SAFETY

SPECIFICATIONS

1. Automated Operation

(1) After putting the carrier on the I/O port and pushing the start buttom the wafer handling and process is proceeded automatically according to the recipe in TS-4000Z controller.

2. Special Notes

(1) EMO SW install, as follows
   ① FNC Front and Rear
   ② Loading Area inside FNC
   ③ Pump Box (EMO SW should be provided by EBARA corp.)
   ④ Power Box Front and Rear

   (※) Head Type of SW is Mushroom type.

(2) EMO circuit is DC24 Voltage.

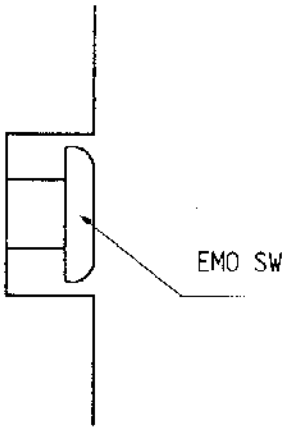
(3) A spot of the interface from customer signal is U/BOX Upper by the terminal. But the interface of Dry pump is Power box.

(4) EMO SW of P/BOX would be installed at the pump.
We will be use it.

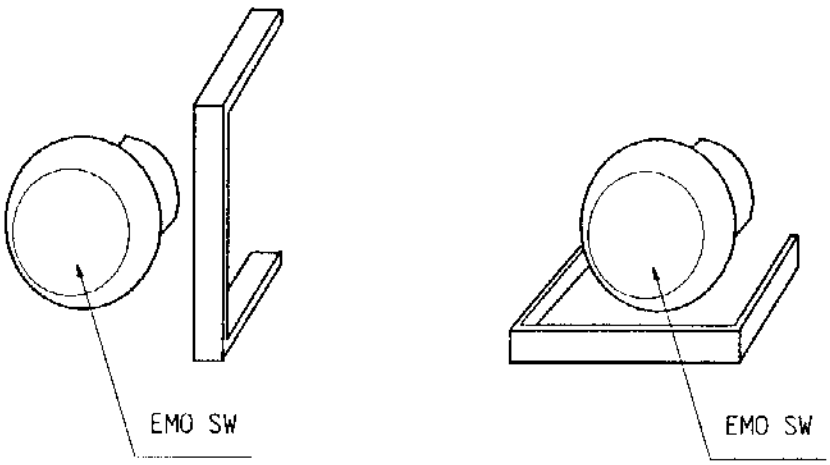
(5) The signal cable of Pump Box should be provided of the length 20 meters.
   - EMO SW line for Pump Box
   - Signal line for Dry Pump

(6) EMO SW should be installed, as follows.

① Panel type



② Side Guard type



6. Gas valve interlock Table.

△ 1997.3.14
△ 1997.2.12

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev
V 01 ~ 03 V 07 V 28	House N_2	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW ~~1~~2 or is 800Torr(VG2)	CLOSE	S		Rev1
V 04	Ar	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW ~~1~~2 or is 800Torr(VG2)	CLOSE	S		Rev1
			(2) V5 OPEN	CLOSE	S		
V 05	H_2	NC	(1) V4 OPEN	CLOSE	~~H~~ S		Rev1
			(2) CAP OPEN	CLOSE	H		
			(3) PUMP OFF	CLOSE	S		
			(4) ~~H_2 LEAK ALARM ON~~	~~CLOSE~~	~~H~~		Del1
			(5) ~~Reactant gas #1(H_2) ON~~ USER	~~CLOSE~~	~~S~~		Del1
			(6) ~~External input~~ alarm 1 ON	CLOSE	~~S~~ H	EXT IN	Rev1
			(7) ~~GAS BOX DOOR OPEN ON~~	~~CLOSE~~	~~H~~		Del1
			(8) FM2(Dilution N_2) Low	CLOSE	H	EXT IN	Rev1
			(9) H_2 LEAK DETECTOR ~~TROUBLE~~ ALM (Any LEAK or TROUBLE)	CLOSE	H		Rev1
			(10) ~~PT5 High~~	~~CLOSE~~	~~H~~		Del1
			(11) V30 OPEN	CLOSE	H		
			(12) V32 OPEN	CLOSE	H		
			(13) ~~ClF_3 detector Alarm ON~~	~~CLOSE~~	~~H~~	~~EXT IN.~~	Del1
			(14) PT5(H_2) pressure high	CLOSE	H		
			(15) Pressure over limit	CLOSE	H	PT~~13~~,14,15 16,17	Rev1
			(16) MV CLOSE	CLOSE	H		Add1
			(17) IV2(VG1) CLOSE	CLOSE	H		Add1
			(18) OVER 9 Torr (VG1)	CLOSE	H		Add1
			(19) Rear Furnace Door Open	CLOSE	S		Add1
			(20) PT3(N_2) pressure Low	CLOSE	S		Add1
			(21) V34 OPEN	CLOSE	H		Add1
			(22) PT5(H_2) pressure Low	CLOSE	S		Add2

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev
V 06	H_2	NC	(1) V4 OPEN	CLOSE	S		
	"		(2) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW 2 or is 800Torr(VG2)	CLOSE	S		Add1
V 08	Cylinder -N_2 (1)	NC	(1) V9 OPEN	CLOSE	S H		Rev1
V 09	NH_3	NC	(1) V8 OPEN	CLOSE	~~S~~ H		Rev1
			(2) V10 OPEN	CLOSE	H		
			(3) V11 OPEN	CLOSE	S		
			(4) V30 OPEN	CLOSE	H		
			(5) V32 OPEN	CLOSE	H		
			(6) MV CLOSE 2 (VG1)	CLOSE	H		
			(7) IV ~~1~~ CLOSE 9	CLOSE	~~S~~ H		Rev1
			(8) Over ~~5~~ Torr(VG1)	CLOSE	H		Rev1
			(9) Cap OPEN	CLOSE	H		
			(10) PUMP OFF	CLOSE	S		
			~~(11) Reactant gas #2 (NH_3) ON~~ USER	~~CLOSE~~	~~S~~		Del1
			~~(12) External~~ INPUT ALARM 1 ON U/BOX Gas Cab	CLOSE	H	EXT IN	Rev1
			~~(13) GAS BOX~~ DOOR OPEN ON	CLOSE	H		Rev1
			~~(14) FM2 (Dilution N_2) LOW~~	~~CLOSE~~	~~H~~		Del1
			~~(15) ClF_3 detector alarm on~~ PT7(NH_3)	~~CLOSE~~	~~H~~	~~EXT IN~~	Del1
			~~(16) PT5(H_2)~~ pressure high	CLOSE	H		Rap1
			(17) Pressure over limit	CLOSE	H	PT~~13~~,14,15 16,17	Rev1
			(18) Rear Furnace Door Open	CLOSE	S		Add1
			(19) H_2 LEAK DETECTOR ALM (Any Leak or TROUBLE)	CLOSE	H		Add1
			(20) N_2 Pressure Low(PT6)	CLOSE	S		Add1
			(21) V34 OPEN	CLOSE	H		Add1

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V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
V 10	VAC-VENT FOR NH_3	NC	(1) V9 OPEN	CLOSE	~~S~~ H		Rev1
			(2) V12 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 11	VAC-VENT FOR NH_3	NC	(1) V9 OPEN	CLOSE	S		
			(2) V12 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 12	NH_3	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW~~1~~2 or is 800Torr(VG2)	CLOSE	S		Rev1
			(2) V10 OPEN	CLOSE	S		
			(3) V11 OPEN	CLOSE	S		
V 13	Cylinder -N_2 (1)	NC	(1) V14 OPEN	CLOSE	~~S~~ H		Rev1
V 14	SiH_4	NC	(1) V13 OPEN	CLOSE	~~S~~ H		Rev1
			(2) V15 OPEN	CLOSE	H		
			(3) V16 OPEN	CLOSE	S		
			(4) V30 OPEN	CLOSE	H		
			(5) V32 OPEN	CLOSE	H		
			(6) MV CLOSE	CLOSE	H		
			(7) IV ~~1~~2 CLOSE	CLOSE	~~S~~ H		Rev1
			(8) Over ~~5~~9 Torr(VG1)	CLOSE	H		Rev1
			(9) Cap OPEN	CLOSE	H		
			(10) PUMP OFF	CLOSE	S		
			(11) ~~Reactant gas #2 (NH_3) ON~~ User	CLOSE	~~S~~		Del1
			(12) ~~External INPUT~~ ALARM 1 ON U/BOX Gas Cab	CLOSE	H	EXT IN	Rev1
			(13) ~~GAS BOX~~ DOOR OPEN ON	CLOSE	H		Rev1
			(14) ~~FM2 (Dilution N_2) LOW~~	CLOSE	~~H~~		Del1
			(15) ~~ClF_3 detector alarm on~~ PT8(SiH_4)	CLOSE	~~H~~	~~EXT IN~~	Del1
			(16) ~~PT5(H_2)~~ pressure high	CLOSE	H		Rap1 Rev1
			(17) Pressure over limit	CLOSE	H	PT~~13~~,14,15 16,17	

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VNo	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
			(18) Rear Furnace Door Open	CLOSE	S		Add1
	-		(19) H_2 LEAK DETECTOR ALM (Any Leak or TROUBLE)	CLOSE	H		Add1
			(20) N_2 Pressure Low(PT6)	CLOSE	S		Add1
			(21) V34 OPEN	CLOSE	H		Add1
V 15	VAC-VENT FOR SiH_4	NC	(1) V14 OPEN	CLOSE	~~S~~ H		Rev1
			(2) V17 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 16	VAC-VENT FOR SiH_4	NC	(1) V14 OPEN	CLOSE	S		
			(2) V17 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 17	SiH_4	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW ~~1~~ 2 or is 800Torr(VG2)	CLOSE	S		Rev1
			(2) V15 OPEN	CLOSE	S		
			(3) V16 OPEN	CLOSE	S		
V 18	Cylinder $-N_2$	NC	(1) V19 OPEN	CLOSE	~~S~~ H		Rev1
V 19	SiH_4	NC	(1) V18 OPEN	CLOSE	~~S~~ H		Rev1
			(2) V20 OPEN	CLOSE	H		
			(3) V21 OPEN	CLOSE	S		
			(4) V30 OPEN	CLOSE	H		
			(5) V32 OPEN	CLOSE	H		
			(6) MV CLOSE	CLOSE	H		
			(7) IV ~~1~~ 2 CLOSE	CLOSE	~~S~~ H		Rev1
			(8) Over ~~5~~ 9 Torr(VG1)	CLOSE	H		Rev1
			(9) Cap OPEN	CLOSE	H		
			(10) PUMP OFF	CLOSE	S		

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
V 19	SiH_4	NC	(11) ~~Reactant gas #3 (SiH_4) ON~~ USER	~~CLOSE~~	~~S~~		Del1
			(12) ~~External INPUT~~ ALARM 1 ON U/BOX Gas Cab	CLOSE	H	EXT IN	Rev1
			(13) ~~GAS BOX~~ DOOR OPEN ON	CLOSE	H		Rev1
			(14) FM2 (Dilution N_2) LOW	~~CLOSE~~	~~H~~		Del1
			(15) ClF_3 detector alarm-on PT8(SiH_4)	~~CLOSE~~	~~H~~	EXT IN	Del1
			(16) ~~PT5(H_2)~~ pressure high	CLOSE	H		Rap1
			(17) Pressure over limit	CLOSE	H	PT~~13~~,14,15 16,17	Rev1
			(18) Rear Furnace Door Open	CLOSE	S		Add1
			(19) H_2 Leak Detector ALM (Any Leak or trouble)	CLOSE	H		Add1
			(20) N_2 Pressure Low(PT6)	CLOSE	S		Add1
			(21) V34 OPEN	CLOSE	H		Add1
V 20	VAC-VENT FOR SiH_4	NC	(1) V19 OPEN	CLOSE	~~S~~ H		Rev1
			(2) V22 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 21	VAC-VENT FOR SiH_4	NC	(1) V19 OPEN	CLOSE	S		
			(2) V22 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 22	SiH_4	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW1~~=or~~ is 800Torr(VG2)	CLOSE	S		Rev1
			(2) V20 OPEN	CLOSE	S		
			(3) V21 OPEN	CLOSE	S		
V 23	Cylinder $-N_2$ (1)	NC	(1) V24 OPEN	CLOSE	~~S~~ H		Rev1

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V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
V 24	SiH_2Cl_2	NC	(1) V23 OPEN	CLOSE	~~S~~ H		Rev1
	"		(2) V25 OPEN	CLOSE	H		
			(3) V26 OPEN	CLOSE	S		
			(4) V30 OPEN	CLOSE	H		
			(5) V32 OPEN	CLOSE	H		
			(6) MV CLOSE 2	CLOSE	H		
			(7) IV 1 CLOSE 9	CLOSE	~~S~~ H		Rev1
			(8) Over 5 Torr(VG1)	CLOSE	H		Rev1
			(9) Cap OPEN	CLOSE	H		
			(10) PUMP OFF	CLOSE	S		
			~~(11) Reactant gas #4 (SiH_2Cl_2) ON~~ User	~~CLOSE~~	~~S~~		Del1
			~~(12) External INPUT ALARM 1 ON~~ U/BOX Gas Cab	CLOSE	H	EXT IN	Rev1
			~~(13) GAS BOX~~ DOOR OPEN ON	CLOSE	H		Rev1
			~~(14) FM2 (Dilution N_2) LOW~~	~~CLOSE~~	~~H~~		Del1
			~~(15) ClF_3 detector alarm on~~	~~CLOSE~~	~~H~~	~~EXT IN~~	Del1
			~~(16) PT5(H_2) pressure high~~	~~CLOSE~~	~~H~~		Del1
			(17) Pressure over limit	CLOSE	H	PT~~13~~,14,15 16,17	Rev1
			(18) Rear Furnace Door Open	CLOSE	S		Add1
			(19) H_2 Leak Detector ALM (Any Leak or trouble)	CLOSE	H		Add1
			(20) N_2 Pressure Low(PT6)	CLOSE	S		Add1
			(21) V34 OPEN	CLOSE	H		Add1
V 25	VAC-VENT	NC	(1) V24 OPEN	CLOSE	~~S~~ H		Rev1
	FOR		(2) V27 OPEN	CLOSE	S		
	SiH_2Cl_2		(3) PUMP OFF	CLOSE	S		
V 26	VAC-VENT	NC	(1) V24 OPEN	CLOSE	S		
	FOR		(2) V27 OPEN	CLOSE	S		
	SiH_2Cl_2		(3) PUMP OFF	CLOSE	S		

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V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
V 27	SiH_2Cl_2	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW 1 2 or is 800Torr(VG2)	CLOSE	S		Rev1
			(2) V25 OPEN	CLOSE	S		
			(3) V26 OPEN	CLOSE	S		
			(4) V12 CLOSE	CLOSE	S		Add1
V 29	Cylinder $-N_2$ (2)	NC	(1) V30 OPEN	CLOSE	~~S~~ H		Rev1
V 30	ClF_3	NC	(1) V5 OPEN	CLOSE	H		
			(2) V9 OPEN	CLOSE	H		
			(3) V14 OPEN	CLOSE	H		
			(4) V19 OPEN	CLOSE	H		
			(5) V24 OPEN	CLOSE	H		
			(6) V29 OPEN	CLOSE	~~S~~ H		Rev1
			(7) V32 OPEN	CLOSE	S		
			(8) MV CLOSE	CLOSE	H		
			(9) IV 1 2 CLOSE 9	CLOSE	~~S~~ H		Rev1
			(10) Over 5 Torr(VG1)	CLOSE	H		Rev1
			(11) Cap OPEN	CLOSE	H		
			(12) PUMP OFF	CLOSE	S		
			~~(13) Reactant gas #5 (CLF_3) ON~~ (13) User	~~CLOSE~~ CLOSE	~~S~~ H		Del1 Rev1
			~~(14) External INPUT ALARM 1 ON~~ (14) U/Box Gas Cab	~~CLOSE~~ CLOSE	~~H~~ H	~~EXT IN~~ EXT IN	Rev1
			~~(15) GAS BOX DOOR OPEN ON~~ (15) GAS BOX DOOR OPEN ON	~~CLOSE~~ CLOSE	~~H~~ H		Rev1
			(16) FM2(Dilution N_2) LOW	CLOSE	H	EXT IN	Rev1
			~~(17) ClF_3 detector alarm on~~	~~CLOSE~~	~~H~~	~~EXT IN~~	Del1
			~~(18) PT5(H_2) pressure high~~	~~CLOSE~~	~~H~~		Del1
			(19) Pressure over limit	CLOSE	H	~~PT13~~,14,15 16,17	Rev1
			(20) Rear Furnace Door Open	CLOSE	S		Add1
			(21) H_2 Leak Detector ALM (Any Leak or trouble)	CLOSE	H		Add1

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V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
			(22) N_2 Pressure Low(PT6)	CLOSE	S		Add1
	-		(21) V34 OPEN	CLOSE	H		Add1
V 31	ClF_3	NC	(1) Pressure in process tube in over +40 Torr to atmospheric pressure (ATM) at P.SW ~~1~~ 2 or is 800Torr(VS2)	CLOSE	S		Rev1
V 32	O_2	NC	(1) V5 OPEN	CLOSE	H		
			(2) V9 OPEN	CLOSE	H		
			(3) V14 OPEN	CLOSE	H		
			(4) V19 OPEN	CLOSE	H		
			(5) V24 OPEN	CLOSE	H		
			(6) V30 OPEN	CLOSE	S		
			(7) ~~EXTERNAL INPUT~~ User ALARM1 ON	CLOSE	H	EXT IN	Rev1
			(8) Cap OPEN	CLOSE	H		Add1
			(9) H_2 Leak Detector ALM (Any Leak or trouble)	CLOSE	H		Add1
			(10) V34 OPEN	CLOSE	H		Add1
V 33	O_2	NC	(1) Pressure in process tube in over +40 Torr to atmospheric pressure (ATM) at P.SW ~~1~~ 2 or is 800Torr(VS2) VG	CLOSE	S		Rev1
V34	N_2O	NC	(1) V5 OPEN	CLOSE	H		Add1
			(2) V9 OPEN	CLOSE	H		Add1
			(3) V14 OPEN	CLOSE	H		Add1
			(4) V19 OPEN	CLOSE	H		Add1
			(5) V24 OPEN	CLOSE	H		Add1
			(6) V30 OPEN	CLOSE	S		Add1
			(7) V34 OPEN	CLOSE	S		Add1
			(8) MV CLOSE	CLOSE	H		Add1
			(9) Cap OPEN	CLOSE	H		Add1

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V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
			(10) H_2 Leak Detector ALM (Any Leak or trouble)	CLOSE	H		Add1
	"		(11) User ALM 1 ON	CLOSE	H	EXT IN	Add1
			(12) Rear furnace door OPEN	CLOSE	S		Add1
			(13) U/BOX Gas cab door OPEN ON	CLOSE	H		Add1
V 35	N_2O	NC	(1) Pressure in process tube in over +40 Torr to atmospheric pressure (ATM) at P.SW 2 or is 800Torr(VG2)	CLOSE	S		Add1
V 36	N_2O	NC	(1) Pressure in process tube in over +40 Torr to atmospheric pressure (ATM) at P.SW 2 or is 800Torr(VG2)	CLOSE	S		Add1
V 38 41	N_2, ClF_3	NC	V~~39~~ OPEN 42	CLOSE	S		Rev1
V 39 42	O_2	NC	V~~38~~ OPEN 41	CLOSE	S		Rev1
V 42 45	Cap Vac	NC	Cap OPEN	CLOSE	S		Rev1
V 43 46	Cap Vac	NC	V~~42~~ OPEN 45	OPEN	S		Rev1
V 44 47	Cap Vac	NC	V~~42~~ OPEN 45	OPEN	S		Rev1
Cap	E/L	-	(1) V5 OPEN	CLOSE	H		
			(2) V9 OPEN	CLOSE	H		
			(3) V14 OPEN	CLOSE	H		
			(4) V19 OPEN	CLOSE	H		
			(5) V24 OPEN	CLOSE	H		
			(6) V30 OPEN	CLOSE	H		
			(7) Below±0 Torr(~~VG4~~) P.SW2	CLOSE	H		Rev1
			(8) V34 OPEN	CLOSE	H		Add1

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V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
VV	EXHAUST VENT	NC	(1) over ± 0 Torr(P.SW1-2)(Delay 30sec)	OPEN	~~S~~ S		Rev1 Rev2
			(2) Below± 0 Torr(P.SW1-2)	CLOSE	~~H~~ S		Rev1 Rev2
			(1) over ±800Torr(VG2)	OPEN	~~S~~ H		Rev2
IV1-2	VG1(C/M)	NC	(1) over 10 Torr(VG2)	CLOSE	S		Rev1
IV2-3	VG3-5 (Pirani)	NC	(1) V5 OPEN	CLOSE	H		Rev1
			(2) V9 OPEN	CLOSE	H		
			(3) V14 OPEN	CLOSE	H		
			(4) V19 OPEN	CLOSE	H		
			(5) V24 OPEN	CLOSE	H		
			(6) V30 OPEN	CLOSE	H		
			(7) V32 OPEN	CLOSE	H		Add1
			(8) V34 OPEN	CLOSE	H		Add1
IV3-4	VG7 (I on)	NC	(1) Below 0.01Torr (VG1)	OPEN	S		Rev1
			(2) V5 OPEN	CLOSE	H		
			(3) V9 OPEN	CLOSE	H		
			(4) V14 OPEN	CLOSE	H		
			(5) V19 OPEN	CLOSE	H		
			(6) V24 OPEN	CLOSE	H		
			(7) V30 OPEN	CLOSE	H		
			(8) Over 0.1Torr (VG1)	CLOSE	S		
			(9) V32 OPEN	CLOSE	H		Add1
			(10) V34 OPEN	CLOSE	H		Add1
IV4-7	P.SW1-2 (ATM Sencer)	No	(1) Over 10Torr (VG2)	OPEN	~~S~~ H		Rev1
			(2) Below 10Torr (VG2)	CLOSE	S		
IV 5	VG8(ION)	NC	Over 0.1Torr(VG4) 6	CLOSE	S		Rev1

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
IV 6	VG5~~-4~~ (Pirani)	NC	(1) V5 OPEN	CLOSE	H		Rev1
			(2) V9 OPEN	CLOSE	H		
			(3) V14 OPEN	CLOSE	H		
			(4) V19 OPEN	CLOSE	H		
			(5) V24 OPEN	CLOSE	H		
			(6) V30 OPEN	CLOSE	H		
			(7) V32 OPEN	CLOSE	H		Add1
			(8) V34 OPEN	CLOSE	H		Add1
SV	VAC	NC	(1) CAP OPEN	CLOSE	S		
			(2) PUMP OFF	CLOSE	S		
MV	VAC	NC	(1) CAP OPEN	CLOSE	H		
			(2) PUMP OFF	CLOSE	S		
			(3) OVER 10Torr(VG2)	CLOSE	S		
			(4) GV OPEN	CLOSE	S		
			(5) BELOW 9×10^{-4} Torr(VG7)	CLOSE	S		
GV	TMP Vac		(1) Over 0.01Torr(VG1)	CLOSE	S		
			(2) Over 0.01Torr (VG~~4~~ 6 2)	CLOSE	S		Rev1
			(3) IV ~~1~~=CLOSE	CLOSE	S		Rev1
			(4) V5 OPEN	CLOSE	H		
			(5) V9 OPEN	CLOSE	H		
			(6) V14 OPEN	CLOSE	H		
			(7) V19 OPEN	CLOSE	H		
			(8) V24 OPEN	CLOSE	H		
			(9) V30 OPEN	CLOSE	H		
			(10) V34 OPEN	CLOSE	H		Add1

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※1. I/L Type

H : HARDWIRE INTERLOCK + SOFTWARE

S : SOFTWARE INTERLOCK

User
※~~EXTERNAL INPUT~~ ALARM 1 : Gas box over temp or Exhaust over temp or Exhaust fail. ⚠
or other facility(external) alarm.

