (5 V)	7	CHANNEL B-
3	GROUND	8	CHANNEL B+
4	NO CONNECTION	9	NO CONNECTION
5	CHANNEL A-	10	NO CONNECTION

V

# EM 6H3H-04D0

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

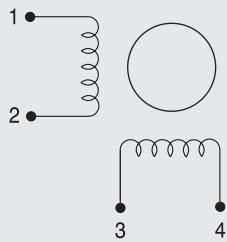
MODEL	EM 6H3H-04D0
SANYO DENKI MOTOR CODE	103-H7826-1612
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	6.0
RESISTANCE (Ohm)	0.43
INDUCTANCE (mH)	1.45
BIPOLAR HOLDING TORQUE (Ncm)	380
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	1080
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	35200
BACK E.M.F. (V/Krpm)	70
MASS (Kg)	1.70
LEADS CODE	V

103-H7826-1612 MOTOR NEEDS CVM78/100 OR CVM78/300 R.T.A. CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

## ENCODER FEATURES

POWER SUPPLY VOLTAGE	(Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION	(mAmp)	50
HIGH LEVEL OUTPUT	(Volt)	3.5 (TIP) - 2.4 (MIN) ( $I_{MAX}=10$ mA)
LOW LEVEL OUTPUT	(Volt)	0.2 (TIP) - 0.4 (MAX) ( $I_{MAX}=10$ mA)
OUTPUT SIGNAL		Differential
RESOLUTION		400 cycles per revolution
MAXIMUM FREQUENCY	(KHz)	100

ENCODER NEEDS CVEPA0D03M R.T.A. CABLE. CONTACT R.T.A. FOR FURTHER DETAILS.

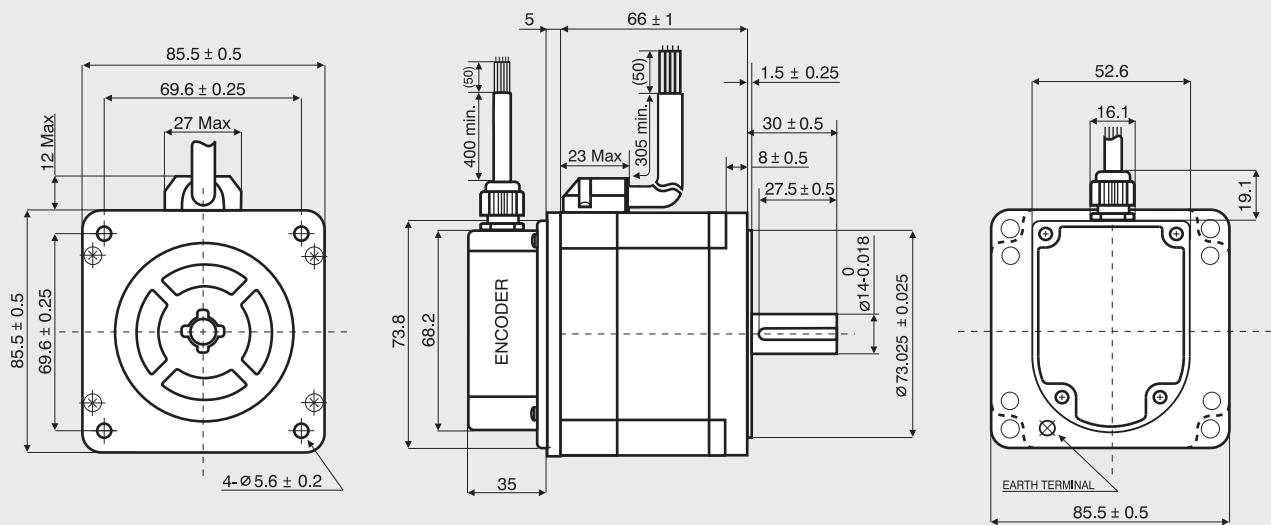


## ENCODER PIN-OUTS

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NO CONNECTION	6	CHANNEL A+
2	+ DC (5 V)	7	CHANNEL B-
3	GROUND	8	CHANNEL B+
4	NO CONNECTION	9	NO CONNECTION
5	CHANNEL A-	10	NO CONNECTION

# EM 3F1H-04DO

## Dimensions (Unit:mm)

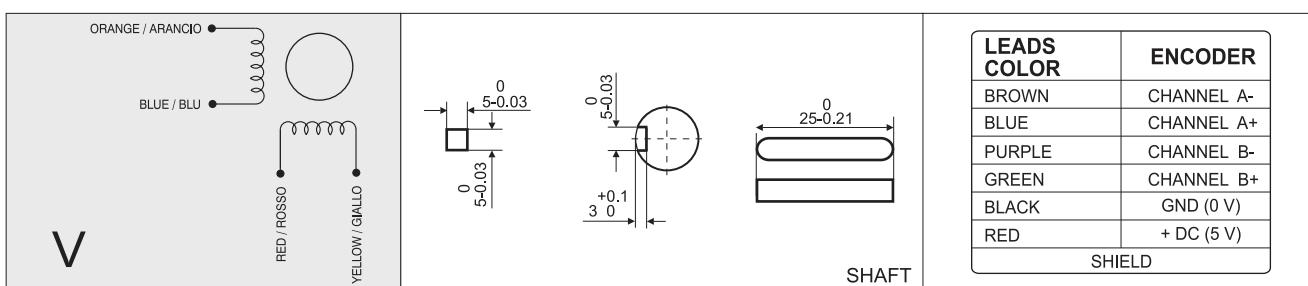


## SANYO DENKI MOTOR FEATURES

MODEL	EM 3F1H-04DO
SANYO DENKI MOTOR CODE	SM 2861-5225
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	6.0
RESISTANCE (Ohm)	0.29
INDUCTANCE (mH)	1.7
BIPOLAR HOLDING TORQUE (Ncm)	360
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	1480
THEORETICAL ACCELERATION (rad $\times$ sec. $^{-2}$ )	24300
BACK E.M.F. (V/Krpm)	60
MASS (Kg)	1.7
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

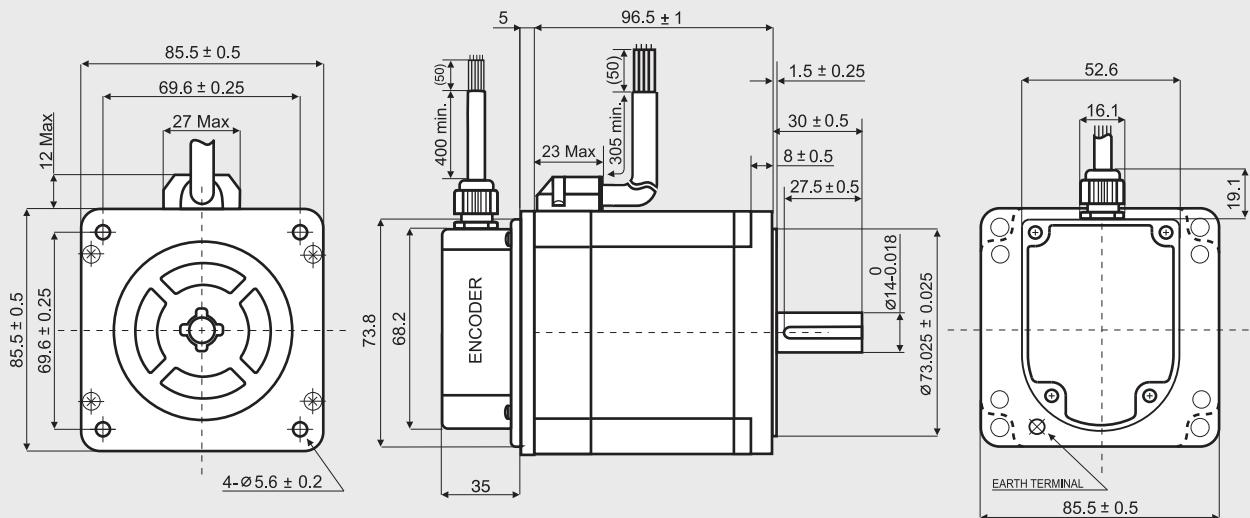
## ENCODER FEATURES

POWER SUPPLY VOLTAGE (Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION (mA)	40
HIGH LEVEL OUTPUT (Volt)	3.4 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =20 mA)
LOW LEVEL OUTPUT (Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =20 mA)
OUTPUT SIGNAL	Differential (SINGLE ENDED version available)
RESOLUTION	400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY (KHz)	60
INDEX VERSION	Available upon request



# EM 3F2H-04DO

## Dimensions (Unit:mm)

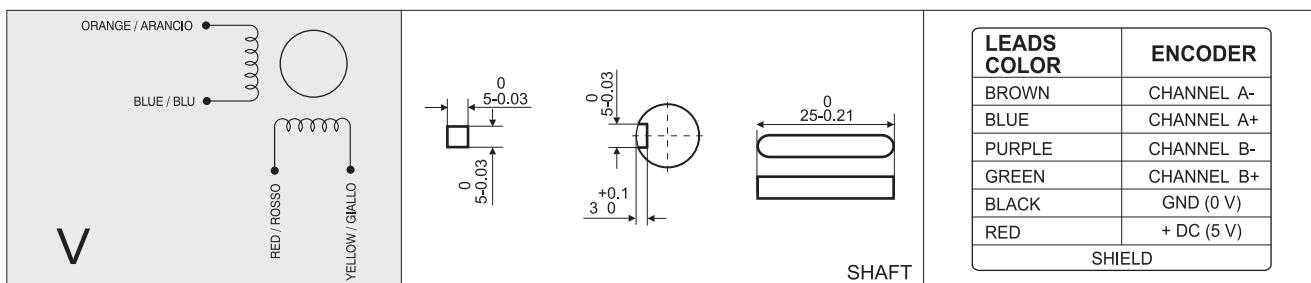


## SANYO DENKI MOTOR FEATURES

MODEL	EM 3F2H-04DO
SANYO DENKI MOTOR CODE	SM 2862-5225
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	6.0
RESISTANCE (Ohm)	0.36
INDUCTANCE (mH)	2.8
BIPOLAR HOLDING TORQUE (Ncm)	700
ROTOR INERTIA (Kgm² × 10⁻⁷)	3000
THEORETICAL ACCELERATION (rad × sec.⁻²)	23300
BACK E.M.F. (V/Krpm)	120
MASS (Kg)	2.9
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

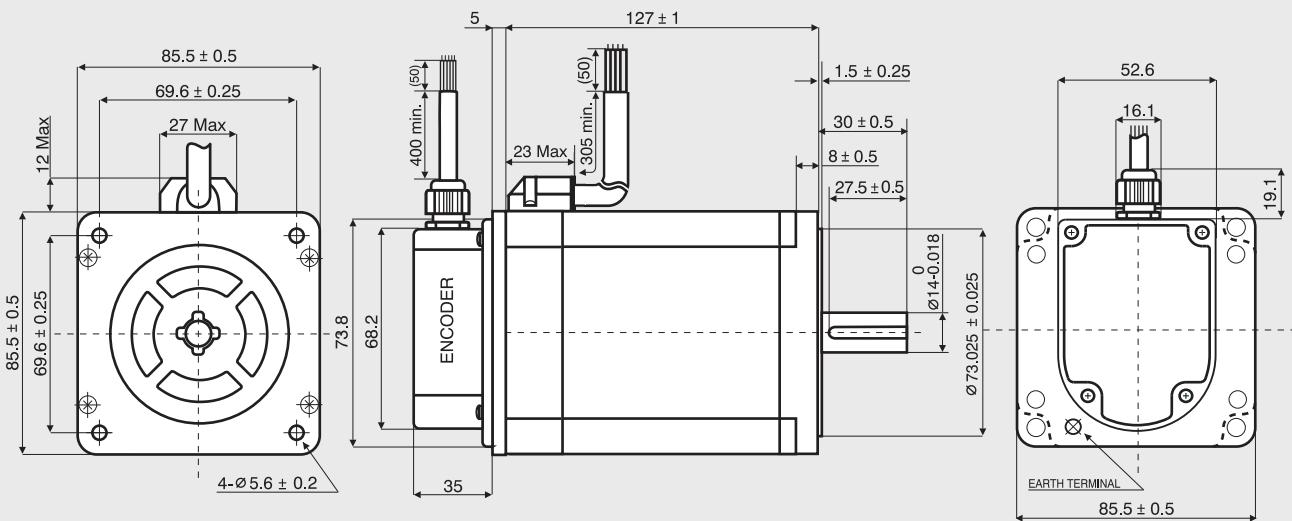
## ENCODER FEATURES

POWER SUPPLY VOLTAGE (Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION (mAmp)	40
HIGH LEVEL OUTPUT (Volt)	3.4 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =20 mA)
LOW LEVEL OUTPUT (Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =20 mA)
OUTPUT SIGNAL	Differential (SINGLE ENDED version available)
RESOLUTION	400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY (KHz)	60
INDEX VERSION	Available upon request



