INSTRUMENT FUNCTION OUTLINE		DEPARTMENT	246
TITLE	#4 Surge Tank Temperature Control	LOOP NUMBER	031
SHEET	2 OF 5	CLASSIFICATION	TIC-31

2.0 COMPONENT AND CALIBRATION DATA

OPERATING DATA

A. TW-31 Thermowell

Location: Ground level on Tank 537

B. TIC-31 Temp. Indicating Controller

Location: 14' level, NW of tank 537
Air Supply: 20 psig
Output: 3-15 psig
Action: Inc. temp.
Dec. output
Span: 150°C

C. TV-31.1 Control Valve

Location: 14' level, north of Tank 537
Input: 3- 15 psig
Action: Air to close
Fails open

D. TV-31.2 Control Valve

Location: 14' level, north of Tank 537
Input: 3-15 psig
Action: Air to open
Fails close

MECHANICAL DATA

A. Alloy Engr. Thermowell #510-V18

1½" 150# R.F. Flg. Aluminum
18" below thread
3/4" NPT female thread
Bulb: ½" x 3 15/16"
ID: .510"

B. Taylor Temp. Ind. Contr. #441RM11318E

Range: 0 - 150°C
25' Inconel capillary
Ext.: 30' bendable
Prop. Bank: 1-100%
Accuracy: 1%
Serial # 1131
IMO: none
IPMO: 087

C. Fisher Gov. Control Valve #657-A

1½" 150# Flg. carbon steel body
1¼" 316 SS Micro-Flute trim
Teflon packing, skirt-top guiding
Serial No.: 4435032
Seat Ring: 1C2368-3507 S.C. 41-60939
IMO: 45
IPMO: 126
Packing Set: 1R2902-0101
Actuator Size 40 Travel 1-1/8"
Valve Plug: 2N5521-000A

D. Fisher Gov. Control Valve #667ES

1" 150# Flg. Carbon Steel Body
3/8" 316 SS Micro-form trim
Teflon V Packing, skirt-top guiding
IMO: 45
IPMO: 126
Actuator size 30 Travel 3/4"
Split Range: 7-15 psig
Range Spring: 1F1768
Packing Set: 1R2900-0101 S.C.41-61908
Serial No. 4228347

PCB-ARCH-EXT0374031

INSTRUMENT FUNCTION OUTLINE DEPARTMENT 246

TITLE #4 Still Pot Level Control & Alarm LOOP NUMBER 028

SHEET 1 OF 4 CLASSIFICATION LICA-28

WRITTEN BY DATE 6/69 REV. BY DATE REV. NO.

1.0 NEED FOR LOOP

This loop is needed to insure that there is a constant level in the still pot and that there will always be undistilled material in the pot available for distillation.

1.1 DESCRIPTION OF LOOP

1.1.1 Function

The function of this loop is to control the level of undistilled material in the still pot and to activate a high or low alarm when required.

1.1.2 System Performance Required

The level should be maintained ± 5" of set point.

1.1.3 Accomplishment of Function

The level transmitter senses the level in the tank and sends a 3-15 psig air signal to the level indicating controller. The controller compares this signal with a set point and sends a 3-15 psig air signal to a control valve to compensate for variation from set point. The control valve allows either more or less material into the tank dependent upon the signal from the controller. The transmitter also sends an air signal to a dual unit pressure switch which activates a high or low level alarm.

PCB-ARCH-EXT0374032

INSTRUMENT FUNCTION OUTLINE | DEPARTMENT 246

TITLE #4 Still Pot Level Control & Alarm | LOOP NUMBER 028

SHEET 2 OF 4 | CLASSIFICATION LICA-28

2.0 COMPONENT AND CALIBRATION DATA

OPERATING DATA

A. LT-28 Level Transmitter

Location: 14' level, over Tank 511
Air Supply: 20 psig
Output: 3-15 psig

B LIC-28 Level Indicating Contr.

