# **SERIES:** VGS-600 | **DESCRIPTION:** INTERNAL AC-DC POWER SUPPLY

## FEATURES

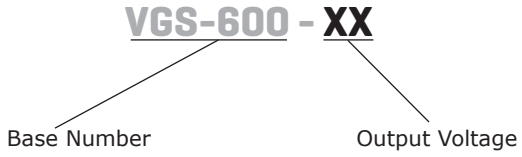
- UL/EN 62368 certified
- active PFC
- temperature range -40°C to +70°C
- isolation up to 4000 Vac
- operating altitude up to 5000 m
- remote on/off
- short-circuit, over-current, over-voltage & over-temperature protection
- AC or DC input
- internal fan cooling
- PCB conformal coating
- 5 V, 1 A standby supply
- remote output voltage sensing

## MODEL

| | output voltage | | output current | output power | ripple and noise[1] | efficiency[2] |
|---|---|---|---|---|---|---|
| | | range | max | max | typ | typ |
| | (Vdc) | (Vdc) | (A) | (W) | (mVp-p) | (%) |
| VGS-600-12 | 12 | 11.8 ~ 12.6 | 50.0 | 600 | 150 | 92 |
| VGS-600-15 | 15 | 14.7 ~ 15.8 | 40.0 | 600 | 150 | 92 |
| VGS-600-24 | 24 | 23.5 ~ 25.2 | 25.0 | 600 | 200 | 94 |
| VGS-600-27 | 27 | 26.4 ~ 28.4 | 22.3 | 600 | 200 | 94 |
| VGS-600-36 | 36 | 35.3 ~ 37.8 | 16.7 | 600 | 300 | 94 |
| VGS-600-48 | 48 | 47.0 ~ 50.4 | 12.6 | 600 | 300 | 94 |

Notes: 1. Ripple & noise are measured at 20 MHz BW with 47 µF aluminum electrolytic capacitor and 0.1 µF ceramic capacitor on the output.
2. Measured at 230 Vac

## PART NUMBER KEY



## INPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| voltage | ac input<br>dc input | 80<br>110 | | 277<br>390 | Vac<br>Vdc |
| frequency | | 47 | | 63 | Hz |
| current | at 115 Vac<br>at 230 Vac | | | 7.5<br>3.5 | A<br>A |
| inrush current | at 230 Vac, cold start | | 40 | | A |
| leakage current | at 240 Vac | | | 0.1 | mA |
| no load power consumption | at 230 Vac, 25°C, on/off add +5V signal | | 0.5 | | W |
| power factor | at 115 Vac, full load<br>at 230 Vac, full load | | 0.98<br>0.95 | | |

## OUTPUT

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| capacitive load | 12 Vdc & 15 Vdc output<br>24 Vdc & 27 Vdc output<br>36 Vdc output<br>48 Vdc output | | | 6,000<br>4,000<br>2,400<br>1,600 | µF<br>µF<br>µF<br>µF |
| total regulation | +5 VSB output, standby, full load<br>all other outputs, full load | | ±2<br>±1 | | %<br>% |
| line regulation | +5 VSB output, standby, rated load<br>all other outputs, rated load | | ±0.5<br>±0.3 | | %<br>% |
| load regulation | +5 VSB output, standby, 0%~100% load<br>all other outputs, 0%~100% load | | ±2<br>±0.5 | | %<br>% |
| hold-up time | at 230 Vac | 15 | | | ms |

## PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| over voltage protection | 12 Vdc output, latching<br>15 Vdc output, latching<br>24 Vdc output, latching<br>27 Vdc output, latching<br>36 Vdc output, latching<br>48 Vdc output, latching | | | 16<br>20<br>32<br>35<br>47<br>60 | Vdc<br>Vdc<br>Vdc<br>Vdc<br>Vdc<br>Vdc |
| over current protection | auto-recovery | 110 | | 160 | % |
| short circuit protection | hiccup, continuous, auto-recovery in < 3 s after short removed | | | | |
| over temperature protection | output turns off and self recovers after temperature drops | | | | |

