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Model 4001A
Modular System Bin
Operating and Service Manual

Printed in U.S.A.

ORTEC® Part No. 733740
Manual Revision D

0704

Advanced Measurement Technology, Inc.

a/k/a/ ORTEC®, a subsidiary of AMETEK®, Inc.

WARRANTY

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Quality Control

Before being approved for shipment, each ORTEC instrument must pass a stringent set of quality control tests designed to expose any flaws in materials or workmanship. Permanent records of these tests are maintained for use in warranty repair and as a source of statistical information for design improvements.

Repair Service

If it becomes necessary to return this instrument for repair, it is essential that Customer Services be contacted in advance of its return so that a Return Authorization Number can be assigned to the unit. Also, ORTEC must be informed, either in writing, by telephone [(865) 482-4411] or by facsimile transmission [(865) 483-2133], of the nature of the fault of the instrument being returned and of the model, serial, and revision ("Rev" on rear panel) numbers. Failure to do so may cause unnecessary delays in getting the unit repaired. The ORTEC standard procedure requires that instruments returned for repair pass the same quality control tests that are used for new-production instruments. Instruments that are returned should be packed so that they will withstand normal transit handling and must be shipped PREPAID via Air Parcel Post or United Parcel Service to the designated ORTEC repair center. The address label and the package should include the Return Authorization Number assigned. Instruments being returned that are damaged in transit due to inadequate packing will be repaired at the sender's expense, and it will be the sender's responsibility to make claim with the shipper. Instruments not in warranty should follow the same procedure and ORTEC will provide a quotation.

Damage in Transit

Shipments should be examined immediately upon receipt for evidence of external or concealed damage. The carrier making delivery should be notified immediately of any such damage, since the carrier is normally liable for damage in shipment. Packing materials, waybills, and other such documentation should be preserved in order to establish claims. After such notification to the carrier, please notify ORTEC of the circumstances so that assistance can be provided in making damage claims and in providing replacement equipment, if necessary.

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CONTENTS

WARRANTY ii

SAFETY INSTRUCTIONS AND SYMBOLS iv

SAFETY WARNINGS AND CLEANING INSTRUCTIONS v

1. DESCRIPTION 1
   1.1. DOE STANDARD MODULE PROGRAM 1
   1.2. ORTEC MODULAR INSTRUMENTS 1
   1.3. ORTEC 4001A MODULAR SYSTEM BIN 2
   1.4. POWER SUPPLY CONSIDERATIONS 2

2. SPECIFICATIONS 2

3. INSTALLATION INSTRUCTIONS 3
   3.1. POWER SUPPLY INPUT VOLTAGE 3
   3.2. INSTALLATION IN RACK 3

4. OPERATING INSTRUCTIONS 4
   4.1. CONTROL PANEL FUNCTIONS 4
   4.2. POWER SUPPLY LIMITATIONS 4
   4.3. INSERTION AND REMOVAL OF MODULES 4

SAFETY INSTRUCTIONS AND SYMBOLS

This manual contains up to three levels of safety instructions that must be observed in order to avoid personal injury and/or damage to equipment or other property. These are:

DANGER Indicates a hazard that could result in death or serious bodily harm if the safety instruction is not observed.

WARNING Indicates a hazard that could result in bodily harm if the safety instruction is not observed.

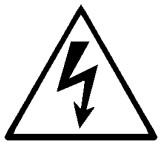
CAUTION Indicates a hazard that could result in property damage if the safety instruction is not observed.

Please read all safety instructions carefully and make sure you understand them fully before attempting to use this product.

In addition, the following symbol may appear on the product:



ATTENTION–Refer to Manual



DANGER–High Voltage

Please read all safety instructions carefully and make sure you understand them fully before attempting to use this product.

SAFETY WARNINGS AND CLEANING INSTRUCTIONS

DANGER	Opening the cover of this instrument is likely to expose dangerous voltages. Disconnect the instrument from all voltage sources while it is being opened.

WARNING	Using this instrument in a manner not specified by the manufacturer may impair the protection provided by the instrument.