Location: Panel
Air Supply: 20# IAS
Output: 3-15 psig
Action: Inc. input
Dec. Output

C LV-28 Control Valve

Location: 14' Level, over Tank 511
Input: 3-15 psig
Action: Air to open
Fails close

D LSA-28 Pressure Switch

Location: Panel
Input: 3-15 psig
Set Point: Hi(85%), Lo(12%)
Fct: Hi & Low level alarms
Spdt Contact/115 V., 10A

MECHANICAL DATA

A, Fisher Gov. Level Trans. #2500T-249BP

4" 150# R.F. Flg. Carbon Steel Body
Torque Tube 1K 4053-000A
316 SS 1" x 93" Displacer W/16" Ext.
Displacer 1P7330-316 SS J.C. 32-39514
W/Piped & Mtd. Air Set
Calibration Pull - 0-3# 802
Zero Setting - Zero
Span Setting - .82
IPMO - 127
Serial - 4464406

B Fischer & Porter Level Ind. Contr. #51-1351ABEC

Range: 0-100 Lin.
Prop Band: 2-500%
Reset Rate: .02 - 5 min.
Accuracy: ½%
Serial No. 4797A14
IMO: None
IPMO: 165

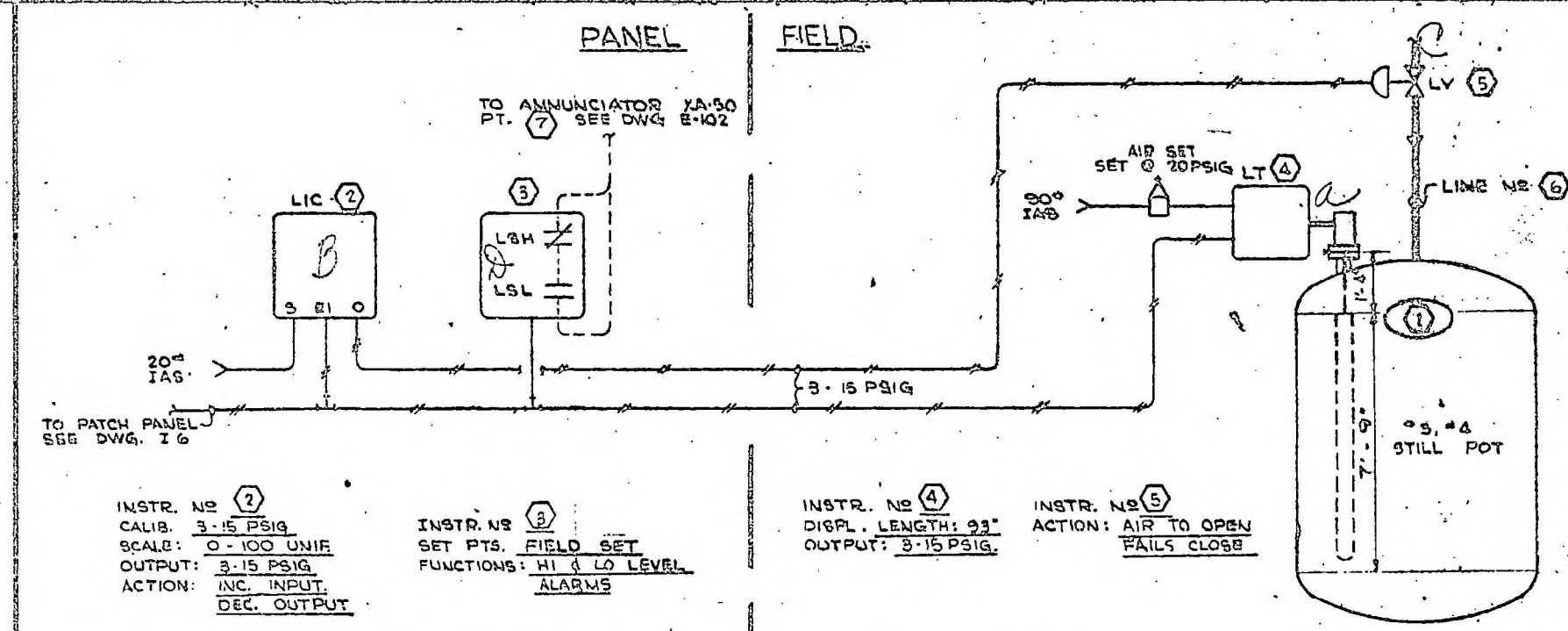
C Fisher Gov. Control Valve #667-A

1" 150# Flg. Carbon Steel Body
1" 316 SS Micro-Flute Trim
Teflon Packing: Skirt-Top Guiding
IMO: 45
IPMO: 126
Valve plug - S.C. 41-60416

D Barksdale Pressure Switch #D2T-H18

Bronze Diaphragm, ¼" IPS
Range: 0-18 psig
Conduit Conn.: ½" NPS
Setting: Trips at 4.2# on drop
Trips at 13.8# on rise
Stores Code: 44-73246

PCB-ARCH-EXT0374033



INSTR. Nº (2)
CALIB. 3-15 PSIG
SCALE: 0-100 UNIF.
OUTPUT: 3-15 PSIG
ACTION: INC. INPUT.
DEC. OUTPUT

INSTR. Nº (3)
SET PTS. FIELD SET
FUNCTIONS: HI & LO LEVEL
ALARMS

INSTR. Nº (4)
DISPL. LENGTH: 99"
OUTPUT: 3-15 PSIG.

INSTR. Nº (5)
ACTION: AIR TO OPEN
FAILS CLOSE

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2-502	LIC-23	LSH/LSL 23	LT-23	LV-23	2-423-3-FIIP-2"	1-6