## SAFETY & COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| isolation voltage | input to ground for 1 minute, 5 mA max<br>input to output for 1 minute, 5 mA max<br>output to ground for 1 minute, 5 mA max | 1,500<br>4,000<br>1,500 | | | Vac<br>Vac<br>Vac |
| insulation resistance | input to ground, 500 Vdc<br>input to output, 500 Vdc<br>output to ground, 500 Vdc | 50<br>50<br>50 | | | MΩ<br>MΩ<br>MΩ |
| safety approvals | certified to 62368: IEC/EN/UL<br>designed to meet 61558: EN<br>designed to meet 60335: EN | | | | |
| safety class | Class I | | | | |
| conducted emissions | CISPR32/EN55032 CLASS B | | | | |
| radiated emissions | CISPR32/EN55032 CLASS B | | | | |
| harmonic flicker | IEC/EN61000-3-2 CLASS A and CLASS D | | | | |

## SAFETY & COMPLIANCE

| | | | | | | |
|---|---|---|---|---|---|---|
| voltage flicker | IEC/EN61000-3-3 | | | | | |
| **parameter** | **conditions/description** | | **min** | **typ** | **max** | **units** |
| ESD | IEC/EN 61000-4-2 Contact ±8KV/Air ±15KV, perf. Criteria A | | | | | |
| radiated immunity | IEC/EN 61000-4-3 10V/m, perf. Criteria A | | | | | |
| EFT/burst | IEC/EN 61000-4-4 ±4KV, perf. Criteria A | | | | | |
| surge | IEC/EN 61000-4-5 line to line ±2KV/line to ground ±4KV, perf. Criteria A | | | | | |
| conducted immunity | IEC/EN61000-4-6 10 Vr.m.s, perf. Criteria A | | | | | |
| voltage dips and interruptions | IEC/EN61000-4-11 0%, 70%, perf. Criteria B | | | | | |
| MTBF | as per MIL-HDBK-217F at 25°C | | 300,000 | | | hours |
| RoHS | yes | | | | | |

## ENVIRONMENTAL

| **parameter** | **conditions/description** | | **min** | **typ** | **max** | **units** |
|---|---|---|---|---|---|---|
| operating temperature | | | -40 | | 70 | °C |
| storage temperature | | | -40 | | 85 | °C |
| operating humidity | non-condensing | | 20 | | 95 | % |
| storage humidity | non-condensing | | 10 | | 95 | % |
| power derating | operating temperature derating | 50°C ~ 70°C | 2.5 | | | %/°C |
| | input voltage derating | 80 Vac ~ 85 Vac<br>85 Vac ~ 100 Vac | 2.0<br>1.33 | | | %/Vac |

