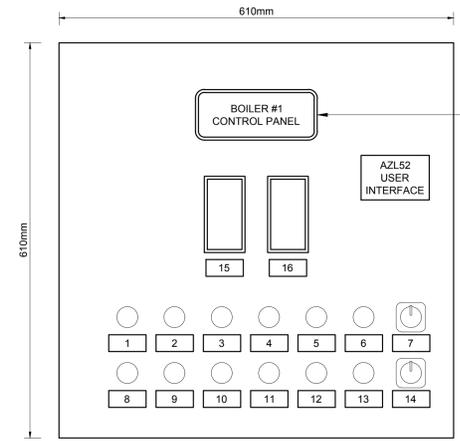


BOILER CONTROL NETWORK SCHEMATIC

NOTE:  
NEW EQUIPMENT AND WIRING SHOWN DARK, EXISTING EQUIPMENT SHOWN SHADED.



BOILER LOCAL CONTROL PANEL CONFIGURATION (TYP.)

LEGEND (LABELS)

SYMBOL	ITEM
1	HIGH WATER LEVEL
2	AUXILIARY LOW WATER CUT OFF
3	HIGH STEAM PRESSURE
4	PILOT ON
5	OIL ON
6	BURNER ON
7	MODULATION MODE SWITCH (LOCAL/REMOTE)
8	ALARM SILENCE
9	LOW WATER CUT OFF
10	FAULT
11	LOW STEAM PRESSURE
12	GAS ON
13	POWER ON
14	ON/OFF SWITCH
15	DRUM LEVEL CONTROLLER
16	ECONOMIZER TEMPERATURE CONTROLLER

LEGEND

SYMBOL	ITEM
(AI)	ANALOG INPUT
(AO)	ANALOG OUTPUT

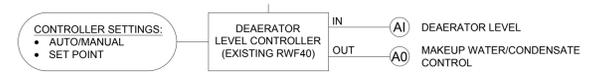
CONTROLLER:

- INPUTS:**
- FEEDWATER PUMP NO. 1 STATUS (NEW)
  - FEEDWATER PUMP NO. 2 STATUS (NEW)
  - HOT WELL PUMP NO. 1 STATUS (NEW)
  - HOT WELL PUMP NO. 2 STATUS (NEW)
  - OIL PUMP NO. 1 STATUS (NEW)
  - OIL PUMP NO. 2 STATUS (NEW)
  - FEEDWATER TEMP
  - FEEDWATER PRESSURE
  - HOT WELL PUMP PRESSURE
- OUTPUTS:**
- FEEDWATER PUMP NO. 1
  - FEEDWATER PUMP NO. 2
  - HOT WELL PUMP NO. 1
  - HOT WELL PUMP NO. 2
  - OIL PUMP NO. 1
  - OIL PUMP NO. 2

CONTROL STRATEGY:

- PUMP CONTROLLER TRIGGERS PUMPS ON/OFF ACCORDING TO USER SETTINGS AT OWS. CONTROLLER MONITORS STATUS OF PUMPS AND OTHER PARAMETERS AS LISTED.

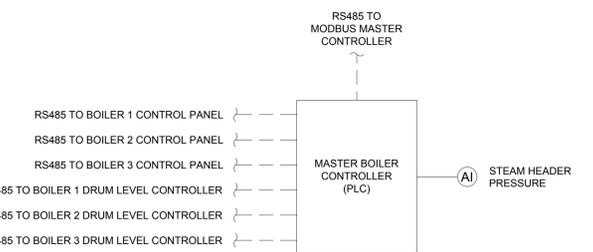
PUMP CONTROLLER



CONTROL STRATEGY:

- IN AUTOMATIC MODE THE CONTROLLER SHALL MODULATE THE FLOW OF CITY WATER AND CONDENSATE TO REGULATE THE DEAERATOR LEVEL. CITY WATER FLOW AND CONDENSATE FLOW ARE MODULATED BY FLOW CONTROL VALVES. THE USER SETS THE DEAERATOR LEVEL.
- IN MANUAL MODE THE USER SETS THE FLOWS DIRECTLY.
- DEAERATOR PRESSURE IS REGULATED BY MODULATING THE STEAM FLOW INTO THE DEAERATOR. THIS IS NOT MANAGED BY THE LEVEL CONTROLLER.

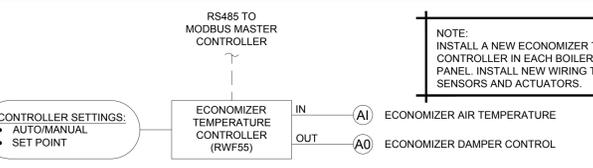
EXISTING DEAERATOR LEVEL CONTROLLER (TYPICAL)



CONTROL STRATEGY:

- IN AUTOMATIC MODE THE MASTER BOILER CONTROLLER SHALL MODULATE THE OUTPUT OF BOILERS 1, 2, AND 3 TO REGULATE THE STEAM HEADER PRESSURE. THE STEAM HEADER PRESSURE IS SET BY THE USER.
- ALTERNATIVELY THE OUTPUT OF EACH BOILER MAY BE SET BY THE USER, OR SET TO MODULATE BASED ON THE LOAD CONTROLLER INTEGRATED INTO EACH BOILER CONTROL PANEL.

