230 TYPES AND SUBTYPES FOR EQUIPMENT ITEMS

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Contact the Component Numbering/Labeling POC for upkeep, interpretation, and variance issues

1.0 PURPOSE AND REQUIREMENTS

A. This Section governs the equipment and component Types and Subtypes to be used in identifying equipment and components as described by Section 200.

B. The type and subtype listing (Attachment 1[1]) is provided as an electronic file.[2] The file can be searched or sorted as needed. It is sometimes referred to as the T&ST listing.

WARNING: Names and acronyms other than those in Section 230 listings may only be created and used by permission of the Chapter 1 Component Number/Labeling POC or any alternates shown on the POC/Tech Committee page above. Requests for addition to or modification of the listing shall be directed to same, who can grant approval for interim use until listing is revised.

C. When this listing and other Standards documents (e.g., CAD Standards Manual P&ID symbols) may conflict, this listing governs.

2.0 ATT 1 LISTING USAGE (GUIDANCE)

A. Columnar guidance

1. "Primary Discipline" Column
Data represents the engineering discipline most commonly associated with the ID. This is included to aid ID selection (e.g., can re-sort by this, then Description); however, this discipline categorization does not preclude using the acronym for disciplines other than that indicated.

2. "Origin" Column
Guidance used by keepers of the listings to track the basis for some Subtype choices.

3. "Subtype Name" Column
The listings in this column sometimes contain guidance for choosing the best acronym and name for use in the Master Equipment List (MEL) and on labels.

[1] Attachment 1 revisions do not require revision of this controlling Section nor the Engineering Standards Board etc. as they are non-technical (only Standards Manager approval required).
[2] Attachment 1 revisions do not require revision of this controlling Section nor the Engineering Standards Board etc. as they are non-technical (only Standards Manager approval required).

The guidance is often in parenthesis but not always; exercise care when determining what is the actual name versus only appended guidance.

4. "Subtype" Column
   a. For Instrumentation:
      General: Instruments and ISA 5.1: Section 230 instrument loop subtype and similar subtypes are based on ISA 5.1 schema, with some exceptions for LANL-historical acronym meanings (forcing addition of "@" or other suffix).

      Converters, Sensors, Switches, Transducers, and Transmitters (working definitions)
      - Converter: Usually takes a signal of one type and converts to another. It can also change signal/power type as in AC to DC. A converter is NOT a sensor.
      - Sensor: Any device that measures a variable and converts it to an electrical signal. It's an all-encompassing term that includes transducers, transmitters, and switches. All transducers, transmitters, and switches are sensors, but not all sensors are transducers, transmitters, or switches.
      - Switch: Unlike a transducer or transmitter that can translate all of the values in its range, a switch will trigger at a specific set value. That set value can either be high or low and can either engage or disengage a circuit.
      - Transducer and Transmitter: These are virtually the same thing, the main difference being the kind of electrical signal each sends. A transducer sends a signal in volts (V) or millivolt (mV) and a transmitter sends a signal in milliamps (mA).

   b. For Electrical utilities:
      The numerical designations from IEEE 803.1 (e.g., "52" can be used on electrical utility drawings but alpha acronyms are generally preferable).

B. New Listing Requests
   1. When an item is not listed and the function is reasonably similar to a listed component/ID, consider using the listed Function ID rather than requesting a new one from the ESM Numbering/Labeling POC or designate. This is especially true when the new one would get little use, since proliferation slows searching and finding. When this is impossible, contact the POC for assistance[3].

      The POC's process for resolution should be:
      - Encourage the use of MISC (miscellaneous) or another existing acronym.
      - When this is not appropriate, determine if one of the referenced national standards, another national standard, and/or a printout of historically used acronyms lists a unique and suitable 6-character-maximum Function ID for the component (Section 230 has many common components, not the entire set).
      - Choose an appropriate Function ID weighing historical precedent against national standard alignment. Bear in mind that more general terms will better fill gaps and serve future needs and minimize acronym proliferation.

[3] POC can grant approval for interim use until listing is revised.

- Grant the requestor provisional OK to use it, and capture the new entry in the revision in-progress.

3.0 ATTACHMENT

Attachment 1, the Type-Subtype listing, is webposted under this document at http://engstandards.lanl.gov/ESM_Chapters.shtml#esm1

