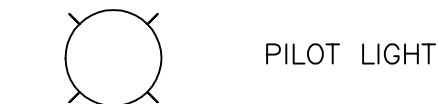


© 2015 CDM SMITH ALL RIGHTS RESERVED. REUSE OF DOCUMENTS: THESE DOCUMENTS AND DESIGNS PROVIDED BY PROFESSIONAL SERVICE, INCORPORATED HEREIN, ARE THE PROPERTY OF CDM SMITH AND ARE NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF CDM SMITH.

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

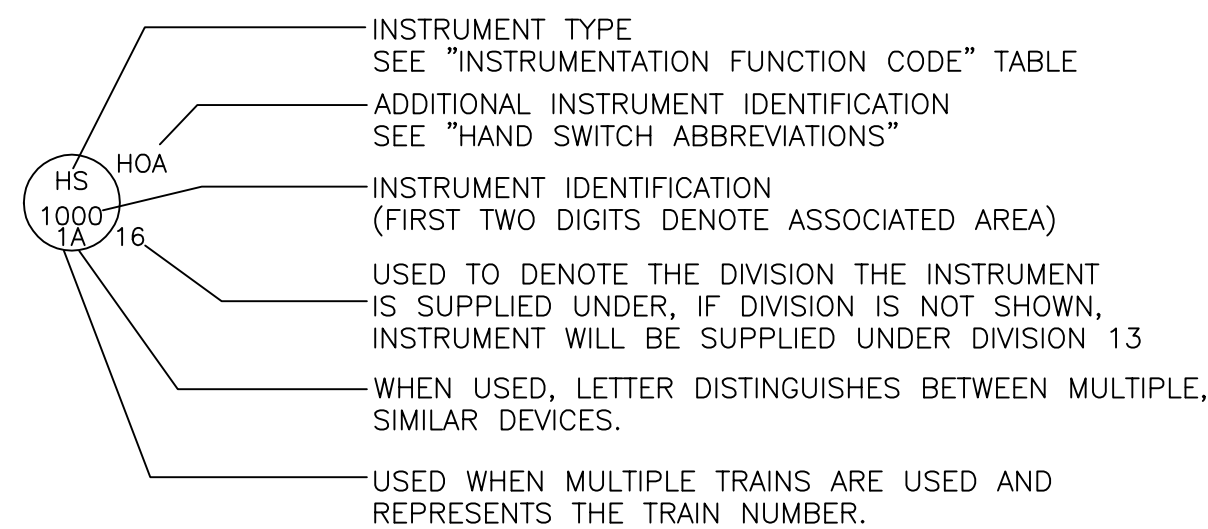
SHARED DISPLAY/SHARED CONTROL		LOCATION AND ACCESSIBILITY		
PRIMARY CHOICE	SECONDARY CHOICE	COMPUTER SOFTWARE	DISCRETE	
				FIELD MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
				PRIMARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
				PRIMARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE
				SECONDARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
				SECONDARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE



MISCELLANEOUS SYMBOLS

- INDICATES INTERLOCK OR LOGIC IN A MOTOR CONTROL CENTER
- INDICATES GENERAL OR MISCELLANEOUS HARDWIRED INTERLOCK
- MOTOR STARTER
- SILICONE CONTROL RECTIFIER
- VARIABLE FREQUENCY DRIVE
- PURGE OR FLUSHING DEVICE

