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10 MWe Solar Thermal  
Central Receiver Pilot Plant

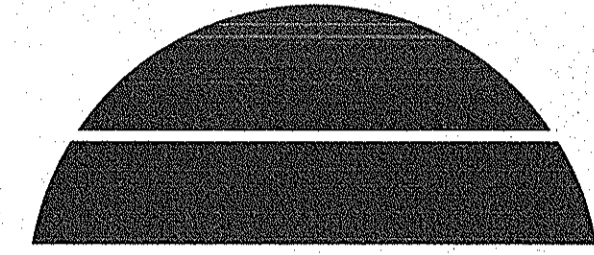
SOLAR FACILITIES DESIGN INTEGRATION

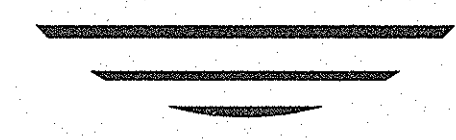
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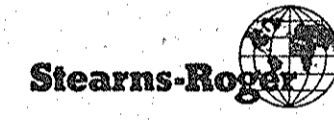
INTERLOCK LOGIC SYSTEM (ILS) DIAGRAMS  
(RADL ITEM 2-38, SUPPLEMENT)

July 1982

WORK PERFORMED UNDER CONTRACT  
DE-AC03-79SF10499  
MCDONNELL DOUGLAS ASTRONAUTICS COMPANY  
5301 BOLSA AVENUE  
HUNTINGTON BEACH, CA 92647



  
U.S. Department of Energy



Solar Energy

**Part I — Solar Portion of Plant  
Digital Interlock Logic  
System (ILS) Diagrams  
(By SRDI)**

**10 MWe Solar Thermal  
Central Receiver Pilot Plant  
Solar Facilities Design Integration**

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**INTERLOCK LOGIC SYSTEM (ILS) DIAGRAMS  
(RADL ITEM 2-38, SUPPLEMENT)**

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July 1981

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**MCDONNELL DOUGLAS ASTRONAUTICS COMPANY  
5301 BOLSA AVENUE  
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**PREPARED FOR THE  
U.S. DEPARTMENT OF ENERGY  
SOLAR ENERGY  
UNDER CONTRACT DE-AC03-79SF10499**

## PREFACE

This document is provided by the McDonnell Douglas Astronautics Company (MDAC) in accordance with Department of Energy contract DE-AC03-79SF10499. It is submitted as a supplement to Reports and Deliveries List (RADL) Item 2-38.

The material presented here is intended to be used in conjunction with the Solar One integrated (operational) piping and instrumentation diagrams (P&IDs) to assist the plant operators in understanding the plant interlock controls as depicted on the P&IDs (shown by the ILS symbol).

The document is presented in two parts as follows:

Part I - Solar Portion of Plant Digital Interlock Logic System (ILS) Diagrams - by SFDI

Part II - EPGS Control Logic Diagrams - by SCE\*

Technical questions concerning this RADL item should be directed to Mr. R. J. Perkins at (714) 896-3073.

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### Part I - Solar Portion of Plant Digital Interlock Logic System (ILS) Diagrams

- Solar One Digital Logic Design Criteria (I15 Series Drawings)
- Solar One Digital Logic Diagrams (I5 Series Drawings)

### Part II - EPGS Control Loop Diagrams

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\*This section was provided by Southern California Edison and technical questions concerning this part should be directed to Mr. C. P. Winarski at (213) 572-3265.

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1. Definition of Terminology

START and STOP are terms used for the actuating commands to pumps or equipment driven by motors which are controlled by motor starters or circuit breakers. RUNNING and STOPPED are terms used for the successful results of these commands.

CLOSE and TRIP are terms used to describe the actuating commands to circuit breakers which do not directly control motors. (for example, bus, feeder, tie, start-up, auxiliary, and generator breakers). CLOSED and TRIPPED are terms used to describe the successful results of these commands.

OPEN and CLOSE are terms used for the actuating commands of motor-operated or solenoid operated valves. OPENED and CLOSED are terms used to describe the successful results of these commands.


ON and OFF are terms used when appropriate to energize or de-energize power to a circuit or in special cases, to solenoids.

MANUAL is the term used to indicate that some operator action is required via the pushbuttons. Manual control does not mean that interlocks required for normal operation will be by-passed unless specifically noted on the I15 drawing.

AUTO is the term used when a system is designed to start via the OCS. This situation applies to single loops.

LOCKOUT is the terms used to describe a mode used in conjunction with a non-selectable AUTO system where selection of the lockout mode prevents either a manual or automatic start until reset by depressing the STOP pushbutton.

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LATCH is used to describe memorization of a command which requires an independent action to reset the memory. Latching is preferably implemented within the logic system rather than in an alternate action pushbutton. Latching may be accomplished through the use of only one pushbutton with alternate action implemented in the logic system.

LATCHES that require memorization of the state throughout loss and restoration of logic power are referred to as a NON-VOLATILE LATCHES.


LOCAL refers to control implemented at or near the driven equipment.

DISAGREEMENT ALARM - This refers to an alarm composed of the command and an indication of the unsuccessful completion of the command. The primary value of such an alarm occurs when a device stops unintentionally, for example, when a protective relay actuates. An operator is alerted to initiate action to clear the alarm.

LOOP is the term used to describe the complete control and indication system provided to control a single field device.

TRIP - Trip actually has two definitions. One applies to circuit breakers, i.e., a circuit breaker may be closed or tripped. A circuit breaker trip may or may not be intentional. The other definition is for driven equipment and complete control subsystems (e.g. RS) and refers to the unintentional removal of the equipment or subsystem from service due to actuation of a safety interlock from abnormal process conditions.

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LADDER NETWORK DRAWING - The drawing which defines the logic, inputs, and outputs for programming the ILS system.

CONTROL LOGIC DIAGRAM (I5) - This drawing which defines the complete process logic; that is contained within and outside of the Interface Logic System.

CONTROL DESIGN CRITERIA (I15) - This is an English language description of the logic drawing and contains the intent of control, sequence of operation, and timer and process input variable settings. This description is used in conjunction with the logic drawing to aid in checking the operation of the logic prior to procurement of the system and during system startup and operation.


INTERFACE LOGIC SYSTEM (ILS) is a system which provides control logic interlocks that interfaces between control switches, process instrumentation, circuit breakers, and motor starters.

## 2. Operator Interface - Pushbuttons and Indication Lights

- A. Pushbuttons are provided with a momentary action unless otherwise noted. Rather than require an operator to maintain the switch depressed, the logic provides latching to maintain the command until it is completed or reset. Where jogging is required, the latch is not provided.
- B. Pushbuttons are backlighted with the light switches on as a result of the successful completion of the command unless otherwise noted. The engraving on the pushbutton lens describes the command rather than the action which switches the light on. (For example; CLOSE rather than CLOSED).

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C. The backlighted pushbutton colors are:

GREEN - stopped, circuit breaker tripped, off, or valve closed  
RED - running, circuit breaker closed, on, or valve open

## 3. General System Considerations


- A. Disagreement alarms require an operator reset for circuit breakers and motor starters. This prevents an alarm from disappearing without the operator's knowledge. Depressing the STOP pushbutton resets this alarm.
- B. Some circuits in which status indication is input to the IPAC unit, and not the ILS, may show a disagreement between the commanded and actual status. The operator must keystroke in the actual status before he can keystroke to the desired status. For example if a valve is commanded shut via SDPC keystroke and the ZI indicator says OPEN but the HS indication says CLOSED repeated CLOSE keystrokes will not affect valve status. An OPEN SDPC command must be sent and displayed on the HS before an SDPC CLOSE command can be sent. On motors and 4.16 KV breakers logic has been added to effect logic alignment and thereby agreement of status and command lites on the CRT display.
- C. Generally where an input is required for two (2) or more loops, only one input contact is provided. This contact is paralleled in the PLC logic. Off page connectors on the logic drawing indicate the requirement for input contact multiplication.
- D. Input contacts are maintained closed on stated condition unless otherwise noted. The direction (raise or lower) of the process variable is also indicated on the logic drawing.



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- E. On both the logic and ladder drawings, positive logic is used, that is logic level "1" outputs equate to the stated conditions unless otherwise noted. On the ladder drawings only, all ILS system inputs and outputs are uniquely identified to the ILS terminal identifications.
- F. All alarm inputs to the SDPC are such that the contact is open in the alarm condition wherever possible.
- G. All status outputs to the ILS are such that the contact closes on stated condition wherever possible.
- H. Motor overload trip protection is not wired to the ILS.
- I. Alarms that are not developed in the ILS are not multiplied in the ILS.
- J. Inputs from process variables may be buffered by use of timers in the ILS when necessary to prevent undesirable cycling of motors or valves. However, when possible this buffering action is accomplished by suitable selection of a deadband in the field device. (Pressure, temperature, level or flow switch).

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- K. As a general rule, pressure and temperature switches are supplied with single contact inputs into ILS. This is desirable since more than one switch in the same enclosure increases the operable deadband range. Deadband range is critical in most applications so that the switch may be reset within the process operating range.
- L. On latches (memories) shown on both the logic and ladder drawings, the reset overrides the set of the memory.
- M. Each loop is designed with a minimum of logic components and devices to increase the operation reliability and to reduce the maintenance on the loop.
- N. LOOP INTEGRITY refers to disabling of control components or power supplies from one loop without impairing the operation of another loop.
- O. SYSTEM SET POINTS - are provided as an aid in system startup and initial instrument calibration. They are based upon equipment manufacturers' recommendations and operational experience gained on similar equipment at other plants. They may or may not be correct for new equipment under new operating circumstances and are intended only as a guide. Correct system set points must be determined during equipment checkout, startup and initial operation.

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P. LOGIC ALIGNMENT - Upon restoration of logic power after a failure, the memory/reset components are set to a pre-determined state. For alarm memories, the memory is set if the associated motor is running and reset if the motor is stopped at the time of the power restoration. For auto memories the memory is reset which requires an operator to re-establish the auto mode if desired. Other memories are set or reset dependant upon their application in the circuit.

Q. Certain instrument inputs considered critical to operation of a given process system, use redundant transmitters into the ILS with an automatic hi or lo select function, as required, being performed by the ILS. This helps to minimize the potential for system failures.

#### 4. Circuit Breakers

A. Auto start commands are inputs from the OCS. Both a and b contacts are wired from the movable part of the switchgear. Both red and green lights are extinguished when the switchgear is racked out.


C. Generator breaker auto-synchronizing circuits are not implemented in ILS due to the critical nature of timing the breaker closure.

D. "Not tripped" is a breaker close permit. This prevents an undesirable attempt to close the breaker before a tripped condition is cleared.

E. The following protective relay trips are incorporated in circuit breakers (unless otherwise noted):

- 1) 480 volt load centers
  - a) Solid state trip device with long time delay and instantaneous elements.

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- 2) 4.16 KV breakers
  - a) Three (3) single phase overcurrent relays with long time delay and instantaneous elements.

5. Motor Starters (Note: All references to standby and auto operation also apply to 460 VAC circuit breakers).

A. Auto start commands are inputs from the OCS.

B. Some loops require that the motor automatically re-start when motor control power is restored after a power loss. Only these loops require non-volatile memory latching of the start comand within the ILS. For all other 460 VAC motors the start command is sealed in at the motor starter. The stop output is a N.C. contact which opens the external seal-in upon a stop command, however, remains closed on an ILS logic power failure.

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
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- C. Motor starter protective relay devices include thermal-magnetic trip device and overload heaters.
- D. The "a" contact is provided to the ILS for a running indication. The stopped indication is obtained from the "b".
- E. A pump protection start permissive input and auto trip input may be derived from two (2) separate field contacts. Generally, and more economically, the protection consists of one level switch input with an appropriate deadband set in the switch so that the "not" of the start permissive is the auto trip.
- F. Not tripped is a motor start permit. This prevents an undesirable attempt to start a motor before a tripped condition is cleared.

6. Motor-Operated Valves

- A. Both the open and closed lights remain on during valve travel. The closed light is extinguished when the valve reaches the fully opened position and vice versa. When one opened and one closed light are used to indicate the positions of more than one valve, then all valves must reach the fully opened position before the closed light is extinguished and vice versa. This is accomplished by using the intermediate switch positions and opening the limit switch only at the valve full limit position.


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- B. The logic which is typically implemented for all MOV's is shown on I5-17. This is shown on the E6 drawing and includes the following additional features:

- 1) The closing torque switch is momentarily bypassed (until the valve leaves the fully opened position) to overcome the static torque requirement of the valve. The valve will stop driving in the closing direction if the closing torque switch opens after the valve has left the fully opened position. This provides overload protection for the motor.
- 2) Simultaneous open and close command signals are prevented.
- 3) Either the open torque or open limit switch stops the valve driving in the open direction.
- 4) The local circuit is not sealed in if throttling capability is desired.
- 5) Momentary OPEN/CLOSE signals are provided from the ILS with each circuit sealed-in externally. This prevents cycling the valve past its limit when the torque switch relaxes.

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7. Solenoid Valves

- A. Single coil solenoid valve energized signals are maintained in the ILS.
- B. Careful consideration is given to all fail-safe modes of solenoid valves since many are associated with systems such as turbine water induction prevention. The electrical considerations include input state, logic component failure state, logic power failure, and output driver failed state.
- C. Position indications of solenoid controlled, pneumatically driven valves are treated similarly to motor-operated valves. Both lights are on during travel. Since intermediate position switches are usually not specified the fully opened limit is inverted in the ILS to extinguish the closed light and vice versa.

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APPROVED JAK	DATE 7/8/81	CUSTOMER MDAC	ISSUED 4-15-80 REVISED 7-3-81

1. References

- A. Boiler Feedwater Flow Diagram 40P8005163151.
- B. Logic Sheet I5-5, -5a, -5b.

2. Equipment Description and Use

The Receiver Feedwater Pump (P917) provides feedwater to the receiver. It takes water on its suction side from the third point heater (DA-901) which is the deaerator. The equipment consists of the following items:

- A. Motor Driven Receiver Feed Pump (RFP).
- B. Motor Operated Discharge Valve (MOV-33).
- C. Air operated recirculation valve (FV-37). Air to close, fail safe open pneumatically.
- D. Shaft Driven Lube Oil Pump for Receiver Feed Pump Bearings.
- E. Motor Driven Aux. Oil Pump for Receiver Feed Pump Bearings.
- F. Hydraulic Coupling speed control system.

3. Operator Interface

Operation of this pump can be accomplished via:

- A. Hardwired START/STOP commands located on the main control console.
- B. START/STOP commands from the RS SDPC console.
- C. Automatic START/STOP commands from OCS equipment.
- D. Running/Stopped and Auto/Manual indication is via the RS SDPC console with a green flag for stopped and red flag for running. Status is also provided at the main control board from the backlighted START/STOP pushbuttons.
- E. Auto/Manual operation of this pump is selectable by the operator via the hardwired console pushbuttons.
- F. Open/Closed indication of MOV-33 is via the RS SDPC Console.
- G. Alarms are displayed on the RS SDPC console.

4. Operation

Operation of this pump can be manual start and stop using the hardwired pushbutton stations or, automatic using the RS SDPC console.

When the OCS equipment is in service and automatic is selected this pump may be started or stopped automatically, via the OCS, with no operator interface.

Any stop condition to a pump will put the pump into the manual mode if it was previously in the automatic mode.

To provide a minimum load during starting on the motor, coupling, and pump the discharge valve (MOV 33) must be closed and the hydraulic coupling at minimum speed. Following any stop MOV 33 will be shut automatically; however, the operator must run the coupling to minimum via the SDPC.

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The Receiver Feedwater Pump is provided with a forced circulation bearing lube oil system. A motor-driven auxiliary oil pump is provided for start-up and as a back-up to the shaft driven oil pump. When P917 START command is sent the auxiliary oil pump only is started. When the system oil pressure is 7 psig for 5 seconds as measured at PS-1105-1 then a start command will be sent to P917. This run sequence is indicated by flashing the red, running, lite on P917 while the green, stop, lite remains lit. Following a successful start of P917 only the red, running, lite will be lit.

When the shaft driven oil pump develops 15 psig the auxiliary oil pump will stop. It will start again if system oil pressure drops to 5 psig as measured at PS-1105-2 if P917 is still running.

If oil system pressure drops to 3 psi as measured by PS-1105-1 P917 will be tripped to prevent damage to the pump.

A START/STOP pushbutton (HS 1106) is provided locally to test or run the motor driven auxiliary oil pump.

An ILS output failure will start the auxiliary oil pump and it will run until the ILS is restored or power is shut off to the oil pump at its source.

#### RUN SEQUENCE PERMISSIVES

- A. Discharge Valve MOV 33 fully Closed.
- B. Dedicated STOP button (HS 44B) operated once.
- C. Hydraulic Coupling at minimum speed.

#### PUMP START PERMISSIVES

- A. P917 Start command is sent via:
  1. Dedicated HS 44B (START) if MANUAL operation (HS44C) is selected.
  - OR
  2. SDPC start keystroke if AUTO operation (HS44C) is selected.
- B. Run sequence permissives are true.
- C. Oil pressure is at least 7 psig for 5 seconds (PS-1105-1).

#### STOP CONDITIONS

- A. P917 Stop command is sent via:
  1. Dedicated HS44B (STOP) if either MANUAL or AUTO operation (HS44C) is selected.
  - OR
  2. SDPC stop keystroke if AUTO operation (HS44C) is selected.
- B. Motor timed Overcurrent (51)
- C. Motor Ground Fault (51N)
- D. Low NPSH for 5 seconds (PDIT 86)
- E. Lube oil pressure less than 3 psig.

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8 SHEET NO. I15-5
TITLE RECEIVER FEED WATER PUMP (P917) AND DISCH/ RECIRC. VALVES DESIGN CRITERIA		PAGE <u>3</u> OF <u>3</u> REV. <u>1</u>
CUSTOMER MDAC		ISSUED 4-15-80 REVISED 7-3-81

#### DISCHARGE VALVE (MOV-33)

The discharge valve (MOV-33) for this pump must be closed on a pump start. The valve is interlocked to close on a pump stop or trip if the operator has not previously shut it. The valve will stroke full open or full closed on a given command. It cannot be stopped by the operator at mid travel.

#### Open Permits

1. Operator open command AND
2. Valve full closed.

#### Close Conditions

1. RFP stopped OR
2. Operator close command AND
3. Valve full open.

#### Stop Conditions

1. Motor overload
2. Open/Close overtorque condition

Open/Close Status indication is via the RS SDPC.

#### RECIRCULATION VALVE (FV-37)

The recirculation Valve is fully automatic and is opened as required to provide minimum flow thru the pump.

#### 5. Alarms

- A. Low lube oil pressure will alarm RFP LUBE OIL PRESSURE LO
- B. RFP TRIPPED will alarm if the pump breaker trips due to items B thru F under Stop Conditions listed above.
- C. A trip caused by low NPSH will alarm RFP LO NPSH TRIP.

I-15-4

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DOE NO.	DWG NO. 11165/8 SHEET NO. 115-6 4017002133021
BY DATE RFB 4-15-80				PAGE 1 OF 1 REV.	
DRAWN	RFB	TITLE FV-1006 CONTROL (ATOMIZING STEAM TO DS-901 FOR STEAM DUMP SERVICE)		ISSUED 4-15-80 REVISED 7-3-81	
CHECK	RPF	CUSTOMER MDAC			
APPROVED	RFB				
PROCESS	JAK				
ELECT	JWH				
APPROVED					

1. References

- A. P & ID Drawing 40P8005163149.
- B. Logic Sheet I5-6

2. Equipment Description and Use

Due to the low supply pressure of condensate to the steam dump desuperheater, DS-901, a separate source of atomizing steam must be supplied to the desuperheater for it to work. FV-1006 provides this atomizing steam to DS-901 when the steam dump subsystem, through PV-1001 is in service.

The equipment consists of one 2 inch globe valve with a solenoid operated diaphragm actuator assembly and open/close position switches.

3. Operator Interface

- A. The Operator has no control interface to this valve.
- B. Open/Closed position indication is displayed via RS SDPC console.
- C. There are no alarms associated with this valve.

4. Operation

FV-1006 is a fast acting valve (full stroke time is .8 seconds) which is interlocked to a limit switch on PV-1001. FV-1006 will be commanded open automatically any time PV-1001 is not full closed. Conversely when PV-1001 is full closed FV-1006 will be closed.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DOE NO.	DWG NO. 11165/8 SHEET NO. 115-7 4017002233022
BY DATE RFB 4-15-80				PAGE 1 OF 1 REV.	
DRAWN	RFB	TITLE FV-1007 CONTROL (ATOMIZING STEAM TO DS-901 FOR RS FLASH TANK SERVICE)		ISSUED 4-15-80 REVISED 7-3-81	
CHECK	RPF	CUSTOMER MDAC			
APPROVED	RFB				
PROCESS	JAK				
ELECT	JWH				
APPROVED					

1. References

- A. P & ID Drawing 40P8005163149.
- B. Logic Sheet I5-7

2. Equipment Description and Use

Due to the low supply pressure of condensate to the desuperheater (DS-901) a separate source of atomizing steam must be supplied to the desuperheater for it to work. FV-1007 provides this atomizing steam to DS-901 when the RS Flash Tank is in service thru PV-1000, the RS Flash Tank steam dump valve, and DS-901. The valve is also used as a bleed to maintain the RS Flash tank at operating temperature.

The equipment consists of one 1 1/2 inch globe valve with a solenoid operated diaphragm actuator assembly and open/close position limit switches.

3. Operator Interface

- A. The Operator control is via the RS SDPC console.
- B. Open/Closed position indication is displayed via RS SDPC console.
- C. There are no alarms associated with this valve.

4. Operation

This valve has two functions:

- A. Provides atomizing steam to DS-901 when PV-1000 is in service.
- B. Allows RS Flash Tank bleed steam to vent to the condenser during normal RS operation.

Open Conditions

- A. PV-1000 is not closed AND UV-2905 is not full open  
OR
- B. PV-1000 is closed AND UV-2905 is full open  
OR
- C. PV-1000 is not closed AND UV-2905 is full open.

Close Conditions

- A. PV-1000 is closed AND
- B. UV-2905 not full open AND
- C. Operator close command via HS-1007

In operation FV-1007 opens if either or both PV-1000 is not closed and UV-2905 is full open. It cannot be shut until PV-1000 is closed and UV-2905 is not full open. It then requires an operator command to shut the valve.

I-15-3

I-15-3

ORDER NO. 21700			<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8
					SHEET NO. I15-8
			DOE NO. 40I7002133023		
	BY	DATE			
DRAWN	REB	4-15-80			
CHECK	RPF	7/7/81			
APPROVED	[Signature]	7/7/81	TITLE SOV-1000 CONTROL (PV-1000 Close Interlocks)		
PROCESS	JAK	7/8/81	PAGE 1 OF 1 REV.		
ELECT	[Signature]	7/8/81	ISSUED 4-15-80		
APPROVED			REVISIED 7-3-81		
			CUSTOMER	MDAC	

1. References

- A. P&ID drawing 40P8005163149.
- B. Logic sheet I5-8

2. Equipment Description and Use

PV-1000 is the RS Flash Tank steam dump control valve and is used to control flash tank pressure when the RS flash tank is in service. Under normal operation PV-1000 is controlled with an analog signal. Under abnormal conditions, listed under Operation, SOV-1000 overrides this analog signal by interrupting the air supply to PV-1000 which will cause PV-1000 to fail closed.

The equipment under ILS control is one 3-way solenoid valve SOV-1000.

3. Operator Interface

Normal operation of PV-1000 is thru the RS SDPC analog control system under automatic or operator manual control, unless control has been blocked by SOV-1000. The operator does not have control of SOV-1000. The position of PV-1000 only is indicated on the RS SDPC Console.

4. Operation

When SOV-1000 is deenergized PV-1000 will fail to its closed position.

Three conditions will deenergize SOV-1000.

- a. RS Flash Tank outlet control valve, PV-2906, is closed.
- b. Condenser backpressure greater than 10" Hg.
- c. Outlet temperature from DS-901 greater than 375°F. This is to protect the system from hi temperature due to loss of attemperating water to the desuperheater.

ORDER NO. 21700			<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8
					SHEET NO. I15-10
			DOE NO. 40I7002133025		
	BY	DATE			
DRAWN	REB	4-15-80			
CHECK	RPF	7/7/81			
APPROVED	[Signature]	7/7/81	TITLE AOV-1009 CONTROL (ADMISSION STEAM LINE BLANKETING SUPPLY VALVE)		
PROCESS	JAK	7/8/81	PAGE 1 OF 1 REV.		
ELECT	[Signature]	7/8/81	ISSUED 4-15-80		
APPROVED			REVISIED 7-3-81		
			CUSTOMER	MDAC	

1. References

- A. P & ID Drawing 40P8005163149.
- B. Logic Sheet I5-10.

2. Equipment Description and Use

This valve is used to provide blanketing steam to the turbine admission supply line, 6"-ST-5-FBA. Blanketing steam is used to keep the admission steam line in hot standby.

The equipment under ILS Control consists of one 1 1/2" globe valve complete with 3-way solenoid operated pneumatic valve actuator and open/close position limit switches.

3. Operator Interface

- A. The Operator has no control interface to this valve.
- B. Open/Closed position indication is displayed via EPGS SDPC console.
- C. There are no alarms associated with this valve.

4. Operation

When admission steam pressure to the turbine exceeds 90 psig SOV-1009 will be deenergized to close AOV-1009.

I-15-3

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
BY <u>RFB</u> DATE <u>4-15-80</u>			SHEET NO. I15-11
DOE NO. 40I7002133026		TITLE AOV-1008 CONTROL (ADMISSION STEAM TO AUX. STEAM SUPPLY VALVE)	PAGE <u>1</u> OF <u>1</u>
DRAWN <u>RFB</u> 7/7/81			REV. <u>1</u>
CHECK <u>RPF</u> 7/7/81		CUSTOMER MDAC	ISSUED 4-15-80
APPROVED <u>RFB</u> 7/7/81			REVISED 7-3-81
PROCESS <u>JAK</u> 7/19/81			
ELECT <u>QuH</u> 7/22/81			
APPROVED			

1. References

- A. P & ID Drawing 40P8005163149.
- B. Logic Sheet I5-11.

2. Equipment Description and Use

This valve allows use of the admission steam line 6"-ST-5-FBA to supply steam to the plant aux. steam system and to provide blanketing steam to the turbine main steam supply line 6"-MS-2-QEB.

The equipment under ILS control consists of one 4" globe valve complete with 3-way solenoid operated pneumatic valve actuator and open/close position limit switches.

3. Operator Interface

- A. Auto/Manual select is via the EPGS SDPC console.
- B. Open/Close indication is via EPGS SDPC console.
- C. No alarms are associated with these valves.

4. Operation

There are two modes of operation, Auto/Manual, for this valve. Operator select is via the EPGS SDPC console.

Automatic Operation

Open Condition: A. UV-2905 not full open

OR

B. Receiver steam temp < 660°F.

Close Conditions: A. UV-2905 is full open

AND

B. Receiver steam temp > 660°F

Manual Operation

Open Condition: A. Operator OPEN command

AND

B. UV-2905 is not full open

OR

C. Receiver steam temp < 660°F

Closed Conditions: A. Operator close command

OR

B. UV-2905 is full open

AND

C. Receiver steam temp > 660°F

The operator can select automatic or manual operation at any time; however, the valve is interlocked to always shut when UV-2905 is full open AND receiver steam temperature is greater than 660°F.

I-15-3

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 1165/8
BY <u>RFB</u> DATE <u>4-15-80</u>			SHEET NO. I15-15
DOE NO. 40I7002133027		TITLE STEAM LINE DRAIN POT VALVES (Single Level Switch)	PAGE <u>1</u> OF <u>2</u>
DRAWN <u>RFB</u> 7/7/81			REV. <u>1</u>
CHECK <u>RPF</u> 7/7/81		CUSTOMER MDAC	ISSUED 4-15-80
APPROVED <u>RFB</u> 7/7/81			REVISED 7-3-81
PROCESS <u>JAK</u> 7/19/81			
ELECT <u>QuH</u> 7/22/81			
APPROVED			

1. References

- A. P&ID drawing 40P8005163149.
- B. Logic sheet I5-15 & 15a.

2. Equipment Description and Use

The steam line drain pots with a single level sensing switch are used on various steam lines where condensation during startup or, due to deadend service, during normal unit operation can be expected. These drain pots prevent condensate from standing in the steam lines and allow the condensate to be returned to the condenser. Single switch assemblies are used only on steam lines not supplying steam to the turbine.

A drain pot assembly consists of:

- A. Steam Line Drain Pot
- B. Level sensing chamber and associated level switch.
- C. Air operated drain valve with solenoid actuator and position switches.
- D. This criteria is applicable to drain valve assemblies LV-1010, LV-1011, LV-1012, LV-1013, LV-1015, and LV-3116.

3. Operator Interface

- A. Control of these drain pots is normally automatic to open the drain valve on high level and close on low level.
- B. Manual control of the drain pots is available at the operator console via the appropriate SDPC (See chart below) console.
- C. Open/Close/Alarm indication is displayed on an SDPC (See chart below) console.

4. Operation

Normal control of these drain pot level valves is automatic. A high condensate level in a drain pot will simultaneously open the associated drain pot level control valve and alarm the operator via CRT that the valve is open.

The operator can open a level valve at any time. He can close it at any time provided that the automatic circuit is not commanding the valve open. Operator control is via an SDPC (see chart Below) Console.

Open/Close status of a given level valve is via an SDPC (see chart below) Console.

These drain valves fail safe open electrically and pneumatically.



ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED	DWG NO. 1165/8 SHEET NO. I15-15 DOE NO. 4017002133027
TITLE STEAM LINE DRAIN POT VALVES (Single Level Switch)		PAGE 2 OF 2 REV.
CUSTOMER MDAC		ISSUED 4-15-80 REVISED 7-3-81

5. Alarms  
When a level valve is open an SDPC Console will alarm LEVEL VALVE "A" OPEN.

LV	Control Console
1010	RS
1011	RS
1012	RS
1013	TSS
1015	RS
3116	TSS

I-15-4

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8 SHEET NO. I5-16 DOE NO. 4017002133028
DRAWN RCS	BY RCS	DATE 4-15-80	TITLE STEAM LINE DRAIN POT VALVE -LV-1016 (Dual Level Switches)	PAGE 1 OF 1 REV.
CHECK RPF	DATE 7/7/81			
APPROVED MAG	DATE 7/2/81		CUSTOMER MDAC	ISSUED 4-15-80 REVISED 7-3-81
PROCESS JAK	DATE 7/8/81			
ELECT DWH	DATE 7/8/81			
APPROVED				

1. References  
A. P&ID drawing 40P8005163149  
B. Logic sheet I5-16 & 16a.

2. Equipment Description and Use  
The steam line drain pots with dual level sensing switches are used on turbine steam supply lines where condensation during startup or, due to deadend service, during normal unit operation can be expected. These drain pots prevent condensate from standing in the steam lines and allow the condensate to be returned to the condenser. Redundant level sensing switches are provided for added protection against a single switch failure.

A drain pot assembly consists of:  
A. Steam Line Drain Pot  
B. Level sensing chambers and associated level switches.  
C. Air operated drain valve LV-1016 with solenoid actuator and position switches.

3. Operator Interface  
A. Control of these drain pots is normally automatic to open the drain valve on high level and close on low level.  
B. Manual control of the drain pots is available at the operator console via the RS SDPC.  
C. Open/Close/Alarm indication is displayed on the RS SDPC.

4. Operation  
Normal control of these drain pot level valves is automatic. A high condensate level in a drain pot will simultaneously open the associated drain pot level control valve and alarm the operator via CRT that the valve is open.

Redundant Level switches and level sensing chambers are provided on the drain pots for reliability against water induction into the turbine.

5. Alarms  
When a level valve is open the RS SDPC console will alarm LEVEL VALVE "A" OPEN.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DOE NO. 4017002133029	
BY <i>REP</i> DATE <i>4-15-80</i>				DWG NO. 11165/8	
DRAWN	<i>REP</i>	TITLE MOV CONTROL MOV-1030, MOV-1031, MOV-1132		SHEET NO. I15-17	
CHECK	<i>REP</i>	CUSTOMER MDAC		PAGE 1 OF 2	
APPROVED	<i>REP</i>			REV.	
PROCESS	<i>REP</i>			ISSUED 4-15-80	
ELECT	<i>REP</i>			REVISED 7-3-81	
APPROVED					

- References
  - P & ID Drawing 40P8005163149 & 40P8005163151.
  - Logic Sheet I5-17
- Equipment Description and Use
 

These motor operated valves are used for system block valves as required by the operator.

MOV-1030 isolates receiver steam from the thermal storage charging subsystem.

MOV-1031 isolates receiver steam from the main steam supply to the turbine.

MOV-1132 isolates thermal storage feedwater from the Thermal Storage Subsystem.

Each valve assembly is complete with valve, motor actuator and position indicating switch assemblies.
- Operator Interface
  - Control of these valves is via an SPDC (see Chart below) console.
  - Open/Closed indication of this valve is via an SPDC (see Chart below) console.
  - There are no alarms associated with these valves.
- Operation
 

These valves go completely closed or open following an operator command. Direction of travel cannot be changed until the open or closed limit is made.

Open Permissives

- Operator Open command  
AND
- Close starter deenergized  
AND
- Open torque switch not operated  
AND
- Motor overload reset  
AND
- Valve not open.

I-15-3

I-15-4

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DOE NO. 4017002133029	
BY <i>REP</i> DATE <i>4-15-80</i>				DWG NO. 11165/8	
TITLE MOV CONTROL MOV-1030, MOV-1031, MOV-1132		SHEET NO. I15-17		PAGE 2 OF 2	
CUSTOMER MDAC				REV.	
				ISSUED 4-15-80	
				REVISED 7-3-81	

Close Permissives

- Operator Close Command  
AND
- Open starter deenergized  
AND
- Close torque switch not operated  
AND
- Motor overload reset.

Open Stop Conditions

- Valve full open
- Open torque switch operated.
- Motor overload operated.

Close Stop Conditions

- Close torque switch operated
- Motor overload operated.

VALVE	CONTROL CONSOLE
1030	TSS
1031	RS
1132	TSS

ORDER NO. 21700			<b>Stearns-Roger</b> INCORPORATED			DWG NO. 11165/8		
						SHEET NO. I15-60		
			DOE NO. 40I7002133078			PAGE 1 OF 4		
DRAWN BY DATE			TITLE SOLAR ONE OVERALL PLANT TRIP Logic Design Criteria			REV.		
CHECK AEB 1-2-80								
APPROVED GAT 8-18-81			CUSTOMER MDAC			ISSUED REVISED 8-18-81		
PROCESS JAK 8-18-81								
ELECT OAK 8-18-81								
APPROVED [signature] 9-10-81								

PART A GENERAL DESCRIPTION

The power train portion of the Solar One Power Plant consists of six major subsystems. The subsystems are:

1. Collector Subsystem (CS)
2. Receiver Subsystem (RSS)
3. Turbine Generator Subsystem (TGS)
4. Thermal Storage Charging Subsystem (TSSc)
5. Thermal Storage Extraction Subsystem (TSSe)
6. Steam Dump Subsystem (SDS)

These subsystems can be operated in nine different combinations or modes. (See Plant Operating Manual for mode descriptions).

Each of these subsystems has been designed to protect itself against a process disturbance or internal malfunction. In the event the subsystem controls cannot correct the problem, the subsystem will remove itself from service by tripping. Tripping is defined here as the unintentional removal of a subsystem from service due to actuation of a safety interlock from abnormal process conditions.

Overall plant trip logic for Solar One requires the six subsystems to be interlocked to allow sequential and orderly shutdown for part or all of the remaining subsystems following a trip condition to any given subsystem.

When a subsystem trips it will output the condition via a closed contact. These trip outputs along with "Subsystem Reset" conditions and "Subsystem ready for service" contacts are combined in the plant trip relay panel. This unit will output trip signals (via dry closed contact) to other subsystems to effect the desired sequential shutdown of the remaining subsystems as required. The exact trip sequences are detailed in Part C.

PART B - SUBSYSTEM TRIP CONDITIONS

1. GENERAL

Process trip conditions to given subsystems have been defined by each subsystem supplier and are detailed in documents as noted below under 2.

In addition to the process trips the plant operator can initiate subsystem trips from the main control console. Operator tripping is via hardwired, dedicated pushbutton located on the main control board as shown below.

I-15-3

ORDER NO. 21700			<b>Stearns-Roger</b> INCORPORATED			DWG NO. 11165/8		
						SHEET NO. I15-60		
			DOE NO. 40I7002133078			PAGE 2 OF 4		
			TITLE SOLAR ONE OVERALL PLANT TRIP Logic Design Criteria			REV.		
CHECK								
APPROVED			CUSTOMER MDAC			ISSUED REVISED		
PROCESS								
ELECT								
APPROVED								

Pushbutton No.

Function

- |           |  |
|-----------|--|
| H.S.-6000 | Trips all Subsystems Simultaneously                |
| HS-6200A  | Trips RSS via Receiver Redline Unit                |
| HS-1001A  | Trips SDS  |
| HS-6301A  | Trips TSSc via TSSc Redline Unit                   |
| HS-6302A  | Trips TSSe via TSSe Redline Unit                   |
| HS-TBD    | Defocus CS via Heliostat Area Controller           |
| HS-TBD    | High Wind Stow of CS via Heliostat Area Controller |

Following any trip into a subsystem that subsystem must be reset by operator action from the appropriate SDPC control console after first correcting the initial trip condition.

2. INDIVIDUAL SUBSYSTEM TRIP DESCRIPTIONS

A. Steam Dump Subsystem (SDS)

An SDS trip will deactivate SOV-1001 which will remove air to PV-1001. This will override any control signal to PV-1001 and PV-1001 will immediately close. Further operation of PV-1001 will be prevented until the SDS is reset.

Manual reset from the RS SDPC console is required by the operator following a trip to the SDS. All trips must be cleared before the SDS will reset. The following conditions will trip the SDS:


1. Operator command via HS-6000
2. Operator command via HS-1001A
3. Both Circulating Water Pumps (P905 & P906) stopped.
4. Condensate Pump (P907) stop.
5. Hi temperature (greater than 370°F) out of DS-901 for greater than 7 seconds  
AND  
PV-1001 not closed.
6. Condenser backpressure greater than 10 inches Hg.

Items 3, 4, 5, and 6 above are to prevent turbine or condenser damage due to high temperature or pressure from the causes listed.

B. Collector Subsystem (CS)

Supplied by Martin Marietta Corporation. See Heliostat Area Controller (HAC) description. (Location TBD).

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> <small>INCORPORATED</small>	DWG NO. 11165/8 SHEET NO. I15-60 DOE NO. 40I7002133078
TITLE SOLAR ONE OVERALL PLANT TRIP Logic Design Criteria		PAGE <u>3</u> OF <u>4</u> REV. 
CUSTOMER MDAC		ISSUED REVISED

C. Receiver Subsystem (RSS)

Supplied by Rocketdyne Corporation. See Receiver Subsystem Redline Unit (RSS RLU) description. (Location TBD).

D. Thermal Storage Charging Subsystem (TSSc) supplied by Rocketdyne Corporation. See Thermal Storage Redline Unit (TSS RLU) description. (Location TBD).

E. Thermal Storage Extraction Subsystem (TSSe) supplied by Rocketdyne Corporation. See Thermal Storage Redline Unit (TSS RLU) description. (Location TBD).

F. Turbine Generator Subsystem supplied by Southern California Edison Company. (Description and Location TBD)

PART C SUBSYSTEM TRIP SEQUENCE

A "First In" trip signal to a given subsystem as detailed in Part A will initiate the following subsystem tripping sequence.

1. An RSS trip will:

- a. Output contact closures to trip the CS
- b. Output contact closures to the trip relay panel which will:
  - 1. Close the T-G high pressure stop valves.
  - 2. Trip the TSSc RLU.
  - 3. Trip the T-G if TSSe steam is not flowing to the turbine.


2. A T-G trip will output contact closures to the trip relay panel which will:

- a. Trip the TSSe RLU if TSSe steam is flowing to the turbine.
- b. Trip the RS if the SDS is tripped and TSSc is not service or is tripped.

3. An SDS trip will output contact closures from the trip relay panel to trip the RSS if,

- a. The T-G trips AND
- b. The TSSc is tripped OR not in service.

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> <small>INCORPORATED</small>	DWG NO. 11165/8 SHEET NO. I15-60 DOE NO. 40I7002133078
TITLE SOLAR ONE OVERALL PLANT TRIP Logic Design Criteria		PAGE <u>4</u> OF <u>4</u> REV. 
CUSTOMER MDAC		ISSUED REVISED

4. A TSSc trip or not in service condition will output contact closures from the TSSc RLU to the trip relay panel which will trip the RS if,

- a. The T-G is tripped
- b. AND  
The SDS is tripped

5. A TSSe trip will output contact closures from the TSSe RLU to the trip relay panel which will:

- a. Close the turbine admission steam stop valve.
- b. Trip the T-G if the RS is not flowing steam to the turbine.

6. A CS trip will defocus the heliostats. No further subsystem trips will follow until a process upset is detected.

I-15-4

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 1165/8
			SHEET NO. I15-18
		DOE NO.	40I7002133097
BY	DATE		
DRAWN RRB	7-3-81		
CHECK RPF	7/7/81	TITLE	DEMINERALIZED WATER TRANSFER PUMP P-710
APPROVED JAK	7/7/81	PAGE	1 OF 2
PROCESS JAK	7/8/81	REV.	0
ELECT JWH	7/10/81	CUSTOMER	MDAC
APPROVED		ISSUED	7-3-81
		REVISED	

1. References

- A. PSS Water Treatment Flow Diagram 40P7005133145.
- B. Logic sheet I5-18.

2. Equipment Description and Use

The Demineralized Water Transfer Pump (P-710) is used to transfer water from the demineralized Water Storage Tank (TK-702) to the Condensate Storage Tank (TK-902). It is also used to fill the mirror wash truck via local control.

The equipment consists of a centrifugal pump assembly and motor and a control station.

3. Operator Interface

- A. A local HAND-OFF-AUTO station (HS-1202B) is used to select the required control mode
- B. P-710 can be run locally via HS-1202B or remotely via HS-1202A from the EPGS SDPC console.
- C. Alarms are displayed on the EPGS SDPC console.

4. Operation

The mode of operation is selected from the local control station, HS-1202B, which has three positions HAND-OFF-AUTO.

The pump control is also interlocked to LS-1203 and will not run in either HAND or AUTO if water level in TK-702 is below TBD feet.

The pump can be run locally putting HS-1202B in the HAND position.

When HS-1202B is in the AUTO position the pump will be started and stopped automatically (via LIT-160) to maintain level in TK 902 between TBD feet and TBD feet.

When HS-1202B is in the AUTO position P-710 can also be started and stopped by the Operator via HS-1202A on the EPGS SDPC.

If the Operator fails to stop P-710 after starting it from the SDPC it will automatically stop when water level in TK-902 reaches TBD feet.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 1165/8
			SHEET NO. I15-19
		DOE NO.	40I7002133099
BY	DATE		
DRAWN RRB	7-3-81		
CHECK RPF	7/7/81	TITLE	RAW WATER PUMPS P703 & P704
APPROVED JAK	7/7/81	PAGE	1 OF 2
PROCESS JAK	7/8/81	REV.	0
ELECT JWH	7/10/81	CUSTOMER	MDAC
APPROVED		ISSUED	7-3-81
		REVISED	

1. References

- A. PSS Water Treatment Flow Diagram 40P7005133150.
- B. Logic sheet I5-19 and I5-19a.

2. Equipment Description and Use

The Raw Water Pumps (P-703 and P-704) provide service water to the plant via the service water distribution system. They take suction from Raw/Service Water Tank TK-701.

The equipment consists of two centrifugal pumps and the associated recirculation system.

3. Operator Interface

- A. A local HAND-OFF-AUTO station (HS-1703A for P-703 and HS-1703B for P-704) is used to select the required control mode.
- B. The Operator has no control of these pumps from the plant control room.
- C. Alarms for these pumps are displayed on the EPGS SDPC console.

4. Operation

The following description is for P-703. P-704 is identical. Normal operation is to place one pump in HAND and the second pump in AUTO.

Pump Run Permits


1. HAND operation

- A. Raw Water Tank level greater than TBD feet (LS-1703) AND
- B. HS-1703A in HAND

2. AUTO operation

- A. Raw Water Tank level greater than TBD feet (LS-1703) AND
- B. HS-1703 in AUTO AND
- C. Total flow (FT 1703A plus FT 1703B) greater than 350 gpm OR
- D. P-704 not running.

I-15-3

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED	DWG NO. 1165/8
		SHEET NO. I15-19
		DOE NO. 4017002133099
	TITLE RAW WATER PUMPS P-703 & P704	PAGE 1 OF 2 REV. 
	CUSTOMER MDAC	ISSUED 7-3-81 REVISED

Pump Stop Conditions

1. HAND Operation

- A. Raw water level less than TBD feet (LS-1703) OR HS-1703A in OFF

2. AUTO Operation

- A. Raw water level less than TBD feet (LS-1703) OR
- B. Total flow (FT 1703A plus FT 1703B) less than 160 GPM AND
- C. P-704 running.

Pump Recirculation

Any time total flow is less than 70 GPM the recirculation valve PV1703 will open to provide minimum flow protection for the pumps.


The pumps should not be run simultaneously when total system flow is less than 140 GPM. This could occur if both pumps were operated in the HAND position at the same time.

5. Alarms

If P-703 and P-704 are both running and total flow is less than 140 GPM an alarm RAW WATER RECIRC TROUBLE will lite.

This will alarm the condition noted under pump recirculation above.

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED		DOE NO. 4017002133030
	BY	DATE	DWG NO. 11165/8
DRAWN	RFB	4-15-80	SHEET NO. I15-20
CHECK	RPF	7/7/81	NO. 4017002133030
APPROVED	JAK	7/7/81	TITLE TSS FLASH TANK DRAIN PUMP P-307
PROCESS	JAK	7/7/81	PAGE 1 OF 1 REV. 
ELECT	DWH	7/7/81	CUSTOMER MDAC
APPROVED			ISSUED 4-15-80 REVISED 7-3-81

1. References

- A. P & ID Drawing 40P8005163141.
- B. Logic Sheet I5-20

2. Equipment Description and Use

This pump returns condensate from the TSS Flash Tank, V-304, to the condenser.

The equipment consists of a vertical turbine pump and motor with a Yarway LARC type valve for automatic pump recirculation control.

3. Operator Interface

- A. Control of this pump is via the TSS SDPC console.
- B. Pump Off/Running indications via the TSS SDPC console.
- C. Alarms are displayed via the TSS SDPC console.



4. Operation

The pump will start automatically at a tank hi level of TBD feet and remain running until to level at TBD feet is reached or until the operator stops the pump. Normal operation is for this pump to run whenever the TSS Flash Tank is in service.

5. Alarms

Hi Tank Level and P-307 not running will alarm P-307 trouble.

I-15-3

ORDER NO. 21700		 INCORPORATED DOE No.	DWG NO. 11165/8
			SHEET NO. I15-30
DRAWN	BY RCS	DATE 4-15-80	DOE No. 4017002133046
CHECK			
APPROVED			
PROCESS			
ELECT			
APPROVED			
TITLE THERMAL STORAGE FLUID AUX. PUMP P305 (TFAP) CONTROL			PAGE 1 OF 1 REV. 
CUSTOMER MDAC			ISSUED 4-15-80 REVISED 7-3-81

1. References

- A. P&ID Drawing 40P8005163141
- B. Logic Sheet I5-30

2. Equipment Description and Use

This pump is used to initially circulate oil through the TSS extraction systems.

The equipment consists of a pump, motor and associated controls.

3. Operator Interface

- A. Start/stop control of this pump is via the TSS SDPC.
- B. Running/Stopped indication is via the TSS SDPC with a green flag for stopped and a red flag for running.
- C. Alarms are displayed on the TSS SDPC.

4. Operation

Operation of this pump is manual start/stop only by the operator via the TSS SDPC control console.

Pump Run Permits

- A. Operator start comand via the TSS SDPC console AND
- B. Flow greater than 30 gpm 10 seconds after a pump starts AND
- C. TSS RLU reset.



Stop Condition

- A. Operator STOP command via the TSS SDPC console
- B. Flow less than 30 gpm 10 seconds after starting.
- C. Motor current overload.
- D. Low coolant flow to pump
- E. Hi pump seal leakage.
- F. TSS RLU trip.

5. Alarms

- A. Pump lo flow will alarm P305 LO FLOW
- B. Conditions C thru F above will alarm P305 TROUBLE.

I-15-3

ORDER NO. 21700		 INCORPORATED DOE No.	DWG NO. 11165/8
			SHEET NO. I15-31
DRAWN	BY RCS	DATE 4-15-80	DOE No. 4017002133047
CHECK			
APPROVED			
PROCESS			
ELECT			
APPROVED			
TITLE TSS FLUID OIL PUMP CONTROL (CHARGING AND EXTRACTION PUMPS P301, P302, P303, P304)			PAGE 1 OF 2 REV. 
CUSTOMER MDAC			ISSUED 4-15-80 REVISED 7-3-81

1. References

- A. P&ID Drawing 40P8005163141
- B. Logic Sheet I5-31 & 31a.

2. Equipment Description and Use

These pump assemblies provide oil circulation through the thermal storage charging and extraction subsystems.

- A. (HOLD FOR EQUIPMENT INFORMATION FROM ROCKETDYNE)

3. Operator Interface

Operation of these pumps can be accomplished via:

- A. Hardwired START/STOP commands located on the main control board.
- B. START/STOP commands from the TSS SDPC console.
- C. Automatic START/STOP commands from OCS equipment.
- D. Running/Stopped indication is via the TSS SDPC console with a green flag for stopped and red flag for running. Status is also provided at the main control board from the backlighted START/STOP pushbuttons.
- E. Auto/Manual operation of this pump is selectable by the operator via the hardwired console pushbutton.
- F. Alarms are displayed on the TSS SDPC console.

4. Operation

These pumps can be either manually started and stopped using the hardwired pushbutton stations or the TSS SDPC Console.

When the OCS equipment is in service, these pumps may be started or stopped automatically, via the OCS, with no operator interface after the operator has selected Automatic.

Any stop condition to a pump will put the pump into the manual mode if it was previously in the automatic mode.

Pump Run Permits

- A. TSS RLU reset.
- B. Hardwired STOP hand switch (HS) operated once AND
- C. SDPC keystroke start command (or OCS) if AUTO is selected OR
- D. Dedicated HS START command if MANUAL is selected.
- E. Discharge oil flow greater than 100 gpm 10 seconds after starting.
- F. Pump controller reset (see items E thru J under stop conditions).

I-15-3

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8 SHEET NO. 115-31
TITLE TSS FLUID OIL PUMP CONTROL (CHARGING AND EXTRACTION PUMPS P301, P302, P303, P304)		PAGE 2 OF 2 REV.
CUSTOMER MDAC		ISSUED 4-15-80 REVISED 7-3-81

Stop Condition

- A. SDPC keystroke stop command (or OCS) if AUTO is selected.
- B. Discharge oil flow less than 100 gpm 10 seconds after starting.
- C. TSS RLU trip.
- D. Dedicated HS STOP command if AUTO or MAN is selected.
- E. Motor Controller GFI trip.
- G. Motor current overload.
- G. Motor overtemp.
- H. Low coolant flow to pump.
- I. Pump Oil Temperature Hi.
- J. Inverter Temperature Hi.

Items E thru J are furnished with the pump controller and are part of the pump controller reset function which is locally located at the pump controller.

NOTE: Following a start command both running and stopped lites will be displayed. This will alert the operator that a start is in progress. After ten seconds if flow is greater than 100 gpm only running indication will be displayed. If flow is not greater than 100 gpm after 10 seconds, the pump will be stopped and only the stopped indication will be displayed.

5. Alarms

- A. Pump lo oil flow will alarm TSS DISCHARGE (EXTRACTION) PUMP LO FLOW.
- B. Condition E thru J above will alarm TSS DISCHARGE (EXTRACTION) TROUBLE.

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8 SHEET NO. 115-32 DOE No. 4017002133073
DRAWN RQB	BY RQB	DATE 4/5/80	TITLE AOV-3708 & AOV-3808 BOILER BLOWDOWN VALVES
CHECK			PAGE 1 OF 1 REV.
APPROVED			CUSTOMER MDAC
PROCESS			ISSUED 4-15-80 REVISED 7-3-81
ELECT			
APPROVED			

1. References

- A. P&ID Drawings 40P8005163146
- B. Logic Sheet I5-32

2. Equipment Description and Use

These valve assemblies control the following functions:

- AOV-3708 Boiler, E-305, blowdown valve
- AOV-3808 Boiler, E-306, blowdown valve

These are air operated valve assemblies consisting of the valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface

- A. Open/Close control of these valves is via TSS SDPC console.
- B. Open/Close indication of these valves is via the TSS SDPC console.
- C. No alarms are associated with these valves.

4. Operation

Operation of these valves is manual open/shut only by the operator via the appropriate SDPC console.

A TSS RLU trip will automatically shut these valves. Manual opening from the TSS SDPC console will not be possible until the TSS RLU is reset.

I-15-3



ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
			SHEET NO. 115-33
			DCE NO. 4017002133048
DRAWN	BY RFB	DATE 4-15-80	PAGE 1 OF 1 REV.
CHECK			
APPROVED			ISSUED 4-15-80 REVISED 7-3-81
PROCESS			
ELECT			
APPROVED			
TITLE AOV VALVES: 3220 -3320 -3209 -3309 -3905 -3906 -3707 -3807 -3218 -3318 -2903			
CUSTOMER MDAC			

1. References

- A. P&ID Drawings 40P8005163144 Sheet 2  
P&ID Drawings 40P8005163146  
P&ID Drawings 40P8005163146  
P&ID Drawings 40P8005163140
- B. Logic Sheet 15-33 & 33a

2. Equipment Description and Use

These valve assemblies control the following functions:

- AOV-3220 Steam Trap, V-305, Vent Control Valve (P&ID 40P8005163144)
- AOV-3320 Steam Trap, V-306, Vent Control Valve (P&ID 40P8005163144)
- SOV-3209 R-CAL SOV to PT-3209 (P&ID 40P8005163144)
- SOV-3309 R-CAL SOV to PT-3309 (P&ID 40P8005163144 )
- AOV-3905 Extraction Oil Pump, P-303, Interconnect Valve (P&ID 40P8005163145)
- AOV-3906 Extraction Oil Pump, P-304, Interconnect Valve (P&ID 40P8005163145)
- AOV-3707 TSS Steam Generator Blanket Steam Control Valve, SA-307 (P&ID 40P8005163146)
- AOV-3807 TSS Steam Generator Blanket Steam Control Valve, SA-308 (P&ID 40P8005163146)
- AOV-3218 TSS Heater Blanket Steam Control Valve, SA-302 (P&ID 40P8005163144)
- AOV-3318 TSS Heater Blanket Steam Control Valve, SA-303 (P&ID 40P8005163144)
- AOV-2903 Downcomer Manifold Steam Vent Valve (P&ID 40P8005163140)

3. Operator Interface

- A. Open/Close control of these valves is via TSS SDPC console (RS SDPC Console for AOV 2903).
- B. Open/Close indication of these valves is via the TSS SDPC console (RS SDPC console for AOV 2903).
- C. No alarms are associated with these valves.

4. Operation

Operation of these valves is manual open/shut only by the operator via the appropriate SDPC console.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
			SHEET NO. 115-34
			DCE NO. 4017002133049
DRAWN	BY RFB	DATE 4-15-80	PAGE 1 OF 1 REV.
CHECK			
APPROVED			ISSUED 4-15-80 REVISED 7-3-81
PROCESS			
ELECT			
APPROVED			
TITLE VALVE AOV 3005 (THERMAL STORAGE HOT STANDBY FLUID VALVE)			
CUSTOMER MDAC			

1. References:

- A. P&ID Drawings 40P8005163141
- B. Logic Sheet 15-34

2. Equipment Description and Use

This valve is used to maintain the thermal storage system in hot standby. The air operated valve assembly consists of the valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface

- A. Open/Close control of this valve is via the TSS SDPC console or with no direct operator interface via the OCS.
- B. No alarm is associated with this valve.

