FAULT DESCRIPTIONS

Failure Modes

Troubleshooting the rooftop unit is aided by the fact that the unit stores the last 12 unit "faults" in its history buffer, and can be viewed under the History key. The History navigation is explained in this manual under the section on Menu Navigation and Display Descriptions. Anytime the unit has a Fault, the System Alarm LED, just to the right of the display will be illuminated.

Fault Descriptions

The Fault Description Table, Table 34, classifies faults into two categories, T*rouble* faults and *Alarm* faults. Trouble faults will cause the event to be recorded into the history buffer, but **will not** shut the unit down. Alarm faults will cause the event to be recorded into the history buffer, and **will** cause the unit to be shut down. Both type of faults will illuminate the LED on the OptiLogic keypad.

Clearing Faults

The nature of the shutdown determines if the unit requires a "manual reset", verses an "auto reset". A manual reset requires removal of power from the rooftop unit control board. This can most easily be accomplished by cycling power at the unit disconnect switch. An auto reset will be reset automatically once the fault has cleared itself.

Remember, when power is recycled, the control board goes through a 5 minute self-check, with the display showing version, address, status "no Comm", and start-up "Ok Ok Ok" being displayed.

MOD UNT Communication Fault

When the Expansion Input/Output controller is connected via the N2 bus to the controller for a Refrigerant Transducer Package, Low Ambient operation, or Flex-Sys option, the communication status will be monitored. A fault is declared if the communication is lost.

Analog Input Faults

All analog inputs will be monitored for reliability according to the type of input connected and the range specified. The controller monitors all AI inputs to determine if the value at the input is within an acceptable range. These values are listed in Table 28. The engineering units represented are also listed as applicable.

Temperature Inputs

Temperature inputs will be monitored for reliability. If the controller determines that the input is not within the accepted range (shorted or open), a fault will be declared.

Voltage Inputs

Voltage inputs will be compared with the allowed voltage range as shown in Tables 28. Inputs with voltages outside of this range will be declared unreliable and a fault will be declared.

Negative Pressure Safety Switch

This safety device is in series with the analog output to the outside air damper when the unit is configured for an Air Measuring station. A Negative Pressure safety switch will be factory installed in the filter section of the unit whenever a Minimum Air Measuring Station is installed (none for full Air Measuring Station), and will be located upstream of the filters. This switch will open at negative 4 iwg for the purpose of preventing an excessive negative pressure in the return section, should the outside air damper fail. If the outside air damper fails (fails closed), the Primary Unit Controller will drive the return air dampers closed to increase the outside air because it sees a decrease in airflow (dampers are closed). If the pressure exceeds – 4 iwg as a result of the return dampers closing, the negative pressure switch will open and remove power from the return damper actuator. The return damper actuator is "fail open" and will open the return dampers to relieve the negative pressure. The Primary Unit Controller does not monitor the negative pressure switch. As such this safety is used only to prevent damage to the unit panels, and the failure of the outside air damper will continue to exist until noticed by service or maintenance personnel.

