

Control Panel Check on the In-Service Plant

The following is a list of controls and gauges on the in service O2 Plant main control panel. These are descriptions of normal operating parameters.

1. **HIC501** - Compressor Inlet guide vanes. Note position of inlet guide vanes on in-service compressors.
 1. When one compressor is on line; Compressors 1-1, 1-2, 2-1 = 80% to 100% open. Compressor 2-2 = 70% to 100%.
 2. When two are on line: Compressors 1-1, 1-2, 2-1 = 40% to 60% open and Compressor 2-2 = 30% to 60% open.
2. **HIC507** - Vent Valves - Vent valves on in-service compressors at 100% - indicating closed.
3. **PR506** - Air compressor discharge chart - Pressures should not exceed 70 psi - relief valves lift at approximately 74 psi.
4. **FFC120** - Cold end air/unbalanced air ratio - Usually between 0.8 - 1.1.
5. **TDI186** - (located right above FFC120) - Cold end delta T range is 1.5 to 3.0 (2.5 is optimum). If cold end delta T is out of range, adjust ratio control knob on FFC120. To increase delta T, lower FFC120 ratio. To decrease delta T, raise FFC120 ratio. Note: Make only minor adjustments to ratio controller.
6. **FI115** - Unbalanced air flow - Run in auto.
7. **FIC115/FR120** - Unbalanced air flow/Cold end air chart - Check for even and consistent flows.
8. **HIC221** - Turbine inlet guide vanes - If over 50%, check SI219.
9. **SI219** - (Located above HIC221) Turbine speed - If over 22,000 RPM, check the Westronics chart (Located below HIC221) for temperature of T/C216 - Turbine outlet temperature (pt. #12 on chart). Keep above -175 C. (warmer). If it's colder than -175 C., reduce turbine inlet guide vanes HIC221.
10. **HIC120** - Normally at 0.
11. **LIC330** - Kettle level - Keep in auto, set point at 30.
12. **LR352** - Main condenser level - Maintain between 50 and 55 inches, check chart for even and consistent flow.
13. **FFC340** - Cold end air/Shelf transfer - Ratio kept at approx. 0.8 - 1.1.
14. **FIC340** - Shelf transfer - Keep in auto.
15. **FR340/FR600** - Shelf transfer/O2 product - Chart should indicate even and consistent flows.
16. **FIC600** - Oxygen product - Keep in auto.
17. **AIC355** - Oxygen product - Can be in auto or manual.
18. **AR355** - Oxygen purity/Nitrogen purity - Chart should be tracking in an even and consistent manner.
19. **HIC350** - Liquid make - Keep in normal position.
20. **HIC351** - Liquid add - Keep in normal position.
21. **PIC635** - Driox pressure controller - Keep in manual.
22. **PI300** - Lower column pressure - Keep between 55 - 65 psi.
23. **PI352** - Main condenser - Keep between 3 -4 psi.

24. **PI349** - Upper column pressure - Keep between 2 -3 psi.
25. **Lights** - Check alarm panel lights.
26. **PI216** - Turbine outlet pressure - Keep at approximately 3 psi.
27. **PI214** - Turbine inlet pressure - Keep at approximately 55 psi.
28. **Westronics chart** - Check thermocouples #3 T/C154 & #4 T/C155 Note: #3 and #4 should have a delta T no greater than 5. If there is a great delta T, an adjustment to the mid points is necessary.
29. **AIT312** - Waste nitrogen purity/Shelf purity - Waste (90 - 100%); Shelf (98 - 100%).
30. **Oxygen purity** - 96 - 98%.