4. Operation

Operation of this valve is done in manual by the Operator via the TSS SDPC console.

Automatic operation of this valve will be done via the OCS when the system is under automatic control with no operator interface.

A manual close command will override an automatic open command.

A TSS RLU trip will automatically shut these valves. Neither manual or automatic opening of this valve will be possible until the TSS RLU is RESET.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
			SHEET NO. 115-35
BY	DATE	DOE NO.	4017002133050
DRAWN	RGB	4-15-80	
CHECK			
APPROVED			
PROCESS			
ELECT			
APPROVED			
TITLE		PAGE 1 OF 2	
VALVES AOV 3001, AOV 3002, AOV 3003 AOV 3004, AOV 3907		REV.	
CUSTOMER		ISSUED 4-15-80	
MDAC		REVISED 7-3-81	

1. References

- A. P&ID Drawing 40P8005163141  
P&ID Drawing 40P8005163145
- B. Logic Sheet I5-35 & 35a.

2. Equipment Description and Use

These valves are used to control the oil circulation paths in the Thermal Storage Subsystem. Their functions are:

Valve No.	Valve Description
AOV-3002	Thermal Storage Unit Inlet/Outlet Control Valve (P&ID 40P8005163141)
AOV-3001	Thermal Storage Unit Bypass Control Valve (P&ID 40P8005163141)
AOV-3003	Thermal Storage Unit Bypass Control Valve (P&ID 40P8005163141)
AOV-3004	Thermal Storage Unit Fluid Extraction Control Valve (P&ID 40P8005163141)
AOV-3907	Thermal Storage Aux. Fluid Control Valve (P&ID 40P8005163145)

Each valve assembly consists of the valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface

- A. Open/Close control of these valves is via the TSS SDPC console or with no direct operator interface via the OCS.
- B. Open/Close indication of these valves is via the TSS SDPC console.
- C. No alarms are associated with these valves.

4. Operation

Operation of these valves is done in manual by the Operator via the TSS SDPC console.

Automatic operation of this valve will be done via the OCS when the system is under automatic control with no operator interface.

A TSS CHG and EXT trip will remove power from these valves and they will go to their fail positions.

I-15-3

I-15-4

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
			SHEET NO. 115-35
		DOE NO.	4017002133050
TITLE		PAGE 2 OF 2	
VALVES AOV 3001, AOV 3002, AOV 3003 AOV 3004, AOV 3907		REV.	
CUSTOMER		ISSUED 4-15-80	
MDAC		REVISED 7-3-81	


Fail Open

Fail Close

AOV 3001	AOV 3004
AOV 3002	AOV 3907
AOV 3003	

Operation of these valves will not be possible until the TSS CHG and EXT are reset.

NOTE: During an RLU trip a disagreement will exist in the indications (ZI and HS) for the fail open valves. Following a successful RLU reset the valves will shut and the indications will be in agreement.

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
			SHEET NO. I15-36
BY	DATE	DOE NO.	4017002133051
DRAWN	RFB 4-15-80		
CHECK		TITLE	VALVES AOV 3717 and AOV 3817 TSS SUPERHEATER OUTLET VALVES
APPROVED		PAGE	1 OF 1
PROCESS			REV. 
ELECT		CUSTOMER	MDAC
APPROVED		ISSUED	4-15-80
		REVISED	7-3-81

1. References

- A. P&ID Drawing 40P8005163146
- B. Logic Sheet I5-36

2. Equipment Description And Use

These are the steam discharge valves from the thermal storage extraction systems supplying admission steam to the turbine.

AOV-3717 Superheater E-307 Steam Outlet Valve  
AOV-3817 Superheater E-308 Steam Outlet Valve

The valve assemblies consist of the valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface


- A. Open/Close control of these valves is via the TSS SDPC console or with no direct operator interface via the OCS.
- B. Open/Close indication of these valves is via the TSS SDPC console.
- C. No alarms are associated with these valves.

4. Operation

Operation of these valves is done in manual by the Operator via the TSS SDPC console.

Automatic operation of this valve will be done via the OCS when the system is under automatic control with no operator interface.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8
			SHEET NO. I15-37
BY	DATE	DOE NO.	4017002133052
DRAWN	RFB 4-15-80		
CHECK		TITLE	VALVES AOV 3117 and AOV 3118 (TSS STEAM GENERATOR BLEED VALVES)
APPROVED		PAGE	1 OF 1
PROCESS			REV. 
ELECT		CUSTOMER	MDAC
APPROVED		ISSUED	4-15-80
		REVISED	7-3-81

1. References

- A. P&ID Drawings 40P8005163143
- B. Logic Sheet I5-37 & 37a.

2. Equipment Description And Use

These valves provide a steam flow path from the TSS steam generators to the TSS Flash Tank, V-304, for use during system startup and shut down periods.

AOV-3117 Steam Generator, SA-307 Bleed Valve  
AOV-3118 Steam Generator, SA-306 Bleed Valve

The valve assemblies consist of the valve, piston actuator, air set, solenoid valve operator, and open/closed position limit indication switches.

3. Operator Interface

These valves operate independently. The description following for AOV 3117 is typical for both valves.

- A. Operator control of AOV 3117 is via the TSS SDPC console.
- B. Open/Close indication is displayed on the TSS SDPC console.
- C. Alarm conditions associated with this is displayed on the TSS SDPC console.

4. Operation (Typical for AOV 3117)

Open Conditions

- A. TSS RLU is reset AND
- B. Operator OPEN command via the TSS SDPC Console OR
- C. Steam inlet pressure at AOV 3117 > 425 psig will automatically open the valve OR
- D. A CLOSE command to (AOV 3817 for AOV 3118)

Close Condition

- A. TSS RLU trip
- B. Operator CLOSE command via the TSS SDPC console.
- C. Inlet steam pressure < 300 psig if either open condition C or D opened the valve.

An operator OPEN command will override the automatic close condition in C above and the Operator must manually close the valve from the TSS SDPC console.

5. Alarms

TSSBV-1 Open will alarm the above C and D Open Conditions as:

- A. Ext. LOOP 1 BLEED VALVE OPEN DUE TO HI STEAM PRESSURE
- B. Ext. LOOP 1 BLEED VALVE OPEN DUE TO CLOSE COMMAND TO AOV 3717 (AOV 3817 for AOV 3118).

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8	
				SHEET NO. I15-38	
		DOE NO. 40I7002133053		PAGE 1 OF 1	
DRAWN	BY R&B	DATE 4-15-80	TITLE VALVES AOV 3206 and AOV 3306 (TSS HEATER STEAM INLET VALVES)		REV.
CHECK					
APPROVED					
PROCESS					
ELECT					
APPROVED			CUSTOMER MDAC		ISSUED 4-15-80
					REVISED 7-3-81

1. References

- A. P & ID Drawing 40P8005163144.
- B. Logic Sheet I5-38

2. Equipment Description and Use

These valves isolate the output of the thermal storage charging desuperheater, DS-901, from the thermal storage oil heater skids, SA-302 and SA-303.

AOV-3206 TSS Heater Steam Inlet Valve to SA-302  
AOV-3306 TSS Heater Steam Inlet Valve to SA-303

These valve assemblies consists of the valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface

- A. Open/Close control of these valves is via the TSS SDPC console or with no direct operator interface via the OCS.
- B. Open/Close indication of this valve is via the TSS SDPC console.
- C. Alarms are displayed via the TSS SDPC console.

4. Operation

These valves can be opened by the operator in manual or by the OCS system in automatic only when the respective charging train oil flow is greater than 120 gpm.

Close Condition

The valves can be shut at any time by the Operator in manual control or the OCS system in automatic control.

When flow in a train is less than 120 gpm the valves will automatically shut in either mode.

5. Alarms

If a valve has been shut by low oil flow in a train the TSS SDPC will alarm LO OIL FLOW TO CHARGING TRAIN 1 (2). This alarm will stay in until the valve is commanded open by the operator or OCS.

I-15-3

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8	
				SHEET NO. I15-50	
		DOE NO. 40I7002133054		PAGE 1 OF 2	
DRAWN	BY R&B	DATE 4-15-80	TITLE RECEIVER NITROGEN PRESSURE VALVES		REV.
CHECK					
APPROVED					
PROCESS					
ELECT					
APPROVED			CUSTOMER MDAC		ISSUED 4-15-80
					REVISED 7-3-81

1. References

- A. P&ID Drawings 40P8005163147
- B. Logic Sheet I5-50

2. Equipment Description and Use

These valves are used to inert the receiver preheater and boiler panels and flash tank following draining and also are used to pressurize the system to prevent flashing during the first stages of receiver startup.

Pairs of two way solenoid valves with each pair acting as a single three way valve are provided since one 3 way valve was not available for this service.

- A. SOV 2019A and SOV 2019B act to vent N<sub>2</sub> or fill the receiver boiler panels and flash tank with N<sub>2</sub>
- B. SOV 2016A and SOV 2016B out to vent N<sub>2</sub> or fill the receiver preheater panels with N<sub>2</sub>.

3. Operator Interface

- A. Control of these valves is manual actuation by the Operator via the RS SDPC console.
- B. No position indication is available for these valves.
- C. Alarm conditions are displayed via the RS SDPC console.

4. Operation

Permissives to admit N<sub>2</sub> to system


- A. Operator open command via RS SDPC console.
- AND
- B. Receiver flash tank pressure < 400 psi for SOV 2019A and SOV 2019B.
- C. Receiver preheater panel pressure < 140 psi for SOV 2016A and SOV 2016B.

Venting Conditions

- A. Operator vent command via RS SDPC control console.
- OR
- B. Receiver flash tank pressure > 400 psi for SOV 2019A and SOV 2019B
- C. Receiver preheater panel pressure > 140 psi for SOV 2016A and SOV 2016B.

Sequence of Operation

- A. An open command by the operator will cause SOV 2019A to open and SOV 2019B to close for the boiler panels (SOV 2016A and SOV 2016B for the preheater panels). This will admit N<sub>2</sub> to the panels.
- B. A vent command to the boiler panels will close SOV 2019A and open SOV 2019B to vent the N<sub>2</sub> line to atmosphere (SOV 2016A and SOV 2016B for the preheater panels).

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED	DWG NO. 1116578 115-50 SHEET NO.
TITLE RECEIVER NITROGEN PRESSURE VALVES		PAGE 2 OF 2 REV. 
CUSTOMER MDAC		ISSUED 4-15-80 REVISED 7-3-81


C. These are interlocked to remain in the venting position when boiler pressure is 400 psi for the receiver boiler panels and 140 psi for the receiver preheater panels. This is to prevent admission of high pressure steam into the N<sub>2</sub> system.

5. Alarms

If the valves are open to admit N<sub>2</sub> to their respective systems and are closed by pressure 400 psi for the boiler panels or 140 psi for the preheater panels the RS SDPC console will alarm respectively.

- A. RCVR N<sub>2</sub> PRESSURE VALVE CLOSED BY HIGH BOILER PRESSURE (PIH 2019)
- B. RCVR N<sub>2</sub> PRESSURE VALVE CLOSED BY HIGH PREHEATER PRESSURE. (PIH 2006)

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED		DWG NO. 1116578 SHEET NO. 115-51 NO. 4017002133074
DRAWN RQB	BY RQB	DATE 4-15-80	TITLE AOV 2007 PREHEATER PANEL WATER VENT VALVE (RPWVV)
CHECK			PAGE 1 OF 1 REV. 
APPROVED			CUSTOMER MDAC
PROCESS			ISSUED 4-15-80 REVISED 7-3-81
ELECT			
APPROVED			

1. References

- A. P&ID Drawing 40P8005163140
- B. Logic Sheet I5-51

2. Equipment Description and Use

This valve is used to vent the receiver preheater panels to atmosphere, at the operator's direction, when preheater panel pressure is less than 450 PSIG.

The air operated valve assembly consists of the valve piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface

- A. Open/Close control of this valve is via the RS SDPC console.
- B. Open/Close indication is displayed on the RS SDPC console.
- C. Alarms associated with this valve are displayed on the RS SDPC.

4. Operation

Operation of this valve is done manually by the operator via the RS SDPC console.

Open Condition

- A. Operator open command AND
- B. Preheater panel pressure less than 450 psig.


Closed Conditions

- A. Operator close command

5. Alarms

Any time AOV 2007 is open the RS SDPC will alarm PREHEATER PANEL VENT VALVE (AOV 2007) OPEN.

I-15-3

ORDER NO. 21700			<b>Stearns-Roger</b> <small>INCORPORATED</small>			DWG NO. 11165/8		
BY RQB						SHEET NO. I15-52		
DATE 4-15-80			DOE NO. 40I7002133055			PAGE 1 OF 1		
DRAWN			TITLE VALVE AOV-2911 CONTROL (FLASH TANK STEAM INLET VALVE)			REV. 		
CHECK						ISSUED 4-15-80		
APPROVED						REVISED 7-3-81		
PROCESS						CUSTOMER MDAC		
ELECT								
APPROVED								

1. References

- A. P&ID Drawings 40P8005163140
- B. Logic Sheet I5-52

2. Equipment Description and Use

This valve admits water or steam into the receiver flash tank, V-201, from the receiver boiler panels.

The valve assembly consists of the valve, piston actuator, air set, solenoid valve operator and open/closed position indication switches.

3. Operator Interface

- A. Control of this valve is via the RS SDPC console.
- B. Open/Closed indication of this valve is via the RS SDPC console.
- C. Alarm conditions are displayed on the RS SDPC console.

4. Operation

Open Conditions

- A. This valve can be opened at Operator command any time receiver inlet pressure to AOV 2911 is less than 650 psig.

Close Conditions

- A. Close any time at Operator command.
- B. Automatic close when flash tank pressure is greater than 540 psig.
- C. RS RLU trip.
- D. Inlet Steam Temperature 950°F.


5. Alarms

When receiver flash tank pressure is greater than 540 psi AOV 2911 will be closed and the RS SDPC console will alarm FLASH TANK STEAM INLET VALVE CLOSED BY HIGH FLASH TANK PRESSURE. (PIH 2911)

When receiver steam temperature is greater than 950°F AOV 2911 will be closed and the RS SDPC console will alarm flash tank steam inlet valve closed by RS Steam Temperature. (TIH 2911)

I-15-3

I-15-3

ORDER NO. 21700			<b>Stearns-Roger</b> <small>INCORPORATED</small>			DWG NO. 11165/8		
BY RQB						SHEET NO. I15-53		
DATE 4-15-80			DOE NO. 40I7002133056			PAGE 1 OF 2		
DRAWN			TITLE VALVES AOV 2901 & AOV 2902 CONTROL			REV. 		
CHECK						ISSUED 4-15-80		
APPROVED						REVISED 7-3-81		
PROCESS						CUSTOMER MDAC		
ELECT								
APPROVED								

1. References

- A. P&ID Drawings 40P8005163140
- B. Logic Sheet I5-53

2. Equipment Description and Use

AOV-2901, the moisture accumulator water drain valve, allows accumulated water from the receiver moisture separator drain manifold to be drained into the receiver flash tank, V-201.

AOV-2902, the downcomer manifold steam vent valve is used to vent the receiver main steam downcomer in the event of high pressure conditions in 6"-MS-201-QEB. Control of this valve is either automatic or operator manual according to the requirements listed under Operation below.

These air operated valve assemblies consists of valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface


- A. Open/Close control of these valves is via the RS SDPC control console.
- B. Open/Closed indication of these valves is via the RS SDPC control console.
- C. Alarms are associated with AOV 2901 only.
- D. AOV 2901 can be disabled via dedicated HS 2901A.

4. Operation

- A. RS RLU must be reset.  
AND  
B. Operator keystroke open command  
OR  
C. Inlet condition exceeds:
  - 1) Moisture accumulator level greater than 75% for AOV 2901
  - 2) 1625 psig for AOV 2902
- D. For AOV-2901 only in addition to A, B, and C above the ENABLE function (via dedicated HS 2901A) must be selected.

Close Condition

- A. RS RLU trip
- B. Operator keystroke close command and conditions in C above are not exceeded.
- C. Inlet condition is less than:
  - 1) Moisture accumulator level less than 25% for AOV 2901
  - 2) 1500 psig for AOV 2902  
after opening due to condition C above.
- D. For AOV 2901 only in addition to A, B, and C above the DISABLE function (via dedicated HS 2901A) must be selected.

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED	DWG NO. 11165/8 SHEET NO. 115-53
TITLE VALVES AOV 2901 & AOV 2902 CONTROL		PAGE 2 OF 2 REV. 
CUSTOMER MDAC		ISSUED 4-15-80 REVISED 7-3-81

NOTE: If AOV 2901 is DISABLED and the ENABLE function is selected AOV 2901 will travel to the position dictated by the permissives and interlocks previously noted in this section.


Without operator intervention these valves work automatically to maintain their respective systems between two set points.

An Operator close command must follow an Operator open command before these valves will shut.

5. ALARMS

When AOV 2901 is DISABLED an alarm AOV 2901 DISABLED will be shown on the RS SDPC console.

I-15-4

ORDER NO. 21700	<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8 SHEET NO. 115-54 DOE NO. 7002133061
DRAWN R&B	BY R&B	DATE 4-15-80	PAGE 1 OF 1 REV. 
CHECK	TITLE VALVE AOV 2004 CONTROL (RECEIVER FEEDWATER INLET VALVE)		ISSUED 4-15-80
APPROVED	CUSTOMER MDAC		REVISED 7-3-81
PROCESS			
ELECT			
APPROVED			

1. References

- A. P&ID Drawing 40P8005163133
- B. Logic Sheet I5-54

2. Equipment Description and Use

This valve admits feedwater to the receiver preheat panels.

The air operated valve assembly AOV 2004 consists of the valve, piston actuator, air set, solenoid valve operator, and open/closed position indication switches.

3. Operator Interface

- A. Open/Close control of this valve is via the RS SDPC console or with no direct operator interface via the OCS.
- B. Open/Close indication of this valve is via the RS SDPC console.
- C. No alarms are associated with these valves.


4. Operation

Operation of this valve is done in manual by the Operator via the RS SDPC console.

Automatic operation of this valve will be done via the OCS when the system is under automatic control with no operator interface.

A RS RLU trip will automatically open this valve. Neither manual or automatic closing of this valve will be possible until the RS RLU is RESET.

I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DWG NO. 11165/8
				SHEET NO. I15-56
				DOE NO. 40I7002133076
DRAWN	BY RAB	DATE 4-15-80	PAGE 1 OF 1	
CHECK			REV. 	
APPROVED			TITLE AOV 2914 & AOV 2915 RS FLASH TANK STEAM INLET & OUTLET ORIFICE VALVES	
PROCESS			CUSTOMER MDAC	
ELECT			ISSUED 4-15-80	
APPROVED			REVISED 7-3-81	

1. References

- A. P&ID Drawing 40P8005165140
- B. Logic Sheet I5-56

2. Equipment Description and Use

These valves are used during normal receiver operation to flow a small amount of Receiver steam thru the RS Flash Tank to maintain the flash tank and associated piping at working temperature.

These are air operated valve assemblies consisting of the valve, piston actuator,, air set, solenoid valve operator, and open/close position indication switches.

3. Operator Interface

- A. Open/Close control of these valves is via the RS SDPC console.
- B. Open/Close indication of these valves is via the RS SDPC console.
- C. No alarms are associated with these valves.

4. Operation

Open Condition

- A. Operator command via RS SDPC OR
- B. UV 2905 full open


Close Conditions

- A. Operator command via RS SDPC

I-15-3



I-15-3

ORDER NO. 21700		<b>Stearns-Roger</b> INCORPORATED		DWG NO. 1165/8
				SHEET NO. I15-57
				DOE NO. 40I7002133079
DRAWN	BY RAB	DATE 7-1-81	PAGE 1 OF 1	
CHECK			REV. 	
APPROVED			TITLE RECEIVER PANEL DRAIN VALVES	
PROCESS			CUSTOMER MDAC	
ELECT			ISSUED 7-1-81	
APPROVED			REVISED	

1. References

- A. P&ID Drawing 40-8005163140
- B. Logic Sheet I5-57

2. Equipment Description and Use

The equipment is a combination of an electromechanical relay in series with the SDPC control system. This controls the 24 receiver panel drain valves which are air operated with position indicating limit switches.

The electromechanical relay is used in series with the SDPC control system as a backup system to prevent opening of the drain valves except by direct operator action.

3. Operator Interface

- A. Control of these valves is from dedicated handswitches on the RS console in conjunction with a keystroke function on the RS SDPC keyboard.
- B. Status is displayed in the RS SDPC.
- C. No alarms are associated with these valves.

4. Operation

These valves are not to be opened when RS pressure is greater than 140 psig.

Open Permissives

- A. Dedicated ENABLE switch (HS 2913A) on AND
- B. Keystroke OPEN command via HS 2913 AND
- C. Receiver boiler panel pressure less than 140 psig (PT 2902) AND
- D. Receiver preheater panel pressure less than 140 psig (PT 2006).

Close Conditions

- A. Dedicated DISABLE switch (HS 2913A) on OR
- B. Keystroke close command via HS 2913 OR
- C. Receiver boiler panel pressure greater than 140 psig (PT 2902) OR
- D. Receiver preheater panel pressure greater than 140 psig (PT 2006).

NOTE:

The 24 close limit switches associated with these valves are connected in series and all 24 valves must be fully closed before the status (ZI 2913) will indicate closed.

The same is true for the open direction limit switches.

I-15-3



SOLAR ONE  
DIGITAL LOGIC DIAGRAM

When the Logic Diagrams are revised only the individual sheets needing revision will be issued. The main title sheet and complete set of index sheets will be issued at each change and will always show the latest revision for each logic diagram.

15-0-0

DRAWING STATUS	
ISSUED	DATE
PRELIMINARY FOR COMMENTS AND/OR APPROVAL	4-15-80
APPROVED FOR CONSTRUCTION	11/14/80
REVISED & APPROVED FOR CONSTRUCTION	2
NOT APPROVED FOR CONSTRUCTION UNLESS SIGNED & DATED. DESTROY ALL PORTS BEARING EARLIER DATE &/OR REVISION NO.	

REVISIONS				PRINT RECORD								BY		DATE		TITLE SHEET	DWG. NO. 9033/A	SHEET NO. 15-1	DOE NO. 40I7002133000	ORDER NO.	REVISION
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10	DRAWN						
1	FOR APPROVAL	REB	6-9-80	DATE ISSUED	1	2	3	4	5	6	7	8	9	10	REB	4-15-80					
2	AFC	REB	11-7-80	CUSTOMER	1	2	3	4	5	6	7	8	9	10	SAT	10/23/80					
3	ADDED PLC INTERFACE FROM PLC I & E PROGRAM'S RPF	REB	7-3-81	FIELD	1	2	3	4	5	6	7	8	9	10	REB	11-3-80					
4	REVISED RECORD DRAWINGS	REB	3-6-82	INTRA CO.	1	2	3	4	5	6	7	8	9	10							

**Stearns-Roger**  
INCORPORATED


CONTROL/LOGIC DRAWING INDEX

DOE NO.	SHEET NO.	DRAWING TITLE	REVISIONS									
40I7002133000	I5-1	TITLE SHEET	P1			A		0	1	2		NO.
			4-15-80			6-14-80		11-7-80	7-3-81			DATE
40I7002133001	I5-2	ILS INDEX										NO.
												DATE
40I7002133002	I5-2a+b	ILS INDEX (CONT.)		P2						2		NO.
				5-15-80						10-2-81		DATE
40I7002133003	I5-3	DIGITAL LOGIC SYMBOLS		P2								NO.
				5-22-80								DATE
40I7002133004	I5-4	NOTES		P2								NO.
				5-22-80								DATE
40I7002133005	I5-5	RECEIVER FEEDWATER PUMP - P917 (RFP)	4	P2	P3		B		1	2	3	NO.
			5-19-80	6-23-80			7-7-80		12-22-80	7-27-81	9-29-81	DATE
40I7002133006	I5-5a	P-917 LUBE OIL SYSTEM	P1	P2			3		1	2		NO.
			4-15-80	6-23-80			7-17-80		7-3-81			DATE
40I7002133007	I5-5b	P-917 DISCHARGE MOV CONTROL		P2			3					NO.
				6-13-80			7-7-80					DATE
40I7002133008	I5-6	FV1006 (ATOMIZING STEAM TO DS901 FOR STEAM DUMP SERVICE)										NO.
												DATE
40I7002133009	I5-7	FV1007 (ATOMIZING STEAM TO DS901 FOR RS FLASH TANK SERVICE)		P2						2	3	NO.
				5-15-80						2-27-81		DATE
40I7002133010	I5-8	SOV1000 CONTROL (PV1000 CLOSE INTERLOCKS)		P2			B			2		NO.
				5-15-80			9-19-80					DATE
40I7002133011	I5-9	SOV1002 CONTROL (TV1002 CLOSE INTERLOCKS)		P2					VOID			NO.
				5-15-80					7-3-81			DATE
40I7002133012	I5-10	AOV1009 CONTROL (ADM. STEAM LINE BLANKETING VALVE)		P2					1			NO.
				5-15-80					7-3-81			DATE
40I7002133013	I5-11	AOV1008 CONTROL (ADM. STEAM TO AUX. STEAM SUPPLY VALVE)		P2			B					NO.
				5-15-80			8-4-80					DATE
40I7002133014	I5-15	DRAIN POT LEVEL CONTROL (SINGLE LEVEL SWITCH)		P2								NO.
				5-15-80								DATE
40I7002133015	I5-15a	I5-15 CONTROL TABLE		P2						2		NO.
				5-15-80								DATE
40I7002133016	I5-16	DRAIN POT LEVEL CONTROL (DUAL LEVEL SWITCH)		P2								NO.
				5-22-80								DATE
40I7002133017	I5-16a	I5-16 CONTROL TABLE		P2						2		NO.
				5-15-80								DATE
40I7002133018	I5-17	MOV CONTROL (MOV-1030, -1031, -1132)		P2			B			2		NO.
				5-15-80			7-17-80					DATE
40I7002133096	I5-18	DEMINERALIZED WATER TRANSFER PUMP P710							0			NO.
									7-3-81			DATE
40I7002133098	I5-19	RAW WATER PUMP P703							0			NO.
									7-3-81			DATE
40I7002133098	I5-19a	RAW WATER PUMP P704							0			NO.
									7-3-81			DATE
40I7002133019	I5-20	TSS FLASH TANK DRAIN PUMP (P307)	P1	P2		A			1			NO.
			4-15-80	5-15-80		6-19-80			7-3-81			DATE

I5-0-3

REVISIONS			
NO.	DESCRIPTION	BY	DATE
1	FOR APPROPRIAL	RFB	6-17-80
2	AFC	RFB	11-7-80
3	PLC INTERFACE RPF	RFB	7-3-81
4	ADDED I5-19a RPF	RFB	10-26-81
5	REVISED RECORD DRAWING	RFB	3-16-82

REVISIONS				PRINT RECORD						
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	BY	DATE
1				1	4/15/80	4/16			RFB	4-15-80
2				2	5/15/80	6/10			GAT	10-23-80
3				3	7/3/80	7/19			DRS	10-23-80
4				4	7/3/81	7/19				11-3-80

ILS INDEX		DWG. NO. 9033/4
DOE NO. 40I7002133001		SHEET NO. I5-2
		ORDER NO.
REVISION		3

DETAIL DRAWING INDEX

DOE NO.	SHEET NO.	DRAWING TITLE	REVISIONS									
40I7002133031	I5-30	THERMAL STORAGE FLUID AUX PUMP CONTROL (P305)	PI	P2	A	B		0	1			NO.
	I5-30a	PUMP CONTROL P305	4-15-80	5-15-80	6-19-80	9-24-80		11-7-80	7-3-81			DATE
								0				NO.
								9-21-81				DATE
40I7002133032	I5-31	TSS FLUID OIL PUMP CONTROL (CHARGING-P301 & P302; EXTRACTION-P303 & P304)	PI	P2	A	B		0	1			NO.
	I5-31a	TSS FLUID OIL PUMP CONTROL TABLE	4-15-80	5-15-80	6-19-80	9-24-80		11-7-80	7-3-81			DATE
	I5-31b	THERMAL STORAGE FLUID CHARGING PUMP P301, P302						0				NO.
	I5-31c	PUMP CONTROL P-303, P304						9-21-81				DATE
40I7002133069	I5-32	AOV VALVES: AOV-3708 & AOV-3808 BOILER BLOWDOWN			A			0	1			NO.
	I5-32a	BOILER WATER BLOWDOWN VALVE AOV-3708, AOV-3808			8-12-80			11-7-80	7-3-81			DATE
								0				NO.
								9-21-81				DATE
40I7002133033	I5-33	AOV VALVES: -3220, -3320, -3209, -3309, -3905, -3906, -3707, -3807, -3218, -3318, -2903	PI	P2	A			0	1			NO.
	I5-33a	I5-33 VALVES CONTROL TABLE	4-15-80	5-16-80	6-19-80			11-7-80	7-3-81			DATE
								0				NO.
								9-21-81				DATE
40I7002133034	I5-34	TSS HOT STANDBY FLUID CONTROL VALVE -AOV 3005				B	C					NO.
	I5-34a	CONTROL AOV-3005				9-18-80	9-29-80					DATE
								0				NO.
								9-21-81				DATE
40I7002133035	I5-35	AOV VALVES: -3001, -3002, -3003, -3004, -3907	PI	P2	A			0	1			NO.
	I5-35a	I5-35 VALVES CONTROL TABLE	4-15-80	5-16-80	6-19-80			11-7-80	7-3-81			DATE
	I5-35b	CONTROL AOV-3001, AOV-3002, AOV-3003, AOV-3004, AOV-3907						0				NO.
								9-21-81				DATE
40I7002133036	I5-36	SUPERHEATER STEAM OUTLET CONTROL VALVES -AOV3717 & AOV3817	PI	P2	A	B		0	1			NO.
	I5-37	TSS STEAM GENERATOR BLEED CONTROL VALVES -AOV3117 & AOV3118	4-15-80	5-16-80	6-19-80	9-19-81		11-7-80	7-3-81			DATE
	I5-37a	AOV3117 & AOV3118 (CONT)		P2						2		NO.
	I5-37b	STEAM GENERATOR BLEED CONTROL VALVE AOV3117 AOV3118		6-16-80						9-29-81		DATE
								0				NO.
								9-21-81				DATE
40I7002133038	I5-38	TSS HEATER STEAM INLET VALVES AOV-3206 & AOV-3306	PI	P2	A	B	C					NO.
	I5-39	DESUPERHEATER WATER CONTROL VALVE (TDWTCV) (TV-3105)	4-15-80	6-16-80	6-19-80	9-19-81						DATE
	I5-40	CONTROL LV-3505, LV-3605, PV-3702, PV-3802, TV-3710, TV-3810, PV-3910						0				NO.
	I5-41	CONTROL PV-3110, PV-3111, UV-3102, TV-3410, TV-3411						9-21-81				DATE
40I7002133039	I5-50	RS NITROGEN PRESSURE VALVES SOV 2019A & B AND SOV 2016A & B	PI	P2	A	B		0	1			NO.
			4-15-80	6-18-80	6-19-80	9-19-80		11-7-80	7-3-81			DATE

REVISIONS					REVISIONS					PRINT RECORD					BY	DATE	
NO	DESCRIPTION	BY	APPD	DATE	NO	DESCRIPTION	BY	APPD	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED
1	ADDED I5-30a, -31a, -31c, -32a, -33a, -33b, -33c, -40, -41	REP	RPZ	10-26-91						1	10-26-91						

ILS INDEX (CONT)

DOE NO. 40I7002133002

DWG. NO. 9033/4  
SHEET NO. I5-2a  
REVISION 2

**Stearns-Roger** ORDER NO.

14-0-3 REV. 7/80

DETAIL DRAWING INDEX

DRAWING NO.	SHEET NO.	DRAWING TITLE	REVISIONS																		
					A			O	1			NO.									
40I7002133070	I5-51	AOV-2007 PREHEATER PANEL WATER VENT VALVE (RPWVV)			8-12-80			11-7-80	7-3-81												
40I7002133040	I5-52	FLASH TANK STEAM INLET VALVE AOV-2911	P1	P2	A	B	C														
	I5-52a	FLASH TANK STEAM INLET VALVE AOV-2911																			
40I7002133041	I5-53	VALVES: AOV2901 & AOV2902	P1	P2	A	B															
	I5-53a	MOISTURE ACCUMULATOR WATER DRAIN VALVE AOV-2901																			
	I5-53b	STEAM VENT VALVE AOV-2902																			
40I7002133060	I5-54	AOV 2004 CONTROL (RPWIV)	P1		A	B															
	I5-54a	PREHEATER WATER INLET VALVE AOV-2004																			
	I5-55	DOWNCOMER STEAM INLET VALVE UV-2905																			
40I7002133072	I5-56	AOV2914 & AOV2915 RS FLASH TANK STEAM INLET & OUTLET ORIFICES			A																
40I7002133080	I5-57	RECEIVER PANEL DRAIN VALVES			A																
	I5-58	FLASH TANK PRESSURE CONTROL VALVE PV-2906																			

REVISIONS					REVISIONS					PRINT RECORD					BY	DATE					
NO.	DESCRIPTION	BY	APPD	DATE	NO.	DESCRIPTION	BY	APPD	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED				
1	ADDED R RLV; REDREW	RQB	RQB	10-26-81						1					RQB				RQB	10-26-81	

ILS INDEX (CONT)

DOE NO. 40I7002133002

**Stearns-Roger**

ORDER NO.

DWG. NO. 9033/4  
SHEET NO. I5-26  
REVISION

14-0-3 REV. 7/80

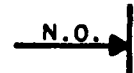
FUNCTION

SYMBOL

DESCRIPTION

INDICATING LIGHTS

OUTPUT



OUTPUT CONTACT OR SOLID STATE EQUIVALENT.  
N.O. INDICATES CONTACT OPEN WHEN LOGIC '0' EXISTS.  
N.C. INDICATES CONTACT CLOSED WHEN LOGIC '0' EXISTS.



RED - MOTOR RUNNING, VALVE PARTIALLY OPEN, CIRCUIT BREAKER CLOSED, OR DEVICE ON.

AND

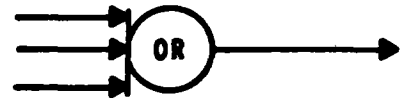


OUTPUT EXISTS ONLY WHEN ALL INPUTS ARE PRESENT.



GREEN - MOTOR STOPPED, VALVE PARTIALLY CLOSED, CIRCUIT BREAKER TRIPPED, OR DEVICE OFF.

OR

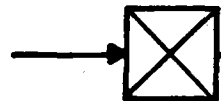


OUTPUT EXISTS WHEN ANY INPUT IS PRESENT.

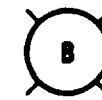


YELLOW - EQUIPMENT SELECTED FOR AUTO OR STANDBY START.

NOT

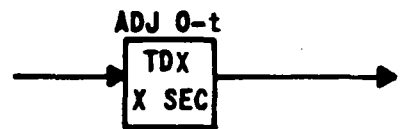


OUTPUT EXISTS ONLY WHEN INPUT IS NOT PRESENT.

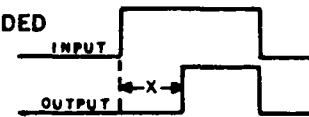


BLUE - EQUIPMENT LOCKED OUT OF CONTROL.

TIME DELAY



OUTPUT EXISTS ONLY AFTER TIME X HAS ELAPSED, PROVIDED INPUT HAS BEEN MAINTAINED. OUTPUT CEASES UPON LOSS OF INPUT. ADJUSTABLE TO RANGE Y.

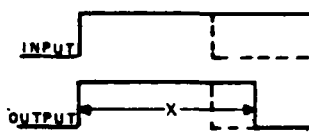


WHITE - PROCESS COMPLETED OR MANUAL OR LOCAL CONTROL SELECTED.

TIME DELAY WIPEOUT

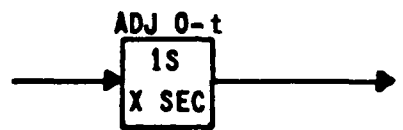


OUTPUT EXISTS AS SOON AS INPUT IS RECEIVED AND CEASES ON LOSS OF INPUT. OUTPUT CEASES AFTER TIME X IF INPUT IS MAINTAINED. ADJUSTABLE TO RANGE Y.

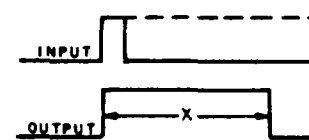


USED TO REFERENCE ANOTHER INPUT OR OUTPUT FUNCTION FROM ANOTHER LOGIC DRAWING.

ONE SHOT



OUTPUT EXISTS AS SOON AS INPUT IS RECEIVED AND CEASES AFTER TIME X REGARDLESS OF WHEN INPUT IS LOST. ADJUSTABLE TO RANGE Y IF DESIRED.



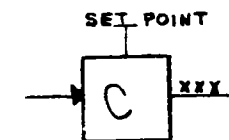
COMPUTER ALARM POINT

MEMORY/RESET

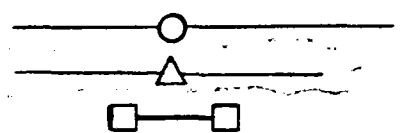


OUTPUT EXISTS ON CORRESPONDING INPUT UNTIL OTHER INPUT IS PULSED. (FLIP-FLOP) RESET INPUT TAKES PRECEDENCE IF BOTH INPUTS ARE SIGNALLED SIMULTANEOUSLY. MEMORIES WITH LATCH ARE NOT RESET UPON RESTORATION OF SYSTEM LOGIC POWER.

COMPARATOR



A DISCRETE OUTPUT IS GIVEN FROM AN ANALOG INPUT ACCORDING TO THE SET POINT. XXX IS THE DISCRETE OUTPUT LEVEL. AN ADJUSTABLE OUTPUT TIME DELAY (0-60 SEC) FOLLOWING AN INPUT CHANGE IS PROVIDED FOR INPUT SIGNAL SETTLING.



SOFTWARE INTERFACE  
IPAC (MULTIPLEXER) INTERFACE  
HARDWARE INTERFACE

LIMIT SWITCHES

- LMSO - CLOSED ONLY AT FULL OPEN
- LMSC - CLOSED ONLY AT FULL CLOSED
- LMSCI - OPEN ONLY AT FULL OPEN
- LMSOI - OPEN ONLY AT FULL CLOSED

MISC

XXXXX PLC NODE POINT

① A ○ AROUND MEM OR RST INDICATES STATE THAT IS SET ON POWER INITIALIZATION.

15-0-2

REVISIONS			PRINT RECORD							BY		DATE		DIGITAL LOGIC SYMBOLS	DWS. NO. 9033/9
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	DATE	SHEET NO. I5-3		
①	ISSUED FOR COMMENT	RFB	4-15-80							RFB	GAT	4-15-80			
②	ADDED COMPARATOR SYMBOL	RFB	5-27-80							GAT	NBS	10-23-80			
③	FOR APPROVAL	RFB	6-9-80							NBS	OSI	11-3-80			
④	AFC	RFB	11-7-80												
⑤	PLC PROGRAM REVISIONS	RPE	7-3-81												

DOE NO. 40I7002133003

**Stearns-Roger**  
INCORPORATED


ORDER NO.

REVISION

Notes to 

1. Initialization status of all memory/reset modules need to be specified to allow plant operation during or following an ILS failure. This requires some knowledge of the selected PLC vendor's equipment.
2. These logics assume that all  $\bar{R}$  specified logics, except I5-30, require +5VDC output from the ILS equipment to energize and 0VDC to deenergize.
3. The exact nature of the  $\bar{R}$  supplied Red Line Units (RLU) has not been detailed. These logics show, by agreement with  $\bar{R}$ , the RLU as a series element following an ILS output. The functional characteristic of the element is to act as a contact in series between the ILS output and the driven element. When the RLU is reset the contact is closed and conversely is open when the RLU is tripped.
4. Implementation of an Auto/Manual select on hardwired pumps has yet to be decided. Revision P<sub>2</sub> of the logic diagrams should reflect this change.

Definitions

- RLU - Red Line Unit. Safety monitor and control unit supplied with Rocketdyne furnished equipment.
- TSSe RLU - Thermal Storage Extraction Red Line Unit
- TSSc RLU - Thermal Storage Charging Red Line Unit
- TSSt RLU - Combined TSSe and TSSc RLU function
- RS RLU - Receiver Red Line Unit
- IPAC - MV-8000 signal multiplexer which is used for inputs which are only displayed or alarmed. 

Notes to 

1. Analog inputs have been added to comparator function modules to provide discrete output levels for ILS operations. Revision P<sub>1</sub> showed these as SDPC outputs.

Notes to 

1. All  $\bar{R}$  specified logics require initialization state of memory/reset modules.
2. A hi select function has been added to logic drawings where redundant transmitters are inputted to the logic.




Notes to 

1. When an RLU is in series with an ILS output the RLU receives a contact closure only from the ILS.
2. The RLU units output +5VDC to controlled equipment for a logical one.
3. On Rocketdyne specified equipment controlled by ILS the ILS will output +5VDC for logical 1.

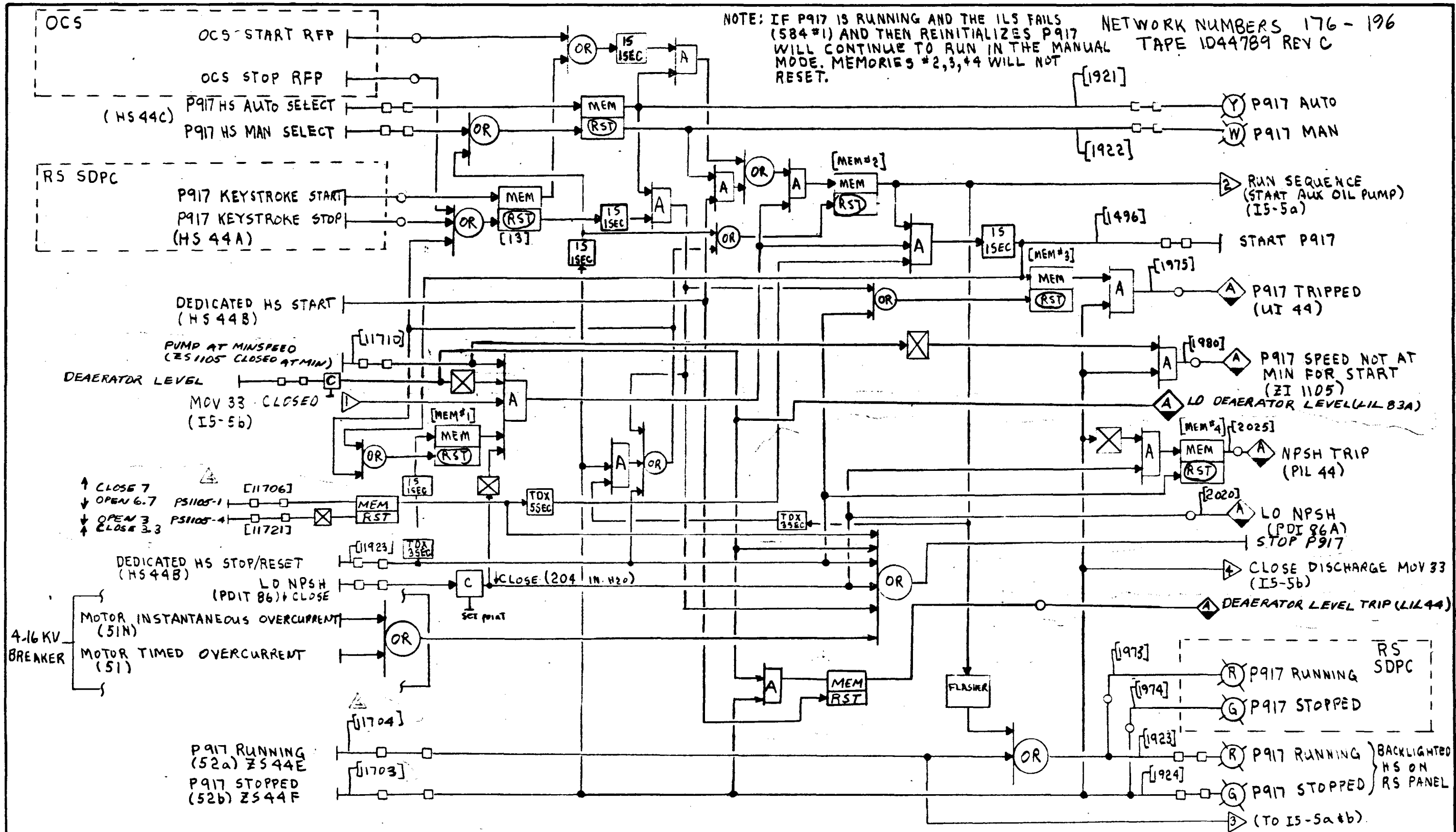


Notes to 

1. When the Beckman MV-8000 system was delivered, ILS outputs were not momentary as the I5 logic diagrams had previously had shown. This necessitated extensive logic changes which are reflected in this revision.
2. This revision incorporates PLC #1 and #2 input and output node internal address numbers.

REVISIONS				PRINT RECORD							BY	DATE	ILS NOTES	DWG. NO.	
NO.	DESCRIPTION	BY	DATE	REVISION										DRAWN	DATE
	ISSUED FOR COMMENT	RFB	4-15-80	DATE ISSUED									REB	4-15-80	
	ADDED NOTE FOR P2 FOR APPROVAL	RFB	5-27-80	CUSTOMER									GAT	10-23-80	SHEET NO.
	AFC	RFB	6-19-80	FIELD									WAS	10-23-80	I5-9
	PLC INTERFACE	RFB	11-7-80	INTRA CO.									CRS	11-3-80	DOE NO. 40I7002133004
		RPF	7-3-81												ORDER NO.
															REVISION 

FORM 02-264



NOTE: IF P917 IS RUNNING AND THE ILS FAILS (584#1) AND THEN REINITIALIZES P917 WILL CONTINUE TO RUN IN THE MANUAL MODE. MEMORIES #2,3,4 WILL NOT RESET.

NETWORK NUMBERS 176 - 196  
TAPE 1044789 REV C

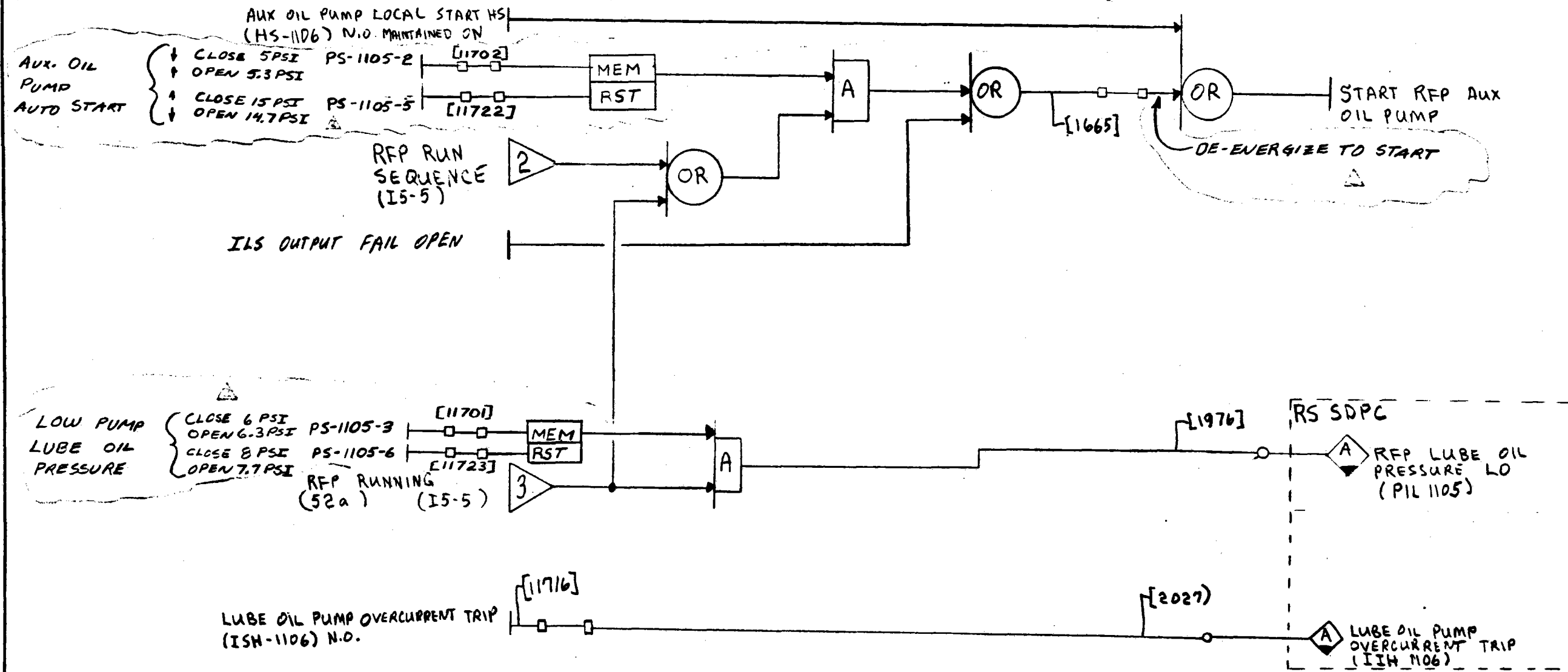
REVISIONS			PRINT RECORD				BY	DATE	RECEIVER FEEDWATER PUMP P917	DWG. NO.								
NO.	DESCRIPTION	BY	DATE	REVISION	0	1	2	3		4	5	6	7	8	9	10	CUSTOMER	DATE
1	AFC	RQB	4-15-80	DATE ISSUED	1/7/81	2/10	7/24	9/24	3/24								8-11-81	9033/4
2	ADDED FV 44; MOVED HS 44 OUTPUT; ADDED FS 1105	RQB	12-12-80	CUSTOMER	1/14/81	2/20	7/14/81	9/18	3/24								8-11-81	DOE NO. 4017002133005
3	ADDED PIC 192 INTERFAKE AND LUBE OIL TRIP; DELETED FV 44 & FS 1105; REDRAWN	RQB	7-27-81	FIELD													8/13/81	I5-5
4	ADDED FAIL TO START RESET; PDIT 86 SET POINT; REVISED STOP	RPF	9-29-81	INTRA CO.														
5	REV. RECORD DWS - REV. LUBE OIL PRESS LOGIC; DELETED 525 INTER.	RQB	3-16-92															
6	W/STOP COMMAND. REV. 526 & 526 ADDRESSES. ADDED LOW DA LEVEL TRIP																	

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ORDER NO.

REVISION **4**

FORM 02-264



REVISIONS			PRINT RECORD							BY			DATE		DRAWN		CHECK		APPROVED	
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	ADDED PS SET POINTS FOR APPROVAL	REB	2-13-80	DATE ISSUED	1/5	2/13	3/9	4/7	5/13	6/14	7/14	8/14	9/14	10/14	11/14	12/14	1/15	2/15	3/15	4/15
2	ADDED AUTO OIL PUMP STOP	REB	6-17-80	CUSTOMER	9/16	10/14	11/20	12/14	1/14	2/14	3/14	4/14	5/14	6/14	7/14	8/14	9/14	10/14	11/14	12/14
3	AFC: REVISED LOGIC FOR VARIABLE SPEED RFP (P-917)	REB	7-17-80	FIELD																
4	ADDED PLC #1 & #2 INTERFACE	REB	11-7-80	INTRA CO.																
5	REV. RECORD DWS - REV. L.O. PRESS LOGIC, ISH ADDRESS, TOOK LOCAL H.S. OUT OF ILS	REB	7-3-81																	
6		REB	3-16-81																	

RFP LUBE OIL SYSTEM

DOE NO. 40I7002133006

Stearns-Roger INCORPORATED

ORDER NO.

REVISION 2

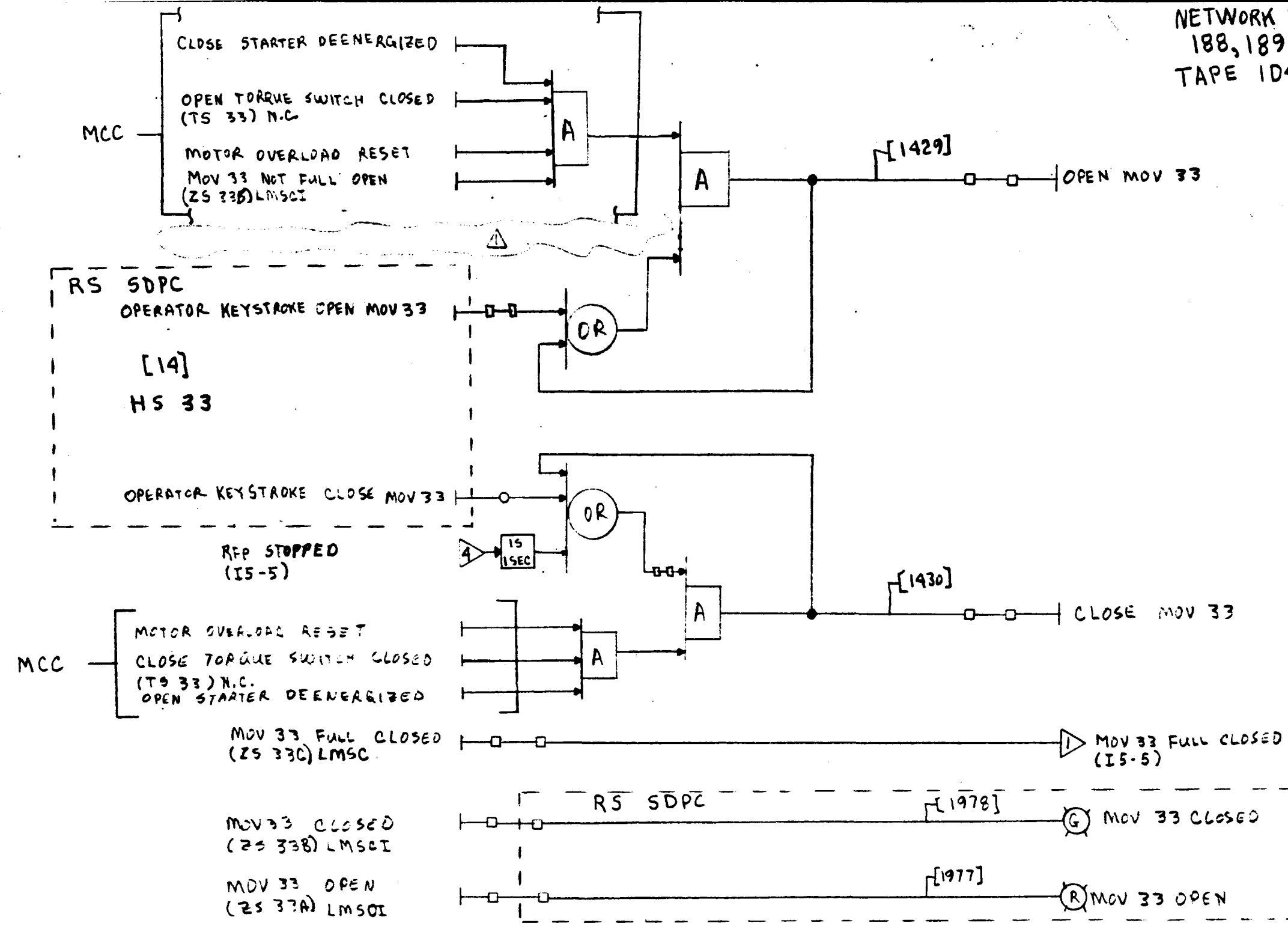
DWG. NO. 9033/4

SHEET NO. I5-5a

FORM 02-264



NETWORK NUMBERS  
188,189  
TAPE 1044789 REV C



FORM 02-264

REVISIONS			PRINT RECORD							BY	DATE	P-917 DISCHARGE MOV CONTROL	DWG. NO.	
NO.	DESCRIPTION	BY	DATE	REVISION	A	B	C	D	E	F	G		H	I
1	DELETED RECIRC VALVE LOGIC	REB	6-13-80	DATE ISSUED	1/16	2/3	3/9	4/19	5/11	6/14	7/14	8/11	9/11	10/23/80
2	FOR APPROVAL	REB	6-19-80	CUSTOMER	1/16	2/3	3/9	4/19	5/11	6/14	7/14	8/11	9/11	10-23-80
3	ADDED RFP RUNNING	REB	9-14-80	FIELD										11-3-80
4	AFC	REB	11-7-80	INTRA CO.										
5	ADDED PLC #1 & #2 INTERFACE, DELETED RFP RUN	RPF	7-3-91											
6	PERMISSIVE TO OPEN MOV 33	RGD	7-3-91											

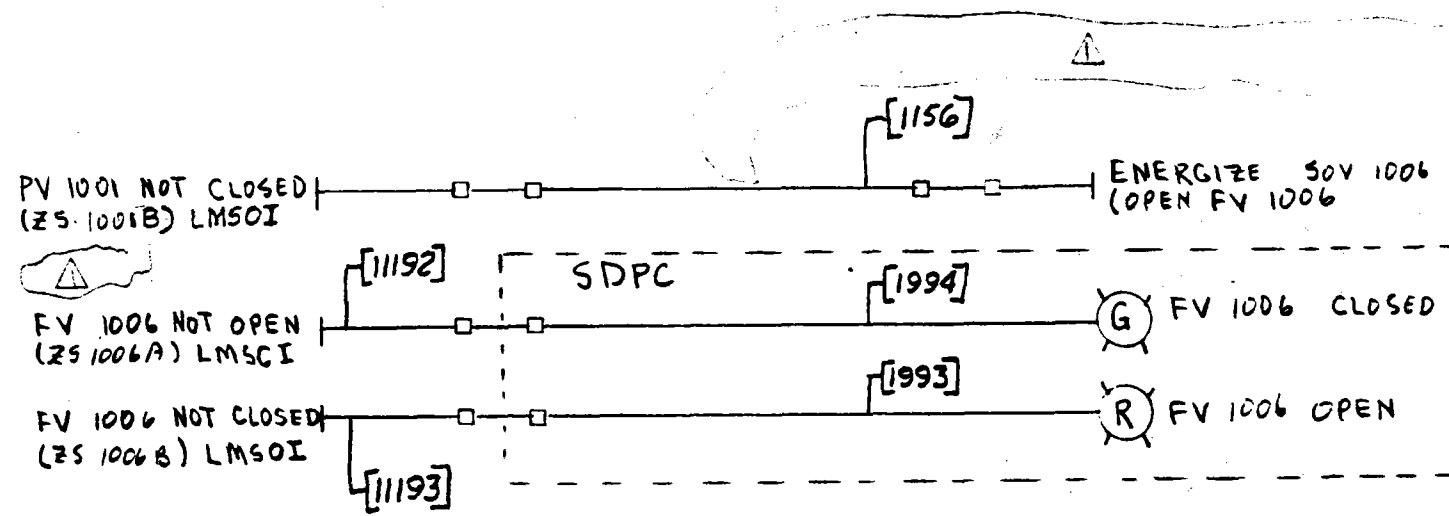
DOE NO. 40I7002133007

**Stearns-Roger**  
INCORPORATED

ORDER NO.

