DPP24 PMDC Motor

User's Manual

This manual covers the use of a set of DPP24, DPP24T PMDC motors.

ElectroCraft
Incorporated

Title: **DPP24 User Manual**
Installation and Operation

Type of Documentation: User Hardware Manual

Document Type code: DPP24 User Manual Release 01.doc

Internal File Reference: Document Number:

Purpose of Documentation: This documentation describes…

- Installation and operation of the DPP24 PMDC motor.

Record of Revisions:

RELEASE NUMBER	DATE	DESCRIPTION	COMMENTS
01	14/7/2022	Initial Release	

Published by: ElectroCraft (Taiwan) Limited
8F., No. 79, Xingfu E. Rd., Xinzhuang Dist., New Taipei City 242040 , Taiwan

Tel: +886-2-2722-3201• Fax: +886-2-2722-3212
http://www.electrocraft.com

Table of Contents

1 DPP24 Motor Introduction

1.1 Overview

This manual describes the installation and operation of a set of DPP24 PMDC motors manufactured by ElectroCraft Inc.

The basic motor is available with a range of armature windings suitable for motor voltages up to 50 Vdc or as specified on the motor outline drawing. The motors are designed to be bidirectional.

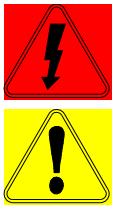
This manual is not intended to include a comprehensive listing of all details required for installation and operation. This manual provides general guidelines for installation and operation of DPP24 motors.

1.2 Theory of Operation

The DPP24 motor is a standard PMDC motor design using brushes and commutator assembly to create rotation and torque with an applied DC voltage. The output speed of the motor is dependent on the applied voltage and system torque load.

2 Product Safety Precautions

Read Section 2 before using the motor.



WARNING! READ THIS ENTIRE SECTION BEFORE ATTEMPTING TO USE THE DPP24 MOTOR! GIVE SPECIAL ATTENTION TO ALL BOLD PRINT ITEMS.

To operate your motor successfully, these minimum safety precautions MUST be followed to insure proper performance without injury to the operator and damage to motor or control. **FAILURE TO OBSERVE THESE SAFETY PRECAUTIONS COULD RESULT IN SERIOUS BODILY INJURY, INCLUDING DEATH IN EXTREME CASES.**

2.1 Operation

1. Always operate the motor within the prescribed voltage limits. Operation at voltages higher than rated voltage could result in overspeed conditions potentially causing mechanical damage to the motor or system.

2. Surface temperatures of the motor enclosure may reach temperatures that can cause injury. Care should be taken to avoid accidental contact with hot surfaces.

3. Follow precautionary guidelines in this manual with regard to proper installation and operating of the device.

4. Do NOT operate this device near flammable, explosive or corrosive materials.

5. Verify ALL wiring BEFORE applying power to the motor. Motor may RUN AWAY if improperly wired.

6. Never touch any moving parts while the motor is running. Failure to observe this warning may result in injury.

7. When motor is driving large inertial loads significant regeneration voltages equal or exceeding the supplied voltage may occur when the motor is disconnected.

8. Do not modify this product. Only authorized personnel must perform disassembly or repair of the motor. Failure to observe warning may result in injury or damage to product.

9. Read ElectroCraft's Life Support Policy in section 2.5 for application limitations.

2.2 Usage, Storage and Transportation Environment

1. Do not store or install the product in the following place
    a. Locations subject to temperature outside of the range specified.
    b. Locations subject to humidity outside the range specified.
    c. Locations subject to condensation as the result of extreme changes in temperature.
    d. Locations subject to corrosive or flammable gases.
    e. Locations subject to dust, salts, or iron contaminants.
    f. Locations subject to exposure to water, acid, oil, or chemicals.
    g. Locations subject to shock or vibration.

Failure to observe this caution may result in fire, electric shock, damage to the product.

2. Store the motor when not in use, in temperatures between -40 to +60 degrees C.

2.3 Installation

1. Take appropriate and sufficient countermeasures when installing systems in the following locations.
    a. Locations subject to static electricity or other forms of noise.
    b. Locations subject to strong electromagnetic fields and magnetic fields.
    c. Locations subject to possible exposure to radioactivity.
    d. Locations close to power supplies including power lines.

   Failure to observe this caution may result in damage to the product.

2. Never use this product in an environment subject to liquids, corrosive chemicals or gases, or combustibles, or where foreign materials are allowed to fall onto or collect inside the motor. Failure to observe this caution may result in electric shock or fire.

3. Do not transport or install the motor with power applied. Failure to observe this caution may result in injury or electric shock.

2.4 Wiring

1. Verify **ALL** wiring **BEFORE** applying power to the motor. Motor may RUN AWAY if improperly wired.

2. Securely connect the motor and tachometer terminals. Failure to observe this caution may result in fire.

3. Do not forcibly bend or pull the motor cable. Failure to observe this caution may result in shock or damage to the product.

4. Always use the specified motor voltage. An incorrect voltage may result in damage to the product.

5. Use AWG 20 or bigger diameter wires for the wiring of the motor.

2.5 Life Support Policy

READ THIS ENTIRE SECTION BEFORE ATTEMPTING TO USE THE MOTOR! GIVE SPECIAL ATTENTION TO ALL BOLD PRINT ITEMS.

ElectroCraft's products are not authorized for use as critical components in life support devices or systems without the express written approval from ElectroCraft Incorporated.

1. Life support devices or systems, are devices or systems which are intended for surgical implant into the body, or support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the User's Manual and in the labeling, can be reasonable expected to result in a significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

2.6 Disposal

Do not dispose of the device in your general waste. Dispose of the device through an approved disposal centre or at your community waste / recycling facility. Observe the currently applicable regulations. In case of doubt, please contact your waste disposal centre.


Dispose of all packaging materials in an environmentally friendly manner.

3 Recommended Cabling and Installation

The motor cable contains 20 Ga. insulated lead wires; and a green/yellow ground lead. The direction of rotation is determined by the polarity of the connection. Each connection should be suitable for continuous currents up to 10 A.

To minimize EMI the braided shield surrounding the lead wires should be terminated such that a strong ground bond is established. And connect the DA4709 drive with PMDC motor, parallel in DC source line with a 1µF capacitor, use model 130 split EMI suppression core in series on line with. Limit the maximum speed of the PMDC motor, see the maximum speed on drawings contained in Section 6.

4 Motor Installation and Setup

4.1 Mounting

Mount the motor using the four M4 tapped holes provided on the front face. Thread engagement should be 6 mm minimum, 10 mm maximum. A centralizing pilot diameter is used to locate the motor, see the drawing in Section 5 for the dimensions of the bolt circle and pilot diameter.

4.2 Environmental Conditions

- Storage Temperature: -40 to 60 degree C
- Humidity: 5-95%RH, Non-condensing
- Operating Temperature range: 0 to 40 degree C, (Ambient Temperature)

  Note: Motor case temperature should be monitored. A maximum case temperature of **100 degree C** for the motor under load will avoid any damage. At the published continuous operating currents the maximum case temperature will be reached in a **40 degree C** ambient. The continuous operating conditions were developed with the motor in free air with no heat sink. If the motor mount does provide an additional heat sink the allowable ambient can be increased however the case temperature should be monitored.

  Motor Enclosure Rating: IP40, motor is not protected against splashing water.

4.3 Overcurrent Protection

The motor should be protected against overcurrent conditions through setting of the current limit of the motor control or selection of appropriate fuses. The duration of overcurrent is defined by:

$(I_{pk})^2 * t_p$

Where:

I_{pk} = Peak Current, see performance peak current on drawings contained in Section 6.

t_{pk} = Time at I_{pk},

Following is a table defining maximum on times (t_{pk}) as a function of housing temperature at the time peak currents are applied.

Initial Housing Temperature (°C)	t_{pk} (sec)
20	30
40	15
60	5
80	0

5 Maintenance

5.1 Brush Inspection and Replacement

Motor brush wear will vary based on applied load and speed. Therefore, brushes should be inspected for wear after approximately 500 hours of use. The brushes should be replaced when the brush length is below 5 mm.

