

# Commercial Inspection Training: Electrical

<http://www.nachi.org/commercial-inspections.htm>

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**Course #1: Inspecting the Commercial Electrical System**



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DEFINITIONS.

ANSUL SYSTEMS. Automatic fire suppression system in exhaust hood over most cooking areas.



AUTOMATIC TRANSFER SWITCH. A panel that switches power during an outage to a back-up source. (Usually a generator)



Commercial Inspection Training  
Electrical System  
Part One  
Definitions

**BALLARD LIGHTS.** A rounded concrete pole with lighting near the top



**BUCKET.** Part of the switch gear that contains fuses.



**CABLE TRAY.** A ladder type tray that is in ceiling supported by rods that is open and cable lay inside.



Commercial Inspection Training  
Electrical System  
Part One  
Definitions

**CASSON.** Concrete foundation where poles and other fixtures are mounted.



**CONDUIT.** A race way to hold and protect wiring



**CONDUIT SUPPORTS.** Means of anchoring conduit to ceilings, walls and floors.



Commercial Inspection Training  
Electrical System  
Part One  
Definitions

**CONTACTOR.** Used for controlling primary lighting by way of timer for different zones and areas.



**E.M.T. Electrical metal tubing.** Bendable thin wall metal conduit.



**EQUIPMENT OUTLET.** Usually round with a twist-lock round plug connected to it.

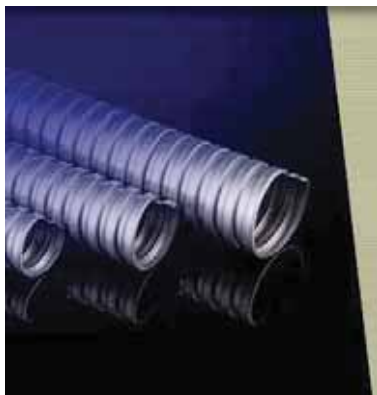


Commercial Inspection Training  
Electrical System  
Part One  
Definitions

**EXPLOSION PROOF.** Conduit and boxes that are sealed for areas with flammable fumes, gases or vapors.



**FLEX.** Flexible metal conduit.



**FROG-EYE.** Exit sign with 2 directional lights on top.



Commercial Inspection Training  
Electrical System  
Part One  
Definitions

**GUTTER.** A metal box that contains wires and may have multiple entry and exit points for conduit.



**HORN/STROBE.** A fire alarm device that flashes light and sound an alarm.



**JELLY-JAR.** A lighting fixture with a thick glass (jar) that screws to the housing. Sometimes has a cage around to protect from damage. lighting



**K.O. CLOSURE.** A metal plug used to fill a hole that is no longer in use.



**KNOCK-OUT.** Pre-punched hole for conduit entry or exit.

**M.C.** Metal clad raceway usually not larger than  $\frac{3}{4}$  " in diameter



**M.C.C.** Motor control center. This cabinet is used to control motors and remote starters.





Commercial Inspection Training  
Electrical System  
Part One  
Definitions

**METER HOUSING.** Contains meter. Properties may contain multiple meters.



**PULL STATION.** A fire alarm device with handle that is pulled to activate fire alarm.



**RIGID CONDUIT.** A thick walled metal pipe that is non bendable.



Commercial Inspection Training  
Electrical System  
Part One  
Definitions

RTU. Roof top unit. Used to provide heating or cooling to property.



SPRINKLER SYSTEM. Rows of piping with heads that are activated under heat. This will be part of the fire alarm system.



SWITCH GEAR. Usually connected to a transformer and used to switch power to different parts of the system.



Commercial Inspection Training  
Electrical System  
Part One  
Definitions

TRANSFORMER. Not a movie. Changes incoming voltages usually from higher to lower.



# EMERGENCY POWER SYSTEMS

RESEARCHED AND EDITED BY DAN MCCARTHY AND DAVE GASTON  
01/2010



# BACK-UP GENERATOR DEISEL POWERED



# BACK-UP GENERATOR

GAS POWERED

U . P . S .  
UNINTERRUPTED POWER  
SOURCE



U.P.S.





