

GUIDE TO P&IDs

I. PURPOSE OF P&IDs

A. P&IDs are:

1. Process and Instrumentation Drawings.
2. The basis document for the design of all processes and facilities.
 - a) If it is NOT on the P&IDs then it is NOT part of the facilities process system.
3. A single document that coordinates and incorporates the design items needed to carry over to the final design by the individual disciplines.

B. P&IDs and databases:

1. P&IDs are linked to a common database.
2. The database is populated at the same time the P&IDs are developed.
3. Mechanical, Electrical, Instrumentation, and Process information resides within this document system.
4. Specialized reports can be generated from the database such as an instrument index or PLC I/O list.

C. P&IDs show:

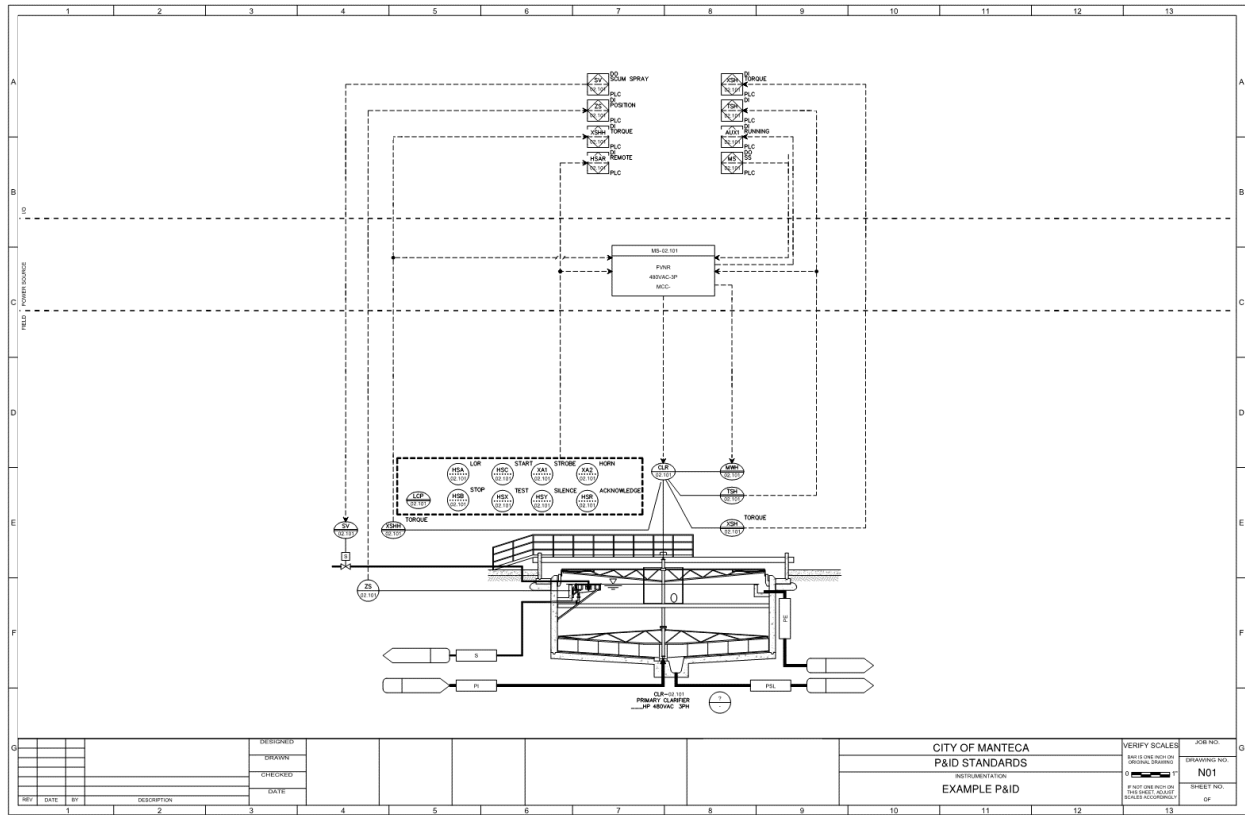
1. All valves, whether manual or controlled, independent of size.
2. Line sizes, designations, and materials.
3. Equipment characteristics such as pump type, flow rate, head, horsepower, voltage, etc.
4. Electrical characteristics such as power source, starting mechanism, variable frequency drive, vendor control panels, etc.
5. Instrumentation characteristics such as:
 - a) Range.
 - b) Scale.
 - c) Material compatibility.
 - d) Block and bleed valves.
 - e) Analyzer requirements.
 - f) Power source.
 - g) Fieldbus.
 - h) Hardwired needs.
 - i) PLC/IO requirements.

