PRODUCT SPECIFICATION

PRODUCT NAME :	Cooling Fan
CATEGORY :	Axial Fan
MODEL :	9HV3612P3K012
CUSTOMER P/N :	—
SPECIFICATION No. :	S5312764

Signature

We would kindly like you to check all specifications, make your signature on one copy, and return it to us by 17-Dec.-2021.
When you have corrections, please write them in red. If this specification is not returned by the above date, we will consider it approved and deliver the products following it.

Caution

- To ensure that this fan is used safely, be sure that you read and understand the following precautions fully and use it only as directed.
- Be sure to read these Safety Precautions carefully before installing, connecting, operating, maintaining, or inspecting the fan. Follow all the precautions and directions given here.
- The fan has been designed and manufactured for built-in use in general industrial machinery, and might not be used otherwise.
- The fan falls into the Category 16 (Class 84, Item 14) of the Appended Table 1 of the Export Trade Control Order. When exporting the fan either as a standalone item or as part of another product, be sure to implement the necessary procedures including the “Informed Cases” and “Objective Cases” based on the “Catch-All Controls” defined by the Ministry of Economy, Trade and Industry of Japan.
- When disposing the fan, treat it as industrial waste. For instructions on proper disposal methods, please contact local government authorities.
- When using the fan in equipment that could affect people’s lives or health, that is used on a car, ship, or aircraft, or that could have a major impact on society or on the public, use it at your own discretion only after deploying sufficient safety measures and making prior evaluation.
- Fully understand the Safety Precautions described in this document before using the product. SANYO DENKI will not be liable for any accidents resulting in death, injury, or property damage due to the failure of the fan.
- Safety precautions necessary for preventing any possible bodily injury or damage to property or equipment are ranked in two levels:

⚠ **Warning**	Denotes hazards which could cause severe bodily injury or death as a result of incorrect operation.
⚠ **Caution**	Denotes hazards which could cause bodily injury or property damage as a result of incorrect operation.

Note: Even those items marked ‘**Caution**’ might also result in serious consequences depending on the situation. Be sure to observe them carefully to the same extent as items marked ‘**Warning**.’

SANYO DENKI CO., LTD.

APPROVED BY	CHECKED BY	DESIGNED BY
HONAMI '21.11.25 OHSAWA	NAOYA '21.11.25 INADA	SHIZUKA '21.11.25 SAITO

SANYO DENKI CO.,LTD. '21. 11. 26 COOLING SYSTEM DIV.

Safety Precautions (1/3)

⚠ WARNING

- When using the fan in the following equipment, use it at your own discretion only after deploying sufficient safety measures and making prior evaluation.
  - Equipment that could affect people's lives or health
  - Equipment that is used on a car, ship, or aircraft
  - Equipment that could have a major impact on society or on the public
  - SANYO DENKI will not be liable for any accidents involving human casualties (death, injury, etc.) or property damage due to the failure of the fan while use in such equipment.
- Ensure that wiring is done correctly. Failure to do so might result in fire, burns, or electrical shock.
- If there are any grounding taps or wires, ground them securely. Failure to do so might result in electric shock.
- Never use in explosive atmospheres, as doing so might result in fires, burns, or bodily injury.
- Do not operate the fan with live parts exposed. Doing so might result in electric shock.
- Never allow any persons or objects to approach or come into contact with the fan's rotor while in operation, as doing so might result in damage or personal injury.
- Turn off the power and stop using the fan immediately if you notice any sparks, smoke, odd odors or sounds, or anything unusual during operation. Failure to do so might result in fire, bodily injury, or electrical shock.
- Never allow the fan to fall, topple over, or be subjected to excessive shocks when moving it. Doing so might result in product failure or performance deterioration.
- The fan should be handled by technically qualified personnel or someone with sufficient expertise; the personnel shall be assigned at your own discretion.
- Never attempt to disassemble, repair, or alter the fan in any way, as doing so might result in electrical shock, fire, or bodily injury.

⚠ Caution

Handling

- Installation, mounting, connections, wiring, and relocation of the fan should be done by technically qualified personnel or someone with sufficient expertise; the personnel shall be assigned at your own discretion.

  Never perform such work while the product is on, as this might lead to injury, electrical shock, burns, or fire.
- Do not operate the fan if it is not secured, nor while held in hand.
- Never allow yourself to come into contact with the fan when measuring insulation resistance or dielectric strength. There is danger of electric shock.
- Never attempt to disassemble or alter the fan in any way. Doing so might not only result in substandard performance, but also fire, burns, bodily injury, or electrical shock.

Operation

- Take protective measures for the equipment in which the fan is embedded in case the fan stops, malfunctions, or fails during operation.
- Never use the fan at voltages, temperatures, or any other parameters exceeding those given in the product specifications. Otherwise, it might result in substandard performance, failure, fire, bodily injury, or electrical shock.
- Using a power supply with insufficient capacity might result in faulty fan operation because an inrush current several times larger than the rated current will flow at the moment of fan startup. Be sure to use a power supply with sufficient capacity.
- Start all fans at the same time when two or more fans are positioned in equipment in a way that creates wind interference. If the fan is exposed to wind from other fans at startup, it might result in fan failure or faulty fan startup. Also, evaluate the influence to individual fans in advance and use them at your own discretion.
- Never connect or disconnect lead wires, plug cords, or connectors while the power is on. Be sure to connect or disconnect them while holding the frame only after power-off. Otherwise, it might result in fan damage or electrical shock.
- Do not remove the lead wire of the fan from the frame hook. Doing so might scratch and damage the surface of the lead wire.
- Do not remove the nameplate. Doing so might result in fan failure or electrical shock.
- Do not press down hard on the nameplate of the fan. Otherwise, the nameplate might break or come into contact with the shaft, hindering proper operation.

