FIRST LETTER		SECOND & SUCCEEDING LETTERS																				
		DISPLAY DEVICES							CONTROLLING DEVICES							SENSING DEVICES						
						ALARM (See Note 12)																
MEASURED VARIABLE	SYMBOL FOR MEASURED VARIABLES	INDICATING	RECORDING	INTEGRATING INDICATOR (See Note 5)	SCAN (See Note 7)	LOW	HIGH	LOW HIGH	INDICATING	RECORDING	BLIND	CONTROL VALVE	SELF ACTUATED VALVE	FINAL CONTROL ELEMENT (See Note 11)	SWITCH (See Note 6)	PRIMARY ELEMENT	BLIND TRANSMITTER	INDICATING TRANSMITTER	LOCAL OBSERVATION GLASS	TEST CONNECTION	RELAY OR CONVERTER (BLIND)	MONITOR
Typical Symbol	( )	( ) I	( ) R	( ) QI	( ) J ( )	( ) AL	( ) AH	( ) AHL	( ) IC	( ) RC	( ) C	( ) V	( ) CV	( ) Z	( ) S ( )	( ) E	( ) T	( ) IT	( ) G	( ) P	( ) Y	( ) M
Analysis (See Note 1)	A	AI	AR		AJ ( )	AAL	AAHL	AAHL	AIC	ARC	AC	AV		AZ	AS ( )	AE	AT	AIT		AP	AY	
Burner Flame	B	BI	BR		BJ ( )	BAL					BC	BV			BS ( )	BE	BT		BG	BP	BY	
Conductivity	C	CI	CR		CJ ( )	CAL	CAH	CAHL	CIC	CRC		CV		CZ	CS ( )	CE	CT	CIT		CP	CY	
Density	D	DI	DR		DJ ( )	DAL	DAH	DAHL	DIC	DRC		DV		DZ	DS ( )	DE	DT	DIT		DP	DY	
Voltage (EMF)	E	EI	ER		EJ ( )	EAL	EAH	EAHL	EIC	ERC	EC			EZ	ES ( )	EE	ET	EIT			EY	
Flow (See Note 10)	F	FI	FR	FQI	FJ ( )	FAL	FAH	FAHL	FIC	FRC	FC	FV	FCV	FZ	FS ( )	FE	FT	FIT	FG	FP	FY	
Flow Ratio	FF	FFI	FFR		FFJ ( )				FFIC	FFRC	FFC	FFV		FFZ								
Gaging (Dimensional)	G	GI	GR		GJ ( )	GAL	GAH	GAHL	GIC	GRC	GC	GV		GZ	GS ( )	GE	GT	GIT				
Hand	H								HIC		HC	HV	HCV	HZ	HS ( )							
Current	I	II	IR	IQI	IJ ( )	IAL	IAH	IAHL	IIC	IRC	IC			IZ	IS ( )	IE	IT	IIT			IY	
Power	J	JI	JR	JQI	JJ ( )	JAL	JAH	JAHL	JIC	JRC	JC			JZ	JS ( )	JE	JT	JIT			JY	
Time	K	KI	KR	KQI	KJ ( )	KAL	KAH	KAHL	KIC	KRC	KC			KZ	KS ( )		KT	KIT			KY	
Level	L	LI	LR		LJ ( )	LAL	LAH	LAHL	LIC	LRC	LC	LV	LCV	LZ	LS ( )	LE	LT	LIT	LG	LP	LY	
Moisture	M	MI	MR		MJ ( )	MAL	MAH	MAHL	MIC	MRC	MC	MV		MZ	MS ( )	ME	MT	MIT		MP	MY	
Users Choice (See Note 2)	N																					
Torque	O	OI	OR		OJ ( )	OAL	OAH	OAHL	OIC	ORC	OC	OV		OZ	OS ( )	OE	OT				OY	
Pressure	P	PI	PR		PJ ( )	PAL	PAH	PAHL	PIC	PRC	PC	PV	PCV	PZ	PS ( )	PE	PT	PIT		PP	PY	
Pressure Differential	PD	PDI	PDR			PDAL	PDAH	PDAHL	PDIC	PDRC	PDC	PDV	PDCV	PDZ	PDS ( )		PDT	PDIT				
Quantity or Event	Q	QI	QR	QQI	QJ ( )	QAL	QAH	QAHL	QIC	QRC	QC	QV		QZ	QS ( )		QT	QIT			QY	
Radiation	R	RI	RR	RQI	RJ ( )	RAL	RAH	RAHL	RIC	RRC	RC			RZ	RS ( )	RE	RT	RIT		RP	RY	RM
Speed or Frequency	S	SI	SR	SQI	SJ ( )	SAL	SAH	SAHL	SIC	SRC	SC			SZ	SS ( )		ST	SIT			SY	
Temperature (SEE NOTE 14)	T	TI	TR		TJ ( )	TAL	TAH	TAHL	TIC	TRC	TC	TV	TCV	TZ	TS ( )	TE	TT	TIT		TW	TY	
Temperature Differential	TD	TDI	TDR			TDAL	TDAH	~~TDAHL~~	TDIC	TDRC	TDC	TDV	TDCV	TDZ	TDS ( )	(See Note 8)				(See Note 8)		
Multi-Variable	U	UI	UR		UJ ( )	UAL	UAH	UAHL	UIC	URC	UC	UV		UZ	US ( )						UY	
Viscosity	V	VI	VR		VJ ( )	VAL	VAH	VAHL	VIC	VRC	VC	VV		VZ	VS ( )	VE	VT	VIT			VY	
Weight	W	WI	WR	WQI	WJ ( )	WAL	WAH	WAHL	WIC	WRC	WC	WV		WZ	WS ( )	WE	WT	WIT			WY	
Unclassified (See Note 4)	X	XI	XR		XJ ( )	XAL	XAH	XAHL	XIC	XRC	XC	XV		XZ	XS ( )	XE	XT	XIT			XY	X( )M
User's Choice (See Note 2)	Y																				YY	XVE
Position	Z	ZI	ZR		ZJ ( )	ZAL	ZAH	ZAHL	ZIC	ZRC	ZC			ZZ	ZS ( )	ZE	ZT	ZIT			ZY	

