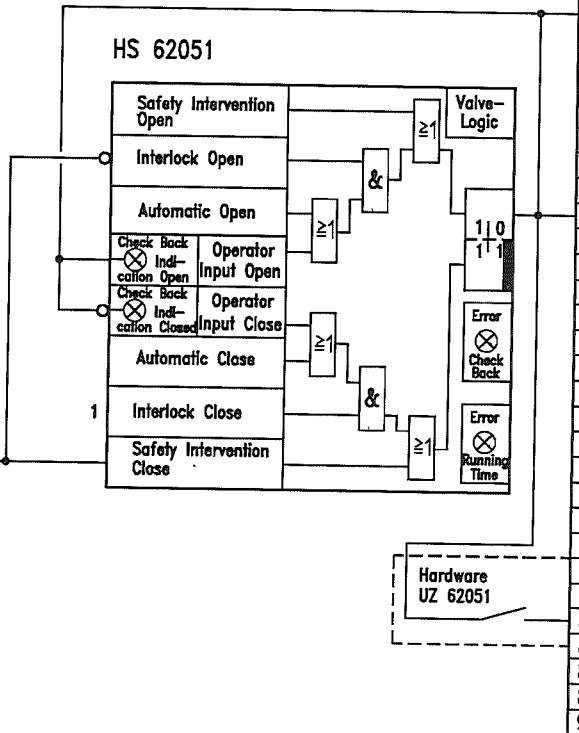
Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
				28
				29
Level LOX-tank	Value > Max2	1	LHH 62005	30
				31
Level LOX-tank	Value > Max	1	LHH 62006	32
				33
Overflow LOX-tank	Value < Min2	1	TLL 62022	34
				35
Pressure LOX-tank	Value > Max	1	PH 62005	36
				37
Pressure LOX-tank	Value > Max	1	PH 62006	38
				39
Hardware interlock	Contact ESD-relay	0	UZ 62051	40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62	0	HS 62051	to page no.	Trip LOX-product
63				US 22001
64				
65				
66				
67				
68				
69				
70	1	HS 62051		
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86	1	UV 62051	Solenoid Valve	Open inlet valve
87				HV 62051
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

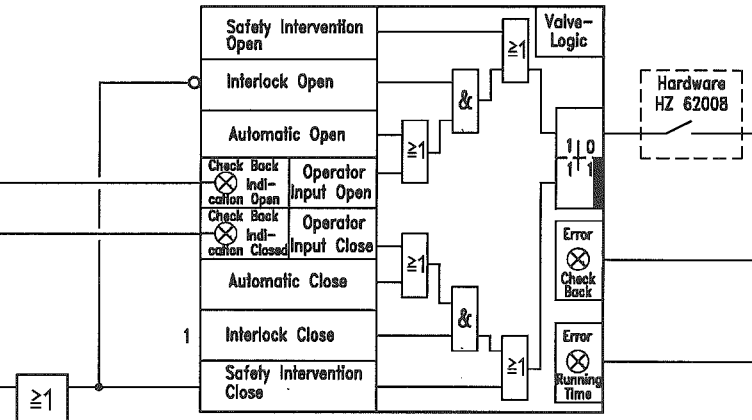
DRAWING NAME:
TANK STORAGE B62001
LOX TANK INLET VALVE
HS 62051

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
DRWG. NO.			AUTHOR Frohn
			CHECK Eichler
			STD.
PROJ. NO.	K70101		Page no. 01
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
Bottom valve opened	End position switch	1	ZH 62008	22
				23
Bottom valve closed	End position switch	1	ZL 62008	24
				25
				26
				27
				28
				29
Level LOX-tank	Value < Min2	1	LLL 62005	30
				31
				32
				33
Emergency shut down	ESD relay	0	HZ 62008	34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function

HS 62008



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70	1	HS 62008	Solenoid Valve	Open bottom valve
71				HV 62008
72				
73				
74				
75	1	HS 62008_CB	Alarm OS	"Check back error"
76				
77				
78				
79	1	HS 62008_RT	Alarm OS	"Running time error"
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				
92				
93				
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95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

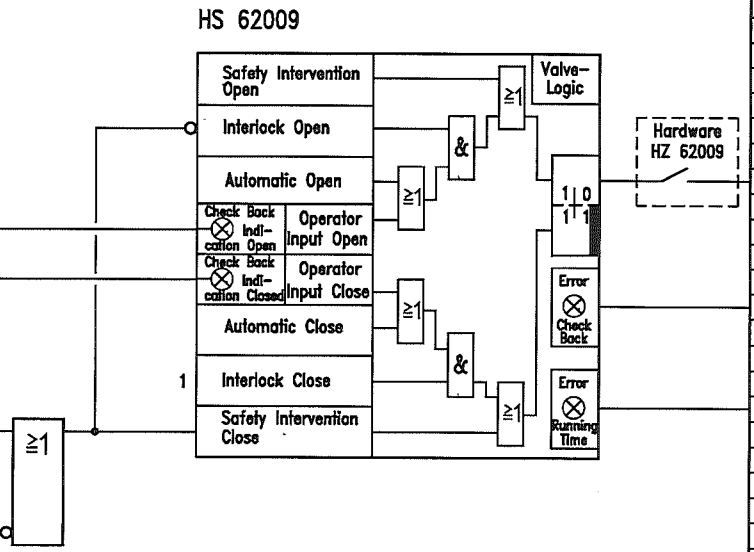
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B62001
LOX TANK BOTTOM VALVE
HS 62008

