DYNATRON CORPORATION

TOP MOTOR TECHNOLOGY (HUIZHOU) CO, LTD

TOP MOTOR

Specification for Approval

Customer:	
Model Number:	U9
Part Number:	LC12250012
Issued Date:	Thursday, September 15, 2022
Version:	A

Customer Approval	
Approval:	Check:

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Approval:	Check:	Handler:
Guo xuan	-	Ling yan

1. SCOPE
   This specification defines the electrical and mechanical characteristics of the □ AC / ■ DC Brush less(□Liquid State /■2-Balls Bearing)axial flow fan, which is carefully designed and manufactured for your special needs by Dynatron Corporation.

2. ELECTRICAL CHARACTERISTICS

Items		Description		
1.	Rated Voltage	DC 12 V		
2.	Operating Voltage	10.8V~13.2V		
3.	PWM Frequency 25KHz	Duty Cycle D＝0%	Duty Cycle D＝50%	Duty Cycle D＝100%
4.	Start Voltage	7V		
5.	Air Flow – At rated voltage zero static pressure (minimal value)	0.6m³ / min (21.2CFM)	1.63m³ / min (57.5CFM)	2.39m³ / min (84.3CFM)
6.	Static Pressure – At rated voltage At zero air flow	0.24mm-H_2O (0.009inch-H_2O)	1.76mm-H_2O (0.07inch-H_2O)	3.78mm-H_2O (0.15inch-H_2O)
7.	Input Current	0.05A	0.1A	0.2A
8.	Speed	600RPM±200	1500RPM±200	2200RPM±10 %
9.	Acoustical Noise	14.26dBA	27.7dBA	36.1dBA
10.	Input Power	0.6W	1.20W	2.40W
11.	Insulation Resistance – Between Frame and Terminal	10 M ohm at DC 500 V		
12.	Dielectric Strength – Between Frame and Terminal	5 MA (Max.) @ AC 500 V 60 Hz 1 min.		
13.	Life – Continuous operating under normal temperature (40°C or 104°F)	50,000 hours		
14.	Lead Wires	UL 2468,AWG 28 or Equivalent “-”: Black; “+”: Black;“s”: Black; “PWM”: Black.		

3. MECHANICAL CHARACTERISTICS

Items		Description
1.	Dimension	Display as Drawing
2.	Frame	PBT UL94V-0 (Black)
3.	Impeller	PBT UL94V-0 (Black)
4.	Bearing System	Two balls Bearing
5.	Weight	/

4. ENVIRONMENTAL

Items		Description
1.	Operating Temperature	- 10 °C ~ + 65 °C (65 %RH)
2.	Storage Temperature	- 30 °C ~ + 70 °C (65 %RH)
3.	Vibration Test	Motor withstands 1000 rpm vibrating with 2 mm amplitude for 30 minutes up and down, right and left, back and forth directions.
4.	Drop Test	Motor withstands one free body drop from 30 cm in high onto 10 mm thickness of wooden board for each of the three faces in minimum packing condition.
5.	Acoustic Noise	36.1dBA – Curve (Max 36.6dBA) Measuring Condition – Under rated voltage in semi-anechoic chamber equipment sound level meter. (Figure A.)