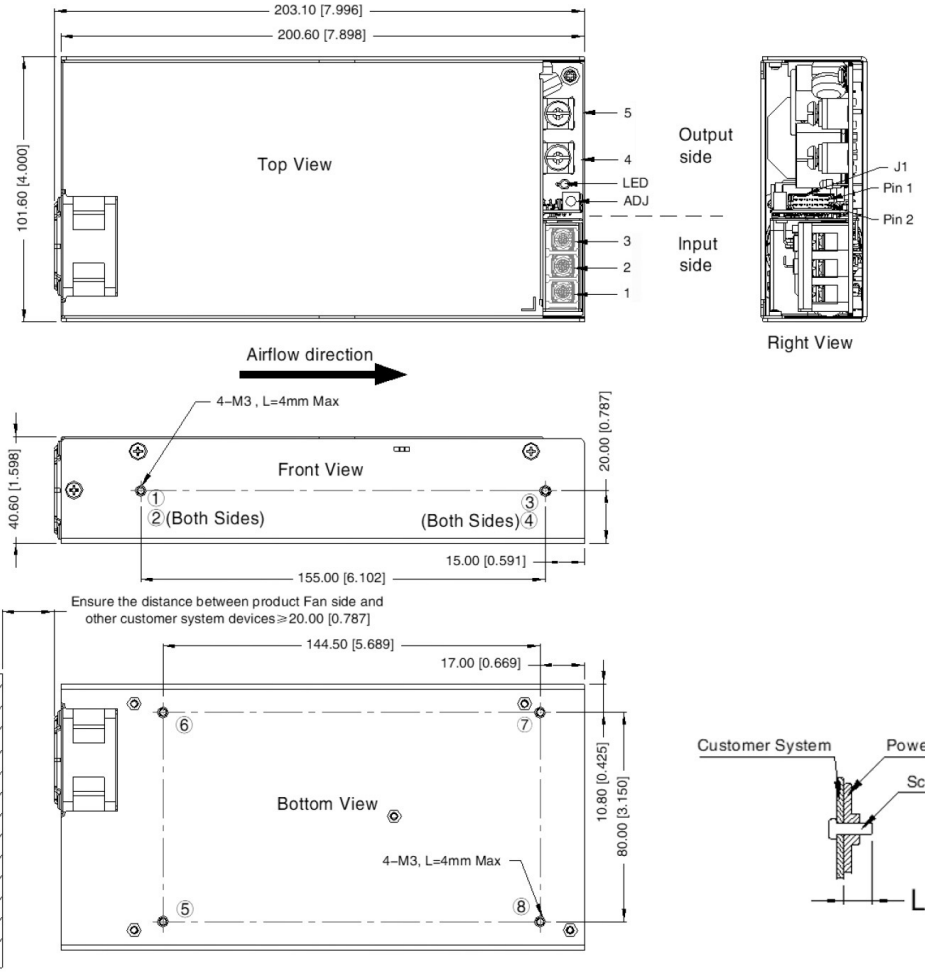
## MECHANICAL

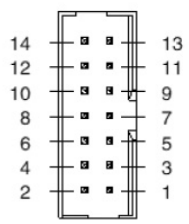
| parameter | conditions/description | min | typ | max | units |
|---|---|---|---|---|---|
| dimensions | 101.6 x 203.1 x 40.6 | | | | mm |
| weight | | | 1,000 | | g |
| cooling | forced air cooling | | | | |
| case material | metal (AL1100, SGCC) | | | | |

## MECHANICAL DRAWING

units: mm [inch]
adj: output adjustable resistor
input connector wire range: 22 ~ 14 awg
input connector tightening torque: M4, 1.2 N·m (max)
output connector (-V0/+V0) tightening torque: M5, 2.4 N·m (max)
tolerance: ±1.0 [±0.039]

| PIN CONNECTIONS | |
|---|---|
| PIN | Function |
| 1 | ⏚ |
| 2 | AC (L) |
| 3 | AC (N) |
| 4 | +Vo |
| 5 | -Vo |




| Figure | Output connector J1 | | | | |
|---|---|---|---|---|---|
| | PIN | Function | PIN | Function | Customer connector |
|  | 1 | -S | 2 | +S | MOLEX PN: 51110-1450 (without locking ramp) or 5110-1451 (with locking ramp) or equivalent |
| | 3 | NC | 4 | NC | |
| | 5 | DC_OK- | 6 | DC_OK+ | |
| | 7 | +5VSB | 8 | 5VSB_RTN | |
| | 9 | RC+ | 10 | RC- | |
| | 11 | +5VSB | 12 | +5VSB | |
| | 13 | 5VSB_RTN | 14 | 5VSB_RTN | |



| Position | Screw spec. | L (max) | Torque (max) |
|---|---|---|---|
| ① - ⑧ | M3 | 4 mm | 0.4 N·m |

Note: At least one hole position, ①~⑧, must be securely connected to Protective Earth (PE) ⏚

## TYPICAL APPLICATION

### REMOTE ON/OFF

**Figure 1**

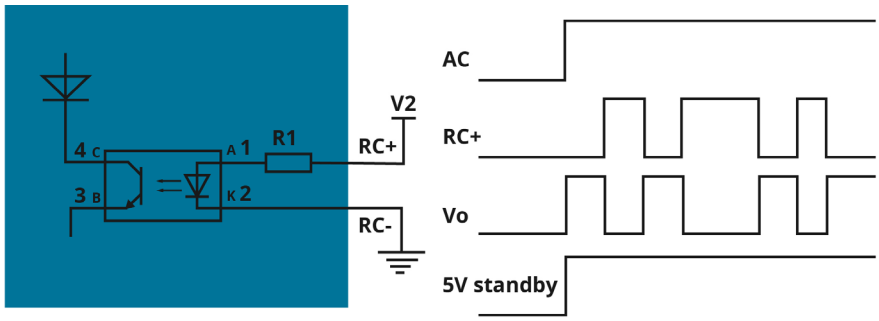



**Table 1**

| | |
|---|---|
| R1 (Product inside) | 2KΩ, $\frac{1}{12}$W |
| V2 (User side) | 5V ~ 15V |

