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1. Features

- Generates positive 20 million Ions typ. (pcs per cc)
- MHM400 generates minimal ozone, less than 0.14mg per hour
- Integrated high voltage power supply, perfectly matched with the ionizer

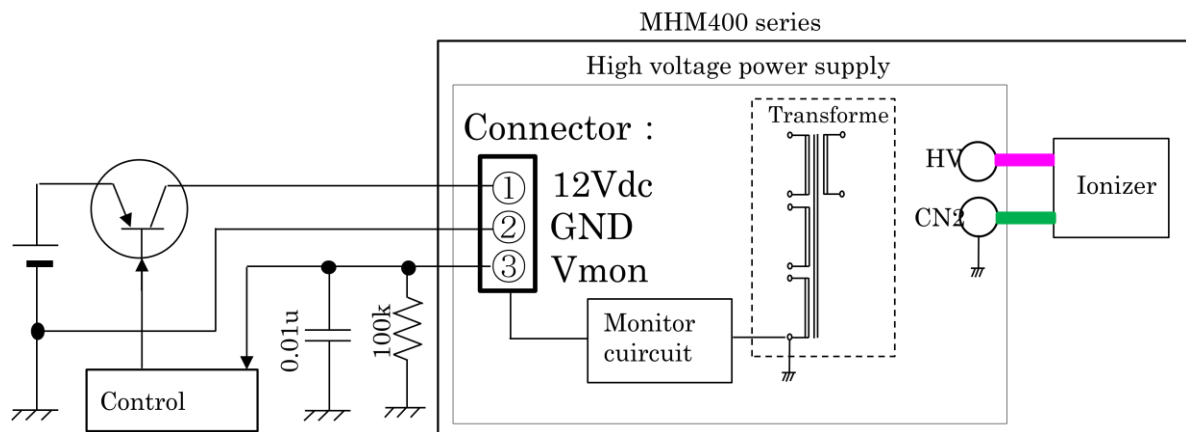


2. Description

The MHM400 Series is effective for applications such as scanner, printer and static elimination by generating a large amount of positive ions. The MHM400 features an integrated high voltage power supply integrated with the ion element. All these features are packaged in an elegant and compact form factor, able to fit most application environments..

3. Circuit & dimension

3.1 Typical Application Circuit



3.2 Mechanical demension

- Please see as Attached fig.1 of the structure of Ionizer module

4. Rating

4.1 Operating temperature (Ambient)

- Ionizer part : -10°C~+70°C
- High Voltage Power Supply (HVPS) part : -10°C~+50°C

4.2 Operating humidity

- 20%RH~80%RH (no dew deposit)

The value of the ion amount and Ozone amount will decrease at the low temperature and high humidity. Therefore, the value of the current will be specified at 25±2°C and 50±10%RH.

4.3 Part number : MHM400-01

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4.4 Pin Function (Input connector)

Connector No.	Connector	Pin number	Signal
CN1	B03B-XASK-1 (JST)	1	+12.0V
		2	GND
		3	Monitor voltage

4.5 Rating

Items	Min.	Typ.	Max.	Unit
Input voltage range	+10.8	+12.0	+13.2	Vdc
Input current		50	130	mA
Value of positive ion amount(Note 1,2)	600,000	20,000,000	-	pcs / cc
Value of Ozone density (Note 3)	0.0	0.1	0.14	mg/h
Monitor voltage	2.10	2.50	2.90	Vdc

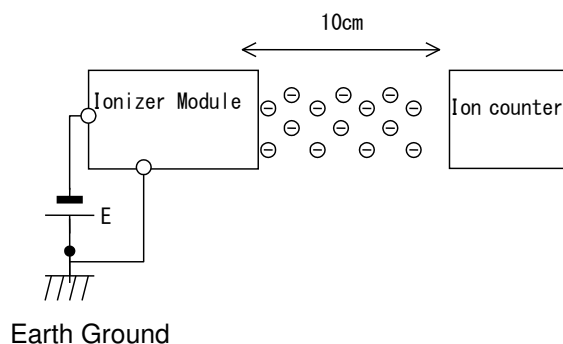
(Note 1) Ion amount measured at +12V input, +25 °C.

(Note 2) Measurement conditions as per Fig.1a. Reference Section 4.4 for Pin Function.

