

10/17/2014 10:32:00 AM - P:\IER1\1740\200-11740-10003\CAD\SHEETFILES\TREATMENT PLANT\WTP-10001 INSTRUMENTATION LEGEND.DWG - CALZARETTA, TIMOTHY

GRAPHIC SYMBOL FOR INSTRUMENTATION ITEMS

	LOGIC IN PLC DISPLAYED ON OIP & SCADA (INCLUDING INPUTS & OUTPUTS)		CONTROL RELAY CONTACT-NORMALLY OPEN
	LOGIC IN PLC		CONTROL RELAY CONTACT-NORMALLY CLOSED
	FIELD OR LOCALLY MOUNTED DEVICE		LIGHTNING ARRESTOR
	PROGRAMMED FUNCTION NOT NORMALLY ACCESSIBLE TO OPERATOR		ELAPSED TIME INDICATOR
	PROGRAMMED FUNCTION ACCESSIBLE THROUGH OPERATOR'S INTERFACE DEVICE		TIMING RELAY COIL
	LOGIC IN PLC DISPLAYED ON OIP (INCLUDING INPUTS AND OUTPUTS)		TIMED RELAY COIL (OFF-DELAY)
	INTERLOCKING		INDICATING LIGHT
	EXCLUSIVE OR		PUSH-TO-TEST INDICATING LIGHT
	ALTERNATOR		BATTERY
	OR		SECONDARY TRANSFORMER
	AND		VARIABLE RESISTOR
	MOTOR STARTER		RESISTOR
	PURGE		MOLDED CASE CIRCUIT BREAKER
	COMPLEX LOGIC		SPEED SWITCH
	COMPUTER LOGIC SYSTEM		MOMENTARY PUSHBUTTON OPERATOR- NORMALLY CLOSED
	TERMINAL OR TRANSITION POINT		MOMENTARY PUSHBUTTON OPERATOR- NORMALLY OPEN
	FLOAT SWITCH		SELECTOR SWITCH-NORMALLY OPEN
	PARSHALL FLUME		PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	MIXER		SOLENOID OR CLUTCH
	SEAL		THERMAL OVERLOAD
	OFF PAGE CONNECTOR		A-C SURGE PROTECTOR
	PROCESS MACHINERY MOTOR		HORN
	VENTURI OR INSERT FLOW TUBE		FIELD LOCATED
	IN-LINE FLOW ELEMENT (PROPELLER TYPE)		TERMINAL POINT
	IN-LINE FLOW ELEMENT (MAGNETIC TYPE)		TERMINAL POINT ARROW
	IN-LINE FLOW ELEMENT (ULTRA SONIC)		LOW VOLTAGE FUSE
	FLOW ORIFICE		CIRCUIT BREAKER WITH STAB CONNECTION
	TURBIDIMETER		CONTROL POWER TRANSFORMER
	ROTAMETER		TWO COIL LATCHING RELAY
	PUMP		RECEPTACLE
	BLOWER		SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	GENERAL USE DISCONNECTING SWITCH		MAINTAINED PUSH-PULL OPERATOR
	TIMED CLOSED CONTACT ON ENERGIZATION		MAINTAINED STOP-START PUSHBUTTON OPERATOR
	TIMED OPEN CONTACT ON ENERGIZATION		DIODE RECTIFIER OR D-C SURGE PROTECTOR
	TIMED OPEN CONTACT ON DE-ENERGIZATION		LIMIT SWITCH - NORMALLY OPEN
	TIMED CLOSED CONTACT ON DE-ENERGIZATION		LIMIT SWITCH - NORMALLY OPEN - HELD CLOSED
	FLOAT ACTUATED SWITCH-NO		LIMIT SWITCH - NORMALLY CLOSED - HELD OPEN
	FLOAT ACTUATED SWITCH-NC		LIMIT SWITCH - NORMALLY CLOSED
	PRESSURE ACTUATED SWITCH-NC		
	PRESSURE ACTUATED SWITCH-NO		
	FLOW ACTUATED SWITCH-NO		
	FLOW ACTUATED SWITCH-NC		
	TEMPERATURE SWITCH-NO		
	TEMPERATURE SWITCH-NC		