# EM 3F3H-04DO

## Dimensions (Unit:mm)

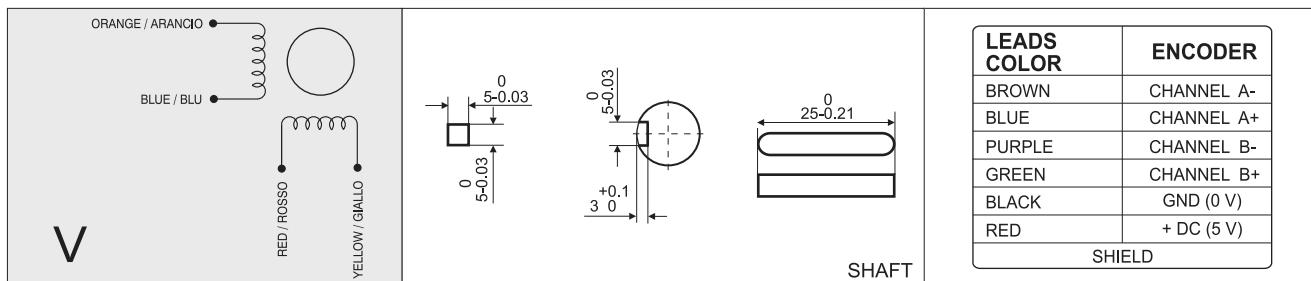


## SANYO DENKI MOTOR FEATURES

MODEL	EM 3F3H-04DO
SANYO DENKI MOTOR CODE	SM 2863-5225
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	6.0
RESISTANCE (Ohm)	0.46
INDUCTANCE (mH)	3.8
BIPOLAR HOLDING TORQUE (Ncm)	920
ROTOR INERTIA (Kgm² × 10⁻⁷)	4500
THEORETICAL ACCELERATION (rad × sec.⁻²)	20500
BACK E.M.F. (V/Krpm)	161
MASS (Kg)	4.0
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

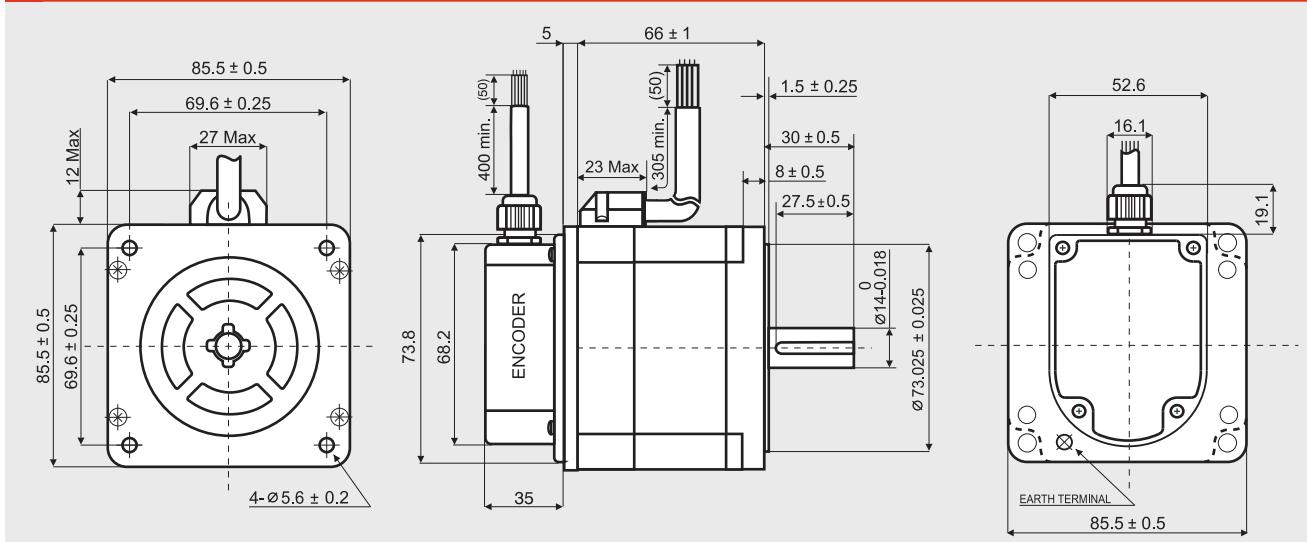
## ENCODER FEATURES

POWER SUPPLY VOLTAGE (Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION (mA)	40
HIGH LEVEL OUTPUT (Volt)	3.4 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =20 mA)
LOW LEVEL OUTPUT (Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =20 mA)
OUTPUT SIGNAL	Differential (SINGLE ENDED version available)
RESOLUTION	400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY (KHz)	60
INDEX VERSION	Available upon request



**EM 3F1L-04D0**

#### **Dimensions (Unit:mm)**

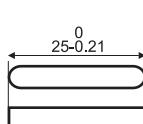
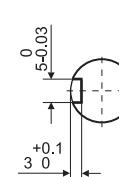
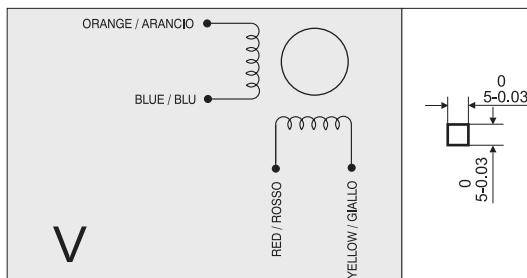


#### SANYO DENKI MOTOR FEATURES

MODEL	EM 3F1L-04D0	
SANYO DENKI MOTOR CODE		SM 2861-5025
BASIC STEP ANGLE		1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT	(Amp)	2.0
RESISTANCE	(Ohm)	2.2
INDUCTANCE	(mH)	15
BIPOLAR HOLDING TORQUE	(Ncm)	360
ROTOR INERTIA	(Kgm <sup>2</sup> × 10 <sup>7</sup> )	1480
THEORETICAL ACCELERATION	(rad × sec. <sup>-2</sup> )	24300
BACK E.M.F.	(V/Krpm)	180
MASS	(Kg)	1.7
INTERNATIONAL STANDARDS		UL, CSA
INSULATION VOLTAGE	(V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS		IP43 - F
LEADS CODE		V

## ENCODER FEATURES

ENCODER FEATURES		
POWER SUPPLY VOLTAGE	(Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION	(mAmp)	40
HIGH LEVEL OUTPUT	(Volt)	3.4 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =20 mA)
LOW LEVEL OUTPUT	(Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =20 mA)
OUTPUT SIGNAL	Differential (SINGLE ENDED version available)	
RESOLUTION	400 cycles per revolution (500 & 1000 CPR version available)	
MAXIMUM FREQUENCY	(KHz)	60
INDEX VERSION	Available upon request	

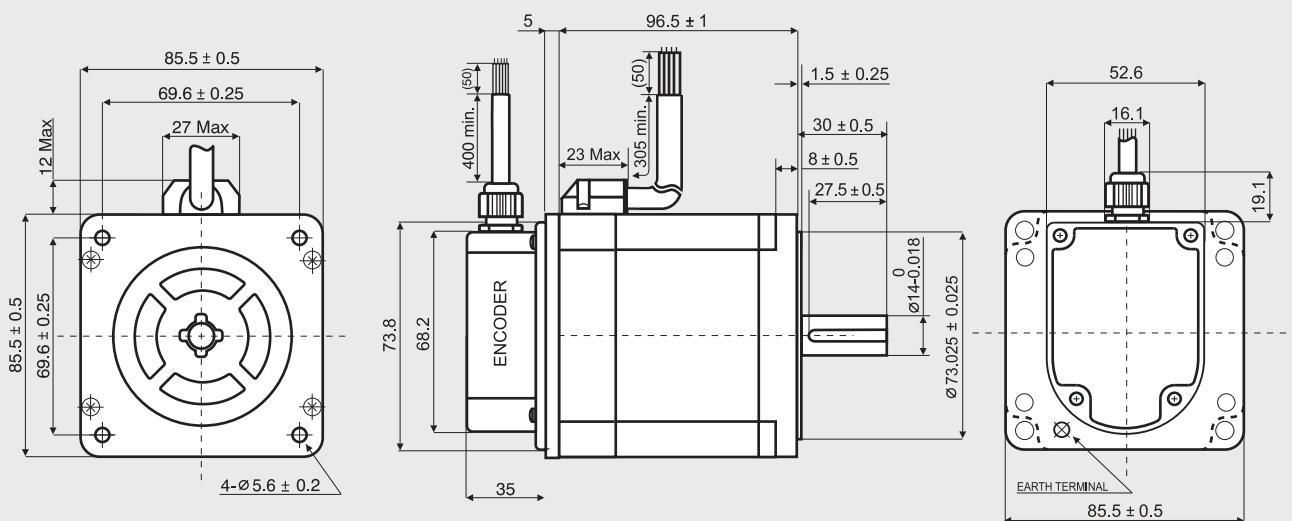


## SHAFT

LEADS COLOR	ENCODER
BROWN	CHANNEL A-
BLUE	CHANNEL A+
PURPLE	CHANNEL B-
GREEN	CHANNEL B+
BLACK	GND (0 V)
RED	+ DC (5 V)
	SHIELD

# EM 3F2M-04DO

## Dimensions (Unit:mm)

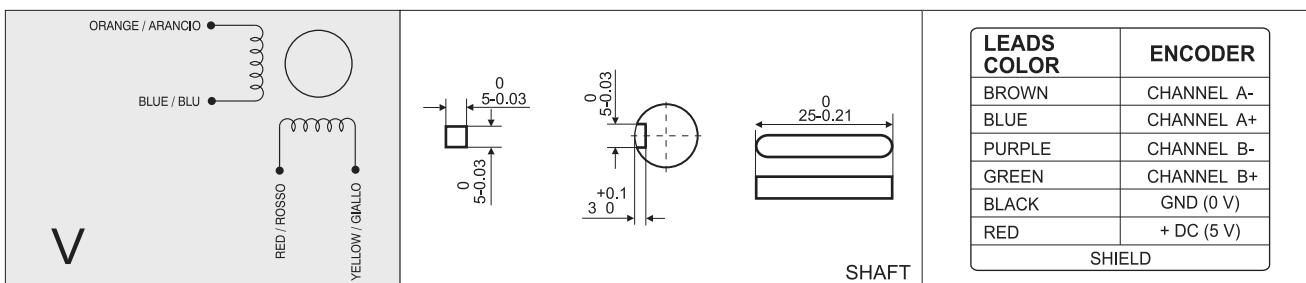


## SANYO DENKI MOTOR FEATURES

MODEL	EM 3F2M-04DO
SANYO DENKI MOTOR CODE	SM 2862-5125
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.83
INDUCTANCE (mH)	6.4
BIPOLAR HOLDING TORQUE (Ncm)	700
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	3000
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	23300
BACK E.M.F. (V/Krpm)	175
MASS (Kg)	2.9
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

