

## Power Modules (Power Supplies with Ultra-low Standby Power Consumption)

### ■Features

- 1.Easy to design compact AC/DC due to small number of external components
- 2.Enables significant reduction in power consumption of no-load and light load
- 3.Corresponding world wide input and PFC output voltage (Vin:DC100V~420V)
- 4.Unique Tamura design insures significant reduction in 'buzz' under light-load conditions for lower noise level
- 5.Reinforced insulation



### ■Applications

- Industrial equipment
- Information processing equipment
- AV equipment
- Home electric appliances
- Other standby power supplies and compact power supplies

### ■Certified safety standards

UL62368-1, CSA C22.2 No.62368-1 (E132244)  
IEC62368-1(CB)

Certified input voltage range  
...DC100-420V

### ■Applicable safety standards

UL/CSA/IEC/EN62368-1  
UL/CSA/IEC/EN60950-1  
UL/CSA/IEC/EN60065  
IEC/EN60335-1

Applicable input voltage range  
...DC100-420V

### ■Application circuit

Method to select external parts for input rectification and smoothing as well as output smoothing is supported by the application note.

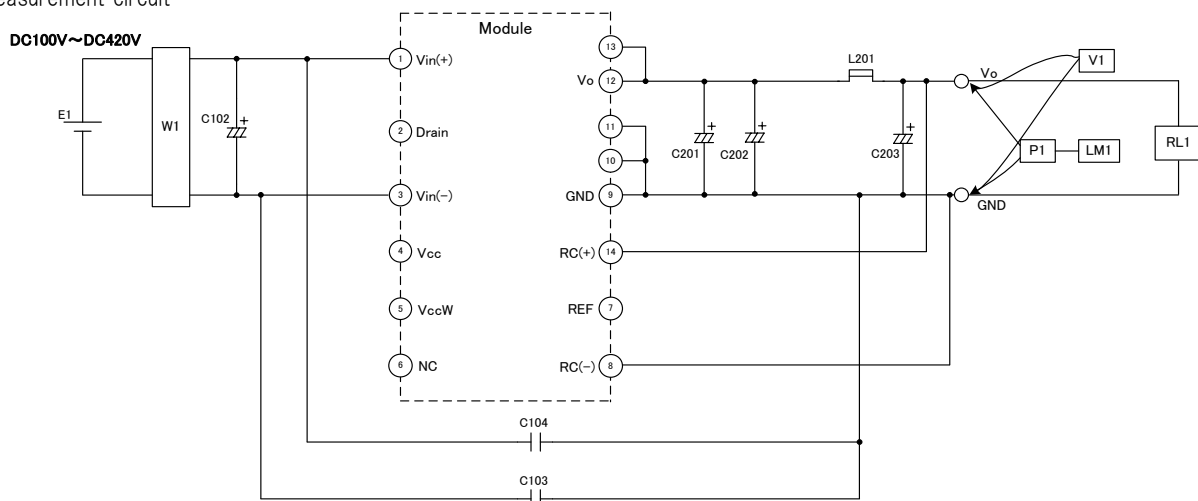
**Input-output condition**

| Item                             | Specification               | Conditions·Note  |
|----------------------------------|-----------------------------|--|
| Input voltage range              | DC100V~420V<br>(DC50V~420V) | Average voltage<br>(Refer to the Input voltage derating curve) |
| Maximum input voltage            | 420V or less                | Including peak value   |
| Input ripple voltage lower limit | 75V or more                 | Ripple voltage of the AC input rectified                       |
| Rated input voltage              | DC140V, DC340V              |  |
| Rated output voltage             | 15V                         |  |
| Rated load current               | 1.7A                        |  |
| Maximum peak load current        | 2.55A                       | 5s or less, Duty 30%. Average current 1.7A or less.            |

**Electrical specification Ta=25°C**

| Item                     | Specification         | Conditions·Note                             |
|--------------------------|-----------------------|---|
| Efficiency               | 80% or more (86% TYP) | Rated input voltage<br>Rated output current |
| Output voltage tolerance | ±5%                   |   |
| Line regulation          | 100mV or less         | Input voltage DC100V~420V                   |
| Load regulation          | 250mV or less         | Output current 0~rated output current       |
| No-load power            | 50mW or less          | Rated input voltage                         |
| Ripple                   | 150mVp-p or less      | Rated input voltage                         |
| Ripple noise             | 180mVp-p or less      | Rated output current                        |

## Measurement circuit



E1 : DC power supply  
W1 : Power meter WT210 (YOKOGAWA)  
RL1: Electronic load  
V1 : Voltmeter Class 0.5  
P1 : Differential probe DP-100(KG)  
LM1: Ripple noise meter RM-103(KG)

C102 : 450BXW82M (RUBYCON)  
C103 : CD85-B2GA471K (TDK)  
C104 : CD85-B2GA471K (TDK)  
C201 : 25ZLG330M (RUBYCON)  
C202 : 25ZLG330M (RUBYCON)  
C203 : 25ZLG100M (RUBYCON)  
L201 : PC8Z-2R2N (KORIN)

**Protection**

| Item                   | Specification | Conditions·Note  |
|------------------------|---------------|--|
| Overcurrent protection | 2.9A~5.9A     | Hiccup mode  |
| Overvoltage protection | 17.0V~24.0V   | Latch off  |
| Overheat protection    |               | Latch off<br>When overheating protection moved,<br>overvoltage sometimes occurs to output. |

**Insulation**

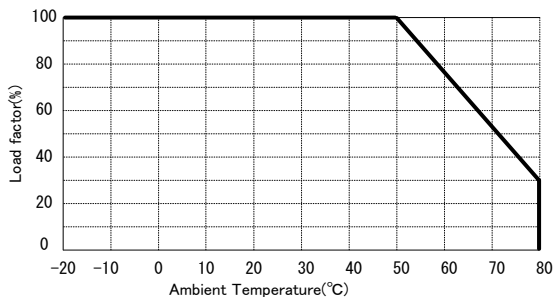
| Item  | Specification | Conditions·Note |
|---|---------------|-----------------|
| Dielectric withstand voltage<br>(Between Pri—Sec) | AC3.75kV 1min | Cutoff 5mA      |
| Insulation resistance<br>(Between Pri—Sec)        | 100MΩ or more | DC500V          |

**Environmental conditions**

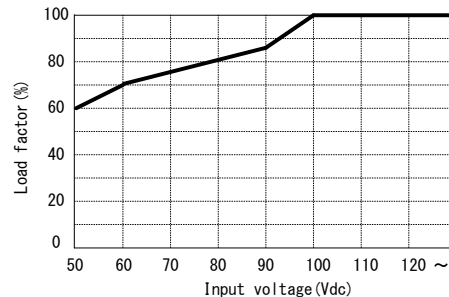
| Item                  | Specification                 | Conditions·Note                                    |
|-----------------------|-------------------------------|--|
| Operating temperature | -20°C~80°C                    | Refer to the Ambient temperature<br>derating curve |
| Operating humidity    | 20~95%RH<br>(No condensation) |  |
| Storage temperature   | -25°C~85°C                    |  |
| Storage humidity      | 5~95%RH<br>(No condensation)  |  |