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 02
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
Bottom valve opened	End position switch	1	ZH 62009	22
				23
Bottom valve closed	End position switch	1	ZL 62009	24
				25
				26
				27
				28
				29
Level LOX-tank	Value < Min2	1	LLL 62005	30
				31
				32
				33
Emergency shut down	ESD relay	0	HZ 62009	34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70	1	HS 62009	Solenoid Valve	Open bottom valve
71				HV 62009
72				
73				
74				
75	1	HS 62009_CB	Alarm OS	"Check back error"
76				
77				
78				
79	1	HS 62009_RT	Alarm OS	"Running time error"
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B62001
LOX TANK BOTTOM VALVE
HS 62009

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 03
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
					15
					16
					17
	Pressure LOX-tank top	P-transmitter	E	PT 62006	18
	B 62001				19
					20
					21
					22
					23
					24
					25
					26
					27
					28
					29
					30
					31
					32
					33
					34
					35
					36
					37
					38
					39
					40
					41
					42
					43
					44
					45
					46
					47
					48

Function

PIC 62005.1

PI – Controller

X Input signal	Control output Y
W ext. Setpoint	PI algorithm Y
W ext. on	Control devitation
Y Start value	
Y Start value switch on	
	Manual mode
Manual on	Automatic mode
Automatic on	Slave mode

PIC 62005.2

PI – Controller

X Input signal	Control output Y
W ext. Setpoint	PI algorithm Y
W ext. on	Control devitation
Y Start value	
Y Start value switch on	
	Manual mode
Manual on	Automatic mode
Automatic on	Slave mode

Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68	E	PV 62005	Positioner 0–100%	Control valve PV62005
69			= 4–20mA	Blow out
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85	E	PV 62040	Positioner 0–100%	Control valve PV62040
86			= 4–20mA	Pressurisation
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

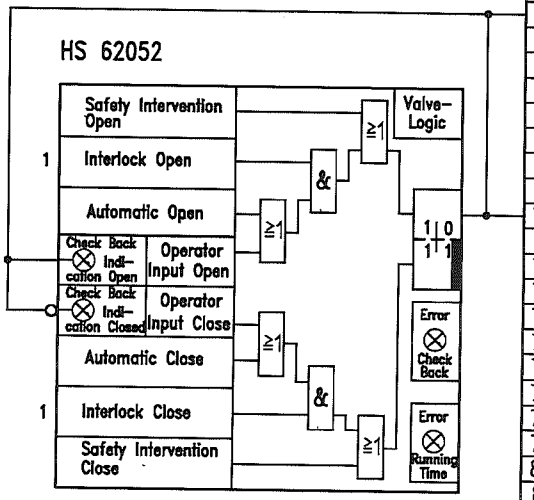
DRAWING NAME:
TANK STORAGE B62001

PRESSURE CONTROL LOX TANK
PIC 62006

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 04
REPLACES:	REPLACED BY:		OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62	1	HS 62051	to page no. 13/21	Lock HV 63034
63				
64				
65				
66				
67				
68				
69				
70	1	HS 62051	Solenoid valve	Open inlet valve
71				HV 62052
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B62001
LOCK FILLING LOX TANK
HS 62052

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

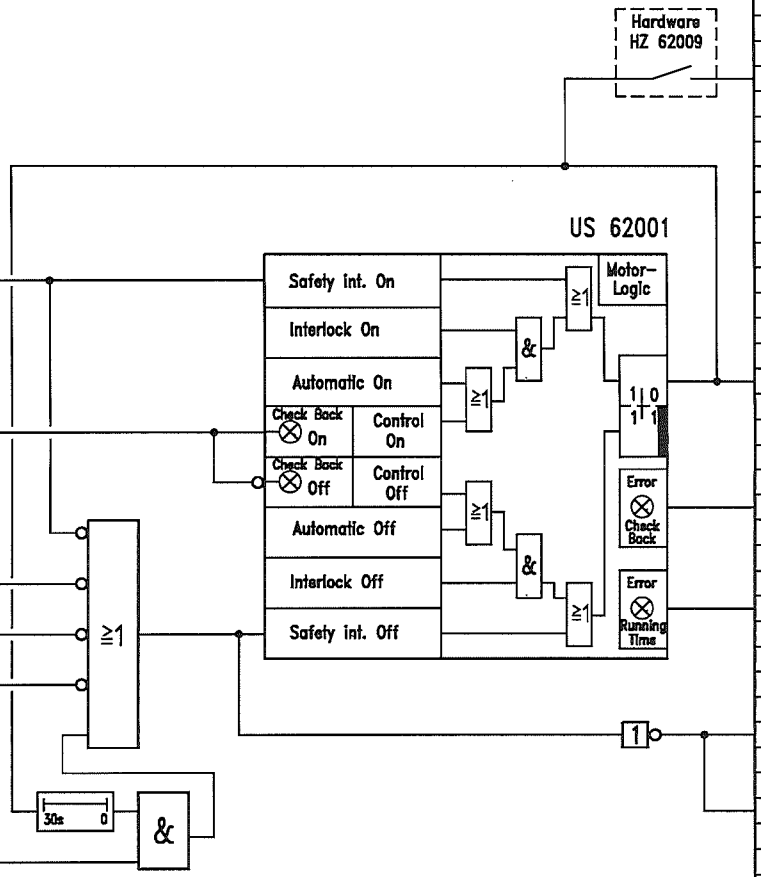
REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Page no. 05
Of 160 Pages