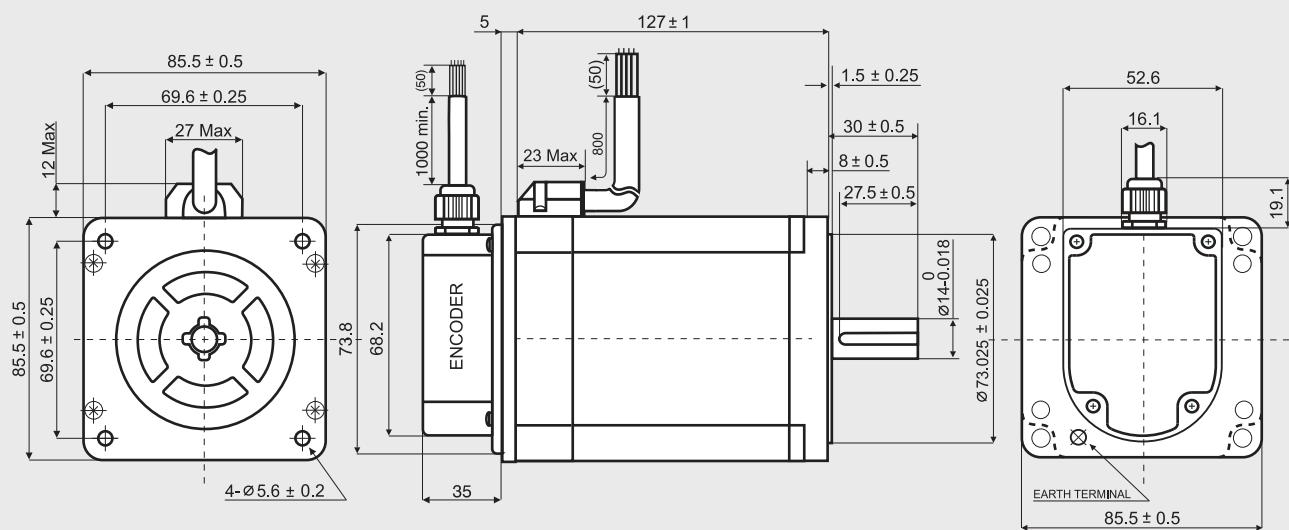
## ENCODER FEATURES

POWER SUPPLY VOLTAGE	(Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION	(mAmp)	40
HIGH LEVEL OUTPUT	(Volt)	3.4 (TIP) - 2.4 (MIN) (I <sub>MAX</sub> =20 mA)
LOW LEVEL OUTPUT	(Volt)	0.2 (TIP) - 0.4 (MAX) (I <sub>MAX</sub> =20 mA)
OUTPUT SIGNAL		Differential (SINGLE ENDED version available)
RESOLUTION		400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY	(KHz)	60
INDEX VERSION		Available upon request



# EM 3F3M-14DO

## Dimensions (Unit:mm)

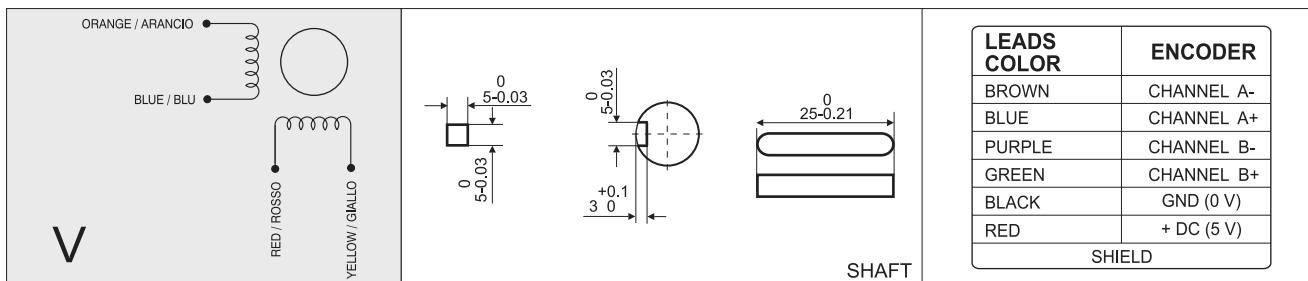


## SANYO DENKI MOTOR FEATURES

MODEL	EM 3F3M-14DO
SANYO DENKI MOTOR CODE	SM 2863-5126
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	4.0
RESISTANCE (Ohm)	1.0
INDUCTANCE (mH)	7.9
BIPOLAR HOLDING TORQUE (Ncm)	920
ROTOR INERTIA (Kgm² × 10⁻⁷)	4500
THEORETICAL ACCELERATION (rad × sec.⁻²)	20500
BACK E.M.F. (V/Krpm)	241
MASS (Kg)	4.0
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

## ENCODER FEATURES

POWER SUPPLY VOLTAGE (Volt)	5 V <sub>DC</sub> ± 5%
CURRENT CONSUMPTION (mA)	40
HIGH LEVEL OUTPUT (Volt)	3.4 (TIP) - 2.4 (MIN) ( $I_{MAX}=20$ mA)
LOW LEVEL OUTPUT (Volt)	0.2 (TIP) - 0.4 (MAX) ( $I_{MAX}=20$ mA)
OUTPUT SIGNAL	Differential (SINGLE ENDED version available)
RESOLUTION	400 cycles per revolution (500 & 1000 CPR version available)
MAXIMUM FREQUENCY (KHz)	60
INDEX VERSION	Available upon request



## *Stepping motors with Brake*

## STEPPING MOTORS WITH BRAKE TABLE OF CONTENTS

STEPPING MOTORS WITH BRAKE	SANYO DENKI MOTOR CODE CODICE MOTORE SANYO DENKI	HOLDING TORQUE COPPIA DI TENUTA (Ncm.)	FLANGE SIZE DIMENSIONI FLANGIA (mm.)	LENGTH LUNGHEZZA (mm.)	CURRENT CORRENTE (Amp)	TECHNICAL DATA DATI TECNICI (page/pagina)
SIZE 1.7" - □ 42 mm.						
103-H5210-4512.B	103-H5210-4512	51	□ 42	48.0	2.0	45
SIZE 2.2" - □ 56 mm.						
103-H7123-5010.B	103-H7123-5010	85	□ 56	53.8	2.0	46
103-H7123-0710.B	103-H7123-0710	110	□ 56	53.8	2.2*	47
103-H7123-1711.B	103-H7123-1711	110	□ 56	53.8	4.0	48
103-H7126-0710.B	103-H7126-0710	165	□ 56	75.8	2.2*	49
103-H7126-1710.B	103-H7126-1710	165	□ 56	75.8	4.0	50
SIZE 60 mm. - □ 60 mm.						
103-H7823-1714.B	103-H7823-1714	300	□ 60	85.8	4.0	51
SIZE 3.4" - □ 85.5 mm.						
SM 2861-5025.B	SM 2861-5025	360	□ 85.5	66.0	2.0	52
SM 2861-5225.B	SM 2861-5225	360	□ 85.5	66.0	6.0	53
SM 2862-5125.B	SM 2862-5125	700	□ 85.5	96.5	4.0	54
SM 2862-5225.B	SM 2862-5225	700	□ 85.5	96.5	6.0	55

(\*) Bipolar series connection  
 (\*\*) Collegamento bipolare serie

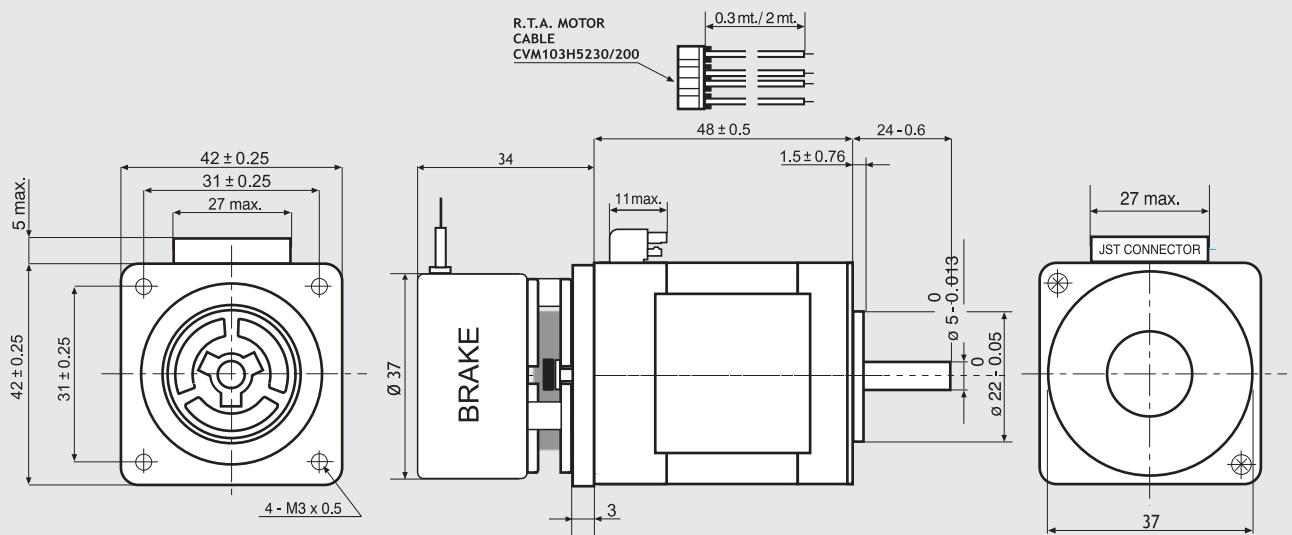


**CAUTION**

Use for safety related functions is forbidden (EN 60204-1). Moreover, when the application arrangement is in such way that a motor fault or failure could generate a risk for property or human life, external independent safety protection system must be provided in the machine.

# 103-H5210-4512.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	103-H5210-4512.B
SANYO DENKI MOTOR CODE	103-H5210-4512
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	2.0
RESISTANCE (Ohm)	1.25
INDUCTANCE (mH)	2.4
BIPOLAR HOLDING TORQUE (Ncm)	51
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	74
THEORETICAL ACCELERATION (rad $\times$ sec. $^{-2}$ )	69000
BACK E.M.F. (V/Krpm)	25
MASS (Kg)	0.55
LEADS CODE	V

103-H5210-4512 MOTOR NEEDS CVM103H5230 OR CVM103H52200 R.T.A. CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

## BRAKE FEATURES

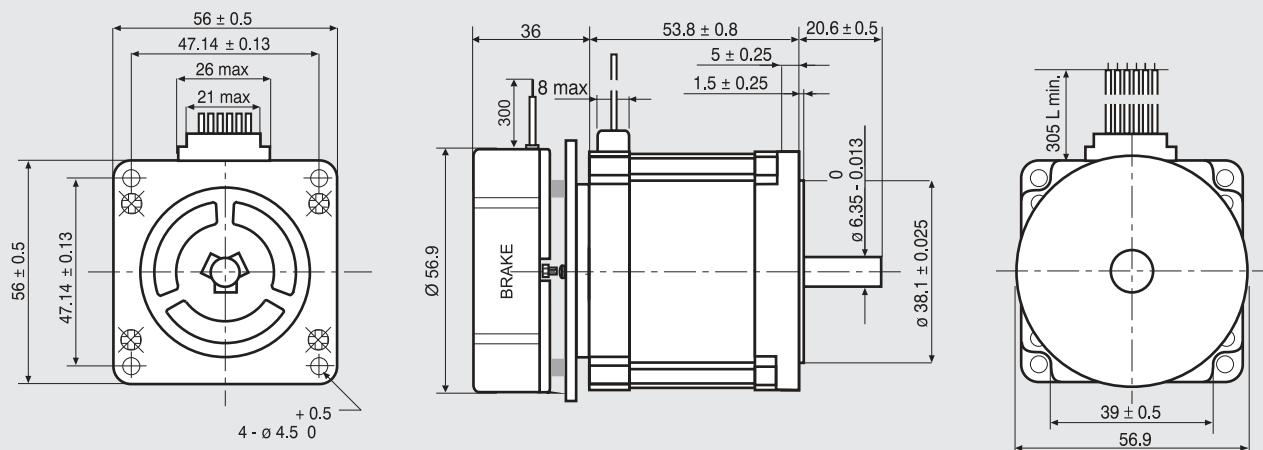
STATIC TORQUE (Nm)	0.24
DUTY CYCLE	50% max.
VOLTAGE (Volt)	24 VDC
POWER (W)	5
RELEASE TIME (ms)	50



Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H7123-5010.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	103-H7123-5010.B
SANYO DENKI MOTOR CODE	103-H7123-5010
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT	(Amp) 2.0
UNIPOLE PARALLEL CURRENT	(Amp)
RESISTANCE	(Ohm) 0.8
INDUCTANCE	(mH) 3.8
BIPOLAR HOLDING TORQUE	(Ncm) 85
UNIPOLE HOLDING TORQUE	(Ncm)
ROTOR INERTIA	(Kgm <sup>2</sup> × 10 <sup>-7</sup> ) 210
THEORETICAL ACCELERATION	(rad × sec. <sup>-2</sup> ) 38500
BACK E.M.F.	(V/Krpm) 31
MASS	(Kg) 1.15
LEADS CODE	V

