DESFA
Hellenic Gas Transmission System Operator

HELLENIC GAS TRANSMISSION SYSTEM OPERATOR

357-359, MESSOGION AVE.,
15231 ATHENS, GREECE
Tel.: 210 6501258
Fax : 210 6501551

TECHNICAL JOB SPECIFICATION
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HIGH PRESSURE (HP) TRANSMISSION SYSTEMS

INSTRUMENTATION SYMBOLS AND IDENTIFICATION

QUALITY ASSURANCE PAGE

CHANGES LOG

REVISIONS LOG

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CONTENTS

REFERENCED DOCUMENTS

1. **ISA S5.1 (1984)**
   [Instrumentation Symbols and Identification]
2. **ISA S5.3(1983)**
   [Graphic Symbols for Distributed Control / Shared Display Instrumentation Logic and Computer Systems]

1.0 GENERAL

Instruments shall be identified by a system of letters and numbers generally in accordance with **the Instrument Society of America (ISA) Standards S5.1, and S5.3** last edition, extracts from which follow. Minor modifications have been made, in this specification.

Each instrument will be identified first by a system of letters used to classify it functionally. (See **Tables 1 and 2** for the system of letters). To establish a loop identity for the instrument, a number will be appended to the letters. This number will, in general, be common to other instruments of the loop of which this instrument is a part. A suffix is sometimes added to complete the loop identification.

Where **ISA Standards S5.1 and S5.3** offer alternate methods of presentation, Owner practice is to use the method requiring the fewest symbols.

Symbols will not be shown for the following:

a) Valve positioners.

b) Field mounted I/P transducers, when no solenoid valve or other device is in line between I/P and valve.

c) Balloons identifying flow and temperature primary elements.

d) Multiplexing, when used for panel mounted temperature indication only.

e) Local process variable indicators on transmitter outputs, unless it is intended to designate a special location for the indicator, as shown by a note next to the tagging balloon.

2.0 FUNCTIONAL IDENTIFICATION

The functional identification of an instrument will consist of letters from **Table 1**, and will include on first-letter, covering the measured or initiating variable, and one or more succeeding letters covering the functions of the individual instrument. Exceptions to this rule are the use of the single letter L to denote a pilot light that is not part of an instrument loop and certain computer functions which will use modifying letters only.

The succeeding-letters of the functional identification designate one or more readout or passive functions, or output functions, or both. A modifying-letter may be used, if required, in addition to one or more other succeeding-letters. Modifying letters may modify either a first-letter or other succeeding-letters, as applicable. All letters of the functional identification shall be upper case. For examples of combinations of functional identification letters, see Table 2.

The functional designation associated with relays and computers may be used, as shown in **Table 3,** individually or in combination. The use of a box enclosing a symbol is required. The box is intended to avoid confusion by setting off the symbol from other markings on a diagram.

TABLE 1
IDENTIFICATION LETTERS

	FIRST – LETTER (2.3.2)		SUCCEEDING - LETTERS		
	MEASURED OR INIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	Analysis (2.3.4)		Alarm		
B	Burner, Combustion		User's Choice (2.3.1)	User's Choice (2.3.1)	User's Choice (2.3.1)
C	Heating Value			Control	
D	Density	Differential (2.3.2)			
E	Voltage		Sensor (Primary Element)		
F	Flow Rate	Ratio (Fraction) (2.3.2)			
G	User's Choice (2.3.1)		Glass, Viewing Device		
H	Hand				High
I	Current (Electrical)		Indicate		
J	Power	Scan			
K	Time, Time Schedule	Time Rate of Change (2.3.2., 2.3.7)		Control Station (2.3.7)	
L	Level		Light (2.3.5)		Low
M	Energy	Momentary (2.3.2)			Middle Intermediate
N	User's Choice (2.3.1)		User's Choice (2.3.1)	User's Choice (2.3.1)	User's Choice (2.3.1)
O	User's Choice (2.3.1)		Orifice, Restriction		
P	Pressure, Vacuum		Point (Test)Connection		
Q	Quantity	Integrate, Totalize (2.3.2)			
R	Radiation		Record		
S	Speed, Frequency	Safety		Switch	
T	Temperature			Transmit	
U	Multivariable (2.3.8)		Multifunction (2.3.9)	Multifunction (2.3.9)	Multifunction (2.3.9)
V	Vibration, Mechanical Analysis			Valve, Damper, Louver	
W	Weight, Force		Well		
X	Unclassified (2.3.3)	X Axis	Unclassified (2.3.3)	Unclassified (2.3.3)	Unclassified (2.3.3)
Y	Event, State or Presence	Y Axis		Relay, Compute Convert	
Z	Position, Dimension	Z Axis		Driver, Actuator Unclassified Final Control Element	

2.1 Notes For Table 1 - Meaning of Identification Letters

A user's choice letter is intended to cover unlisted meanings that will be used repetitively in a particular project. If used, the letter may have one meaning as a first-letter and another meaning as a succeeding-letter. For example, the letter N may be defined as "modulus of elasticity" as a first-letter and "oscilloscope" as a succeeding-letter.

Any first-letter, if used in combination with modifying letters D (differential or deviation), F (ratio), M (momentary), K (time rate of change), Q (integrate or totalize), or any combination of these is intended to represent a new and separate measured variable, and the combination is treated as a first-letter entity. Thus, instruments TDI and TI indicate two different variables, namely, differential- temperature and temperature. Modifying letters are used when applicable.

The unclassified letter X is intended to cover unlisted meanings that will be used only once or to a limited extent. If used, the letter may have any number of meanings as a first-letter and any number of meanings as a succeeding - letter. Except for its use with distinctive symbols, it is expected that the meanings will be defined outside a tagging balloon on a flow diagram. For example, XR-2 may be a stress recorder, XR-3 may be a vibration recorder, and XX-4 may be a stress oscilloscope.

First-letter A for analysis covers all analyses that are not listed in TABLE 1 and are not covered by a user's choice letter. It is expected that the type of analysis in each instance will be defined outside a tagging balloon on a flow diagram.

A pilot light that is part of an instrument loop should be designated by a first-letter followed by the succeeding- letter L. For example, a pilot light that indicates an expired time period should be tagged KQL. If it is desired to tag a pilot light that is not part of an instrument loop, the light is designated in the same way. For example, a running light for an electric motor may be tagged EL, assuming voltage to be appropriate measured variable, or YL, assuming the operating status is being monitored. The unclassified variable X should be used only for applications which are limited in extent. The designation XL should not be used for motor running lights, as these are commonly numerous. It is permissible to use the user's choice letters M, N or O for a motor running light when the meaning is previously defined. If M is used, it must be clear that the letter does not stand for the word "motor", but for a monitored state.

If a given loop has more than one instrument with the same functional identification, then a suffix shall be appended to the loop number, e.g. FV- 2A,FV-2B,etc., or TE-25-1, TE-25-2, etc.

