

★ HANDS-ON ★ ★ HANDS-ON ★

THE MOST USEFUL ONE DAY SEMINAR  
YOU CAN ATTEND

# TROUBLESHOOTING ELECTRICAL CONTROLS

LEARN  
BY  
DOING

STOP!

SWAPPING PARTS HOPING TO FIX THE PROBLEM



NOW IN OUR

14<sup>TH</sup> YEAR!

START!

TROUBLESHOOTING USING A LOGICAL METHODOICAL APPROACH  
PERFORMING LIVE VOLTAGE TESTS USING A DIGITAL VOLTMETER

THIS CLASS CAN BE TAUGHT AT YOUR FACILITY!!!



**Impact**  
Training Services, Inc.

Training that "WORKS" <sup>SM</sup>

[www.impactu.com](http://www.impactu.com)

To Register:  
800-858-6879

[www.impactu.com](http://www.impactu.com)

# TROUBLESHOOTING ELECTRICAL CONTROLS

## WHO WE ARE

As a company, we are dedicated to providing practical, working solutions to the problem areas of industry. We represent no manufacturers and will not subject you to any sales pitches. What we offer is quality technical training that works.

## OUR INSTRUCTORS

Your instructor will be knowledgeable, enthusiastic, personable and effective. You evaluate them at the end of each class. We do not use contractors. All of our instructors are full time employees and have a vested interest in delivering a quality product. Each is well versed in the subjects they teach, has received extensive on-the-job training and follow the same course lesson plan so you receive identical information regardless of who teaches the class.

## WHO SHOULD ATTEND

This is a basic class designed for maintenance and engineering personnel, operators, supervisors and managers. There are no prerequisites for this course.

## CLASS TIMES

7:30 am	Registration
8:00 am	Morning Session Begins
11:30 am - 12:20 pm	Lunch (on your own)
12:30 pm	Afternoon Session Begins
4:15 pm	Post evaluation
4:30 pm	Class Ends

## SUBSTITUTION OR CANCELLATION

Cancellation made SEVEN days prior to seminar date will receive a full refund. Substitutions can be made at any time. Cancellations made less than SEVEN business days will be issued a credit memo to be used within two years. Registered attendees who fail to show up or have not given proper notice of cancellation will not receive refund or credit.

## REPEAT CUSTOMERS

3M Touch Systems • ABB, Inc. • Abbott Diabetes Care • ABC Packaging • Advance Foods • AES • AGC Automotive • Airite • Allied Signal • Alcoa Power Generating • ARCO • AT&T • BOC Gases • BP Oil • Bridgestone Firestone • Cargill • Caterpillar • Champion International • Chevron • Chrysler Clorox • Coca-Cola • Cooper Tire & Rubber • Dana Corp • DART • Delphi Automotive • Dow Corning • Delco Remy America • Dupont • Eaton Corp ENSR • Exxon Mobil • FedEx • Ford • Frito Lay • GAF • General Electric • General Motors • Genesee Power Station • Georgia Pacific • Goodyear Hallmark Cards • Hewlett Packard • Honeywell • IBM • International Paper • Johnson Controls • Kellogg • Lucent Technologies • Mobil • Moody AFB Monsanto • Nabisco • Oxy USA • PackerWare • Parker Hannifin • Pepsi Cola • Perdue Farms • Pepperidge Farms • Phillip Morris • Playtex • Pillsbury Pratt & Whitney • Proctor & Gamble • PSEG • REA Contracting • Ralston Purina • RJ Reynolds • Rockwell Automation • Sara Lee • Shell Oil Sherwin Williams • Siemens • Smurfit Stone • Teksid Aluminum • Texas Instruments • Timken • Trammel Crow • TRW Tyson Foods • United Technologies • US Airforce • US Army Corp of Engr • US Filter • Walt Disney • Westinghouse • Wheelabrator • Xcel Energy

## COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

- ▶ Troubleshoot electrical control circuits using a methodical logical approach.
- ▶ Perform live voltage tests of electrical control circuits using a digital voltmeter.
- ▶ Utilize electrical drawings as a road map to quickly find problems.
- ▶ Recognize and explain the operation of the fundamental control circuits used in industry.
- ▶ Trace through control circuit drawings to aid in troubleshooting.
- ▶ Identify and explain the operation of the components widely used in control circuits.



## CONTINUING EDUCATION UNITS (CEUs)

Impact Training Services, Inc. is an authorized provider (#6284) of CEUs. We are accredited by The International Association of Continuing Education and Training (IACET). Upon successful completion of the course objectives, participation in all learning activities and end-of-course evaluation students will be awarded 0.7 CEUs.