※2 add : line added ⚠
del : line deleted
rev : part of line changed
rep : line replaced with similar new line.

P T T A B L E

SET / PTNO	High	Low
1 (N_2)	ALARM	—
2 (N_2)	—	ALARM
3 (N_2)	—	ALARM (V5 CLOSE : S)
4 (Ar)	—	ALARM
5 (H_2)	ALARM (V5 CLOSE : H)	ALARM (V5 CLOSE : S)
6 (N_2)	—	ALARM (V9,14,19,24,30 CLOSE : S)
7 (NH_3)	ALARM (V9 CLOSE : H)	—
8 (SiH_4)	ALARM (V14 CLOSE : H)	—
9 (SiH_4)	ALARM (V19 CLOSE : H)	—
10 (SiH_2Cl_2)	ALARM	—
11 (ClF_3)	ALARM	—
12 (O_2)	ALARM	—
13 (N_2O)	ALARM	—
14 (H_2)	ALARM (V5,9,14,19,24,30 CLOSE : H)	—
15(SiH_4 NH_3)	ALARM (V5,9,14,19,24,30 CLOSE : H)	—
16 (SiH_2Cl_2)	ALARM (V5,9,14,19,24,30 CLOSE : H)	—
17 (ClF_3)	ALARM (V5,9,14,19,24,30 CLOSE : H)	—

V G T A B L E

VG NO	SET	INTERLOCK
VG1 (0-10Torr)	Over 9 Torr	V5, V9, V14, V19, V24, V30, CLOSE : H
VG2(0-1000Torr)	Over 10 Torr	IV7 OPEN (H)
	Over 800 Torr	VV OPEN (H)

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3. ALARM I/O TABLE

⚠ 1997.2.12

No.	Name of alarm	Description	TS-4000Z Display (Alarm)	MAIN-POWER OFF	HEATER POWER OFF	Hazard gas close	EXT-IN (IBM→TCOL)	EXT-OUT (TOOL → IBM)	Rev.
1	User Alarm ~~EXTIN-1~~	• Gas Box over Temp. • Exhaust over Temp. • Exhaust fail. etc	○			○(H) { H_2 DCS NH_3 ClF_3 SiH_4 O_2 N_2O	○ (DC24V)		Rev1
2	~~ClF_3 detector =(EXT IN)~~	~~ClF_3 detector alarm~~	~~○~~			~~○(H)~~	~~○ (DC24V)~~	~~○ Gas #3(Dry-B)~~	Del
3	~~Gas #1(H_2)~~	~~EXT IN H_2 Alarm~~	~~○~~			~~ONLY H_2(H)~~	~~○ (DC24V)~~		Del
4	~~Gas #2(NH_3)~~	~~EXT IN NH_3 Alarm~~	~~○~~			~~ONLY NH_3(H)~~	~~○ (DC24V)~~		Del
5	~~Gas #3(SiH_4)~~	~~EXT IN SiH_4 Alarm~~	~~○~~			~~ONLY SiH_4(H)~~	~~○ (DC24V)~~		Del
6	~~Gas #4(SiH_2Cl_2)~~	~~EXIT IN SiH_2Cl_2 Alarm~~	~~○~~			ONLY SiH_2Cl_2(H)	~~○ (DC24V)~~		Del
7	~~Gas #5(ClF_3)~~	~~EXIT IN ClF_3 Alarm~~	~~○~~			~~ONLY ClF_3(H)~~	~~○ (DC24V)~~		Del
8a	Gas box door I/L	U/BOX Gas Cab ~~Gas box~~ door open	○			○(H) { NH_3 ClF_3 SiH_4 N_2O DCS		○ { OUT PUT C (DRYB)	Rev1
8b	Gas box door I/L	Gas box door open	○						Add1
9	EMO	Pushed EMO SW		○	○	○(H) { NH_3 H_2 SiH_4 ClF_3 DCS N_2O, O_2		○ { CUT PUT A (DRYB)	Rev1
10	H_2 Gas Leak	H_2 Leak from Gas detector	○			○(H) { H_2 DCS NH_3 ClF_3 SiH_4 O_2 N_2O		○ { OUT PUT B (DRYB) OUT PUT C (DRYB)	Rev1

(H):HARDWIRE
(S):SOFTWARE

REFER TO NOTE

ALARM I/O TABLE

No.	Name of alarm	Description	TS-4000Z Display (Alarm)	MAIN-POWER OFF	HEATER POWER OFF	Hazard gas close	EXT-IN (IBM→TOOL)	EXT-CUT (TOOL → IBM)
11	PT13,14,15,16	Pressure over limit (about 760 Torr over)	○			○(H) { H_2 DCS NH_3 ClF_3 SiH_4 O_2 N_2O		
12	PT5 High	H_2 Pressure high	○			~~⊖(H)~~ ONLY H_2 (H)		CUT PUT B ○H_2-High-(Dry-B)-
13	CHMOVR	Temp > 130℃ in heater cab.	○		○			
14	SCROVER	Over Heat-SCR Unit	○		○			
15	TRANS	Over Heat-Heater Trance	○		○			
16	EXCESS	Over Heat-Heater element	○		○			
17	WATER	Heater Chamber water low Flow	○		○			
18	MANI-W	Manifold water low flow	○		○			
19	Cap-W	Cap water low flow	○					
20	Power down	Heater Breaker power cut off	○		○			
21	BLOWER	RCU broken	○		○			

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REFER TO NOTE

ALARM I/O TABLE

No	Name of alarm	Description	TS-4000Z Display (Alarm)	MAIN-POWER OFF	HEATER POWER OFF	Hazard gas close	EXT-IN (IBM→TOOL)	EXT-CUT (TOOL → IBM)	Rev1
22	RCU W/L	RCU water leak	○						
23	P-T/C (each)	Each Zone paddle T/C Alarm	○						
24	C-T/C (each)	Each Zone control T/C Alarm	○						
25	M-T/C (each)	Each Zone Monitor T/C Alarm	○						
26	A-120	M-120 controller hardware alarm	○						
27	TMP-I	Initial Data temp Alarm	○						
28	TMP-R	Recipe Data temp Alarm	○						
29	PT 1 High	H-N_2 pressure High	○						
30a	PT2, ~~3, 6~~ Low	H-N_2 pressure Low	○						Rev1
30b	PT3. Low	H-N_2 pressure Low	○			ONLY-H_2(S)			Add1
30c	PT6. Low	H-N_2 pressure Low	○			○(S) {NH_3 ClF_3 SiH_4 DCS			Add1
31	PT 4 Low	Ar pressure Low	○						

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ALARM I/O TABLE

No	Name of alarm	Description	TS-4000Z Display (Alarm)	MAIN-POWER OFF	HEATER POWER OFF	Hazard gas close	EXT-IN (IBM→TOOL)	EXT-OUT (TOOL → IBM)	Rev1
32	PT 5 Low	H_2 pressure Low	○						
33	~~PT 5 High~~	~~H_2 pressure High~~	~~○~~			~~◎(H)~~			Del1
34	P.SW3	N_2-pressure low (For air cperate valve)	○						
35	Pump Alarm	Pump Alarm	○						
36	Pump N_2 Low	N_2 for pump flow low	○						
37	Pump Temp Alarm	Pump Temp Alarm	○						
38	TMP Water Low	TMP water low flow	○						
39	FAILURE-T	TMP FAILURE	○						
40	EMERGENCY	TMP EMERGENCY	○						
41	FAILURE-C	Compressor Failure	○						
42	N_2 Flow low	FM2 (Dilution N_2)	○			○(H) { H_2 / ClF_3	INPUT E		

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43	Meg Monitor	Ground Fault Condition	○					
44	S/D Trance Alarm	Over Heat S/D transformer	○					
45	Tape Heater	Tape Heater Temp low or High	○					
46	FNC Door I/L	FNC Back door open	○			○(S) { H_2 DCS, NH_3 CTF_3, SiH_4 N_2O		
47	F/BOX Door I/L	F/BOX door open	○					

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