However, if digital systems are involved, the use of suffixes may not be compatible and unique consecutive numbers shall be used. In such cases, using flow as an example, the main instrument should take the number of the Primary Case, e.g. with High and Low Flow arrangement, the transmitters shall be numbered, say FT-2 and FT-3, while the main instrument would be numbered FRC-2.

Modifying-letter K, in combination with a first-letter such as L, T, or W, signifies a time rate of change of the measured or initiating variable. The variable WKIC, for instance, may represent a rate-of- weight-loss controller.

Succeeding-letter K is a user's option for designating a control station, while the succeeding-letter C is used for describing automatic or manual controllers.

Use of first-letter U for "multivariable" in lieu of a combination of first-letters is optional. It is recommended that nonspecific variable designators such as U be used sparingly.

Use of a succeeding-letter U for "multifunction" instead of a combination of other functional letters is optional.

This non-specific function designator should be used sparingly.

TABLE 2

TYPICAL LETTER COMBINATIONS

MEASURED VARIABLE / INSTRUMENT FUNCTION	ANALYSIS	DENSITY	FLOW	LEVEL	PRESSURE	PRESSURE DIFFERENTIAL	SPEED	TEMPERATURE	TEMPERATURE DIFFERENCE
ELEMENT	AE	DE	FE	LE	PE	PDE	SE	TE	TDE
INDICATOR	AI	DI	FI	LI	PI	PDI	SI	TI	TDI
TRANSMITTER	AT	DT	FT	LT	PT	PDT	ST	TT	TDT
RECORDER	AR	DR	FR	LR	PR	PDR	SR	TR	TDR
CONTROLLER	AC	DC	FC	LC	PC	PDC	SC	TC	TDC
INDICATING CONTROLLER	AIC	DIC	FIC	LIC	PIC	PDIC	SIC	TIC	TDIC
RECORDING CONTROLLER	ARC	DRC	FRC	LRC	PRC	PDRC	SRC	TRC	TDRC
CONTROL VALVE	AV	DV	FV	LV	PV	PDV	SV	TV	TDV
CONTROL VALVE–SELF ACTING	–	–	–	LCV	PCV	PDCV	–	TCV	–
SWITCH–LOW	ASL	DSL	FSL	LSL	PSL	PDSL	SSL	TSL	TDSL
SWITCH–HIGH	ASH	DSH	FSH	LSH	PSH	PDSH	SSH	TSH	TDSH
ALARM–LOW	AAL	DAL	FAL	LAL	PAL	PDAL	SAL	TAL	TDAL
ALARM–HIGH	AAH	DAH	FAH	LAH	PAH	PDAH	SAH	TAH	TDAH
SOLENOID VALVE	AY	DY	FY	LY	PY	PDY	SY	TY	TDY

BE	BURNER FLAME DETECTOR
BS	FLAME DETECTION SWITCH
CE	ELECTRICAL CONDUCTIVITY PROBE
EI	VOLTAGE INDICATOR
EL	INDICATION LIGHT
FG	FLOW SIGH GLASS (FLAPPER, ETC.)
FO	FLOW RESTRICTION ORIFICE
FQI	INDICATION OF INTEGRATED FLOW
FQIS	INDICATION OF INTEGRATED FLOW AND SWITH ACTUATED BY INTEGRATED FLOW
FY	FLOW RELAY (EG. RATIO, LINEARIZING)
HV	HAND CONTROL VALVE
HIC	MANUAL LOADING STATION WITH OUTPUT GAUGE
HS	HAND SWITCH
HLS	HAND SWITGH WITH INDICATING LIGHT
HIK	MANUAL LOADING STATION WITH OUTPUT GAUGE AND PROCESS INDICATION
LG	LEVEL GAUGE
PSE	RUPTURE DISC
PRV	RELIEF VALVE
ZSL	POSITION SWITCH (LOW OR CLOSED)
ZSH	POSITION SWITCH (HIGH OR OPEN)
ZLL	LIGHT IND. LOW OR CLOSED POSITION
ZLH	LIGHT IND. HIGH OR OPEN POSITION
UR	TREND RECORDER
W	MULTIPLEXING UNIT, WHEN USED FOR GENERAL DATA ACQUISITION

TABLE 3
DESIGNATION FOR RELAYS AND COMPUTER FUNCTIONS

NO	FUNCTION	SYMBOL	DEFINITION
1	SUMMING	Σ	THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS. (THE INPUTS MAY BE LABELED WITH POSITIVE OR NEGATIVE SIGNS).
2	AVERAGING	Σ/n	THE OUTPUT EQUALS THE ALGEBRAIC SUM OF THE INPUTS DIVIDED BY THE NUMBER OF INPUTS.
3	DIFFERENCE	Δ	THE OUTPUT EQUALS THE ALGEBRAIC DIFFERENCE OF THE TWO INPUTS.
4	PROPORTIONAL	K 1:1 2:1	THE OUTPUT IS DIRECTLY PROPORTIONAL TO THE INPUT. IN THE CASE OF A VOLUME BOOSTER, "K" MAY BE REPLACED BY 1:1. FOR INTEGER GAINS, 2:1, 3:1,ETC., MAY BE SUBSTITUTED FOR K.
5	INTEGRAL	$\int$	THE OUTPUT VARIES IN ACCORDANCE WITH BOTH MAGNITUDE AND DURATION OF THE INPUT. THE OUTPUT IS PROPORTIONAL TO THE TIME INTEGRAL OF THE INPUT.
6	DERIVATIVE	d/dt	THE OUTPUT IS PROPORTIONAL TO THE RATE OF CHANGE (DERIVATIVE) OF THE INPUT.
7	MULTIPLYING	X	THE OUTPUT EQUALS THE PRODUCT OF THE TWO INPUTS.
8	DIVIDING	$\div$	THE OUTPUT EQUALS THE QUOTIENT OF THE TWO INPUTS.
9	ROOT EXTRACTION	$\sqrt{}$	THE OUTPUT EQUALS THE ROOT (I.E., CUBE ROOT, FOURTH ROOT, 3/2 ROOT, ETC.) OF THE INPUT. IF n IS OMITTED, A SQUARE ROOT IS ASSUMED.
10	EXPONENTIAL	x^n	THE OUTPUT EQUALS THE INPUT RAISED TO A POWER (I.E., SECOND, THIRD, FOURTH, ETC.).
11	NONLINEAR OR UNSPECIFIED FUNCTION	$f(x)$	THE OUTPUT EQUALS SOME NONLINEAR OR UNSPECIFIED FUNCTION OF THE INPUT.
12	TIME FUNCTION	$f(t)$	THE OUTPUT EQUALS THE INPUT TIMES SOME FUNCTION OF TIME OR EQUALS SOME FUNCTION OF TIME ALONE.

TABLE 3 (Contd.)

