

ภาคผนวก ข-30

HyCO Alarm & Trip setting

HyCO Alarm&Trip setting

No.	P&ID No.	Trip Tag Name	DCS Tag Name	HIMA Tag Name	Element Tag Name	Description	System	Trip characteristics	Classify SIL	Alarm	Trip setting	Delay Time	Override button in DCS	Note	Action after trip
NG Compressor A															
1	BD50.001	PALL10534	PI10534A/B		PT10534A/B	Press. suction C10501	DCS	low trip	-	26 bar (N2 =5 bar)	25 bar (N2=4 bar)	2 s		1 of 2 voting	Stop C10501 NG Compressor
2	BD50.001	PAHH10535	PI10535A/B		PT10535A/B	Press. discharge C10501	DCS	high trip	-	48 bar	49 bar	2 s		1 of 2 voting	Stop C10501 NG Compressor
3	BD50.001	TAHH10591	TS10591		TS10591	Temp. motor C10501	DCS	high trip	-	120 C	130 C	2 s		1 single element	Stop C10501 NG Compressor
4	BD50.001	PALL10561	PI10561A/B		PT10561A/B	Press. oil C10501	DCS	low trip	-	2 bar	1.5 bar	2 s		1 of 2 voting	Stop C10501 NG Compressor
5	BD50.001	TAHH10539	TI10539A/B		TT10539 A/B	Temp., Discharge inlet cooler C10501	DCS	high trip	-	80 C	110 C	2 s		1 of 2 voting	Stop C10501 NG Compressor
6	BD50.001	TAHH10543	TI10543A/B		TT10543 A/B	Temp., Discharge after cooler C10501	DCS	high trip	-	50 C	55 C	2 s		1 of 2 voting	Stop C10501 NG Compressor
NG Compressor B															
7	637400-01-02	PALL10536	PI10536A/B		PT10536A/B	Press. suction C10502	DCS	low trip	-	26 bar (N2 =5 bar)	25 bar (N2=4 bar)	2 s		1 of 2 voting	Stop C10502 NG Compressor
8	637400-01-02	PAHH10537	PI10537A/B		PT10537A/B	Press. discharge C10502	DCS	high trip	-	48 bar	49 bar	2 s		1 of 2 voting	Stop C10502 NG Compressor
9	637400-01-02	TAHH10593	TS10593		TS10593	Temp. motor C10502	DCS	high trip	-	120 C	130 C	2 s		1 single element	Stop C10502 NG Compressor
10	637400-01-02	PALL10563	PI10563A/B		PT10563A/B	Press. oil C10502	DCS	low trip	-	2 bar	1.5 bar	2 s		1 of 2 voting	Stop C10502 NG Compressor
11	637400-01-02	TAHH10540	TI10540		TT105340	Temp., Discharge inlet cooler C10502	DCS	high trip	-	80 C	110 C	2 s		1 of 2 voting	Stop C10502 NG Compressor
12	637400-01-02	TAHH10544	TI10544		TT10544	Temp., Discharge after cooler C10502	DCS	high trip	-	50 C	55 C	2 s		1 of 2 voting	Stop C10502 NG Compressor
Feed Pretreatment															
13	10PFP01	FALL10001.A	FI10001.A	-	FT10001.A	N2 start up line flow	DCS	low trip	-	700 kg/h	600 kg/h	-	yes	Single element , with in N2 Mode running	BMS shutdown/Trip UY10099
14	10PFP02	FALL10005	FI10005A/B/C	-	FT10002A/B/C	LPG Feed low flow trip	DCS	low trip	-	550 kg/h	380 kg/h	15 min	yes	2 out of 3. Trip by is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal. Signal error is the function of compensate temp, compensate pressure	BMS shutdown/Trip UY10099
15	10PFP02 / 11PFP02	FAHH10005	FI10005D/E/F	FSHH10005	FT10005A/B/C	LPG feed high flow trip	PLC	High trip	SIL1	-	700 kg/h	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal. Signal error is the function of compensate temp, compensate pressure	Trip TY11068 (11PFP02), Set TSHH-11028 to LPG-feed
16	10PFP04	FFALL10006	FFI10006A/B/C		calculated tag	Total Ratio Steam/LPG feed low trip	DCS	low trip	-	-	2.55	5 s	yes	2 out of 3. Total steam/LPG feed is calculated from A&A, B&B, and C&C. Every signals of steam and LPG are compensated. Trip signal is initiated from low flow or signal error and then compare with the remaining two. If 2 out of 3 signal is triggered	Trip UY10099
17	10PFP04	FALL10008	FFI10008A/B/C	-	calculated tag	Total Steam low trip (LPG feed)	DCS	low trip	-	1,300 kg/h	1,100 kg/h	5 s	yes	2 out of 3. Total steam is combined with FI10011_comp and FI10012_comp. Trip signal is initiated from low total steam or error signal then compare with the remaining two. If 2 out of 3 signal is triggered, it will create the trip signal.	Trip UY10099
