# User Manual

## 3030
## Wideband Amplifier


BK PRECISION

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# Compliance Information

## 1.1 EMC

### EC Declaration of Conformity EMC

This instrument is Safety Class I according to IEC classification and has been designed to meet the requirements of EN61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use). It is an Installation Category II instrument intended for operation from a normal single phase supply.

This instrument has been tested in accordance with EN61010-1 and has been supplied in a safe condition. This instruction manual contains some information and warnings which have to be followed by the user to ensure safe operation and to retain the instrument in a safe condition. This instrument has been designed for indoor use in a Pollution Degree 2 environment in the temperature range 5°C to 40°C, 20% - 80% RH (non-condensing). It may occasionally be subjected to temperatures between +5° and -10°C without degradation of its safety. Use of this instrument in a manner not specified by these instructions may impair the safety protection provided. Do not operate the instrument outside its rated supply voltages or environmental range.

## 1.2 IEC Measurement Category & Pollution Degree Definitions

**Measurement Category (CAT)** - classification of testing and measuring circuits according to the types of mains circuits to which they are intended to be connected.

**Measurement Category other than II, III, or IV** : circuits that are not directly connected to the mains supply.

**Measurement Category II (CAT II)** : test and measuring circuits connected directly to utilization points (socket outlets and similar prints) of the low-voltage mains installation.

**Measurement Category III (CAT III)** : test and measuring circuits connected to the distribution part of a building's low-voltage mains installation.

**Measurement Category IV (CAT IV)** : test and measuring circuits connected at the source of the building's low-voltage mains installation.

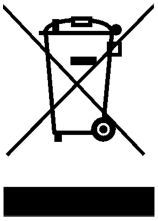
**Mains Isolated** : is for measurements performed on circuits not directly connected to a mains supply.

**Pollution** - addition of foreign matter, solid, liquid, or gaseous (ionized gases) that may produce a reduction of dielectric strength or surface resistivity.

**Pollution Degree 2 (P2)** - only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation is expected

## 1.3 Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. To avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product to an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



This product is subject to Directive 2012/19/EU of the European Parliament and the Council of the European Union on waste electrical and electronic equipment (WEEE), and in jurisdictions adopting that Directive, is marked as being put on the market after August 13, 2005, and should not be disposed of as unsorted municipal waste. Please utilize your local WEEE collection facilities in the disposition of this product.

## 1.4 Terms and Symbols

### Terms

CAUTION

**A caution statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in damage to or destruction of parts or the entire product.**

WARNING

**A warning statement calls attention to an operating procedure, practice, or condition, which, if not followed correctly, could result in injury or death to personnel.**

NOTICE

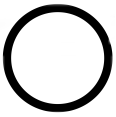
A note statement calls attention to an operating procedure, practice, or condition, which, should be noted before proceeding.

## Symbols

**WARNING - HIGH VOLTAGE - possibility of electric shock.**

**CAUTION – Statements or instructions that must be consulted in order to find out the nature of the potential hazard and any actions which must be taken.**

On (Supply). This is the AC mains connect/disconnect switch on the front of the instrument.



Off (Supply). This is the AC mains connect/disconnect switch on the front of the instrument.

Alternating current

Chassis (earth ground) symbol

**Earth (ground) TERMINAL** - Refer to the instructions accompanying this symbol in this manual.

# Safety Notices

The following safety precautions apply to both operating and maintenance personnel and must be followed during all phases of operation, service, and repair of this instrument.

Before applying power to this instrument:

- Read and understand the safety and operational information in this manual.
- Apply all the listed safety precautions.
- Verify that the voltage selector at the line power cord input is set to the correct line voltage. Operating the instrument at an incorrect line voltage will void the warranty.
- Make all connections to the instrument before applying power.
- Do not operate the instrument in ways not specified by this manual or by B&K Precision.

Failure to comply with these precautions or with warnings elsewhere in this manual violates the safety standards of design, manufacture, and intended use of the instrument. B&K Precision assumes no liability for a customer's failure to comply with these requirements.

## Electrical Power

This instrument is intended to be powered from a CATEGORY II mains power environment. The mains power should be 115 V RMS or 230 V RMS. Use only the power cord supplied with the instrument and ensure it is appropriate for your country of use.