TYPICAL TAG NUMBERS & DESIGNATION



HAND SWITCH ABBREVIATIONS

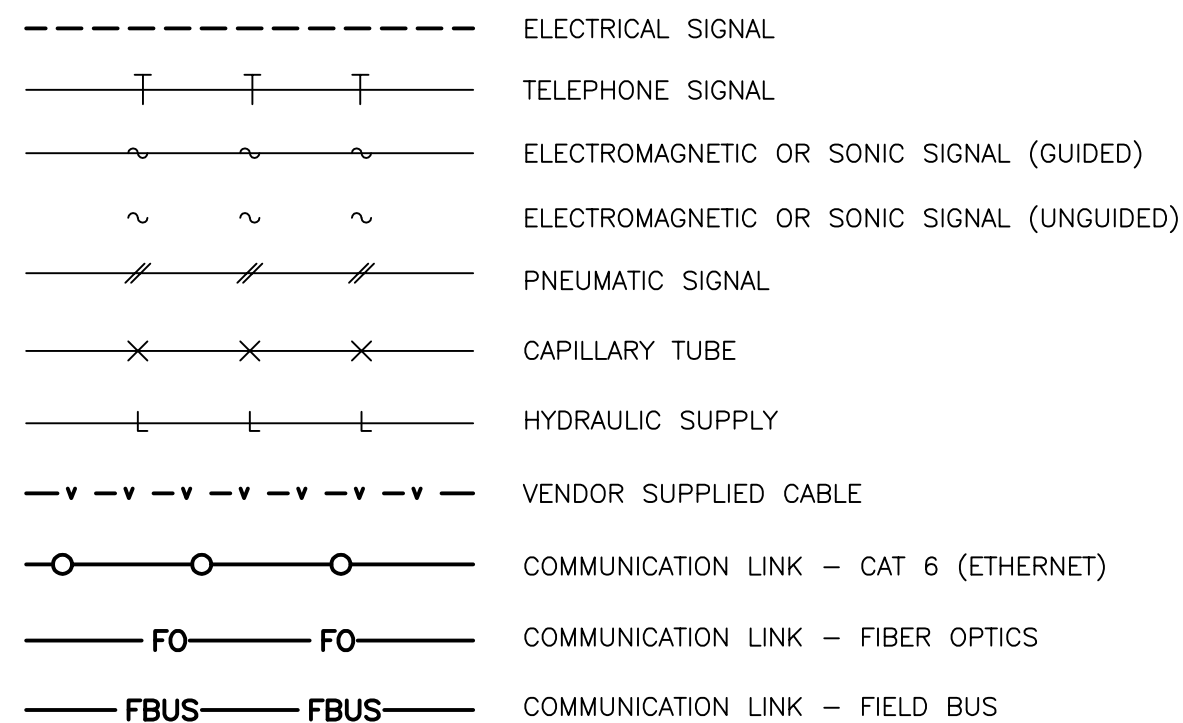
- | | |
|---------------------------|------------------------|
| AO = AUTO/OFF | LOR = LOCAL/OFF/REMOTE |
| AM = AUTO/MANUAL | LOS = LOCKOUT/STOP |
| CM = COMPUTER/MANUAL | LA = LOCAL/AUTO |
| CL = COMPUTER/LOCAL | LR = LOCAL/REMOTE |
| E-STOP = EMERGENCY STOP | OC = OPEN/CLOSE |
| FR = FORWARD/REVERSE | OCA = OPEN/CLOSE/AUTO |
| FOR = FORWARD/OFF/REVERSE | OO = ON/OFF |
| FS = FAST SLOW | OOA = ON/OFF/AUTO |
| FOS = FAST/OFF/SLOW | OSC = OPEN/STOP/CLOSE |
| HOA = HAND/OFF/AUTO | RSL = RAISE/STOP/LOWER |
| LLS = LEAD/LAG/STANDBY | SS = START/STOP |
| LOC = LOCAL/OFF/COMPUTER | SOR = START/OFF/RESET |