2-511	LIC-28	LSH/LSL 28	LT-28	LV-28	2-423-1-FIIP-2"	1-7

BILL OF MATERIAL

MARK NO	QUAN	SPEC. 1800	P.O. NO 1800-9	DESCRIPTION
(2)	2	12.1	0079	FISCHER & PORTER MODEL 51-1351ABEC INDICATING CONTR.
(3)	2	13.2	0112	BARKSDALE D2T-H1S DUAL UNIT PRESSURE SWITCH
(4)	2	20.1	0123	FISHER-GOV. #2500T-249 BP LEVEL TRANSMITTER W/ PIPED & MT'D. AIR SET.
(5)	2	10.2	0055	FISHER-GOV. #667-A-1"-150# CONTROL VALVE

MARK NO.	QUAN	SPEC.	P.O. NO.	DESCRIPTION

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CENTRAL ENGINEERING DEPARTMENT, ST. LOUIS, MISSOURI

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INSTRUMENT SCHEMATIC DIAGRAM
LOOP NO. [redacted], LICA 28
FUNCTION STILL POT LEVEL CONTROL & ALARM

C.E.A. NO.	REFERENCE NO.
1800	I-11B

PCB-ARCH-EXT0374034

INSTRUMENT FUNCTION OUTLINE DEPARTMENT 246

TITLE #4 Still Pot Level Control & Alarm LOOP NUMBER 028

SHEET 4 OF 4 CLASSIFICATION LICA-28

WRITTEN BY _____ DATE _____ REV. BY _____ DATE _____ REV. NO. _____

3.0 OPERATION OF LOOP

3.1 NORMAL OPERATION

The normal operation of this loop is to control the level of the material in the still pot at a field set point. An alarm will sound when level is high or low. High level is 85" from bottom bend line. Low level is 12" from bottom bend line. Set point is 49% on controller.

3.1.1 Start Up Instructions

A. Open valves in air line and check air supply to loop.
B. Check level controller reading against stick measurement or Intermediate Storage Tank readings for accuracy.
C. Maintain level in tank as per operating instructions.

