	<p align="center">Automation & Electrical Department (SG)</p>	<p>Corporate Guidelines for Coding Tag Names of Real Analog and Digital Variables</p> <p>Instrumentation – General Requirements for New and Modernised Production Plant – Technical Annexes to Contracts</p>
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1. Introduction

A revision of tag names of real analogue and digital variables becomes necessary in connection with a growing use of distributed control systems (DCS) and programmable logic controllers (PLC) and their inclusion into the Anwil S.A. integrated IT system.

The sets of these names are basic components of the DCS databases. The goal should be that tag names used on the piping & instrumentation diagrams (P&ID) and in the DCS and PLC database are closely correlated or identical, if possible.

There is conflict of interests in this area. Tag names of analogue and digital real variables used in databases and graphics on monitors for DCS should be as short as possible, whereas on the P&IDs they should be the most comprehensive (i.e. long).

This paper is an attempt to reach a compromise.

Anwil S.A. currently applies two labelling, marking and legend systems for P&IDs.

Polish design offices use the following Polish Standards:

- PN-89/M-42007/01 - Industrial measurements & instrumentation
Legend for diagrams
Basic graphic symbols and general provisions
- PN-90/M-42007/02 - Industrial measurements & instrumentation
Legend for diagrams
Symbols for computer system functions
- PN-89/M-42007/03 - Industrial measurements & instrumentation
Legend for diagrams
Graphic symbols for loop diagrams
- PN-89/M-42007/04 - Industrial measurements & instrumentation
Legend for diagrams
Additional graphic symbols

Western design offices mainly apply the ISA Standards:


- ANSI/ISA - S 5.1 - 1984 (R1992) - Instrumentation symbols and identification
- ISA-S5.3 - 1983 - Graphic symbols for distributed Control/shared display instrumentation, logic and computer systems.

Proposals included herein are an adaptation of the ISA standards.

The instrumentation designs should include descriptions of the real variable tag names developed in the form of a "legend." To avoid ambiguity, the "legend" should be prepared in a very detailed manner. The ISA standards shall be applied in doubtful cases.

2. Format of variable names

Due to the fact that the DCS systems will be connected to the Anwil S.A. integrated IT network, information from individual plant has to be distinguishable and therefore the tag names shall be unique.

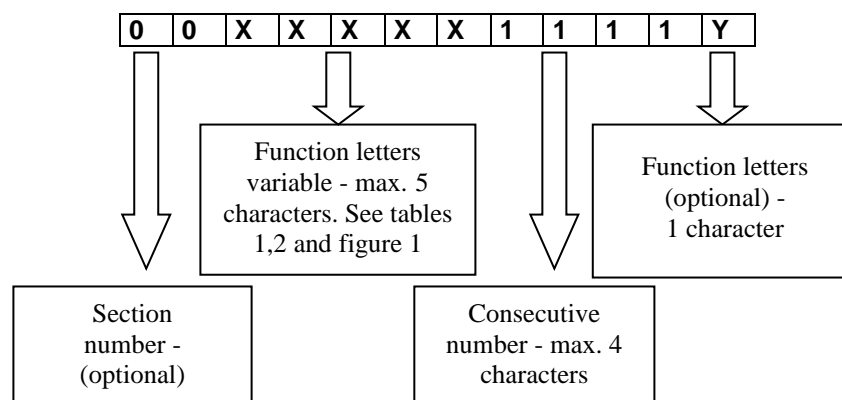
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Three following layers can be distinguished when establishing a tag name:

- Piping & Instrumentation Diagrams (P&ID)
Specific tag names for a process plant. Sub-dividing into sections preceded with suffixes can be applied in case of large and complicated plants.
- DCS and PLC systems
Tag names used for different production areas which often include a few plants sometime also divided into process sections.
In this case, the tag names have to be unique for the entire production area serviced by a DCS or PLC. Special suffixes (section number) shall be used for respective plants/process sections.
- PI - Real Time Database
It covers the whole company. The individual plant, areas and process sections must have specific suffixes – plant codes and section numbers for proper identification.


The name of each variable in the respective layers should be coherent and adequate for implementation. The proposed naming formats for the loops are presented below.

