ELECTRICAL STANDARD SYMBOLS

STANDARD SYMBOLS

SYMBOL	DESCRIPTION
	SINGLE RECEPTACLE, 125V, 20A, NEMA 5-20R FLUSH, #4-S BOX WITH PLASTER RING, HUBBELL #HBL5361 I AND SMOOTH HIGH-IMPACT NYLON COVER PLATE HUBBELL #P724 COLOR TO MATCH RECEPTACLE SURFACE #4-S BOX, WITH STEEL CITY CRUSHED CORNER COVER PLATE.
	DUPLEX RECEPTACLE, 125V, 15A, NEMA 5-15R, HUBBELL #HBL5252 I. (SEE NOTE #10 FOR EQUIVALENTS) FLUSH, #4-S BOX WITH PLASTER RING AND SMOOTH HIGH-IMPACT NYLON COVER PLATE HUBBELL #P8. COLOR TO MATCH RECEPTACLE SURFACE #4-S BOX WITH STEEL CITY CRUSHED CORNER COVER PLATE.
	DOUBLE DUPLEX RECEPTACLE, 125V, 15A, (NEMA 5-15R) HUBBELL #HBL5252 I RECEPTACLES. (SEE NOTE #10 FOR EQUIVALENTS.) FLUSH, #4-S BOX WITH PLASTER RING AND SMOOTH HIGH-IMPACT NYLON COVER PLATE HUBBELL #P82 COVER. COLOR TO MATCH RECEPTACLE SURFACE, 4-S BOX. STEEL CITY CRUSHED CORNER COVER PLATE.
GFI	GFCI RECEPTACLE 125V, 15A, (NEMA 5-15R) 15A HUBBELL #GF5252I A, WITH MATCHING COVER PLATE.
WP	WEATHERPROOF DUPLEX RECEPTACLE, 120 VOLT, 15A, HUBBELL #HBL5252 I, IF PROTECTED BY GFI DEVICE, OTHERWISE 15A HUBBELL #GF-5252A, WP. LABEL 'GFCI PROTECTED DEVICE'. (SEE NOTE 10 FOR EQUIVALENTS.) FLUSH: STEEL CITY HANDY BOX SURFACE: CROUSE-HINDS FS BOX COVER PLATE: CAST ALUMINUM TO MATCH BOX AND RECEPTACLE.
IG	DUPLEX RECEPTACLE, 125V, 20A, ISOLATED GROUND SAME AS DUPLEX RECEPTACLE EXCEPT HUBBELL# IG5362.
L5-20R	RECEPTACLE, 20A, 125V, 2P/3W, LOCKING, NEMA REF L5-20R HUBBELL #HBL2310.
L14-20R	RECEPTACLE, 20A, 125/250V, 3P/4W, LOCKING, NEMA REF L14-20R HUBBELL #HBL2410.
L21-20R	RECEPTACLE, 20A, 120/208V, 4P/5W, LOCKING, NEMA REF L21-20R HUBBELL #HBL2510.
L5-30R	RECEPTACLE, 30A, 125V, 2P/3W, LOCKING, NEMA REF L5-30R HUBBELL #HBL2610.
L14-30R	RECEPTACLE, 30A, 125/250V, 3P/4W, LOCKING, NEMA REF L14-30R HUBBELL #HBL2710.
L21-30R	RECEPTACLE, 30A, 120/208V, 4P/5W, LOCKING, NEMA REF L21-30R HUBBELL #HBL2810.
5/60 208 V	RECEPTACLE, PIN AND SLEEVE TYPE, 60A, 120/208V, 4P, 5W HUBBELL #HBL560R9W, W/15° ANGLE BACK BOX W/1½" HUB. (BB602W)
5/60 480 V	RECEPTACLE, PIN AND SLEEVE TYPE 60A, 277/480V, 4P, 5W HUBBELL #HBL560R7W/15° ANGLE BACK BOX W/1½" HUB (#BB602W)
5/100 208V	RECEPTACLE, PIN AND SLEEVE TYPE, 100A, 120/208VAC, 4P/5W. HUBBELL #HBL5100R9W W/15° ANGLE BACK BOX W/ 2" HUB #BB1002W.
N	RECEPTACLE, N=NEMA LINE NUMBER AS SPECIFIED.
$ a	SWITCH, SINGLE POLE SINGLE THROW SNAP SWITCH, SMALL LETTER OR NUMERAL INDICATES DEVICE SWITCHED, UNLESS OTHERWISE NOTED. AC TYPE WILL BE 277V, 20A, HUBBELL #HBL1221 I. MOUNT AT 48" A.F.F. UNLESS OTHERWISE NOTED. COVER PLATE: SMOOTH HIGH-IMPACT NYLON, COLOR TO MATCH SWITCH. SEE NOTE 11 FOR EQUIVALENTS
$ 2a	SAME AS $ a EXCEPT DOUBLE POLE (DPST) HUBBELL #HBL1222 I. SEE NOTE 11 FOR EQUIVALENTS.
$ 3a	SAME AS $ a EXCEPT THREE WAY SWITCH (SPDT) HUBBELL #HBL1223 I. SEE NOTE 11 FOR EQUIVALENTS.
$ 4a	SAME AS $ a EXCEPT FOUR WAY SWITCH (DPDT) HUBBELL #HBL1224 I. SEE NOTE 11 FOR EQUIVALENTS.
$ WP	SWITCH IN WEATHERPROOF HOUSING, (SEE ABOVE FOR TYPE OF SWITCH).
	PLUG-IN STRIP, AS SPECIFIED ON PLANS.
(J)	JUNCTION BOX FLUSH, 4S BOX WITH PLASTER RING AND COVER PLATE. SURFACE: 4"-SQUARE BOX WITH BLANK COVER.