MASTER BOILER CONTROLLER (TYPICAL)

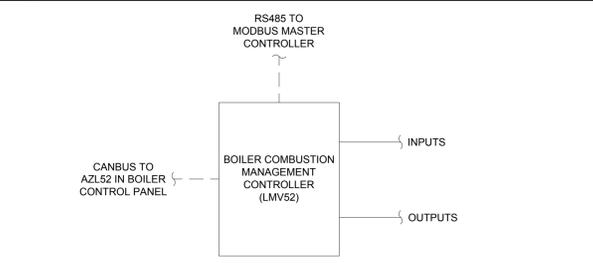


NOTE:  
INSTALL A NEW ECONOMIZER TEMPERATURE CONTROLLER IN EACH BOILER CONTROL PANEL. INSTALL NEW WIRING TO EXISTING SENSORS AND ACTUATORS.

CONTROL STRATEGY:

- IN AUTOMATIC MODE THE CONTROLLER SHALL MODULATE THE FLOW OF FLUE GAS THROUGH THE ECONOMIZER TO REGULATE THE ECONOMIZER EXIT GAS TEMPERATURE. THE FLOW OF FLUE GAS IS MODULATED BY THE POSITION OF THE ECONOMIZER DAMPER. THE USER SETS THE TEMPERATURE.

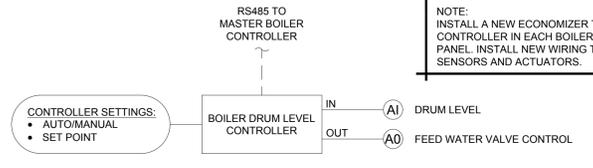
ECONOMIZER TEMPERATURE CONTROLLER (TYPICAL)



CONTROLLER:

- INPUTS:**
- SAFETY LOOP
  - BURNER FLANGE LIMIT SWITCH (NEW)
  - LOW WATER LEVEL CUT-OFF
  - HIGH WATER LEVEL CUT-OFF
  - HIGH PRESSURE CUT-OFF
  - LOW OIL PRESSURE (NEW)
  - HIGH OIL PRESSURE (NEW)
  - BOILER AIR PRESSURE SWITCH (NEW)
  - CPI OIL (NEW)
  - CPI GAS (NEW)
  - HIGH GAS PRESSURE
- OUTPUTS:**
- LOW GAS PRESSURE
  - FLAME DETECTOR QRB (NEW)
  - TEMP SENSOR
  - PRESSURE SENSOR
  - BLOWER MOTOR SPEED SENSOR (NEW)
  - GAS METER PULSE
  - OIL METER PULSE
  - O<sub>2</sub> MODULE (NEW)
  - FLUE GAS TEMPERATURE (NEW)
  - AMBIENT TEMPERATURE (NEW)
  - VSD ALARM
- OTHER:**
- IGNITION (NEW)
  - START SIGNAL (NEW)
  - OIL PUMP MOTOR STARTER (NEW)
  - MAIN OIL VALVE 1 (NEW)
  - MAIN OIL VALVE 2 (NEW)
  - BLOWER MOTOR STARTER (NEW)
  - PILOT GAS VALVE (NEW)
  - MAIN GAS VALVE 1 (NEW)
  - MAIN GAS VALVE 2 (NEW)
  - VSD (NEW)

BOILER COMBUSTION MANAGEMENT CONTROLLER (TYPICAL)



NOTE:  
INSTALL A NEW ECONOMIZER TEMPERATURE CONTROLLER IN EACH BOILER CONTROL PANEL. INSTALL NEW WIRING TO EXISTING SENSORS AND ACTUATORS.

CONTROL STRATEGY:

- IN AUTOMATIC MODE THE CONTROLLER SHALL MODULATE THE FEED WATER FLOW TO REGULATE THE BOILER DRUM. THE FEED WATER FLOW IS MODULATED BY THE FEED WATER VALVE. THE USER SETS THE DRUM LEVEL.
- IN MANUAL MODE THE USER SETS THE FEED WATER VALVE POSITION DIRECTLY.

BOILER DRUM LEVEL CONTROLLER (TYPICAL)

Revision	Description	Date
5		
4		
3	ISSUED FOR TENDER (STAMPED)	2018-05-24
2	ISSUED FOR TENDER	2018-05-04
1	ISSUED FOR 90% REVIEW	2018-04-10
0	ISSUED FOR 60% REVIEW	2018-03-09

PUBLIC WORKS & GOVERNMENT SERVICES

1800-11th AVENUE, SUITE 201  
REGINA, SASKATCHEWAN. S4P 0H8

CORRECTIONAL SERVICE CANADA  
SASKATCHEWAN PENITENTIARY  
PRINCE ALBERT, SK

BOILER CONTROL REPLACEMENT

Designed by: MAH  
Conçu par: MAH

Drawn by: JF  
Dessiné par: JF

Approved by: RLG  
Approuvé par: RLG

PWSSC Project Manager: SHERRI KOBELSKI  
Administrateur de Projets TPSGC: SHERRI KOBELSKI

BOILER ROOM - BOILER CONTROL SCHEMATIC