NO	FUNCTION	SYMBOL	DEFINITION
13	HIGH SELECTING	>	THE OUTPUT IS EQUAL TO THE GREATER OF THE INPUTS.
14	LOW SELECTING	<	THE OUTPUT IS EQUAL TO THE LESSER OF THE INPUTS.
15	HIGH LIMITING	⟩	THE OUTPUT EQUALS THE INPUT OR THE HIGH LIMIT VALUE WHICHEVER IS LOWER.
16	LOW LIMITING	⟨	THE OUTPUT EQUALS THE INPUT OR THE LOW LIMIT VALUE WHICHEVER IS HIGHER.
17	REVERSE PROPORTIONAL	−K	THE OUTPUT IS REVERSELY PROPORTIONAL TO THE INPUT.
18	VELOCITY LIMITER	⩗	THE OUTPUT EQUALS THE INPUT AS LONG AS THE RATE OF CHANGE OF THE INPUT DOES NOT EXCEED A LIMIT VALUE. THE OUTPUT WILL CHANGE AT THE RATE ESTABLISHED BY THIS LIMIT UNTIL THE OUTPUT AGAIN EQUALS THE INPUT.
19	BIAS	+ − ±	THE OUTPUT EQUALS THE INPUT PLUS (OR MINUS) SOME ARBITRARY VALUE (BIAS).
20	CONVERT	*/*	THE FORM OF THE OUTPUT SIGNAL IS DIFFERENT FROM THAT OF THE INPUT. *: E–VOLTAGE, I–CURRENT, P–PNEUMATIC, A–ANALOG, B–BINARY, H–HYDRAULIC, O–ELECTROMAGNETIC, SONIC, R–RESISTANCE (ELECT.), D–DIGITAL
21	SIGNAL MONITOR	**H **L **HL	THE OUTPUT HAS DISCRETE STATES WHICH ARE DEPENDENT ON THE VALUE OF THE INPUT. WHEN THE INPUT EXCEEDS (OR BECOMES LESS THAN) AN ARBITRARY LIMIT VALUE THE OUTPUT CHANGES STATE.

3.0 LOOP IDENTIFICATION

The loop identification of an instrument will generally use a number assigned to the loop of which the instrument is a part. Each instrument loop shall have a unique number. An instrument common to two or more loops may have a separate loop number, if desired.

A consecutive numbering of instruments shall be used for each process variable of a contract. The loop numbering sequence for each process variable will begin with the number 001 and run consecutively until all loops in a given contract/process unit are identified.

It is Owner practice to assign a new contract number to each section of a multi-section job. Therefore, to discriminate between such sections, the functional identification letters will be followed by two digits of the process unit number, as follows:

FIC	**29**	**001**
Functional	**Unit**	**Progressive number**
Identification	**Number**	

4.0 SYMBOLS

It is not the intention of this standard to list all symbols or combinations. **ISA Standards S5.1 and S5.3** list many more.

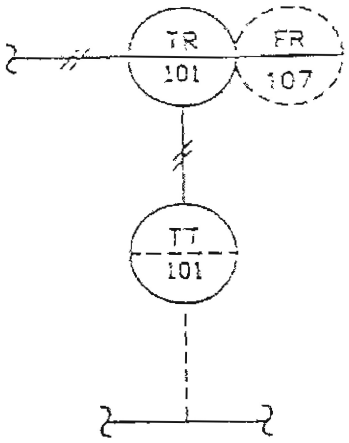
Control valve positioners and control valve electric-to-air converters will not be shown. Therefore, with an electrical system, the controller output (electrical) signal will be schematically shown connected to the valve diaphragm, while the actual installation will have a converter.

Various expedients may be used on individual contracts. For example, the letter "V" just outside the circle can indicate an item supplied by a Package Vendor.

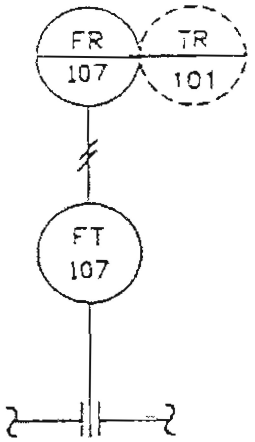
The actuator action in the event of actuating medium failure shall be shown on control valves (see typical control valve symbols).

Software alarms shall follow **ISA Standards sections 5.1 and 5.3.** Letter designators shall be placed on the input or output signal lines of controls or other specific system function.

When dual pen instruments are shown on different flow diagrams, a note can show "To second pen on TR-101" or the tangential circle can be shown in phantom as follows:



P/I DIAGRAM No.1



P/I DIAGRAM No.2

Computer functions will be shown as an hexagon. Use modifying letters only since the measured variable "UJ" is implied by the hexagon.

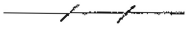
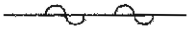
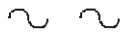
The symbols used to depict instrumentation on flow diagrams and other drawings are shown on **Appendix 1.**

5.0 ATTACHED DOCUMENTS

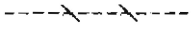
1. **Appendix 1**
   [Instrument Symbols]

APPENDIX 1

INSTRUMENT LINE SYMBOLS

	CONNECTION TO PROCESS	(Note 1)
	UNDEFINED SIGNAL	
	PNEUMATIC SIGNAL	(Note 2)
	ELECTRIC SIGNAL	
	HYDRAULIC SIGNAL	
	CAPILLARY TUBING (FILLED SYSTEM)	
	ELECTROMAGNETIC (NUCLEAR) OR SONIC SIGNAL (GUIDED)	(Note 3)
	ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)	(Note 3)
	INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)	
	MECHANICAL LINK	

OPTIONAL BINARY (ON–OFF) SYMBOLS

	PNEUMATIC BINARY SIGNAL
	ELECTRIC BINARY SIGNAL

Notes :

1. All lines to be fine in relation to process piping lines.
2. The pneumatic signal symbol applies to a signal using any gas as the signal medium. If a gas other than air is used, the gas may be identified by a note on the signal symbol or otherwise.
3. Electromagnetic phenomena include heat, radio waves, nuclear radiation, and light.

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

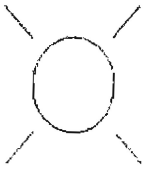
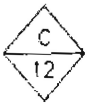
	PRIMARY LOCATION *** NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY LOCATION *** NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	1 * IP1** 	2 	3 
SHARED DISPLAY, SHARED CONTROL	4 	5 	6 
COMPUTER FUNCTION	7 	8 	9 
PROGRAMMABLE LOGIC CONTROL	10 	11 	12 

* Symbol size may vary according to the user's needs and the type of document . A suggested square and circle size for large diagrams is shown above. Consistency is recommended.

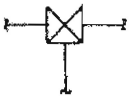
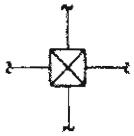
** Abbreviations of the user's choice such as IP1 (Instrument Panel #1), IC2 (Instrument Console #2), CC3 (Computer Console #3) etc., may be used when it is necessary to specify instrument or function location.

*** Normally inaccessible or behind-the-panel devices or functions may be depicted by using the same symbols but with dashed horizontal bars, i.e. 

GENERAL INSTRUMENT OR FUNCTION SYMBOLS (Contd.)