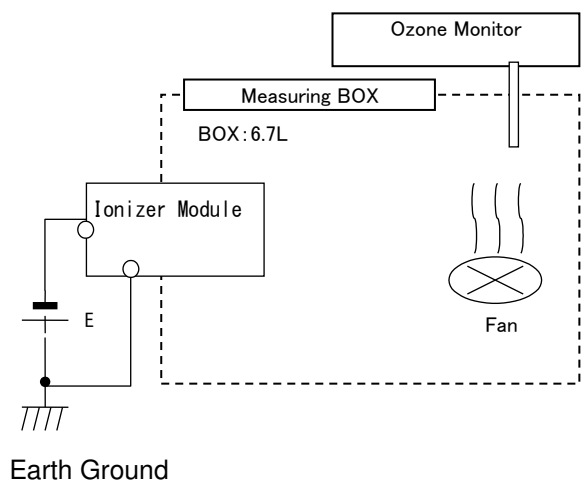
The input voltage E(12.0V) applied between Pins 1 and 2 of connector CN1. Under this condition, ion amount is measured using an Ion counter : NKMH-103, Hokuto electronics.

(Note 3) MHM400 series connected as per Fig.1b, with fan and Teflon tube for air sampling using an ozone dosimeter in (approx. 6.7L). The input voltage E (12.0V) will be loaded between Pins 1 and 2 of connector CN1. Under this condition, ozone density will be measure by the instrument after 3min. generation.

《 Fig.1a 》 Ion measurement



《 Fig.1b 》 Ozone Measurement



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5. 取り付け上の注意 Caution in setting (Ion Element)

- 1) このカタログは、イオナイザモジュール単体での仕様であり、使用環境や取り付け状態、取り付け部周辺の構造、材料などにより、イオン・オゾン発生量がカタログを満足しない場合があります。
This datasheet is representative of typical application conditions. If used outside of our specification, Ion/Ozone amount may not meet same performance levels.
- 2) ご使用の際には機器にイオナイザモジュールを取り付け、イオン・オゾンの発生量をご確認ください。
Please make sure the Ion/ozone generation that your product has been evaluated in view of your specifications with our product being mounted to your product.
- 3) 特に、開口部周辺に金属体やプラスチックが存在しますと、発生したイオン・オゾンが吸収される場合があります。
Please note that some metal or plastic parts located near the Ionizer element can affect the amount of Ion/ozone amount. Please follow the clearance/spacing recommendations on section 7.1



6. 警告 warning (Ion Element)

- 発生子直近では高濃度のオゾンが発生します。高濃度のオゾンを長時間吸い続けると、人体に悪影響を及ぼす恐れがありますので、通電中は高濃度オゾンを吸引しないよう人体から距離を取ってご使用願います。
- High-density ozone will be generated closest to the Ionizer element. Exposure to high-density ozone for prolonged periods can be harmful to the human body. Please maintain appropriate distance from the human body so as not to breathe high-density ozone while the Ionizer is operational (input voltage applied).



7. 使用上の注意 Caution in using

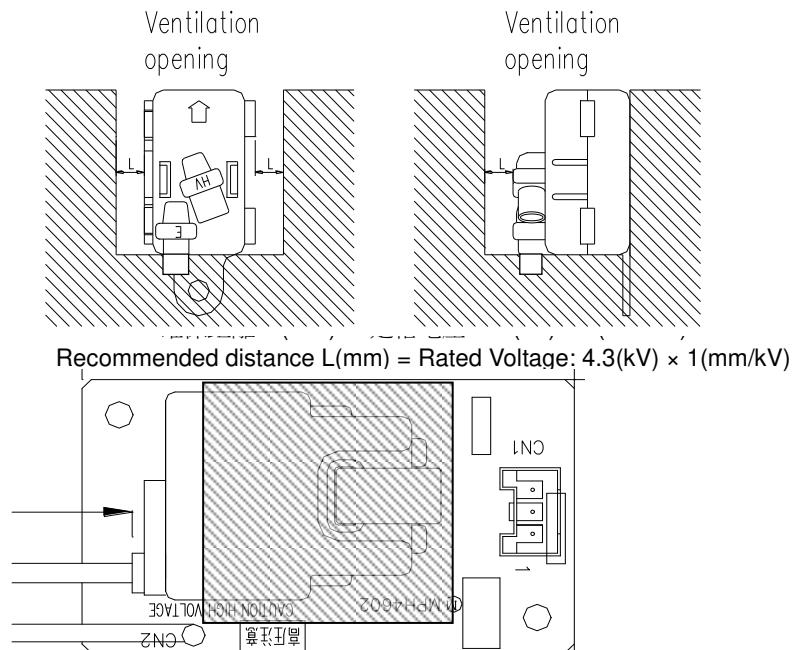
7.1 イオナイザモジュールは高圧部品ですので取り扱いを誤ると、放電および発煙の危険性がありますので、下記の項目を厳守下さい。

The Ionizer module is a high voltage device and may cause discharging or combustion with mishandling. Please observe following items.

7.1.1 発生子と駆動電源のセット配置に際しては、高圧部品であることを考慮していただき、信頼性向上の為、低電位部（シャーシ等）との距離を下図の範囲以上確保し取り付けして下さい。

万一、低電位部との距離が不十分な場合は、低電位部とイオナイザモジュールとの間で放電し、発煙・発火の原因となることがあります。(下記は、イオナイザモジュールを高圧部品と考えた場合の絶縁距離を示したものです。イオン・オゾン発生には、これ以上の距離確保を必要とすることがあります。)

Don't place other electrodes (metal chassis wires. electronic parts. etc.) or conductive materials within Keep distance for 4.3mm or more of the high voltage portion of Ionizer and power supply.
If the distance between Ionizer module and the other low potential electrode is insufficient, sparking may occur and it may cause smoking and combustion.



高圧電源の周辺に導電体（金属、電線、部品等）を近接配置する場合は、4.3mm以上離してください。斜線部に配線を近接しないでください。

Keep distance for 4.3mm or more, when location the electric conductor (Metal, wire or components, etc.) around this high voltage power supply. There is no wire cable at shadow area.

7.1.2 挿入後リード線を持つての搬送は行わないで下さい。

Make sure not to hold insertion leads when transferring the high voltage power supply.

7.1.3 ハロゲン化炭水化水素（4塩化炭素、フロン等）、芳香族炭水化水素（トルエン等）、脂肪族炭水化水素、その他発生子のケース材料など絶縁材料を膨潤、溶解する危険性がある溶剤、接着剤、グリス及び油類は、絶縁劣化をひきおこす危険性がありますので、上記物質、またはそれに類するものは使用しないで下さい。

Don't get Ionizer with hydrocarbon homogenize (Carbon tetrachloride, Freon, etc.) or with aromatic hydrocarbon (Toluene, etc.). These solvents cause the crack or solution of Ionizer parts. Don't use any organic solvent, adhesive agent, grease, and oil, which include above bad solvents or sparking may occur and it may cause smoking and combustion.

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7.1.4 固定用ビス、手袋、治工具類に油類が付着しないようにして下さい。油類の付着によりケース材料が侵され、絶縁劣化を引き起こす危険性があります。

When handling this module, make sure not to apply any oil to the screws, globes and tools. These oils may affect the insulation materials for housing of Ionizer to cause the insulation deterioration.

7.1.5 次のような環境条件では絶縁劣化をひきおこす危険性がありますのでご使用いただけません。

Under following circumstances, this device can't be used. If device will be used under such circumstances, dielectric strength may be down and sparking may occur.

- ①腐食性ガス雰囲気 (CL₂, H₂S, NH₃, SO₂, NO_{x2} 等)
Corrosive gas atmosphere (CL₂, H₂S, NH₃, SO₂, NO_x etc.)
- ②水、油、有機溶剤等の液体がかかる所
Cannot be splashed with water, oil, organic solvent
- ③塵埃の多い所 (清浄度: class 100K 以上)
Dusty atmosphere (Cleanness: more class than 100K)
- ④高湿度雰囲気 (湿度: 95%RH 以上)
high moist atmosphere (Humidity: more than 95%RH)
- ⑤潮風の直接あたる所
Sea breeze atmosphere
- ⑥その他上記の①~⑤に準ずる所
Other atmosphere corresponding ①~⑤

7.1.6 イオナイザモジュールに過度の衝撃(0.5N・m 以上)を与えると、ケースおよび樹脂等の絶縁材料にクラックが生じ、絶縁劣化をひきおこす危険性がありますので、輸送及び取り扱い時に、衝撃を与えないで下さい。電源部のコアはワレモノのため、落下等の衝撃を絶対与えないで下さい。落下させた場合は絶対に使用しないで下さい。

Don't subject the device to a shock (more than 0.5N・m) during handling or transport. If device will be given a hard shock, dielectric material (case, molding resin, etc.) may crack and dielectric strength may be damaged. Do not apply impact to the transformer core such as dropping since it is fragile. Should the Ionizer module be dropped by accident, absolutely do not use it.

