

TWF1000

Telecommunication
rectifier



FEATURES

- 1000W continuous output power
- Power factor corrected, universal input
- Integral fan cooling
- EMC compliant
- Current limit and overvoltage protection
- Active current share
- Thermal protection
- CE marked
- Remote shutdown
- Approved by CSA to UL and CSA safety standards
- Integral series output diode
- Hot pluggable

Advance
POWER

An Advance International Group Company

INTRODUCTION

The TWF1000 range of rectifiers provide up to 1000W of power for 24V or 48V telecommunication systems. Input power can be from any standard utility supply worldwide as the operating range extends from 85V to 264Vac. Active power factor correction ensures compliance with EN61000-3-2 for harmonic content of the input current.

Hot plug connection is provided by a standard Elcon lower drawer connector which carries input power, output power and a wide range of signalling and control functions. An electronic postmate enable function delays unit operation until after connection has been made preventing spark hazards when hot-plugging. The wide range of signalling and control functions enable remote monitoring and control of a rectifier or complete system via a power management system.

An integral cooling fan and integral series output diode complete this extremely versatile and easy to use package.

Shelf systems are available from Advance Power which can take up to four units in parallel to create a 4000W unit. An example is shown below. For details of shelf options and availability please contact your local representative or agent.

AVAILABLE OUTPUTS

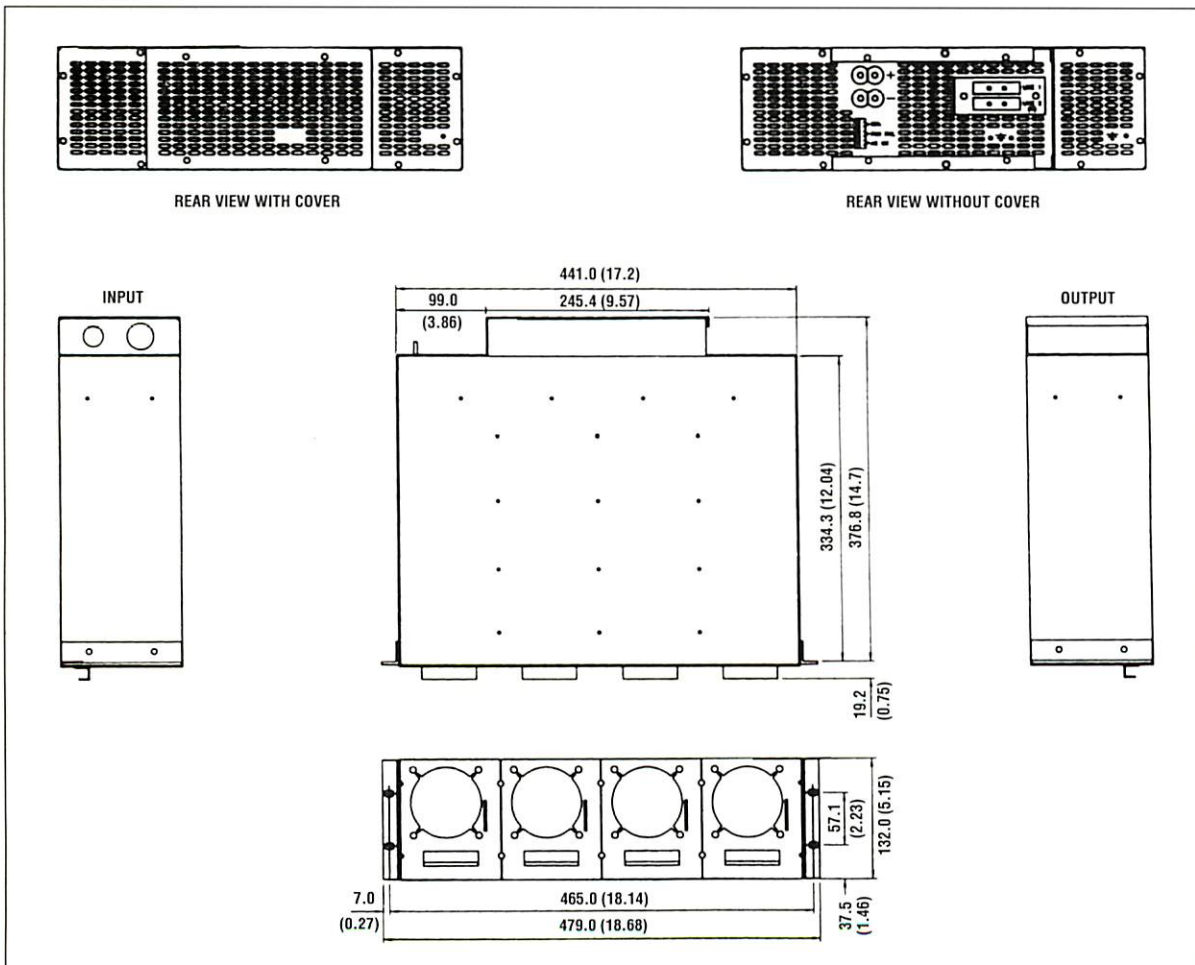
Table 1, Standard Rectifiers

Nominal Voltage	Adjustment Range	Output Current	Order Code
27.4V	20 - 29V	40A(28A)	TWF1000H27
54.9V	40 - 58V	20A(14A)	TWF1000H54

() Output current below 176Vac input.

TWF1000 SHELF OUTLINE DRAWING

All dimensions are nominal and are in mm (inches).



INPUT SPECIFICATION

Voltage Range

85 - 264Vac

Frequency

45 - 66Hz

Supply Type