TABLE 34 – FAULT DESCRIPTION TABLE

FAULT TITLE RDU's HISTORY BUFFER	SET WHEN	RESET WHEN	SHUT DOWN (1)	GENERAL STATUS		ADDITIONAL ACTIONS or DISPLAYS (3) (4)
				TROUBLE	ALARM	
Excess Duct Pressure	The unit is programmed for VAV operation AND the Duct Static Pressure is greater that the Duct Pressure Limit setpoint.	Cycle power on controller.	*(5)		*	—
Sup Fan Fault	Supply Fan has to be running for 60 seconds AND Air Proving Switch has not closed for 30 seconds.	Cycle power on controller.	*		*	—
COR Status Fault	COR (Change Over Relay) is ENERGIZED (cooling requested) and COR Status input is NOT PRESENT, or COR is ENERGIZED and COR input is NOT PRESENT.	Cycle power on controller.	*		*	—
Duct Sensor Fault	Unit programmed for VAV and Duct static pressure sensor is not reliable (open or shorted).	Cycle power on controller.	*		*	—
HW Freeze Fault	HW Freezestat parameter programmed ON AND HW Freezestat Input is OPEN for 10 minutes.	HW Freezestat Tstat closes for 5 minutes.	*(6)		*	HW valve = 100% open.
Sys X Sfty Lockout #1 or Sys X Sfty Lockout #2	Three Comp Safety Trips within one hour.	Cycle power on controller OR the corresponding Compressor. Safety Trip Closes for 60 min.	*(7)		*	—
SAT Sensor Fault	SAT sensor is not reliable.	SAT sensor is not reliable.	*		*	OpData/Supply Air Temp/Temp = ???
Thermostat Conflict	{Y1 OR Y2 = ON} AND {W1 OR W2 = ON}	{(Y1 OR Y2 = ON) AND NOT (W1 OR W2 = ON)} OR {Y1 AND Y2 AND W1 AND W2 = OFF}	*		*	—
MSAT Sensor Fault	Mixed Supply Air Temp input is unreliable.	Mixed Supply Air Temp is reliable.	*		*	—
Sys X Safety Trip	>= 30 sec since a compressor in a given system was activated AND the corresponding 'Compressor System Status input' = OFF for 30 sec.	>= 10 minutes since fault was set	* (8) (9)	*		—
Evap Freeze Fault	Evap Freezestat input closes for at least 1 minute.	Evap Freezestat is open for at least 5 minutes.	*	*		—
Space Sensor Fault	Space Sensor Enable = ON AND 'Space Sensor input' is unreliable.	'Space Sensor input' is reliable OR Space Sensor Enable' = OFF.	*(12)	*		'OpData/Space Temperature/ Temp' = ??? VAV Mode Only Unit Controlled in 'Stand Alone Control'.
High Press Unload x [1, 2 or 3]	Unit programmed for transducer package AND both compressors are ON in a given system AND 'Discharge Pressure is less than the Sys Unloading Setpoint.	{OAT < (OAT @ unload – 5F)} OR {Cycle power on controller}.		*		Destage the compressor in corresponding system with the most run time.

TABLE 34 – FAULT DESCRIPTION TABLE (continued)

FAULT TITLE RDU's HISTORY BUFFER	SET WHEN	RESET WHEN	SHUT DOWN (1)	GENERAL STATUS		ADDITIONAL ACTIONS or DISPLAYS (3) (4)
				TROUBLE	ALARM	
RAT Sensor Fault	Unit programmed to enable RAT Sensor AND RAT sensor is not reliable.	Unit programmed to disable RAT sensor OR RAT sensor is reliable.		*	*(14)	OpData/RA Temp = ??? OpData/RA Enth = ???
Air Switch Fault	Supply fan has been off for at least for 5 minutes AND the Air Proving Switch remains closed.	Supply fan has been off for at least 5 minutes AND Air Proving Switch opens.		*		—
Suction Press Fault	A suction pressure reading is out-of-range (range = 0 to 200 psi).	All suction pressure readings are within range.		*		—
Discharge Press Fault	A discharge pressure reading is out-of-range (range = 0 to 500 psi).	All discharge pressure readings are within range.		*		Low ambient operation for the failed circuit is locked out.
Unit Filter Fault	Unit Filter Switch input closes for at least 1 minute.	Unit Filter Switch input opens.		*		—
Space Control Fault	Unit programmed for CV AND the unit is being controlled by the Space Sensor AND Operating in cooling AND the (Space temp - setpoint) is greater than 'Space Temp Alarm Diff' and increasing in value AND 'Space Temp Alarm Time' setpoint has expired.	'Space Temp Alarm Diff' = 0 OR 'Space Temp Alarm Time' = 0 OR (Space temp - setpoint) is decreasing in value.		*		—
Cooling SAT Fault	SAT is equal to or greater than Cooling SAT Alarm setpoint AND all available compressors have been ON for 60 minutes.	SAT is less than the Cooling SAT Alarm setpoint.		*		—
Heating SAT Fault	SAT is equal to or less than the Heating SAT Alarm setpoint AND all heating stages have been ON for at least 20 minutes.	SAT is greater than the Heating SAT Alarm setpoint.		*		—
Excess Cooling Fault	Only one comp running AND SAT is less than 'Stage 1 Cooling SAT Limit' for one minute. Two or more compressors running: SAT is less than Stage 2-6 Cooling SAT Limit' for one minute.	If 'Stage 1 Cooling Limit' caused the fault: SAT is greater than 'Stage 1 Cooling Limit' + 5 degrees F) for 5 minutes. If 'Stage 2-6 Cool Limit' caused the fault: SAT is greater than 'Stage 2-6 Cool Limit' + 5 degrees F) for 5 minutes.		*		Destage compressors at one minute intervals, if necessary, to reduce the SAT and prevent a cooling stage from starting until SAT is greater than respective 'Cooling Limit' + 5 degrees F for 5 minutes.
Excess Heating Fault	SAT is greater than 'Heating SAT Limit' for one minute.	SAT is less than ('Heating SAT Limit' – 10 degrees F for 5 minutes.		*		Destage heaters at one minute intervals, if necessary, to reduce the SAT. Prevent a heating stage from starting until SAT is less than 'Heating SAT Limit' – 10 degrees F for 5 minutes.

