

SECTION 40 61 93

PROCESS CONTROL SYSTEM INPUT-OUTPUT LIST

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. This Section describes the system input/output (I/O) list, which follows this Section and requirements for configuring the control system database.
- B. Related Sections:
 - 1. Section 40 64 00, Programmable Logic Controllers
- C. The I/O list information is available from the ENGINEER electronically. Allow 14 days from request to deliver this information.

1.2 SUBMITTALS

- A. For each I/O attribute listed in the I/O list that cannot be used exactly as listed, submit an explanation of the reason for the deviation and propose a method to modify the I/O list information. Do not proceed with any configuration until a method of resolving deviations is accepted by the ENGINEER.
- B. Include the control system I/O database information in the submittals for Section 40 64 00, Programmable Logic Controllers.

1.3 I/O POINT LIST DESCRIPTION

- A. The I/O point list contains the information necessary to configure the PLC I/O interface hardware and to construct point data fields. The I/O point list is organized into groupings based on the modules specified in Section 40 64 00, Programmable Logic Controllers.
- B. CHASSIS NAME describes the name/abbreviation given to a particular PLC chassis. Use of PLC denotes that the chassis contains a processor, while use of RIO denotes that the chassis does not contain a processor.
- C. MODULE TYPE describes the module function. Further descriptions are listed on the Legend, Symbols, and Abbreviations drawings.
- D. SLOT denotes the place in the chassis that the module is installed. The chassis numbering begins with 0 being the leftmost slot.
- E. POINT denotes the address on the module that the I/O point is installed. The module point begins at 00.

- F. MODULE/POINT DESCRIPTION names the module type, or describes the I/O point function. The I/O point typically lists a piece of equipment and a description of the function.
- G. LOOP NO. lists the loop associated with the equipment.
- H. INPUT FROM lists the origin of the signal.
- I. OUTPUT TO lists the destination of the signal.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 I/O CONFIGURATION

- A. Implement the control system database fields in a consistent manner by using the following procedures:
 1. Use abbreviations and acronyms already established in the Contract Documents. In particular, use the information in the I/O Point List.
 2. Use only abbreviation or acronym for a word or group of words, respectively.
 3. Use the same term (either phrase, word or acronym) to denote the same meaning. Do not use multiple terms for a single meaning.
 4. Use the point names, descriptions, logic state descriptions, ranges and units of measurement exactly the same wherever the point is referenced.
 5. Show point names and descriptions for all point references on documentation.
 6. Spell correctly.
 7. Maintain lists of acronyms and abbreviations used.

3.2 I/O HARDWARE CONFIGURATION

- A. Partition the I/O among cards within an I/O enclosure to provide control loop integrity.
 1. Put all inputs of the same I/O type associated with a device (e.g. pump, blower, clarifier or other piece of equipment) on the same card.
 2. Put all inputs of the same I/O type for devices arranged in process trains (e.g. a pump, its inlet valve and its outlet valve, or a pump and its associated macerator) on the same card or cards if more than one card is required to accommodate the points.
 3. Put all outputs of the same I/O type associated with a device or group of devices in a process train on the same card or cards if more than one card is required to accommodate the points.

4. Where the preceding requirements specified in this paragraph would cause more than 20 percent spare points on a card, points for a device or process train may be split between two consecutive cards.
5. Make unused terminals resulting from partitioning the I/O into pre-wired spares. Provide pre-wired spare points with all cabling and termination internal to the PLC as done for other I/O points.

3.3 POINT DATA FIELDS

- A. I/O point data fields may be subject to review and modification by the ENGINEER during the Shop Drawing review phase. Incorporate changes directed by the ENGINEER completely into the entire system, at no additional cost to OWNER, subject to the following limitations:
 1. Limit the total number of modifications to 20 percent of the total number of I/O points.
 2. Each unique change will count as one modification. For example, modifying the description, range, and engineering unit on an analog input count as three modifications.
 3. Analog input alarm limit definition will not be counted as a modification.

3.4 INPUT/OUTPUT TAGGING

- A. Each tag number shall be written as follows AAA I #####Y # where:
 1. AAA = Area/PLC Identifier.
 2. I = ISA Identification.
 3. ##### = 4 Digit Loop Number.
 4. Y = Function Identifier.
 5. # = Suffix (to distinguish between similar variables).
- B. Area/PLC Identifier:
 1. ADM – Administration Building
 2. CHB – Chemical Building
 3. ELB – Electrical Building
 4. FIL – Filters
 5. GAC – GAC Area
 6. REB – Reservoir Intake Electrical Building
 7. RHB – Residuals Handling Building
- C. ISA Identification:
 1. A = Miscellaneous Analytical.
 2. B = Burner, Combustion.
 3. C = Chlorine Residual/Gas.
 4. D = Density.
 5. E = Voltage.
 6. F = Flow.
 7. G = Intrusion.
 8. H = Hand.

9. I = Current.
10. J = Power.
11. K = Time.
12. L = Level.
13. M = Motor.
14. N = pH.
15. O = Oxygen.
16. P = Pressure.
17. Q = Quantity.
18. R = Radioactivity.
19. S = Speed, Frequency.
20. T = Temperature.
21. U = Common Alarm.
22. V = Vibration.
23. W = Torque (Weight or Force).
24. X = Hazardous Gas.
25. Y = Event, State or Presence (Switch Position).
26. Z = Position, Dimension.

D. Function Identifier:

1. A = Available / In Auto (input)
2. B = Backward Rotation (input)
3. C = Full Closed (input)
4. D = Full Open (input)
5. E = Close/Energize (output)
6. H = High (input)
7. I = Input (Analog)
8. L = Low (input)
9. N = Open (output) or Control Mode (input)
10. O = Output (Analog)
11. R = Running (input)
12. S = Start (output)
13. T = Stop (output)
14. U = Malfunction (input)
15. V = Slow (output)
16. W = Slow (input)
17. X = Selector Switch (input)

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