**Ambient temperature derating curve**

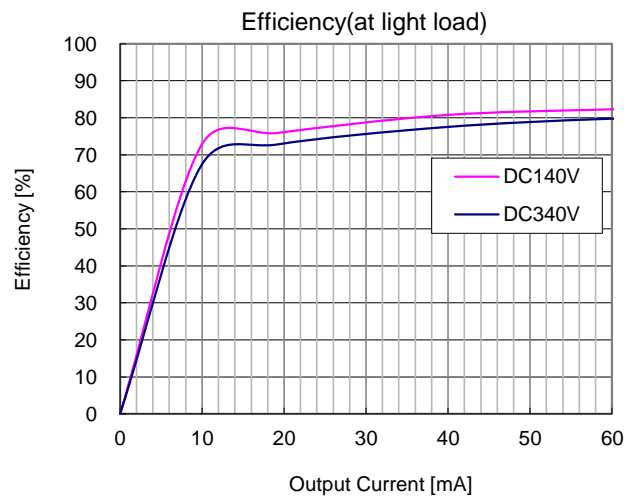
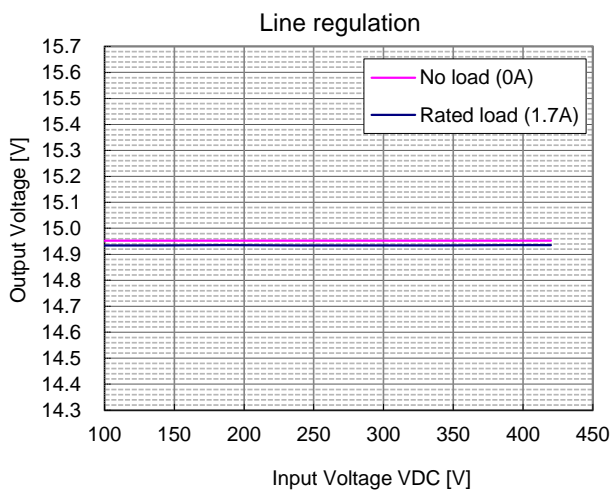
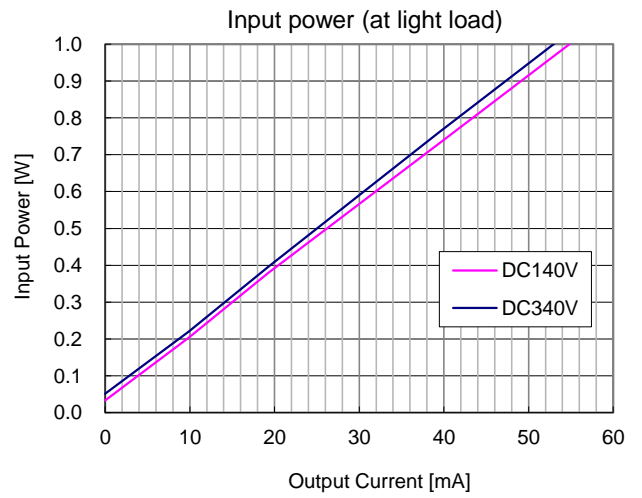
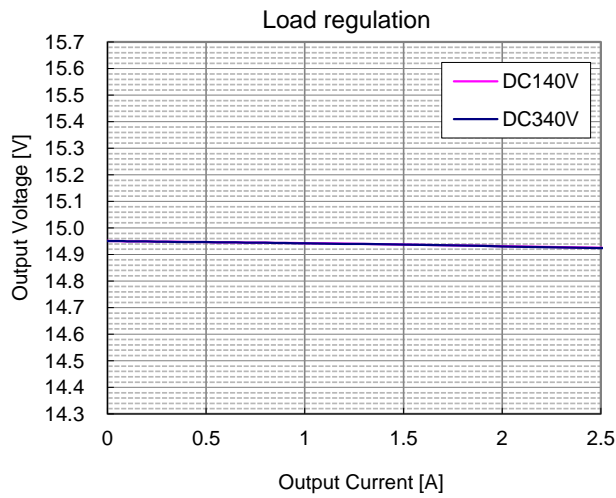
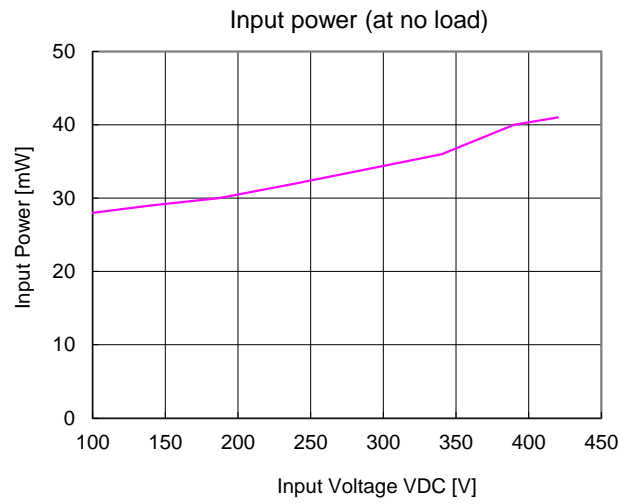
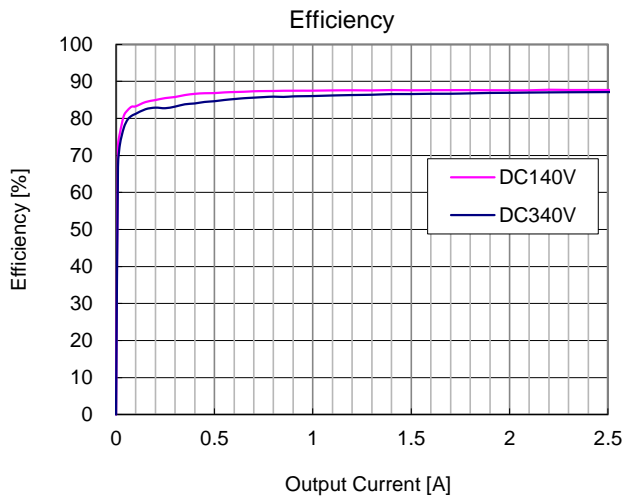
Reduce the load current according to the following temperature derating table.


**Input voltage derating curve**

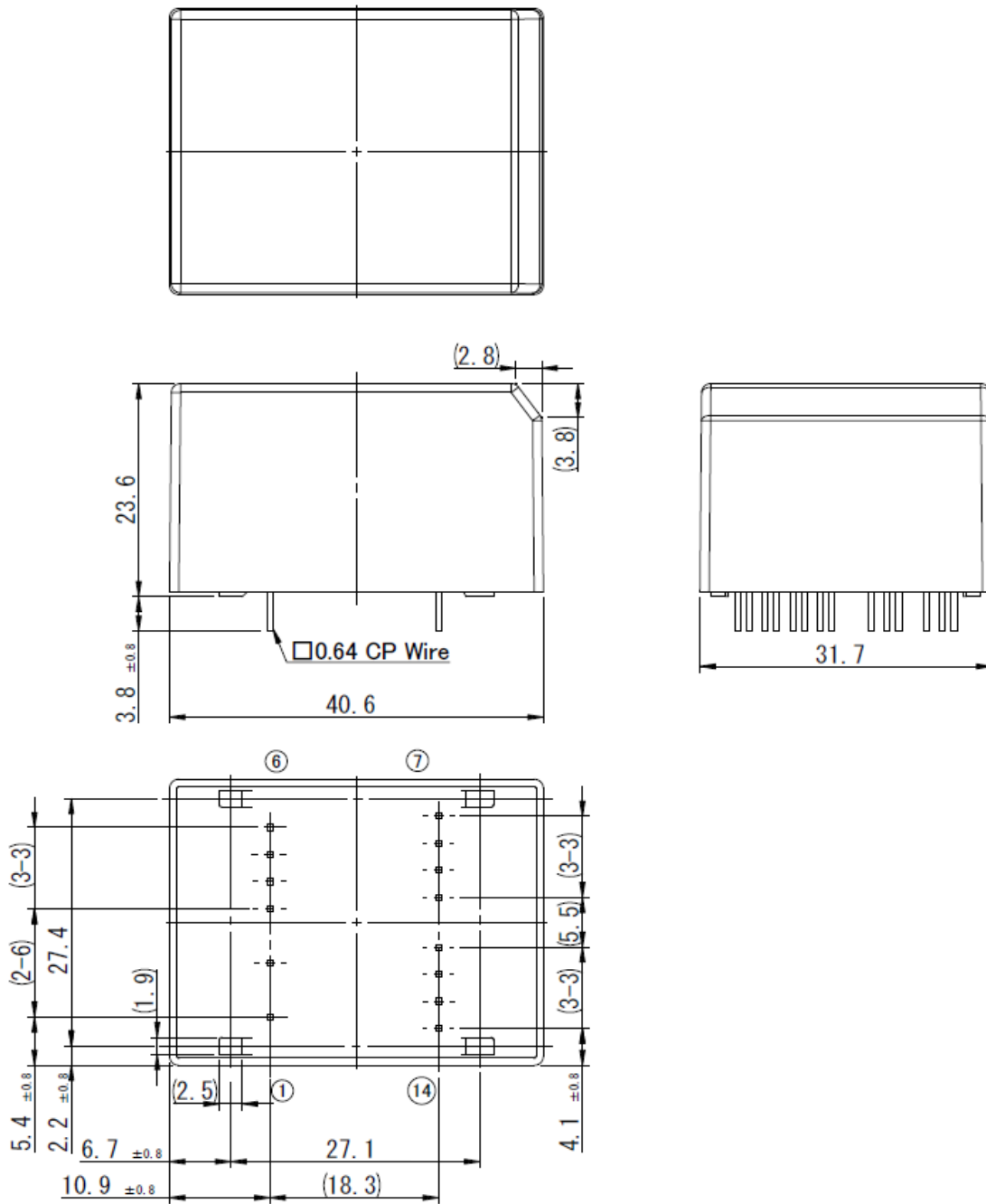
Reduce the load current according to the following input voltage derating table.



■ Typical characteristics Ta=25°C

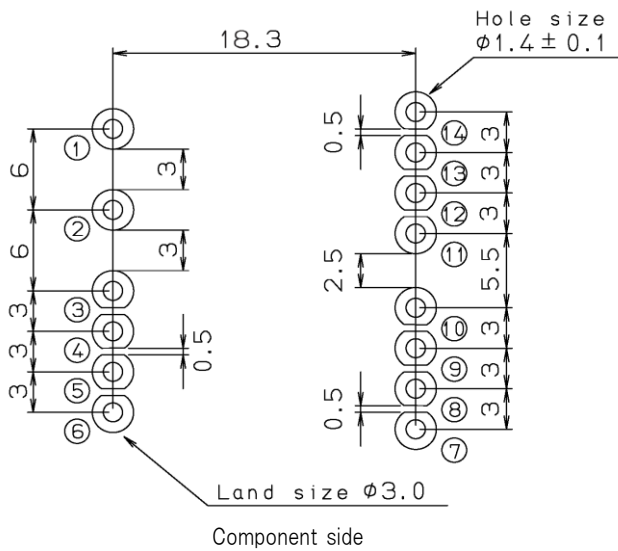


■ Outline dimensional drawing



Note :1.The dimensional tolerance without directions is  $\pm 0.5$ mm.

Unit : mm

**Recommended hole diameter and land size**


※ The round pulling out figure is a pin numbering.