TRANSFORMER



ATS



FROG-EYE



OLDER STYLE FROG-EYE MAYBE  
STILL IN USE



# MAINTENANCE LOG

Date	A/C Make & Model	A/C Year	Engine Size & Other	Component(s)	Maintenance Activity	Type			Hours											
						Major	AMT	in Charge												
						REG	AI	PI	12:00 PM	12:00 PM										
5/4/99	Cessna 182 P	1234M		Fuel Cell	Replaced L/R fuel cell		X			8 hrs										
5/5/99	Piper PA-23	1234P		Airtron	Rebuilt right airtron		X			4 hrs										
<b>SAMPLE</b>																				
I certify that the statements made by me on this form are true.						<small>REG - Regular or Airframe AMT - Annual Inspection PI - Propulsion Inspection</small>			<table border="1"> <tr> <td>Type</td> <td>Time</td> <td></td> </tr> <tr> <td>Major Inspection</td> <td>1</td> <td>12 hrs</td> </tr> <tr> <td>Total in Date</td> <td>1</td> <td>12 hrs</td> </tr> </table>			Type	Time		Major Inspection	1	12 hrs	Total in Date	1	12 hrs
Type	Time																			
Major Inspection	1	12 hrs																		
Total in Date	1	12 hrs																		
Mechanic's Signature: <u>John A. Smith</u>																				
Certificate Number: <u>ASP 123456 JA</u>																				



# MAINTENANCE SHEET

IT MAY NOT BE POSSIBLE TO  
CHECK THE BACK-UP POWER  
SYSTEM WHILE IT'S RUNNING,  
BUT A FULL CHECK AS IT  
STANDS SHOULD BE GOOD  
ENOUGH TO DETECT FAULTS

# THE END

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01/2010





Commercial properties with a refrigeration system may need a different 3<sup>rd</sup> party inspector to inspect things like compressor, motor, refrigerant lines, door seal and other components

## REFRIGERATION SYSTEM

There will be separate control systems



# A separate panel for anti sweats



Anti sweats are used to keep windows clear when doors have been opened and closed.