INSTRUMENTATION FUNCTION CODE

FIRST LETTERS		SUCCEEDING LETTERS		
COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
MEASURED/INITIATING VARIABLE	VARIABLE MODIFIER	READOUT/PASSIVE FUNCTION	OUTPUT/ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS	ALARM		
B	BURNER, COMBUSTION	USER'S CHOICE	START	USER'S CHOICE
C	USER'S CHOICE		CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENTIAL		
E	VOLTAGE	SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)		FAULT
G	USER'S CHOICE			
H	HAND			HIGH
I	CURRENT	INDICATE		
J	POWER	SCAN		
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION
L	LEVEL			LOW
M	MOTOR	MOMENTARY	LIGHT	MIDDLE, INTERMEDIATE
N	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE	RUNNING
O	USER'S CHOICE	ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM, PUMP	POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE		
R	RADIATION	RECORD		REMOTE
S	SPEED, FREQUENCY	SAFETY	SWITCH	
T	TEMPERATURE		TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL, ANALYSIS		VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE	WELL		
X	UNCLASSIFIED (1)	X-AXIS	UNCLASSIFIED (1)	UNCLASSIFIED (1)
Y	EVENT, STATE, PRESENCE	Y-AXIS	RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z-AXIS	DRIVER, ACTUATOR, UNCLASSIFIED, FINAL CONTROL ELEMENT	

TABLE NOTES:
 (1) WHEN USED SYMBOL OR SIGNAL LINE IS ANNOTATED.

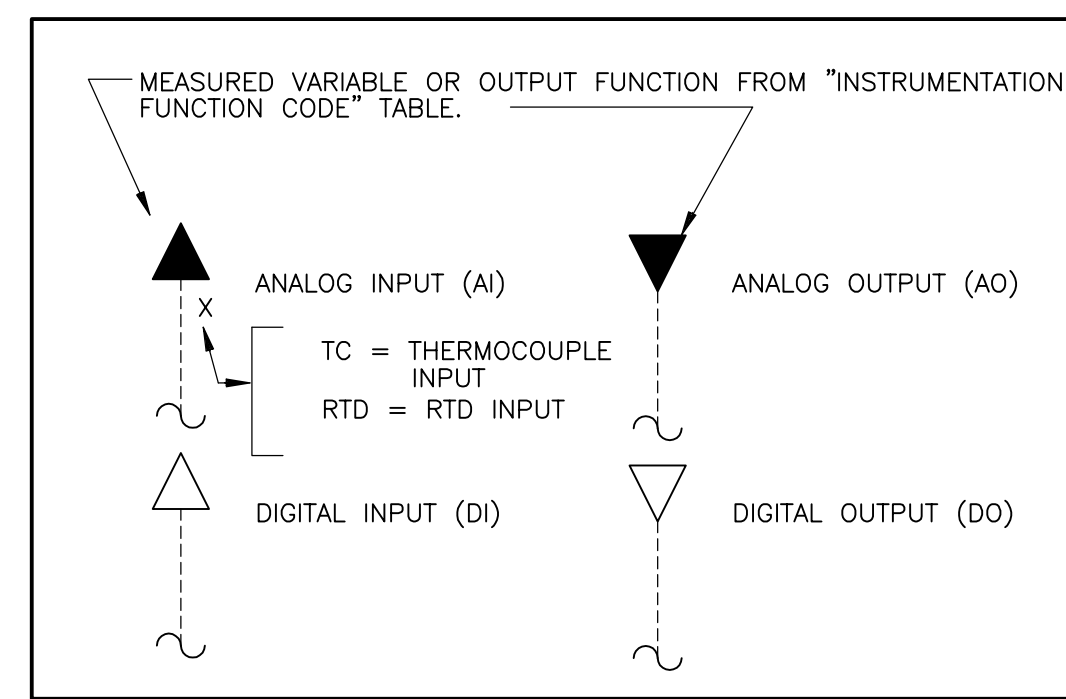
INSTRUMENT LINE SYMBOLS



ELECTRICAL / AIR SOURCES

- UPS --- UPS POWERED ELECTRICAL SOURCE
- 120V --- ELECTRICAL SOURCE (VOLTAGE)
- 480V --- ELECTRICAL SOURCE (VOLTAGE)
- IA --- INSTRUMENT AIR SOURCE