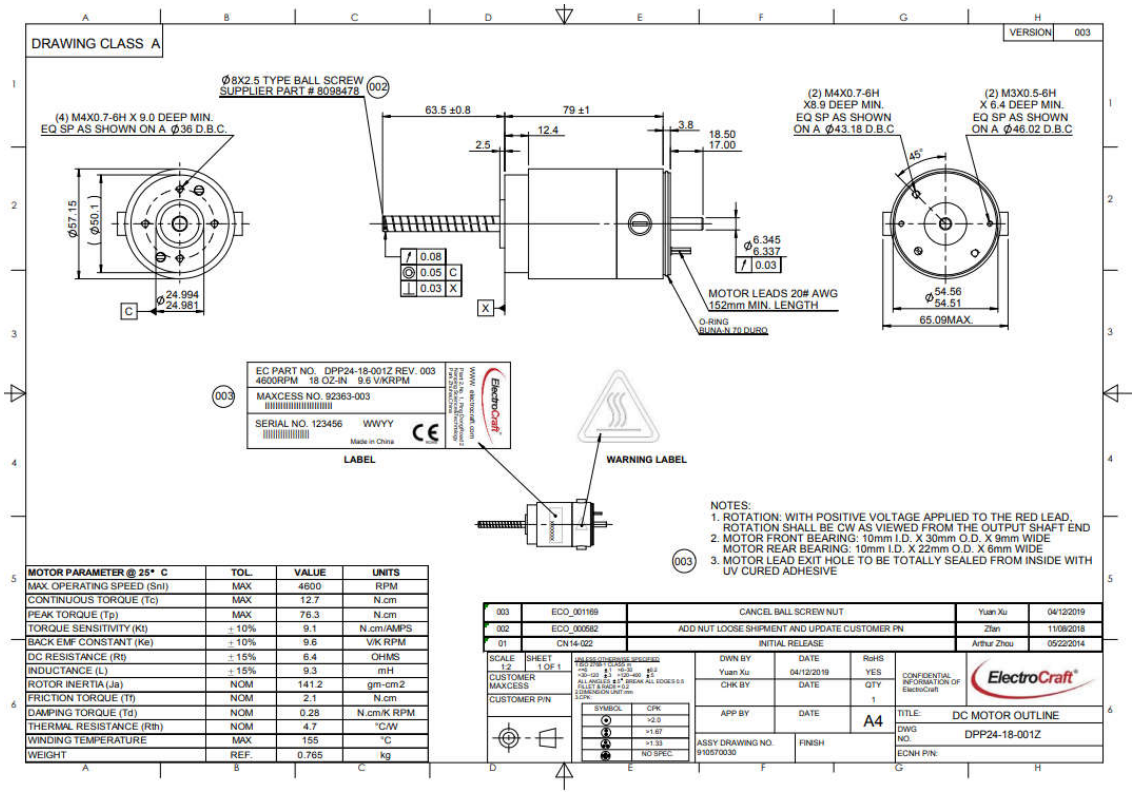
Brush Inspection and Replacement

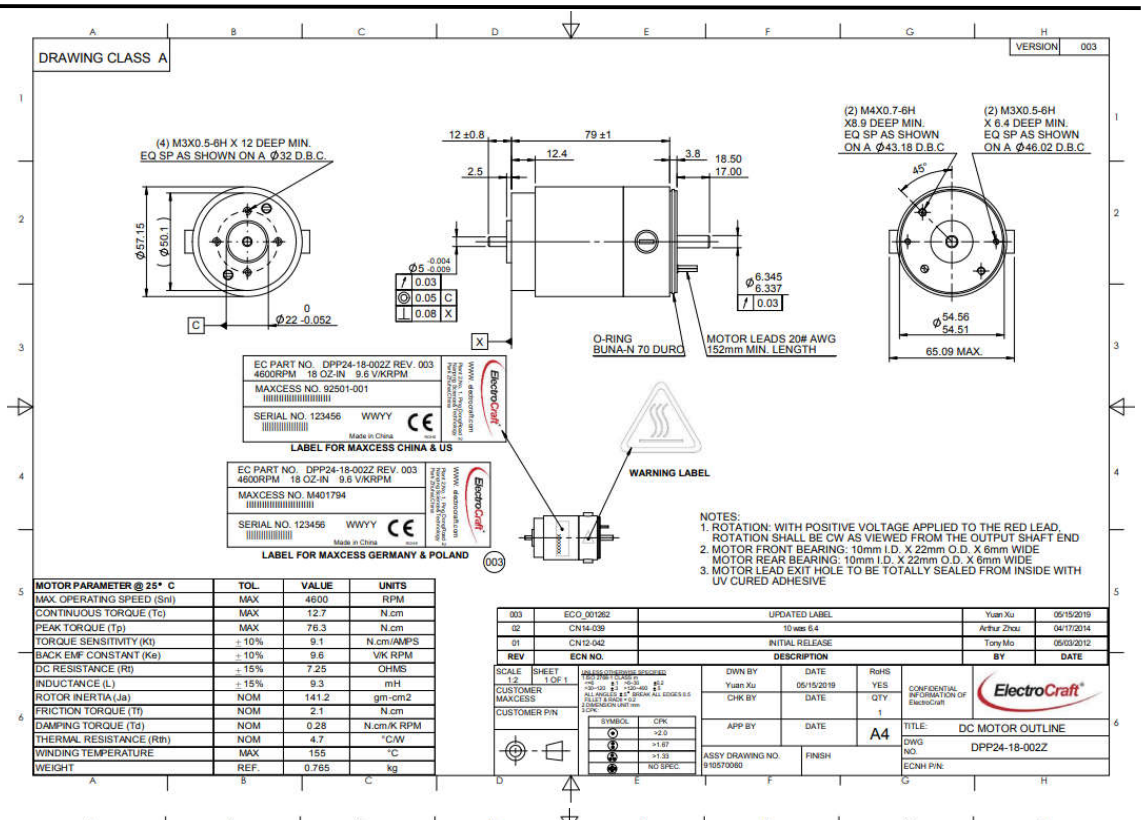
- Disconnect the motor from the power source.
- Remove brush cap using suitable flat blade screwdriver.
- Remove brush assembly from holder by grasping cap and gently pulling. It is a good practice to note location and orientation of brush so that the brush is returned to the same position when reassembled.
- Measure length of brush. If either brush length is less than the minimum replaces both brushes.
- Install brush, compress spring so that the brush cap contacts the top of the brush holder and reinstall brush cap. Torque brush cap to 45-56 N-cm

6 Motor Dimensional Drawings

Part Numbers

DPP24-18-001Z
DPP24-18-002Z
DPP24-40-004Z
DPP24-50-002Z
DPP24-50-004
DPP24T-18-002 (Maximum Speed: 1900rpm)
DPP24T-40-001
DPP24T-40-002
DPP24T-40-003Z
DPP24T-40-004
DPP24T-40-004Z
DPP24T-40-010Z
DPP24T-50-001
DPP24T-50-003Z
DPP24T-50-006

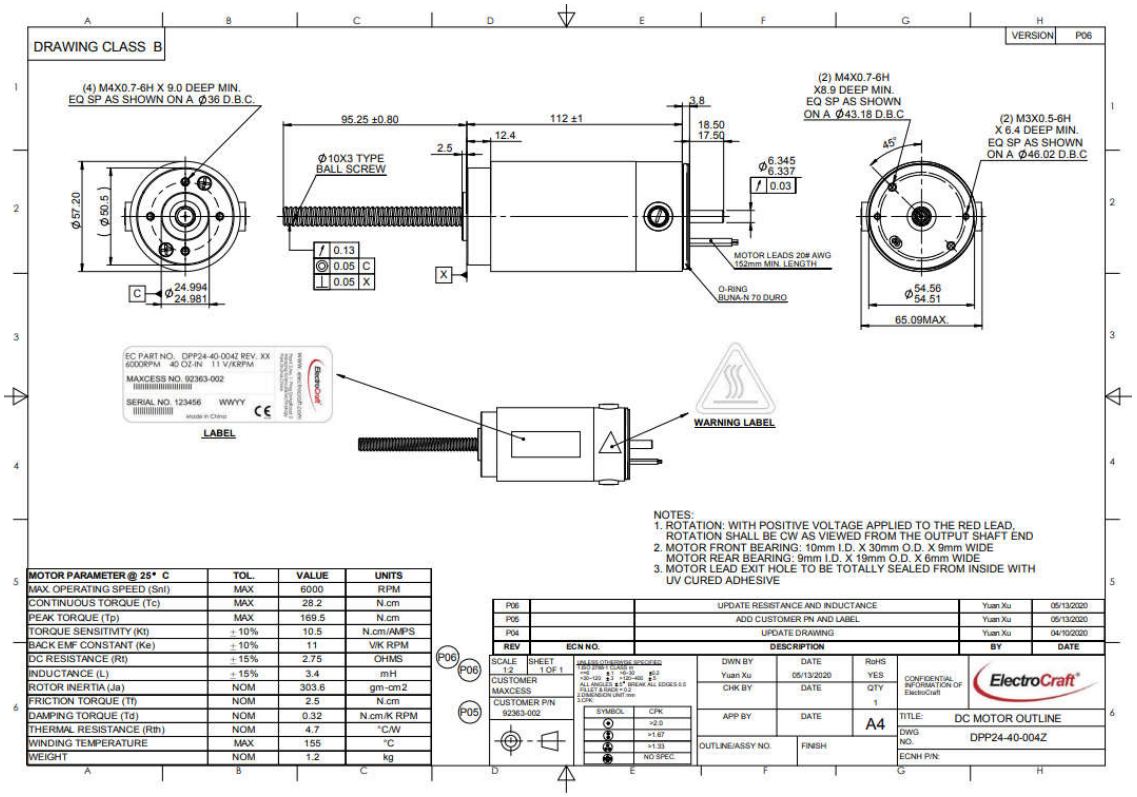




MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Snl)	MAX	4600	RPM
CONTINUOUS TORQUE (Tc)	MAX	12.7	N.cm
PEAK TORQUE (Tp)	MAX	76.3	N.cm
TORQUE SENSITIVITY (Kt)	± 10%	9.1	N.cm/AMPS
BACK EMF CONSTANT (Ke)	± 10%	9.6	V/K RPM
DC RESISTANCE (Rt)	± 15%	7.25	OHMS
INDUCTANCE (L)	± 15%	9.3	mH
ROTOR INERTIA (Ja)	NOM	141.2	gm-cm2
FRICTION TORQUE (Tf)	NOM	2.1	N.cm
DAMPING TORQUE (Td)	NOM	0.28	N.cm/K RPM
THERMAL RESISTANCE (Rth)	NOM	4.7	°C/W
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	REF.	0.765	kg

REV	ECN NO.	DESCRIPTION	BY	DATE
003	ECO_001262	UPDATED LABEL	Yuan Xu	05/15/2019
02	CN14-039	10 was 6.4	Arthur Zhou	04/17/2014
01	CN12-042	INITIAL RELEASE	Tony Mo	05/03/2012