Valve List - Use with P&ID

B	111	A	Gate Valve	Hand	Bypass DeZurik
B	112	A	Gate Valve	Hand	Bypass DeZurik
B	201	A	Gate Valve	Hand	Bypass C E G T
B	216	A	Gate Valve	Hand	Bypass RHX Cooldown
B	351	X	Vendor Supplied	Hand	Bypass Lower Column Cooldown
B	510	C	Gate Valve	Hand	Condensate Bypass Surge Tank
B	616	X	Vendor Supplied	Hand	Bypass O2 Tank Level
B	626	X	Vendor Supplied	Hand	Bypass O2 Tank Level
Y	21	L	Check Valve	Check Valve	Turbine Lube System
Y	50	L	Check Valve	Check Valve	Air Compressor Lube System
Y	51	L	Check Valve	Check Valve	Air Compressor Lube System
Y	112	A	Check Valve	Check Valve	RHX Air Pass B
Y	113	A	Check Valve	Check Valve	RHX Air Pass A
Y	140	N	Check Valve	Check Valve	N2 Pass B
Y	141	N	Check Valve	Check Valve	N2 Pass A
Y	142	N	Check Valve	Check Valve	N2 Pass B
Y	143	N	Check Valve	Check Valve	N2 Pass A
Y	350	A	Check Valve	Check Valve	Tank Fill Line From Column
Y	500	A	Check Valve	Check Valve	After Cooler in Air Line
Y	555	A	Check Valve	Check Valve	Back-up Inst Air to Thaw Heater
Y	581	A	Check Valve	Check Valve	Back-up Inst Air System after A/C
Y	582	A	Check Valve	Check Valve	Back-up Inst Air System After FI580
Y	583	A	Check Valve	Check Valve	Back-up Inst Air System After Dryer
Y	584	A	Check Valve	Check Valve	Back-up Inst Air System After Dryer
Y	585	A	Check Valve	Check Valve	Back-up Inst Air System After FI580
Y	590	A	Check Valve	Check Valve	Inst Air Header From RHX
Y	600	X	Check Valve	Check Valve	Product O2 After RHX
Y	610	X	Check Valve	Check Valve	After X610X Tank Fill From Column
Y	615	X	Check Valve	Check Valve	Liquid Line From Tank 1 or Tank 3
Y	625	X	Check Valve	Check Valve	Liquid Line From Tank 2 or Tank 4
Y	635	X	Check Valve	Check Valve	After PV635X
FCV	111		Plug Valve	Pneumatic	RHX Switching for cleaning
FCV	112		Plug Valve	Pneumatic	RHX Switching for cleaning
FCV	113		Plug Valve	Pneumatic	RHX Switching for cleaning
FCV	114		Plug Valve	Pneumatic	RHX Switching for cleaning
FV	120	A	Butterfly Valve	Pneumatic	Regulate Cold End Air to Column
FV	213	A	Control Valve	Pneumatic	Turbine Bypass Unbalance Air
FV	214	A	Butterfly Valve	Pneumatic	Turbine Inlet Shutdown Trip
FV	215	A	Butterfly Valve	Pneumatic	Turbine Cold End Air

FV	340	N	Control Valve	Pneumatic	Shelf Transfer
FV	500	A	Inlet Guide Vane	Pneumatic	A/C Guide Vane
FV	506	A	Control Valve	Pneumatic	Surge Control
FV	600	X	Butterfly Valve	Pneumatic	Varies Product O2 Supply
FV	601	X	Butterfly Valve	Pneumatic	Vent Excess O2 Product
FV	690	X	Control Valve	Pneumatic	O2 From Drain Manifold
LV	330	A	Control Valve	Pneumatic	Kettle Transfer
LV	350	X	Control Valve	Pneumatic	Batch Transfer to O2 Storage
LV	351	X	Control Valve	Pneumatic	Liquid Transfer to Main Condenser
PCV	21	L		Pressure	Turbine Lube Oil System
PCV	51	L	Control Valve	Pressure	A/C Lube Oil System
PCV	590	A			Instrument Air Header
PCV	615	A	Control Valve	Pneumatic	Driox
PCV	616	A	Control Valve	Pneumatic	Driox
PCV	635	X	Butterfly Valve	Pneumatic	Driox Output Throttle
PCV	625	X	Control Valve	Pneumatic	Driox
PCV	626	X	Control Valve	Pneumatic	Driox
D	20	L	Gate Valve	Hand	Turbine Lube Oil Drain
D	21	L	Gate Valve	Hand	Turbine Lube Oil Drain
D	22	L	Gate Valve	Hand	Turbine Lube Oil Drain
D	23	L	Gate Valve	Hand	Turbine Lube Oil Drain
D	120	A	Gate Valve	Hand	O2 Superheater Air Pass Drain
D	121	A	Gate Valve	Hand	N2 Suerheater Air Pass Drain
D	203	A	Gate Valve	Hand	C E G T Outlet Drain
D	210	A	Gate Valve	Hand	RHX Air Inlet Drain "B"
D	211	A	Gate Valve	Hand	RHX Air Inlet Drain "A"
D	330	A	Gate Valve	Hand	Lower Column Drain
D	331	A	Gate Valve	Hand	Kettle Line Drain
D	340	N	Gate Valve	Hand	Shelf Transfer Drain
D	341	N	Gate Valve	Hand	Shelf Transfer Drain
D	349	N	Gate Valve	Hand	Waste N2 Line Drain
D	350	X	Gate Valve	Hand	Main Condenser Transfer Drain
D	581	A	Vendor Provided	Hand	Instrument Air Package Drain
D	582	A	Vendor Provided	Hand	Instrument Air Package Drain
D	583	A	Vendor Provided	Hand	Instrument Air Package Drain
D	584	A	Vendor Provided	Hand	Instrument Air Package Drain
D	820	W	Gate Valve	Hand	Air Compressor Intercooler 1 Drain
D	821	W	Gate Valve	Hand	Air Compressor Intercooler 1 Drain
D	830	W	Gate Valve	Hand	Air Compressor Intercooler 2 Drain
D	831	W	Gate Valve	Hand	Air Compressor Intercooler 2 Drain
D	860	W	Gate Valve	Hand	Air Compressor Aftercooler Drain
D	861	W	Gate Valve	Hand	Air Compressor Aftercooler Drain
H/L	115	A	Gate Valve	Hand	Taps for FT115
H/L	120	A	Gate Valve	Hand	Taps for FT120
H/L	214	A	Gate Valve	Hand	Taps on orifice FE214
H/L	215	A	Gate Valve	Hand	Taps for PD215

