Trinity

Model Numbers: T150-200, Ti100-200 (not used on Ti400)
Version Date: 2011-07-21

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SENTRY 2100 VERSION T2.2 (P/N 82013) INSTALLATION INSTRUCTIONS

⚠ WARNING Sentry control version T2.2 can only be used on Trinity boiler models: T150, T150C, T200, T200C, Ti100, Ti150, Ti150C, Ti200 and Ti200C. Version T2.2 of the Sentry control cannot be used on Trinity boiler model Ti400 or any non-Trinity boiler models. Consult NTI for appropriate control version and part number for other boiler models.

Prior to installing the new Sentry controller, check the internal fuse of the control you are replacing **(NTI does not warranty controllers returned with blown internal fuses)**. The condition of the internal fuse can be determined by checking for resistance between the controller's L1 and L2 terminals (once the control has been removed from the boiler). If the fuse is good the circuit between L1 and L2 will have 300-400 Ohms resistance, if the fuse is blown the circuit will be open, "OL". If the fuse is blown, check the system circulators controlled by the boiler and check the 120V field wiring leading from the boiler to the system circulators prior to replacing the fuse.

Sentry Menu Options

The new Sentry is equipped with the following menu options (see table). Consult the boiler installation manual for instructions on adjusting the control settings.

Menu Item	Settable Range	Description	Typical Settings
RUN		***Program Mode*** - When Run is displayed; controller is in 'Prog' mode. Arrow up or down to scroll through menu items.	NA
LO	80-190ºF	***DHW Set Point –*** Boiler temperature the control attempts to maintain during a domestic hot water call (A-C circuit closed).	160ºF
HI	80-200ºF	***Central Heating Set Point –*** Boiler temperature the control attempts to maintain during a heating call (T-C circuit closed). Note: the domestic call takes priority over the heating call.	140-160ºF (Fan Coil) 170-190ºF (Baseboard) 100-120ºF (Low temperature Infloor)
DIF	1-40	***Differential Setting*** - Applies only to a heating call. Temperature difference below set point at which burner will re-light.	20
RES	70-HI	***Sets Outdoor Reset Curve Slope*** – The temperature where the boiler water set-point (heat call only) equals the outdoor temperature. I.e., if RES is set to 70, then the heating set point becomes 70 when it is 70ºF outdoors or higher. (Only used if outdoor sensor is connected)	85
SFS	75-100	***Starting Gas Input Value –*** Settable from 45-90 on Ti400 models (Sentry Version T4.1).	80 for Ti100-200 50 for Ti400
HFS	100-240	***Maximum Gas Input Value –*** Settable from 90-195 on Ti400 models (Sentry Version T4.1).	240 for Ti100-200 195 for Ti400
LFS	40-100	***Minimum Gas Input Value –*** Settable from 35-90 on Ti400 models (Sentry Version T4.1)	50 for Ti100-150 40 for Ti200 35 for Ti400
ER5	ON/OFF	***DHW Time-Out –*** When turned ON removes priority from DHW call after 2.5 hours; prioritizes heating call.	ON
FRE	ON/OFF	***Freeze Protection –*** When turned ON the control operates the burner and the circulator once the temperature drops below 40ºF. **WARNING** this is not a guarantee protection from freeze-up.	ON (if boiler controls primary circulator)
StO	OFF-24	***Storage Feature Timer*** – Length of time in hours storage feature will keep boiler hot after the latest DHW call, only active on Combi boilers.	4 (turn OFF if Combi boiler utilizes a storage tank)

Troubleshooting

This section will assist the service technician in detecting and correcting common errors. The Sentry 2100 is equipped with an internal diagnostic system that verifies control operation. The following series of error codes hasvebeen developed to aid in diagnosing control problems.