13  REPORT ON PRINTER	14  INSTRUMENT WITH LONG TAG NUMBER	15  INSTRUMENTS SHARING COMMON HOUSING
16  PILOT LIGHT	17  PANEL MOUNTED PATCHBOARD POINT 12	18  PURGE OR FLUSHING DEVICE
19  RESET FOR LATCH-TYPE ACTUATOR	20  DIAPHRAGM SEAL	21  UNDEFIND INTERLOCK LOGIC

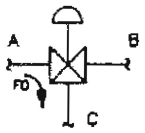
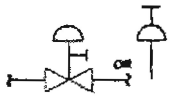
CONTROL VALVE BODY SYMBOLS, DAMPER SYMBOLS

 GENERAL SYMBOL	 ANGLE	 BUTTERFLY	 ROTARY VALVE
 THREE-WAY	 FOUR-WAY	 GLOBE	 DAMPER OR LOUVER

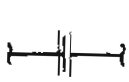
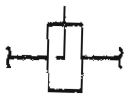
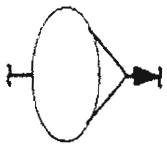
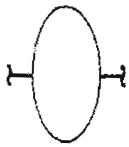
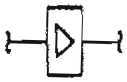
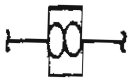
ACTUATOR SYMBOLS

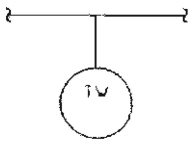
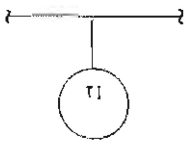
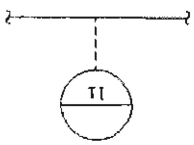
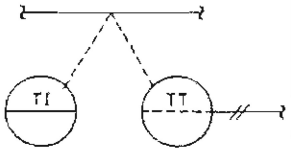
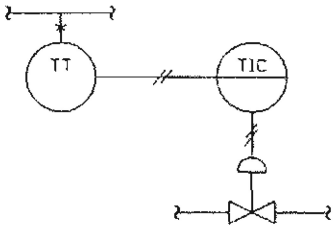
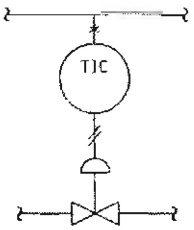
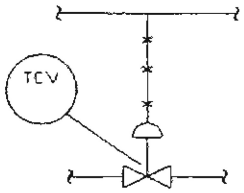
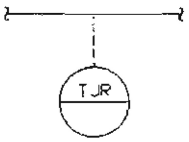
 DIAPHRAGM TYPE ACTUATOR	 PISTON TYPE ACTUATOR	 MOTOR ACTUATOR	 SOLENOID ACTUATOR