3.1.2 Shut Down Instructions

A. Put controller on manual and close control valve by moving set point to lowest setting.
B. Close all block valves in loop.

3.1.3 Manual Operating Instructions

A. Put controller on "Manual" set point on 9# air to valve, check level frequently.
B. There is no by-pass on LV-23.

3.2 INTERLOCKS

None.

3.3 ABNORMAL OPERATIONS

REVIEW

3.3.1 Air Failure

An air failure to the loop will cause the control valve to fail closed and the level in the still pot will decrease. Check level frequently.

3.3.2 Power Failure

Loss of power will cause loss of alarm system.

GW 8/5

R M McCutchen 11/20/69

PS Niehoff 9/20/69

INSTRUMENT FUNCTION OUTLINE

DEPARTMENT 246

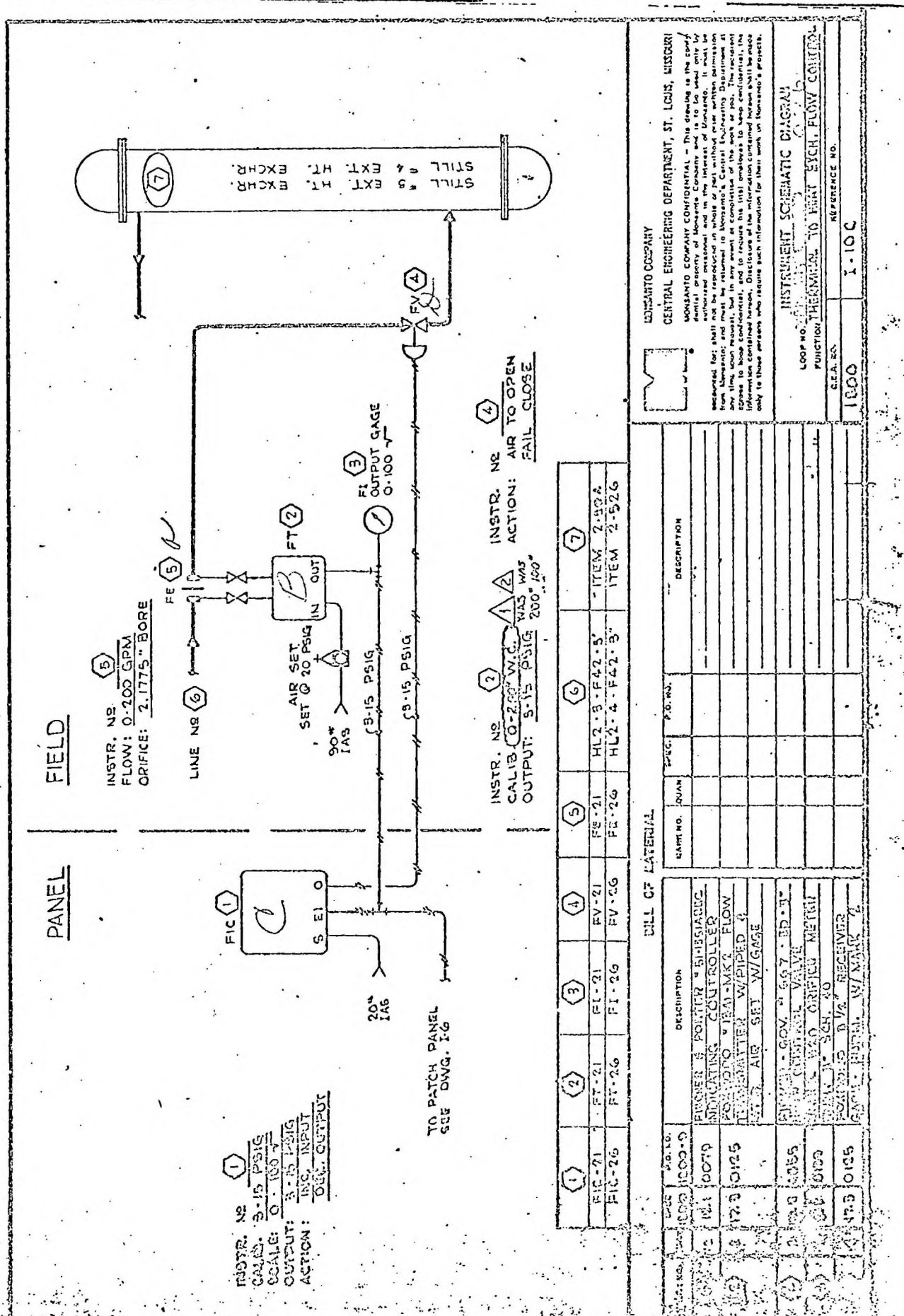
TITLE Therminol to #4 Heat Exch. Flow Control