Safety Precautions (2/3)

⚠ Caution

Operation (Continued)

- The fan might be damaged or burned out if foreign objects or external forces hinder normal fan operation.
- Do not use the power supply's PWM to control the speed of the fan. Doing so might result in fan malfunction.
- Do not turn the power on or off on the negative power line. Doing so might damage the fan.
- Turning the power on and off frequently or turning the power back on before the fan comes to a complete stop might result in fan failure or damage. Before conducting such operations, fully evaluate the equipment in which the fan is embedded.
- The protection of fans with IP ratings (Splash Proof Fans) applies only to the live parts (electronic components and motor coils) of the fan in accordance with IEC 60529. The protection does not apply to the non-live parts of the fan. If the fan is to be used for a long period of time in an environment subject to dust, water, or condensation, take measures required for the operating environment.
- Do not wash the fan during maintenance of equipment. Doing so might result in failure of the fan.

Installation (Common to All Fans)

- Install and secure the fan properly with its weight and vibration during operation taken into account. Failure to do so might result in bodily injury or equipment failure due to the fan or its parts falling off.
- Ensure that the fan is installed in the right orientation. Failure to do so might result in bodily injury or equipment failure.
- For the fan to perform to its full capacity, secure air vents and take measures to prevent foreign objects from entering the fan. Failure to do so might result in bodily injury or fan failure.
- Do not subject the fan to excessive shock. Doing so might result in failure or substandard performance of the fan.
- Pulling or pinching lead wires might result in damage and stress to the wire. Also, make connections so that the lead wires do not come into contact with the rotating blades. Failure to do so might result in equipment failure or electrical shock.
- Take proper precautions against static electricity when wiring. Failure to do so might cause failure of the fan or equipment.
- Take safety measures such as installing a finger guard and displaying a warning symbol if there is any danger of fingers or objects coming into contact with the rotating blades. Failure to do so might result in bodily injury or fan failure.
- When installing an inlet nozzle, finger guard, or base plate to the fan, ensure that they are positioned correctly according to this Product Specification and other documents so that they do not come into contact with the rotating blades. Also, operate the fan after checking that the rotating blades do not come into contact with anything. Otherwise, it might result in equipment failure. Please use only genuine SANYO DENKI inlet nozzles and finger guards.
- Make connections correctly in accordance with the information of this Product Specification and the nameplate of the fan. Failure to do so might result in equipment failure or the malfunction, failure, or performance degradation of the fan.

Installation (Axial Fan and Blower)

- When mounting the fan with screws, make sure that the screw and base plate will not deform the frame of the fan before mounting. A deformed frame might result in failure or substandard performance of the fan.
- When mounting the fan with screws, ensure that the screw tightening torque is correct. If the tightening torque exceeds the recommended torque, the fan frame might be deformed or damaged. Choose a ribbed frame model if mounting fans with plastic frames through both sides of the frame with through-screws. To prevent loose screws, use plain washers or spring washers. For the screwing torque of each fan type, contact SANYO DENKI or a SANYO DENKI distributor.
- Avoid mounting the fan with self-tapping screws, as doing so might damage the fan frame.
  If using self-tapping screws, be sure to choose the screw that we recommend and conduct evaluations before using it.

Safety Precautions (3/3)

⚠ Caution

Installation (Centrifugal Fan)

- The fan shall be mounted with screws. For the screw size for each fan model, see this Product Specification.
- Choose screws with the right length with information such as the fan mounting depth and base plate thickness taken into account. Failure to do so might result in stripped screw holes and improper fan mounting. For the mounting depth of each fan model, see this Product Specification.
- Ensure that the screw tightening torque is correct. If the tightening torque exceeds the recommended torque, the screw hole might be deformed or damaged. Also, to prevent loose screws, use plain washers or spring washers. For the tightening torque for each fan model, see this Product Specification.
- For the inlet nozzle and base plate installation dimensions for each fan model, see this Product Specification.

Operating Environments

- Avoid using or storing the fan in the following environments. Otherwise, it might result in fire or the failure or performance degradation of the fan.

  In environments where flammable or corrosive gas is present, where water or oil splashes, where there is much dust or humidity, where condensation occurs, where exposed to radioactive rays or direct sunlight, where a salty sea breeze blows or seawater splashes, where the fan might be contaminated by such corrosive materials as sulfurous water, sulfurous volcanic ash, organic solvents, acidic and alkali chemicals, or nuclear fuel materials, where subjected to constant vibration, strong shocks, centrifugal force, acceleration, or strong magnetic force, where electromagnetic noise radiation is present, where the electromagnetic noise overlaps into power voltage, or where subjected to rapid environmental fluctuations (temperature, humidity, pressure, etc.).

Storage

- The fan should be stored in packaging.
- Ensure that the fan is stored in the following environments where:
  - the temperature is normal and stable;
  - the relative humidity is 20% to 85% with no sudden changes in humidity and no condensation;
  - not subjected to direct sunlight;
  - not subjected to water, oil, corrosive materials, or other hazardous substances;
  - and not subjected to vibration or shock.

