

# DRY CONTACT MODULE MODEL C-41

- **COMPANION TO THE MODEL 941**  
Adds Dry Contact functions
- **SIMULATE DRY CONTACTS**  
Replaces signal contacts in powered circuits
- **MEASURE DRY CONTACTS**  
Read unpowered contacts



## GENERAL DESCRIPTION

Extend the usefulness of your Model 941 Frequency Calibrator to measure and simulate a wide variety of relays, mechanical pickups and other dry contact frequency devices.

### SIMULATE DRY CONTACTS

Calibrate inputs to your flowmeters, totalizers, SCADA, telemetry systems, supervisory control systems and other frequency control devices using the Model 941 with the Model C-41 to simulate the remote sensor. Many of these systems provide an excitation current or voltage which the sensor interrupts to generate the frequency signal. Coupled with the Model 941 Frequency Calibrator, the Model C-41 Dry Contact Module simulates the contacts of these sensors to calibrate these devices from 1 Count-per-hour to 5 KHz.

### READ DRY CONTACTS

Check all your relays, mechanical contacts, cam driven switches, photoconductive cells, and momentary contact switches. The Model C-41 supplies an excitation current which allows the Model 941 to read your dry contacts from 10 Counts-per-hour up to 2 KHz. An adjustable filter on the Model C-41 combined with the trigger level adjustment of the Model 941 allow a wide variety of electronic and mechanical contacts to be measured.

### FILTERING CONTACT BOUNCE

Many mechanical contacts (relays, switches, etc.) *bounce* when they are closed. This causes a ringing effect on the waveform that is being generated. The Model C-41 has an adjustable circuit that filters this effect and allows the Model 941 Frequency Calibrator to measure the correct frequency.

## SPECIFICATIONS

(Unless otherwise indicated, specifications are @ 23°C)

### READ DRY CONTACTS

OUTPUT VOLTAGE: 9 VDC with fresh battery  
 OUTPUT CURRENT: 6 mA, nominal  
 MAXIMUM FREQUENCY: > 2 KHz with no contact bounce  
 MINIMUM PULSE WIDTH: 250 microseconds  
 MAXIMUM CONTACT RESISTANCE: 500 Ohms  
 FILTER ADJUSTMENT: Attenuates at > 5 KHz with minimum filter (CCW), at > 500 Hz with maximum filter (CW)

### SIMULATE DRY CONTACTS

RISE TIME: <1microsecond @ 12V peak-to-peak  
 MAXIMUM FREQUENCY: > 5 KHz  
 CONTACT RESISTANCE:  
     Contacts Closed: 24 Ohms, Maximum  
     Contacts Open: 10<sup>10</sup> Ohms, Minimum  
 MAXIMUM LOAD CURRENT: 130 mA  
 MAXIMUM VOLTAGE: ±300 Volts peak  
 MAXIMUM WATTAGE: 400 milliwatts  
 SHORT CIRCUIT DURATION: Infinite

### GENERAL

BATTERIES: Single 9V battery (Alkaline supplied and recommended)  
 BATTERY LIFE: Nominal 300 hours  
 LOW BATTERY: If the LED doesn't light or pulse the battery needs to be replaced. Batteries should be removed when storing the unit >3 months.  
 VOLTAGE PROTECTION: Protected against misconnection to 120 Volts AC/DC without fuses for 30 seconds  
 OPERATING TEMPERATURE RANGE: -5 to +140°F  
     (-20 to +60°C)  
 STORAGE TEMPERATURE RANGE: -13 to +149°F  
     (-25 to +65°C)  
 RELATIVE HUMIDITY: 10 to 90%, non-condensing for 24 hours  
 OVERALL SIZE: 4 x 2<sup>1</sup>/<sub>8</sub> x 2<sup>7</sup>/<sub>16</sub> inches (102 x 54 x 62 mm)  
 WEIGHT: 7oz (0.2 kg)

Specifications subject to change without notice

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# OPERATING INSTRUCTIONS

## SIMULATE DRY CONTACTS

- 1) Set the 941 to SOURCE, Waveform to Zero Based Square Wave and Output Level to >6 Volts
- 2) Connect the Module to the Model 941
- 3) Switch the Module to SOURCE
- 4) Disconnect the receiver from the contacts
- 5) Connect the Module to the receiver
- 6) Select the correct frequency range on the 941

## READ DRY CONTACTS

- 1) Set the Model 941 to READ, Attenuator to x1 and set the Trigger Level to 5 Volts
- 2) Connect the Module to the Model 941
- 3) Switch the Module to READ
- 4) Disconnect the contacts from the circuit providing power
- 5) Connect the Module to the contacts
- 6) Select the correct frequency range on the 941

Note: Noisy readings may be indicating contact bounce. See FILTERING CONTACT BOUNCE.

## CALIBRATION

The Model C-41 Dry Contact Module doesn't require calibration. An annual performance check is recommended.

Note: Calibration is required of the Model 941 Frequency Calibrator which is used in conjunction with the Model C-41 Dry Contact Module.

## FILTERING CONTACT BOUNCE

Mechanical contacts *bounce* when they are closed, sending a large pulse as well as a series of smaller pulses to the measuring equipment. These small pulses can cause the measuring equipment to measure the frequency incorrectly. The Model C-41 has the ability to filter these small pulses out and measure the true frequency signal.

- 1) Set the Model 941 to READ, Attenuator to x1 and set the Trigger Level to 5 Volts
- 2) Connect the Module to the Model 941
- 3) Switch the Module to READ
- 4) Disconnect the contacts from the circuit providing power
- 5) Connect the Module to the contacts
- 6) Select the correct frequency range on the 941
- 7) Start with the FILTER knob set at MIN (fully counter clockwise)
- 8) Slowly increase the filter until stable readings are measured on the 941.

Note: Higher frequencies need less filtering than lower frequencies. Some adjustment of the filter may be necessary as the frequency of the signal changes.

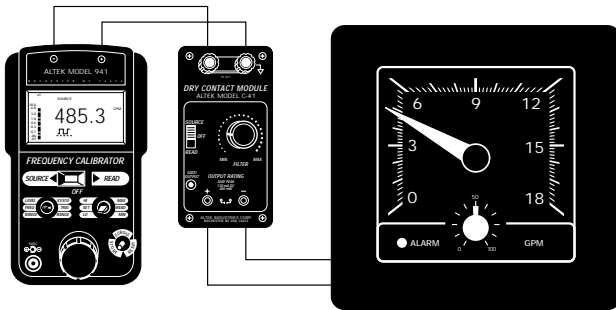
## BATTERY CHECK

The LED will pulse at the same rate as the simulated or measured frequency (it will appear to be constantly lit above 30 Hz). To check the battery without connecting the C-41 to any devices:

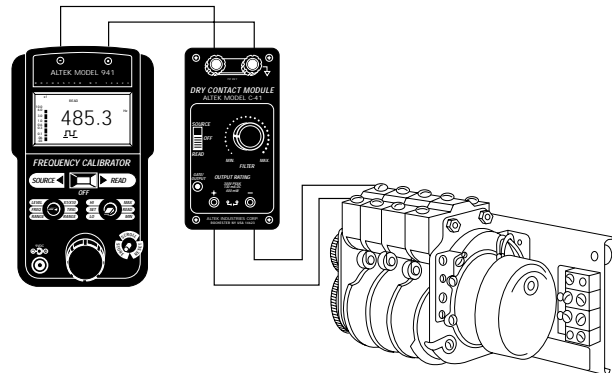
- 1) Switch the module to READ
  - 2) Connect the red & black output leads together
  - 3) The battery needs replacement if the LED doesn't light
- Note: Remember to turn the C-41 module off when you turn off the Model 941.

# CONNECTIONS

## SIMULATE DRY CONTACTS



## READ DRY CONTACTS



## THREE YEAR WARRANTY

Our equipment is guaranteed against defective material and workmanship (excluding batteries) for a period of three years from date of shipment. Claims under guarantee can be made by returning the equipment prepaid to our factory. The equipment will be replaced, repaired or adjusted at our option. The liability of Altek is restricted to that given under our guarantee. No responsibility is accepted for damage, loss or other expense incurred through sale or use of our equipment. Under no condition shall Altek be liable for any special, incidental or consequential damage.

## OTHER PRODUCTS

Altek designs and manufactures fast, accurate instruments for measurement, generation and simulation of virtually every process control signal. Consult our factory directly or contact your local stocking representative to order precise, low cost Milliamp Calibrators, Voltage Sources, Direct Thermocouple Sources, RTD Simulators and Frequency Sources. Altek also produces calibrators for custom ranges and unique applications. Additional models and ranges are frequently added to the Altek instrument family to meet all of your critical calibration requirements. Altek products are made in the USA.

## ORDERING INFORMATION

### MODEL C-41 DRY CONTACT MODULE

Included with each Model C-41 is a Three Year Warranty.

Note: The Model C-41 Dry Contact Module doesn't require calibration. An annual performance check is recommended. No NIST traceable certificate is available for the Model C-41.

## Part No.

C-41

## AVAILABLE FROM: