NOT MEASUREMENT SENSITIVE

KSC-STD-152-1C
May 15, 1992
Supersedes
KSC-STD-152-1B
June 7, 1991

GRAPHIC SYMBOLS FOR DRAWINGS

PART 1

FACILITIES

STANDARD FOR

ENGINEERING DEVELOPMENT DIRECTORATE

National Aeronautics and
Space Administration

John F. Kennedy Space Center

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STANDARD FOR

Approved By:

Walter T. Murphy
Director of Engineering Development

JOHN F. KENNEDY SPACE CENTER, NASA

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PART 1
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1. SCOPE

This standard establishes the requirements applicable to the graphic symbols to be used on conventional and nonconventional facilities drawings prepared by or for the John F. Kennedy Space Center (KSC), NASA. This standard applies to those symbols used on civil, architectural, structural, mechanical, and electrical drawings used to construct or modify facilities and other drawings required for operation, maintenance, or other use of the facilities.

2. APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitation, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/Statement of Work/Contract.

2.1 Governmental.

2.1.1 Standards.

John F. Kennedy Space Center (KSC), NASA

KSC-STD-E-0011	Electrical Power Receptacles Standard for

Military

MIL-STD-14	Architectural Symbols

2.1.2 Drawings.

John F. Kennedy Space Center (KSC), NASA

79K05763	Tube Fitting Symbols

2.1.3 Publications.

John F. Kennedy Space Center (KSC), NASA

GP-435, Volume II	Engineering Drawing Practices, Facilities

2.2 Non-Governmental.

American Institute of Steel Construction (AISC)

M015	Manual of Steel Construction - Load and Resistance Factor Design
M016	Manual of Steel Construction - Allowable Stress Design

(Application for copies should be addressed to the American Institute of Steel Construction, Inc., 400 North Michigan Avenue, Chicago, IL 60611)

American National Standards Institute (ANSI)

ANSI Y10.3	Letter Symbols for Quantities Used in Mechanics of Solids
ANSI Y10.20	Mathematical Signs and Symbols for Use in Physical Sciences and Technology
ANSI Y14.36	Surface Texture Symbols
ANSI Y32.2.6	Graphical Symbols for Heat Power Apparatus
ANSI Y32.4	Graphic Symbols for Plumbing
ANSI Y32.9	Graphic Symbols for Electrical Wiring and Layout Diagrams Used in Architecture and Building Construction
ANSI Z32.2.3	Graphical Symbols for Pipe Fittings, Valves, and Piping

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018)

American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

ANSI/ASME B1.7M	Nomenclature, Definitions, and Letter Symbols for Screw Threads

(Application for copies should be addressed to the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017)

American National Standards Institute/American Welding Society (ANSI/AWS)

ANSI/AWS A2.4	Standard Symbols for Welding, Brazing, and Non-destructive Examination

(Application for copies should be addressed to the American Welding Society, 550 N. W. LeJeune Road, P. O. Box 351040, Miami, FL 33135)

American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)

ANSI/IEEE STD 260	Letter Symbols for Units of Measurement
ANSI/IEEE STD 280	Standard Letter Symbols for Quantities Used in Electrical Science and Electrical Engineering
ANSI/IEEE STD 315	Graphic Symbols for Electrical and Electronic Diagrams

(Application for copies should be addressed to the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th, New York, NY 10017)

American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)

ASHRAE Handbook	Fundamentals

(Application for copies should be addressed to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1791 Tullie Circle, N. E., Atlanta, GA 30329)

National Fire Protection Association (NFPA)

NFPA 172	Fire Protection Symbols for Architectural and Engineering Drawings, Standard

(Application for copies should be addressed to the National Fire Protection Association, Battery March Park, Quincy, MA 02269)

3. REQUIREMENTS

The graphic symbols used on facilities drawings shall be in accordance with the following paragraphs.

3.1 General. - The graphic symbols used on a facilities drawing shall be shown on a legend located on the drawing sheet where the symbol is used or on a legend located at the front of the drawing. However, commonly used, easily recognized symbols may be omitted from the legend. A drawing note referring to KSC-STD-152-1 for identification of symbols may be appropriate in some cases. If an item does not have a symbol in this standard, a new symbol may be created by the responsible design organization, provided that the new symbol is included in a legend on the drawing.

3.2 Civil. - Graphic symbols used for roads, markers, topographic contours, soil classifications, and other symbology on civil engineering drawings shall be in accordance with GP-435, Volume II.

3.3 Architectural. - Graphic symbols for common types of architectural construction and materials shall be in accordance with GP-435, Volume II and MIL-STD-14.

3.4 Structural. - Graphic symbols used for identifying structural steel shapes on facilities drawings shall contain the standard abbreviations and nomenclature in accordance with AISC M015 or AISC M016. General use symbols, reinforced concrete construction symbols, and symbols for combination of structural shapes, flat-rolled metals, and timber construction shall be in accordance with GP-435, Volume II. Symbols for welding and nondestructive testing shall be in accordance with ANSI/AWS A2.4.

3.5 Mechanical.

3.5.1 Plumbing. - The graphic symbols used for plumbing on facilities drawings are shown in appendix A. The symbols shown in appendix A shall be used on potable water, safewaste, firex, and other plumbing system drawings and diagrams that require the identification of pipe valves and piping components. Flow diagrams shall be drawn using the valve symbols shown in appendix A; however, fittings such as elbows, tees, etc., shall not be shown. Facility plumbing/piping drawings shall indicate the type of pipe connections (i.e., flanged, screwed, welded, etc.) in the specifications but not on the drawings. The basic symbols for plumbing lines and miscellaneous components are shown in table A-1. Pipe fittings, valves, and piping symbols shall be in accordance with ANSI Z32.2.3. The symbols for pipe fittings, valves, and piping that indicate pipe connections shall be used without reference to pipe connections in facilities drawings. Build-to-print drawings, or other special drawings may use symbols that

show pipe connections. Plumbing fixture symbols used on facility drawings shall be in accordance with ANSI Y32.4. Fire protection symbols shall be in accordance with NFPA 172 and as shown in tables A-2 and A-3. Symbols used for tube fittings shall be in accordance with drawing 79K05763.

3.5.2 Heating, Ventilating, and Air Conditioning (HVAC). - The basic symbols used for HVAC systems and components shall be in accordance with ASHRAE Handbook, Fundamentals. Heat power symbols shall be in accordance with ANSI Y32.2.6.

3.6 Electrical. - Electrical graphic symbols for use on facilities drawings are shown in appendix B. The electrical symbols shown in appendix B shall be used on facilities power distribution, lighting, instrumentation, fire alarm, and control system drawings and diagrams. The electrical symbols indicate the physical location and arrangement of the components and identify the physical requirements for various types of materials required for the electrical installation in accordance with ANSI Y32.9, as modified by this standard.

3.6.1 Electrical Power Receptacles. - Graphic symbols for electrical power receptacles shall be in accordance with KSC-STD-E-0011. When an item is used that does not have a symbol listed in KSC-STD-E-0011, a symbol for that item may be used as specified in ANSI/IEEE STD 315.

3.6.2 Electrical Plan Views. - Graphic symbols for electrical plan views shall be as listed in table B-1.

3.6.3 Electrical Wiring or Control Diagrams. - Graphic symbols for electrical wiring or control diagrams shall be as listed in table B-2.

3.6.4 Electrical Single-Line Diagrams. - Graphic symbols for single-line diagrams shall be as listed in table B-3.

3.6.5 Fire Alarms and Emergency Communication. - Graphic symbols for fire alarm and emergency communication systems shall be in accordance with NFPA 172 and as shown in appendix C.

3.6.6 Electronic Security and Intrusion Detection Systems. - Graphic symbols for electronic security and intrusion detection systems shall be as shown in appendix D.

3.6.7 Special Identification. - Electrical components requiring special identification such as weatherproof, dusttight, explosionproof, etc., may be indicated by the use of uppercase letter abbreviations at the standard symbol.

Examples:

Dusttight	DT
Explosionproof	EP
Grounded	G
Key	K
Momentary contact	MC
Potted	PO
Pressurized	PR
Purged	PG
Raintight	RT
Recessed	R
Remote control	RC
Time	T
Vaportight	VT
Watertight	WT
Weatherproof	WP

Single-pole switch, explosionproof	S_{EP}
Recessed incandescent fixture	R
Explosionproof emergency lighting fixture	E_{EP}

3.7 Letter Symbols. - Letter symbols used on facilities drawings shall be in accordance with ANSI Y10.3, ANSI/ASME B1.7M, ANSI/IEEE STD 260, and ANSI/IEEE STD 280.