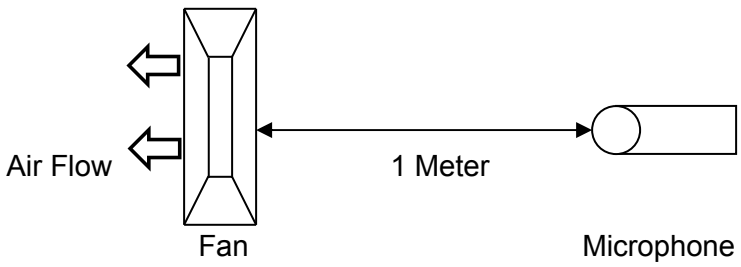


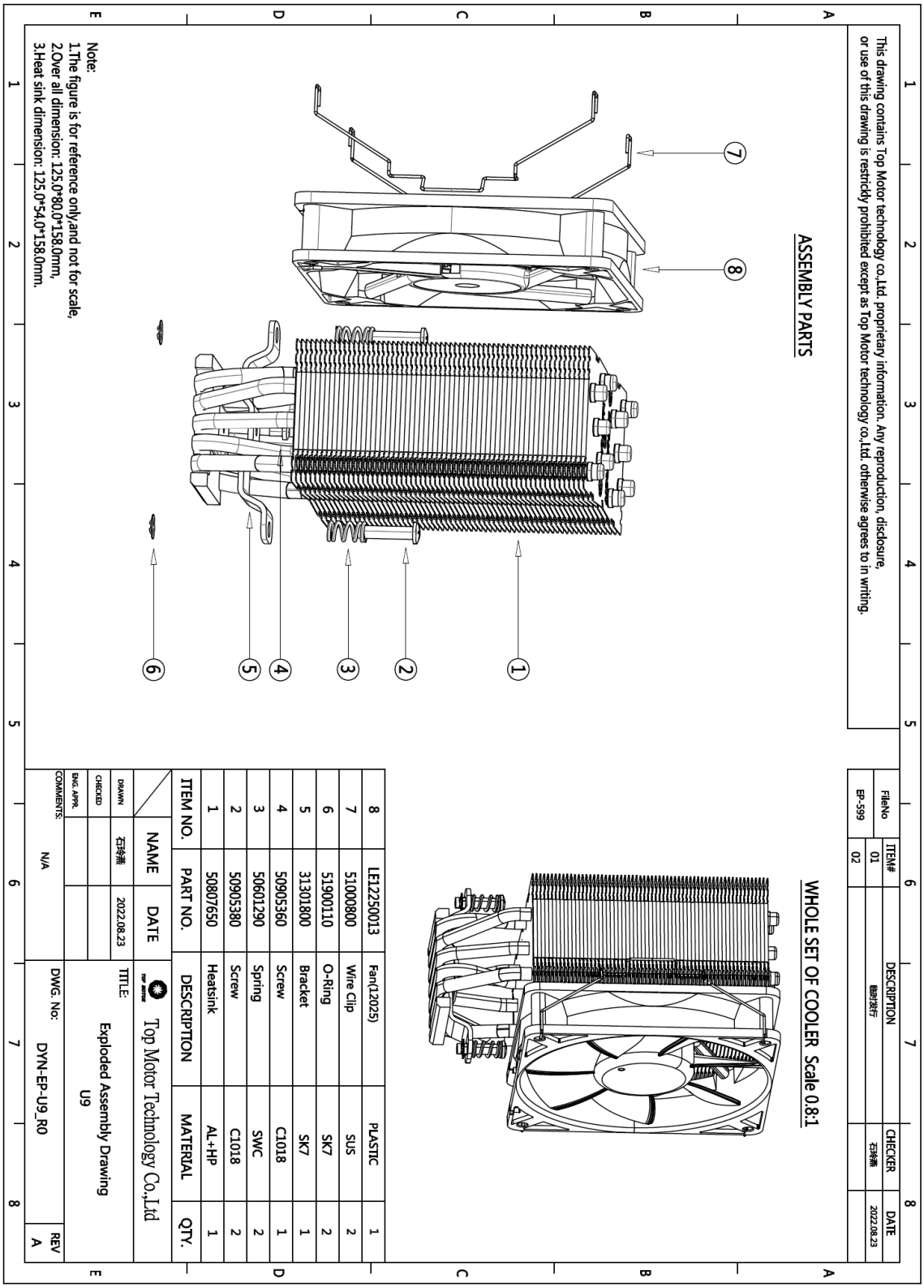
Figure A – Noise Level is measure at rated voltage in anechoic chamber in free air as above.