Maintenance

- Maintenance and inspections of the fan should be done by technically qualified personnel or someone with sufficient expertise; the personnel shall be assigned at your own discretion. Otherwise, it might result in fire, burns, bodily injury, or electrical shock.
- Never perform any maintenance or inspections while the fan is in operation. Also note that the blades continue to rotate for some time immediately after operation ceases. Always confirm that all rotating parts have come to a stop before beginning work. Failure to do so might result in bodily injury.
- Never use gasoline, paint thinner, benzene, or any other organic solvents to clean the fan. Also, avoid placing excessive stresses on the fan. Otherwise, it might result in product deformation or performance degradation.

Contact:

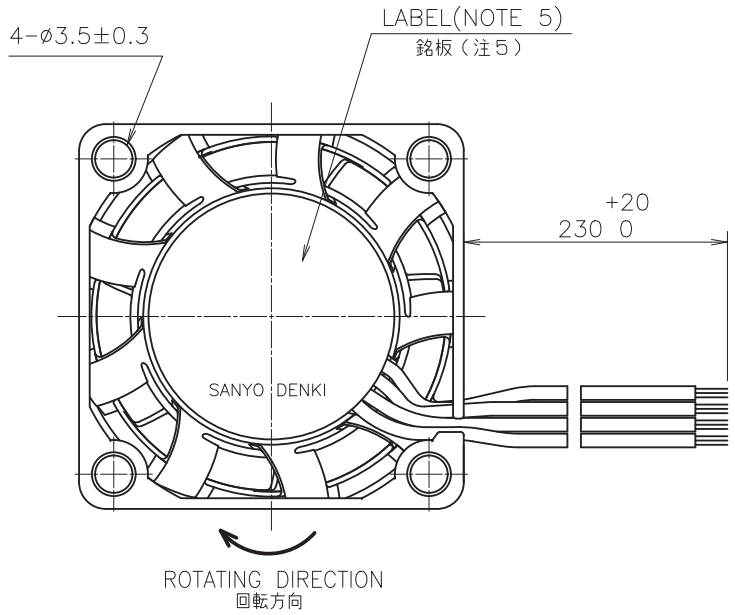
SANYO DENKI CO., LTD.
3-33-1 Minami-Otsuka, Toshima-ku, Tokyo 170-8451
Tel: +81 3 5927 1020

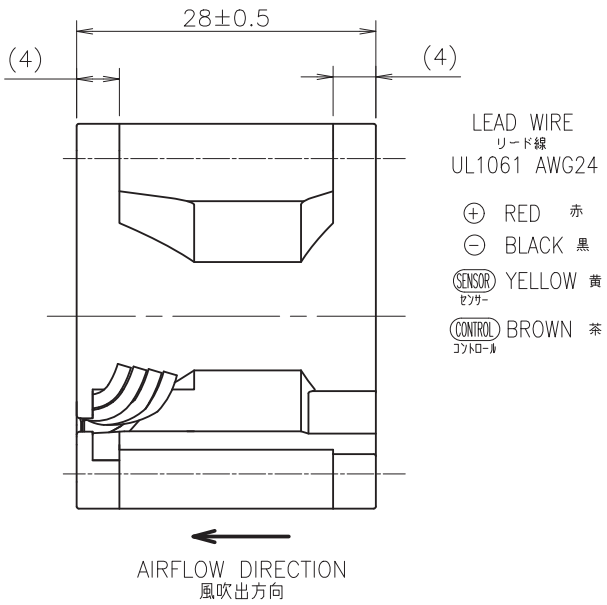
＊＊ ＲｏＨＳ指令対応について ＊＊
Compliance with the RoHS Directive

◆ **本製品は、ＲｏＨＳ指令（１０物質）対応品です。**
This product complies with the RoHS Directive (10 substances).

本製品は、電気電子機器に含まれる特定有害物質の使用制限（RoHS）に関する 2011 年 6 月 8 日付欧州議会及び理事会指令 2011/65/EU の改訂指令 2015/863 付属書Ⅱに示される許容値に適合しています。
なお、2011/65/EU の付属書Ⅲに示される適用除外用途は認められるものとします。
We hereby declare that the product given under mentioned complies with the threshold values laid down in Annex II, Directive 2015/863/EU, which is an amendment to Directive 2011/65/EU of the European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment.
Application exempted from the restriction referred to ANNEX III of RoHS Directive 2011/65/EU is acceptable.