Single phase TN-S system (as defined in IEC364).

Input Current

9.5A maximum at 770W output power and 115Vac input.

7A maximum at 1160W output power and 230Vac input.

Inrush Current

20A maximum at 1160W output power and 264Vac input, hot or cold start.

Power

1650W maximum at 230V input, 1160W output power; 1100W maximum at 115V input, 770W output power.

Power Factor

0.99 typical, 0.95 minimum at full output power and 85 - 264Vac input.

Efficiency

Typically 86% at 240Vac input and 1160W output power.

Harmonic Distortion

Units comply with the requirements of EN61000-3-2.

OUTPUT SPECIFICATION

Voltage

The nominal output voltage and adjustment ranges are shown in Table 1. Adjustments by means of a multi-turn potentiometer on the rectifier, or over a limited range via the Voltage Trim input. Output voltage is factory set to 27.4V/54.9V $\pm 1\%$.

Current

Recommended maximum continuous current ratings (I_{MAX}) are shown in Table 1. All maximum current ratings are applicable up to 50°C. From 50°C to 70°C derate by 2.5%/°C.

Power

The power level is automatically adjusted to suit the input voltage. Maximum available output power is 1160W at input voltages above 176Vac and 770W at input voltages below 176Vac.

Load Regulation

A load change from 0 to I_{MAX} results in a maximum voltage deviation of 75mV.

Line Regulation

A change of input voltage over the operating range results in a maximum voltage deviation of 75mV.

Dynamic Regulation

A step change in output current from 10% to 90% of full load results in a maximum output voltage deviation of 1V, recovering to within 1% of nominal within 2ms.

Quiescent Current

When non-energized, the steady state quiescent current into the rectifier output from a connected source will not exceed 10mA after 1 minute for a source of 28V/55V.

Temperature Coefficient

$\pm 0.02\%/^{\circ}\text{C}$ typical over the range 0 to 50°C.

Ripple and Noise

Psophometrically weighted noise in accordance with C.C.I.T.T. No 1, does not exceed 2mVr.m.s.

C message weighted noise is less than 38dBmC.

Wideband differential noise over the frequency range 10Hz - 30MHz does not exceed 500mVpk - pk. Typically 200mVpk - pk.

TURN ON AND TURN OFF CHARACTERISTICS

Start-up Time

The output reaches nominal voltage within 3s of application of input power.

Start-up Characteristics

The output voltage rise is monotonic with no overshoot and typically reaches nominal voltage in 100ms.

Hold Up

With the output loaded to maximum output power, the output will hold up for 18ms minimum over the input operating voltage range.

PROTECTION

Input Fuse

Internally fitted fuse rated at 15A T 250V.

Input Undervoltage

Unit turn on occurs when the input voltage exceeds the low voltage threshold of 88Vac nominal. Turn off occurs when the input voltage drops below the threshold voltage of 75Vac nominal.

Output Current Limit

This unit is designed to operate continuously in current limit for battery charging purposes. Current limit occurs between 100% and 120% I_{MAX} . Characteristic is constant power down to 20V/40V $\pm 10\%$.

Short circuit current is between 70% and 100% I_{MAX} .

Series Output Diode

A diode is fitted in series with the output for protection in parallel applications.

Output Overvoltage

The unit will shutdown in the event of the output voltage exceeding the overvoltage limit. Reset is achieved by interrupting the input power or pulsing the Inhibit input.

The overvoltage threshold is:
27V units: 31.5V $\pm 0.5V$
54V units: 59.5V $\pm 0.5V$

Overtemperature

Under thermal overload conditions, the output will be inhibited. Output will be restored when the unit has cooled to normal operating temperatures.

Parallel Voltage

Units will withstand a parallel voltage applied to the output terminals when turned off up to a maximum voltage of 35V on 27V units, 63V on 54V units.

AUXILIARY FUNCTIONS

Remote Sense

Units are set to local sense by default. Remote sense is available as an option.

Remote sense will compensate for lead drops up to 500mV provided the output terminal voltage does not exceed 29.5V/58.5V

Current Share

Units may be operated in parallel without limitation. The current share facility forces sharing of load current between units to within 10% I_{MAX} . Under fault conditions, the Current Share port is isolated.

Enable

To allow hot plugging of this unit, operation is inhibited until after the Enable pin is connected to -Sense.

Inhibit

Opto-isolated input referenced to opto common emitter. Application of a logic high ($>2.4V$, $<5.2V$) inhibits the units. Logic low ($<0.7V$) or open circuit enables the output. A pulse in excess of 1s duration will reset the OVP circuit.

Voltage Trim

Analogue input referenced to -Sense. Provides adjustment of the output voltage over the range of:
27V units: 25 - 29V
54V units: 50 - 58V

Transfer function is as follows:
 $V_{OUT} = V_{NOM} - 2.5 \times (V_{TRIM} - 2)$

or

$$V_{TRIM} = 2 + \frac{(V_{NOM} - V_{OUT})}{2.5}$$

Output Healthy Relay

Change over relay contacts. Normally open contact is made when the output voltage exceeds the threshold of 20V/40V.

Input Healthy Signal

Open collector, opto-isolated output referenced to opto common emitter, active low when input voltage is within specification limits.

Output Healthy Signal

Open collector, opto-isolated output referenced to opto common emitter, active low when the output voltage exceeds the threshold of 20V/40V.

Current Limit Signal

Open collector, opto-isolated output referenced to opto common emitter, active low when the output current demand exceeds I_{MAX} .

Overvoltage Trip Signal

Open collector, opto-isolated output referenced to opto common emitter, active low when the unit shuts down due to an overvoltage condition.

Fan Fail Signal

Open collector, opto-isolated output referenced to opto common emitter, active low when fan is not operating.

Auxiliary Output

A power output for interface circuitry. Rated at 12V $\pm 1V$, 100mA, referenced to auxiliary supply 0V.

Indicators

Five front panel LED indicators are provided which mimic the following signals:

1. Input Healthy Signal
2. Output Healthy Signal
3. Current Limit Signal
4. Overvoltage Trip Signal
5. Fan Fail Signal

ENVIRONMENTAL SPECIFICATION

ISOLATION

Primary to Earth (Ground)

1500Vac

Secondary to Earth (Ground)

700Vdc

Primary to Secondary

4000Vac

Earth (Ground) Leakage Current

Complies with the requirements of EN60950.

3.5mA maximum at 240V, 60Hz input.

Operating Voltages

Absolute maximum ratings.

Output to Earth: 100Vdc working voltage.

Signals to Earth: 100Vdc working voltage.

Signals to Output: 100Vdc working voltage.

ELECTROMAGNETIC COMPATIBILITY

Emissions

Compliant with EN50081-1(92) with compliance to the following specific conditions:

Conducted 0 - 2kHz: EN61000-3-2.

Conducted 0.15 - 30MHz: EN55022-B.

Radiated 0.03 - 1GHz: EN55022-A at 10m.

Immunity

Compliant with EN50082-1(92) with compliance to the following specific conditions:

Fast transients: EN61000-4-4 failure criteria B, 1kVac, 500Vdc.

ESD: EN61000-4-2 failure criteria A, 4kV contact.

RF Field: EN61000-4-3, 3Vm⁻¹ 80% modulation over the range 80MHz - 1GHz.

Conducted RF: EN61000-4-6, 3Vr.m.s. 80% modulation over the range

150kHz - 80MHz.

Surge: EN61000-4-5, line to earth 2kV; line to line 1kV; 500V on dc output.

ENVIRONMENTAL CONDITIONS

Ambient Temperature

Operating: 0 to +70°C, derating applies above 50°C, see current in output specifications.

Non-operating: 0 to 85°C.

Humidity

0 - 85% R.H. non-condensing, operating.

0 - 95% R.H. non-condensing, non-operating.

Altitude

0 to 3,000m (10,000 ft) operating.

0 to 10,000m (30,000 ft) non-operating.

Mechanical Shock and Vibration

Compliant with the following requirements:

Drop & Topple: EN60068-2-31 Test Ec.

Transportation: EN60068-2-6 Part 2.1

Test Fc when in original packing.

Drop Test: EN60068-2-32 Test Ed when in original packing.

Pollution

These rectifiers are designed for use in office type environments, i.e. pollution degree 2 environments, as defined in EN60950.

RELIABILITY

MTBF to 220,000 hours calculated to HRD4 (400,000 hours excluding fan).

In excess of 100,000 hours calculated to MIL217F at 25°C, ground benign.

INTERNATIONAL SAFETY APPROVALS

The TWF1000 has been designed, tested, and approved to the following safety specifications:

CE marked to the low voltage directive EN60950.

UL1950-3rd edition- approved by CSA under the NRTL scheme.

CSA 22.2 No. 234.

WARRANTY

All Advance Power products are warranted against faulty manufacture and faulty components for a period of twelve months from the date of dispatch. See conditions of sale for full details.

MECHANICAL SPECIFICATION

MECHANICAL SPECIFICATIONS

External Dimensions

All dimensions are nominal and are in mm (inches). W x H x D
101(4.00) x 127(5.00) x 279(11.00)

Mass

Typically 3.7kg (8.1 lbs.).

Fixings

Units are designed for rack mounting, using M3 x 8 screws with wavy and flat washers.

Mounting Orientation

These rectifiers are designed for mounting in a rack, with the front panel vertical and the front panel text upright.

Advance Power manufactures power shelves which can house up to 4 TWF1000 rectifiers in a 19" 3U(5.25") shelf. (See outline drawing on pg. 2)

Ventilation and Cooling

The unit is cooled by an integral fan. Free airflow is required through the ventilation slots in the rear and front faces. Airflow is from front to back.

Finish

The front panel is finished in dawn grey with blue legend. The body is finished in gold colored chemical etch.

CONNECTORS

Input, output, and signals connections are made with an Elcon Lower Drawer Connector.

Connector Kits

Connectors are available as accessory kits:

Mating connector, 7 power pins and 5 signal pins: order code: TKL01

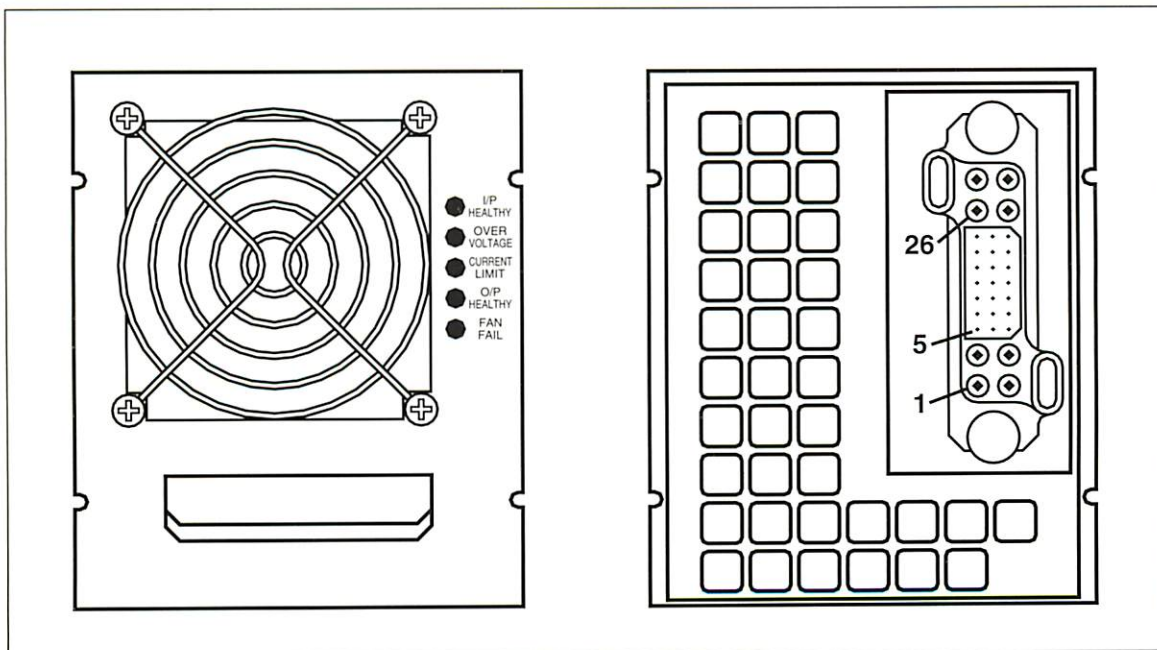
Mating connector, 7 power pins and 20 signal pins: order code: TKL02

10 signal pins: order code: TKS10

Pin connections

1. Positive Output
2. Positive Output
3. Negative Output
4. Negative Output
5. Voltage Trim
6. Enable
7. No Connection
8. -Sense
9. Auxiliary Supply, 0V
10. Inhibit
11. No Connection
12. No Connection
13. Auxiliary Supply, +12V
14. +Sense
15. Output Healthy Relay, common
16. Output Healthy Relay, N/O
17. Output Healthy Relay, N/C
18. Output Healthy Signal
19. Fan Fail Signal
20. Overvoltage Trip Signal
21. Input Healthy Signal
22. Current Share
23. No Connection
24. Current Limit Signal
25. Opto Common Emitter
26. Input Earth
27. No Connection
28. Input Line
29. Input Neutral