**1.** When the product is working normally, apply voltage (5-15V) to RC+ and RC- to trigger the remote ON/OFF function, and the output voltage will be off. Withdraw the voltage, the output voltage will be re-established.
**2.** 5V standby power supply is not controlled by remote ON/OFF function.

### DC_OK

**Figure 2**

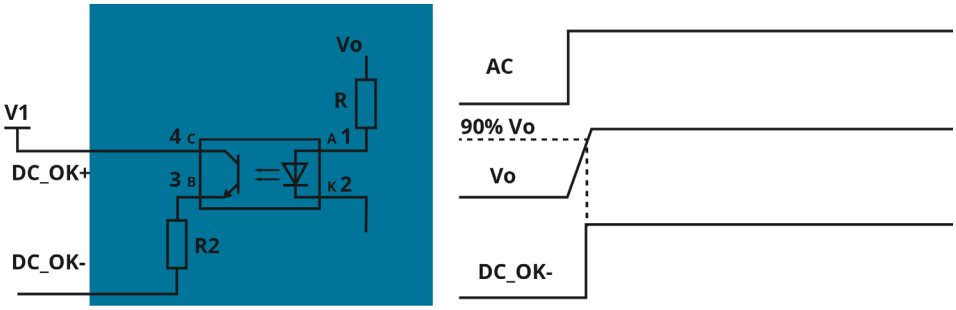


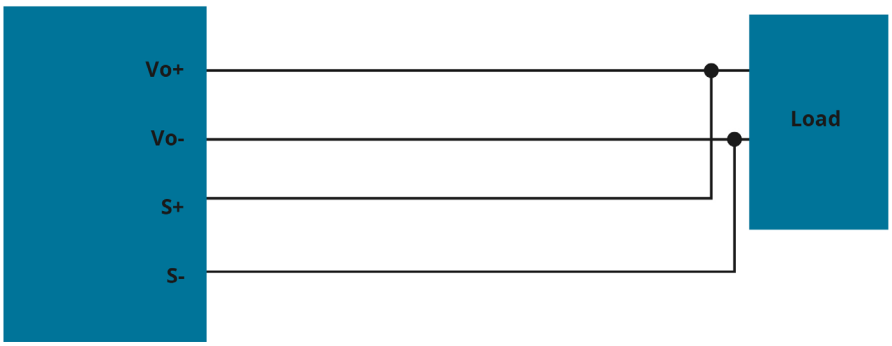

**Table 2**

| | |
|---|---|
| R2 (Product inside) | 1KΩ, $\frac{1}{12}$W |
| V1 (User side) | 5V ~ 15V |

**1.** When the output voltage of the product reaches 90% of the rated value, DC_OK+ will be connected to DC_OK-.
**2.** It is recommended that users apply a certain voltage between DC_OK+ and DC_OK- to detect the signal.