## BRAKE FEATURES

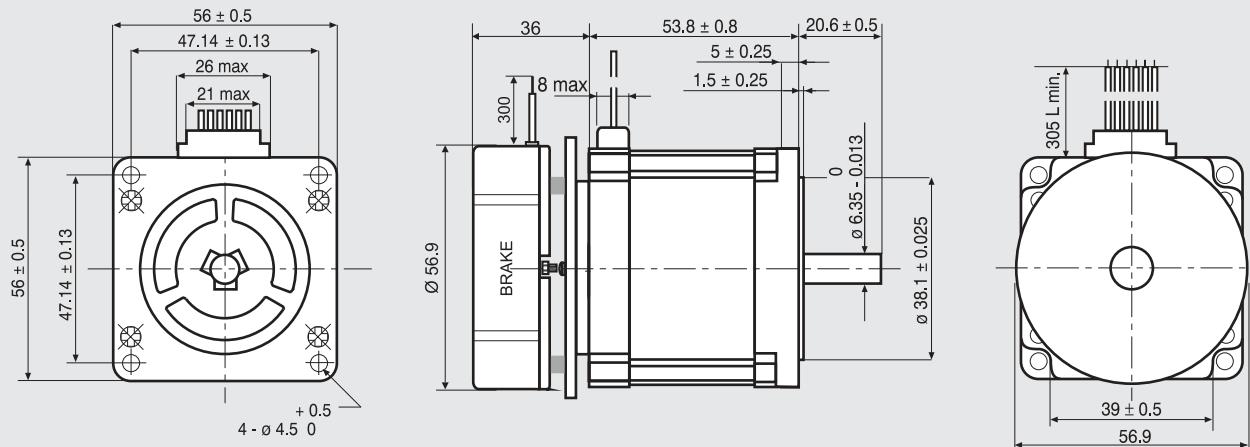
STATIC TORQUE	(Nm)	3.3
DUTY CYCLE		50% max.
VOLTAGE	(Volt)	24 VDC
POWER	(W)	11
RELEASE TIME	(ms)	300



Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H7123-0710.B

Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	103-H7123-0710.B
SANYO DENKI MOTOR CODE	103-H7123-0710
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT	(Amp) 2.2*
UNIPOLAR PARALLEL CURRENT	(Amp) 3.0
RESISTANCE	(Ohm) 0.77
INDUCTANCE	(mH) 1.6
BIPOLAR HOLDING TORQUE	(Ncm) 110
UNIPOLAR HOLDING TORQUE	(Ncm) 85
ROTOR INERTIA	(Kgm² × 10⁻⁷) 210
THEORETICAL ACCELERATION	(rad × sec.⁻²) 50000
BACK E.M.F.	(V/Krpm) 20
MASS	(Kg) 1.15
LEADS CODE	IV

<sup>(\*)</sup> Bipolar series connection.  
<sup>(\*)</sup> Collegamento bipolare serie.

## BRAKE FEATURES

STATIC TORQUE	(Nm) 3.3
DUTY CYCLE	50% max.
VOLTAGE	(Volt) 24 VDC
POWER	(W) 11
RELEASE TIME	(ms) 300

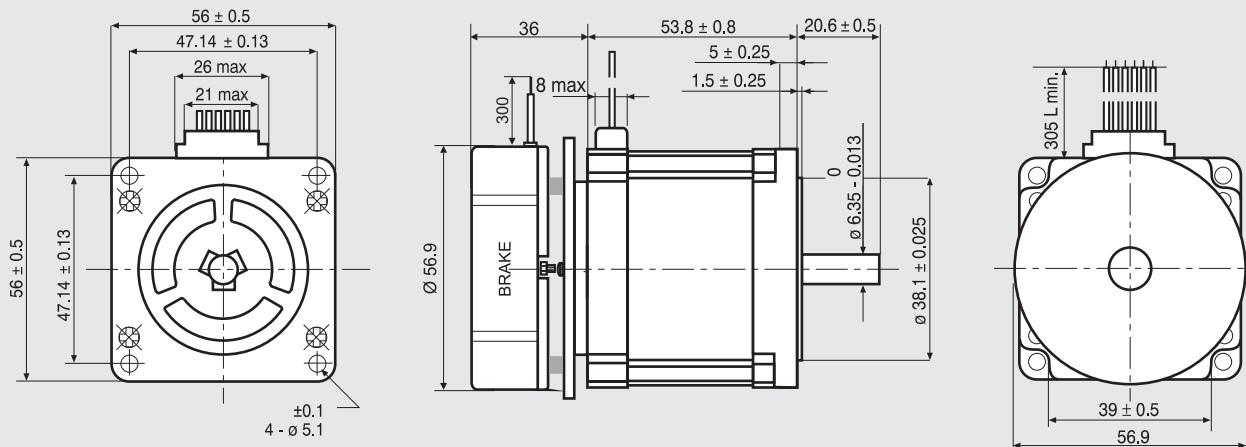


IV

Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H7123-1711.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	103-H7123-1711.B
SANYO DENKI MOTOR CODE	103-H7123-1711
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	4.0
UNIPOLAR PARALLEL CURRENT (Amp)	
RESISTANCE (Ohm)	0.41
INDUCTANCE (mH)	1.6
BIPOLAR HOLDING TORQUE (Ncm)	110
UNIPOLAR HOLDING TORQUE (Ncm)	
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	210
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	50000
BACK E.M.F. (V/Krpm)	20
MASS (Kg)	1.15
LEADS CODE	V

## BRAKE FEATURES

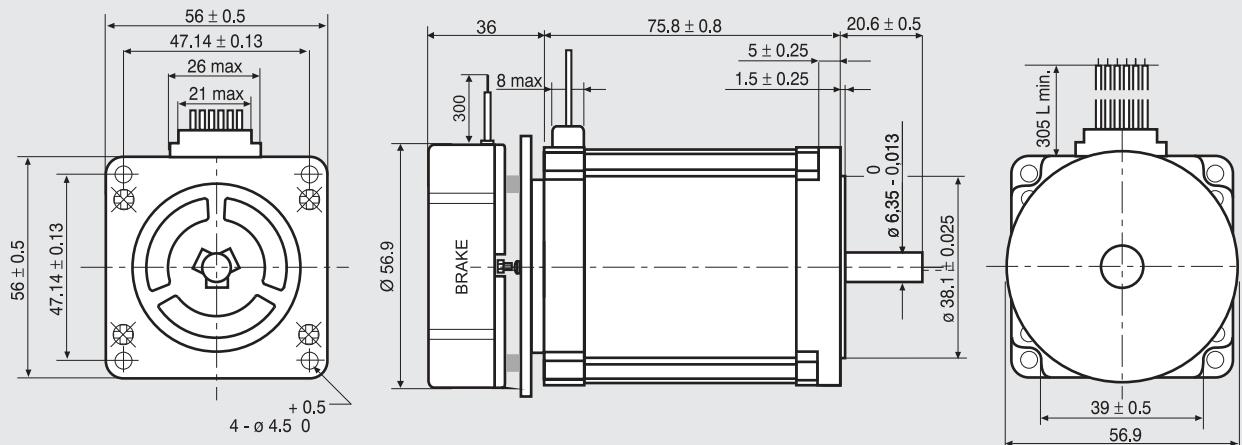
STATIC TORQUE (Nm)	3.3
DUTY CYCLE	50% max.
VOLTAGE (Volt)	24 VDC
POWER (W)	11
RELEASE TIME (ms)	300



Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

# 103-H7126-0710.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	103-H7126-0710.B
SANYO DENKI MOTOR CODE	103-H7126-0710
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT	(Amp) 2.2*
UNIPOLAR PARALLEL CURRENT	(Amp) 3.0
RESISTANCE	(Ohm) 0.9
INDUCTANCE	(mH) 2.2
BIPOLAR HOLDING TORQUE	(Ncm) 165
UNIPOLAR HOLDING TORQUE	(Ncm) 130
ROTOR INERTIA	(Kgm <sup>2</sup> × 10 <sup>-7</sup> ) 360
THEORETICAL ACCELERATION	(rad × sec. <sup>-2</sup> ) 45800
BACK E.M.F.	(V/Krpm) 31
MASS	(Kg) 1.5
LEADS CODE	IV

<sup>(\*)</sup>Bipolar series connection.  
<sup>(\*)</sup>Collegamento bipolare serie.

## BRAKE FEATURES

STATIC TORQUE	(Nm)	3.3
DUTY CYCLE		50% max.
VOLTAGE	(Volt)	24 VDC
POWER	(W)	11
RELEASE TIME	(ms)	300

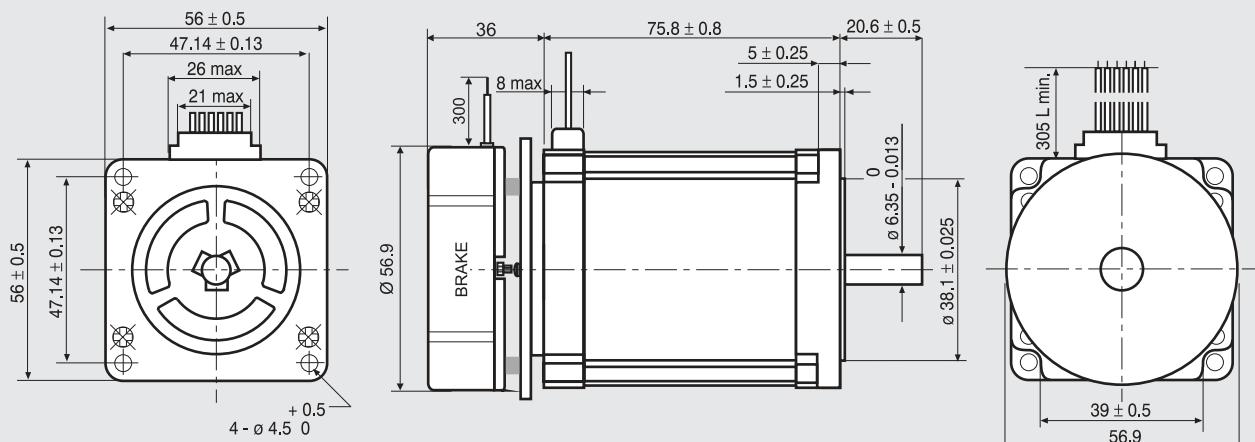


IV

Suggested R.T.A. driver: BSD Series, CSD/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series.

# 103-H7126-1710.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	103-H7126-1710.B
SANYO DENKI MOTOR CODE	103-H7126-1710
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT	(Amp) 4.0
UNIPOLAR PARALLEL CURRENT	(Amp)
RESISTANCE	(Ohm) 0.48
INDUCTANCE	(mH) 2.2
BIPOLAR HOLDING TORQUE	(Ncm) 165
UNIPOLAR HOLDING TORQUE	(Ncm)
ROTOR INERTIA	(Kgm <sup>2</sup> × 10 <sup>-7</sup> ) 360
THEORETICAL ACCELERATION	(rad × sec. <sup>-2</sup> ) 45800
BACK E.M.F.	(V/Krpm) 31
MASS	(Kg) 1.5
LEADS CODE	V

## BRAKE FEATURES

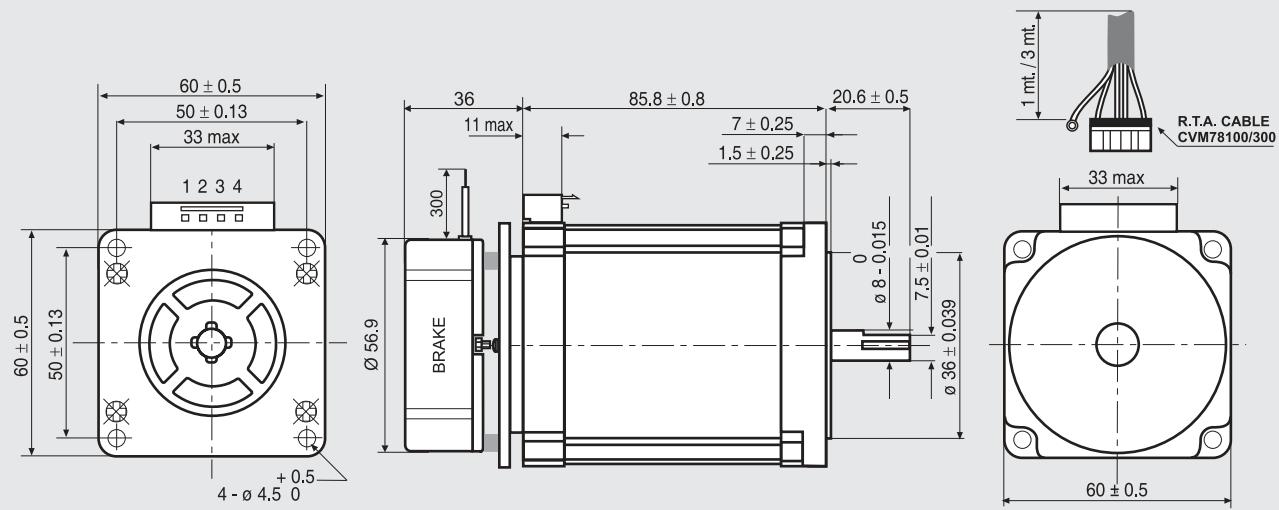
STATIC TORQUE	(Nm)	3.3
DUTY CYCLE		50% max.
VOLTAGE	(Volt)	24 VDC
POWER	(W)	11
RELEASE TIME	(ms)	300



Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

# 103-H7823-1714.B

## Dimensions (Unit:mm)



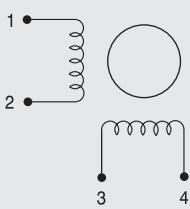
## SANYO DENKI MOTOR FEATURES

MODEL	103-H7823-1714.B
SANYO DENKI MOTOR CODE	103-H7823-1714
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	4.0
UNIPOLAR PARALLEL CURRENT (Amp)	
RESISTANCE (Ohm)	0.65
INDUCTANCE (mH)	2.4
BIPOLAR HOLDING TORQUE (Ncm)	300
UNIPOLAR HOLDING TORQUE (Ncm)	
ROTOR INERTIA (Kgm² × 10⁻⁷)	840
THEORETICAL ACCELERATION (rad × sec.⁻²)	35700
BACK E.M.F. (V/Krpm)	75
MASS (Kg)	1.9
LEADS CODE	V

103-H7823-1714 MOTOR NEEDS CVM78100 OR CVM78300 R.T.A. CABLES. CONTACT R.T.A. FOR FURTHER DETAILS.

## BRAKE FEATURES

STATIC TORQUE (Nm)	3.3
DUTY CYCLE	50% max.
VOLTAGE (Volt)	24 VDC
POWER (W)	11
RELEASE TIME (ms)	300



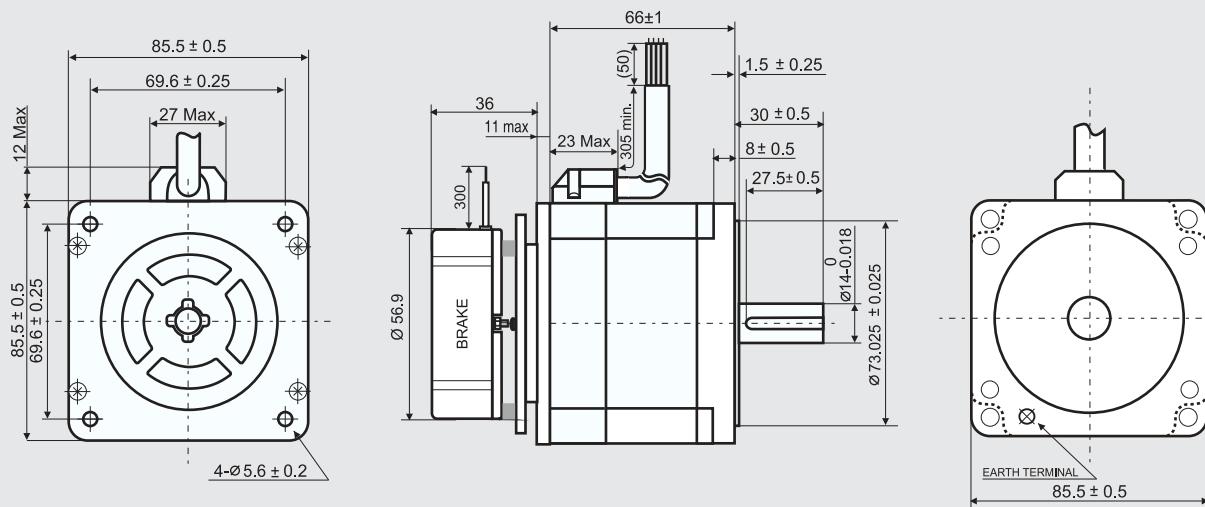
V



Suggested R.T.A. driver: CSD/CSD J/A-CSD Series, NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

# SM 2861-5025.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	SM 2861-5025.B
SANYO DENKI MOTOR CODE	SM 2861-5025
BASIC STEP ANGLE	$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT (Amp)	2.0
RESISTANCE (Ohm)	2.2
INDUCTANCE (mH)	15
BIPOLAR HOLDING TORQUE (Ncm)	360
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	1480
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	24300
BACK E.M.F. (V/Krpm)	180
MASS (Kg)	2.2
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

## BRAKE FEATURES

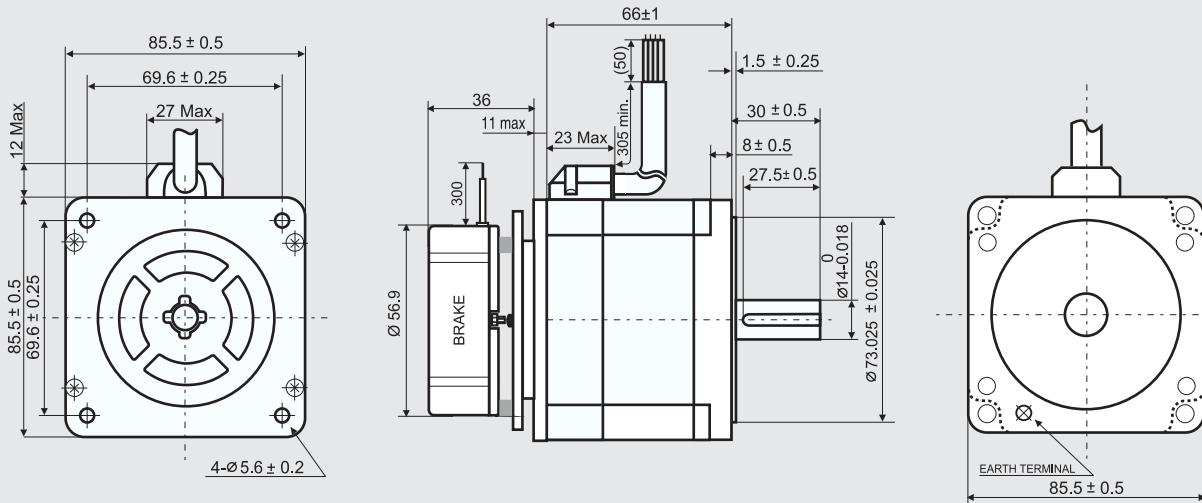
STATIC TORQUE (Nm)	3.3
DUTY CYCLE	50% max.
VOLTAGE (Volt)	24 VDC
POWER (W)	11
RELEASE TIME (ms)	300



Suggested R.T.A. driver: X-PLUS B Series, X-MIND Series.

# SM 2861-5225.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	SM 2861-5225.B
SANYO DENKI MOTOR CODE	SM 2861-5225
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT	(Amp) 6.0
RESISTANCE	(Ohm) 0.29
INDUCTANCE	(mH) 1.7
BIPOLAR HOLDING TORQUE	(Ncm) 360
ROTOR INERTIA	(Kgm <sup>2</sup> × 10 <sup>-7</sup> ) 1480
THEORETICAL ACCELERATION	(rad × sec. <sup>-2</sup> ) 24300
BACK E.M.F.	(V/Krpm) 60
MASS	(Kg) 2.2
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE	(V) 250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

## BRAKE FEATURES

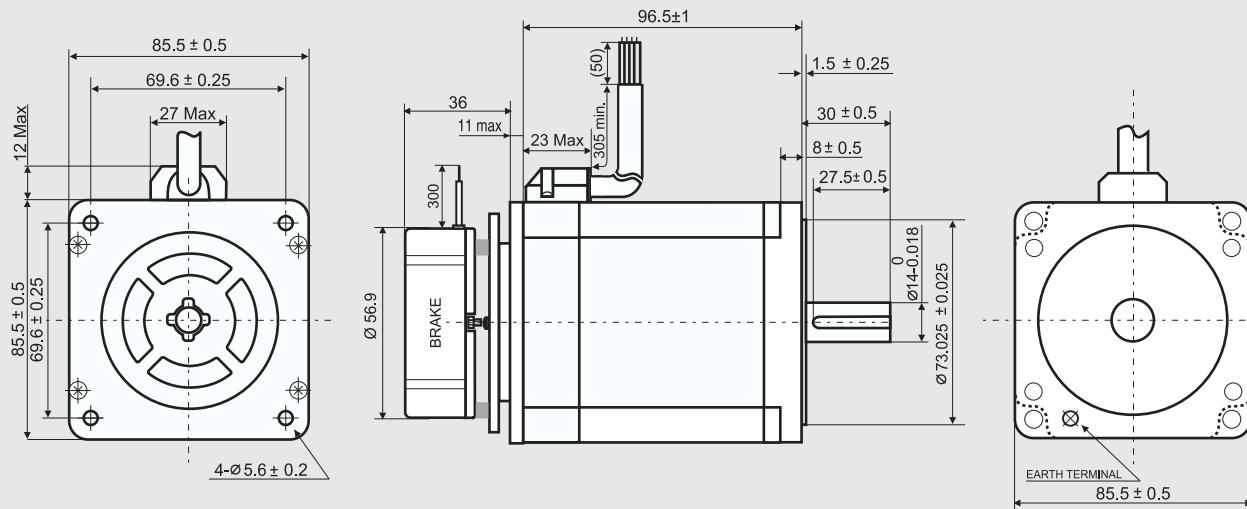
STATIC TORQUE	(Nm)	3.3
DUTY CYCLE		50% max.
VOLTAGE	(Volt)	24 VDC
POWER	(W)	11
RELEASE TIME	(ms)	300



Suggested R.T.A. driver: NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.

# SM 2862-5125.B

## Dimensions (Unit:mm)



## SANYO DENKI MOTOR FEATURES

MODEL	SM 2862-5125.B
SANYO DENKI MOTOR CODE	SM 2862-5125
BASIC STEP ANGLE	1.8° ± 0.09°
BIPOLAR PARALLEL CURRENT (Amp)	4.0
RESISTANCE (Ohm)	0.83
INDUCTANCE (mH)	6.4
BIPOLAR HOLDING TORQUE (Ncm)	700
ROTOR INERTIA ( $\text{Kgm}^2 \times 10^{-7}$ )	3000
THEORETICAL ACCELERATION (rad × sec. <sup>-2</sup> )	23300
BACK E.M.F. (V/Krpm)	175
MASS (Kg)	3.4
INTERNATIONAL STANDARDS	UL, CSA
INSULATION VOLTAGE (V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS	IP43 - F
LEADS CODE	V

## BRAKE FEATURES

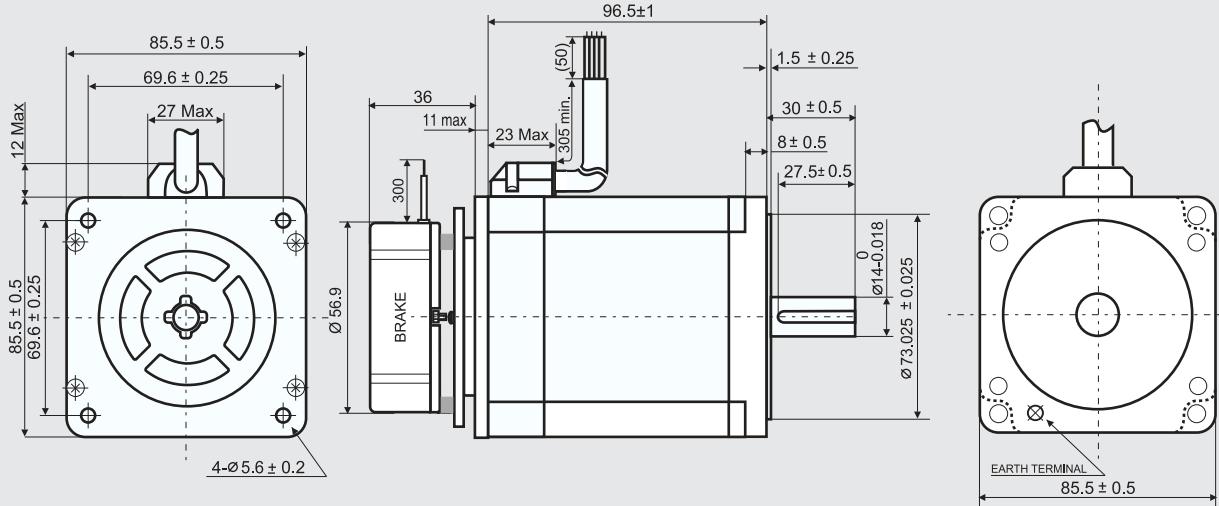
STATIC TORQUE (Nm)	3.3
DUTY CYCLE	50% max.
VOLTAGE (Volt)	24 VDC
POWER (W)	11
RELEASE TIME (ms)	300



Suggested R.T.A. driver: X-PLUS B Series, X-MIND Series.

