TYPICAL ELECTRICAL DRAWING SYMBOLS AND CONVENTIONS

ELECTRICAL SYMBOLS

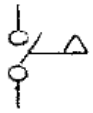
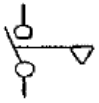
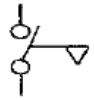
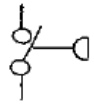
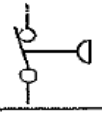
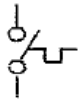
CONTACTS, SWITCHES, CONTACTORS AND RELAYS

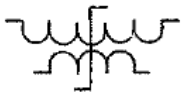
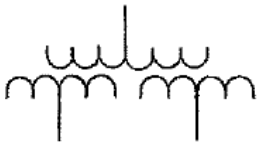
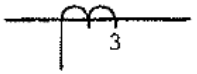
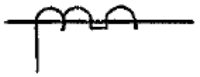
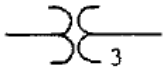
SYMBOL	DESCRIPTION
X1 N.O. X1 N.C.	Relay contact - Shown with relay in de-energized or in reset position. (Show relay coil designation near contact.)
T1 TDC T1 TDO	Timing Relay Contact - TDC indicates contact closes at end of timing period. TDO contact opens at end of timing period.
X1	Coil - Relay, contactors, circuit breaker, solenoid etc. (Show device designation, X1)
T1 TDPU (TDDO)	Coil - Timing Relay - TDPU indicates timing period starts when coil is energized. TDDO indicates timing period starts when coil is de-energized.
R1 O R	Latching Relay or Mechanically-Held Contactor O=operate; R=reset; TC=trip coil; CC=closing coil. (Coils may be separated on diagram)
	Knife Switch, general. (If shown closed, terminals must be added.)
	Switch - General, single pole, single throw.
	Switch - One pole of multi-pole switch shown. Other poles shown elsewhere.

	Pushbutton - Momentary or spring return. Single Circuit (make)
	Pushbutton - Momentary or spring return. Single Circuit (break)
	Pushbutton - Momentary or spring return. Two Circuit
	Pushbutton - Maintained, two circuit
	Pushbutton - Maintained, single circuit
H A	Selector Switch - Two position, maintained (designate position shown; i.e. A=Auto; H=Hand)
T C SR SR	Selector Switch - Three position, SR indicates spring return from position so labeled. ("TRIP-(NORMAL)-CLOSE" position shown)
	Limit Switch - Normally open - Not applicable for Motor Operated Valves and Solenoid Valves.
	Limit Switch - Normally closed - Not applicable for Motor Operated Valves and Solenoid Valves.

	Used with other symbols to indicate device is adjustable
+ (Positive) — (Negative)	Polarity markings - Direct current.
	Instantaneous Polarity Markings
	3-phase, 3-wire, delta
G	3-phase, 3-wire, open delta grounded
	3-phase, 3-wire, wye
G	3-phase, 3-wire, wye grounded neutral
	3-phase, 3-wire, zigzag

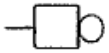
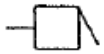
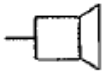
G	3-phase, 3 wire zigzag, grounded neutral
	Connection to earth ground (may be plant grounding system)
	Connection to chassis or frame
○	Terminal - may be added to any of the following symbols at connection points.
	Short circuit (not a fault)
□	Terminal - Designates termination point of field run cables to main control board, emergency power board, main control board termination cabinet or emergency power board termination cabinet.

	Flow Switch - Closes on increase in flow at value shown
	Flow Switch - Opens on increase in flow at value shown
	Flow Switch - Closes on decrease in flow at value shown.
	Flow Switch - Opens on decrease in flow at value shown.
	Liquid Level Switch - Opens on rising level (Closes on low level)
	Liquid Level Switch - Closes on rising level (Opens on low level)
	Pressure or Vacuum Switch - Closes on rising pressure
	Pressure or Vacuum Switch - Opens on rising pressure (Closes on increase in vacuum)
	Temperature Switch - Closes on increasing temp.
	Torque Switch - Opens on high torque

	Transductor - Control winding shown with 5 loops. Power winding shown with 3 loops.
	Transformer - General, two winding
	Autotransformer - General
	Transformer - General, three winding
	Current Transformer - number represents quantity (Add instantaneous polarity marks and ratio)
	Bushing Type Current Transformer
	Potential Transformer - number represents quantity (Show instantaneous polarity marks, voltage rating, vectors, etc.)

	Fuse - General
	High Voltage Primary Fuse Cutout
	Lightning Arrester - General Gap Type
	Lightning Arrester - Valve or film type
	Circuit Breaker - General
	Power Circuit Breaker - (Show location of operating mechanism)
OR	Circuit Breaker, 3-pole with magnetic - overload device in each pole. (Show rating)
OR	Circuit Breaker, 3-pole, drawout type (Used in metal clad switchgear groups) 2

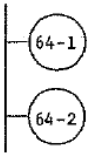
INDICATORS & ALARMS

	Bell, electric
	Buzzer
	Horn - General
	Annunciator - General
	Indicating Light - General Use the following to specify color: A - Amber B - Blue C - Clear G - Green NE - Neon O - Orange OP - Opalescent P - Purple R - Red W - White Y - Yellow

RELAYS

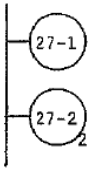
The following methods are used on drawings to identify relays:

1)