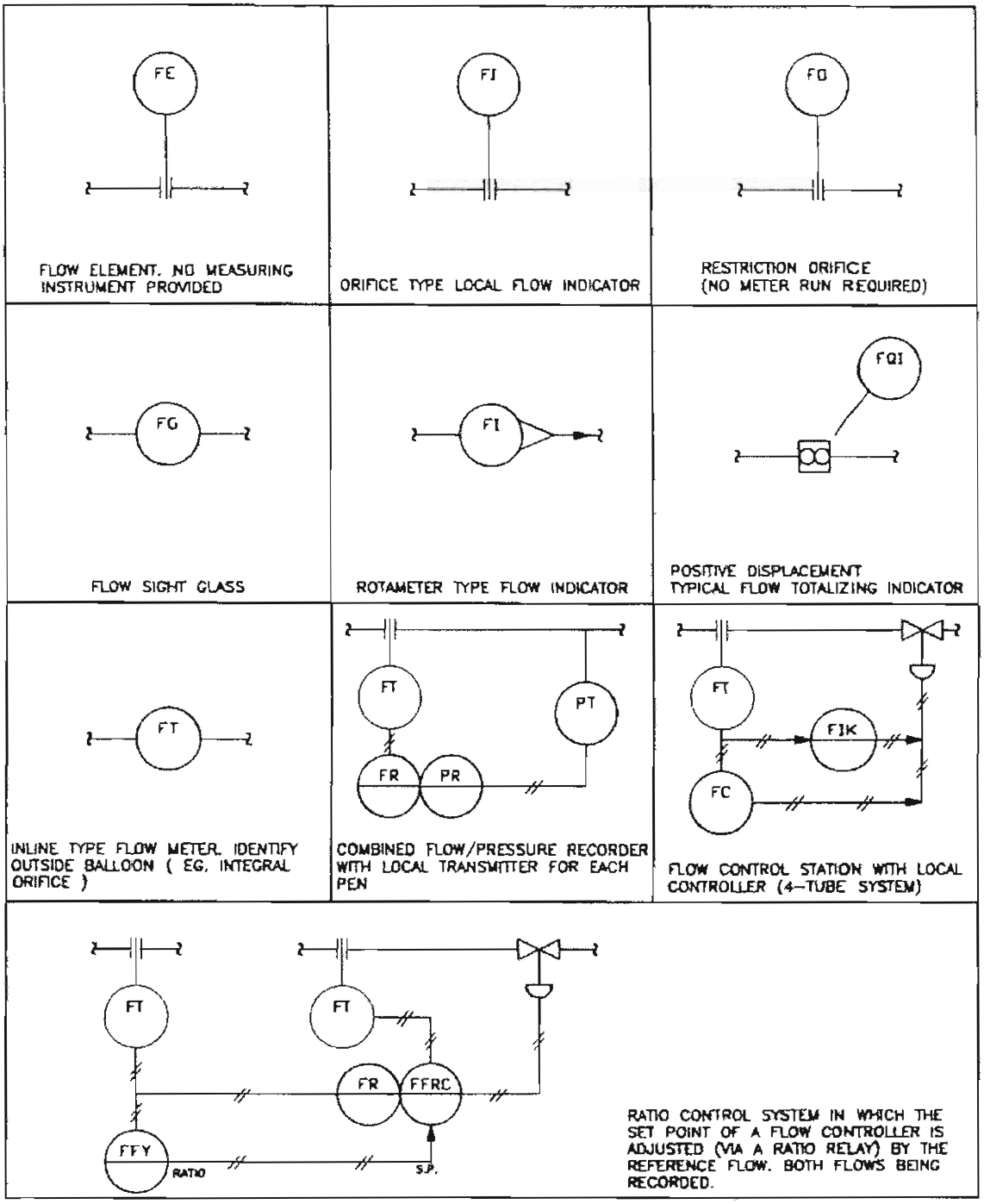
TYPICAL CONTROL VALVE SYMBOLS

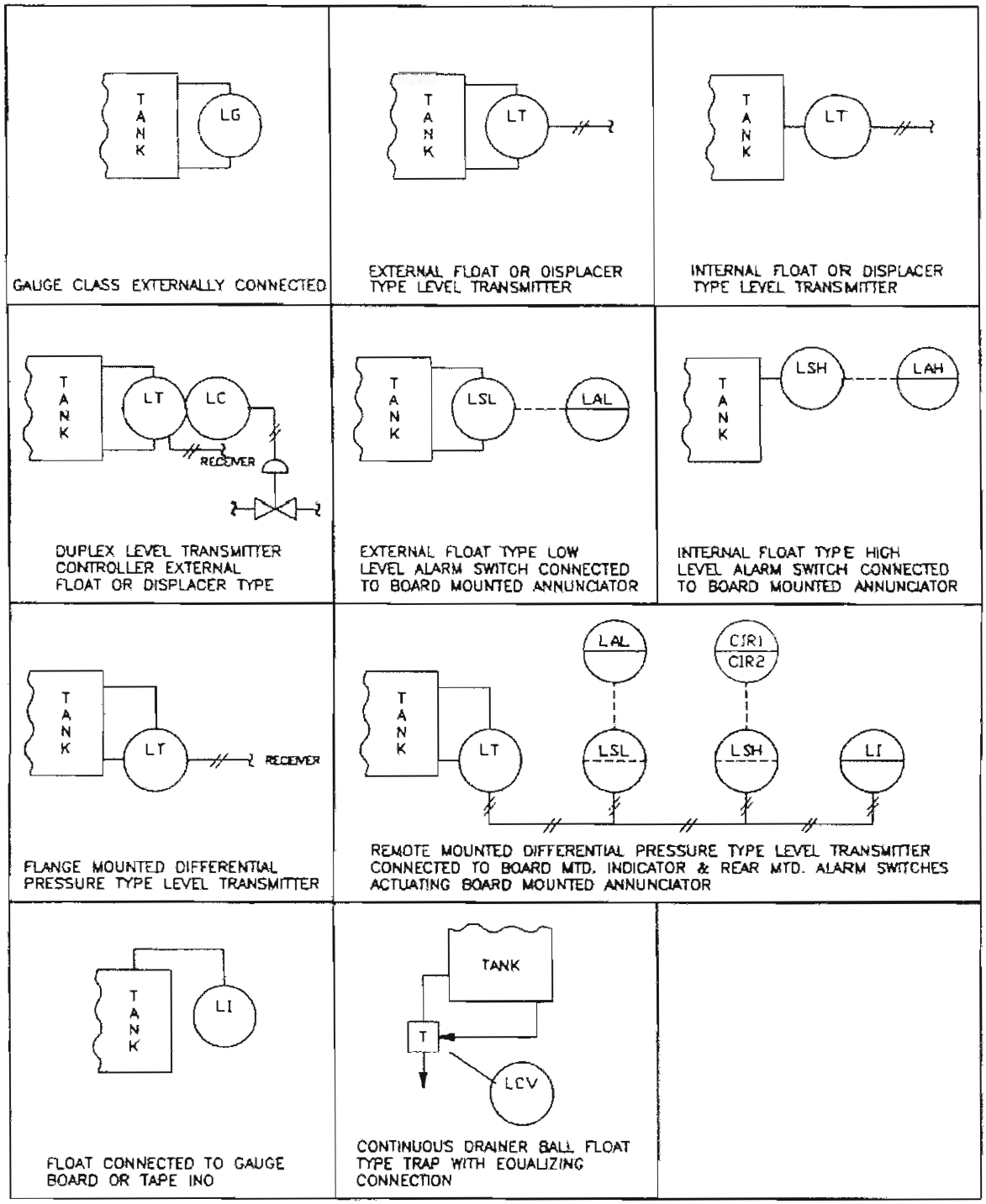
 2-WAY VALVE-FAIL OPEN	 3-WAY VALVE, FAIL OPEN TO PATH A-C
 2-WAY VALVE-FAIL CLOSED	 DIAPHRAGM OPERATED VALVE WITH SIDE MOUNTED HANDWHEEL (OR TOP MOUNTED)
 2-WAY VALVE-FAIL LOCKED	 HAND CONTROL VALVE IN PROCESS LINE

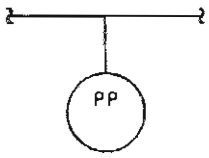
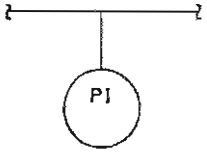
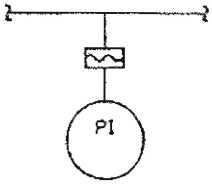
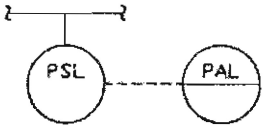
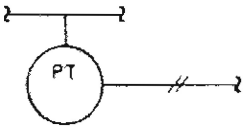
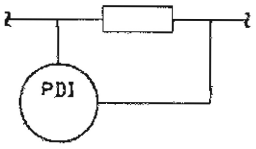
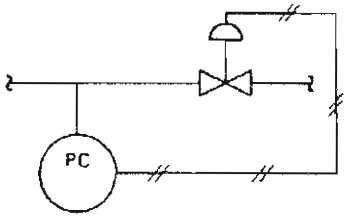
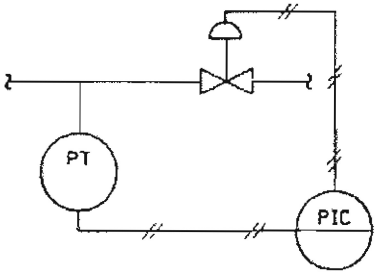
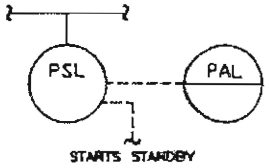
PRIMARY ELEMENT SYMBOLS

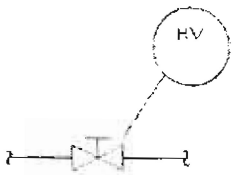
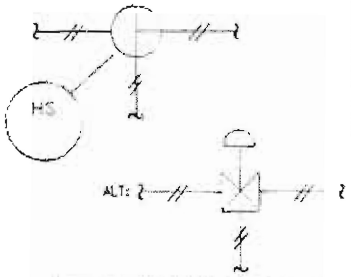
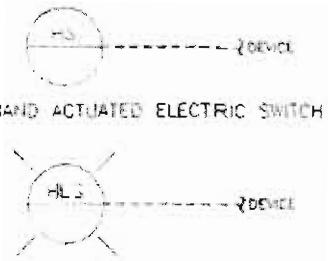
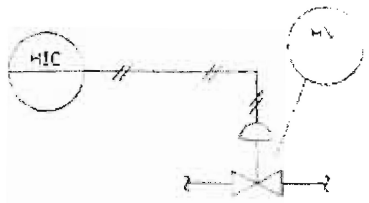
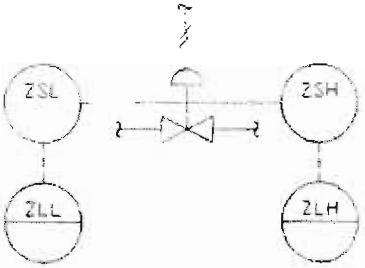
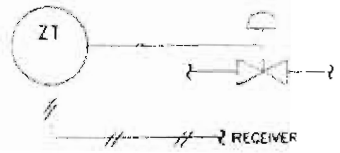
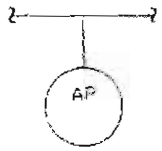
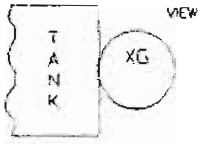
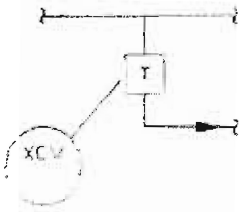
 ORIFICE PRIMARY ELEMENT	 PITOT-TUBE OR ANNUBAR	 VENTURI TUBE OR FLOW NOZZLE	 ROTAMETER TYPE FLOW METER
 LINE TYPE FLOW METER	 VORTEX FLOW METER	 TURBINE METER	 POSITIVE DISPLACEMENT-TYPE FLOW TOTALIZING INDICATOR