18	10PFP04	FFALL10018	FFI10018A/B/C	-	calculated tag	Ratio R1105 Steam flow/LPG feed	DCS	low trip	-	-	1.8	5 s	yes	2 out of 3. It is ratio with FI10011_comp and FI10005_comp. Trip signal is initiated from low total steam or error signal then compare with the remaining two. If 2 out of 3 signal is triggered, it will create the trip signal. Signal error is functi	Trip UY10099
19	11PFP08	PDALL11021	PDI11021A/B/C	PDS11021A/B/C	PDT11021A/B/C	Pressure Diff NG Fuel/Reformer Box low trip	PLC	low trip	SIL 1	2.5 mbar	1.5 mbar	5s	yes	2 out of 3. Trip is initialed from low diff press or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	BMS shutdown
20	10PFP01	FALL10002	FI10002A/B/C	-	FT10002A/B/C	NG Feed low flow trip	DCS	low trip	-	500 kg/h	250 kg/h	15 min	yes	2 out of 3. Trip by is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal. Signal error is the function of compensate temp, compensate pressure, and f	BMS shutdown/Trip UY10099
21	10PFP04	FFALL10506	FFI10506A/B/C	-	calculated tag	Total Ratio Steam/NG feed low trip	DCS	low trip	-	-	2.3	5 s	yes	2 out of 3. Total steam/NG feed is calculated from A&A, B&B, and C&C. Every signals of steam and LPG are compensated. Trip signal is initiated from low flow or signal error and then compare with the remaining two. If 2 out of 3 signal is triggered, i	Trip UY10099
22	10PFP04	FALL10508	FFI10508A/B/C	-	calculated tag	Total Steam low trip (NGfeed)	DCS	low trip	-	1,200 kg/h	1,000 kg/h	5 s	yes	2 out of 3. Total steam is combined with FI10011_comp and FI10012_comp. Trip signal is initiated from low total steam or error signal then compare with the remaining two. If 2 out of 3 signal is triggered, it will create the trip signal.	Trip UY10099
23	10PFP04	FFALL10518	FFI10518A/B/C	-	calculated tag	Ratio R1105 Steam flow/NG feed	DCS	low trip	-	-	1.8	5 s	yes	2 out of 3. It is ratio with FI10011_comp and FI10005_comp. Trip signal is initiated from low total steam or error signal then compare with the remaining two. If 2 out of 3 signal is triggered, it will create the trip signal. Signal error is functi	Trip UY10099
24	11PFP08	PDALL11014	PDH11014A/B/C	PDS11014A/B/C	PDT11014A/B/C	Pressure Diff PG/TG Fuel/Reformer Box low trip	PLC	low trip	SIL1	3.5 mbar	2.5 mbar	5s	yes	2 out of 3 voting will be provided for reliability reasons. From classification 1 out of 1 voting would be sufficient.	BMS shutdown
25	10PFP03	TAHH10014	TI10014A/B/C/D	TS10014A/B/C/D	TT10014A/B/C/D	Temp 1st Bed of R1001 Desulphurizer	PLC	High trip	SIL1	410 C	420 C	5 s	No	From classification 1 out of 1 voting would be sufficient.	BMS, PN1009 close
26	10PFP04	FALL10011	FI10011A/B/C	-	FT10011A/B/C	Steam feed flow	DCS	low trip	-	-	800 kg/h (Shut down)	5 s	No	2 of 3 Voting	-
27	10PFP05	FALL10012	FI10012A/B/C	-	FT10012A/B/C	Steam feed flow	DCS	low trip	-	-	200 kg/h (Shut down)	5 s	No	2 of 3 Voting	-
H2 feed recycle															
28	10PFP07	PAH0019	PI10019/B	-	PT10019/B	Hydrogen pressure back up feed mixing	DCS	High trip	-	40 bar	-	-	No	alarm H2 back up from H2 comprsing station pressure high	
Steam System															
30	11PFP01	LALL11002	LIC11001	LS11002A/B/C	LS11002A/B/C	Steam drum level	PLC	Low trip	SIL1	50%	30%	-	individual override for A, B, C at local	2 out of 3 voting will be provided for reliability reasons. From classification 1 out of 1 voting would be sufficient	BMS will be shut down
31	13PFP02	LALL13004	LIC13004	-	LS13004	Deaerator level	DCS	Low trip	-	40%	30%	-	No	One signal of level limit switch.	P1371 (BFW pump) trip. But there is demin water for emergency case. However, if demin water is not enough, it causes low level in steam drum. Then BMS will be shut down
