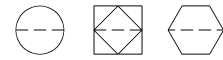


**GENERAL INSTRUMENT OR FUNCTION SYMBOLS**

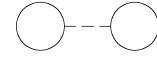
	(CONTROL ROOM) PRIMARY LOCATION *** NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	(OTHER) AUXILIARY LOCATION *** NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	IP1**		
SHARED DISPLAY, SHARED CONTROL	SCADA AND HMI DISPLAY	HMI DISPLAY ONLY	SCADA DISPLAY ONLY
AUXILIARY CONTROLLERS (OMNI, MULTILIN, ETC...)			
PROGRAMMABLE LOGIC CONTROL OR PLC REMOTE I/O	CAB #		

\*\* ABBREVIATIONS OF THE USER'S CHOICE SUCH AS IP1 (INSTRUMENT PANEL #1), IC2 (INSTRUMENT CONSOLE #2), CC3 (COMPUTER CONSOLE #3), ETC., MAY BE USED WHEN IT IS NECESSARY TO SPECIFY INSTRUMENT OR FUNCTION LOCATION.

\*\*\* NORMALLY INACCESSIBLE OR BEHIND-THE-PANEL DEVICES OR FUNCTIONS MAY BE DEPICTED BY USING THE SAME SYMBOLS BUT WITH DASHED HORIZONTAL BARS, I.E.



INSTRUMENTS SHARING COMMON HOUSING



TRANSMITTER REMOTE FROM PRIMARY ELEMENT



ROTAMETER



MAGNETIC FLOWMETER

**LINE DESIGNATIONS / PIPE LINE LEGEND**

	MAIN PROCESS LINE	DIP	DUCTILE IRON PIPE
	SECONDARY LINE	CIP	CAST IRON PIPE
	ELECTRICAL SIGNAL	MJ	MECHANICAL JOINT
	EXISTING PIPE & EQUIPMENT	SS	STAINLESS STEEL
	DEMOLITION	STL	STEEL
	EXISTING ABANDONED		
	RETURN ACTIVATED SLUDGE		
	WASTE ACTIVATED SLUDGE		
	UTILITY WATER		
	SANITARY SEWER		
	POTABLE WATER		
	RECYCLE WATER		
	DIGESTED SLUDGE		
	DRAIN		
	ELECTRIC HEAT TRACE		
	LINE CONTINUATION FLAG		

**ISA FUNCTIONAL IDENTIFICATION LETTERS**

	FIRST-LETTER (4)		SUCCEEDING-LETTERS (3)		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	Analysis (5, 19)		Alarm		
B	Burner, Combustion		User's Choice (1)	User's Choice (1)	User's Choice (1)
C	User's Choice (1)	Color		Control (13)	
D	Density / Gravity	Differential (4)			
E	Voltage		Sensor (Primary Element)		
F	Flow Rate	Ratio (Fraction) (4)			
G	Viscosity		Glass, Viewing device (9)		
H	Hand	Haze			High (7, 15, 16)
I	Current (Electrical)		Indicate (10)		
J	Power	Scan (7)			
K	Time, Time Schedule	Time Rate of Change (4, 21)		Control Station (22)	
L	Level		Light (11)		Low (7, 15, 16)
M	Motor	Momentary (4)	Malfunction		Middle, Intermediate (7, 15)
N	User's Choice (1)		User's Choice (1)	User's Choice (1)	User's Choice (1)
O	Optical		Orifice, Restriction		
P	Pressure, Vacuum	Vapor Pressure	Point (Test) Connection		
Q	Quantity	Integrate, Totalize (4)			
R	Radiation		Record (17)		
S	Speed, Frequency	Safety, Sulfur		Switch (13)	
T	Temperature	Temp. (Flash Pt.)		Transmit (18)	
U	Multivariable (6)		Multifunction (12)	Multifunction (12)	Multifunction (12)
V	Vibration, Mechanical Analysis	Vapor		Valve, Damper, Louver (13)	
W	Weight, Force		Well		
X	Unclassified (2)	X Axis	Unclassified (2)	Unclassified (2)	Unclassified (2)
Y	Event, State or Presence (20)	Y Axis		Relay, Compute, Convert (13, 14, 18)	
Z	Position, Dimension	Z Axis		Driver, Actuator, Unclassified Final Control Element	

NOTE: NUMBERS IN PARENTHESES REFER TO SPECIFIC EXPLANATORY NOTES IN SECTION 5.1 OF THE ISA SYMBOLS MANUAL.

**PLC SYMBOLS**

	EMERGENCY POWER SYSTEM INTERLOCK
	UNDEFINED INTERLOCK LOGIC
	RESET FOR LATCH-TYPE ACTUATOR
	PURGE OR FLUSHING DEVICE
	TIE BREAKER INTERLOCK
	LO SELECT
	HI SELECT
	DIGITAL INPUT
	DIGITAL OUTPUT
	ANALOG INPUT
	ANALOG OUTPUT
	SERIAL I/O TO PLC
	ETHERNET I/O TO PLC
	SERIAL TO ETHERNET CONVERTER PROLIX OR OTHER

**PIPE EQUIPMENT**

	EJECTOR
	PULSATIION DAMPENER
	ELECTRIC MOTOR
	VARIABLE SPEED DRIVE
	MIXER
	POSITIVE DISPLACEMENT PUMP BLOWER
	INLINE PUMP
	CENTRIFUGAL PUMP
	SUBMERSIBLE PUMP
	METERING PUMP
	DIAPHRAGM PUMP
	SOLENOID OPERATED DIAPHRAGM PUMP
	PERISTALTIC PUMP

**PIPING SYMBOLS**

	FLANGE CONNECTION
	STRAINER WYE TYPE W/BLOWOFF VALVE
	RUPTURE DISC
	DIAPHRAGM SEAL
	BACKFLOW PREVENTER
	FLEXIBLE CONNECTOR
	STATIC MIXER

**GENERAL SYMBOLS**

	DEMOLITION NOTES
	KEY NOTES (INSTALLATION AND NEW CONSTRUCTION)

**HVAC SYMBOLS**

	BALANCING DAMPER
	MOTOR
	DAMPER
	DUCT WORK

**VALVE & GATE ACTUATORS**

	ELECTRIC MOTOR
	SOLENOID
	DIAPHRAGM
	PULSATION DAMPNER

**VALVE BODY SYMBOLS**

	GATE
	GLOBE
	BALL
	NEEDLE
	PLUG
	THREE WAY PLUG
	SWING CHECK
	PRESSURE RELIEF
	BUTTERFLY
	SPRING AIR CHECK
	INJECTION QUILL
	AIR OPERATED PINCH VALVE
	RESTRAINED CORPORATION COCK
	PRESSURE REDUCING REGULATOR SELF CONTAINED
	BACK PRESSURE REGULATOR SELF CONTAINED
	NORMALLY OPEN
	NORMALLY CLOSED



NO.	DATE	APPR.	DESCRIPTION

DESIGNED BY: DATE: 8/20/2009	STV PROJECT NO: 30-14131	USACE CONTRACT NO: AS3K45-98-C-0007.DA01	DRAWING NUMBER: F-831-10-05
CHECKED BY: ENH	DATE: 8/20/2009	FILE NAME: D-01.dwg	ANSI D
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U.S. ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT BALTIMORE, MARYLAND	STV INCORPORATED 712 BALTIMORE MARYLAND 21240 TEL: (410)844-8112 FAX: (410) 288-2794	WASTEWATER TREATMENT PLANT FORT DETRICK, MARYLAND	PROCESS SYSTEMS P&ID LEGEND AND SYMBOLS
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SHEET IDENTIFICATION <b>D-001</b> SHEET 31 OF 288
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