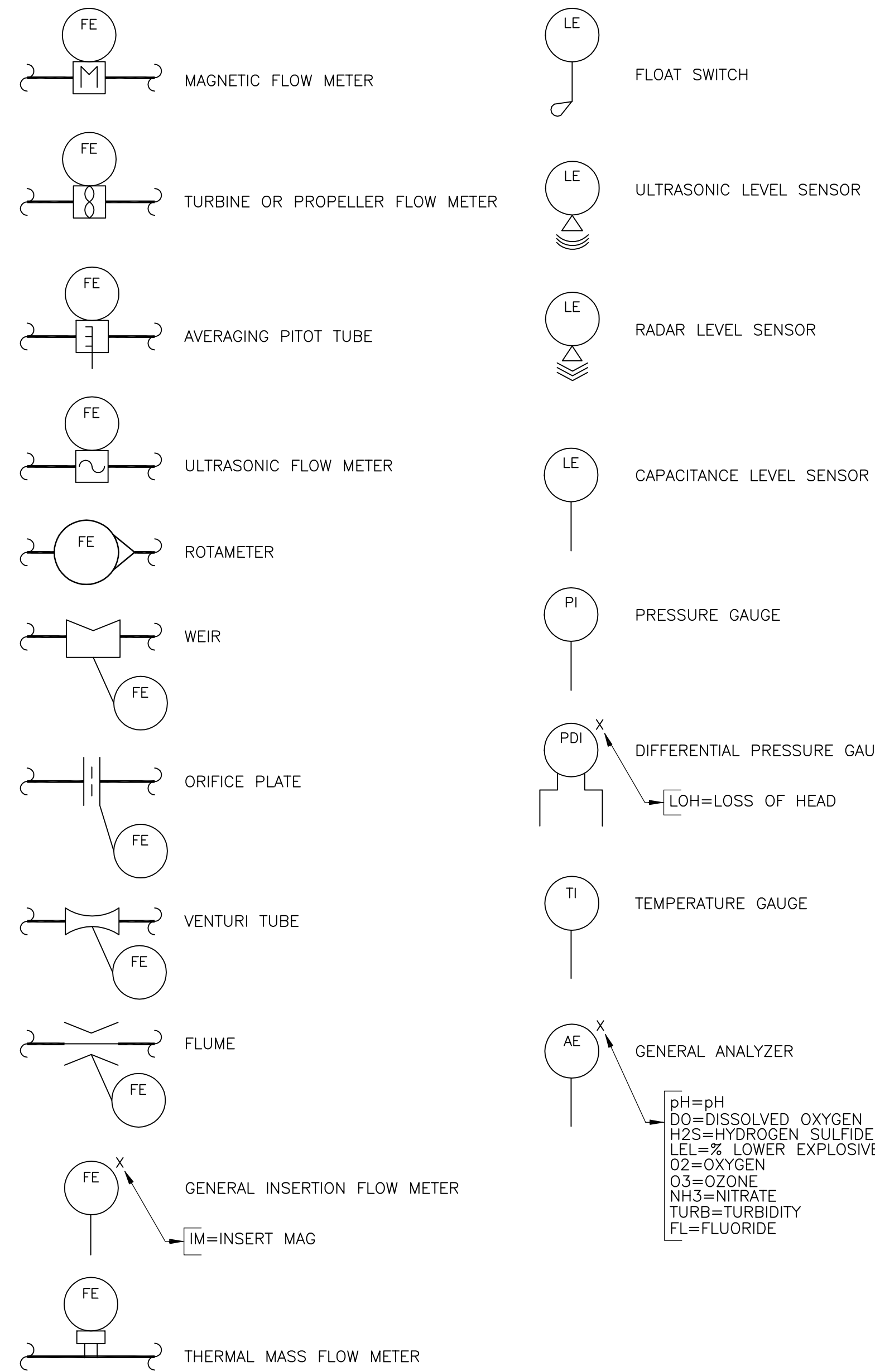
I/O SIGNALS



GENERAL NOTES

- THIS LEGEND APPLIES TO P&IDS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.
- IN GENERAL THIS LEGEND SHEET AND THE P&IDS ARE BASED ON THE INTERNATIONAL SOCIETY OF AUTOMATION (ISA) STANDARDS FOR PRACTICES FOR INSTRUMENTATION. SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS REQUIRED TO ACCOMMODATE PROJECT REQUIREMENTS.
- SOME PROCESS ITEMS SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC., WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE P&IDS.
- SEE ELECTRICAL AND MECHANICAL SHEETS AND SPECIFICATIONS FOR ADDITIONAL CONTROL AND INTERLOCK REQUIREMENTS.
- LIGHTER WEIGHT LINES, SHOWN AS _____, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE EXISTING. HEAVIER LINES, SHOWN AS _____, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED HEAVY LINES, SHOWN AS _____, INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.

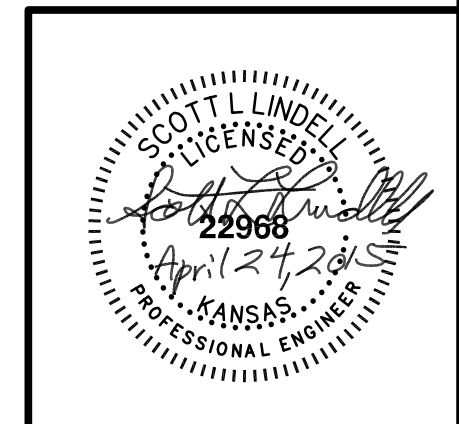
PRIMARY ELEMENTS



GENERAL ABBREVIATIONS

- AI ANALOG IN
- AO ANALOG OUT
- CPU CENTRAL PROCESSOR UNIT
- DI DIGITAL OR DISCRETE INPUT
- DO DIGITAL OUTPUT
- ES ETHERNET SWITCH
- ENET ETHERNET COMMUNICATION MODULE
- FBUS FIELD BUS COMMUNICATION
- FC FAIL CLOSED
- FCC FILTER CONTROL CONSOLE
- FLT FILTER
- FO FAIL OPEN OR FIBER OPTIC
- FOPP FIBER OPTIC PATCH PANEL
- HMI HUMAN MACHINE INTERFACE
- IWS INDUSTRIAL WORKSTATION
- LCP LOCAL CONTROL PANEL
- MCC MOTOR CONTROL CENTER
- MC MEDIA CONVERTER
- MOD MODULATING
- NC NORMALLY CLOSED
- NO NORMALLY OPEN
- NS ETHERNET NETWORK SWITCH
- OIT OPERATOR INTERFACE TERMINAL
- PLC PROGRAMMABLE LOGIC CONTROLLER
- PSU POWER SUPPLY UNIT
- PW PLANT WATER
- RIO REMOTE INPUT/OUTPUT
- UPS UNINTERRUPTIBLE POWER SUPPLY
- VFD VARIABLE FREQUENCY DRIVE
- VLV VALVE

- pH=pH
- DO=DISSOLVED OXYGEN
- H2S=HYDROGEN SULFIDE
- LEL=% LOWER EXPLOSIVE LIMIT
- O2=OXYGEN
- O3=OZONE
- NH3=NITRATE
- TURB=TURBIDITY
- FL=FLUORIDE



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: <u>K. ROOD</u>	 9200 Ward Parkway, Suite 500 Kansas City, MO 64114 Tel: (816) 444-9270 MO COA No. 001431
DRAWN BY: <u>K. REESE</u>	
SHEET CHK'D BY: _____	
CROSS CHK'D BY: _____	
APPROVED BY: _____	
DATE: <u>APRIL 2015</u>	

CITY OF WICHITA, KANSAS
 WATER AND SEWER DEPARTMENT
**SEWAGE TREATMENT PLANT NO.2 IMPROVMENTS
 UV DISINFECTION**

**INSTRUMENTATION NOTES, LEGENDS, AND
 ABBREVIATIONS I**

PROJECT NO. 2395-104609
FILE NAME: 1001SYMB.DWG
SHEET NO. I-1