Reformer and fuel gas system															
32	11PFP01	BSL11002	BS11001, BS11002, BS11004	BSL11002, BSL11005	AT11003A/B	Excess oxygen in flue gas	PLC	low trip	SIL1	1.0 mol%	0.5 mol%	54 s	No	1 out of 2 voting, with deviation alarm	Incomplete combustion and increase air combustion or reduction fuel
33	11PFP02	AALL11003	AI11003A/B	AS11003A/B	AT11003A/B	Excess oxygen in flue gas	PLC	low trip	SIL1	1.0 mol%	0.5 mol%	55 s	No	2 out of 2 voting, with deviation alarm	Incomplete combustion and increase air combustion or reduction fuel
34	11PFP01	TAHH11024	TI10014A/B/C/D	TS11024	TT11024	WHB Reformer gas temperature	PLC	High trip	SIL1	-	440 C	5 s	No	1 of 1 , close the by-pass valve of WHB	Close TV-11001
35	11PFP05	PAHH11007	PI11007A/B/C	PS11007D/E/F	PT11007A/B/C	Reformer box pressure	PLC	High trip	SIL1	-0.5 mbar	0 mbar	30 s	No	2 out of 3. Trip signal is initiated from high pressure only excluding error signal	C1109 (Combustion air blower) stop, and BMS will be shut down
36	11PFP05	PALL11007	PI11007A/B/C	PS11007A/B/C	PT11007A/B/C	Reformer box pressure	PLC	low trip	SIL1	-3 mbar	-5 mbar	30 s	No	2 out of 3. Trip signal is initiated from low pressure only excluding error signal	C1107 (flue gas blower) stop, and BMS will be shut down
37	11PFP05	TAHH11011	TI11011A/B/C	TS11011A/B/C	TT11011A/B/C	Reformer syn gas outlet temperature	PLC	High trip	SIL1	880 C	900 C	5 s	No	2 out of 3. Trip signal is initiated from high temperature only excluding error signal	BMS will be shut down
38	11PFP08	PAHH11013	PI11013A/B/C	PS11013A/B/C	PT11013A/B/C	PG/TG fuel gas pressure	PLC	High trip	SIL1	117 mbar	160 mbar	5 s	No	2 out of 3. Trip signal is initiated from fuel gas high pressure only excluding error signal	BMS will be shut down close XV-11004A/B open XV-11004C close FV-11004 close FV-11007 close PDV-11017 close FV-11005
39	11PFP08	PAHH11020	PI11020A/B/C	PS11020A/B/C	PT11020A/B/C	NG fuel gas pressure	PLC	High trip	SIL1	1900 mbag	2100 mbag	5 s	No	2 out of 3. Trip signal is initiated from fuel gas high pressure only excluding error signal	BMS will be shut down close XV-11005A/B open XV-11005C
40	11PFP02	TAHH11028C	TIC11028C	TS11028C	TT11028	Temperature at R1005 for LPG	PLC	High trip	SIL1	530 C	540 C	5 s	No	1, TAHH11028C, D use the same elements. It is different only trip setting	Close TV-11002A, Open TV-11002B,
41	11PFP02	TAHH11028D	TIC11028D	TS11028D	TT11028	Temperature at R1005 for NG	PLC	High trip	SIL1	440 C	460 C	5 s	No	1, TAHH11028C, D use the same elements. It is different only trip setting	Close TV-11002A, Open TV-11002B,
42	11PFP07	FALL111001	FIC111002	FS11001A/B/C	FT11001A/B/C	Combustion air low flow	PLC	Low trip	SIL1	5,350 kg/h	4,900 kg/h	5 s	No	2 out of 3. Trip signal is initiated from low flow only	BMS will be shut down
43	11PFP08	PAHH11015	PI11005	PI11015	PT11005	Fuel Gas pressure	PLC	High trip	SIL1	-	0.5 bar	5 s	No	1 signal.	Stop start up sequence
Gas Cooling System															
44	12PFP01	LALL12002	LIC12003	LS12002	LS12002	D1231 knock out drum level	PLC	low trip	SIL1	-	20%	5 s	No	1 signal. Level limit switch signal to HIMA	close LV12003 (bottom valve at D1231) 10PFP01
45	12PFP02	PDAHH12004	PDI12004	PDS12004	PDT12004	Diff Pressure of XV12001 to MDEA	PLC	High trip	SIL1	120 mbar	200 mbar	5 s	No	1 signal. Trip signal is initiated from diff pressure only excluding error signal	close XV12001(12PFP02). This will trip adsorber and cold box
46	12PFP02	TAHH12007	TI12007A/B/C	TS12007A/B/C	TT12007A/B/C	Reformer outlet gas temp @ D1232	PLC	High trip	SIL1	80 C	90 C	5 s	No	2 out of 3. Trip signal is initiated from high temperature only excluding error signal	close XV12001 (12PFP02). This will trip adsorber and cold box

