

Specifications

Model No.	TF029B-1000-P
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Issuing Date	Aug.1, 2017
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1. Scope

This specification applies to Blower Kit:TF029B-1000-P (hereinafter referred to as "the PRODUCT"), a product of NIDEC COPAL ELECTRONICS CORP. (hereinafter referred to as "NCEL").

Contents of the kit are Micro Blower:TF029B-1000-F, Driver board, Harness and Instruction manual.

2. Specification

(Note1) Unless otherwise specified, the environmental conditions are 23°C±5°C, normal humidity, and atmospheric pressure range 90 to 106kPa.

(Note2) Measuring conditions :

Supply voltage = DC24V, measurement equipment = NCEL's standard equipment

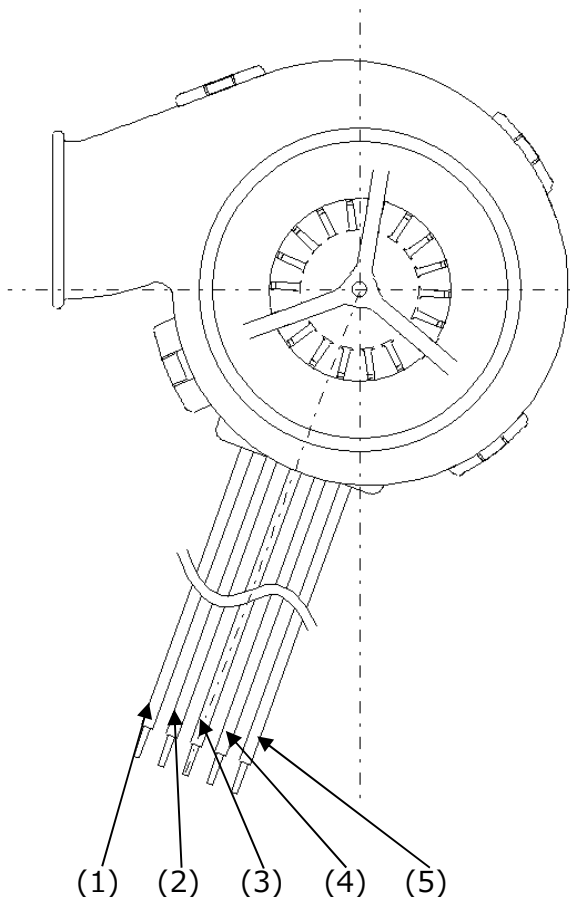
(Note3) This specification represents the characteristics at the time of product shipment. Changes in characteristics over time are not covered by this specification.

No.	Items	Specification	Remarks
1	Rated Voltage	DC 24 V±10%	
2	Direction of Rotation	CCW (Counter-Clockwise)	Viewed from top of air inlet.
3	Kind of Gas	Air	Noncorrosive gas
4	Configuration	Motor with Centrifugal Turbo Blade	Driving circuit required separately
5	Type of Motor	DC Brushless Motor	
6	Number of Poles	4 Poles (2 pole pairs)	
7	Drive System	3 Phase, Bipolar	
8	Bearings	Aero-Dynamic Bearings	
9	Impeller	Centrifugal Turbo Blade	
10	Outline	Micro Blower : 6405-00151-01 (Drawing)	Please refer to attached drawing.
		Driver Board : 6405-00164-01 (Drawing)	
11	Mounting Direction	Shaft vertical to ground, air inlet facing upwards	No vibration, shock, or gyration to be applied to the product operation.
12	Max. Input Coil Current	3.0 A max. (rms)	Excluding inrush current.
13	Rated Power Current	0.67 A max. (reference value)	at Rated Voltage=DC 24V at 2.0kPa, 100L/min
14	Rated Power Consumption	29 W max. (reference value)	at Rated Voltage=DC 24V at 2.0kPa, 100L/min
15	Rated Air Flow	100 L/min	at 2.0kPa