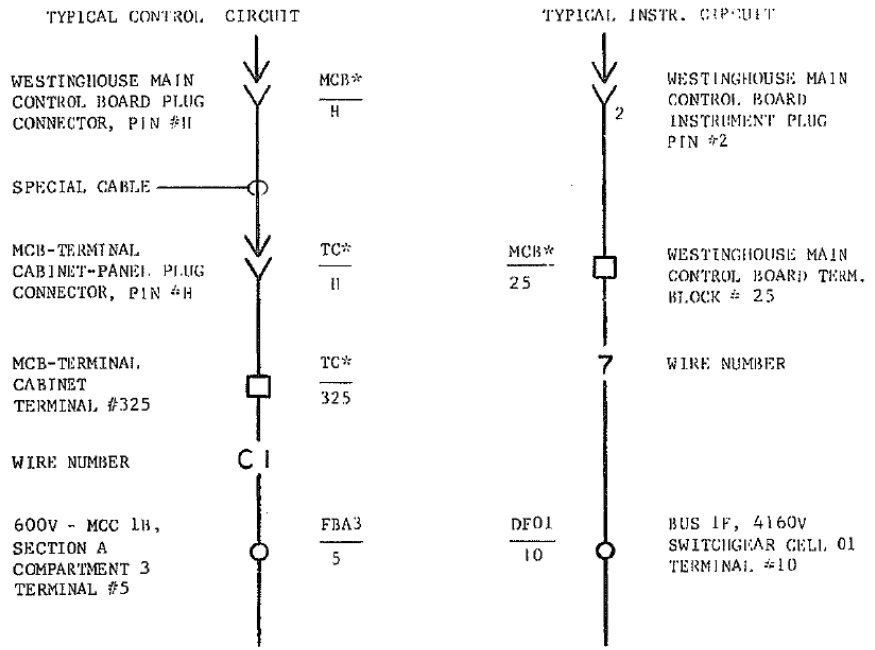
Two (2) 64 devices 64-1 and 64-2 in same cell.

2)



Three (3) 27 devices 27-1, 27-2 and 27-3. The two (2) below the 27-2 device indicates there are two (2) 27 devices and their sequence numbers are in numerical order starting with -2.

ELEMENTARY DIAGRAM CONNECTIONS



*Abbreviation for equipment - The corresponding equipment number will appear in a table on the elementary diagram (e.g. MCB = Q1H12C005)

WIRE NUMBERING

WIRE NUMBERING SYSTEM

1. The following standard interconnecting wire numbers shall be used wherever applicable (for computer - schedule programming).

Wire Number	Purpose	Wire Number	Purpose
1	A - Phase Power	4	A - Phase Potential (See Notes 3 & 5)
2	B - Phase Power		
3	C - Phase Power	5	A - Phase Current (See Notes 3 & 5)
(Note 1)	Annunciator		
N	D. C. Negative (See Note 2)	6	B - Phase Potential (See Notes 3 & 5)
P	D. C. Positive (See Note 2)		
U	115 volt A. C.-Ground Return (see Note 2)	7	B Phase Current (see Notes 3 & 5)
X	115 volt A. C. (See Note 2)		
C	Closing (See Note 2)	8	C - Phase Potential (See Notes 3 & 5)
T	Tripping (See Note. 2).		
O	Opening, MOV Only (See Note 2)	9	C - Phase Current (See Notes 3 & 5)
F	Instrumentation (e.g. indicator, recorder, etc; See Note 2)		
H	Computer (See Note 2)		
M	General Control (Neither tripping nor closing; See Note 2)	0	Potential (or Current) Neutral (See Notes 4 & 5)
A	Amber Lamp (See Note 2)		
B	Blue Lamp (See Note 2)		
L	Green Lamp (See Note 2)		
R	Red Lamp (See Note 2)		
W	White Lamp (See Note 2)		

	Basic, Generator or Motor
	Field, Compensating, Generator or Motor
	Field, Series, Generator or Motor
	Field, Short or Separately Excited, Generator or Motor
	Field, Permanent Magnet, Generator or Motor
	1-phase
	2-phase
	3-phase, wye

	3-phase wye, grounded
	3-phase delta

ABBREVIATIONS

A	Ammeter
AH	Ampere-hour
C	Coulombmeter
CMA	Contact-making (or breaking) ammeter
CMC	Contact-making (or breaking) clock
CMV	Contact-making (or breaking) voltmeter
CRO	Oscilloscope or cathoderay oscillograph
DB	DB (decibel) meter: Audio level/meter
DBM	DBM (decibels referred to 1 milliwatt (meter)
DM	Demand meter
DTR	Demand-totalizing relay
F	Frequency meter
G	Galvanometer
GD	Ground detector
I	Indicating
INT	Integrating
UA	Microammeter
MA	Milliammeter
NM	Noise meter
OHM	Ohmmeter
OP	Oil pressure
OSCG	Oscillograph, string
PF	Power factor
PH	Phasemeter
PI	Position indicator
RD	Recording demand meter
REC	Recording
RF	Reactive factor
SY	Synchroscope
t^{o}	Temperature meter
THC	Thermal converter
TLM	Telemeter
TT	Total time: Elapsed time
V	Voltmeter
VA	Volt-ammeter
VAR	Varmeter
VARH	Varhour meter
VI	Volume indicator: Meter, audio level
VU	Standard volume indicator Meter, audio level
W	Wattmeter
WH	Watthour meter