基本管路流程、儀器圖資料識別
P&ID(Pipe and Instrument Diagram)

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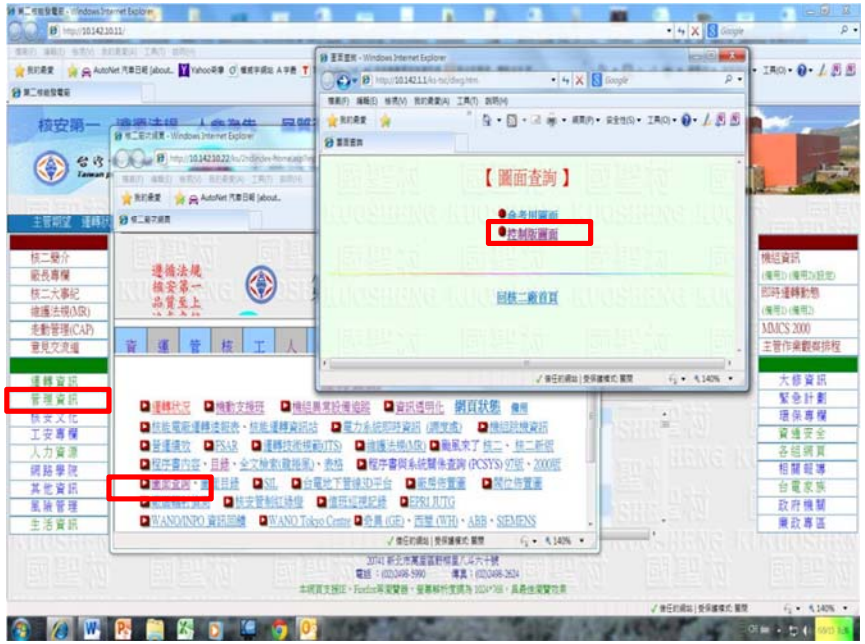
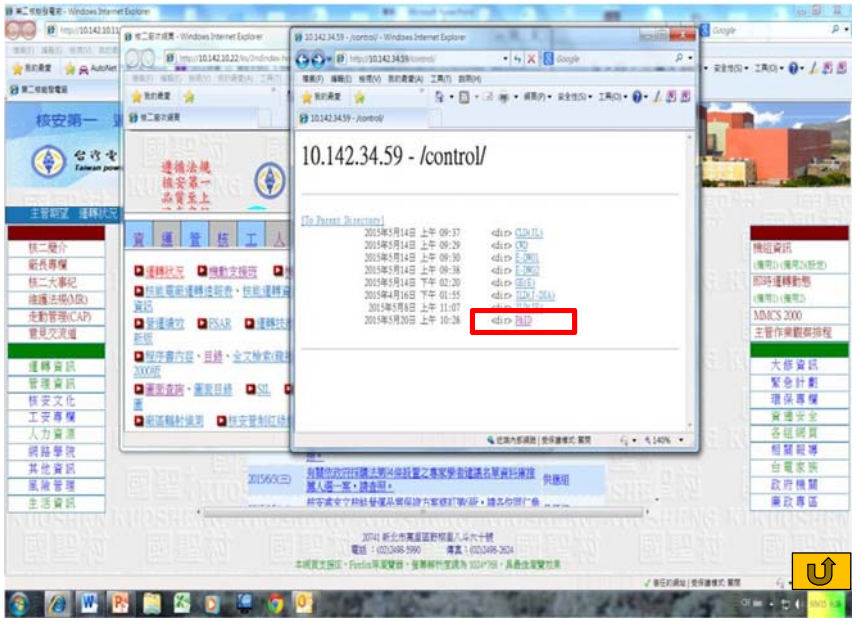
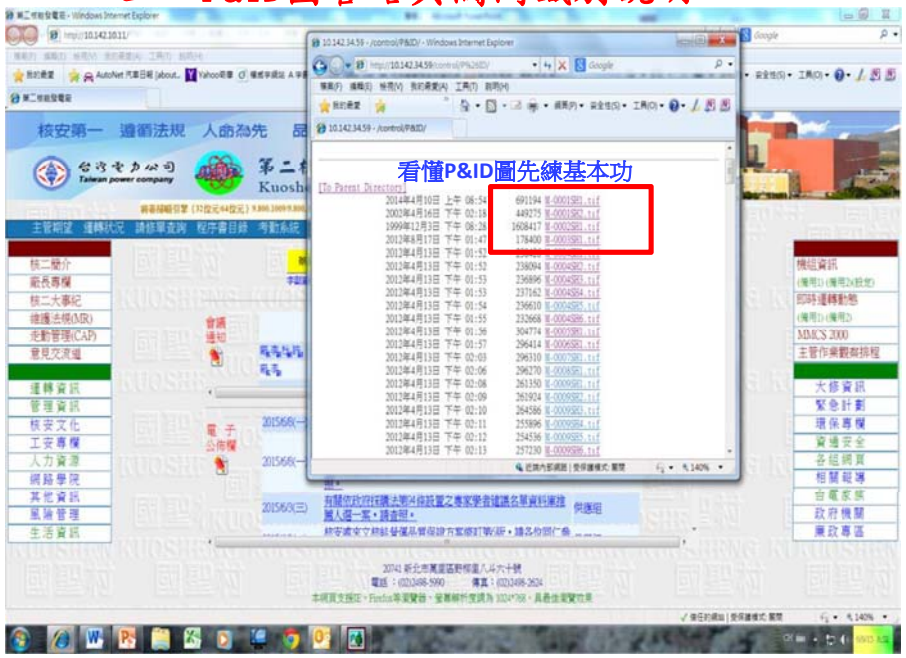
二、如何進入核二廠P&ID圖資料庫



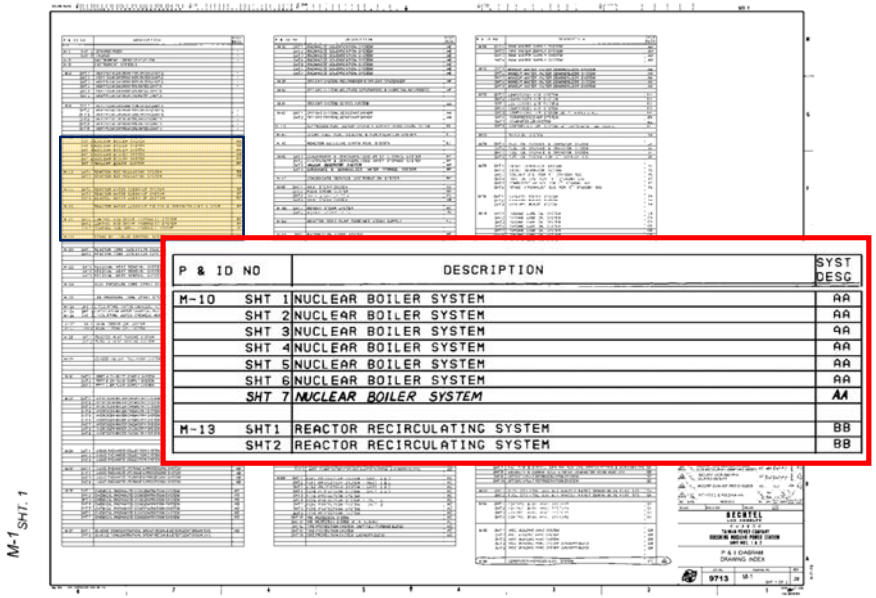
如何進入核二廠P&ID圖資料庫



三、P&ID圖管路與閥門識別說明



P&ID-M0001SH1:圖號與系統名稱及系統代號



P & ID NO		DESCRIPTION	SYST DESC
M-10	SHT 1	NUCLEAR BOILER SYSTEM	AA
	SHT 2	NUCLEAR BOILER SYSTEM	AA
	SHT 3	NUCLEAR BOILER SYSTEM	AA
	SHT 4	NUCLEAR BOILER SYSTEM	AA
	SHT 5	NUCLEAR BOILER SYSTEM	AA
	SHT 6	NUCLEAR BOILER SYSTEM	AA
	SHT 7	*NUCLEAR BOILER SYSTEM*	*AA*
M-13	SHT1	REACTOR RECIRCULATING SYSTEM	BB
	SHT2	REACTOR RECIRCULATING SYSTEM	BB

P&ID:圖號與系統名稱與系統代號

P & ID NO		DESCRIPTION	SYST DESC
M-1	SHT 1	*DRAWING INDEX*	-
	SHT 2	*LEGEND*	-
M-2		INSTRUMENT IDENTIFICATION	-
M-3		INSTRUMENT SYMBOLS	-
M-10	SHT 1	NUCLEAR BOILER SYSTEM	AA
	SHT 2	NUCLEAR BOILER SYSTEM	AA
	SHT 3	NUCLEAR BOILER SYSTEM	AA
	SHT 4	NUCLEAR BOILER SYSTEM	AA
	SHT 5	NUCLEAR BOILER SYSTEM	AA
	SHT 6	NUCLEAR BOILER SYSTEM	AA
	SHT 7	*NUCLEAR BOILER SYSTEM*	*AA*
M-13	SHT1	REACTOR RECIRCULATING SYSTEM	BB
	SHT2	REACTOR RECIRCULATING SYSTEM	BB
M-14	SHT1	REACTOR WATER CLEAN-UP SYSTEM	BP
	SHT2	REACTOR WATER CLEAN-UP SYSTEM	BP
	SHT3	REACTOR WATER CLEAN-UP SYSTEM	BP
M-15		REACTOR WATER CLEAN-UP FILTER & DEMINERALIZER SYSTEM	BP
M-17	SHT1	CONTROL ROD DRIVE HYDRAULIC SYSTEM	BF
	SHT2	CONTROL ROD DRIVE HYDRAULIC SYSTEM	BF
	SHT.3	CONTROL ROD DRIVE HYDRAULIC SYSTEM	BF
M-19		STAND BY LIQUID CONTROL SYSTEM	BH

蒸汽系統

再循環系統

RWCU

控制棒驅動系統

SBLC

P&ID:圖號與系統名稱與系統代號

M-20	SHT1	REACTOR CORE ISOLATION COOLING SYSTEM	EK
	SHT2	REACTOR CORE ISOLATION COOLING SYSTEM	EK
M-22	SHT1	RESIDUAL HEAT REMOVAL SYSTEM	EJ
	SHT2	RESIDUAL HEAT REMOVAL SYSTEM	EJ
	SHT3	RESIDUAL HEAT REMOVAL SYSTEM	EJ
M-24		HIGH PRESSURE CORE SPRAY SYSTEM	EM
M-25		LOW PRESSURE CORE SPRAY SYSTEM	EL
M-26	SHT 1	CIRCULATING WATER CHEMICAL INJECTION SYSTEM	DD
M-26	SHT 2	CIRCULATING WATER CHEMICAL INJECTION SYSTEM	DD
M-26	SHT 3	CIRCULATING WATER CHEMICAL INJECTION SYSTEM	DD
M-27	SHT.1	MAIN TURBINE EHC SYSTEM	AB
M-27	SHT.2	MAIN TURBINE EHC SYSTEM	AB
M-28	SHT.1	PROCESS HEAT TRACING SYSTEM	QM
	SHT.2	PROCESS HEAT TRACING SYSTEM	QM

RCIC

RHR餘熱移除系統

HPCS

LPCS

P&ID:圖號與系統名稱與系統代號

M-29		CLOSED CIRCUIT TELEVISION SYSTEM	RH
M-30	SHT.1	RFPT A EH FLUID SUPPLY SYSTEM	FC
	SHT.2	RFPT B EH FLUID SUPPLY SYSTEM	FC
	SHT.3	RFPT C EH FLUID SUPPLY SYSTEM	FC
M-31	SHT.1	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.2	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.3	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.4	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.5	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.6	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.7	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.8	HYDROGEN WATER CHEMISTRY SYSTEM	BG
	SHT.9	HYDROGEN WATER CHEMISTRY SYSTEM	BG

HWC飼水加氫系統

P&ID:圖號與系統名稱與系統代號

M-39		OFF GAS SYSTEM, RECOMBINER & OFF GAS CONDENSER	HF
M-40		OFF GAS SYSTEM, MOISTURE SEPARATORS & CHARCOAL ADSORBERS	HF
M-41		OFF GAS SYSTEM, GLYCOL SYSTEM	HA
M-42	SHT.1	OFF GAS SYSTEM, DESICCANT DRYER	HA
	SHT.2	OFF GAS SYSTEM, DESICCANT DRYER	HA
M-43		SUPPRESSION POOL CLEANUP SYSTEM & AUXILARY DEMINERALIZER SYSTEM	EE
M-44		SPENT FUEL POOL COOLING & PURIFICATION SYSTEM	EC
M-45		REACTOR BUILDING UPPER POOL SYSTEM	EC

P&ID:圖號與系統名稱與系統代號

M-46	SHT.1	CONDENSATE & DEMINERALIZED WATER STORAGE SYSTEM	AP
	SHT.2	CONDENSATE & DEMINERALIZED WATER STORAGE SYSTEM	AP
	SHT.3	VACUUM DEAERATOR SYSTEM	AP
	SHT.4	CONDENSATE & DEMINERALIZED WATER STORAGE SYSTEM	AP
M-47		CONDENSATE SERVICE DISTRIBUTION SYSTEM	AP
M-48	SHT.1	MAIN STEAM SYSTEM	AB
	SHT.2	MAIN STEAM SYSTEM	AB
	SHT.3	MAIN STEAM SYSTEM	AB
	SHT.4	MAIN STEAM SYSTEM	AB
M-49	SHT.1	REHEAT STEAM SYSTEM	AC
	SHT.2	REHEAT STEAM SYSTEM	AC
M-50		REACTOR FEED PUMP TURBINES STEAM SUPPLY	FC
M-51	SHT1	EXTRACTION STEAM SYSTEM	AF
	SHT2	EXTRACTION STEAM SYSTEM	AF
M-52	SHT1	CONDENSATE SYSTEM	AD
	SHT2	CONDENSATE SYSTEM	AD