5. PROTECTION

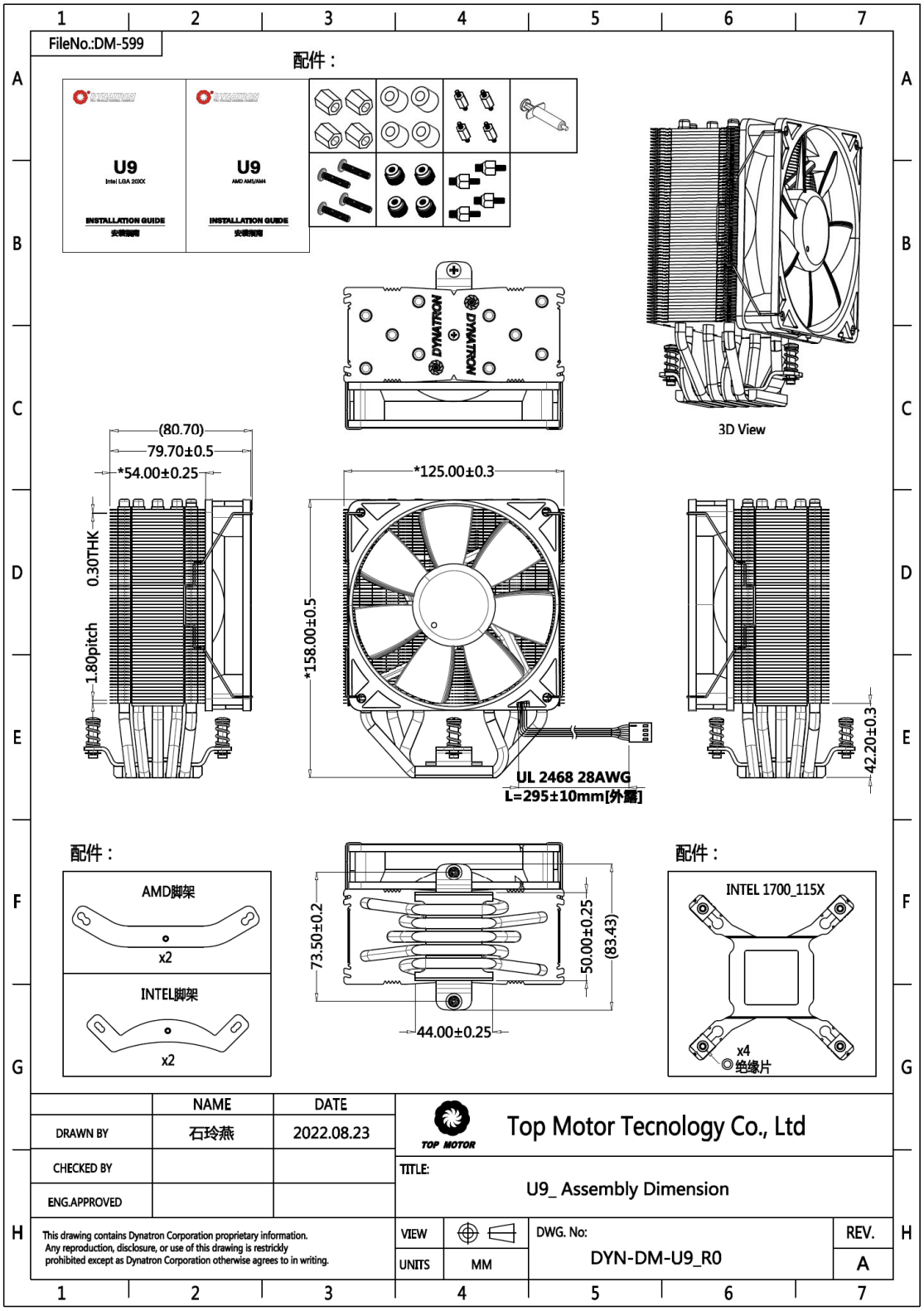
Items		Description
1.	Polarity Protection	For polarity error connection to power, the circuit withstands reversed connection between positive and negative leads.

6. ATTACHMENTS
   6.1. Assembly Parts
   6.2. Product Dimension
   6.3. Frequency Generator Output
   6.4. Electrical specifications for pwm production

6.1. Assembly Parts



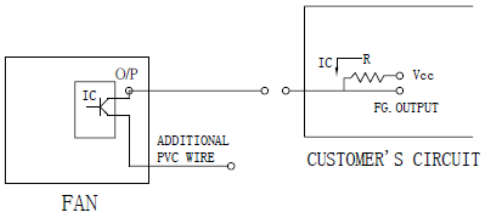
6.2. Product Dimension



6.3. Frequency Generator Output

FREQUENCY GENERATOR O/P:

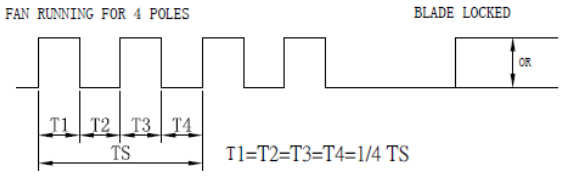
Frequency generator function is activated by an internal IC for customer's application.
Electrical schematic:



CUSTOMER'S CIRCUIT

Vcc = From +5 To +28 VDC (Generally using +12 or +24 VDC)
Ic = 5 mA max.
R = V/I (Output "R" value calculation)

- **SUPPLY A WAVEFORM:**

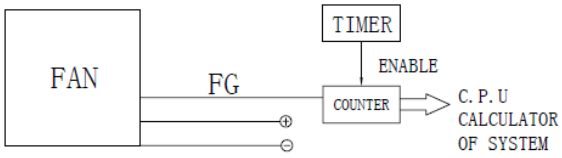


N=R.P.M. (Rotation speed will be different for various models L/M/H/HH/VH/SH)
TS=60/N (Sec)
* Voltage level after blade locked

- **OUTPUT LEVEL:**

High = Vcc 10%
Low = 0~0.5V
Ic = 5 mA max.

- **APPLICATION:**



- **FUNCTIONS:**

. By means of waveform & customer's design, schematic can reach alarm function, either in the form of buzzing or LED flashing. Adjust rotation speed.
. When power supply output voltage level decreases, it will result in the lowering of fan rotation speed. The irregular situation will be controlled by using FG. O/P through P/S circuit to increase the output voltage and result in a stable rotation speed.

6.4. Electrical specifications for pwm production

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Electrical Specifications for PWM production

Voltage

Fan operating voltage shall be whthin the range 12V+/-1.2V.