## TRAINING AT YOUR FACILITY

Bring any of Impact Training Services, Inc. electrical training programs to your facility. For more information:

Call **(800) 858-6879** or Visit [www.impactu.com](http://www.impactu.com)

## COURSES OFFERED:

- ▶ **Reading Electrical Drawings**
- ▶ **Electrical Safety**
- ▶ **Industrial Electricity**
- ▶ **Troubleshooting Electrical Controls**
- ▶ **Programmable Logic Controllers**  
Maintenance and Troubleshooting
- ▶ **Programmable Logic Controllers** using  
Allen-Bradley SLC 500™ and RSLogix 500™ Software
- ▶ **Programmable Logic Controllers** using  
RSLogix 5000™ and ControlLogix™

\* Not affiliated with Rockwell Automation

**Register today!**

# TRUBLESHOOTING ELECTRICAL CONTROLS COURSE OUTLINE

## THIS CLASS IS 50% HANDS-ON LABS

LEARN TO QUICKLY AND EFFECTIVELY TROUBLESHOOT ELECTRICAL CONTROL CIRCUITS

### LABS USING

CONTROL RELAYS  
PLUG-IN RELAYS  
TIME-DELAY RELAYS  
SOLID-STATE RELAYS  
MOTOR STARTERS  
PUSHBUTTONS  
SELECTOR SWITCHES

### READING LADDER DIAGRAMS

TRACING THROUGH THE DRAWINGS  
WIRE NUMBERS  
CROSS REFERENCING

### SWITCHES

CONTACTS  
MANUALLY OPERATED SWITCHES  
AUTOMATIC SWITCHES  
SCHEMATIC SYMBOLS

### RELAYS

COILS, CONTACTS  
CONTROL, PLUG-IN,  
TIME DELAY, SOLID-STATE

### MOTOR STARTERS

COILS, HIGH VOLTAGE CONTACTS  
AUXILIARY CONTACTS, OVERLOADS

### SOLENOIDS

COILS, OPERATION

### CONTROL CIRCUITS DISCUSSED

PERMISSIVE  
INTERLOCKING  
HOLDING/SEAL-IN  
MASTER CONTROL  
TIME SEQUENCING  
EVENT SEQUENCING  
START/STOP  
JOG/OFF/RUN  
HAND/OFF/AUTO  
FORWARD/REVERSING

### SHORTS

DEAD SHORTS, STUCK CONTACTS  
INDICATIONS, CAUSES, FINDING SHORTS

### OPENS

INDICATIONS, CAUSES,  
FINDING OPENS WITH A VOLTMETER

### TROUBLESHOOTING TECHNIQUES

A LOGICAL APPROACH  
EFFECTIVELY USING THE PRINTS  
TRACING THROUGH CIRCUITS  
TIME SAVING TIPS FOR LOCATING OPENS  
ELIMINATING SHORTS QUICKLY  
CORRECTLY USING A VOLTMETER

## BRING THIS CLASS TO YOUR FACILITY

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 NOW IN OUR  
**14<sup>TH</sup> YEAR!**

**THE MOST USEFUL ONE DAY SEMINAR YOU  
 CAN ATTEND**

**TROUBLESHOOTING  
 ELECTRICAL CONTROLS**

**THIS CLASS CAN BE TAUGHT AT YOUR FACILITY**

Stop using the shotgun approach of replacing everything in sight when your electrical control circuits fail.

**FOUR WAYS TO REGISTER:**

**Seminar Fee:**  
**\$489**  
 per person

- 1) **Internet** www.impactu.com
- 2) **Fax** 502-252-8060
- 3) **Phone** 800-858-6879
- 4) **Mail** this form to:  
 Impact Training Services, Inc.  
 PO Box 532, Bloomfield KY 40008



**IACET Approved**  
**CEUs available**  
**CCR Registered**  
**Cage Code 4C510**

**Register for any of our classes using this form.**

Student Name	Class Date	Class Length (circle one)	
_____	_____	1-Day	3-Day
_____	_____	1-Day	3-Day
_____	_____	1-Day	3-Day
_____	_____	1-Day	3-Day

Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Primary Contact: \_\_\_\_\_  
 E-Mail: \_\_\_\_\_

Authorizing manager's name: \_\_\_\_\_

Check is enclosed for \$ \_\_\_\_\_  
*S. Dakota Companies add 4% Sales Tax*  
 Make Checks Payable to:  
**Impact Training Services, Inc.**

Company P.O. # \_\_\_\_\_  
 Attention: \_\_\_\_\_

Credit Card # \_\_\_\_\_  
 Name on Card \_\_\_\_\_  
 Type of Card \_\_\_\_\_ Exp. Date \_\_\_\_ / \_\_\_\_  
 VIP Code \_\_\_\_\_

Located on front of brochure beneath 2008 Locations

**THANK YOU!**

**Visit Us At: [impactu.com](http://impactu.com)**

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