3.8 Mathematical Signs and Symbols. - Mathematical signs and symbols shall be in accordance with ANSI Y10.20.

3.9 Surface Texture. - Surface texture symbols shall be in accordance with ANSI Y14.36.

4. QUALITY ASSURANCE PROVISIONS

Not applicable

5. PREPARATION FOR DELIVERY

Not applicable

6. NOTES

6.1 Intended Use. - This standard is intended to establish uniform engineering practices and methods for graphic symbols used on facilities drawings at KSC.

6.2 Definitions. - For the purpose of this standard, the following definitions shall apply.

a. Cell. - An organized group of lines and/or symbols that is composed and normally stored in the library of an automated drafting system for future use on drawings. Each cell is given a specific cell name by which it is retrieved and utilized in the preparation of drawings by the automated data system, thus eliminating any redundant effort in the reconstruction of commonly used graphic presentations. Also included are any composite graphic symbols or patterns of common usage in the preparation of engineering drawings in which a master (cell) is manually drafted for utilization in the various step-and-repeat processes made available through the reproduction facilities (e.g., washoffs, etc.).

b. Component. - The smallest assembled item identifiable as a complete, functioning, hardware entity that performs a distinctive function in the operation of an item of equipment or a system.

c. Conventional Facilities. - Conventional (institutional or support) facilities are office buildings, laboratory buildings, auditoriums, libraries, warehouses, cafeterias, shops, walkways, utility systems, and other facilities whose structures are characterized by well established design precedents and loading conditions.

d. Nonconventional Facilities. - Nonconventional facilities are program oriented or experimental in nature and include test stands, launch complexes, operational or research facilities, towers, and similar special-purpose facilities whose structures are characterized by unusual or inadequately defined loading conditions, a lack of established design precedent, or frequent modifications to support changes in the operational requirements.

Custodian:

NASA - John F. Kennedy Space Center

Preparing Activity:

John F. Kennedy Space Center
Facilities Engineering Division
Engineering Development Directorate

APPENDIX A

PLUMBING GRAPHIC SYMBOLS FOR FACILITIES DRAWINGS

The graphic symbols provided herein shall be used in the preparation of Kennedy Space Center (KSC) facilities drawings that require the use of plumbing symbols.

The KSC computer-aided design (CAD) cell names are shown for the graphic symbols listed in the tables in this appendix. These CAD cell names are shown for easy reference in the preparation of computer-generated drawings. If a CAD cell does not currently exist for a symbol shown in the applicable table, a dash is shown in the CAD cell name column.

The CAD cells containing the graphic symbols for CAD-prepared drawings are maintained in the KSC Standard Cell Library and are available for use in preparing KSC drawings.

The symbols provided in this appendix are listed in the following tables.

Table A-1. Graphic Symbols for Plumbing Lines and Miscellaneous Components

PLUMBING LINES		
LINE DESCRIPTION	KSC CAD CELL NAME	SYMBOL
AIR, COMPRESSED	—	——— CA ———
DRAIN, CONDENSATE, ABOVE FLOOR OR GRADE	—	——— CD ———
DRAIN, CONDENSATE, BELOW FLOOR OR GRADE	—	- - - - - CD - - - -
DRAIN, FLOOR	DRFL	⊡ — FD
DRAIN, FUNNEL, OPEN	DRFUNO	Y
DRAIN, SANITARY, ABOVE FLOOR OR GRADE	—	——— SS ———
DRAIN, SANITARY, BELOW FLOOR OR GRADE	—	- - - - - SS - - - -
DRAIN, STORM, ABOVE FLOOR OR GRADE	—	——— SD ———
DRAIN, STORM, BELOW FLOOR OR GRADE	—	- - - - - SD - - - -
GAS	—	— G ——— G —
PIPE, EXISTING	—	——(NAME)——
PIPE, NEW	—	——(NAME)——

Table A-1. Graphic Symbols for Plumbing Lines and Miscellaneous Components (cont)

PLUMBING LINES (CONT)

LINE DESCRIPTION	KSC CAD CELL NAME	SYMBOL
PIPE, TO BE REMOVED	PIPREM	
SPRINKLER, AUTOMATIC	—	ASP
STANDPIPE, DRY	—	DSP
STANDPIPE, WET	—	WSP
SUCTION, MAIN	SUCMAN	
VACUUM (AIR)	—	VAC
VENT	—	
WASTE, ACID	—	ACID
WATER, COLD	—	
WATER, HOT	—	
WATER, HOT, RETURN	H2OHRT	
	H2OMP1	
		OR
WATER, MAIN, PRIVATE	—	
		OR
	—	

Table A-1. Graphic Symbols for Plumbing Lines and Miscellaneous Components (cont)

PLUMBING LINES (CONT)

LINE DESCRIPTION	KSC CAD CELL NAME	SYMBOL
WATER, MAIN, PUBLIC	—	
	—	OR
WATER, MAIN, UNDER BUILDING	H2OMUB	
WATER, POTABLE	—	PW

MISCELLANEOUS COMPONENTS

COMPONENT	KSC CAD CELL NAME	SYMBOL
PUMP	PUMP2	C
PREVENTER, BACKFLOW	BKPREV	
		OR
	BKPRV2	
STRAINER	STRAIN	
STRAINER, SINGLE	STRSI	
STRAINER, TWIN	STRTW	

Table A-1. Graphic Symbols for Plumbing Lines and Miscellaneous Components (cont)

MISCELLANEOUS COMPONENTS (CONT)

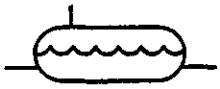
COMPONENT	KSC CAD CELL NAME	SYMBOL
TANK, HYDROPNEUMATIC	HDPNEU	
VALVE, CHECK	VCGEN2	

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment

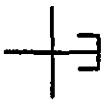
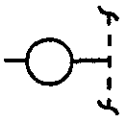
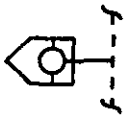
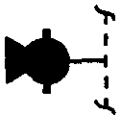
ITEM/DESCRIPTION	GENERAL SYMBOLS KSC CAD CELL NAME	SYMBOL	COMMENTS
BLOCK, THRUST	BLKTHR		
CONNECTION, FREE-STANDING (SIAMESE) (FIRE DEPARTMENT CONNECTION)	CONFST		SIDEWALK OR PIT TYPE, SPECIFY SIZE
CONNECTION, ONE-WAY (FIRE DEPARTMENT CONNECTION)	CONONE		SPECIFY TYPE, SIZE, THREAD, AND ANGLE
CONNECTION, TWO-WAY (SIAMESE) (FIRE DEPARTMENT CONNECTION)	CONTWO		SPECIFY TYPE, SIZE, AND ANGLE
EQUIPMENT, FIRE FIGHTING-GENERAL SYMBOL	EQFIRF		GENERALLY FOR USE WITH OTHER SYMBOLS TO REPRESENT SPECIFIC DEVICES
HANGER, PIPE	HNGPIP		THIS SYMBOL IS AN X IMPOSED ON THE PIPE THAT IT SUPPORTS
HYDRANT, PRIVATE, WITH ONE HOSE OUTLET	HPRONE		INDICATE SIZE
HYDRANT, PRIVATE-HOUSED, WITH TWO HOSE OUTLETS	HPRTWO		INDICATE SIZE
HYDRANT, PUBLIC, WITH TWO HOSE OUTLETS	HPUTWO		INDICATE SIZE
HYDRANT, PUBLIC, WITH TWO HOSE OUTLETS AND PUMPER CONNECTION	HPUTWP		INDICATE SIZE

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment (cont)

GENERAL SYMBOLS (CONT)

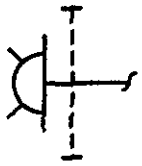
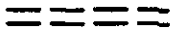
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
HYDRANT, WALL, WITH TWO HOSE OUTLETS	HWTHOS		INDICATE SIZE
LINE, SPRINKLER, MAIN AND BRANCH	—		INDICATE PIPE SIZE
LINE, SUCTION, MAIN	SUCMAN		INDICATE PIPE SIZE
LINE, WATER, MAIN, PRIVATE	H2OMP1		INDICATE PIPE SIZE
LINE, WATER, MAIN, PUBLIC	—		INDICATE PIPE SIZE
LINE, WATER, MAIN, UNDER BUILDING	H2OMUB		INDICATE PIPE SIZE
NOZZLE, MONITOR, CHARGED	NZMONC		
NOZZLE, MONITOR, DRY	NZMOND		
NOZZLE, SPECIAL-SPRAY	NZSPSP		SPECIFY TYPE, ORIFICE, SIZE, OTHER REQUIRED DATA. (SHOWN HERE ON PIPE)
RISER, SPRINKLER	RCEXVA		SHOULD NOT BE CONFUSED WITH FOAM SYSTEM SYMBOL WHEN SHOWN ONLY ON SPRINKLER PLANS
SPRINKLER, GENERAL	SPRGEN		

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment (cont)

GENERAL SYMBOLS (CONT)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
SPRINKLER, OUTSIDE	SPROUT		OPER SPRINKLER (WINDOW OR CORNICE). SPECIFY TYPE, ORIFICE, SIZE.
SPRINKLER, PENDENT	SPRPEN		
SPRINKLER, PENDENT, ON DROP NIPPLE	SPRPDN		
SPRINKLER, SIDEWALL	SPRSDW		
SPRINKLER, UPRIGHT	SPRUPR		
SPRINKLER, UPRIGHT, NIPPLED UP	SPRNPU		
SPRINKLER, WITH GUARD	SPRGRD		
STATION, HOSE, WITH CHARGED STANDPIPE	STHCSP	FHC 	
STATION, HOSE, WITH DRY STANDPIPE	STHDSP	FHD 	
STATION, REEL, CO_2	STRCO2		
STATION, REEL, DRY-CHEMICAL	STRDCM		
STATION, REEL, FOAM	STRFOM		

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment (cont)

GENERAL SYMBOLS (CONT)

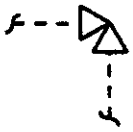
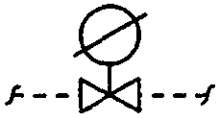
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
TANK, PRESSURE	TANKPR		INDICATE TYPE, CONSTRUCTION, SIZE, AND HEIGHT VIA NOTATIONS
TOWER OR TANK, WATER, ABOVE GROUND, VERTICAL	TWAVRT		INDICATE TYPE, CONSTRUCTION, SIZE, AND HEIGHT VIA NOTATIONS
TOWER OR TANK, WATER, ABOVE GROUND, HORIZONTAL	TWAHOR		INDICATE TYPE, CONSTRUCTION, SIZE, AND HEIGHT VIA NOTATIONS
VALVE AND POST INDICATOR	VPIND		INDICATE VALVE SIZE
VALVE, ANGLE (ANGLE HOSE VALVE)	VANG		INDICATE SIZE, TYPE, AND OTHER REQUIRED DATA
VALVE, BALL	VBAL		
VALVE, BUTTERFLY, INDICATING	VBFIND		INDICATE VALVE SIZE
VALVE, CHECK, ALARM	VCALRM		
VALVE, CHECK, (GENERAL)	VCGEN		INDICATE VALVE SIZE
VALVE, DELUGE	VDELUG		SPECIFY SIZE AND TYPE

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment (cont)

GENERAL SYMBOLS (CONT)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
VALVE, DRY-PIPE	VDRP		
VALVE, DRY-PIPE, WITH QUICK-OPENING DEVICE (ACCELERATOR OR EXHAUST)	VDRPQO		
VALVE, GATE	VGATE1		
VALVE, GLOBE	VGLOBE		
VALVE, IN PIT	VPIT		INDICATE VALVE SIZE
VALVE, KEY-OPERATED	VKEY		INDICATE VALVE SIZE
VALVE, NONINDICATING (NONRISING STEM)	VGATE		
VALVE, OS&Y (OUTSIDE SCREW AND YOKE, RISING STEM)	VOSY		

PORTABLE FIRE EXTINGUISHER SYMBOLS

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
EXTINGUISHER, CO_2	EXTCO2		
EXTINGUISHER, DRY-CHEMICAL, FOR FIRES OF ALL TYPES EXCEPT METALS	EXDEXM		

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment (cont)

PORTABLE FIRE EXTINGUISHER SYMBOLS (CONT)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
EXTINGUISHER, DRY-CHEMICAL, FOR FIRES OF LIQUID, GAS, OR ELECTRICAL TYPES	EXDLGE		
EXTINGUISHER, FOAM	EXTFOM		
EXTINGUISHER, HALON	EXTHAL		
EXTINGUISHER, WATER	EXTH2O		

SMOKE/PRESSURIZATION CONTROL SYMBOLS

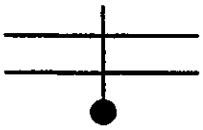
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
BARRIER, FIRE AND SMOKE (COMBINATION)	BARFSM		
BARRIER, SMOKE	BARSMO		
CONTROL, PURGE, MANUAL	CONPMN		
DAMPER, BAROMETRIC	DAMBAR		
DAMPER, FIRE	DAMFIR		

Table A-2. Graphic Symbols for General Fire Protection and Fire Fighting Equipment (cont)

SMOKE/PRESSURIZATION CONTROL SYMBOLS (CONT)

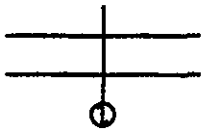
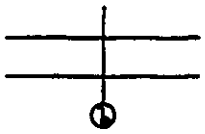
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
DAMPER, FIRE/SMOKE	DAMFSM		
DAMPER, SMOKE	DAMSMO		
DAMPER, STAIRWELL, PRESSURIZED	DAMSTP		ORIENT AS REQUIRED FOR BASE OR HEAD INJECTION
DAMPER, VENTILATION-OPENING	DAMVNT		ORIENT AS REQUIRED FOR BASE OR HEAD INJECTION
FAN, BLOWER	FANBLO		
FAN, DUCT	FANDUC		
FAN, GENERAL	FANGEN		ARROW DIRECTION AS REQUIRED
FAN, ROOF	FANROF		
FAN, WALL	FANWAL		ARROW DIRECTION AS REQUIRED
PANEL, CONTROL, PURGE	PCPRG		
WALL, FIRE-RATED	—		

Table A-3. Graphic Symbols for Special Hazard Extinguishing Systems

The symbols listed in this table are intended for use in identifying the type of system installed to protect an area within a building.

TYPE SYSTEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
CARBON DIOXIDE, AUTOMATICALLY ACTUATED	CO2AUT	
CARBON DIOXIDE, MANUALLY ACTUATED	CO2MAN	
DRY CHEMICAL, FOR FIRES OF ALL TYPES EXCEPT METALS, AUTOMATICALLY ACTUATED	DRYEMA	
DRY CHEMICAL, FOR FIRES OF ALL TYPES EXCEPT METALS, MANUALLY ACTUATED	DRYEMM	
DRY CHEMICAL, FOR LIQUID, GAS, AND ELECTRICAL FIRES, AUTOMATICALLY ACTUATED	DRLGEA	
DRY CHEMICAL, FOR LIQUID, GAS, AND ELECTRICAL FIRES, MANUALLY ACTUATED	DRLGEM	
FORM, AUTOMATICALLY ACTUATED	FOMAUT	
FORM, MANUALLY ACTUATED	FOMMAN	
HALON, AUTOMATICALLY ACTUATED	HALAUT	
HALON, MANUALLY ACTUATED	HALMAN	
WATER-BASED, DRY, AUTOMATICALLY ACTUATED	WATDRA	

Table A-3. Graphic Symbols for Special Hazard Extinguishing Systems (cont)

TYPE SYSTEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
WATER-BASED, DRY, MANUALLY ACTUATED	WATDRM	
WATER-BASED, WET (CHARGED), AUTOMATICALLY ACTUATED	WATWA	
WATER-BASED, WET (CHARGED), MANUALLY ACTUATED	WATWM	

SUPPLEMENTARY SYMBOLS

DESCRIPTION	KSC CAD CELL NAME	SYMBOL
DESIGNATION FOR FULLY SPRINKLERED SPACE	SPRFUL	AS
DESIGNATION FOR NONSPRINKLERED SPACE	SPRNON	NS
DESIGNATION FOR PARTIALLY SPRINKLERED SPACE	SPRPAR	AS

APPENDIX B

ELECTRICAL GRAPHIC SYMBOLS FOR FACILITIES DRAWINGS

The graphic symbols provided herein shall be used in the preparation of Kennedy Space Center (KSC) facilities drawings that require the use of electrical graphic symbols.

The KSC computer-aided design (CAD) cell names are shown for the graphic symbols listed in the tables in this appendix. These CAD cell names are shown for easy reference in the preparation of computer-generated drawings. If a CAD cell does not currently exist for a symbol shown in the applicable table, a dash is shown in the CAD cell name column.

The CAD cells containing the graphic symbols for CAD-prepared drawings are maintained in the KSC Standard Cell Library and are available for use in preparing KSC drawings.

The symbols provided in this appendix are listed in the following tables.

Table B-1. Graphic Symbols for Electrical Plan Views

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
AMPLIFIER, PAGING (INSTALLATION)	PAGAMP	PA
BOX, JUNCTION, CEILING	JBCEIL	J
BOX, JUNCTION, WALL	JBWALL	J
BOX, PULL (DESIGNATES APPLICABLE PULL BOX NUMBER AND TYPE - IF SPECIAL, USE DESCRIPTIVE NOTE AND/OR DETAIL)	PULBOX	PB
BREAKER, CIRCUIT (NOTE SIZE AND TYPE)	CB1	CB
BREAKER, CIRCUIT, AIR (OPERATING CONDITION IS NORMALLY CLOSED INDICATE NORMALLY OPEN CONDITION BY N.O.)	CBA	A. C. B.
BREAKER, CIRCUIT, OIL (OPERATING CONDITION IS NORMALLY CLOSED INDICATE NORMALLY OPEN CONDITION BY N.O.)	CBO	O. C. B.
CABLE, DIRECT-BURIAL, UNDERGROUND (INDICATE CONDUCTOR AND SIZE AS INDICATED)	CDBUG	4C #2 / D. B.
CENTER, MOTOR-CONTROL	CABHTT	
CIRCUIT, BRANCH, CONCEALED IN CEILING OR WALL (MAKE LINE HEAVIER TO DIFFERENTIATE NEW WORK)	—	———
CIRCUIT, BRANCH, CONCEALED IN FLOOR OR UNDERGROUND (MAKE LINE HEAVIER TO DIFFERENTIATE NEW WORK)	—	— — — —
CIRCUIT, BRANCH, EXPOSED (MAKE LINE HEAVIER TO DIFFERENTIATE NEW WORK)	—	- - - - - - - -

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
CONDUIT, RUN DOWN	CONRD	●
CONDUIT, RUN UP	CONRU	○
CONDUIT, STUBBED-UP (6 INCHES ABOVE FLOOR UNLESS OTHERWISE NOTED. CAP END IF CONDUIT IS EMPTY. PROVIDE INSULATED BUSHING IF CONDUIT CONTAINS WIRING)	CONSU6	○S
CONTACTOR, ELECTRICALLY OPERATED, MECHANICALLY HELD (NOTE TYPE AND SIZE)	CONTA3	CM
CONTACTOR, MAGNETIC (SIZE AND TYPE AS NOTED)	CONMAG	C
CONTROLLER, MOTOR, ELECTRICALLY OPERATED (NOTE TYPE AND SIZE)	MOTCEO	⊠
CONTROLLER, MOTOR, WITH DISCONNECT DEVICE, MANUALLY OPERATED (NOTE TYPE AND SIZE)	MOTCDD	⊠ M
CONTROLLER, MOTOR AND DISCONNECT (DEVICE) (COMBINATION) (NOTE TYPE AND SIZE)	MOTCDC	⊠
CUTOUT, OIL-FUSED, LOAD-BREAK (OPERATING CONDITION IS NORMALLY CLOSED - INDICATE NORMALLY OPEN CONDITION BY N.O.)	FCLBO	OIL
DUCT, BUS, PLUG-IN (NOTE SIZE AND TYPE)	DBPI	
DUCT, BUS, SERVICE-FEEDER OR PLUG-IN (IDENTIFY BY NOTATION OR SCHEDULE)	DBSFPI	B B
DUCT, TROLLY, (IDENTIFY BY NOTATION OR SCHEDULE)	DTROL	T T

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
FITTING, SEAL-OFF, CONDUIT	CSEAL	
FIXTURE, EMERGENCY-LIGHTING, CEILING	LEMERF	E
FIXTURE, EMERGENCY-LIGHTING, WALL	LEMERW	E
FIXTURE, FLUORESCENT, CONTINUOUS-ROW	FLF2	
FIXTURE, FLUORESCENT, INDIVIDUAL	FLF	
FIXTURE, LIGHT, EXIT, CEILING	LEXIT	X
FIXTURE, LIGHT, EXIT, WALL	LEXITW	X
FIXTURE, LIGHT, INCANDESCENT, CEILING	LIFC	
FIXTURE, LIGHT, INCANDESCENT, WALL	LIFW	
FIXTURE, LIGHT, RECESSED, CEILING	LRCEIL	R
FIXTURE, LIGHT, RECESSED, WALL	LRWALL	R
FLOODLIGHT	LFL	

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
GENERATOR	GEN	G
GROUND, DRIVEN	GNDDRI	● g
GROUND, INSTRUMENTATION	—	— I ——— I —
GROUND, LIGHTNING-PROTECTION	—	- L —— L —— L -
GROUND, POWER OR BUILDING	—	— G ——— G —
GUY, SPAN OR HEAD (IDENTIFY BY NOTATION OR SCHEDULE)	GUYSP	∪∪
HANDHOLE	HANHOL	HH
HEATER (NOTE RATING)	HEATSP	≡
HOLDER, LAMP, CEILING	LPHOLD	L
HOLDING, LAMP, WALL	LPWALL	L⊣
HUMIDISTAT	HUMIDI	H
LADDER OR CHANNEL, CABLE-TROUGH (IDENTIFY BY NOTATION OR SCHEDULE)	LADCTR	BP BP

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
LIGHT, METAL HALIDE	LMHL	MH
LIGHT, MERCURY-VAPOR	LMV	MV
LIGHT, SODIUM-VAPOR	LSV	SV
LUMINAIRE, STREET-LIGHT, ENCLOSED (INDICATE TYPE OF DISTRIBUTION) **	LSLEN	
LUMINAIRE, STREET-LIGHT, OPEN-TYPE **	LSLOT	
MANHOLE (DESIGNATE MANHOLE NUMBER AND TYPE - IF SPECIAL, USE DESCRIPTIVE NOTE AND/OR DETAIL)	MANHOL	MH
MANHOLE OR VAULT, TRANSFORMER (IDENTIFY BY NOTATION OR SCHEDULE)	MHXFRM	TM
MOTOR * INDICATE HOURSEPOWER	MOTOR	*
MOTOR-GENERATOR (SET) (INDICATE SIZE AND TYPE)	MOGEN	M G
OUTLET, PAGING, CEILING	PGOTO	C
OUTLET, PAGING, WALL	PGOTW	W

** REQUIREMENT FOR SERIES OR MULTIPLE TYPE FIXTURE WILL BE INDICATED BY POLE OR IN SPECIFICATIONS. CIRCUIT IS INDICATED BY SEPARATE SYMBOL. RATING OF LAMP IS INDICATED BY SUBSCRIPT OR IN NOTE. LAMPS ARE INCANDESCENT UNLESS SPECIFICALLY INDICATED OTHERWISE.

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
OUTLET, PAGING, WEATHERPROOF	PGOTWP	WP
OUTLET, LIGHTING, BLANKED, CEILING	LIFCB	B
OUTLET, LIGHTING, BLANKED, WALL	LIFWB	B
PAD, TRANSFORMER (IDENTIFY BY NOTATION OR SCHEDULE)	PDXFRM	TP
PANEL, LIGHT AND POWER	PANLP	
PANELBOARD, POWER, 120/208-VOLT	PANLVP	
PANELBOARD, POWER, 480-VOLT	PANHVP	
PANELBOARD AND CABINET, FLUSH-MOUNTED	PCFM	
PANELBOARD AND CABINET, SURFACE-MOUNTED	PCSM	
POLE (PLACE APPLICABLE NUMBER BESIDE SYMBOL TO DENOTE CLASS AND HEIGHT AS INDICATED. PLACE APPLICABLE POLE NUMBER IN CIRCLE AS INDICATED)	POL	4/40 172
POLE, RELOCATED (NEW LOCATION OF RELOCATED POLE) (PLACE APPLICABLE NUMBER BESIDE SYMBOL TO DENOTE CLASS AND HEIGHT AS INDICATED. PLACE APPLICABLE POLE NUMBER IN CIRCLE AS INDICATED)	POLREL	4/40 14

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
POLE, TO BE REMOVED OR RELOCATED (WHEN EXISTING POLE IS TO BE REMOVED WITHOUT REPLACEMENT, ADD APPLICABLE NUMBER TO DENOTE CLASS AND HEIGHT AS INDICATED. PLACE APPLICABLE POLE NUMBER IN CIRCLE AS INDICATED. WHEN EXISTING POLE IS TO BE REPLACED, INDICATE EXISTING POLE SIZE AND NEW POLE SIZE. EXAMPLE: 4/40 / 3/45 BOTTOM NUMBER INDICATES NEW POLE SIZE	POLREM	⊗ 4/40 ⑭
POLE, WITH DOWN GUY AND ANCHOR (IDENTIFY BY NOTATION OR SCHEDULE)	POLE	
POLE, WITH STREET LIGHT (IDENTIFY BY NOTATION OR SCHEDULE)	LSLWP	
RECEPTACLE, GROUNDING	GNDREC	
RECLOSER, CIRCUIT, OIL (OPERATING CONDITION IS NORMALLY CLOSED. INDICATE NORMALLY OPEN CONDITION BY N.O.)	OCR	O. C. R.
REGULATOR, VOLTAGE (DENOTE CAPACITY AND RATING)	REGVOL	
RELAY, ELECTRIC-EYE	EYERL	
SECTIONALIZER, CIRCUIT (NOTATE DESCRIPTION)	CIRSEC	SECT
SOURCE, BEAM, ELECTRIC-EYE	EYEBS	
STATION, PUSHBUTTON, MOMENTARY-CONTRACT (ON-OFF OR AS NOTED)	PBSTA	

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

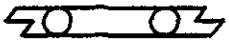
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
STRIP, PLUG-IN (15-AMP RECEPTACLES 18 INCHES BETWEEN CENTERS OR AS NOTED ON DRAWING)	STPI15	
SWITCH, DISCONNECT (NOTE SIZE AND TYPE)	SDISC	
SWITCH, DISCONNECT, FUSIBLE, CLAMP-ON (TO FEED PLUG-IN RUNS)	SDFCO	
SWITCH, DOOR	SD	S_D
SWITCH, DOUBLE-POLE	S2	S_2
SWITCH, EXPLOSIONPROOF	SEP	S_{EP}
SWITCH, FLOAT, MECHANICAL	SMFL	F
SWITCH, FOR LOW-VOLTAGE SWITCHING SYSTEM	SL	S_L
SWITCH, FOUR-WAY	S4	S_4
SWITCH, KEY-OPERATED	SK	S_K
SWITCH, LIMIT, MECHANICAL	SML	L
SWITCH, MASTER, FOR LOW-VOLTAGE SWITCHING SYSTEM	SLM	S_{LM}

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
SWITCH, MOMENTARY-CONTACT	SMC	SMC
SWITCH, OIL, LOAD-BREAK (OPERATING CONDITION IS NORMALLY CLOSED. INDICATE NORMALLY OPEN CONDITION BY N.O.)	SLBO	OIL
SWITCH, PNEUMATIC, MECHANICAL	SMPNEU	P
SWITCH, REMOTE-CONTROL	SRC	SRC
SWITCH, SINGLE-POLE	S	S
SWITCH, THREE-WAY	S3	S3
SWITCH, TIME	ST	ST
SWITCH, WEATHERPROOF	SWP	SWP
SWITCH AND LAMP, PILOT	SP	SP
SWITCH AND RECEPTACLE, DOUBLE	RCPTDO	S
SWITCH AND RECEPTACLE, SINGLE	RCPTSO	S
TELEPHONE, INTERCONNECTING	PHINT	

Table B-1. Graphic Symbols for Electrical Plan Views (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
TELEPHONE, OUTSIDE	PHOUT	
TERMINATION, CONDUIT, FLUSH WITH WALL, WITH INSULATED BUSHING	TCFWIB	
TERMINATION, CONDUIT, BURIED (PLUG OR CAP ENDS AS REQUIRED)	TCBUR	
THERMOSTAT (5 FEET 0 INCHES ABOVE THE FLOOR)	THERMO	T
TRANSFORMER, CONSTANT-CURRENT (DENOTE CAPACITY AND RATING)	TCCUR	
TRANSFORMER, SINGLE-PHASE (DENOTE SIZE, VOLTAGE, RATING, AND METHOD OF CONNECTION)	XSP	T
TRANSFORMER, SINGLE-PHASE, TO BE REMOVED OR RELOCATED (WHEN EXISTING TRANSFORMER IS TO BE REPLACED, BOTH REMOVAL SYMBOL AND NEW SYMBOL WITH APPROPRIATE NOTES WILL BE SHOWN)	XSPREM	
WIRING, INDICATING HOME RUN TO PANELBOARD (INDICATE NUMBER OF CIRCUITS BY NUMBER OF ARROWS. ANY CIRCUIT WITHOUT FURTHER DESIGNATION INDICATES A 2-WIRE CIRCUIT. INDICATE NUMBER OF WIRES AS SHOWN IN THE FOLLOWING EXAMPLES)	WHRPAN	
EXAMPLES		
3 WIRES		12, 3 #12 / 3/4" CND
CABLES		3C #12 / 1" CND
WIREWAYS (IDENTIFY BY NOTATION OR SCHEDULE)	WWAY	W W

Table B-2. Graphic Symbols for Wiring and Control Diagrams

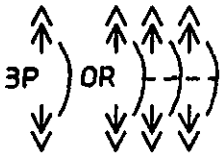
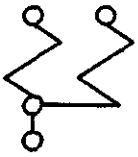
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
AMMETER	MTRAM	
BREAKER, CIRCUIT	CB3	
BREAKER, CIRCUIT, THREE-POLE, DRAWOUT-TYPE	CB3PD	
COIL, BLOWOUT, MAGNETIC	KRMBO	
COIL, RELAY	KRPC1	
COIL, RELAY, DROPOUT-DELAY	KRDOD	
COIL, RELAY, LATCH-TYPE	KRLT	
COIL, RELAY, PICKUP-DELAY	KRPUD	
COIL, RELAY, POLORIZED, DOUBLE-ACTION	KRPDA	
COIL, RELAY, POLORIZED SINGLE-ACTION	KRPSA	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
COIL, SOLENOID, ELECTROMAGNET-ACTUATED, WITH MECHANICAL LINKAGE	KREAML	
CAPACITOR	CAP	|(
CONDUCTORS, THREE (OR CONDUCTIVE PATHS)	COND31 COND32	OR
CONDUCTORS, TWO (OR CONDUCTIVE PATHS)	COND21 COND22	OR
CONNECTION, ELECTRICAL (USE FOR TERMINALS NOT DESIGNATED)	CONC	●
CONNECTION, TERMINAL, SOLDER	TERCS	O
CONNECTION, TERMINAL, PATCH, PLUG-IN	TERPIP	⊘
CONNECTION, TERMINAL, SCREW-STUD	TERSS	⊗
CONNECTION, TEST-POINT	TP1	
CONNECTIONS, SEPARABLE (ENGAGED)	CONM	
CONNECTOR, (MALE OR FEMALE)	CONPOS	>
CONTACT, CLOSED, WITH TIME OPENING (TO) FEATURE	KCCWTO	TO
CONTACT, CLOSED, WITH TIME-DELAY OPENING (TDO) FEATURE	KCCWTD	TDO

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
CONTACT, OPEN, WITH TIME CLOSEING (TC) FEATURE	KCOTC	TC
CONTACT, OPEN, WITH TIME-DELAY CLOSING (TDC) FEATURE	KCOTDC	TDC
CONTACT, RELAY, CLOSED BREAK)	KCRCB1	
	KCRCB2	
CONTACT, RELAY, MAGNETIC, LATCHING	KCML	
CONTACT, RELAY, NORMALLY CLOSED	KCC	
CONTACT, RELAY, NORMALLY OPEN	KCO	
CONTACT, RELAY, OPEN (MAKE)	KCRNO	
	KCRO	
CONTACT, RELAY, TRANSFER	KCTR	
CONTACT, WITH TIME SEQUENTIAL CLOSING	KCTSCC	
CONTACTOR, ELECTRICALLY OPERATED, ONE-POLE, WITH SERIES BLOWOUT COIL	KEO1P1	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

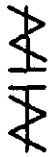
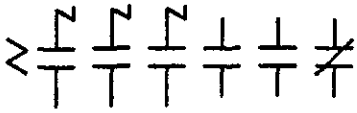
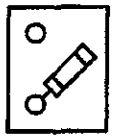
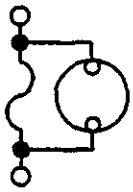
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
CONTACTOR, ELECTRICALLY OPERATED, ONE-POLE, WITH SHUNT BLOWOUT COIL	KEO1P2	
CONTACTOR, ELECTRICALLY OPERATED, THREE-POLE, WITH SERIES BLOWOUT COILS	KEO3PS	
DISCONNECT, FUSED	FDISC	
DISCONNECT, NONFUSED	FNDISC	
FILTER, AC-POWER	FILACP	
FUSE (ONE-TIME THERMAL CURRENT OVERLOAD DEVICE)	FUSE2	
FUSE, WITH INDICATING LAMP	FWIL	
GROUND, EARTH	GNDES	
GROUND, MACHINE, FRAME OR CHASSIS	GNDEQ	
HEATER, SPACE	HEATSP	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
LEADS, GROUPED (BEND OF LINES INDICATES DIRECTION OF OTHER END OF LINE PATH)	LGR	
LEADS, GROUPED, INTERRUPTED (ON DIAGRAM)	LGRINT	
LAMP (SINGLE OR MULTIPLE) *LETTER INDICATES COLOR OF LENS A - AMBER B - BLUE C - CLEAR G - GREEN O - ORANGE R - RED W - WHITE Y - YELLOW	LP3	
LAMP, NEON	LPNEON	
LAMP, PRESS-TO-TEST * USE LETTER TO INDICATE COLOR OF LENS AS NOTED FOR LAMP ABOVE	LPPTT	
MAGNETORESISTOR, LINEAR-TYPE	RMLT	
MOTOR-GENERATOR	MOGEN	
OVERLOAD, MOTOR (THERMAL)	MOTOVL	
PASSOVER, CONDUCTOR (NO ELECTRICAL CONNECTION)	CONPAS	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
RESISTOR	RFIX4	
RESISTOR, NONLINEAR (INTRINSIC)	RINL	
RESISTOR, WITH ADJUSTABLE CONTACT	RV5	
RESISTOR, VARIABLE	RV4	
SWITCH, AMMETER	SAMTR	AS
SWITCH, CLOSED, WITH TIME-DELAY CLOSING (TDC) FEATURE	SCTDCF	TDC
SWITCH, CLOSED, WITH TIME-DELAY OPENING (TDO) FEATURE	SCTDOF	TDO
SWITCH, SINGLE-POLE, DOUBLE-THROW, OFF IN CENTER, MOMENTARY CONTACT	SSPDTM	
SWITCH, FLOW-ACTUATED (CLOSES ON INCREASE IN FLOW)	SCOIF	
SWITCH, FLOW-ACTUATED (OPENS ON INCREASE IN FLOW)	SOIFL	
SWITCH, LIMIT, NORMALLY CLOSED	SLIMNC	
SWITCH, LIMIT, NORMALLY CLOSED, HELD OPEN	SHOL	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
SWITCH, LIMIT, NORMALLY OPEN	SLNO	
SWITCH, LIMIT, NORMALLY OPEN, HELD CLOSED	SLNOHC	
SWITCH, LIQUID-LEVEL-ACTUATED (CLOSES ON RISING OF LIQUID LEVEL)	SCRLLA	
SWITCH, LIQUID-LEVEL-ACTUATED (OPENS ON RISING OF LIQUID LEVEL)	SORLLA	
SWITCH, MECHANICALLY LATCHED	SMLAT	
SWITCH, MOMENTARY, LEFT	SMTOG1	
SWITCH, MOMENTARY, RIGHT	SMTOG2	
SWITCH, NONLOCKING, CIRCUIT-CLOSING (MAKE)	SNCCM	
SWITCH, NONLOCKING, CIRCUIT-CLOSING (BREAK)	SNCOB	
SWITCH, OPEN, WITH TIME-DELAY CLOSING (TDC) FEATURE	SOTDC	TDC
SWITCH, OPEN, WITH TIME-DELAY OPENING (TDO) FEATURE	SOTDO	TDO
SWITCH, PRESSURE (CLOSES ON RISING PRESSURE)	SPRES2	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

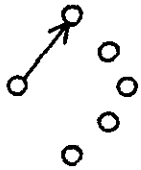
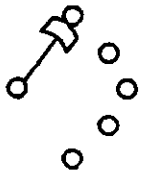
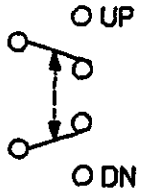
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
SWITCH, PRESSURE (OPENS ON RISING PRESSURE)	SPRES1	
SWITCH, PUSHBUTTON, CIRCUIT-OPEN	SCOP	
SWITCH, PUSHBUTTON, MOMENTARY, TWO-CIRCUIT	S2CMP	
SWITCH, PUSHBUTTON, WITH HOLD CONTACTS	PBHC	
SWITCH, ROTARY, BREAK-BEFORE-MAKE	SBBMR	
SWITCH, ROTARY, MAKE-BEFORE-BREAK	SMBBR	
SWITCH, SPECIAL-CIRCUIT, CENTER-POSITION (UP POSITION TRANSFERS CONTROL OF FIRST SECTION. DOWN POSITION TRANSFERS CONTROL OF SECOND SECTION AND RESTORES FIRST SECTION.)	SSCCPS	
SWITCH, TEMPERATURE-ACTUATED (CLOSES ON RISING TEMPERATURE)	SCRTA	
SWITCH, TEMPERATURE-ACTUATED (OPENS ON RISING TEMPERATURE)	SORTA	
SWITCH, TOGGLE	STOG3	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

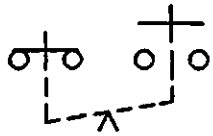
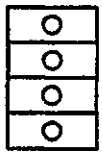
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
SWITCH, TOGGLE, LEFT	STOG2	
SWITCH, TOGGLE, MOMENTARY, LEFT	SMTOG1	
SWITCH, TOGGLE, MOMENTARY, OFF IN CENTER POSITION	SMCOT	
SWITCH, TOGGLE, MOMENTARY, RIGHT	SMTOG2	
SWITCH, TOGGLE, OFF IN CENTER POSITION	SCOT	
SWITCH, TOGGLE, RIGHT	STOG1	
SWITCH, TRANSFER	STRAN	
SWITCH, TWO-CIRCUIT, MAINTAINED OR NOT SPRING-RETURN	SMONS2	
SWITCH, VOLTMETER	SVOLT	
TERMINAL, CIRCUIT (FOUR TERMINALS SHOWN. NUMBER AND ARRANGEMENT OF TERMINALS AS REQUIRED)	TB04	
TERMINATION, CABLE	CABTER	
THERMISTOR (RESISTOR, TEMPERATURE-SENSITIVE)	THERMI	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

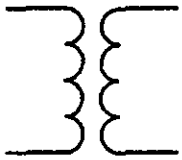
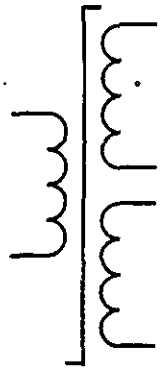
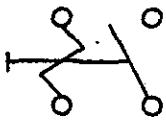
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
THERMOCOUPLE, TEMPERATURE-MEASURING	TCTM	
TRANSFORMER (ADDITIONAL WINDINGS MAY BE SHOWN OR INDICATED BY A NOTE) (IN COAXIAL AND WAVEGUIDE CIRCUITS, THIS SYMBOL REPRESENTS A TAPER OR STEP TRANSFORMER WITHOUT MODE CHANGE)	TRANS2	
TRANSFORMER, IRON-CORE	TIC	
TRANSFORMER, IRON-CORE, VARIABLE	TICV	
TRANSFORMER, ONE-PHASE, TWO-WINDING	T1P2W	
TRANSFORMER, SATURATING	TSAT	
VALVE, SOLENOID, NORMALLY OPEN	VSNO2	

Table B-2. Graphic Symbols for Wiring and Control Diagrams (cont)

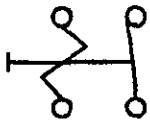
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
VALVE, SOLENOID, PILOT, NORMALLY OPEN	VSNO1	
VARISTOR, ADJUSTABLE OR CONTINUOSLY ADJUSTABLE (RHEOSTAT)	REOVAR	
VARISTOR, SYMMETRICAL (INTRINSIC)	RSVAR	
VOLTMETER	MTRVLT	

Table B-3. Graphic Symbols for Electrical Single-Line Diagrams

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
AMMETER	MTRAM	A
BOX, JUNCTION	JUNBOX	
	JNBOX2	J
BREAKER, CIRCUIT (NOTE TRIP AMPS, FRAME AMPS, AND NUMBER OF POLES)	CB2	
BREAKER, CIRCUIT, DRAW-OUT, FRAME/TRIP	CBDO	
CONNECTION, ELECTRICAL (FOR USE WHERE TERMINALS ARE NOT DESIGNATED)	CONC	
CONNECTION, TERMINAL, DESIGNATED	TERCS	
CONNECTION, SEPARABLE	CONM	
CONTACTOR, POWER, ELECTRICALLY OPERATED X = NUMBER OF POLES (RELAY POWER SOURCE)	CONXP	XP
DISCONNECT OR CUTOUT, FUSED (SUBSCRIPT DENOTES NUMBER AND RATED CURRENT CARRYING CAPACITY)	FDOC	3-100A
DUCT, BUS, PLUG-IN (NOTE SIZE AND TYPE	DBPI	
ENTRANCE, SERVICE (INDICATE SIZE IN INCHES AND IDENTIFY DIFFERENT FUNCTIONS OF WIRING SYSTEM, SUCH AS SIGNALING, BY NOTATION OR OTHER MEANS)	SERVEN	

Table B-3. Graphic Symbols for Electrical Single-Line Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
FILTER, AC-POWER	FILACP	
FIXTURE, LIGHT, FLUORESCENT	FLF	
FIXTURE, LIGHT, INCANDESCENT	LIFC	
FIXTURE, LIGHT, MERCURY-VAPOR	LMV	MV
FIXTURE, LIGHT, METAL HALIDE	LMHL	MH
FIXTURE, LIGHT, SODIUM-VAPOR	LSV	SV
FIXTURE, LIGHTING, EMERGENCY	LEMERF	E
FLOODLIGHT	LFL	
GENERATOR	GEN	G
GROUND, DRIVEN	GNDDRI	9
GROUND, EARTH	GNDES	
GROUND, MACHINE, FRAME, OR CHASSIS	GNDEQ	

Table B-3. Graphic Symbols for Electrical Single-Line Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
HEATER (NOTE RATING)	HEATSP	
HOLDER, LAMP	LPHOLD	L
INTERLOCKED, ELECTRICAL	INTLKE	E
INTERLOCKED, KEY	INTLKK	K
INTERLOCKED, MECHANICAL	INTLKM	M
LIGHT, EXIT	LEXIT	X
LIGHT, EXIT, RECESSED	LRE	RX
LUMINAIRE, STREET-LIGHT, ENCLOSED (NOTE TYPE OF DISTRIBUTION) **	LSLEN	
LUMINAIRE, STREET-LIGHT, OPEN-TYPE **	LSLOT	
MOTOR * INDICATE HORSEPOWER	MOTOR	*
MOTOR-GENERATOR (SET) (NOTE SIZE AND TYPE)	MOGEN	M G

** REQUIREMENT FOR SERIES OR MULTIPLE TYPE FIXTURE WILL BE INDICATED BY POLE OR IN SPECIFICATIONS. CIRCUIT IS INDICATED BY SEPARATE SYMBOL. RATING OF LAMP IS INDICATED BY SUBSCRIPT OR IN NOTE. LAMPS ARE INCANDESCENT UNLESS SPECIFICALLY INDICATED OTHERWISE.

Table B-3. Graphic Symbols for Electrical Single-Line Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
OUTLET, CLOCK-HANGER	CLKOUT	C
PASSOVER, CONDUCTOR (NO ELECTRICAL CONNECTION)	CONPAS	
RECEPTACLE (NOTE SIZE AND TYPE) (USE ONLY FOR IDENTIFICATION OF RECEPTACLES NOT LISTED IN KSC-STD-E-0011)	RCPTST	R
RECEPTACLE, UNKNOWN	RCPTUN	U
RECTIFIER	RECT	DC
STRIP, PLUG-IN, 15-AMP	STPI15	
STRIP, PLUG-IN, 30-AMP	STPI30	
SWITCH, AMMETER	SAMTR	AS
SWITCH, DISCONNECT, FUSED (NOTE TRIP AMPS, FRAME AMPS, AND NUMBER OF POLES)	FDISC	
SWITCH, DISCONNECT, NONFUSED (NOTE FRAME RATING AND NUMBER OF POLES)	FNDISC	
SWITCH, GANG-OPERATED, AIR-BREAK, LOAD-BREAK, THREE-PHASE	SGOABL	LB

Table B-3. Graphic Symbols for Electrical Single-Line Diagrams (cont)

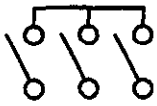
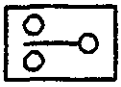
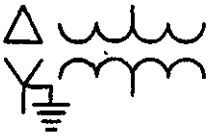
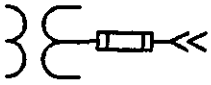
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
SWITCH, GANG-OPERATED, AIR-BREAK, NONLOAD-BREAK, THREE-PHASE	SGOABN	
SWITCH, LOAD-BREAK	SLBRK	
SWITCH, MANUAL ON/OFF AUTOMATIC	SMOFA	
SWITCH, TRANSFER, AUTOMATIC (NOTE FRAME AMPS AND NUMBER OF POLES)	SAT	
SWITCH, TRANSFER, MANUAL (NOTE FRAME AMPS AND NUMBER OF POLES)	SMANT	
SWITCH, VOLTMETER	SVOLT	
TERMINATION, CONDUIT INDICATE SIZE IN INCHES AND IDENTIFY DIFFERENT FUNCTIONS OF WIRING SYSTEM, SUCH AS SIGNALLING, BY NOTATION OR OTHER MEANS.	—	
TRANSFORMER (NOTE KVA RATING, PRIMARY VOLTAGE, AND SECONDARY VOLTAGE)	TRANS	
TRANSFORMER, CURRENT	TCUR	
TRANSFORMER, POTENTIAL, DRAWOUT-TYPE, WITH CURRENT-LIMITING FUSE	TPOT	

Table B-3. Graphic Symbols for Electrical Single-Line Diagrams (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
VOLTMETER	MTRVLT	V
WIRE, COILED (ABANDONED IN PLACE FOR FUTURE CONNECTION)	COILED	
WIRE AND CONDUIT (RUN)	WCOND	NO OF WIRES; SIZE OF WIRES; Y-WZ / (XX') P" CND; SIZE OF CONDUIT; LENGTH OF RUN
WIRING, TURNED DOWN INDICATE SIZE IN INCHES AND IDENTIFY DIFFERENT FUNCTIONS OF WIRING SYSTEM, SUCH AS SIGNALLING, BY NOTATION OR OTHER MEANS.	WTURND	
WIRING, TURNED UP INDICATE SIZE IN INCHES AND IDENTIFY DIFFERENT FUNCTIONS OF WIRING SYSTEM, SUCH AS SIGNALLING, BY NOTATION OR OTHER MEANS.	WTURNU	

APPENDIX C

FIRE ALARM EMERGENCY COMMUNICATION SYSTEMS GRAPHIC SYMBOLS FOR FACILITIES DRAWINGS

The graphic symbols provided herein shall be used in the preparation of Kennedy Space Center (KSC) facilities drawings that require the use of fire alarm and emergency communication systems symbols. (See table C-1.)

The KSC computer-aided design (CAD) cell names are shown for the graphic symbols listed in table C-1. The CAD cell names are shown for easy reference in the preparation of computer-generated drawings. The CAD cells containing the graphic symbols for CAD-prepared drawings are maintained in the KSC Standard Cell Library and are available for use in preparing KSC drawings.