GUIDE TO P&IDs

II. P&ID DRAWING FORMAT

A. General:

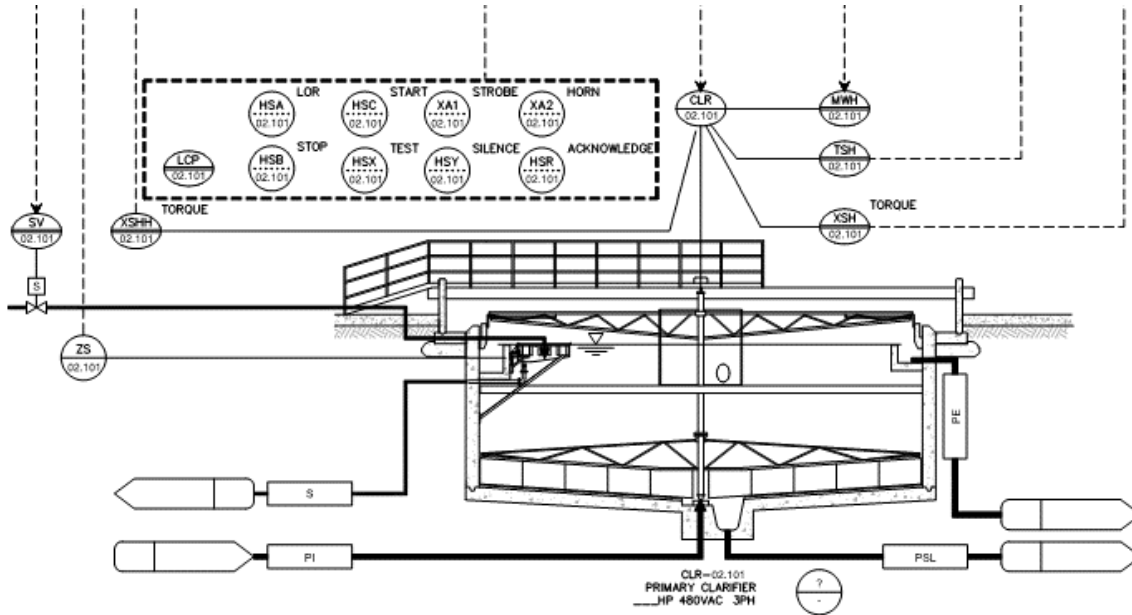
- The structural level format groups the individual P&ID symbols in horizontal bands, which represent separate physical areas, within the document.



GUIDE TO P&IDs

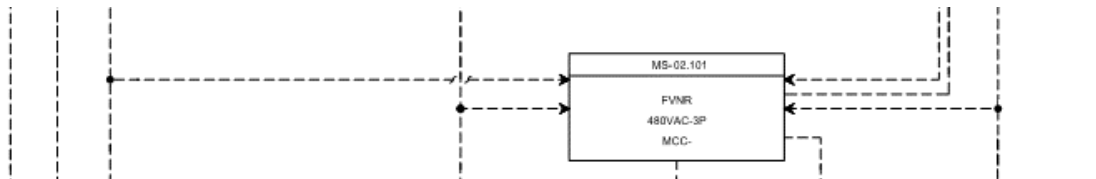
B. Field Band:

1. Reflects the process flow from left to right.
2. Depicted in the band:
 - a) All components that are physically located in the field (piping, valves, equipment, instruments, etc.).
 - b) Equipment furnished with a vendor control panel.
 - c) The function of this band is to show the process flow.