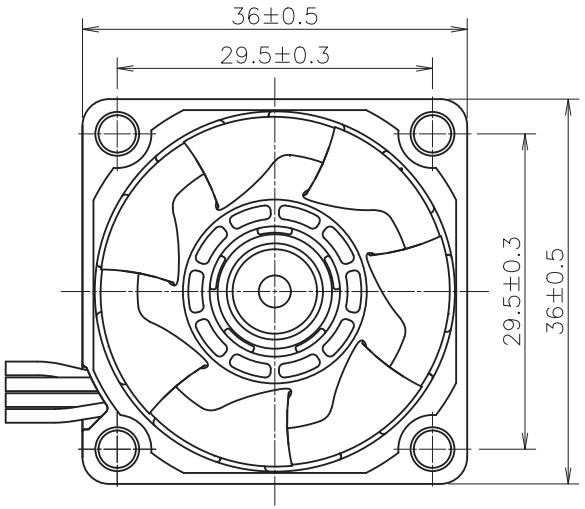
（貴社からの指定に基づき対象製品に使用している部品・材料（例：コネクタ、端子）については、当社の確認範囲外とさせていただきます。
We do not confirm the component situation about an appointed part from your company.
(ex. Connector, Contact)）





LEAD WIRE
リード線
UL1061 AWG24

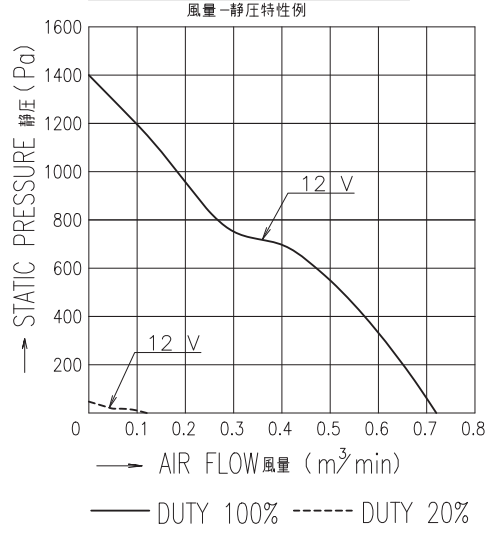
⊕	RED 赤
⊖	BLACK 黒
SENSOR センサー	YELLOW 黄
CONTROL コントロール	BROWN 茶



PWM DUTY CYCLE PWMデューティサイクル	100 %	20 %	0 %
RATED VOLTAGE 定格電圧	12 V DC		
OPERATING VOLTAGE 使用電圧範囲	10.8 V DC ～ 13.2 V DC		
RATED CURRENT 定格電流	1.75 A AT 12 V DC （DC12 Vにて）	0.05 A AT 12 V DC （DC12 Vにて）	0.04 A MAX AT 12 V DC （DC12 Vにて）
RATED SPEED 定格回転速度	32500±3900 min^{-1} AT 12 V DC （DC12 Vにて）	6000±1800 min^{-1} AT 12 V DC （DC12 Vにて）	NO ROTATION 回転停止
INSULATION RESISTANCE 絶縁抵抗	10 MΩ MIN. AT 500 V DC （NOTE2） DC500 Vメガーにて10 MΩ以上（注2）		
DIELECTRIC STRENGTH 絶縁耐圧	1 MINUTE AT 500 V AC, 50/60 Hz（NOTE2） AC50/60 Hz, 500 Vにて1分間耐えること（注2）		
OPERATING TEMPERATURE 使用温度範囲	-20 ℃ ～ +60 ℃		
SOUND PRESSURE LEVEL 騒音レベル	67 dB(A)（NOMINAL）（NOTE1） （中心値）（注1）	26 dB(A)（NOMINAL）（NOTE1） （中心値）（注1）	
MASS 質量	APPROX. 53 g 約		
MATERIAL 材質	FRAME, IMPELLER : PLASTICS フレーム･羽根 : 樹脂		
BEARING SYSTEM 軸受	2 BALL BEARINGS ボールベアリング		
CONTROL TERMINAL コントロール端子	SOURCE CURRENT : 1 mA MAX AT CONTROL VOLTAGE 0 V. ソース電流： 以下（コントロール電圧 0 V時）		
	SINK CURRENT : 1 mA MAX AT CONTROL VOLTAGE 5.25 V. シンク電流： 以下（コントロール電圧 5.25 V時）		
	CONTROL TERMINAL VOLTAGE : 5.25 V MAX .(OPEN CIRCUIT) 端子電圧 ： 以下（コントロール端子オープン時）		

NOTE:
注
1. MEASURED AT 1 m DISTANCE FROM THE AIR INLET.
ファン吸込側より1 mにて測定する。
2. MEASURED BETWEEN THE LEAD WIRES AND THE FRAME.
リード線導体部とフレームとの間。
3. MOTOR IS PROTECTED FROM DAMAGE OF LOCKED ROTOR CONDITION AT THE OPERATING VOLTAGE.
DO NOT LOCK ROTOR EXCEPT OPERATING VOLTAGE.
ファン拘束時焼損の恐れはない。
使用電圧範囲外でファンを拘束しないでください。
4. FOR SENSOR SPEC., SEE 9D0001H269.
センサー仕様は、9D0001H269による。
THE SWITCHING BY PWM CONTROL MAY INFLUENCE THE SENSOR OUTPUT.
PWM制御によるスイッチングがセンサ出力に影響する場合があります。
5. PRINT PRODUCT NAME, MODEL No., MANUFACTURER, AND MANUFACTURED DATE ETC.
品名，型名，製造会社名 及び 製造年月日等を表示する。
6. ALL VALUES OF EACH CHARACTERISTICS ARE AT ROOM TEMPERATURE AND NORMAL HUMIDITY.
諸特性は常温、常湿での値です。

PERFORMANCE CURVES
風量－静圧特性例



	ECN No.	名称 Title	San Ace 36 (9HV) RIBBED/PULSE_SENSOR/PWM_CONTROL
単位 Unit mm	新規 New Design S.SAITO 21-11-25		
尺度 Scale -	図面番号 Dwg. No.	9HV3612P3K012	Rev. A

SANYO DENKI

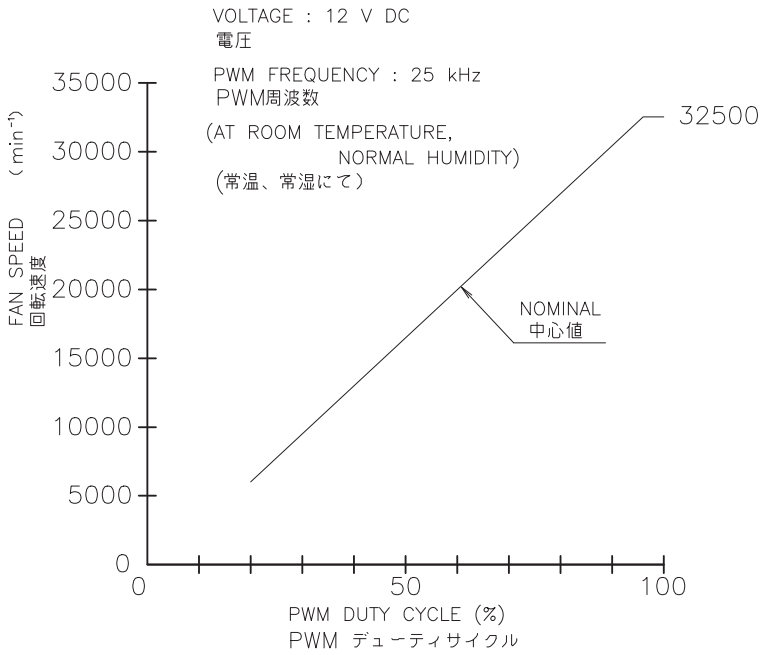
SANYO DENKI CO.,LTD. ISSUED

承認 Approved By	審査 Checked By	設計 Designed By
H.OHSAWA 21-11-25	N.INADA 21-11-25	S.SAITO 21-11-25

Group D12 | User E0 | Page 1/2

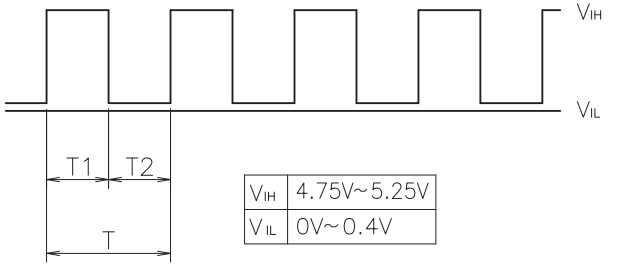
A3G-F5

PWM DUTY CYCLE (BETWEEN CONTROL LEAD AND ⊖LEAD) - SPEED CHARACTERISTIC (REFERENCE)
PWMデューティサイクル （コントロールー ⊖間） － 回転速度特性例

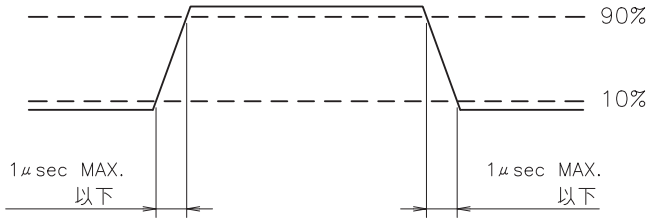


PWM INPUT SIGNAL
PWM入力信号

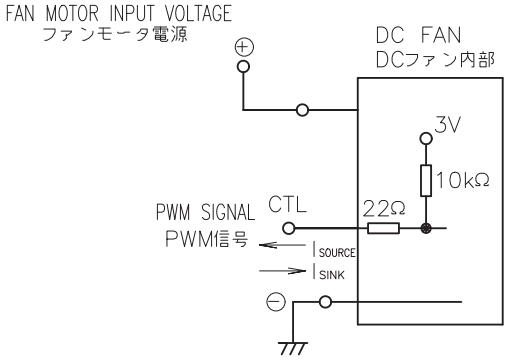
$\frac{T1}{T} \times 100 =$ PWM DUTY CYCLE(%)
PWMデューティサイクル



V_{IH}	4.75V~5.25V
V_{IL}	0V~0.4V



CONNECTION
結線例



NOTE:
注

1. WHEN PWM DUTY CYCLE IS 0%, THE SPEED IS 0 min^{-1}.
   PWMデューティサイクルが 0%の時、回転速度は0 min^{-1}であること。
2. WHEN PWM DUTY CYCLE ARE 20% AND 100%, REFER TO PAGE 1 FOR THE SPEED.
   PWMデューティサイクルが 20%と100%の時、回転速度は1頁を参照のこと。
3. WHEN THE CONTROL LEAD WIRE IS NOT CONNECTED,
   THE SPEED IS THE SAME SPEED AS AT 100% OF PWM DUTY CYCLE.
   PWM入力端子がオープン状態の時、回転速度はPWMデューティサイクル100%と同じであること。
4. INPUT PWM FREQUENCY IS 25 kHz.
   入力PWM周波数は、25 kHzであること。
5. THIS FAN SPEED SHOULD BE CONTROLLED BY PWM INPUT SIGNAL OF EITHER TTL INPUT OR OPEN COLLECTOR, DRAIN INPUT.
   AND IN CASE OF OPEN COLLECTOR, DRAIN INPUT, THE PWM DUTY CYCLE SHOULD BE $\frac{T-T2}{T} \times 100$.
   PWM入力信号はTTL入力又は、オープンコレクタ、ドレイン入力にて使用可能であること。
   但し、オープンコレクタ、ドレイン入力の場合、
   PWMデューティ［%］ ＝ $\frac{T-T2}{T} \times 100$ のこと。

ECN No.	名称 Title		
単位 Unit: mm	新規 New Design: S.SITO 21-11-25	San Ace 36 (9HV) RIBBED/PULSE_SENSOR/PWM_CONTROL	
尺度 Scale: -	図面番号 Dwg. No.	9HV3612P3K012	Rev. A
SANYO DENKI	SANYO DENKI CO.,LTD. ISSUED	承認 Approved By: H.OHSAWA 21-11-25	審査 Checked By: N.INADA 21-11-25 / 設計 Designed By: S.SAITO 21-11-25
A3G-F5		Group D12	User E0
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SENSOR SPECIFICATION FOR BRUSHLESS DC FAN

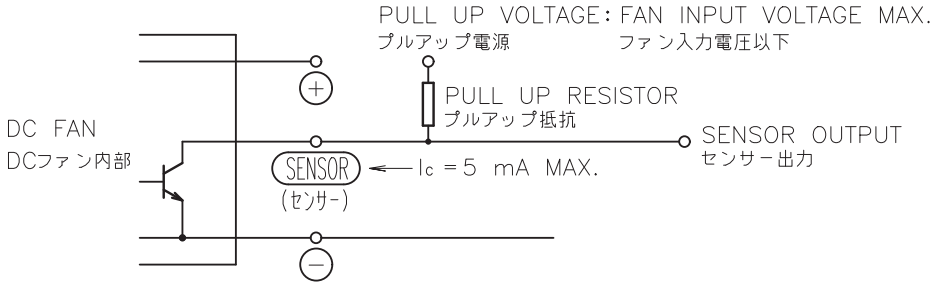
ブラシレスDCファン　センサー仕様

1. OUTPUT CIRCUIT – OPEN COLLECTOR
出力回路－オープンコレクタ

2. SPECIFICATION
仕様

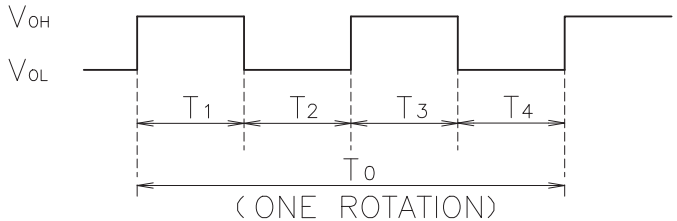
V_{CE} = FAN INPUT VOLTAGE MAX.
ファン入力電圧以下

I_C = 5 mA MAX. (V_{CE}(SAT) = 0.6 V MAX.)



3. WAVEFORM OF SENSOR OUTPUT
センサー出力波形

(a) RUNNING CONDITION
通常回転時



(ONE ROTATION)
(ファン1回転)

$T_{1\sim4} \fallingdotseq (1/4)\,T_0$

$T_{1\sim4} \fallingdotseq (1/4)\,T_0 = 60/4\ N(s)$

N=FAN ROTATION SPEED (min^{-1})
ファン回転速度

(b) LOCKED ROTOR CONDITION
羽根ロック時

V_{OH} ＿＿＿＿＿＿＿＿＿＿

0V ＿＿＿＿＿＿＿＿＿＿

NOTE 1. WHEN THE FAN IS STOPPED BY PWM INPUT SIGNAL, SENSOR OUTPUT BECOMES V_{OH}.
注　PWM信号によりファンを停止させた場合、センサー出力はV_{OH}になります。

				承認 APPROVED BY TE.YAMAZAKI 17-05-26	PULSE SENSOR パルスセンサー
			単位 UNIT mm	審査 CHECKED BY TO.NAKAMURA 17-05-26	名称 TITLE SENSOR SPECIFICATION BLDCファン センサー仕様
A	新規作成 西牧	17-05-18	尺度 SCALE	設計 DESIGNED BY K.NISHIMAKI 17-05-18	
記号 REV.	記事 DESCRIPTION	日付 DATE			

山洋電気株式会社
SANYO DENKI CO.,LTD.

