



Compact 2A Thermocouple Controller Instruction Manual



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1 Introduction

1.1 Disclaimer

All information in this manual is subject to change without notice. The Fredericks Company assumes no responsibility for inaccuracies in product specifications or any liability arising from product use. Please [contact us online](#) or call +1 215 947 2500 with comments or questions.

1.2 Description

The Compact 2A is a thermocouple vacuum sensor controller with a range of 1×10^{-3} Torr to 20 Torr that utilizes several Televac® thermocouple vacuum sensors including the [2A Thermocouple](#), [2A VacuMini](#), and [2A NASA Mini](#) vacuum gauges. The Compact 2A has a 0-10 Volt analog output.

1.3 Operating Specifications

Table 1: Operating Specifications

Operating Range	1×10^{-3} to 20 Torr
Communications	N/A
Programmable Set Points	N/A
Analog Output	0 to 10 V Non-linear
Supply Voltage for Charging	90 V to 135 V AC, 60 Hz
Calibration Medium	Dry air or nitrogen
Overpressure	Sensor-dependent
Analog Output Resolution	12 bits
Operating Temperature	0 °C to 50 °C
Storage Temperature	-20 °C to 60 °C
Bakeout Temperature	Sensor-dependent
Response Time	≤ 1 second
Accuracy	
1 mTorr to 10 mTorr	±1 mTorr
10 mTorr to 500 mTorr	±10%
500 mTorr to 1 Torr	±20%
Analog Output	±10 mV
Display Readable Distance	1 m (3 feet)

1.4 Safety Information

START BY READING THESE IMPORTANT SAFETY INSTRUCTIONS AND NOTES

In these instructions the word “product” refers to the Compact 2A and all of its approved parts and accessories.

NOTE: These instructions do not and cannot provide for every contingency that may arise in connection with the installation, operation, or maintenance of this product. Should you require further assistance, please [contact us](#).

This product has been designed and tested to offer reasonably safe service provided it is installed, operated and serviced in strict accordance with these safety instructions.

These safety precautions must be observed during all phases of operation, installation, and service of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Televac® disclaims all liability for the customer’s failure to comply with these requirements.

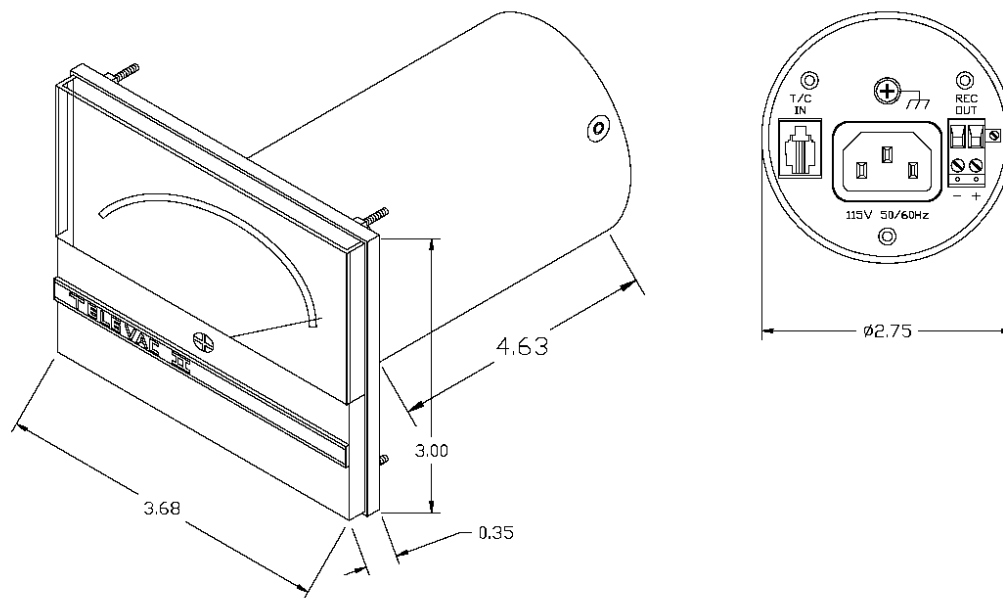
- READ instructions – Read all safety and operating instructions before operating the product.
- RETAIN instructions – Retain the Safety and Operating Instructions for future reference.
- HEED warnings – Adhere to all warnings on the product and in the operating instructions.
- FOLLOW instructions – Follow all operating and maintenance instructions.
- ACCESSORIES – Do not use accessories not recommended in this manual as they may require a technician to restore the product to its normal operation.