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
					15
	Death man's handle	from page no. 07/79	1	HS 62011_Out	16
					17
					18
					19
					20
					21
	LOX pump P62001 on	Check back signal	1	EH 62001	22
					23
					24
					25
					26
					27
	Bottom valve open	End position switch	1	ZH 62008	28
					29
	Emergency shut down	ESD relay	0	HZ 62009	30
					31
	Temperature pump	Value < Min	1	TL 62001	32
	LOX pump P62001				33
					34
					35
					36
					37
					38
	End pressure	Value < Min	1	PL 62012	39
	LOX pump P62001				40
					41
					42
					43
					44
					45
					46
					47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
55					
56					
57					
58	1	US 62001	Signal to MCC	LOX pump on	
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70	1	US 62001			
71					
72					
73					
74					
75	1	US 62001_CB	Alarm OS	"Check back error"	
76					
77					
78					
79	1	US 62001_RT	Alarm OS	"Running time error"	
80					
81					
82					
83					
84	1	UH 62003	Monitoring OS	"Ready to start"	
85					
86					
87	1	UH 62003	Local lamp	"Ready to start"	
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98					

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

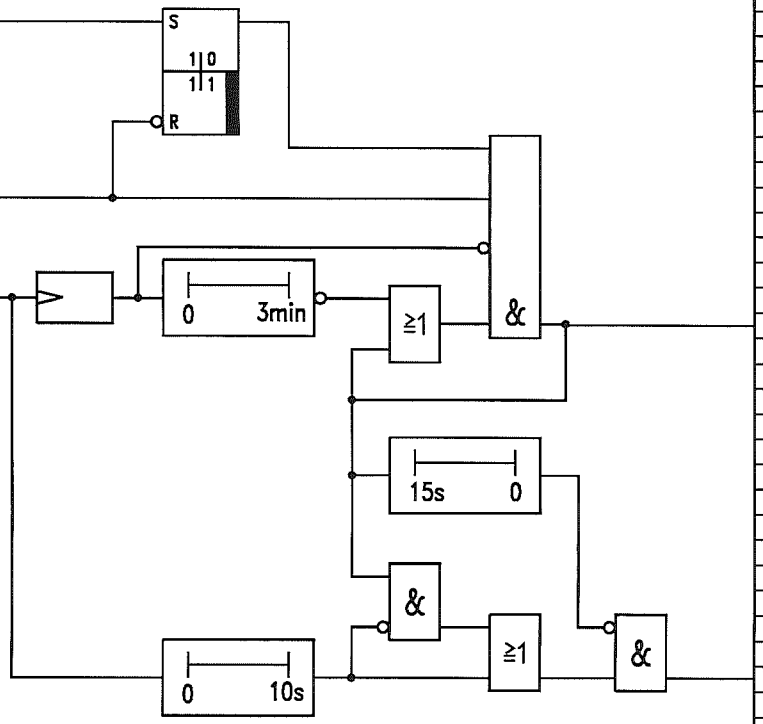
Air Liquide AGS GmbH
Füllingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B62001
LOX PUMP P62001
US 62001

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 06
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
Start filling	Local push button	1	HS 62012	3
				4
				5
				6
				7
				8
				9
Enable LOX pump	Software switch OS	1	HS 62010	10
				11
				12
				13
Death man's handle	Contact 1 - 0 - 1	1	HS 62011	14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65	1	UO 62011	Local flash lamp	"Push dead man's
66				handle!"
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79	1	HS 62011_Out	to page no. 06/16	LOX-pump on
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B62001
DEAD MAN'S HANDLE HS 62011

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

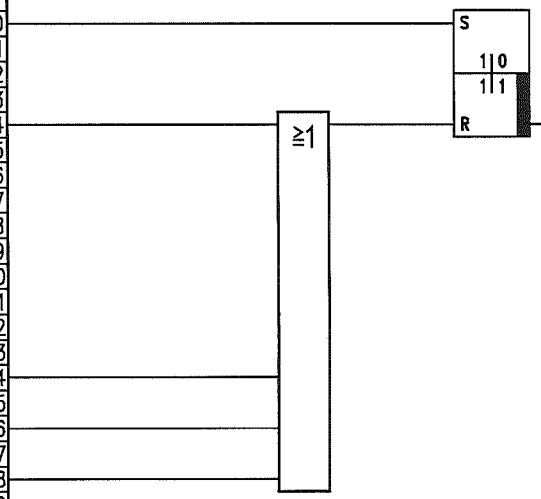
REPLACES: REPLACED BY: BASED:

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

Page no. 07
Of 160 Pages

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
	Reset trip LOX-pump	Software reset button	1	HS 63001_RES	10
	P63001				11
					12
					13
	Fail pump	from page no. 11/88	1	HS 63001_fail	14
					15
					16
					17
					18
					19
					20
					21
					22
					23
	End pressure P63001	Value > Max1	1	PH 63033	24
					25
	Pressure B32001	Value < Min	1	PL 62005	26
					27
	Bottom valve closed	End position switch	1	ZL 62009	28
					29
					30
					31
					32
					33
					34
					35
					36
					37
					38
					39
					40
					41
					42
					43
					44
					45
					46
					47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61	1	UA 63000	Alarm OS	"Trip LOX-pump P63001"	
62					
63					
64	1	US 63000	to page no. 11/40	Trip LOX-pump P63100	
65					
66	1	US 63000	to page no. 09/7	Start conditions	
67					
68					
69					
70					
71					
72					
73					
74					
75					
76	1	US 63000	to page no. 12/39	HS63016 off	
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98					

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

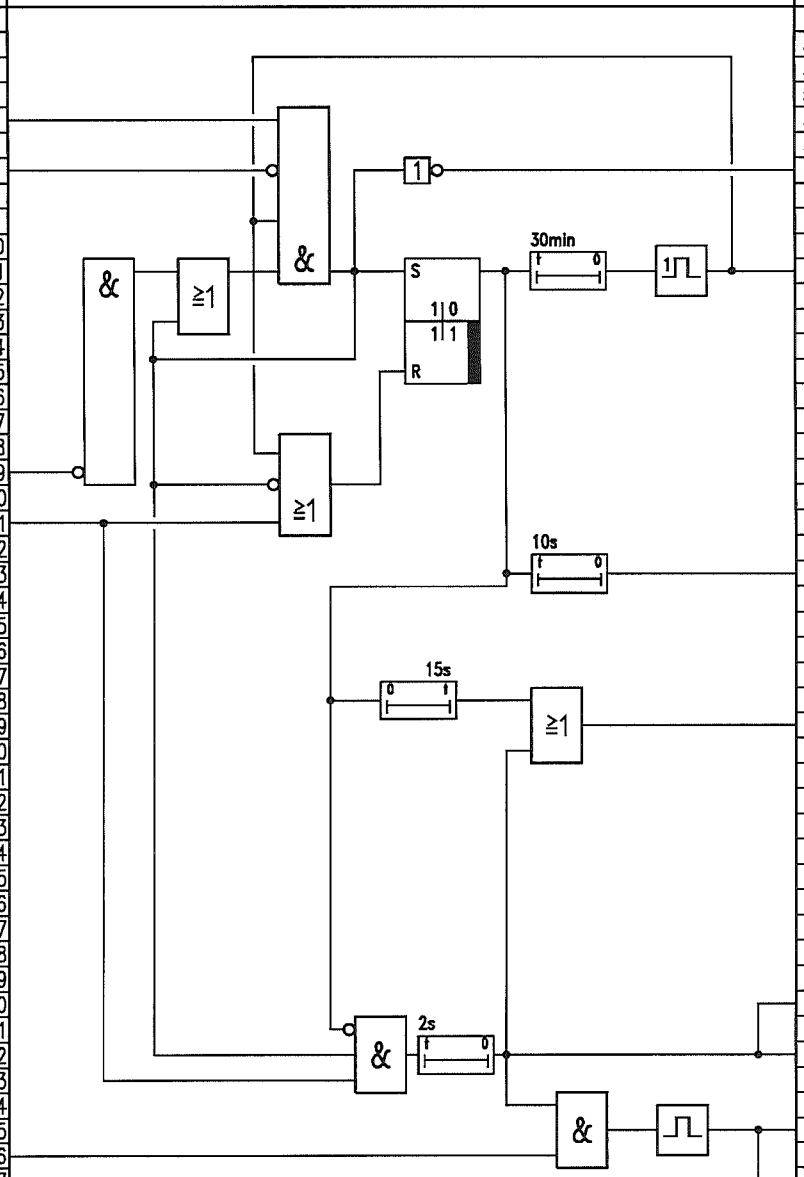
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE P63001
LOX CONVERTER CYCLE PUMP
TRIP US 63000

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.		K70101	Page no. 08
			Of 150 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
Start cool down pump	Software switch	1	HS 63001	5
				6
Trip LOX-pump	from page no. 8/66	1	US 63000	7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
HV 63016 closed	from page no.12/69	0	US 63016	19
				20
Cool down pump	Value < Min	1	TL 63001	21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
Start pump	Software push button	1	HS 63001_S	46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57	1	UL 63001	to page no. 11/36	LOX-pump off from seq.
58				
59				
60				
61	1	TAH 63001	Alarm OS	"Cool down seq. fault"
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73	1	PIC 63033	to page no. 10/14	Start valve PV63033
74				
75				
76				
77				
78				
79	1	UH 63016	to page no. 12/27	Open HV 63016
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90	1	UOH 63003	Monitoring OS	"LOX-Pump ready to
91				start"
92	1	UH 63003	to page no. 11/28	Ready to start
93				
94				
95	1	UH 63001	to page no. 11/30	LOX-pump on from
96				sequence
97	1	UH 63001	to page no. 10/16	PIC63033 on "Auto"
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
LOX STORAGE P63001
LOX CONVERTER CYCLE PUMP
START SEQUENCE US63001