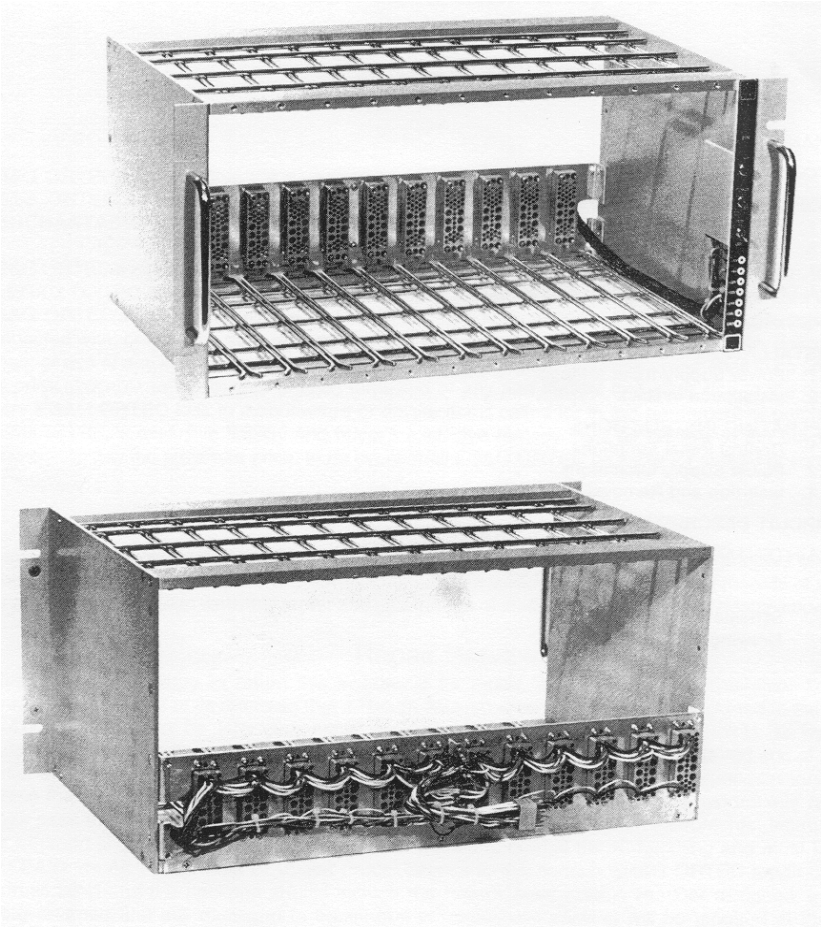
Cleaning Instructions

To clean the instrument exterior:

- Unplug the 4001A from the ac power supply.
- Remove loose dust on the outside of the instrument with a lint-free cloth.
- Remove remaining dirt with a lint-free cloth dampened in a general-purpose detergent and water solution. Do not use abrasive cleaners.

CAUTION	To prevent moisture inside of the instrument during external cleaning, use only enough liquid to dampen the cloth or applicator.

- Allow the instrument to dry completely before reconnecting it to the power source.



ORTEC MODEL 4001A
MODULAR SYSTEM BIN

1. DESCRIPTION

1.1. DOE STANDARD MODULE PROGRAM

The ORTEC 4001A Modular System Bin conforms to the recommended standards of DOE Report TID-20893 (Rev), "Standard Nuclear Instrument Modules." This report, the work of a committee of equipment users from DOE-related institutions, provides standards for a modular instrument system that allow electrical and mechanical interchangeability of units made in conformance with the standards. The standards prescribe the necessary mechanical dimensions and connector types to ensure mechanical interchangeability. They also specify standard power supply voltages and pin assignments in the connectors so that electrical interchangeability is assured, at least with respect to the main connector joining module to bin.

The standards currently specify power supply voltages of plus and minus 6,12, and 24 V dc and of 117 V ac delivered to assigned module connector pins. The available current specified to each pin has undergone some change with successive issues of the standards. Refer to the most recent issue of TID-20893 (Rev) and addenda for current requirements. Also, since power supplies of earlier manufacture conformed to earlier versions of the standards, the user should familiarize himself with the specifications of the particular supply in use to determine the available current at each voltage.

Twelve basic module widths of 1.35 in. (3.43 cm) each are provided in a standard bin. Modules may be of single width or any multiple thereof as required by the individual module design. However, all 12 module connectors are provided in the standard bin, allowing any desired combination of module location. Two module and bin heights are provided by the standards, 8-3/4 in. (22.23 cm) and 5-1/4 in. (13.34 cm). These standard heights, as well as the basic external mounting dimensions of the bin, conform to the established ASA standards for relay rack mounting of electrical equipment. Therefore the TID-20893 (Rev) standard bins will mount in standard relay racks along with other rack-mounted equipment.