P&ID:圖號與系統名稱與系統代號

M-53		CONDENSATE POLISHING DEMINERALIZER SYSTEM	AK
M-54	SHT.1	CONDENSATE DEMINERALIZER REGENERATION SYSTEM	AK
	SHT.2	CONDENSATE DEMINERALIZER REGENERATION SYSTEM	AK
	SHT.3	CONDENSATE DEMINERALIZER REGENERATION SYSTEM	AK
M-55		FEEDWATER SYSTEM	AE
M-56	SHT.1	FEEDWATER HEATER DRAINS AND VENT SYSTEM	AG
	SHT.2	FEEDWATER HEATER DRAINS AND VENT SYSTEM	AG
	SHT.3	FEEDWATER HEATER DRAINS AND VENT SYSTEM	AG
	SHT.4	FEEDWATER HEATER DRAINS AND VENT SYSTEM	AG
	SHT.5	FEEDWATER HEATER DRAINS AND VENT SYSTEM (MOPS. SCRUPS)	AG
M-57	SHT1	CONDENSER CONNECTIONS	AD
	SHT2	CONDENSER CONNECTIONS	AD
M-58		AIR REMOVAL SYSTEM	CG
M-59		STEAM SEALING SYSTEM	CA

P&ID:圖號與系統名稱與系統代號

M-60	SHT.1	TRAVELING SCREENS AND SCREEN WASH PUMPS - CIRCULATING WATER	DC
	SHT.2	TRAVELING SCREENS AND SCREEN WASH PUMPS - ECW	DC
M-61	SHT.1	EMERGENCY CIRCULATING WATER SYSTEM	EH
	SHT.2	EMERGENCY CIRCULATING WATER SYSTEM	EH
M-62	SHT.1	NUCLEAR COMPONENT CLOSED COOLING WATER SYSTEM	EG
	SHT.2	NUCLEAR COMPONENT CLOSED COOLING WATER SYSTEM	EG
	SHT.3	NUCLEAR COMPONENT CLOSED COOLING WATER SYSTEM	EG
	SHT.4	NUCLEAR COMPONENT CLOSED COOLING WATER SYSTEM	EG
	SHT.5	NUCLEAR COMPONENT CLOSED COOLING WATER SYSTEM	EG
M-63	SHT. 1	CIRCULATING WATER SYSTEM	DA
M-63	SHT. 2	CIRCULATING WATER SYSTEM	DA
M-64		EXTERNAL CIRCULATING WATER SYSTEM	DA
M-65	SHT.1	TURBINE PLANT CLOSED COOLING WATER SYSTEM	EB
	SHT.2	TURBINE PLANT CLOSED COOLING WATER SYSTEM	EB
	SHT.3	TURBINE PLANT CLOSED COOLING WATER SYSTEM	EB
M-66	SHT.1	MISC. COMPONENT COOLING WATER SYSTEM	ED
	SHT.2	MISC. COMPONENT COOLING WATER SYSTEM	ED
	SHT.3	MISC. COMPONENT COOLING WATER SYSTEM (LAUNDRY BLD'G)	ED

P&ID:圖號與系統名稱與系統代號

M-68	SHT.1	FIRE PROTECTION SYSTEM - UNIT 1 & 2	KC
	SHT.2	FIRE PROTECTION SYSTEM - UNIT 1 & 2	KC
	SHT.3	FIRE PROTECTION SYSTEM - UNIT 1 & 2	KC
	SHT.4	FIRE PROTECTION SYSTEM - UNIT 1 & 2	KC
	SHT.5	FIRE PROTECTION SYSTEM	KC
	SHT.6	FIRE PROTECTION SYSTEM - UNIT 1	KC
	SHT.7	FIRE PROTECTION SYSTEM - UNIT 2	KC
	SHT.8	FIRE PROTECTION SYSTEM	KC
	SHT.9	FIRE PROTECTION SYSTEM	KC
	SHT.10	FIRE PROTECTION SYSTEM	KC
	SHT.11	FIRE PROTECTION SYSTEM (M.L.R. BLDGING)	KC
	SHT.12	FIRE PROTECTION SYSTEM - UNIT 1 & 2 (TURBINE BLD'G)	KC
	SHT.13	FIRE PROTECTION SYSTEM	KC
	SHT.14	FIRE PROTECTION SYSTEM (LAUNDRY BLD'G)	KC

P&ID:圖號與系統名稱與系統代號

P & ID NO		DESCRIPTION	SYST DESG
M-69	SHT.1	RAW WATER SUPPLY SYSTEM	AM
	SHT.2	RAW WATER SUPPLY SYSTEM	AM
	SHT.3	RAW WATER SUPPLY SYSTEM	AM
	SHT.4	RAW WATER SUPPLY SYSTEM	AM
M-70	SHT.1	MAKEUP WATER, FILTER DEMINERLIZER SYSTEM	AN
	SHT.2	MAKEUP WATER, FILTER DEMINERLIZER SYSTEM	AN
	SHT.3	MAKEUP WATER, FILTER DEMINERLIZER SYSTEM	AN
	SHT.4	MAKEUP WATER, FILTER DEMINERLIZER SYSTEM	AN
	SHT.5	MAKEUP WATER, FILTER DEMINERLIZER SYSTEM	AN
M-72	SHT.1	COMPRESSED AIR SYSTEM	KA
	SHT.2	COMPRESSED AIR SYSTEM	KA
	SHT.3	COMPRESSED AIR SYSTEM	KA
	SHT.4	COMPRESSED AIR SYSTEM	KA
	SHT.5	COMPRESSED AIR SYSTEM (M.L.R. PROCESSING)	KA
	SHT.6	COMPRESSED AIR SYSTEM	KA
	SHT.7	COMPRESS AIR SYSTEM	KA
	SHT.8	COMPRESSED AIR SYSTEM (4TH INSTRUMENT AIR DRYER)	KA
M-73		NITROGEN SYSTEM	KH

P&ID:圖號與系統名稱與系統代號

M-74	SHT.1	FUEL OIL STORAGE & TRANSFER SYSTEM	JA
	SHT.2	FUEL OIL STORAGE & TRANSFER SYSTEM	JA
	SHT.3	FUEL OIL STORAGE & TRANSFER SYSTEM	JA
	SHT.4	FUEL OIL SYSTEM FOR 5TH STANDBY D/G	JA
M-75	SHT.1	DIESEL GENERATOR SYSTEM	PE
	SHT.2	DIESEL GENERATOR SYSTEM	PE
	SHT.3	COOLANT SYS. FOR 5TH STANDBY D/G	PE
	SHT.4	LUBE OIL SYS. FOR 5TH STANDBY D/G	PE
	SHT.5	COMPRESSED AIR SYS. FOR 5TH STANDBY D/G	PE
	SHT.6	INTAKE AIR-EXHAUST GAS FOR 5TH STANDBY D/G	PE
M-76	SHT.1	AUXILIARY BOILER SYSTEM	FA
	SHT.2	AUXILIARY BOILER SYSTEM	FA
	SHT.3	AUXILIARY BOILER SYSTEM	FA
M-78	SHT.1	TURBINE LUBE OIL SYSTEM	CB
	SHT.2	TURBINE LUBE OIL SYSTEM	CB
	SHT.3	TURBINE LUBE OIL SYSTEM	CB
	SHT.4	TURBINE LUBE OIL SYSTEM	CB
	SHT.5	TURBINE LUBE OIL SYSTEM	CB
	SHT.6	TURBINE LUBE OIL SYSTEM	CB
	SHT.7	TURBINE LUBE OIL SYSTEM	CB

P&ID:圖號與系統名稱與系統代號

M-79		POST ACCIDENT SAMPLING SYSTEM	SJ
M-81	SHT.1	PROCESS SAMPLING	RC
	SHT.2	PROCESS SAMPLING	RC
M-82	SHT.1	M.L.R. PROCESSING SYSTEM	LF
	SHT.3	M.L.R. PROCESSING SYSTEM	LF
	SHT.4	M.L.R. PROCESSING SYSTEM	LF
	SHT.5	M.L.R. PROCESSING SYSTEM	LF
	SHT.6	M.L.R. PROCESSING SYSTEM	LF
	SHT.7	M.L.R. PROCESSING SYSTEM	LF
	SHT.8	M.L.R. PROCESSING SYSTEM	LF
M-83	SHT.1	DOMESTIC WASTE WATER TREATMENT SYSTEM	LR
	SHT.2	DOMESTIC WASTE WATER TREATMENT SYSTEM	LR
	SHT.3	DOMESTIC WASTE WATER TREATMENT SYSTEM	LR
M-84	SHT.1	LAUNDRY BLDG WORK-CLOTHING LAUNDRY SYS. AND WATER WASTE TREATMENT SYS.	LW
	SHT.2	LAUNDRY BLDG WORK-CLOTHING LAUNDRY SYS. AND WATER WASTE TREATMENT SYS.	LW
	SHT.3	LAUNDRY BLDG WORK-CLOTHING LAUNDRY SYS. AND WATER WASTE TREATMENT SYS.	LW

P&ID:圖號與系統名稱與系統代號

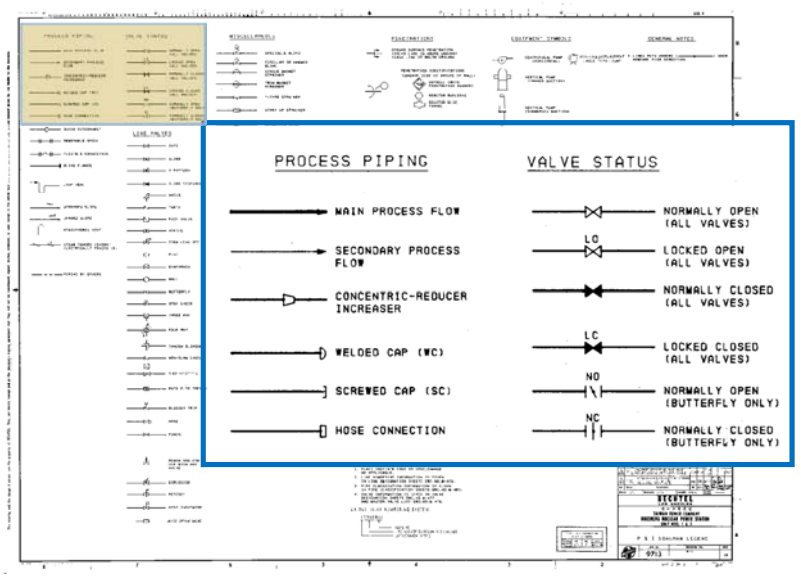
M-85	SHT.1	EMERGENCY CHILLED WATER SYSTEM	GJ
	SHT.2	EMERGENCY CHILLED WATER SYSTEM	GJ
M-87	SHT.1	NORMAL CHILLED WATER SYSTEM	GB
	SHT.2	NORMAL CHILLED WATER SYSTEM	GB
M-88	SHT.1	MISCELLANEOUS CHILLED WATER SYSTEM	GC
	SHT.2	MISCELLANEOUS CHILLED WATER SYSTEM (LAUNDRY BLD'G)	GC
	SHT.3	MISCELLANEOUS CHILLED WATER SYSTEM (LAUNDRY BLD'G)	GC
M-89	SHT.1	REACTOR BUILDING HVAC SYSTEM	GN
	SHT.2	REACTOR BUILDING HVAC SYSTEM	GN
	SHT.3	REACTOR BUILDING HVAC SYSTEM	GN
	SHT.4	REACTOR BUILDING HVAC SYSTEM	GN
M-90		REACTOR AUXILIARY BLDG HVAC SYSTEM	GL
M-91	SHT.1	REACTOR AUXILIARY BLDG HVAC SYSTEMS	GL
	SHT.2	REACTOR AUXILIARY BLDG HVAC SYSTEM	GL
M-92	SHT.1	RADWASTE & TURBINE BLDG & DIESEL GENERATOR ROOM HVAC SYS	GE
	SHT.2	RADWASTE & TURBINE BLDG & DIESEL GENERATOR ROOM HVAC SYS	GE
	SHT.3	RADWASTE & TURBINE BLDG & DIESEL GENERATOR ROOM HVAC SYS	GE
	SHT.4	RADWASTE & TURBINE BLDG & DIESEL GENERATOR ROOM HVAC SYS	GE
	SHT.5	RADWASTE & TURBINE BLDG & DIESEL GENERATOR ROOM HVAC SYS	GE
	SHT.6	M.L.R. BLDG. HVAC SYSTEM	GE
	SHT.7	RAD. T/B & DIESEL GEN. RM. HEATING, VENTILATING & AIRCOND. SYS	GE
	SHT.8	RADWASTE & TURBINE BLDG. & DIESEL GENERATOR ROOM HVAC SYS	GE
	SHT.9	OFFGAS VAULT REFRIGERATION SYSTEM	GE
	SHT.10	OFFGAS VAULT REFRIGERATION SYSTEM	GE