Refrigeration systems have a separate alarms for Leak detection



There could be Jelly-jars with protective cages



It could be a walk-in cooler



# Inside a walk-in cooler.





# Typical cooler in a fast food outlets



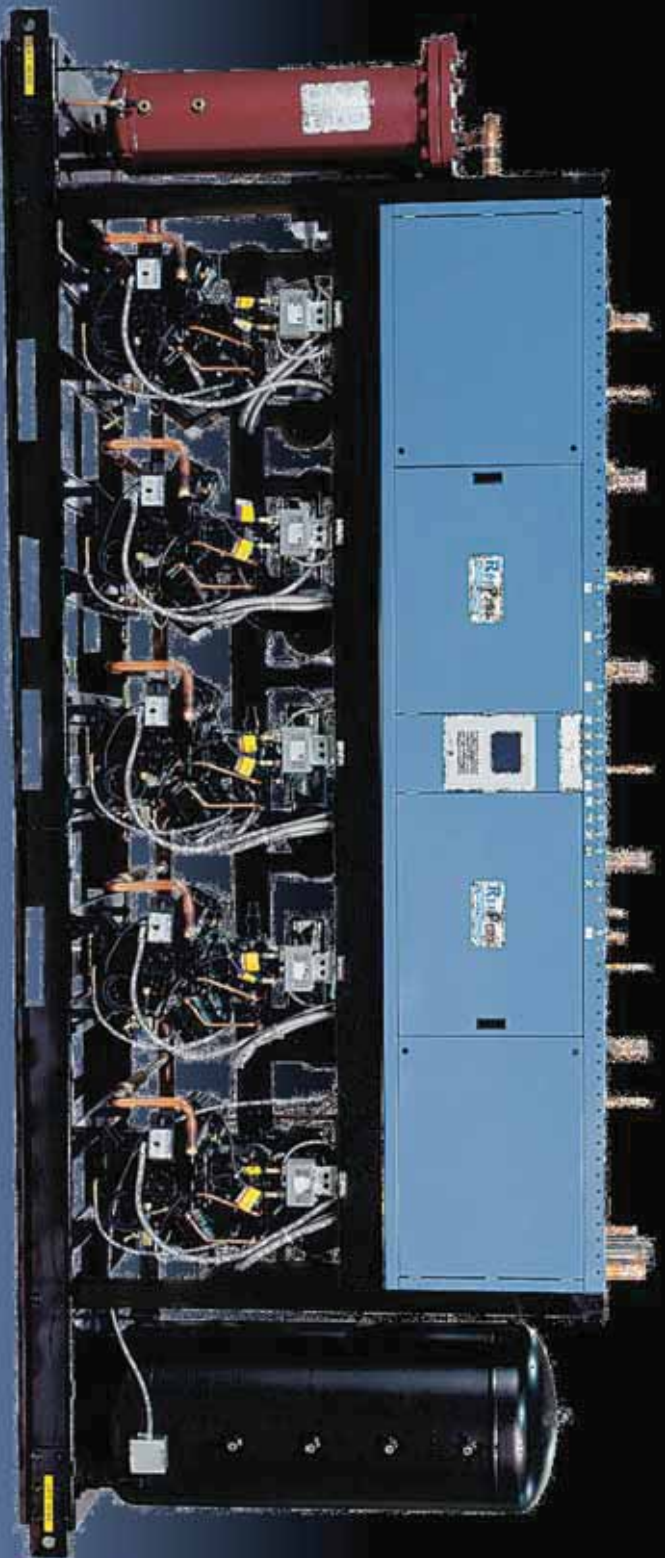
May have plastic strips hanging  
down





These systems are specialized  
and will have separate  
maintenance records

A rack like this is used in large stores or storage facilities and may be in a basement area



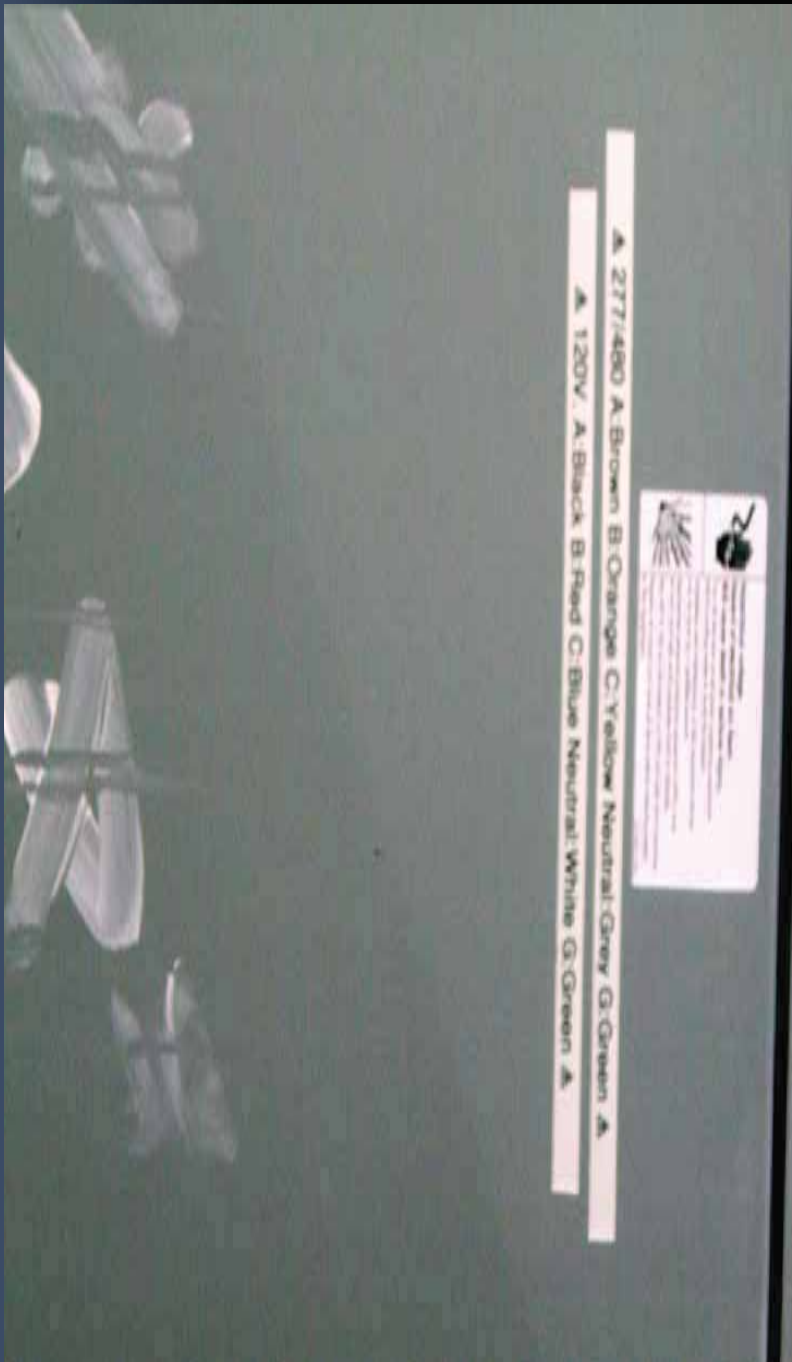
DETERMINING THE  
DIFFERENCE BETWEEN HIGH  
AND LOW VOLTAGE AND  
COMMUNICATION SYSTEMS

