

SIGNAL CONVERTERS

NOTE:

1: PROCESS OR INITIATING VARIABLE 2/3: A = ANALOG

D = DIGITAL E = VOLTAGE F = FREQUENCY H = HYDRAULIC

O = ELECTROMAGNETIC, SONIC P = PNEUMATIC PF = PULSE FREQUENCY PD = PULSE DURATION R = RESISTANCE

SMALL CIRCLE SIGNIFIES SIGNAL INVERSION

I = CURRENT

HAND SWITCHES

SELECTOR SWITCH (MAINTAINED CONTACT)

SPRING RETURN SWITCH OR PUSHBUTTONS

AM = AUTO/MANUAL CM = COMPUTER/MANUAL CAM = COMPUTER/AUTO/MANUAL CL = COMPUTER/LOCAL FR = FOWARD/REVERSE FOR = FOWARD/OFF/REVERSE FS = FAST/SLOW LOR = LOCAL/OFF/REMOTE HOA = HAND/OFF/AUTO LOS = LOCKOUT/STOP MOC = MODULATE OPEN/CLOSE OC = OPEN/CLOSE OO = ON/OFFOSC = OPEN/STOP/CLOSE SS = START/STOP

COL = COLOR

NH4 = AMMONIA

PH = pH

OG = OXYGEN GAS

(MOMENTARY CONTACT)

EXPOSED PROBE OR GAS DETECTOR

TAPPED OR SAMPLED

(FLOW THROUGH)

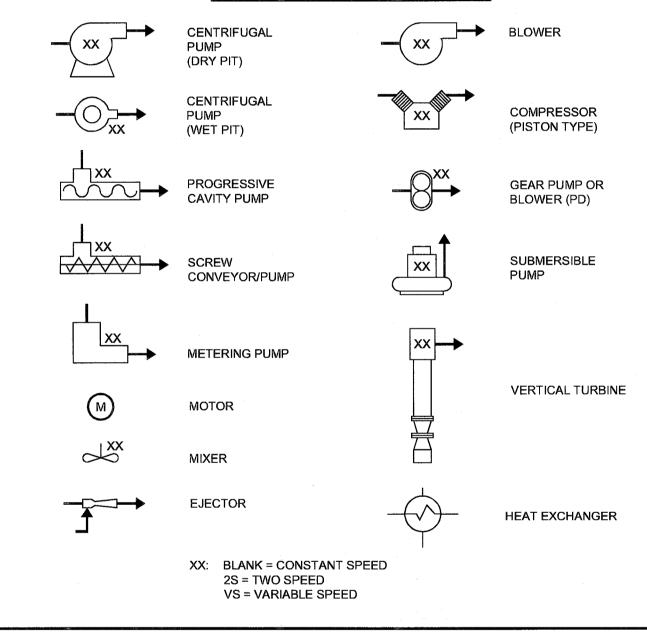
**ANALYSIS INSTRUMENTS** CDG = CARBON DIOXIDE GAS CG = COMBUSTIBLE GAS CH4 = METHANE CLG = CHLORINE GAS CLR = CHLORINE RESIDUAL COG = CARBON MONOXIDE GAS DO = DISSOLVED OXYGEN HUM = HUMIDITY HC = HYDROCARBONS H2S = HYDROGEN SULFIDE MHO = CONDUCTIVITY N2G = NITROGEN GAS OZG = OZONE GAS SD = SOLIDS DENSITY SO2 = SULPHUR DIOXIDE GAS SS = SUSPENDED SOLIDS TOC = TOTAL ORGANIC CARBON TRB = TURBIDITY

FOS = FAST/OFF/SLOW

MFS = MODULATE fASTER/SLOWER

**INSTRUMENT TAG NUMBER** -INSTRUMENT LOOP NUMBER INSTRUMENT SYMBOL-COMMONLY USED INSTRUMENT FUNCTIONAL IDENTIFICATION LETTER COMBINATIONS DEVELOPED FROM CHART AT LEFT (UNLESS NOTED AS CUSTOM SYMBOL): COMBINATION DESCRIPTION ANALYZER PRIMARY ELEMENT FLOW PRIMARY ELEMENT LEVEL PRIMARY ELEMENT PRESSURE PRIMARY ELEMENT FLOW CONTROL VALVE (FINAL ELEMENT) FCV FLOW INDICATING TRANSMITTER LEVEL INDICATING TRANSMITTER ANALYSIS INDICATING TRANSMITTER PRESSURE INDICATING TRANSMITTER FAL FLOW ALARM LOW LEVEL ALARM HIGH FLOW INDICATOR PRESSURE INDICATOR LEVEL INDICATOR FLOW INDICATING RECORDER FIRQ FLOW INDICATING RECODER WITH TOTALIZER FIC FLOW INDICATING CONTROLLER CONTROL RELAY CURRENT TO CURRENT CONVERTER (LOOP ISOLATOR) FLOW COMPUTING RELAY TELEPHONE DIALER MOTOR STATUS MOTOR OVERLOAD MO FMR FM RADIO (CUSTOM SYMBOL) RTU REMOTE TERMINAL UNIT (CUSTOM SYMBOL) MTU MASTER TERMINAL UNIT (CUSTOM SYMBOL) PS POWER SUPPLY (CUSTOM SYMBOL) INPUT/OUTPUT MODULE (CUSTOM SYMBOL) PRESSURE TRANSDUCER (CUSTOM SYMBOL) ANALOG TO DIGITAL CONVERTER (CUSTOM SYMBOL) DIGITAL TO ANALOG CONVERTER (CUSTOM SYMBOL) PCM PUMP CONTROL MODULE (CUSTOM SYMBOL) TSG THUMBWHEEL SETPOINT GENERATOR (CUSTOM SYMBOL) MNC MOTOR CALL MNF MOTOR FAILED DFA DATA FAIL ALARM MTS MOTOR TEMPERATURE SWITCH

**EQUIPMENT SYMBOLS** 

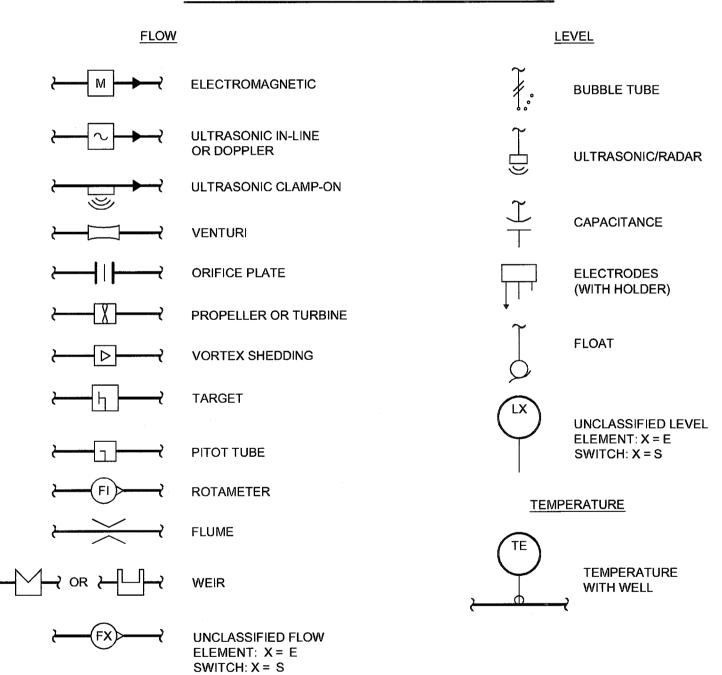


MISCELLANEOUS SYMBOLS

	<del> </del>	DIAPHRAGM SEAL	TS	TRANSIENT SUPPRESSOR
<b>\</b>		RUPTURE DISK (PRESSURE RELIEF)	xc	SIGHT GLASS  X: W = WATER A = AIR
		RUPTURE DISK (VACUUM RELIEF)	<b>├──</b>	FLOW STRAIGHTENER
	PI	(REGULATED SIDE) PRESSURE REGULATOR	<b>*</b>	DIFFERENTIAL PRESSURE REGULATOR
		PRESSURE GAUGE		ANTENNA (GENERIC)
	<b>\</b>	VENT TO ATMOSPHERE	•	INTERLOCK LOGIC
	Ţ	AUD CAD	⟨R⟩	RESET
		AIR GAP	<b>√</b>	SQUARE ROOT EXTRACTOR
		SNUBBER	-X X	SIGNAL CONTINUATION WHERE X = 1,2,3,ETC.

GENERAL INSTRUMENT OR FUNCTION SYMBOLS COMPUTER **PROGRAMMABLE** SHARED DISPLAY/ DISCRETE FUNCTION LOGIC SHARED CONTROL INSTRUMENT CONTROLLER OPERATOR ACCESSIBLE **NOT ACCESSIBLE** TO OPERATOR FIELD MOUNTED FRONT OF PANEL MOUNTED INTERIOR OF PANEL MOUNTED MOTOR CONTROL **CENTER MOUNTED** INSTRUMENTS SHARING A COMMON HOUSING ANNUNCIATOR

PRIMARY ELEMENT SYMBOLS



ACTUATOR SYMBOLS

7.010/t10It 01WB0E0					
P	PNUEMATIC		ELECTROPNEUMATIC		
H	HYDRAULIC		ELECTROHYDRAULIC		
(M)    xx	NOTE XX: PZ, HZ OR MZ INDICATES ACTUATOR WITH POSITIONER	s xx	SOLENOID		
#	PRESSURE OR VACUUM RELIEF SPRING OR WEIGHT LOADED				
T	MANUAL				
	NOTE: ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)				
	XX: FO = FAIL OPEN FC = FAIL CLOSED FI = FAIL TO INTERMEDIATE POSITION BLANK = FAIL TO LAST POSITION				

**VALVE & GATE SYMBOLS** 

<b>₹</b>	BUTTERFLY VALVE, DAMPER OR LOUVER
<b>├</b>	CHECK VALVE
$\leftarrow$	GLOBE, GATE, PINCH OR OTHER IN-LINE VALVE
$\leftarrow \bigcirc \leftarrow$	BALL VALVE
<b>₹</b>	THREE WAY VALVE (ARROWS INDICATE FLOW PATTERN)
	TELESCOPING VALVE
<b>⊚</b>	SLUICE GATE
	PREFABRICATED SLIDE GATE
$\vdash$	MUD VALVE

## INSTRUMENT LINE SYMBOLS

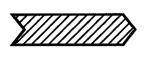
(LINES TO BE DRAWN FINE IN RELATION TO PROCESS PIPING LINES)

CONNECTION TO PROCESS	LACOTON CONTRACTOR CON
PNEUMATIC SIGNAL	<del>////</del>
ELECTRIC	OR ————————————————————————————————————
HYDRAULIC SIGNAL	
CAPILLARY TUBE	X X
ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)	
ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)	$\sim$ $\sim$
INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)	

	ABBREVIATION	IS/ACF	RONYMS
AS GS WS CI FMR RTU	AIR SUPPLY GAS SUPPLY WATER SUPPLY CONTACT INPUT FM RADIO REMOTE TERMINAL UNIT	ES HS CO PD MTU	ELECTRIC SUPPLY HYDRAULIC SUPPLY CONTACT OUTPUT POSITIVE DISPLACEMEN' MASTER TERMINAL UNIT
	GENERAL	NOTE	<u>S</u>

- 1. SEE DIVISION 40 OF THE SPECIFICATIONS FOR FURTHER INSTRUMENTATION REQUIREMENTS.
- 2. THIS IS A GUIDE TO READING INSTRUMENT SOCIETY OF AMERICA (ISA) FORMAT P&ID OR LOOP DIAGRAMS. THESE SYMBOLS AND TECHNIQUES HAVE MOSTLY EXTRACTED FROM ISA STANDARD S5.1. THIS IS NOT HOWEVER, A COMPLETE OR EXACT DUPLICATION OF S5.1. NOT ALL SYMBOLS SHOWN ARE USED ON THIS PROJECT. SOME SYMBOLS MAY BE USED THAT ARE NOT SHOWN. CONTACT THE ENGINEER OR REFER TO ISA STANDARD S5.1 FOR CLARIFICATIONS.
- 3. POWER SUPPLIES SHALL BE FURNISHED BY THE INSTRUMENT SUPPLIER AS REQUIRED TO MEET THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IN EACH LOOP OR SYSTEM.

COMMUNICAT	MOI &	PROCES	SS	SYI	MB	OL:	S
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MECHANICAL LINK

FLOW STREAM CONNECTION NOT SHOWN ON OTHER DRAWINGS

-o-o-o-o-o-

<b>XXXX</b>	FLOW STREAM CONNECTION SHOWN ON ANOTHER DRAWING. XXXX IS SHEET NUMBER WHERE SHOWN.
	DIGITAL INPUT (DISCRETE)
	DIGITAL OUTPUT (DISCRETE)
	PULSE TRAIN INPUT
<b>-</b>	PULSE OUTPUT (MOMLENTARY UNLESS F IS PRESENT - F MEANS PULSE TRAIN OUTPUT)

ANALOG OUTPUT

ANALOG INPUT

## **GENERAL NOTE:**

1. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING WIRING WITH INSTRUMENTATION EQUIPMENT PROVIDED IN DIVISION 40. I-001

NOT TO SCALE

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STATE OF

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TANDARD