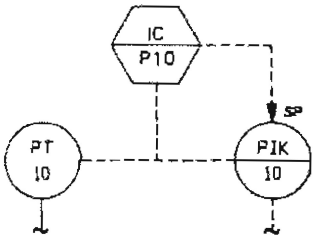
 TEMPERATURE TEST CONNECTION WITH WELL	 LOCAL TEMPERATURE INDICATOR	 BOARD MOUNTED TEMPERATURE INDICATOR (CAN ALSO BE USED WHEN TEMPERATURES ARE MULTIPLEXED TO BOARD MOUNTED DISPLAY)
 DUPLEX THERMOCOUPLE CONNECTED TO REAR BOARD MTD TRANSMITTER AND CHECKING INDICATOR	 FILLED SYSTEM TYPE TRANSMITTER AND INDICATING CONTROLLER	 FILLED SYSTEM TYPE LOCALLY MOUNTED INDICATING CONTROLLER
 SELF ACTUATED TEMPERATURE CONTROL VALVE	 THERMOCOUPLE OR RESISTANCE BULB CONNECTED TO MULTIPOINT RECORDER	


FE
FLOW ELEMENT. NO MEASURING INSTRUMENT PROVIDED
FI
ORIFICE TYPE LOCAL FLOW INDICATOR
FO
RESTRICTION ORIFICE (NO METER RUN REQUIRED)
FG
FLOW SIGHT GLASS
FI
ROTAMETER TYPE FLOW INDICATOR
FQI
POSITIVE DISPLACEMENT TYPICAL FLOW TOTALIZING INDICATOR
FT
INLINE TYPE FLOW METER. IDENTIFY OUTSIDE BALLOON (EG. INTEGRAL ORIFICE)
FT
PT
FR
PR
COMBINED FLOW/PRESSURE RECORDER WITH LOCAL TRANSMITTER FOR EACH PEN
FT
FIK
FC
FLOW CONTROL STATION WITH LOCAL CONTROLLER (4-TUBE SYSTEM)
FT
FT
FR
FFRC
FFY
RATIO
S.P.
RATIO CONTROL SYSTEM IN WHICH THE SET POINT OF A FLOW CONTROLLER IS ADJUSTED (VIA A RATIO RELAY) BY THE REFERENCE FLOW. BOTH FLOWS BEING RECORDED.

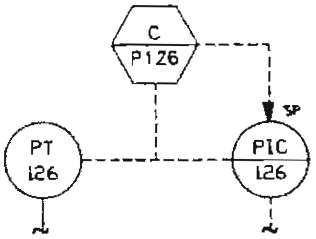

TANK
LG
GAUGE CLASS EXTERNALLY CONNECTED
TANK
LT
EXTERNAL FLOAT OR DISPLACER TYPE LEVEL TRANSMITTER
TANK
LT
INTERNAL FLOAT OR DISPLACER TYPE LEVEL TRANSMITTER
TANK
LT
LC
RECEIVER
DUPLEX LEVEL TRANSMITTER CONTROLLER EXTERNAL FLOAT OR DISPLACER TYPE
TANK
LSL
LAL
EXTERNAL FLOAT TYPE LOW LEVEL ALARM SWITCH CONNECTED TO BOARD MOUNTED ANNUNCIATOR
TANK
LSH
LAH
INTERNAL FLOAT TYPE HIGH LEVEL ALARM SWITCH CONNECTED TO BOARD MOUNTED ANNUNCIATOR
TANK
LT
RECEIVER
FLANGE MOUNTED DIFFERENTIAL PRESSURE TYPE LEVEL TRANSMITTER
TANK
LT
LAL
LSL
CIR1
CIR2
LSH
LI
REMOTE MOUNTED DIFFERENTIAL PRESSURE TYPE LEVEL TRANSMITTER CONNECTED TO BOARD MTD. INDICATOR & REAR MTD. ALARM SWITCHES ACTUATING BOARD MOUNTED ANNUNCIATOR
TANK
LI
FLOAT CONNECTED TO GAUGE BOARD OR TAPE INO
TANK
T
LCV
CONTINUOUS DRAINER BALL FLOAT TYPE TRAP WITH EQUALIZING CONNECTION

 PRESSURE CONNECTION WITH PROCESS CONNECTION BLOCK VALVE AND INSTRUMENT BLEED ONLY (TEST POINT)	 LOCAL PRESSURE INDICATOR (INCLUDES PRESSURE VACUUM AND DRAFT)	 LOCAL PRESSURE INDICATOR WITH CHEMICAL SEAL
 LOCALLY MOUNTED LOW PRESSURE ALARM SWITCH CONNECTED TO BOARD MTD. ANNUNCIATOR	 PRESSURE TRANSMITTER (INCLUDES PRESSURE VACUUM & DRAFT). IF ABSOLUTE IDENTIFY OUTSIDE BALLOON	 DIFFERENTIAL PRESSURE INDICATOR
 LOCAL PRESSURE CONTROLLER BLIND TYPE, PILOT OPERATED	 PRESSURE TRANSMITTER CONNECTED TO BOARD MTD. INDICATING CONTROLLER	 LOW PRESSURE SWITCH WITH TWO OUTPUTS OPERATING AT SAME TIME FOR ALARM AND CONTROL

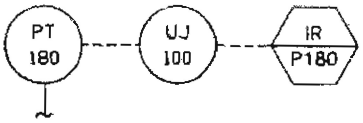
 HAND CONTROL VALVE IN PROCESS LINE	 HAND ACTUATED SWITCHING VALVE IN PNEUMATIC SIGNAL LINE	 HAND ACTUATED ELECTRIC SWITCH HAND ACTUATED ELECTRIC SWITCH WITH PILOT LIGHT
 MANUAL LOADING STATION WITH OUTPUT GAUGE	 POSITION SWITCHES CONNECTED TO PILOT LIGHTS INDICATING LOW (OR CLOSED) AND HIGH (OR OPEN) POSITION	 POSITION TRANSMITTER
 ANALYSIS TEST SAMPLE POINT	 SIGHT GLASS FOR INTERNAL VIEWING	 ALL TRAPS OTHER THAN BALL FLOAT TYPE CONTINUOUS DRAINERS