**Do not use this instrument in an electrical environment with a higher category rating than what is specified in this manual for this instrument.**


**You must ensure that each accessory you use with this instrument has a category rating equal to or higher than the instrument's category rating to maintain the instrument's category rating. Failure to do so will lower the category rating of the measuring system.**

## Ground the Instrument

**WARNING**

**To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical safety ground. This instrument is grounded through the ground conductor of the supplied, three-conductor AC line power cable. The power cable must be plugged into an approved three-conductor electrical outlet. The power jack and mating plug of the power cable meet IEC safety standards.**

**WARNING**

**Do not alter or defeat the ground connection. Without the safety ground connection, all accessible conductive parts (including control knobs) may provide an electric shock. Failure to use a properly-grounded approved outlet and the recommended three-conductor AC line power cable may result in injury or death.**

**WARNING**

**Unless otherwise stated, a ground connection on the instrument's front or rear panel is for a reference of potential only and is not to be used as a safety ground. Do not operate in an explosive or flammable atmosphere.**

## Environmental Conditions

This instrument is intended to be used in an indoor pollution degree 2 environment. The operating temperature range is 0°C to 40°C and 20% to 80% relative humidity, with no condensation allowed.

Measurements made by this instrument may be outside specifications if the instrument is used in non-office-type environments. Such environments may include rapid temperature or humidity changes, sunlight, vibration and/or mechanical shocks, acoustic noise, electrical noise, strong electric fields, or strong magnetic fields.

**WARNING**

**Do not operate the instrument in the presence of flammable gases or vapors, fumes, or finely-divided particulates.**

**The instrument is designed to be used in office-type indoor environments. Do not operate the instrument**

- **In the presence of noxious, corrosive, or flammable fumes, gases, vapors, chemicals, or finely-divided particulates.**
- **In relative humidity conditions outside the instrument's specifications.**

**WARNING**

- **In environments where there is a danger of any liquid being spilled on the instrument or where any liquid can condense on the instrument.**
- **In air temperatures exceeding the specified operating temperatures.**
- **In atmospheric pressures outside the specified altitude limits or where the surrounding gas is not air.**
- **In environments with restricted cooling air flow, even if the air temperatures are within specifications.**
- **In direct sunlight.**

## Do not operate instrument if damaged

**WARNING**

**If the instrument is damaged, appears to be damaged, or if any liquid, chemical, or other material gets on or inside the instrument, remove the instrument's power cord, remove the instrument from service, label it as not to be operated, and return the instrument to B&K Precision for repair. Notify B&K Precision of the nature of any contamination of the instrument.**

**WARNING**

**Hazardous voltages may be present in unexpected locations in circuitry being tested when a fault condition in the circuit exists.**

## Clean the instrument only as instructed

**WARNING**

**Do not clean the instrument, its switches, or its terminals with contact cleaners, abrasives, lubricants, solvents, acids/bases, or other such chemicals. Clean the instrument only with a clean dry lint-free cloth or as instructed in this manual. Not for critical applications.**

## Do not touch live circuits

**WARNING**

**Instrument covers must not be removed by operating personnel. Component replacement and internal adjustments must be made by qualified service-trained maintenance personnel who are aware of the hazards involved when the instrument's covers and shields are removed. Under certain conditions, even with the power cord removed, dangerous voltages may exist when the covers are removed.**

To avoid injuries, always disconnect the power cord from the instrument, disconnect all other connections (for example, test leads, computer interface cables, etc.), discharge all circuits, and verify there are no hazardous voltages present on any conductors by measurements with a properly-operating voltage-sensing device before touching any internal parts. Verify the voltage-sensing device is working properly before and after making the measurements by testing with known-operating voltage sources and test for both DC and AC voltages.

Do not attempt any service or adjustment unless another person capable of rendering first aid and resuscitation is present.