**SM 2862-5225.B**

### **Dimensions (Unit:mm)**



#### SANYO DENKI MOTOR FEATURES

MODEL		SM 2862-5225.B
SANYO DENKI MOTOR CODE		SM 2862-5225
BASIC STEP ANGLE		$1.8^\circ \pm 0.09^\circ$
BIPOLAR PARALLEL CURRENT	(Amp)	6.0
RESISTANCE	(Ohm)	0.36
INDUCTANCE	(mH)	2.8
BIPOLAR HOLDING TORQUE	(Ncm)	700
ROTOR INERTIA	(Kgm <sup>2</sup> × 10 <sup>-7</sup> )	3000
THEORETICAL ACCELERATION	(rad × sec. <sup>-2</sup> )	23300
BACK E.M.F.	(V/Krpm)	120
MASS	(Kg)	3.4
INTERNATIONAL STANDARDS		UL, CSA
INSULATION VOLTAGE	(V)	250 VAC (350 VDC)
PROTECTION DEGREE - INSULATION CLASS		IP43 - F
LEADS CODE		V

## BRAKE FEATURES

Brake Features		
STATIC TORQUE	(Nm)	3.3
DUTY CYCLE		50% max.
VOLTAGE	(Volt)	24 VDC
POWER	(W)	11
RELEASE TIME	(ms)	300



Suggested R.T.A. driver: NDC/A-NDC Series, ADW Series, HGD Series, PLUS Series.



# *Stepper Gearboxes*

## STEPPER GEARBOXES SG SERIES TABLE OF CONTENTS

SG SERIES STEPPER GEARBOXES	GEARBOX BODY (mm.)	MAXIMUM VELOCITY (min <sup>-1</sup> )	BACKLASH (arcmin)	EMERGENCY TORQUE (Nm)	MOTOR COUPLING (Flange Size)	TECHNICAL DATA DATI TECNICI (page/pagina)
<b><i>i=3</i></b>						
SG-P11-050-003-12-HH-712X	55	4000	12'	28	NEMA 23	59
SG-P11-050-003-12-HH-782X	55	4000	12'	28	60 mm.	60
SG-P11-070-003-12-SM-286X	70	4000	12'	60	NEMA 34	61
<b><i>i=5</i></b>						
SG-P12-040-005-15-HH-712X	40	5000	<15'	30	NEMA 17	62
SG-P11-050-005-12-HH-712X	55	5000	12'	30	NEMA 23	63
SG-P11-050-005-12-HH-782X	55	5000	12'	30	60 mm.	64
SG-P11-050-005-12-SM-2861	55	5000	12'	30	NEMA 34	65
SG-P11-070-005-12-SM-286X	70	5000	12'	70	NEMA 34	66
<b><i>i=9</i></b>						
SG-P11-050-009-12-HH-712X	55	6000	12'	28	NEMA 23	67
<b><i>i=10</i></b>						
SG-P12-040-010-15-HH-52XX	40	5000	<15'	25	NEMA 17	68
SG-P11-070-010-12-HH-782X	70	6000	12'	60	60 mm.	69
SG-P11-070-010-12-SM-2861	70	6000	12'	60	NEMA 34	70
SG-P11-090-010-12-SM-286X	90	6000	12'	150	NEMA 34	71
<b><i>i=25</i></b>						
SG-P12-040-025-19-HH-52XX	40	5000	<19'	30	NEMA 17	72



**i** = From 3 to 25

**Φ=12'**

**IP64**

**PLUG & GO!**

**IN STOCK**

# SG-P11-050-003-12-HH-712X-00000

## PLANETARY GEARBOXES

SG 050

$i=003$

$\Phi=12'$

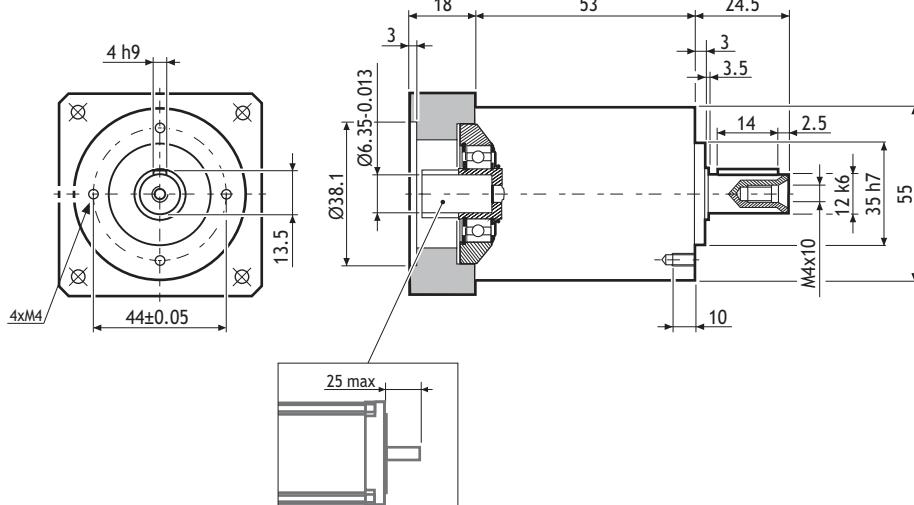
MADE  
IN  
ITALY

IP64

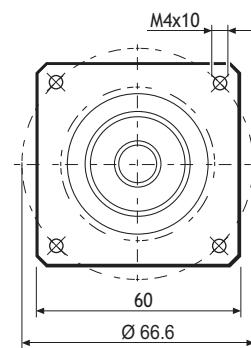


## Dimensions (Units:mm)

SHAFT SIDE VIEW



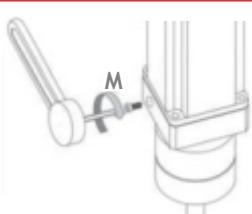
FLANGE SIDE VIEW



1.1  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹] [Nm/arcmin]	Torsional stiffness	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-050-003-12-HH-712X-00000	10	16	28	12'	3300	4000	0.9	500	600	97	$0.07 \times 10^4$

## Suggested motors



103-H7123 SERIES

103-H7126 SERIES

MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

**SG-P11-050-003-12-HH-782X-00000**

## PLANETARY GEARBOXES

SG 050

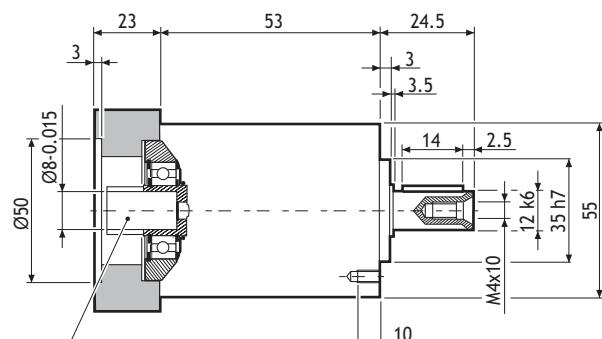
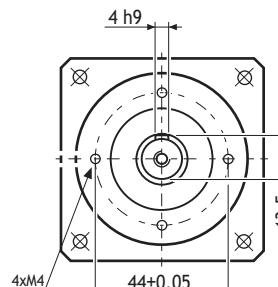
 $i=003$  $\Phi=12'$ MADE  
IN  
ITALY

IP64

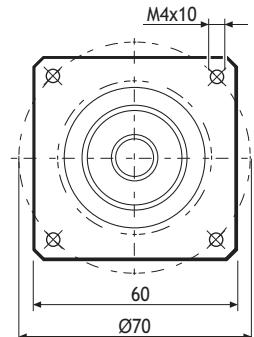


## Dimensions (Units:mm)

## SHAFT SIDE VIEW

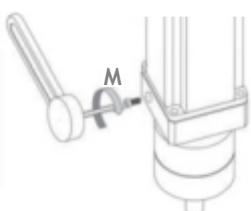


## FLANGE SIDE VIEW

1.1  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-050-003-12-HH-782X-00000	10	16	28	12'	3300	4000	0.9	500	600	97	0.07x10⁴

## Suggested motors



103-H7823 SERIES



MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

# SG-P11-070-003-12-SM-286X-00000

## PLANETARY GEARBOXES

SG 070

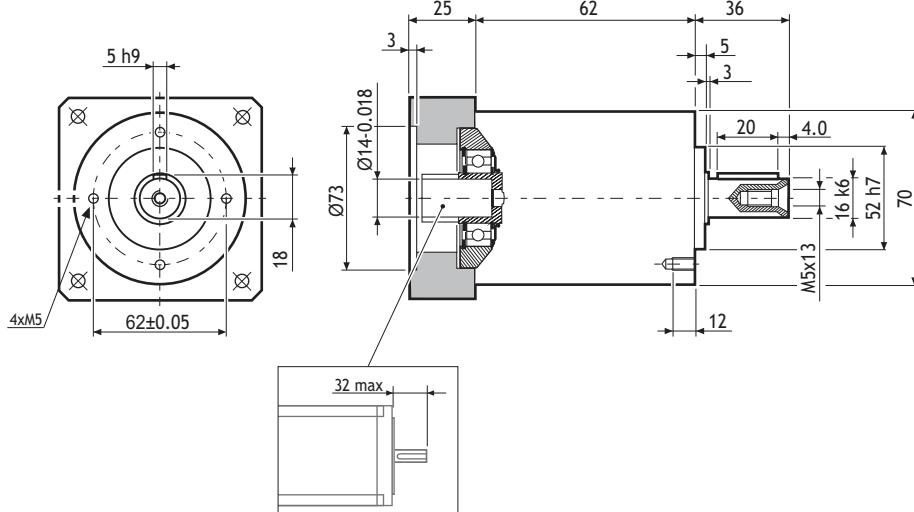
 $i=003$  $\Phi=12'$ MADE  
IN  
ITALY

IP64

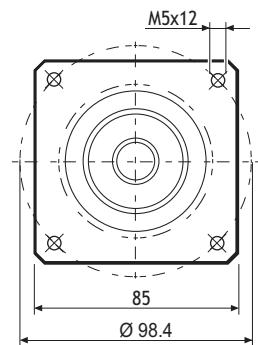


## Dimensions (Units:mm)

SHAFT SIDE VIEW

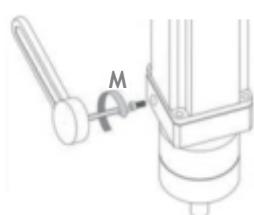


FLANGE SIDE VIEW

2.0  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-070-003-12-SM-286X-00000	18	30	60	12'	3300	4000	3	1300	1400	97	$0.14 \times 10^{-4}$