LOOP NUMBER 026

SHEET 3 OF 4

CLASSIFICATION FIC-26

026



PCB-ARCH-EXT0374036

INSTRUMENT FUNCTION OUTLINE DEPARTMENT 246

TITLE Therminol To #4 Heat Exch. Flow Control LOOP NUMBER 026

SHEET 4 OF 4 CLASSIFICATION FIC-26

WRITTEN BY _____ DATE _____ REV. BY _____ DATE _____ REV. NO. _____

3.0 OPERATION OF LOOP

3.1 NORMAL OPERATION

Set therminol flow as per operating instructions (0-100%). 100% is equal to 200 gpm. Increase in therminol flow will result in larger boil-up, decrease in flow will result in slower boil-up.

3.1.1 Start Up Instructions

Check all air pressures, align manual valves to heat exchanger, start therminol pump.

3.1.2 Shut Down Instructions

Set flow controller to 0 gpm, close manual valves to heat exchanger.

3.1.3 Manual Operations

Set flow controller to manual, regulate air pressure to control valve.

3.2 INTERLOCKS

None

3.3 ABNORMAL OPERATIONS

3.3.1 Air Failure

Air failure to the loop will cause loss of control, the control valve will close, the flow to heat exchanger will stop.

3.3.2 Power Failure

Power failure to the loop will not affect control power failure to therminol pump will cause loss of flow.

REVIEW

R Flynn 6/16/69

[illegible] 6/25

R M McCutchen 11/20/69

P S Neuhoff 9/20/69

INSTRUMENT FUNCTION OUTLINE DEPARTMENT 246

TITLE #4 Still Pot Flow Totalization & Alarm LOOP NUMBER 027

SHEET 1 OF 4 CLASSIFICATION FOA-27

WRITTEN BY Brawley DATE 4/28/69 REV. BY _____ DATE _____ REV. NO. _____

1.0 NEED FOR LOOP

This loop is needed to determine the amount of input to the tank. This information then determines when the process is to be temporally terminated and lime added or the tank emptied.

1.1 DESCRIPTION OF LOOP

1.1.1 Function

The function of this loop is to count the number of gallons put into the still pot, and to sound an alarm when a preset amount is reached.

1.1.2 System Performance Required

This system should totalize the final gallon count within ± 150 gallons of actual total input and should meter the flow rate within ± 1/2 gpm of actual rate.

1.1.3 Accomplishment of Function

The flow meter transmitter operates on a positive displacement principle and sends an electrical pulse to a counter for every given amount of displacement. The counter receives the pulses from the transmitter and counts one for every ten pulses received.