## General Safety

**WARNING**

**Do not insert any object into an instrument's ventilation openings or other openings.**

**WARNING**

**This instrument is not authorized for use in contact with the human body or for use as a component in a life-support device or system.**

## Servicing

**WARNING**

**Do not substitute parts that are not approved by B&K Precision or modify this instrument. Return the instrument to B&K Precision for service and repair to ensure that safety and performance features are maintained.**

**WARNING**

**Fuse replacement must be done by qualified service-trained maintenance personnel who are aware of the instrument's fuse requirements and safe replacement procedures. Disconnect the instrument from the power line before replacing fuses. Replace fuses only with new fuses of the fuse types, voltage ratings, and current ratings specified in this manual or on the back of the instrument. Failure to do so may damage the instrument, lead to a safety hazard, or cause a fire. Failure to use the specified fuses will void the warranty.**

## For continued safe use of the instrument

- Do not place heavy objects on the instrument.
- Do not obstruct cooling air flow to the instrument.
- Do not place a hot soldering iron on the instrument.
- Do not pull the instrument with the power cord, connected probe, or connected test lead.
- Do not move the instrument when a probe is connected to a circuit being tested.

# Introduction

## 3.1 Overview

The 3030 amplifier operates from DC to 1 MHz with a maximum output of 30 V peak-to-peak (50 Ω source) and offers a 600 Ω output option. It delivers up to 15 V peak-to-peak into a 50 Ω load and can drive up to 300 mA peak into low impedance or a short. Gain is adjustable from x1 to x10 via a Vernier knob, and it includes a -20 dB attenuator and an LED indicator for output clipping.


**Figure 3.1** 3030 Amplifier

## 3.2 Features

- 30 Vpp output from 50 Ω
- DC to 1 MHz bandwidth
- 50 Ω and 600 Ω outputs
- 20 dB attenuation
- LED notification for clipped signals
- Fully protected output with high current drive

## 3.3 Package Contents

Please inspect the instrument mechanically and electrically upon receiving it. Unpack all items from the shipping carton, and check for any obvious signs of physical damage that may have occurred during transportation. Report any damage to the shipping agent immediately. Save the original packing carton for possible future reshipment. Every electronic load is shipped with the following contents:

- 1 x 3030 Amplifier
- 1 x Certificate of Calibration
- 1x Power cord

**NOTICE** Verify that all items above are included in the shipping container. If anything is missing, please contact B&K Precision.

## 3.4 Dimensions

The 3030 Series dimensions are approximately.

| Model | Dimensions (W x H x D) | Weight |
|---|---|---|
| 3030 | 8.3 in x 3.0 in x 9.1 in (210 x 75 x 230 mm) | 2.4 lbs (1.1 kg) |

**Table 3.1** Dimensions and Weight

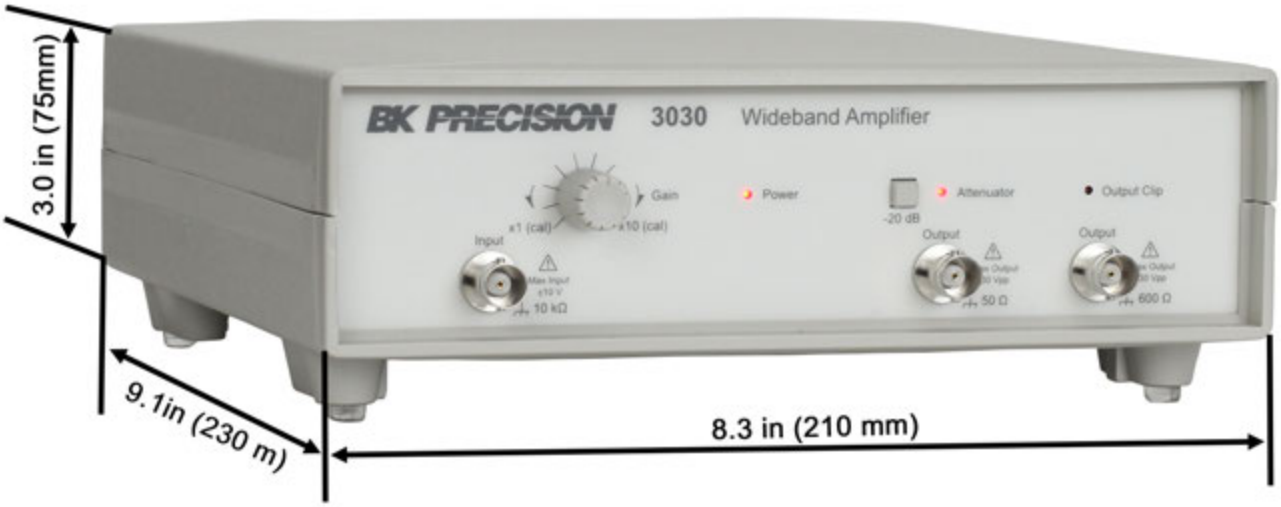



**Figure 3.2** 3030 Dimensions

# Installation

Before connecting and powering up the instrument, please review the instructions in this chapter.