No.	Items	Specification	Remarks									
16	Minimum Air Flow	10 L/min										
17	Rated Pressure	2.0 kPa (\approx 20 cmH ₂ O)	at 100L/min									
18	Maximum Pressure	3.5 kPa (\approx 35 cmH ₂ O)	Absolute maximum pressure									
19	Rated Rotation Speed	36,000 r/min (reference value)	at 2.0kPa, 100L/min									
20	Min. Rotation Speed	10,000 r/min										
21	Max. Rotation Speed	50,000 r/min	Pressure-air flow must be within the "area of use" specified in "7. Operating Range" on P.5.									
22	Readiness time	5 sec max.	From power on to motor start									
23	Torque Constant	0.0014 ~ 0.0020 N·m/A (reference value)										
24	Acoustic Audible Noise	65.0 dB(A) max.	at 2.0kPa, 100L/min Measured at 1m from air inlet Background noise 15dB(A)									
25	Coil Resistance	0.37 ~ 0.49Ω (reference value)	at 20°C (Between 2 phase)									
26	Coil Inductance	22 ~ 29 μH (reference value)	at 20°C, 10kHz (Between 2 phase)									
27	Insulation Class	Class E	JIS C 4003									
28	Insulation Resistance	1M ohm min.	DC500V,between terminal pins and plate JIS C 4003									
29	Dielectric Strength	Leak current to be less than 1mA JIS C 4003	AC600V for 1sec. between terminal pins and plate									
30	Weight	Micro Blower : 55g Driver Board : 40g	(reference value)									
31	Rotor Inertia	10 g·cm ² (reference value)										
32	Max. Axial Loading	3 N max.	Max. allowable force to the intake (upper housing) in axial direction.									
33	Operating Temperature Range	0 ~ 50°C										
34	Operating Humidity Range	10 ~ 80%RH	No condensation									
35	Storage Temperature Range	-20 ~ 60°C										
36	Storage Humidity Range	10 ~ 90%RH	No condensation									
37	Resistance to Vibration	Satisfy Spec No.12 ~ 29 after the following test; <table border="1"> <tr> <td>Kind of Vibration</td> <td>Frequency veering</td> </tr> <tr> <td rowspan="2">Frequency Range</td> <td>10~22Hz @ amplitude 1mm</td> </tr> <tr> <td>@ acceleration 22~50Hz 19.6m/s² (2G)</td> </tr> <tr> <td>Sweep</td> <td>To-and-fro, approx. 5min.</td> </tr> <tr> <td>Test Time</td> <td>X, Y, Z directions, 60min. each</td> </tr> </table>	Kind of Vibration	Frequency veering	Frequency Range	10~22Hz @ amplitude 1mm	@ acceleration 22~50Hz 19.6m/s ² (2G)	Sweep	To-and-fro, approx. 5min.	Test Time	X, Y, Z directions, 60min. each	Non-operating
Kind of Vibration	Frequency veering											
Frequency Range	10~22Hz @ amplitude 1mm											
	@ acceleration 22~50Hz 19.6m/s ² (2G)											
Sweep	To-and-fro, approx. 5min.											
Test Time	X, Y, Z directions, 60min. each											
38	Resistance to Shock	Satisfy Spec No.12 ~ 29 after the following test; <table border="1"> <tr> <td>Acceleration</td> <td>294m/s² (30G)</td> </tr> <tr> <td>Pulse Width</td> <td>6ms</td> </tr> <tr> <td>Shock Wave</td> <td>Semi-sinusoidal wave</td> </tr> <tr> <td>Number of Shock</td> <td>X, Y, Z, directions, once per each direction</td> </tr> </table>	Acceleration	294m/s ² (30G)	Pulse Width	6ms	Shock Wave	Semi-sinusoidal wave	Number of Shock	X, Y, Z, directions, once per each direction	Non-operating	
Acceleration	294m/s ² (30G)											
Pulse Width	6ms											
Shock Wave	Semi-sinusoidal wave											
Number of Shock	X, Y, Z, directions, once per each direction											

3. Interface

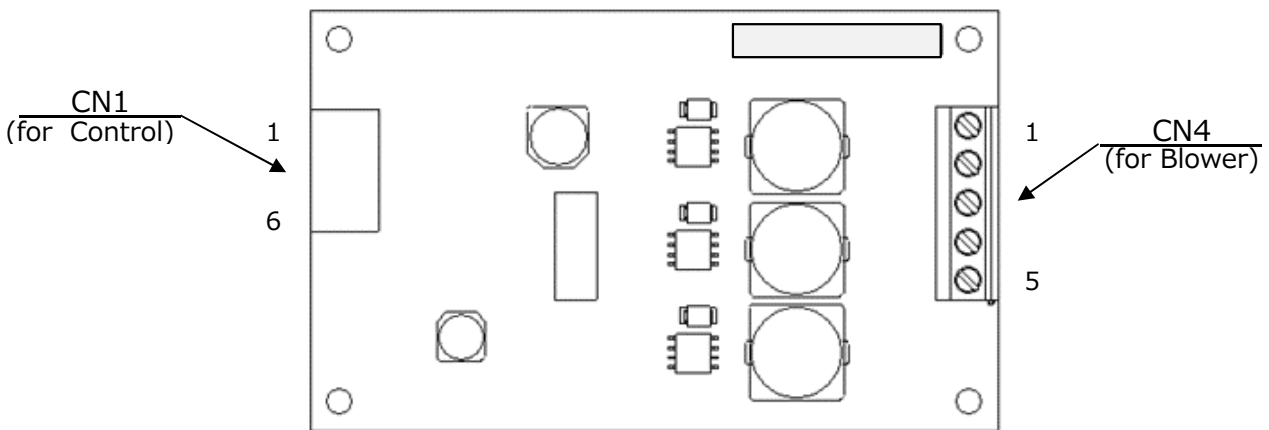
【Micro Blower】



CN4 : Connector for Blower

Pin No.	Symbol	Wire Color	Signal
1	TH(+)	Green	Thermistor Output (+)
2	TH(-)	Yellow	Thermistor Output (-)
3	W	Orange	Motor Coil (W)
4	V	Red	Motor Coil (V)
5	U	Brown	Motor Coil (U)

