

# Specifications

Model No.

TF037-1001-D

Issuing Date

Aug.1, 2017

## 1. Scope

This specification is for the driver kit[TF037-1001-D] dedicated to the Micro Blower [TF037 series], a product of NIDEC COPAL ELECTRONICS CORP.(hereinafter referred to as "NCEL").  
Contents of the kit are Driver board and Harness (2 types).

## 2. Specification

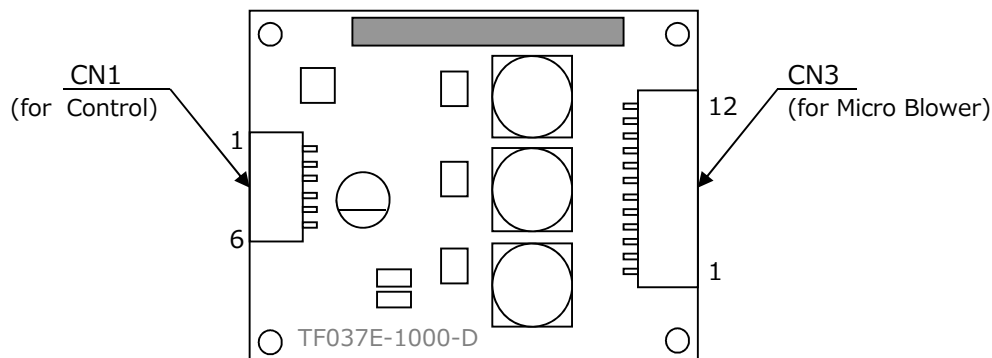
- (Note1) Environmental conditions :  $23\pm 5^{\circ}\text{C}$ , normal humidity, atmospheric pressure range 90 to 106kPa (unless otherwise specified).  
 (Note2) Measuring conditions :  
 Blower = TF037C-2100-F, measurement equipment = NCEL's standard equipment  
 (Note3) Measuring conditions (unless otherwise specified) : supply voltage = DC24V, pressure = 4.0kPa, air flow = 100L/min  
 (Note4) It is the specification at the time of shipment and is not applied with the characteristics change by the time-dependent change.

No.	Items	Specification	Remarks
1	Configuration	Drivers	Dedicated to the Micro Blower (TF037 series)
2	Rotational Speed	40,000 r/min (reference value)	at 4.0kPa, 100L/min
3	Power Consumption	29 W max.	at 4.0kPa, 100L/min
4	Rated Voltage	DC 24 V $\pm$ 10%	
5	Max. Input Current	2.0 A max. (DC)	Excluding inrush current.
		4.0 A max. (Pulse)	
6	Running Current	1.2 A max.	at 4.0kPa, 100L/min
7	Weight	32 g max.	
8	Operating Temperature	-10~50 $^{\circ}\text{C}$	
9	Operating Humidity Range	10~90 %RH	No condensation
10	Storage Temperature	-20~60 $^{\circ}\text{C}$	
11	Storage Humidity Range	10~90 %RH	No condensation

No.	Items	Specification	Remarks
12	Resistance to Vibration	To meet the Spec after the following test;	
		Kind of Vibration	Sweep
		Frequency Range	10~22Hz @ amplitude 1mm
			22~50Hz @ acceleration 19.6m/s <sup>2</sup> (2G)
		Sweep	To-and-fro, approx. 5min.
Test Time	X, Y, Z directions, 60min. each		
13	Resistance to Shock	To meet the Spec after the following test;	
		Acceleration	294m/s <sup>2</sup> (30G)
		Pulse Width	6ms
		Shock Wave	Semi-sinusoidal wave
		Number of Shock	X, Y, Z, directions, once per each direction
14	Outline	Drawing : 6404-00431-01	

### 3. Interface

[Driver Board ]



CN1 : Connector for Control

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

CN3 : Connector for Micro Blower

Manufacturer	J.S.T. Mfg. Co., Ltd.
Part No.	SM12B-PASS

Pin No.	Symbol	Signal
1	Error	Error Output
2	FG	Rotational Speed Signal Output (FG)
3	BR	Short brake Input
4	CNT	Control Voltage Input
5	Vcc	Power Supply Voltage Input
6	GND	GND

Pin No.	Symbol	Signal
1	U	Motor Coil (U)
2	W	Motor Coil (W)
3	V	Motor Coil (V)
4	TH	Thermistor Input
5	GND	GND
6	H1+	Hall Element 1 Input
7	H1-	
8	H3+	Hall Element 3 Input
9	H3-	
10	H2+	Hall Element 2 Input
11	H2-	
12	Vcc	Hall Element Power (+12V)

