

**REACTOR PROTECTIVE SYSTEM RELAYS**

<u>Con-</u> <u>tact</u>	<u>Function</u>	<u>Con-</u> <u>tact</u>	<u>Function</u>
K1-1	SOE Node	K2-1	SOE Node
K1-2	Rod Rundown(a)	K2-2	Rod Rundown(a)
K1-3	Trip Reset(b)	K2-3	Trip Reset
K1-4	Trip Reset	K2-4	Trip Reset
K1-5	Not Used	K2-5	Not Used
K1-6	Trips Turbine	K2-6	Trips Turbine
K1-7	Trip Reset Lockout(c)	K2-7	Trip Reset Lockout
K1-8	Critical Function Multiplexor	K2-8	Critical Function Multiplexor
K3-1	SOE Node	K4-1	SOE Node
K3-2	Rod Rundown	K4-2	Rod Rundown
K3-3	Trip Reset	K4-3	Trip Reset
K3-4	Trip Reset	K4-4	Trip Reset
K3-5	Not Used	K4-5	Not Used
K3-6	Trips Turbine	K4-6	Trips Turbine
K3-7	Trip Annunciator	K4-7	(Spare)
K3-8	Critical Function Multiplexor	K4-8	Critical Function Multiplexor

- (a) Rod Rundown - The control rods receive a "rods in" signal following a reactor trip which causes any rod with a "stuck" clutch to be driven to the bottom of the core.
- (b) Trip Reset - The reactor trip reset push button must be depressed to permit reactor start-up following a trip.
- (c) Trip Reset Lockout - The reactor trip cannot be reset within 30 seconds following a reactor trip. This function prevents the reactor trip being reset while the control rods are still descending following a reactor trip.

**REGULATING RODS WITHDRAWAL INTERLOCKS**

<b>Withdrawal Prohibit Conditions</b>	<b>Manual Individual Control Mode</b>	<b>Manual Sequential or Group Control Mode</b>
Pretrip Overpower	X	X
High Start-up Rate (Between $10^{-4}\%$ and 15% Full Power)	X	X

**SOURCE/WIDE RANGE NUCLEAR INSTRUMENT CHANNEL TRIP UNIT ACTIONS**

<u>Trip Unit</u>	<u>Input Signal</u>	<u>Action</u>	<u>Approximate Set Point</u>
1	Low High Voltage	Audible and Visible Alarm	410 vdc Decreasing HV
2	Log Power Level	Bypass Rate-of-Change of Power Trip	$< 10^{-4}\%$ Full Power
		Disable Zero Power Mode Bypass (Effective for One Protective Channel)	$> 10^{-4}\%$ Full Power Enable $\Delta T$ Power Block in Thermal Margin Monitor
3	Log Power Level	Bypass Rate-of-Change of Power Trip	$10^{-4}\%$ Full Power
		Disable Zero Power Mode Bypass (Effective for One Protective Channel)	$> 10^{-4}\%$ Full Power Enable $\Delta T$ Power Block in Thermal Margin Monitor
4	Log Power Level	Spare	-
5	Rate-of-Change of Power	Pretrip Signal and Rod Withdrawal Prohibit (Effective for Two Protective Channels)	1.5 Decades/Minute (Bypassed $< 10^{-4}\%$ and $> 15\%$ )
6	Rate-of-Change of Power	Trip Signal to Reactor Protective System (Effective for One Protective Channel)	2.6 Decades/Minute (Bypassed $< 10^{-4}\%$ and $> 15\%$ )
7	Rate-of-Change of Power	Trip Signal to Reactor Protective System (Effective for One Protective Channel)	2.6 Decades/Minute (Bypassed $< 10^{-4}\%$ and $> 15\%$ )
8	Rate-of-Change of Power	Spare	-

**POWER-RANGE SAFETY CHANNEL TRIP UNIT ACTIONS**

<u>Trip Unit</u>	<u>Input Signal</u>	<u>Action</u>	<u>Approximate Set Point</u>
1	Detector Voltage, Module Interlock, Operate Calibrate Switch	Audible and Visible Alarm	3.5% Below Normal Operating Voltage
2	Power Level	Spare	
3	Power Level	Spare	
4	Power Level	Spare	
5	Power Level	Spare	
6	Power Level	Spare	
7	Power Level	Spare	
8	Power Level	Rate Trip Inhibit to Logarithmic Channel	> 15% Full Power
		Enable ASI Alarm	> 15% Full Power
		Bypass Loss-of-Load Trip	< 15% Full Power

**CONTROL ROD POSITION LIGHT MATRIX**

<u>Color</u>	<u>Control Rod Position</u>		
	<u>Shutdown Control Rods</u>	<u>Regulating Control Rods</u>	<u>Part-Length Control Rods</u>
Green	Lower Electrical Limit	Lower Electrical Limit	Lower Electrical Limit
White	Between Shutdown Control Rod Insertion Limit and Lower Electrical Limit	Between Upper Control Rod Stop and Lower Electrical Limit	Moving
Amber	NA	Between Upper Control Rod Stop and Upper Electrical Limit	Between Upper Control Rod Stop and Upper Electrical Limit
Blue	Between Upper and Shutdown Control Rod Insertion Limit	NA	-
Red	At Upper Electrical Limit	At Upper Electrical Limit	At Upper Electrical Limit