

SAFETY

SPECIFICATIONS

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1. Automated Operation

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

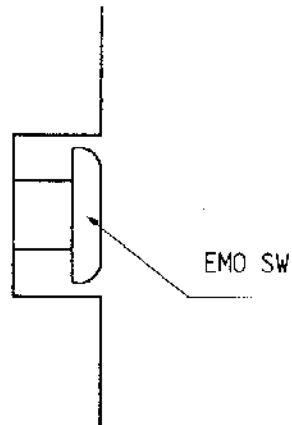
2. Special Notes

- (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

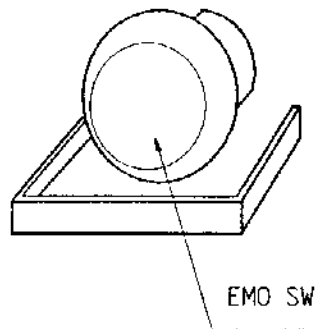
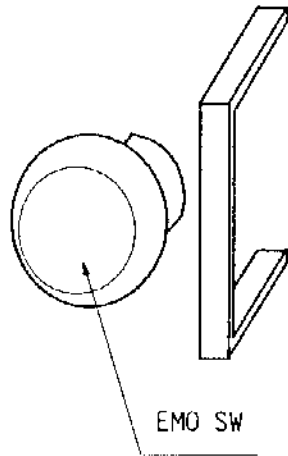
(※) Head Type of SW is Mushroom type.
- (2) EMO circuit is DC24 Voltage.
- (3) A spot of the interface from customer signal is U/BOX Upper by the terminal. But the interface of Dry pump is Power box.
- (4) EMO SW of P/BOX would be installed at the pump. We will be use it.
- (5) The signal cable of Pump 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

VNo	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev
V 01 V 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 or is 800Torr(VG2) 2	CLOSE	S		Rev1
V 04	Ar	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW 1 or is 800Torr(VG2) 2 (2) V5 OPEN	CLOSE CLOSE	S S		Rev1
V 05	H ₂	NC	(1) V4 OPEN (2) CAP OPEN (3) PUMP OFF (4) H₂ LEAK ALARM ON (5) Reactant gas #1(H₂) ON USER (6) External input alarm 1 ON (7) GAS BOX DOOR OPEN ON (8) FM2(Dilution N ₂) Low (9) H ₂ LEAK DETECTOR TROUBLE ALM (Any LEAK or TROUBLE) (10) PT5 High (11) V30 OPEN (12) V32 OPEN (13) ClF₃ detector Alarm ON (14) PT5(H ₂) pressure high (15) Pressure over limit (16) MV CLOSE (17) IV2(VG1) CLOSE (18) OVER 9 Torr (VG1) (19) Rear Furnace Door Open (20) PT3(N ₂) pressure Low (21) V34 OPEN (22) PT5(H ₂) pressure Low	CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE	H S H S H S H H H H H H H H H H H H H S S H S S		Rev1 De11 De11 Rev1 De11 Rev1 Rev1 De11 Rev1 De11 Rev1 De11 Rev1 Rev1 Add1 Add1 Add1 Add1 Add1 Add1 Add2

1-9-017
1-9-018

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev
V 06	H ₂	NC	(1) V4 OPEN (2) Pressure in process tube in over +40Torr to atmospheric pressure (ATM) at P.SW 2 or is 800Torr(VG2)	CLOSE CLOSE	S S		Add1
V 08	Cylinder -N ₂ (1)	NC	(1) V9 OPEN	CLOSE	S H		Rev1
V 09	NH ₃	NC	(1) V8 OPEN (2) V10 OPEN (3) V11 OPEN (4) V30 OPEN (5) V32 OPEN (6) MV CLOSE 2 (VG1) (7) IV 1-CLOSE 9 (8) Over 5-Torr(VG1) (9) Cap OPEN (10) PUMP OFF (11) Reactant gas #2-(NH₃) ON USER (12) External-INPUT ALARM 1 ON U/BOX Gas Cab (13) GAS BOX DOOR OPEN ON (14) FM2-(Dilution N₂) LOW (15) ClF₃ detector alarm on PT7(NH₃) (16) PT5(H₂) pressure high (17) Pressure over limit (18) Rear Furnace Door Open (19) H ₂ LEAK DETECTOR ALM (Any Leak or TROUBLE) (20) N ₂ Pressure Low(PT6) (21) V34 OPEN	CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE	S H H S H H H S H H H S S H H H H H H S S H S H		Rev1 De11 Rev1 Rev1 De11 De11 Rap1 Rev1 Add1 Add1 Add1 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 (2) V12 OPEN (3) PUMP OFF	CLOSE CLOSE CLOSE	=S H S S		Rev1
V 11	VAC-VENT FOR NH ₃	NC	(1) V9 OPEN (2) V12 OPEN (3) PUMP OFF	CLOSE CLOSE CLOSE	S S S		
V 12	NH ₃	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure 2 (ATM) at P.SW 1 or is 800Torr(VG2) (2) V10 OPEN (3) V11 OPEN	CLOSE CLOSE CLOSE	S S S		Rev1
V 13	Cylinder -N ₂ (1)	NC	(1) V14 OPEN	CLOSE	=S H		Rev1
V 14	SiH ₄	NC	(1) V13 OPEN (2) V15 OPEN (3) V16 OPEN (4) V30 OPEN (5) V32 OPEN (6) MV CLOSE 2 (7) IV CLOSE 9 (8) Over 5 Torr(VG1) (9) Cap OPEN (10) PUMP OFF (11) Reactant gas #2 (NH₃) ON User (12) External INPUT-ALARM 1 ON U/BOX Gas Cab (13) GAS BOX DOOR OPEN ON (14) FM2 (Dilution N₂) LOW (15) ClF₃ detector alarm on PT8(SiH ₄) (16) PT5(H₂) pressure high (17) Pressure over limit	CLOSE CLOSE	=S H H S H H H H =S H H H S S S H H H H H H H H H H		Rev1 Rev1 Rev1 Rev1 Rev1 Del1 EXT IN Rev1 Del1 EXT IN Del1 Rapl Rev1

V No	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 2 (ATM) at P.SW 4 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 2	CLOSE	H		
			(7) IV 3 CLOSE 9	CLOSE	=S H		Rev1
			(8) Over 5 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	(1) Reactant gas #3 (SiH₄) ON	CLOSE	S		De11	
			USER					
			(12) External INPUT ALARM 1 ON	CLOSE	H	EXT IN	Rev1	
			U/BOX Gas Cab					
			(13) GAS BOX DOOR OPEN ON	CLOSE	H		Rev1	
			(14) FM2 (Dilution N₂) LOW	CLOSE	H		De11	
			(15) ClF₃ detector alarm on	CLOSE	H	EXT IN	De11	
			PT8(SiH ₄)					
			(16) PT5(H₂) pressure high	CLOSE	H	PT13,14,15	Rap1	
						16,17	Rev1	
			(17) Pressure over limit	CLOSE	H			
			(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 2 (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	

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
V 24	SiH ₂ Cl 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 ₂ Cl 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	PT13, 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 FOR SiH ₂ Cl ₂	NC	(1) V24 OPEN	CLOSE	S H		Rev1
			(2) V27 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		
V 26	VAC-VENT FOR SiH ₂ Cl ₂	NC	(1) V24 OPEN	CLOSE	S		
			(2) V27 OPEN	CLOSE	S		
			(3) PUMP OFF	CLOSE	S		

V No.	Gas line	V Type	Interlock condition	Result	I/L Type	NOTES	Rev.
V 27	SiH ₂ Cl ₂	NC	(1) Pressure in process tube in over +40Torr to atmospheric pressure 2 (ATM) at P.SW is 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 2	CLOSE	H		
			(9) IV is 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 (ClF₃) ON User	CLOSE	S		Del1
			(14) External INPUT=ALARM 1 ON U/Box Gas Cab	CLOSE	H	EXT IN	Rev1
			(15) GAS BOX DOOR OPEN ON	CLOSE	H		Rev1
			(16) FM2(Dilution N ₂) LOW	CLOSE	H	EXT IN	Rev1
			(17) ClF₃ detector alarm on	CLOSE	H	EXT IN	Del1
			(18) PT5(H₂) pressure high	CLOSE	H		Del1
			(19) Pressure over limit	CLOSE	H	PT 13 , 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

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

VNo	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 ₂ O	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 ₂ O	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	V39 OPEN 42	CLOSE	S		Rev1
V 39 42	O ₂	NC	V38 OPEN 41	CLOSE	S		Rev1
V 42 45	Cap Vac	NC	Cap OPEN	CLOSE	S		Rev1
V 43 46	Cap Vac	NC	V42 OPEN 45	OPEN	S		Rev1
V 44 47	Cap Vac	NC	V42 OPEN 45	OPEN	S		Rev1
Cap	E/L		(1) V5 OPEN (2) V9 OPEN (3) V14 OPEN (4) V19 OPEN (5) V24 OPEN (6) V30 OPEN (7) Below ± 0 Torr (P. SW2 VG4) (8) V34 OPEN	CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE CLOSE	H H H H H H H H		Rev1 Add1

