Closed-loop stepper motor with dPOS® Technology

dSM17XXX/A/B/C/BB/CB/AIO/BIO/CIO/BBIO/CBIO

Revision Version 1.0.0

Contents

General Description

The ***dSM17XXX series*** offer a low cost, high precision and robustness option of NEMA 17 closed loop stepper motors with our dPOS® technology. With pneumatic cylinder direct replacement, multi-actuator applications and the circular M8-M12 connector for a quick installation feature.

The dSM17XXX stepper motor can be implemented to perform tasks as simple as single axis automation to more complex tasks as a laser welding machine. Available in single-stack, double-stack, triple-stack, with a brake additament, and I/O's. These series of stepper motors bring a broad list of configurations to satisfy every application and need.

Figure 2 dSM17XXIO series.

Features

dPOS® technology is one of the main features in the closed loop stepper motor, some characteristics are listed next:

- Magnetic encoder with 2 X 10^{14} PPR.
- Multi-Turn Absolute magnetic encoder.
- Battery backup operation (Lithium).
- Shock and vibration resistant encoder.

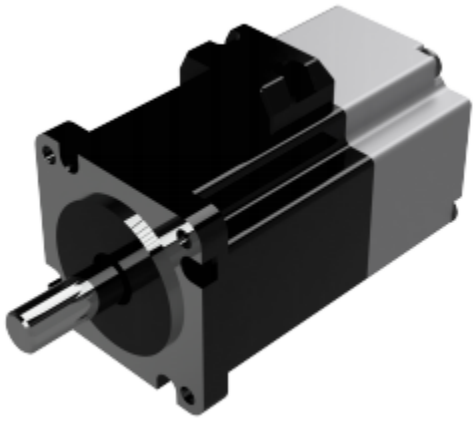


Figure 1 dSM17XXX Series.

- Heat and Humidity resistance encoder.
- 24v PNP output for control in resistive or inductive loads. ***1**
- Sinking and sourcing digital I/O capability. ***1**

Applications

The closed loop stepper motor can be used to any industrial application however the robotics and high precision usage is recommended. Some examples are:

- Single axis motion.
- Pneumatic cylinder actuator replacement.
- Multi-Actuator applications.
- Cartesian robots.
- Selective soldering.
- Laser beam welding machine.
- Dispensing.
- Pick and place applications.

***1 – Applies only for the dSM17XXIO series.**

Model Number Structure

- Model Number Legend for Stepper Motors

dSM☐☐☐☐
(1) (2) (3) (4)

1. Size
   17 : Nema 17
   23 : Nema 23
   34 : Nema 34

2. Type
   A : Single stack
   B : Double stack
   C : Triple stack

3. Brake additament
   B : brake additament

4. I/O model
   IO : 2 universal inputs and 1 PNP output

- Model Number Legend for Cables & Connectors (Feedback)

CPOS - ☐ **-** ☐
(1) (2)

1. End
   F : Female Ends
   M : Male Ends
   MF : Male to Female End
   FR : Female Ends - Right angled
   MR : Male Ends - Right angled
   MFR : Male to Female - Right angled End
   MRF : Male - Right angled to Female End
   MRFR : Male to Female – Right Angled Ends

2. Length (m)
   05 : 0.5 m
   10 : 1 m
   12 : 1.2 m
   14 : 1.4 m
   16 : 1.6 m
   ↓*2
   50 : 5 m

- Model Number Legend for Stepper Motors Power Cables

CPWRT☐ **-** ☐
(1) (2)

1. End
   R : Right Angled

2. Length (m)
   05 : 0.5 m
   10 : 1 m
   ↓*2
   50 : 5 m

***2 - Lengths go from 1 m to 5 m, in increments of 0.2m each.**

Specifications

- Closed loop Stepper Motors (No Brake additament)

Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/⌀	Ω/⌀	mH/⌀	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17A	2	17	1.8	1.7	1.5	2.8	0.4	54	Bi (4)	0.32	43	325
dSM17B	2	17	1.8	2.3	1.0	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17C	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325