STANDARD SYMBOLS (CONTINUED)

SYMBOL	DESCRIPTION
[J]	JUNCTION BOX: SIZE AS SPECIFIED.
	EXPOSED RACEWAY. CROSS LINES (DIAGONAL OR PERPENDICULAR) INDICATE NUMBER OF WIRES (-PHASE, -NEUTRAL, -SWITCH, -GROUND).
	CONCEALED RACEWAY IN WALLS OR ABOVE CEILING.
	CONCEALED RACEWAY IN FLOOR, UNDER FLOOR, OR UNDERGROUND. CROSS LINES (DIAGONAL OR PERPENDICULAR) INDICATE NUMBER OF WIRES (-PHASE, -NEUTRAL, -SWITCH, -GROUND).
E	EXISTING TO REMAIN.
R	EXISTING TO BE REMOVED.
(N)	MOTOR. ALL MOTORS SHALL HAVE FINAL CONNECTION MADE WITH A LIQUID TIGHT FLEXIBLE CONDUIT HAVING A MAXIMUM LENGTH OF 18". "N" IS THE MOTOR HORSEPOWER. EXCEPTION: SMALL MOTORS THAT ONLY HAVE PROVISIONS FOR CORD CONNECTIONS SHALL HAVE A JUNCTION BOX LOCATED AS CLOSE TO THE MOTOR AS POSSIBLE AND FINAL CONNECTION SHALL BE MADE WITH THE MULTIWIRE TYPE SO CORD.
[MC]	MOTOR CONTROLLER. MOUNT TOP AT 72" ABOVE FLOOR UNLESS OTHERWISE NOTED.
[C]	MAGNETIC CONTACTOR. MOUNT TOP AT 72" ABOVE FLOOR UNLESS OTHERWISE NOTED.
[MC]	SAFETY SWITCH AND MOTOR CONTROLLER, COMBINATION, PROVIDE WITH ELECTRICAL LOCK-OUT PROVISIONS. MOUNT AT 72" ABOVE FLOOR UNLESS OTHERWISE NOTED.
[SS]	SAFETY SWITCH. PROVIDE WITH ELECTRICAL LOCK-OUT PROVISIONS. MOUNT TOP AT 72" A.F.F. UNLESS OTHERWISE NOTED.
$ T	SWITCH, THERMAL OVERLOAD, FOR FRACTIONAL HORSEPOWER MOTORS. (GE #CR101H1IN NEMA 1ENCLOSURE UNLESS OTHERWISE NOTED.) MOUNT AT 54" ABOVE FLOOR UNLESS OTHERWISE NOTED.
(T)	THERMOSTAT.
	CABLE TRAY.
	277/480V BUS DUCT.
	120/208V BUS DUCT.
	PANELBOARD: REFER TO PANEL SCHEDULE AND SPECIFICATIONS FOR DETAILS.
	RECESSED LIGHTING FIXTURE.
	RECESSED EMERGENCY LIGHTING FIXTURE, "NORMALLY ON".
	RECESSED EMERGENCY LIGHTING FIXTURE, "NORMALLY OFF".
	FLUORESCENT LIGHTING FIXTURE.
	FLUORESCENT EMERGENCY LIGHTING FIXTURE, "NORMALLY ON".
	FLUORESCENT EMERGENCY LIGHTING FIXTURE, "NORMALLY OFF".
	FLUORESCENT LIGHT FIXTURE W/ CENTER LAMP ON EMERGENCY LIGHTING CIRCUIT.
	EXIT LIGHT, BLACK HI-IMPACT PLASTIC FRAME, INDIRECT-VIEW LED LAMPS, GREEN LETTERS & ARROWS, BLACK SINGLE OR DOUBLE FACE, UNIVERSAL MOUNT KIT INCLUDED, OPERABLE ON 120V OR 277V. NUMBER OF FACES, ARROW DIRECTION, &REQUIREMENT FOR A BATTERY AS SHOWN ON DRAWINGS. BATTERY UNIT SHALL INCLUDE SELF-DIAGNOSTIC/SELF TESTING ELECTRONICS (SPECTRON) WITH SELF-TEST FEATURE WITH LED STATUS LIGHT & MANUAL TEST BUTTON ON LOWER EDGE OF FRAME.

MANUFACTURE	MODEL	VOLTAGE	FACES	BATTERY	SERVICE
DUAL-LITE	LXUGB	120/277	½	NO	INVERTER CKT.
DUAL-LITE	LXUGBEI	120/277	½	YES	LIGHTING CKT.

SYMBOL	DESCRIPTION
(PC)	PHOTO CELL.
	EMERGENCY LIGHT, (ORIENTATION AS SHOWN ON FLOOR PLANS.) (EXIDE NO. M2012RH126) 120V, 2 LAMP.
[T]	TRANSFORMER AS SPECIFIED.
	BOND TO EQUIPMENT OR BUILDING, FOR LIGHTNING PROTECTION.
	AIR TERMINAL, FOR LIGHTNING PROTECTION AS SPECIFIED ON PLANS OR IN SPECIFICATIONS.
	CABLE TO CABLE PARALLEL SPLICER, FOR LIGHTNING PROTECTION AS SPECIFIED ON PLANS OR IN SPECIFICATIONS.

STANDARD SYMBOLS (CONTINUED)

SYMBOL	DESCRIPTION
	GROUND ROD, ¾"x10' COPPER WELD.
(S)	SPEAKER, FOR INTERCOM/EPPA.
[M]	MONITOR, FOR INTERCOM/EPPA.
[PS]	PAGING STATION, FOR INTERCOM/EPPA.
[MS]	PAGING MASTER STATION, FOR INTERCOM/EPPA.
[RD]	RADIATION DETECTOR, FOR RADIATION/GAS DETECTION.
[GD]	GAS DETECTOR, FOR RADIATION/GAS DETECTION.

GENERAL NOTES

1. WHERE SYMBOLS ARE NOT SHOWN, SYMBOLS LISTED IN ANSI, Y32.9, GRAPHIC SYMBOLS FOR ELECTRICAL WIRING AND LAYOUT DIAGRAMS USED IN ARCHITECTURE AND BUILDING CONSTRUCTION, CURRENT ISSUE, SHALL APPLY.

2. THE FOLLOWING SYMBOLS ARE USED FOR THE APPLICATION SHOWN (N=IDENTIFICATION NUMBER USED):

   [N] CONDUIT SCHEDULES

   (N) MECHANICAL EQUIPMENT IDENTIFICATION

   <N> CONTROLS EQUIPMENT IDENTIFICATION.

   /N\ ELECTRICAL EQUIPMENT IDENTIFICATION

   (N) KEYED CONSTRUCTION NOTES

3. ALL SYMBOLS SHOWN ON STANDARD SYMBOL LIST MAY NOT APPEAR ON DRAWINGS.

4. NEW FURNISH AND INSTALL — EXISTING TO REMAIN — EXISTING TO REMOVE

   EXCEPT FOR MOTOR SYMBOLS, THIS METHOD SHALL APPLY TO ALL SYMBOLS LISTED TO SHOW WHETHER THEY ARE TO BE INSTALLED, ARE EXISTING TO REMAIN, OR ARE EXISTING TO BE REMOVED. THEY SHALL BE INDIVIDUALLY DESCRIBED AS NECESSARY. ALTERNATE METHOD: USE EXISTING TO REMAIN AND REMOVAL NOTES.