P&ID:圖號與系統名稱與系統代號

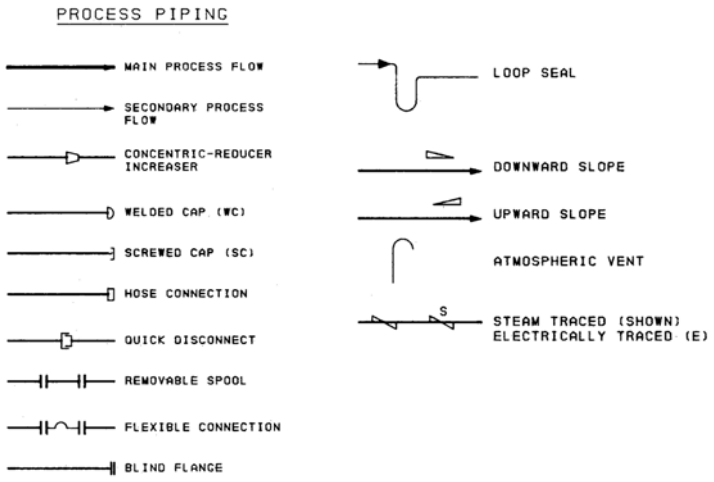
M-93	SHT.1	FUEL STG. CTRL. AUX. BLR. MAKEUP WATER DEMIN BLDG HVAC SYS.	GK
	SHT.2	FUEL STG. CTRL. AUX. BLR. MAKEUP WATER DEMIN BLDG HVAC SYS.	GK
M-94	SHT.1	CONTROL BLDG HVAC SYSTEMS	GK
	SHT.2	CONTROL BLDG HVAC SYSTEMS	GK
	SHT.3	CONTROL BLDG HVAC SYSTEMS	GK
	SHT.4	CONTROL BLDG HVAC SYSTEMS	GK
M-95	SHT.1	MISC. BUILDING HVAC SYSTEM	GR
	SHT.2	MISC. BUILDING HVAC SYSTEM	GR
	SHT.3	MISC. BUILDING HVAC SYSTEM	GR
	SHT.4	MISC. BUILDING HVAC SYSTEM (LAUNDRY BLD'G)	GR
	SHT.5	MISC. BUILDING HVAC SYSTEM (LAUNDRY BLD'G)	GR
M-96		GENERATOR HYDROGEN & CO_2 SYSTEM	CC

四、P&ID-管路說明

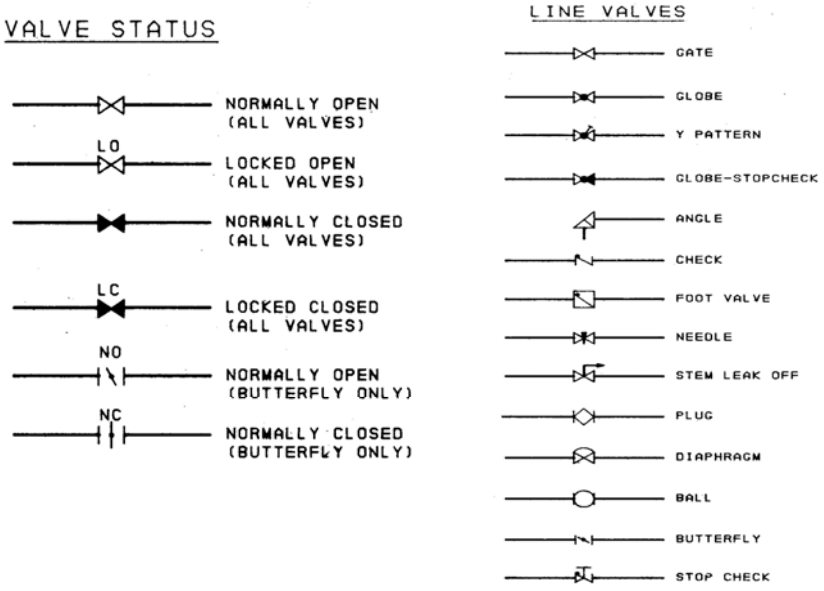
P&ID-M0001SH2:圖形或符號代表的意義



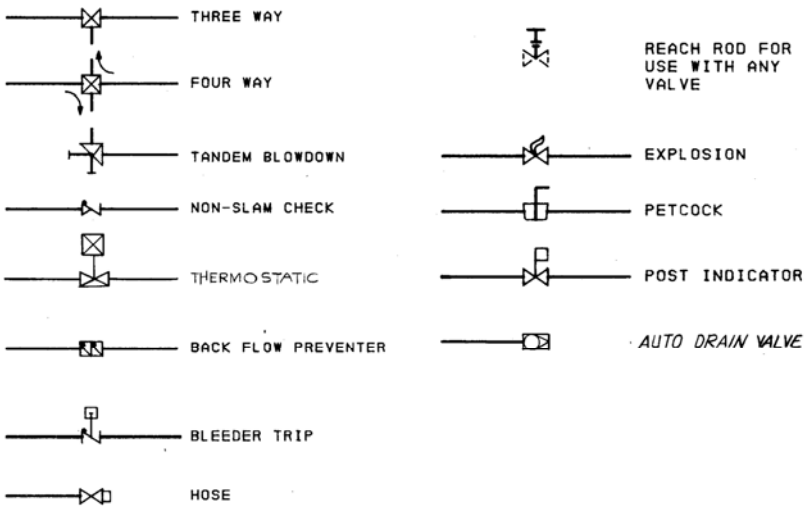
P&ID圖形或符號代表的意義 (流程管路PROCESS PIPING)



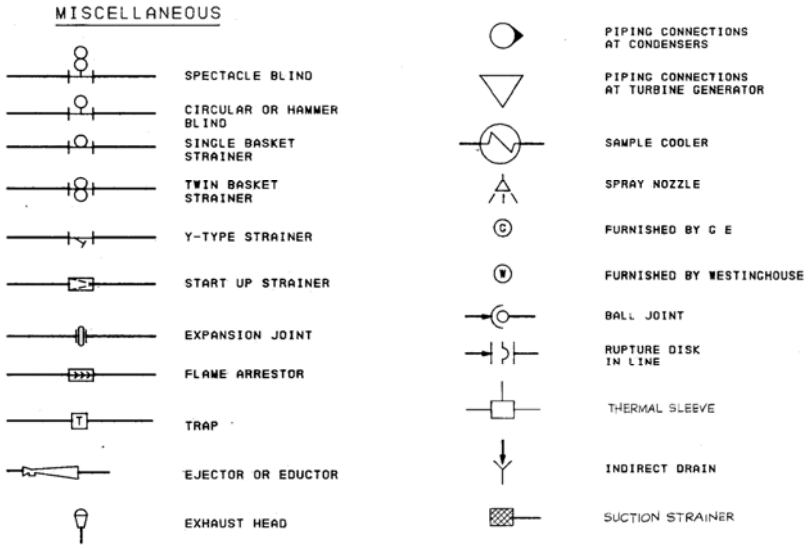
P&ID圖形或符號代表的意義:閥型與狀態



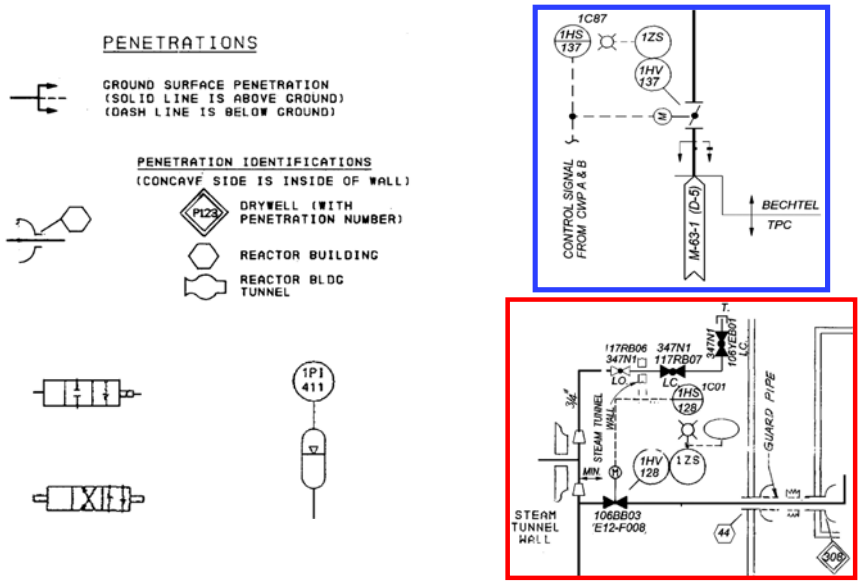
P&ID圖形或符號代表的意義:閥的類型



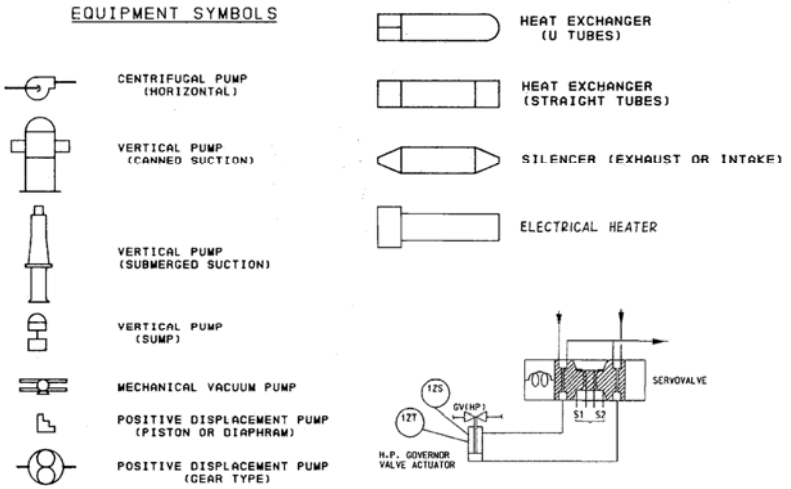
P&ID:圖形或符號代表的意義(管路元件)



P&ID:圖形或符號代表的意義



P&ID圖形或符號代表的意義(泵與熱交換器)



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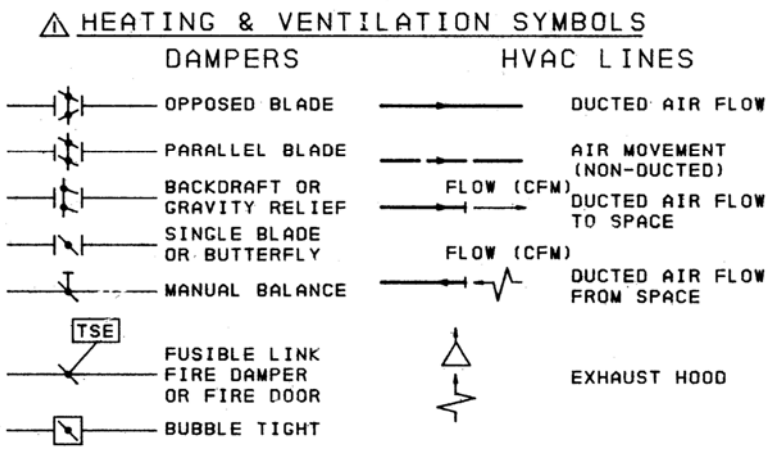
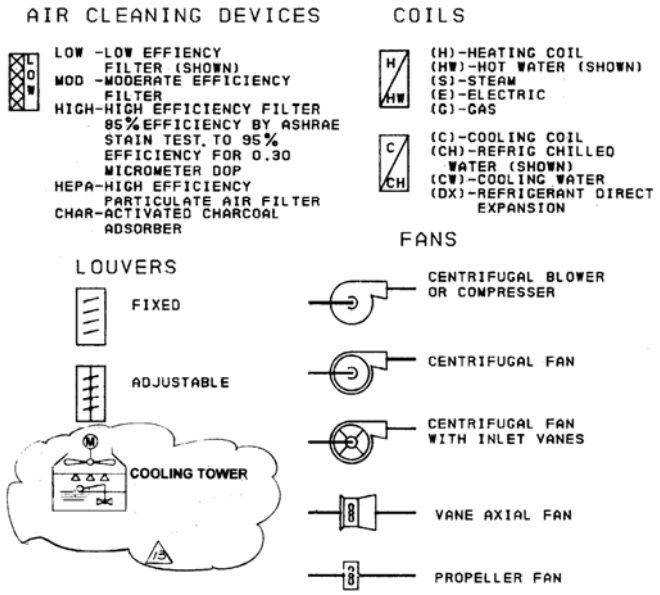
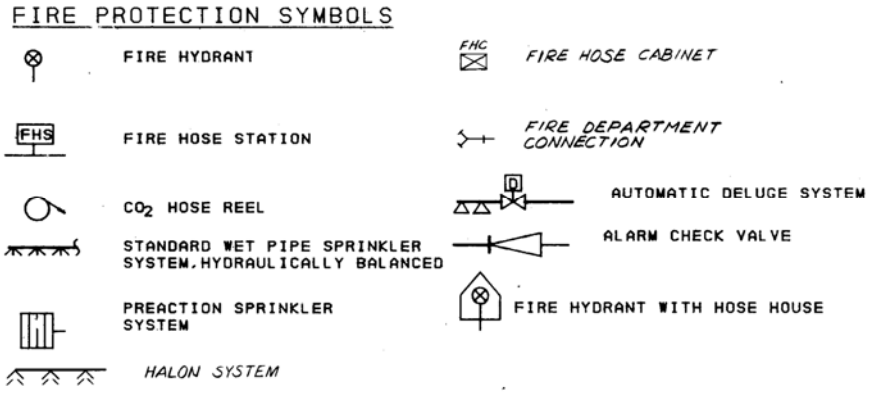


P&ID:圖形或符號代表的意義(通風與空調系統)



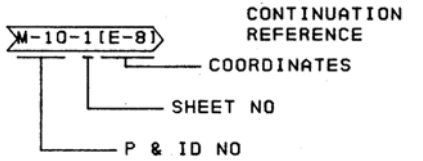
P&ID:圖形或符號代表的意義(消防系統)

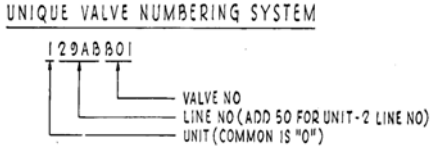


P&ID:文字或敘述代表的意義

ABBREVIATIONS

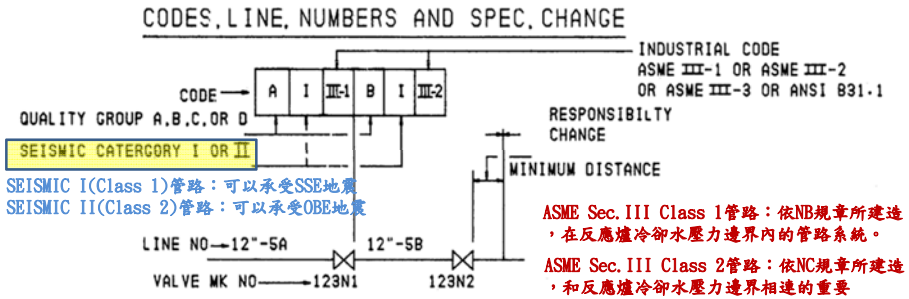
RW	RADWASTE
NW	NORMAL WASTE
SRW	SLUDGE RADWASTE
AW	ACID WASTE
OW	OILY WATER WASTE
T	TEST
V	VENT
T/V	TEST & VENT
MD	MOTORIZED DAMPER
FD	FIRE DAMPER
VCD	VOLUME CONTROL DAMPER
CH. OP.	CHAIN OPERATED VALVE





二號機閥號:279ABB01

ASME Code Sec.III Class 1，2，3
(Nuclear Power Plant Components)



SEISMIC I(Class 1)管路：可以承受SSE地震
SEISMIC II(Class 2)管路：可以承受OBE地震

For ASME Class 1 components (Quality Group A), the requirements of Subsection IWB apply; for ASME Class 2 components (Quality Group B)

the requirements of Subsection IWC apply; and for ASME Class 3 (Quality Group C) components the rules of Subsection IWD apply.