Current

Peak fan current draw during start-up operation(with 13.2V applied,with fan operating in the free stream condifion)shall not exceed 2.0 A.

Fan current spike during start-up operation(with 13.2V applied with fan operating in the free stream condition)shall be allowed to exceed.1.0 A for a duration of no greater than 1.0 sec.

Tachometer Output Signal

Fan shall provide tachometer output signal with the following characteristics:

* Two pulses per revolution
* Open-collector or open-drain type output
* Motherboard will have a pull up to 12V, maximum 13.2V

PWM Control Input Signal

The following requirements are measured at the PWM(control) pin of the fan cable cnnector:PWM Frequency:Target frequency 25kHz, acceptable operational range 21 kHz to 28 Khz Maximum voltage for logic low:VIL=0.8V Absolute maximum current sourced:Imax=5mA(short circuit current) Absolute maximum voltage level:Vmax=5.25V(open circuit voltage)

Fan Speed Control

1.1Maximum Fan Speed Requirements

The maximum fan speed shall be specified for the fan model by the vendor and correspond to 100% duty cycle PWM signal input.

1.2 Minimum Fan S peed Requirements

The vendor shall specify the minimum RPM and the corresponding PWM duty cycle. This specified minimum RPM shall be 30% of maximum RPM or less.The fan shall be able to start and run at this RPM. To allow a lower specified minimum RPM,it is acceptable to provide a higher PWM duty cycle to the fan motor for a short period of time for startup conditions.This pulse should not exceed 30% maximum RPM and should last no longer than 2 seconds.

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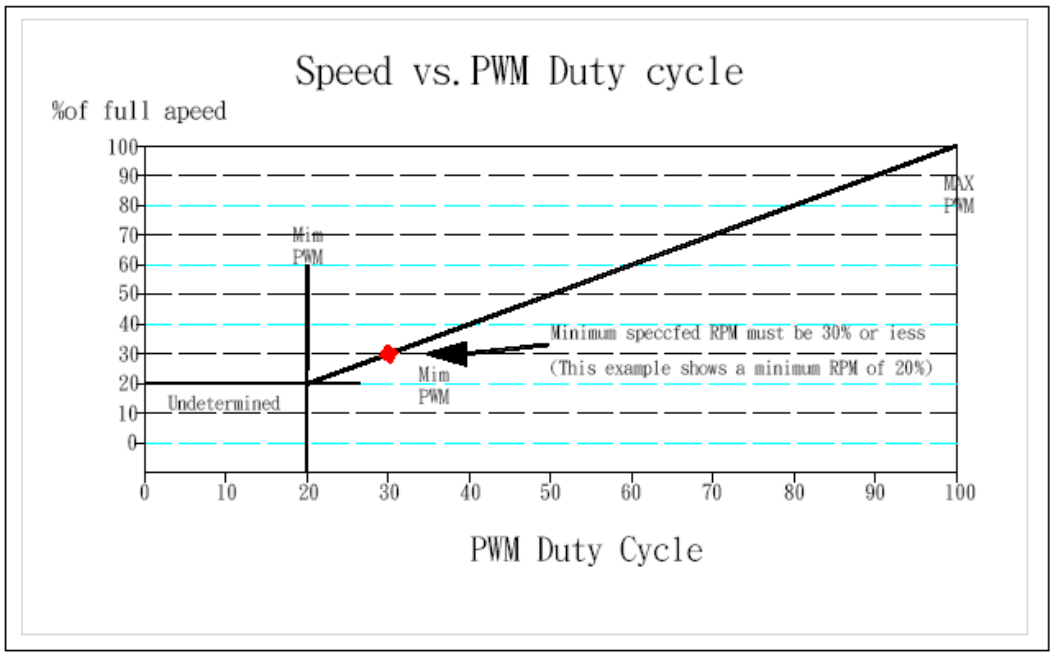
1.3 Fan Speed Response PWM Control Input Signal

The PWM input shall be delivered to the fan through the control signal on Pin4.Fan speed response to this signal shall be a continuous and monotonic of the duty cycle of the signal,from 100% to the minimum specified RPM. The fan RPM (as a percentage of maximum RPM)should match the PWM duty cycle within ±10%.If no control signal is present the fan shall operate at maximum RPM.

Figure 1 Fan speed Response to PWM Control input Signal



1.4 Operation Below Minimum RPM

For all duty cycles less than the minimum duty cycle ,the RPM shall not be greater than the minimum RPM. The floolw ing graphs and definitions show three recommended solutions to handle PWM duty cycles that are less than the minimum operational PRM,as a percentage of maximum.

Reference resource by Intel's 4-wire PWM Fan controlled specification.

Performance Chart: Active Cooler U9 Thermal Resistance

Thermal Resistance vs. Fan Speed (Duty Cycle and RPM)

Environment temperature: 35℃