4.0 REVISION RECORD

Rev	Date	Description	POC	RM
0	9/26/01	Initial issue as part of Section 230, Component Nomenclature.	Tobin Oruch, *FWO-SEM*	Mitch Harris, *FWO-SEM*
1	5/22/02	Adopted additional acronyms used frequently at LANL historically.	Tobin Oruch, *FWO-SEM*	Kurt Beckman, *FWO-SEM*
2	11/18/02	Eliminated unused/hardly-used historical acronyms, added shop equipment, other IDs	Tobin Oruch, *FWO-SEM*	Kurt Beckman, *FWO-SEM*
3	2/9/04	Added/clarified several fire acronyms.	Tobin Oruch, *FWO-DO*	Gurinder Grewal, *FWO-DO*
4	8/16/04	No change to actual IDs from Rev. 3. Became single, rev-controlled appendix to 230 with the 3 lists as attachments. Future revs do not require ESB meeting prior to approval by Chief Engineer.	Tobin Oruch, *FWO-DO*	Gurinder Grewal, *FWO-DO*
5	5/18/05	Moved general numbering/labeling requirements to new Section 200. Added a number of items to listing.	Tobin Oruch, *ENG-CE*	Gurinder Grewal, *ENG-CE*
6	2/1/06	Added a number of items to listing. OST became ISD 342-1.	Tobin Oruch, *ENG-CE*	Mitch Harris, *ENG-DO*
7	10/27/06	IMP and ISD number changes based on new Conduct of Engineering IMP 341. Other administrative changes.	Tobin Oruch, *CENG-OFF*	Kirk Christensen, *CENG-OFF*
8	5/13/10	Acro request process clarified. Listing posted as xls, pdf tables optionally; future xls revs don't require revision of this controlling section; expanded for TA-55, others.	Tobin Oruch, *CENG-OFF*	Larry Goen, *CENG-OFF*
9	1/28/21	Major revision to implement Type-Subtype hierarchy (for MEL realignment to support Builder).	Tobin Oruch, *ES-FE*	Jim Streit, *ES-DO*

ENDNOTES

Standards on which these listings are often based:

- ASME Y14.38, *Abbreviations and Acronyms for Use on Drawings and Related Documents*
- ASPE – Am Soc Plumbing Engrs *Data Book Ch 21*

- IEEE 803.1-92, *Recommended Practice for Unique Identification in Power Plants and Related Facilities - Component Function Identifiers* [used despite being withdrawn]
- IEEE 1015, *IEEE Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems(Blue Book)*
- IEEE 1100, *Recommended Practice for Powering and Grounding Electronic Equipment (Emerald Book)*
- ISA 5.1, *Instrumentation Symbols and Identification (reaffirmation of ISA S5.1)*[4]
- NECA 100, *Symbols for Electrical Construction Drawings*
- NFPA 170, *Standard for Fire Safety Symbols*
- CMMS file showing current usage of acronyms

The process to produce the Type-Subtype listings was (and to some extent still is, albeit with newer editions):

A comprehensive listing of items was produced from national standards, CMMS, D. T. Bush memo FSS-9/MM-95-048, and the 1999 LANL drafting and engineering standards manuals. This was then thinned to include the most commonly used and expected components. Historically used IDs in widespread use were retained. This was augmented by IEEE 803.1.

- For instruments, if 803.1 referenced ISA, then ISA was listed as the source.
    - In a few rare cases, it was necessary to modify national acronyms where the source documents were non-unique from one to the next (e.g., the instrument "Final Element, Flow" was designated FE@ [with its basis sometimes noted as "5.1mod"] to distinguish it from "Fan, Exhaust" which is commonly designated "FE" at LANL).
- For electrical/I&C, when 803.1 did not provide sufficient granularity or did not list a component, it was augmented by ISA, NECA, or IEEE 1100.
    - IEEE C37.2-2008, *Standard Electrical Power System Device Function Numbers and Contact Designations,* was reviewed and found to duplicate the device numbers in IEEE 803.1; likewise an informative listing in Annex E of NFPA 79-2018, *Electrical Standards for Industrial Machinery,* was reviewed but not utilized.
- For mechanical, ASME was used to augment 803.1; NFPA and NECA provided fire-related IDs in rare instances. ASPE Data Book Ch 21 provided some plumbing acronyms.
    - ASHRAE Guideline 4-2008, *Preparation of Operating and Maintenance Documentation for Building Systems*, which has suggested HVAC-R acronyms, was reviewed but not utilized.

- The IEEE/ANSI C37.2 "standard electrical power device function numbers" shown in 803.1 are most commonly used in conjunction with utility-type transmission and distribution equipment and sometimes in one-line diagrams for low voltage utilization level switchgear. These numbers are rarely seen in conjunction with NEMA switchboards, panelboards, or motor control centers. It is not necessarily wrong to use them in conjunction with NEMA-grade equipment, just unusual and cumbersome.

  Where they are used, power device function numbers must be use strictly in accordance with IEEE Std C37.2. In that document, a device **52** is a circuit breaker, but the trip unit is usually represented by a **51**, **51G**, **51/50,** or **51G/50G** device function number, the **51** indicating an ac time overcurrent relay function (long time and short time), the **50** indicating an instantaneous overcurrent relay function, and **G** indicating ground fault overcurrent relay function (if present).

  This kind of representation is fine for low-voltage switchgear in which the power circuit breakers have identifiable electronic trip units—one can think of the trip unit as a "relay." But to this

[4] ISA 5.1 (as slightly augmented by this document) is required for nuclear projects subject to DOE O 420.1C, Facility Safety.

approach breaks down for equipment employing molded case circuit breakers that do not have identifiable trip units.

IEEE Std C37.2 defines the 89 "line switch**"** as "A switch used as a disconnecting, load interrupter, or isolating switch in an ac or dc power circuit. (This device function number is normally not necessary unless the switch is electrically operated or has electrical accessories such as an auxiliary switch, a magnetic lock, etc.)" It appears that the proposed use of 89 is OK used as MV disconnecting, load interrupter, or isolating switches. CDD should be used for low-voltage systems.