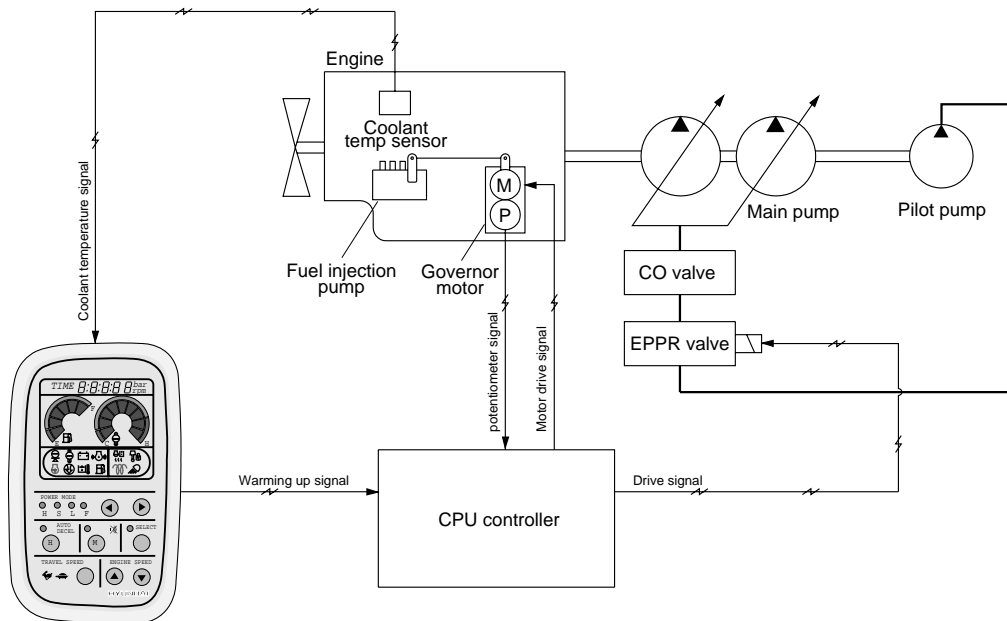## GROUP 10 AUTOMATIC WARMING UP FUNCTION

1. Cluster reads engine coolant temperature through the temperature sensor, and if the coolant temperature is less than 30℃, it turns the warming-up lamp ON and sends warming-up control signal to the CPU controller.

2. **Mode and engine rpm**

   1) **Machine serial number : Upto #1023**

      When the CPU controller receives the warming-up control signal from the cluster, it changes mode set to **F** mode and engine speed also increases from auto deceleration speed to **F** mode speed.

   2) **Machine serial number : #1024 and up**

      When the CPU controller receives the warming-up control signal from the cluster, it increases the engine rpm minimum speed to auto deceleration speed.

3. If the coolant temperature increases upto 30℃, or an operator changes mode set among the warming up function, the CPU controller cancels the automatic warming up function.

4. Logic table(1)

	Condition	Function

Actuated	- Coolant temperature :
	
	  Less than 30℃(after engine run)
		- Mode : **F** after 10 seconds of low idling
		  (upto #1023)
		  Auto decel after 10 seconds of low idling(#1024 and up)
		
		- Warming up time : At least 10 minutes
		
		- Warming-up lamp : ON

Canceled	- Coolant temperature : Above 30℃ - Warming up time : Above 10 minutes - Changed mode set by operator ★ If any of the above conditions is applicable, the automatic warming-up function is canceled	- Default mode - Default mode - Changed mode
Warming-up lamp	Coolant temperature : Above 30℃	Warming-up lamp : OFF

5. Logic table(2)

	Coolant temp ≤30℃	Coolant temp >30℃	Description
Signal	Low(0V)	High(5V)	Cluster
Warming-up lamp	ON	OFF	
Mode	F(upto #1023)	Default(S)	CPU controller
	Default(S, #1024 and up)	Default(S)	