The TID-20893 (Rev) standards deal only with requirements for electrical and mechanical interchangeability. They do not deal with circuit designs or methods except to the extent of the power supply voltage standards.

In addition to the firm requirements designated as "Standards" in TID-20893 (Rev), there are "Preferred Practices" which deal with subsidiary matters in the interest of suggested further compatibility. Included in the Preferred Practices are standard linear and logic signal parameters which, if observed, allow compatible interconnections between instruments.

1.2. ORTEC MODULAR INSTRUMENTS

ORTEC Modular Nuclear Instruments conforming to the standards of TID-20893 (Rev) are designed for insertion and operation in a 4001A bin with an attached mating power supply. In addition to meeting the basic requirements of TID-20893 (Rev), each ORTEC module also provides two additional compatibility features:

1. Where applicable, the standard linear and logic signal parameters of the Preferred Practices of TID-20893 (Rev) are used, providing compatible interconnections between instruments.

2. The power supply demand of any given ORTEC module is generally limited to no more than its proportional share of the occupancy of bin space. In this way, the user does not have to compute the power supply total demand and compare this to the capability of the supply.

These ORTEC instrument modules are made only in the 8-3/4-in.-high standard module package. The panel space requirements of this type of research instrumentation have precluded the use of the smaller 5-1/4-in. standard height.

1.3. ORTEC 4001A MODULAR SYSTEM BIN

The ORTEC 4001A Modular System Bin provides mounting space for 12 standard module widths of the 8-3/4-in.-high type. The 12 corresponding module connectors are provided with necessary wiring for distribution of all of the standard power supply voltages. These power distribution circuits terminate in the standard connector prescribed by TID-20893 (Rev) for connection to the power supply. A small control panel, not occupying any of the available module space, is located at the right side of the bin, providing test points, a control switch, and indicator lamps for the power supply. Further description of the 4001 A bin is given in the remaining sections of this manual.

1.4. POWER SUPPLY CONSIDERATIONS

The power supply provisions of TID-20893 (Rev) allow either a supply mounted on the rear of the standard bin or an external supply, possibly furnishing power to several standard bins. Specified mounting-screw dimensions and a standard power connector make the bin-mounting power supplies interchangeable when they are made to the TID-20893 (Rev) standards.

The ORTEC 4002D Power Supply, which conforms to the requirements of TID-20893 (Rev) in force at time of manufacture, is usually furnished with the 4001A bin. Please refer to the instruction manual provided with these power supplies.



CAUTION – Do not insert modules that use 115 V ac from Bin Power unless CE certified to EN61010, Low Voltage Directive.

2. SPECIFICATIONS

MECHANICAL TOLERANCES In accordance with TID-20893 (Rev), provide for interchangeability of all standard modules.

PANEL DIMENSIONS Standard Relay Rack, 22.23 cm (8-3/4-in.) high, 48.26 cm (19-in.) wide.

DEPTH BEHIND PANEL Without power supply, 26.6 cm (10.5 in.); with 4002D power supply, 40.6 cm (16.0 in.).

MODULE CONNECTORS 12 each connectors as specified by TID-20893 (Rev).

INSTALLED WIRING All connectors of the 4001A are wired in parallel for +6V, -6V, +12V, -12V, +24V, -24V, high-quality power return and 117 V ac, in accordance with TID-20893 (Rev) pin assignments, with interface connector furnished for connection to power supply as required by TID-20893 (Rev).

CONSTRUCTION Aluminum alloy side members with nickel-chromium-plated handles on front panel mounting flanges. Top and bottom members are high-tensile steel rod weldments, nickel-plated, containing module guides. Rear connector plate is steel, cadmium-plated.

WEIGHT

Net 4001A, 4.5 kg (10 lb); with 4002A power supply, 10.5 kg (23 lb).

Shipping 4001A, 7.3 kg (16 lb); with 4002A power supply, 14 kg (30 lb).

ENVIRONMENTAL Temperature 0-45 °C. Indoor use. Humidity 95% max. R.H. non-condensing Altitude up to 2000 meters.

3. INSTALLATION INSTRUCTIONS

3.1. POWER SUPPLY INPUT VOLTAGE

The power supply that accompanies the ORTEC 4001A bin must be set for the proper range of line voltage before connecting its ac-power cord to a mains outlet. Check the manual of the mating power supply for the procedure to use in setting the mains voltage selector switch. If a field change of input voltage is made, the fuse rating should also be checked. Consult the power supply manual for information on fuse rating requirements and fuse replacement.