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 09
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
End pressure P63001	P-Transmitter	E	P 63033	8
				9
				10
				11
				12
				13
Start sequence	from page no. 09/73	1	US 63001	14
				15
Start LOX pump	from page no. 09/97	1	UH 63001	16
				17
				18
				19
				20
				21
				22
				23
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				27
				28
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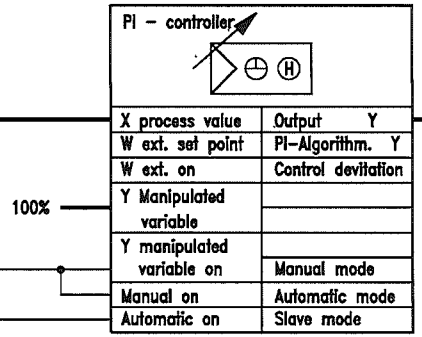
				45
				46
				47
				48

Function

PIC 63033



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58	E	PV 63033	Positioner 0–100%	PV 63033
59			= 4...20mA	
60				
61				
62				
63				
64				
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66				
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68				
69				
70				
71				
72				
73				
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
LOX STORAGE P63001
LOX CONVERTER CYCLE PUMP
PRESSURE CONTROL PIC 63033

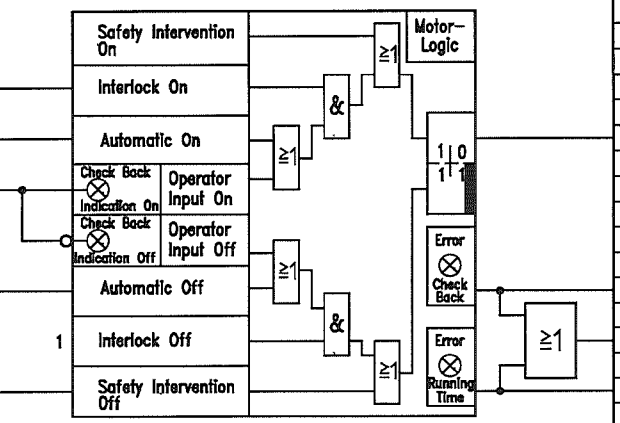
SIZE	A3	FUNKTION DIAGRAM	
DRWG. NO.			
PROJ. NO.	K70101		
REPLACES:		REPLACED BY:	

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	
Page no.	10
Of	160 Pages
BASED:	

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
Ready to start	from page no. 09/92	1	US 63003	28
				29
Pump on from seq.	from page no. 09/95	1	UH 63001	30
				31
LOX-pump on	Check back signal	1	EH 63001	32
				33
				34
				35
Pump off from seq.	From page no. 09/57	1	UL 63001	36
				37
				38
				39
Trip LOX-Pump	from page no. 08/64	1	US 63000	40
				41
				42
				43
				44
				45
				46
				47
				48

Function

HS 63001



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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74				
75				
76				
77				
78				
79				
80	1	HS 63001	Signal to MCC	LOX-pump P63001 on
81				
82				
83				
84				
85				
86	1	HS 63001_CB	Alarm OS	"Check back error"
87				
88	1	HS 63001_fail	to page no. 08/14	LOX-pump fail
89				
90	1	HS 63001_RT	Alarm OS	"Running time error"
91				
92				
93				
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95				
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97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
LOX STORAGE P63001
LOX CONVERTER CYCLE PUMP
HS 63001

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			Page no. 11
PROJ. NO.	K70101		Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
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				9
				10
				11
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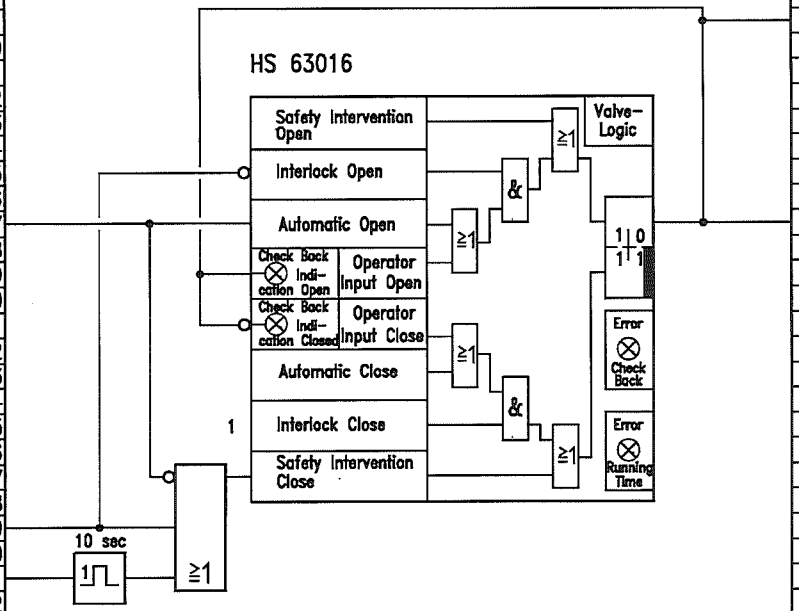
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
Open from sequence	from page no.09/79	1	UH 63016	27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
Trip LOX-pump	from page no. 08/76	1	US 63000	39
				40
LOX-pump off	Check back signal	0	EH 63001	41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
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56				
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59				
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61				
62				
63				
64				
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66				
67				
68				
69	0	US 63016	to page no. 09/19	Start conditions
70				
71				
72				
73				
74				
75				
76				
77	1	US 63016	Solenoid valve	Open valve HV63016
78				LOX from B63001
79				
80				
81				
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88				
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98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
LOX CONVERTER CYCLE PUMP
LOX FROM B63001
HS 63016

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Page no. 12
OF 160 Pages

BASED:

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
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					15
					16
					17
					18
					19
					20
	LOX to B62001	from page no. 05/62	1	HS 62052	21
	open				22
					23
					24
					25
					26
					27
					28
					29
					30
					31
					32
					33
					34
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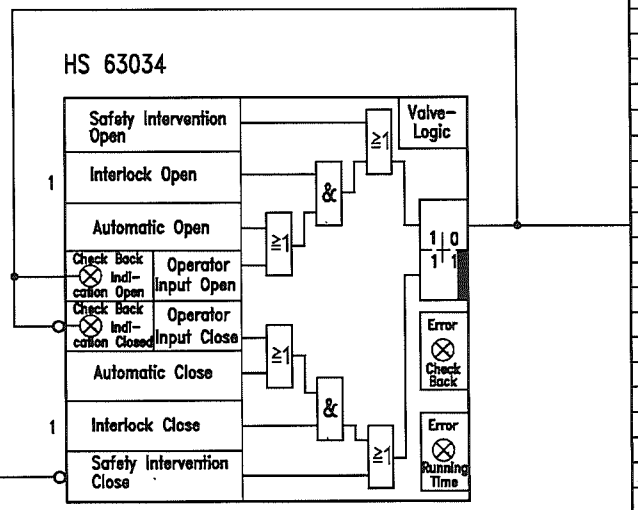
					45
					46
					47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61	1	HS 63034	Solenoid valve	Open valve HV63034	
62					
63					
64					
65					
66					
67					
68					
69					
70					
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72					
73					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füfingsweg 34
47805 Krefeld

DRAWING NAME:
LOX CONVERTER CYCLE PUMP
LOX ASSIST
HS 63034

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.		K70101	Page no. 13
			Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

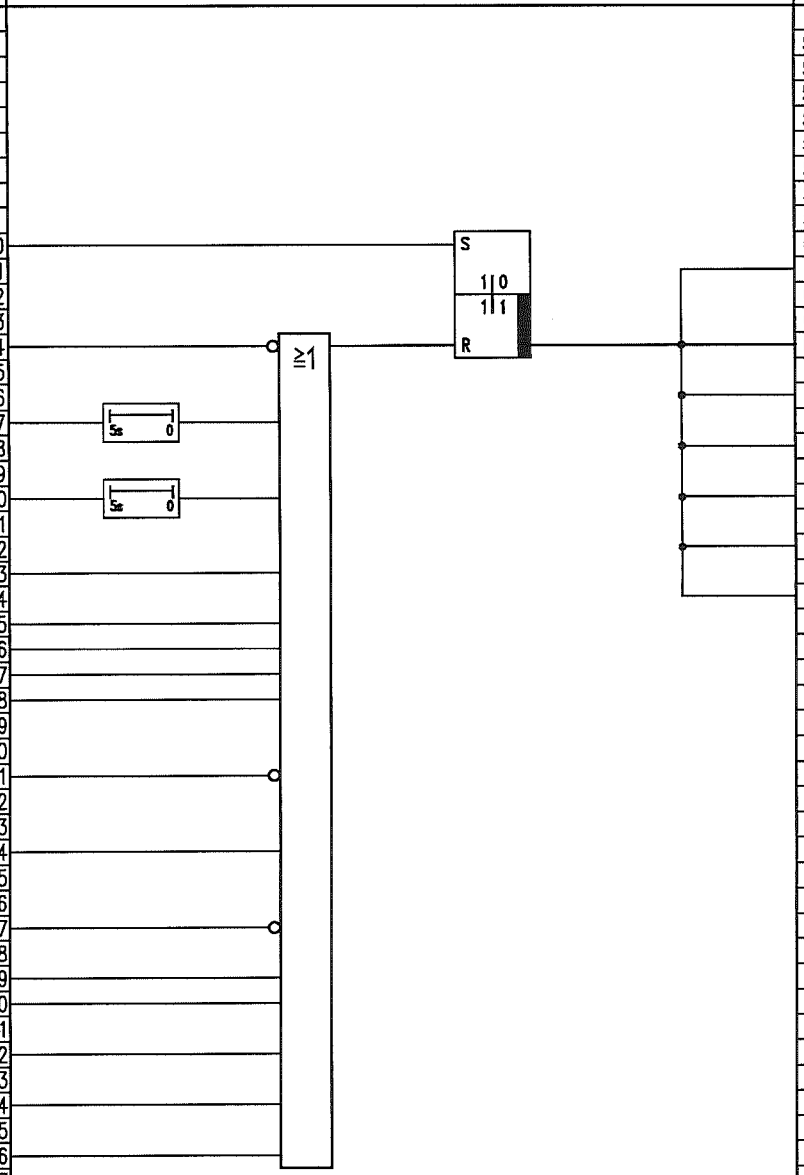
REPLACES: REPLACED BY:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