GRAPHIC SYMBOLS FOR VALVES

SYMBOL	DESCRIPTION
	STROKE OR POSITION ACTUATOR CYLINDER (OPEN-SHUT)
	STROKE OR POSITION ACTUATOR CYLINDER (THROTTLING)
	PNEUMATIC DIAPHRAGM OR POSITIONER (OPEN-SHUT)
	PNEUMATIC DIAPHRAGM OR POSITIONER (THROTTLING)
	MOTOR OPERATED (THROTTLING)
	MOTOR OPERATED (OPEN-SHUT)
	SLIDE-STOP GATE
	SLUICE GATE
	AIR SET ASSEMBLY
	BALL VALVE
	GLOBE VALVE
	GATE VALVE OR KNIFE GATE
	CHECK VALVE
	PLUG VALVE
	BUTTERFLY VALVE, DAMPER OR LOUVER
	TWO-WAY SOLENOID VALVE OPERATOR
	ELECTRONICALLY CONTROLLED CHECK VALVE
	TWO-WAY SOLENOID VALVE OPERATOR-DETENTED
	THREE-WAY SOLENOID VALVE OPERATOR
	FOUR-WAY SOLENOID VALVE OPERATOR

ABBREVIATIONS

SYMBOL	DESCRIPTION
%	GAIN OR PROPORTIONAL CONTROL
	INTEGRAL OR RESET CONTROL
D	DERIVATIVE OR RATE CONTROL
V	VELOCITY ALGORITHM
1-0	ON-OFF CONTROL
	SQUARE ROOT EXTRACTOR
	ADD OR TOTALIZE
	SUBTRACT OR DIFFERENCE
>	HIGHEST MEASURED VARIABLE
<	LOWEST MEASURED VARIABLE
E/I, I/P	CONVERT ONE TO ANOTHER
X, ÷	MULTIPLY, DIVIDE
	BIAS OR REVERSING
(x)	CHARACTERIZE - (EQUATION / D%/ETC.)

INSTRUMENTATION LINE SYMBOLS

SYMBOL	DESCRIPTION
	ELECTRICAL SIGNAL
	AIR LINE
	HYDRAULIC SIGNAL
	ELECTROMAGNETIC OR SONIC SIGNAL
	SOFTWARE SIGNAL
	CONNECTION TO PROCESS, OR MECHANICAL LINK

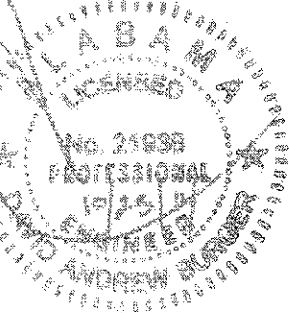
I.S.A. STANDARD LETTER FUNCTIONS

SYMBOL	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYSIS, ANALOG	ALARM
B	BURNER, FLAME	BATCH
C	CONDUCTIVITY, COMMAND	CONTROL (FEEDBACK TYPE)
D	DENSITY, SPECIFIC GRAVITY	
E	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	RATIO
G	GAGING	GLASS
H	HAND, MANUAL	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME, TIME SCHEDULE	CONTROL (NO FEEDBACK)
L	LEVEL, LIGHT	LOW
M	MOISTURE, HUMIDITY	MIDDLE, MODULATE
N		
O	OVERLOAD	ORIFICE
P	PRESSURE, VACUUM	POINT
Q	QUANTITY	TOTALIZE, INTEGRATE
R	RADIOACTIVITY	RECORD, PRINT, RECEIVE
S	SPEED, FREQUENCY, SOLENOID	SWITCH
T	TEMPERATURE, TURBIDITY	TRANSMIT, TRANSFORM
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION, VISCOSITY	VALVE, DAMPER, LOUVER
W	WEIGHT, FORCE	
X		
Y		RELAY, COMPUTE
Z	POSITION	DRIVE, ACTUATE

TETRA TECH



BID SET



BY

MARK DATE DESCRIPTION

HUNTSVILLE UTILITIES
SOUTHEAST WATER TREATMENT PLANT

**INSTRUMENTATION
LEGEND**

Project No.: 200-11740-10003
Designed By: CSW
Drawn By: CSW
Checked By: DAB

I-0001