7.1.7 イオナイザモジュールは高圧部品であり、感電する危険性がありますので、通電中にイオナイザモジュール本体に触れないで下さい。

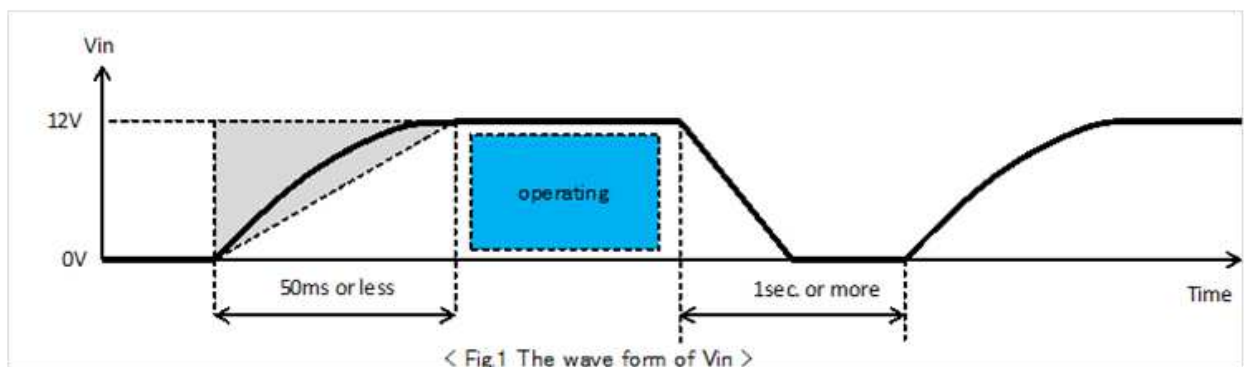
This device has a high voltage portion. Please apply appropriate safety precautions to prevent from receiving an electrical shock.

7.1.8 頻りに間欠動作させますと、12V 入力のコアにストレスを与えます。入力電圧は、半導体スイッチ等を用い累積スイッチ回数を 100 万回以下 に抑えてください。

To prevent fuse stress, please control input switching time less than 1Million times totally under recommended circuit which is using semiconductor.

7.1.9 入力電圧印加時は図-1 で規定する灰色内としてください。また入力電圧を遮断後、再び印加する場合は図-1 で規定する間隔(又は Vin=1V 以下になる)をとってください。

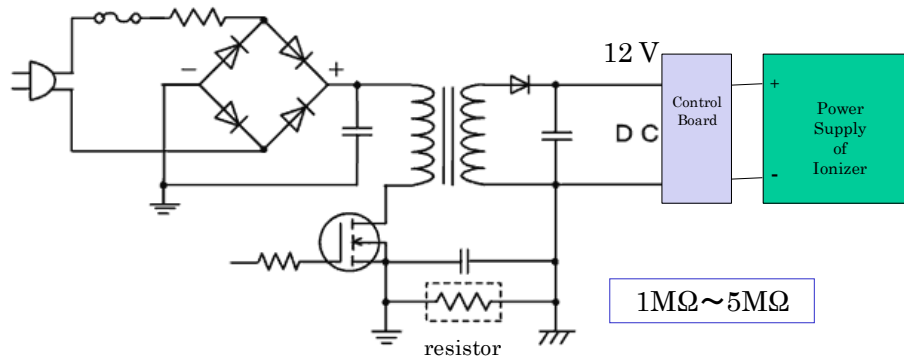
Vin should be in gray area of Fig.1 when Vin input. And it should take the time(Vin=1V or less) when Vin re-input after turn off.



7.1.10 完成品においても、使用者がイオナイザモジュールに触れられない位置に取り付ける、もしくは触れないよう危険性についての表示をおこなってください。
Please locate the ionizer module in an area where users can't touch easily and also indicate "Danger for high voltage" marking on your products..

7.1.11 イオナイザのアースおよびセットのアースは必ず取ってください。アースが取れていないと、アースラインに高電圧が乗り正常に動作しないことがあります。
Please connect earth GND line of ionizer and your products. If earth GND is not connected, high voltage may charge on earth line and ionizer may not work.