ASME Sec. III Class 1管路：依NB規章所建造，在反應爐冷卻水壓力邊界內的管路系統。

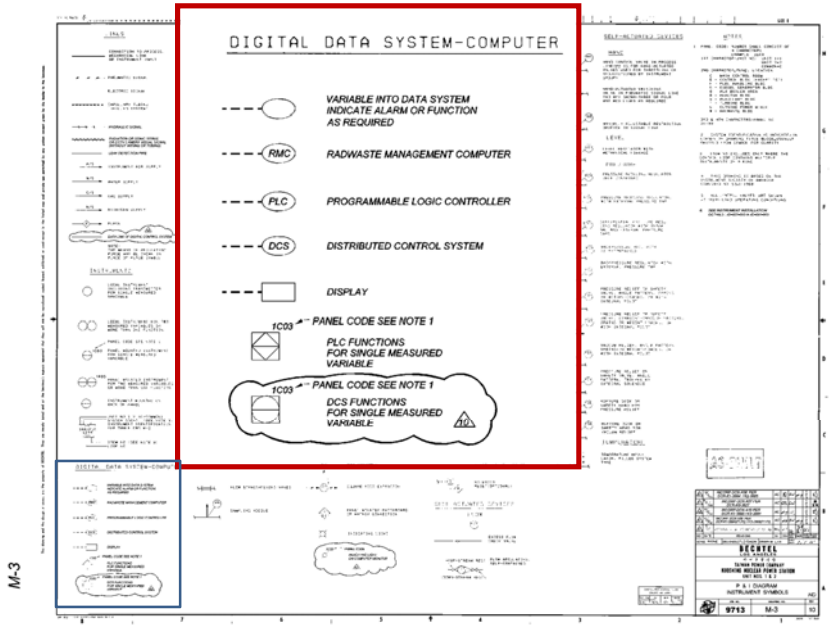
ASME Sec. III Class 2管路：依NC規章所建造，和反應爐冷卻水壓力邊界相連的重要安全系統之管路

ASME Sec. III Class 3管路:依ND規章所建造，如廠用冷卻水和輔助飼水系統之管路。

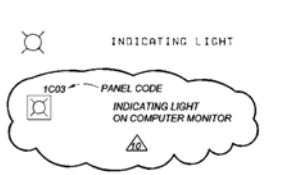
ASME Sec.III Class 3管路:
(1)「高能管」(High Energy Piping)：最高運轉溫度超過200°F或者最大運轉壓力大於 275 PSIG者(quality group C)。
(2)「低能管」(Moderate Energy Piping)：非高能管者(quality group D)。

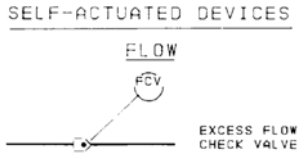
五、P&ID-儀器說明

P&ID-M0003:儀器文字或敘述代表的意義

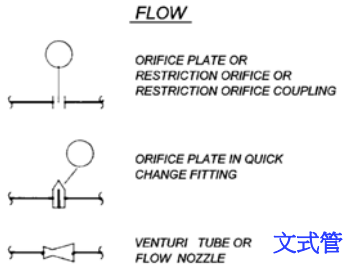


P&ID:文字或敘述代表的意義

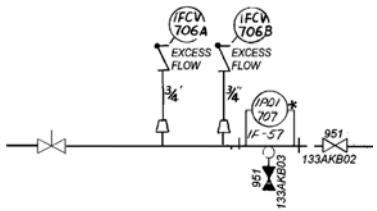




過流保護裝置

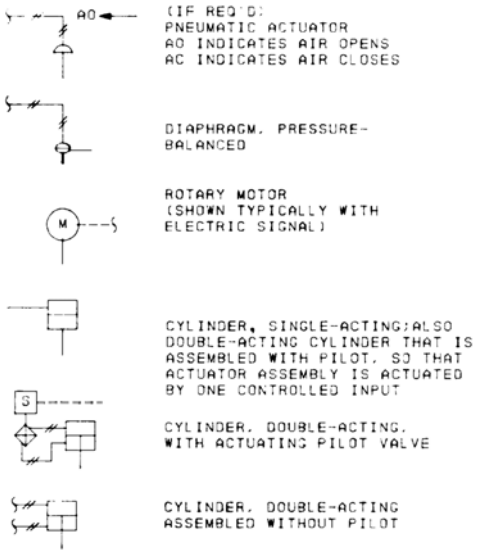


文式管



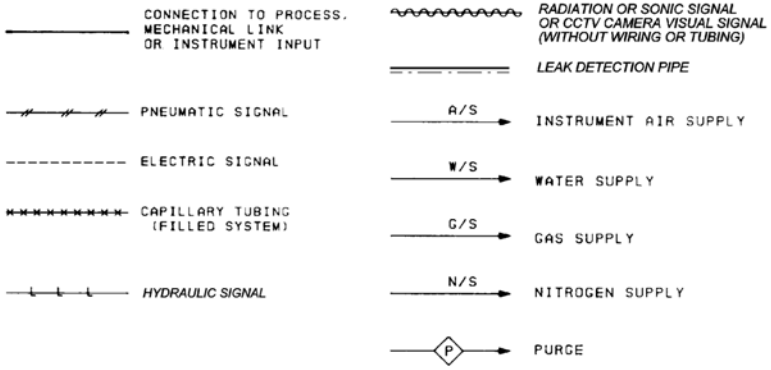
P&ID:文字或敘述代表的意義

ACTUATORS



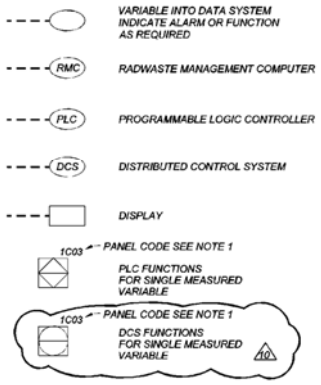
P&ID:文字或敘述代表的意義(儀器管路)

LINES



P&ID:文字或敘述代表的意義

DIGITAL DATA SYSTEM-COMPUTER



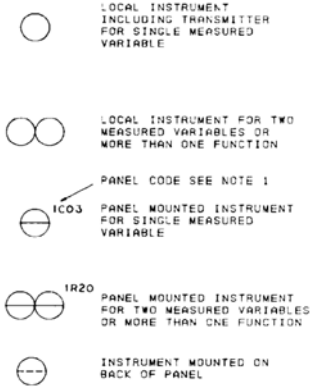
盤面編號

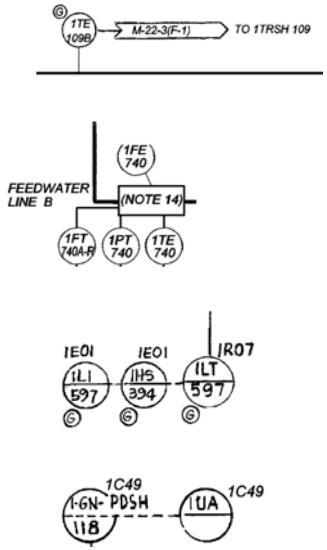
1 PANEL CODE: NUMBER SHALL CONSIST OF 4 CHARACTERS
EXAMPLE 1C03
1ST CHARACTER-UNIT NO; UNIT 1=1, UNIT 2=2, COMMON=0
2ND CHARACTER, PANEL LOCATION
C - MAIN CONTROL ROOM
E - CONTROL BLDG (EXCEPT "C")
F - FUEL HANDLING BLDG
G - DIESEL GENERATOR BLDG
Q - AUX BOILER AREA
R - REACTOR BLDG
S - AUXILLARY BLDG
T - TURBINE BLDG
U - OUTSIDE POWER BLOCK
W - RADWASTE BLDG
3RD & 4TH CHARACTERS-PANEL NO 01-99

2C01,1R18,1T04

P&ID:文字或敘述代表的意義

INSTRUMENTS

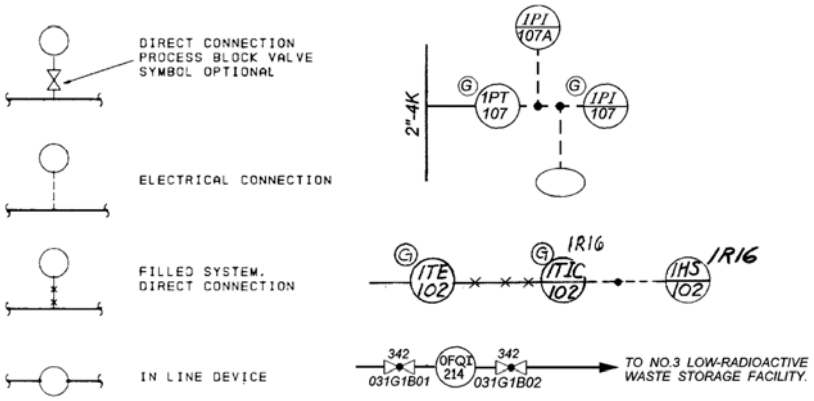




P&ID:文字或敘述代表的意義

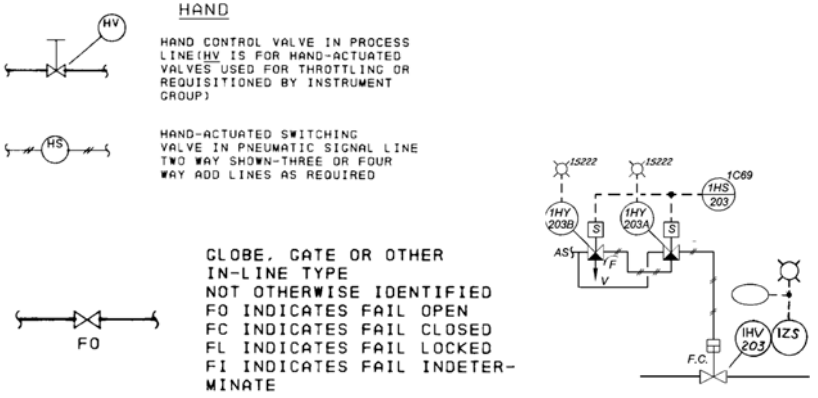
VARIABLES

TYPICAL CONNECTION-ANY VARIABLE

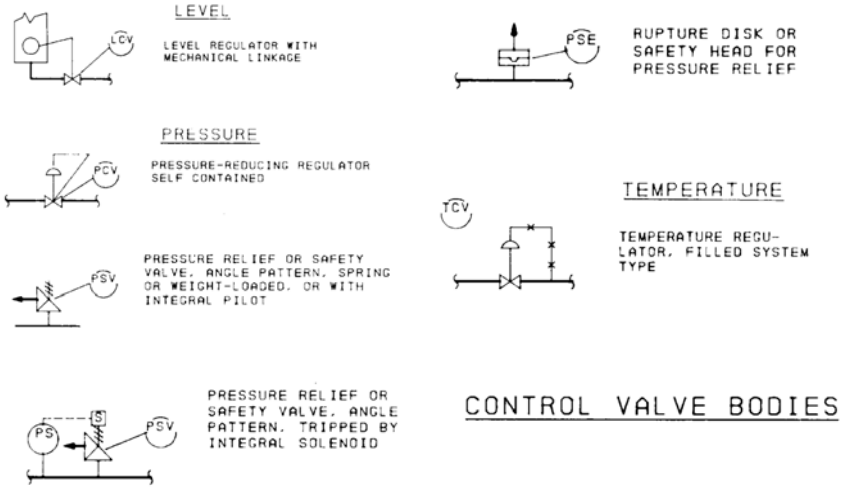


P&ID:文字或敘述代表的意義

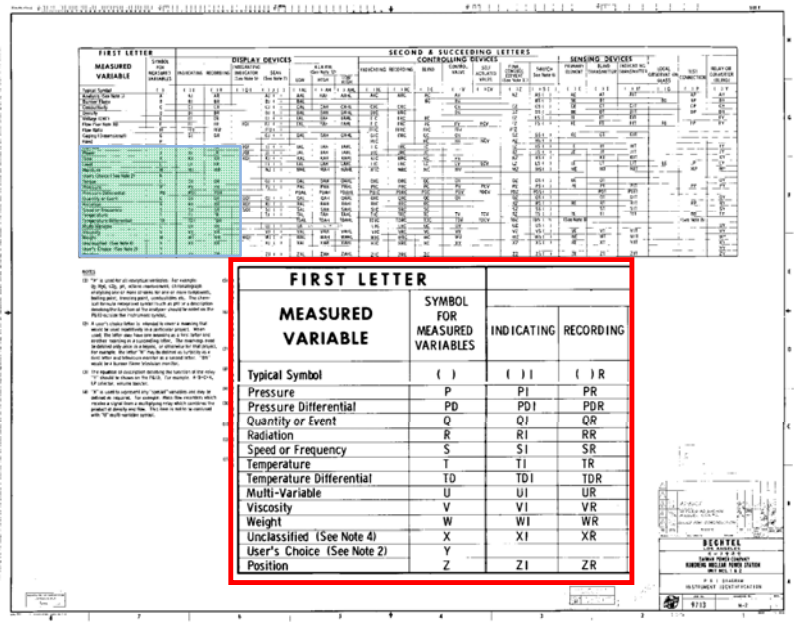
SELF-ACTUATED DEVICES



P&ID:文字或敘述代表的意義



P&ID-M0002:儀器文字符號代表的意義



FIRST LETTER			
MEASURED VARIABLE	SYMBOL FOR MEASURED VARIABLES	INDICATING	RECORDING
Typical Symbol	( )	( )I	( )R
Pressure	P	PI	PR
Pressure Differential	PD	PDI	PDR
Quantity or Event	Q	QI	QR
Radiation	R	RI	RR
Speed or Frequency	S	SI	SR
Temperature	T	TI	TR
Temperature Differential	TD	TDI	TDR
Multi-Variable	U	UI	UR
Viscosity	V	VI	VR
Weight	W	WI	WR
Unclassified (See Note 4)	X	XI	XR
User's Choice (See Note 2)	Y		
Position	Z	ZI	ZR

P&ID:儀器文字符號代表的意義(1)

FIRST LETTER		DISPLAY DEVICES						
MEASURED VARIABLE	SYMBOL FOR MEASURED VARIABLES	INDICATING	RECORDING	INTEGRATING INDICATOR (See Note 5)	SCAN (See Note 7)	ALARM (See Note 12) LOW	HIGH	LOW HIGH
Typical Symbol	( )	( )I	( )R	( )QI	( )J( )	( )AL	( ) AH	( ) AHL
Analysis (See Note 1)	A	AI	AR		AJ ( )	AAL	AAH	AAHL
Burner Flame	B	BI	BR		BJ ( )	BAL		
Conductivity	C	CI	CR		CJ ( )	CAL	CAH	CAHL
Density	D	DI	DR		DJ ( )	DAL	DAH	DAHL
Voltage (EMF)	E	EI	ER		EJ ( )	EAL	EAH	EAHL
Flow (See Note 10)	F	FI	FR	FQI	FJ ( )	FAL	FAH	FAHL
Flow Ratio	FF	FFI	FFR		FFJ ( )			
Gaging (Dimensional)	G	GI	GR		GJ ( )	GAL	GAH	GAHL
Hand	H							
Current	I	II	IR	IQI	IJ ( )	IAL	IAH	IAHL
Power	J	JI	JR	JQI	JJ ( )	JAL	JAH	JAHL
Time	K	KI	KR	KQI	KJ ( )	KAL	KAH	KAHL
Level	L	LI	LR		LJ ( )	LAL	LAH	LAHL
Moisture	M	MI	MR		MJ ( )	MAL	MAH	MAHL
Users Choice (See Note 2)	N							
Torque	O	OI	OR		OJ ( )	OAL	OAH	OAHL
Pressure	P	PI	PR		PJ ( )	PAL	PAH	PAHL
Pressure Differential	PD	PDI	PDR			PDAL	PDAH	PDAHL
Quantity or Event	Q	QI	QR	QQI	QJ ( )	QAL	QAH	QAHL
Radiation	R	RI	RR	RQI	RJ ( )	RAL	RAH	RAHL
Speed or Frequency	S	SI	SR	SQI	SJ ( )	SAL	SAH	SAHL
Temperature	T	TI	TR		TJ ( )	TAL	TAH	TAHL
Temperature Differential	TD	TDI	TDR			TDAL	TDAH	TDAHL
Multi-Variable	U	UI	UR		UJ ( )	UA	(See Note 13)	
Viscosity	V	VI	VR		VJ ( )	VAL	VAH	VAHL
Weight	W	WI	WR	WQI	WJ ( )	WAL	WAH	WAHL
Unclassified (See Note 4)	X	XI	XR		XJ ( )	XAL	XAH	XAHL
User's Choice (See Note 2)	Y							
Position	Z	ZI	ZR		ZJ ( )	ZAL	ZAH	ZAHL

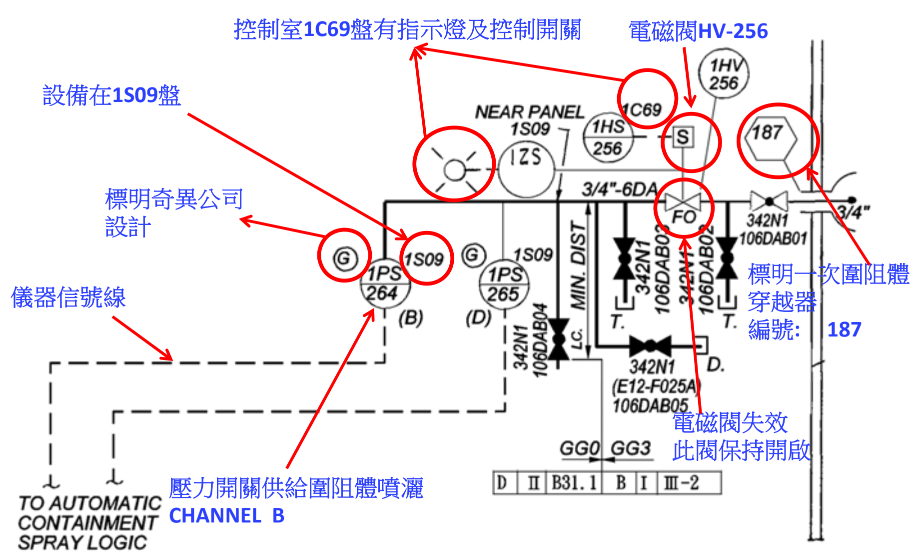
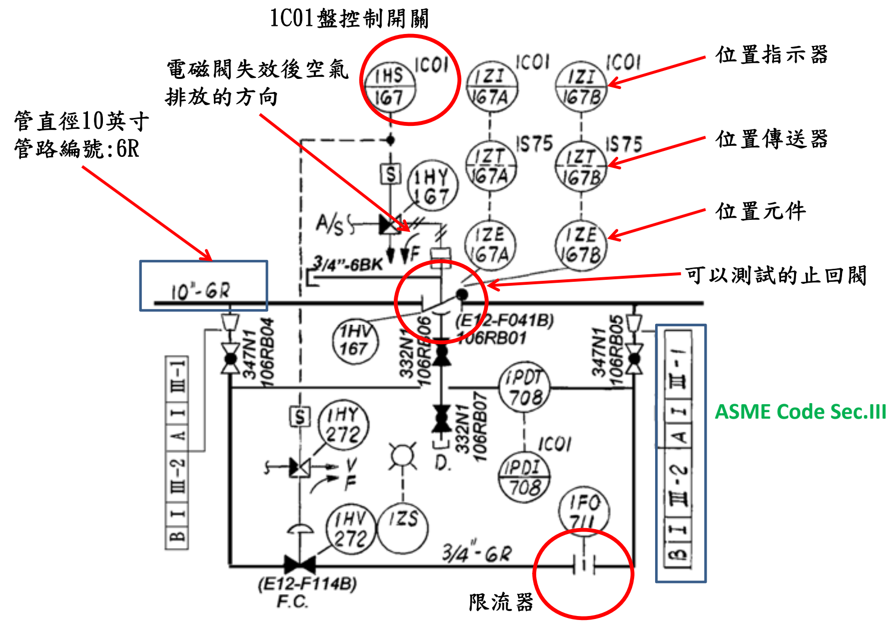
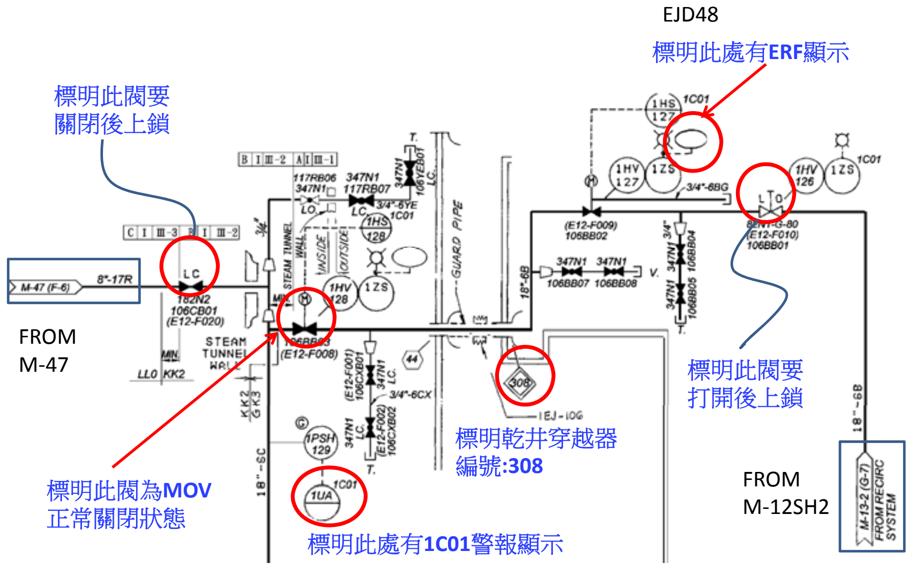
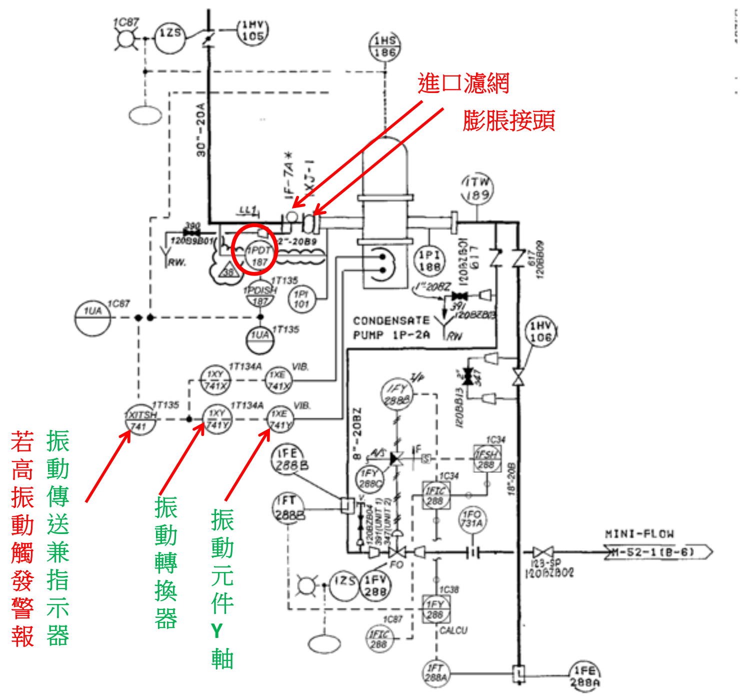
P&ID:儀器文字符號代表的意義(2)

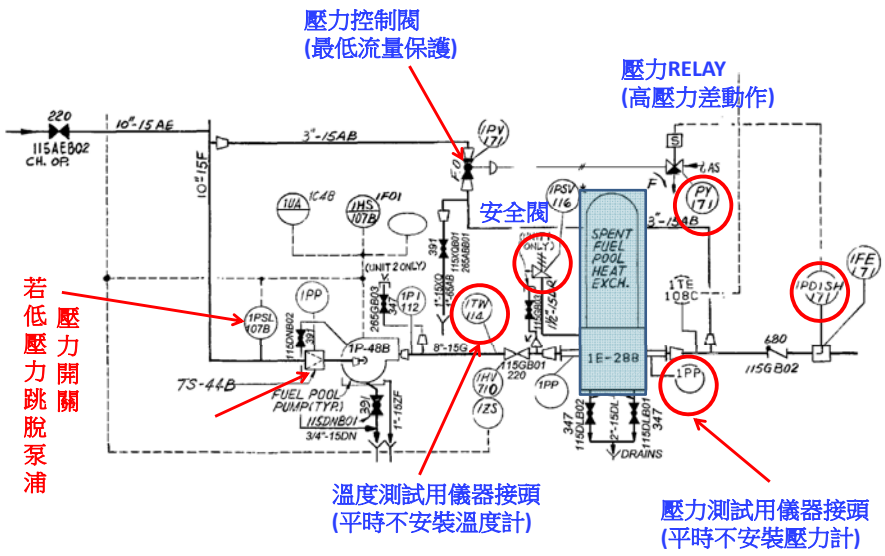
	SECOND & SUCCEEDING LETTERS						
	CONTROLLING DEVICES						
	INDICATING	RECORDING	BLIND	CONTROL VALVE	SELF ACTUATED VALVE	FINAL CONTROL ELEMENT (See Note 11)	SWITCH (See Note 6)
Typical Symbol	( )IC	( )RC	( )C	( )V	( )CV	( )Z	( )S( )
Analysis (See Note 1)	AIC	ARC	AC	AV		AZ	AS( )
Burner Flame			BC	BV			BS( )
Conductivity	CIC	CRC		CV		CZ	CS( )
Density	DIC	DRC		DV		DZ	DS( )
Voltage (EMF)	EIC	ERC	EC			EZ	ES( )
Flow (See Note 10)	FIC	FRC	FC	FV	FCV	FZ	FS( )
Flow Ratio	FFIC	FFRC	FFC	FFV		FFZ	
Gaging (Dimensional)	GIC	GRC	GC	GV		GZ	GS( )
Hand	HIC		HC	HV	HCV	HZ	HS( )
Current	IIC	IRC	IC			IZ	IS( )
Power	JIC	JRC	JC			JZ	JS( )
Time	KIC	KRC	KC	KV		KZ	KS( )
Level	LIC	LRC	LC	LV	LCV	LZ	LS( )
Moisture	MIC	MRC	MC	MV		MZ	MS( )
Users Choice (See Note 2)							
Torque	OIC	ORC	OC	OV		OZ	OS( )
Pressure	PIC	PRC	PC	PV	PCV	PZ	PS( )
Pressure Differential	PDIC	PDRC	PDC	PDV	PDCV	PDZ	PDS( )
Quantity or Event	QIC	QRC	QC	QV		QZ	QS( )
Radiation	RIC	RRC	RC			RZ	RS( )
Speed or Frequency	SIC	SRC	SC			SZ	SS( )
Temperature	TIC	TRC	TC	TV	TCV	TZ	TS( )
Temperature Differential	TDIC	TDRC	TDC	TDV	TDCV	TDZ	TDS( )
Multi-Variable	UIC	URC	UC	UV		UZ	US( )
Viscosity	VIC	VRC	VC	VV		VZ	VS( )
Weight	WIC	WRC	WC	WV		WZ	WS( )
Unclassified (See Note 4)	XIC	XRC	XC	XV		XZ	XS( )
User's Choice (See Note 2)							
Position	ZIC	ZRC	ZC			ZZ	ZS( )