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No.	P&ID No.	Trip Tag Name	DCS Tag Name	HIMA Tag Name	Element Tag Name	Description	System	Trip characteristics	Classify SIL	Alarm	Trip setting	Delay Time	Override button in DCS	Note	Action after trip
47	12PFP02	LALL12005	LIC12005	LS12005	LS12005	Level in D1232 (knock out reformer gas drum)	PLC	low trip	SIL1	44%	25%	5 s	No	1 signal. Trip signal is initiated from low level of limit switch only	close LV12006 (12PFP02)
46	CO2 compressor														
47	KR00-12-026	LAHH14300	LSHH14300	-	LS14300	Suction drum level stage 1 st	DCS	high trip	-	-	-	2 s	No	1 signal. Trip	Stop CO2 compressor
48	KR00-12-026	LAHH14301	LSHH14301	-	LS14301	Suction drum level stage 2 nd	DCS	high trip	-	-	-	2 s	No	1 signal. Trip	Stop CO2 compressor
49	KR00-12-026	LAHH14302	LSHH14302	-	LS14302	Suction drum level stage 3 rd	DCS	high trip	-	-	-	2 s	No	1 signal. Trip	Stop CO2 compressor
50	KR00-12-026	PALL143410	PI143410	-	PT14310	Press. suction stage 1 st	DCS	low trip	-	0.3 bar	0.01 bar	2 s	No	1 signal. Trip	Stop CO2 compressor
51	KR00-12-026	PAHH143412	PI43412	-	PT14312	Press. suction stage 3 rd	DCS	high trip	-	43 bar	46 bar	2 s	No	1 signal. Trip	Stop CO2 compressor
52	KR00-12-026	PALL14314	PI14314	-	PT14313 PV	Press. Oil CO2 Comp.	DCS	low trip	-	1.7 bar	1.4 bar	2 s	No	1 out of 2. It is pressure alarm low (PV1 = PI-14313, PV2 = PI-14314)	Stop CO2 compressor
53	KR00-12-026	TAHH14315	TI14315	-	TT14315	Temp discharge stage 1 st	DCS	high trip	-	155 C	165 C	2 s	No	1 signal. Trip	Stop CO2 compressor
54	KR00-12-026	TAHH14317	TI14317	-	TT14317	Temp discharge stage 2 nd	DCS	high trip	-	155 C	165 C	2 s	No	1 signal. Trip	Stop CO2 compressor
55	KR00-12-026	TAHH14319	TI14319	-	TT14319	Temp discharge stage 3 rd	DCS	high trip	-	155 C	165 C	2 s	No	1 signal. Trip	Stop CO2 compressor
56	KR00-17-019	TAHH14326	TI14326	-	TT14326	Temp motor winding U	DCS	high trip	-	130 C	140 C	2 s	No	1 signal. Trip	Stop CO2 compressor
57	KR00-17-019	TAHH14327	TI14327	-	TT14327	Temp motor winding V	DCS	high trip	-	130 C	140 C	2 s	No	1 signal. Trip	Stop CO2 compressor
58	KR00-17-019	TAHH14328	TI14328	-	TT14328	Temp motor winding W	DCS	high trip	-	130 C	140 C	2 s	No	1 signal. Trip	Stop CO2 compressor
59	KR00-17-019	TAHH14332	TI14332	-	TT14332	Temp motor bearing NDE	DCS	high trip	-	85 C	90 C	2 s	No	1 signal. Trip	Stop CO2 compressor
60	KR00-17-019	TAHH14333	TI14333	-	TT14333	Temp motor bearing DE	DCS	high trip	-	85 C	90 C	2 s	No	1 signal. Trip	Stop CO2 compressor
61	KR00-17-019	TAHH14334	TI14334	-	TT14334	Temp motor cooling air inlet	DCS	high trip	-	90 C	100 C	2 s	No	1 signal. Trip	Stop CO2 compressor
62	KR00-17-019	TAHH14335	TI14335	-	TT14335	Temp motor cooling air outlet	DCS	high trip	-	90 C	100 C	2 s	No	1 signal. Trip	Stop CO2 compressor
63	KR00-14-024	VAHH14300	VS14300	-	VS14300	CO2 vibration	DCS	high trip	-	-	-	2 s	No	1 signal. Trip	Stop CO2 compressor
71	MEEA System														
72	14PFP01	LALL14002	LIC14003	LS14002A/B/C	LS14002A/B/C	T1401 (MDEA removal) level	PLC	low trip	SIL2	27.50%	15%	5 s	No	2 out of 3 votes : It is the limit switch. (LS1400C input from LIC14003)	close T1401(14PFP01) bottom valve - LN14003A, LN14003B and XN14011
73	14PFP01	FALL14002	FIC14002	-	FT14002A/B	Lean MDEA flow	DCS	low trip	-	12,000 kg/h	10,000 kg/h	5 s	Yes	One signal. Trip signal is initiated from low flow. This will trip P1471	P1474 (reflux MDEA pump) trip and close XV12001. This cause the downstream since (adsorber, cold box, CO, CO2 trip)
74	14PFP02	LALL14005	LIC14004	-	LS14005A/B/C	T1404 level	DCS	low trip	-	-	25%	5 s	No	2 out of 3 votes : It is the limit switch. It will trip P1471	Trip P1474 (refluxMDEA pump)
75	14PFP04	LAHH14008	LIC14010	-	LS14008	D1441 knock out drum level	DCS	High trip	-	-	65%	5 s	No	One signal. Trip signal is initiated from the trigger of limit switch level	Trip C1408 (CO2 compressor)