SHEET NO.  
I 5-5b  
REVISION

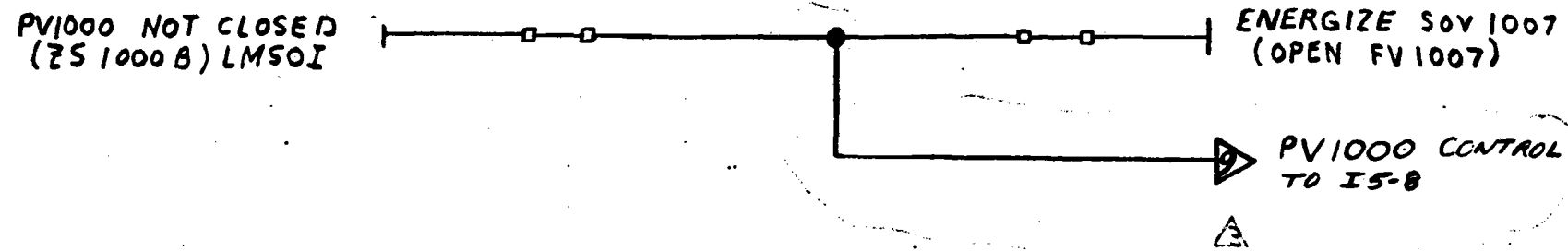
NETWORK NUMBER  
52, 53  
TAPE ID44789 REV C



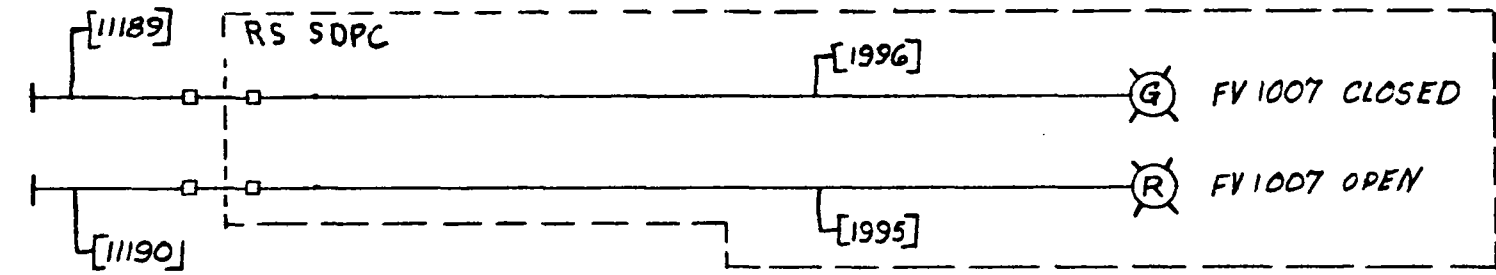
REVISIONS			PRINT RECORD							BY		DATE		FV-1006 (ATOMIZING STEAM TO DS-901 FOR STEAM DUMP SERVICE)		DWG. NO.			
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
△	FOR APPROVAL	RGB	6-17-80	DATE ISSUED	1/15	1/19	1/17	7/26											
△	AFC	RGB	11-7-80	CUSTOMER	9/16	6/20	4/14	7/28											
△	ADDED PLC #1 & #2 INTERFACE	RPE	RGB	7-3-80	FIELD														
△				INTRA CO.															
△																			
△																			
△																			

**Stearns-Roger** INCORPORATED  
ORDER NO. 15-6  
REVISION 1

FORM 02-264



FV1007 NOT OPEN  
(ZS 1007A) LMSCI  
FV1007 NOT CLOSED  
(ZS 1007B) LMSOI



3 REVISED RECORD DRAWING, ADDED CONNECTOR TO I5-8 GMM RPB 3-16-82

REVISIONS			PRINT RECORD							BY	DATE			
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10
3	ISSUED FOR COMMENT	REB	4-15-80	DATE ISSUED	4/15/80	5/15/80	6/15/80	7/15/80	8/15/80	9/15/80	10/15/80	11/15/80	12/15/80	1/15/81
2	DELETE SOV2019 INPUT; ADD ZS 2906; ADD 50PC BOX	REB	5-15-80	CUSTOMER	4/15/80	5/15/80	6/15/80	7/15/80	8/15/80	9/15/80	10/15/80	11/15/80	12/15/80	1/15/81
1	FOR APPROVAL	REB	6-19-80	FIELD										
0	AFC	REB	11-7-80	INTRA CO.										
1	ADDED PLC #1 & #2 INTERFACE; REVISED LOGIC	RPF	7-3-81											
2	COMPLETELY REVISED; DELETED UV2905 INTERLOCK	RPF	9-29-81											

FV 1007 (ATOMIZING STEAM TO DS 901 FOR RS FLASH TANK SERVICE)  
DOE NO. 40I7002133009

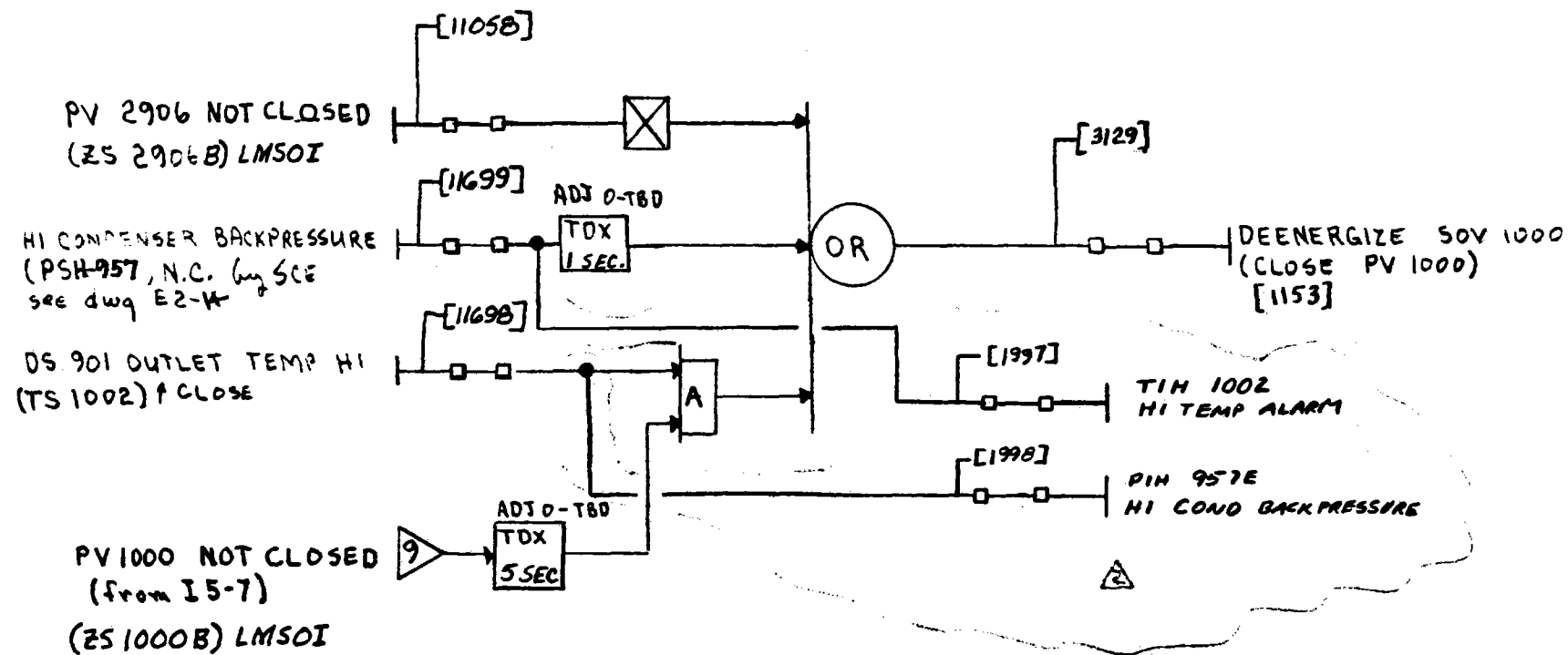
DWG. NO. 9033/4  
SHEET NO. I5-7  
REVISION 3

**Stearns-Roger**  
INCORPORATED

ORDER NO.

FORM 02-264

NETWORK NUMBERS  
56, 57  
TAPE 1044789 REVC



REV RECORD DWG. DEFINED TIMERS. ADDED TIM 1002 & PIN 957E RCB 3-16-82

REVISIONS			PRINT RECORD							BY	DATE				
NO.	DESCRIPTION	BY	DATE	REVISION	A	P	A	B	D	Δ	Δ	Δ	Δ	Δ	Δ
1	ISSUED FOR COMMENT	RCB	4-15-80	DATE ISSUED	4/15	5/14	6/19	8/20	11/7	7/30					
2	ADD TS 1002 & TDX...	RCB	5-15-80	CUSTOMER	4/15/80	5/14/80	6/19/80	8/20/80	11/7/80	7/30/80					
3	FOR APPROVAL	RCB	6-19-80	FIELD											
4	ADDED TDX ON CONDENSER BACK PRESSURE	RCB	7-19-80	INTRA CO.											
5	AFC	RCB	11-7-80												
6	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-82												

SOV-1000 CONTROL  
(PV-1000 CLOSE INTERLOCKS)

DOE NO. 40I7002133010

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INCORPORATED

ORDER NO.

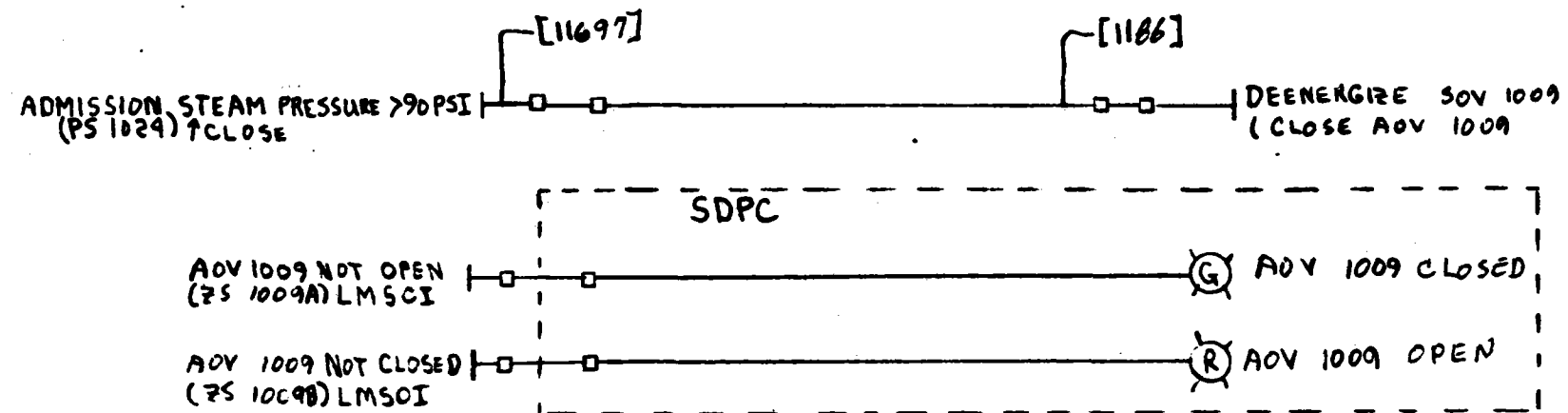
DWG. NO.  
9033/4

SHEET NO.  
I5-8

REVISION **2**

FORM 02-264

NETWORK NUMBERS  
54, 55  
TAPE 1044789 REV C



FORM 02-264

REVISIONS			PRINT RECORD							BY		DATE	ADV-1009 CONTROL (ADM. STEAM LINE BLANKETING VLV.)	DWG. NO.	
NO.	DESCRIPTION	BY	DATE	REVISION	△	△	△	△	△	△	△	△		DATE	9033/4
△	ISSUED FOR COMMENT	RFB	4-15-80	DATE ISSUED	1/24	1/24	4/19	4/17	7/20				DRAWN	RFB	4-15-80
△	ADDED PS 1029	RFB	5-15-80	CUSTOMER	1/24	5/10	4/20	11/1	7/24				CHECK	GAT	10-23-80
△	FOR APPROVAL	RFB	6-17-80	FIELD									APPROVED	DAS	10-23-80
△	AFC	RFB	11-7-80	INTRA CO.										AB	11-3-80
△	ADDED PLC #1 & #2 INTERFACE	RPF	RFB	7-3-81											

DOE NO. 40I7002133012

**Stearns-Roger**  
INCORPORATED

ORDER NO.

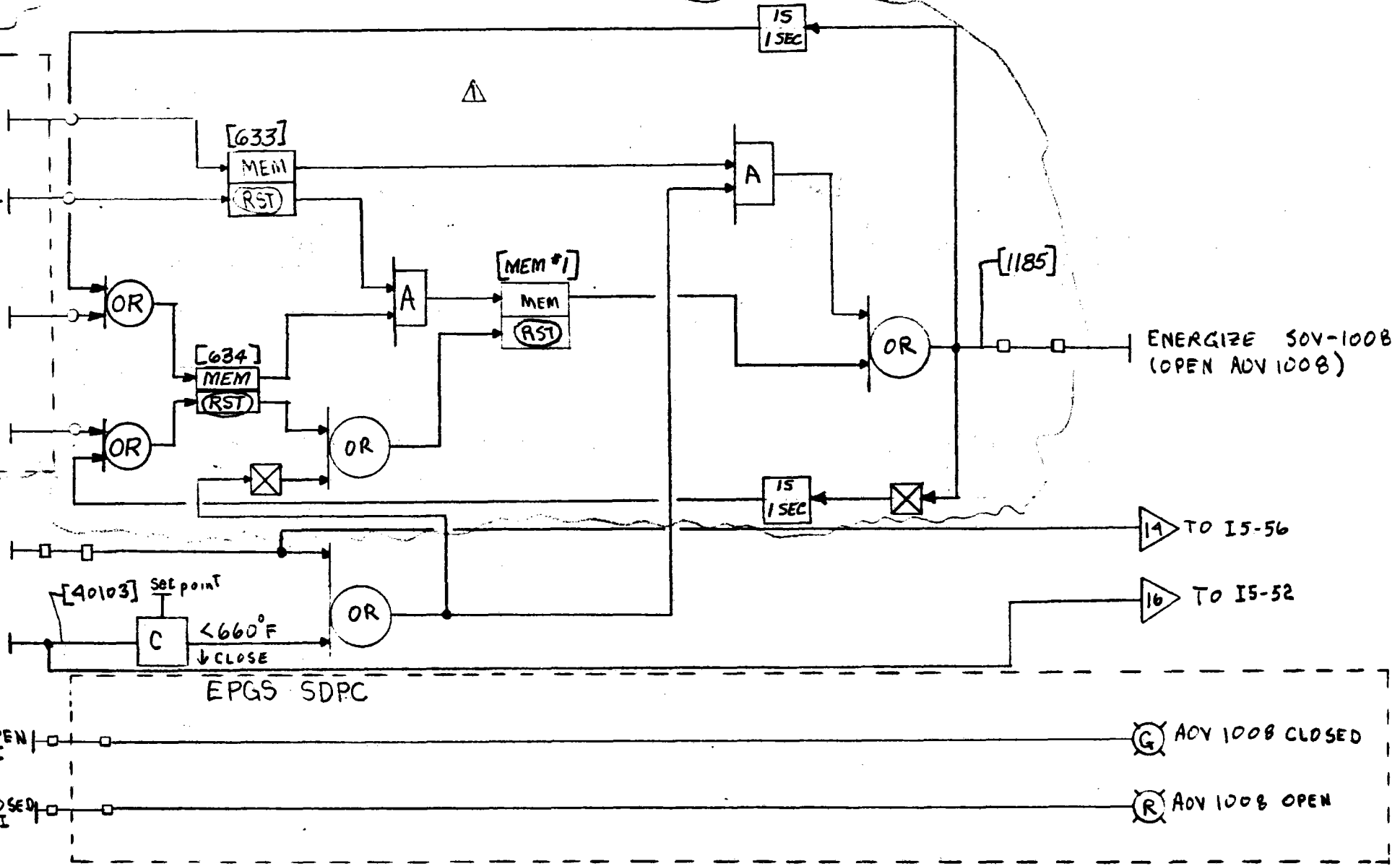
SHEET NO.  
I5-10  
REVISION

EPGS SDPC

OPERATOR KEYSTROKE AUTO  
HS 1008C  
OPERATOR KEYSTROKE MANUAL  
OPERATOR KEYSTROKE OPEN  
HS 1008  
OPERATOR KEYSTROKE CLOSE

UV 2905 NOT FULL OPEN  
(ZS 2905A) LMSCI

RCVR STEAM TEMP  
(TE 2903)



ADV 1008 NOT OPEN  
(ZS 1008A) LMSCI

ADV 1008 NOT CLOSED  
(ZS 1008B) LMSCI

(G) ADV 1008 CLOSED

(R) ADV 1008 OPEN

FORM 02-284

REVISIONS		PRINT RECORD						BY	DATE
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	
1	ISSUED FOR COMMENT	RQB	4-15-80	1	4/15/80				
2	REVISED LOGIC; ADDED [C]	RQP	5-15-80	2	5/15/80				
3	FOR APPROVAL	RQB	6-19-80	3	6/19/80				
4	ADDED OUTPUT [D]	RQB	8-12-80	4	8/12/80				
5	AF	RQB	11-7-80	5	11/7/80				
6	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81	6	7/3/81				

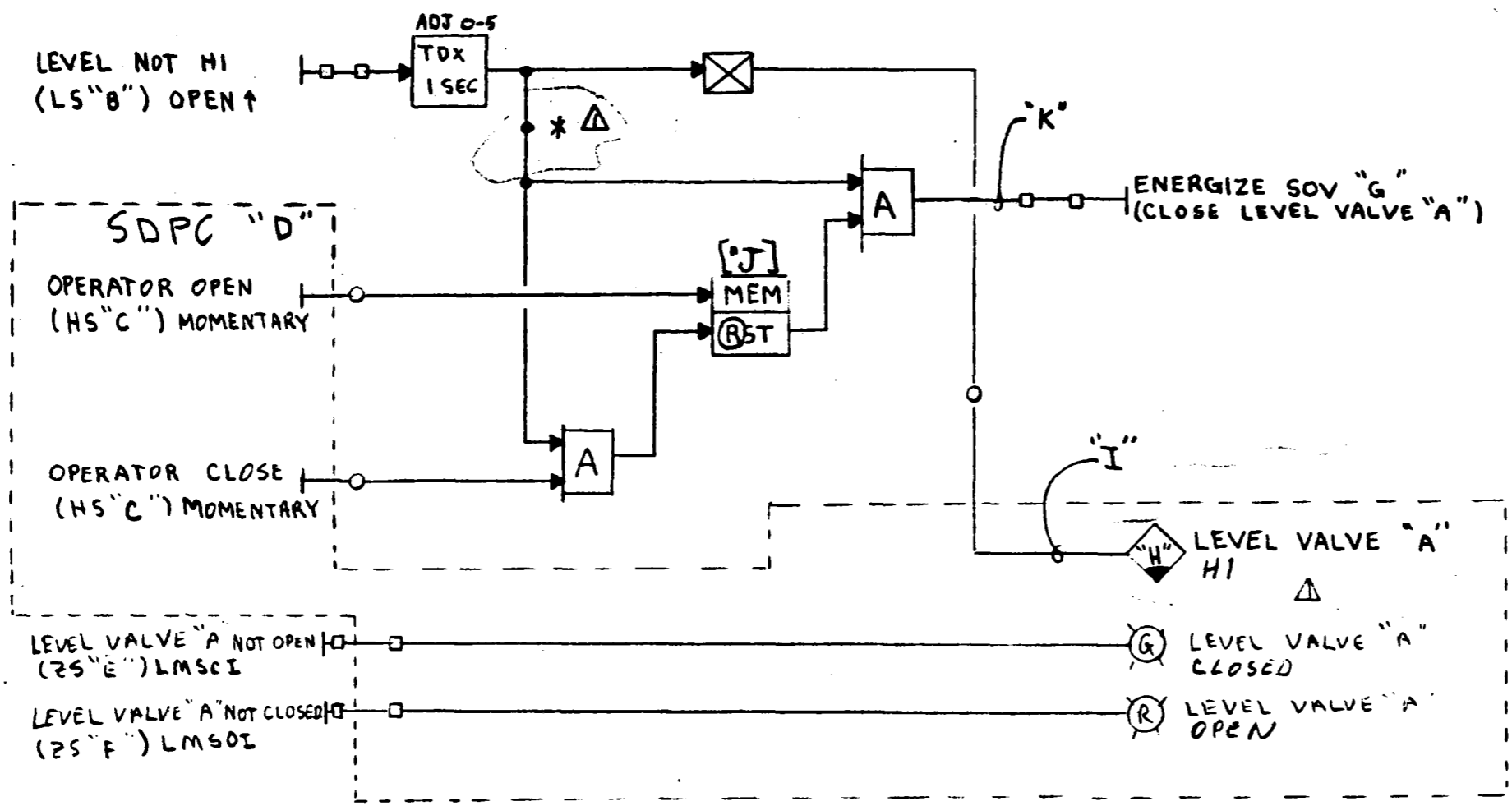
ADV 1008 CONTROL (ADM. STEAM TO AUX. STEAM SUPPLY VALVE)

DOE NO. 40I7002133013

**Stearns-Roger** INCORPORATED ORDER NO.

DWG. NO. 9033/4  
SHEET NO. I5-11  
REVISION

NOTE: 5 SYSTEMS REQUIRED  
SEE I5-15a



\* FIELD TO VERIFY THAT LS LEAVES LV OPEN LONG ENOUGH TO DRAIN WATER. ADD TDY TIMER HERE IF NOT. △

REVISIONS			PRINT RECORD					BY	DATE	DRAIN POT LEVEL CONTROL (SINGLE LEVEL SWITCH)	DRG. NO.
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	CHECK		APPROVED
1	ISSUED FOR COMMENT	RGB	4-15-80	1	4/15/80	9/10/80	3/20/80	1/14/80	GAT	10-23-80	9033/4
2	CHANGED TO 5 SYSTEMS REQUIRED FROM 12	RGB	5-12-80	2	5/12/80	9/10/80	3/20/80	1/14/80	DAS	10-23-80	I5-15
3	FOR APPROVAL	RGB	6-19-80	3	6/19/80				OR	11-3-80	
4	AFC	RGB	11-7-80	4	11-7-80						
5	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81	5	7-3-81						

DOE NO. 40I7002133014


**Stearns-Roger** INCORPORATED

ORDER NO.

REVISION 1

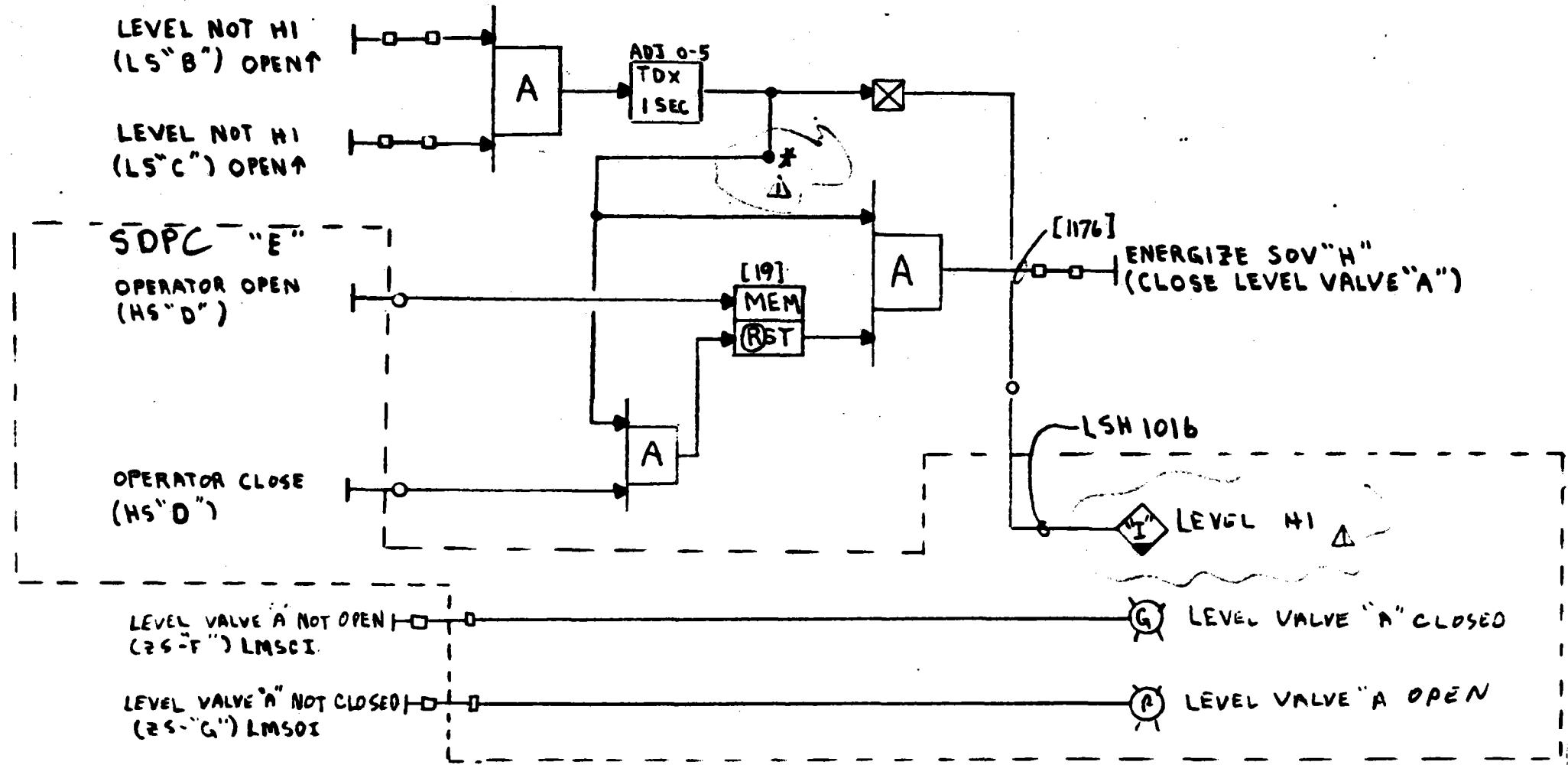
FORM 02-264


"A" LEVEL VALVE	"B" LEVEL SWITCH	"C" OPERATOR HS	"D" OPERATOR CONSOLE	"E" OPEN POSITION SWITCH	"F" CLOSE POSITION SWITCH	"G" SOLENOID VALVE	"H" ALARM POINT	"I" ALARM TAG	NETWORK NUMBERS	"J" [INPUT COIL]	"K" [OUTPUT NODE]
LV1010	LS1010	HS1010	RS SDPC	ZS1010A	ZS1010B	SOV1010	RS SDPC	LIH1010	40,41	15	1154
LV1011	LS1011	HS1011	RS SDPC	ZS1011A	ZS1011B	SOV1011	RS SDPC	LIH1011	42,43	16	1158
LV1012	LS1012	HS1012	RS SDPC	ZS1012A	ZS1012B	SOV1012	RS SDPC	LIH1012	44,45	17	1159
LV1013	LS1013	HS1013	TSS SDPC	ZS1013A	ZS1013B	SOV1013	TSS SDPC	LIH1013	46,47	260	1160
LV1015	LS1015	HS1015	EPGS SDPC	ZS1015A	ZS1015B	SOV1015	EPGS SDPC	LIH1015	48,49	18	1175
LV3116	LS3116	HS3116	TSS SDPC	ZS3116A	ZS3116B	SOV3116	TSS SDPC	LIH3116	214,215	297	1250

REVISIONS			PRINT RECORD						BY	DATE	I5-15 CONTROL TABLE	DWG. NO.			
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6		7	8	9	10
1	ISSUED FOR COMMENT	REA	4-15-80	DATE ISSUED	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/11	9033/4
2	DELETED LV-1014, -1017, -1018, -1403, -1404, -1405, -1406	REA	5-22-80	CUSTOMER	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/11	1/11	15-15a
3	FOR APPROVAL	REA	6-19-80	FIELD											
4	ATC	REB	11-7-80	INTRA CO.											
5	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81												
6	REVISED RECORD DRAWINGS - REV. MADE FOR PS ON CONTROL TABLE "E" & "F"	RPF	3-16-92												
										DOE NO. 40I7002133015	ORDER NO.	REVISION 			
										<b>Stearns-Roger</b> INCORPORATED					



NOTE: 1 SYSTEM REQUIRED  
SEE IS-16a



X FIELD TO VERIFY THAT LS LEAVES LV OPEN LONG ENOUGH TO DRAIN WATER. ADD TOY TIMER HERE IF NOT. 

FORM 02-264

REVISIONS			PRINT RECORD							BY		DATE		DRG. NO. 9033/A	SHEET NO. I5-16	
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9			10
1	ISSUED FOR COMMENT	RFB	7-5-80	DATE ISSUED	9/5/80	5/22/80	9/1/80	11/7/80	1/2/81							
2	REVISED SYSTEMS REQUIRED FROM 3 TO 1	RFB	5-22-80	CUSTOMER	1/14/81	7/24/80	9/20/80	11/14/80	2/6/81							
3	FOR APPROVAL	REB	6-19-80	FIELD												
4	APC	RFB	11-7-80	INTRA CO.												
5	ADDED PLC #1 & #2 INTERFACE	RPF	RFB	7-3-81												

DRAIN POT LEVEL CONTROL  
(DUAL LEVEL SWITCH)

DOE NO. 40I7002133016

**Stearns-Roger**  
INCORPORATED

ORDER NO.

REVISION 

"A" LEVEL VALVE	"B" LEVEL SWITCH	"C" LEVEL SWITCH	"D" OPERATOR HS	"E" OPERATOR CONSOLE	"F" OPEN POSITION SWITCH	"G" CLOSE POSITION SWITCH	"H" SOLENOID VALVE	"I" ALARM POINT	NETWORK NUMBER	INPUT COIL	OUTPUT NODE
LV1016	LS1016A	LSA016B	HS1016	RS SDPC	ZS1016A	ZS1016B	SOV1016	RS SDPC	50,51	19	1176

REVISIONS			PRINT RECORD							BY		DATE		I 5-16 CONTROL TABLE		DWG. NO.	
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10	11	12	13
1	ISSUED FOR COMMENT	REB	4-15-80	DATE ISSUED	1/16	2/16	3/16	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	13/16
2	DELETED LV-1401 & LV-1402	REB	5-22-80	CUSTOMER	1/16	2/16	3/16	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	13/16
3	FOR APPROVAL	REB	6-19-80	FIELD													
4	ATC	REB	11-2-80	INTRA CO.													
5	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-80														
6	REVISED RECORD DRAWING - REV. MADE FOR PS. ON CONTROL TABLE "F" & "G"	REB	3-16-84														

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INCORPORATED

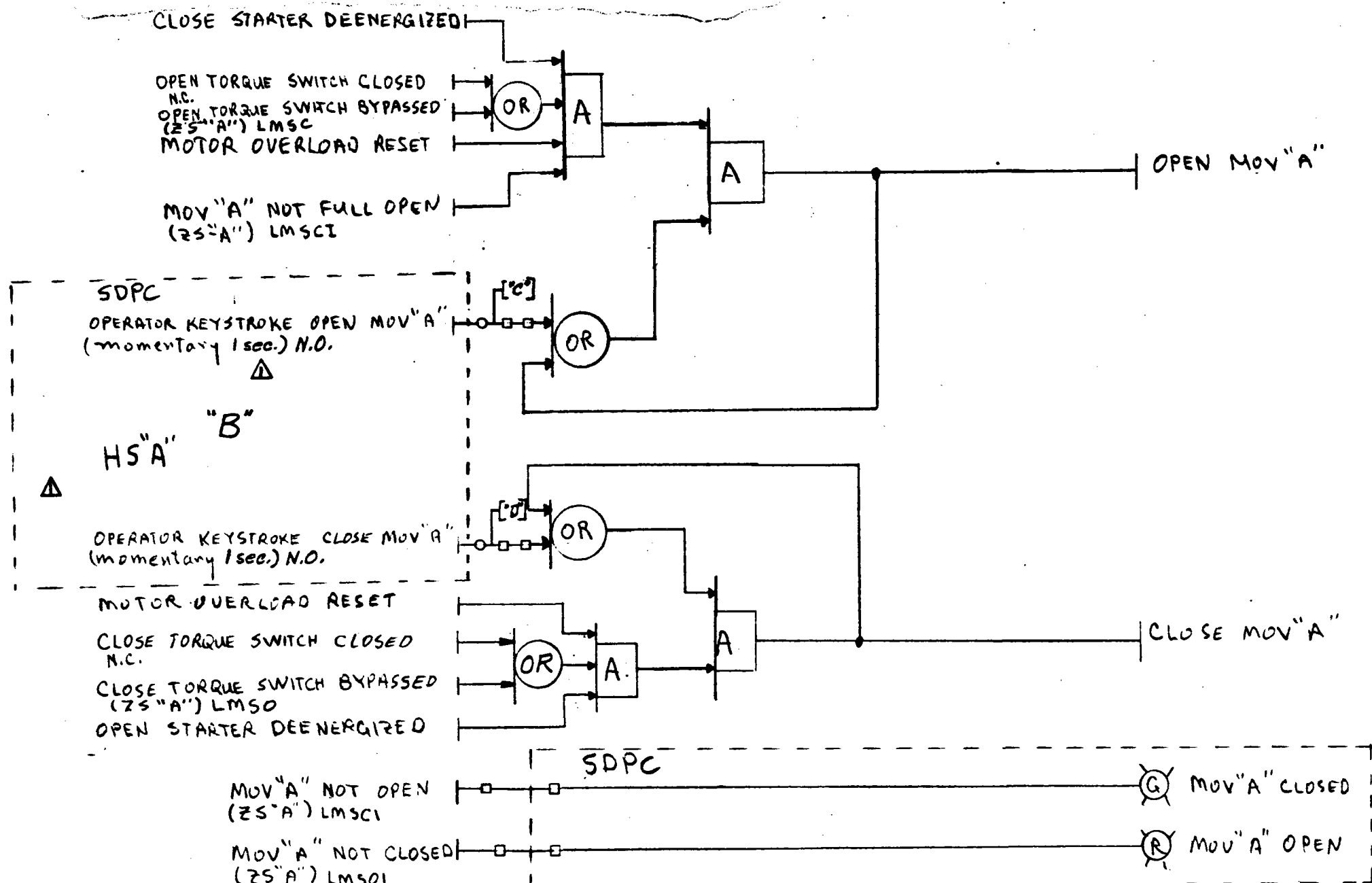
ORDER NO.

DWG. NO.  
**9033/4**  
SHEET NO.  
**I5-16a**  
REVISION **2**

FORM 02-284

NOTE: ALL LOGIC PERFORMED AT MCC UNLESS NOTED OTHERWISE

"A" MOV	NETWORK NUMBERS	"B" [INPUT COIL]	"C" [OUTPUT NODE]	"D" CLOSE OUTPUT NODE
1030	62,63,64	264	1361	1362
1031	33,34,35	20	1363	1364



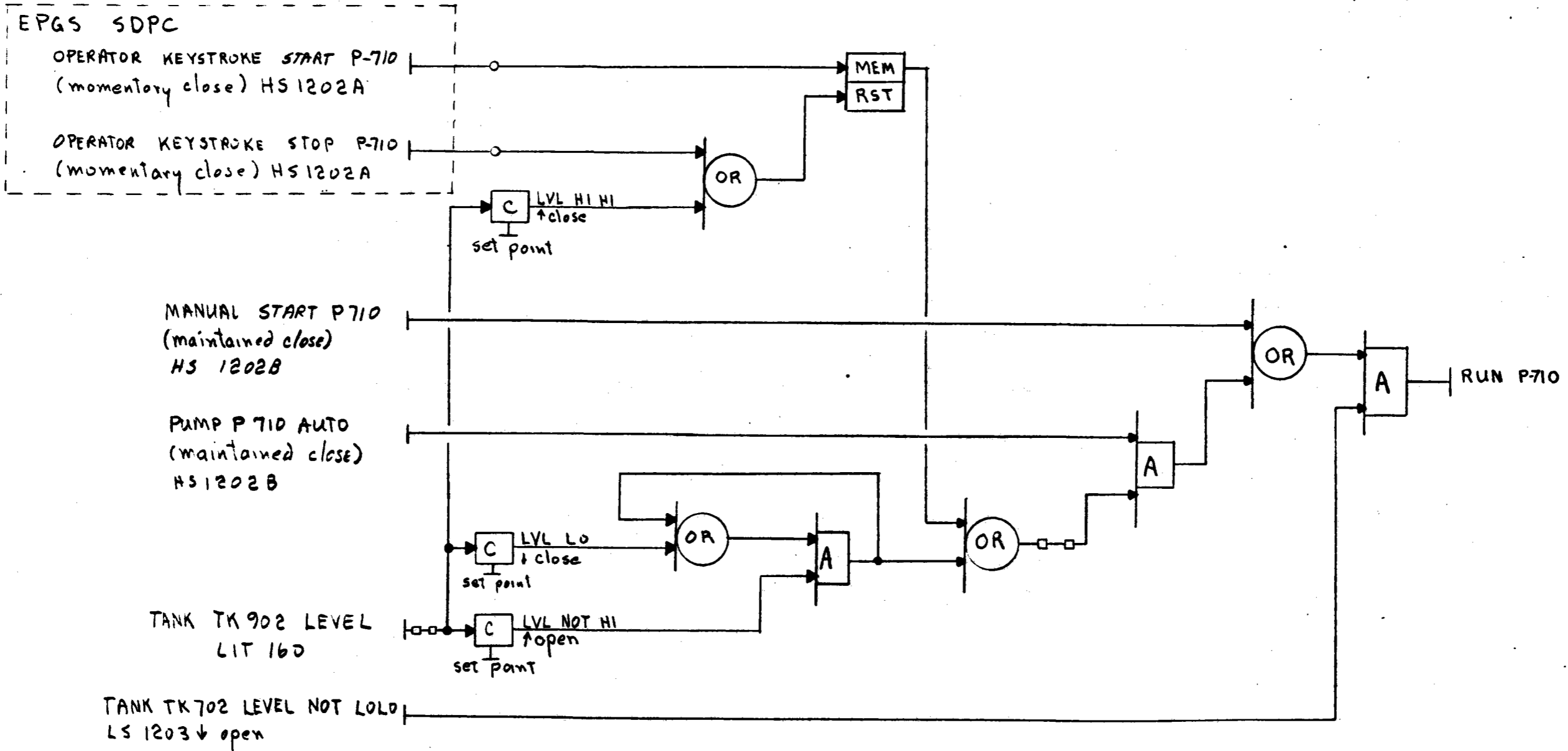
REVISIONS			PRINT RECORD					BY	DATE	MOV CONTROL	MOV-1030	MOV-1031	DRG. NO.
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	DOE NO.	SHEET NO.
2	REV. RECORD DUNS. DELETED MOV 1132	RPF	5-16-81									40I7002133018	9033/4
1	ISSUED FOR COMMENT	REP	4-15-80						REP	6AJ	10-23-80		I5-17
1	SEGATED MCC LOGIC FOR APPROVAL	REP	5-15-80						REP	ARS	10-23-80		
1	MOVED SEAL IN; ADDED TORQUE SWITCH BYPASS	REP	6-19-80						REP	ARS	11-3-80		
1	AFC	REP	7-17-80										
1	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81										

FORM 02-264

**Stearns-Roger**  
INCORPORATED

ORDER NO. 2

NETWORK NUMBERS  
251-255  
TAPE ID 44789 REV C



FORM 02-264  
48

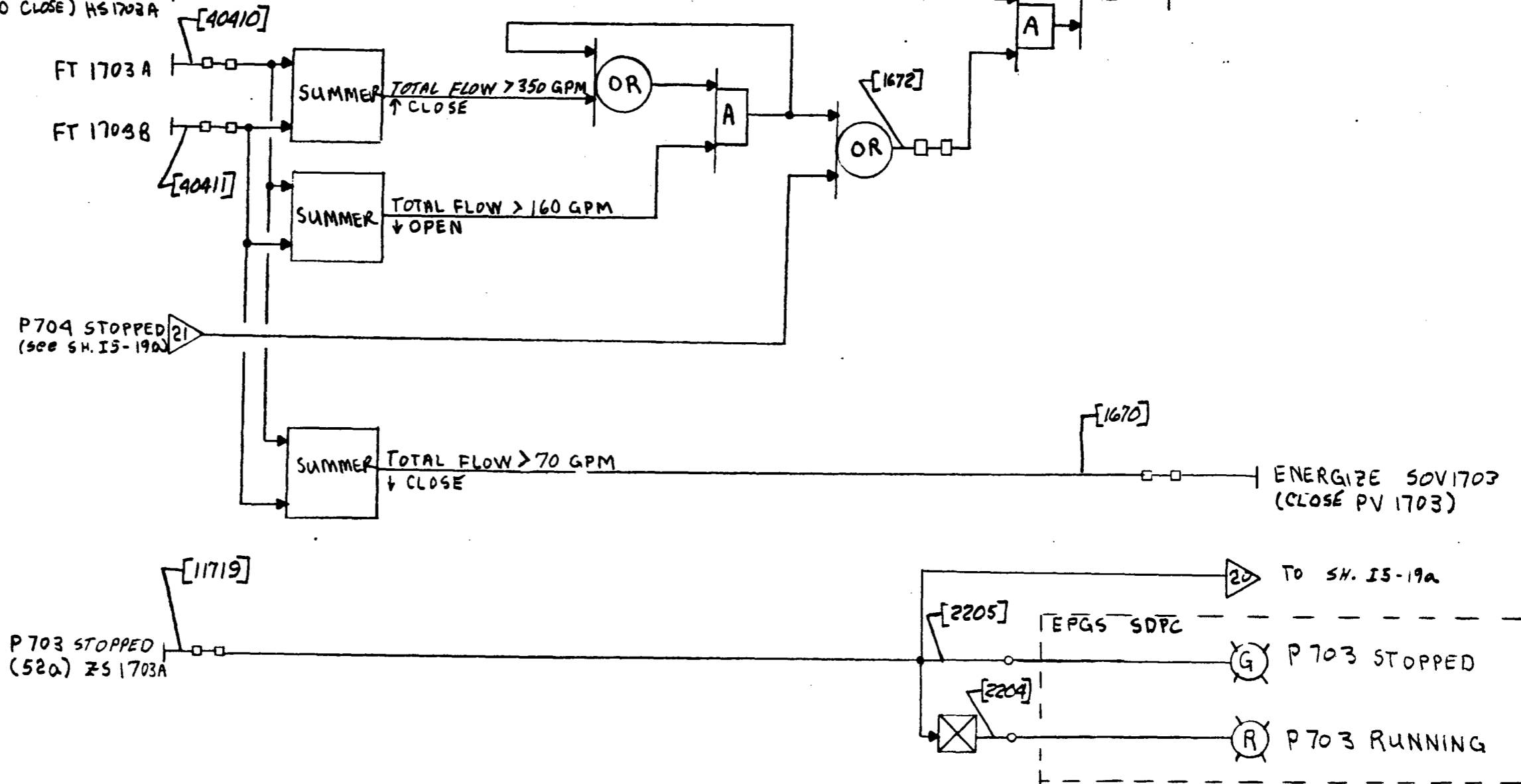
REVISIONS			PRINT RECORD							BY		DATE		DESCRIPTION		DWG. NO.	
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	BY	DATE	DESCRIPTION	DWG. NO.	SHEET NO.	
1				0	11/5/81				REG	RPF		REG	3-13-81	DEMINERALIZED WATER TRANSFER PUMP P-710	9033/4	I5-18	
2														DOE NO 40I7002133096			
3														Stearns-Roger INCORPORATED	ORDER NO.	REVISION 0	

NETWORK NUMBERS  
245, 246, 247, 248, 249  
TAPE ID44789 REV C

RAW WATER TANK LEVEL NOT LO  
LS-1703 ↑ CLOSE

P703 MANUAL START  
(MAINTAINED CLOSE) HS 1703A  
LOCAL

P703 AUTO START  
(MAINTAINED CLOSE) HS 1703A  
LOCAL



P704 STOPPED  
(see SH. IS-19a)

P703 STOPPED  
(52a) ZS 1703A

ENERGIZE SOV1703  
(CLOSE PV 1703)

TO SH. IS-19a

P703 STOPPED

P703 RUNNING

FORM 02-284

REVISIONS			PRINT RECORD					BY		DATE		RAW WATER PUMP P-703		DWG. NO. 9033/4	
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	DOE NO.	ORDER NO.	SHEET NO. IS-19	REVISION
1				0	7/31	744			RCD	RPF		40I7002133098			0

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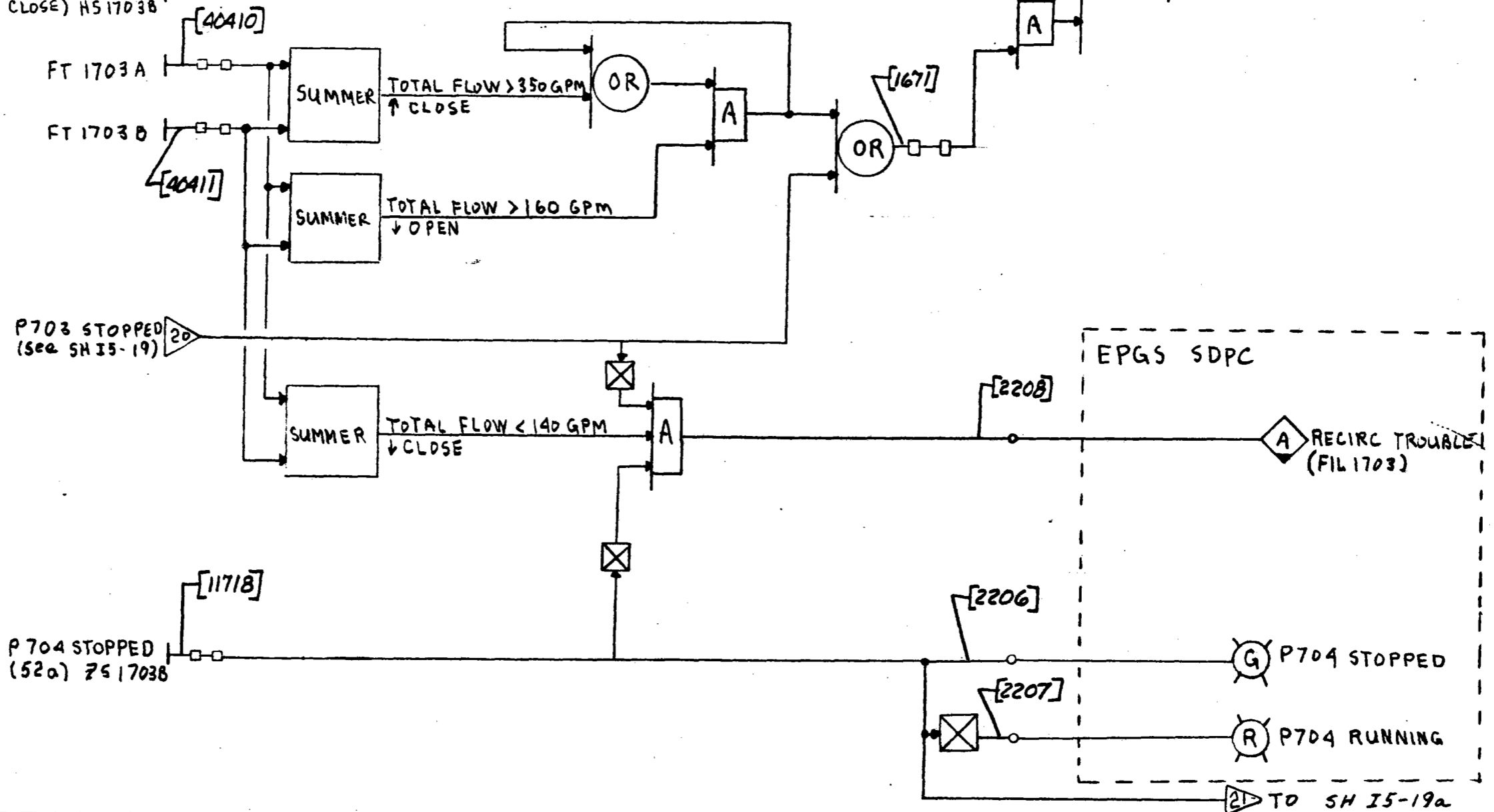
ORDER NO.

REVISION

RAW WATER TANK LEVEL NOT LO  
LS-1703 ↑ CLOSE

P704 MANUAL START  
(MAINTAINED CLOSE) HS 1703B  
LOCAL

P704 AUTO START  
(MAINTAINED CLOSE) HS 1703B  
LOCAL



REVISIONS			PRINT RECORD					BY	DATE		
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED
△				1	7/1/81				REB	RPE	
△											
△											
△											
△											

RAW WATER PUMP P-704

DOE NO 40I 7002 133098

**Stearns-Roger**  
INCORPORATED

ORDER NO.

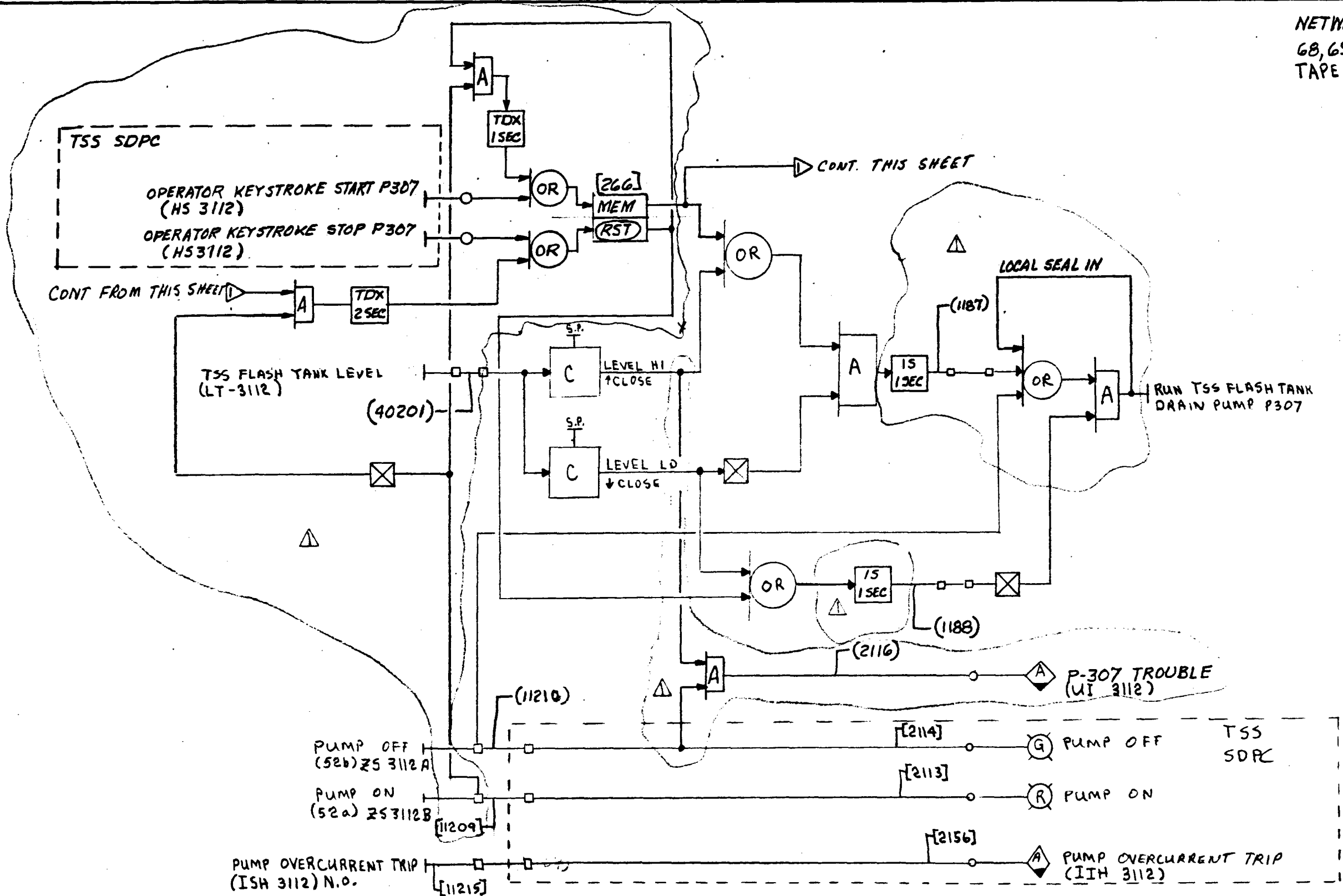
DWG. NO. 9033/4

SHEET NO. I5-19a

REVISION

FORM 02-264

NETWORK NUMBERS  
68, 69, 70, 71, 72  
TAPE 1044789 REYC



FORM 02-284

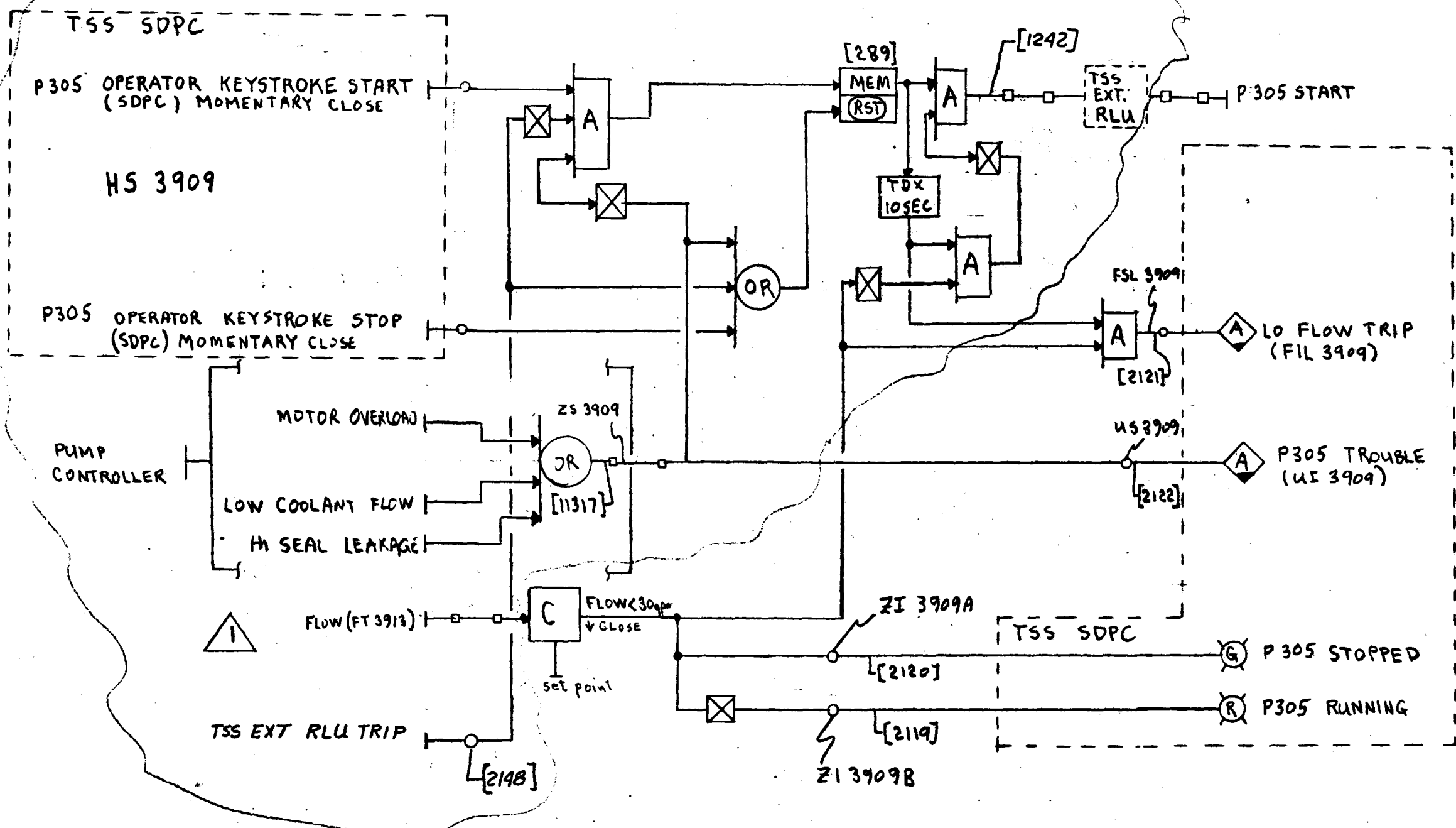
REVISIONS			PRINT RECORD					BY		DATE	TSS FLASH TANK DRAIN PUMP (P307)		DWG. NO.
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	DATE	SHEET NO.
1	ISSUED FOR COMMENT	REB	4-15-80	1	4/15/80				REB	GAJ	DRS	5-23-80	9033/4
2	DELETED BY UNITS AND REPLACED WITH ILS COMPARATORS, REDREW FOR APPROVAL	REB	5-23-80	2	5/23/80				GAJ	DRS	DRS	10-23-80	15-20
3	APC	REB	6-19-80	3	6/19/80				DRS			11-3-80	
4	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81	4	7/3/81								

DOE NO. 40I7002133019

**Stearns-Roger**  
INCORPORATED

ORDER NO.