H/L	330	A	Gate Valve	Hand	Taps for LT330 Kettle Liquid
H/L	340	N	Gate Valve	Hand	Taps for LT340 Shelf N2
H/L	351	X	Gate Valve	Hand	Taps for LSH351 & LSL352 Main Condenser
H/L	352	X	Gate Valve	Hand	Taps for LT352 Main Condenser
H/L	600	X	Gate Valve	Hand	Taps for FT600 Product Oxygen
H/L	616	X	Gate Valve	Hand	Driox tank #1 & #3
H/L	626	X	Gate Valve	Hand	Driox Tank #2 & #4
P	20	L	Needle Valve	Hand	Maintenance PI20 Turbine
P	21	L	Needle Valve	Hand	Maintenance PI21 Turbine
P	22	L	Needle Valve	Hand	Maintenance PI22 Turbine
P	23	L	Needle Valve	Hand	Maintenance PI23 Turbine
P	50	L	Gate Valve	Hand	Maintenance PI51 Air Compressor
P	52	L	Vendor Supplied	Hand	Maintenance PI52 Air Compressor
P	53	L	Gate Valve	Hand	Maintenance PI53 Air Compressor
P	200	A	Hand Valve	Hand	Maintenance PSH200/ PSL200
P	201	A	Hand Valve	Hand	Maintenance PI201 C E G T
P	216	A	Gate Valve	Hand	Maintenance PI216
P	300	N	Gate Valve	Hand	Maintenance PI300
P	301	N	Gate Valve	Hand	Maintenance PI301
P	349	N	Gate Valve	Hand	Maintenance PI349
P	356	X	Hand Valve	Hand	Maintenance PI355
P	500	A	Gauge Cock	Hand	Maintenance PI500 Isolation
P	501	A	Gate Valve	Hand	Maintenance PDI500 Isolation
P	502	A	Gauge Cock	Hand	Maintenance PI502 Isolation
P	503	A	Gauge Cock	Hand	Maintenance PI503 Isolation
P	506	A	Gate Valve	Hand	Maintenance PT506 Isolation
P	510	A	Gate Valve	Hand	Maintenance PI510
P	580	A	Gate Valve	Hand	Maintenance PSL580
P	581	A	Needle Valve	Hand	Maintenance PI581
P	582	A	Needle Valve	Hand	Maintenance PI582
P	583	A	Vendor Supplied	Hand	Maintenance PI583
P	584	A	Vendor Supplied	Hand	Maintenance PI584
P	585	A	Vendor Supplied	Hand	Maintenance PI585
P	586	A	Vendor Supplied	Hand	Maintenance PI586
P	587	A	Vendor Supplied	Hand	Maintenance PI587
P	588	A	Vendor Supplied	Hand	Maintenance PI588
P	590	A	Vendor Supplied	Hand	Maintenance PI590
P	591	A	Gate Valve	Hand	Maintenance PL591
P	600	X	Gate Valve	Hand	Maintenance PT635
S	312	N	Gate Valve	Hand	Waste N2 Sample
S	313	N	Hand Valve	Hand	Waste N2 Sample @ Analyzer
S	314	A	Hand Valve	Hand	Instrument Air to N2 Analyzer
S	330	A	Hand Valve	Hand	Lower Column Liquid Sample

S	350	N	Hand Valve	Hand	N2 Sample Lower Column
S	354	X	Hand Valve	Hand	O2 Analyzer Sample
S	355	X	Gate Valve	Hand	O2 Superheater Sample
S	356	X		Hand	O2 Sample from Liquid Transfer Line
S	357	X	Hand Valve	Hand	Span Gas Sample for O2 Analyzer
S	358	X	Gate Valve	Hand	Liquid Tricock Main Condenser
S	359	X	Hand Valve	Hand	Zero Gas Sample for O2 Analyzer
S	600	X	Hand Valve	Hand	Warm End O2 Product Sample
S	602	X	Hand Valve	Hand	Product O2 Cold End Sample
S	616	X	Vendor Supplied	Hand	Full Tricock Sample on Tank #1 & #3
S	626	X	Vendor Supplied	Hand	Full Tricock Sample on Tank #2 & #4
X	20	L	Gate Valve	Hand	Shutoff Turbine Lube System
X	23	L	Gate Valve	Hand	Shutoff Turbine Lube System
X	51	C	Gate Valve	Hand	Air Surge Tank
X	111	A	Vendor Supplied	Hand	DeZurik Air Supply
X	112	A	Vendor Supplied	Hand	DeZurik Air Supply
X	113	N	Vendor Supplied	Hand	DeZurik Air Supply
X	114	N	Vendor Supplied	Hand	DeZurik Air Supply
X	213	A	Butterfly Valve	Hand	Unbalanced Air Shutoff
X	214	A	Gate Valve	Hand	Turbine Inlet Shutoff
X	216	A	Vendor Supplied	Hand	Outlet Turbine Shutoff
X	301	N	Gate Valve	Hand	N2 Transfer Upper to Lower Column
X	500	N	Butterfly Valve	Hand	Air Compressor Output Shutoff
X	512	A	Gate Valve	Hand	Air Ejector System Air Compressor
X	513	A	Gate Valve	Hand	Air Ejector System Air Compressor
X	581	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	582	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	583	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	584	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	585	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	586	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	587	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	588	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	589	A	Vendor Supplied	Hand	Backup Instrument Air Maintenance
X	590	A	Gate Valve	Hand	Instrument Air Header
X	591	A	Gate Valve	Hand	Instrument Air Header
X	592	A	Gate Valve	Hand	Instrument Air Header
X	593	A	Gate Valve	Hand	Instrument Air Header
X	594	A	Gate Valve	Hand	Instrument Air Header
X	596	A	Gate Valve	Hand	Instrument Air Header
X	600	X	Butterfly Valve	Hand	Product O2 Shutoff
X	600	X-1	Butterfly Valve	Hand	Product O2 Trim
X	600	X-2	Butterfly Valve	Hand	Product O2 Trim
X	603	X	Gate Valve	Hand	Truck Fill Shutoff #1 & #3
X	604	X	Gate Valve	Hand	Truck Fill Shutoff #2 & #4
X	605	X	Vendor Supplied	Hand	Truck Fill Shutoff #1 & #3
X	606	X	Vendor Supplied	Hand	Truck Fill Shutoff #2 & #4