Note that when the power supply is operated from 117-V input power, a direct connection provides the 117-V ac power to the assigned pins in the module connectors and the amount of 117-V power available is limited only by the fuse. However, when input power is 230 V, the 117-V ac power provided for the module connectors is limited by transformer ratings in the power supply, as stated in the power supply specifications.

3.2. INSTALLATION IN RACK

The mounting provisions of the 4001 A bin conform to the well-established ASA standards for rack mounting equipment. The mounting holes at the edge of the panel will match the standard spacing of tapped 10-32 holes provided in the standard relay rack. The use of the usual oval-head screws and cup washers is recommended. Mechanical support of the bin may be entirely from the panel members. However, the use of horizontal guide brackets to support the bottom of the bin will facilitate removal of the bin from the rack and will remove strain from the bin and rack.

The basic design of the TID-20893 (Rev) standard bin and modules provides for cooling by natural convection flow. Several bins can be mounted above each other without heat problems in the usual installation. However, one should not mount heat-producing vacuum tube equipment or other large sources of heat in the same cabinet with the standard bin without accounting for the temperature rise.

The use of cooling fans in equipment cabinets will reduce the operating temperature of the enclosed equipment. However, it will also invariably couple the circuits involved more tightly to the temperature variations of the environment, In systems installations requiring the ultimate in stability of operating parameters, the best practice is to provide only for natural convection cooling of the equipment. This provides long time constants between the equipment and external temperature variations, with resultant smaller variations, even though the average absolute temperature may be higher.

ORTEC modules are designed with all major signal connections on the front panel to the greatest extent possible. In some cases, connections are located on the rear of the module when necessary, due to panel space limitations. If systems are contemplated that require use or rear panel connections to any great extent, the user may find it convenient to leave open gaps between installed bins for convenience in making front-to-rear connections.

4. OPERATING INSTRUCTIONS

4.1. CONTROL PANEL FUNCTIONS

ON-OFF Switch interrupts both sides of the input power line.

POWER Pilot lamp indicates that ac input power is being supplied to the power transformer primary. Either a blown fuse or a temperature cutout will extinguish this lamp.

TEMP Warning pilot lamp is illuminated if the power supply temperature rises to within ~20°C of the maximum safe operating temperature. When the maximum safe temperature is reached, an internal cutout in the power supply removes power and neither lamp will be illuminated.

TEST JACKS Located on the panel; allow convenient checking of the power supply voltages from the front panel without disassembly of the supply.

4.2. POWER SUPPLY LIMITATIONS

The available current at each voltage is dependent on the power supply. Since the requirements of TID-20893 (Rev) have been changed from time to time, the actual capability of any given power supply will depend on its date of manufacture. The instruction manual for the particular power supply in use should be consulted.

The power requirements of individual modules are stated on their front panels. The user should verify that the power supply capability is not exceeded in any given system in one bin.

4.3. INSERTION AND REMOVAL OF MODULES

No damage will result to the power supply from insertion or removal of modules while power is on. However, since the sequence of power application to a module is indeterminate when inserted with bin power on, it is prudent to turn off the bin power when modules are being changed or inserted.

BIN/MODULE CONNECTOR PIN ASSIGNMENTS FOR STANDARD NUCLEAR INSTRUMENT MODULES PER DOE/ER-0457T

Pin	Function	Pin	Function
1	+3 volts	23	Reserved
2	-3 volts	24	Reserved
3	Spare Bus	25	Reserved
4	Reserved Bus	26	Spare
5	Coaxial	27	Spare
6	Coaxial	*28	+24 volts
7	Coaxial	*29	-24 volts
8	200 volts dc	30	Spare Bus
9	Spare	31	Spare
*10	+6 volts	32	Spare
*11	-6 volts	*33	117 volts ac (Hot)
12	Reserved Bus	*34	Power Return Ground
13	Spare	35	Reset (Scaler)
14	Spare	36	Gate
15	Reserved	37	Reset (Auxiliary)
*16	+12 volts	38	Coaxial
*17	-12 volts	39	Coaxial
18	Spare Bus	40	Coaxial
19	Reserved Bus	*41	117 volts ac (Neut.)
20	Spare	*42	High Quality Ground
21	Spare	G	Ground Guide Pin
22	Reserved		

Pins marked (*) are installed an wired in ORTEC's 4001A and 4001C Modular System Bins.

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