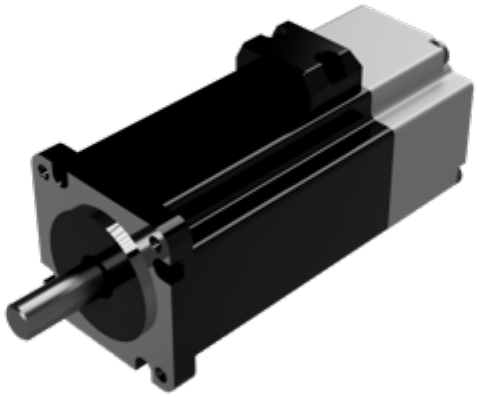


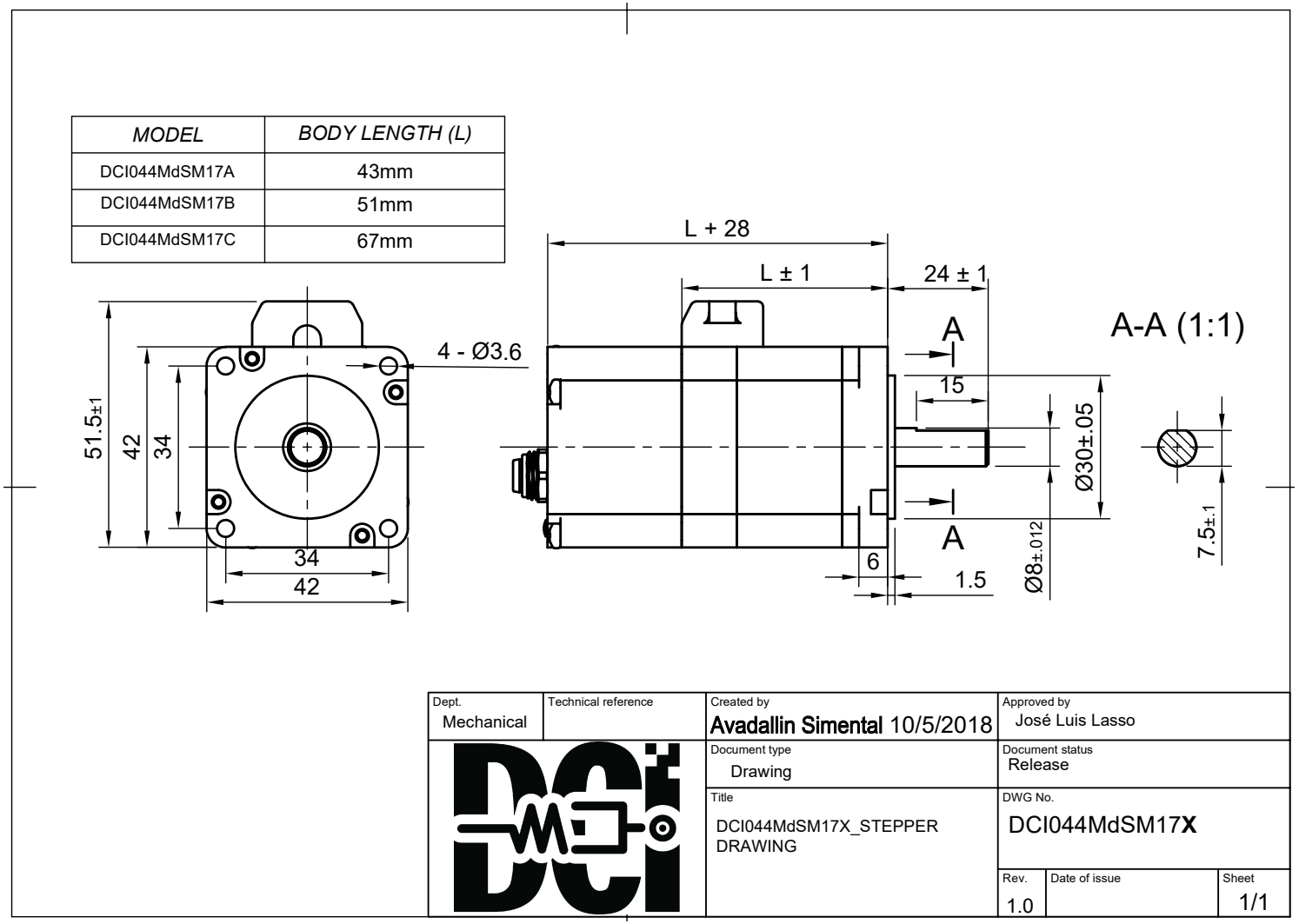
Figure 3 dSM17C Isometric View.

Figure 4 dSM17C Connectors.

Figure 5 dSM17C Top View.

- dSM17X Mechanical Drawing

MODEL	BODY LENGTH (L)
DCI044MdSM17A	43mm
DCI044MdSM17B	51mm
DCI044MdSM17C	67mm



- Closed loop I/O Stepper Motors (No brake additament)

Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/⌀	Ω/⌀	mH/⌀	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17AIO	2	17	1.8	1.7	1.5	2.8	0.4	54	Bi (4)	0.32	43	325
dSM17BIO	2	17	1.8	2.3	1.0	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17CIO	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325

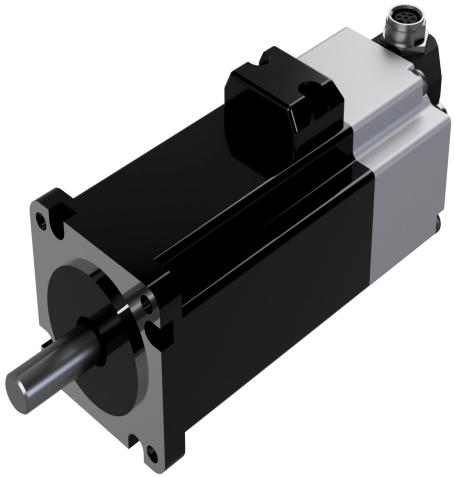


Figure 6 dSM17CIO Isometric View.

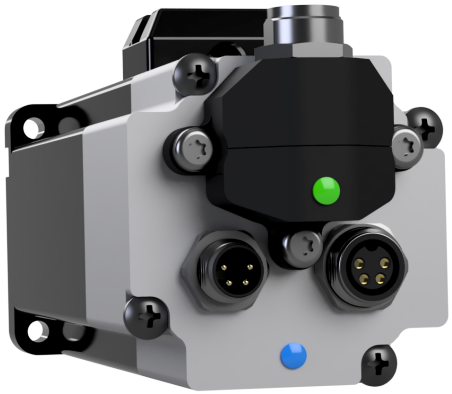


Figure 7 dSM17CIO Connectors.

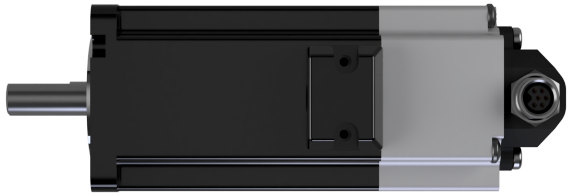
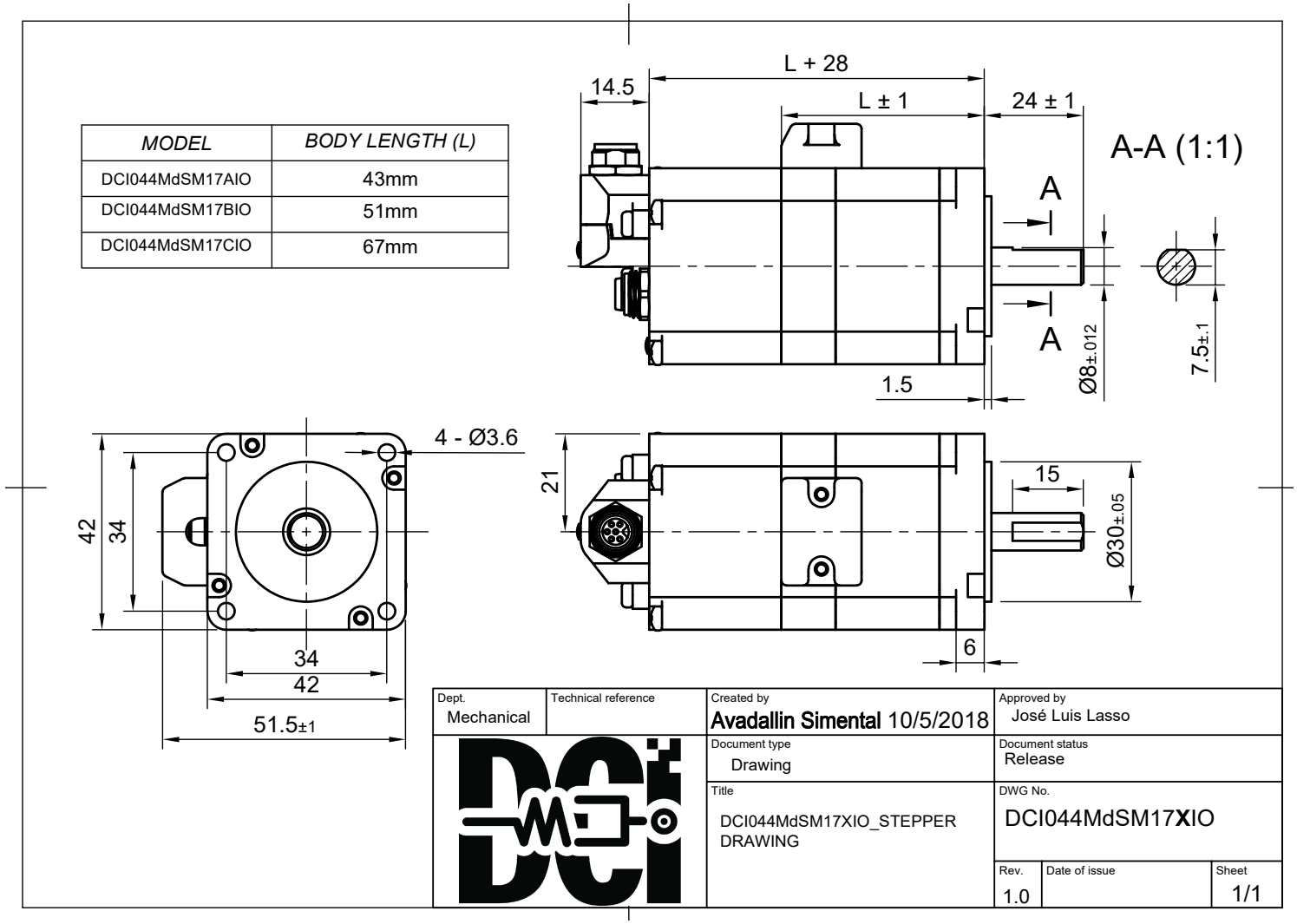


Figure 8 dSM17CIO Top View.

- dSM17XIO Mechanical Drawing

MODEL	BODY LENGTH (L)
DCI044MdSM17AIO	43mm
DCI044MdSM17BIO	51mm
DCI044MdSM17CIO	67mm



- Closed loop Stepper Motors (With Brake additament)

Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/⌀	Ω/⌀	mH/⌀	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17BB	2	17	1.8	2.3	1	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17CB	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325

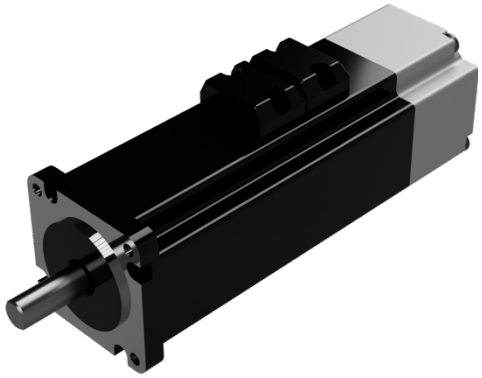


Figure 9 dSM17CB Isometric View.

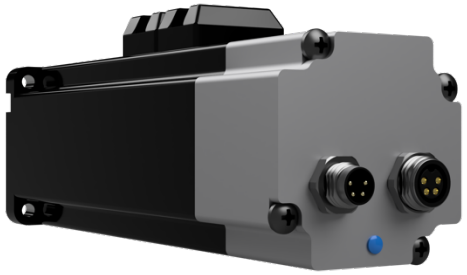
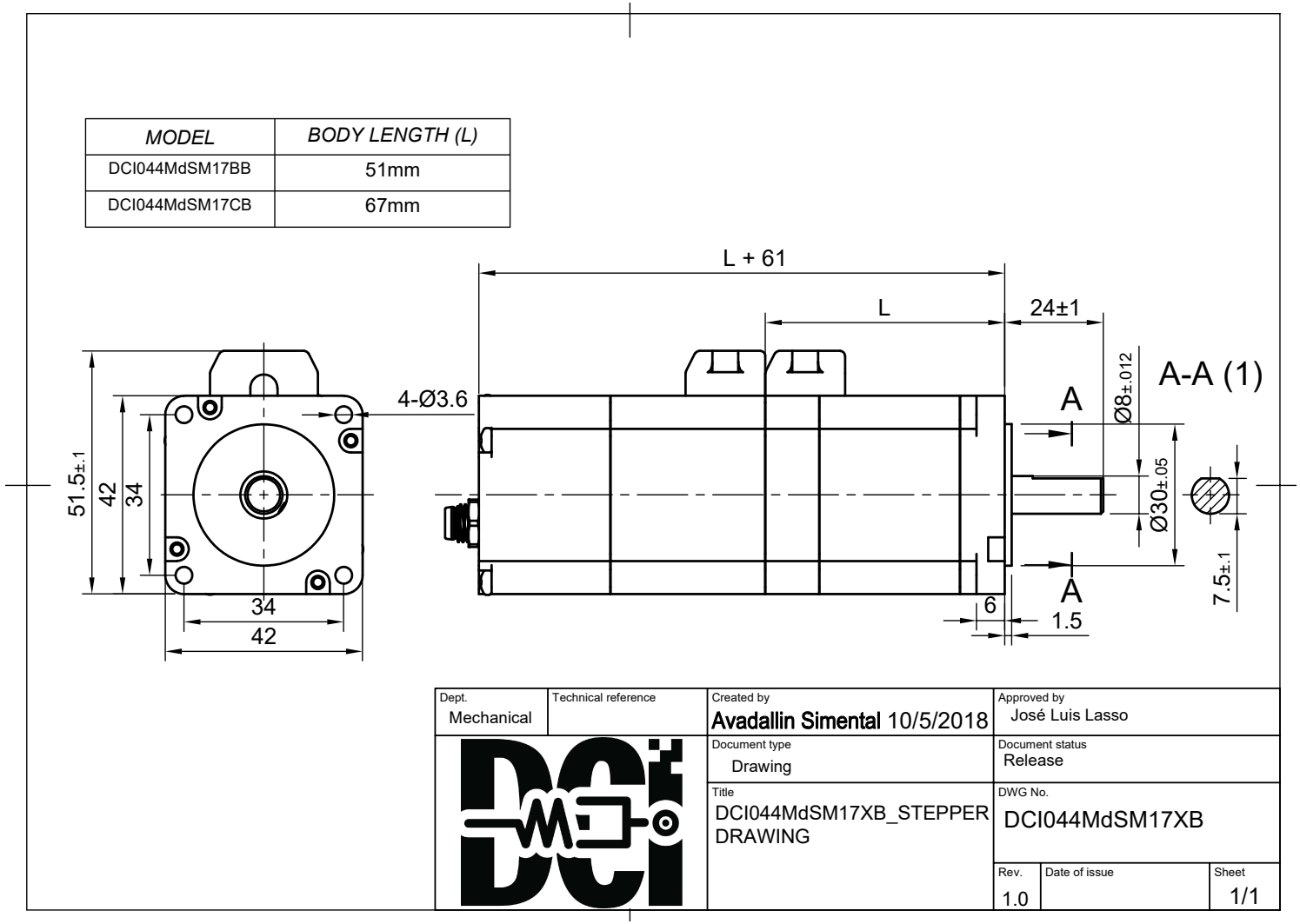


Figure 10 dSM17CB Connectors.

Figure 11 dSM17CB Top View.

- dSM17XB Mechanical Drawing

MODEL	BODY LENGTH (L)
DCI044MdSM17BB	51mm
DCI044MdSM17CB	67mm



- Closed loop I/O Stepper Motors (With brake additament)

Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/⌀	Ω/⌀	mH/⌀	N.m	$g.cm^2$	# of Leads	kg	mm	P/R
dSM17BBIO	2	17	1.8	2.3	1	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17CBIO	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325

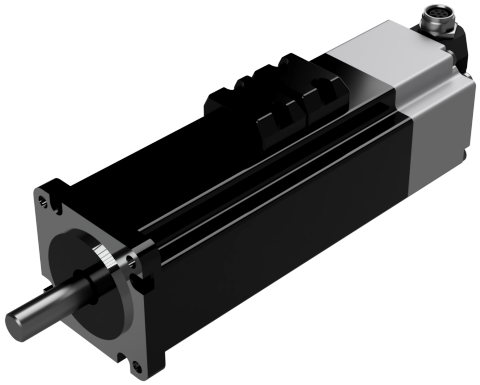


Figure 12 dSM17CBIO Isometric View.

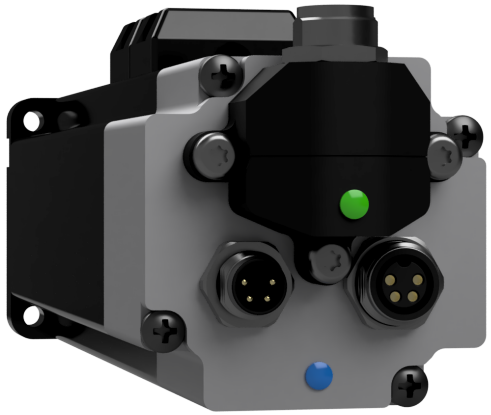
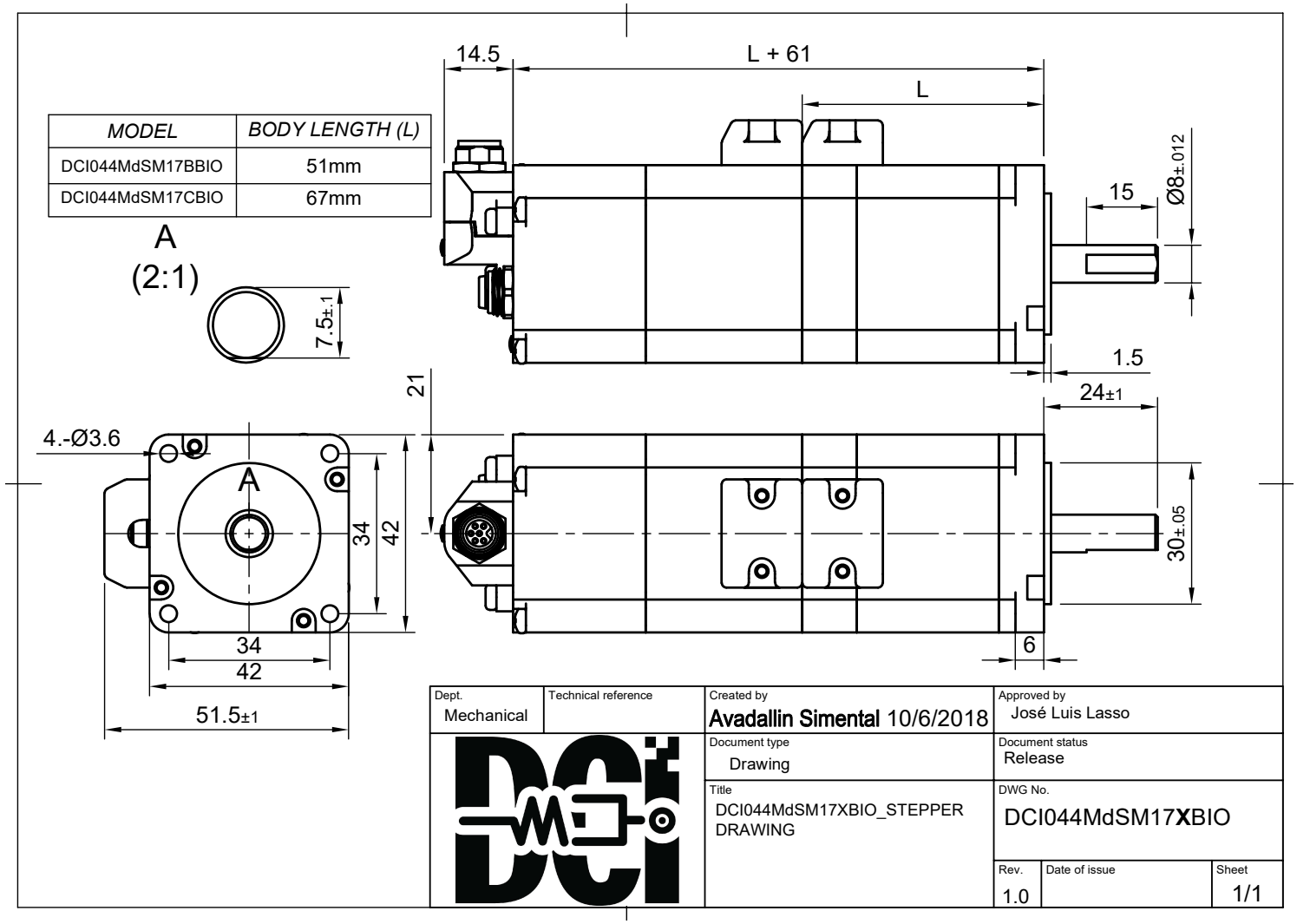


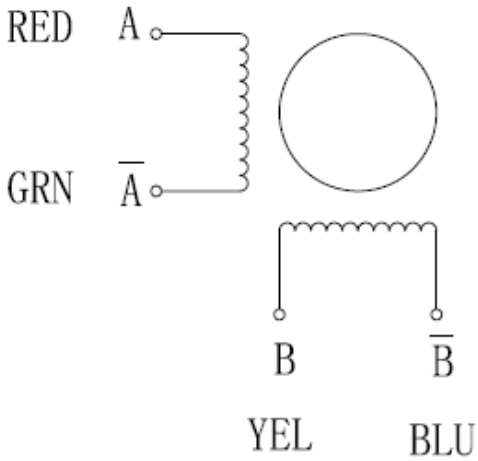
Figure 13 dSM17CBIO Connectors.

Figure 14 dSM17CBIO Top View.

- dSM17XBIO Mechanical Drawing



- Wiring connection



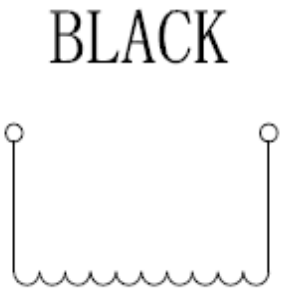
- Exciting sequence (Two phases) Vs Direction of rotation

STEP	A	B	$\overline{A}$	$\overline{B}$
1	+	+	–	–
2	–	+	+	–
3	–	–	+	+
4	+	–	–	+

CW ↓ CCW ↑

Figure 15 Clockwise rotation from mounting side.

- Brake Connection



- Encoder connection

Encoder	
White	A+
WHI/BLK	A-
GREEN	B+
GRE/BLK	B-
YELLOW	Z+
YEL/BLK	Z-
RED	VCC+5V
BLACK	GND
SHIELD	

- Output waveform