TABLE 34 – FAULT DESCRIPTION TABLE (continued)

FAULT TITLE RDU's HISTORY BUFFER	SET WHEN	RESET WHEN	SHUT DOWN (1)	GENERAL STATUS		ADDITIONAL ACTIONS or DISPLAYS (3) (4)
				TROUBLE	ALARM	
Tstat Cooling Fault (10)	{Y1 = OFF} AND {Y2 = ON}	{Y1 AND Y2 = ON} OR {Y1 AND Y2 = OFF}		*		—
Tstat Heating Fault (10)	{W1 = OFF} AND {W2 = ON}	{W1 AND W2 = ON} OR {W1 AND W2 = OFF}		*		—
Bldg Pressure Fault	Unit is programmed for Power Exhaust AND building static pressure sensor is not reliable.	Building Pressure is within the acceptable range.		*		OpData/Building Pressure Press = ??? (11)
OAT Sensor Fault	OAT sensor is not reliable.	OAT sensor is reliable.	(13)	*		OpData/OA Temp = ??? OpData/OA Enth = ??? Unit will Ignore htg & clg lockouts, allow htg or clg, & disable the Economizer and other functions dependent on OAT.
F/SLAB Sensor Fault	FlexSys Dewpt reset programmed for ON and Slab Temp Input is unreliable.	FlexSys Dewpt Reset programmed for OFF, or Slab Temp Input is reliable.		*		Control SAT to VAV High Setpoint.
F/RH Sensor Fault	FlexSys Dewpt Reset programmed ON and Humidity Sensor Input is unreliable	FlexSys Dewpt Reset programmed for OFF, or Humidity Sensor is reliable		*		Control SAT to VAV High Temp Setpoint.
OAH Sensor Fault	Unit programmed to read OAH sensor AND OAH sensor is not reliable.	Unit reprogrammed to disable OAH sensor OR OAH sensor is reliable.		*		OpData/OA RH = ??? OpData/OA Enth = ???
RAH Sensor Fault	Unit programmed to enable RAH sensor AND RAH sensor is not reliable.	Unit programmed to disable RAH sensor or RAH sensor is reliable.		*		OpData/RA RH = ??? OpData/RA Enth = ???
IAQ Sensor Fault	Unit programmed for Economizer AND programmed to enable IAQ sensor AND CO2 sensor is not reliable.	Unit programmed to disable IAQ Sensor OR CO2 sensor is reliable.		*		Demand Ventilation is not permitted.
OA Flow Sensor Fault	Unit programmed to enable 'OA Flow Control' AND Air flow sensors are not reliable. (15)	Airflow sensors are reliable.		*		OA Flow Control not permitted.
Bad OAF Transducer	Unit programmed to enable 'OA Flow Control' AND following an OA Flow Transducer Auto-Zero Function, the transducers are not within 10% of the sensor range (i.e. > .05 in wg)}. (16)	Following subsequent OA Flow Transducer Auto-Zero Function, transducers are <= 10% of full range for the sensors.		*		OA Flow Control not permitted.
SensConsist Fault #1	During Sensor Consistency check the SAT-(RAT+1.5F) is greater than 3 OR RAT – Space Temperature is greater than 3.	During Sensor Consistency check the SAT-(OAT+1.5F)] is less than or equal to 3 OR Cycle power on controller.		*		—

TABLE 34 – FAULT DESCRIPTION TABLE (continued)

FAULT TITLE RDU's HISTORY BUFFER	SET WHEN	RESET WHEN	SHUT DOWN (1)	GENERAL STATUS		ADDITIONAL ACTIONS or DISPLAYS (3) (4)
				TROUBLE	ALARM	
SensConsist Fault #2	During Sensor Consistency check the SAT-(OAT+1.5F)] is greater than 3.	During Sensor Consistency check' the SAT-(RAT+1.5F)] is less than or equal to 3 AND RAT - Space Temperature is less than or equal to 3 OR Cycle power on controller.		*		—
UNT Comm Fault	Unit programmed for refrigerant refrigerant transducer package OR Low Ambient Operation AND the Primary Unit Controller loses communication with the MOD-UNT.	Communication between the Primary Unit Controller and the MOD-UNT is restored.		*		MOD-UNT controls VSDs to setpoint.
RA Byp Filter Fault	Unit is programmed for VAV FlexSys and the Bypass Filter Switch is closed for 60 sec.	Bypass filter switch opens.		*		—

TABLE 34 – FAULT DESCRIPTION TABLE – NOTES

NOTES (PAGES 132 - 135):

1. The rooftop unit is shut down when the controller for the rooftop unit is in a defined idle state, 'shutdown', where all of its outputs are OFF.
2. 'General Unit Status' is the first display under 'UNIT STATUS'. When applicable, 'Trbl' (Trouble) and 'Alm' (Alarm) correlate with the RDU's History buffer.
3. OpData' = Operation Data display item
4. Except as noted, every fault (a) illuminates the System Alarm LED on the display and (b) creates a related entry in the History buffer.
5. Supply Fan output is set to 0 after duct pressure greater than limit for 10 seconds or less
6. The unit shuts down EXCEPT for the hot water valve, which is driven to 100% open.
7. When commanded to turn OFF, a compressor stops operating within one second. Both compressors in the system remain OFF until the specified 'Reset When' conditions are met. If any system locks out, any other available systems may operate.
8. Both compressors in the system turn OFF for at least 10 minutes. If any system turns OFF due to a trip, any other available systems may operate.
9. All trip counters are reset to zero after a power cycle to the controller.

   Counter #1 for each system: An individual trip counter resets if {(trip counter #1 > 0) AND (one or both compressors are operating in the associated system) AND (15 minutes has passed since the last trip added to trip counter #1)}.

   Counter #2 for each system: An individual trip counter resets if {(trip counter #2 > 0) AND (both compressors are operating in the associated system) AND (15 minutes has passed since the last trip added to trip counter #2)}.
10. Neither error history nor illumination of the System Alarm LED is provided for the Tstat Cooling or Heating faults.
11. 'Press= ???' is only displayed if the building static pressure sensor becomes unreliable after startup.
12. In CV mode, the unit shuts down and displays the fault shutdown message if the RAT sensor is not detected OR is unreliable. In VAV mode, the unit self configures to Stand Alone mode and continues to operate, though it will shut down if the SAT sensor is not detected OR is unreliable.
13. This message appears if the OAT sensor is disconnected or is unreliable and if 'Economizer Enable' = ON.
14. If the RAT sensor becomes unreliable after operation defaulted to it due to the space temperature sensor becoming unreliable the unit will shut down.
15. The airflow sensor on Input #2 is only present when the ¼ - ¾ configuration is installed.
16. The Bad OAF Transducer test is not run if an OAF sensor is unreliable and only tested in UNOCC mode.