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NATIONAL IRANIAN OIL REFINING & DISTRIBUTION COMPANY
NATIONAL IRANIAN OIL ENGINEERING
& CONSTRUCTION COMPANY

NIOEC SP

NIOEC SPECIFICATION FOR NUMBERING SYSTEM

SECOND EDITION

March, 2015

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IN THE NAME OF GOD**FOREWORD**

By their very nature, technical Specifications are continuously subject to modifications and revisions. To strengthen their merit and usefulness, continuous improvements, addendum, deletion of disparate information and consequently provision of updated revisions are to be made in order to ascertain that such Specifications meet the current requirements, inclusive of Iranian Petroleum Standards (IPS) and the recognized and acceptable national and international Standards, as well as the optimal codes and practices based on the accumulated in-house know-how and plant knowledge and experiences.

However, in reality, due to several reasons, not to mention the complexity of the matter, the ultimate goal of continuous direct embedment of the required changes on the relevant Specifications may be far reaching. Therefore, in the interim periods between the officially issued revisions, the required changes will appear in other documents related to the engineering and design work of the ongoing projects.

In response to the initiative of the Design and Engineering Directorate, and considering that the task of the execution of several important and mega projects for the realization of the new oil refineries, pipelines and oil terminals as well as improvements of the existing facilities, has been assigned to NIOEC, it was decided to update the NIOEC Specifications and to issue new official revisions.

The Design and Engineering Directorate was itself entrusted to carry out this important task, and as such by forming several special technical committees, working in close co-operation and cohesion and sharing their expertise and knowledge, the updated and revised NIOEC Specifications were successfully prepared and complied.

These Specifications are intended to be used for Oil Refineries, Distribution Depots, Oil Terminals, Pipelines and Pump Stations within NIOEC's projects, and have been proven to be of high value for such purposes. It must however be appreciated that these Specifications represent the minimum requirements and should in no way be interpreted as a restriction on the use of better procedures, engineering and design practices or materials.

We encourage and highly appreciate the users and other clear sighted and experts to send their comments on the Specifications to the Design and Engineering Director of NIOEC for evaluation and approval.

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24	X	X				49		X				74						99					
25	X	X				50		X				75						100					

NOTES:

- 1) THIS SHEET IS A RECORD OF ALL REVISIONS TO THIS SPECIFICATION.
- 2) WHEN APPROVED EACH REVISION SHALL BE CONSIDERED AS A PART OF THE ORIGINAL DOCUMENT.
- 3) NUMBER OF PAGES EXCLUDES THIS SHEET AND THE COVER SHEET.

A5					
A4					
A3					
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A0	JULY, 2005	M.A.A.SAJEDI		M.R.FARZAM	M.A.A.SAJEDI
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1. SCOPE

This Specification prescribes minimum requirements for equipment and material numbering system including numbering for instrument and electrical equipment, piping line and engineering documents such as specifications, purchase orders, etc. and other facilities.

Deviations from this specification will only be permitted on obtaining written approval from NIOEC.

Resolution on cases not explicitly stipulated in this Specification, or on cases where conflicts may arise among the requirements of the referenced/relevant IPS and the international standards, shall be made through written consent and approval of NIOEC.

2. REFERENCES

The following standards, codes, and specifications, to the extent specified hereinafter, shall constitute a part of this NIOEC Specification. Latest edition of the undated referenced documents and the cited edition of the dated references shall apply. The applicability of changes made to the dated references, after the cited date shall be mutually agreed upon between NIOEC and the Vendor/Contractor.

ISA (INSTRUMENT SOCIETY OF AMERICA)

ISA-S 5.1 “Instrumentation Symbol and Identification”

ISO (INTERNATIONAL ORGANIZATION FOR STANDARDIZATION)

ISO 6708- (E) “Pipe Components-Definition and Selection of Nominal Size”

NIOEC-SP (NIOEC SPECIFICATIONS)

[NIOEC-SP-00-10](#) “NIOEC Specification for Units”

NIOEC-SP-50-04 “NIOEC Specification for Piping Material”

NIOEC-SD (NIOEC STANDARD DRAWINGS)

[NIOEC-SD-00-0101-1/1](#) “P &I Ds, Abbreviation”

3. UNITS

International system of units (SI) shall be used in accordance with NIOEC-SP-00-10, unless otherwise specified.

4. DEFINITIONS AND TERMINOLOGY

Throughout this Specification, words have specific meaning as described below:

Company/Employer/Owner: Mentioned in General Definitions of Foreword.

Contractor: Refers to the persons, firm or company whose tender has been accepted by the "Employer", and includes the contractor's personnel representative, successor and permitted assigns.

Project: Refers to the all activities to be performed and rendered by the "Contractor" in accordance with the terms and conditions of the contract documents.

Unit or Units: Refers to one or all process, offsite and/or utility units and facilities as applicable to form a complete operable refinery/pipeline and/or complex/plant.

Notice: Using slash (/), comma (,) and blank space shall be strongly avoided in all documents and correspondences, etc. numbering.

5. SYMBOLS AND ABBREVIATIONS

For further information reference is made to paragraphs 7.2, 8.2, 8.3.2, 12.2, Appendices A, B, D, E, F and G.