PCB-ARCH-EXT0374038

INSTRUMENT FUNCTION OUTLINE		DEPARTMENT	246
TITLE	#4 Still Pot Flow Totalization & ~~Alarm~~	LOOP NUMBER	027
SHEET	2 OF 4	CLASSIFICATION	FQA-27

2.0 COMPONENT AND CALIBRATION DATA

OPERATING DATA

A. FT-27 Flow Meter Transmitter
Location: 14' level, over tank 511
Flow: 6-37 GPM
Working Pressure: 30-80 psig
Pulses/Gal.: 1
Switch Rating: .2 AMP
Totalizer: 5 Digit - Non Reset
10 Gal./Count

B. FQA-27 Flow Batch Totalizer
Location: Panel
Input: 6-37 GPM (Pulses/Min.)
Pulse Source: 115 Vac, .5 A.
Display: 5 Digits
Counting Coil: 115 VDC
Contact: SPDT @ 250 Vac, 2 A.
Power Supply: 115 Vac
Operating Voltage: DC
*Build-in DC rectifier for coil operation

MECHANICAL DATA

A. Brooks Inst. Co. Flow Meter Trans.
#9455-B7C-01-C-111-010
Meter Size: 1"
Conn.: 1", 150# Flg. R.F. ASA
Material: Housing, Gears, Shaft, Flanges } 316 SS

Bearings: Hard carbon
Gasket & Seals: Teflon

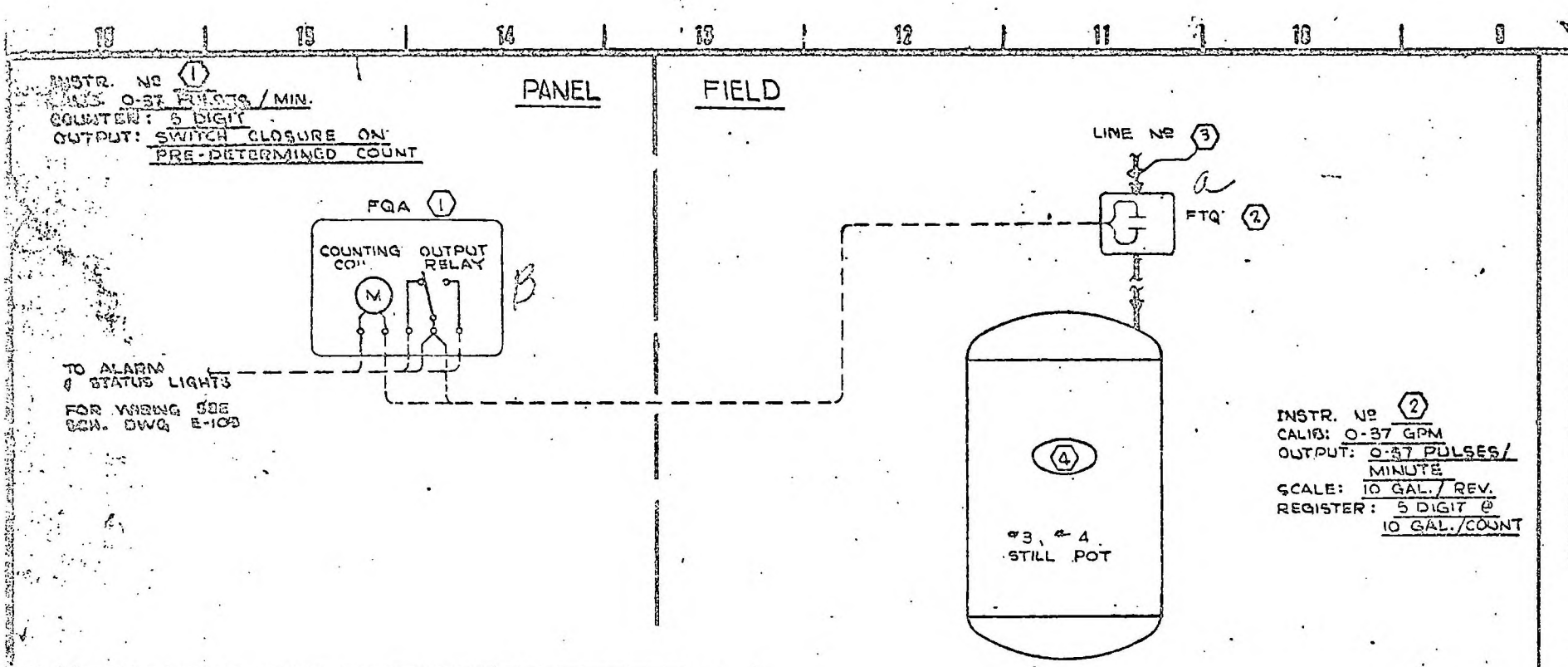
B. Presin Flow Batch Totalizer #F185
For Repairs: Ship to:
Presin Co., Inc.
Trap Fails Road
Shelton, Conn. 06484