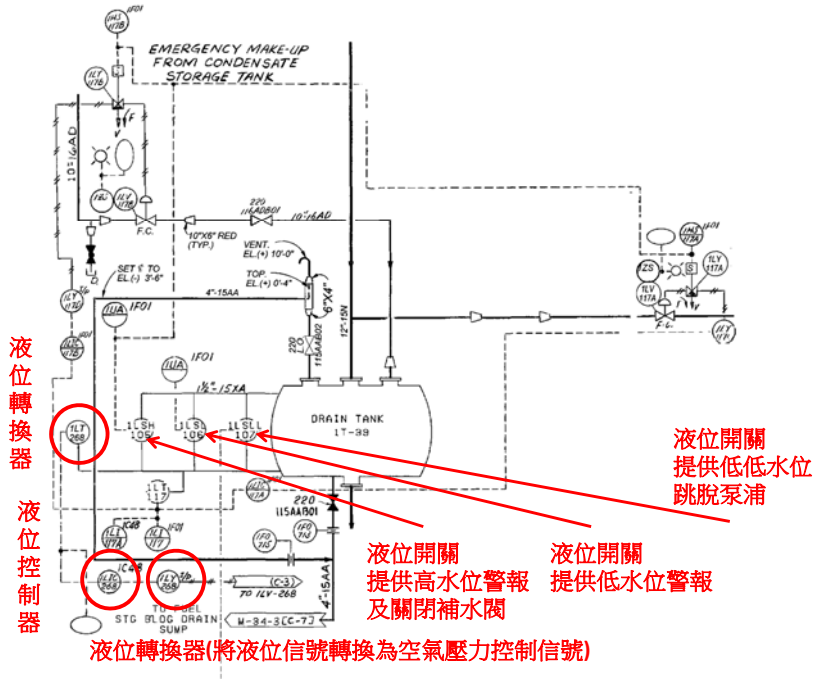
P&ID:儀器文字符號代表的意義(3)

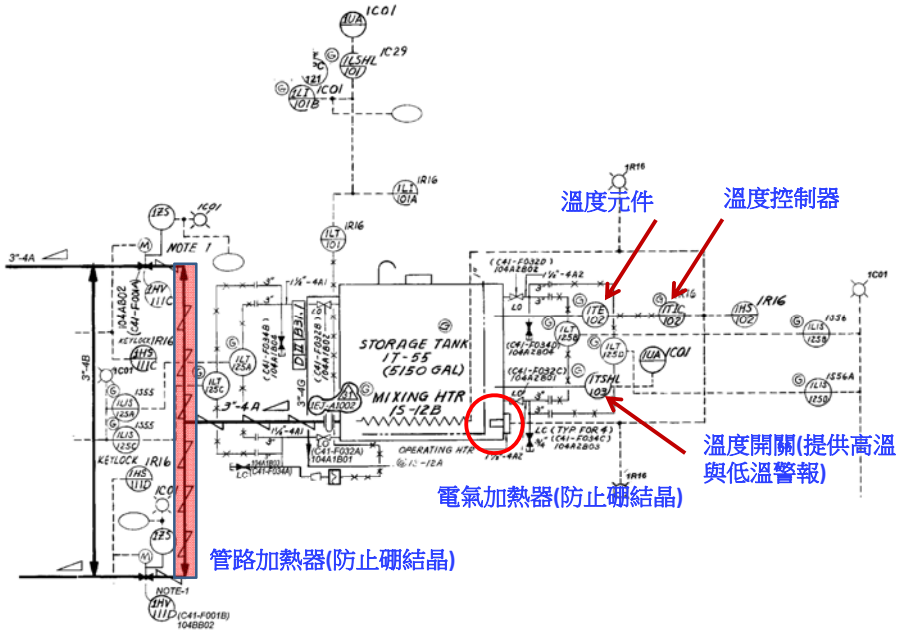
	SENSING DEVICES					
	PRIMARY ELEMENT	BLIND TRANSMITTER	INDICATING TRANSMITTER	LOCAL OBSERVATION GLASS	TEST CONNECTION	RELAY OR CONVERTER (BLIND)
Typical Symbol	( ) E	( ) T	( ) IT	( ) G	( ) P	( ) Y
Analysis (See Note 1)	AE	AT	AIT		AP	AY
Burner Flame	BE	BT		BG	BP	BY
Conductivity	CE	CT	CIT		CP	CY
Density	DE	DT	DIT		DP	DY
Voltage (EMF)	EE	ET	EIT			EY
Flow (See Note 10)	FE	FT	FIT	FG	FP	FY
Flow Ratio						
Gaging (Dimensional)	GE	GT	GIT			
Hand						
Current	IE	IT	IIT			IY
Power	JE	JT	JIT			JY
Time		KT	KIT			KY
Level	LE	LT	LIT	LG	LP	LY
Moisture	ME	MT	MIT		MP	MY
Users Choice (See Note 2)						
Torque	OE	OT				OY
Pressure	PE	PT	PIT		PP	PY
Pressure Differential		PDT	PDIT			
Quantity or Event		QT	QIT			QY
Radiation	RE	RT	RIT		RP	RY
Speed or Frequency		ST	SIT			SY
Temperature	TE	TT	TIT		TW	TY
Temperature Differential	(See Note 8)				(See Note 8)	
Multi-Variable						UY
Viscosity	VE	VT	VIT			VY
Weight	WE	WT	WIT			WY
Unclassified (See Note 4)	XE	XT	XIT			XY
User's Choice (See Note 2)						YY
Position	ZE	ZT	ZIT			ZY

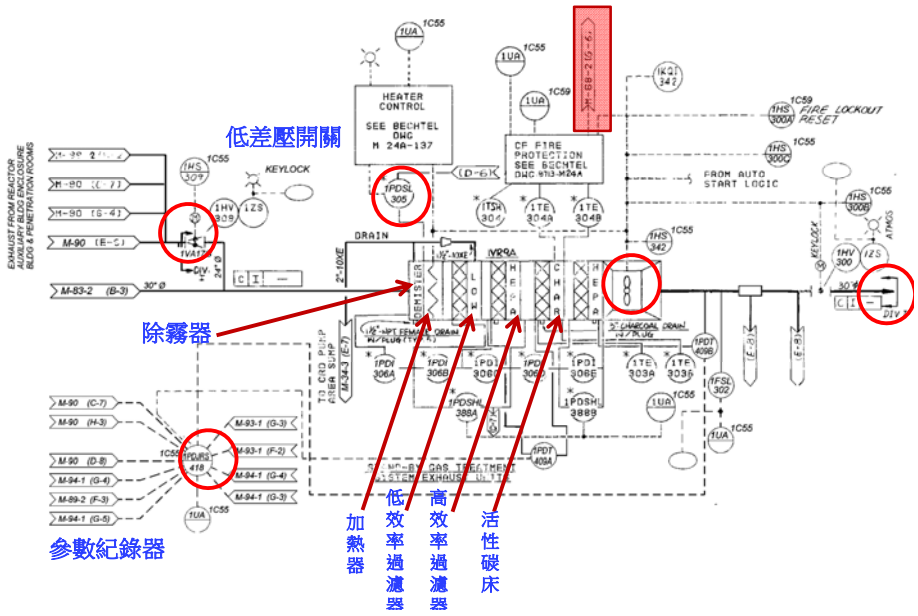
六、P&ID:圖型、儀器文字、符號實際解說

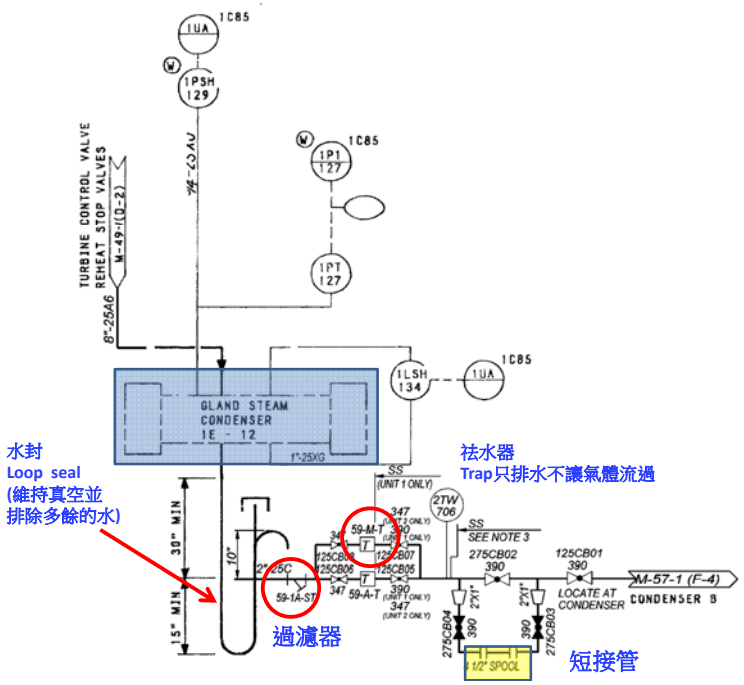

控制室1C69盤有指示燈及控制開關
電磁閥HV-256
設備在1S09盤
標明奇異公司
設計
儀器信號線
NEAR PANEL
1S09
1HS
256
1C69
1HV
256
187
1ZS
3/4"-6DA
FO
342N1
106DAB01
3/4"
1PS
264
1S09
1PS
265
(B)
(D)
MIN. DIST
342N1
106DAB03
342N1
106DAB02
342N1
106DAB04
342N1
(E12-F025A)
106DAB05
標明一次圍阻體
穿越器
編號: 187
電磁閥失效
此閥保持開啟
GG0 GG3
D II B31.1 B I III-2
TO AUTOMATIC
CONTAINMENT
SPRAY LOGIC
壓力開關供給圍阻體噴灑
CHANNEL B

1C01盤控制開關
電磁閥失效後空氣
排放的方向
管直徑10英寸
管路編號:6R
位置指示器
位置傳送器
位置元件
可以測試的止回閥
1HS
167
1C01
1ZI
167A
1ZI
167B
1S75
1ZT
167A
1ZT
167B
1HY
167
1ZE
167A
1ZE
167B
A/S
3/4"-6BK
10"-6R
(E12-F041B)
106RB01
1HV
167
347N1
106RB04
332N1
106RB06
347N1
106RB05
1PDT
708
1HY
272
332N1
106RB07
1PDI
708
1HV
272
1ZS
1FO
711
3/4"-6R
(E12-F114B)
F.C.
限流器
B I III-2 A I III-1
ASME Code Sec.III

EJD48
標明此處有ERF顯示
標明此閥要
關閉後上鎖
M-47 (F-6)
8"-17R
152N2
106CB01
(E12-F020)
FROM
M-47
STEAM TUNNEL WALL
INSIDE
OUTSIDE
GUARD PIPE
1HS
127
1C01
1HV
127
1ZS
1HV
126
(E12-F009)
106BB02
(E12-F010)
106BB01
347N1
106BB07
347N1
106BB08
(E12-F008)
308
1PSH
129
1UA
1C01
標明此閥為MOV
正常關閉狀態
標明此處有1C01警報顯示
標明乾井穿越器
編號:308
標明此閥要
打開後上鎖
FROM
M-12SH2
M-13-2 (G-7)
FROM RECIRC
SYSTEM
18"-6B

進口濾網
膨脹接頭
CONDENSATE
PUMP 1P-2A
MINI-FLOW
若高振動觸發警報
振動傳送兼指示器
振動轉換器
振動元件Y軸

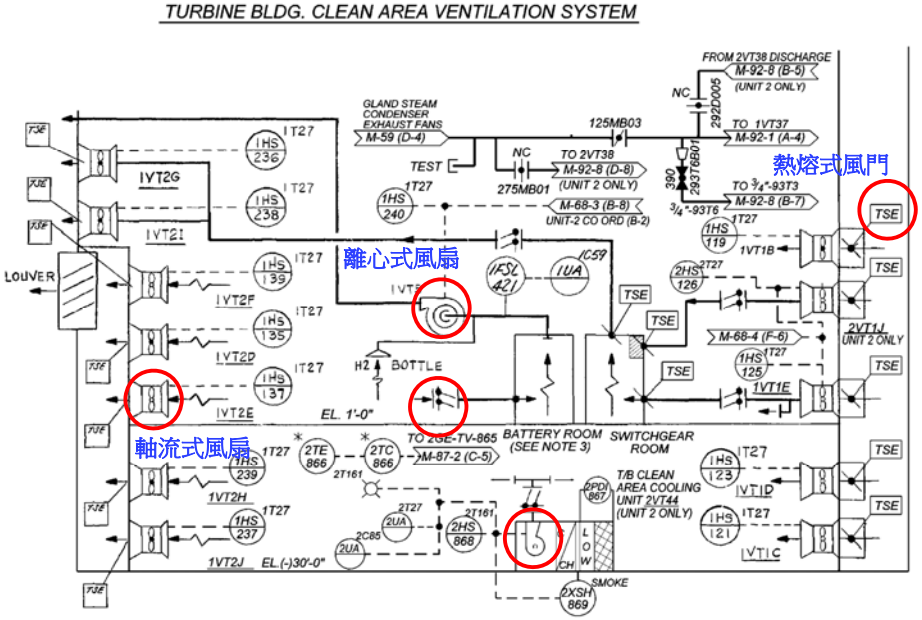

壓力控制閥
(最低流量保護)
壓力RELAY
(高壓力差動作)
安全閥
若低壓力跳脫泵浦
壓力開關
溫度測試用儀器接頭
(平時不安裝溫度計)
壓力測試用儀器接頭
(平時不安裝壓力計)
SPENT FUEL POOL HEAT EXCH.
1E-28B
FUEL POOL PUMP(TYP.)
TS-44B
DRAINS

