## TUESDAY
## OCTOBER 24

# DAY 1

**CLASSROOM DAY**

8:00 AM to 10:00 AM
- Basic components of low voltage power circuit breakers
- Short history of series overloads
  - o Dashpots, sucker disks, etc.
  - o Issues with series overloads
- Short history of electronic trip units
  - o Analog trip units
  - o Digital trip units
  - o Communications

10:00 AM to 10:15 AM
- Break

10:15 AM to 11:30 AM
- Components of an electronic trip system
  - o Sensors
  - o Actuator
  - o Trip Unit

11:30 AM to 12:00 PM
- Tour of URC facility

12:00 PM to 12:45 PM
- Lunch at URC

12:45 PM to 3:30 PM
- Basic iron core sensor theory
  - o Dual & single core sensors
  - o Advantages and issues
  - o Polarity

3:30 PM to 3:45 PM
- Break

3:45 PM to 4:15 PM
- Rogowski coil sensor theory
  - o Advantages and issues
  - o Polarity

4:15 PM to 5:00 PM
- Test

## WEDNESDAY
## OCTOBER 25

# DAY 2

**CLASSROOM DAY**

8:00 AM to 10:00 AM
- Trip Units
  - o Protection functions
    - i. What is LSIG
    - ii. Issues with GF
    - iii. Double Ended Subs

10:00 AM to 10:15 AM
- Break

10:15 AM to 12:00 PM
- Trip Units (continued)
  - o Entering Settings
  - o Testing
    - i. Secondary Injection
    - ii. Primary Injection

12:00 PM to 12:45 PM
- Lunch at URC

12:45 PM to 3:30 PM
- TCCs

3:30 PM to 3:45 PM
- Break

3:45 PM to 4:15 PM
- Prepare for tomorrows hands-on retrofit
  - o Review of retrofit kit installation manual
  - o Review of actuator adjustments
  - o Review of trip unit settings
  - o Review of breaker test sheet
  - o Review of pre-retrofit breaker checks
  - o Review of post-retrofit breaker tests

4:15 PM to 5:00 PM
- Test

URC
Utility Relay Company

**Note: Schedule may change depending on student experience level**

## THURSDAY
## OCTOBER 26

# DAY 3

**HANDS-ON DAY**

8:00 AM to 12:00 PM
- Pre-retrofit inspection of breaker
- Install retrofit kit

12:00 PM to 12:45 PM
- Lunch at URC

12:45 PM to 4:30 PM
- Install retrofit kit (continued)
- Grade quality of retrofit
- Test retrofit using secondary injection (break as needed)

7:00 PM
Celebration Dinner

## FRIDAY
## OCTOBER 27

# DAY 4

**HANDS-ON 1/2 DAY**

8:00 AM to 11:30 AM
- Test retrofitted breaker
  - o Primary injection
  - o Dielectric
  - o Low-resistance ohm meter

11:00 AM to 12:00 PM
- Review test reports

12:00 PM
- Adjourn

**This is a classroom and hands-on course intended for new or experienced technicians that maintain, repair or troubleshoot low voltage power circuit breakers (rated less than 1,000 Volt AC). The attendee should have basic knowledge of AC/DC electricity and be familiar with low voltage circuit breakers.**

## What will a student learn

- Basic theory of protective devices used on low voltage power breakers
- Hands-on installation of a retrofit kit (Two students per breaker)
- Primary and secondary injection testing of a retrofitted circuit breaker

# 3.5 Days
## 28 NETA CTD Credits

**Instructor Information:**
Degreed Electrical Engineers with many years of experience with the design of electronic trip devices and associated components for retrofit on hundreds of low voltage AC & DC power circuit breakers.

Degreed mechanical engineer with years of experience designing retrofit kits.