REVISION



REVISIONS		PRINT RECORD							BY		DATE			
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10
1	ISSUED FOR COMMENT	RQB	9-15-80	DATE ISSUED	1/20	2/20	3/19	4/19	5/17	6/17	7/17	8/17	9/17	10/17
2	PUT PUMP STATUS INDICATION ON FLOW INDICATION; ADDED [G]	RQB	5-15-80	CUSTOMER	1/10	2/10	3/20	4/19	5/19	6/19	7/19	8/19	9/19	10/19
3	FOR APPROVAL	RQB	6-19-80	FIELD										
4	ADDED MEMORY RESET PER D.LANDY	RQB	9-29-80	INTRA CO.										
5	AFC	RQB	11-7-80											
6	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81											

THERMAL STORAGE FLUID  
AUX PUMP CONTROL (P305)

DOE NO. 40I7002133031

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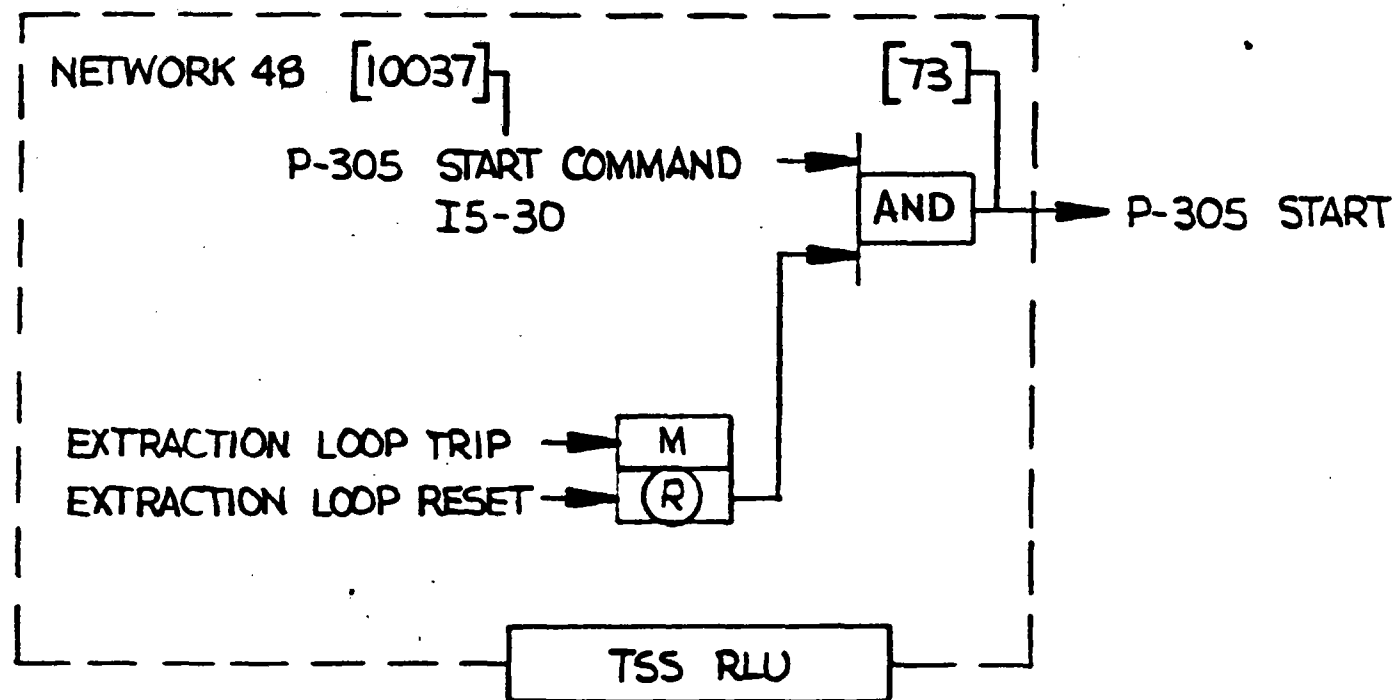
ORDER NO.

DRG. NO.  
9033/A

SHEET NO.  
I5-30

REVISION

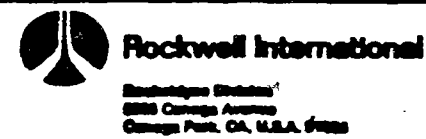




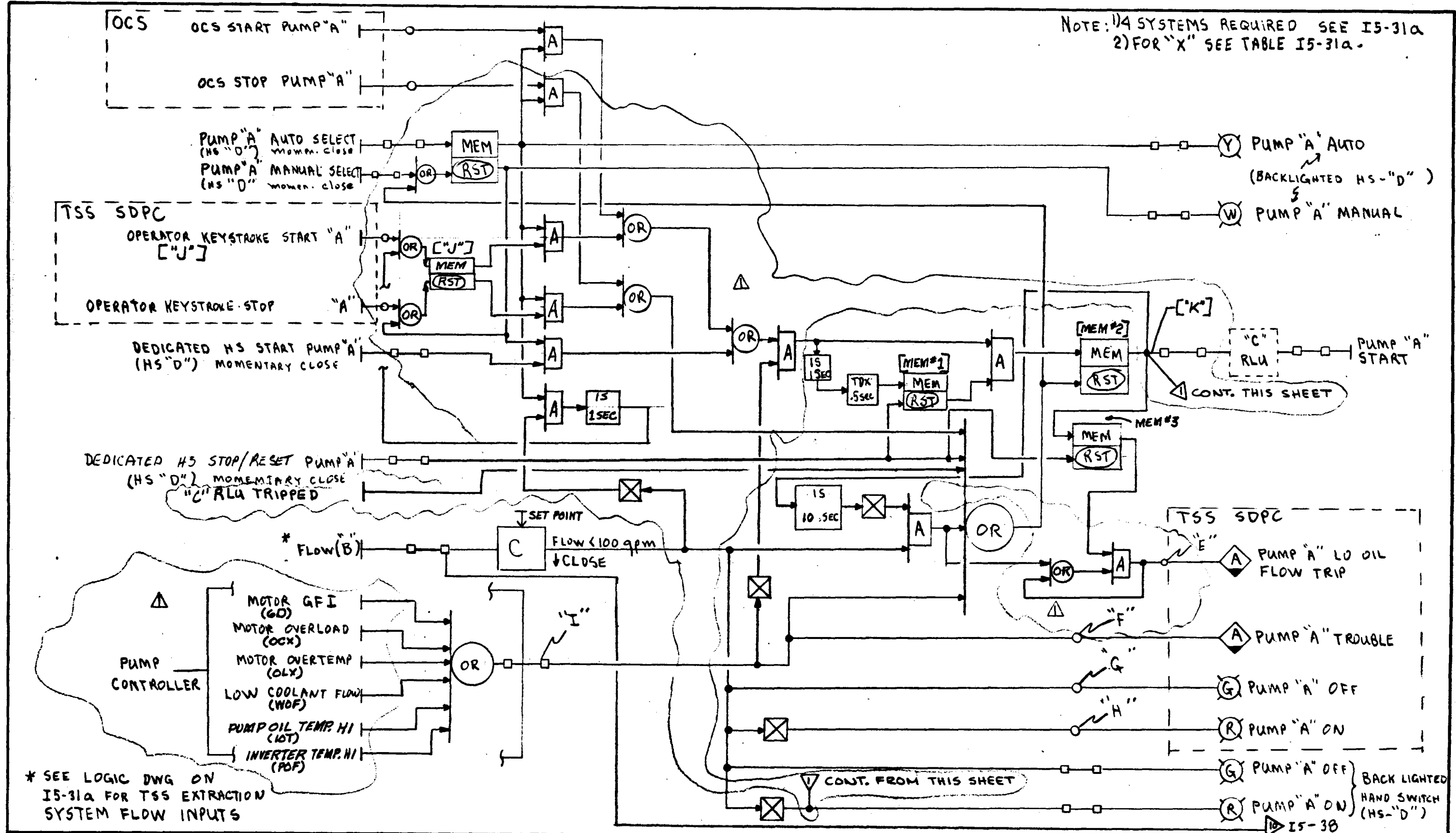
NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE  
 TAPE 1D44773 REV. A RCVR RLU, 9-21-81

NO.	DESCRIPTION	BY	APPO	DATE	PRINT RECORD												BY	DATE	PUMP CONTROL P-305	DRWG. NO. 9033/4	SHEET NO. I5-30a	REVISION
					REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	ELECT. APPD	APPROVED								

12-0-2 2-0-21



NOTE: 1) A SYSTEMS REQUIRED SEE I5-31a  
 2) FOR "X" SEE TABLE I5-31a.



\* SEE LOGIC DWG ON I5-31a FOR TSS EXTRACTION SYSTEM FLOW INPUTS

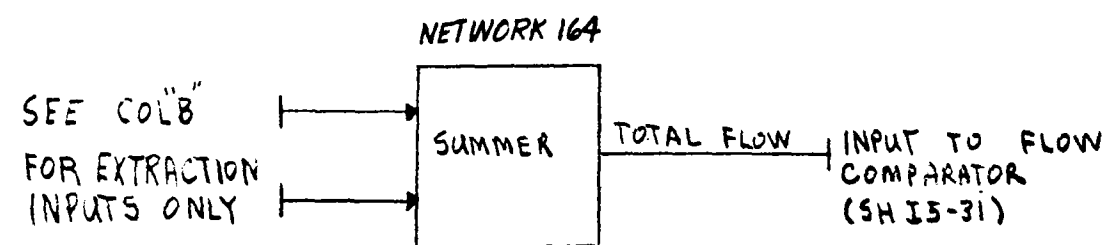
REVISIONS			PRINT RECORD				BY	DATE	TSS FLUID OIL PUMP CONTROL (CHARGING - P301 & P302 ; EXTRACTION - P303 & P304)	Dwg. No. 9033/4
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CHECK	DATE			
1	ISSUED FOR COMMENT	RGB	9/15/80	1	11/3/80	1	11/3/80	11-3-80	SHEET NO. I5-31	
2	REDRAW TO ADD AUTO/MAN SELECT; ADD [C] FOR APPROVAL	RGB	5/16/80	2	11/3/80	2	11/3/80	11-3-80		
3	ADDED TOX TO LOCKOUT; ADDED ALARM RESET TO LO FLOW PERD	RGB	9-29-80	3					DOE NO. 40I7002133032	
4	AFC	RGB	11-7-80	4						
5	ADDED PLC #1 & #2 INTERFACE	RIF	7-3-81	5					ORDER NO.	
								REVISION	1	

**Stearns-Roger**  
INCORPORATED

FORM 02-264

PUMP FUNCTION	"A" PUMP R/SFDI NO.	"B" FLOW TRANSMITTER R/SFDI NO.	"C" RLU	* "D" HS NO.	"E" ALARM TAG	"F" ALARM TAG	"G" INDICATOR TAG	"H" INDICATOR TAG
TSS CHARGING	TFCP-1/P301	THFFR-1/FT 3211	TSS CHARGING	HS-3413A, B,C	FIL 3413 [2123]	UI 3413 [2124]	ZI 3413A [2126]	ZI 3413B [2125]
TSS CHARGING	TFCP-2/P302	THFFR-2/FT 3310	DITTO	HS-3414A, B,C	FIL 3414 [2127]	UI 3414 [2128]	ZI 3414A [2130]	ZI 3414B [2129]
TSS EXTRACTION	TFEP-1/P303	TBFFR-1+TSFFR-1/FT 3706+FT 3712	TSS EXTRACTION	HS-3903B, A,C	FIL 3903 [2131]	UI 3903 [2132]	ZI 3903A [2134]	ZI 3903B [2133]
TSS EXTRACTION	TFEP-2/P304	TBFFR-2+TSFFR-2/FT 3806+FT 3812	DITTO	HS-3904B, A,C	FIL 3904 [2135]	UI 3904 [2136]	ZI 3904A [2138]	ZI 3904B [2137]

"I" TROUBLE TAG	NETWORK NUMBERS	"J" KEYSTROKE COIL	"K" OUTPUT NODE
ZS 3413 [11313]	131-141	290	1239
ZS 3414 [11314]	142-152	291	1238
ZS 3903 [11316]	153-164	292	1240
ZS 3904 [11317]	164-175	293	1241



\* FOR P301 & P302  
 A = DEDICATED START/STOP SW  $\Delta$   
 B = SDPC KEYSTROKE START/STOP SW  
 C = AUTO/MAN SW  
 FOR P303 & P304 A & B ARE REVERSED

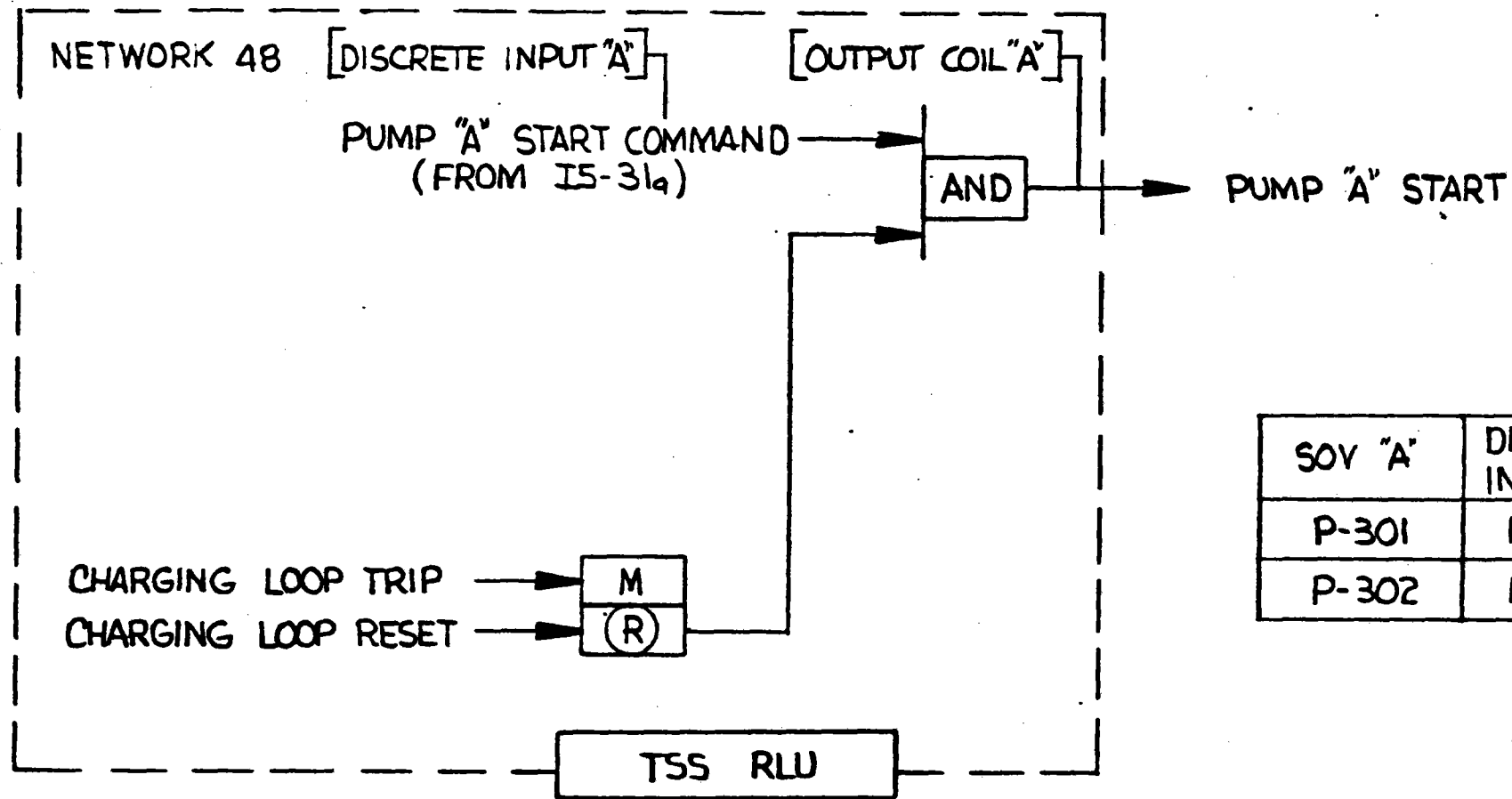
TAPE ID 44789 REV C  $\Delta$

REVISIONS			PRINT RECORD							BY	DATE	TSS FLUID OIL PUMP CONTROL TABLE	Dwg. NO. 9033/4
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	BY	DATE	BY	DATE	DESCRIPTION	SHEET NO. I5-31a		
$\Delta$	ISSUED FOR COMMENT	REB	4-15-80		4/15	5/16	6/19	7/17	7/30	REB	4-15-80	DOE NO. 40I 700213303Z	REVISION $\Delta$
$\Delta$	ADDED ISA TRANSMITTER NOS.; ADDED HS NOS.	REB	5-16-80	CUSTOMER	5/16	5/16	6/10	7/19	7/24	REB	11-3-80		
$\Delta$	FOR APPROVAL	REB	6-19-80	FIELD						REB	11-3-80		
$\Delta$	AFC	REB	11-7-80	INTRA CO.									
$\Delta$	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81										

**Stearns-Roger**  
INCORPORATED

ORDER NO.

FORM 02-264

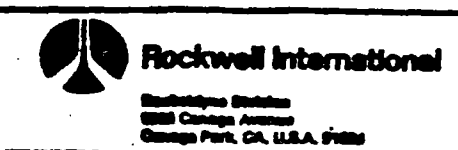


SOV "A"	DISCRETE INPUT "A"	OUTPUT COIL "A"
P-301	10033	65
P-302	10034	66

NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

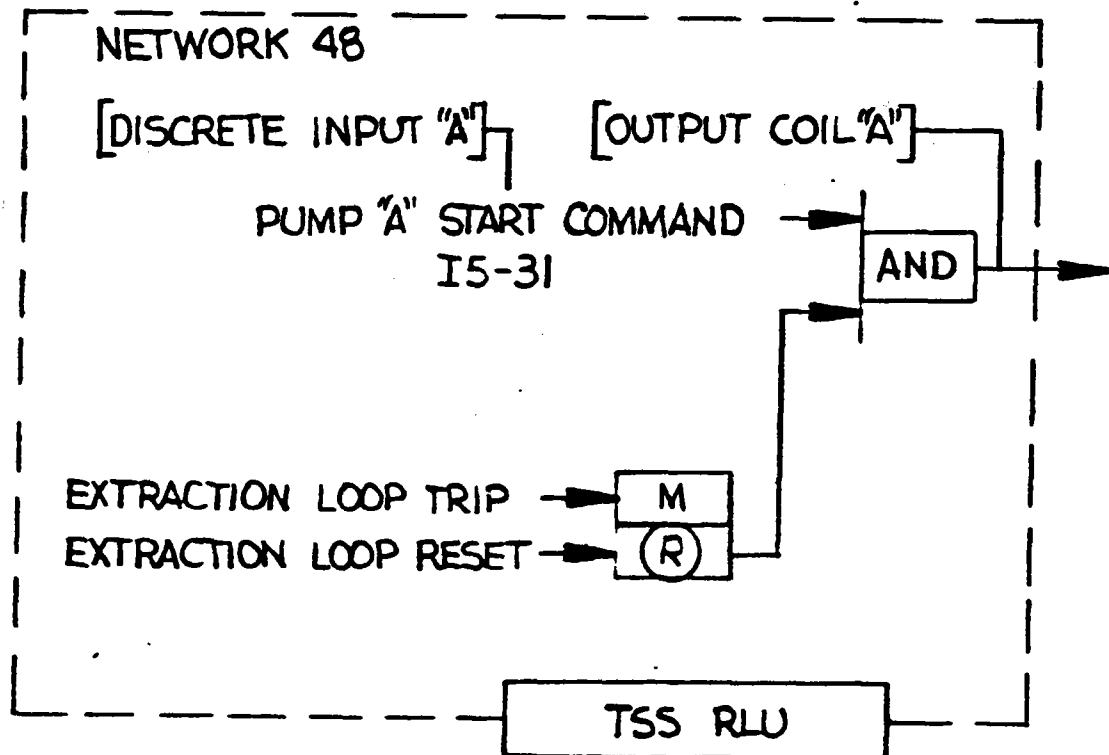
				PRINT RECORD										
NO.	DESCRIPTION	BY	APPD	DATE									BY	DATE
					REVISION								DRAWN	
					DATE ISSUED								CHECK	
					CUSTOMER								APPROVED	<i>L.B.</i> 9-21-81
					FIELD								ELECT. APPD	
					INTRA CO.								APPROVED	<i>RTP</i> 9-21-81
	REVISIONS													

THERMAL STORAGE FLUID CHARGING PUMP P-301, P-302



DWG. NO. 9033/4  
SHEET NO. I5-31b  
REVISION

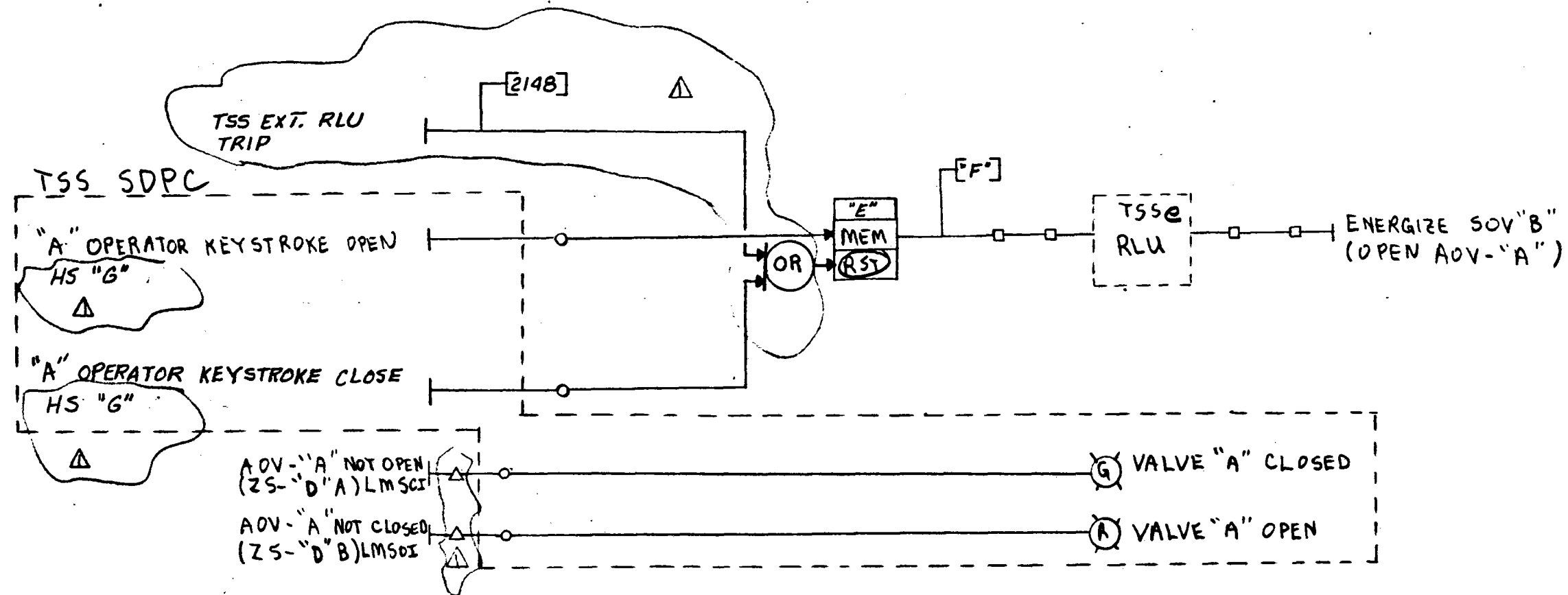
12-0-2 REV. 7/88



PUMP "A"	DISCRETE INPUT "A"	OUTPUT COIL "A"
P-303	10035	69
P-304	10036	70

NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE 1D44773 REV. A RCVR RLU, 9-21-81

12-0-2 REV. 7/89	PRINT RECORD										PUMP CONTROL P-303, P-304	Rockwell International Rockledge Station 6200 Carnegie Avenue Chicago Park, IL, U.S.A. 60630	REVISION	BY	DATE	DWG. NO.
	DATE ISSUED	DRAWN	CHECK	9033/4												
	CUSTOMER	APPROVED	9-21-81	SHEET NO.												
	FIELD	SELECT. APPD	9-21-81	I5-31c												
	INTRA CO.	APPROVED	9-21-81	REVISION												
NO.	DESCRIPTION	BY	APPO	DATE												
REVISIONS																



"A" SFOI / R TAG NO.	"B" SOV NO	"D" VALVE POSITION INDICATION SWITCH NO.	VALVE DESCRIPTION	NETWORK	INPUT COIL "E"	OUTPUT NODE "F"	KEYSTROKE TAB "G"
AOV-3708/TBWBLV-1	SOV-3708	ZS-3708	BOILER WATER BLOWDOWN VALVE	75	267	1224	HS-3708
AOV-3808/TBWBLV-2	SOV-3808	ZS-3808	BOILER WATER BLOWDOWN VALVE	77	268	1227	HS-3808

TAPE ID44789 REYC

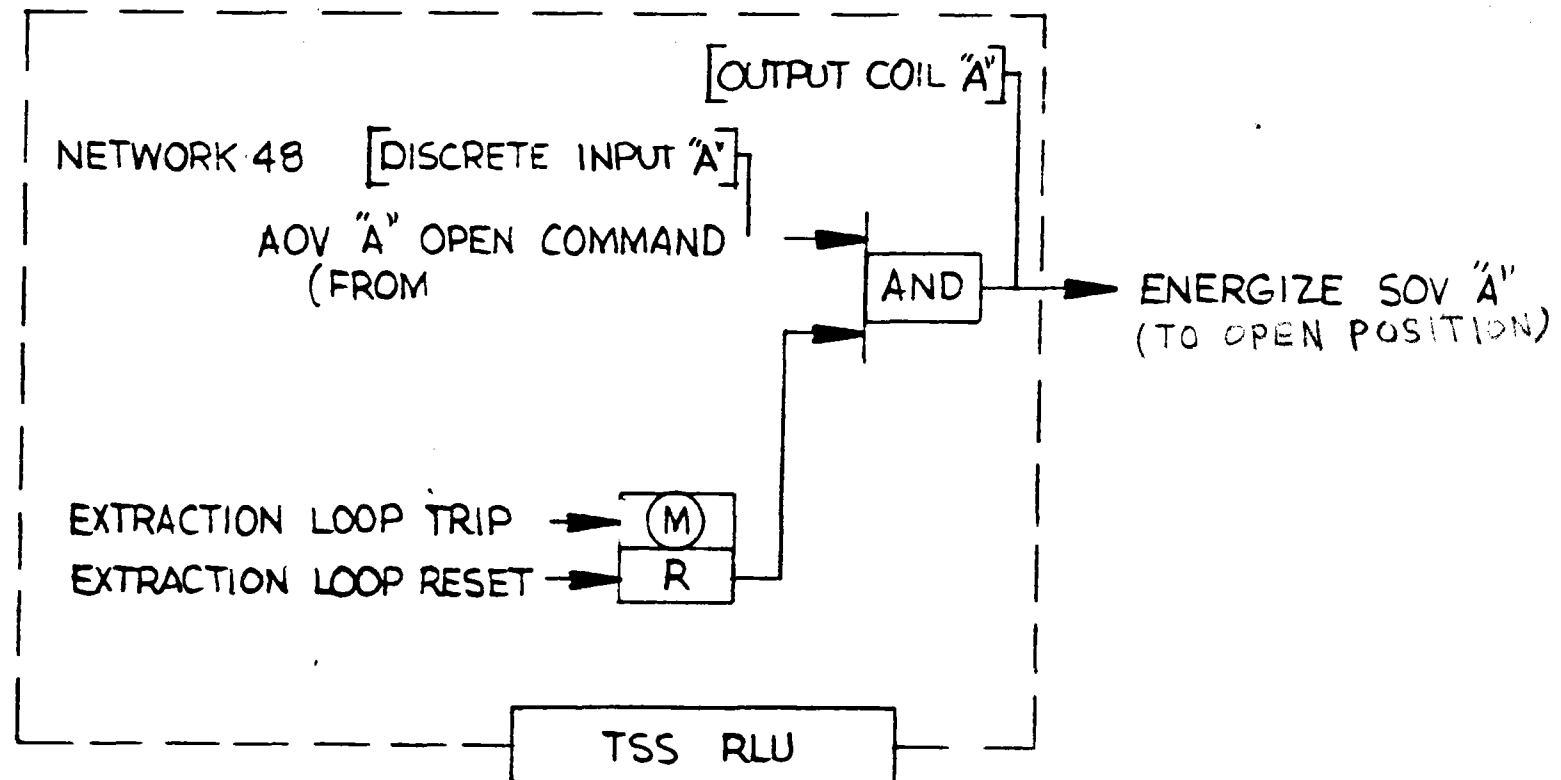
REVISIONS			PRINT RECORD										BY		DATE		NO.		
NO.	DESCRIPTION	BY	DATE	REVISION	A	B	C	D	E	F	G	H	I	J	DRAWN	CHECK	APPROVED	DOE NO.	REV.
1	MOVED FROM I5-33	RFB	8-12-80	1											RFB	RFB	11-3-80	4017002133069	9033/4
2	AFC	RFB	11-2-80	2											RFB	RFB	11-3-80		I5-32
3	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81	3											RFB	RFB	11-3-80		

Stearns-Roger  
INCORPORATED

ORDER NO.

REVISION

SOV "A"	DISCRETE INPUT "A"	OUTPUT COIL "A"
SOV 3708	10021	9
SOV 3808	10022	14

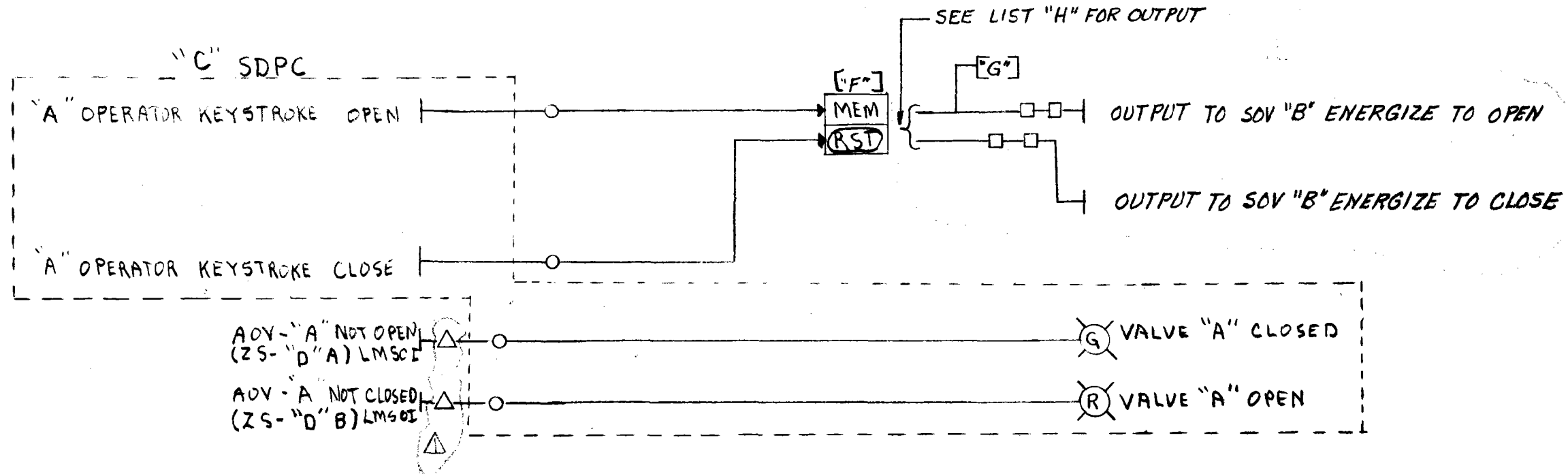


NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

NO.	DESCRIPTION	BY	APPD	DATE	PRINT RECORD												BY	DATE	DWG. NO.	SHEET NO.	REVISION									
					REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	ELECT. APPD	APPROVED																
																			BOILER WATER BLOWDOWN VALVE	DWG. NO.	9033/4									
																			AOY-3708, AOV-3808	SHEET NO.	I5-32a									
																			Rockwell International	REVISION										
																			Rockwell International 8025 Carnegie Avenue Cupertino, CA, U.S.A. 95014											

NOTE: 11 SYSTEMS REQUIRED SEE I5-33a

NETWORK NUMBER "E"



FORM 02-264

REVISIONS			PRINT RECORD							BY	DATE	AOV VALVES: -3220 -3320 -3209 -3309 -3905 -3906 -3707 -3807 -3218 -3318 -2903	DWG. NO.							
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7		8	9	10	11	12	13	14	15
1	ISSUED FOR COMMENT	RQB	4-15-80	DATE ISSUED	4/15/80	5/19/80	6/19/80	7/15/80												9033/4
2	REVISED TAG NOS TO ISA.	RQB	5-16-80	CUSTOMER	4/15/80	5/19/80	6/19/80	7/15/80												SHEET NO.
3	FOR APPROVAL	RQB	6-19-80	FIELD																I5-33
4	MOVED AOV 3708 & AOV 3805 TO I5-32	RQB	8-12-80	INTRA CO.																DOE NO. 40I7002133033
5	AFC	RQB	11-7-80																	ORDER NO.
6	ADDED PLC #1 INTERFACE	RPF	11-7-81																	REVISION

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"H" ENERGIZE TO	"A" HS/SFOI NO.	"B" SOV NO.	"C" SDPC CONTROL CONSOLE	"D" VALVE POSITION IND. SW. NO.	VALVE DESCRIPTION	NETWORK "E"	INPUT COIL "F"	OUTPUT NODE "G"
OPEN	HS3220 / ADV-3220	SOV-3220	TSS	ZS-3220	STEAM TRAP VENT CONTROL VALVE	99	278	1351
OPEN	HS3320 / ADV-3320	SOV-3320	TSS	ZS-3320	DITTO	95	277	1350
OPEN	HS3209 / ADV-3209	SOV-3209	TSS	NONE	R-CAL SOV TO PT 3209	93	276	1348
OPEN	HS3309 / ADV-3309	SOV-3309	TSS	NONE	R-CAL SOV TO PT 3309	91	275	1347
OPEN	HS3905 / ADV-3905	SOV-3905	TSS	ZS-3905	EXTRACTION PUMP INTERCONNECT CONTROL VALVE	89	274	1353
OPEN	HS3906 / ADV-3906	SOV-3906	TSS	ZS-3906	DITTO	87	273	1352
CLOSE	HS3707 / ADV-3707	SOV-3707	TSS	ZS-3707	STEAM GENERATOR BLANKET STEAM CONTROL VALVE	81	270	1249
CLOSE	HS3807 / ADV-3807	SOV-3807	TSS	ZS-3807	DITTO	79	269	1251
CLOSE	HS3218 / ADV-3218	SOV-3218	TSS	ZS-3218	THERMAL STORAGE HEATER BLANKET STEAM CONTROL VALVE	85	272	1346
CLOSE	HS3318 / ADV-3318	SOV-3318	TSS	ZS-3318	DITTO	83	271	1345
OPEN	HS2903 / ADV-2903	SOV-2903	RS	ZS-2903	DOWNCOMER MANIFOLD START UP BLEED VALVE	97	12	1047

TAPE 1044789 REVC

REVISIONS				PRINT RECORD							BY		DATE		I5-33 VALVES CONTROL TABLE	DWG. NO. 9033/4
NO.	DESCRIPTION	BY	DATE	REVISION	A	B	C	D	E	F	G	H	I	J		
1	ISSUED FOR COMMENT	RGB	4-15-80	1											11-3-80	
2	ADDED ADV-3209 + ADV-3309 ISA NOS.	RGB	5-16-80	2											11-3-80	
3	FOR APPROVAL	RGB	6-19-80	3											11-3-80	
4	MOVED ADV 3708 + ADV 3808 TO I5-32	RGB	9-11-80	4												
5	AFC	RGB	11-7-80	5												
6	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81	6												

I5-33 VALVES CONTROL TABLE

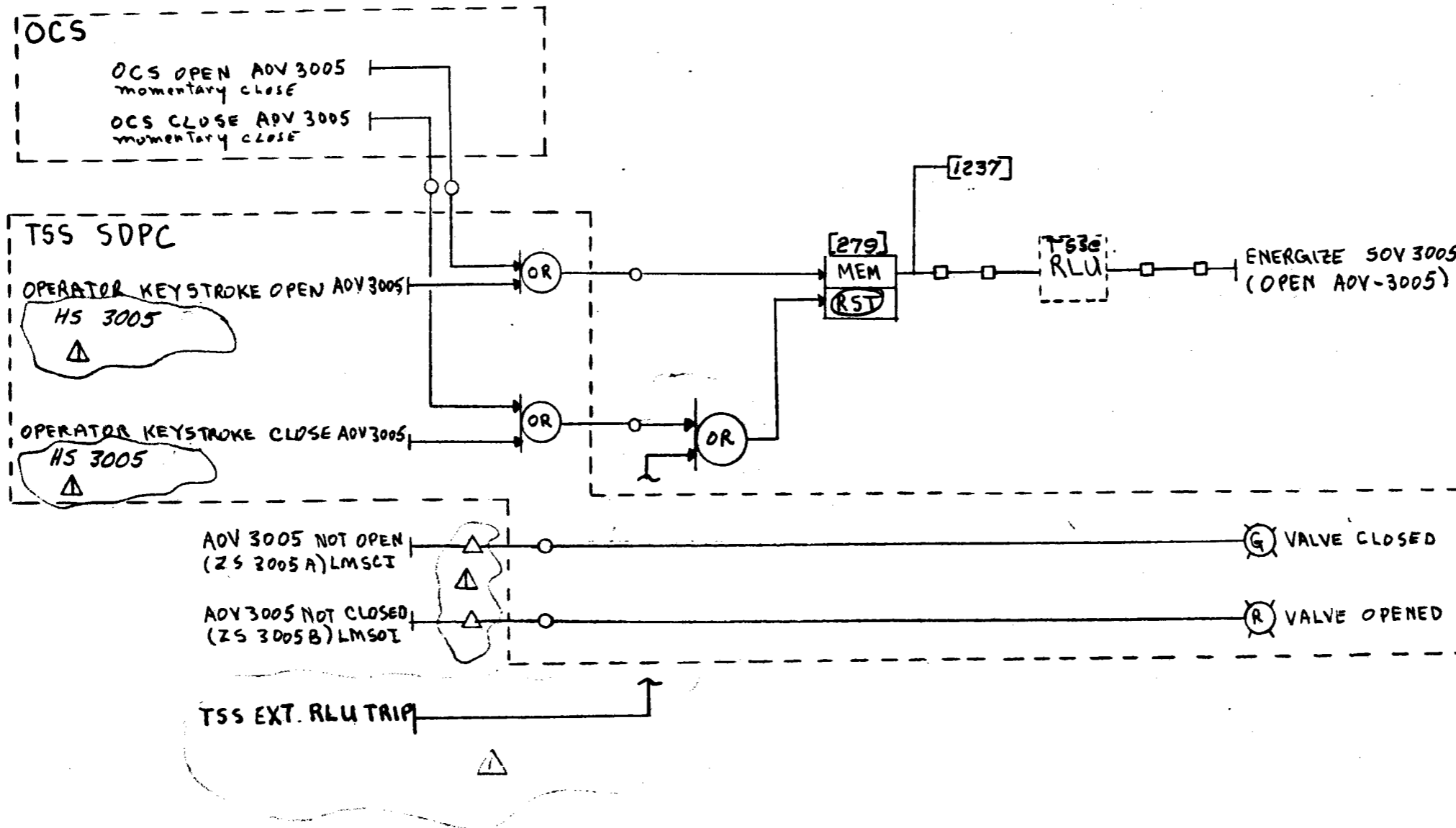
DOE NO 40I7002133033

**Stearns-Roger**  
INCORPORATED

ORDER NO.

REVISION 

FORM 02-264



REVISIONS		BY		DATE		PRINT RECORD							BY		DATE	
NO.	DESCRIPTION	BY	DATE	REVISION	A	R	A	A	A	A	A	A	A	A	A	
1	ADDED PLC #1 & #2 INTERFACE	RPE	7-3-81													
2	ISSUED FOR COMMENT	RCS	4-15-80													
3	ADDED ISA NOS.	RCS	5-16-80													
4	FOR APPROVAL	RCS	6-19-80													
5	ADDED RLU	RCS	9-18-80													
6	ADDED POSITION SWITCHES	RCS	9-24-80													
7	AFC	RCS	11-7-80													

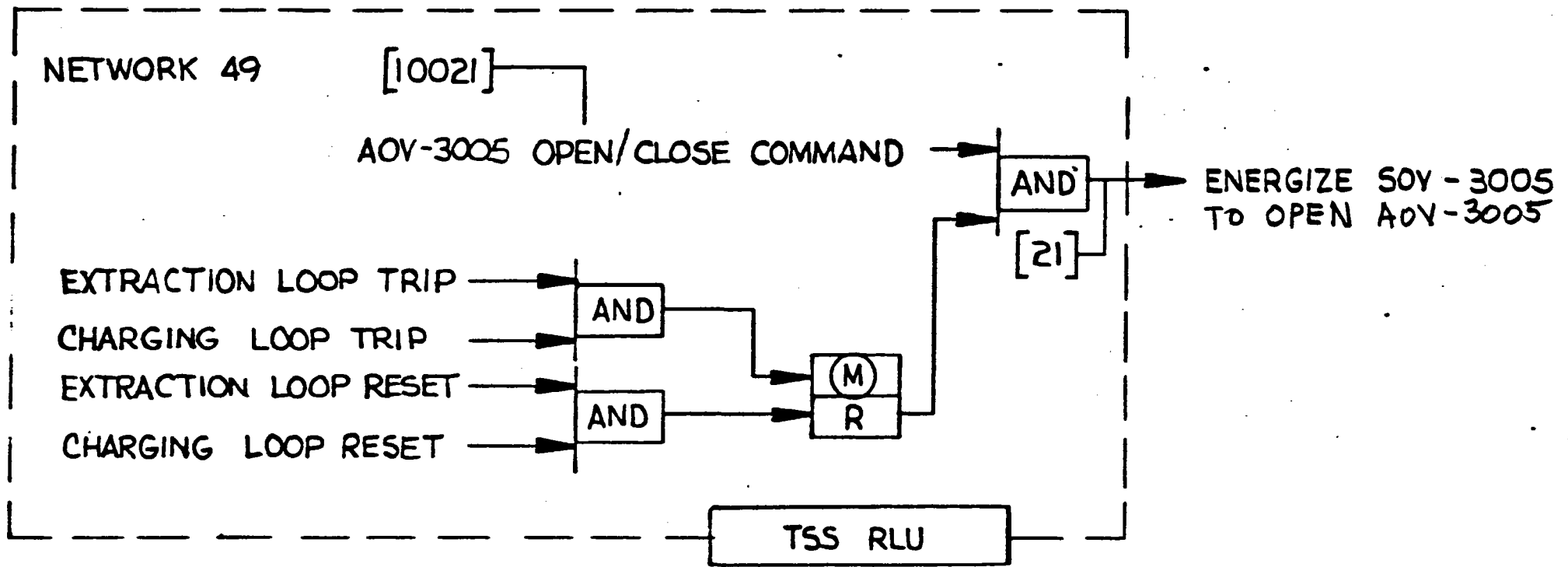
THERMAL STORAGE HOT STANDBY  
FLUID CONTROL VALVE - ADV 3005

DOE NO. 40I7002133034

**Stearns-Roger**  
INCORPORATED

ORDER NO.

DWG. NO.  
**9033/4**  
SHEET NO.  
**I5-34**  
REVISION

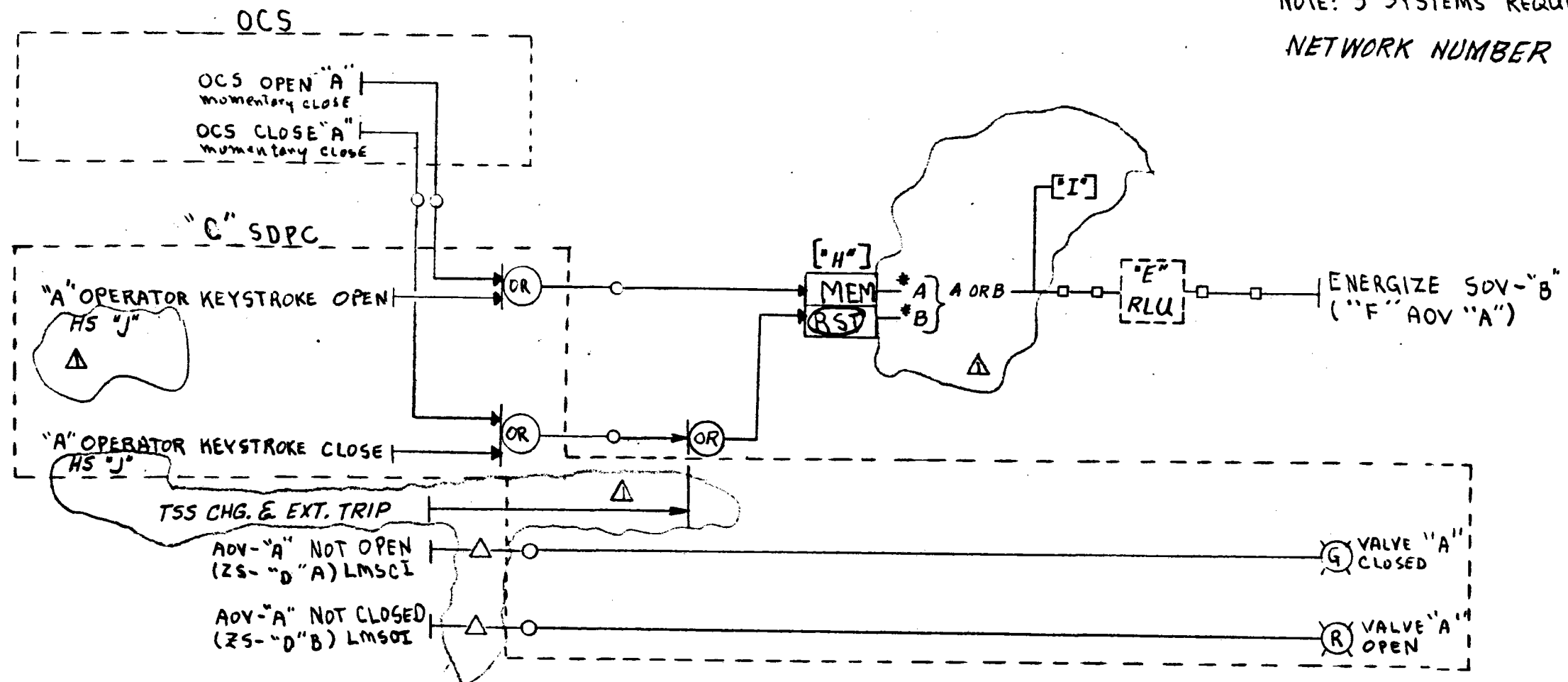


NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

				PRINT RECORD								BY		DATE		CONTROL AOV-3005		DWG. NO.		
				REVISION	/ / / / / / / / / /								DRAWN				9033/4		SHEET NO.	
				DATE ISSUED									CHECK				I5-34a		REVISION	
				CUSTOMER									APPROVED	B.B.	9-21-81	Rockwell International		△		
				FIELD									ELECT. APPD			Rockledge Station				
				INTRA CO.									APPROVED	R.P.P.	9-21-81	8880 Carnegie Avenue				
																Garage Park, CA, U.S.A. 95026				
NO.	DESCRIPTION	BY	APPD	DATE																
				REVISIONS																

NOTE: 5 SYSTEMS REQUIRED SEE I5-35a

NETWORK NUMBER "G"



\* A IS AOV-3907 OR AOV-3004  
 \* B IS AOV-3001 OR AOV-3002 OR AOV-3003

REVISIONS			PRINT RECORD							BY		DATE		DOE NO. 40I7002133035	Stearns-Roger INCORPORATED	ORDER NO.	REVISION
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED						
1	ISSUED FOR COMMENT	RFB	4-15-80							RFB		4-15-80	AOV VALVES: -3001 -3002 -3003 -3004 -3907	9033/4	SHEET NO. I5-35	REVISION	
2	ADDED ISA NOS. TO TITLE BLOCK; DELETED AOV 2009	RFB	5-16-80							DL		11-3-80					
3	FOR APPROVAL	RFB	6-19-80									11-3-80					
4	AFC	RFB	11-7-80									11-3-80					
5	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81														

FORM 02-264

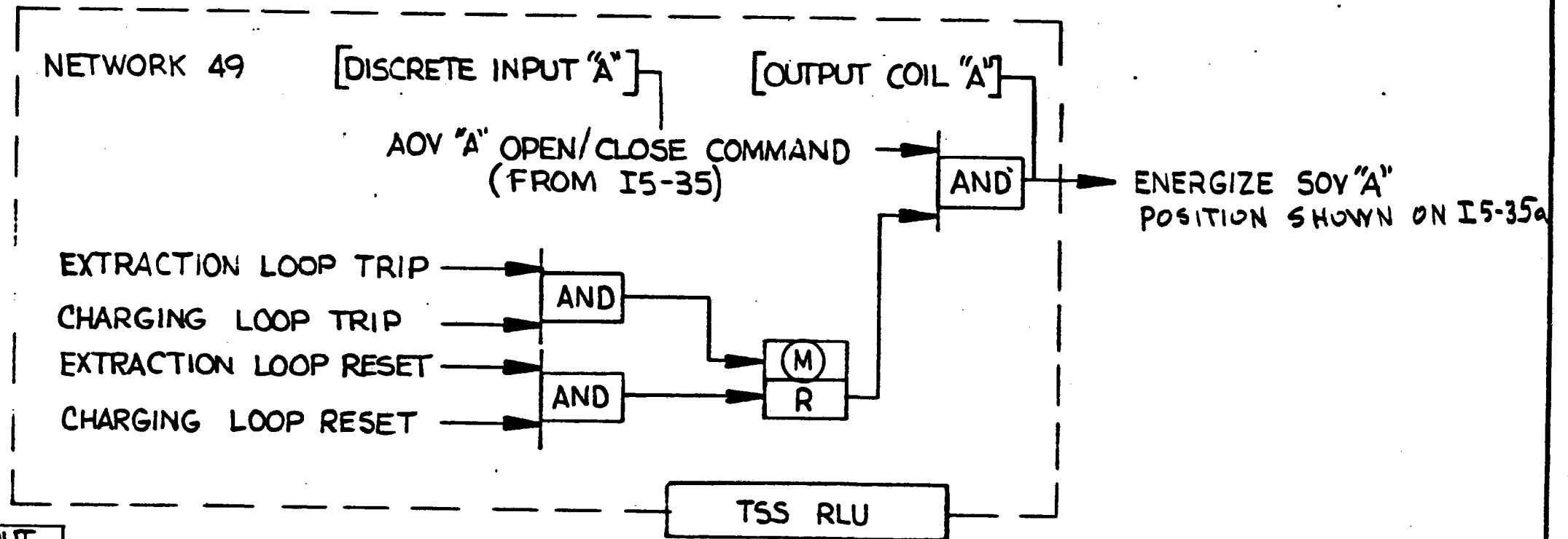
"A" R / SFDI TAG NO.	"B" SOV NO.	"C" SDPC CONTROL CONSOLE	"D" VALVE POSITION INDICATION SW. NO.	VALVE DESCRIPTION	"E" RLU
TUFCV / ADV-3002	SOV-3002	TSS	ZS-3002	THERMAL STORAGE UNIT INLET/OUTLET CONTROL VALVE	TSSe
TUFBV-1 / ADV-3001	SOV-3001	TSS	ZS-3001	THERMAL STORAGE UNIT BYPASS CONTROL VALVE	TSSE
TUFBV-2 / ADV-3003	SOV-3003	TSS	ZS-3003	DITTO	TSSe
TUFEV / ADV-3004	SOV-3004	TSS	ZS-3004	THERMAL STORAGE UNIT FLUID EXTRACTION CONTROL VALVE	TSSE
TFAV / ADV-3907	SOV-3907	TSS	ZS-3907	THERMAL STORAGE AUX FLUID CONTROL VALVE	TSSE

"F" ENERGIZED POSITION	NETWORK NUMBER "G"	INPUT COIL "H"	OUTPUT NODE "I"	HS TAG "J"
CLOSE	109	283	1234	HS 3002
CLOSE	111	284	1233	HS 3001
CLOSE	107	282	1235	HS 3003
OPEN	105	281	1236	HS 3004
SELECT AUX MANIFOLD	103	280	1228	HS 3907

TAPE ID44789 REVC  
△

REVISIONS				PRINT RECORD								BY	DATE	I5-35 VALVES CONTROL TABLE	DWG. NO.
NO.	DESCRIPTION	BY	DATE	REVISION	PA	PA	PA	PA	PA	PA	PA	PA	PA		DATE
△	ISSUED FOR COMMENT	RFB	4-15-80	DATE ISSUED	1/16/80	5/14/80	6/19/80	11/7/80	11/30/80					9-15-80	SHEET NO.
△	ADDED ISA NOS. TO TITLE BLOCK	RFB	5-16-80	CUSTOMER	1/16/80	5/14/80	6/19/80	11/7/80	11/30/80					11-3-80	I5-35a
△	FOR APPROVAL	RFB	6-19-80	FIELD										11-3-80	DOE NO. 40I7002133035
△	ADDED "F" COLUMN	RFB	11-7-80	INTRA CO.											ORDER NO.
△	RFC	RFB	11-7-80												REVISION
△	ADDED PLC #1 & #2 INTERFACE	RPF RFB	7-3-81												△

**Stearns-Roger**  
INCORPORATED



SOV "A"	DISCRETE INPUT "A"	OUTPUT COIL "A"
SOV-3001	10017	17
SOV-3002	10019	20
SOV-3003	10018	18
SOV-3004	10020	19
SOV-3907	10027	36

NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

REV. A 2-0-81

NO.	DESCRIPTION	BY	APPD	DATE
	REVISION			
	DATE ISSUED			
	CUSTOMER			
	FIELD			
	INTRA CO.			

CONTROL AOV-3001, AOV-3002, AOV-3003, AOV-3004, AOV-3907

APPROVED *L.B.* 9-21-81

APPROVED *R.P.P.* 9-21-81

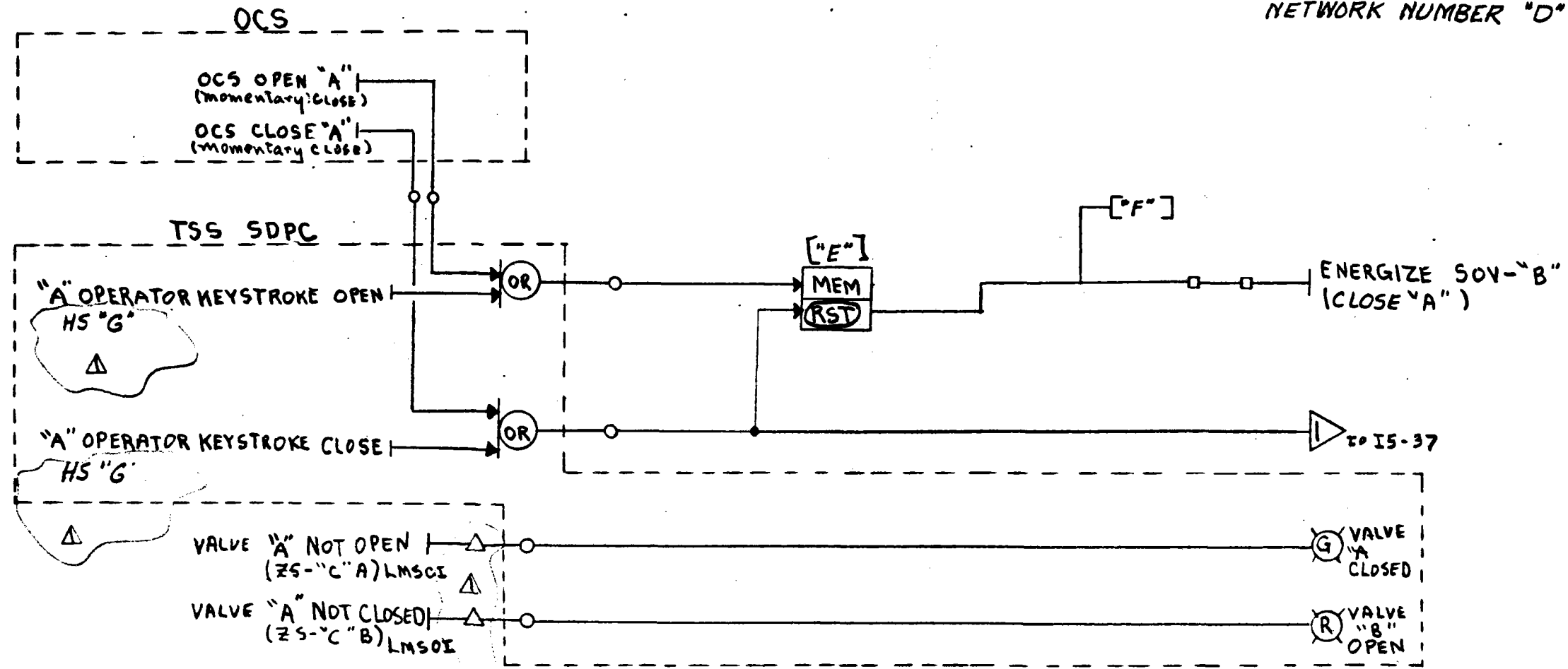
Rockwell International  
 Rockledge Station  
 6500 Carnegie Avenue  
 Chicago Park, IL, U.S.A. 60630

DWG. NO. 9033/4

SHEET NO. I5-35b

REVISION

NOTE: 2 SYSTEMS REQUIRED  
NETWORK NUMBER "D"



"A" R/SFDI NO.	"B" SOV NO	"C" VALVE POSITION INDICATION SW. NO.	VALVE FUNCTION	NETWORK "D"	INPUT COIL "E"	OUTPUT NODE "F"	HS TAG "G"
TSSOV-1 / ADV-3717	SOV-3717	ZS-3717	SUPERHEATER STEAM OUTLET CONTROL VALVE	113	285	1217	HS 3717
TSSOV-2 / ADV-3817	SOV-3817	ZS-3817	DITTO	73	286	1225	HS 3817

TAPE 1044789 REVC

△

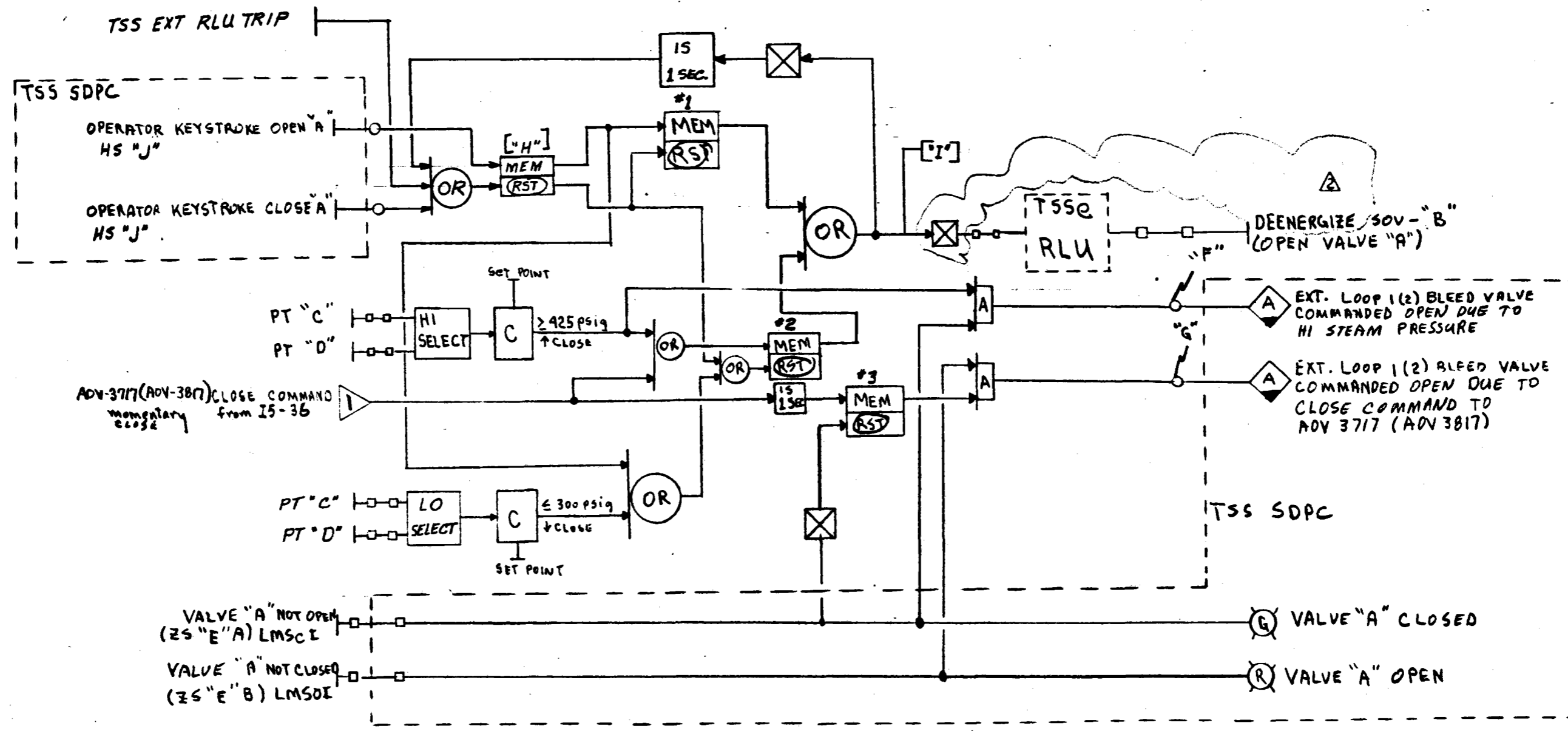
FORM 02-264

REVISIONS			PRINT RECORD								BY		DATE		SUPERHEATER STEAM OUTLET CONTROL VALVES ADV3717 & ADV3817	DOE NO. 40I7002133036	Dwg. No. 9033/4	SHEET NO. I5-36	REVISION
NO.	DESCRIPTION	BY	DATE	REVISION	A	B	C	D	E	F	G	H	I	J					
1	ISSUED FOR COMMENT	REB	4-15-80	DATE ISSUED	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	REB	REB	4-15-80		
2	ADDED ISA NOS. TO TITLE BLOCK	REB	5/14/80	CUSTOMER	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	REB	REB	11-3-80		
3	FOR APPROVAL	REB	6-19-80	FIELD	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	REB	REB	11-3-80		
4	DELETED RLU	REB	9-19-80	INTRA CO.	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	REB	REB	11-3-80		
5	RFC	REB	11-7-80		1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	REB	REB	11-3-80		
6	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81		1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	REB	REB	7-3-81		

**Stearns-Roger**  
INCORPORATED

ORDER NO.

NOTE: 2 SYSTEMS REQUIRED SEE I5-37a.  
 2) FOR "X" SEE I5-37a



FORM 02-264

REVISIONS			PRINT RECORD					BY	DATE	TSS STEAM GENERATOR BLEED CONTROL VALVES (ADV-3117 & ADV-3118)	DWG. NO.
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5		9033/4
1	DELETED SDPC PY. ELEMENTS; ADDED HI SELECT & COMP	REP	6-16-80	DATE ISSUED	5/15	6/16	7/19	8/24	9/24	10/14	11-3-80
2	FOR APPROVAL	REP	6-19-80	CUSTOMER	5/16	6/16	6/20	7/19	7/24	10/28	11-3-80
3	AFC	REP	11-7-80	FIELD							11-3-80
4	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-81	INTRA CO.							
5	REVISED TO FAIL OPEN	RPF	10-1-91								

DOE NO. 40I7002133037

**Stearns-Roger** INCORPORATED

ORDER NO.

REVISION **2**



"A" R/SFDI TAG NO.	"B" SOV NO	"C" PRESSURE TRANSMITTER R/SFDI TAG NO.	"D" PRESSURE TRANSMITTER R/SFDI TAG NO.	"E" VALVE POSITION INDICATION SW.	VALVE FUNCTION
TSSBV-1/ADV 3117	SOV 3117	TBSOP1-1/PT3702A[40202]	TBSOP1-2/PT 3702B[40211]	ZS 3117	STEAM GENERATOR BLEED CONTROL
TSSBV-2/ADV 3118	SOV 3118	TBSOP2-1/PT3802A[40203]	TBSOP2-1/PT 3802 B[40204]	ZS 3118	DITTO

"F" ALARM TAG	"G" ALARM TAG	["H"] INPUT COIL	["I"] OUTPUT NODE	NETWORK NUMBERS	"J" HS TAG
PIH 3117	UI 3117	298	1222	221 - 229	HS 3117
PIH 3118	UI 3118	299	1223	231 - 239	HS 3118

TAPE ID44789 REVC



FORM 02-284

REVISIONS				PRINT RECORD							BY		DATE		ADV 3117 & ADV-3118 (CONT.)	DWG. NO. 9033/4	SHEET NO. 15-37a	
NO.	DESCRIPTION	BY	DATE	REVISION	1	2	3	4	5	6	7	8	9	10				DRAWN
1	DELETED ALL PY ELEMENTS	RQB	6-10-80	DATE ISSUED	1/5	1/6	1/10	1/17	1/13									
2	FDR APPROVAL	RQB	6-19-80	CUSTOMER	1/17	1/18	1/20	1/29	1/44									
3	AFC	RQB	11-7-80	FIELD														
4	ADDED PLC #1 & #2 INTERFACE	RPE	7-3-80	INTRA CO.														

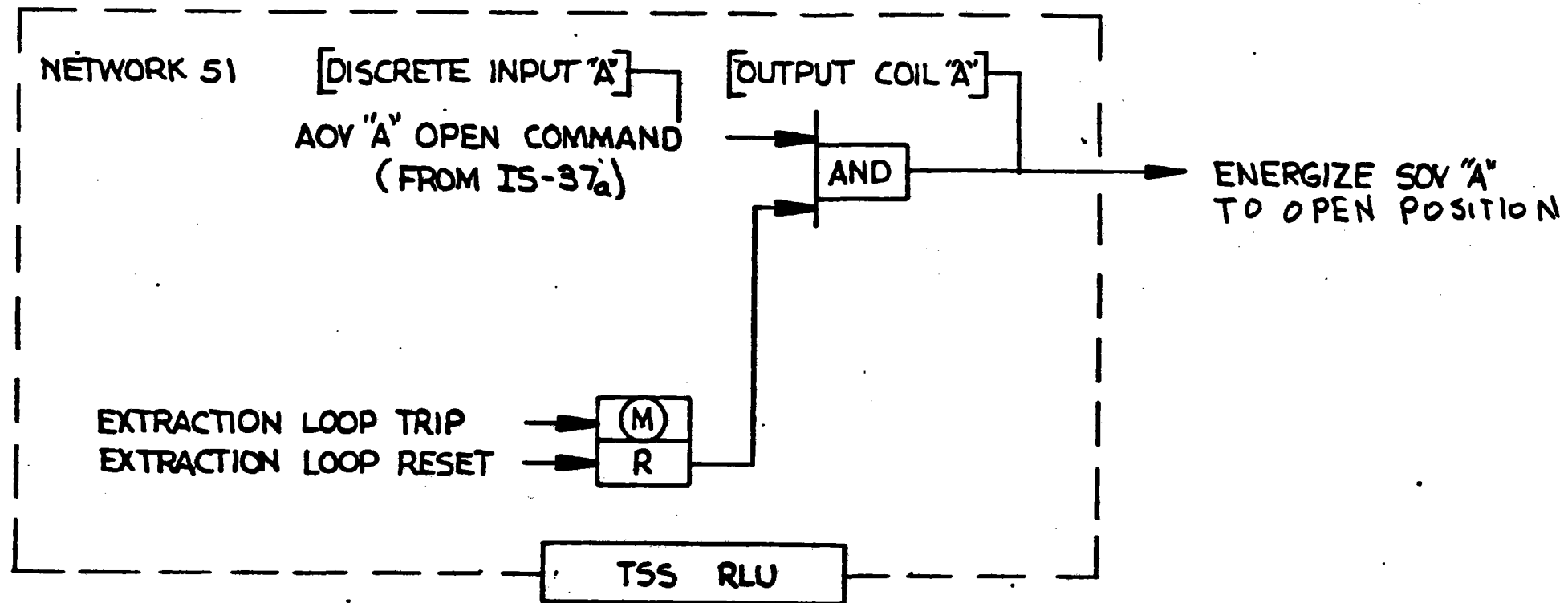
ADV 3117 & ADV-3118 (CONT.)

DOE NO. 40I 7002133037

**Stearns-Roger**  
INCORPORATED

ORDER NO.

REVISION



SOV "A"	DISCRETE INPUT "A"	OUTPUT COIL "A"
SOV 3117	10025	7
SOV 3118	10026	12

NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

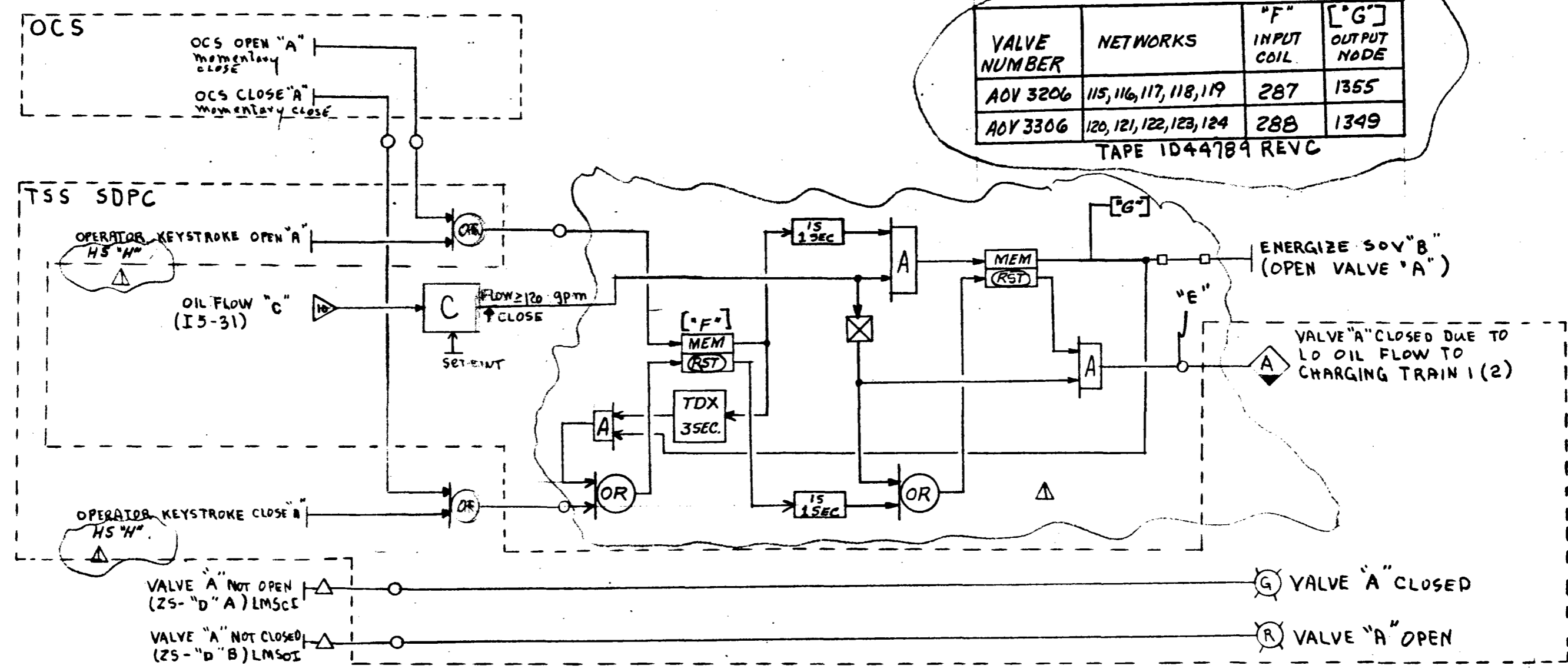
				PRINT RECORD				BY		DATE		STEAM GENERATOR BLEED CONTROL VALVE AOV 3117 AOV 3118		DWG. NO. 9033/4	
REVISION				DRAWN								SHEET NO. I5-37b		REVISION	
DATE ISSUED				CHECK				E.B.		7-21-81				△	
CUSTOMER				APPROVED				RPP		9-21-81					
FIELD				SELECT. APPD.											
INTRA CO.				APPROVED											
NO.				DESCRIPTION				BY		APPD		DATE			
REVISIONS															



Rockwell International

Rockwell Building  
6000 College Avenue  
Orange Park, CA, U.S.A. 91264

NOTE: TWO SYSTEMS REQUIRED



VALVE NUMBER	NETWORKS	"F" INPUT COIL	"G" OUTPUT NODE
ADV 3206	115, 116, 117, 118, 119	287	1355
ADV 3306	120, 121, 122, 123, 124	288	1349

TAPE 1044789 REV C

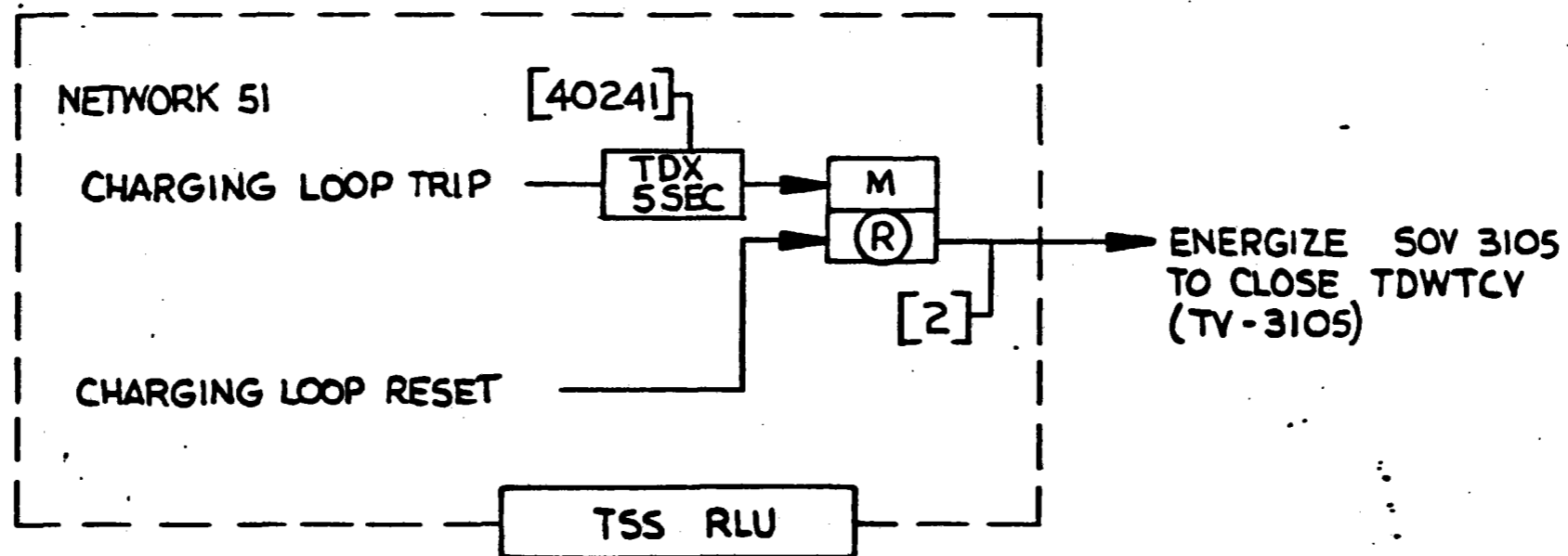
"A" R/SFDI TAG NO.	"B" SOV NO	"C" FLOW TRANSMITTER	"D" R/SFDI TAG NO.	VALVE POSITION INDICATION SW.	VALVE FUNCTION	"E" ALARM TAG	"H" HS TAG
THSIV-1 / ADV-3206	SOV-3206	THFFR-1 / FT-3211 / 40302	ZS-3206	ZS-3206	THERMAL STORAGE HEATER STEAM INLET CONTROL	FIL3206	HS 3206
THSIV-2 / ADV-3306	SOV-3306	THFFR-2 / FT-3310 / 40301	ZS-3306	ZS-3306	DITTO	FIL3306	HS 3306

REVISIONS			PRINT RECORD							BY DATE			THERMAL STORAGE HEATER STEAM INLET VALVES (ADV-3206 & ADV-3306)	DOE NO. 40I 7002133038	DWG. NO. 9033/4	SHEET NO. I5-38	REVISION
NO.	DESCRIPTION	BY DATE	REVISION	A	B	C	D	E	BY	DATE	DRAWN	CHECK					
1	DELETED PY ELEMENT ; ADDED COMPARTOR FOR APPROVAL	RFB 6-16-80	DATE ISSUED	1/5	1/6	1/9	1/19	1/21	1/7		REG	REG	REG	11-3-80			
2	DELETED RLU	RFB 7-19-80	CUSTOMER	1/16	1/16	6/20	9/20	11/9			REG	REG	REG	11-3-80			
3	ADDED LO OIL FLOW ALARM	RFB 9-29-80	FIELD														
4	AFC	RFB 11-7-80	REVISION	1													
5	ADDED PLC #1 & #2 INTERFACE	RPF RFB 7-3-81	DATE ISSUED	1/41													
			CUSTOMER	1/41													

Stearns-Roger INCORPORATED

ORDER NO.

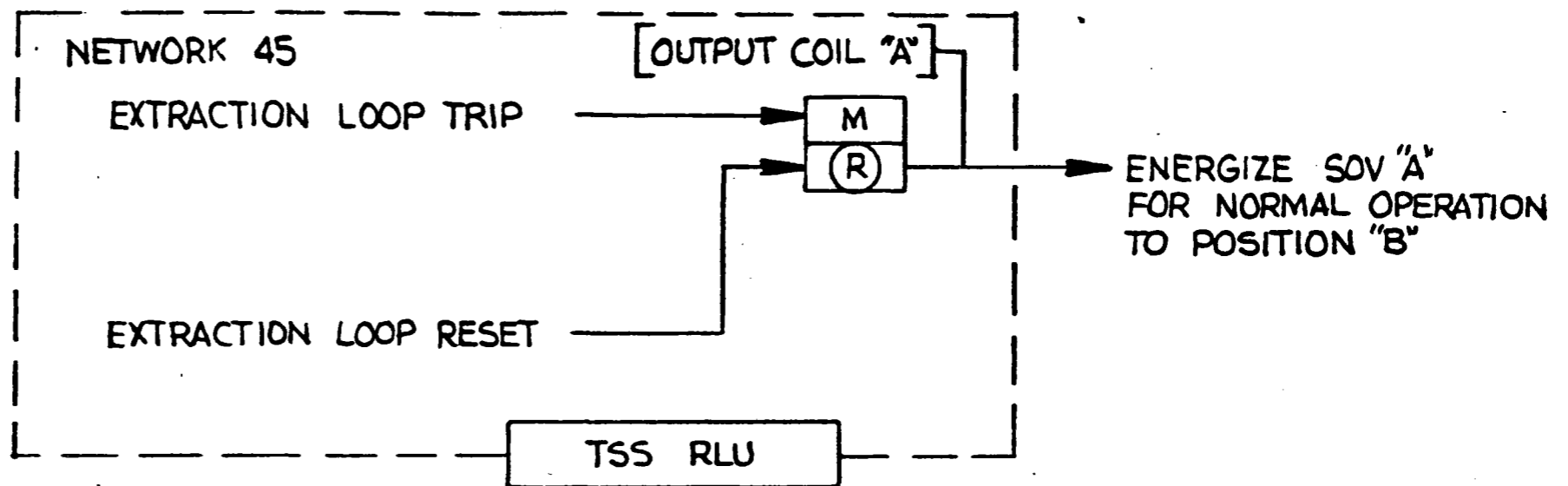
FORM 02-264





NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE  
 TAPE 1D44773 REV. A RCVR RLU, 9-21-81

DESCRIPTION		BY	APPRO	DATE	PRINT RECORD		BY	DATE	DESUPERHEATER WATER CONTROL VALVE (TDWTCY) (TV-3105)	ENG. NO. 9033/4 SHEET NO. IS-39 REVISION
NO.	REVISION				REVISION		DRAWN			
					DATE ISSUED		CHECK			
					CUSTOMER		APPROVED	G.B. 9-21-81		
					FIELD		ELECT. APPE			
					INTRA CO.		APPROVED	R.P.P. 9-21-81		
DESCRIPTION		BY	APPRO	DATE					Rockwell International 6800 Carnegie Avenue Chicago Park, IL, U.S.A. 60630	
REVISION										

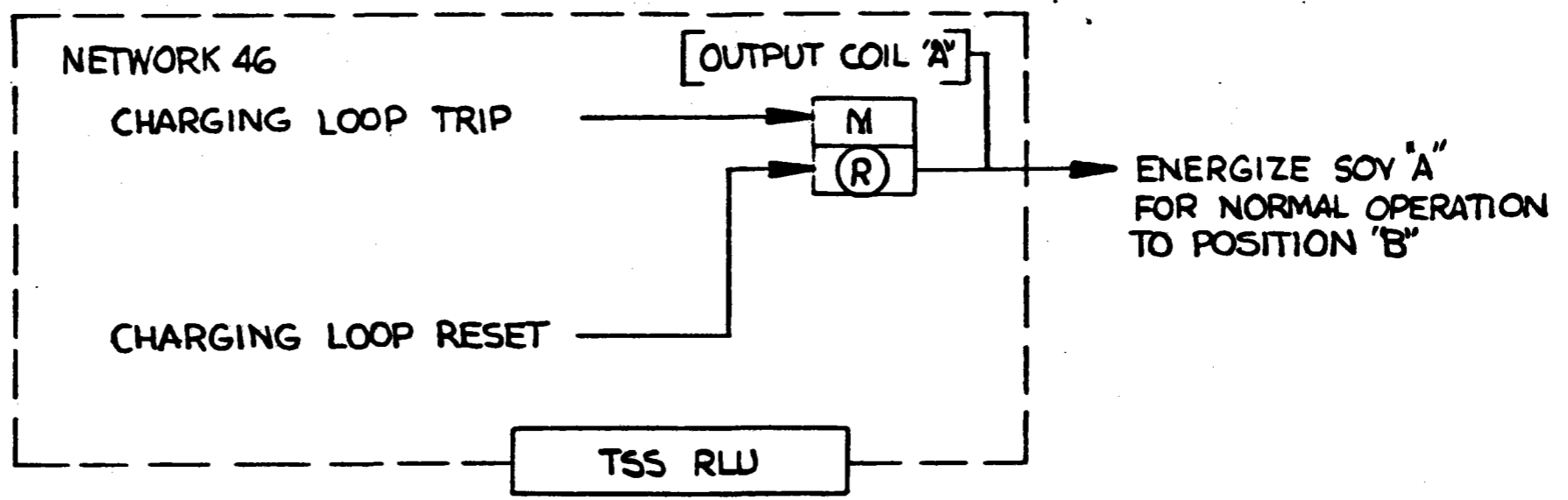
SOV "A"	OUTPUT COIL "A"	POSITION "B"
SOV-3505	5	CLOSED
SOV-3605	6	CLOSED
SOV-3702	11	OPEN
SOV-3802	16	OPEN
SOV-3710	10	OPEN
SOV-3810	15	OPEN
SOV-3910	35	OPEN



NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

NO.		DESCRIPTION	BY	APPD	DATE	PRINT RECORD				BY	DATE	CONTROL LV-3505, LV-3605, PV-3702, PV-3802, TY-3710, TV-3810, PV-3910	 Rockwell International <small>Rockwell International            6800 Carnegie Avenue            Orange Park, CA, U.S.A. 95868</small>	DWG. NO. 9033/4 SHEET NO. IS-40 REVISION 		
		REVISIONS				REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN				CHECK	APPROVED

SOV 'A'	OUTPUT COIL 'A'	POSITION 'B'
SOV 3102	1	CLOSED
SOV 3110	3	CLOSED
SOV 3111	4	CLOSED
SOV 3410	34	OPEN
SOV 3411	33	OPEN

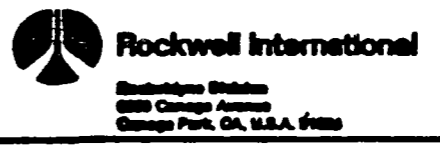


NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

12-0-2 REV. 1/81

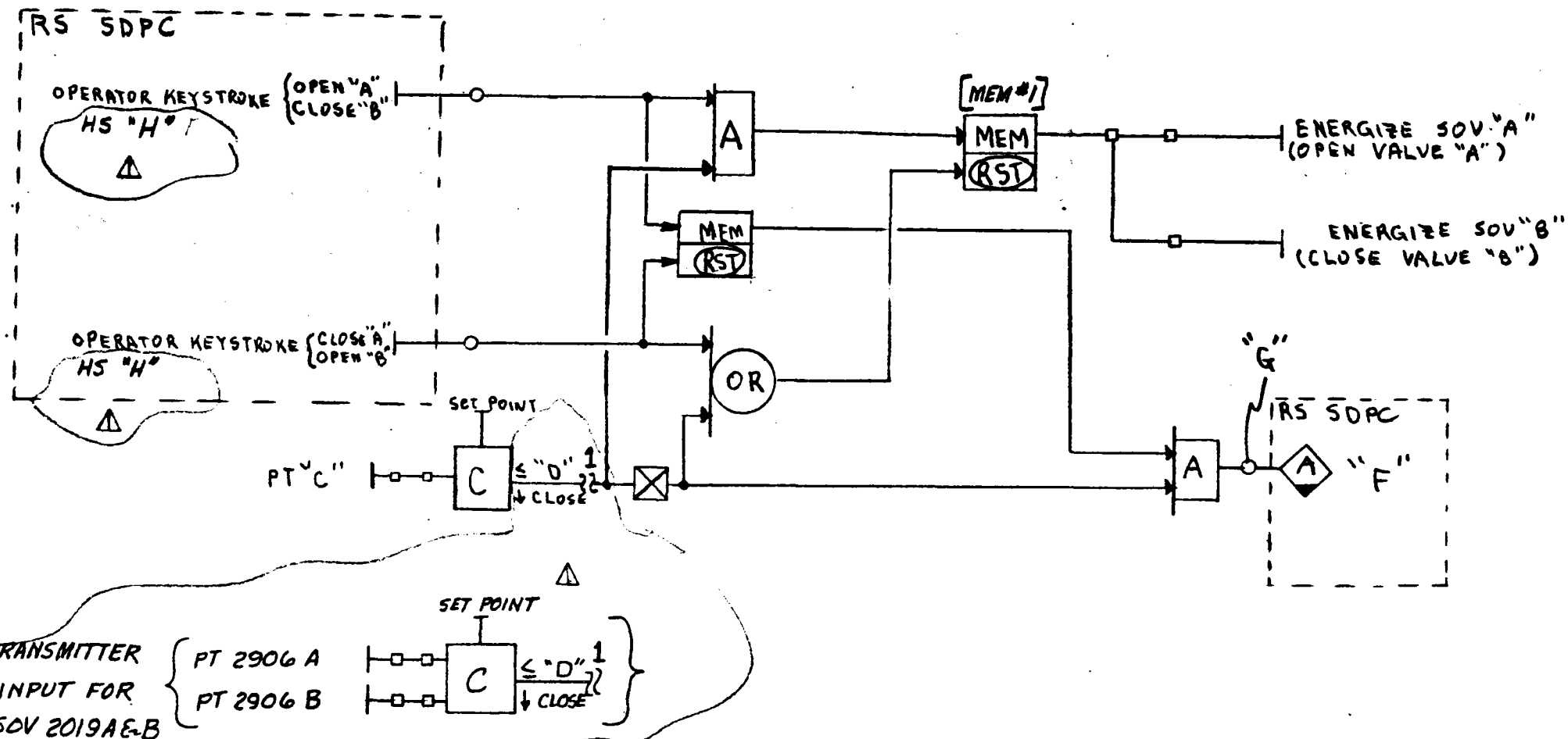
		PRINT RECORD								BY	DATE
NO.	DESCRIPTION REVISIONS	REVISION	DRAWN							BY	DATE
		DATE ISSUED	CHECK	APPROVED	ELECT. APPD				APPROVED		
		CUSTOMER									
		FIELD									
		INTRA CO.									
NO.	DESCRIPTION REVISIONS	BY	APPD	DATE							

CONTROL PV-3110, PV-3111,  
UV-3102, TV-3410, TV-3411



DWG. NO.  
**9033/4**  
SHEET NO.  
**I5-41**  
REVISION

SOV 2016 - NETWORK NOS. 3,4,5,6  
 SOV 2019 - NETWORK NOS 7,8,9,10  
 TAPE ID44789 REV C



"H" HS TAG	"A" R/SFDI VALVE TAG NO.	"B" R/SFDI VALVE TAG NO.	"C" PRESSURE TRANSMITTER	"D" PRESSURE SET POINT PSIG	"F" ALARM LEGEND	"G" ALARM TAG
HS 2019	RNPV-1-1 / SOV-2019A	RNPV-2 / SOV-2019B	RMSOP/PT2906	400	RS FLASH TANK N <sub>2</sub> PRESSURE VALVE CLOSED BY HIGH FLASH TANK PRESSURE	PIH 2906
HS 2016	RNPV-2-1 / SOV-2016A	RNPV-2-2 / SOV-2016B	RPWOP/PT2006	140	RECEIVER N <sub>2</sub> PRESSURE VALVE CLOSED BY HIGH PREHEATER PRESSURE	PIH 2006

REVISIONS				PRINT RECORD				BY	DATE	RS NITROGEN PRESSURE VALVES SOV 2019A&B AND SOV 2016A&B	DWG. NO. 9033/4 SHEET NO. 15-50	
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN			CHECK
1	DELETED PY ELEMENT; ADDED COMPARTER FOR APPROVAL	RFB	6-15-80	1	9/15	1/18	1/19	1/16	7/13	ACB	9-15-80	11-3-80
2	APC	RFB	6-19-80	2	1/16	1/18	1/20	1/14	7/14	RFB	11-3-80	11-3-80
3	ADDED PLC #1 & #2 INTERFACE	RFB	11-7-80	3						RFB	7-3-81	11-3-80
4		RFB	7-3-81	4								

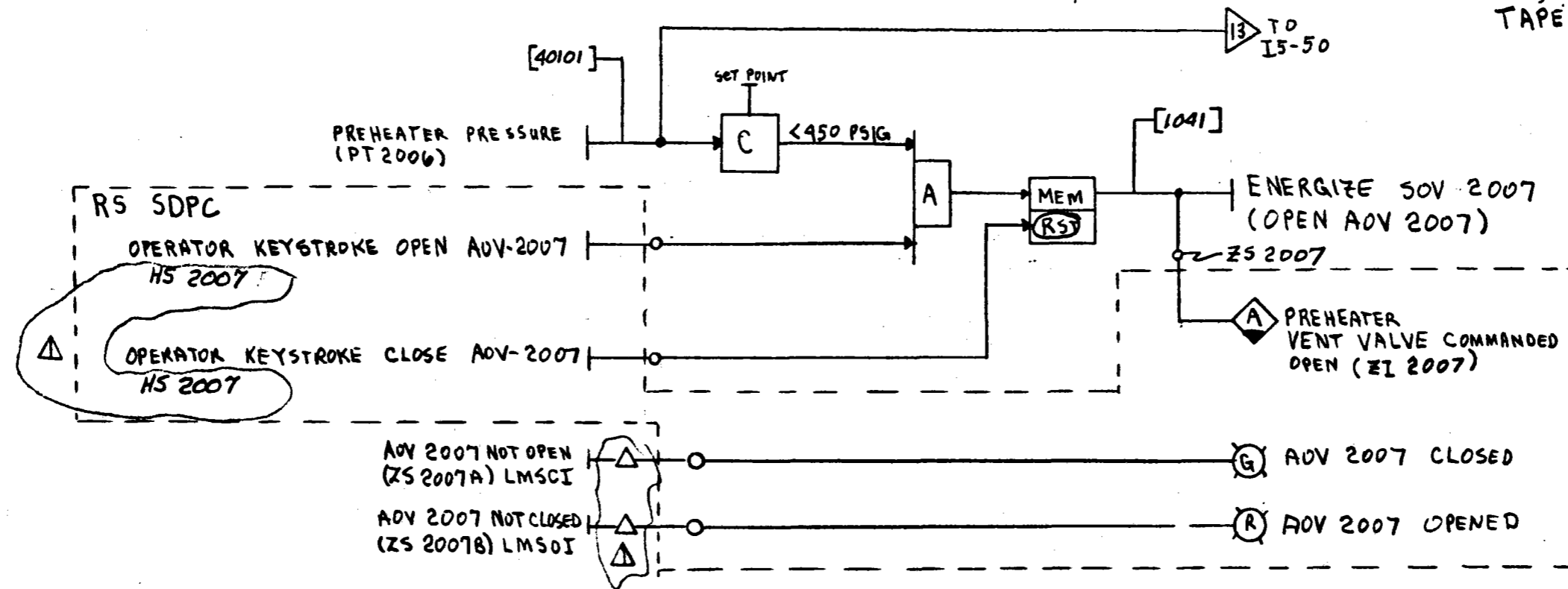
Stearns-Roger  
INCORPORATED

ORDER NO.

REVISION

FORM 02-264

NETWORK NUMBERS  
11, 12 & 13  
TAPE ID44789 REV C



FORM 02-264

REVISIONS			PRINT RECORD							BY			DATE		DRAWN		CHECK		APPROVED		DATE		Dwg. No.	
NO.	DESCRIPTION	BY	DATE	REVISION	A	D																		
1	NEW PER R DATA RECEIVED 8-9-80	RCS	8-12-80																					9033/4
2	AFC	RCS	11-7-80																					SHEET NO.
3	ADDED PLC #1 & #2 INTERFACE	RPF/RCS	7-3-81																					I5-51
4																								REVISION
5																								
6																								

AOV-2007 PREHEATER PANEL  
WATER VENT VALVE (RPWVV)  
DOE NO 40I7002133070

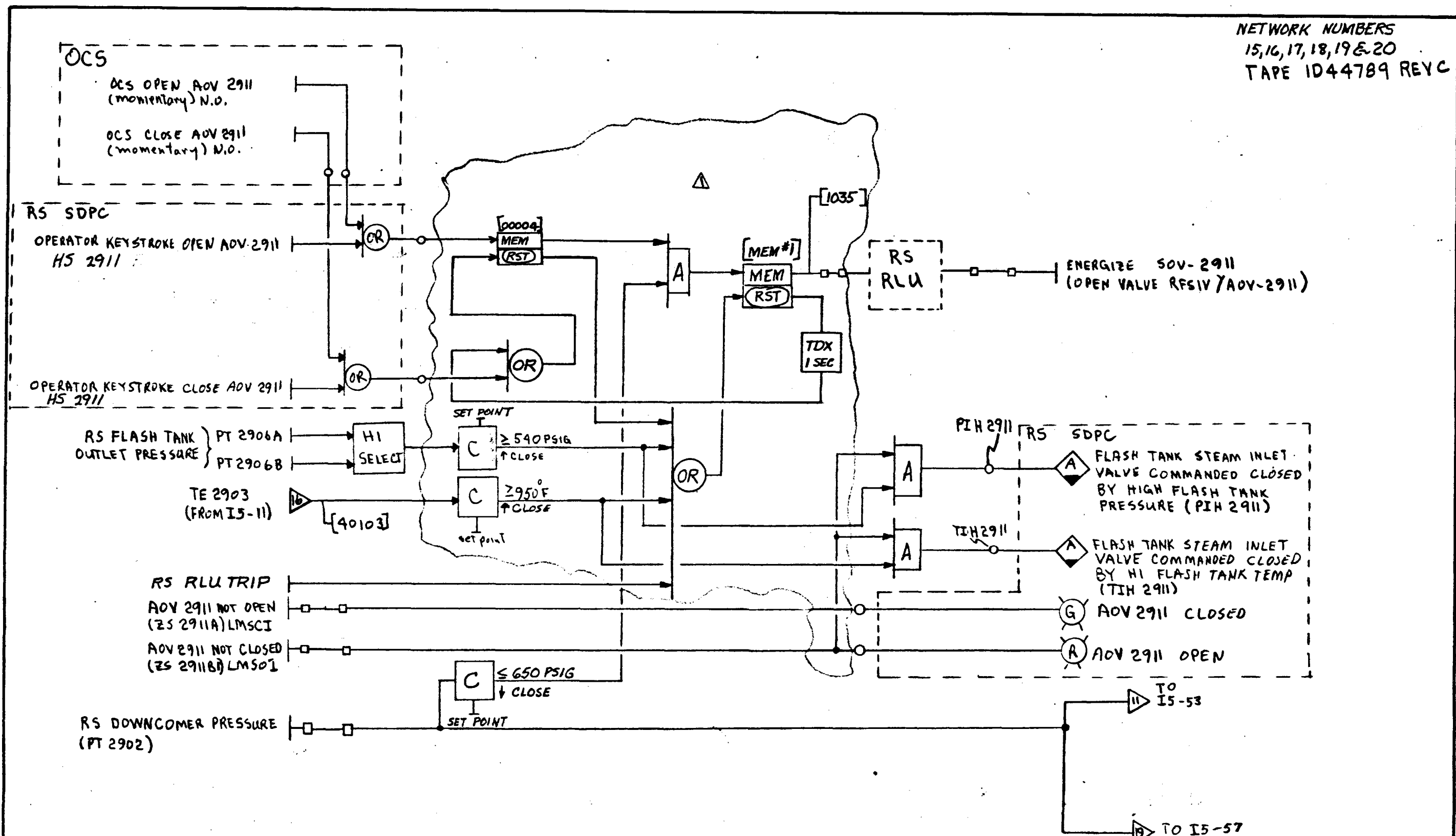
**Stearns-Roger**  
INCORPORATED

ORDER NO.

REVISION



NETWORK NUMBERS  
15,16,17,18,19 & 20  
TAPE ID44789 REYC



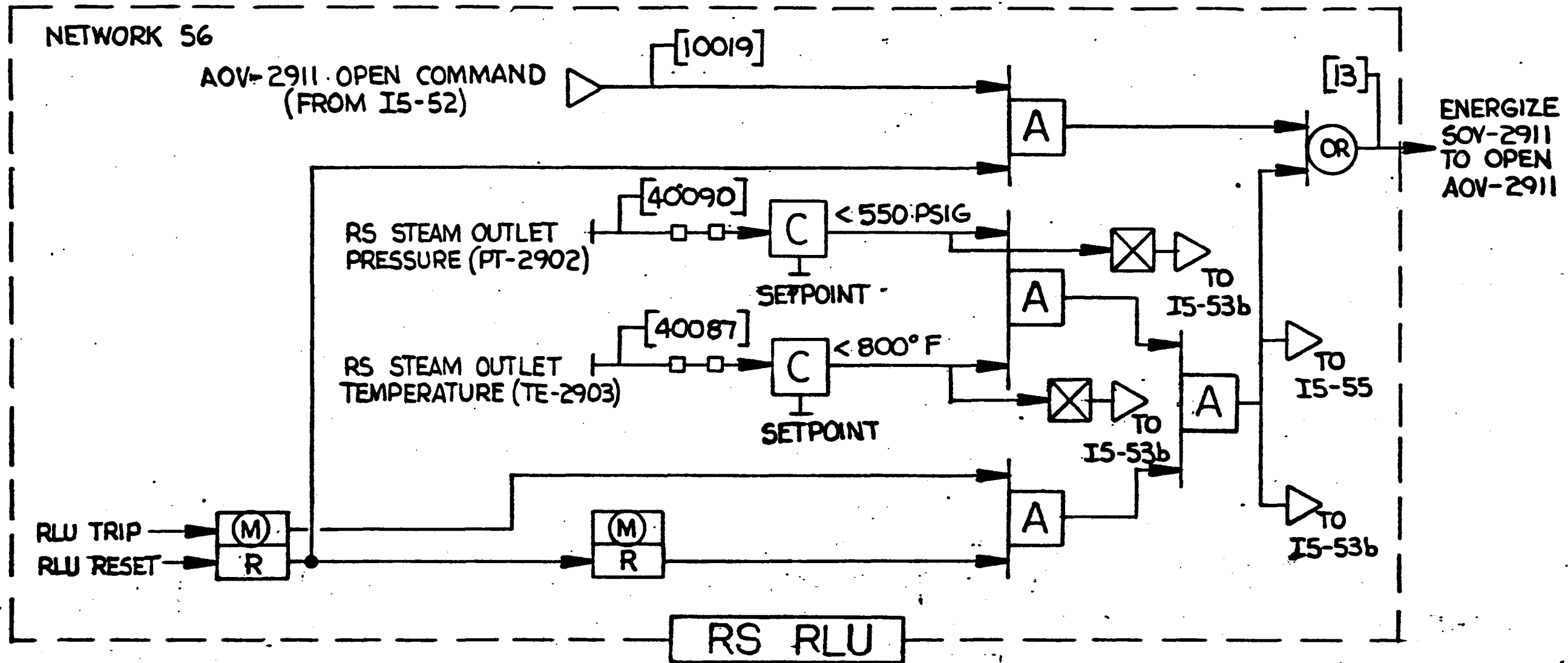
REVISIONS			PRINT RECORD										BY		DATE	DRAWN	CHECK	APPROVED	DOE NO. 40I700213304D	ORDER NO.	REVISION
NO.	DESCRIPTION	BY	DATE	REVISION	A	A	A	B	C	D	E	F	G	H	I						
1	DELETED PY ELEMENT; ADDED COMPARATOR FOR APPROVAL	RFB	6-16-80	DATE ISSUED	1/5	4/16	4/19	4/22	4/24	11/7											
2	ADDED OCS AND TE 2903 LOGIC PER R DATA 8-4-90	RFB	6-17-80	CUSTOMER	1/16	4/16	4/20			11/9											
3	ADDED PT 2906A & B; REVISED INDICATION TO ZS per D.L.	RFB	8-12-80	FIELD																	
4	AFC	RFB	9-24-80	REVISION	1																
5	ADDED PLC #1 & #2 INTERFACE	RIF	11-7-80	DATE ISSUED	1/13/81																
		RFB	7-3-81	CUSTOMER	7/29																

FLASH TANK STEAM INLET VALVE  
ADV-2911

Stearns-Roger  
INCORPORATED

9033/4  
SHEET NO. I5-52

FORM 02-284

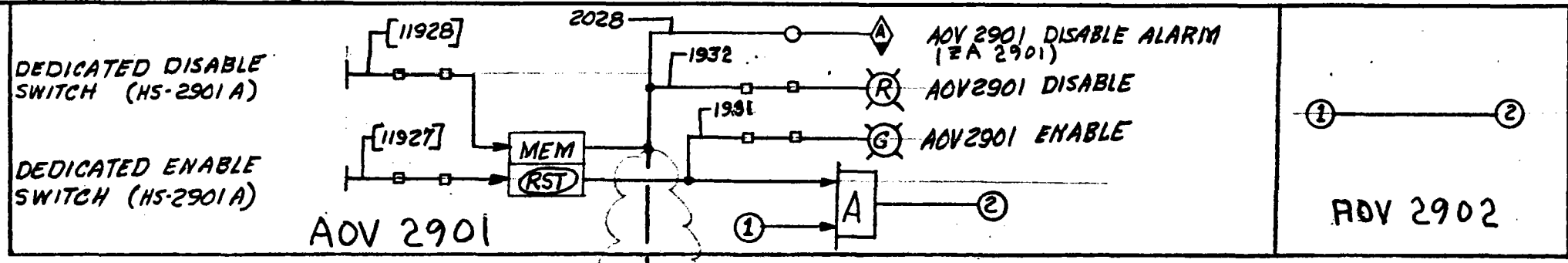


NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV. A RCVR RLU, 9-21-81

NO.		DESCRIPTION	BY	APPD	DATE	PRINT RECORD		BY	DATE	FLASH TANK STEAM INLET VALVE AOV-2911	DWS. NO. 9033/4	SHEET NO. I5-52a	REVISION
						REVISION		DRAWN					
						DATE ISSUED		CHECK					
						CUSTOMER		APPROVED	L.B.	9-21-81			
						FIELD		ELECT. APPD					
						INTRA CO.		APPROVED	RJP	9-21-81			

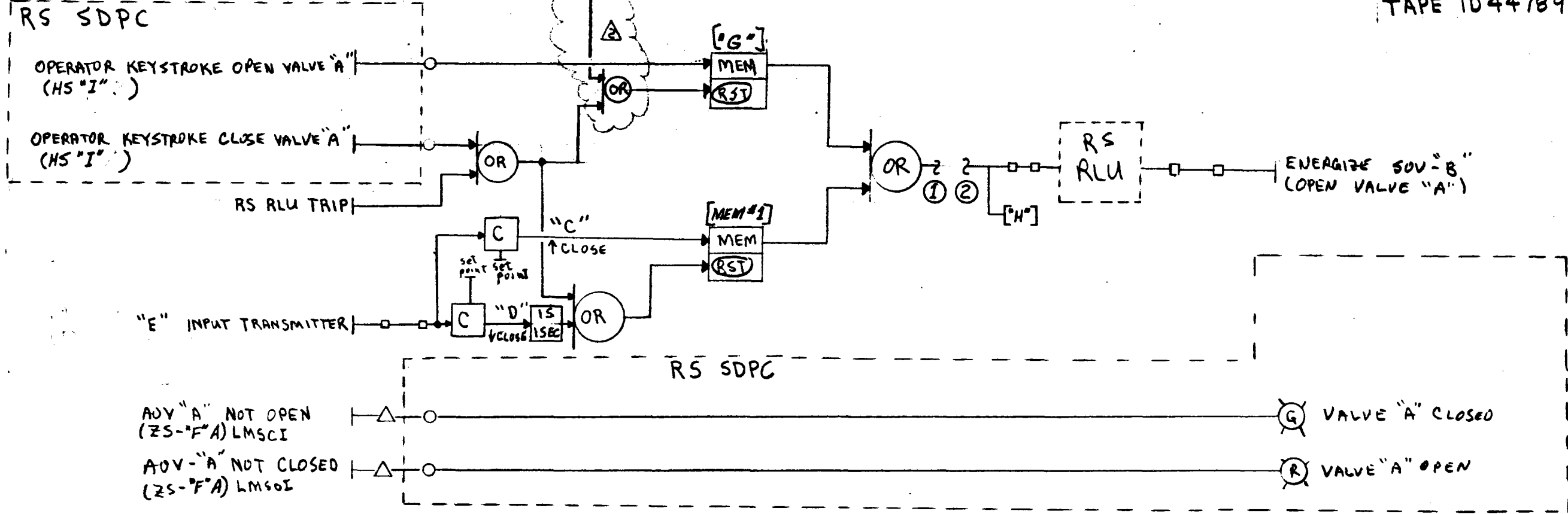
Rockwell International  
 Rockwell Building  
 6880 Carnegie Avenue  
 Carnegie Park, CA, U.S.A. 91284

REV. 2-0-21



NETWORK NUMBERS	"G" INPUT COIL	"H" OUTPUT NODE
25,26,27,28	00006	1034
21,22,23,24	00005	1929

TAPE ID 44789 REV C



"I" HS TAG	"A" R I S F D I VALVE TAG NO.	"B" SOV NO.	"C" SET POINT (OPEN)	"D" SET POINT (CLOSE)	"E" S F D I / R TAG NO.	"F" VALVE POSITION INDICATION SW.	VALVE DESCRIPTION
HS2901	RANDV / AOV-2901	SOV-2901	Level > 75%	Level < 25%	LT 2901 / RAWL	ZS-2901	MOISTURE ACCUMULATOR WATER DRAIN VALVE
HS2902	RMSVV-1 PSV-2902	SOV-2902	Pressure > 1625 psig	Pressure < 1500 psig	PT 2902 / RMSDP <small>SEE 15-52</small>	ZS-2902	DOWNCOMER MANIFOLD STEAM VENT VALVE