6. ASSIGNMENT AND APPLICATION OF EQUIPMENT AND MATERIAL NUMBER

6.1. Assignment of Equipment and Material Number

Equipment and material number shall be assigned to process equipment, package Units, tanks, civil constructions, buildings, structures, electrical equipment, instruments, piping, etc., including their auxiliaries as detailed as practical to secure a uniform identification of the equipment throughout the project.

6.2. Application of Equipment and Material Number

6.2.1. Documents and Drawings

6.2.1.1. Equipment and material number shall be fully utilized in engineering documents and drawings such as Process Flow Diagram (PFD), Plot Plan, Piping and Instrument Diagrams (P & IDs), Equipment Data Sheets, Instrument Data Sheets, etc.

6.2.1.2. Vendor's documents including drawings, data sheets, etc., shall bear equipment and material number.

6.2.1.3. Shipping documents shall fully utilize equipment, and material number.

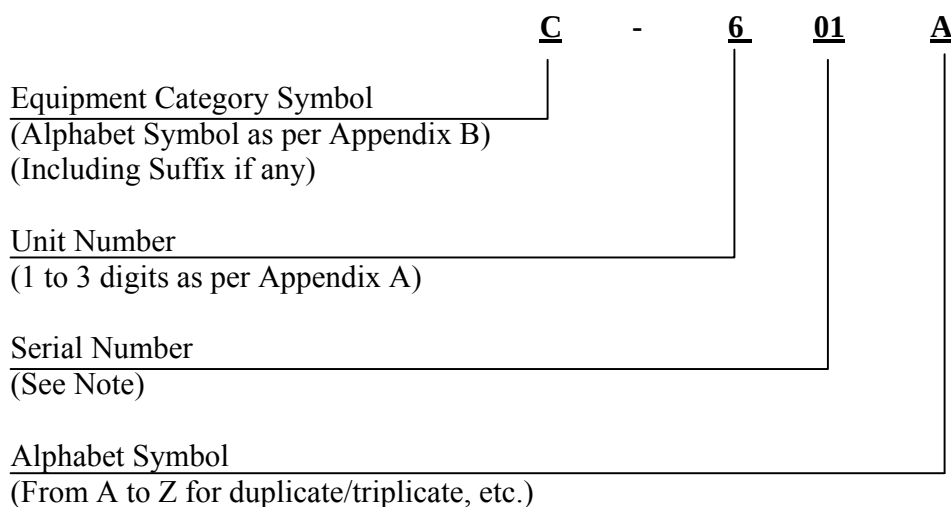
6.2.1.4. Equipment and material number shall be assigned for spare parts.

6.2.1. Equipment Name Plate and Tag Number Stamping or equipment and material number in the name plate or the tag number shall be made except for certain minor bulk items.

7. EQUIPMENT NUMBERING SYSTEM

7.1. Main Equipment & Package Units

Main Equipment and Package Units shall be numbered in the following manner:

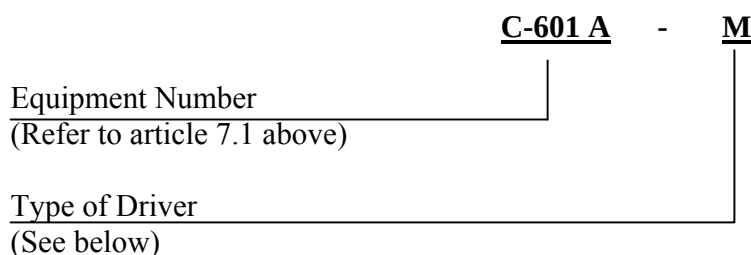


Note:

Serial number for equipment including mechanical, machinery, electrical, ancillary facilities, buildings, general items, etc., shall be from 01 to 99 unless otherwise specified. The numbering of instruments and control equipment should be from 001 to 999. For the units with more than one section (e.g., crude and vacuum distillation unit, etc.), equipment serial number to be utilized for each section shall be determined by the Contractor (e.g., from 01 to 50 and from 50 to 99 to crude distillation and vacuum distillation sections respectively).

7.2. Drivers for Main Equipment

Drivers for main equipment shall be numbered as follows:



Note:

Type of drivers shall be as follows:

