200 A Progress Drive Ext.
P.O. Box 159
Burgaw, NC 28425

Phone: (910) 259-9794
Fax: (910) 259-1625
email: sales@kiln-direct.com

kiln-direct.com

Providing the lumber industry with quality kiln drying equipment and knowledge. Helping you build a better kiln more economically.

Technical specifications for PLC Controllers Type WSxx-WIS-1717.

Warning: Kiln-direct has manufactured this system in order to reduce the risk of misreadings, sensor errors, error on control valves, etc. However, it is important to understand that close attention is required of kiln operator at all times. We suggest the kiln operator to check the heat treatment kiln or steam chamber at least twice per cycle, including checking the heat treatment report close after each cycle. Kiln-direct can not and is not responsible for any degrade before, during, or after the drying or heat treatment process.

Settings:
The following values can be accessed on the display by using the forward (right) and back (left) arrow button on the display.

SETTINGS:	DESCRIPTION:
Temp.	Chamber temperature (Cha = actual in chamber) (PD=predry phase set point) (KD=Kiln phase set point)
RH%	RH% (Cha = actual in chamber) (PD=predry phase set point) (KD=Kiln phase set point)
Min Ext temp.	Minimum exhaust temperature. The kiln will not vent /exhaust if chamber temp is below this set point
To Kiln Ph	Delay time in minutes before switching to kiln phase from predry phase. (enable on some Controller type settings).
PD MF For	Forward operation in minutes for main fans in Predry phase.
PD MF Rev	Reverse operation in minutes for main fans in Predry phase.
KD MF For	Forward operation in minutes for main fans in Kiln phase.
KD MF Rev	Reverse operation in minutes for main fans in Kiln phase.
KD MF run	Main fan, kiln phase, Run period (Interval fan operation need to be engaged from Controller type setting). This is the run period for main fans before pausing if Humidity stays too low in chamber.
KD MF pause	Main fan, kiln phase, Pause period (Interval fan operation need to be engaged from Controller type setting). This is the pause period for main fans before running if Humidity stays too low in chamber.
Heat adjustments	Tune+ Positive temperature delta between ON/OFF function in kiln phase (default 2) Tune- Negative temperature delta between ON/OFF function in predry phase (default 2) Heat only with main fans (check box): Must be checked on direct gas heated kilns.
Vent adjustments	Tune+ Positive RH% delta between ON/OFF function in kiln phase (default 2) Tune- Negative RH% delta between ON/OFF function in predry phase (default 2)
Controller type	A numerical value that determines how the controller will act. 0=standard, 24=best for AD material, 35=slave type controller. Otherwise please visit our on-line manual. (See detail on page 3)
Zone heating	ON means that we are using the Wood temp 2 (analog input 4) as the left Zone and Wood temp 5 (analog input 7) as the right zone for turning on the Left and Right zone heating relays. OFF means that the main (center) chamber temperature is used for turning on the Left and Right zone heating relays.
Zone Diff (erence)	The maximum difference between main (center) chamber temperature allow between the zone readings before the main chamber temperature is used for turning on the heating in the specific zone. Zone heating must be ON for this parameter to be in use.

PLC information:

Standard heat treat PLC with:

- DV-1000 display.
- 1 analog input/output module (4-20ma)
- 1 analog input/output module (4-20ma)

24VDC+ On/Off inputs:	**Relay outputs:**	**Analog inputs, 4-20mA**
x0: Error on main fan overload (tripped)	y0: Spray/humidifying	1: Chamber temp input from chamber
x1: Error on exhaust overload (tripped)	y1: Main fans 1 forward	3: RH% or Wet bulb input from chamber
x2: Error on heat unit overload (tripped)	y2: Main fans 1 reverse	2: Moisture meter or Wood temp 1
x3: Error on phase protection	y3: Main fan 2 forward	4: Left Temp Zone input or Wood temp 2
x4: Error external input 1	y4: Main fan 2 reverse	
x5: Error external input 2	y5: Main fan 3 forward	5: Left Heat recovery temp or Wood temp 3
x6: Error external input 3	y6: Main fan 3 reverse,	6: Left Heat recovery temp or Wood temp 4
x7: Remote main fan shut off (24VDC)	y7: Error output / dial up	7: Right Temp Zone input or Wood temp 5
x10: Push button input for HT/Dry mode	y10: Heat treatment mode	8: Outside temperature or Wood temp 6
x11: MC1 (MC meter)	y11: Vent	
x12: MC2 (MC meter)	y12: Primary Heating (Low temp heat)	Analog output, 4-20mA
x13: MC3 (MC meter)	y13: Power exhaust	1: Main fan speed
x14: Push button input for Forced venting.	y14: Main Heating Left side	2: Chamber RH%
x15: Push button input for Process ON/OFF.	y15: Main Heating Right side	3: Chamber temperature output
x16: RH% error to HIGH	y16: Main Heat unit motor.	4: Wet bulb temperature output
x17: Heating in Reverse.	Y17: Next MC point	
x20: Wet/Dry temp used		
x21: Partial vent (On 1/6 vent / Off 1/3 vent)		
x22: No reverse in HT mode		
x23: 24VDC power supply input		

Valve operation:

Predrying phase:

Heat:	Start heat by temp 1 set point - 'tune -'	Stop heat by temp 1 set point.
Exhaust:	Exhaust push button must be ON	Temperature must be over min. exhaust temp (normally 20ºC)
	Start exhaust at RH% (phase 1) set point + 'tune +'	Stop exhaust at RH% (phase 1) set point - 'tune -'
	Important: System may be in a pause interval.	