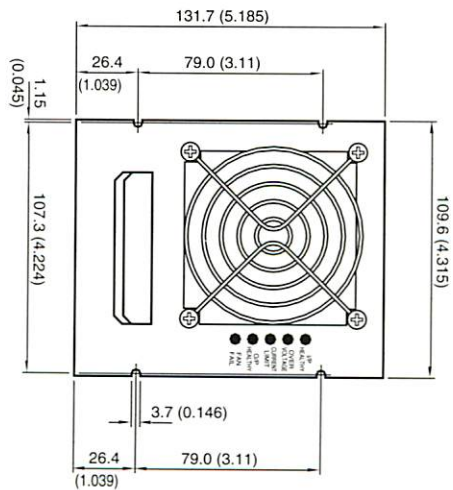
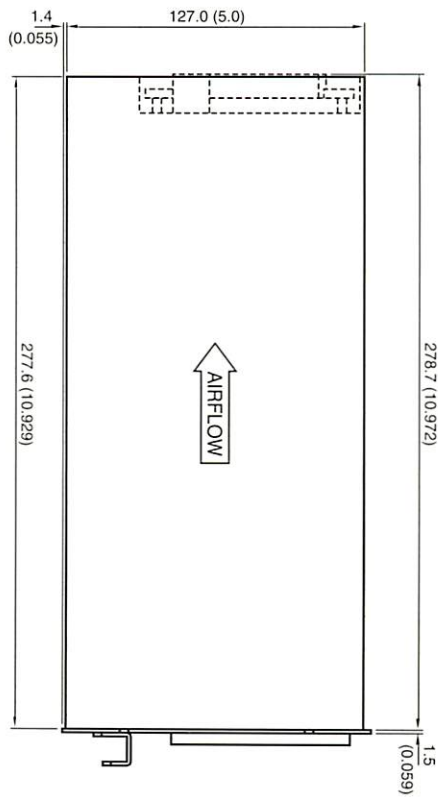
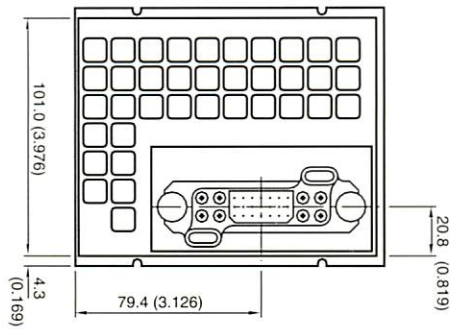
Figure 1 Indicator and connector diagram.



MECHANICAL SPECIFICATION

TWF1000 OUTLINE DRAWING



All dimensions are nominal and are in mm (inches).



ORDERING INFORMATION

ORDERING INFORMATION

TWF1000H  /

Voltage	Code	Current
27.4V	 27	40A(28A)
54.9V	 54	20A(14A)

Advance Power Inc

32111 Aurora Road, Solon, Ohio,
44139, USA

Telephone

(440) 349 0755

Facsimile

(440) 349 0142

E-mail

104436.1621@compuserve.com

Advance Italia s.r.l.

Via Flli Cernuschi 22,
23807 Merate (LC)
Italy

Telephone

+39 (0)39 9907 612

Facsimile

+39 (0)39 599 213

E-mail

staff@advance.it

Internet

www.advance.it

Advance Power Electronic GmbH

Gutenbergring 5
63110 Rodgau-Neider-Roden
Germany

Telephone

+49 (0)6106 7080 30

Facsimile

+49 (0)6106 7080 40

Advance Power Elektronikai KFT

Czobor u. 84/b
Budapest
H-1147
Hungary

Telephone

+36 1 220 9401

Facsimile

+36 1 251 5520

E-mail

100263.1056@compuserve.com



Advance Power

Wetherby Road,
Boroughbridge,
York YO5 9UY, UK

Telephone

+44 (0) 1423 320000

Facsimile

+44 (0) 1423 320033

E-mail

sales@advancepower.com

Internet

www.advancepower.com



An Advance International Group Company

We reserve the right to amend specifications without prior notification
Ref 9FS0168E Issue A January 1998 Printed in USA