76	14PFP04	LALL14009	LIC14010	-	LS14009	D1441 knock out drum level	DCS	Low trip	-	-	35%	5 s	No	One signal. Trip signal is initiated from the trigger of limit switch level	Trip P1473 (Condensate MDEA pump). Close FV14006
77	Drying System														
78	15PFP01	LALL15007	-	LS15007	LS15007	Level at D1531 (Syn gas knock out drum)	PLC	Low trip	SIL1	-	35%	5 s	No	1 signal initiated trip	close PV14015 (14PFP06),
79	15PFP02	PDAAH15002	PDI15002A	-	calculated tag	Diff outlet pressure of A1501A/B	DCS	High trip	-	-	3 bar	5 s	No	calculated signal from P15002 and P15004	Adsorber sequence will stop (Trip PSA, lead to process upset)
80	15PFP02	PDAAH15004	PDI15004A	-	calculated tag	Diff outlet pressure of A1501A/B	DCS	High trip	-	-	3 bar	5 s	No	calculated signal from P15002 and P15004	Adsorber sequence will stop (Trip PSA, lead to process upset)
81	15PFP03	TAHH15012	TI15012A/B/C	TS15012A/B/C	TT15012A/B/C	SG outlet temp of E1526	PLC	High trip	SIL3	45 C	50 C	5 s	No	2 out of 3. Trip is initiated from high temperature only	close KV15010, KV15011, XV15002 (trip cold box), Increase set point PIC16008 close FV14015 (14PFP06),
82	15PFP04	TAHH15008	-	LS15008	LS15008	D1541 (knock out drum) level	PLC	Low trip	SIL1	-	35%	5 s	No	1 signal. Level limit switch signal to HIMA	close FV14015 (14PFP06),
83	15PFP04	LAHH15006	LS15006B/L115004	LS15006	LS15006	D1541 (knock out drum) level	PLC	High trip	SIL1	-	90%	5 s	No	1 out of 2. voting in DCS to alarm sending to PLC willto alarm high	close FN18001, PSA stop
84	Cold box & CO compressor														
85	16PFP02	TALL16031	TALL16031	TS16031	TS16031	Tail gas inlet temp. to E1611	PLC	Low tip	-	H=-135 C, L = -150 C	-170 C	-	No	1 signal. Temperature signal to HIMA	close HV16003, TAL18031 Not open (permissive open) XV15002
86	16PFP03	TALL16002	TALL16002	TS16002	TS16002	Syn gas feed to T1601	PLC	Low tip	-	-	-182.5	-	No	1 signal. Temperature signal to HIMA	Not open (permissive open) XV15002
87	16PFP04	TALL16067	TALL16067	TS16067	TS16067	CO/CH4 temp. to E1615 from T1602	PLC	Low tip	-	-	-175	-	No	1 signal. Temperature signal to HIMA	close HV16021
88	16PFP05	TALL16023	TALL16023	TS16023	TS16023	CO Top column T603temp to E1612	PLC	Low tip	-	-	-183	-	No	1 signal. Temperature signal to HIMA	Not open (permissive open) XV15002
89	16PFP07	TAHH16040	TI16024A/B/C	TS16024A/B/C	TT16024A/B/C	CO temp suction side C1608	PLC	Low trip	SIL3	10 C	-10 C	5 s	No	2 out of 3 voting	CM16008(16PFP07) stop, FN16018(16PFP06), FN16008 (16PFP06), FN16006 (16PFP06), FN16007(16PFP04), LN16003(16PFP04), HN16009 (16PFP04), HN16021 (16PFP04), PN16016 (16PFP03)
90	16PFP08	TAHH16040	TI16040A/B/C	TS16040A/B/C	TT16040A/B/C	Outlet temp C1608 4th stage	PLC	High trip	SIL2	45 C	50 C	5 s	No	2 out of 3 voting	CM16008 stop
91	16PFP09	TALL16050	TI16050A/B/C	TS16050A/B/C	TT16050A/B/C	CO product temperature from D1633	PLC	Low trip	SIL2	10 C	-10 C	5 s	No	2 out of 3 voting	XN16002, PN16001 close
92	16PFP10	TALL16012	TI16012A/B/C	TS16012A/B/C	TT16012A/B/C	H2 Fraction temperature to E1512	PLC	Low trip	SIL1	20 C	10 C	5 s	No	2 out of 3 signal	P1671A/B (CH4 pump) stop, KN15015 (15PFP03) and KN15017(15PFP03) close
93	16PFP10	TALL16059	TI16059A/B/C	TS16059A/B/C	TT16059A/B/C	CO product temp from E1611	PLC	Low trip	SIL3	10 C	-10 C	5 s	No	2 out of 3 signal	HN16012 (16PFP01), HN16001 (16PFP02) close, CM16008 stop
94	16PFP10	TALL16016	TI16016A/B/C	TS16016A/B/C	TT16016A/B/C	Tail gas temperature to F1101	PLC	Low trip	SIL1	10 C	-10 C	5 s	No	2 out of 3 signal	HN16003 (16PFP02), PN16003 (16PFP04) close lead to process upset
95	16PFP14	PAHH16702	PI16702A/B/C	PS16701A/B/C	PT16701A/B/C	CO pressure at metering	PLC	High trip	SIL3	-	6.5 bar	-	No	2 out of 3 signal	XN16702, XN16700, PN16701A, PN16701B close (16PFP14)
96	0-122.819.087 1/2	VAHH16340A/B/C	VS16340A/B/C	VS116340A/B/C	VS116340A/B/C	C1608 vibration	PLC	High trip	SIL1	-	-	-	No	2 out of 3 signal	C1608 stop
97	0-122.819.087 1/2	PALL16300	PI16300A/B/C	-	PT16300A/B/C	C1608 suction press 1st stage	DCS	Low trip	-	N2 = 0.85 bar CO = 0.85 bar	N2 = 0.5 bar CO = 0.8 bar	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
98	0-122.819.087 1/2	TAHH16350	TI16350A/B/C	-	TT16350A/B/C	C1608 Discharge temp 1st stage	DCS	High trip	-	130 (CO, N2)	135 (CO, N2)	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
99	0-122.819.087 1/2	TAHH16360	TI16360A/B/C	-	TT16360A/B/C	C1608 discharge temp 2nd stage	DCS	High trip	-	130 (CO, N2)	135 (CO, N2)	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
100	0-122.819.087 2/2	PALL16400	PI16400A/B/C	-	PT16400A/B/C	C1608 suct press 4th stage	DCS	Low trip	-	12.4 (CO, N2)	N2 = 1 bar CO = 11 bar	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
101	0-122.819.087 2/2	PAHH16500	PI16500A/B/C	-	PT16500A/B/C	C1608 disch press 4th stage	DCS	High trip	-	27.5 bar	29 bar	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
102	0-122.819.087 2/2	TAHH16370	TI16370A/B/C	-	TT16370A/B/C	C1608 disch temp 3rd stage	DCS	High trip	-	125 (CO, N2)	130 C	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
103	0-122.819.087 2/2	TAHH16380	TI16380A/B/C	-	TT16380A/B/C	C1608 Disch temp 4th stage	DCS	High trip	-	130 C	150 C	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
104	0-122.819.089 1/1	PDALL16550	PDI16550A/B/C	-	PT16550A/B/C	C1608 Oil Diff Pressure	DCS	Low trip	-	2.9 bar	2.5 bar	5 s	No	2 out of 3. Trip is initiated by low flow(not compensate) or signal error. Then compare with the remaining two. If 2 out of 3 is triggered, it will create the trip signal.	C1608 stop
105	98PFP02	AAHH16009_13	AI16009/AI16013	-	AT16009, AT16013	CH4 in CO product	DCS	High trip	-	7 ppm	10 ppm	10 s	Yes	1 out of 2. voting alarm high	PV16020, PV16009, and HV16005 close
106	98PFP02	AAHH16010	AI16010	-	AT16010	H2 in CO product	DCS	High trip	-	1500 ppm	2000 ppm	10 s	Yes	1 signal	Stop CO turbine
107	98PFP02	AAHH16011	AI16011	-	AT16011	CO purity in CO product	DCS	Low trip	-	97.62	97	10 s	Yes	1 signal	PV16020, PV16009, and HV16005 close
108	CO turbine														
109	D-4040-A-002	PDALL16104	PDI16104	-	PT16101A	Press. break low	DCS	Low trip	-	3.05 bar	2.05 bar	2 s	No	1 signal	Stop CO turbine
110	D-4040-A-002	PDAAH16104	PDI16104	-	PT16101A	Press. break high	DCS	High trip	-	10.05 bar	9.05 bar	2 s	No	1 signal	Stop CO turbine
111	D-4040-A-002	PDAAH16101	PDI16101	-	PT16101	Press. inlet filter	DCS	High trip	-	2.5 bar	1.5 bar	2 s	No	1 signal	Stop CO turbine
112	D-4040-A-002	SAHH16101B	SI16101	-	PT16101	Critical speed zone	DCS	High trip	-	-	-	2 s	No	1 signal	Stop CO turbine
113	D-4040-A-002	PAHH16101A	PI16101A	-	PT16101A	Press. inlet high	DCS	High trip	-	27.46 bar	28.81 bar	2 s	No	1 signal	Stop CO turbine
114	D-4040-A-002	PALL16102	PI16102	-	PT16102	Press. outlet low	DCS	Low trip	-	8.05 bar	7.52 bar	2 s	No	1 signal	Stop CO turbine
115	D-4040-A-002	PAHH16102	PI16102	-	PT16102	Press. outlet high	DCS	High trip	-	14.79 bar	15 bar	2 s	No	1 signal	Stop CO turbine
116	D-4040-A-002	PDAAH16102	PDI16102	-	PT16102	Press. variation outlet	DCS	High trip	-	-	7.50%	2 s	No	1 signal	Stop CO turbine
117	D-4040-A-002	PDAAH16103	PDI16103	-	PT16103	Press. wheel	DCS	High trip	-	12.50%	25%	2 s	No	1 signal	Stop CO turbine
118	D-4040-A-002	TAHH16101A	TI16101A	-	TT16101A	Temp. gas break	DCS	High trip	-	100 C	105 C	2 s	No	1 signal	Stop CO turbine
119	D-4040-A-002	TALL16102	TI16102	-	TT16102	Temp. gas bearing	DCS	Low trip	-	2 C	-3 C	2 s	No	1 signal	Stop CO turbine
120	D-4040-A-002	TALL16103	TI16103	-	TT16103	Temp. outlet X1606	DCS	Low trip	-	148 C	-153 C	2 s	No	1 signal	Stop CO turbine
121	D-4040-A-002	ZALL16102	ZS16102	-	ZS16102	Inlet valve close to shutdown	DCS	Low trip	-	-	-	2 s	No	1 signal	Stop CO turbine