Researched and edited by Dan McCarthy and Dave Gaston 01/2010

**HIGH VOLTAGE**

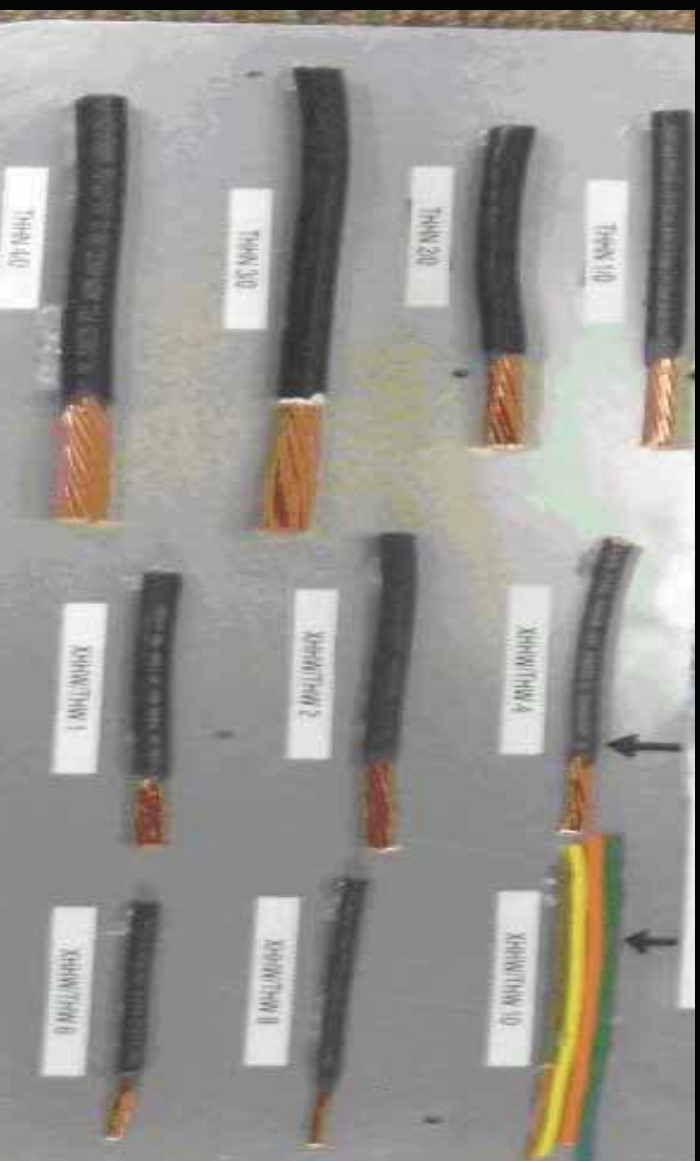


# TRANSFORMER AND PANELS



# PANEL DESIGNATIONS





HIGH VOLTAGE WIRE SIZES  
UNLIKELY TO FIND ANYTHING  
SMALLER THAN NO 12

# HIGH VOLTAGE WIRE





**HIGH VOLTAGE COLORS BROWN  
ORANGE YELLOW (BOY) GREY AND  
GREEN**

## WIRE COLOR CHEAT SHEET

277/480 volt 3  $\phi$  phase 4 wire

A	B	C	N
1	2	3	4
3	4	5	6
5	6	7	8
7	8	9	10
9	10	11	12
11	12	13	14
13	14	15	16
15	16	17	18
17	18	19	20
19	20	21	22
21	22	23	24
23	24	25	26
25	26	27	28
27	28	29	30
29	30	31	32
31	32	33	34
33	34	35	36
35	36	37	38
37	38	39	40
39	40	41	42
41	42		

DIVIDE CKT # BY 6 The corresponding remainder # is your color.

Remainder # of 0 will always be Yellow.

42÷6=6= 42 w/ a remainder of 0.

28÷6=4=24 w/a remainder of 4=Orange

23÷6=3=18 w/ a remainder of 5=Yellow

31÷6=5=30 w/ a remainder of 1=Brown

# HIGH VOLT COLORS



600 VOLT      277/480 VOLT  
SIGNS

**120/208 VOLTS**

**240 VOLTS**

**LOW VOLTAGE**