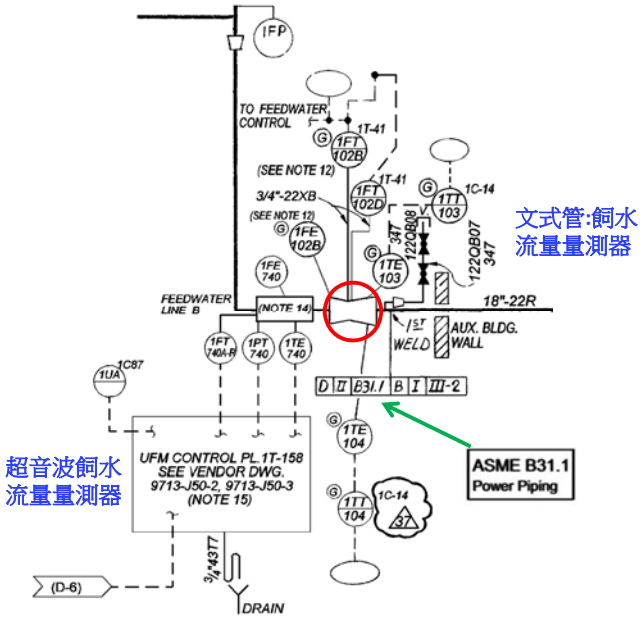

液位轉換器
液位控制器
液位開關
提供低低水位
跳脫泵浦
液位開關
提供高水位警報
及關閉補水閥
液位開關
提供低水位警報
液位轉換器(將液位信號轉換為空氣壓力控制信號)
EMERGENCY MAKE-UP FROM CONDENSATE STORAGE TANK
DRAIN TANK
1T-39


溫度元件
溫度控制器
溫度開關(提供高溫
與低溫警報)
電氣加熱器(防止硼結晶)
管路加熱器(防止硼結晶)
STORAGE TANK
1T-55
(5150 GAL)
MIXING HTR
1S-12B


低差壓開關
除霧器
參數紀錄器
加熱器
低效率過濾器
高效率過濾器
活性碳床
HEATER CONTROL
SEE BECHTEL DWG M 24A-137
CF FIRE PROTECTION SEE BECHTEL DWG 613-M24A
FROM AUTO START LOGIC
FIRE LOCKOUT RESET
DRAIN





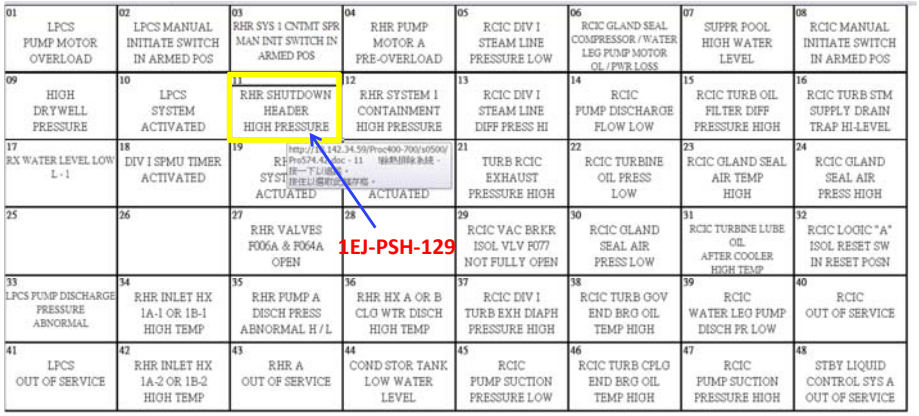


P&ID上標明此處有ERF顯示

P&ID上標明此處有ERF顯示

標明乾井穿越器編號:308

P&ID標明1C01警報顯示



七、奇異公司與貝泰系統代碼

P&ID.NO	貝泰代號	GE代號	系統名稱
M-10	AA	B21	NUCLEAR BOILER SYSTEM
M-13	BB	B33	REACTOR RECIRCULATING SYSTEM
M-14	BP	G33	REACTOR WATER CLEAN UP SYSTEM
M-15	BP	G36	RWCU FILTER DEMINERALIZER SYSTEM
M-17	BF	C11	CONTROL ROD DRIVE HYD. SYSTEM
M-19	BH	C41	STAND-BY LIQUID CONTROL SYSTEM
M-20	EK	E51	REACTOR CORE ISOLATION COOLING SYSTEM
M-22	EJ	E12	RESIDUAL HEAT REMOVAL SYSTEM
M-24	EM	E22	HIGH PRESSURE CORE SPRAY SYSTEM
M-25	EL	E21	LOW PRESSURE CORE SPRAY SYSTEM
M-39	HF	N64	OFF GAS RECOMBINER & OFF GAS CONDENSER
M-40	HF	N64	OFF GAS SYSTEM MOISTURE SEPARATION & CHARCOAL FILTER
M-41	HF	N64	OFF GAS SYSTEM GLYCOL SYSTEM
M-50	FC	C34	REACTOR FEED PUMP TURBINES STEAM SUPPLY

奇異公司與貝泰系統代碼

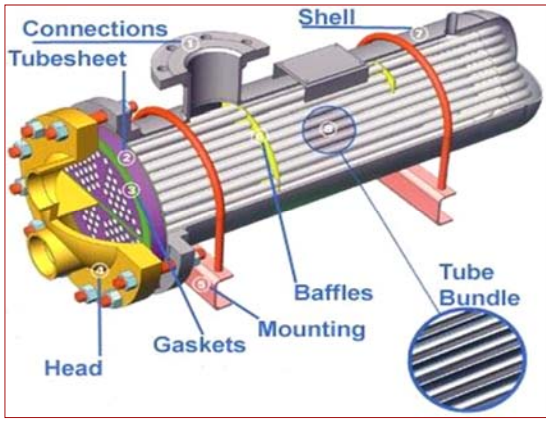
P&ID.NO	貝泰代號	GE代號	系統名稱
	SB	C71	REACTOR PROTECTION SYSTEM
		C91	COMPUTER SYSTEM
		D17	PROCESS RADIATION MONITORING SYSTEM
	SD	D21	AREA RADIATION MONITORING SYSTEM
	SK	E31	LEAK DETECTION SYSTEM
		F42	FUEL TRANSFER SYSTEM
		G18	ULTRANSONIC RESIN CLEANER
		H13	CONTROL ROOM PANELS
		A61	TURB-GEN ＆STEAM BYPASS SYSTEM
		B13	REACTOR SYSTEM
		C21	RELIEF VALVE AUGMENTED BYPASS SYSTEM
		C61	REMOTE SHUTDOWN SYSTEM
	SE	C51	NEUTRON MONITOR SYSTEM
		A42	REPORT AND DATA SHEETS

八、機械基本元件

八、機械基本元件

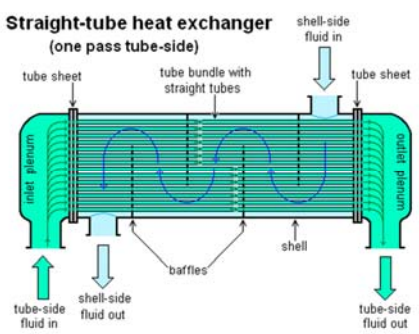
殼側與管側熱交換器

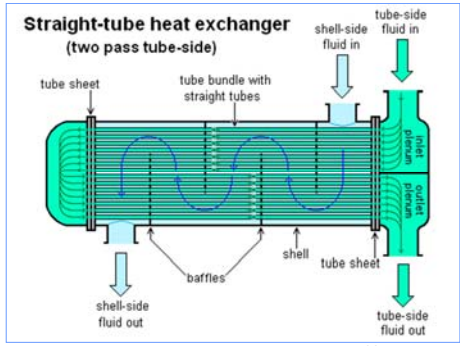
- (shell and tube heat exchanger)
- 兩熱交換流體分別流經殼側與管側，交換流體可為液體或氣體
- 熱能經過管壁傳導
- 傳熱面越大，傳熱效果越好
- 適用於較高壓力流體



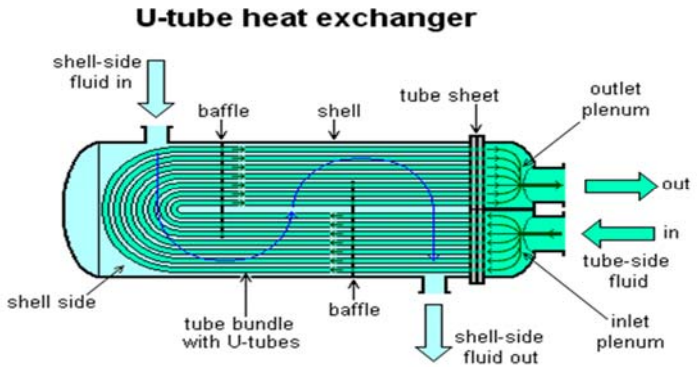
直管單通與直管雙通熱交換器

- 直管單通熱交換器管側流體進出口在兩端，直管雙通則進出口在同一側，兩者兩端都有一個水箱室
- 殼側通常有擋板延長流體的行程，可提高效率
- 也可設計成4行程熱交換器



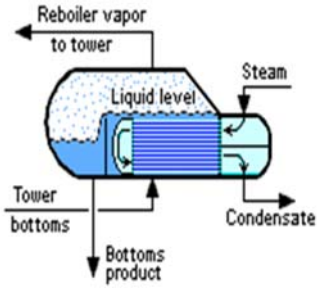


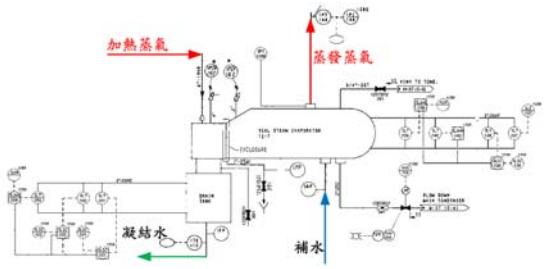
- U形管熱交換器原理與雙通直管式相似，但少了一個水箱室
- 大型熱交換器管子太長，常有管板(tube sheet)間隔固定



蒸發器

- 蒸發器的運作原理與封閉式加熱器相同，但目的與加熱器不同
  - 利用較熱流體(水或蒸汽)加熱另一流體使成為蒸汽
  - 一般多為封閉式加熱器
  - 可用於除去水份(如廢料系統的廢液蒸發器)
  - 也可用於產生蒸汽(如汽封蒸汽蒸發器)





閥的種類

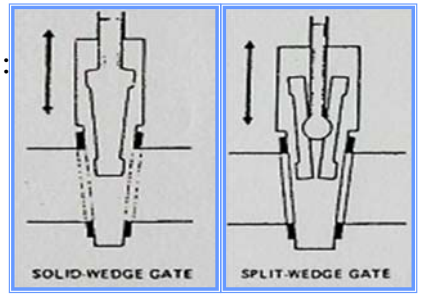
- 閥的功能有開／斷流、節流、流向的控制、調節壓力、止回等功能。
- 閥按功能的不同可分成許多種類

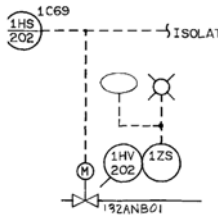
閘閥 (Gate valve)
球形閥 (Globe Valve)
止回閥 (Check valve)
針閥 (Needle valve)
蝶型閥 (Butterfly valve)
膜片閥
塞閥 (Plug valve)
球閥 (Ball Valve)

電動閥(MOV)
引動器 (Actuator)
安全閥 (Safety valve)
釋放閥 (Relief Valve)
減壓閥 (Pressure reducing Valve)
控制閥(Control valve)

閘閥

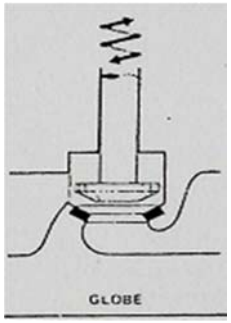
- 閘閥名稱之由來是因為其閥盤像閘門的作用一樣
- 閘閥以閥盤之構造可分為兩種：
- 實心式閥盤(Solid-wedge type)
  - 閥盤為實心，其關閉位置必須與閥座面的斜度吻合才能完全止漏。
- 分叉式閥盤(Split-wedge type)
  - 閥盤由兩片分叉組成，兩片閥盤可稍微相對地移動，，如此較容易自行地調整到緊閉的正確位置

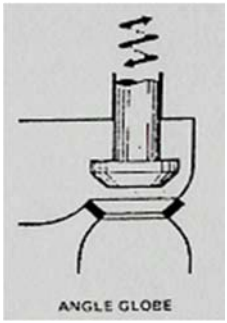


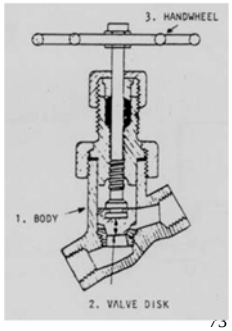


球形閥(Global Valve)