For example



Please design your converter by no insulation as above circuit.

7.2 搬送には、同時に発生子と電源部分をお持ち下さい。

リード線や、イオナイザ接触端子に負荷が掛かり接触不良に発展する可能性があります。

During handling, please hold the ionizer element and power supply portion at the same time in to avoid damage to the wire or terminal connections.

7.3 リード線挿入後の製品において、リード線の回転、引っ張りを繰り返しますと、抜去力が低下しますのでご注意ください。また、リード線挿入部に一度挿入されたリード線を抜去した場合、クリップ端子の変形、リード線クズ等により品質が低下いたします。リード線抜去を行った製品は、再使用しないで下さい。

Do not attempt to remove and reconnect any of the factory installed wire connections. Pull force decreases when the rotation and the pull of the lead wire are repeated.

Do not to use the ionizer if the lead wire was inserted and pulled out. The ionizer quality and performance will likely be decreased due to this customer induced action.

7.4 使用環境によっては、イオナイザモジュール針先部の汚損状態によりイオン・オゾン発生量が変動いたします。

In a dusty environment, lon/ozone amount will be decreased until environmental air quality improves.

7.5 オゾンは高い腐食性を持ちます。周辺機器、部材を酸化、腐食させる恐れがありますので、実機での評価 確認の上 ご使用をお願い致します。

Ozone has a high corrosive effect. Ozone is likely to make peripherals and material oxidize and corrode.

Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

7.6 低分子シロキサン(ジメチルポリシロキサン)含有率の高いシリコンゴム、シリコンボンド等の使用により、ポリウムやポテンションメータ摺動子やスイッチ類の接点接触不良が発生する場合があります。低分子シロキサン含有量は 0.1% 以下のものをご使用ください。

The use of silicone rubber or silicone bond which contain a high percentage of diethylpolysiloxane may trigger the contact failure of variable resistors, potentiometers or switches. Make sure to use silicone with the percentage of dimethylpolysiloxan 0.1 or less %..

7.7 組み込み取り扱いは、組み込み環境条件に放置し、なじませた上で常温常湿にて行ってください。(急激な環境変化による結露が発生している状態等での組み立て及び取り扱いは行わないで下さい。)

Prior to assembling this module to your unit, leave it under the environment for assembling for a while so that the module may get harmonized with the environment. Then assemble to your main unit under the environment at normal temperature and humidity. (Do not assemble or handle the module under high humidity conditions.)

7.8 本カタログに定められている範囲外の入力電圧を投入した際は、製品破損の危険性があります。特に、過大入力電圧の投入は電界コンデンサの電解液噴出をまねき、発火の危険性があります。
Exceeding the specifications of this datasheet may cause product damage. Application of excessive input voltage can especially damage electrolytic capacitors.

7.9 本カタログに定められている最大出力電流値を超える過電流値での使用は絶対に避けてください。製品破損の危険性があります。また、部品の劣化を生じ、寿命が短くなります。
Do not exceed the maximum output current value as defined on this product datasheet. Such use will damage or deteriorate components and shorten the life of the unit.

7.10 耐電圧試験を実施する場合は、0[V]からゆっくりと電圧を上げてください。また、電圧を下げる場合も同様にゆっくりと下げてください。耐電圧試験機をタイマーにより遮断すると遮断時インパルス電圧が発生し、電源を破損することがあります。
When conducting the withstand voltage test, raise the voltage slowly from 0[V], and conversely, decrease the voltage slowly. Cutting the operation of the withstand voltage tester using a timer will generate an impulse voltage and may damage the power supply.

7.11 用途の限定

当製品について、その故障や誤動作が人命または財産に危害を及ぼす恐れがある等の理由により、高信頼性が要求される以下の用途でのご使用をご検討の場合は、必ず事前に当社までご連絡下さい。

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property..

- ①航空機器 Aircraft equipment
- ②宇宙機器 Aerospace equipment
- ③海底機器 Undersea equipment
- ④発電所制御機器 Power plant control equipment
- ⑤医療機器 Medical equipment
- ⑥輸送機器（自動車、列車、船舶等）Transportation equipment（automobiles, trains, ships, etc.）
- ⑦交通信号機器 Traffic signal equipment
- ⑧防災／防犯機器 Disaster prevention / crime prevention equipment
- ⑨情報処理機器 Data-processing equipment
- ⑩その他上記機器と同等の機器

Applications of similar complexity or with reliability requirements comparable to the applications listed in above.