Kiln phase:

Heat:	Start heat by temp 1 set point.	Stop heat by temp 1 set point + 'tune +'.
Exhaust:	Exhaust push button must be ON	Conditioning push button must be OFF
	Start exhaust at RH% (phase 1) set point	Stop exhaust at RH% (phase 1) set point - 'tune -'
	Disable exhaust if temp is less than temp (phase 2) set point - 'tune -'	
	Enable exhaust if temp is more than temp (phase 2) set point + 'tune +'	
	Important: System may be in a pause interval.	
Conditioning:	Conditioning push button must be ON.	Start water or steam spray at RH% (phase 2) set point - 'tune -'
	Important: System may be in a pause interval	Stop water or steam spray at RH% (phase 2) set point – tune+'

RH% Out-of-range readout for Kiln mode:

05: The raw input from RH sensor is <10% or >96% RH (400/4000 in raw input) AND RH% error input is set to fail LOW (x16 is not lit up)
06: The raw input from Wet bulb sensor is less than 100 (about ~40F/4C) AND RH% error input is set to fail LOW (x16 is not lit up)
07: The depression between Dry/ Wet bulb sensor is <11 (1F/0.5C) AND RH% error input is set to fail LOW (x16 is not lit up)
08: The depression between Dry/ Wet bulb sensor is >570 (50F28C) AND RH% error input is set to fail LOW (x16 is not lit up)
09: RH% calculation is too LOW (less than 10%)
105: The raw input from RH sensor is <10% or >96% RH (400/4000 in raw input) AND RH% error input is set to fail HIGH (x16 is lit up)
106: The raw input from Wet bulb sensor is less than 100 (about ~40F/4C) AND RH% error input is set to fail HIGH (x16 is lit up)
107: The depression between Dry/ Wet bulb sensor is <11 (1F/0.5C) OR >570 (50F28C) AND RH% error input is set to fail HIGH (x16 is lit up)
108: The depression between Dry/ Wet bulb sensor is >570 (50F28C) AND RH% error input is set to fail HIGH (x16 is lit up)

Temperature Out-of-range readout:

225: The raw input is <100 (about ~40F/4C)
226: The raw input is >4000 (NA)
227: The actual reading on main chamber temperature is >215F/102C (On Temp/RH% sensor this is >195F/90C)
228: The actual reading on left or right zone is >220F/105C

Error readout during first 90 minutes of operation

05: The raw input is <100 (about ~40F/4C)

If either of the actual temperature zones are less than 60F/15C then the controller will use the center temperature reading for turning the heat zone ON and OFF.

Controller type for LUMBER KILN mode:

Control Setup	Interval fans	Main fan reverse %	Phase	Vent in Reverse	Spray
0	Yes	85%	PREDRY / KILN phase	No vent in reverse	Only in Conditioning
1	Yes	85%	PREDRY, then lock in KILN phase	No vent in reverse	Only in Conditioning
2	Yes	100%	PREDRY, then lock in KILN phase	No vent in reverse	Only in Conditioning
3	N o	100%	PREDRY, then lock in KILN phase	No vent in reverse	Only in Conditioning
4	Yes	100%	Start in KILN phase	No vent in reverse	Only in Conditioning
5	No	100%	Start in KILN phase	No vent in reverse	Only in Conditioning
10	Yes	85%	PREDRY / KILN phase	Yes, with temp restriction	Only in Conditioning
11	Yes	85%	PREDRY, then lock in KILN phase	Yes, with temp restriction	Only in Conditioning
12	Yes	100%	PREDRY, then lock in KILN phase	Yes, with temp restriction	Only in Conditioning
13	N o	100%	PREDRY, then lock in KILN phase	Yes, with temp restriction	Only in Conditioning
14	Yes	100%	Start in KILN phase	Yes, with temp restriction	Only in Conditioning
15	No	100%	Start in KILN phase	Yes, with temp restriction	Only in Conditioning
20	Yes	85%	PREDRY / KILN phase	Yes, no temp restriction	Only in Conditioning
21	Yes	85%	PREDRY, then lock in KILN phase	Yes, no temp restriction	Only in Conditioning
22	Yes	100%	PREDRY, then lock in KILN phase	Yes, no temp restriction	Only in Conditioning
23	N o	100%	PREDRY, then lock in KILN phase	Yes, no temp restriction	Only in Conditioning
24	Yes	100%	Start in KILN phase	Yes, no temp restriction	Only in Conditioning
25	No	100%	Start in KILN phase	Yes, no temp restriction	Only in Conditioning
30	Yes	85%	PREDRY / KILN phase	Yes, no temp restriction	Yes
31	Yes	85%	PREDRY, then lock in KILN phase	Yes, no temp restriction	Yes
32	Yes	100%	PREDRY, then lock in KILN phase	Yes, no temp restriction	Yes
33	N o	100%	PREDRY, then lock in KILN phase	Yes, no temp restriction	Yes
34	Yes	100%	Start in KILN phase	Yes, no temp restriction	Yes
35	No	100%	Start in KILN phase	Yes, no temp restriction	Yes

Controller type for HEAT TREATMENT mode:

Control type	Venting during Heat Up phase	Partial venting (Vent1Temp)
14	No	Yes
16	Yes	Yes