

Table 2. Gas system alarm conditions and responses generated by the nanoautomate. An alarm is a “false” input of a safety sensor, corresponding to an open connection, sometimes in conjunction with a specific operating mode. The “Alarm Mode” specifies the exact pattern of outputs produced (Table 3). “SP” means a valid sample point is selected. “Delay” is the time in seconds that a condition must be present before an alarm is generated.

<i>Item and Input Number</i>			<i>Additional Condition</i>	<i>Alarm Mode</i>	<i>Delay (sec)</i>
1	Bulkhead flows	2-11		1	30
2	Isobutane in outlet line	3-8	O ₂ in outlet input 3-7	1	5
3	Isobutane in front flush	3-10		1	5
4	Isobutane in rear flush	3-11		1	5
5	Helium input pressure	2-0		2	5
6	Isobutane input pressure	2-1	running output 2-0	2	15
7	Circulation line pressure	2-2	pump on output 2-10	2	50
8	Chamber pressure	2-3		2	5
9	Isobutane temperature	2-4		2	5
10	Flow in circulation line	2-5	pump on output 2-10	2	30
11	Flow of fresh gas	2-6	running output 2-0	2	30
12	Concentration of O ₂	2-7	SP & running input 1-10 & output 2-0	2	90
13	Isobutane concentration	2-8	SP & running input 1-10 & output 2-0	2	90
14	Compressed air pressure	2-9		2	5
15	Inlet line pressure	2-10		2	5
16	110V wall power	2-12		2	5
17	Gas hut alarm	3-6		3	5