【Driver Board】



CN1 : Connector for Control

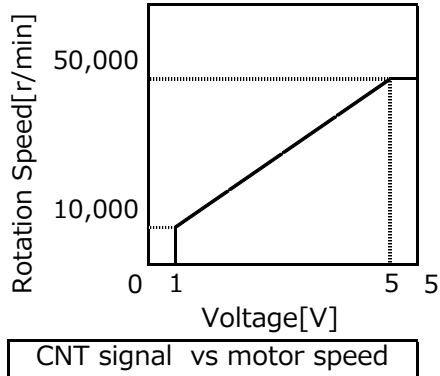
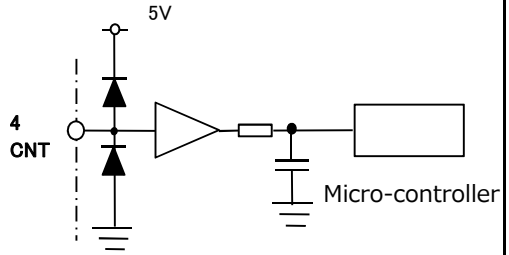
Manufacturer	J.S.T. Mfg. Co., Ltd.
Part No.	SM06B-PASS

Dedicated power supply harness included

CN4 : Connector for Blower

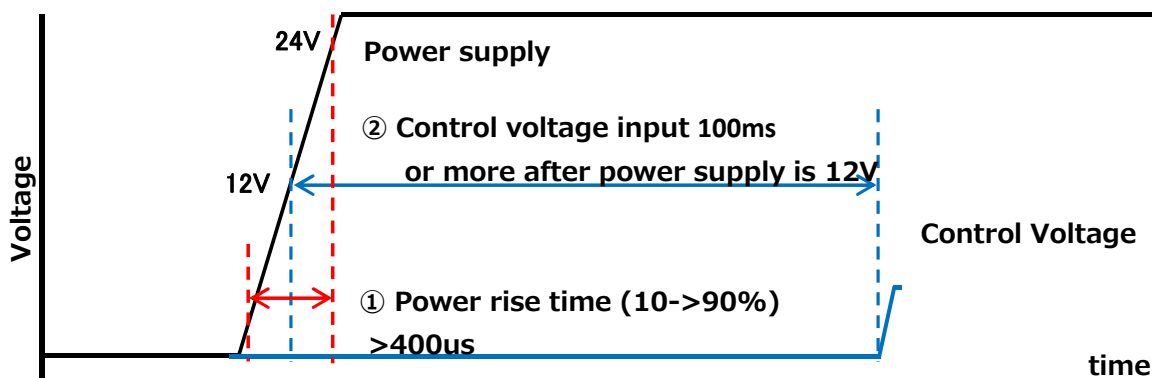
Manufacturer	Phoenix contact
Part No.	1729157

4. CN1(Connector for Control)Specification

Pin No	Input/output	Signal name	Specification
1	Output	ERROR	Error Output Detection Undetected Open Collector Output (Max. Voltage : 10V, Max Current : 10mA)
2	Output	FG	Rotational Speed Signal Output (FG) Open Collector Output (Max. Voltage : 50V, Max Current : 10mA) FG signal 1 pulse = 10rev.
3	-	NC	Not Connected
4	Input	CNT	Control Voltage Input Input voltage range -0.5~5.5V Valid control voltage 0.5~4.5V For CNT signal vs motor speed, refer to below  
5	-	VIN	Power Supply
6	-	GND	GND

5. Power supply, Control voltage input

To avoid high in rush current and protect driver, follow below chart at power up and CNT signal input sequence.



- ① Keep power rise time(10->90%) is more than 400us.
If high rate power is applied, in rush current will be so huge.
- ② Wait more than 100ms after power exceeds 12V to apply CNT signal.

6. Protective Functions

Attached Driver Board[TF029B-1000-D] is featured with the following protective functions.

Protective Functions	Description
Over voltage	If over voltage detected at power line, Blower will be stopped. Recover: Check and correct supply voltage.
Over current	When power line current exceeds 3A, fuse will be opened and cut off power. Recover: Contact with us.
High temperature	When high Turbo Fan internal temperature, outputs error signal and turn it off. If error is detected, LED will blink at 1Hz Recover: Wait until it's coil down and try again. (If not solved, contact with us.)
Over speed	When motor speed exceeds limit, outputs error signal and turn it off. If error is detected, LED will blink at 1Hz Recover: Reduce CNT signal voltage and try again.(If not solved, contact with us.)
Over current at motor coil	When motor coil current exceeds limit, outputs error signal and turn it off. Recover: Check motor operation condition.
Abnormal voltage of supplied power	When power supply voltage exceeds limit, outputs error signal and turn it off. If error is detected, LED will blink at 1Hz Recover: Check power supply voltage and try again
Abnormal operation	When any failure is detected on driver, outputs error signal and turn it off. If error is detected, LED will blink at 4Hz Recover: Check power supply voltage and try again.(If not solved, contact with us)

Normal operation : Green LED is ON. (Red is OFF.)