DE: Diesel Engine

GE: Gas Engine

GT: Gas Turbine

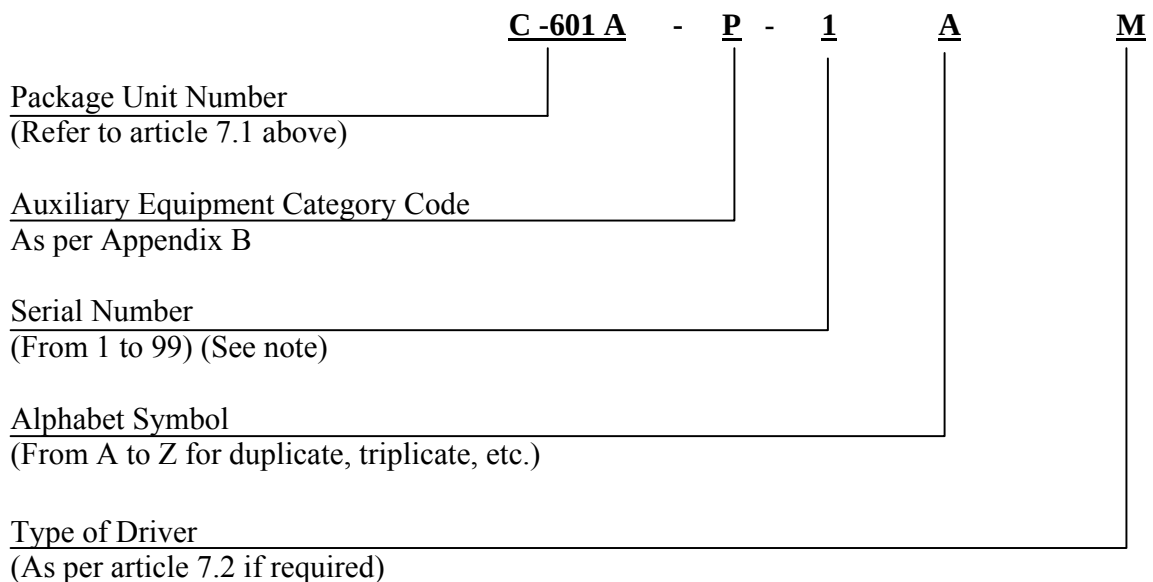
HT: Hydraulic Turbine

M: Electro Motor

ST: Steam Turbine

TEX: Turbo Expander.

7.3. Auxiliary Equipment of Package Units



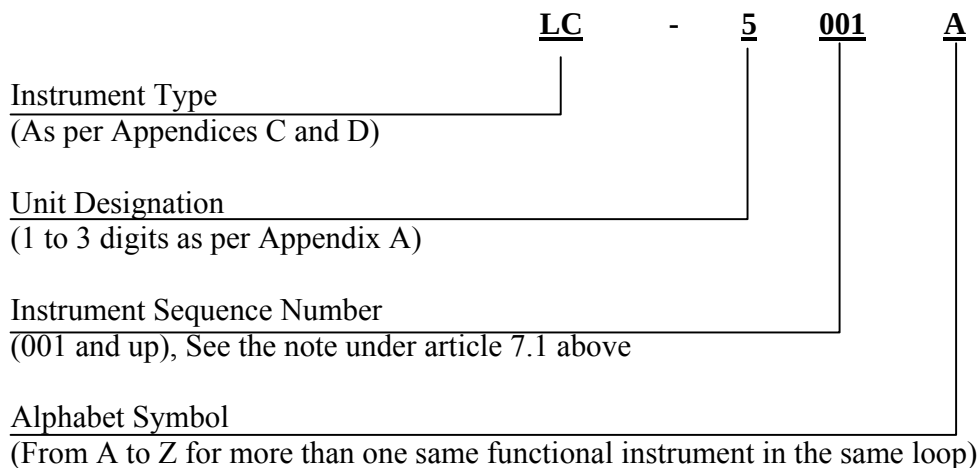
Note:

Serial number for auxiliary equipment in package unit shall start from 1 (not from 01).

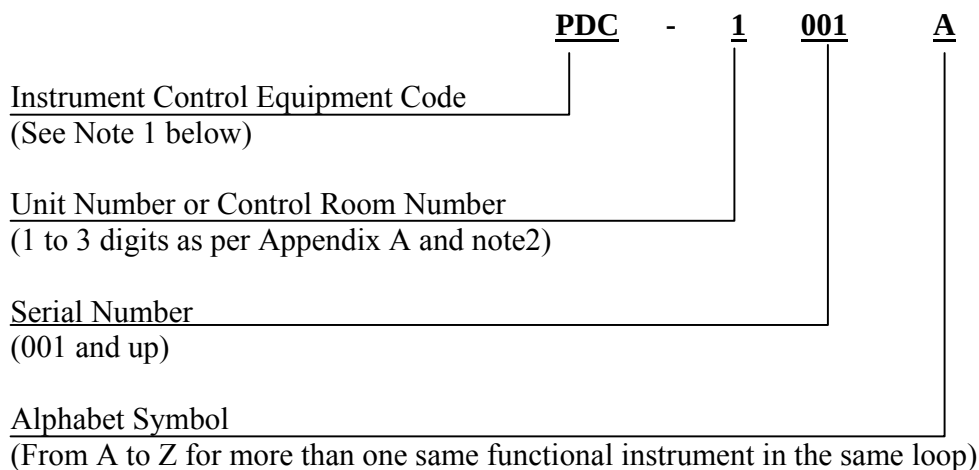
8. INSTRUMENT AND CONTROL EQUIPMENT NUMBERING SYSTEM

8.1. Instrument and Control Equipment

Instrument and control equipment including Pressure Safety Valve (PSV) shall be numbered in the following manner, (for gage glasses see item 8.3 below):



8.2. Instrument Accessories and Locations



Notes:

1) Equipment code should comply as follows:

a) Equipment located in Control Room

- PCS DCS/FCS system cabinets
- SIS SIS system cabinets
- IS Interlock system cabinets
- UCP Package units cabinets (in RIB)
- PDC Power distribution cabinet
- PPC Patch Panel cabinets
- IEC Electrical-Instrument interface cabinets
- AXC Auxiliary Instrument cabinets

- FFC Foundation Field-bus termination cabinets
- MRC Marshaling cabinets (may include barriers)
- CD Control desks
- OPS Operator Station
- EWS Engineering Work Station
- CDE Computer Desks for engineering
- AC Auxiliary consoles
- PC Computer (personal style-historian, sequence of events, etc)

b) Equipment located at field(Instrument Junction Box)