REVISIONS		PRINT RECORD		BY	DATE
NO.	DESCRIPTION	BY	DATE	REVISION	DATE
2	ADDED DISABLE RESET TO AOV 2901	RPF	RGB	7-29-91	
1	ISSUED FOR COMMENT	RGB	9-15-80	1	9-15-80
2	ADDED [G] FUNCTIONS; ADDED TAG NOS COL E	RGB	5-16-80	2	11-3-80
3	FOR APPROVAL	RGB	6-19-80	3	11-3-80
4	ADDED ALARM FOR AOV-2901; CHANGED "C" SETPOINT ON AOV 2901	RGB	7-28-80	4	
5	AFC	RGB	11-7-80	5	
6	ADDED PLC #1 & #2 INTERFACE	RPF	RGB	7-3-91	

VALVES: AOV 2901 & AOV 2902

DOE NO. 40I7002133041

**Stearns-Roger** INCORPORATED

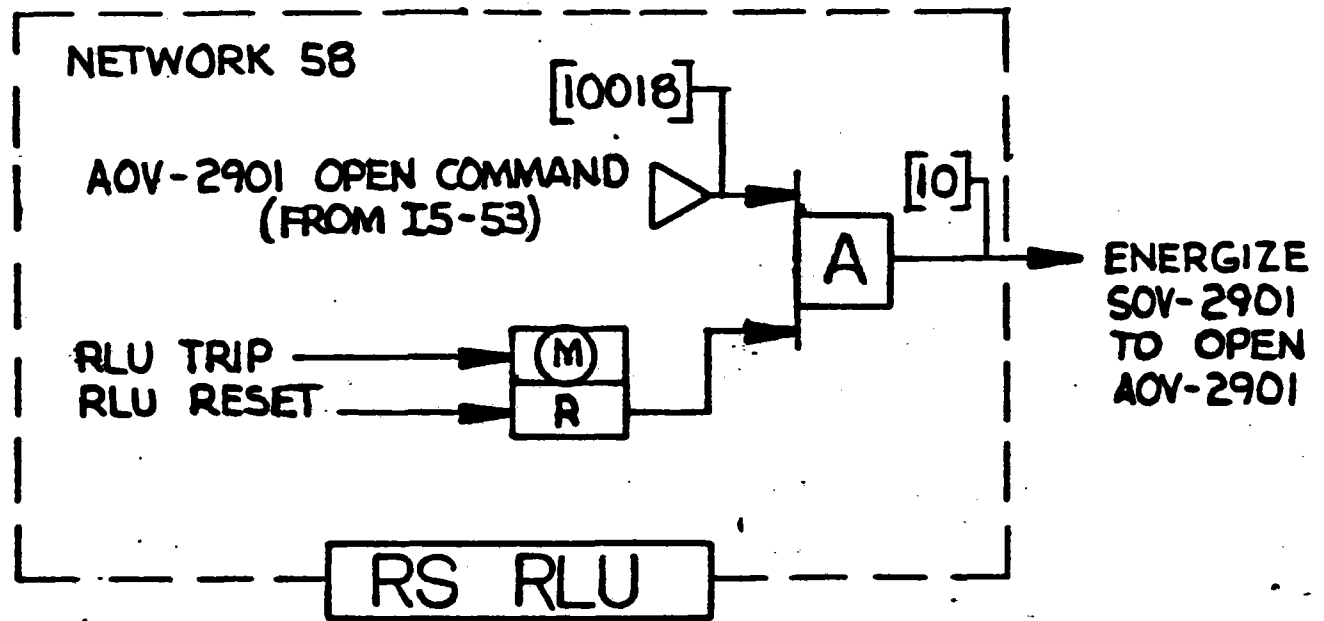
ORDER NO. 2

DWG. NO. 9033/4

SHEET NO. I5-53

REVISION 2

FORM 02-264



NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE  
 TAPE 1D44773 REV. A RCVR RLU, 9-21-81

12-0-2 REV. 7/80

				PRINT RECORD				BY	DATE					
NO.	DESCRIPTION	BY	APPD	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	BY	DATE
	REVISIONS													

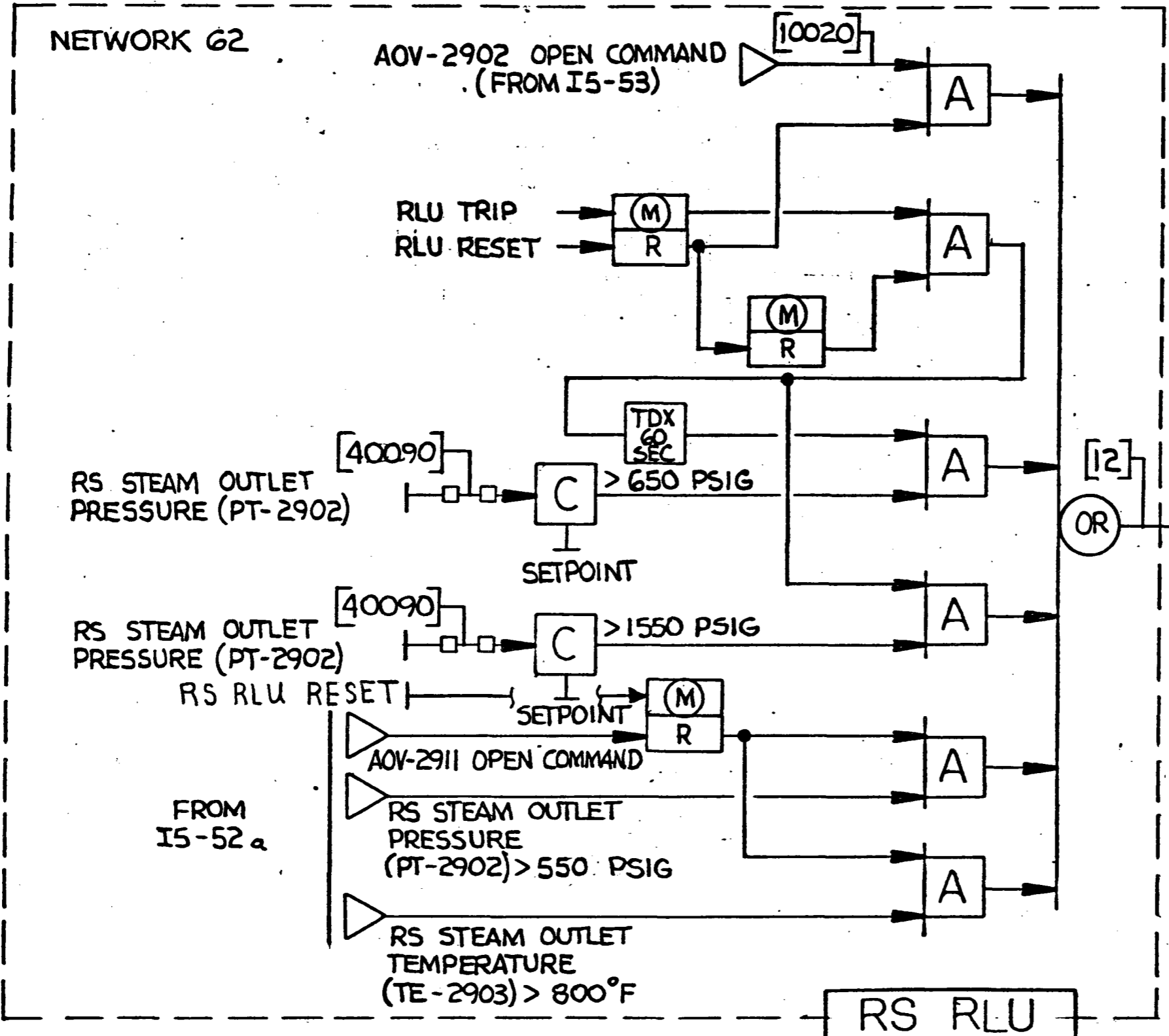
**MOISTURE ACCUMULATOR WATER  
 DRAIN VALVE AOY-2901**

**Rockwell International**  
 Rockwell Building  
 6221 College Avenue  
 Chicago Park, CA, U.S.A. 91204

DWG. NO.  
**9033/4**

SHEET NO.  
**15-53a**

REVISION



ENERGIZE SOV-2902 TO OPEN AOV-2902

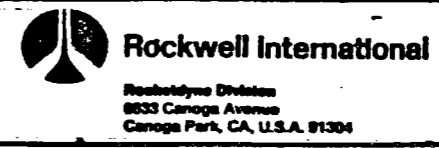
NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE ID44773 REV A RCVR RLU, 9-12-81

12-0-2 REV. 7/80

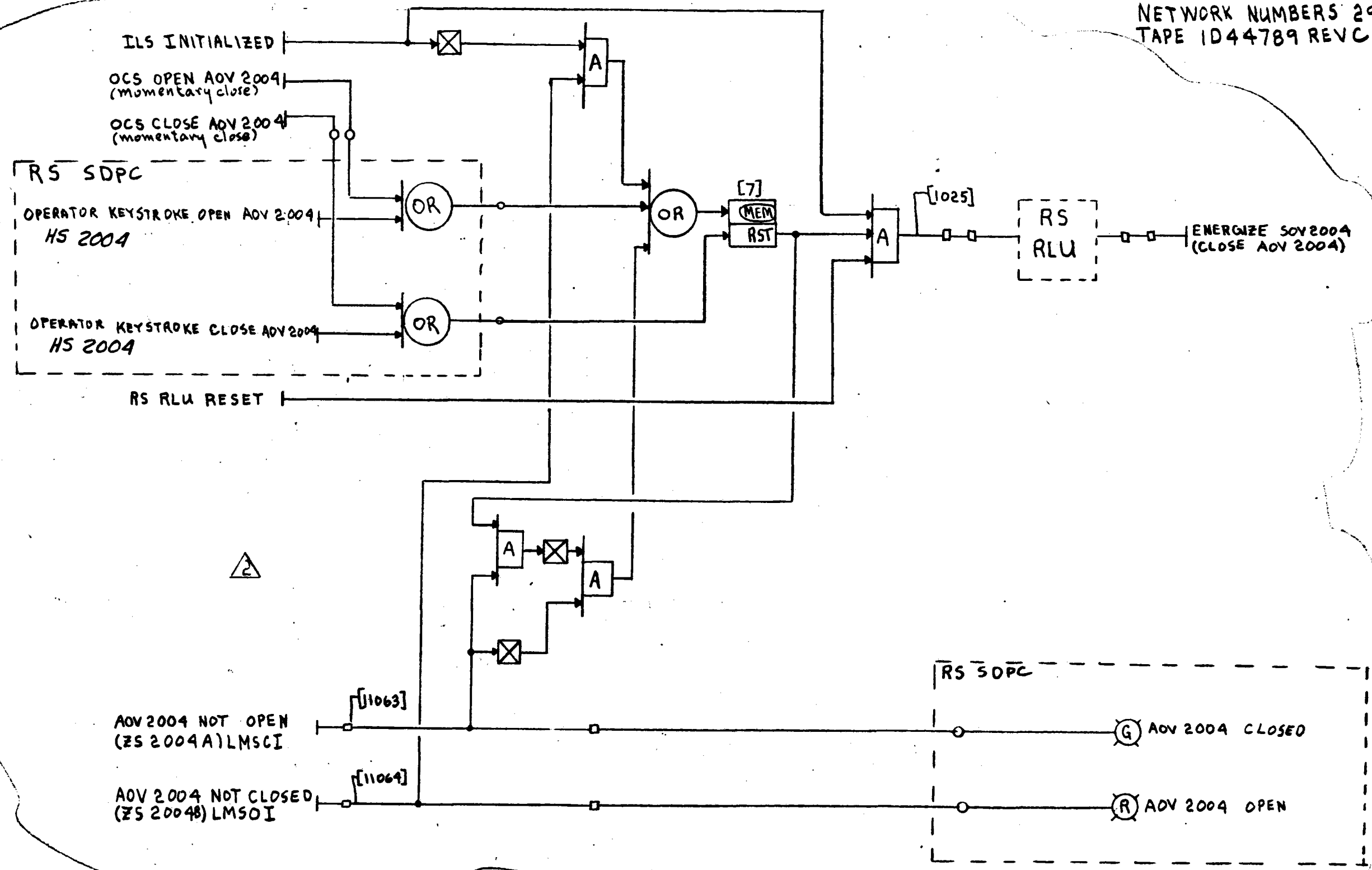
				PRINT RECORD								BY	DATE
REVISION													
DATE ISSUED													
CUSTOMER													
FIELD													
INTRA CO.													
NO.	DESCRIPTION	BY	APPO	DATE									
	REVISIONS												

STEAM VENT VALVE  
AOV-2902

DWG. NO.  
9033/4  
SHEET NO.  
I5-53b  
REVISION



NETWORK NUMBERS 29,30  
TAPE ID44789 REVC



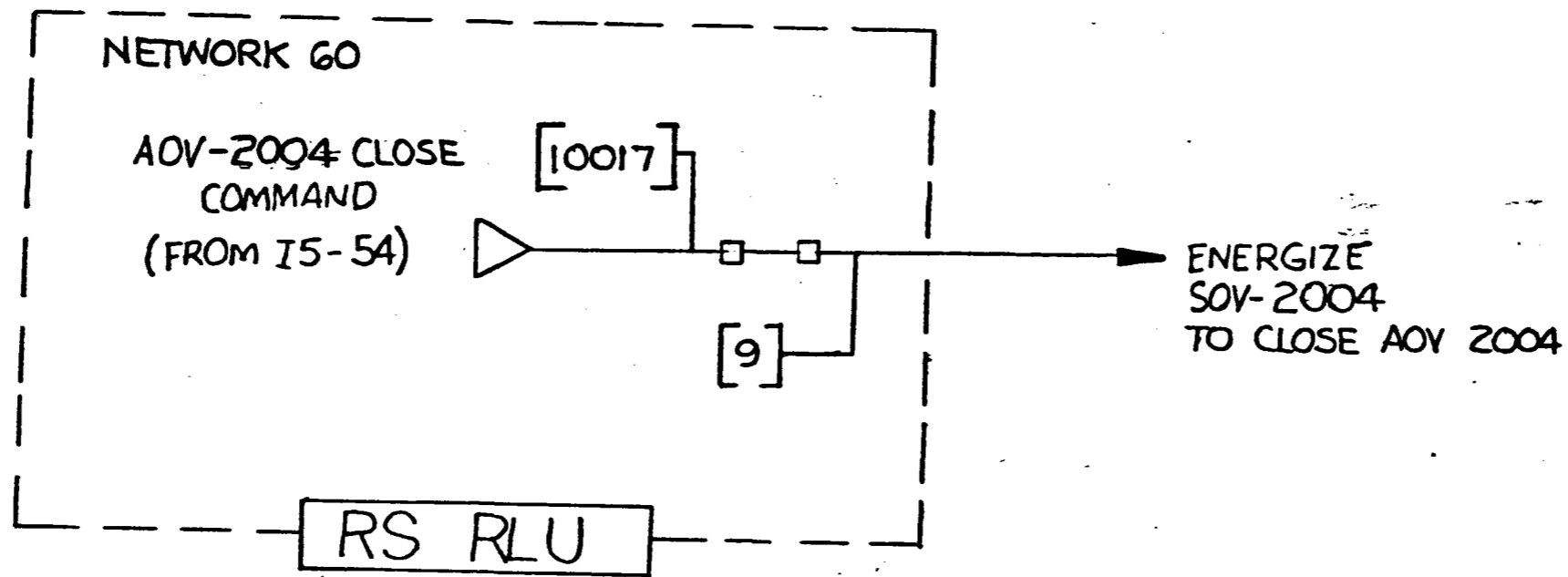
2

REVISIONS			PRINT RECORD							BY		DATE		DRAWN		CHECK		APPROVED	
NO.	DESCRIPTION	BY	DATE	REVISION	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
1	FOR COMMENT	REP	5-15-80																
2	FOR APPROVAL	REP	6-19-80																
3	MOVED OUTPUT TO RST	REP	7-14-80																
4	RFC	REP	11-7-80																
5	ADDED PLC #1 & #2 INTERFACE AND RLU LOCKOUT	RPE	7-3-81																
6	REVISED TO FAIL OPEN	RPE	9-29-81																

AOV 2004 CONTROL (RPWIV)  
DOE NO. 407002133060  
Stearns-Roger INCORPORATED  
ORDER NO.

DWG. NO. 9033/4  
SHEET NO. I5-59  
REVISION 2

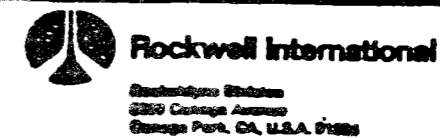
FORM 02-264



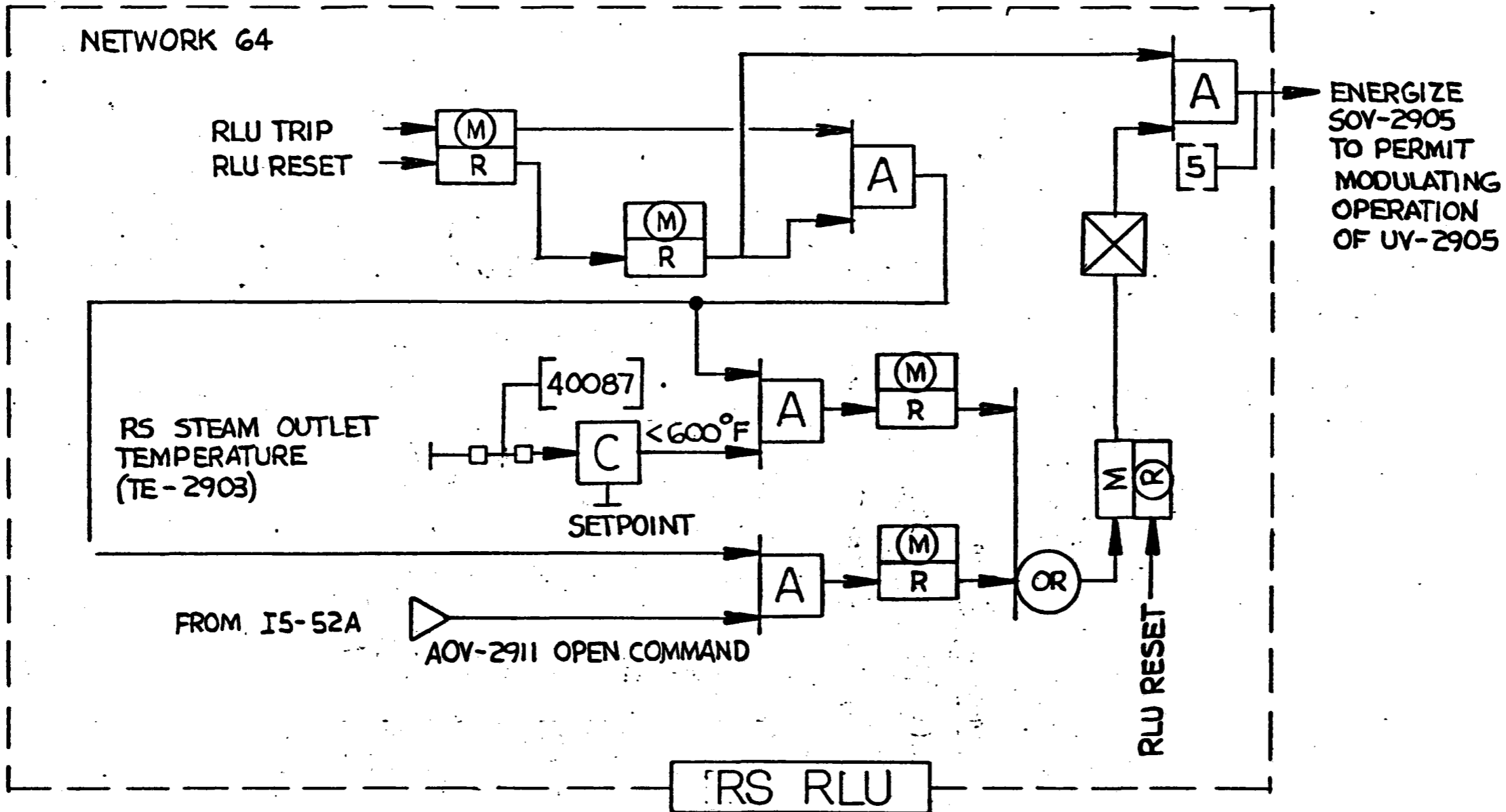
NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE  
TAPE ID44773 REV. A RCVR RLV, 9-12-81

REVISIONS		BY		DATE		DESCRIPTION	
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PREHEATER WATER INLET  
VALVE AOV-2004



ENG. NO.  
9033/4  
SHEET NO.  
I5-54a  
REVISION

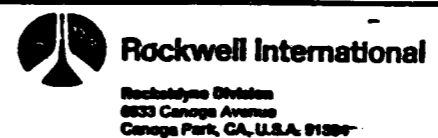


NOTE- THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE TAPE 1D44773 REV. A RCVR RLU, 9-12-81

12-0-2 REV. 7/80

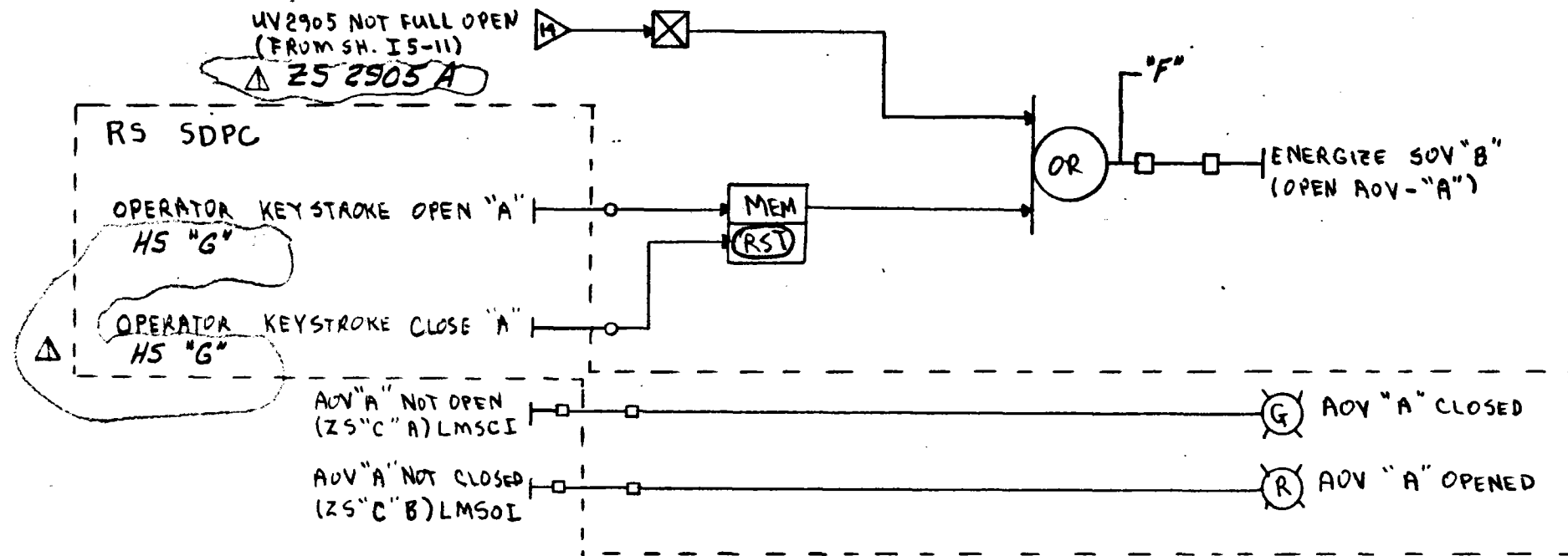
		PRINT RECORD										BY		DATE	
REVISION												DRAWN			
DATE ISSUED												CHECK			
CUSTOMER												APPROVED	<i>L.B.</i>	<i>9-21-81</i>	
FIELD												ELECT. APPD			
INTRA CO.												APPROVED	<i>RTP</i>	<i>9-21-81</i>	
NO.	DESCRIPTION	BY	APPD	DATE											
	REVISIONS														

DOWNCOMER STEAM INLET VALVE UV-2905



DWG. NO. 9033/4  
SHEET NO. I5-55  
REVISION





"A" VALVE TAG NO SFDI / R	"B" SOV TAG NO.	"C" VALVE POSITION IND. SW. NO.	VALVE DESCRIPTION	"D" NETWORK NUMBER	"E" INPUT COIL	"F" OUTPUT NODE	"G" HS TAG
AOV 2914 / RFSOV	SOV 2914	ZS 2914 A & B	RS FLASH TK. STEAM OUTLET ORIFICE VALVE	36, 37	10	1045	HS 2914
AOV 2915 / RFSIS	SOV 2915	ZS 2915 A & B	RS FLASH TK. STEAM INLET ORIFICE VALVE	38, 39	11	1044	HS 2915

FORM 02-264

REVISIONS				PRINT RECORD				DRAWN	BY	DATE	AOV 2914 & AOV 2915 RS FLASH TANK STEAM INLET & OUTLET ORIFICES	DWC. NO. 9033/4
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD					
1	NEW PER R DATA SUPPLIED 8-9-90	RFB	8-12-90	A	8/17/90	11/11/90						
2	ADDED PLC #1 & #2 INTERFACE	RPF	7-3-80	B								
3	REVISED VALVE DESCRIPTION	RPF	9-29-90	C								

**Stearns-Roger**  
INCORPORATED

ORDER NO.

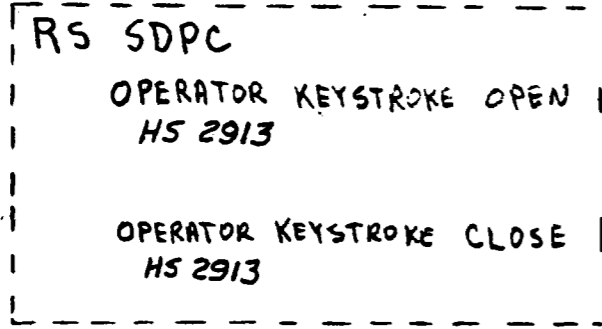
REVISION

2

NETWORK NUMBERS  
197, 198, 199, 200  
TAPE ID 44789 REV C

DEDICATED  
HS 2913A  
(BOTH MOMENTARY  
N.O.)

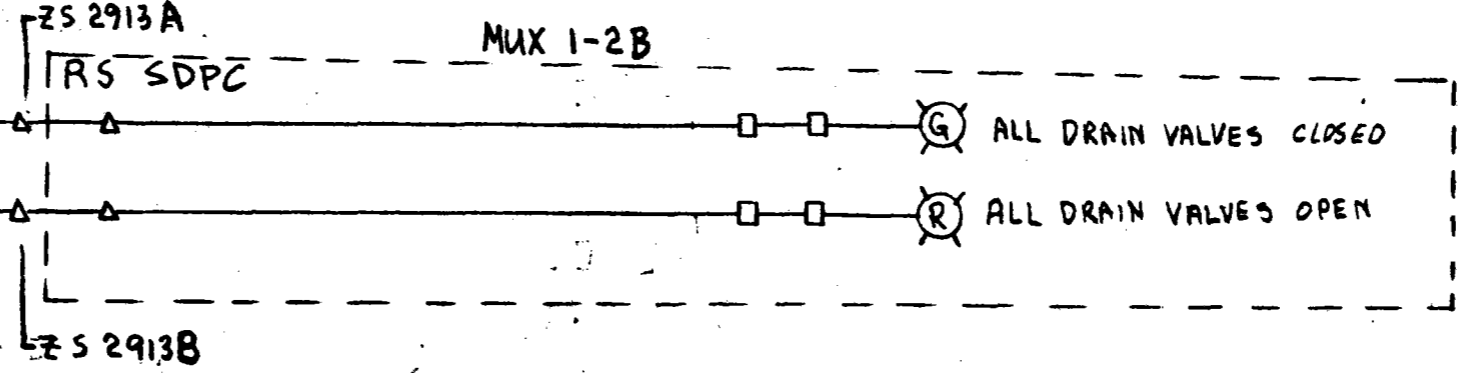
ENABLE RCVR PNL DRAIN VALVES  
TO OPEN  
DISABLE RCVR PNL DRAIN VALVES  
CLOSED



PT 2006  
(I5-51)

PT 2902  
(I5-52)

SET POINT



DRAIN VALVES OPEN ENABLE

DRAIN VALVES CLOSE DISABLE

BACKLIGHTED  
SWITCHES  
ON  
CONTROL BOARD

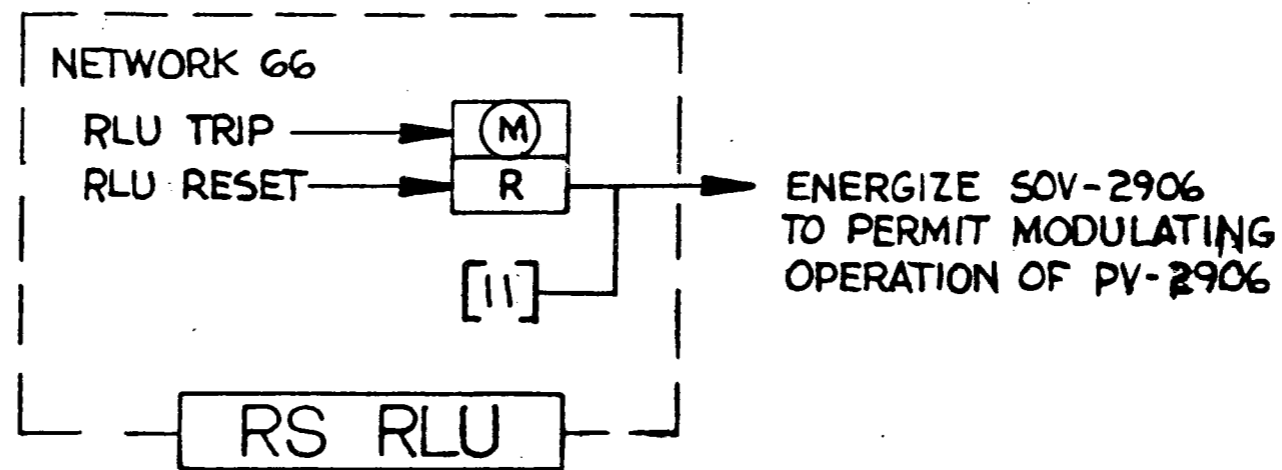
ENERGIZE DRAIN VALVE SOV'S  
(OPEN RCVR PNL DRAIN VALVES [29])

TABLE A

CLOSE (LMSCT) ZS 2913B	OPEN (LMSOI) ZS 2913A
ZS2101A	-B
ZS2102A	-B
ZS2103A	-B
ZS2201A	-B
ZS2202A	-B
ZS2203A	-B
ZS2313A	-B
ZS2314A	-B
ZS2315A	-B
ZS2413A	-B
ZS2414A	-B
ZS2415A	-B
ZS2513A	-B
ZS2514A	-B
ZS2515A	-B
ZS2613A	-B
ZS2614A	-B
ZS2615A	-B
ZS2713A	-B
ZS2714A	-B
ZS2715A	-B
ZS2813A	-B
ZS2814A	-B
ZS2815A	-B

FORM 02-264

REVISIONS			PRINT RECORD					BY		DATE	Dwg. No.		
NO.	DESCRIPTION	BY	DATE	REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	DRAWN	CHECK	APPROVED	9033/4	
1	FOR COMMENT	RFB	11-7-80						RFB	RFB	11-7-80	SHEET NO. I5-57	
2	AFC	RFB	7-3-81						RFB	RFB	7/1/81		
3	ADDED DEDICATED RESET	RFB	9-29-81									DOE NO. 40I7002133080	
										Stearns-Roger INCORPORATED		ORDER NO.	REVISION 1



NOTE - THE LOGIC SHOWN HERE IS INCORPORATED IN BASELINE  
 TAPE 1D44773 REV. A RCVR RLU, 9-21-81

12-0-2 REV. 7/80

NO.	DESCRIPTION	BY	APPO	DATE	PRINT RECORD												DRAWN	BY	DATE
					REVISION	DATE ISSUED	CUSTOMER	FIELD	INTRA CO.	CHECK	APPROVED	ELECT. APPD	APPROVED						
	REVISIONS																		

FLASH TANK PRESSURE  
 CONTROL-VALVE PV-2906



Rockwell International  
 Rockledge Station  
 8833 Canoga Avenue  
 Canoga Park, CA, U.S.A. 91304

DWG. NO.  
 9033/4  
 SHEET NO.  
 I5-58  
 REVISION



<u>FUNCTION</u>	<u>SYMBOL</u>	<u>DEFINITION</u>
AND		A DEVICE WHICH PRODUCES AN OUTPUT ONLY WHEN ALL INPUTS ARE PRESENT.
OR		A DEVICE WHICH PRODUCES AN OUTPUT WHEN AT LEAST ONE INPUT IS PRESENT.
NOT		A DEVICE WHOSE OUTPUT IS THE INVERSE OF INPUT.
TIME DELAY	(ADJ. 0-t) 	A DEVICE WHICH PRODUCES AN OUTPUT FOLLOWING A DEFINITE TIME DELAY AFTER ITS INPUT IS APPLIED. ADJUSTABLE TO RANGE t.
TIME DELAY	(ADJ. 0-t) 	A DEVICE WHOSE OUTPUT IS REMOVED FOLLOWING A DEFINITE TIME DELAY AFTER ITS INPUT IS REMOVED. ADJUSTABLE TO RANGE t.
MEMORY AND RESET		A DEVICE WHICH RETAINS THE CONDITION OF OUTPUT CORRESPONDING TO THE INPUT LAST PRESENT.
MISCELLANEOUS FUNCTION		OUTPUT EXISTS ACCORDING TO CONDITIONS SPECIFIED. MUST BE EXPLAINED WITHIN OR ADJOINING THE SYMBOL.
ALARM		DISPLAYED BY S.D.P.C. CRT TERMINALS (UNLESS OTHERWISE NOTED, I.E. DEDICATED WINDOW)
COMMAND/SIGNAL		DENOTES COMMAND/SIGNAL TO DEVICE.
SIGNAL		(DWG. NO.) DENOTES OUTPUT FUNCTION TO ANOTHER LOGIC DRAWING.

Location SOLAR I GENERATING STATION										
<b>CONTROL LOGIC DIAGRAM LEGEND</b>										
5133300	P&ID LEGEND	Scale	Date	Approved	O.K.	O.K.	O.K.	Mod	IO.No	
	Reference Drawings									

SYMBOL

DESCRIPTION

(R) RED

EQUIPMENT OR PROCESS IN OPERATING CONDITION  
DISPLAYED BY S.D.P.C. CRT TERMINALS  
UNLESS OTHERWISE NOTED

(G) GREEN


EQUIPMENT OR PROCESS NOT IN OPERATING CONDITION  
DISPLAYED BY S.D.P.C. CRT TERMINALS UNLESS OTHERWISE NOTED

(A) AMBER

DEDICATED HAND SWITCH IN "AUTO" POSITION

GENERAL NOTES:

1. FOR INSTRUMENTATION IDENTIFICATION & ABBREVIATIONS REFER TO P&ID LEGEND; DWG. 5133300.
2. ONLY ONE LOGIC DIAGRAM WILL BE SHOWN FOR IDENTICAL EQUIPMENT. REFER TO ACCOMPANYING TABLE FOR THE INSTRUMENT IDENTIFICATION NUMBER ASSOCIATED WITH THE PARTICULAR EQUIPMENT.
3. ALL EQUIPMENT STARTING AND STOPPING CIRCUITS ARE ACTUATED BY MOMENTARY ACTION. HAND SWITCHES WILL REMAIN IN THE SET CONDITION UNTIL THE COUNTERMANDING COMMAND IS RECEIVED.
4. FOR "HIGH", "LOW" AND "NORMAL" VALUES (SET POINTS) REFER TO INSTRUMENT DATA SHEETS OR VENDOR DRAWINGS.

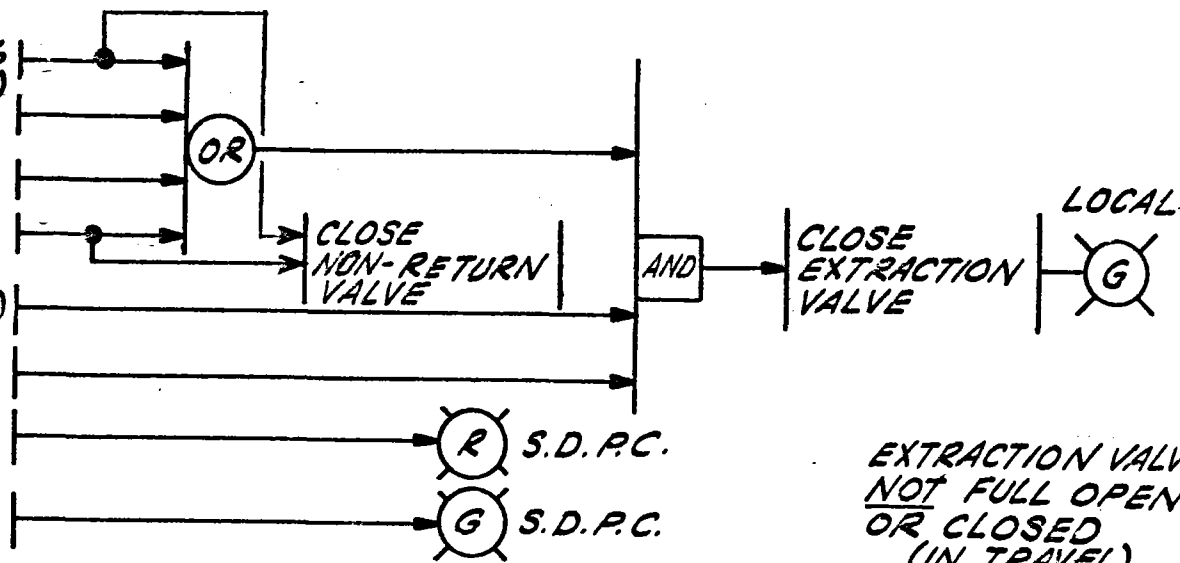
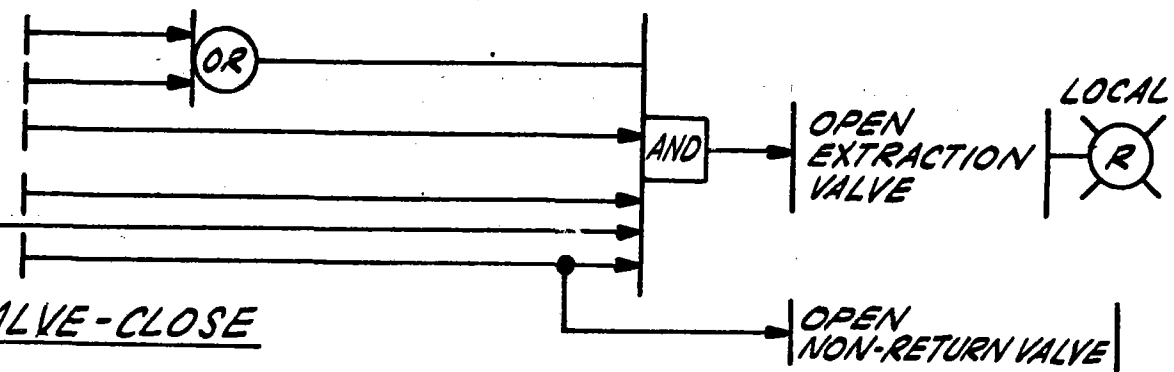
										Location SOLAR I GEN. STATION					
										CONTROL LOGIC DIAGRAM					
										LEGEND					
															
										Rosemead California					
										N322I SH. IA B					
5133300	P&ID LEGEND	B	ISSUED FOR REVIEW & COMMENT								FRB	JT	JT	7361	
		A	ISSUED FOR REVIEW & COMMENT	1-14-88							FKP	EL	ENCO	7361	
	Reference Drawings	No.	Revisions	IM	Date	P.E.	Q.A.E.	Disc. Supv.	Approved		Resp. Engr.	Ch'd.	Made	J.O. No.	D/L

# MOTOR OPERATED EXTRACTION VALVE-OPEN

OPERATOR KEY STROKE COMMAND  
 OSC COMMAND (SEE NOTE 2)  
 VALVE NOT FULLY OPEN (LS4-SEE NOTE 3)  
 MOTOR OVERLOAD RESET  
 TURBINE NOT TRIPPED  
 FEEDWATERS HEATER LEVEL NOT HIGH

# MOTOR OPERATED EXTRACTION VALVE-CLOSE

TURBINE TRIP (STOP VVS CLOSED-Z5L-9016  
 Z3L-902)  
 OPERATOR KEY STROKE COMMAND  
 OCS COMMAND (SEE NOTE 2)  
 HEATER SHELL LEVEL HIGH  
 VALVE NOT FULLY CLOSE (LS8-SEE NOTE 4)  
 MOTOR OVERLOAD RESET  
 EXTRACTION VALVE FULL OPEN  
 EXTRACTION VALVE FULL CLOSE



### NOTES:

1. SCHEME IS APPLICABLE TO ALL FOUR (4) EXTRACTION POINTS. SEE LIST (THIS SHEET) FOR INSTRUMENT TAG NO'S.
2. OPERATIONAL CONTROL SYSTEM (OCS) COMMAND APPLICABLE TO 1ST. AND 2ND. POINT EXTRACTION VALVES ONLY.
3. LS4 = "OPEN" LIMIT SWITCH WHEN VALVE IS FULLY OPEN LS4 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.
4. LS8 = "CLOSE" LIMIT SWITCH WHEN VALVE IS FULLY CLOSE LS8 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.

EXTRACTION VALVE	HAND SWITCH NO. (OPERATOR KEY-STROKE COMMAND)	DESCRIPTION	FEEDWATER HEATER LEVEL	NON-RETURN VA.	NOTES
MOV-624	HS-624	1ST. POINT EXTRACTION	LIT-8	NV-625	2
MOV-626	HS-626	2ND. POINT EXTRACTION	LIT-24	NV-627	2
MOV-628	HS-628	3RD. POINT EXTRACTION (OPERATOR)	LIT-83	NV-629A & B	-
MOV-630	HS-630	4TH. POINT EXTRACTION	LIT-104	NV-631	-

S/R-15-101

No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supp.	Approved	Iss. Engr.	Gr'd.	Made	J.O. No.
	F		7-33-79					FKB	JT		7361
	E		8-31-79					FKB	JT		7361
	D		10-23-79					FKB	FKB	JT	7361
	C								EB	EACo	7361
	B		11-4-79					FKB	EB	EACo	7361
	A		11-23-79					FKB	EB	EACo	7361

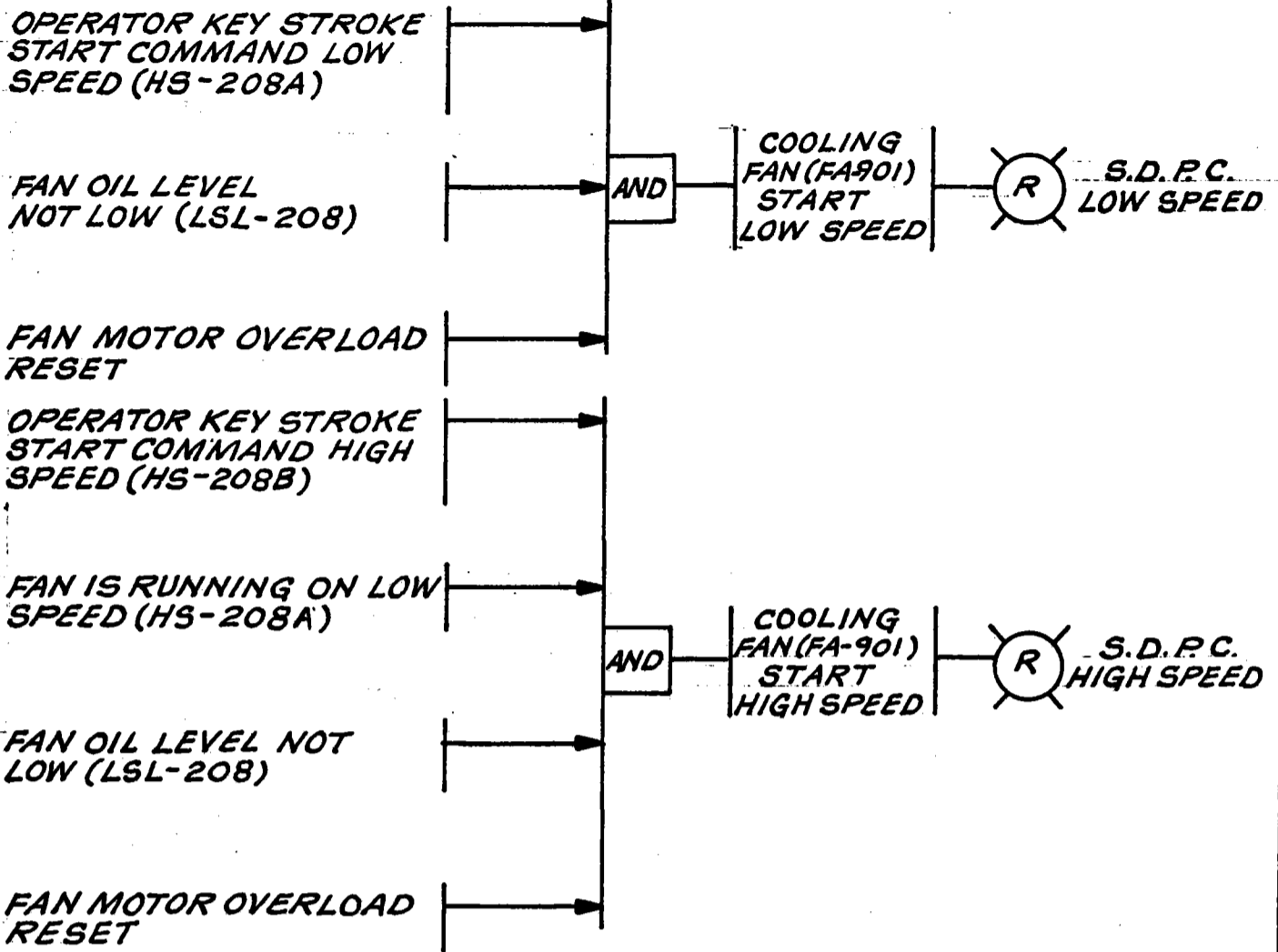
Location SOLAR I GEN. STATION

CONTROL LOGIC DIAGRAM  
 EXTRACTION VALVES

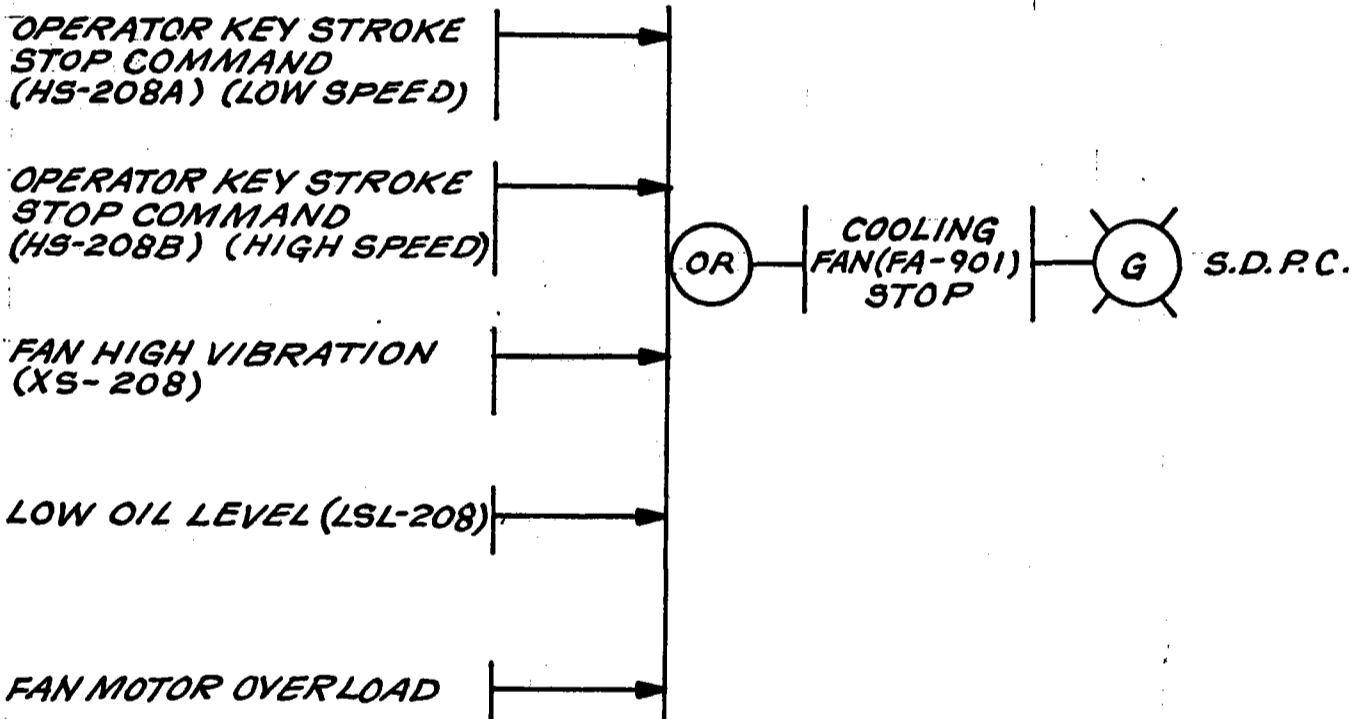
**SE EDISON**  
 Rosemead California

N3221 SH. 2 F

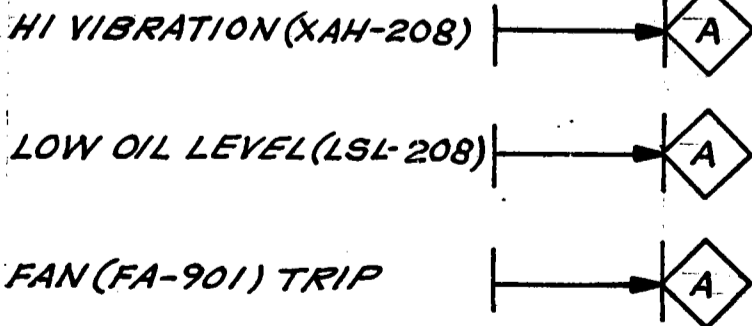
**COOLING TOWER FAN-START (FAN FA-901)**



**COOLING TOWER FAN-STOP (FAN FA-901)**



**ALARMS**



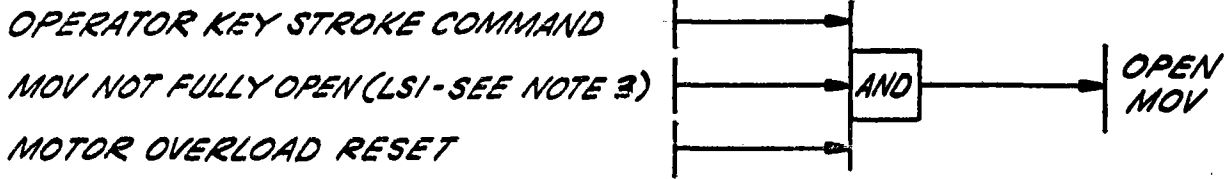
**NOTES**

1. SAME SCHEME IS APPLICABLE TO FANS (FA-902 & FA-903)
2. TO RUN FAN MOTOR FROM HI SPEED TO LOW SPEED THERE IS 30 SEC TIME DELAY.

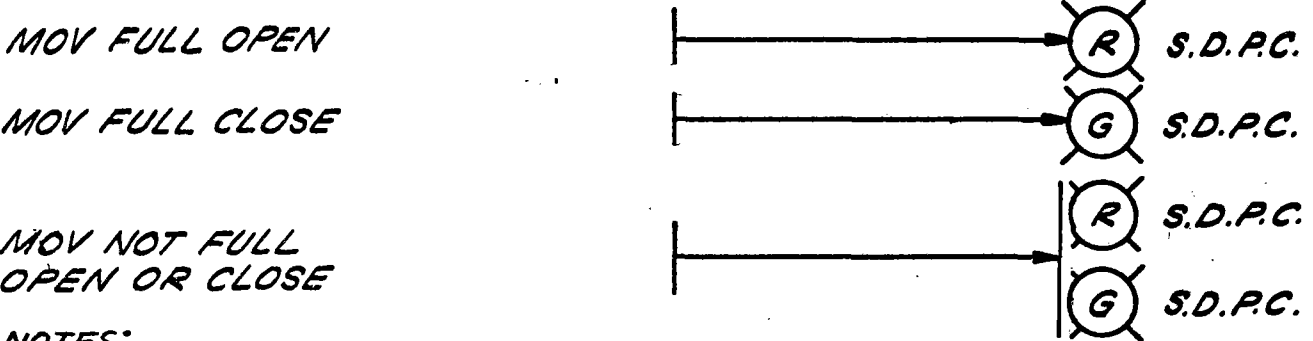
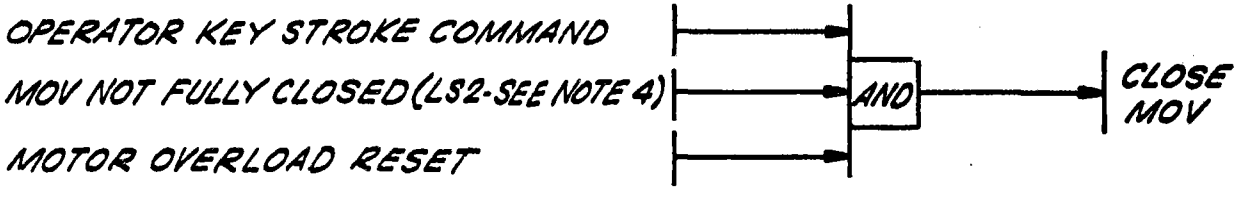
5133302 CIRC. WATER SYS. - R.F.I.D.		E ISSUED FOR REVIEW & COMMENT		8-25-91		RJM		1361	
N3221SH1 LEGEND		D ISSUED FOR REVIEW & COMMENT		8-25-91		RJM		1361	
Reference Drawings:		Revisions		M Date		P.E. QAE		Disc. Sign.	
				Approved					
		Responsible Engr.		Res. Cr'd. Made		No.			
		FKB		JT		7361			
		FKB		JT		7361			
		RO		7361					
		D/L							
		N3221 SH.3		E					
		EDISON		California					
		SCE		Rosedale					
		Location SOLAR I GEN. STATION							
		CONTROL LOGIC DIAGRAM							
		COOLING TOWER FAN							



**MOTOR OPERATED VALVE (MOV)-OPEN**



**MOTOR OPERATED VALVE (MOV)-CLOSED**



**NOTES:**  
 1. SAME SCHEME APPLICABLE TO ALL MOV'S LISTED ON THIS SHEET (UNLESS OTHERWISE NOTED).  
 2. LS1 = "OPEN" LIMIT SWITCH WHEN MOV IS FULLY OPEN LS1 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.  
 3. LS2 = "CLOSE" LIMIT SWITCH WHEN MOV IS FULLY CLOSE LS2 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS

MOV'S	OPERATOR KEY STROKE	DESCRIPTION	P&ID	NOTES
MOV-110	HS-110	1ST. POINT HEATER OUTLET TO COND.	5133301 - FEEDWATER & CONDENSATE SYS.	
MOV-140	HS-140	VACUUM BREAKER		
MOV-33	HS-33	RECEIVER FEED-WATER PP. DISCHARGE		
MOV-229	HS-229	CIRC. WATER FROM COND. TO COOLING TOWER BASIN	5133302 - CIRC. WATER SYSTEM	
MOV-609	HS-609	1ST. POINT EXTRACTION TO DRAIN HDR. DH-2	5133306 - STEAM TURBINE	
MOV-637	HS-637	4TH. POINT EXTRACTION TO DRAIN HDR. DH-2		
MOV-652	HS-652			
MOV-615	HS-615	2ND. POINT EXTRACTION TO DRAIN HDR. DH-3		
MOV-616	HS-616	ADMISSION STEAM TO CONDENSER (UP STREAM STOP VALVE)		
MOV-617	HS-617	INLET STEAM TO CONDENSER (UP STREAM STOP VALVE)		
MOV-675	HS-675	2ND. POINT EXTRACTION DRAIN TO HDR. DH-2		
MOV-676	HS-676	3RD. POINT EXTRACTION DRAIN TO HDR. DH-3		
MOV-623	HS-623	1ST. POINT EXTRACTION TO DRAIN HDR. DH-3		
MOV-650	HS-650	3RD. POINT EXTRACTION TO DRAIN HDR. DH-2		

5133306	STEAM TURBINE P&ID.	D	ISSUED FOR REVIEW & COMMENT	6-25-80																
5133302	CIRC. WATER SYSTEM P&ID.	C	ISSUED FOR REVIEW & COMMENT																	
5133301	FEEDWATER & COND. P&ID.	B	ISSUED FOR REVIEW & COMMENT	1-14-80																
N3221 SH 1	LEGEND	A	ISSUED FOR REVIEW & COMMENTS	11-23-79																

Reference	Drawings	No.	Revisions	M	Date	P.E.	DATE	Disc. Supp.	Approved	Exp. No.	Exp. Date	Exp. No.	Exp. Date	Exp. No.	Exp. Date	Exp. No.	Exp. Date	Exp. No.	Exp. Date	Exp. No.	Exp. Date

CONTROL LOGIC DIAGRAM  
 MOTOR OPERATED VALVES

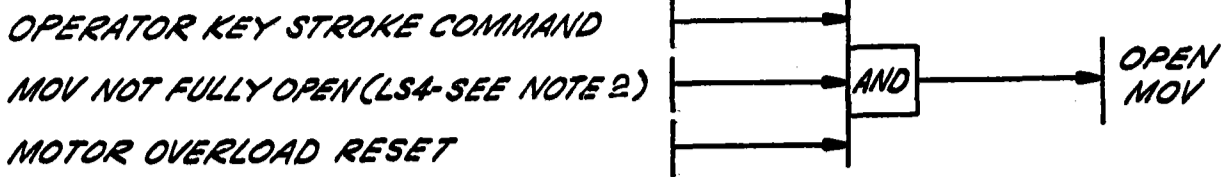
**SE EDISON**  
 Rosemead California

N3221 SH. 4 D

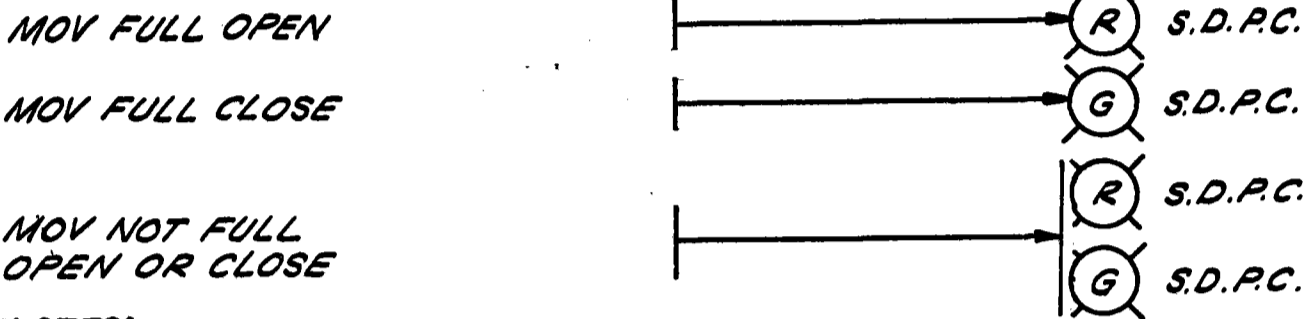
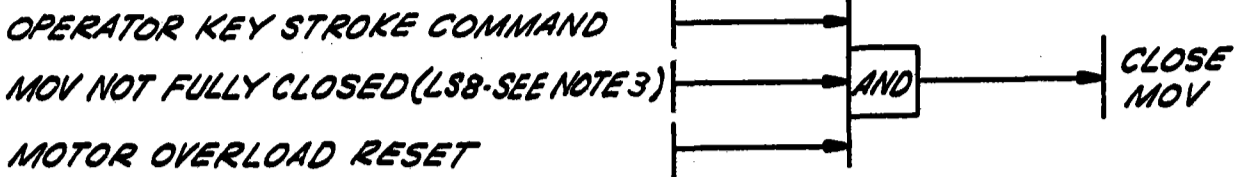




**MOTOR OPERATED VALVE (MOV)-OPEN**



**MOTOR OPERATED VALVE (MOV)-CLOSED**



**NOTES:**

1. SAME SCHEME APPLICABLE TO ALL MOV'S LISTED ON THIS SHEET (UNLESS OTHERWISE NOTED).
2. LS4 = "OPEN" LIMIT SWITCH WHEN MOV IS FULLY OPEN. LS3 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.
3. LS8 = "CLOSE" LIMIT SWITCH WHEN MOV IS FULLY CLOSE. LS7 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.
4. ALL CONTROL SIGNALS ARE MOMENTARY CONTACT

MOV'S	OPERATOR KEY STROKE	DESCRIPTION	P&ID	NOTES
MOV-110	HS-110	FEEDWATER CLEAN UP	5133301-FEEDWATER & CONDENSATE SYS.	
MOV-140	HS-140	CONDENSER VACUUM BREAKER	5133306-STEAM	
MOV-33	HS-33	RECEIVER FEED-WATER PP. DISCHARGE	5133301 FW & COND.	
MOV-229	HS-229	CIRC. WATER FROM COND. TO COOLING TOWER BASIN	5133302- CIRC. WATER SYSTEM	
MOV-903	HS-903	ADMISSION STOP VV. BEFORE SEAT DRAIN	5133309 TURBINE	
MOV-904	HS-904	ADMISSION STOP VV. AFTER SEAT DRAIN		
MOV-905	HS-905	INLET STOP VV. BEFORE SEAT DRAIN		
MOV-906	HS-906	INLET STOP VV. AFTER SEAT DRAIN		
MOV-935	HS-935	SEALING STEAM DRAIN VALVE		
MOV-960	HS-960	SEALING STEAM EXHAUST TO COND.		
MOV-982	HS-982	AUX. STEAM TO SEALS		
MOV-990	HS-990	SEALING STEAM DRAIN		
MOV-991	HS-991	SEALING STEAM DRAIN		
MOV-942	HS-942	COOLING STEAM VALVE		

5133306	STEAM TURBINE P&ID.
5133302	CIRC. WATER SYSTEM P&ID.
5133301	FEEDWATER & COND. P&ID.
N3221 SH 1	LEGEND

No.	Revisions
E	ISSUED FOR REVIEW & COMMENT
D	ISSUED FOR REVIEW & COMMENT
C	ISSUED FOR REVIEW & COMMENT
B	ISSUED FOR REVIEW & COMMENT
A	ISSUED FOR REVIEW & COMMENTS

M	Date	P.E.	P.A.E.	Drawn
	11-23-77			

Approved	Checked	Checked	Checked	Checked	Checked

Location SOLAR I GEN. STATION

CONTROL LOGIC DIAGRAM 480V

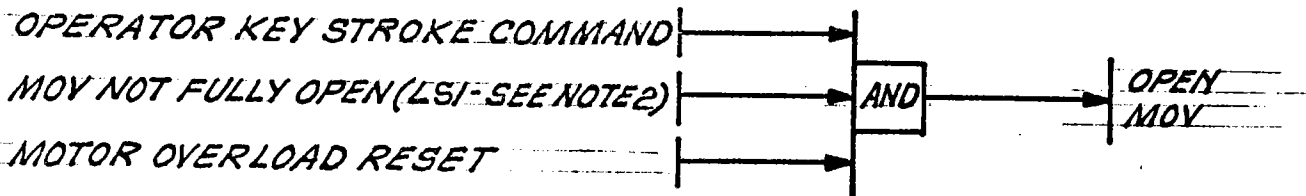
MOTOR OPERATED VALVE

**EDISON**  
Rossmore  
California

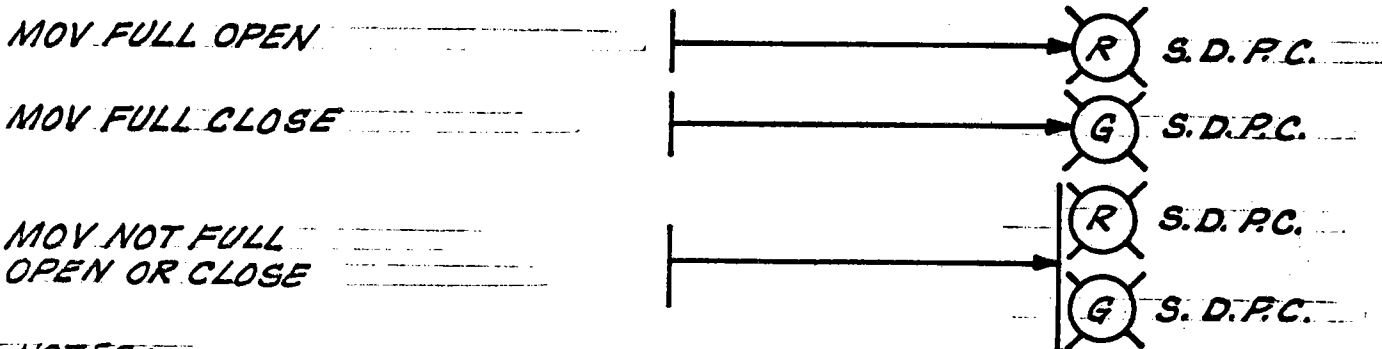
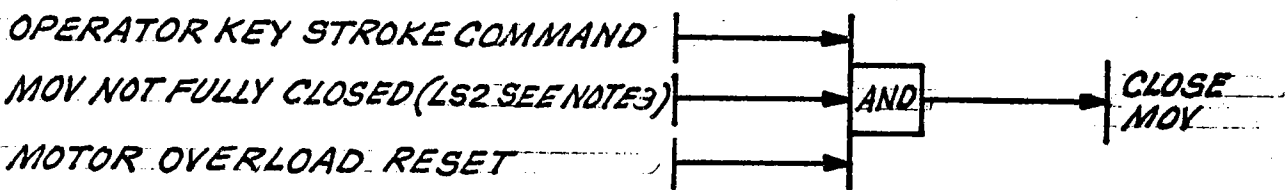
N3221 SH. 4A

S/R-15-103

MOTOR OPERATED VALVE (MOV)-OPEN



MOTOR OPERATED VALVE (MOV)-CLOSED



NOTES:

1. SAME SCHEME APPLICABLE TO ALL MOV'S LISTED ON THIS SHEET (UNLESS OTHERWISE NOTED)
2. LS1 = "OPEN" LIMIT SWITCH WHEN MOV IS FULLY OPEN LS1 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.
3. LS2 = "CLOSE" LIMIT SWITCH WHEN MOV IS FULLY CLOSE LS2 CONTACTS ARE OPEN, THEY ARE N.C. FOR ALL OTHER POSITIONS.
4. ALL CONTROL SIGNALS ARE MOMENTARY CONTACT

MOV'S	OPERATOR KEY STROKE	DESCRIPTION	P&ID	NOTES
MOV-609	HS-609	1ST. POINT EXTRACTION TO CONDENSER	5133306-STEAM	
MOV-637	HS-637	4TH POINT EXTRACTION TO CONDENSER		
MOV-652	HS-652			
MOV-615	HS-615	2ND. POINT EXTRACTION TO CONDENSER		
MOV-616	HS-616	ADMISSION STEAM TO CONDENSER (UPSTREAM STOP VALVE)		
MOV-617	HS-617	INLET STEAM TO CONDENSER (UPSTREAM STOP VALVE)		
MOV-675	HS-675	2ND. POINT EXTRACTION TO CONDENSER		
MOV-676	HS-676	3RD. POINT EXTRACTION TO CONDENSER		
MOV-623	HS-623	1ST. POINT EXTRACTION TO CONDENSER		
MOV-650	HS-650	3RD. POINT EXTRACTION TO CONDENSER		
MOV-941	HS-941	COOLING STEAM TRAP	5133309 TURBINE	
MOV-999	HS-999	ADMISSION STEAM TRAP BY PASS		
MOV-660	HS-660	NITROGEN SUPPLY TO CONDENSER	5133306 STEAM	

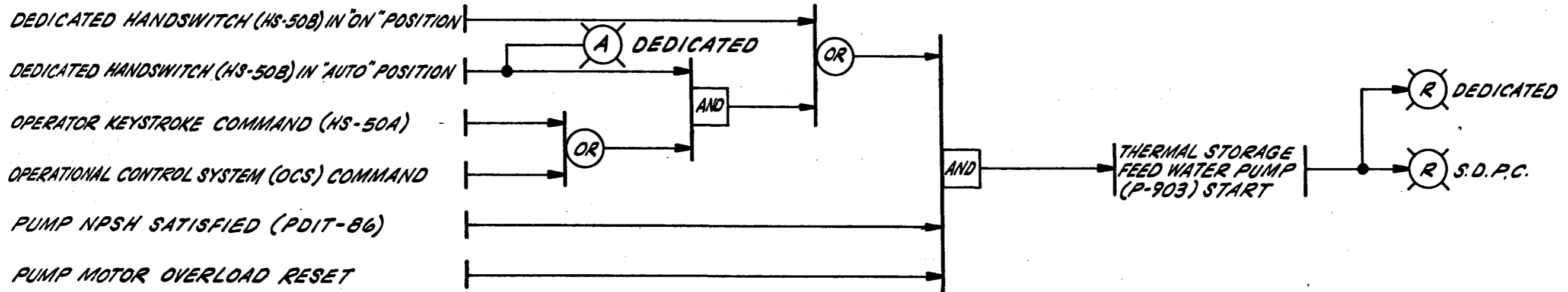
5133305	STEAM TURBINE P&ID.	G	ISSUED FOR INFORMATION	7-28-51															
5133302	CIRC WATER SYS. P&ID.	E	ISSUED FOR REVIEW & COMMENT	2-26-52															
5133301	CONDENSER & COND. P&ID.	D	ISSUED FOR REVIEW & COMMENT	5-25-52															
513321	CONDENSER P&ID.	C	ISSUED FOR REVIEW & COMMENT	4-23-51															
513321	CONDENSER P&ID.	B	ISSUED FOR REVIEW & COMMENT	4-23-51															
513321	CONDENSER P&ID.	A	ISSUED FOR REVIEW & COMMENT	4-23-51															

CONTROL LOGIC DIAGRAM 120V  
MOTOR OPERATED VALVE

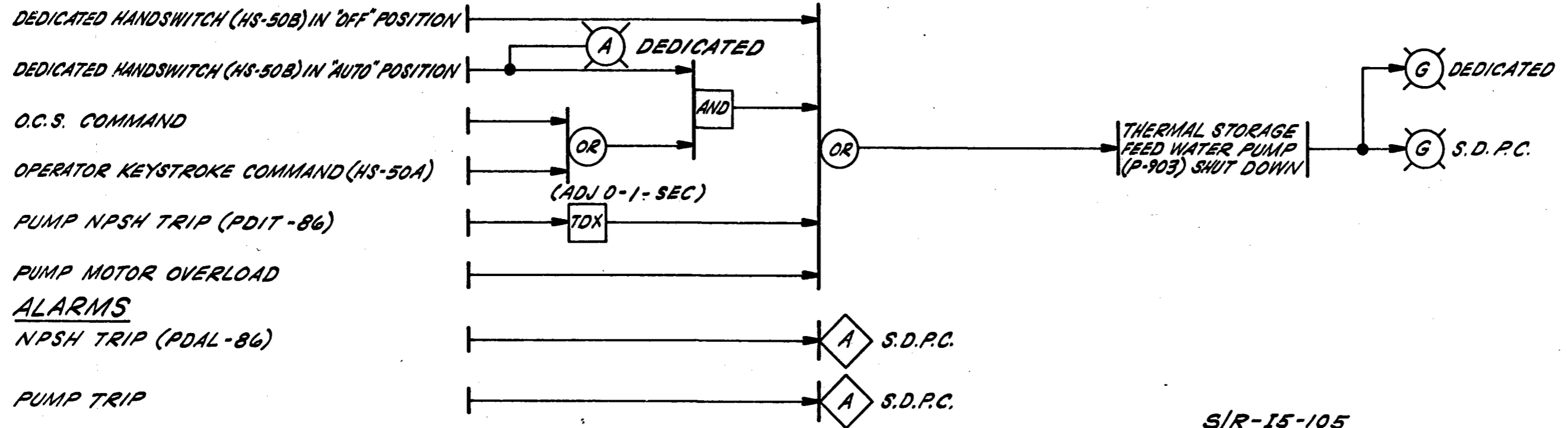
**EDISON**  
Rosemead California

S/R-15-104

### THERMAL STORAGE FEEDWATER PUMP (P-903) - START



### THERMAL STORAGE FEEDWATER PUMP (P-903) - STOP



S/R-15-105

										Location SOLAR I GENERATING STATION				
										CONTROL LOGIC DIAGRAM				
										THERMAL STOR. FEEDWATER PUMP				
N3221SH.1	LEGEND	F	ISSUED FOR REVIEW & COMMENT	4-8-81				FKB	JT		7361	SCE EDISON		
5133301	FEEDWATER & COND. SYS.-P & ID	E	ISSUED FOR REVIEW & COMMENT	4-18-81				JJ	JT	MEP	7361	Rosemead California		
		D	ISSUED FOR REVIEW & COMMENT	6-25-81				FKB	FKB	JT	7361			
		C	REDRAWN & ISSUED FOR REVIEW & COMMENT						EB	EACB	7361			
Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Resp. Engr.	Ch'd.	Made	J.O. No.	D/L	N3221 SH. 5 F

PUMP-START (P-901)

OPERATOR KEY-STROKE START COMMAND  
(HS-313B)

PUMP MOTOR OVERLOAD RESET

AND

PUMP START  
(P-901)



PUMP-STOP (P-901)

OPERATOR KEY-STROKE STOP COMMAND  
(HS-313A)

PUMP MOTOR OVERLOAD

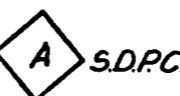
OR

PUMP STOP  
(P-901)



ALARMS

PUMP TRIP



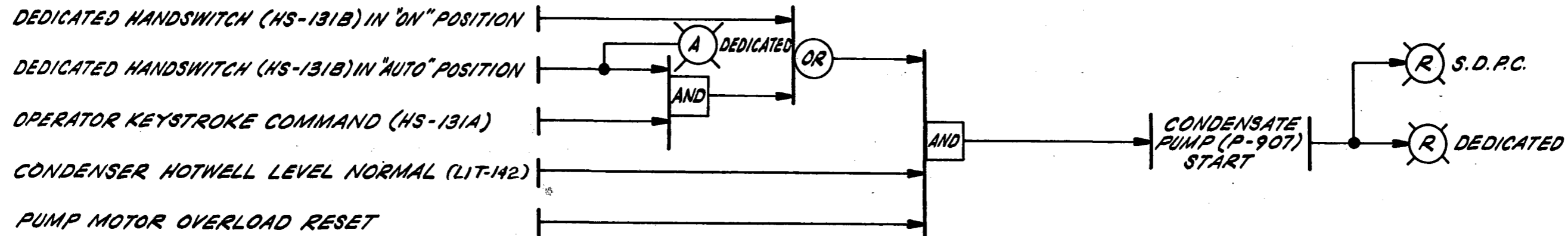
NOTES:

1. LOGIC SHOWN IS FOR A PUMP CONTROLLED AND DISPLAYED BY S.D.P.C. SYSTEM IN MAIN CONTROL ROOM

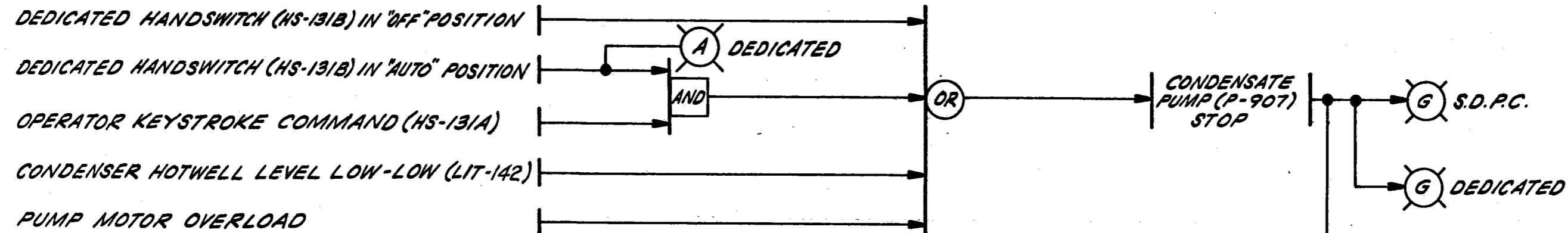
S/R-15-106

										Location SOLAR I GEN. STATION					
										FKB	JT		7361	<b>CONTROL LOGIC DIAGRAM</b> <b>COOLING WATER PUMP (P-901)</b> Rosemead California	
										FKB	JT	DP	7361		
										FKB	JT		7361		
										FKB	JT	JT	7361		
										FKB	EB	EA	7361		
										FKB	EB	COPE	7361		
										FKB	EB	COPE	7361	D/L	
										Approved				N3221 SH.6	F
Reference Drawings	No.	Revisions		M	Date	P.E.	Q.A.E.	Disc. Supv.							
N3221 SH.1	LEGEND	B			1-14-80										
5133303	COOLING WATER P&ID	A			1-25-81										
		C			6-25-81										
		D			3-25-82										
		E			1-10-83										
		F			4-29-83										

### CONDENSATE PUMP (P-907) - START



### CONDENSATE PUMP (P-907) - STOP



### ALARMS PUMP TRIP



STOP AMMONIA PUMP (P-934) DWG. NO. N3221 SH. 17  
HYDRAZINE PUMP (P933) DWG. NO. N3221 SH. 16

S/R-15-107

										Location SOLAR I GENERATING STATION		
										CONTROL LOGIC DIAGRAM		
										CONDENSATE PUMP		
										<b>SCE EDISON</b>		
										Rosemead California		
										D/L		
										N3221 SH. 7 F		
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE.	Disc. Supv.	Approved	Engr.	Ch'd.	Made	J.O. No.
		F		4-28-01					FKR	JT		7361
		E		10-8-01					LD	JT		7361
N3221 SH. 1	LEGEND	D		5-25-00					FKB	JT		7361
5133301	FEEDWATER & CONDENSATE-P & ID	C								Ch	ENCO	7361

### START POLISHING DEMINERALIZER SUMP PUMP (P-936)

LOCAL (HS-802) "START" POSITION

LOCAL (HS-802) "AUTO" POSITION

SUMP LEVEL AT MID LEVEL (LSHL-805)

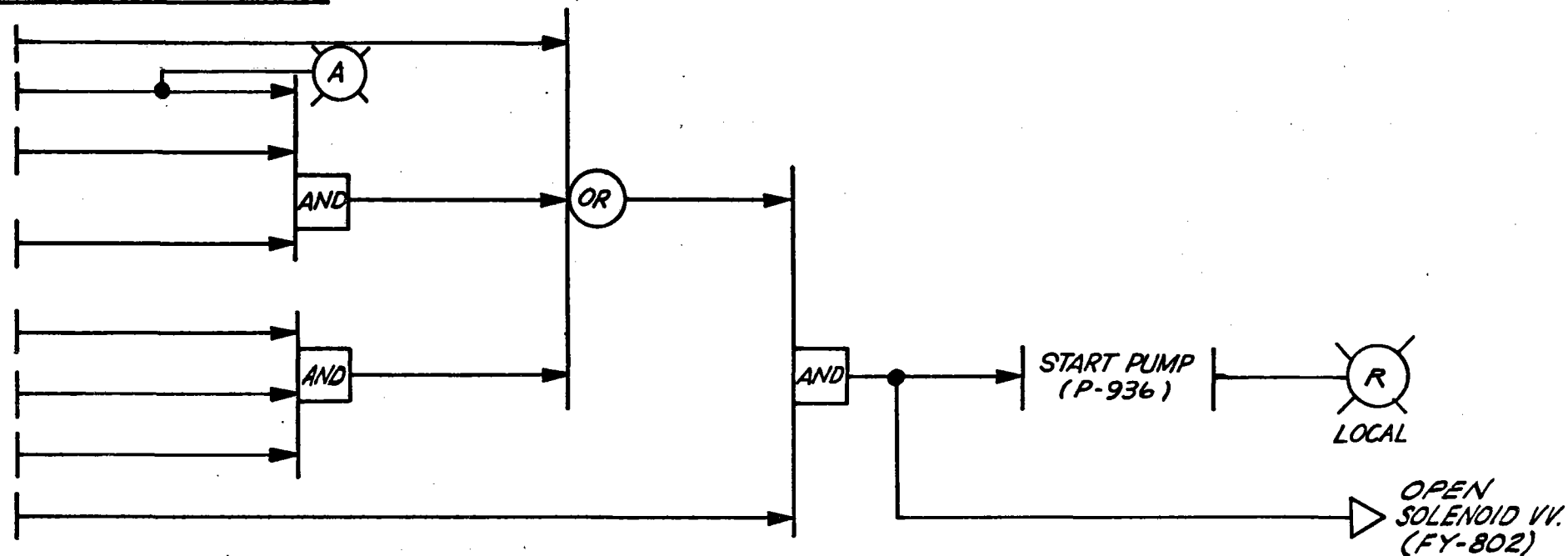
ALTERNATOR RELAY (KC-806) SET FOR PUMP (P-936) TO START FIRST

LOCAL (HS-802) "AUTO" POSITION

SUMP LEVEL AT HIGH LEVEL (LSHL-805)

PUMP (P-937) IS SELECTED TO START FIRST (HS-803)

PUMP (P-936) MOTOR OVERLOAD RESET

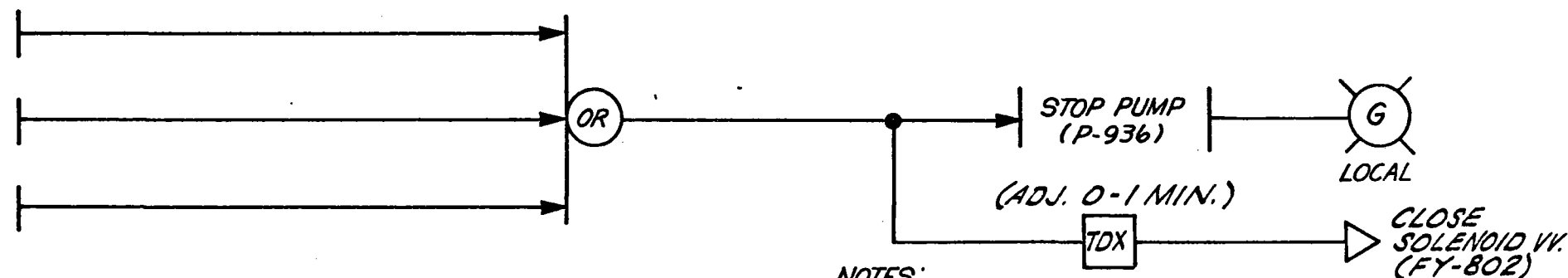


### STOP POLISHING DEMINERALIZER SUMP PUMP (P-936)

LOCAL (HS-802) "STOP" POSITION

SUMP LEVEL AT LOW LEVEL (LSHL-805)

PUMP (P-936) MOTOR OVERLOAD



**NOTES:**

- 1 LOGIC DIAGRAM SHOWN FOR PUMP (P-936), SAME SCHEME APPLICABLE FOR PUMP (P-937) & (FY-802)
- 2 ALTERNATOR RELAY ESTABLISHES ALTERNATE OPERATION OF PUMPS (KC-806)

S/R-15-108

										Location SOLAR I GEN. STATION			
										CONTROL LOGIC DIAGRAM POLISHING DEMINERALIZER SUMP PUMPS			
										<b>SC EDISON</b> Rosemead California			
										D/L N3221 SH.8 E			
N3221 SH.1	LEGEND	B	ISSUED FOR REVIEW & COMMENT	11-14-81						FKB	JT	EKO	7361
5133308	DRAIN & SUMP SYS. - P&ID	A	ISSUED FOR REVIEW & COMMENT	11-3-81						FKB	EB	COPE	7361
	Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Resp. Engr.	CK'd.	Made	J.O. No.

### PUMP-START

LOCAL HS START POSITION

PUMP MOTOR OVERLOAD RESET

AND

PUMP START



### PUMP-STOP

LOCAL HS STOP POSITION

PUMP MOTOR OVERLOAD

OR

PUMP STOP



PUMP NO.	HS. NO.	DESCRIPTION	P. & I. D.
P-915	HS-446	CAUSTIC TRANSFER PUMP	5133304-MISCELLANEOUS SYS.
P-935	HS-432	ACID TRANSFER PUMP	5133304-MISCELLANEOUS SYS.
P-923	HS-262	POLYACRYLATE PUMP	5133302-CIRC WATER SYS.
P-925	HS-303	CHILLER SAMPLE PUMP	5133303-COOLING WATER SYS.

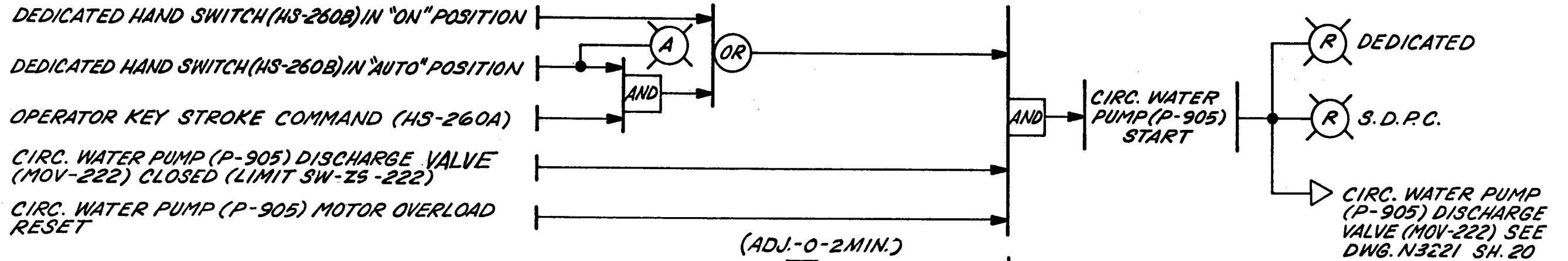
**NOTES:**

- LOGIC SHOWN IS FOR LOCAL PUMP CONTROL AND IS TYP. FOR PUMPS LISTED (THIS SHEET).

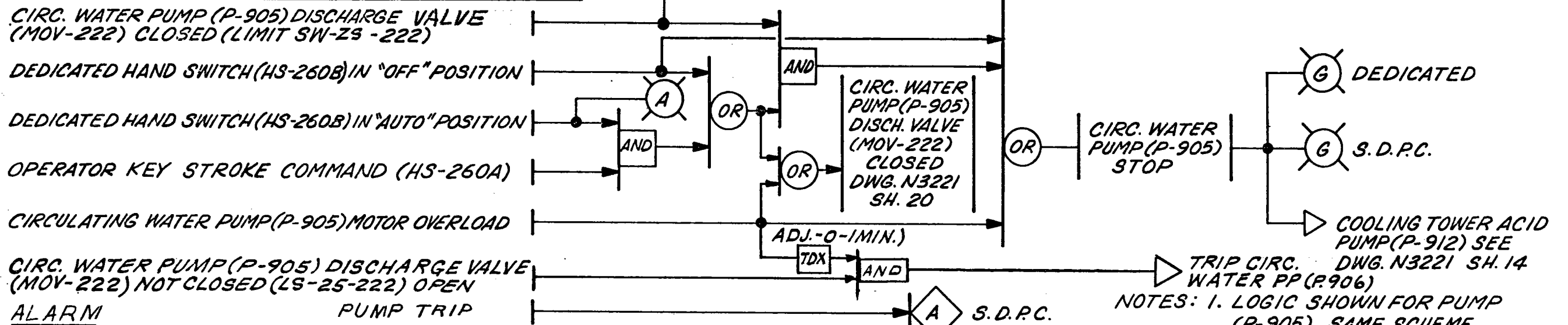
S/R-15-109

										Location SOLAR I GEN. STA.		
										CONTROL LOGIC DIAGRAM		
										PUMP CONTROL-LOCAL		
										Rossmead California		
										N 3221 SH. 9   E		
										D/L		

# CIRCULATING WATER PUMP (P-905) - START



# CIRCULATING WATER PUMP (P-905) - STOP



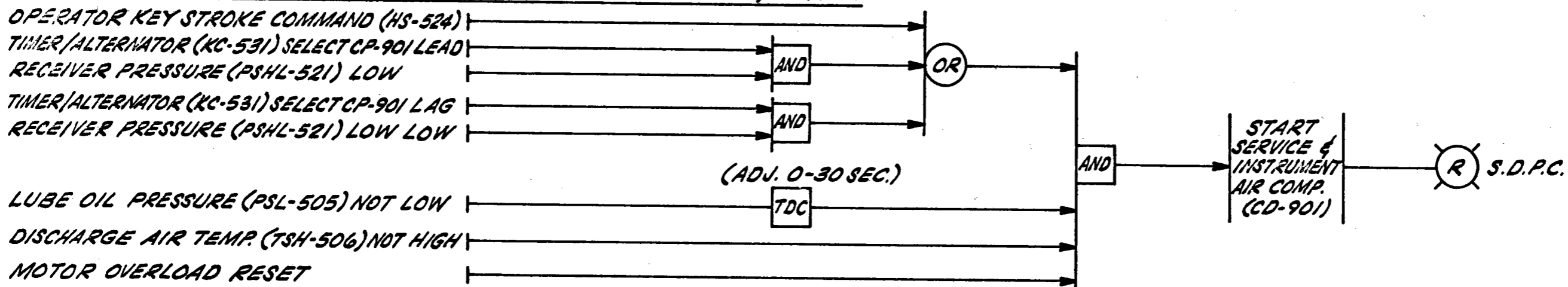
NOTES: 1. LOGIC SHOWN FOR PUMP (P-905), SAME SCHEME APPLICABLE TO CIRC. WATER PUMP (P-906)

S/R-15-110

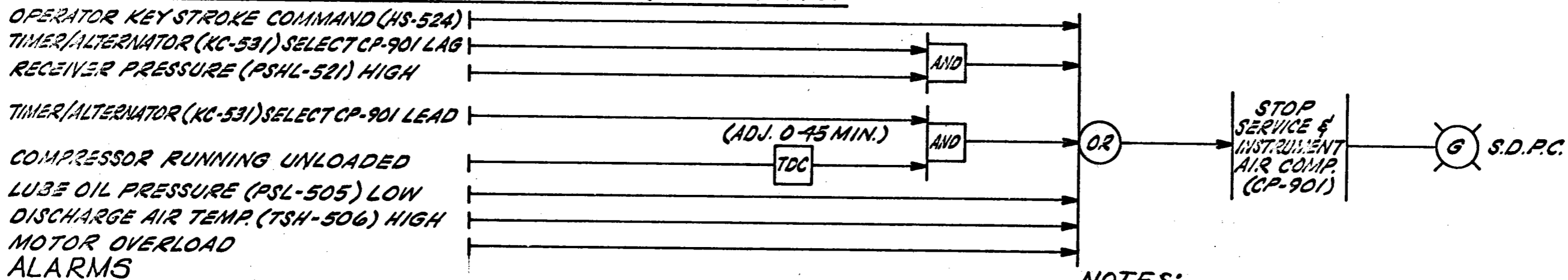
Location SOLAR I GEN. STATION									
CONTROL LOGIC DIAGRAM									
CIRCULATING WATER PUMPS									
Rosemead California									
Reference Drawings No. Revisions M Date P.E. QAE Disc. Supp. Approved Issp. Engr. W'd. Made J.O. No. D/L									
N3221 SH.1 LEGEND N3221 SH.14 COOLING TOWER ACID PP N3221 SH.20 CIRC. PP DISCH. (MOV-222) 513302 CIRC. WATER SYSTEM P&ID									
ISSUED FOR REVIEW & COMMENT 10-2-90 (1/1)									
N3221 SH.10 E									



### SERVICE & INSTRUMENT AIR COMPRESSOR (CP-901) START



### SERVICE & INSTRUMENT AIR COMPRESSOR (CP-901) STOP



**NOTES:**

1. LOGIC DIAGRAM SHOWN FOR COMPRESSOR (CP-901) SAME SCHEME APPLICABLE FOR COMPRESSOR (CP-902), (PSL-515) & (TSH-516)

PUMP TRIP

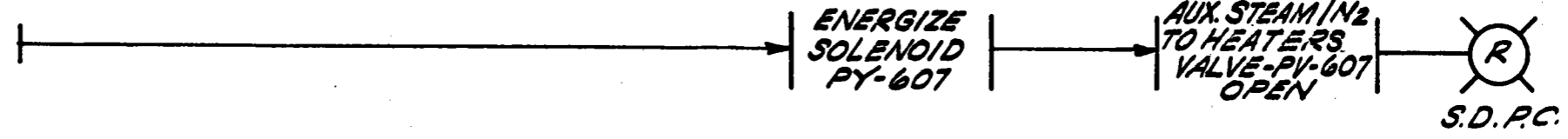
DISCHARGE AIR TEMP. HIGH (TSH-506)

S/R-15-111

										Location SOLAR I GENERATING STATION			
										LOGIC DIAGRAM			
										SERVICE & INSTRUMENT AIR COMPRESSOR (CP-901)			
										Rosemead California			
										N3221 SH.11			
										F			
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE	Disc. Subst.	Approved	Iss. Engr.	Chd.	Made	J.O. No.	D/L
313133	COMPRESSED AIR P&ID	3	ISSUED FOR REVIEW & COMMENT	7-29-71				FKR	JT			7351	
313133	COMPRESSED AIR P&ID	3	ISSUED FOR REVIEW & COMMENT	7-29-71				FKR	JT			7351	
313133	COMPRESSED AIR P&ID	3	ISSUED FOR REVIEW & COMMENT	7-29-71				FKR	JT			7351	

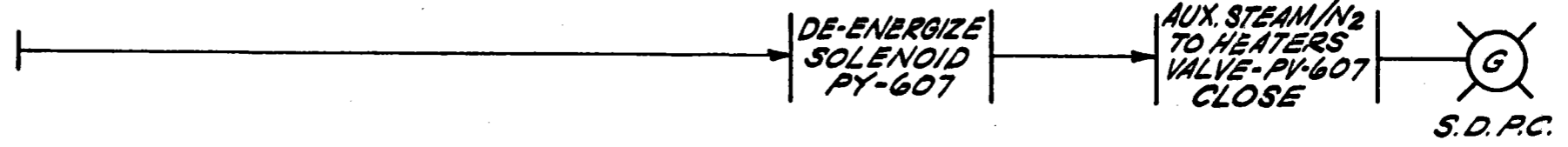
AUX. STEAM/N<sub>2</sub> TO HEATERS-CONTROL VALVE (PV-607)-OPEN

OPERATOR KEY-STROKE COMMAND



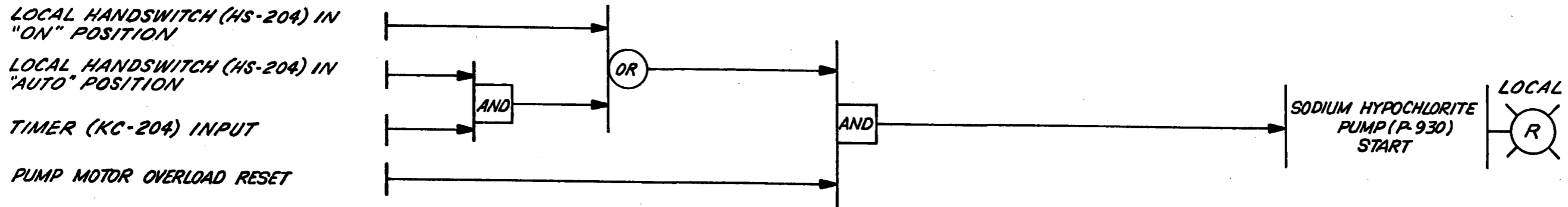
AUX. STEAM/N<sub>2</sub> TO HEATERS-CONTROL VALVE (PV-607)-CLOSE

OPERATOR KEY-STROKE COMMAND

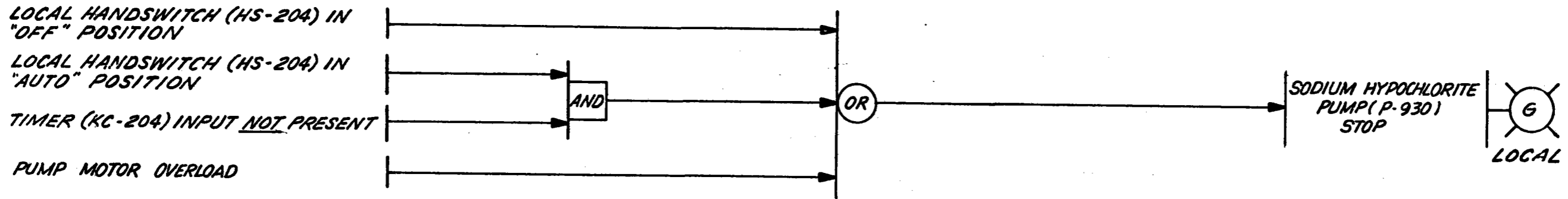


													Location SOLAR I GEN. STA.	
													CONTROL LOGIC DIAGRAM	
													PV 607	
													Rosemead California	
													N 3221 SH.12 B	
													D/L	
													Approved	
													Disc. Supv.	
													QA.E.	
													P.E.	
													M Date	
													Revisions	
													No.	
													Reference Drawings	
													LEGEND	
													N 3221 SH.1	
													B ISSUED FOR REVIEW & COMMENT	
													A ISSUED FOR REVIEW & COMMENT	
													1-14-80	
													11-28-79	
													FKB EB CORE 7361	
													FID EB CORE 7361	

### SODIUM HYPOCHLORITE PUMP (P-930) - START



### SODIUM HYPOCHLORITE PUMP (P-930) - STOP



### ALARM



S/R-15-113

										Location SOLAR I GEN. STA.			
										CONTROL LOGIC DIAGRAM			
										SODIUM HYPOCHLORITE PUMP			
										 Rosemead California			
N 3221 SH.1	LEGEND	D	ISSUED FOR REVIEW & COMMENT	4-23-81	FKB	JT		7361					
5133302	CIRC. WATER SYS. - P&ID	C	ISSUED FOR REVIEW & COMMENT	6-26-80	FKB	JT	EAG	7361					
		B	ISSUED FOR REVIEW & COMMENT	1-14-80	FKB	EB	EAG	7361					
		A	ISSUED FOR REVIEW & COMMENT	11-28-79	FKB	EB	COPE	7361					
Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Resp. Engr.	Ck'd.	Made	J.O. No.	D/L
													N 3221 SH.13 D

### COOLING TOWER ACID PUMP (P-912) - START

LOCAL HAND SWITCH (HS-207B) IN "ON" POSITION

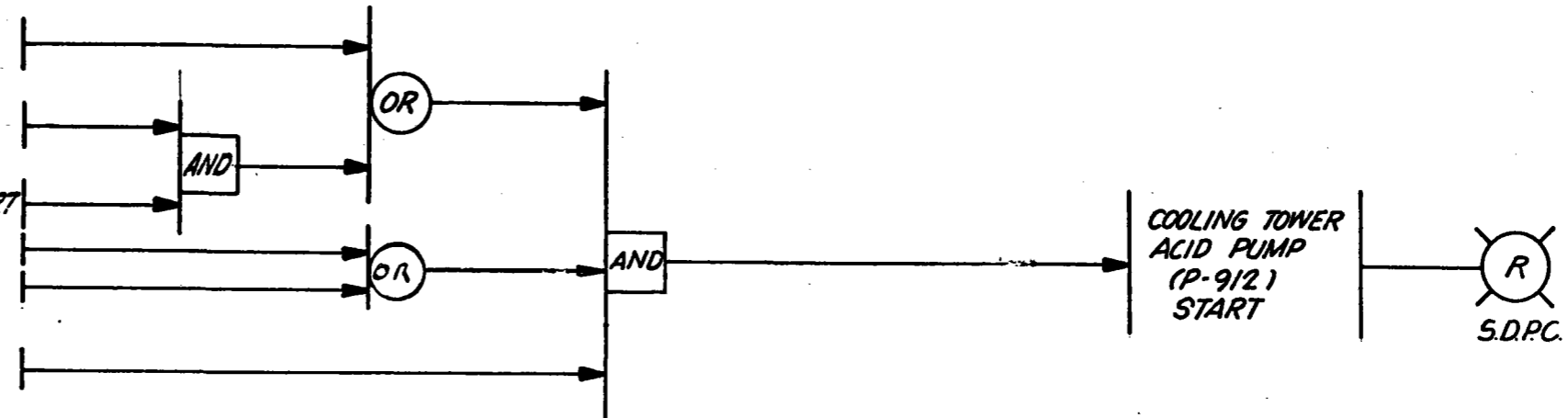
LOCAL HAND SWITCH (HS-207B) IN "AUTO" POSITION

OPERATOR KEY STROKE COMMAND (HS-207) START

CIRC. WATER PUMP (P-905) RUNNING

CIRC. WATER PUMP (P-906) RUNNING

PUMP MOTOR OVERLOAD RESET



### COOLING TOWER ACID PUMP (P-912) - STOP

LOCAL HAND SWITCH (HS-207B) IN "OFF" POSITION

LOCAL HAND SWITCH (HS-207B) IN "AUTO" POSITION

OPERATOR KEY STROKE COMMAND (HS-207) STOP

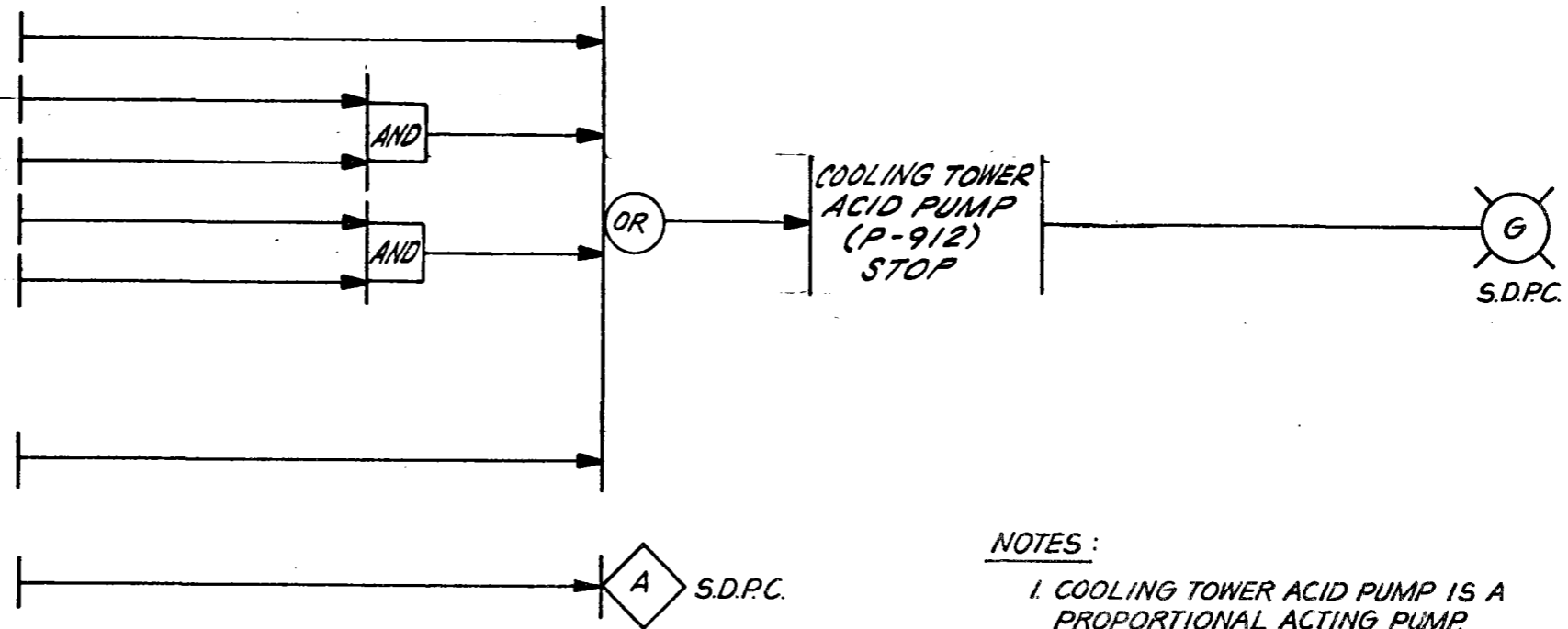
CIRC. WATER PUMP (P-905) STOPPED

CIRC. WATER PUMP (P-906) STOPPED

PUMP MOTOR OVERLOAD

ALARMS

PUMP TRIP



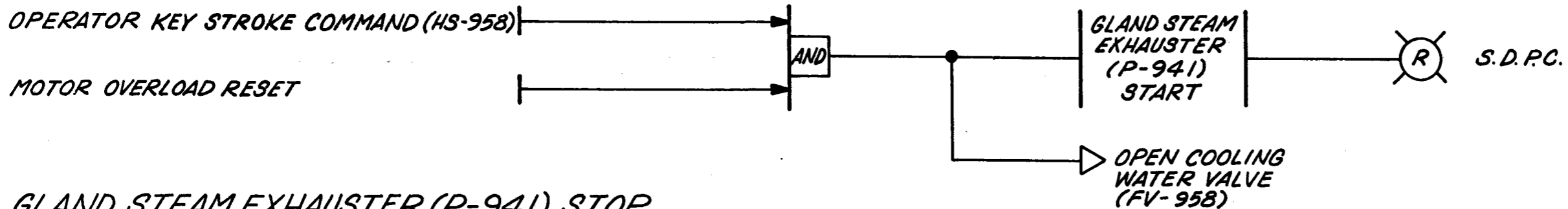
**NOTES:**

1. COOLING TOWER ACID PUMP IS A PROPORTIONAL ACTING PUMP.

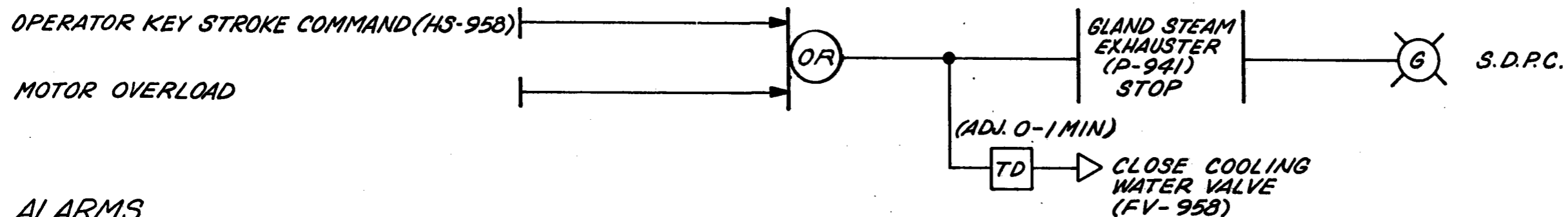
S/R-15-114

										Location SOLAR I GENERATING STATION	
										CONTROL LOGIC DIAGRAM	
										COOLING TOWER ACID PUMP	
										Rosemead California	
										D/L	
										N 3221 SH. 14 E	
										105	

### GLAND STEAM EXHAUSTER (P-941) START



### GLAND STEAM EXHAUSTER (P-941) STOP



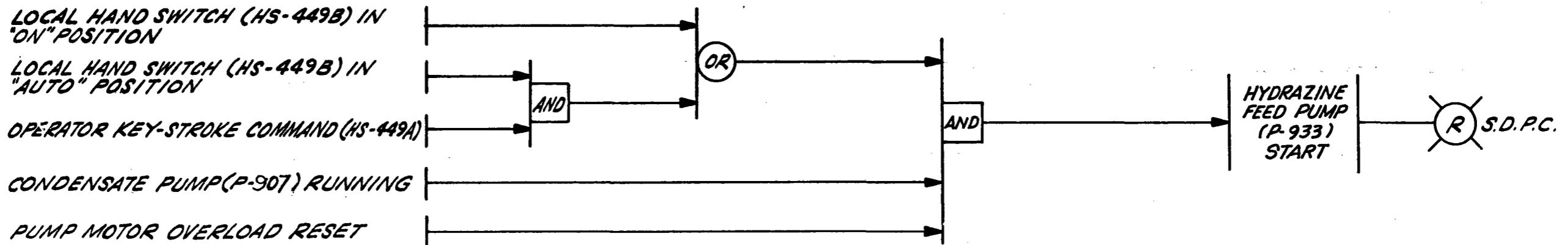
### ALARMS



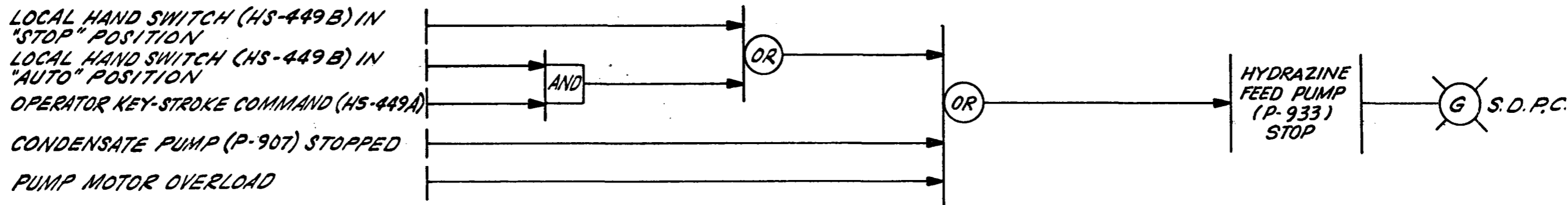
S/R-15-115

										Location SOLAR I GEN. STATION				
										CONTROL LOGIC DIAGRAM				
										GLAND STEAM EXHAUSTER				
5/33309 TURBINE P&I DIAGRAM		E	ISSUED FOR REVIEW & COMMENT	10-29-91						FKB	JT	7361	 Rosemead California	
N3221 SH.1 LEGEND		D	ISSUED FOR REVIEW & COMMENT	10-29-91						FKB	JT	7361		
		C	ISSUED FOR REVIEW & COMMENT	3-25-92						FKB	JT	EA		
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE	Disc. Supp.	Approved	Resp. Engr.	Ck'd	Made	J.O. No.	D/L	N3221 SH.15 E

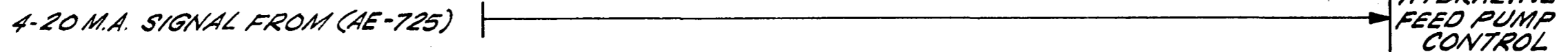
**HYDRAZINE FEED PUMP (P-933) - START**



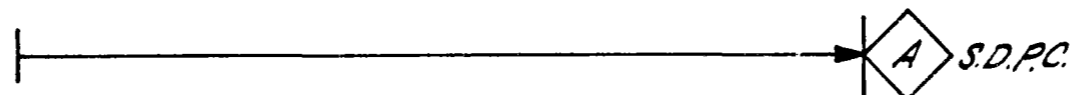
**HYDRAZINE FEED PUMP (P-933) - STOP**



**HYDRAZINE FEED PUMP (P-933) CONTROL**



**ALARMS**  
PUMP TRIP

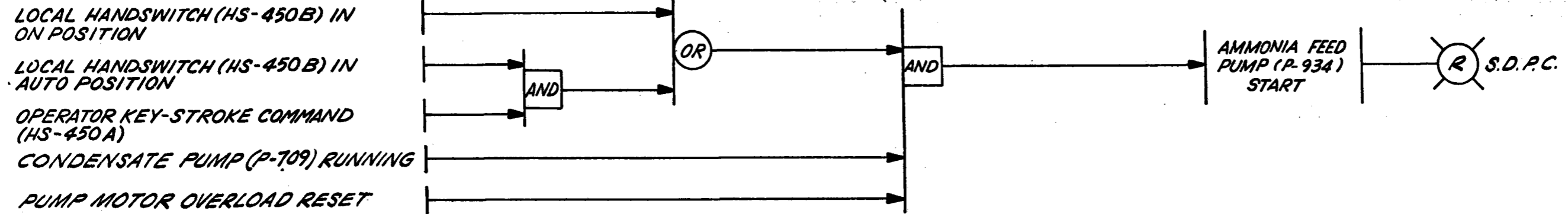


**NOTES:**  
1. CONDENSATE'S SYSTEM HYDRAZINE LEVEL IS MONITORED AT DEAERATOR'S INLET (AE-725) PUMP SPEED INCREASES WITH LOW HYDRAZINE LEVEL AND DECREASES WITH HIGH HYDRAZINE LEVEL.