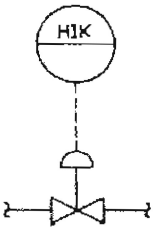
A/M STATION ON COMPUTER SUPERVISORY MODE CONTROL WITH CRT DISPLAY



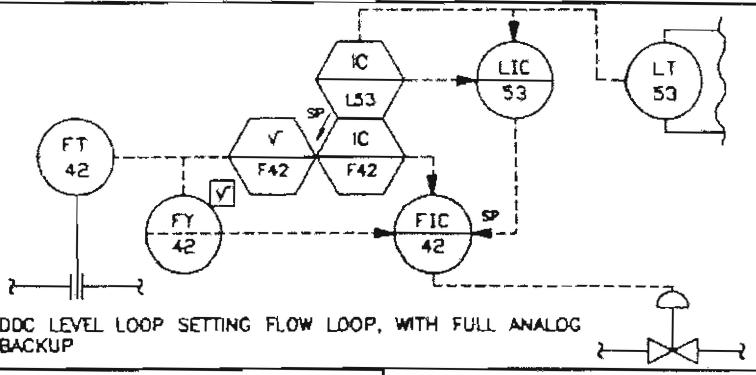
COMPUTER A/M STATION ON COMPUTER CONTROL WITHOUT CRT DISPLAY



PRESSURE MULTIPLEXED TO COMPUTER FOR CRT DISPLAY AND LOGGING

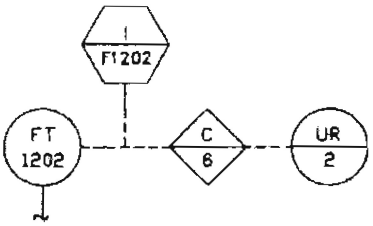


MANUAL CONTROL STATION IN COMPUTER BASE SYSTEM



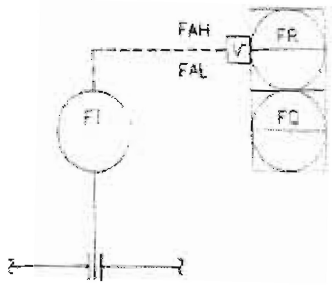
DDC LEVEL LOOP SETTING FLOW LOOP, WITH FULL ANALOG BACKUP

PRESSURE SIGNAL TO BOARD MOUNTED PATCHBOARD OR MATRIX BOARD CONNECTION (No. 9), CAPABLE OF OUTPUT TO MULTIPLE LOCATIONS

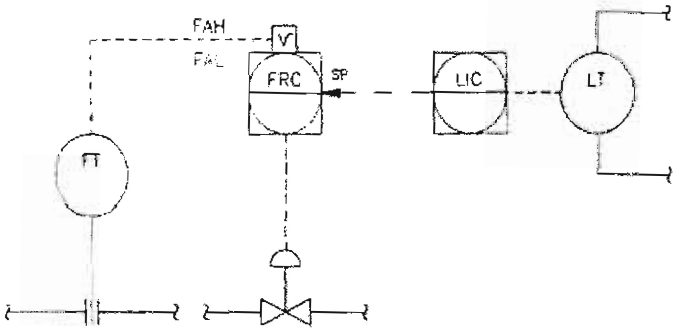


FLOW LOOP CONNECTED TO DATA DISPLAY AND TRENO RECORDER ON PANEL BOARD (POINT No. 6 of 12 POINT TREND RECORDER)

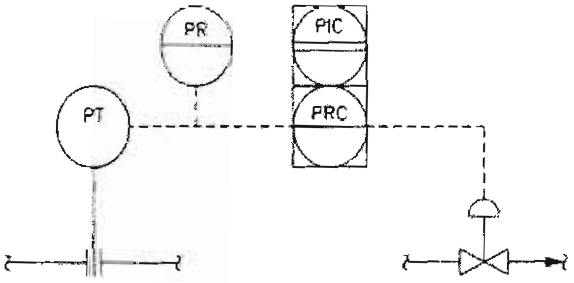
Shared display
Flow indicating and Totalizing Loop, Showing √ Signal Conditioning Function, Alarms On Measured Variable, Trend Recording Available (Not all System Signals have Trending Available)



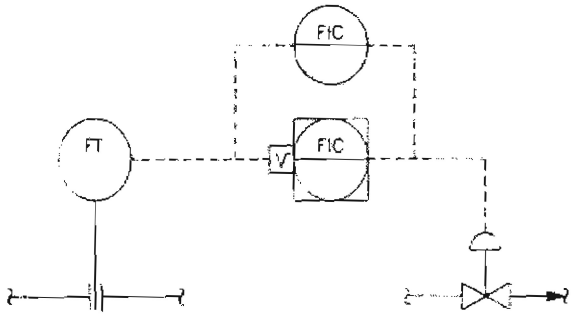
Shared Display
Shared Control
No Backup.
Cascade Control Loop,
Showing √ Signal
Conditioning Function,
Alarms on Measured
Variable Trend Recording Available
(Not all System Signals
have Trending Available)