SCALE 1:2 SHEET 1 OF 1
CUSTOMER MAXCESS
CUSTOMER P/N
DWN BY Yuan Xu DATE 05/15/2019 RoHS YES
CHK BY DATE QTY 1
APP BY DATE A4
ASSY DRAWING NO. 910570060 FINISH
CONFIDENTIAL INFORMATION OF ElectroCraft
TITLE: DC MOTOR OUTLINE
DWG NO. DPP24-18-002Z
ECNH P/N:

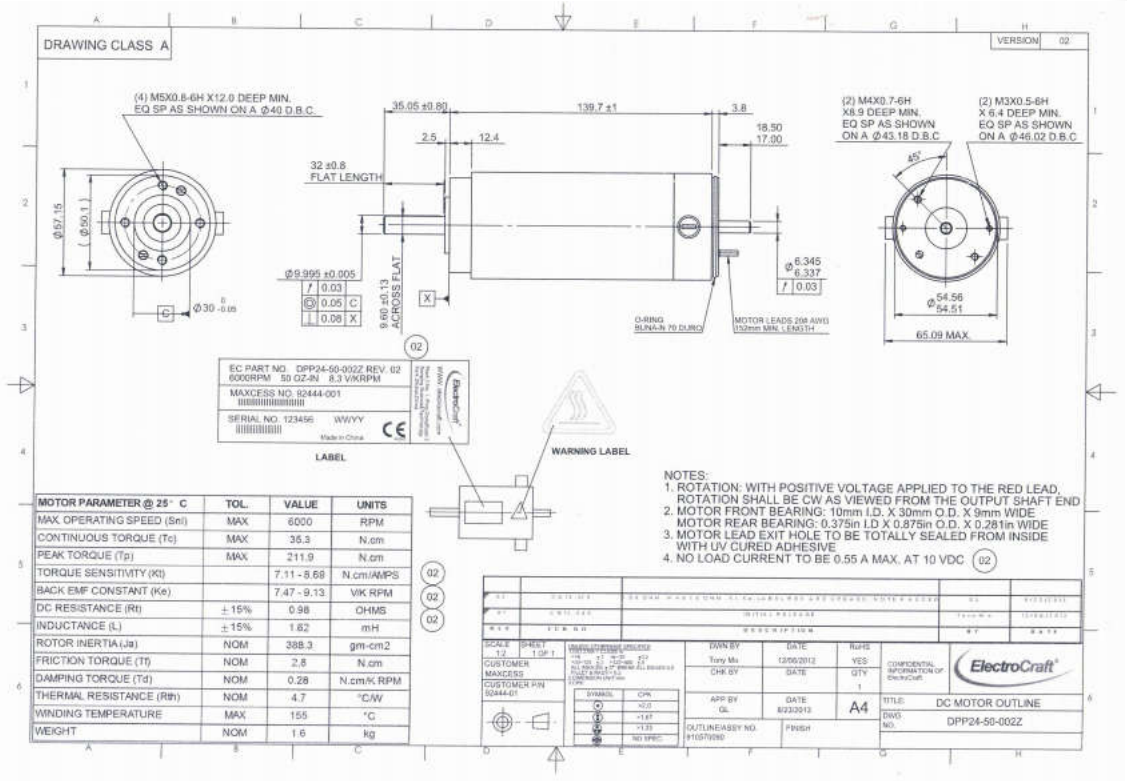


MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Snl)	MAX	6000	RPM
CONTINUOUS TORQUE (Tc)	MAX	28.2	N.cm
PEAK TORQUE (Tp)	MAX	169.5	N.cm
TORQUE SENSITIVITY (Kt)	± 10%	10.5	N.cm/AMPS
BACK EMF CONSTANT (Ke)	± 10%	11	V/K RPM
DC RESISTANCE (Rt)	± 15%	2.75	OHMS
INDUCTANCE (L)	± 15%	3.4	mH
ROTOR INERTIA (Ja)	NOM	303.6	gm-cm2
FRICTION TORQUE (Tf)	NOM	2.5	N.cm
DAMPING TORQUE (Td)	NOM	0.32	N.cm/K RPM
THERMAL RESISTANCE (Rth)	NOM	4.7	°C/W
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	1.2	kg

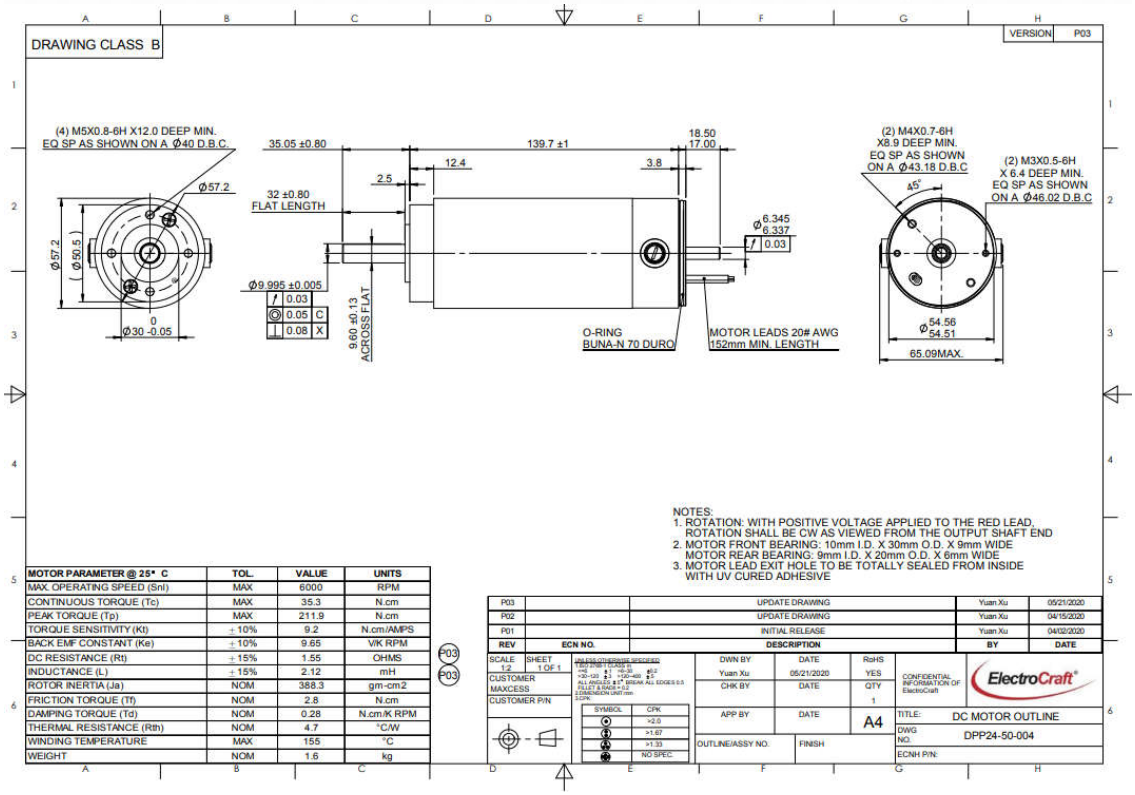
REV	ECN NO.	DESCRIPTION	BY	DATE
P06		UPDATE RESISTANCE AND INDUCTANCE	Yuan Xu	05/13/2020
P05		ADD CUSTOMER PN AND LABEL	Yuan Xu	05/13/2020
P04		UPDATE DRAWING	Yuan Xu	04/10/2020

P06
P06
P05

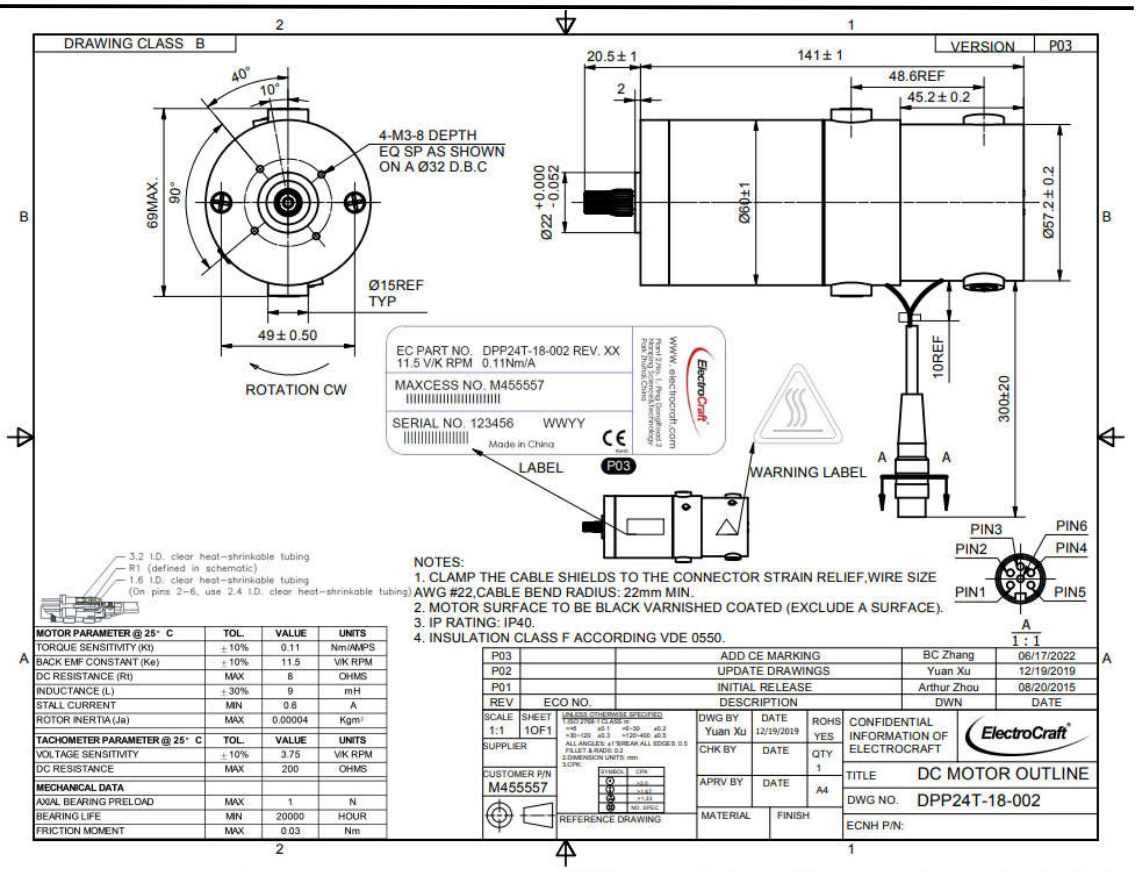
SCALE 1:2 SHEET 1 OF 1
CUSTOMER MAXCESS
CUSTOMER P/N 92363-002
DWN BY Yuan Xu DATE 05/13/2020 RoHS YES
CHK BY DATE QTY 1
APP BY DATE A4
OUTLINE/ASSY NO. FINISH
CONFIDENTIAL INFORMATION OF ElectroCraft
TITLE: DC MOTOR OUTLINE
DWG NO. DPP24-40-004Z
ECNH P/N:

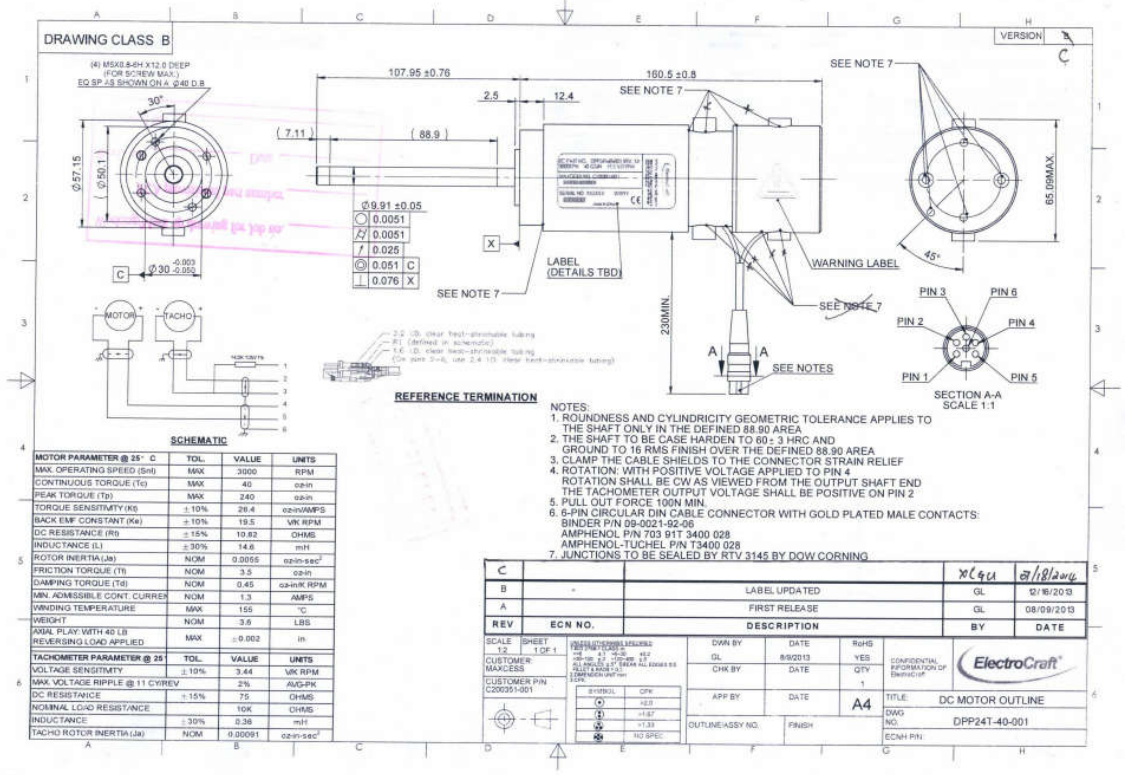


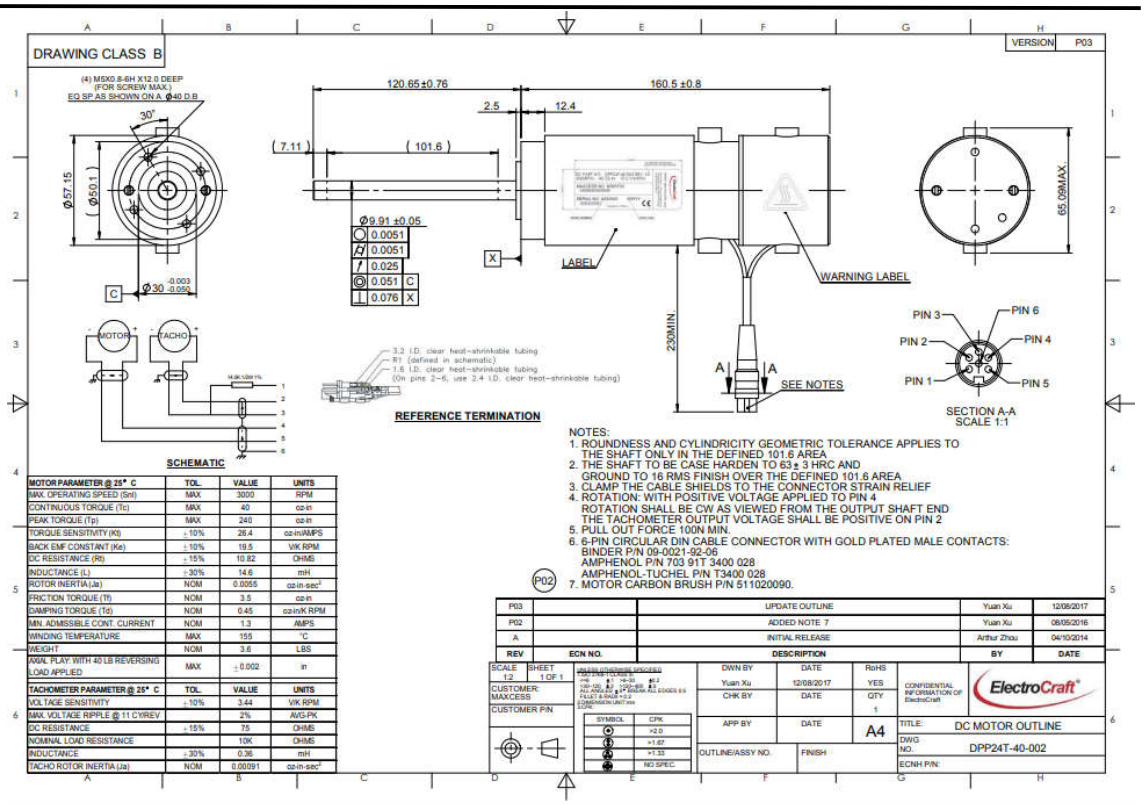
MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Sn1)	MAX	6000	RPM
CONTINUOUS TORQUE (Tc)	MAX	35.3	N.cm
PEAK TORQUE (Tp)	MAX	211.9	N.cm
TORQUE SENSITIVITY (Kt)		7.11 - 8.69	N.cm/AMPS
BACK EMF CONSTANT (Ke)		7.47 - 9.13	V/K RPM
DC RESISTANCE (Rt)	±15%	0.98	OHMS
INDUCTANCE (L)	±15%	1.62	mH
ROTOR INERTIA (Ja)	NOM	388.3	gm-cm2
FRICTION TORQUE (Tf)	NOM	2.8	N.cm
DAMPING TORQUE (Td)	NOM	0.28	N.cm/K RPM
THERMAL RESISTANCE (Rth)	NOM	4.7	°C/W
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	1.6	kg



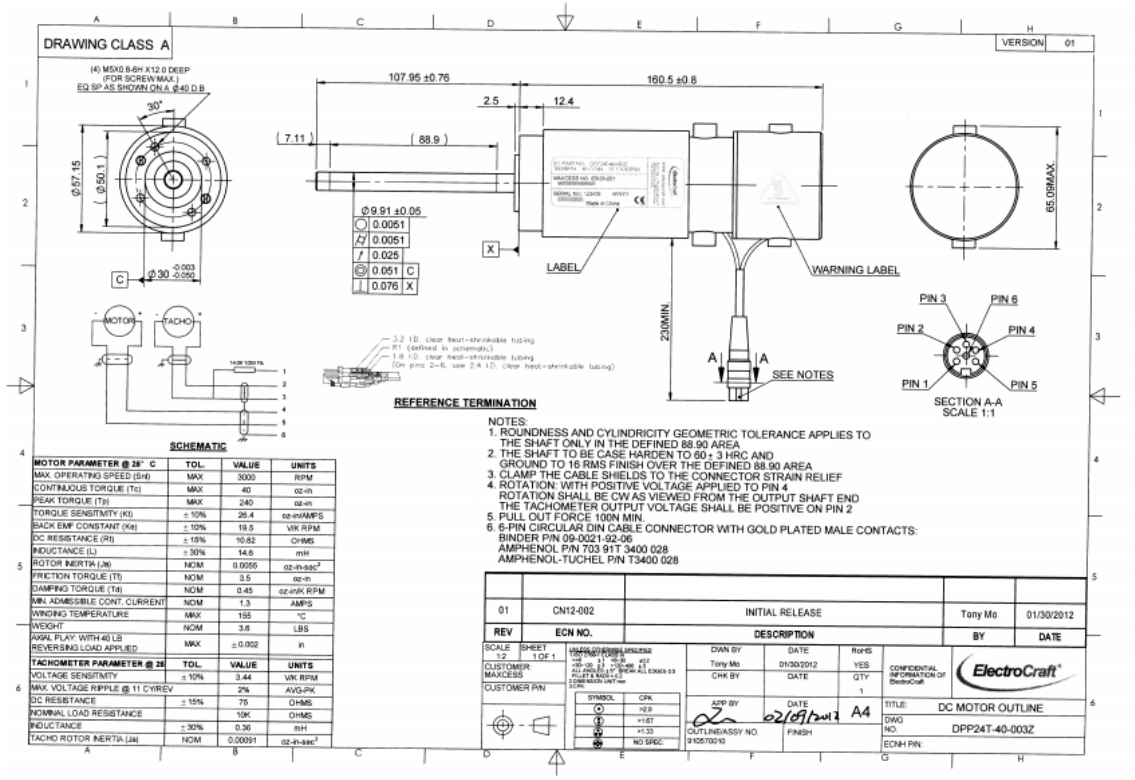
MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Sn1)	MAX	6000	RPM
CONTINUOUS TORQUE (Tc)	MAX	35.3	N.cm
PEAK TORQUE (Tp)	MAX	211.9	N.cm
TORQUE SENSITIVITY (Kt)	±10%	9.2	N.cm/AMPS
BACK EMF CONSTANT (Ke)	±10%	9.65	V/K RPM
DC RESISTANCE (Rt)	±15%	1.55	OHMS
INDUCTANCE (L)	±15%	2.12	mH
ROTOR INERTIA (Ja)	NOM	388.3	gm-cm2
FRICTION TORQUE (Tf)	NOM	2.8	N.cm
DAMPING TORQUE (Td)	NOM	0.28	N.cm/K RPM
THERMAL RESISTANCE (Rth)	NOM	4.7	°C/W
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	1.6	kg


DRAWING CLASS B
VERSION P03
20.5 ± 1
141 ± 1
48.6REF
45.2 ± 0.2
40°
10°
4-M3-8 DEPTH
EQ SP AS SHOWN
ON A Ø32 D.B.C
69MAX.
90°
Ø15REF
TYP
49 ± 0.50
ROTATION CW
Ø22 +0.000 -0.052
Ø60±1
Ø57.2 ± 0.2
10REF
300±20
EC PART NO. DPP24T-18-002 REV. XX
11.5 V/K RPM 0.11Nm/A
MAXCESS NO. M455557
SERIAL NO. 123456 WWYY
Made in China
LABEL
P03
WARNING LABEL
PIN3
PIN6
PIN2
PIN4
PIN1
PIN5
A
1 : 1
3.2 I.D. clear heat-shrinkable tubing
R1 (defined in schematic)
1.6 I.D. clear heat-shrinkable tubing
(On pins 2-6, use 2.4 I.D. clear heat-shrinkable tubing)
NOTES:
1. CLAMP THE CABLE SHIELDS TO THE CONNECTOR STRAIN RELIEF,WIRE SIZE AWG #22,CABLE BEND RADIUS: 22mm MIN.
2. MOTOR SURFACE TO BE BLACK VARNISHED COATED (EXCLUDE A SURFACE).
3. IP RATING: IP40.
4. INSULATION CLASS F ACCORDING VDE 0550.
P03 ADD CE MARKING BC Zhang 06/17/2022
P02 UPDATE DRAWINGS Yuan Xu 12/19/2019
P01 INITIAL RELEASE Arthur Zhou 08/20/2015
REV ECO NO. DESCRIPTION DWN DATE
SCALE 1:1
SHEET 1OF1
SUPPLIER
CUSTOMER P/N M455557
REFERENCE DRAWING
DWG BY Yuan Xu
DATE 12/19/2019
CHK BY
APRV BY
MATERIAL
FINISH
ROHS YES
QTY 1
A4
CONFIDENTIAL INFORMATION OF ELECTROCRAFT
ElectroCraft
TITLE DC MOTOR OUTLINE
DWG NO. DPP24T-18-002
ECNH P/N:
MOTOR PARAMETER @ 25° C TOL. VALUE UNITS
TORQUE SENSITIVITY (Kt) ±10% 0.11 Nm/AMPS
BACK EMF CONSTANT (Ke) ±10% 11.5 V/K RPM
DC RESISTANCE (Rt) MAX 8 OHMS
INDUCTANCE (L) ±30% 9 mH
STALL CURRENT MIN 0.6 A
ROTOR INERTIA (Ja) MAX 0.00004 Kgm²
TACHOMETER PARAMETER @ 25° C TOL. VALUE UNITS
VOLTAGE SENSITIVITY ±10% 3.75 V/K RPM
DC RESISTANCE MAX 200 OHMS
MECHANICAL DATA
AXIAL BEARING PRELOAD MAX 1 N
BEARING LIFE MIN 20000 HOUR
FRICTION MOMENT MAX 0.03 Nm

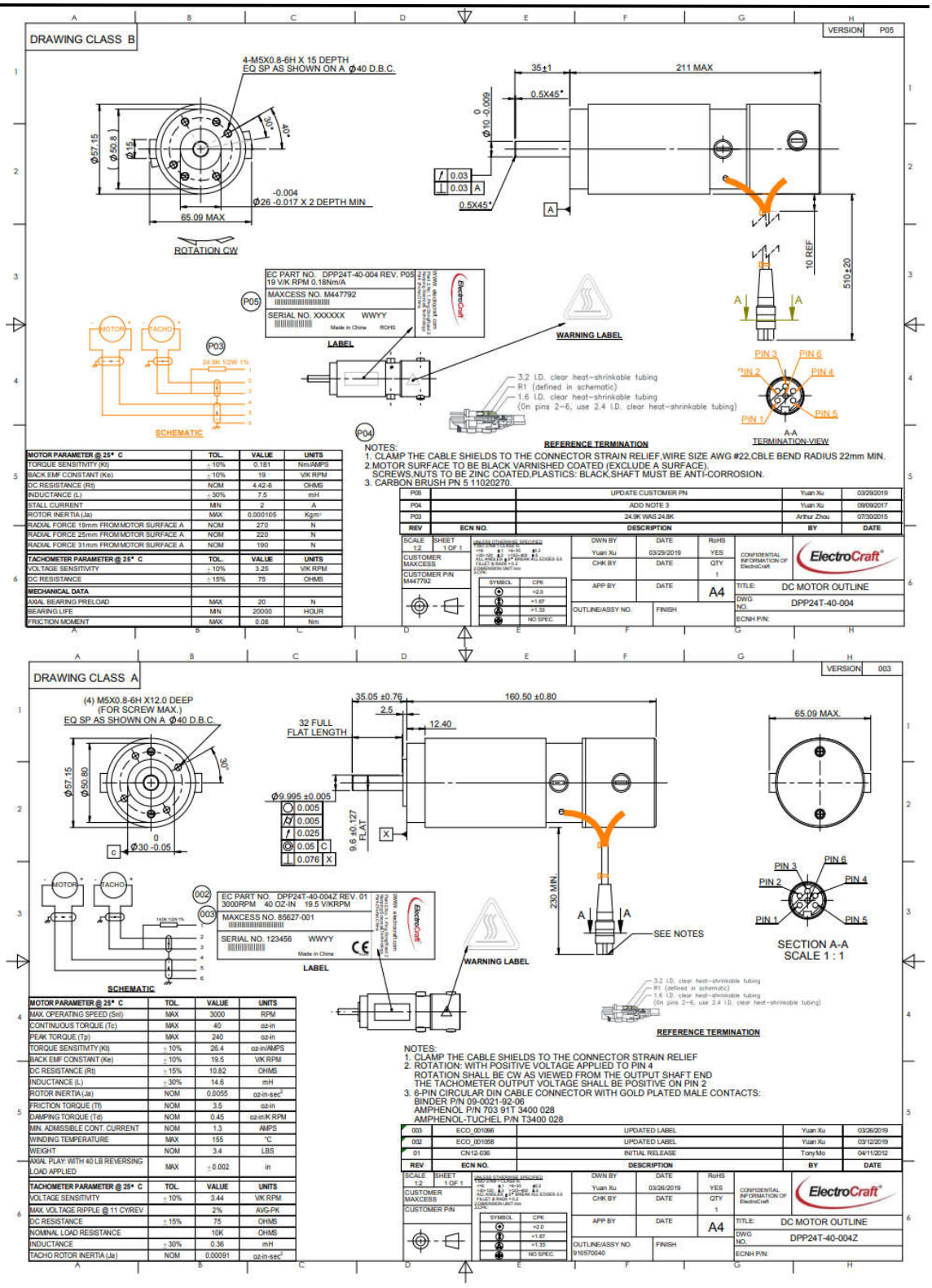

DRAWING CLASS B
VERSION C
(4) M5X0.8-6H X12.0 DEEP
(FOR SCREW MAX.)
EQ SP AS SHOWN ON A Ø40 D.B
30°
107.95 ±0.76
160.5 ±0.8
SEE NOTE 7
2.5
12.4
(7.11)
(88.9)
Ø57.15
(Ø50.1)
Ø30 -0.003 -0.055
Ø9.91 ±0.05
0.0051 M X
0.0051
0.025
0.051 C
0.076 X
LABEL
(DETAILS TBD)
WARNING LABEL
65.09MAX.
45°
230MIN.
SEE NOTES
PIN 3
PIN 6
PIN 2
PIN 4
PIN 1
PIN 5
SECTION A-A
SCALE 1:1
MOTOR
TACHO
SCHEMATIC
REFERENCE TERMINATION
NOTES:
1. ROUNDNESS AND CYLINDRICITY GEOMETRIC TOLERANCE APPLIES TO THE SHAFT ONLY IN THE DEFINED 88.90 AREA
2. THE SHAFT TO BE CASE HARDEN TO 60 ± 3 HRC AND GROUND TO 16 RMS FINISH OVER THE DEFINED 88.90 AREA
3. CLAMP THE CABLE SHIELDS TO THE CONNECTOR STRAIN RELIEF
4. ROTATION: WITH POSITIVE VOLTAGE APPLIED TO PIN 4 ROTATION SHALL BE CW AS VIEWED FROM THE OUTPUT SHAFT END THE TACHOMETER OUTPUT VOLTAGE SHALL BE POSITIVE ON PIN 2
5. PULL OUT FORCE 100N MIN.
6. 6-PIN CIRCULAR DIN CABLE CONNECTOR WITH GOLD PLATED MALE CONTACTS: BINDER P/N 09-0021-92-06 AMPHENOL P/N 703 91T 3400 028 AMPHENOL-TUCHEL P/N T3400 028
7. JUNCTIONS TO BE SEALED BY RTV 3145 BY DOW CORNING
C
B - LABEL UPDATED GL 12/16/2013
A FIRST RELEASE GL 08/09/2013
REV ECN NO. DESCRIPTION BY DATE
SCALE 1:2
SHEET 1 OF 1
CUSTOMER MAXCESS
CUSTOMER P/N C20035I-001
DWN BY GL
DATE 8/9/2013
CHK BY
APP BY
OUTLINE/ASSY NO.
FINISH
RoHS YES
QTY 1
A4
CONFIDENTIAL INFORMATION OF ELECTROCRAFT
ElectroCraft
TITLE: DC MOTOR OUTLINE
DWG NO. DPP24T-40-001
ECNH P/N:
MOTOR PARAMETER @ 25° C TOL. VALUE UNITS
MAX. OPERATING SPEED (Sm) MAX 3000 RPM
CONTINUOUS TORQUE (Tc) MAX 40 oz-in
PEAK TORQUE (Tp) MAX 240 oz-in
TORQUE SENSITIVITY (Kt) ±10% 28.4 oz-in/AMPS
BACK EMF CONSTANT (Ke) ±10% 19.5 V/K RPM
DC RESISTANCE (Rt) ±15% 10.82 OHMS
INDUCTANCE (L) ±30% 14.6 mH
ROTOR INERTIA (Ja) NOM 0.0055 oz-in-sec²
FRICTION TORQUE (Tf) NOM 3.5 oz-in
DAMPING TORQUE (Td) NOM 0.45 oz-in/K RPM
MIN. ADMISSIBLE CONT. CURRE NOM 1.3 AMPS
WINDING TEMPERATURE MAX 155 °C
WEIGHT NOM 3.8 LBS
AXIAL PLAY: WITH 40 LB REVERSING LOAD APPLIED MAX ±0.002 in
TACHOMETER PARAMETER @ 25° TOL. VALUE UNITS
VOLTAGE SENSITIVITY ±10% 3.44 V/K RPM
MAX. VOLTAGE RIPPLE @ 11 CYI/REV 2% AVG-PK
DC RESISTANCE ±15% 75 OHMS
NOMINAL LOAD RESISTANCE 10K OHMS
INDUCTANCE ±30% 0.36 mH
TACHO ROTOR INERTIA (Ja) NOM 0.00091 oz-in-sec²

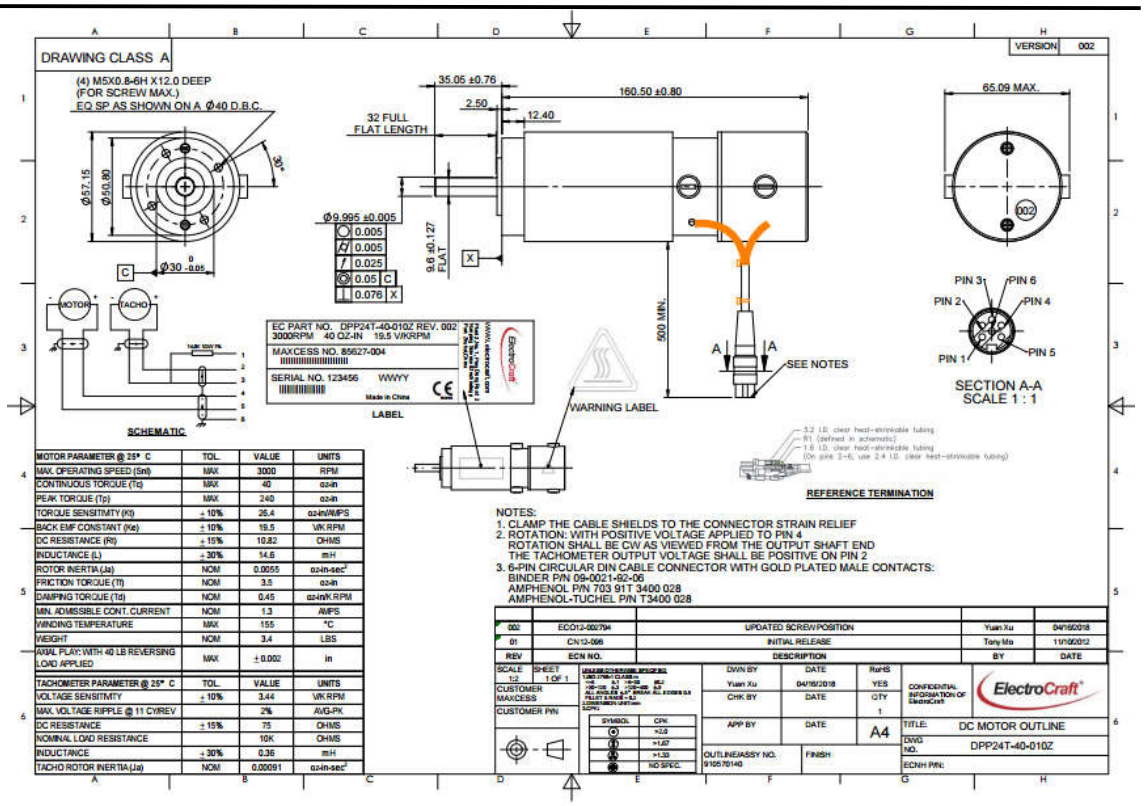


MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Sn)	MAX	3000	RPM
CONTINUOUS TORQUE (Tc)	MAX	40	oz-in
PEAK TORQUE (Tp)	MAX	240	oz-in
TORQUE SENSITIVITY (Kt)	± 10%	26.4	oz-in/AMPS
BACK EMF CONSTANT (Ke)	± 10%	19.5	V/K RPM
DC RESISTANCE (Rt)	± 15%	10.82	OHMS
INDUCTANCE (L)	± 30%	14.6	mH
ROTOR INERTIA (Ja)	NOM	0.0055	oz-in-sec²
FRICTION TORQUE (Tf)	NOM	3.5	oz-in
DAMPING TORQUE (Td)	NOM	0.45	oz-in/K RPM
MIN. ADMISSIBLE CONT. CURRENT	NOM	1.3	AMPS
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	3.6	LBS
AXIAL PLAY: WITH 40 LB REVERSING LOAD APPLIED	MAX	± 0.002	in
TACHOMETER PARAMETER @ 25° C	**TOL.**	**VALUE**	**UNITS**
VOLTAGE SENSITIVITY	± 10%	3.44	V/K RPM
MAX. VOLTAGE RIPPLE @ 11 CYREV		2%	AVG-PK
DC RESISTANCE	± 15%	75	OHMS
NOMINAL LOAD RESISTANCE		10K	OHMS
INDUCTANCE	± 30%	0.36	mH
TACHO ROTOR INERTIA (Ja)	NOM	0.00091	oz-in-sec²