## 4.1 Mains Operating Voltage

To change the operating voltage from 230V to 115V (or vice-versa):

**Step 1.** Disconnect the instrument from power sources.

**Step 2.** Remove the four screws holding the case, and lift off the upper half.

**Step 3.** Unscrew the four screws securing the power supply PCB.

**Step 4.** Adjust zero-ohm links:

- For 230V: Link LK1.
- For 115V: Links LK2 and LK3.

**Step 5.** Reassemble the PCB and case, ensuring all connections (especially earth) are secure.

**Step 6.** Update the voltage label on the rear panel to reflect the new setting.

## 4.2 Mains Lead

For a three-core mains lead:

- Brown = Live
- Blue = Neutral
- Green/Yellow = Earth


**This instrument must be earthed. Disconnecting the earth conductor poses a serious hazard. Any interruption of the mains earth conductor inside or outside the instrument will make the instrument dangerous. Intentional interruption is prohibited.**

# Operation

The 3030 amplifier is a DC to 1 MHz amplifier with a 30 V peak-to-peak maximum output (e.m.f.) from a 50 Ω source impedance, also offering a 600 Ω output. It provides up to 15 V peak-to-peak into a 50 Ω load and can deliver up to 300 mA peak into low impedance or a short circuit. Gain is adjustable from x1 to x10 using a vernier with calibrated stops. A -20 dB output attenuator and "OUTPUT CLIP" lamp indicate when output exceeds ±15 V.

## 5.1 Power

The amplifier powers on when connected to AC, with the POWER LED lit. Disconnect by unplugging the mains cord or switching off the AC outlet.

**NOTICE** Keep disconnection means accessible.

## 5.2 Operation

Connect the input signal to the **Input** socket and the load to the appropriate output. Note: the 50 Ω and 600 Ω outputs are linked, so loading one affects the other. Adjust the input and/or vernier gain for the desired output level, from x1 to x10. The **Output Clip** LED lights if output exceeds ±15 V. Selecting the -20 dB attenuator, indicated by the **Attenuator** LED, extends the output range for fixed-level inputs. The amplifier's 50 Ω output can deliver up to 300 mA into low impedance or short circuit indefinitely.

# Maintenance

The manufacturer or their overseas agents offer repair services for any unit with a fault. For more information refer to **Service Information**


**Cleaning: Use a cloth lightly dampened with water or mild detergent.**


**To prevent electric shock or damage, do not let water enter the case. Avoid using solvents to clean the case.**

# Service Information

**Warranty Service:** Please go to the support and service section on our website to obtain an RMA #. Return the product in the original packaging with proof of purchase to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

**Non-Warranty Service:** Please go to the support and service section on our website to obtain an RMA #. Return the product in the original packaging to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device. Customers not on an open account must include payment in the form of a money order or credit card. For the most current repair charges please refer to the service and support section on our website.

Return all merchandise to B&K Precision Corp. with prepaid shipping. The flat-rate repair charge for Non-Warranty Service does not include return shipping. Return shipping to locations in North America is included for Warranty Service. For overnight shipments and non-North American shipping fees please contact B&K Precision Corp.

Include with the returned instrument your complete return shipping address, contact name, phone number and description of problem.

B&K Precision Corp.

# LIMITED THREE-YEAR WARRANTY

B&K Precision Corp. warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of **three years** from date of purchase. B&K Precision Corp. will, without charge, repair or replace, at its option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

To help us better serve you, please complete the warranty registration for your new instrument via our website.

**Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed.**

B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages. So the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

B&K Precision Corp.

**Version: November 6, 2024**