## Suggested motors



SM 2862 SERIES



cRJ us

SM 2863 SERIES



cRJ us

MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

**SG-P12-040-005-15-HH-52XX-00000**

## PLANETARY GEARBOXES

SG 040

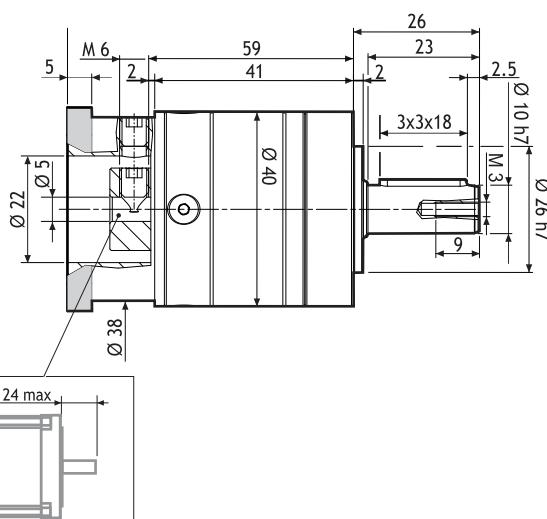
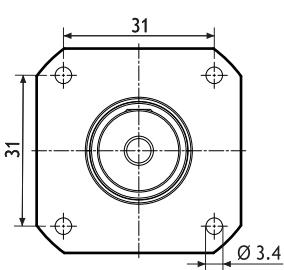
 $i=005$  $\phi < 15'$ MADE  
IN  
ITALY

IP64

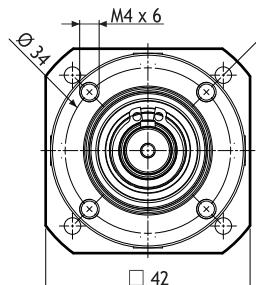


## Dimensions (Units:mm)

SHAFT SIDE VIEW



FLANGE SIDE VIEW



MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P12-040-005-15-HH-52XX-00000	12	18	30	<15'	5000	8000	0.8	220	200	98	$1.6 \times 10^{-6}$

## Suggested motors

	103-H5205 SERIES	103-H5208 SERIES	103-H5210 SERIES
MOUNTING OPERATION MODE:	■ Tightening torque M=5 Nm	■ Locking bolt M4	■ R.T.A. Quality Control

# SG-P11-050-005-12-HH-712X-00000

## PLANETARY GEARBOXES

SG 050

$i=005$

$\Phi=12'$

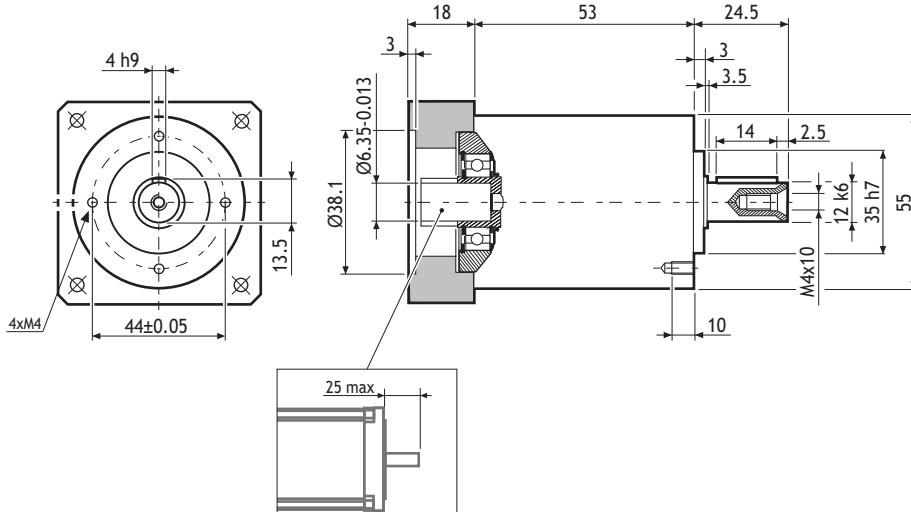
MADE  
IN  
ITALY

IP64

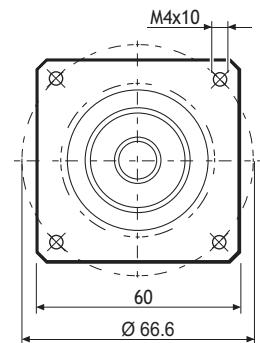


## Dimensions (Units:mm)

SHAFT SIDE VIEW



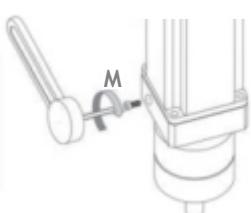
FLANGE SIDE VIEW



1.1  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-050-005-12-HH-712X-00000	12	20	30	12'	3500	5000	0.9	500	600	97	$0.05 \times 10^4$

## Suggested motors



103-H7123 SERIES



103-H7126 SERIES



MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

**SG-P11-050-005-12-HH-782X-00000**

## PLANETARY GEARBOXES

SG 050

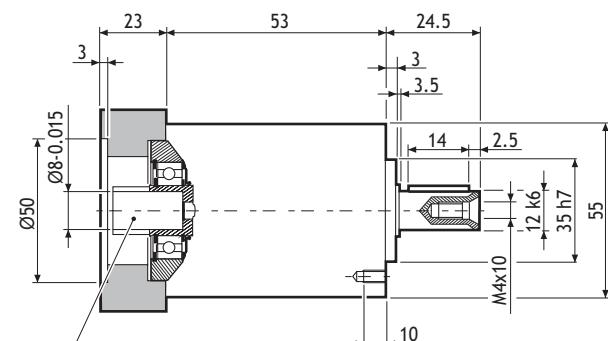
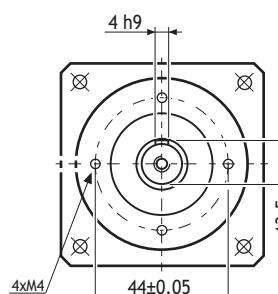
 $i=005$  $\Phi=12'$ MADE  
IN  
ITALY

IP64

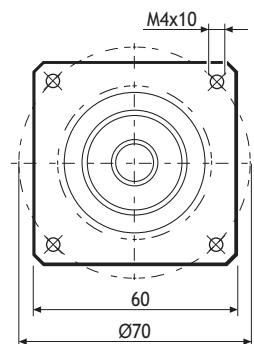


## Dimensions (Units:mm)

## SHAFT SIDE VIEW

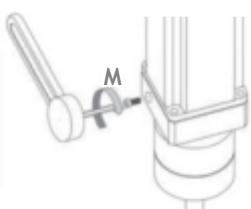


## FLANGE SIDE VIEW

1.1  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-050-005-12-HH-782X-00000	12	20	30	12'	3500	5000	0.9	500	600	97	0.05x10⁴

## Suggested motors



103-H7823 SERIES



MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

# SG-P11-050-005-12-SM-2861-00000

## PLANETARY GEARBOXES

SG 050

$i=005$

$\Phi=12'$

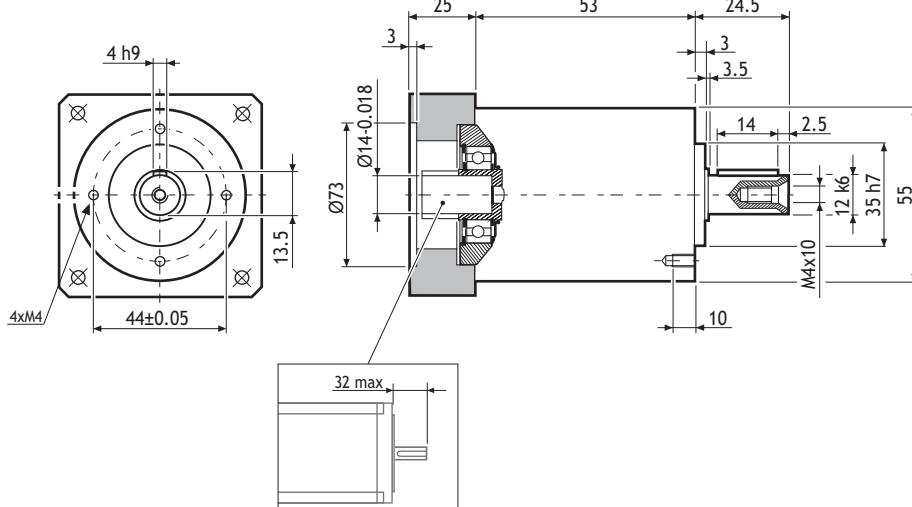
MADE  
IN  
ITALY

IP64

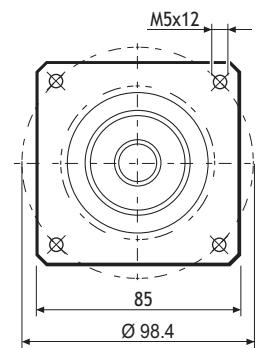


## Dimensions (Units:mm)

SHAFT SIDE VIEW



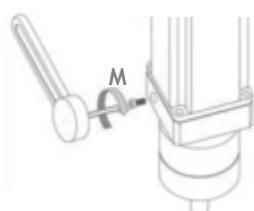
FLANGE SIDE VIEW



1.1  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-050-005-12-SM-2861-00000	12	20	30	12'	3500	5000	0.9	500	600	97	$0.07 \times 10^4$

## Suggested motors



SM 2861 SERIES



CULUS

MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

**SG-P11-070-005-12-SM-286X-00000**

## PLANETARY GEARBOXES

SG 070

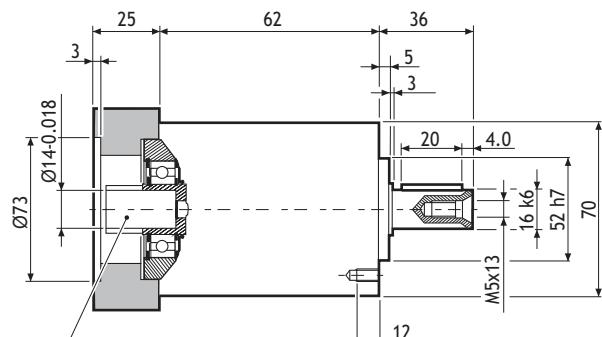
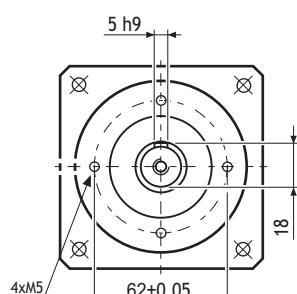
 $i=005$  $\Phi=12'$ MADE  
IN  
ITALY

IP64

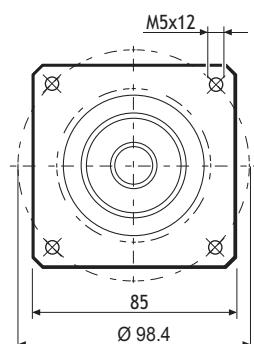


## Dimensions (Units:mm)

## SHAFT SIDE VIEW

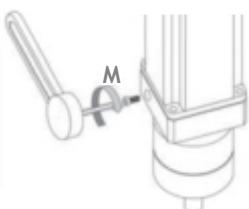


## FLANGE SIDE VIEW

2.0  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-070-005-12-SM-286X-00000	25	35	70	12'	3500	5000	3	1300	1400	97	0.09x10⁴

## Suggested motors



SM 2862 SERIES



cRJus

SM 2863 SERIES



cRJus

MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

# SG-P11-050-009-12-HH-712X-00000

## PLANETARY GEARBOXES

SG 050

 $i=009$  $\Phi=12'$ 

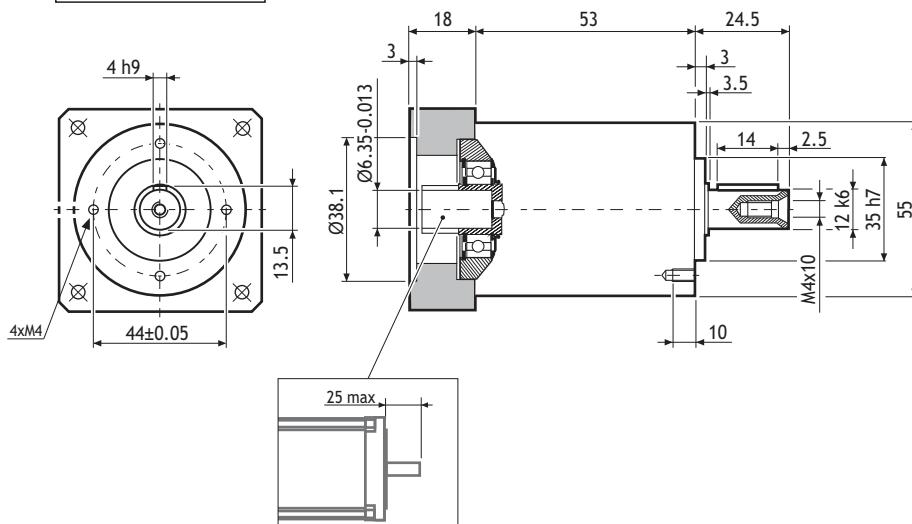
MADE IN ITALY

IP64

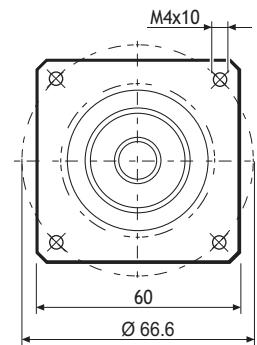


## Dimensions (Units:mm)

SHAFT SIDE VIEW



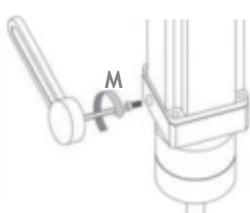
FLANGE SIDE VIEW



1.1 Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-050-009-12-HH-712X-00000	10	16	28	12'	4000	6000	0.9	500	600	97	$0.04 \times 10^4$

## Suggested motors



103-H7123 SERIES



103-H7126 SERIES



MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

# SG-P12-040-010-15-HH-52XX-00000

## PLANETARY GEARBOXES

SG 040

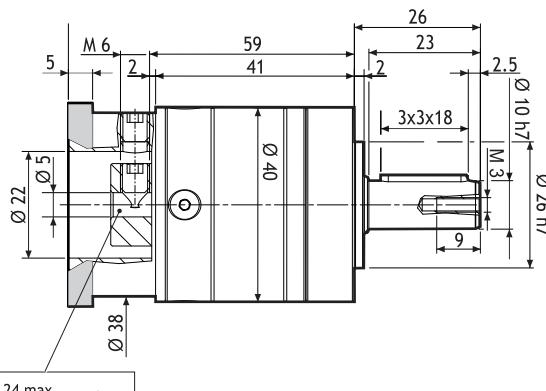
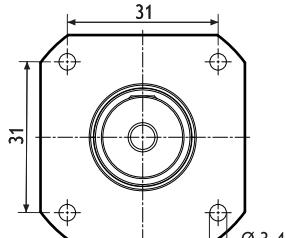
 $i=10$  $\varphi < 15'$ MADE  
IN  
ITALY

IP64

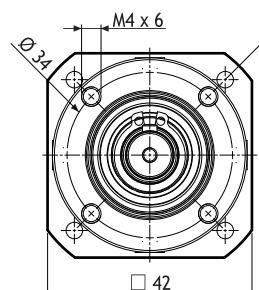


## Dimensions (Units:mm)

SHAFT SIDE VIEW



FLANGE SIDE VIEW



MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P12-040-010-15-HH-52XX-00000	6	9	25	<15'	5000	8000	0.8	220	200	98	$1.2 \times 10^{-6}$

## Suggested motors

	103-H5205 SERIES	103-H5208 SERIES	103-H5210 SERIES
MOUNTING OPERATION MODE:  Tightening torque $M=5$ Nm  Locking bolt M4  R.T.A. Quality Control			

**SG-P11-070-010-12-HH-782X-00000**

## PLANETARY GEARBOXES

SG 070

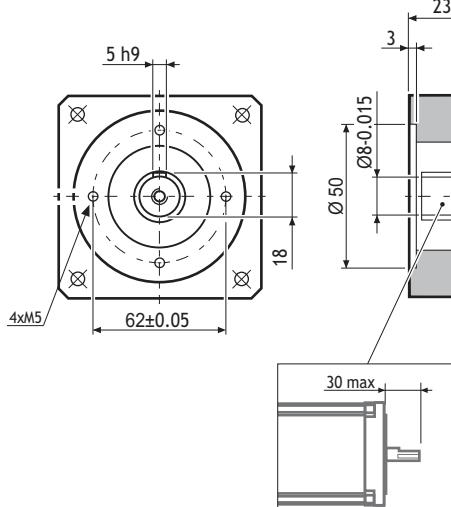
i=010

Φ=12°

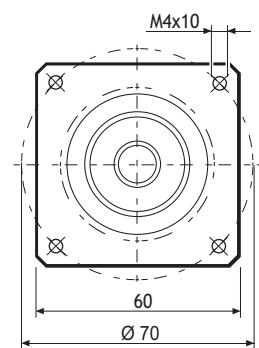


## Dimensions (Units:mm)

SHAFT SIDE VIEW



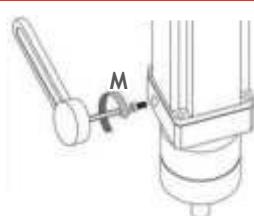
#### FLANGE SIDE VIEW



2.0  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min <sup>-1</sup> ]	Maximum momentary input speed [min <sup>-1</sup> ]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm <sup>2</sup> ]
SG-P11-070-010-12-HH-782X-00000	18	30	60	12'	4000	6000	3	1300	1400	97	0.06x10 <sup>4</sup>

## Suggested motors



103-H7823 SERIES



#### **MOUNTING OPERATION MODE:**

#### ■ Tightening torque M=5 Nm

#### ■ Locking bolt M4

#### ■ R.T.A. Quality Control

**SG-P11-070-010-12-SM-2861-00000**

## PLANETARY GEARBOXES

SG 070

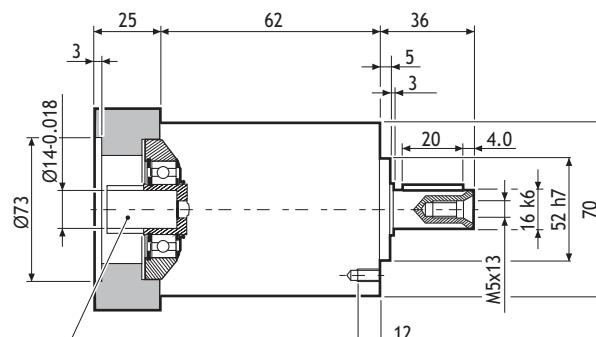
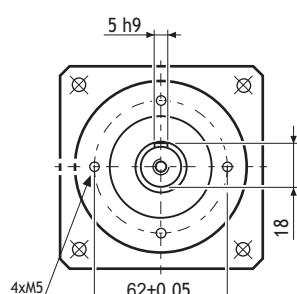
 $i=010$  $\Phi=12'$ MADE  
IN  
ITALY

IP64

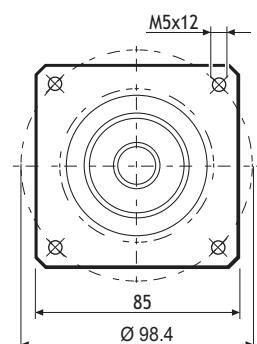


## Dimensions (Units:mm)

## SHAFT SIDE VIEW

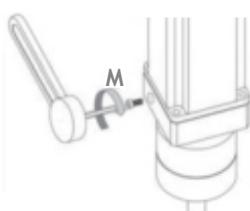


## FLANGE SIDE VIEW

2.0  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-070-010-12-SM-2861-00000	18	30	60	12'	4000	6000	3	1300	1400	97	0.04x10⁴

## Suggested motors



SM 2861 SERIES



cRJus

MOUNTING OPERATION MODE:

■ Tightening torque M=5 Nm

■ Locking bolt M4

■ R.T.A. Quality Control

# SG-P11-090-010-12-SM-286X-00000

## PLANETARY GEARBOXES

SG 090

$i=10$

$\Phi=12'$

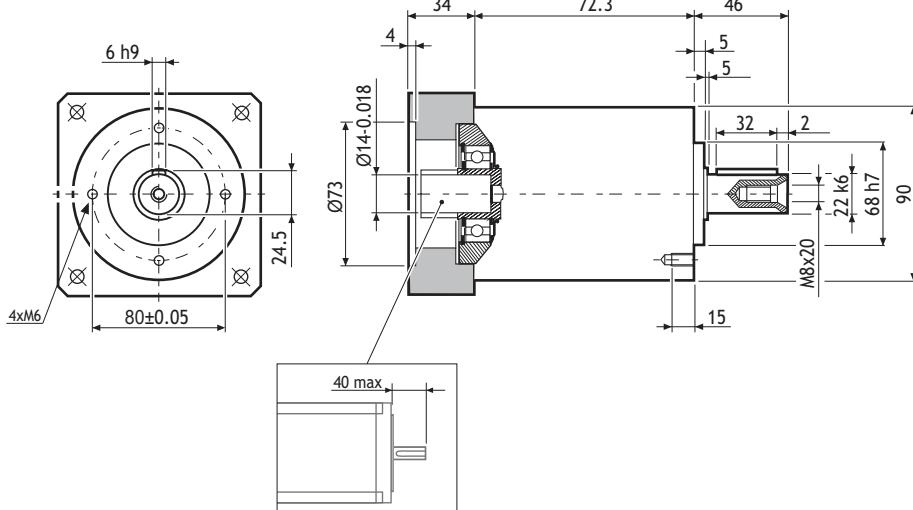
MADE  
IN  
ITALY

IP64

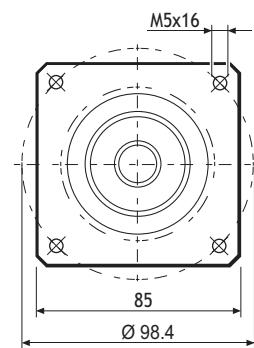


## Dimensions (Units:mm)

SHAFT SIDE VIEW



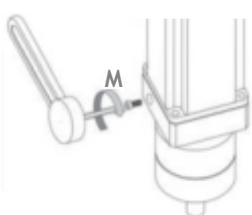
FLANGE SIDE VIEW



4.2  
Kg

MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P11-090-010-12-SM-286X-00000	37	70	150	12'	4000	6000	9	2200	1900	97	$0.35 \times 10^{-4}$

## Suggested motors



SM 2862 SERIES



cRUS

SM 2863 SERIES



cRUS

MOUNTING OPERATION MODE:

■ Tightening torque M=11 Nm

■ Locking bolt M6

■ R.T.A. Quality Control

**SG-P12-040-025-19-HH-52XX-00000**

## PLANETARY GEARBOXES

SG 040

i=025

Φ&lt;19'

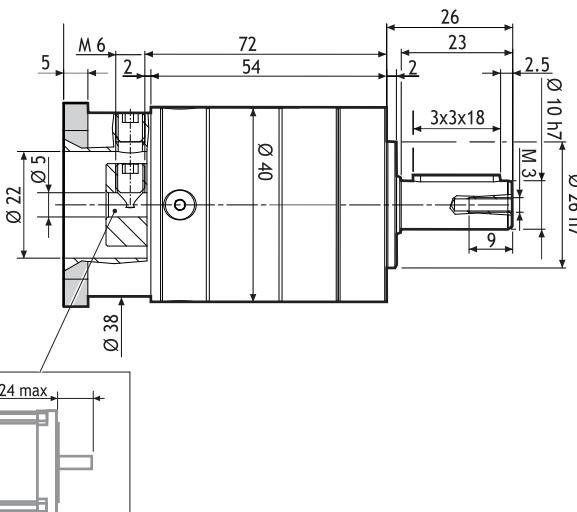
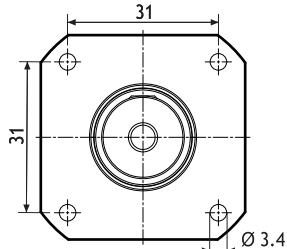
MADE  
IN  
ITALY

IP64

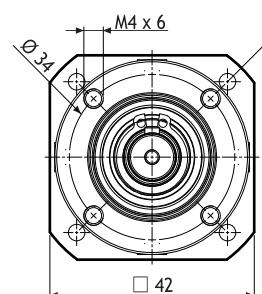


## Dimensions (Units:mm)

SHAFT SIDE VIEW



FLANGE SIDE VIEW



MODEL	Rated output torque [Nm]	Maximum acceleration output torque [Nm]	Emergency step output torque [Nm]	Backlash [arcmin]	Nominal input speed [min⁻¹]	Maximum momentary input speed [min⁻¹]	Torsional stiffness [Nm/arcmin]	Maximum radial force applying on output shaft [N]	Maximum axial force applying on output shaft [N]	Gear efficiency [%]	Gear moment of inertia [Kgm²]
SG-P12-040-025-19-HH-52XX-00000	12	18	30	<19'	5000	8000	0.8	220	200	97	1.5x10⁶

## Suggested motors



## ■ NOTES



## NOTES



#### HEADQUARTERS

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