JBmnp-rryyy:

The identification codes are as follow:

- m: System type (one letter)
- n: Protection type (one letter)
- p: Signal type (one letter)
- rr: Unit number
- yyy: serial number

- System Type (m)

This code stands as a symbol for the type of system which associated junction boxes are connected to. This designation code can vary according to the system type as follow:

- E: For PCS system
- Z: For SIS & IS system
- P: For Package units (systems or power supply)
- G: For Gas Detection system
- F: For Fire Detection system
- T: Temperature

- Protection Type (n)

This code is intended to specify the type of electrical protection as follow:

- I: For Intrinsically safe
- N: For Non Intrinsically safe

- Signal Type (p)

For indentifying the various types of signals, this designation code is used. The signal names are abbreviated as follow:

- A: For Analogue signals (4-20mA)
- D: For Binary signals (contact or proximity or vibration switch, lamp, contact style output, solenoid valves, etc)
- F: For field-bus
- PA: For Power 110 or 230V AC
- PD: For Power 24V DC
- R: For RTD
- T: For Thermocouples
- H: For Data Highway/Serial links
- G: For General purpose

For example: “JBEIF-4011” is related to the intrinsically safe, intermediate field-bus or spur junction box (no.11) located in unit04 i.e. kerosene Hydro-treating Unit.

It is pointed out that package unit junction boxes integrated in PCS/IS or SIS will be identified in the same manner as above.

c) Instrument Cable Identification

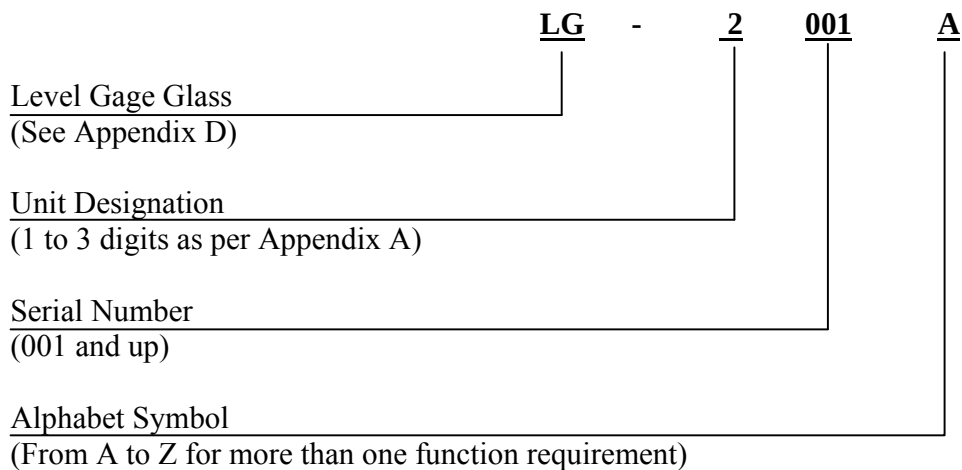
- Single Pair/Triad from Instruments
The cable identification of the single pair/ triad from the instruments to the local junction box, local panel or marshaling cabinet directly, will be the same identification as the instrument tag itself. (See article 7.1 above)
For example, the cable between junction box JBEID-14010 and transmitter FT-23019A, is identified FT-23019A.
- Power Supply Cables
For power supply cables to single field instruments, the above rule should be followed, however the extra suffix “P” to be added to the end of tag number in order to differentiate from the instrument cable tag number.
- Multi-Pair Cable and Field-bus Trunk Cables
 - Multi-pair cables and field-bus trunk cables will be identified same as the associated junction box or field barrier, except “JB” will be changed to “MC”. (See article 7.2 b) For example, the multi-pair cable from junction box “JBEIF-14009” is tagged with “MCEIF-14009”.
 - For identifying the multi-pair cable from a panel located in the field it is proposed that above rule is recommended. For example the multi-pair cable from local panel “LPC-C1401A” to PCS will be identified as “MCENA-14101”.
 - For identifying internal multi-pair cables within a building (auxiliary or RIB, control room) control system vendor procedure will be followed.

2) Control room number shall be as per article 12 below.

3) For all the equipment located in the control room, the relevant drawings and data sheets shall have proper tagging or marking showing the unit numbers.

8.3. Gage Glasses Designation

8.3.1. Gage Glasses Numbering System

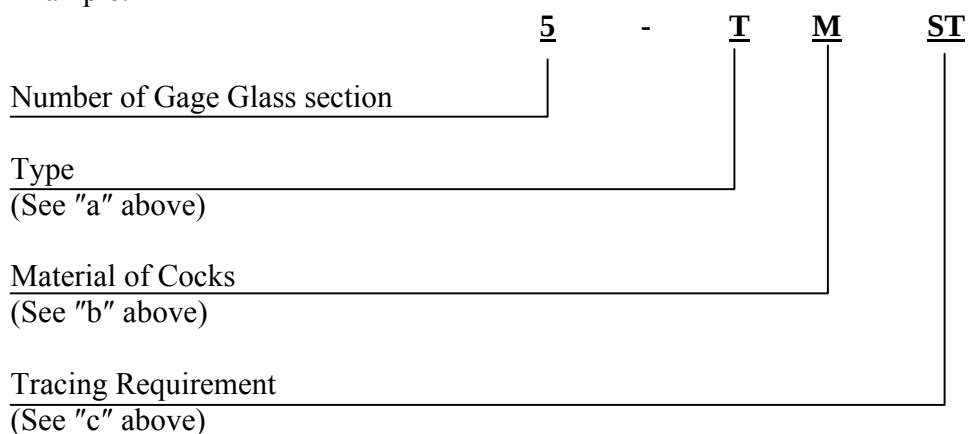


8.3.2. Special feature of gage glasses

Special feature of the gage glasses shall be presented beside the gage glasses in the drawings according to the following abbreviations:

- a) Type
 - R = Reflex
 - T = Transparent
- b) Material of Cocks
 - M = Monel Trim Cocks
 - SS = Stainless Steel
- c) Steam/Electrical Trace Requirement
 - ST = Steam Traced
 - ET = Electrical Traced

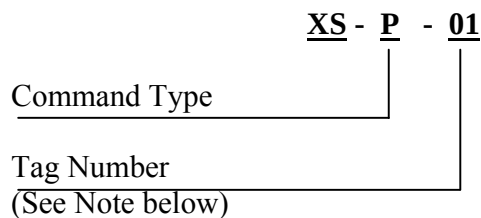
Example:



8.4. Numbering for Signal Exchanged Between MCC and DCS/ESD

Numbering of signals exchanged between MCC/DCS/ESD and indication of equipment status shall be as follow:

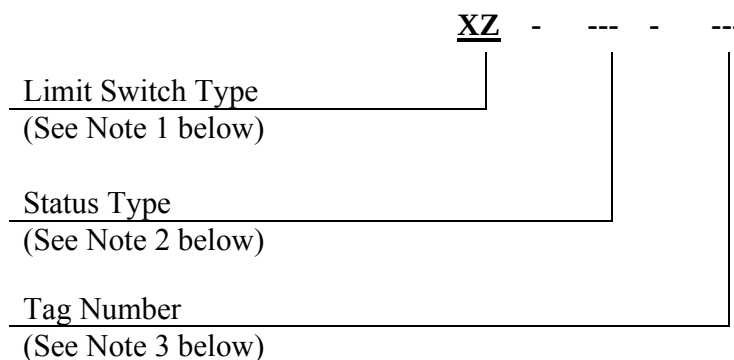
- a) DCS/ESD interlock/ logic commands to equipment (Via MCC):



Command Type: P = Stop, T = Start

Note: Tag number is included Unit Designation and Instrument Sequence Number (Refer to Section 7.1 above).

- b)

Limit Switch Status:**Notes:**

- Where first-letter X depends on the type of process functions for loop of the valve identification as follows:

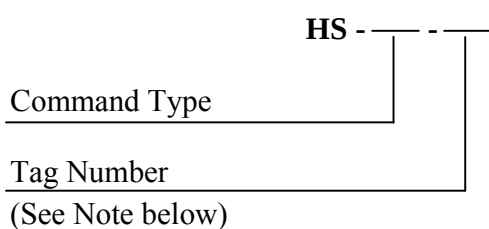
T:	For Temperature control valve
P:	For Pressure control valve
F:	For Flow control valve
L:	For Level control valve
H:	For Hand control valve
K:	For Sequence valve
M:	Motor operated valve
E:	For ESD Valve

2. Status Type:

SO:	Valve open position
SC:	Valve closed position
IO:	Valve open position Indication
IC:	Valve closed position Indication

3. Tag number is included Unit Designation and Instrument Sequence Number (Refer to Section 6.1 above).

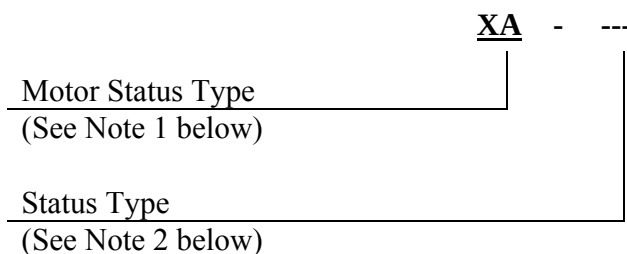
c) Operator Console Commands:



Command Type: P = Stop, T = Start

Note: Tag number is included Unit Designation and Instrument Sequence Number (Refer to Section 6.1 above).