BASED:

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
	Reset trip LOX-pump	Software reset button	1	HS 64101_Res	10
	P64101				11
					12
					13
	Emergency shut down	Contact ESD-relay	0	UZ 64001	14
					15
					16
	GOX temp. trip	Value < Min2	1	TLL 64050	17
					18
					19
	GOX temp. trip	Value < Min2	1	TLL 64051	20
					21
					22
	Fail LOX pump	from page no. 31/88	1	HS 64101_fail	23
					24
	Bearing temp.	Value < Min2	1	TLL 64140	25
	Motor bearing	Value < Min2	1	TLL 64141	26
	Bearing temp.	Value > Max2	1	THH 64140	27
	Motor bearing	Value > Max2	1	THH 64141	28
					29
					30
	Emergency shut down	Contact ESD-relay	0	HZ 64008	31
					32
					33
	Press. outlet pump	Value > Max2	1	PHH 64150	34
					35
					36
	Level vaporizer	Level switch < Min	0	LL 64030	37
					38
	Water bath vaporizer	Value < Min	1	TL 64031	39
	Water bath vaporizer	Value < Min	1	TL 64032	40
					41
	GOX beh. vaporizer	Value > Max2	1	PHH 64050	42
					43
	Level LP-tank	Value < Min2	1	LLL 62005	44
	B62001				45
	Pressure LP-tank	Value < Min1	1	PL 62005	46
	B62001				47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61	1	UA 64101	Alarm OS	"Trip LOX-pump P64101"	
62					
63					
64	1	US 64101	to page no. 16/16	Trip P64101	
65					
66	1	US 64101	to page no. 27/17		
67					
68	1	US 64101	to page no. 28/39		
69					
70	1	US 64101	to page no. 31/40		
71					
72	1	US 64101	to page no 34/27		
73					
74	1	US 64101	to page no. 35/17		
75					
76					
77					
78					
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98					

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE, LOX PUMP P64101
TRIP US 64101

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 15
			Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
Sequence on/off	Software button OS	1	HS 64101	14
				15
Trip P64101	from page no. 15/64	1	US 64101	16
				17
Bottom valve open	End position switch	1	ZH 62008	18
				19
				20
				21
Steam pressure	Value < Min	1	PL 64080	22
				23
Bearing temp.	Value < Min1	1	TL 64140	24
				25
Motor bearing	Value < Min1	1	TL 64141	26
				27
Bearing temp.	Value > Max1	1	TH 64140	28
				29
Motor bearing	Value > Max1	1	TH 64141	30
				31
				32
				33
				34
				35
				36
				37
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				40
				41
				42
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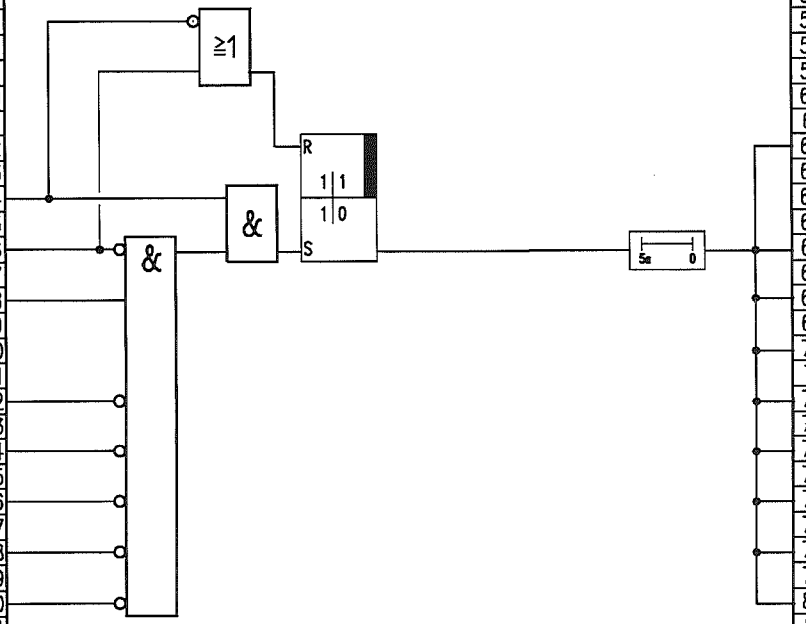
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
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54				
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56				
57				
58				
59				
60				
61				
62	1	P64101_Start_ok	Monitoring OS	Enabling after start
63				
64				
65				
66	1	P64101_Start_ok	to page no. 19/6	
67				
68	1	P64101_Start_ok	to page no. 20/14	
69				
70	1	P64101_Start_ok	to page no. 21/14	
71				
72	1	P64101_Start_ok	to page no. 22/8	
73				
74	1	P64101_Start_ok	to page no. 23/14	
75				
76	1	P64101_Start_ok	to page no. 24/14	
77				
78	1	P64101_Start_ok	to page no. 25/14	
79				
80	1	P64101_Start_ok	to page no. 31/28	
81				
82				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
SEQUENCE START / STOP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR frohn
			CHECK Eichler
			STD.
DRWG. NO.			Page no. 16
PROJ. NO.	K70101		Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
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				7
				8
				9
				10
				11
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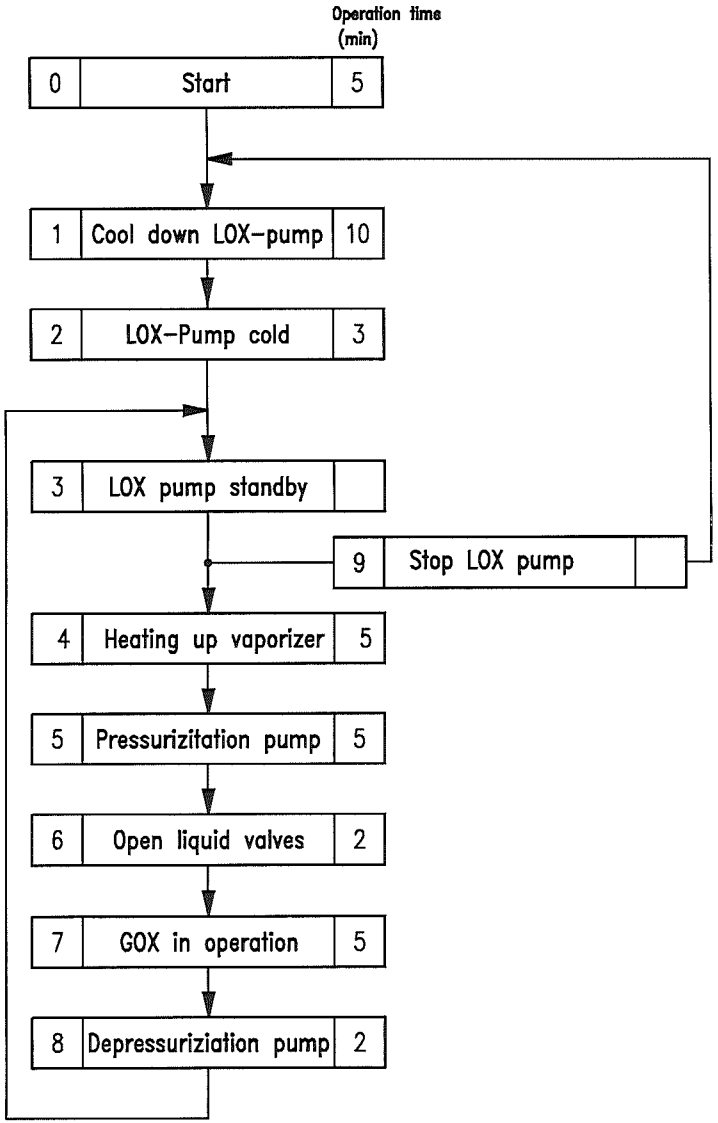
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
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62				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fötingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
ALL STEPS OF THE LOX PUMP SEQUENCE CONTROL