HyCO Alarm&Trip setting

No.	P&ID No.	Trip Tag Name	DCS Tag Name	HIMA Tag Name	Element Tag Name	Description	System	Trip characteristics	Classify SIL	Alarm	Trip setting	Delay Time	Override button in DCS	Note	Action after trip
122	D-4040-A-002	SALL16101	SI16101		ST16101	Zero speed X1606	DCS	Low trip	-		0 Hz	2 s	No	1 signal	Stop CO turbine
123	D-4040-A-002	PALL16105	PI16105		PT16105	Press. gas bearing inlet	PLC	Low trip	-	Calculation from load X1606	Calculation from load X1606	2 s	No	2 signal	Stop CO turbine
124	D-4040-A-002	PAHH16106	PI16106		PT16106	Press. gas bearing outlet	PLC	High trip	-	Calculation from load X1606	Calculation from load X1607	2 s	No	3 signal	Stop CO turbine
125	PSA unit														
126	18PFP01	TAHH18001	TI18001A/B	TS18001A/B	TT18001A/B	H2 Fraction inlet temperature of PSA	PLC	High trip	SIL 1	45 C	50 C	5 s	No	1 out of 2. voting temperature alarm high	Close FN-18001 lead to process upset
127	18PFP01	PAHH18001	PI18004A/B/C	PS18004A/B/C	PT18004A/B/C	Purege gase drum pressure	PLC	High trip	SIL 2	-	1.2 bar	3 s	No	2 out of 3. voting temperature alarm high	PSA Unit Stop XA18003
128	LCO2 Storage tanks, T-85A														
129	H0202-T-D-104-01-10	LAH9085A-1	LI9085A-1		LT9085A-1	Level LP CO2 Tank	DCS	High trip	-	-	85%	5 s	No	1 single element	
130	H0202-T-D-104-01-10	PAH9085A-1	PI9085A-1		PT9085A-1	Press LP CO2 Tank	DCS	High trip	-	-	20.5 bar	5 s	No	1 single element	
131	LCO2 Storage tanks, T-85B														
132	H0202-T-D-104-01-10	LAH9085B-1	LI9085B-1		LT9085B-1	Level HP CO2 Tank	DCS	High trip	-	85%	95%	5 s	No	1 single element	Stop CO2 pump transfer
133	H0202-T-D-104-01-10	PAH9085B-1	PI9085B-1		PT9085B-1	Press HP CO2 Tank	DCS	High trip	-	40 bar	42 bar	5 s	No	1 single element	
134															
135	LIN Tank, T81														
136	H0202-T-D-101-01-06	LAH9081	LI9081		LT9081	Level HP CO2 Tank	DCS	High trip	-	-	98%	5 s	No	1 single element	
137	H0202-T-D-101-01-06	PAH9081	PI9081		PT9081	Press HP CO2 Tank	DCS	High trip	-	-	14.5	5 s	No	1 single element	

ภาคผนวก ข-31

การตรวจสอบ

Control Valve Maintenance Report



Customer LINDE HYCO LTD.
Tag No. HV-11001A
Plant Hyco

Report No. 6711111
Job/Service No. 6709039
Date 19-Nov-2024

Equipment Data

Brand	VETEC	Actuator Type	R200	Positioner Model	3730-3100000040000000.03
Model No.	73.7R	Actuator Size	-	Serial No.	5112821
Serial No.	43068/02	Position.	-	Bench Range	0.4 - 1.2 Bar
Body Type	73.7R	Body Size	3 Inch	Preload Range	-
Body Rating	CL900	Body Matl.	A217WC6	Stroke	75 Deegre
Extension	-	Action	Fail open	Solenoid Model	Norgren
☉ Cv ○ Kvs	243-FTC	Characteristic Log	30	Solenoid SN	-
Sealing	ME	Flow Divider	-	Limit Switch	3776-1120000001200000
Leakage Class	IV	Trim Material	1.4571	Limit Switch S/N	10247865
		* Handwheel	○ Yes ● No	Regulator	4708-1152
		Lockup Valve	-	Booster	-
		Quick Exhaust	-	Position TX	-
		Speed Cont.	-	Position TX S/N	-

Action Taken

Body	Actuator	Positioner
<input checked="" type="checkbox"/> Replacement Parts (See list below)	<input type="checkbox"/> Replacement Parts (See list below)	<input type="checkbox"/> Replacement Parts (See list below)
<input type="checkbox"/> Plug and Seat Lapping	<input checked="" type="checkbox"/> Leakage test	<input checked="" type="checkbox"/> Pre-function test
<input type="checkbox"/> Flange machining	<input type="checkbox"/> Check spring range	<input checked="" type="checkbox"/> Calibration
<input checked="" type="checkbox"/> Leakage test	<input type="checkbox"/> Change function	<input checked="" type="checkbox"/> Cleaning
<input checked="" type="checkbox"/> Tightness test	<input checked="" type="checkbox"/> Cleaning	<input type="checkbox"/> Painting
<input checked="" type="checkbox"/> Hydrostatic test	<input checked="" type="checkbox"/> Painting	Function test
<input checked="" type="checkbox"/> Cleaning	<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Solenoid valve
<input checked="" type="checkbox"/> Painting		<input checked="" type="checkbox"/> Limit switches

Testing

Item	Action	Test Medium	Actuator pressure	Test pressure	Standard Leakage	Actual value	Leakage class	Result
1	Seat leakage Before	Air	4 Bar	4 Bar	1679 L/Hr	130 NI/Hr	IV	OK
2	Seat leakage After	Air	4 Bar	4 Bar	1679 L/Hr	460 NI/Hr	IV	OK
3	Hydrostatic test	Water	0 Bar	56 Bar	No leakage	No leakage	-	OK
4	Tightness test	Air	0 Bar	5 Bar	No leakage	No leakage	-	OK
5	Actuator	Air	4 Bar	4 Bar	No leakage	No leakage	-	OK