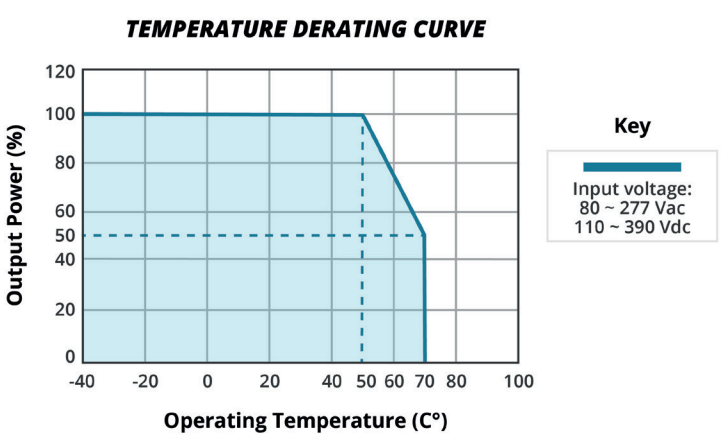
### REMOTE SENSE COMPENSATION

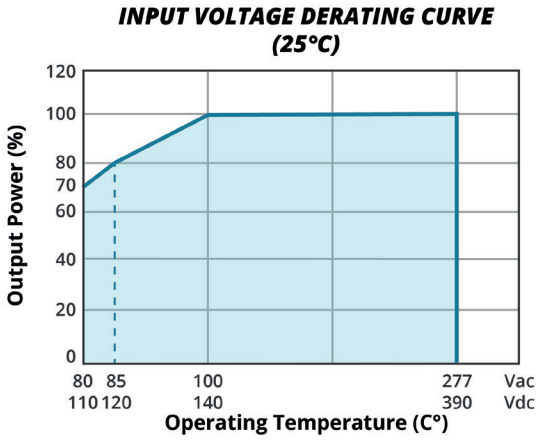
**Figure 3**



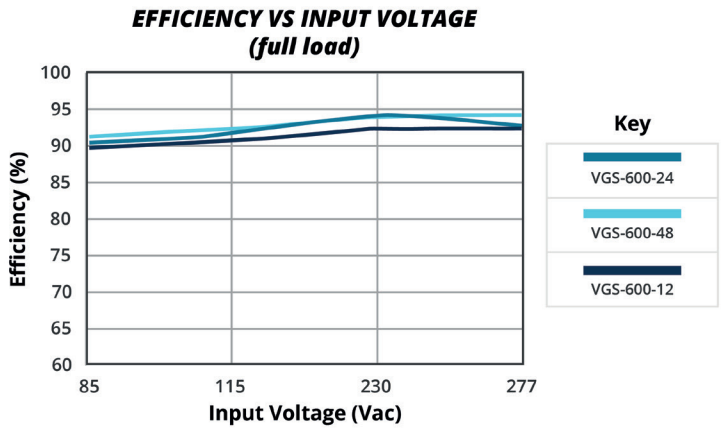

**1.** The left side represents the internal schematic diagram of the product, the right side represents the customer system.
**2.** Twisted pair wires are needed for S+/S-.

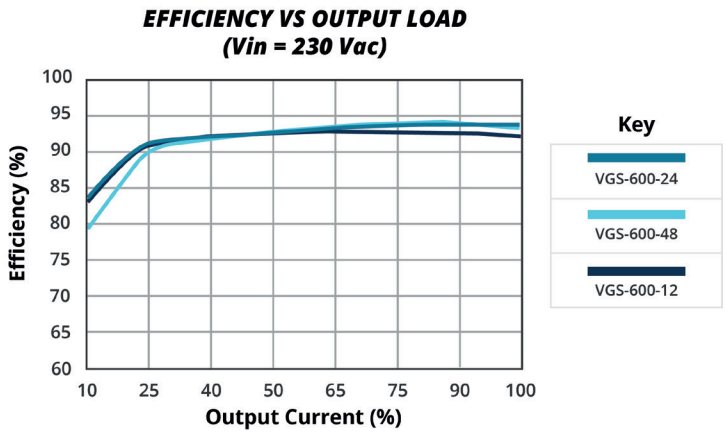
## DERATING CURVE




## EFFICIENCY CURVES




Notes:
3. The room temperature derating of 5°C/1000m is needed for operating altitude greater than 2000m.
4. In order to improve the efficiency at high input voltage, there will be audible noise generated, but it does not affect product performance and reliability.
5. The out case needs to be connected to PE (⏚) of system when the terminal equipment in operating.
6. CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.
   ATTENTION: Double pôle/fusible sur le neutre. Débrancher lalimentation avant lentretien.

## REVISION HISTORY

| rev. | description | date |
|---|---|---|
| 1.0 | initial release | 09/09/2022 |

The revision history provided is for informational purposes only and is believed to be accurate.

CUI INC
a bel group

**Headquarters**
20050 SW 112th Ave.
Tualatin, OR 97062
**800.275.4899**

Fax 503.612.2383
**cui**.com
techsupport@cui.com