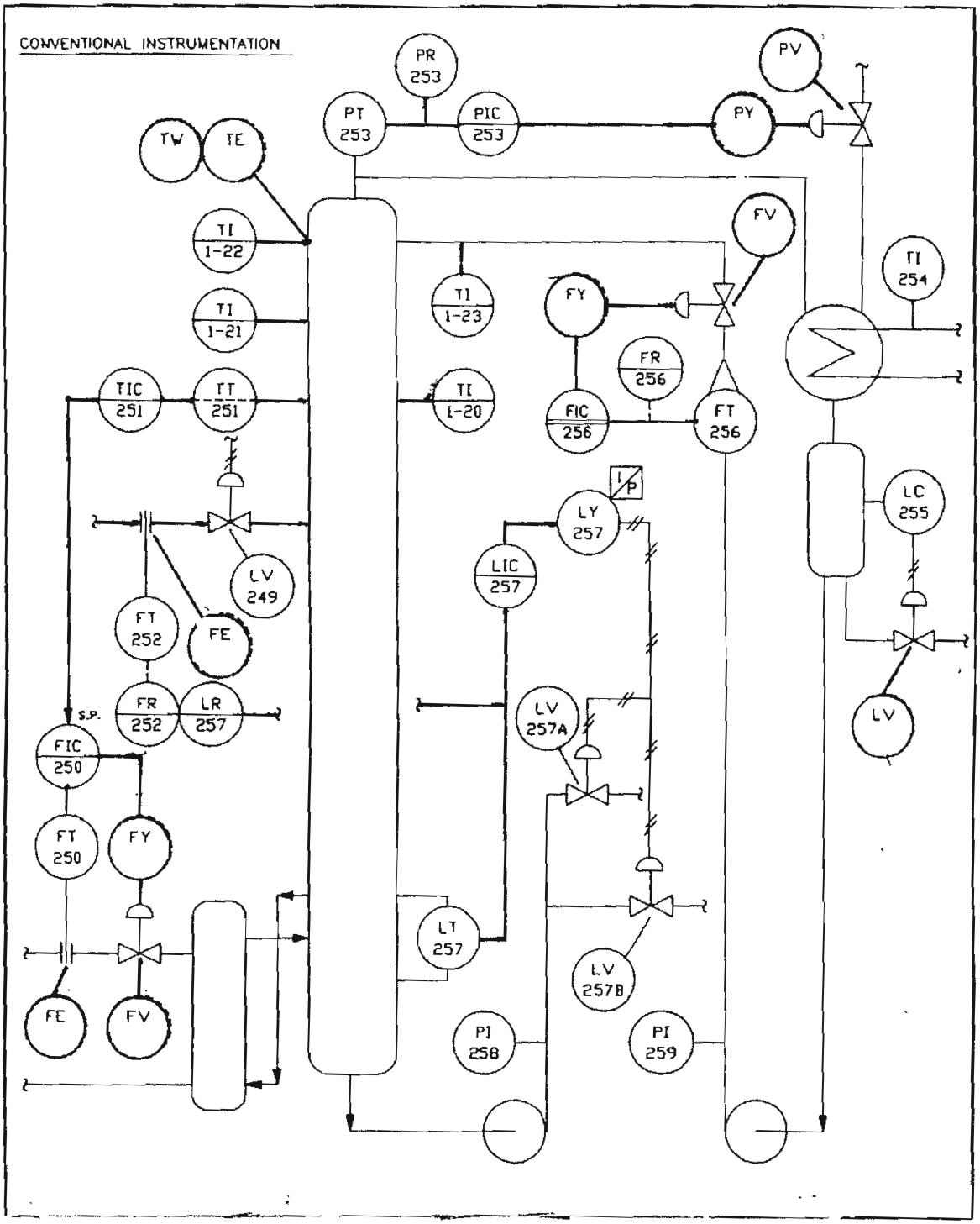


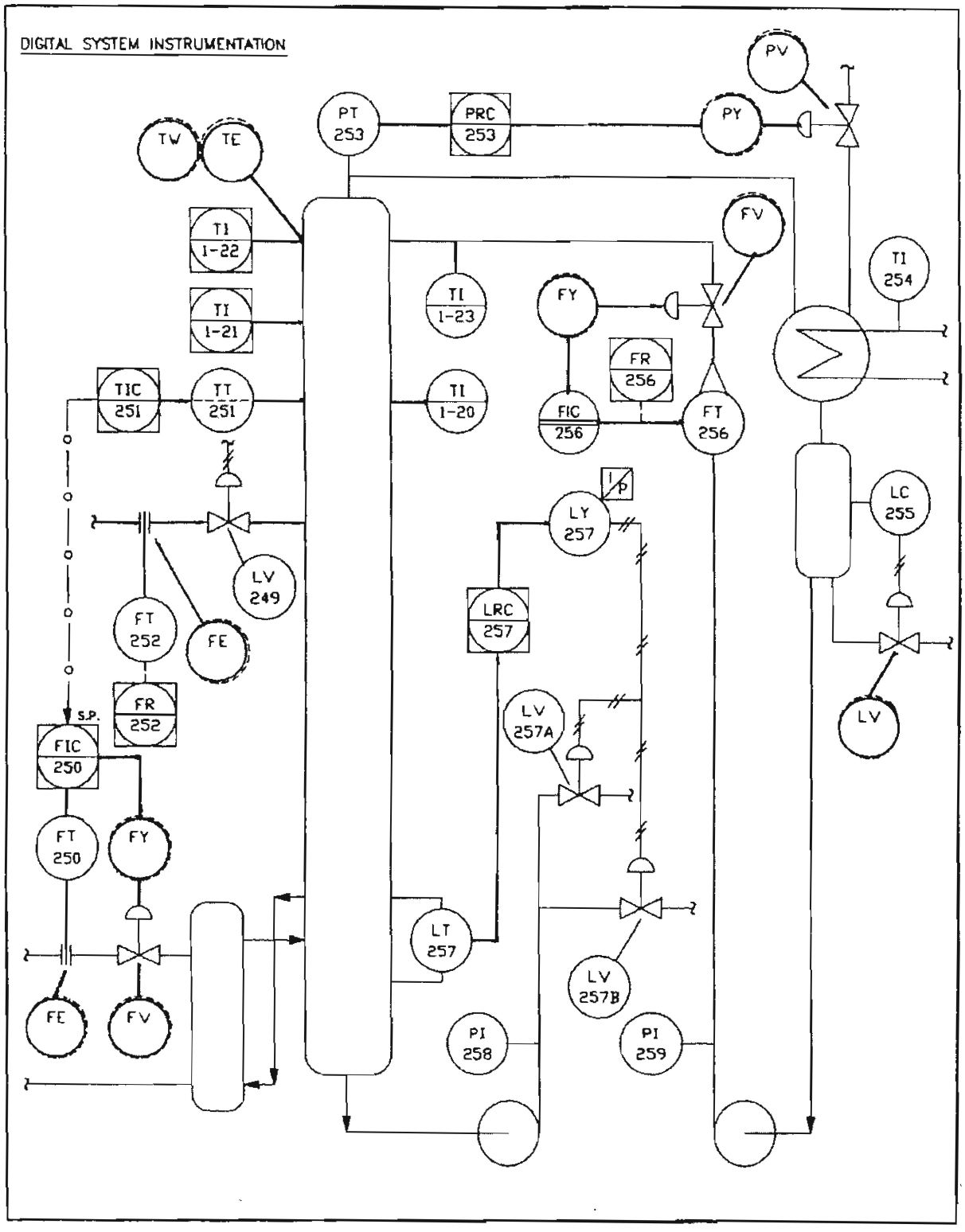
Shared display
Shared control
Analogue back-up station interfaced with the system.
Hardwired continuous analogue recorder.
Trend recording available
(Not all System Signals have Trending Available)



Shared display
Shared control.
√ signal conditioning system function,
analogue control station independent from the system.




CONVENTIONAL INSTRUMENTATION
PR 253
PT 253
PIC 253
PV
PY
TW
TE
TI 1-22
TI 1-21
TIC 251
TT 251
TI 1-23
TI 1-20
FY
FV
FR 256
FIC 256
FT 256
TI 254
I/P
LY 257
LIC 257
LV 249
FT 252
FE
FR 252
LR 257
S.P.
FIC 250
FT 250
FY
FE
FV
LV 257A
LV 257B
LT 257
PI 258
PI 259
LC 255
LV


DIGITAL SYSTEM INSTRUMENTATION
PV
PT 253
PRC 253
PY
TW
TE
TI 1-22
TI 1-21
TI 1-23
FY
FV
TI 254
FR 256
TIC 251
TT 251
TI 1-20
FIC 256
FT 256
I/P
LY 257
LC 255
LV 249
FT 252
FE
LRC 257
FR 252
S.P.
FIC 250
LV 257A
LV
FT 250
FY
LT 257
LV 257B
FE
FV
PI 258
PI 259