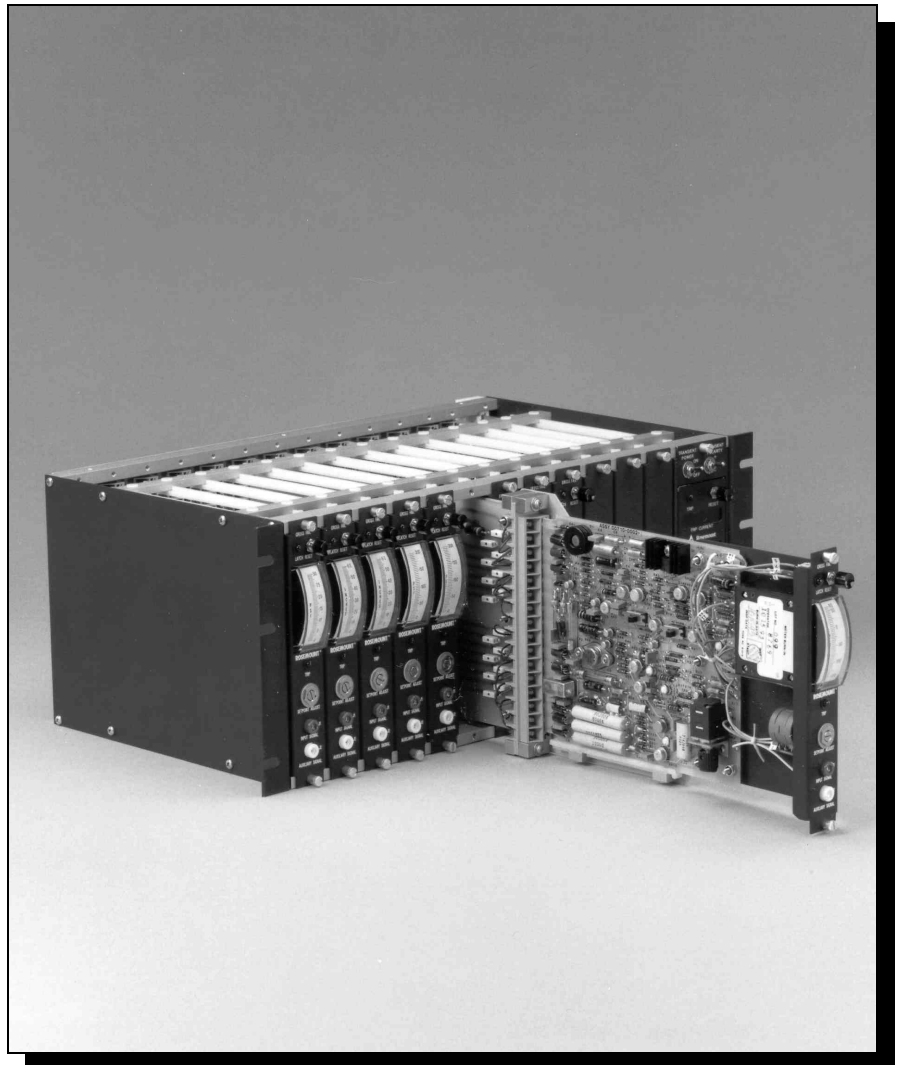


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Model 710DU Trip/ Calibration System Accessories



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Accessories Include:

- Bench Test Facility
- Calibration Unit
- Readout Assembly
- Card Extender
- Blank Panel
- Spare Parts Kit

INTRODUCTION

The Rosemount Model 710DU Trip/Calibration System is designed to monitor critical process parameters and provide high accuracy alarm action. Consisting of a card file with channels for up to twelve master and slave trip units and one calibration unit, the Model 710DU Trip/Calibration System meets the requirements of IEEE Std 323-1974 and IEEE Std 344-1975, as described in Rosemount Reports D8200037 and D8300112.

Rosemount offers extensive accessory hardware for use with the Model 710DU Trip/Calibration System, including bench test facilities, calibration units, readout assemblies, blank panels, and card extenders.