5. MOUNTING HEIGHTS

   MOUNT GENERAL PURPOSE RECEPTACLES AT THE FOLLOWING HEIGHTS A.F.F. (MEASURED FROM CENTER OF RECEPTACLE), UNLESS OTHERWISE NOTED ON DRAWINGS.

   18" A.F.F. - OFFICES, CONFERENCE ROOMS, AND SIMILAR SPACES
   36" A.F.F. - CORRIDORS AND HALWAYS
   48" A.F.F. - LAB AREAS

   UNLESS OTHERWISE SPECIFIED, ALL MOUNTING HEIGHTS ARE TO CENTER OF EQUIPMENT. DO NOT MOUNT TOP OF PANELBOARDS ABOVE 6 FEET, 6 INCHES A.F.F., UNLESS OTHERWISE SPECIFIED.

6. ALL RACEWAYS THAT CONTAIN MORE THAN 50V L-G SHALL HAVE AN EQUIPMENT GROUND CONDUCTOR INSTALLED. GROUND CONDUCTOR SHALL BE SIZED PER NEC TABLE 250-95 WITH #12 THHN BEING THE MINIMUM SIZE CONDUCTOR, OR LARGER IF SHOWN ON THE DRAWINGS. A GROUNDING CONDUCTOR IS NOT REQUIRED FROM THE BUILDING TRANSFORMER TO THE SERVICE ENTRANCE.

7. COLOR CODING OF CONDUCTORS SHALL BE AS FOLLOWS:

   208Y/120VAC - PHASE A-BLACK, PHASE B-RED, PHASE C-BLUE, NEUTRAL-WHITE AND GROUND-GREEN.

   480Y/277VAC - PHASE A-BROWN, PHASE B-ORANGE, PHASE C-YELLOW, NEUTRAL-GRAY AND GROUND-GREEN WITH YELLOW TRACER.

8. INSTALL ¾ INCH TAPE (SCOTCH #35) AT EACH CONDUIT JOINT AND TERMINATION. THE COLOR CODING OF CONDUITS SHALL BE AS FOLLOWS:

   (1) RED & WHITE STRIPPED (SFM) - INTERNAL SECURE NETWORK (ISN).
   (2) BLUE - NORMAL POWER AND CONTROLS 120V TO 5KV.
   (3) YELLOW - INTRUSION ALARM.
   (4) WHITE - VOICE/DATA - INTERNAL RESTRICTED NETWORK (IRN), INTERCOM, SIGNAL INSTRUMENTATION.
   (5) ORANGE - SPECIAL POWER, INCLUDING DC, REGULATED, ISOLATED, EMERGENCY POWER, ETC.
   (6) BROWN - FIRE ALARM, EVACUATION ALARM.
   (7) GREEN - GROUND.
   (8) BLACK - SPECIAL SYSTEMS, INCLUDING CLOSE-CIRCUIT TV, SPECIAL ALARMS, SAFETY (SCOTCH #33)
   (9) PURPLE - ENERGY MANAGEMENT CONTROL SYSTEM.

9. INSTALL EMERGENCY SERVICE LABEL (THOMPSON & BETTS WAT-5033 'EMERGENCY SERVICE'), COLOR ORANGE) ON ALL EMERGENCY LIGHTING FIXTURES (VISIBLE FROM FLOOR LEVEL) AND ON EMERGENCY LIGHTING RELAY ENCLOSURES.

10. RECEPTACLE EQUIVALENTS

    HUBBELL: 5252-I, GF-5252IA
    ARROWHART: 5252, GF-5242
    PASS & SEYMOUR: 5232, GFCI-1591
    LEVITON: 5252, GF-6599

    EXCPETION:
    UNLESS OTHERWISE INDICATED, IN REMODEL AREAS, THE COLOR OF THE RECEPTACLE SHALL MATCH EXISTING DEVICES.