Abnormal condition : Red LED is blinking. (Green is turned off.)

7. Operating Range

Conditions: Ambient temperature $23\pm 5^{\circ}\text{C}$, normal humidity, atmospheric pressure ($100\pm 2\text{kPa}$).

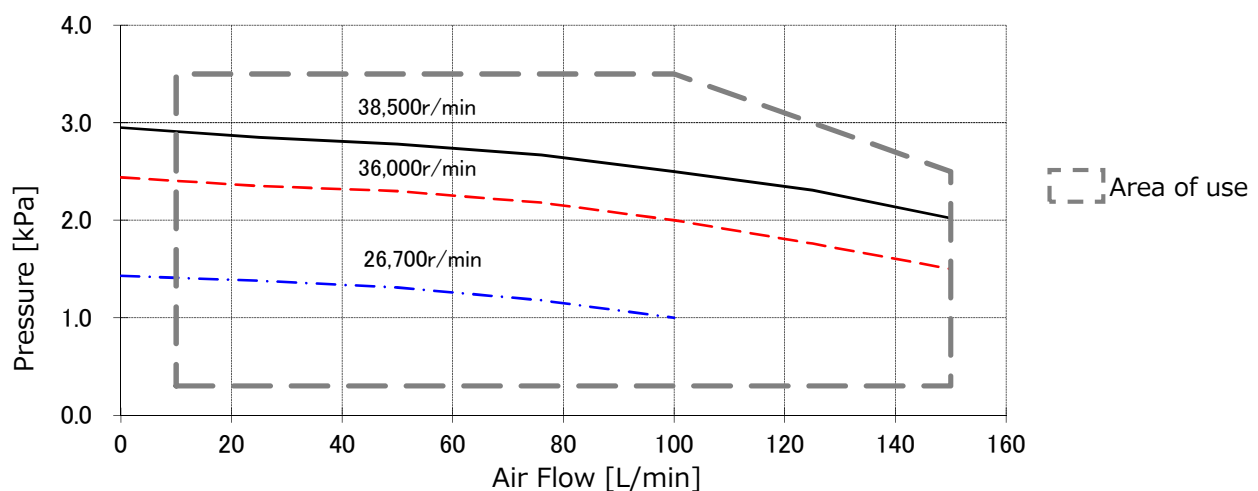
Operating range will be discussed separately.

The following graph is provided for reference only. Values are not guaranteed.

Make sure the thermistor temperature does not exceed 80°C during blower operation.

(Thermistor resistance value $R(80\text{ deg C})=1.177\text{k}\Omega$)

Operating Range at DC24V (1atm)

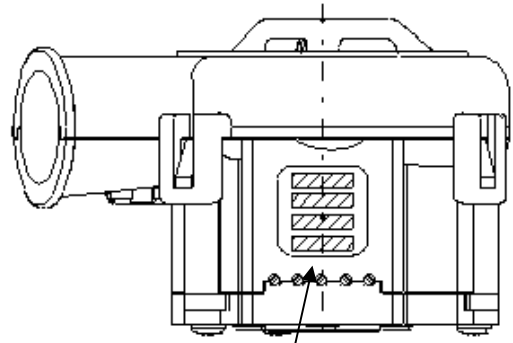


8. Manufacturing Code

【Micro Blower】

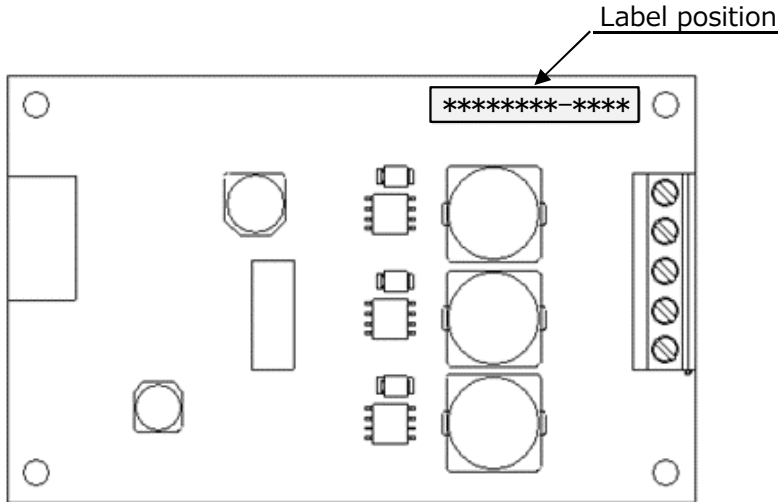


Serial Number
 Control No. : alphabet (A-Z)
 Date of manufacture : refer to Chart 1
 Month of manufacture : refer to Chart 2
 Year of manufacture : last digit of the year (A.D.)

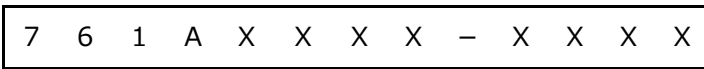


Label position

【Driver Board】



Label position



Serial Number
 Version
 Control No. : alphabet (A-Z)
 Date of manufacture : refer to Chart 1
 Month of manufacture : refer to Chart 2
 Year of manufacture : last digit of the year (A.D.)

【Chart 1】

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J	K	L

Date	21	22	23	24	25	26	27	28	29	30	31
Code	M	N	P	Q	R	T	U	V	W	X	Y

【Chart 2】

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	1	2	3	4	5	6	7	8	9	O	N	D

9. Warranty

9-1. Warranty Period

Warranty period of the PRODUCT is 1 year from delivery.

9-2. Warranty Scope

- (1) In case a defect is found in the PRODUCT during the above warranty period and NCEL is responsible for the defect, NCEL will either repair or replace the defected PRODUCT free of charge. However, in the following cases, the PRODUCT will not be covered by warranty.
 - Defects caused by inappropriate conditions, environments, handlings, and use which are not specified in this specification.
 - Defects caused by your equipments and/or software.
 - Defects caused by modifications and/or repairs which were not done by NCEL.
 - Defects which could have been avoided if the PRODUCT was used accordingly to this specification.
 - Defects which were unpredictable with the scientific or technical level of NCEL at the time of
 - Defects caused by external factors such as natural hazards (fire, earthquakes, floods) or electrical
- (2) NCEL will be responsible for the PRODUCT only in which the coverage will be limited to Clause 9-2. (1). NCEL shall not be liable for customer's equipment damages, opportunity losses, or lost earnings caused by defects of the PRODUCTS. The user shall indemnify NCEL and hold NCEL harmless from any liability or damage whatsoever arising out of any action not in accordance with this specification.

9-3. Product Application

The PRODUCT is designed and manufactured for general industrial use for general-purposes. Please do not use in applications such as nuclear power, aviations, railroads, or medical equipment where great effect to human lives or wealth are expected.

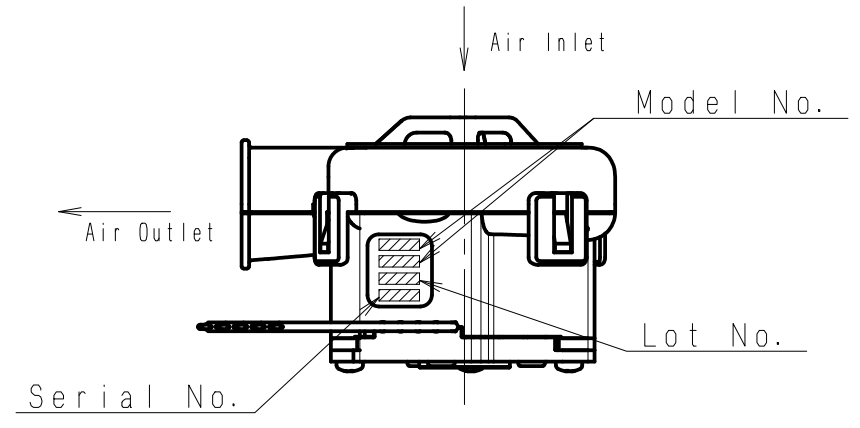
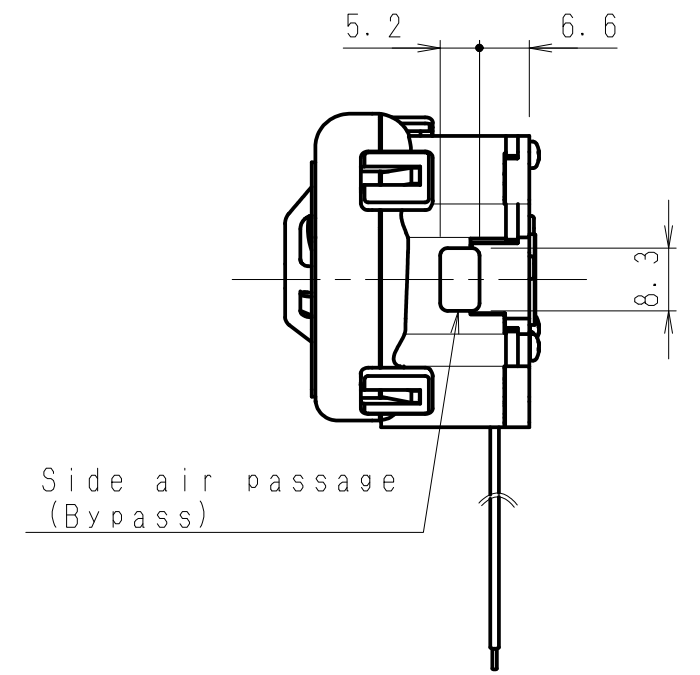
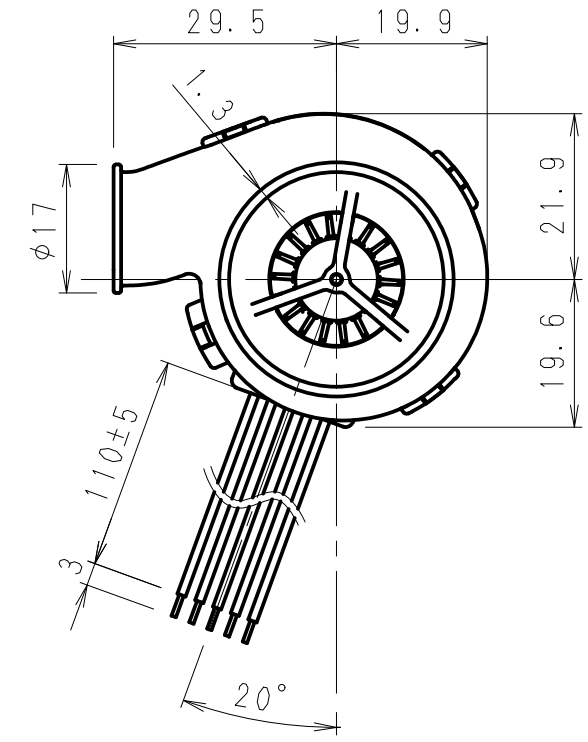
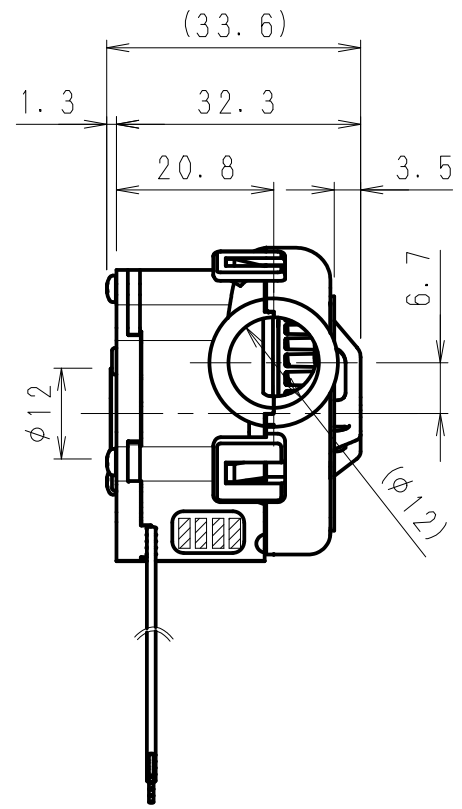
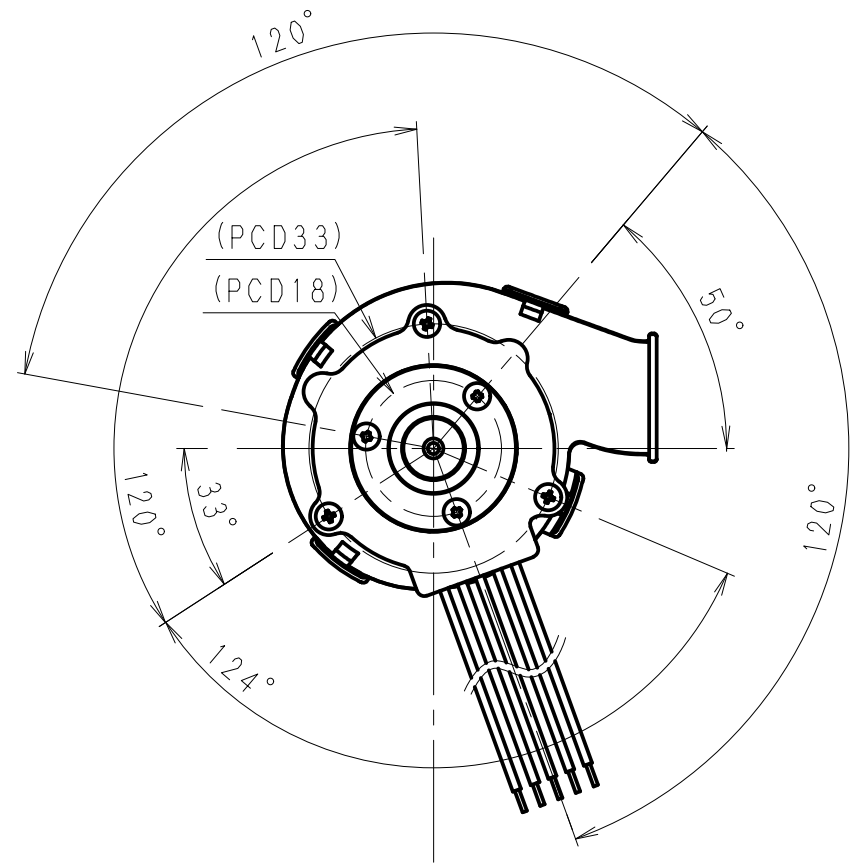
However, if NCEL agree with the customer the usage of the PRODUCT in such applications, NCEL will warrant the PRODUCT in the same scope described in "9. Warranty" in this specification.

10. Notes

- (1) All values are measured with NCEL's standard equipments unless otherwise specified.
- (2) The PRODUCT is compliant with RoHS directives which went into effect July, 2011. Designated hazardous substances are lead, mercury, cadmium, hexavalent chrome, brominated flame retardants (PBB, PBDE) and its compounds.
- (3) The PRODUCT is compliant with Directive 2006/122/EC of the European Parliament (Council Directive 76/769/EEC (30th amendment)) which restricts the use of PFOS.
- (4) Contents of this document may be changed without notice. The production of the PRODUCT may be discontinued without notice. Please confirm with your local contact before ordering.
- (5) Please check if the PRODUCT operates normally at every start-up and during operation.
- (6) Please provide safety measures to prevent damages in case of product failures.
- (7) Performance cannot be guaranteed in case the PRODUCT is used beyond the specification or the PRODUCT is modified.
- (8) Depending on the conditions or the environment, functions or performances of the PRODUCT may not be satisfied when the PRODUCT is used with other equipments.
- (9) Please do not use the PRODUCT in applications to protect the body.
- (10) Please protect the PRODUCT from condensation.
- (11) Please use the correct supply voltage to operate the PRODUCT.
- (12) Do not disassemble or modify the PRODUCT.
- (13) Turn off the power immediately and stop using the PRODUCT in the following cases.
 - In case water or foreign substances get into the PRODUCT.
 - In case the PRODUCT is dropped or the housing is broken.
 - In case unusual odor, abnormal noise, or smoke are generated from the PRODUCT.
- (14) Do not use or store in the following conditions;
 - Humid, dusty, or poorly-ventilated area.
 - Areas where the temperature is expected to rise (direct sunlight, etc.).
 - Areas with corrosive gas or flammable gas in the surrounding air.
 - Areas where vibration, shock, or rocking motion is applied directly to the PRODUCT.
 - Areas where the PRODUCTS may be splashed with water, oil, or chemicals.
 - Areas where static electricity can easily be built up.
- (15) Make sure the wiring is done properly.
- (16) Turn off the power of the PRODUCT and any equipment attached to the PRODUCT when putting on or taking off the cables.

- (17) Install the PRODUCT using cushioning materials such as vibration dampeners. Please contact NCEL if you have any questions regarding installation.
- (18) Do not block the air inlet and outlet (3 places). Please contact NCEL if you have any questions regarding the air inlet and outlet.
- (19) Vibration or audible noise level may change over time due to contamination of the blade. Please provide dust-proof constructions around the PRODUCT.
- (20) Please advise us in case the driving circuit will be designed at the customer's side.
- (21) Please connect and don't use air inlet of this product (2 places) in series.

No.	Drawing Number	Name	Qty.	Notes
1				
2				



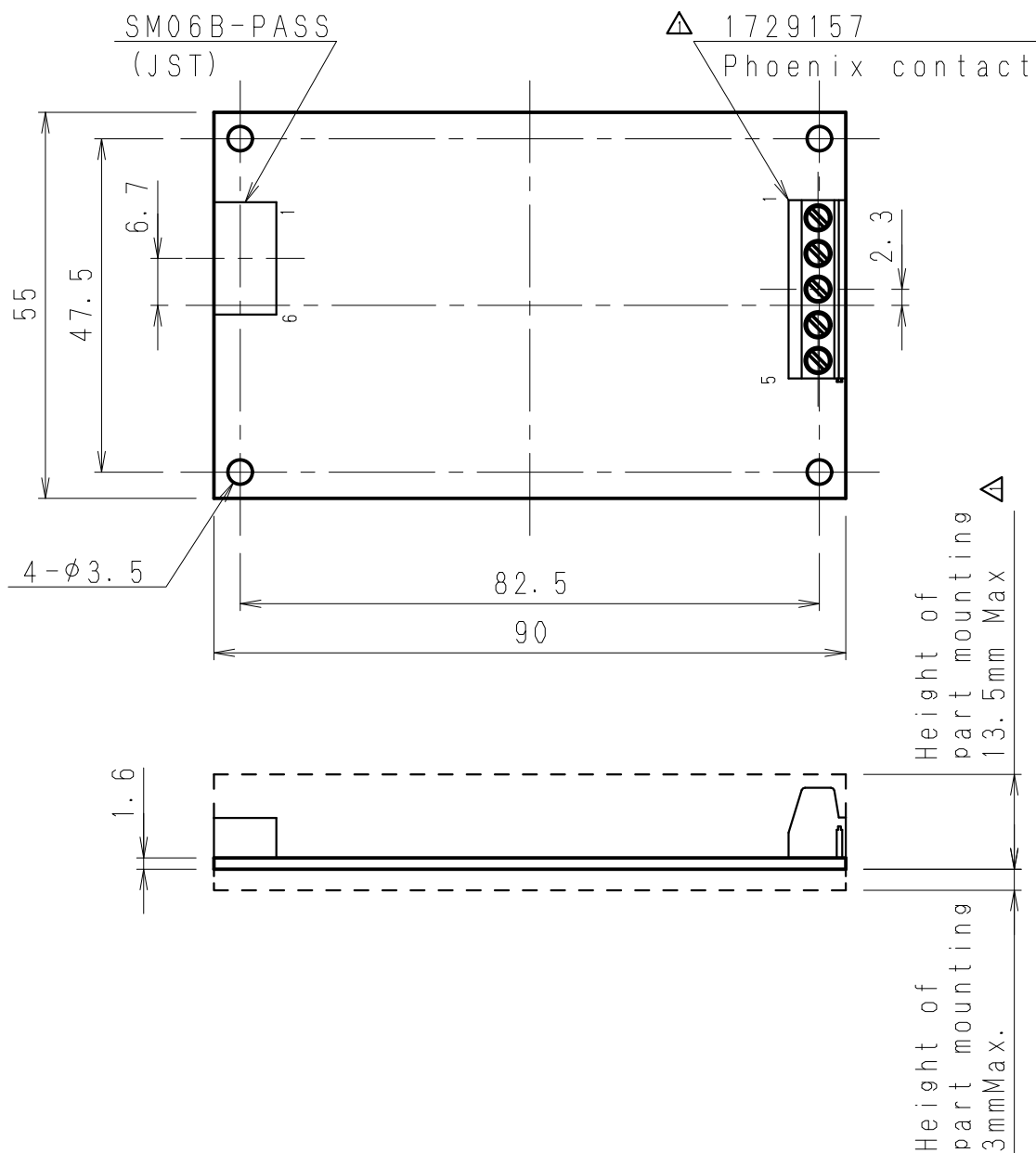
Note
1) General Tolerances. ±0.5

(Dimensions: in mm) ISSUED BY DESIGN GROUP 3
Previous Drawing: 6405-00151-92

C. No.	Date	Ecn. No.	Revision	Name	Third Angle Projection Method	Scale	Tolerances			Material	Surface Treatment
					Qty.	Finish	A	B	S		
						1 : 1	0 - 30	±0.1	±0.2	±	
							30 - 120	±0.15	±0.3	±	
							120 - 315	±0.2	±0.5	±	
							315 - 1000	±0.3	±0.8	±	
△	Feb. 17 '17	8SELB-0860	Revised English version released.	M. O	Approved by	Checked by	Designed by				Name
	Jan. 16 '16		First Print	M. O	N. Watanabe	Y. Akabane	M. Obayashi	NIDEC COPAL ELECTRONICS CORP.			BLOWER OUTLINE
											Dwg. No.
											6405-00151-01

Note

1. General tolerances. ± 0.5
 2. About substrate details as follows.
- Layers: 4 layers



ISSUED BY DESIGN GROUP 3
Previous Drawing: 6405-00164-91

(Dimensions: in mm)

					Tolerances	A	B	S	Material
					0 - 30	± 0.1	± 0.2	\pm	
					30 - 120	± 0.15	± 0.3	\pm	Surface Treatment
					120 - 315	± 0.2	± 0.5	\pm	Heat Treatment
Δ	May. 8.'17	8SELB-0879	Dimension change by connector change	Y. A	315 - 1000	± 0.3	± 0.8	\pm	Heat Treatment
Δ	May. 8.'17	8SELB-0879	Changing outline by connector change	Y. A	Angle Tolerances	\pm			Model
	Feb. 13.'17		First Print	Y. A	Finish	Date			TF029B-1000-D
C.No.	Date	Ecn.No.	Revision	Name	Qty.	May. 9.'17			
Approved by	Checked by	Designed by	Third Angle Projection Method	Scale	1 : 1				
N. Watanabe	S. Yanagi	Y. Akabane	NIDEC COPAL ELECTRONICS CORP.		Name	DRIVER OUTLINE			
					Dwg. No.	6405-00164-01			