Unit:mm

**Terminal function and connection**

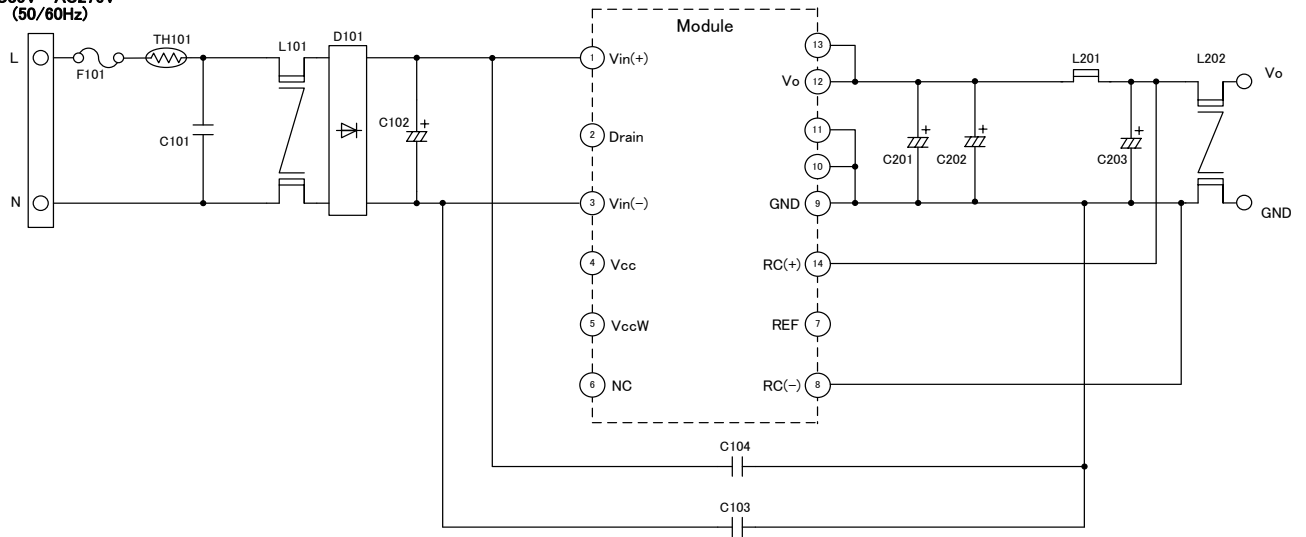
## Primaries

| Pin No. | Name   | Explanation of terminals                                       |
|---------|--------|--|
| 1       | Vin(+) | DC voltage input terminal (+)                                  |
| 2       | Drain  | Terminal for noise adjustment                                  |
| 3       | Vin(-) | DC voltage input terminal (-)                                  |
| 4       | Vcc    | Terminal for start-up time adjustment                          |
| 5       | VccW   | Auxiliary winding terminal ※Don't connect with other circuits. |
| 6       | N.C.   | Unused terminal ※Don't connect with other circuits.            |

## Secondaries

| Pin No. | Name  | Explanation of terminals              |
|---------|-------|---------------------------------------|
| 7       | REF   | Output voltage adjustment terminal    |
| 8       | RC(-) | Output voltage detection terminal (-) |
| 9       | GND   | Output terminal (-)                   |
| 10      | GND   | Output terminal (-)                   |
| 11      | GND   | Output terminal (-)                   |
| 12      | Vo    | Output1 terminal (+)                  |
| 13      | Vo    | Output1 terminal (+)                  |
| 14      | RC(+) | Output voltage detection terminal (+) |

**Application circuit example**

 AC85V~AC276V  
(50/60Hz)


| Symbol | Description | Part No.          | Manufacturer  |
|--------|-------------|-------------------|---------------|
| D101   | Diode       | D2SB60A           | SHINDENGEN    |
| L101   | Inductor    | LF-4Z-E193H       | KORIN         |
| L201   | Inductor    | PC8Z-2R2N         | KORIN         |
| L202   | Inductor    | 0-5127-15-TM      | KORIN         |
| C101   | Capacitor   | LE104-MX          | OKAYA         |
| C102   | Capacitor   | 450BXW82M         | RUBYCON       |
| C103   | Capacitor   | CD85-B2GA471K     | TDK           |
| C104   | Capacitor   | CD85-B2GA471K     | TDK           |
| C201   | Capacitor   | 25ZLG330M         | RUBYCON       |
| C202   | Capacitor   | 25ZLG330M         | RUBYCON       |
| C203   | Capacitor   | 25ZLG100M         | RUBYCON       |
| F101   | Fuse        | FIH 250V 2.0A     | NIPPON-SEISEN |
| TH101  | Thermistor  | SCK102R55AMIAY499 | THINKING      |

※Mount the fuse on the input Live side to ensure safety without fail.  
Recommended parts:FIH 250V 2.0A~3.15A / NIPPON-SEISEN

※Depend on the applying safety standard, please add the discharge resistance in paralell with C101.

### ■ Usage cautions

- Always mount fuse on the Live side of input for ensuring safety because the fuse is not built-in the product. Please select the fuse considering conditions such as steady current, inrush current, and ambient temperature at your own responsibility.  
 ※Recommended parts: FIH 250V 2.0A~3.15A / NIPPON-SEISEN  
 When using a fuse having large rated current or high capacity input electrolytic condenser, by combining another converter and input line and input electrolytic condenser, fuse may not blow off in the case of abnormality. Do not combine high voltage line and fuse.

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  - Use that involves exposure to direct sunlight, outdoor exposure, or dusty conditions.
  - Use in locations where corrosive gases such as salt air, C12, H2S, NH3, SO2, or NO2, are present.
  - Use in environments with strong static electricity or electromagnetic radiation.
  - Use that involves placing inflammable material next to the product.
  - Use of this product either sealed with a resin filling or coated with resin.
  - Use of water or a water soluble detergent for flux cleaning.
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