11. LIGHT SWITCH EQUIVALENTS

	SPST	DPST	SPDT	DPDT
HUBBELL	HBL1221 I	HBL1222 I	HBL1223 I	HBL1224 I
ARROW HART	1221 I	1222 I	1223 I	1224 I
PASS & SEYMOUR	20AC1-I	20AC2-I	20AC3-I	20AC4-I
LEVITON	1221-2I	1222-2 I	1223-2 I	1224-2 I

    EXCPETION:
    UNLESS OTHERWISE INDICATED, IN REMODEL AREAS, THE COLOR OF THE LIGHT SWITCH SHALL MATCH EXISTING DEVICES.

12. WHEN LABELING A CIRCUIT AT PANELBOARD OR EQUIPMENT, USE THE FOLLOWING UNLESS OTHERWISE SPECIFED ON DRAWING.

    a. WHEN LABELING A 2-POLE CIRCUIT, USE THE FIRST NUMBER AS THE CIRCUIT NUMBER.

    b. WHEN LABELING A 3-POLE CIRCUIT, USE THE MIDDLE NUMBER AS THE CIRCUIT NUMBER.

13. LABEL POWER PANEL AND CIRCUIT NUMBER ON ALL RECEPTACLES AND LIGHT SWITCH COVERS USING BROTHER P-TOUCH 3 (WITH TC-10 TAPE CARTRIDGE) LABEL. FOR EXTERIOR LOCATIONS, USE ALUMINUM DYMO ½ INCH ALUMINUM LABEL.

14. ON ALL PANELBOARDS, INSTALL LABEL ON DEAD FRONT COVER SO THAT IT CAN EASILY BE SEEN WHEN THE INNER DOOR IS OPEN. LABEL "DANGER: ELECTRICAL EQUIPMENT AUTHORIZED PERSONNEL ONLY:, BRADY SIGNMARK CAT. NO. 86237.

15. ON ALL PANELBOARSD & SAFETY SWITCHES, INSTALL WHITE MICARTA PLATE WITH ½" BLACK BLOCK LETTERING FOR INTERIOR INSTALLATIONS AND ANODIZED ALUMINUM NAMEPLATE WITH ½" BLOCK LETTERS FOR EXTERIOR INSTALLATIONS LOCATE APPOX. 5'-6" ABOVE FLOOR LINE IN CLEAR SPACE. ATTACH WITH HERMES CONTACT CEMENT.
    EXAMPLES:
    POWER PANEL: "120/208 VOLT PANEL P"
    SAFETY SWITCH: "S.W. CIRC. PUMP NO. 3
    CKT. P-4".

16. PHASE ROTATION CHECK: WHEN INDICATED, ROTATION CHECK SHALL BE MADE WITH A KNOPP K-3 (OR SMILAR DEVICE) WITH THE RED LEAD CONNECTED TO THE LEFT OR TOP LUG, THE WHITE LEAD CONNECTED TO THE MIDDLE LUG, AND THE BLUE LEAD CONNECTED TO THE RIGHT OR BOTTOM LUG DEPENDING ON THE CONFIGURATION OF THE EQUIPMENT BEING CHECKED. ON THE INSIDE COVER OF THE EQUIPMENT BEING CHECKED, NOTE THE ROTATION DEVICE USED, THE MANNER CONNECTED AND THE RESULTING PHASE ROTATION.

17. FOR FIRE ALARM STANDARD SYMBOLS LIST SEE DWG. FA7001STD.

18. FOR INTRUSION ALARM STANDARD SYMBOLS LIST SEE DWG. TY6001STD.

19. FOR ACCESS CONTROL STANDARD SYMBOLS LIST SEE DWG. TY0001STD.

REV	DATE	DESCRIPTION	DWN	CKD	APP
L	12/01/02	NOTING CHANGES	ELG	PS	
K	6/01	LIGHTING STANDARDS MODIFICATIONS	ELG	FL	
H	04/01	STANDARDS MODIFICATIONS	MFK	FL	
G	10/00	REVISE SWITCHES AND EXIT LIGHT	YMA	PD	

P.O.
PROJECT NO.

U.S. DEPARTMENT OF ENERGY
KIRTLAND AREA OFFICE — ALBUQUERQUE, NEW MEXICO

SANDIA NATIONAL LABORATORIES

STANDARD SYMBOLS LIST & GENERAL NOTES

P.O.
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ELECTRICAL — STANDARD

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