**4. CN1(Connector for Control)Specification**

Pin No.	Symbol	Specification					
1	Error	Error Output L = Undetected H = Detection					
2	FG	Rotational Speed Signal Output (FG)  12 pulse / rev. Open Collector Output Max. Voltage : 50V Max. Output Current : 3mA					
3	BR	Short brake Input L = Rotation H = Short brake					
4	CNT	Control Voltage Input  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Input Voltage for Standby</td> <td>0V</td> </tr> <tr> <td>Input Voltage for Operation</td> <td>1.0 to 5.0V</td> </tr> </table>	Input Voltage for Standby	0V	Input Voltage for Operation	1.0 to 5.0V	
Input Voltage for Standby	0V						
Input Voltage for Operation	1.0 to 5.0V						
5	Vcc	Power Supply Voltage Input  DC24V±10%					
6	GND	GND					

**5. Characteristics of Flow Rate - Static Pressure**

This data is the value of the Micro Blower [TF037C-2100-F].

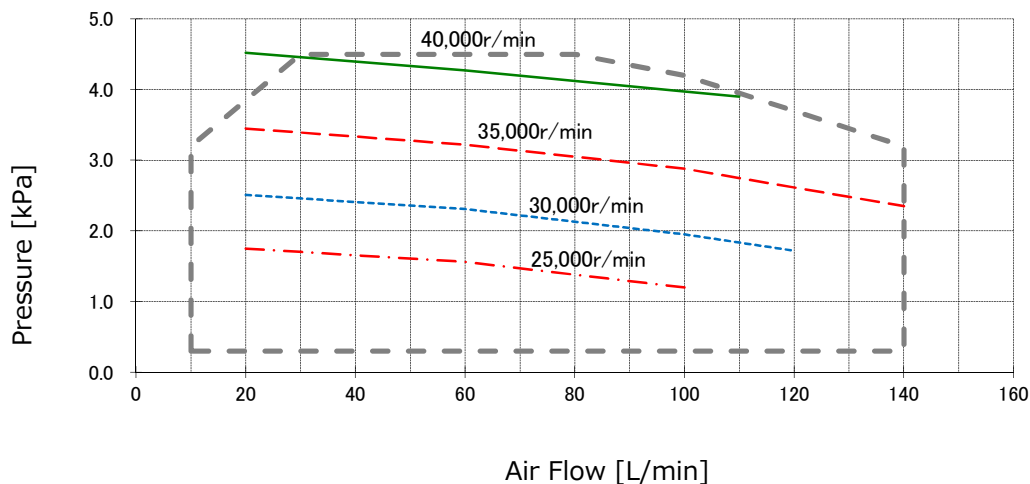
Conditions: Ambient temperature 23±5°C, normal humidity, atmospheric pressure (100±2kPa).

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

Make sure the thermistor temperature does not exceed 86°C during blower operation.

(Thermistor resistance value R(86 deg C)=0.968kΩ)

**Operating Range at DC24V (1atm)**



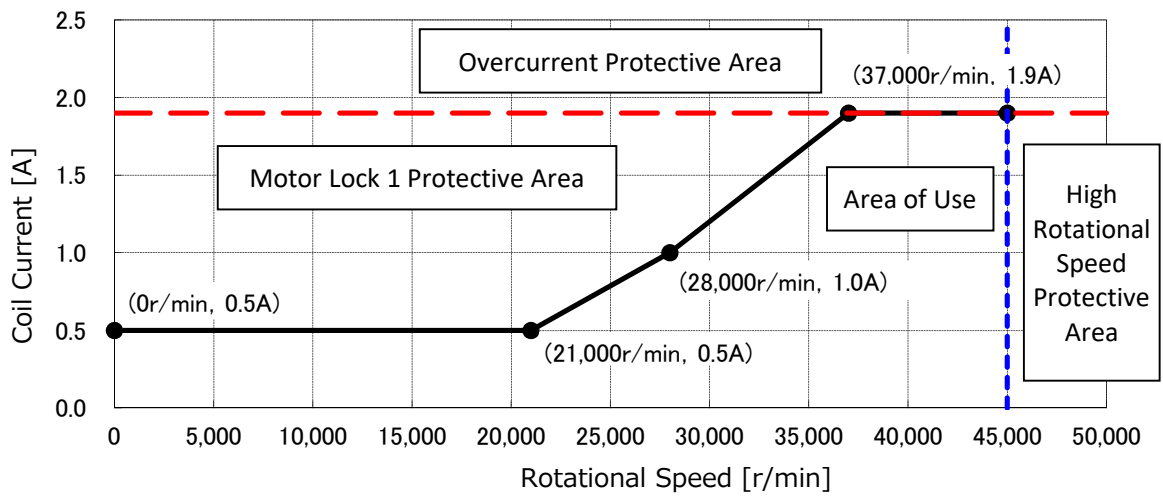
Area of use

### 6. Protective Functions

Attached Driver Board is featured with the following protective functions.