SANYO DENKI CO.,LTD. ISSUED

図番 DWG NO. 9D0001H269 REV. A

D12,E0　00978273

A3G-F1

山洋電気株式会社
クーリングシステム事業部　設計部

製作仕様書

１．型番　９ＨＶ３６１２Ｐ３Ｋ０１２

２．適用　本仕様書は山洋電気（株）が納入する冷却用軸流ＢＬＤＣファンの仕様について規定する。

３．性能

	項　　目		特　性（規　格）			備　　考
			PWM デューティサイクル			
			100 %	20 %	0 %	
3-1	定格電圧		DC 12 V			
3-2	使用電圧範囲		DC 10.8 V ～ DC 13.2 V			
3-3	定格電流	標準値	1.75 A	0.05 A	－	定格電圧,フリーエアーにて
		最大値	1.93 A	0.07 A	0.04 A	
3-4	定格入力		23.16 W 以下	0.84 W 以下	0.48 W 以下	定格電圧,フリーエアーにて
3-5	定格回転速度		32500±3900 min^{-1}	6000±1800 min^{-1}	回転停止	定格電圧,フリーエアーにて
3-6	起動電流	標準値	2.4 A		－	定格電圧,フリーエアーにて
		最大値	2.7 A		－	
3-7	起動時間		15 秒以内		－	定格電圧,フリーエアーにて
3-8	最大風量	標準値	0.72 m^3/min	0.12 m^3/min	－	定格電圧にて
		最小値	0.63 m^3/min	0.08 m^3/min	－	
3-9	最大静圧	標準値	1400 Pa	47.2 Pa	－	定格電圧にて
		最小値	1080 Pa	23.1 Pa	－	
3-10	騒音レベル	標準値	67 dB(A)	26 dB(A)	－	定格電圧,フリーエアーにて吸込み側より 1 m の位置で測定
		最大値	71 dB(A)	32 dB(A)	－	
3-11	絶縁抵抗		10 MΩ 以上			DC 500 V メガーにて,リード線導体部とフレームとの間
3-12	絶縁耐圧		異常なきこと			AC 500 V 1 分間,リード線導体部とフレームとの間
3-13	絶縁種別		E 種（UL　A 種）			
3-14	巻線温度上昇		45 K 以下			定格電圧,フリーエアーにて
3-15	使用温度範囲		－20 ℃ ～ ＋60 ℃			結露なきこと
3-16	保存温度範囲		－30 ℃ ～ ＋70 ℃			結露なきこと
3-17	湿度 (使用時,保存時)		20 %～85 % RH			結露なきこと
3-18	逆接続保護		使用電圧範囲において,電源用リード線を逆接続しても異常が発生しないこと。			
3-19	焼損防止		使用電圧範囲において,24 時間拘束されても異常が発生しないこと。			
3-20	センサー仕様		別紙センサー仕様（9D0001H269）による。			

【測定条件】

測定環境は 20 ℃,相対湿度 60 %を基準とする。但し判定に疑義を生じない場合は温度 5 ℃～35 ℃,
相対湿度 45 %～85 %の環境下で行ってもよいこととする。

４．構造及び機械的仕様

4-1	フレーム材質	PBT (UL94V-0)
4-2	羽根材質	PPHOX (UL94V-1)
4-3	軸受	2 ボールベアリング
4-4	リード線	UL1061 AWG24
4-5	締付トルク	0.44 N・m 以下　（M3ネジ／バネ座金／平座金付にて） （ファンの取付に関しては、装置側で検証の上決定願います。）
4-6	質量	約 53 g
4-7	回転方向	別紙外形図 9HV3612P3K012 による。
4-8	風吹出方向	別紙外形図 9HV3612P3K012 による。

５．耐環境及び寿命仕様

本品の耐環境及び寿命仕様は次の通りとする。

5-1	耐振動試験	ファン単体に周波数 10～150 Hz,加速度 20 m/s^2,掃引速度 1 オクターブ/分の振動を X, Y, Z の 3 方向に各 20 サイクル印加しても,異常なきこと。 (JIS C 60068-2-6 に準拠)
5-2	耐衝撃試験	ファン単体に衝撃力 300 m/s^2,衝撃時間 18 ms の衝撃を 3 方向,表裏各 3 回,計 18 回印加しても異常なきこと。 （JIS C 60068-2-27 に準拠）
5-3	期待寿命	定格電圧連続運転における期待寿命（残存率 90 %にて） 30,000 h（周囲温度 60 ℃,常湿） 回転速度が初期値より 30 %低下した時点を寿命と判定する。

６．特記事項

（１）本ファンモータは,日光の当たる場所,及び直接風雨の当たる場所での使用を避けてください。
（２）本仕様書に記載されていない項目で,特に取り決めの必要がある項目は,事前にご連絡ください。
（３）本仕様書を満足する範囲内において,性能の向上等の為に部品等一部変更する場合があります。
（４）製品保証：不具合が発生した場合は,双方で協議し解決をはかることとします。
（５）接続配線は正しく行ってください。装置の故障や製品の誤動作,故障,性能劣化のおそれがあります。
　　特にセンサー付きファン／コントロール付きファンは,必ず仕様をご確認のうえ,配線をお願いします。