Date:
October 24-27, 2017

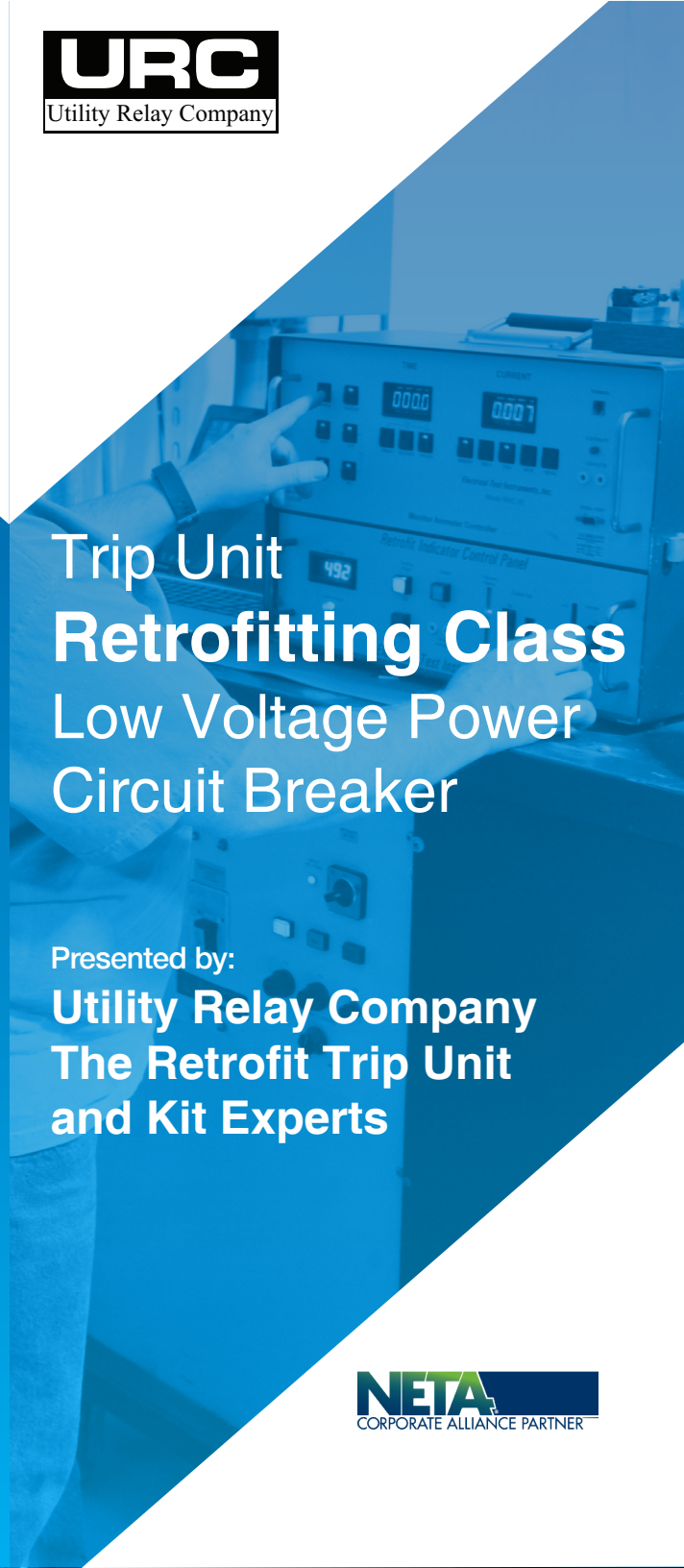
COURSE LOCATION
Utility Relay Company
10100 Queens Way
Chagrin Falls, Ohio
44023
440-708-1000

**Cost:**
$1465.00
Transportation and accomodations not included.
Credit card required to reserve a seat.
Registration includes
3 lunches and 1 dinner.

**Class Size:**
To maximize the learning experience this course is limited to 12 students.

**To Register or More Information:**
Call: 440-708-1000 x-106
Email: PClayman@UtilityRelay.com

URC
Utility Relay Company



# Trip Unit **Retrofitting Class** Low Voltage Power Circuit Breaker

Presented by:
**Utility Relay Company**
**The Retrofit Trip Unit and Kit Experts**

NETA
CORPORATE ALLIANCE PARTNER