C. Power Source Band:

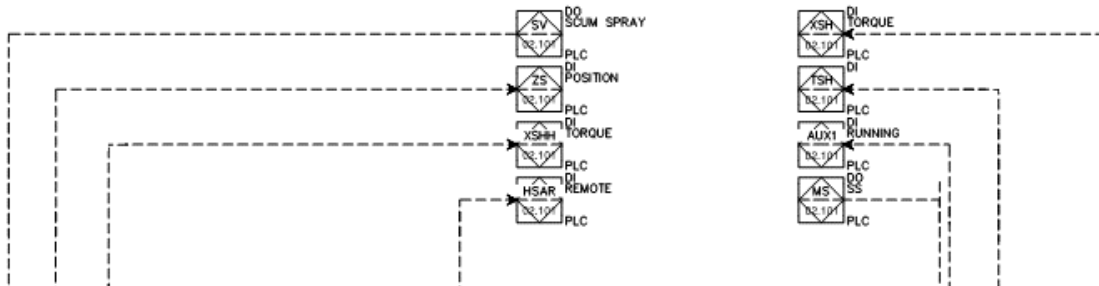
1. This band reflects the power source for all powered devices in the field.
2. Power sources identified in this band and their associated control include:
 - a) MCCs.
 - b) VFDs.
 - c) Panelboards.
 - d) Circuit breakers.
 - e) Fuses.
 - f) Any other power devices located in an electrical room or control panel.



GUIDE TO P&IDs

D. PLC I/O Band:

1. Contains the PLC I/O devices as well as some logic used to describe the control functions.
2. The symbol set and designations identify hardwired I/O such as:
 - a) Discrete inputs (DI).
 - b) Discrete outputs (DO).
 - c) Analog inputs (AI).
 - d) Analog outputs (AO).
 - e) Register connections for field bus connected devices.



GUIDE TO P&IDs

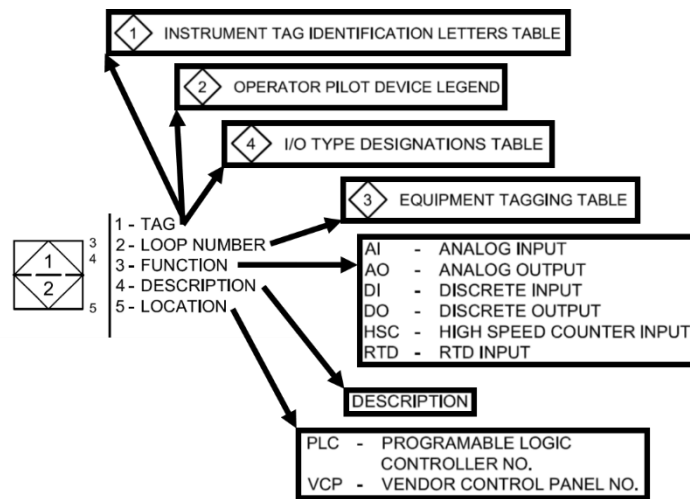
III. P&ID Symbols and Abbreviations

A. General:

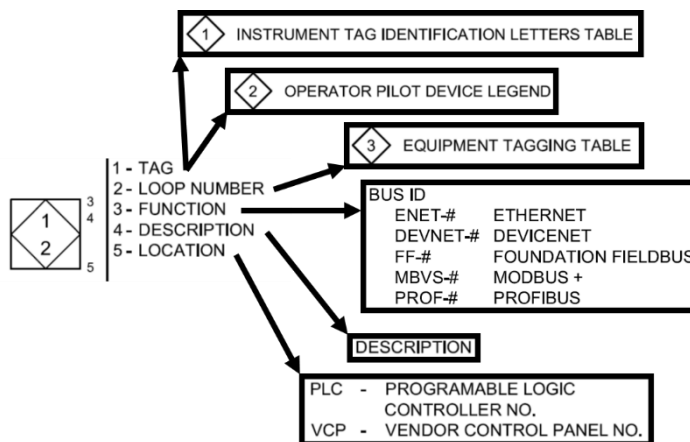
1. P&ID Symbols and Abbreviations can be found on general drawings 00GN01 to 00GN04.
2. Supplemental equipment tagging instructions are found on general drawings 00GN07 and 00GN08.

B. Instrument Bubbles:

1. PLC Hardwire I/O Point.

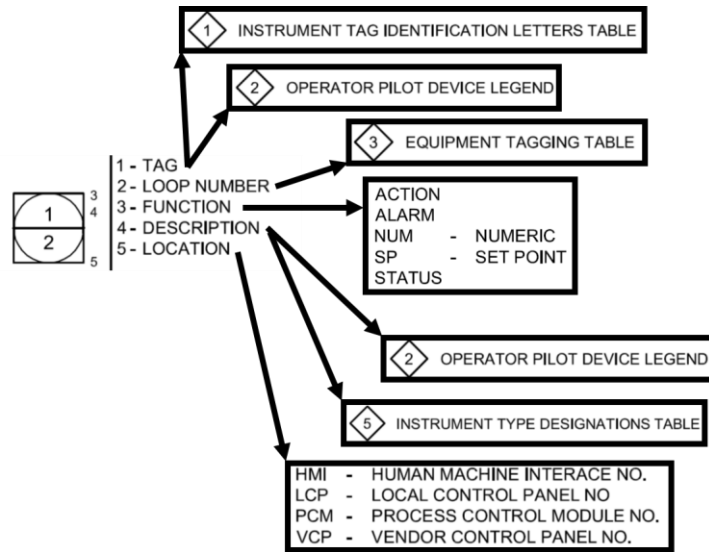


2. PLC I/O Register (Fieldbus I/O).

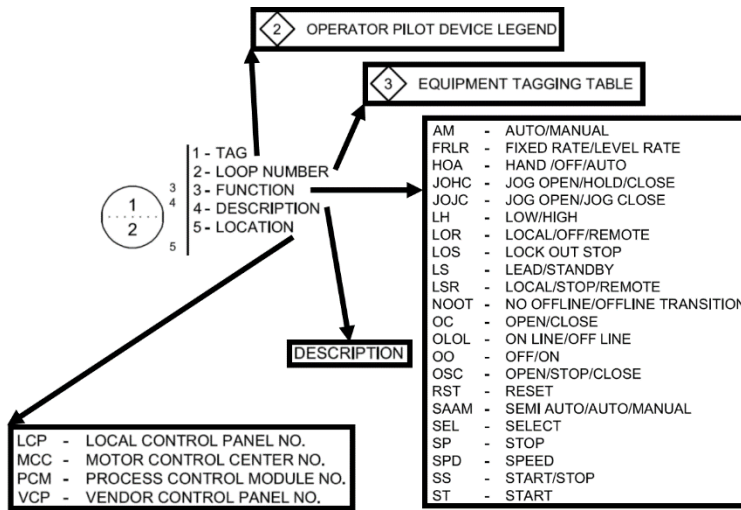


GUIDE TO P&IDs

3. PLC Based Human Machine Interface (HMI).

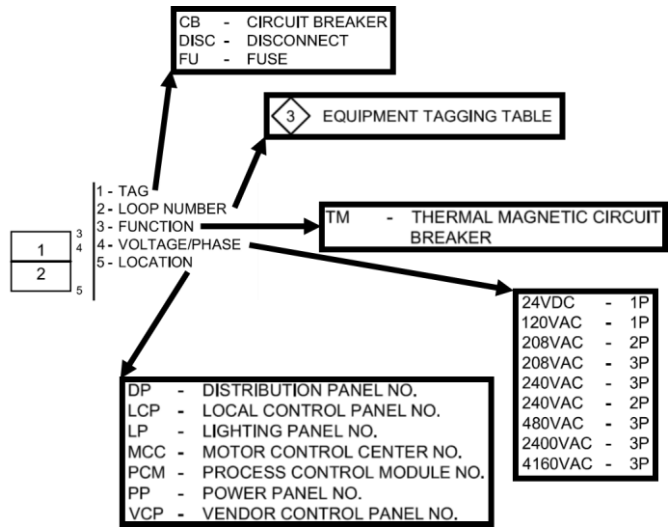


4. Pilot Device Operator Interface.

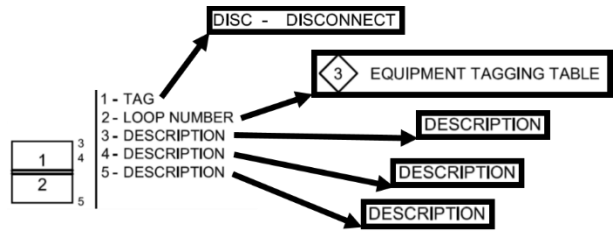


GUIDE TO P&IDs

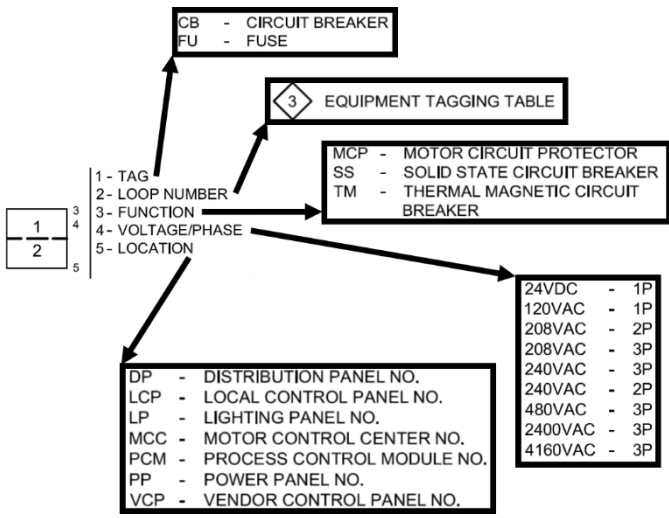
5. Power Device Primary Function: Operator Accessible.



6. Power Device Auxiliary Function: Operator Accessible.

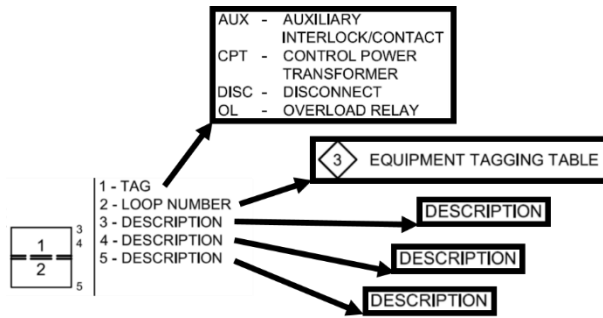


7. Power Device Primary Function: Operator Inaccessible.

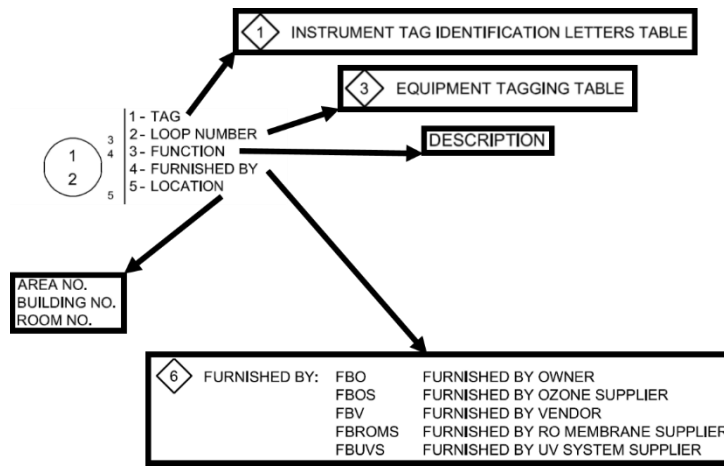


GUIDE TO P&IDs

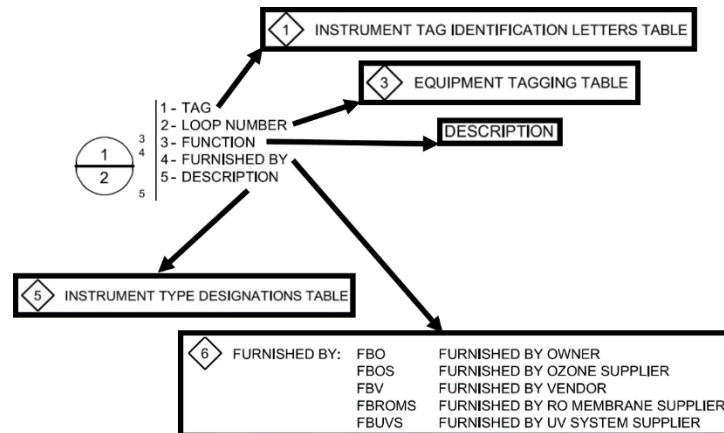
8. Power Device Auxiliary Function: Operator Inaccessible.