Table C-1. Graphic Symbols for Fire Alarm and Emergency Communication Systems

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
ALARM, WATER-MOTOR (WATER-MOTOR GONG)	AWMOT		SHIELD OPTIONAL
BELL (GONG)	BELLG		DESIGNATE SIZE AND TYPE
BELL, FIRE-ALARM	BELLF	F	DESIGNATE SIZE AND TYPE
DETECTOR, FLAME (FLICKER DETECTOR)	DTFLM		INCLUDES ULTRAVIOLET, INFRARED, AND VISIBLE RADIATION DETECTORS
DETECTOR, FLAME, ULTRAVIOLET (ARROW INDICATES DIRECTION)	DTFUV	UV	DESIGNATE CONE OF VISION
DETECTOR, FLAME, ULTRAVIOLET/INFRARED (ARROW INDICATES DIRECTION)	DTFUI	UI	DESIGNATE CONE OF VISION
DETECTOR, GAS	DTGAS		
DETECTOR, HEAT	HEATDE		COMBINATION 136 °F FIXED TEMPERATURE 15 °F/MIN RATE OF RISE. DESIGNATE DIFFERING OPERATING PARAMETERS
DETECTOR, HEAT (THERMAL)	DTHTH		INCLUDES FIXED-TEMPERATURE OR RATE-COMPENSATION
DETECTOR, IONIZATION	DTION	I	
DETECTOR, PHOTOELECTRIC	DTPHOT	P	

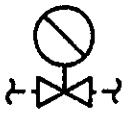
Table C-1. Graphic Symbols for Fire Alarm and Emergency Communication Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
DETECTOR, SMOKE	DTSMO		EXCLUDES PHOTO-ELECTRIC AND IONIZATION
DETECTOR, SMOKE, IN DUCT	DTSMOD		USE P FOR PHOTO-ELECTRIC AND I FOR IONIZATION
DETECTOR/SWITCH, FLOW	DTSFLO		NON-FIRE ALARM
DETECTOR/SWITCH, LEVEL	DTSLEV		
DETECTOR/SWITCH, PRESSURE	DTSPR		NON-FIRE ALARM
DETECTOR/SWITCH, TAMPER	DTSTAM		
HOLDER, DOOR	DHOLD		
HORN/SPEAKER (ELECTRIC HORN)	HORNSP	H	
HORN, WITH LIGHT/ STROBE	HORNLT	H	
LIGHT (LAMP, SIGNAL LIGHT, INDICATOR LAMP, STROBE)	LIT		
LIGHT, EMERGENCY, BATTERY-POWERED, ONE LAMP	LEMBP1		
LIGHT, EMERGENCY, BATTERY-POWERED, THREE LAMPS	LEMBP3		

Table C-1. Graphic Symbols for Fire Alarm and Emergency Communication Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
LIGHT, EMERGENCY, BATTERY-POWERED, TWO LAMPS	LEMBP2		
PANEL, CONTROL, FIRE-ALARM	FACPNL	F	
PANEL, CONTROL, HALON	PANHAL	H	
PANEL, CONTROL, SPRINKLER/DELUGE	PANDEL		SPECIFY S FOR PREACTION SPRINKLER, D FOR DELUGE
SIGN, EXIT, ILLUMINATED	EXSIL		
SIGN, EXIT, ILLUMINATED, WITH DIRECTION ARROW	EXSILA		
STATION, FIRE-ALARM, AUTOMATICALLY OPERATED	STFAAO	F A	
STATION, FIRE-ALARM, MANUALLY OPERATED (CALL POINT)	STFAMO	F	
STATION, TELEPHONE (CALL POINT)	SPHONE		
SWITCH, FLOW	SFLOW	FS	FIRE ALARM
SWITCH, PRESSURE	SPRESS	PS	FIRE ALARM
TRANSFORMER, BELL-RINGING	XFBELL	BT	

Table C-1. Graphic Symbols for Fire Alarm and Emergency Communication Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL	COMMENTS
VALVE, WITH TAMPER DETECTOR/SWITCH	VTAMDS		

APPENDIX D

ELECTRONIC SECURITY AND INTRUSION DETECTION SYSTEMS GRAPHIC SYMBOLS FOR FACILITIES DRAWINGS

The graphic symbols provided herein shall be used in the preparation of Kennedy Space Center (KSC) facilities drawings that require the use of electronic security and intrusion detection systems symbols. (See table D-1.)

The KSC computer-aided design (CAD) cell names are shown for the graphic symbols listed in table D-1. The CAD cell names are shown for easy reference in the preparation of computer-generated drawings. The CAD cells containing the graphic symbols for CAD-prepared drawings are maintained in the KSC Standard Cell Library and are available for use in preparing KSC drawings.

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
ANNUNCIATOR, ZONE, REMOTE	RZA	
BARRICADE, ANTITERRORIST	ATB	
BATTERY/SUPPLY, POWER, EMERGENCY	EPSB	
BOARD/CONTROL/ANNUNCIATOR, ZONE, SLAVE	SZBCA	
BOLT, DOOR	DB	
BOX, SPLICE/CONNECTION	SCB	
BREAKER, CIRCUIT	CB3	
BUTTON, HOLDUP/PANIC	HUPB	
BUZZER	BUZZ	
CAMERA, CCTV	CAM1	
CAMERA, CCTV, WITH ZOOM LENS	CAM2	
CAMERA, FILM	CAM3	

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
COMMUNICATOR, DIGITAL, SLAVE	SDC	C n
COMPUTER	COMP	μ
CONTROL, ZOOM, LENS	ZLC	ZM
DETECTOR, GLASS-BREAKAGE	GBD	G
DETECTOR/DISCRIMINATOR, SOUND	SDD	S
DEVICE, DUAL-TECHNOLOGY	DTD	
DEVICE, HOLDUP/PANIC	HUPD	
DEVICE, PROTECTION, SPACE	SPD	
DIALER, TAPE, SLAVE	STD	L n
GATE, PARKING	PG	
KEYPAD, DIGITAL	DK	D
KEYPAD, DIGITAL, AND CARD READER	DKCR	D

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems (cont)

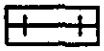
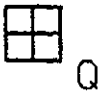
ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
KEYPAD, DIGITAL, REMOTE-CONTROL	RCDK	
KEYSWITCH, REMOTE-CONTROL	RCK	
LOCK, DOOR, ELECTROMAGNETIC	EDL	
LOCK, KEYLESS	KL	
MAT, FLOOR	FM	
MICROPHONE, LISTEN-IN	LIM	
MONITOR	MON	
PHOTOELECTRIC, SELF-CONTAINED	SCP	
PRINTER	PRN	
PROCESSOR, SIGNAL	SPROC	
PROCESSOR, SIGNAL, INFRARED, PASSIVE	PISP	
PROCESSOR, SIGNAL, LISTEN-IN	LISP	

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
PROCESSOR, SIGNAL, MICROWAVE	MSP	M
PROCESSOR, SIGNAL, SOUND-DETECTOR	SDSP	S
PROCESSOR, SIGNAL, ULTRASONIC	USP	U
PROCESSOR, SIGNAL, VIBRATION/SHOCK	VVSP	V
READER, BIOMETRIC	BR	
READER, CARD	CR	
RECEIVER, BEAM, PHOTOELECTRIC	PBR	P
RECEIVER, MICROWAVE	MWR	M
RECEIVER, ULTRASONIC	USR	U
RECEIVER, WIRELESS	WR	W
RECEIVER, WIRELESS, SUPERVISED	SWR	Y
RECORDER, TAPE, VIDEO	VTR	

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
SCREEN, ALARM	AS	
SENSOR, INFRARED, PASSIVE	PIS	I
SENSOR, MOTION DETECTION, VIDEO	MDVS	C
SENSOR, VIBRATION/SHOCK	VSS	V
SPEAKER, HORN/SIREN	HSS	
STRIKE, DOOR	DS	
SWITCH, CONTACT, FLUSH-MOUNTED	FMCS	F
SWITCH, CONTACT, SURFACE-MOUNTED	SMCS	
SWITCH, MAGNETIC, BALANCED	BMS	
SWITCH, MAGNETIC, BALANCED, EXPLOSIONPROOF	EBMS	
SWITCHER, MANUAL	MS	
SWITCHER, SEQUENTIAL	SS	SQ
TAPE, FOIL	FT	

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
TOGGLE/PUSHBUTTON, REMOTE-CONTROL	RCTP	R T
TRANSCEIVER, MICROWAVE	MT	M
TRANSCEIVER, ULTRASONIC	UT	U
TRANSMITTER, BEAM, PHOTOELECTRIC	PBT	P
TRANSMITTER, MICROWAVE	MWT	M
TRANSMITTER, ULTRASONIC	UST	U
TRANSMITTER, WIRELESS	WT	W
TRANSMITTER, WIRELESS, SUPERVISED	SWT	Y
TURNSTILE	TS	
UNIT, CONTROL	CU	
UNIT, CONTROL, ACCESS	ACU	AL
UNIT, CONTROL, PAN	PCU	PN

Table D-1. Graphic Symbols for Electronic Security and Intrusion Detection Systems (cont)

ITEM/DESCRIPTION	KSC CAD CELL NAME	SYMBOL
UNIT, CONTROL, PAN AND TILT	PTCU	
UNIT, CONTROL, REMOTE	RCU	
UNIT, CONTROL, ZONED	ZCU	
UNIT, PAN	PU	
UNIT, PAN AND TILT	PATU	
WIRE, LACED	LW