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

VNo	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 (VG4) 6	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

※ 1. I/L Type

H : HARDWARE INTERLOCK + SOFTWARE

S : SOFTWARE INTERLOCK

User

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

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

P T T A B L E



PTNO \ SET	High	Low
1 (N ₂)	ALARM	—
2 (N ₂)	—	ALARM
3 (N ₂)	—	ALARM (V5 CLOSE : S)
4 (A r)	—	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 ₂ Cl ₂)	ALARM	—
11 (ClF ₃)	ALARM	—
12 (O ₂)	ALARM	—
13 (N ₂ O)	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 ₂ Cl 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	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)

3. ALARM I/O TABLE

No	Name of alarm	Description	IS-4000Z Display (Alarm)	MAIN-POWER OFF	HEATER POWER OFF	Hazard gas Close	EXT-IN (IBM) → TOOL → IBM)	EXT-OUT (TOOL → IBM)	Rev.
1	User Alarm EXT-IN-1	<ul style="list-style-type: none"> Gas Box over Temp. Exhaust over Temp. Exhaust fail. etc 	○			○(H) { H ₂ NH ₃ SiH ₄ DCS ClF ₃ O ₂ N ₂ O	○ (DC24V)	Rev1	
2	ClF₃ detector (EXT-IN)	ClF₃ detector alarm	○			○(H)	○ (DG24V)	○ Gas-#3(DRY-B)	Del:
3	Gas-#1(H₂)	EXT-IN-H₂ Alarm	○			ONLY H₂(H)	○ (DG24V)		Cell
4	Gas-#2(NH₃)	EXT-IN-NH₃ Alarm	○			ONLY-NH₃(H)	○ (DC24V)		Cell
5	Gas-#3(SiH₄)	EXT-IN-SiH₄ Alarm	○			ONLY-SiH₄(H)	○ (DG24V)		Cell
6	Gas-#4(SiH₂Cl₂)	EXT-IN-SiH₂Cl₂ Alarm	○			ONLY SiH₂Cl₂(H)	○ (DG24V)		Cell
7	Gas-#5(ClF₃)	EXT-IN-ClF₃ Alarm	○			ONLY ClF₃(H)	○ (DG24V)		Cell
8a	Gas box door I/L	U/BOX Gas Cab Gas=box=door open	○			○(H) { NH ₃ SiH ₄ DCS ClF ₃ N ₂ O	○ { OUT PUT C (DRYB)	Rev1	
8b	Gas box door I/L	Gas box door open	○					Add1	
9	EMO	Pushed EMO SW	○	○	○	○(H) { NH ₃ SiH ₄ DCS ClF ₃ N ₂ O, O ₂	○ { OUT PUT A (DRYB)	Rev1	
10	H ₂ Gas Leak	H ₂ Leak from Gas detector	○			○(H) { H ₂ NH ₃ SiH ₄ DCS ClF ₃ O ₂ N ₂ O	○ { OUT PUT B (DRYB) OUT PUT C (DRYB)	Rev1	

(H): HARDWARE
(S): SOFTWARE

REFER TO NOTE

ALARM I/O TABLE

No.	Name of alarm	Description	TS-4000Z Display (Alarm)	MAINT-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)	○			O(H) { H ₂ DCS NH ₃ CTF ₃ SiH ₄ O ₂ N ₂ C		
12	PT5 High	H ₂ Pressure high	○			⊖(H)= ONLY H ₂ (H)		CUT PUT B OH ₂ =High (Dry-B)→
13	CHMOVR	Temp > 130°C 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	○		○			

(H) : HARDWARE
(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)	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)			Acc1
30c	PT6. Low	H-N ₂ pressure Low	○			○(S) { NH ₃ ClF ₃ SiH ₄ DCS			Acc1
31	PT 4 Low	Ar pressure Low	○						

(H): HARDWARE
(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-OUT (TOOL → IBM)	Rev1
32	PT 5 Low	H ₂ pressure Low	○						
33	PT 5 High	H₂ pressure High	○			○(H)			De11
34	P-SW3	N ₂ -pressure low (For air operate 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 CIF ₃	INPUT E		

(H): HARDWARE
(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	EXEXT-IN (I(IBM) → TCOOL	EXT-OUT (TOOL → IBM)
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 CIF ₃ SiH ₄ N ₂ O		
47	F/BOX Door I/L	F/BOX door open	○					

REFER TO NOTE

{H}: HARDWARE
{S}: SOFTWARE