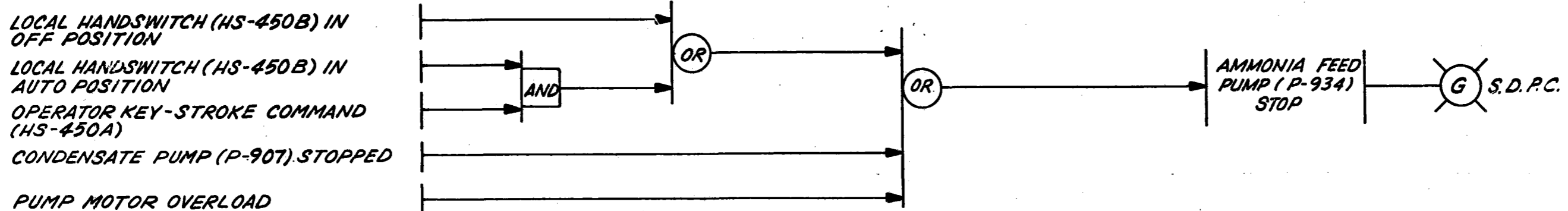
SIR-15-116

										Location SOLAR I GEN. STA.					
		F	ISSUED FOR REVIEW & COMMENT	4-8-81	LT			FKB	JT	JT	7361	CONTROL LOGIC DIAGRAM HYDRAZINE FEED PUMP			
		E	ISSUED FOR REVIEW & COMMENT	7-10-80	LT			FKB	JT	JT	7361				
		D	ISSUED FOR REVIEW & COMMENT	3-25-81	LT			FKB	JT		7361				
		C	ISSUED FOR REVIEW & COMMENT	6-26-80	LT			FKB	JT	JT	7361				
		B	ISSUED FOR REVIEW & COMMENT	1-14-81	LT			FKB	EB	COPE	7361				
N3221 SH.1	LEGEND	B	ISSUED FOR REVIEW & COMMENT	1-14-81	LT			FKB	EB	COPE	7361	 Rosemead California			
5133304	MISC. SYSTEMS - P&ID	A	ISSUED FOR REVIEW & COMMENT	1-28-79				FKB	EB	COPE	7361				
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE	Disc. Supv.	Approved	Resp. Engr.	Ch'd.	Made	J.O. No.	D/L	N3221 SH.16	E

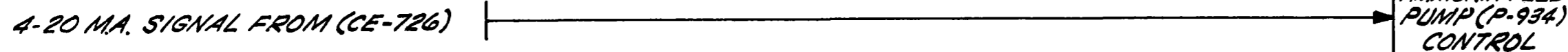
### AMMONIA FEED PUMP (P-934)-START



### AMMONIA FEED PUMP (P-934)-STOP

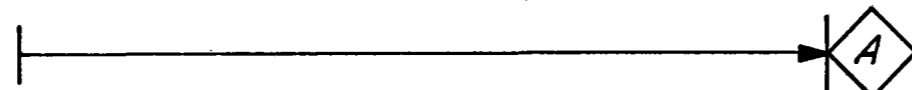


### AMMONIA FEED PUMP (P-934) CONTROL



### ALARMS

PUMP TRIP



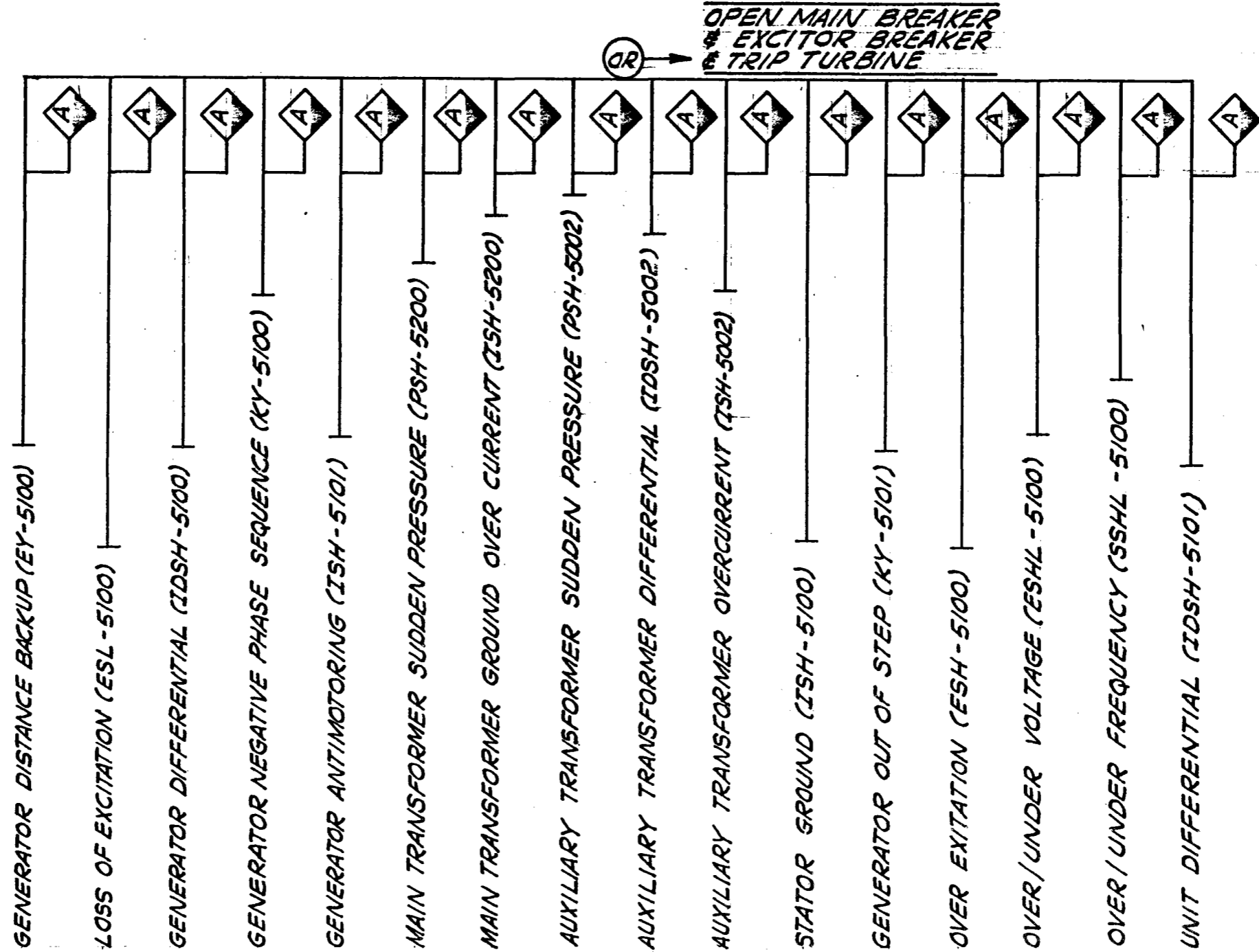
S/R-15-117

### NOTES:

- CONDENSATE'S SYSTEM AMMONIA LEVEL IS MONITORED AT DEAERATOR'S INLET (CE-726). PUMP SPEED INCREASES ON HIGH CONDUCTIVITY LEVEL, AND DECREASES WITH LOW CONDUCTIVITY.

Reference Drawings		No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Resp. Engr.	Ch'd.	Made	J.O. No.	D/L
N3221SH.1	LEGEND									FKB	JT	JT	7361	
E33304	MISC SYS. - PSD									FKB	JT	DD	7361	
										FKB	JT		7361	
										FKB	JT	JT	7361	
										FKB	EB	COPE	7361	
										FKB	EB	COPE	7361	
Location SOLAR I GEN. STA.														
CONTROL LOGIC DIAGRAM														
AMMONIA FEED PUMP														
Rosemead California														
N3221 SH.17 F														

GENERATOR TRIPPING LOGIC

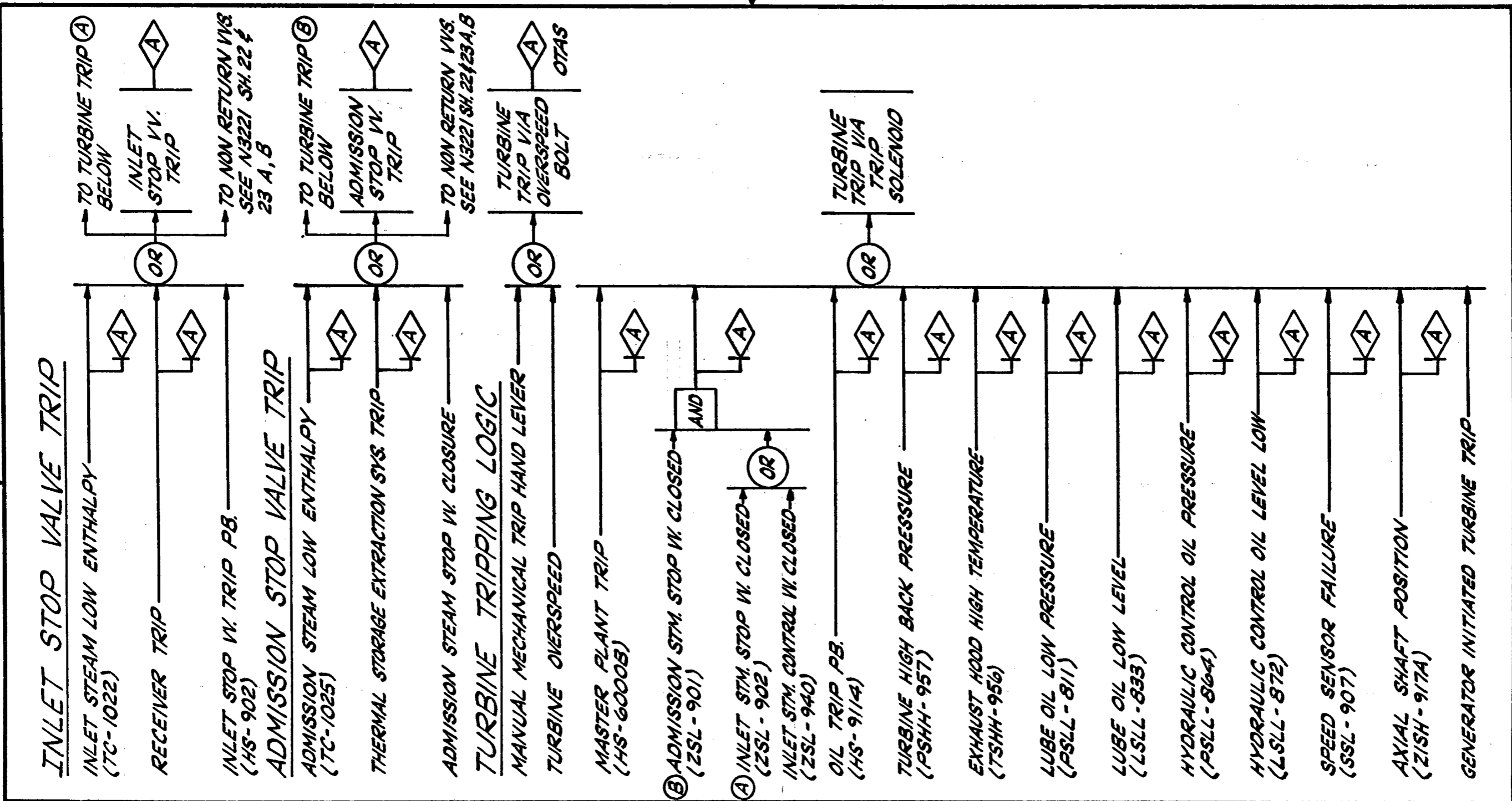



OR

OPEN MAIN BREAKER  
& EXCITOR BREAKER  
& TRIP TURBINE

Location SOLAR I GENERATING STATION																	
CONTROL LOGIC DIAGRAM GENERATOR																	
Rosemead California																	
S/R E2-14	OVERAL PLANT TRIP LOGIC																
N322/SH1	LEGEND	C	REDRAWN FOR REVIEW & COMMENT	7-4-81													
Reference Drawings	No.	Revisions		M	Date	P.E.	QAE	Disc. Supv.	Approved	Resp. Engr.	Ck'd	Made	J.O. No.	D/L	N3221	SH.18	C





										Location SOLAR I GENERATING STATION			
										CONTROL LOGIC DIAGRAM STEAM TURBINE TRIPPING			
										 Rosemead California			
5133309	TURBINE PFD												
3/R E2-14	OVERALL PLANT TRIP LOGIC												
N3221 SH.1	LEGEND	C	REDRAWN FOR REVIEW & COMMENT	AA	6-30-81					FRB	JT	7361	
Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Resp. Engr.	Ck'd	Made	J.O. No.	D/L
													N3221 SH.19A C

BEARING OIL PRESSURE LOW (PSL-810) |-----| A

BEARING OIL RESERVOIR LEVEL LOW (LSL-834) |-----| A

BEARING OIL RESERVOIR LEVEL HIGH (LSH-834) |-----| A

HYDRAULIC OIL PRESSURE LOW (PSL-866) |-----| A

HYDRAULIC OIL RESERVOIR LEVEL LOW (LSL-872) |-----| A

HYDRAULIC OIL RESERVOIR LEVEL HIGH (LSH-872) |-----| A

TURBINE SUPPLY INSTRUMENT FAULT (XSL-915A) |-----| A

TURBINE VIBRATION HI HI (XSHH-915) |-----| A

TURBINE VIBRATION HI (XSH-915) |-----| A

AXIAL THRUST POSITION TO FRONT (ZSH-917A) |-----| A

AXIAL THRUST POSITION TO BACK (ZSH-917B) |-----| A

TURBINE CONTROL MONITOR (UA-5251) |-----| A

SHAFT VOLTAGE HIGH (ES-5251) |-----| A

SHAFT CURRENT HIGH (IS-5251) |-----| A

SPEED SENDING FAILURE (SSL-907) |-----| A

ADMISSION STOP VALVE OPEN (ZSH-901) |-----| A

ADMISSION STOP VALVE CLOSED (ZSL-901) |-----| A

CONTROL VV SIGNAL SWITCH (ZSL-940) |-----| A

INLET CONTROL VALVE NO. LOAD (ZSLL-940) |-----| A

ADMISSION CONTROL VALVE NO. LOAD (ZSL-943) |-----| A

HIGH BACK PRESSURE (PSH-957) |-----| A

EXHAUST HOOD HIGH TEMP. (TAH-956) |-----| A

4TH STAGE SHELL TEMP. HIGH (TSH-955) |-----| A

EMERGENCY TRIP (PSL-912) |-----| A

TRIP LOCKOUT (PSL-913) |-----| A

TURBINE TRIP (UA-5250) |-----| A

TURBINE/STEAM GEN. INTERFACE TRIP (QA-5250) |-----| A

FIELD GROUND (ISG-5100) |-----| A

VOLTS/HERTZ (ESSL-5100) |-----| A

RECTIFIER TEMPERATURE (TSH-5100A) |-----| A

RECTIFIER TEMPERATURE (TSH-5100B) |-----| A

OVEREXCITATION TRANSFER TO MANUAL (ESH-5100) |-----| A

GENERATOR LOCK UP (US-5200) |-----| A

GENERATOR LOSS OF POWER (JA-5250) |-----| A

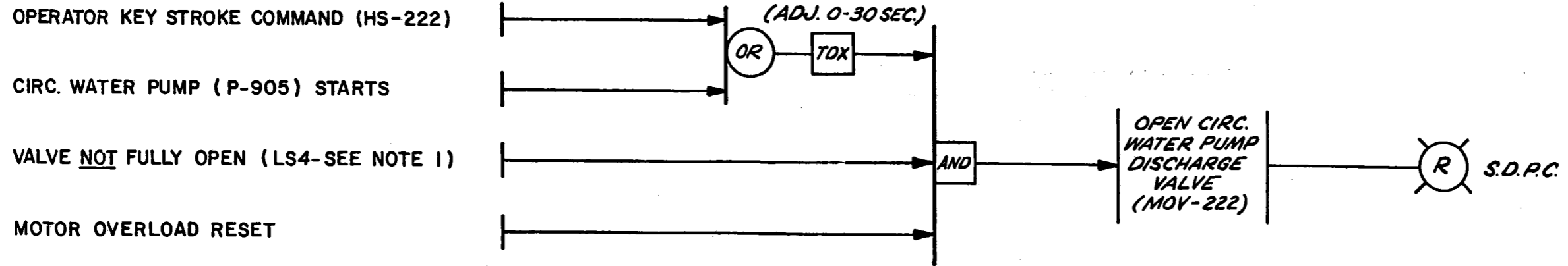
NEGATIVE PHASE PRE TRIP (KY-5100A) |-----| A

OVER EXCITATION PRE TRIP (ESSL-5110) |-----| A

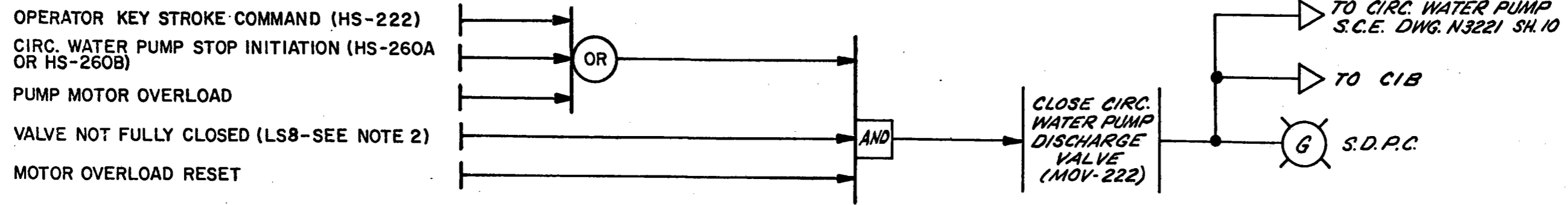
VOLTAGE UNBALANCE (E-5100) |-----| A

										Location SOLAR 1 GENERATING STA.						
										CONTROL LOGIC DIAGRAM						
										TURBINE GEN. ALARMS						
										<b>SCE EDISON</b>						
										Rosemead California						
S/RE2-14	OVERALL PLANT TRIP LOGIC										FkB	JT	KMB	7361		
V3221 SH1	LEGEND	B	REDRAWN FOR REVIEW & COMMENT	4A	7-15-81											
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE.	Disc. Supv.	Approved	Resp. Engr.	Ch'd.	Mod's	J.O. No.	D/L	N3221	SH.198	B

**CIRC. WATER PUMP (P-905) DISCHARGE VALVE OPEN (MOV-222)**



**CIRC. WATER PUMP (P-905) DISCHARGE VALVE-CLOSE (MOV-222)**



**NOTES :**

1. LS4= OPEN LIMIT SWITCH, CONTACTS ARE OPEN WHEN VALVE IS FULL OPEN, OTHERWISE THEY ARE N.C. CONTACTS.
2. LS8= CLOSE LIMIT SWITCH, CONTACTS ARE OPEN WHEN VALVE IS FULL OPEN, OTHERWISE THEY ARE N.C. CONTACTS.
3. LOGIC SHOWN FOR PUMP (P-905) DISCHARGE VALVE. SAME SCHEME APPLICABLE TO PUMP (P-906) DISCHARGE VALVE (MOV-243).

MOV-222 NOT FULLY OPEN OR NOT FULLY CLOSE



S/R-15-118

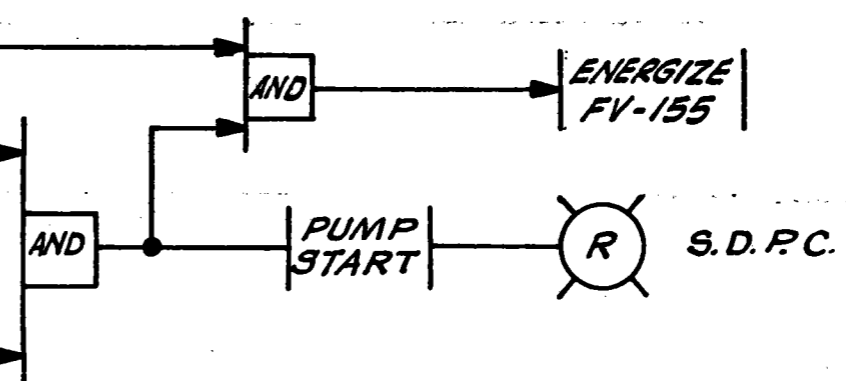
Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Issp. Engr.	Ck'd	Made	J.O. No.	D/L	Location
M33316	DATA SHEET													SOLAR I GENERATING STATION
N32219A	INSTRUMENT LIST	E		4-23-81	JK				FKB	JT		7361		<b>CONTROL LOGIC DIAGRAM</b> <b>CIRC. WTR. PUMP DISCH. VALVE</b>  <b>SCE EDISON</b> Rosemead California
N3221 SH.1	LEGEND	D		10-2-80	JK				JK	JT		7361		
5133302	CIRC. WATER SYS. - P&ID	C		8-1-80	JK				FKB	JT		7361		
M33335	BILL OF MATERIAL	B		5-26-80	JK				FKB	JT	JT	7361		
		A		1-14-80	JK				FKB	ES	EACD	7361		
														N3221 SH.20

CONDENSER VACUUM PUMP START (P-910)

VACUUM AT PP EQUAL TO COND.  $\pm 1"$  (DPS-155)

OPERATOR KEY STROKE START  
COMMAND (HS-155)

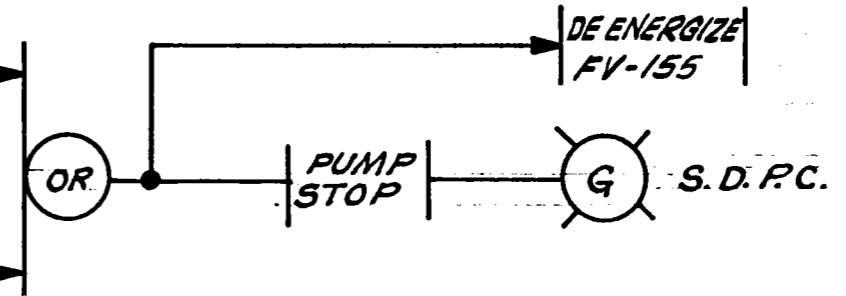
PUMP MOTOR OVERLOAD RESET



CONDENSER VACUUM PUMP STOP (P-910)

OPERATOR KEY STROKE STOP  
COMMAND (HS-155)

PUMP MOTOR OVERLOAD



ALARMS

PUMP TRIP



S/R-15-119

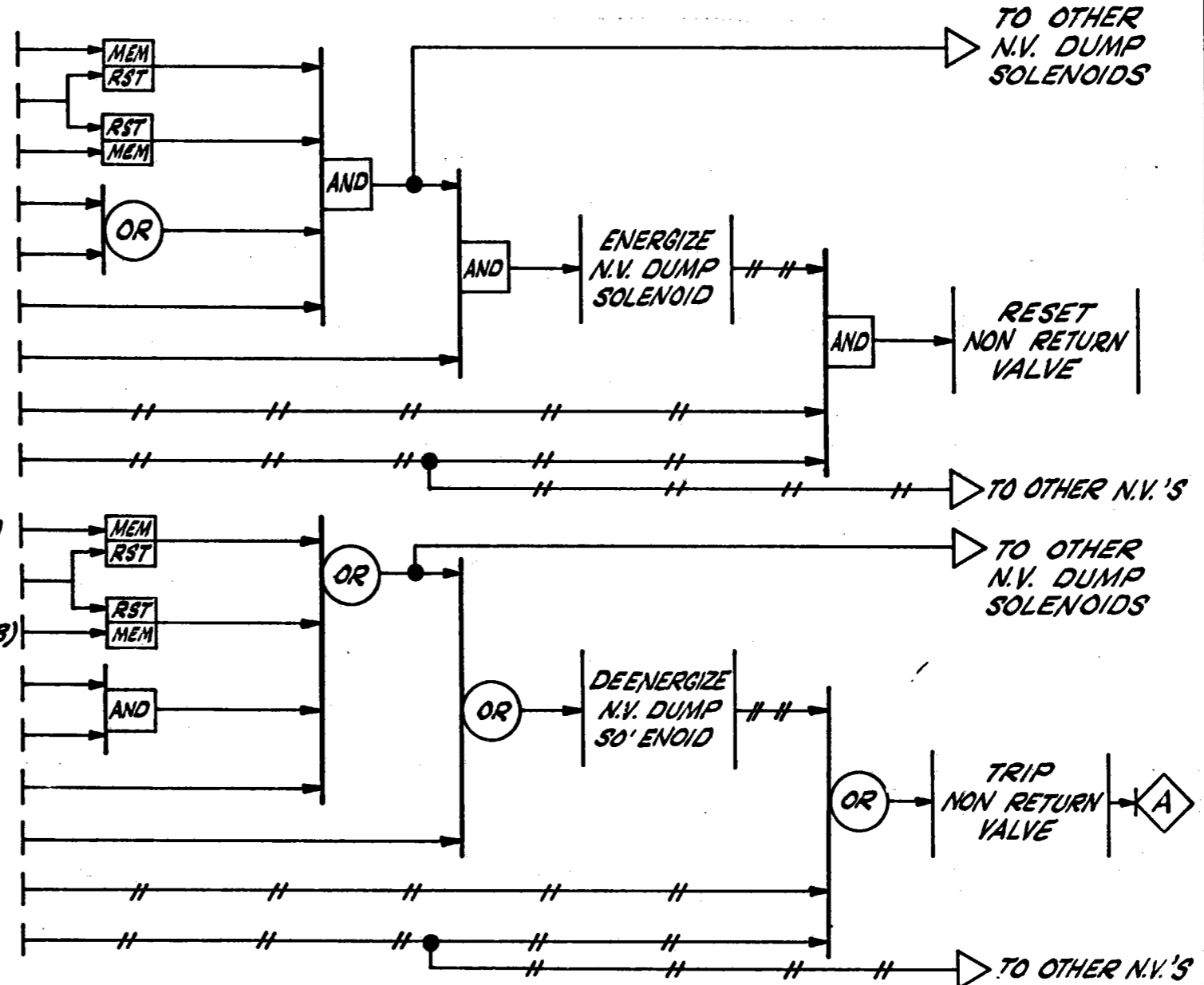
										Location SOLAR I GEN. STATION		
										CONTROL LOGIC DIAGRAM VACCUM PUMP START		
										SCE EDISON Rosemead California		
										D/L N3221 SH.21 C		
113221 SH.1	LEGEND	C	ISSUED FOR REVIEW & COMMENT	4-8-91	CP					JT	7361	
5133301	F.V. & COND. SYS. P&ID	B	ISSUED FOR REVIEW & COMMENT	11-10-88	CP					RS JT	7361	
		A	ISSUED FOR REVIEW & COMMENT	7-2-90						FX JT RO	7361	
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE.	Disc. Supv.	Approved	Resp. Engr.	Ck'd.	Made	J.O. No.

### NON RETURN VALVE RESET

MAIN (H.P.) STOP VALVE TRIP (STOP VALVE TRIP SOLENOID) RESET (HS-902B)  
 NON RETURN VALVE RESET PUSH BUTTON (HS- )  
 ADMISSION (L.P.) STOP VALVE TRIP (STOP VALVE TRIP SOLENOID) RESET (HS-901B)  
 MAIN (H.P.) STOP VALVE LIMIT SWITCH (ZSL-902) OPEN  
 ADMISSION (L.P.) STOP VALVE LIMIT SWITCH (ZSL-901) OPEN  
 NO GENERATOR LOAD LOSS (MAIN BREAKER 252-GS CLOSED)  
 HEATER LEVEL NOT HI  
 LOCAL TEST DEVICE IN "NEUTRAL" POSITION  
 TURBINE "OIL RELAY" TRIP RESET

### NON RETURN VALVE TRIP

MAIN (H.P.) STOP VALVE TRIP (STOP VALVE TRIP SOLENOID) TRIPPED (HS-902B)  
 NON RETURN VALVE RESET PUSH BUTTON (HS- )  
 ADMISSION (L.P.) STOP VALVE TRIP (STOP VALVE TRIP SOLENOID) TRIPPED (HS-901B)  
 MAIN (H.P.) STOP VALVE CLOSED LIMIT SWITCH (ZSL-902) CLOSED  
 ADMISSION (L.P.) STOP VALVE CLOSED LIMIT SWITCH (ZSL-901) CLOSED  
 GENERATOR LOAD LOSS (MAIN BREAKER 252-GS OPEN)  
 HEATER LEVEL HIGH LEVEL  
 LOCAL TEST DEVICE IN "TRIP" POSITION  
 TURBINE "OIL RELAY" TRIP



**NOTES:**

1. THIS SCHEME APPLICABLE TO ALL N.V.'S LISTED.
2. // // // REPRESENTS PNEUMATIC SIGNAL.

S/R-15-120

N.V. NUMBER	LEVEL TRANSMITTER	LEVEL SWITCH	DUMP SOLENOID
N.V. - 625	LIT-8	LSH-8	NY-625
N.V. - 627	LIT-24	LSH-24	NY-627
N.V. - 629A	LIT-83	LSH-83	NY-629A
N.V. - 631	LIT-104	LSH-104	NY-631

Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Assp. Engr.	CK'd.	Made	J.O. No.
M33316		INST. LOCATION PLAN										
N-3223		DATA SHEET										
N-3219A		INSTALLATION DETAIL										
N-3221 SH.1		INSTRUMENT LIST										
M33335		LEGEND										
5133306		BILL OF MATERIAL	B	ISSUED FOR REVIEW & COMMENT	4-9-81			FKB	JT		7361	
		STEAM P. & I.D.	A	ISSUED FOR REVIEW & COMMENTS	10-20-80			JT	JT		7361	

Location SOLAR I GENERATING STATION

**CONTROL LOGIC DIAGRAM**  
**NON-RETURN VALVES**

**SCE EDISON**  
Rosemead California

D/L N3221 SH.22 B

## 1ST POINT HEATER NON RETURN VALVE (NV-625)

LOSS OF CONTROL OIL (TURBINE TRIP)

HAND SWITCH (HS-625) RESET

HAND SWITCH (HS-620) RESET

HAND SWITCH (HS-625) TRIPPED

HAND SWITCH (HS-620) TRIPPED

INLET STOP VV CLOSED (ZSL-902)

ADMISSION STOP VV CLOSED (ZSL-901)

1ST POINT EXTRACTION BLOCK VALVE (MOV-624) CLOSED (ZS-624B)

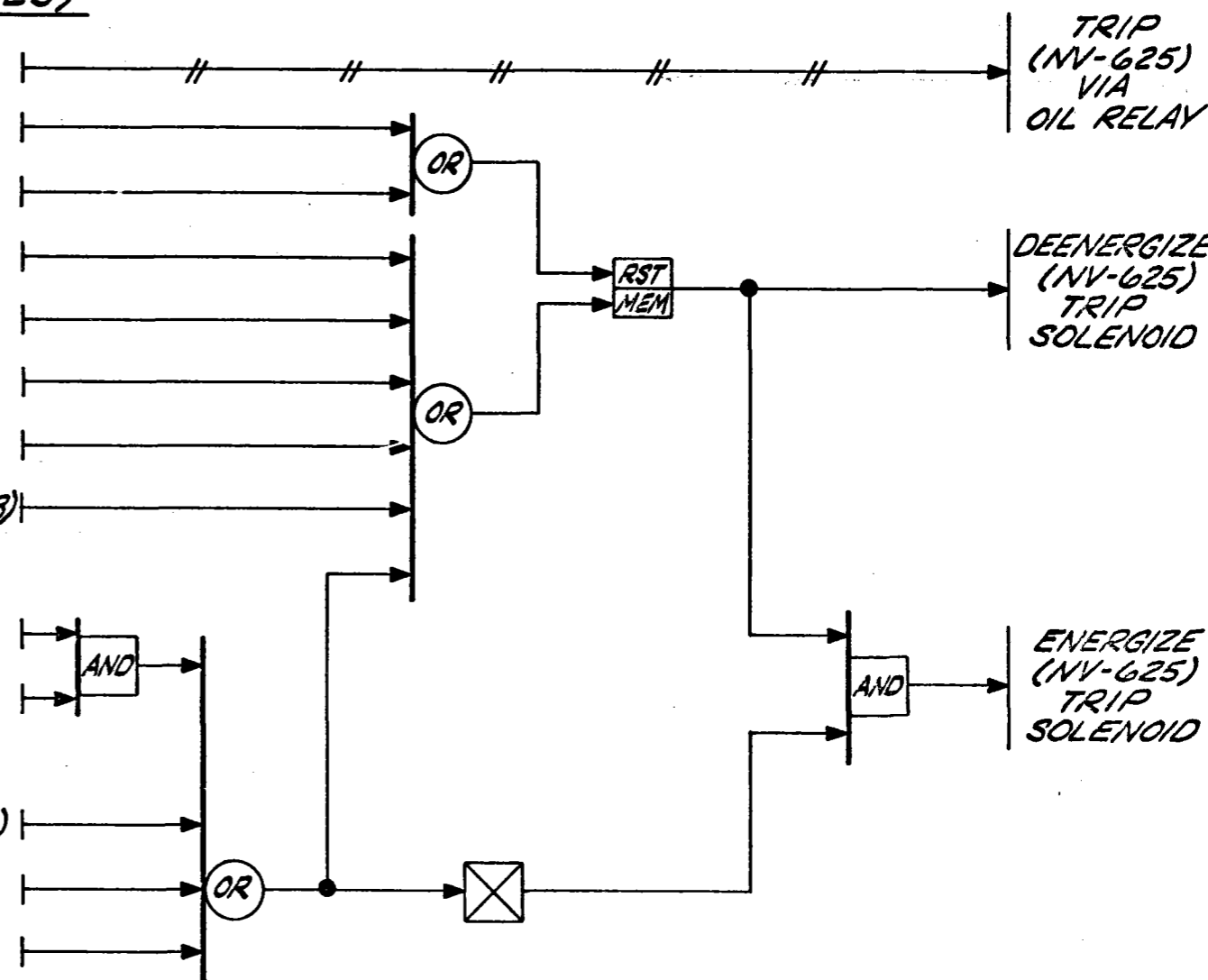
INLET STEAM CONTROL VALVE LOW LOAD LIMIT SWITCH (ZSL-940)

COOLING STEAM VALVE (MOV-942) NOT CLOSED (ZSL-942)

ADMISSION STEAM CONTROL VALVE LOW LOAD LIMIT SWITCH (ZSL-943)

GENERATOR BREAKER (252-GS) OPEN (ZS-5100A)

1ST POINT HEATER HIGH LEVEL (LSH-8)



S/R - I5-120

5133306	STEAM P. & I.D.																		Location SOLAR I GEN. STATION
5133402	INST. LOCATION PLAN																		CONTROL LOGIC DIAGRAM
N-3223	INSTALLATION DETAIL																		NV-625
N-3219	INSTRUMENT INDEX																		
N-3221.341	LEGEND																		
M-33316	CATA SHEET																		
573-500	ILS NETWORKS	C	ISSUED FOR INFORMATION.	9-30-71															
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE	Disc. Supp.	Approved	ENR	IT	73/61								
									ENTR.	Ckd.	Mads	J.O. No.	D/L						N3221 SH.22A C

## 2<sup>ND</sup> POINT HEATER NON RETURN VALVE (NV-627)

LOSS OF CONTROL OIL (TURBINE TRIP)

HAND SWITCH (HS-627) RESET

HAND SWITCH (HS-620) RESET

HAND SWITCH (HS-627) TRIPPED

HAND SWITCH (HS-620) TRIPPED

INLET STOP VV CLOSED (ZSL-902)

ADMISSION STOP VALVE CLOSED (ZSL-901)

2<sup>ND</sup> POINT EXTRACTION BLOCK VALVE (MOV-626) CLOSED (ZS-626)

INLET STEAM CONTROL VALVE LOW LOAD (ZSL-940)

COOLING STEAM VALVE (MOV-942) NOT CLOSED (ZSL-942)

ADMISSION STEAM CONTROL VALVE LOW LOAD (ZSL-943)

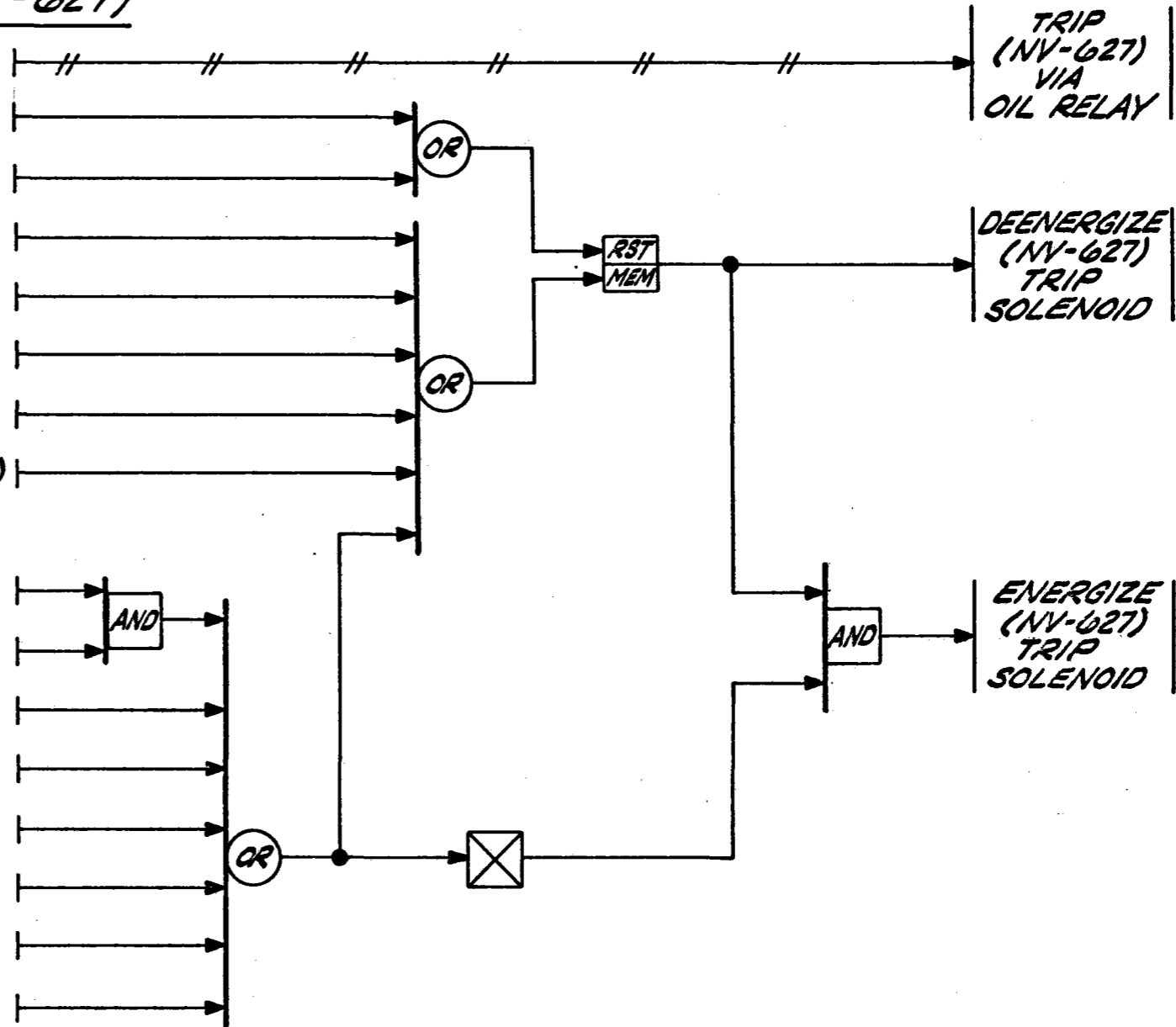
RECEIVER FLASH TANK DRAIN (LV-74A) NOT CLOSED (ZSL-74B)

TSS FLASH TANK DRAIN (LV-74B) NOT CLOSED (ZSL-74A)

GENERATOR BREAKER (252-GS) OPEN (ZS-5100A)

2<sup>ND</sup> POINT HEATER HIGH LEVEL (LSH-24)

NV-629B PNEUMATIC TRIP (PS-699)



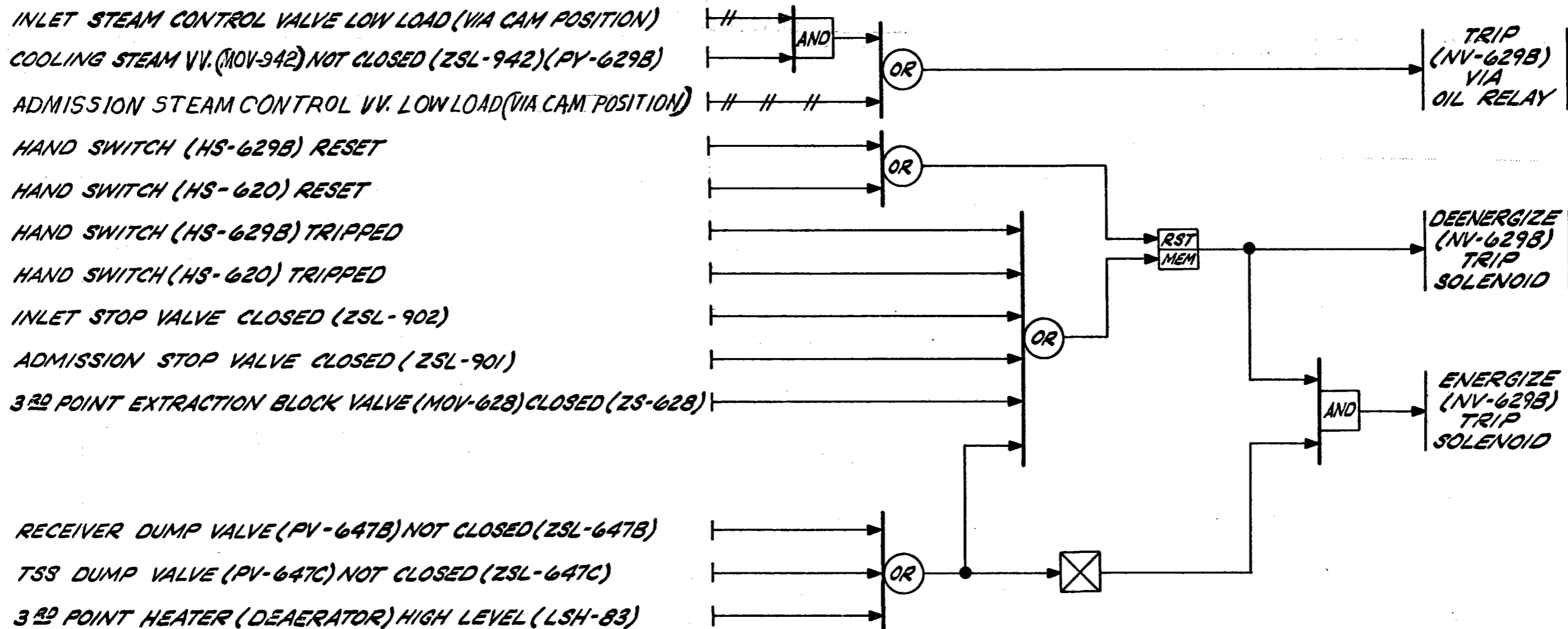
S/R-15-120

5133306	STEAM P & I.D.																			Location SOLAR I GEN. STATION
5133402	INST. LOCATION PLAN																			CONTROL LOGIC DIAGRAM
M-32316	DATA SHEET																			NV-627
N-3223	INSTALLATION DETAIL																			
N-3219	INSTRUMENT INDEX																			
N-3221(1)	LEGEND																			
531-533	ILS NETWORKS	C	ISSUED FOR INFORMATION	9.30.91																
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE	Disc. Supk	Approved	FK9	JT	7361									
																				N3221 SH.223 C





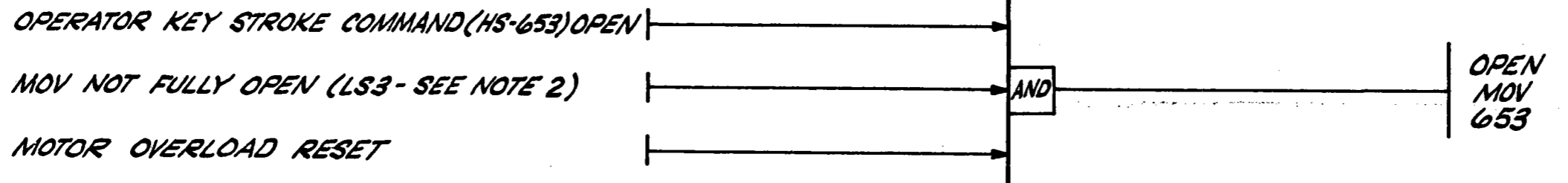
### 3<sup>RD</sup> POINT EXTRACTION (DEAERATOR) NON RETURN VALVE (NV-629B)



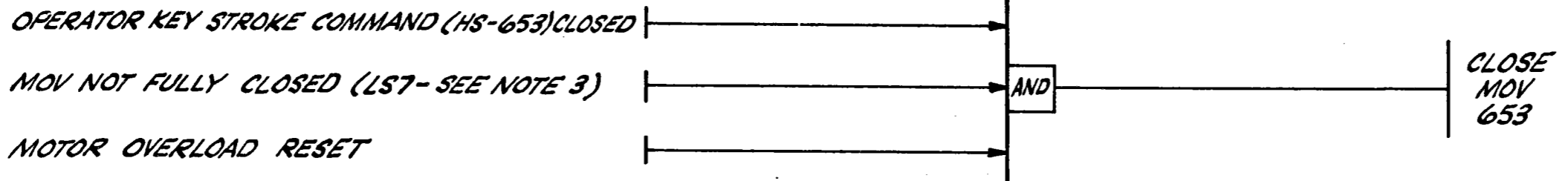
S/R-15-120

513306	STEAM P. I.D.										Location SOLAR I GEN. STATION				
513302	INST. LOCATION PLAN										CONTROL LOGIC DIAGRAM NV-629B				
N-3223	INSTALLATION DETAIL										SCE EDISON Rosemead California				
N-3217	INSTRUMENT LIST														
N-3221	LEGEND														
M-33316	DATA SHEET														
537-337	ILS NETWORKS	B	ISSUED FOR INFORMATION												
Reference Drawings	No.	Revisions	M	Date	P.E.	Q.A.E.	Disc. Supv.	Approved	Prep. Engr.	Ch'd.	Made	J.O. No.	D/L	N3221 SH. 23B	5

**DEAERATOR VENT (MOV 653) OPEN**



**DEAERATOR VENT (MOV 653) CLOSED**



MOV NOT FULL CLOSED (R) S.D.P.C.

MOV NOT FULL OPEN (G) S.D.P.C.

**NOTES:**

1. THIS SCHEME SHOWN FOR DEA. VENT (MOV-653) ALSO APPLIES TO DEA. VENT (MOV-659).
2. LS3 - OPEN LIMIT SWITCH CONTACTS OPEN WHEN MOV FULLY OPEN ONLY.
3. LS7 - CLOSED LIMIT SWITCH CONTACTS OPEN WHEN MOV FULLY CLOSED ONLY.
4. CLOSING & OPENING CONTACTS ARE NON LATCHING (CLOSED OR OPEN ONLY AS LONG AS PUSH BUTTON IS PRESSED).

**OBSOLETE DRAWING**

Revised and Redrawn or Superseded by Dwg. No. None  
 J.O. No. 7361 By JT Date 4-8-81

Location SOLAR I GENERATING STATION											
CONTROL LOGIC DIAGRAM DEA. VENT MOV'S 653 & 659											
Rosemead California											
Approved: <span style="float: right;">JT 7/3/81</span>											
Reference Drawings: No. <u>          </u> Revlsons <u>          </u> M Date <u>          </u> P.E. <u>          </u> QAE <u>          </u> Disc. <u>          </u> Supv. <u>          </u>											
N3221 SH.24 <span style="float: right;">A</span>											

### START AUX. BLR. / T.S.S. F.W. PUMP (P-904)

OPERATOR KEY STROKE ENABLE (HS-71B)

FEED AUX. BLR. KEY STROKE COMMAND (HS-31)  
 AUX. BLR. LEVEL (LS-690) LOW  
 NOT FEEDING T.S.S. (HS-1)

FEED T.S.S. KEY STROKE COMMAND (HS-1)  
 T.S.S. LEVEL (1-LT-3705) LOW  
 T.S.S. LEVEL (2-LT-3805) LOW  
 NOT FEEDING AUX. BLR. (HS-31)  
 MOTOR OVERLOAD RESET

### STOP AUX. BLR. / T.S.S. F.W. PUMP (P-904)

OPERATOR KEY STROKE DISABLE (HS-71A)  
 FEED AUX. BLR. COMMAND (HS-31)  
 AUX. BLR. LEVEL (LC-690) HIGH  
 NOT FEEDING T.S.S. (HS-1)

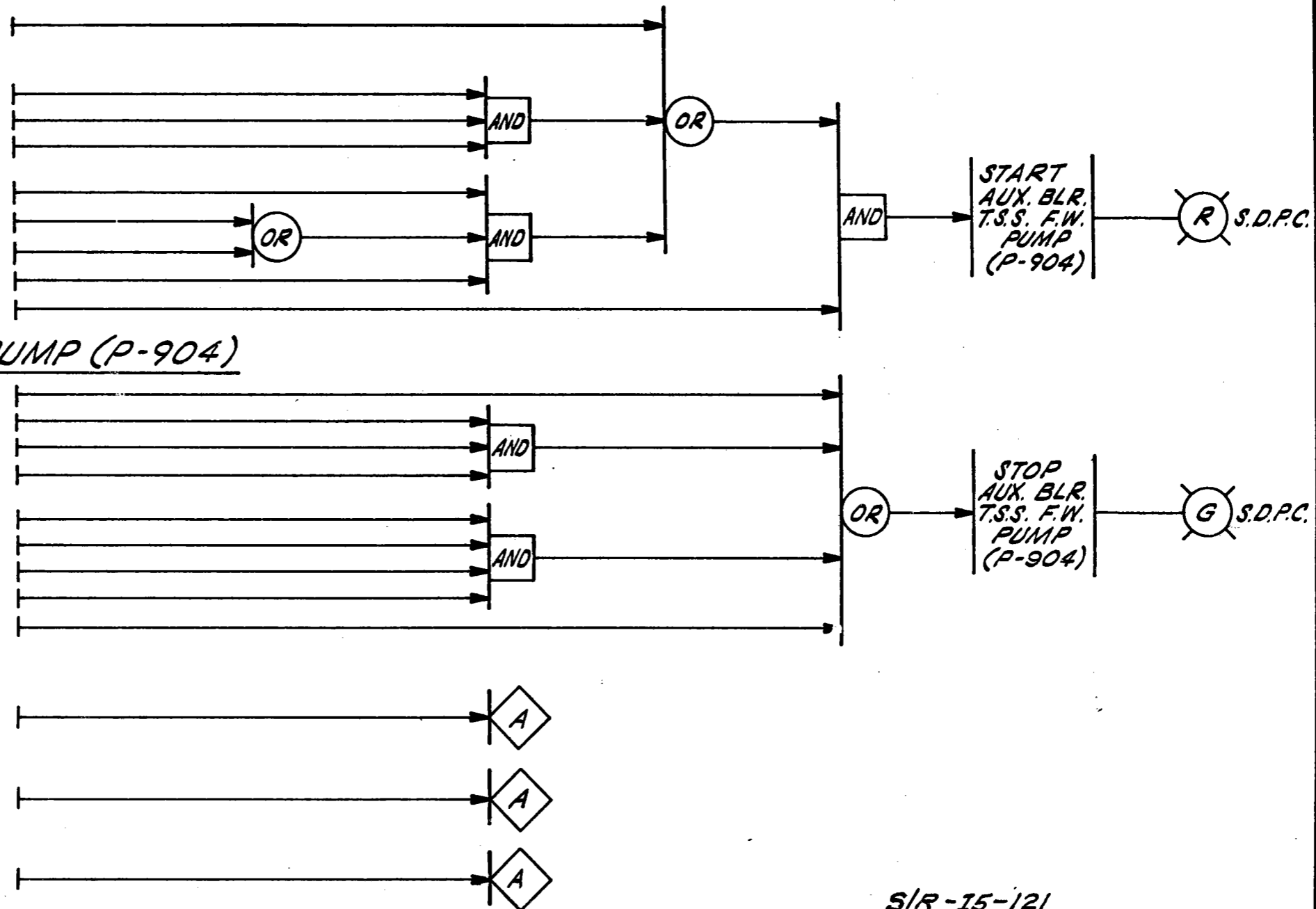
FEED T.S.S. KEY STROKE COMMAND (HS-1)  
 T.S.S. LEVEL (1-LT-3705) HIGH  
 T.S.S. LEVEL (2-LT-3805) HIGH  
 NOT FEEDING AUX. BLR. (HS-31)  
 MOTOR OVERLOAD

### ALARMS

AUX. BLR. LEVEL ALARM HIGH (LAH-691)

AUX. BLR. LEVEL ALARM LOW (LAL-692)

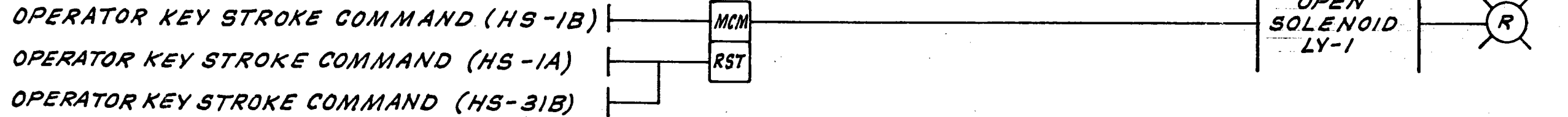
PUMP TRIP



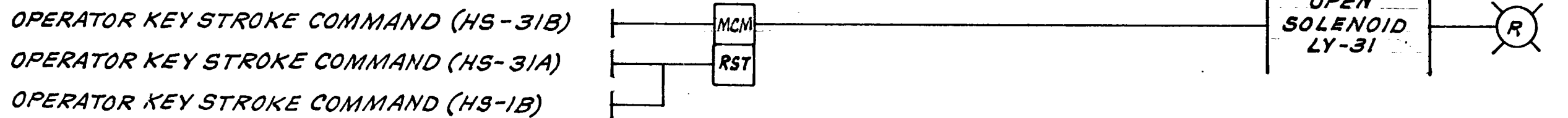
S/R-15-121

										Location SOLAR I GENERATING STATION					
										CONTROL LOGIC DIAGRAM					
										AUX. BLR. / T.S.S. F.W. PUMP					
										(P-904)					
5133301	F.W. & COND. P. & ID.	B	ISSUED FOR REVIEW & COMMENT	4-23-71				FRS	JT	7361	 Rosemead California				
N3221 SH	LEGEND	A	ISSUED FOR REVIEW & COMMENT	11-10-71				JK	JT	7361					
Reference Drawings	No.	Revisions	M	Date	P.E.	QAE.	Disc. Supv.	Approved	Engr.	Ch'd.	Made	J.O. No.	D/L	N3221 SH.25	B

OPEN SOLENOID VALVE (LY-1)



OPEN SOLENOID VALVE (LY-31)



S/R-15-123

										Location SOLAR I GEN. STATION						
										CONTROL LOGIC DIAGRAM						
										AUX BLR & T.S.S FEED SOLENOIDS						
										LY-1 & LY-31						
M33829	DATA SHEET										 Rosemead California					
M33835	BILL OF MATERIAL															
N3219	INSTRUMENT LIST															
N3221541	LEGEND															
5133301	COND. & F.W. P&I.D	A	ISSUED FOR REVIEW & COMMENT	1-3-31	CF1					FXB	JT	RD	7361			
Reference Drawings		No.	Revisions	M	Date	P.E.	QAE	Disc. Supv.	Approved	Resp. Engr.	Ck'd	Made	J.O. No.	D/L	N3221 SH26	A