8.お願い

8.1 ご使用に際しては、貴社製品に実装された状態で必ず評価して下さい。

Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

8.2 当製品を当カタログの記載内容を逸脱して使用しないで下さい。

You are requested not to use our product deviating from the agreed specifications.

8.3 フェールセーフ機能の付加

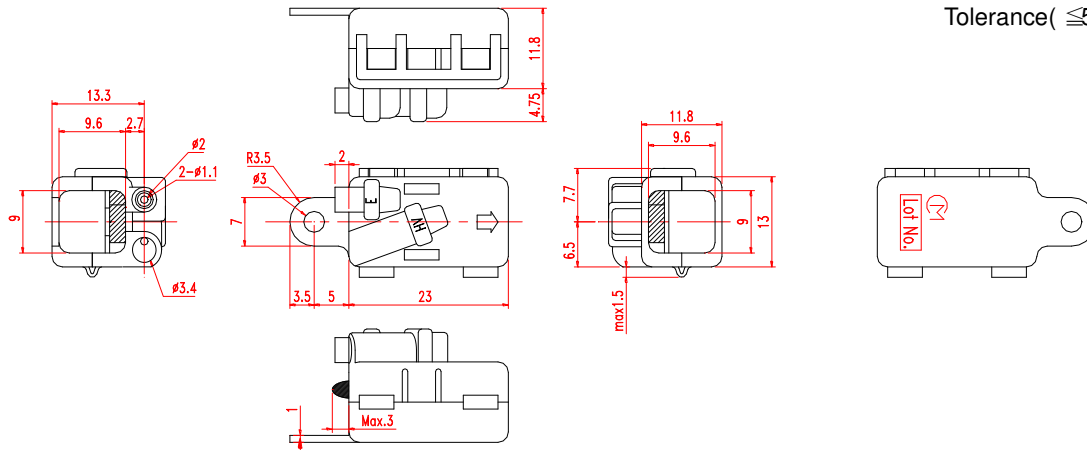
当製品に万が一異常や不具合が生じた場合でも、二次災害防止のために完成品にもしくは最終セットに適切なフェールセーフ機能を必ず付加して下さい。

Be sure to provide an appropriate fail-safe function on your product that will prevent secondary damage that may be caused by the abnormal function or the failure of our product.

付図 1 Attached fig. 1

イオン・オゾン発生モジュール構造図
Mechanical Specifications for MHM400 Series

(発生子) (Detail drawing Ionizer section)

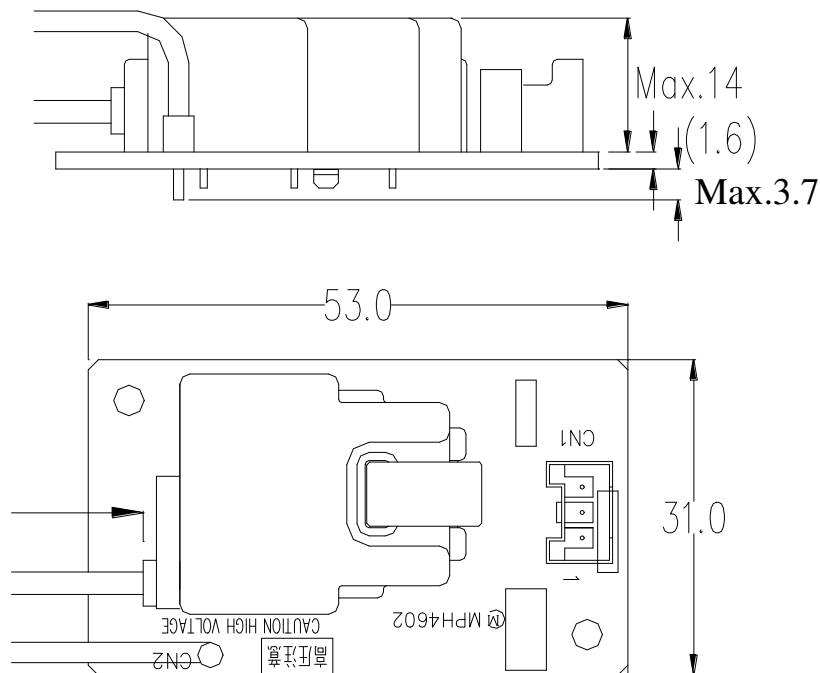


Unit(mm)