Protective Functions	Description
High Temperature	Power will be turned off when the thermistor inside the Blower exceeds 86°C.
High Temperature	Power will be turned off when the rotational speed exceeds 45,000 r/min..
Overcurrent	Power will be turned off when the coil current exceeds 1.9A (except start-up).
Motor Lock 1	Power will be turned off when coil current and rotational speed are in the "Motor Lock Protection Area" shown in Graph 2 below.
Motor Lock 2	Power will be turned off when the Blower does not operate even when the PRODUCT is giving command to operate.

Graph 2. Protective Area

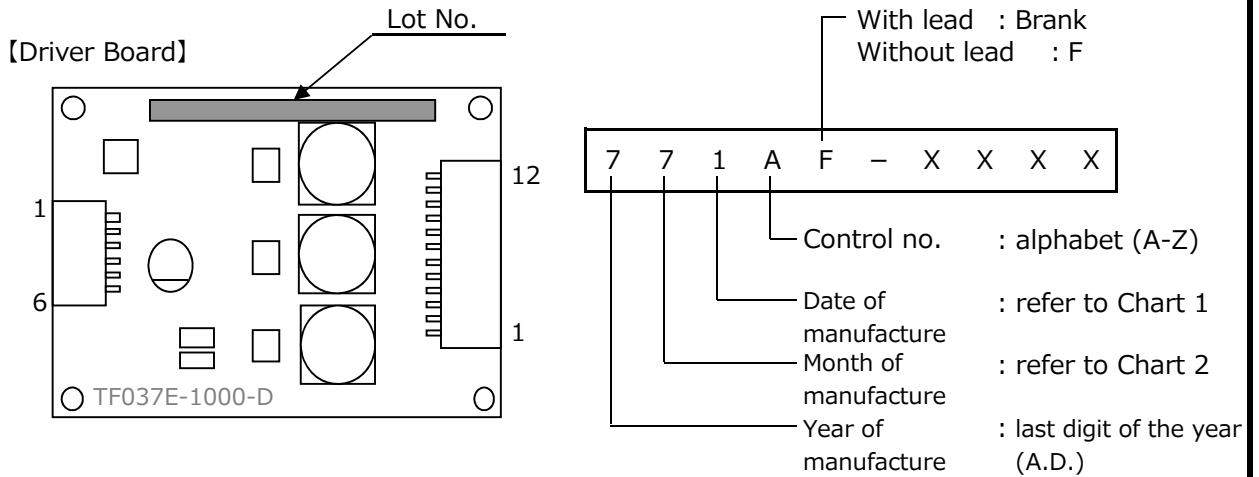


[Monitor / Control Flow]

Monitored Items	Protective Functions	Criteria	Control
CNT V 1.0~5.0V			
Thermistor temperature	High Temperature	Thermistor 86°C or higher	Blower Stop
Rotational speed	High Rotational	45,000r/min or higher	
Coil current	Overcurrent	Shunt resistant current 1.9A or higher	
	Motor Lock 1	Motor Lock 1 Protective Area	
	Motor Lock 2	Rotation failure of Blower	

《 Restart Conditions After Blower Stop》  
Restart with turning the power on again.

## 7. Manufacturing Code



[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

## 8. Warranty

### 8-1. Warranty Period

Warranty period of the PRODUCT is 1 year from delivery.

### 8-2. 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 shipment.
- (2) NCEL will be responsible for the PRODUCT only in which the coverage will be limited to Clause 8-2. (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.

### 8-3. 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 "8. Warranty" in this specification.

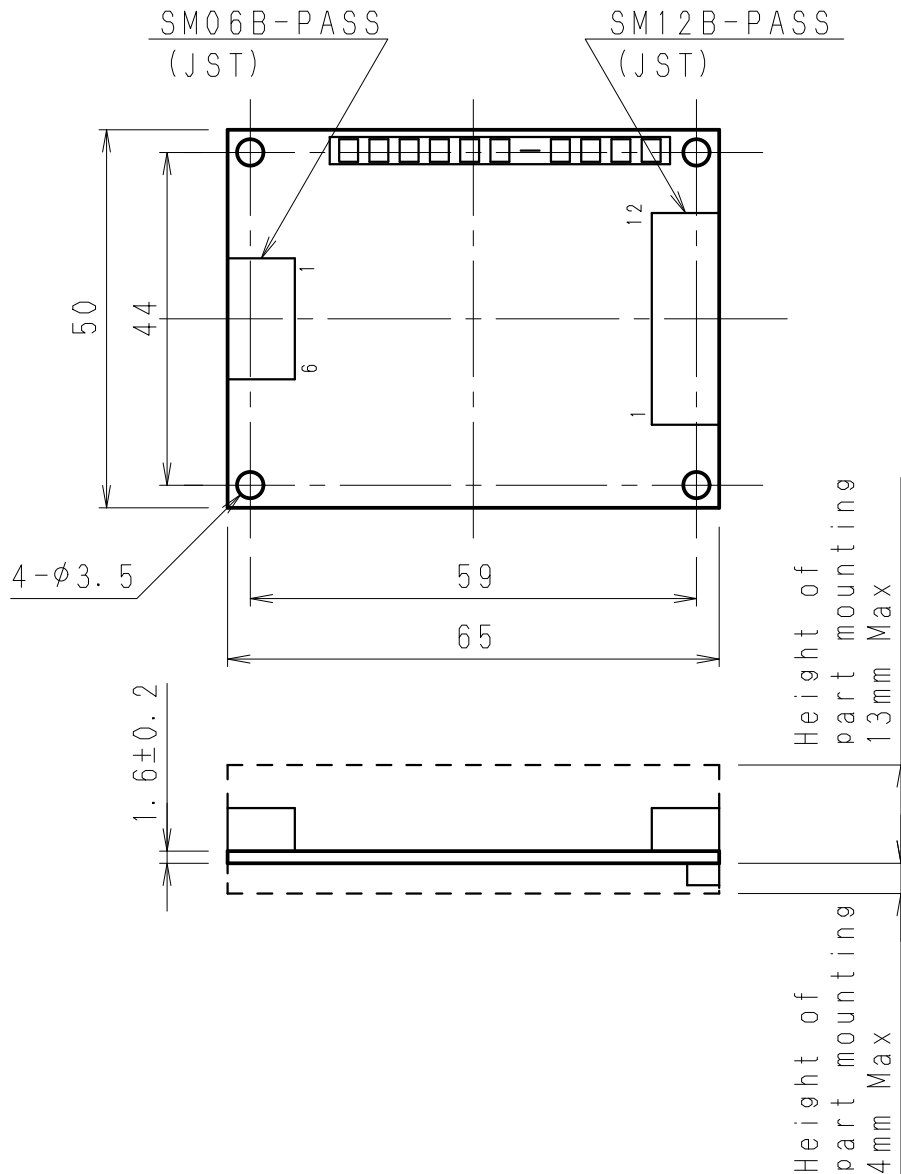
## 9. Notes

- (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 in well-ventilated environment.
- (18) The PRODUCT does not come with a cover. Make sure the surface of the PRODUCT is kept clean. Do not let conductive foreign substances get on the surface of the PRODUCT.
- (19) Do not bend or stress the PRODUCT.
- (20) Make sure other circuits or wirings do not effect the PRODUCT.
- (21) Reliability of the PRODUCT may decrease rapidly when operated continuously with high load, even if the load is within the specification. Please take this into consideration when designing the equipment which the PRODUCT will be installed.
- (22) IC and other parts of the PRODUCT may get hot due to the compact, dense design.  
Do not touch the PRODUCT until it is cooled down.

Note

- 1. General tolerances.  $\pm 0.5$
  - 2. About substrate details as follows.
- Layers: 2 layers
- Material: FR-4



ISSUED BY DESIGN GROUP 3  
Previous Drawing: 6404-00431-92

(Dimensions: in mm)

					Tolerances	A	B	S	Material
					0 - 30	±0.1	±0.2	±	
					30 - 120	±0.15	±0.3	±	Surface Treatment
					120 - 315	±0.2	±0.5	±	Heat Treatment
					315 - 1000	±0.3	±0.8	±	
△	Feb. 17 '17	8SELB-0860	Revised English version released.	M. O	Angle Tolerances	±			
	Oct. 11 '12		First Print	T. A	Finish	Date			Model
C.No.	Date	Ecn. No.	Revision	Name	Qty.	Feb. 17 '17			TF037E-1000-D
Approved by	Checked by	Designed by	Third Angle Projection Method	Scale	1 : 1				
N. Watanabe	Y. Akabane	M. Obayashi	<b>NIDEC COPAL ELECTRONICS CORP.</b>		Name	DRIVER OUTLINE			
					Dwg. No.	6404-00431-01			