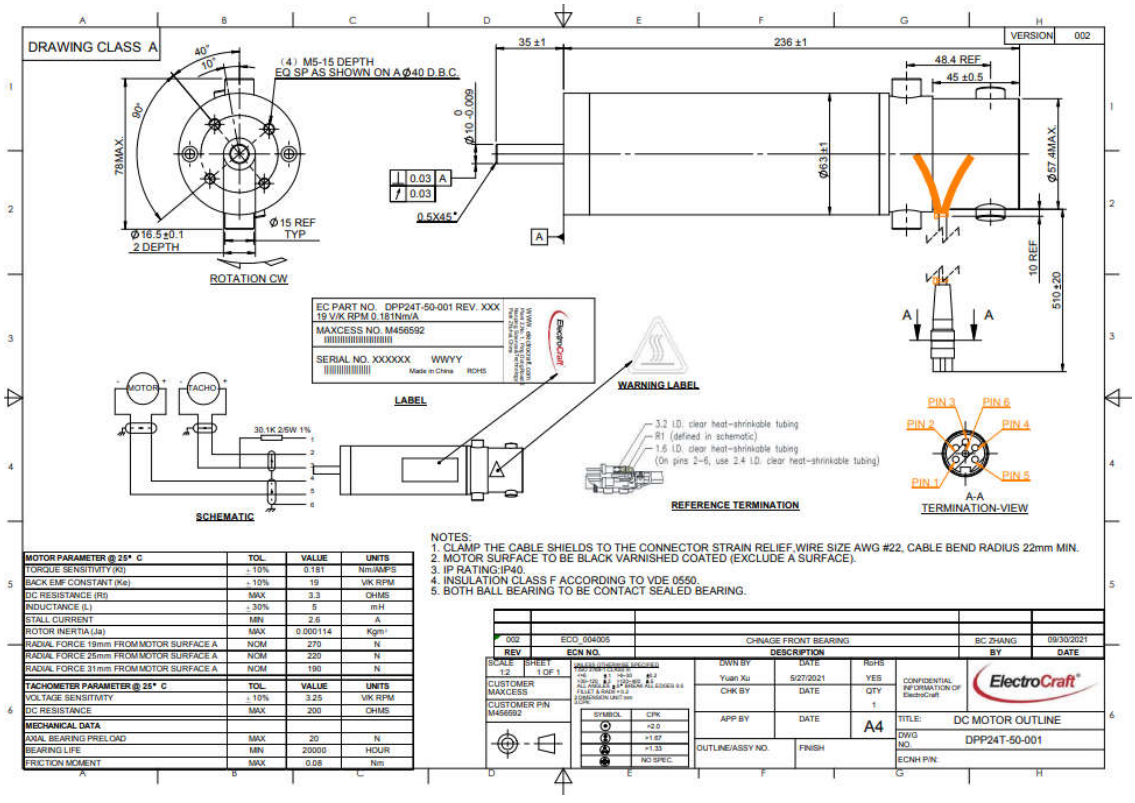


MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Sn)	MAX	3000	RPM
CONTINUOUS TORQUE (Tc)	MAX	40	oz-in
PEAK TORQUE (Tp)	MAX	240	oz-in
TORQUE SENSITIVITY (Kt)	± 10%	26.4	oz-in/AMPS
BACK EMF CONSTANT (Ke)	± 10%	19.5	V/K RPM
DC RESISTANCE (Rt)	± 15%	10.82	OHMS
INDUCTANCE (L)	± 30%	14.6	mH
ROTOR INERTIA (Ja)	NOM	0.0055	oz-in-sec²
FRICTION TORQUE (Tf)	NOM	3.5	oz-in
DAMPING TORQUE (Td)	NOM	0.45	oz-in/K RPM
MIN. ADMISSIBLE CONT. CURRENT	NOM	1.3	AMPS
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	3.6	LBS
AXIAL PLAY: WITH 40 LB REVERSING LOAD APPLIED	MAX	± 0.002	in
TACHOMETER PARAMETER @ 25° C	**TOL.**	**VALUE**	**UNITS**
VOLTAGE SENSITIVITY	± 10%	3.44	V/K RPM
MAX. VOLTAGE RIPPLE @ 11 CYREV		2%	AVG-PK
DC RESISTANCE	± 15%	75	OHMS
NOMINAL LOAD RESISTANCE		10K	OHMS
INDUCTANCE	± 30%	0.36	mH
TACHO ROTOR INERTIA (Ja)	NOM	0.00091	oz-in-sec²