Problem	Detected Problem	Solution
ER1 On Display	**"Water Temperature Excessive"** Sentry has sensed a water temperature in excess of 250ºF at the Water Sensor.	1 – If the boiler is extremely hot check for adequate water pressure and circulation, contact NTI for assistance. 2 – If not hot, check for sources of grounding or shorting at the Water Sensor electrical connections, check wiring from Sensor to Sentry Control. 3 – Replace Water Sensor if the resistance is not in the correct range. (See resistance charts for 1 Mohm Trinity Thermister)
ER2 On Display	**"Water Sensor Short Circuit"** Sentry has sensed a short circuit in the Water Sensor circuit.	See ER1
ER3 On Display	**"Water Sensor Open Circuit"** Sentry has sensed an open circuit in the Water Sensor circuit.	1 – Check wiring to Water Sensor for open circuits or shorting to ground. (Note: ER3 will be displayed if temperature sensed is less then 0°F.) 2 – Replace Water Sensor if the resistance is not in the correct range. (See resistance charts for 1 Mohm Trinity Thermister)
ER4 On Display	**"24V Limit Error"** Sentry has sensed a lack of 24V on the outlet of the Sentry burner relay (B1).	The error locks the boiler out for one hour before retrying ignition. 1 – Reset power, if error goes away the problem is intermittent and was likely caused by a tripped limit that has automatically reset, check for adequate water pressure and flow rate. Allow the boiler to cycle and verify proper operation including outlet water temperature and flue temperature. If operation is unsuccessful and the error reoccurs: 2 – Ti100-200's are equipped with a low water pressure switch on the boiler return that requires a minimum of 10PSI to complete the 24VAC ignition circuit. Ensure there is a minimum of 12PSI on the boiler outlet, prior to the primary circulator; ensure the boiler is plumbed in primary-secondary fashion. Replace water pressure switch if plumbing and pressure is correct and if it measures an open circuit. 3 – Ti400's are equipped with a flow switch on the boiler outlet. Ensure the flow switch is closing, if not check for proper flow rate. 4 – Check for continuity through the 24VAC limit wiring and manifold and stack limits, replace limits or wiring that are not a closed circuit.
ER5 On Display	**"DHW Time-Out"** The ER5 option is ON and the Sentry has sensed that the DHW call has lasted longer then 2.5 hours, thus removing priority from the DHW call.	Reset the ER5 error by resetting the power or cycling the DHW call. Check for proper operation of the DHW call. 1 – Combi's are equipped with a DHW flow switch; ensure it is not sticking in the closed position when there is no DHW flow. If so, remove it and free it of any debris and check for proper operation, replace if necessary. 2 – For non-Combi boilers, operating with an indirect water heater, check for proper boiler water circulation during a DHW call, and check for proper operation of the indirect water heater's Aquastat. 3 – For applications with prolonged DHW draws, turn the ER5 option OFF.
ER6	**"Flame Lock Out"** Sentry has sensed a lack of 24V to the gas valve during operation or a Fenwal ignition lockout.	1- There is a problem in the ignition sequence, it could be caused by a faulty igniter, flame sensor, gas valve or improper line pressure or combustion. Check ignition sequence to determine which component is not functioning. *(Sentry will retry ignition sequence 1 hour after ER6 code originally occurs or if control is reset)*
ER9	**Internal Controller Fault**	Indicates that the Sentry control has lost communication with an internal processor, contact NTI for assistance.
ASO Indicates that the Air Switch is	**"Air Switch Open"** This is displayed when the boiler is expecting the air switch to be	1 – Are the vinyl tubes connected between the air switch and the ports on the inlet pipe? Negative side of switch connects to the port on the 1-1/2" PVC elbow (2" elbow on Ti400). 2 – Check for blockage on the intake and exhaust vents. 3 – If fan is running the air switch may be faulty, ensure it is set at 0.2"wc. (Note:

Open	closed by a differential pressure generated when the combustion blower turns on.	switch on Ti400 condensate drain must be set at 3"wc.) 4 – If fan is not running, check 120V wiring to blower, if ok remove low voltage harness from blower, if blower fails to start, replace blower, if blower does start problem may be with blower or Sentry control.
ASC Indicates that the Air Switch is Closed	**"Air Switch Closed"** This is displayed when the boiler has turned the blower off and is expecting the air switch to be open.	1 – Is the fan running. If so check for 24V between B and D terminals (see wiring diagram). If 24V is not present replace transformer. 2 – Check venting termination with required venting described in manual.
Sentry Controller Locks-up	Excessive noise, current, or voltage spikes in the 120V power supply.	Check for voltage at the wires going to the A-C-T-O-D terminals of the Boiler. Check the magnitude of the line voltage power supply. Check the Amp draw of output C1 and Ap (max 3 Amp). Check the Amp draw of control on start-up (max 6 Amps)
Display Goes Blank	No power to control or control failure	Check for 120V between terminals L1 and L2 at Sentry. If 120V exists turn power off and remove line voltage harness from Sentry. Then check for resistance between L1 and L2 of control, if the circuit is open (O.L) the internal fuse has blown. Check for shorts in wires leading to circulators prior to replacing controller. If 120V not present, check wiring and for 120V at source.



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