Remark : Leakage test conforms to DIN IEC 534-4 and ANSI FCI 70-2

Step	Input			Before calibration				After calibration			
	Input %	Signal mA	Reading %	Value		Error		Value		Error	
				Up	Down	Up	Down	Up	Down	Up	Down
1	0	20	0.0	-4.3	-4.3	4.3	4.3	0.3	0.3	-0.3	-0.3
2	25	16	10.7	10.4	10.8	0.3	-0.1	11.0	10.2	-0.3	0.5
3	50	12	20.3	19.9	20.6	0.4	-0.3	20.6	19.6	-0.3	0.7
4	75	8	47.4	47.8	47.9	-0.4	-0.5	47.9	47.0	-0.5	0.4
5	100	4	100.	96.3	96.3	3.7	3.7	99.9	99.9	0.1	0.1

Plug start at = 98.1 (4.1 mA)

Stroke Timing Close to open = 14.4 Sec

Open to close = 7.7 Sec

List of parts changed

Item	Part No.	Part Name	Q'ty
1	1102053	Graphite Gasket Ø88/78x1	1 Pce
2	1132867	Shim ring set 72/73/82 DN80 A4 Material	1 Set
3	1108651	Packing set 73 DN80 2165-0 Shaft 28 (Old)	1 Set
4	1018100	seat ring 72/73 DN80 60 F1 FTO kvs 220 /	1 Pce
5	1103047	Packing ring 40/32x5 W S9500 Material WS	1 Pce
6	Local	Gasket Non-Asbestos	2 Pcs

Item	Part No.	Part Name	Q'ty

Note : VS1180-0924, Flow diction FTC.

Customer [Signature]
Witness by [Signature] Date 19/11/2024
Approved by [Signature] Date 18 Dec 2024

Samson
Service by 1st : Pinsuda Sh. Service date
Service by 2nd : 5.6/11/24 19-Nov-2024

Last Printed 06-Dec-2024 13:45:53



Inspection Report



Customer LINDE HYCO LTD.

Report No 6711111

Tag No HV-11001

Job No 6709039

Plant Hyco

Date 27/11/2024

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New washer



Flow direction FTC

Inspection Report

SAMSON

Customer LINDE HYCO LTD.

Report No 6711111

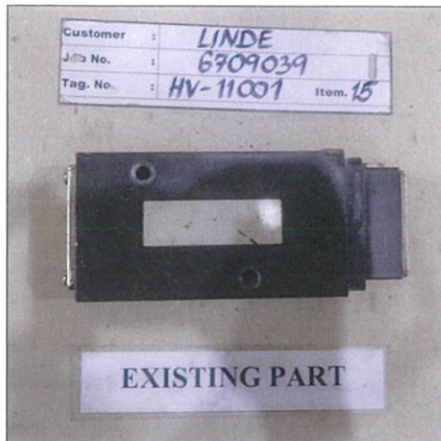
Tag No HV-11001

Job No 6709039

Plant Hyco

Date 27/11/2024

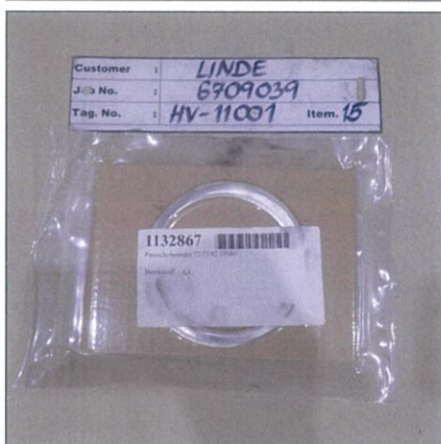
(Page 3/4)



Existing solenoid



New solenoid



New shim ring set



New graphite gasket



New gasket tunion



New ring joint

Inspection Report

SAMSON

Customer LINDE HYCO LTD.

Report No 6711111

Tag No HV-11001

Job No 6709039

Plant Hyco

Date 27/11/2024

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Plug before clean



Plug after clean



Seat before clean



Seat after clean



Exiting packing



New packing

Inspection Report

SAMSON

Customer LINDE HYCO LTD.

Report No 6711111

Tag No HV-11001

Job No 6709039

Plant Hyco

Date 27/11/2024

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Control valve before overhaul



Control valve after overhaul



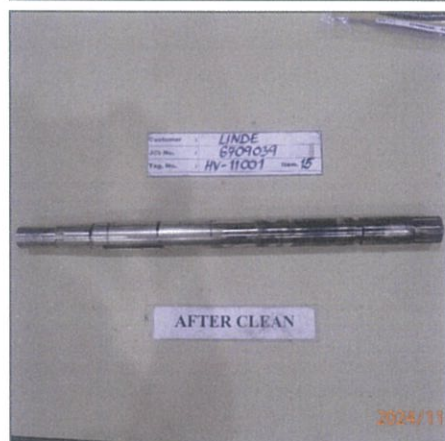
Valve body before clean



Valve body after clean



Stem before clean



Stem after clean