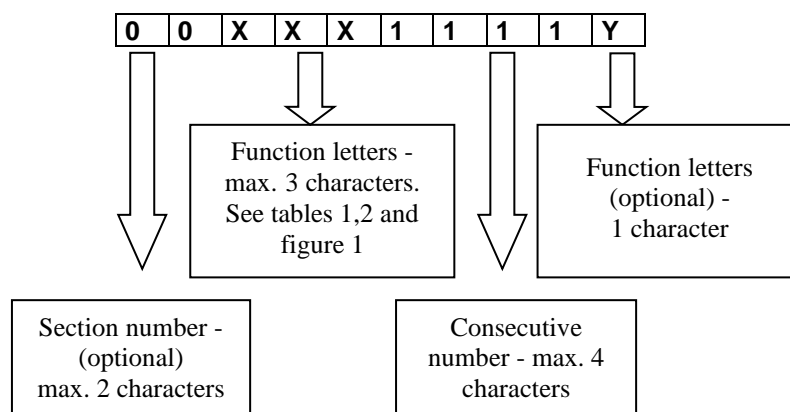
2.1 P&IDs



2.2 DCS and PLC

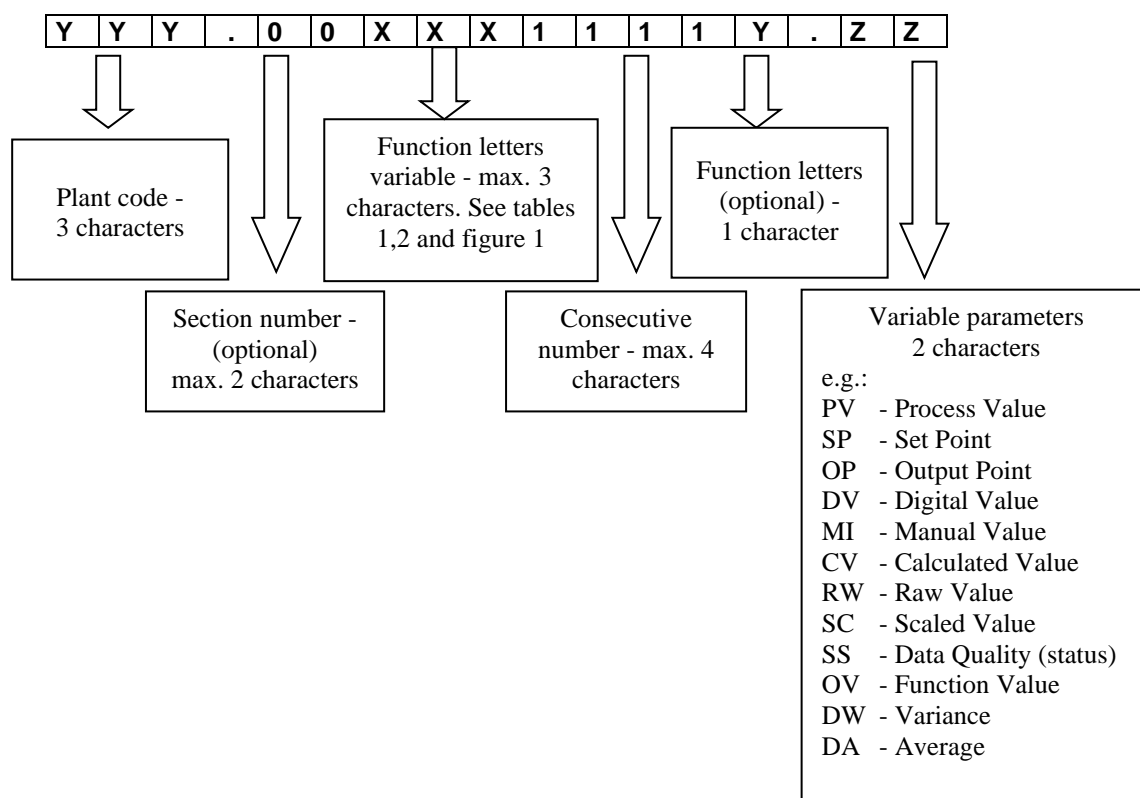
Conversion from the P&ID designation to the tag name in DCS should lead to the maximum simplification of the letter part of the tag name (in most cases, a number of characters should not exceed 3). In particular, such functions as I – indication, R – registration, AL, AH, ALL, AHH-types of alarms for analogue variables, shall be omitted.