X	607	X	Gate Valve	Hand	Tank #2 & #4 Pressure Build Shutoff
X	608	X	Gate Valve	Hand	Tank #1 & #3 Pressure Build Shutoff
X	609	X	Gate Valve	Hand	Driox O2 Supply Shutoff
X	610	X	Gate Valve	Hand	Manual Shutoff Tank #1 & #3 from Column
X	611	X	Vendor Supplied	Hand	Top Tank Fill Shutoff #1 & #3
X	613	X	Vendor Supplied	Hand	Pressure Build from Driox Shutoff #1 & #3
X	614	X	Gate Valve	Hand	Isolation Valve Inlet
X	614	X	Gate Valve	Hand	Isolation Valve Outlet
X	615	X	Gate Valve	Hand	Tank #1 & #3 Outlet Shutoff
X	616	X	Gate Valve	Hand	Shutoff Signal to PSL616
X	617	X	Gate Valve	Hand	Shutoff Tank #1 & #3 Vapor Recovery
X	619	X	Gate Valve	Hand	Shutoff Vapor Recovery @ Tank #1 & #3
X	620	X	Gate Valve	Hand	Manual Shutoff Tank #2 & #4 from Column
X	621	X	Vendor Supplied	Hand	Top Tank Fill Shutoff #2 & #4
X	623	X	Gate Valve	Hand	Pressure Build from Driox Shutoff #2 & #4
X	625	X	Gate Valve	Hand	Tank #2 & #4 Outlet Shutoff
X	626	X	Gate Valve	Hand	Shutoff Signal to PSL626
X	627	X	Gate Valve	Hand	Shutoff Tank #2 & #4 Vapor Recovery
X	629	X	Gate Valve	Hand	Shutoff Vapor Recovery @ Tank #2 & #4
X	635	X	Butterfly Valve	Hand	Shutoff Driox Output
X	640	X	Gate Valve	Hand	Shutoff Tank Evaporation Losses
X	641	X	Gate Valve	Hand	Shutoff Cool Down Line
X	642	X	Gate Valve	Hand	Shutoff Main Condenser Add
X	810	W	Gate Valve	Hand	Water Make Driox
X	824	W	Butterfly Valve	Hand	Shutoff & Air Compressor Intercooler #1
X	825	W	Butterfly Valve	Hand	Shutoff Air Compressor Intercooler #1
X	834	W	Butterfly Valve	Hand	Shutoff Air Compressor Intercooler #2
X	835	W	Butterfly Valve	Hand	Shutoff Air Compressor Intercooler #2
X	844	W	Gate Valve	Hand	Shutoff Air Compressor Oil Cooler
X	845	W	Globe Valve	Hand	Shutoff Air Compressor Oil Cooler
X	864	W	Gate Valve	Hand	Aftercooler Shutoff
X	865	W	Butterfly Valve	Hand	Aftercooler Shutoff
X	871	W	Globe Valve	Hand	Turbine Oil Cooler #1
X	880	W	Gate Valve	Hand	Turbine Oil Cooler #1
X	881	W	Globe Valve	Hand	Turbine Oil Cooler #2
T	215	A	Gate Valve	Hand	Turbine Inlet Thaw
T	216	A	Gate Valve	Hand	Turbine Outlet Thaw
T	201	A	Gate Valve	Hand	C E G T Thaw
T	340	N	Gate Valve	Hand	Lower Column Thaw

V	201	A	Gate Valve	Hand	Vent Inlet C E G T
V	202	A	Gate Valve	Hand	Vent Bypass C E G T
V	210	A	Gate Valve	Hand	Vent RHX "B" Pass
V	211	A	Vendor Supplied	Hand	Vent RHX "A" Pass
V	214	A	Gate Valve	Hand	Vent Turbine Inlet
V	216	A	Gate Valve	Hand	Vent Turbine Outlet
V	330	A	Gate Valve	Hand	Vent Lower Column
V	341	N	Gate Valve	Hand	Vent N2 Pass Main Condenser
V	350	X	Gate Valve	Hand	O2 Transfer Line Vent
V	351	X	Globe Valve	Hand	Vent O2 Pass Main Condenser
V	555	A	Vendor Supplied	Hand	Vent on Thaw Heater
V	581	A	Vendor Supplied	Hand	Vent Backup Instrument Air
V	582	A	Gate Valve	Hand	Vent Backup Instrument Air
V	590	A	Gate Valve	Hand	Vent Instrument Air Header
V	600	X	Gate Valve	Hand	Vent O2 Pass RHX
V	619	X	Gate Valve	Hand	Vent Line O2 Storage Tank #1 & #3
V	629	X	Gate Valve	Hand	Vent Line O2 Storage Tank #2 & #4
V	803	W	Gate Valve	Hand	Vent
V	820	W	Gate Valve	Hand	Vent Air Compressor Intercooler #1
V	830	W	Gate Valve	Hand	Vent Air Compressor Intercooler #2
V	860	W	Gate Valve	Hand	Vent After Cooler