Tolerance(>5) : ±0.5

Tolerance(≤5) : ±0.1

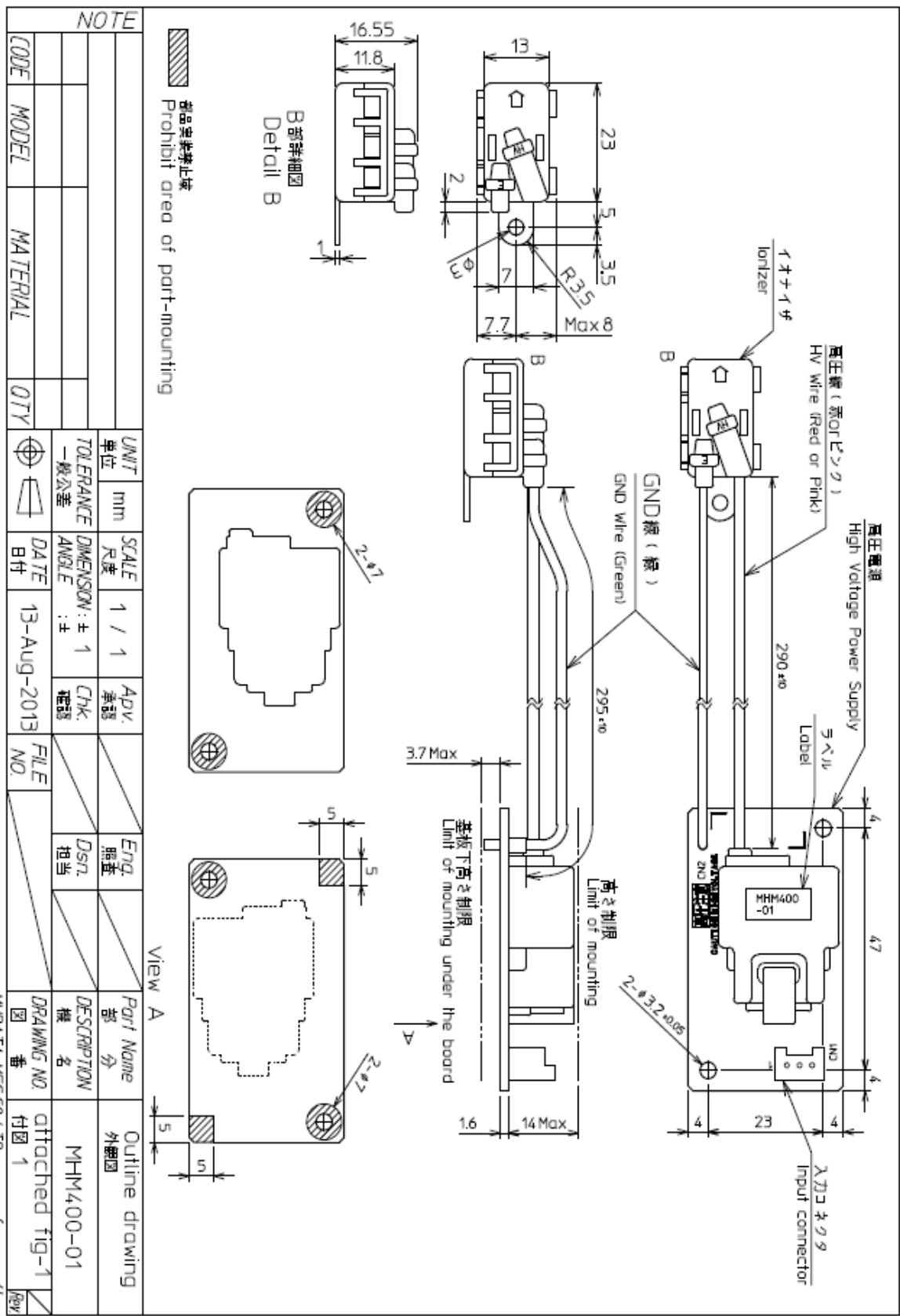
(高圧電源) (Detail drawing High voltage power supply section)



Unit(mm)

Tolerance : ±1

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