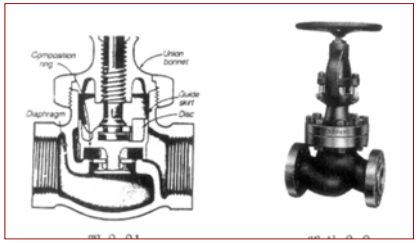
- 球形閥是由於其閥體形狀像球形而得名。
- 球形閥的型式有三種：
  - 單純球形閥：閥桿及閥盤移動的方向和管路的方向成直角
  - 角型球形閥：流體流經角型球形閥時，方向會轉90度
  - Y型球形閥：閥座和閥桿與管路方向成45度角。

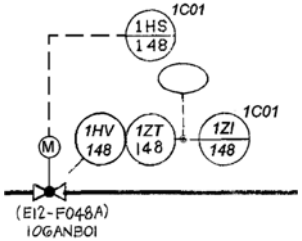






球形閥





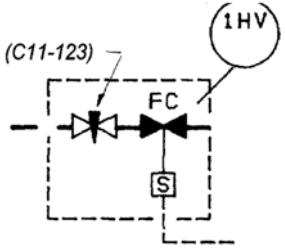
- 球形閥之用途：
  - 球形閥用於須要調整管路中的流量或壓力
  - 球形閥之閥盤行程較短，使得它能較迅速開關
  - 在管路需要轉彎的地方，用角型球閥更可省去彎管接頭

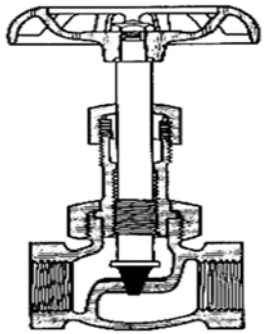
球形閥的操作方法：

- 球形閥在安裝時應使流體由閥盤的下方往上流
- 不可用加力桿或扳手來幫忙關緊閥門

針閥

- 針閥的特徵是在閥桿的末端形成長的錐形的針狀端點，這針狀端點係作為閥盤之用。
- 針閥可用來作比球形閥更精確的流量調整
- 在操作時不可用扳手施加過大的力量於閥的旋鈕上。

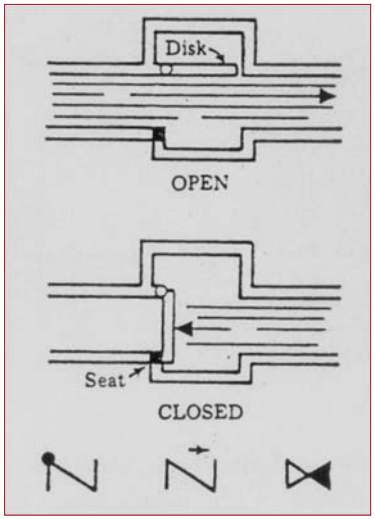




NEEDLE
Union bonnet with a stainless steel disk assures a tight closing and long wearing seat

止回閥

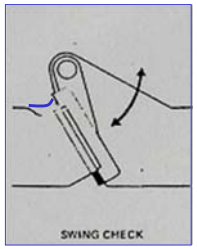
- 止回閥又稱為逆止閥，是用來防止管路中發生逆流。
- 止回閥可有下列關閉力量
  - 逆流的流體的反壓
  - 閥盤本身的重力
  - 使用彈簧力量
- 閥盤與閥座可能是以金屬對金屬或是金屬閥座對複合材料的閥盤來密合

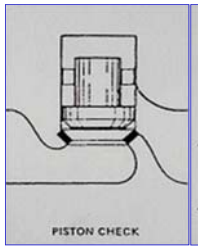


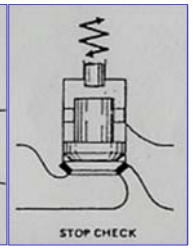
止回閥

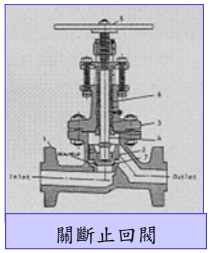
常見的止回閥有：

- 擺動式止回閥 (swing-check valve)
- 提昇式止回閥 (lift-check valve)
- 關斷止回閥 (stop-check valve)
  - 除止回閥功能外另可將之關閉



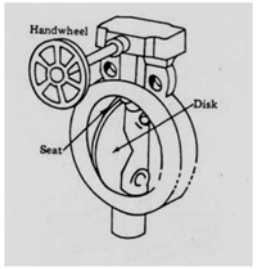


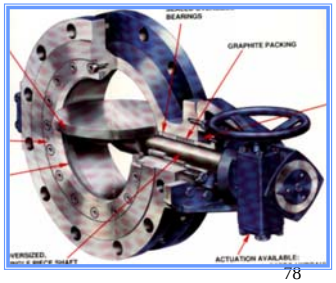



關斷止回閥

蝶型閥

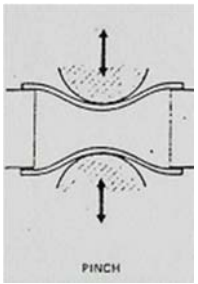
- 蝶型閥的工作原理是靠一片安裝在管路當中與管路直徑相同的閥盤產生阻尼作用而達到調整流量的目的。
- 蝶型閥的閥盤係隨著一支水平或垂直安裝的軸而旋轉
- 當閥盤轉至與管路方向平行時，閥即位於全開狀態
- 當其轉 90 °至與管路方向垂直時，閥即位於全關狀態
- 蝶型閥的閥座材料可為金屬或橡膠，橡膠閥座密封較佳

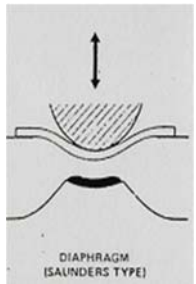


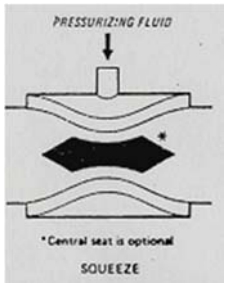


膜片閥(diaphragm valve) 或鉗閥(pinch valve)

- 膜片閥是靠撓性膜片擋住流體通道而達成阻斷流體的功能。
- 膜片通常是由橡膠之類的撓性材料所鑄成
- 膜片使用久了之後會磨損所以必須定期更換
- 用鉗夾機構夾緊閥膜達成關閉閥門者稱鉗閥

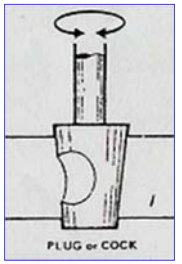


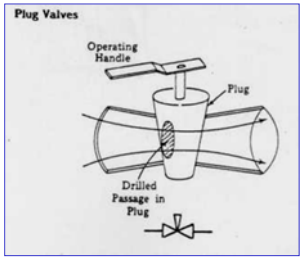




塞閥及球閥

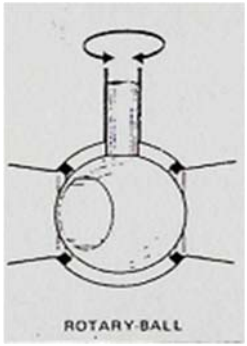
- 塞閥的閥盤形狀像一個塞子
- 閥塞中間有一圓孔形的通道，當閥於開的位置時，塞子的圓孔與閥體的進出口連成一線
- 當閥塞轉 90 °實心部份與閥體的進出口通成一線時，閥就關閉
- 塞子的形狀可以是圓柱形或是帶有斜度的柱形
- 塞子的進口孔徑和出口孔徑可能不一樣大

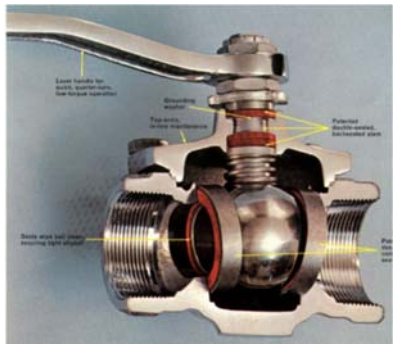




圓球閥

- 圓球閥(Ball Valve)
  - 圓球閥是一個拋光的球體夾在兩片塑膠製成的密合墊當中，球體有一孔通過中心，其開關原理與塞閥相似

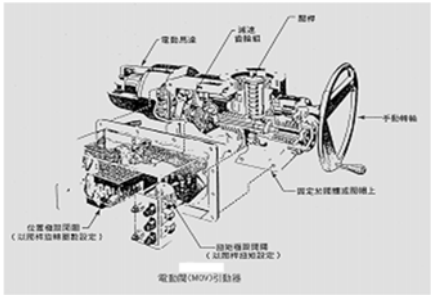


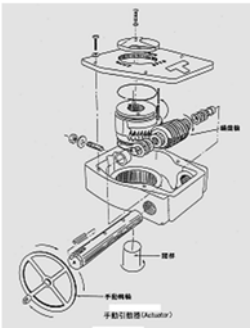


電動閥

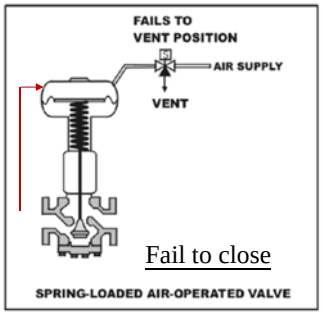
電動閥(motor operated valve, MOV)

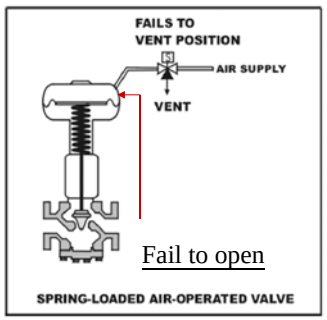
- 電動閥用馬達經過蝸輪齒輪組減速後帶動閥桿上昇下降達到開關的目的。
- 該引動器是由裝在現場或遙控的電氣開關來控制的。
- 引動器的內部裝有極限開關以及扭力開關使閥到達全開或全關的位置時能切斷電源





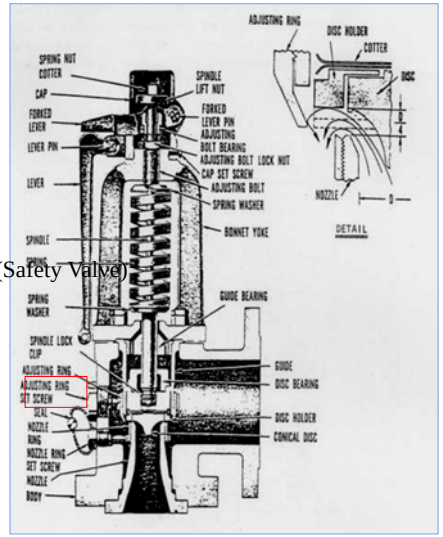
- 空氣控制閥(AOV)
- 利用膜片上空氣壓力來操作閥的開關，用以控制流量或壓力，當空氣壓力消失時按其功能閥的反應如下之一：
  - 全開(fail to open)
  - 全關(fail to close)
  - 停留在現在原狀的位置上(fail to lock)





安全閥 (Safety Valve)

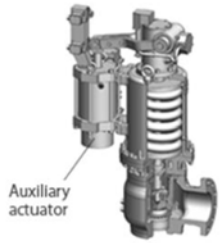
- 當閥體底盤向上總壓力大於關閉彈簧的壓力時，安全閥自動開啟時，
- 閥開啟後閥盤受向上壓力底面積增加，使閥快速開啟並停留在全開位置--沖放 作用(popping effect)
- 向上壓力下降到低於彈簧壓力壓力時，安全閥自動關閉

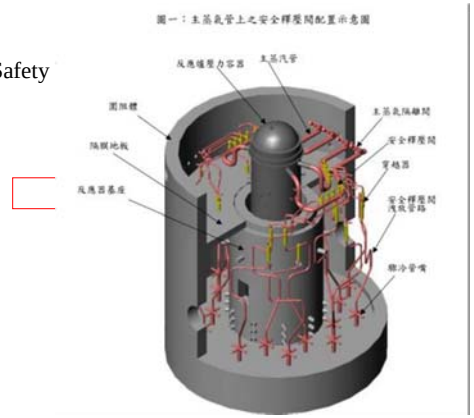


安全閥 (Safety Valve)

安全釋壓閥 (Safety relief Valve)

- 當閥體底盤向上總壓力大於關閉彈簧的壓力時，安全閥自動開啟.
- 爐壓信號達設定值時，會使釋壓閥之直流電磁閥開啟，引導蓄壓空氣至氣壓操作活塞，藉機械機構使閥開啟.
- 結合安全與釋壓功能

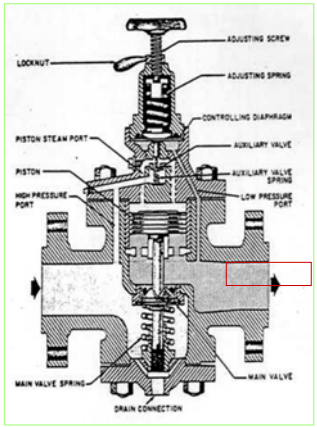


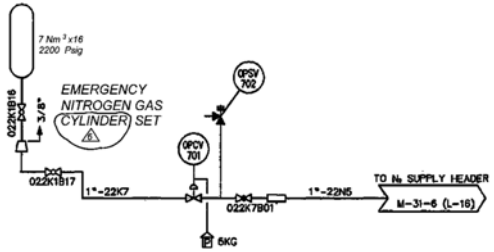


安全閥 (Safety

減壓閥(Reducing Valve)

- 將系統壓力降低，並保持在某一固定的較低壓力
- 閥座向上關閉的主閥與輔助閥各一只
- 控制膜片及調整彈簧
- 下游壓力由調整彈簧的壓力來設定





- 電磁閥Solenoid Valve (SOV)
- 利用電磁力克服彈簧的力量來操作閥的開關，不直接以控制流量與壓力，當電磁力(沒電)消失時按其功能閥的反應如下之一：
  - 全開(fail to open)
  - 全關(fail to close)