NOTES

(1) "A" is used for all analytical variables: For example: O_2, H_2O, CO_2, pH, octane improvement, chromatograph analyzing one or more streams for one or more compounds, boiling point, freezing point, combustibles etc. The chemical formula recognized symbol (such as pH) or a description denoting the function of the analyzer should be noted on the P&ID outside the instrument symbol.

(2) A user's choice letter is intended to cover a meaning that would be used repetitively in a particular project. When used, the letter may have one meaning as a first letter and another meaning as a succeeding letter. The meanings need be defined only once in a legend, or otherwise for that project. For example, the letter "N" may be defined as turbidity as a first letter and television monitor as a second letter. "BN" would be a burner flame television monitor.

(3) The equation of description denoting the function of the relay "Y" should be shown on the P&ID. For example: A=B+C+K, LP selector, volume booster.

(4) "X" is used to represent any "special" variables and may be defined as required. For example: Mass flow recorders which receive a signal from a multiplying relay which combines the product of density and flow. This item is not to be confused with "U" multi-variable symbol.

(5) When "Q" is used as a second or succeeding letter it denotes an integrating modifier. For example: "FQI" is an indicating flow integrator (or totalizer). Note that the integrating function shall be shown with separate identification: For example: FQI/FRS or FR/FQIS.

(6) Startup and shutdown devices are usually blind, but may be indicating or recording. If so, add "I" or "R" after measured variable. For example: FIS, TRS. If the switch performs an on-off control function, replace "S" by "C". For example: "FS" becomes "FC". Switch functions shall be further modified by "L" for low and "H" for high. Suffix 'S' to 'HS' etc. means selecting feature of the switch.

(7) The designation "AJ ( )" may denote a scanning analyzer indicator, recorder, transmitter, etc., by using the designation AJI, AJR, AJT, etc., respectively.

(8) "TW" denotes an empty thermowell. "TE" denotes a thermowell with thermocouple or resistance bulb and head suitable for use with a secondary instrument.

(9) Pressure relief valves and rupture disks shall be identified as "PSV" and "PSE" respectively.

(10) "FO" is used to designate a restriction orifice. (INCLUDING SNUBBERS, PULSATION DAMPENERS, ETC.)

(11) For devices other than control valves, such as hydraulic couplings, variable speed drives, etc.

(12) High-high alarms will be designated "( ) AHH" and low-low alarms "( ) ALL". For example: LAHH denotes "high-high level alarm".

(13) LSS is used to indicate level alternator. When applied to two 100 % capacity pumps it switches the pump logic to start pumps alternately.

(14) THE LETTER "A" SHALL BE ADDED AS THE THIRD LETTER FOR "AVERAGE" TEMPERATURE INDICATING AND RECORDING. FOR EXAMPLE: TIA WOULD BE AN AVERAGE TEMPERATURE INDICATOR AND TRA WOULD BE AN AVERAGE TEMPERATURE RECORDER.

(15.) XVE = VIBRATION SENSOR

GENERAL NOTES:

(A) All instrument identifications are based upon ISA standard "S5.1 - 1967". For further details refer to ISA standard.

(B) Where special designation is required, pilot lights shall be identified with the particular variable letter, followed by second letter "L".

NOTE:

THE SYMBOLS SHOWN HERE ARE FOR USE WITH P&ID'S M-103 THROUGH M-149 AND M-180 THROUGH M189 ONLY. REFER TO M-179 FOR SYMBOLS AND ABBREVIATIONS USED ON THE HV/AC P&ID'S M-150 THROUGH M-178. (9)

D-004

NO.	DATE	REVISION	DRFTR.	CHK'D	ENGR.	VER.
9	1 24 94	REV. PER DDC-2340	LG	TAK	RLB	MAE
8	4/12/89	REVISED PER DCP 1426 (E-2 B-6)	TAK	HH	[illegible]	[illegible]
0	10/27/69	ISSUED FOR CONSTRUCTION	[illegible]	G.C.	[illegible]	[illegible]

SCALE | DESIGNED Alex M. Wayne | DRAWN

BECHTEL
SAN FRANCISCO

DUANE ARNOLD ENERGY CENTER—UNIT NO 1
IOWA ELECTRIC LIGHT AND POWER COMPANY
CEDAR RAPIDS, IOWA

P. & I. D.
INSTRUMENT IDENTIFICATION

DRAWING No. BECH-M102 REV. 9

SIZE E