The Compact 2A qualifies as a Safety Extra-Low Voltage (SELV) device. As such, it represents little to no hazard concerning electrical shock or burns.

Do not substitute parts or modify instrument. Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modifications to the product. Return the product to Televac® for service and repair to ensure that safety features are maintained. Do not use this product if it has unauthorized modifications.

1.5 Dimensions

Figure 1: Compact 2A Dimensional Drawing (inches)



2 Setup

2.1 Installation

Each Compact 2A is designed to be used in conjunction with a 2A Thermocouple sensor. The 2A sensor can be mounted in any orientation. The sensor should be mounted close to the area where vacuum measurement is desired. Each 2A sensor has a key that only allows the sensor end of the Compact 2A cable to mate with the sensor in the proper orientation. Rotate the sensor end of the Compact 2A cable until the correct alignment is obtained and the Compact 2A cable is able to slide onto the 2A sensor. Connect the RJ14 end of the Compact 2A cable into the port on the back of the Compact 2A. It is recommended that the ground connector on the cable is also connected to the port on the back of the Compact 2A labeled with the universal earth ground symbol.

Try to avoid connecting the 2A sensor to the vacuum chamber by long or narrow piping as this may affect the accuracy and response time of the unit. Avoid mounting the unit near a heater within the chamber as this may affect the measurement accuracy. Excessive vibration of the sensor may affect accuracy and decrease the life of the sensor. Exposure to oils and other contaminants will decrease the accuracy and decrease the life of the sensor. Do not expose the sensor to corrosive gases.

2.2 Electrical Information

The Compact 2A has several connectors located on the rear of the unit. A connection diagram is provided for convenience.

Figure 2: Compact 2A Electrical Connection Information

Label	Description
1	Thermocouple Sensor Input
2	AC Input
3	Analog Output
4	Thermocouple Sensor Ground



2.3 Calibration

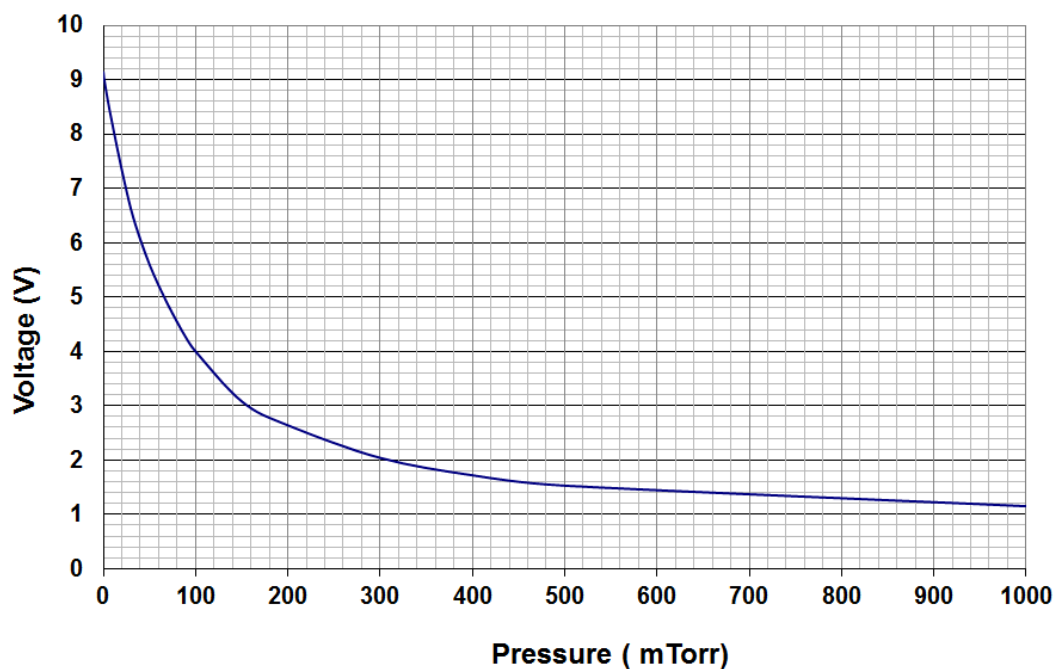
The Compact 2A controller provides a calibration adjustment to maximize the accuracy of each sensor. The adjustment should be set at 1 mTorr. Maximum accuracy will utilize a 2A sensor and a NIST traceable reference gauge co-located on a vacuum chamber. A controlled leak of dry nitrogen is necessary for calibration. All Compact 2A controllers purchased with a 2A sensor will be factory calibrated and there is no need for adjustment.

For calibration, pump the vacuum chamber down to below 1×10^{-4} Torr. Using the leak control on the vacuum system, adjust the pressure in the chamber until the reference gauge reads 1 mTorr. Then adjust the potentiometer located in the rear of the unit until the display shows 1 mTorr.

2.4 Analog Output

The Compact 2A contains a 0-10 V Non-Linear analog output for use with voltmeters, programmable logic controllers or other data acquisition devices. To convert the analog output signal to a pressure, refer to Figure 3.

Figure 3: Compact 2A Analog Output



3 Part Numbers

Table 2: Controller, Cable, and Sensor Part Numbers

Compact 2A Vacuum Controller	2-3014-042
2A Thermocouple 1/8" NPT Nickel-Plated Brass	2-2100-10
2A Thermocouple 1/8" NPT Stainless Steel	2-2126-001
2A Thermocouple 3/8" Straight Nickel-Plated Brass	6-2100-11
2A Thermocouple 1/2" Straight Stainless Steel	2-2126-011
2A Thermocouple NW16/KF16 Nickel-Plated Brass	2-2100-016
2A Thermocouple NW16/KF16 Stainless Steel	2-2126-030
2A Thermocouple NW25/KF25 Nickel-Plated Brass	2-2100-025
2A Thermocouple NW25/KF25 Stainless Steel	2-2126-031
2A Thermocouple NW40/KF40 Stainless Steel	2-2126-032
2A Thermocouple 8-VCO Male Stainless Steel	2-2126-040
2A Thermocouple 8-VCO Female Stainless Steel	2-2126-041
2A Thermocouple 8-VCR Male Stainless Steel	2-2126-042
2A Thermocouple 8-VCR Female Stainless Steel	2-2126-043
2A Thermocouple 4-VCR Male Stainless Steel	2-2126-044
2A Thermocouple 4-VCR Female Stainless Steel	2-2126-045
2A Thermocouple CF16/1.33" CF-F Stainless Steel	2-2126-050
2A Thermocouple CF40/2.75" CF-F Stainless Steel	2-2126-052
10' 2A Modular Connector Cable	2-9800-077
20' 2A Modular Connector Cable	2-9800-078
35' 2A Modular Connector Cable	2-9800-079
50' 2A Modular Connector Cable	2-9800-080
10' Coiled 2A Modular Connector Cable	2-9800-081
2A VacuMini Thermocouple 1/8" NPT Stainless Steel	2-2100-102
2A VacuMini Thermocouple 4-VCR-F Stainless Steel	2-2100-045
2A NASA Mini Thermocouple 1/8" NPT Stainless Steel	2-2100-31
2A NASA Mini Thermocouple 4-VCR-M Stainless Steel	2-2100-97
10' 2A Mini Modular Connector Cable	2-9800-096
10' Coiled 2A Mini Modular Connector Cable	2-9800-082