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2.3 Real Time Database - PI

Conversion of the tag name between the DCS database and PI involves adding to the name in DCS a prefix representing the plant code and a suffix representing the name of a parameter.



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3. Letter coding of instrumentation loop functions

Assigning a function to respective letters depending on position in the letter code (1, 2, 3) is shown in Tables 1 and 2 and in Figure 1. Table 1 defines coding of analogue and digital variable names with exclusion of machines and devices as well as valves which are included in Table 2 and in Figure 1.

3.1 Function Coding

	First letter		Next letters		
	Measured value or initiating variable	Modifier	Indication or additional function	Output function	Modifier
A	Analysis		Alarm		
B	Burner				
C				Control	
D		Differential			
E	Voltage		Sensor		
F	Flow	Ratio			
G			Glass View		
H	Manual Control				High
I	Current (Electrical)		Indication		
J	Power	Scan			
K	Time	Time Rate - Speed			
L	Level		Lamp		Low
M		Momentary Pulse			Intermediate
N	Motor Status				
O			Restriction Orifice		
P	Pressure		Point (Test) Connection		
Q	Quantity	Integrate, Totalize			
R	Radiation		Record		
S	Speed, Frequency	Safety		Switch, Contact	
T	Temperature			Transmit	
U	Multivariable par.				
V	Vibration			Valve	
W	Weight, Force		Socket		
X		X Axis			
Y	Event, State	Y Axis		Relay, Compute, Convert	
Z	Position, Dimension	Z Axis		Driver, Actuator	



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Table No. 1**3.2 Definition of signals for machines and devices**

	First Letter	Second Letter	Third (or last) Letter
A			Fail
B		Compressor	
E		Expander	
G	Turbine Driven		Availability
I			Motor current
J			Motor Power
K			Running Time
L			Local / Remote
M	Motor Driven	Mixer	Manual / Auto
P	Pushbutton	Pump	Run
S			Start
W		Fan	Stop
Z			Permission

Table No. 2

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3.3 Designation of valves

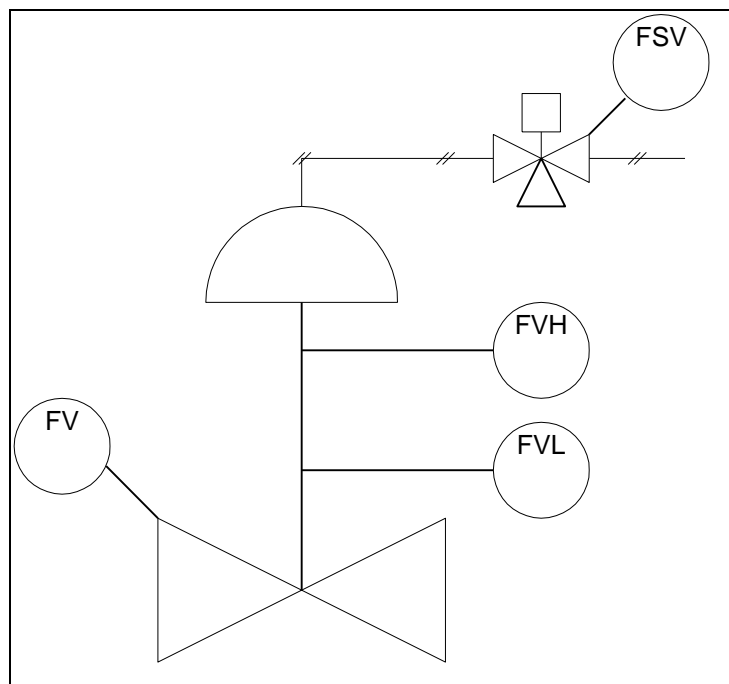



Figure No. 1

4. Examples of tag names

4.1 Examples of instrumentation loop tag names and their conversion


Type	P&ID	DCS & PLC	PI database
Pressure indication with alarm	PDIAH100	PD100	INS.PD100.PV
Temperature control with alarm	TRCAHL1234	TC1234	INS.TC1234.PV INS.TC1234.SP INS.TC1234.OP
Flow indication with totalizing	2FIQ100	2FQ100	INS.2FQ100.PV INS.2FQ100.CV
Manual control with indication	1HIC1234	1HC1234	INS.1HC1234.OP
Differential pressure control with indication and alarm	PDICAL123	PDC123	INS.PDC123.PV INS.PDC123.SP INS.PDC123.OP
High analysis alarm	AAH100	AAH100	INS.AAH100.DV
High analysis interlock (alarm trip)	ASHH100	ASH100	INS.ASH100.DV
Low pressure alarm	1PAL200	1PAL200	INS.1PAL200.DV
Low pressure interlock (alarm trip)	1PSLL200	1PSL200	INS.1PSL200.DV
High position alarm (e.g. lever)	ZAH1234	ZAH1234	INS.ZAH1234.DV

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Type	P&ID	DCS & PLC	PI database
Low position alarm (e.g. lever)	ZAL1234	ZAL1234	INS.ZAL1234.DV
High displacement interlock (alarm trip)	ZSHH1234	ZSH1234	INS.ZSH1234.DV
High vibration alarm	1VAH123	1VAH123	INS.1VAH123.DV
High vibration interlock (alarm trip)	1VSHH123	1VSH123	INS.1VSH123.DV
Low temperature alarm	1TAL1234	1TAL1234	INS.1TAL1234.DV
Low temperature interlock (alarm trip)	1TSL1234	1TSL1234	INS.1TSL1234.DV
High flow alarm	2FAH1234	2FAH1234	INS.2FAH1234.DV
High flow interlock	2FSHH1234	2FSH1234	INS.2FSH1234.DV
Low speed alarm	SAL123	SAL123	INS.SAL123.DV
Low speed interlock (alarm trip)	SSLL123	SSL123	INS.SSL123.DV
Low level alarm	5LAL123	5LAL123	INS.5LAL123.DV
Low level interlock	5LSLL123	5LSL123	INS.5LSL123.DV
No flame alarm	BAL1234	BAL1234	INS.BAL1234.DV
No flame interlock	BSLL1234	BSL1234	INS.BSL1234.DV

4.2 Examples of machine and device tag names

Type	P&ID	DCS & PLC	PI database
ELECTRICAL			
Status of pump No. 100: - Running - Available - Fail	MP100-P MP100-G MP100-A	MP100*	INS.MP100.DV
Permission for electrical motor pump No. 100	MP100-Z	MP100Z	INS.MP100Z.DV
Local / Remote switch status	MP100-L	MP100L	INS.MP100L.DV
Auto / Manual switch status	MP100-M	MP100M	INS.MP100M.DV
Remote start of motor pump No. 100	MP100-S	MP100S	INS.MP100S.DV
Remote stop of motor pump No. 100	MP100-W	MP100W	INS.MP100W.DV
Motor hours of motor pump No. 100	MP100-K	MP100K	INS.MP100K.PV
Current of motor pump No. 100	MP100-I	MP100I	INS.MP100I.PV
TURBINES			
Turbine driven pump No. 100 - Running / Area 1	1GP100-P	1GP100	INS.1GP100.DV
Power of turbine / compressor No. 100 / Area 3	3GB100-J	3GB100J	INS.3GB100J.PV
MIXERS			
Mixer motor No. 100 / Area 2	2MM100-P	2MM100	INS.2MM100.DV
Permission for mixer motor No. 100 / Area 2	2MM100-Z	2MM100Z	INS.2MM100Z.DV
FAN			
Fan motor No. 123 - Running	MW123-P	MW123P	INS.MW123.DV

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Remote start of fan motor No. 123	MW123-S	MW123S	INS.MW123S.DV
PUSHBUTTONS AND SWITCHES			
Pushbutton (unstable type)	PB100	PB100	INS.PB100.DV
Hand switch (bi-stable type)	HS100	HS100	INS.HS100.DV

* It can be used as Composite and Device in the DCS systems

4.3 Examples of valve tag names

	Valve	Solenoid valve	Limit switch close	Limit switch open
Flow valve	FV100	FSV100	FVL100	FVH100
Pressure valve	PV100	PSV100	PVL100	PVH100
Temperature valve	TV100	TSV100	TVL100	TVH100
Level valve	LV100	LSV100	LVL100	LVH100
Hand valve	HV100	HSV100	HVL100	HVH100
Emergency on-off valve	EV100	ESV100	EVL100	EVH100
Other valve (e.g. shut-off valve)	XV100	XSV100	XVL100	XVH100
Motor driven valve	MV100		MVL100	MVH100