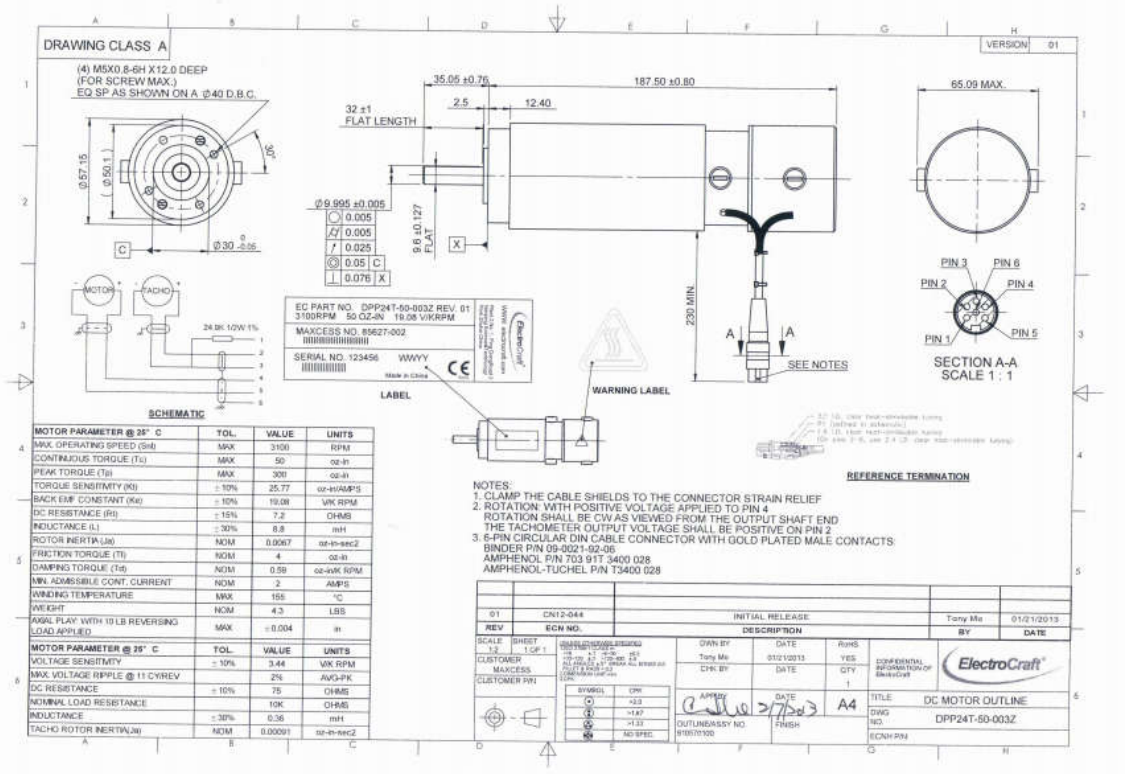

DRAWING CLASS B
VERSION P05
4-M5X0.8-6H X 15 DEPTH
EQ SP AS SHOWN ON A Ø40 D.B.C.
65.09 MAX
ROTATION CW
35±1
211 MAX
0.5X45°
Ø10 0 -0.009
0.03
0.03 A
0.5X45°
10 REF
510±20
EC PART NO. DPP24T-40-004 REV. P05
19 V/K RPM 0.18Nm/A
MAXCESS NO. M447792
SERIAL NO. XXXXXX WWYY
LABEL
WARNING LABEL
SCHEMATIC
3.2 I.D. clear heat-shrinkable tubing
R1 (defined in schematic)
1.6 I.D. clear heat-shrinkable tubing
(On pins 2-6, use 2.4 I.D. clear heat-shrinkable tubing)
REFERENCE TERMINATION
PIN 1
PIN 2
PIN 3
PIN 4
PIN 5
PIN 6
A-A
TERMINATION VIEW
NOTES:
1. CLAMP THE CABLE SHIELDS TO THE CONNECTOR STRAIN RELIEF,WIRE SIZE AWG #22,CBLE BEND RADIUS 22mm MIN.
2.MOTOR SURFACE TO BE BLACK VARNISHED COATED (EXCLUDE A SURFACE).
SCREWS,NUTS TO BE ZINC COATED,PLASTICS: BLACK,SHAFT MUST BE ANTI-CORROSION.
3. CARBON BRUSH PN 5 11020270:
P05 UPDATE CUSTOMER PN Yuan Xu 03/29/2019
P04 ADD NOTE 3 Yuan Xu 09/09/2017
P03 24.9K WAS 24.8K Arthur Zhou 07/30/2015
REV ECN NO. DESCRIPTION BY DATE
SCALE 1:2 SHEET 1 OF 1
DWN BY Yuan Xu DATE 03/29/2019 RoHS YES
CHK BY DATE QTY 1
APP BY DATE A4
CUSTOMER MAXCESS
CUSTOMER P/N M447792
OUTLINE/ASSY NO. FINISH
CONFIDENTIAL INFORMATION OF ElectroCraft
ElectroCraft
TITLE: DC MOTOR OUTLINE
DWG NO. DPP24T-40-004
ECN# P/N:
MOTOR PARAMETER @ 25° C | TOL. | VALUE | UNITS
TORQUE SENSITIVITY (Kt) | ± 10% | 0.181 | Nm/AMPS
BACK EMF CONSTANT (Ke) | ± 10% | 19 | V/K RPM
DC RESISTANCE (Rt) | NOM | 4.42-6 | OHMS
INDUCTANCE (L) | ± 30% | 7.5 | mH
STALL CURRENT | MIN | 2 | A
ROTOR INERTIA (Ja) | MAX | 0.000105 | Kgm²
RADIAL FORCE 19mm FROM MOTOR SURFACE A | NOM | 270 | N
RADIAL FORCE 25mm FROM MOTOR SURFACE A | NOM | 220 | N
RADIAL FORCE 31mm FROM MOTOR SURFACE A | NOM | 190 | N
TACHOMETER PARAMETER @ 25° C | TOL. | VALUE | UNITS
VOLTAGE SENSITIVITY | ± 10% | 3.25 | V/K RPM
DC RESISTANCE | ± 15% | 75 | OHMS
MECHANICAL DATA
AXIAL BEARING PRELOAD | MAX | 20 | N
BEARING LIFE | MIN | 20000 | HOUR
FRICTION MOMENT | MAX | 0.08 | Nm
DRAWING CLASS A
VERSION 003
(4) M5X0.8-6H X12.0 DEEP
(FOR SCREW MAX.)
EQ SP AS SHOWN ON A Ø40 D.B.C.
35.05 ±0.76
2.5
160.50 ±0.80
32 FULL FLAT LENGTH
12.40
65.09 MAX.
Ø9.995 ±0.005
0.005
0.005
0.025
0.05 C
0.076 X
9.6 ±0.127 FLAT
230 MIN
SEE NOTES
SECTION A-A
SCALE 1 : 1
EC PART NO. DPP24T-40-004Z REV. 01
3000RPM 40 OZ-IN 19.5 V/KRPM
MAXCESS NO. 85627-001
SERIAL NO. 123456 WWYY
LABEL
WARNING LABEL
SCHEMATIC
REFERENCE TERMINATION
NOTES:
1. CLAMP THE CABLE SHIELDS TO THE CONNECTOR STRAIN RELIEF
2. ROTATION: WITH POSITIVE VOLTAGE APPLIED TO PIN 4
ROTATION SHALL BE CW AS VIEWED FROM THE OUTPUT SHAFT END
THE TACHOMETER OUTPUT VOLTAGE SHALL BE POSITIVE ON PIN 2
3. 6-PIN CIRCULAR DIN CABLE CONNECTOR WITH GOLD PLATED MALE CONTACTS:
BINDER P/N 09-0021-92-06
AMPHENOL P/N 703 91T 3400 028
AMPHENOL-TUCHEL P/N T3400 028
003 ECO_001086 UPDATED LABEL Yuan Xu 03/26/2019
002 ECO_001058 UPDATED LABEL Yuan Xu 03/12/2019
01 CN12-036 INITIAL RELEASE Tony Mo 04/11/2012
REV. ECN NO. DESCRIPTION BY DATE
SCALE 1:2 SHEET 1 OF 1
DWN BY Yuan Xu DATE 03/26/2019 RoHS YES
CHK BY DATE QTY 1
APP BY DATE A4
CUSTOMER MAXCESS
CUSTOMER P/N
OUTLINE/ASSY NO. 910570040 FINISH
CONFIDENTIAL INFORMATION OF ElectroCraft
ElectroCraft
TITLE: DC MOTOR OUTLINE
DWG NO. DPP24T-40-004Z
ECN# P/N:
MOTOR PARAMETER @ 25° C | TOL. | VALUE | UNITS
MAX. OPERATING SPEED (Snl) | MAX | 3000 | RPM
CONTINUOUS TORQUE (Tc) | MAX | 40 | oz-in
PEAK TORQUE (Tp) | MAX | 240 | oz-in
TORQUE SENSITIVITY (Kt) | ± 10% | 26.4 | oz-in/AMPS
BACK EMF CONSTANT (Ke) | ± 10% | 19.5 | V/K RPM
DC RESISTANCE (Rt) | ± 15% | 10.82 | OHMS
INDUCTANCE (L) | ± 30% | 14.6 | mH
ROTOR INERTIA (Ja) | NOM | 0.0055 | oz-in-sec²
FRICTION TORQUE (Tf) | NOM | 3.5 | oz-in
DAMPING TORQUE (Td) | NOM | 0.45 | oz-in/K RPM
MIN. ADMISSIBLE CONT. CURRENT | NOM | 1.3 | AMPS
WINDING TEMPERATURE | MAX | 155 | °C
WEIGHT | NOM | 3.4 | LBS
AXIAL PLAY: WITH 40 LB REVERSING LOAD APPLIED | MAX | ± 0.002 | in
TACHOMETER PARAMETER @ 25° C | TOL. | VALUE | UNITS
VOLTAGE SENSITIVITY | ± 10% | 3.44 | V/K RPM
MAX. VOLTAGE RIPPLE @ 11 CY/REV | | 2% | AVG-PK
DC RESISTANCE | ± 15% | 75 | OHMS
NOMINAL LOAD RESISTANCE | | 10K | OHMS
INDUCTANCE | ± 30% | 0.36 | mH
TACHO ROTOR INERTIA (Ja) | NOM | 0.00091 | oz-in-sec²



MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Sm)	MAX	3000	RPM
CONTINUOUS TORQUE (Tc)	MAX	40	oz-in
PEAK TORQUE (Tp)	MAX	240	oz-in
TORQUE SENSITIVITY (Kt)	± 10%	26.4	oz-in/AMPS
BACK EMF CONSTANT (Ke)	± 10%	19.5	VK RPM
DC RESISTANCE (Rt)	± 15%	10.82	OHMS
INDUCTANCE (L)	± 30%	14.8	mH
ROTOR INERTIA (Ja)	NOM	0.0055	oz-in-sec²
FRICTION TORQUE (Tf)	NOM	3.5	oz-in
DAMPING TORQUE (Td)	NOM	0.45	oz-in/K RPM
MIN. ADMISSIBLE CONT. CURRENT	NOM	1.3	AMPS
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	3.4	LBS
AXIAL PLAY: WITH 40 LB REVERSING LOAD APPLIED	MAX	± 0.002	in
TACHOMETER PARAMETER @ 25° C	**TOL.**	**VALUE**	**UNITS**
VOLTAGE SENSITIVITY	± 10%	3.44	VK RPM
MAX. VOLTAGE RIPPLE @ 11 CYREV		2%	AVG-PK
DC RESISTANCE	± 15%	75	OHMS
NOMINAL LOAD RESISTANCE		10K	OHMS
INDUCTANCE	± 30%	0.36	mH
TACHO ROTOR INERTIA (Ja)	NOM	0.00091	oz-in-sec²



MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
TORQUE SENSITIVITY (Kt)	± 10%	0.181	Nm/AMPS
BACK EMF CONSTANT (Ke)	± 10%	19	VK RPM
DC RESISTANCE (Rt)	MAX	3.3	OHMS
INDUCTANCE (L)	± 30%	5	mH
STALL CURRENT	MIN	2.6	A
ROTOR INERTIA (Ja)	MAX	0.000114	Kgm²
RADIAL FORCE 19mm FROM MOTOR SURFACE A	NOM	270	N
RADIAL FORCE 25mm FROM MOTOR SURFACE A	NOM	220	N
RADIAL FORCE 31mm FROM MOTOR SURFACE A	NOM	190	N
TACHOMETER PARAMETER @ 25° C	**TOL.**	**VALUE**	**UNITS**
VOLTAGE SENSITIVITY	± 10%	3.25	VK RPM
DC RESISTANCE	MAX	200	OHMS
MECHANICAL DATA			
AXIAL BEARING PRELOAD	MAX	20	N
BEARING LIFE	MIN	20000	HOUR
FRICTION MOMENT	MAX	0.08	Nm



MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
MAX. OPERATING SPEED (Sm)	MAX	3100	RPM
CONTINUOUS TORQUE (Tc)	MAX	50	oz-in
PEAK TORQUE (Tp)	MAX	300	oz-in
TORQUE SENSITIVITY (Kt)	± 10%	25.77	oz-in/AMPS
BACK EMF CONSTANT (Ke)	± 10%	19.08	V/K RPM
DC RESISTANCE (Rt)	± 15%	7.2	OHMS
INDUCTANCE (L)	± 30%	8.8	mH
ROTOR INERTIA (Ja)	NOM	0.0067	oz-in-sec2
FRICTION TORQUE (Tf)	NOM	4	oz-in
DAMPING TORQUE (Td)	NOM	0.59	oz-in/K RPM
MIN. ADMISSIBLE CONT. CURRENT	NOM	2	AMPS
WINDING TEMPERATURE	MAX	155	°C
WEIGHT	NOM	4.3	LBS
AXIAL PLAY: WITH 10 LB REVERSING LOAD APPLIED	MAX	±0.004	in
MOTOR PARAMETER @ 25° C	**TOL.**	**VALUE**	**UNITS**
VOLTAGE SENSITIVITY	± 10%	3.44	V/K RPM
MAX. VOLTAGE RIPPLE @ 11 CY/REV		2%	AVG-PK
DC RESISTANCE	± 10%	75	OHMS
NOMINAL LOAD RESISTANCE		10K	OHMS
INDUCTANCE	± 30%	0.36	mH
TACHO ROTOR INERTIA(Ja)	NOM	0.00091	oz-in-sec2

MOTOR PARAMETER @ 25° C	TOL.	VALUE	UNITS
TORQUE SENSITIVITY (Kt)	± 10%	0.181	Nm/AMPS
BACK EMF CONSTANT (Ke)	± 10%	19	V/K RPM
DC RESISTANCE (Rt)	MAX	3.3	OHMS
INDUCTANCE (L)	± 30%	5	mH
STALL CURRENT	MIN	2.6	A
ROTOR INERTIA (Ja)	MAX	0.000114	Kgm²
RADIAL FORCE 19mm FROM MOTOR SURFACE A	NOM	270	N
RADIAL FORCE 25mm FROM MOTOR SURFACE A	NOM	220	N
RADIAL FORCE 31mm FROM MOTOR SURFACE A	NOM	190	N
TACHOMETER PARAMETER @ 25° C	**TOL.**	**VALUE**	**UNITS**
VOLTAGE SENSITIVITY	± 10%	3.25	V/K RPM
DC RESISTANCE	MAX	200	OHMS
MECHANICAL DATA			
AXIAL BEARING PRELOAD	MAX	20	N
BEARING LIFE	MIN	20000	HOUR
FRICTION MOMENT	MAX	0.08	Nm