d) Motor Status Indication in DCS/ESD

**Notes:**

1. Where second-letter/ letters depends on the following identification:

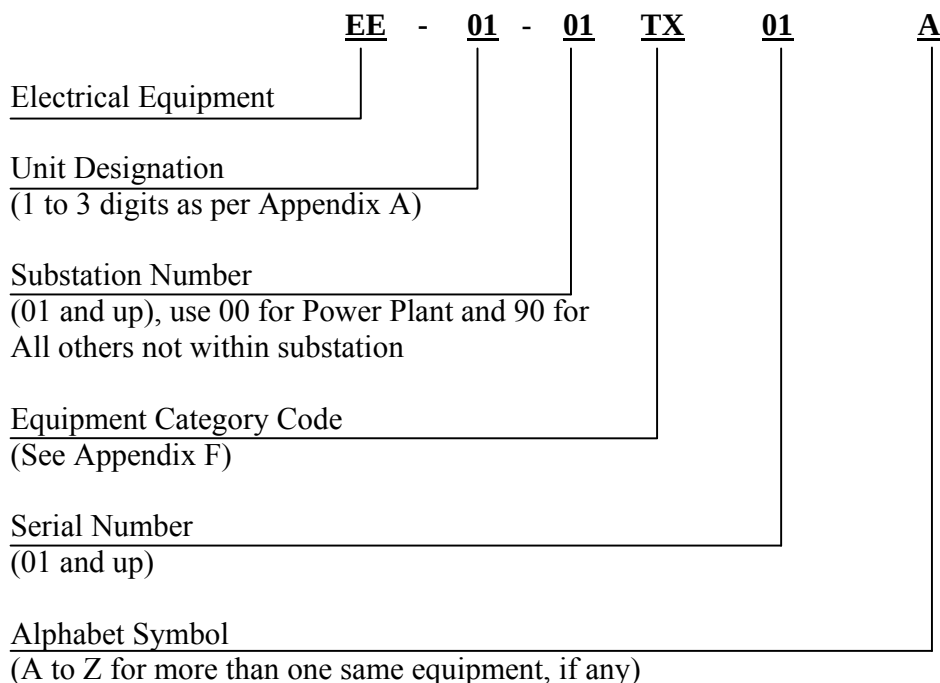
XA:	Motor fault status
XL:	Motor running status
XR/L:	Motor Remote / Local status

2. Tag number is included Unit Designation and Instrument Sequence Number (Refer to Section 6.1 above).

9. ELECTRICAL EQUIPMENT NUMBERING SYSTEM

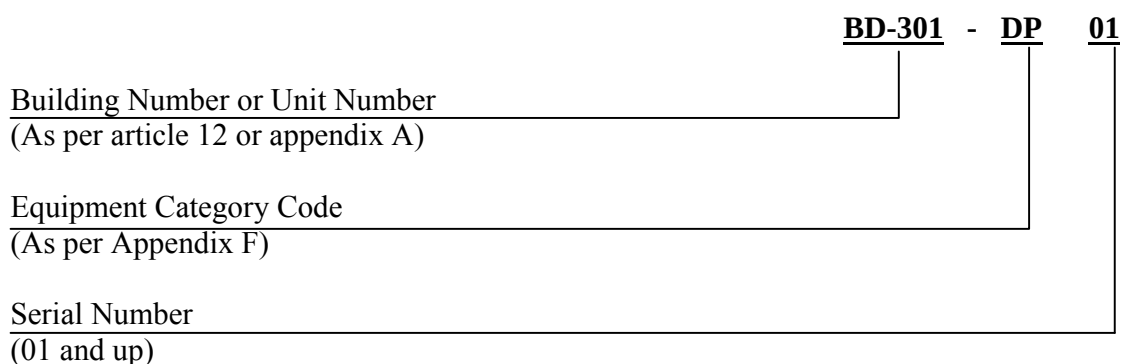
9.1. Numbering for Main Electrical Equipment

Main Electrical Equipment which composes primary power distribution system, power supply to process equipment, instrument power supply and supervisory system shall be numbered in the following manner:



9.2. Numbering for Other Electrical Equipment

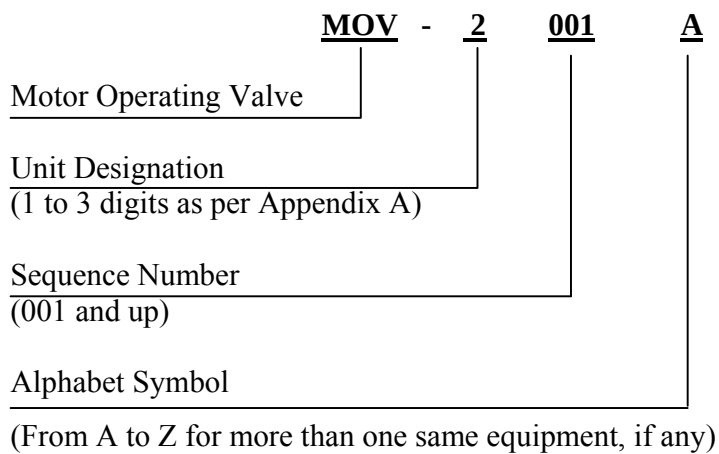
Panel boards and other electrical equipment shall be numbered in the following manner:



Example:

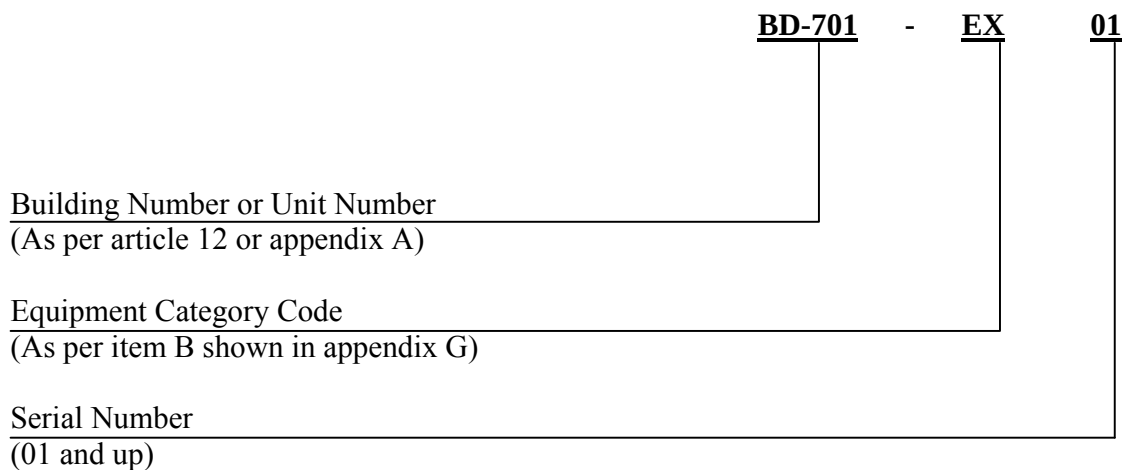
BD 701-DP02 Distribution panel board No. 02 located in the building No. BD-701.

9.3. Numbering for Motor Operating Valves



10. COMMUNICATION EQUIPMENT NUMBERING SYSTEM

Communication equipment shall be numbered in the following manner:



11. PIPING LINE NUMBERING SYSTEM

Piping lines shall be numbered in the following manner:

11.1. Numbering for All Lines Excluding Steam Tracing Spools

	<u>CRD</u>	-	<u>1</u>	-	<u>001</u>	<u>A</u>	-	<u>4"</u>	-	<u>ST (W)</u>	<u>(1-3/8")</u>
Fluid Abbreviation (See Appendix B)											
Unit No. (1 to 3 digits as per Appendix A)											
Serial Number (001 and up, see Note 1)											
Piping Class Code (See Note 2)(1 to 3 Alphabet Symbols)											
Nominal Pipe Size (inch)											
Insulation or Tracing Symbol (See Appendix E)											
Quantity and Size of Tracers											

Notes:

- 1) Piping serial number, in general is started from 0001 and Up except for the units which are characterized by more than one section such as crude and vacuum distillation unit. In such cases, split of piping serial numbers to be assigned for each section of the unit shall be determined by the Contractor(e.g. from 001 to 499 and 500 to 999 to crude distillation and vacuum distillation sections respectively). Special number 901: 999 shall be used for new lines in existing units.

Due to common activities and in order to avoid any duplication of common units such as utility, offsite shall be determined by contractors (Joint Venture) e.g. from 001to 333 and 334 to 666.

All drains, relief headers and utility services including fuel oil and fuel gas for all units shall be numbered following the numbering procedure applied for the units which are producing/consuming the subject utility services.

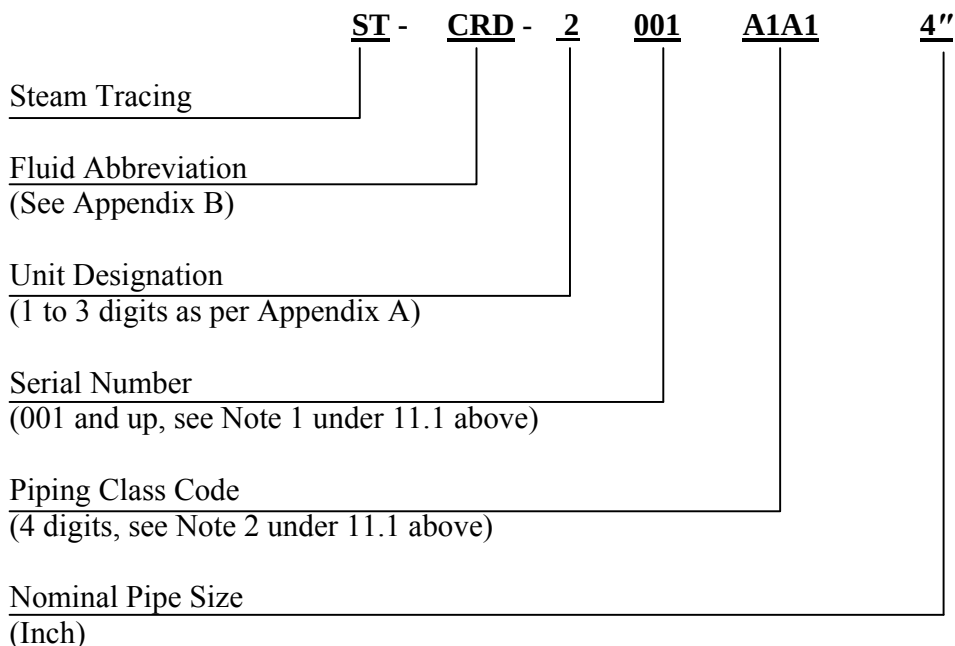
For assigning the piping serial number, the following items should be taken into consideration:

- a) Pipe line numbers shall be prefixed, from source to unit battery limit with the unit number of the unit of origin.
- b) The individual line number shall be held up to the point where the line ends at the inlet of equipment such as a vessel, exchanger, pump, etc., another number is required for the line downstream of the equipment.
- c) A new line number is required when the pipe design condition can vary (e.g., downstream of the control valve assembly) or when a new piping class is to be specified.
- d) Line number shall be held up to the point where the line ends to the header or unit battery limit block valve. All branches to and from header shall have an individual line number.
- e) All utility headers (systems) shall be numbered with their respective units. All branches serving a specific unit will be numbered with that unit.
- f) All firewater and sewer branches serving a specific unit shall be numbered in accordance with note number (e) above.
- 2) Piping class code shall be in accordance with line classes utilized in NIOEC piping material specification. (NIOEC-SP-50-04)

Piping components not identified by instrument or mechanical equipment numbers, etc., and not covered by the piping material specification, are identified by a special item number.

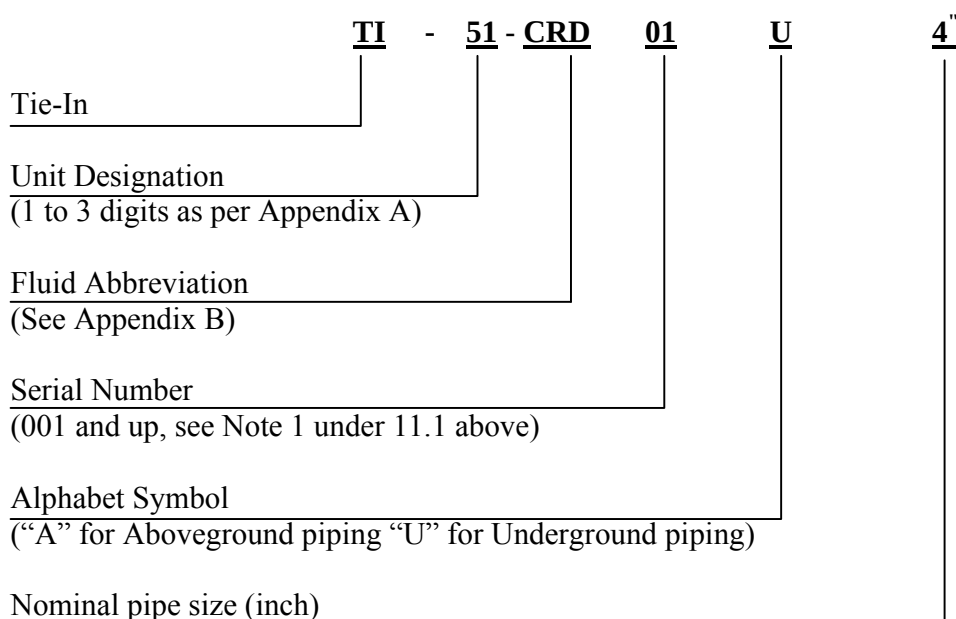
11.2. Numbering for Steam Tracing Spools

Steam tracing spools (drawings) shall be numbered in the following manner:



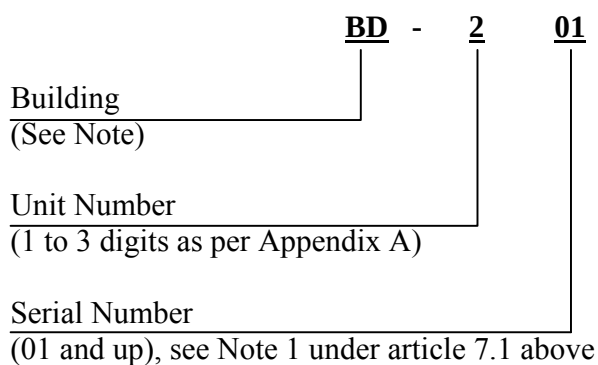
11.3. Numbering of Tie-In Points

Tie-In Points shall be numbered in the following manner:



12. BUILDING AND STRUCTURE NUMBERING SYSTEM

12.1. Numbering for Buildings



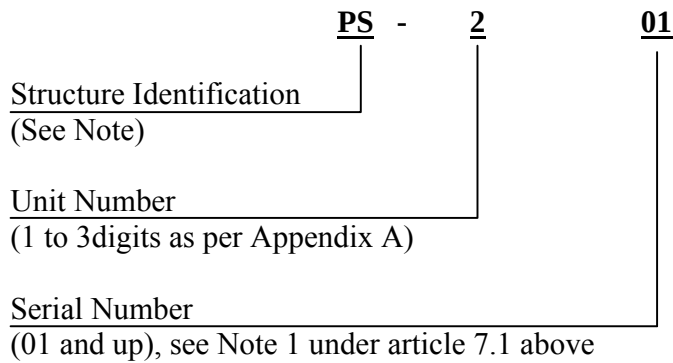
Note:

Use:

BD	Building (e.g. Administration, Rest room,...)
AH	Analyzer House
SS	Substation
PIB	Process Interface Building
SHR	Shelter
TB	Temporary Building
CR	Control Room (Building)

12.2. Numbering for Structures and Civil Works

Structure and pipe rack shall be numbered in the following manner:



Note:

Structure Identification:

AT = Antenna Tower

CB = Catch Basin

CPS = Concrete Pipe Sleeper

MH = Sewer Manhole

MP = Miscellaneous Platform

PB = Pull Box

PBC = Pipe Box Culvert

PS = Pipe Support

SL = Stiles

SST = Steel Structure

LM = Line Marker

BM = Bench Mark

IP = Intersection Point

PR = Pipe Rack

AB = Anchor Block

JC = Jib Crane

13. NUMBERING OF PROJECT/JOB SPECIFICATIONS AND DATA SHEETS

13.1. Numbering of Project/Job Specifications

All project specifications shall be assigned a number as per the following example: