

# 2011

## LOCATIONS

Cincinnati, OH  
Aug 16, 2011

Dayton, OH  
Aug 17, 2011

Columbus, OH  
Aug 18, 2011

Cleveland, OH  
Aug 30, 2011

Akron, OH  
Aug 31, 2011

Toledo, OH  
Sept 1, 2011

Grand Rapids, MI  
Sept 27, 2011

Lansing, MI  
Sept 28, 2011

Troy, MI  
Sept 29, 2011

Buffalo, NY  
Nov 1, 2011

Syracuse, NY  
Nov 2, 2011

Albany, NY  
Nov 3, 2011

Burlington, VT  
Nov 29, 2011

Manchester, NH  
Nov 30, 2011

Portland, ME  
Dec 1, 2011

**To Register:**  
**800-858-6879**  
**www.impactu.com**

# ★ HANDS-ON ★ ★ HANDS-ON ★

## THE MOST USEFUL ONE DAY SEMINAR

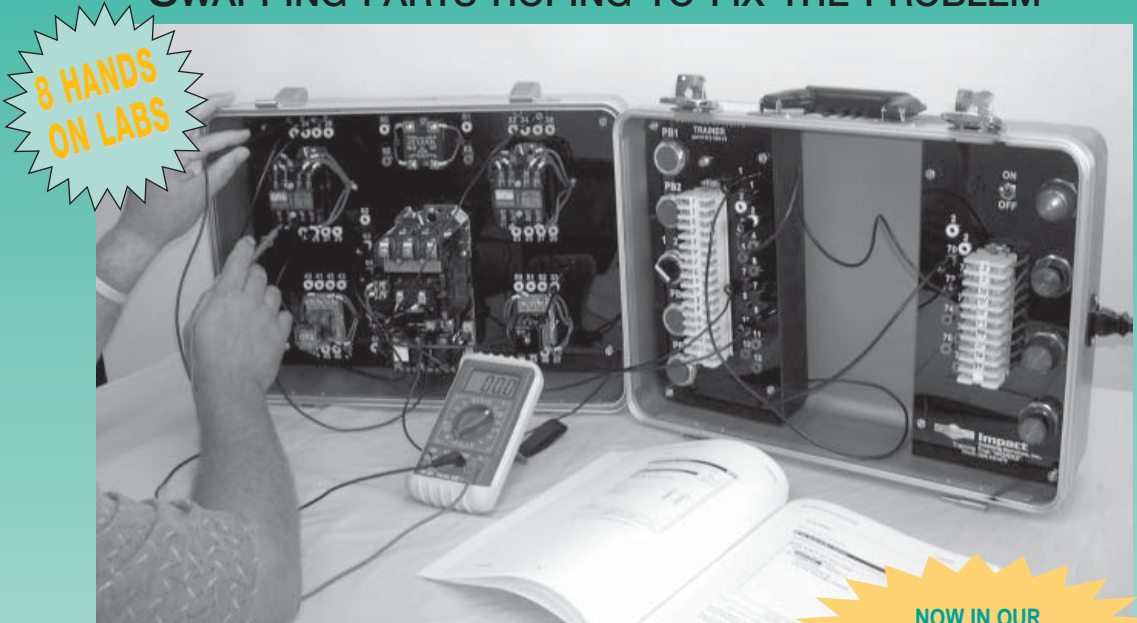
### YOU CAN ATTEND

# TROUBLESHOOTING ELECTRICAL CONTROLS

NO PRIOR ELECTRICAL EXPERIENCE REQUIRED

## STOP!

SWAPPING PARTS HOPING TO FIX THE PROBLEM



## 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

# 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 the 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.

## TRAINING AT YOUR FACILITY

Bring this or any of our other electrical/electronic training programs to your facility.

**Call (800) 858-6879**

You may also visit us on the web at:

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

## COURSES OFFERED

- Reading Electrical Drawings
- Electrical Safety – with Arc Flash
- Industrial Electricity
- Troubleshooting Electrical Controls
- Programmable Logic Controllers: Maintenance and Troubleshooting
- Programmable Logic Controllers: Using Allen-Bradley SLC 500™ PLCs and RSLogix 500™ Software
- Programmable Logic Controllers: Using Allen-Bradley ControlLogix™ PLCs and RSLogix 5000™ Software

\* Not affiliated with Rockwell Automation

**Register today!**

# **TROUBLESHOOTING 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 ANY OF OUR CLASSES TO  
YOUR FACILITY**

HANDS-ON

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HANDS-ON

# TROUBLESHOOTING ELECTRICAL CONTROLS



NO PRIOR ELECTRICAL EXPERIENCE REQUIRED

THIS CLASS CAN BE TAUGHT AT YOUR FACILITY

Impact Training Services, Inc.  
P.O. Box 532  
Bloomfield, KY 40008

PRSR STD  
U.S. POSTAGE  
PAID  
IMPACT MAILING, INC.

MAILROOM:  
If undeliverable as addressed please route to your training or maintenance manager

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

CCR  
REGISTERED  
CAGE CODE  
4C510

Student Name	Class Date	Class Location
_____	_____	_____
_____	_____	_____
_____	_____	_____
Company: _____		
Address: _____		
_____		
City: _____ State: _____ Zip: _____		
Phone: _____ Fax: _____		
Primary Contact: _____		
E-Mail: _____		

Check is enclosed for \$ \_\_\_\_\_  
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 to the left of address label

**THANK YOU!**