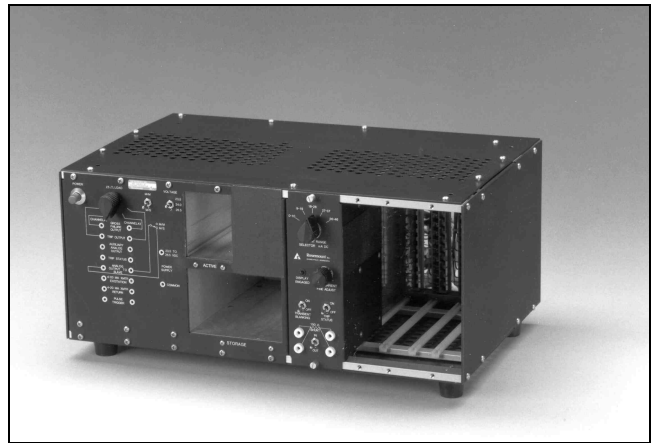
BENCH TEST FACILITY

Designed as an aid to the technician, the Model 710DU bench test facility (see Figure 1) functions as the center for calibrating and servicing components of the Model 710DU Trip/Calibration System. The bench test facility performs the following functions:

- Calibration, acceptance testing, troubleshooting, and servicing of master and slave units
- Acceptance testing of a calibration unit
- Calibration and acceptance testing of a readout assembly
- Storage for two spare readout assemblies

Except for the power supply, all electronics in the bench test facility are mounted on a single printed circuit board—the chassis electronics assembly—connected to the center front panel of the facility. The power supply is mounted behind the left portion of the front panel.

Electronic connections between the bench test facility and the Model 710DU units are made through five edge card connectors at the rear of the facility. Two single-sided connectors are used for trip units tested in Channels 1 and 2. The calibration unit location has both a single-sided and a double-



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FIGURE 1. Bench Test Facility.

sided connector, while another single-sided connector enables connections to the chassis electronics assembly portion of the bench test facility.

Rosemount Instruction Manuals 4471-1, 4471-2, and 4471-3 contain detailed procedural instructions on the operation of the bench test facility and on the calibration of associated hardware.

SPECIFICATIONS

Input Power Requirements

115 V ac, 50/60 Hz, 4.0 A (maximum). A 230 V ac option is available.

DC Power

Internal 24 V dc, nominal switch selectable to 23.5, 24.0, or 26.5 V dc.

Internal Current Source

Adjustable over a range from 0–46 mA, supplied to the readout assembly's ACTIVE location.

Operating Environment

- Temperature: 75 ± 15 °F
- Humidity: Up to 90% relative humidity
- Vibration: None
- Radiation: 3.3 Rad (Si) total integrated dosage



FIGURE 2. Calibration Unit.

CALIBRATION UNIT

The calibration unit is mounted in position 13 of each card file, providing a fast, precise way to verify, adjust, or calibrate the trip point of any of the twelve channels in the card file. With a calibration unit, all master and slave trip units in the Model 710DU System can be checked or adjusted while in place in the card files. The calibration unit produces a calibrate command, a calibration current, and a calibration status signal.

The calibration unit features a power switch, stable and transient current adjustments, and a selector switch for applying the calibration current to any master trip unit channel while reading the trip point of the master or any of its associated slaves. A calibration status signal for remote display and an LED on the faceplate of the calibration unit indicate when the system is in calibration mode.

The calibration current supplied by the unit is composed of independently adjustable stable and transient current sources. Calibration of any master or slave trip unit is initiated by the passage of the calibrate command signal from the calibration unit to a master trip unit. This signal enables the master trip unit to accept the calibration current in place of its input signal and causes the master trip unit gross failure output to generate a high (+24 V dc) output signal.

The stable current is used to verify or adjust trip points on any of the 12 channels in the card file and to check the analog signals of master trip units. The transient current is added to or subtracted from the stable current to provide a step current for checking time response characteristics of the Model 710DU Trip/Calibration System and equipment driven by the system. The step current is also used for verifying high-low gross failure set points. The 24 V dc calibration status signal generated by the

calibration unit can be used for remote display/indication.

A two-part selector switch on the front panel of the calibration unit serves three functions: selection of the master or slave trip unit with a trip point requiring verification or calibration; routing of the calibration current to the appropriate master trip unit; and activation of the calibrate command signal. The front panel also includes an on-off power switch, a transient current polarity switch, stable current amplitude adjustment, a transient current amplitude adjustment on-off switch and a calibration status LED. Three test jacks provide access to the transient trigger signal, signal return, and trip status signal.

The calibration unit provides both a mechanical support and an electrical connection for readout assembly via a spring-loaded door. The calibration unit is seismically qualified to IEEE Std 344-1975.

SPECIFICATIONS

Electrical Specifications:

Power Supply: 24 V dc (nominal) power required
Current Drain: 140 mA

Adjustments and Controls:

Power: On/Off toggle switch for 24 V power to calibration unit.

Transient Polarity: Positive/Negative toggle switch for transient current.

Transient Current: Single-turn push/pull potentiometer sets and engages transient calibration current.

Stable Current: Ten-turn potentiometer adjusts current which replaces sensor input to master trip unit.

Channel Selector: Dual push/pull and rotary switch selects master trip unit channel, applies calibration current, and selects master or slave trip unit for trip current readout.

Indication: LED on calibration unit lighted when system is in calibration mode.

Test Jacks: Signal return, trip status output, and transient trigger may be monitored for time response measurements.

Performance Specifications:

Stable Current: 3.50–20.50 mA \pm 0.005 mA

Transient Current: 0.50–20.50 mA \pm 0.05 mA

Power Supply Range: 22–28 V dc



FIGURE 3. Readout Assembly.

READOUT ASSEMBLY

The readout assembly is a portable measurement and display device inserted in the front of the calibration unit. It may be transferred to any other calibration unit in the Model 710DU Trip/Calibration System. The readout assembly contains two four-digit displays that measure and display calibration currents with an 0.01 mA resolution.

The calibration current display (the lower of the two) shows the total calibration current generated by the calibration unit. The trip current display tracks the stable calibration current shown on the lower display until the trip output of the master or slave trip unit being calibrated changes state. The calibration current reading at that point is latched on the trip current display by the trip status signal from the master or slave trip unit. The trip current display is blanked when transient current is energized.

A trip status LED on the front of the readout assembly indicates when the trip current display is latched. A trip current display reset button reverses the latching logic for the trip current display and trip status LED so that trip current may be read for reversed trip status logic. The zero adjustment and span adjustment of the readout assembly can be made through potentiometers located near the rear of the unit.

SPECIFICATIONS

Electrical Specifications:

Power Supply: 24 Vdc (nominal) power required
Current Drain: 275 mA

Adjustments and Controls:

Digital Display: Readout assembly displays calibration current and trip current.

Display Reset: A trip current display reset button reverses the latching logic for the current display and trip status LED so that trip current can be read for reversed trip status logic.

Indication: LED on readout assembly activated by status signal.

Performance Specifications:

Display Accuracy:

0–20.00 mA \pm 0.01 mA

20.01–30.00 mA \pm 0.05 mA

30.01–40.00 mA \pm 0.10 mA

CARD EXTENDERS

Card extenders are available for master and slave trip units, the calibration unit, and the readout assembly. Card extenders are used to make internal adjustments, alter system configuration, or troubleshoot a corresponding component.

The trip unit and calibration unit card extenders slide into the card file, where they plug into the rear edge of the card connectors and interface with the trip or calibration units through a mating connector. The card extender brings the electrical connection to the front of the card file, which makes it more accessible.

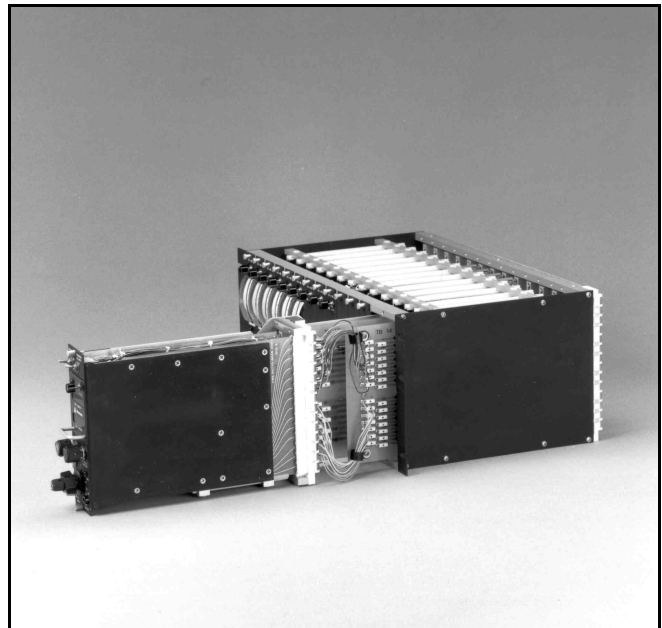


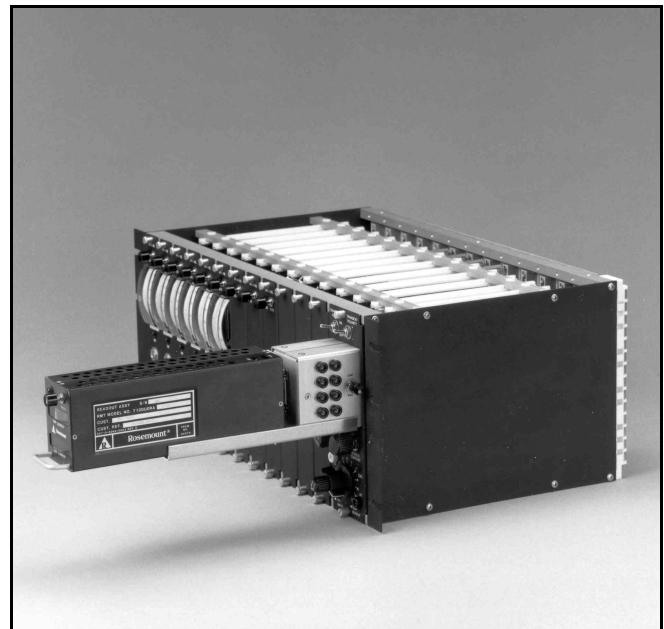
FIGURE 4. Calibration Unit Extender.

The trip unit card extender makes the master or slave trip unit circuit card assembly accessible for the following adjustments:

- Reset differential
- High gross failure trip current
- Low gross failure trip current
- Trip output logic
- Trip status output/LED logic
- Frequency response of auxiliary analog output (4–20 mA input master trip unit)
- Linearity adjustment (RTD input master trip unit)
- Zero adjustment (RTD input master trip unit)
- Span adjustment (RTD input master trip unit)

The calibration unit card extender brings the card file terminals to the front of the calibration unit. Test jacks on the card extender facilitate troubleshooting or the connection of external test equipment.

The readout assembly card extender plugs into the calibration unit, which makes electrical connections for the readout assembly accessible from the front of the card file. This card extender also includes test jacks for troubleshooting or external test equipment connection.

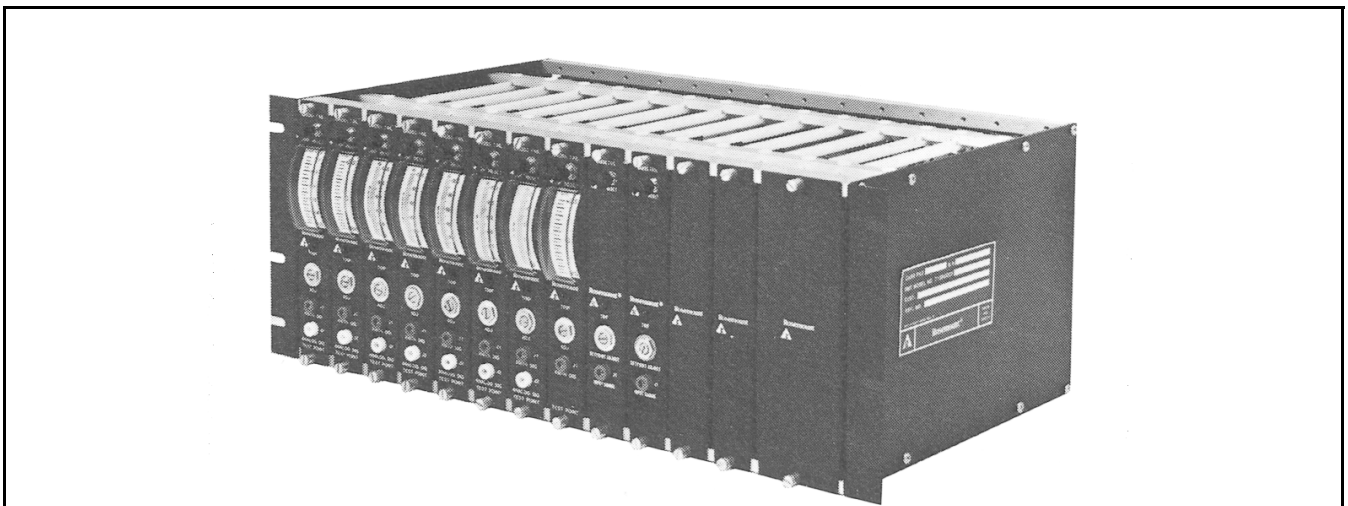


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FIGURE 5. Readout Unit Extender.

BLANK PANELS

Blank panels serve to cover unused card file locations in the bench test facility, the master and slave trip units, and the calibration unit. The panels prevent foreign materials from entering unused card file locations and adjacent trip units. Blank panels were used to cover all open slots during IEEE qualification testing; they are required to ensure the structural integrity of the card file during seismic events.



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FIGURE 6. Blank Panels.

ORDERING INFORMATION

Model	Product Description
710DU0	Trip/Calibration System for Nuclear Applications
Code	Assembly Description
CF	Card File
CL	Calibration Unit
RA1	Readout Assembly
BT	Blank Panel, Trip Unit
BC	Blank Panel, Calibration Unit
B1	Bench Test Facility (115 Vac Power)
B2	Bench Test Facility (230 Vac Power)
ET	Extender, Trip Unit
EC	Extender, Calibration Unit
ER	Extender, Readout Assembly
Typical Model Number: 710DU0 RA1	

For further information on the Model 710DU Trip/Calibration System accessories, contact Rosemount Nuclear Instruments, Inc.

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