9. Instrument Primary Element.

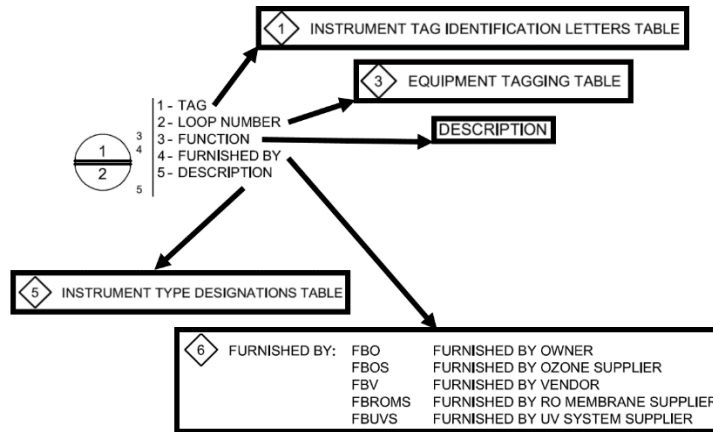


10. Instrument/Control Element Primary Function: Operator Accessible.

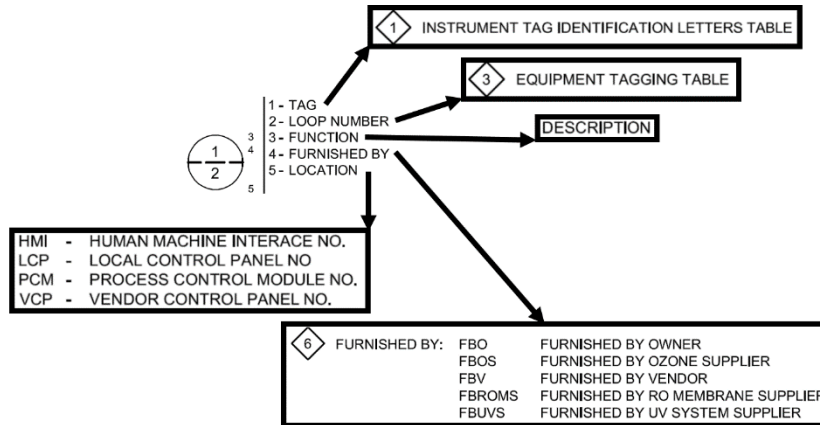


GUIDE TO P&IDs

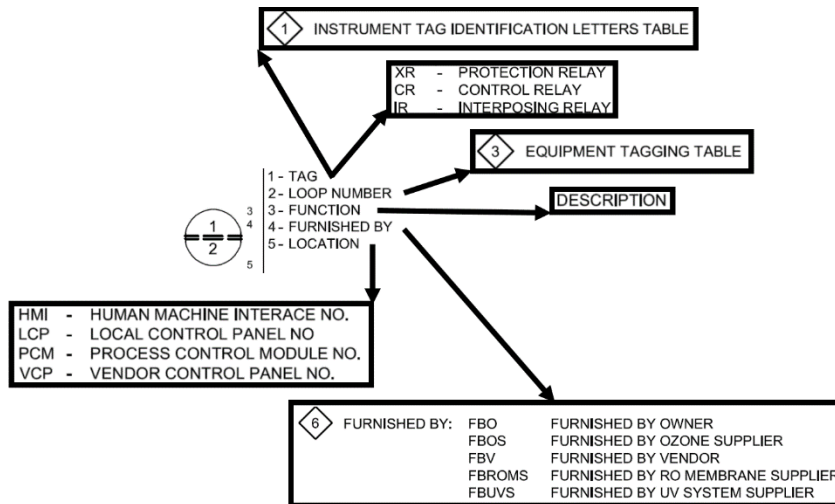
11. Instrument/Control Element Auxiliary Function: Operator Accessible.



12. Instrument/Control Element Primary Function: Operator Inaccessible.

