COAL POWER PLANT

AREA No. B100

CONTROL PHILOSOPHY

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1. Coal Crusher

Function of the coal crusher is to convert bigger chunks of coal in to the pulverized or talcum powder. It can be start from control panel or HMI screen. The coal crusher can only start if its at least 70% full. The level transmitter is used to determine the level of coal in the crusher. The crusher will stop after 50 seconds of operation. The coal conveyor will start after coal crusher stops. The knife gate open position switch will operate after coal conveyor start with 5 seconds of delay. The knife gate close position switch operates as soon as level transmitter reads 0 % in coal crusher. In addition, the coal conveyor will stop after 5 seconds.

Field Devices:					
Tag	**Service**	**Range**	**Normal**	**EU**	**Remarks**
B100-LIT-001	Coal level transmitter in coal crusher	0-100	100	m^3/hr	
B100-HV-002	Coal Crusher Knife Gate Actuator				
B100-ZSC-002	Coal Crusher Knife Gate Closed Position Switch				
B100-ZSO-002	Coal Crusher Knife Gate Open Position Switch				
Control System Points:					
Tag	**Service Description**	**Range**	**Setpt**	**EU**	**Remarks**
B100-LI-001	Coal Level Indication	0-100		m^3/hr	
B100-LAH-001	Coal Crusher Full Indicator		90		
B100-LAL-001	Coal Crusher Empty Indicator		10		
B100-ZIC-002	Coal Crusher Knife Gate Closed Indicator				
B100-ZIO-002	Coal Crusher Knife Gate Open Indicator				
Motor Control/ InterLocks:					
Tag	**Service**	**Inputs**	**Outputs**	**Start/Perm**	**Stop/Trip**
B100-COAL-001	**Crush motor drive**	**HMI ST/SP Panel ST/SP**	**B100-COAL-001-RUN**		

2. Coal Conveyor

The function of coal conveyor is to move coal coming out of the crusher to the furnace. In order to avoid any pile up on coal conveyor proper time delays are in place at the start as well as when to stop the conveyor. Furthermore, speed switch is in place to stop the motor in case coal conveyor breaks which leaves motor running which can cause safety hazard. Lastly, speed of coal conveyor can be varied by change in boiler temperature. If boiler temperature is lower than the required, then speed of the conveyor increases and vise versa. The speed of motor is being varied by using variable frequency drive and PLC.

Field Devices:					
Tag	**Service**	**Range**	**Normal**	**EU**	**Remarks**
B100-SSL-005	Coal Conveyor Speed Switch Low	Open/Close	open		
B100-SC-004	Coal Conveyor Speed Control				
Control System Points:					
Tag	**Service Description**	**Range**	**Setpt**	**EU**	**Remarks**
B100-SSL-004	Coal Conveyor Speed Switch Light				
B100-HIC-004	Coal Conveyor Hand Operated Control				
Motor Control/ InterLocks:					
Tag	**Service**	**Inputs**	**Outputs**	**Start/Perm**	**Stop/Trip**
B100-CNV-001	**Coal Screw Conveyor Drive**	**HMI ST/SP Panel ST/SP Panel L/R**	**B100-CNV-001-RUN**		

3. Furnace

The main function of furnace is to heat the boiler to high temperature. In addition, the furnace temperature can be varied by varying the speed of coal conveyor. Furthermore, it contains temperature switch low to maintain required temperature in the furnace.

Field Devices:					
Tag	**Service**	**Range**	**Normal**	**EU**	**Remarks**
B100-TSL-008	Furnace Temperature Switch Low				
Control System Points:					
Tag	**Service Description**	**Range**	**Setpt**	**EU**	**Remarks**
B100-TAH-008	Furnace Temperature Alarm High				
Motor Control/ InterLocks:					
Tag	**Service**	**Inputs**	**Outputs**	**Start/Perm**	**Stop/Trip**
B100-FAC-001	**Generates heat by combustion of coal**				

4. Boiler & Turbine

The boiler converts the water into steam using the heat generated by furnace. In addition, it contains condenser for the conversion of water into steam. Furthermore, boiler is connected to turbine, speed of turbine can be varied by varying the speed of coal conveyor. Turbine is coupled with alternator to generate electricity. The output of turbine is being monitored using power indication transmitter. Furthermore, it is necessary to maintain frequency at 60 Hz which is directly related to speed of the turbine. It can be varied by varying the speed of coal conveyor.

Field Devices:					
Tag	**Service**	**Range**	**Normal**	**EU**	**Remarks**
B100-TIT-007	Boiler Temperature Indication Transmitter				
B100-SIT-009	Turbine Speed Indication Transmitter				
B100-SCV-009	Turbine Speed Control Valve				
B100-JIT-011	Turbine Power Indication Transmitter				
Control System Points:					
Tag	**Service Description**	**Range**	**Setpt**	**EU**	**Remarks**
B100-TIC-007	Boiler Temperature Indication Control				
B100-TAL-007	Boiler Temperature Alarm Low				
B100-TAH-007	Boiler Temperature Alarm High				
B100-JI-011	Turbine Power Indicator				
B100-JQI-011	Turbine Total Power Indication				
B100-SIC-009	Turbine Speed Indication Control				
Motor Control/ InterLocks:					
Tag	**Service**	**Inputs**	**Outputs**	**Start/Perm**	**Stop/Trip**
B100-BLR-001	**Converts water into steam**				
B100-TRB-001	**Produces mechanical energy from flow of steam**				

5. Water storage tank & Pump

Water tank stores the water for the boiler. The water storage tank can be filled from lake via lake pump. The lake pump will turn off when water level in water storage tank reaches at 100%. The boiler pump can be started only if water level in the tank is at least 50%. The boiler pump is connected to the condenser. It will stop when water level in the water storage tank dips below 2%.

Field Devices:					
Tag	**Service**	**Range**	**Normal**	**EU**	**Remarks**
B100-LIT-006	Water Storage Tank Level Indication Transmitter	0-100	70	%	
Control System Points:					
Tag	**Service Description**	**Range**	**Setpt**	**EU**	**Remarks**
B100-LI-006	Water Storage Tank Level Indicator	0-100	70	%	
B100-LAH-006	Water Storage Tank High Level Alarm		90	%	
B100-LAL-006	Water Storage Tank Low Level Alarm		5	%	
Motor Control/ InterLocks:					
Tag	**Service**	**Inputs**	**Outputs**	**Start/Perm**	**Stop/Trip**
B100-PMP-001	**Fills up water storage tank from the Lake**	**HMI ST/SP Panel ST/SP Panel L/R**	**B100-PMP-001-RUN**		
B100-PMP-002	**Fills up condenser from water storage tank**	**HMI ST/SP Panel ST/SP Panel L/R**	**B100-PMP-002-RUN**		