PCB-ARCH-EXT0374039

INSTRUMENT FUNCTION OUTLINE — DEPARTMENT 246

TITLE #4 Still Pot Flow Totalization — LOOP NUMBER 027

SHEET 3 OF 4 & Alarm — CLASSIFICATION FQA-27



Nº (1)	(2)	(3)	(4)
FQA-22	FTQ 22	2-423-3-FIIP-2"	ITEM 2-502
FQA-27	FTQ 27	2-423-1-FIIP-2"	ITEM 2-511

BILL OF MATERIAL

MARK NO.	QUAN.	SPEC.	P.O. NO.	DESCRIPTION
(1)	2	167	0116	PRESIN FIB5, 5 DIGIT BATCH TOTALIZER
(2)	2	16.6	0115	BROOKS INSTR. CO. #5455-BTC-01-C-111-010 POSITIVE DISPL. METER W/TYPE PG-2 PULSER

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INSTRUMENT SCHEMATIC DIAGRAM
LOOP NO. [redacted] & FQA-27
FUNCTION STILL POT FLOW TOTALIZATION & ALARM

C.E.A. NO.	REFERENCE NO.
1800	I-11A

PCB-ARCH-EXT0374040

INSTRUMENT FUNCTION OUTLINE DEPARTMENT 246

TITLE #4 Still Pot Flow Totalization & Alarm LOOP NUMBER 027

SHEET 4 OF 4 CLASSIFICATION FQA-27

WRITTEN BY _____ DATE _____ REV. BY _____ DATE _____ REV. NO. _____

3.0 OPERATION OF LOOP

3.1 NORMAL OPERATION

The flow integrator is used to measure input to still from intermediate storage tank and sound an alarm when a pre-set amount is reached.

3.1.1 Start Up Instructions

Check electrical supply to loop and manually test alarm system. Energize feed totalizer.

3.1.2 Shut Down Instructions

None

3.1.3 Manual Operating Instructions

None

3.2 INTERLOCKS

None

3.3 ABNORMAL OPERATIONS

3.3.1 Air Failure

No effect on loop.

3.3.2 Power Failure

Loss of control of measurement of material to still pot.

REVIEW

R Fl[illegible] 6/16/69

GW 6/25

R M McCatchen 11/20/69

PS [illegible] 9/20/69

INSTRUMENT FUNCTION OUTLINE

DEPARTMENT 246

TITLE Therminol To #4 Heat Exch. Flow Control

LOOP NUMBER 026

SHEET 1 OF 4

CLASSIFICATION FIC-26

WRITTEN BY Brawley DATE 4/28/69 REV. BY _____ DATE _____ REV. NO. _____

1.0 NEED FOR LOOP

This loop is needed to heat process stream to a temperature such that the correct boiling process occurs in the constant pressure still pot.

1.1 DESCRIPTION OF LOOP

1.1.1 Function

The function of this loop is to control the flow of the hot therminol.

1.1.2 System Performance Required

The flow rate should be maintained $\pm$ 5 GPM of set point.

1.1.3 Accomplishment of Function

The rate of flow of therminol is determined by an orifice plate and flow transmitter. The transmitter sends a 3-15 psig air signal to a flow indicating controller which compares this signal to a set point and sends a corresponding 3-15 psig air signal to a control valve to compensate for variation from set point.

PCB-ARCH-EXT0374042