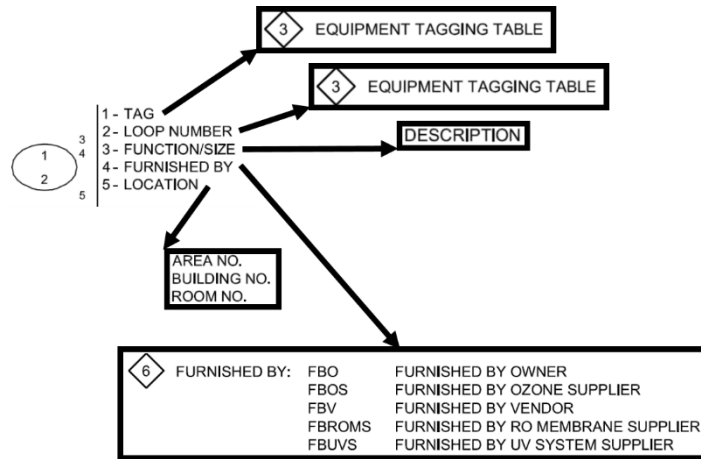


13. Instrument/Control Element Auxiliary Function: Operator Inaccessible.

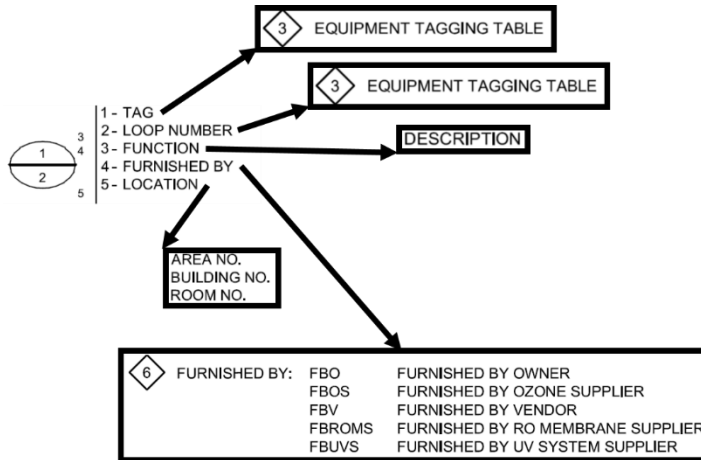


GUIDE TO P&IDs

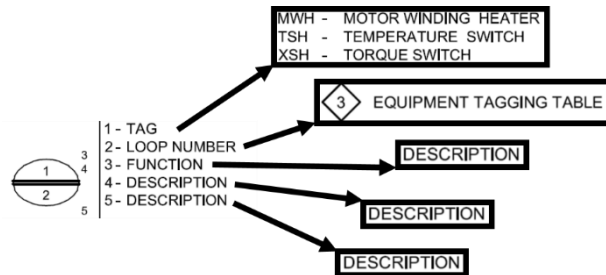
14. Field Equipment: Non-Powered.



15. Field Equipment Primary Function: Powered.



16. Field Equipment Auxiliary Function: Powered.



GUIDE TO P&IDs

17. Field Equipment Starter/Drive.