SPECIFICATIONS

SANYO DENKI Brushless DC Fan

MODEL No. 9HV3612P3K012

1. ELECTRICAL CHARACTERISTICS

Item			Characteristics			Remarks
			PWM duty cycle			
			100 %	20 %	0 %	
1-1	Rated voltage		12 VDC			
1-2	Operating voltage range		10.8 VDC to 13.2 VDC			
1-3	Rated current	Nom.	1.75 A	0.05 A	—	Rated voltage, free air
		Max.	1.93 A	0.07 A	0.04 A	
1-4	Rated input		23.16 W max.	0.84 W max.	0.48 W max.	Rated voltage, free air
1-5	Rated speed		32500±3900 min^{-1}	6000±1800 min^{-1}	No rotation	Rated voltage, free air
1-6	Starting current	Nom.	2.4 A		—	Rated voltage, free air
		Max.	2.7 A		—	
1-7	Startup time		15 s max.		—	Rated voltage, free air
1-8	Max. airflow	Nom.	0.72 m^3/min	0.12 m^3/min	—	Rated voltage
		Min.	0.63 m^3/min	0.08 m^3/min	—	
1-9	Max. static pressure	Nom.	1400 Pa	47.2 Pa	—	Rated voltage
		Min.	1080 Pa	23.1 Pa	—	
1-10	Sound pressure level	Nom.	67 dB(A)	26 dB(A)	—	Rated voltage, free air, measured at 1 m away from the air inlet
		Max.	71 dB(A)	32 dB(A)	—	
1-11	Insulation resistance		10 MΩ min.			500 VDC between lead wire conductors and frame
1-12	Dielectric strength		No damage			500 VAC for 1 minute between lead wire conductors and frame
1-13	Insulation class		E (UL A)			
1-14	Winding temp. rise		45 K max.			Rated voltage, free air
1-15	Operating temp.		-20 °C to +60 °C			Non-condensing
1-16	Storage temp.		-30 °C to +70 °C			Non-condensing
1-17	Humidity(operating and storage)		20 % to 85 % RH			Non-condensing
1-18	Reverse polarity protection		When run within the operating voltage range, the fan is protected even if positive and negative leads are wired in reverse.			
1-19	Burnout protection		When run within the operating voltage range, the fan does not burn out even if the rotor is locked for 24 hours.			
1-20	Sensor spec.		Refer to 9D0001H269			

Measurement conditions: 20 °C at 60 % RH. However, testing at 5 °C to 35 °C and 45 % to 85 % RH are acceptable unless results may be affected.

2. MECHANICAL CHARACTERISTICS

2-1	Frame material	Plastic (UL94V-0)
2-2	Impeller material	Plastic (UL94V-1)
2-3	Bearing system	2 ball bearings
2-4	Lead wires	UL1061 AWG24
2-5	Recommended screw torque for mounting	0.44 N・ m MAX. (With M3 screws with spring washer and washer.) Please decide it after verifying the installation of the fan on the device side.
2-6	Mass	Approx. 53 g
2-7	Rotating direction	Refer to 9HV3612P3K012 drawing
2-8	Airflow direction	Refer to 9HV3612P3K012 drawing

3. ENVIRONMENT and LIFE

3-1	Vibration test	No abnormal behavior was observed when each fan was subjected to frequencies of 10 to 150 Hz, 20 m/s^2 acceleration at a sweep rate of 1 oct/min in the x, y, and z directions, 20 cycles each. (Compliance with JIS C 60068-2-6)
3-2	Shock test	No abnormal behavior was observed when each fan was subjected to shocks of 300 m/s^2 for 18 ms in the x, y, and z directions, 3 times each direction, 18 times in total. (Compliance with JIS C 60068-2-27)
3-3	Expected life	30,000 h (at rated voltage, continuous operation, ambient temperature 60 °C, normal humidity, survival rate of 90 %) Failure is defined as a speed decrease of 30 % from the initial speed.

4. OTHER

(1) Do not use the fan where it is exposed to direct sunlight, wind, or rain.

(2) Contact us for any additional details not listed in the above specifications.

(3) While satisfying the above specifications, components may be changed to improve performance without prior notice.

(4) Product warranty: Product malfunctions shall be resolved through mutual consultation.

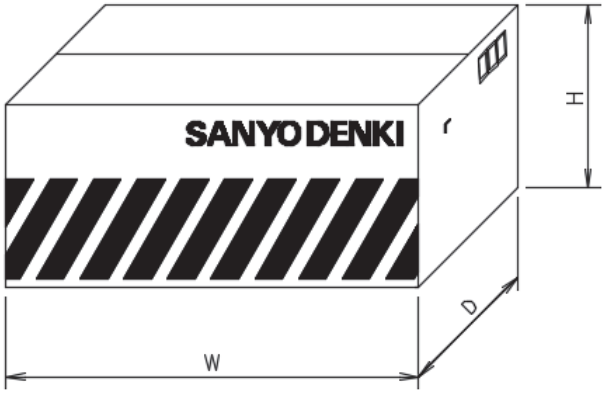
(5) Make electrical connections properly. Failure to do so may result in device failure, or failure, malfunction, and deterioration of the product.

Particularly for sensor or PWM enabled fans, be sure to connect the wiring according to control and sensor specifications.

山洋電気株式会社
SANYO DENKI CO., LTD.
クーリングシステム事業部設計部
COOLING SYSTEM DIV. DESIGN DEPT.

サンエース36（9HVタイプ） 28mm厚
San Ace 36 (9HV) 28mm thick

最小包装荷姿仕様（箱）
Shipping Package（Carton Box）



メーカ Manufacturer	山洋電気株式会社 SANYO DENKI CO., LTD.
寸法（mm） Dimension	W=450 D=390 H=150
入数（個） Quantity	126
製品１個の質量（g） Mass of product	53
製品トレータイプ Tray for products in the box	段ボール組しきり Partition tray of fiberboard

■ 包装箱表示
・製品型番
・数量
・ロット番号または製造年月日
・製造社名

■ 構造
・通常の輸送、荷扱い時の振動、衝撃に耐え、
製品に損傷を与えない様に処理されていること。
・輸送、保管中に塵埃に対して保護されていること。

■Marking on Package
・Model Number
・Quantity
・Lot Number or Manufacturing Date
・Manufacturer

■ Structure
・Packaging shall afford protection against shock and vibration to prevent and damage of the product during transportation.
・Packaging shall be designed to prevent any contamination of the product during transportation or storage.