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 17
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
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				8
				9
				10
				11
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				41
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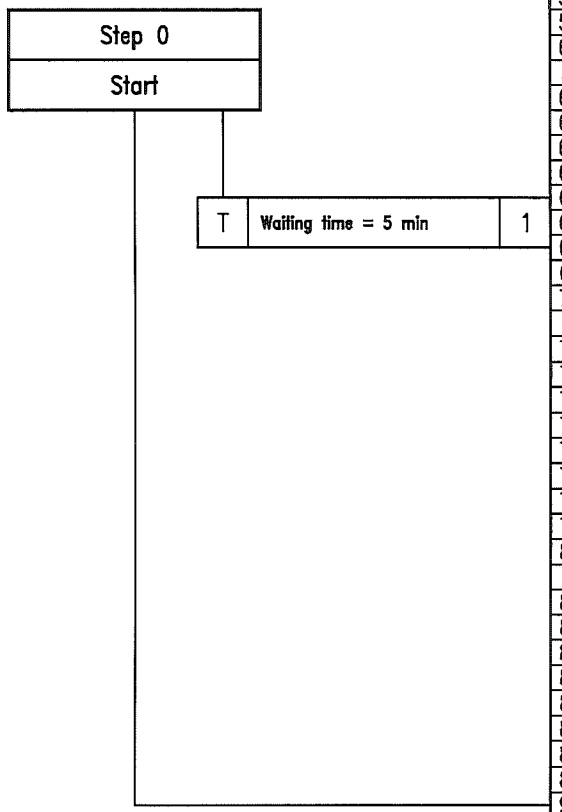
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67	1	WaitingtimeO	to page no. 19/4	Time over initial
68				position
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90	1	StepO	to page no. 19/2	Initial position
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fötingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
NEW START OF THE SEQUENCE, ALL VALVES AT START POSITION

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Initial position	from page no.18/90	1	Step0	2
				3
Time over	from page no.18/67	1	Waitingtime0	4
				5
Enabling after start	from page no.16/66	1	P64101_Start_ok	6
				7
LOX pump off	Check back signal	0	EH 64101	8
				9
Liquid valve closed	from page no. 34/63	0	HS 64150	10
				11
Start cool down pump	Software button OS	1	HS 64101_CD	12
				13
				14
				15
				16
				17
				18
Stop LOX pump	from page no. 27/97	1	Step09	19
				20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
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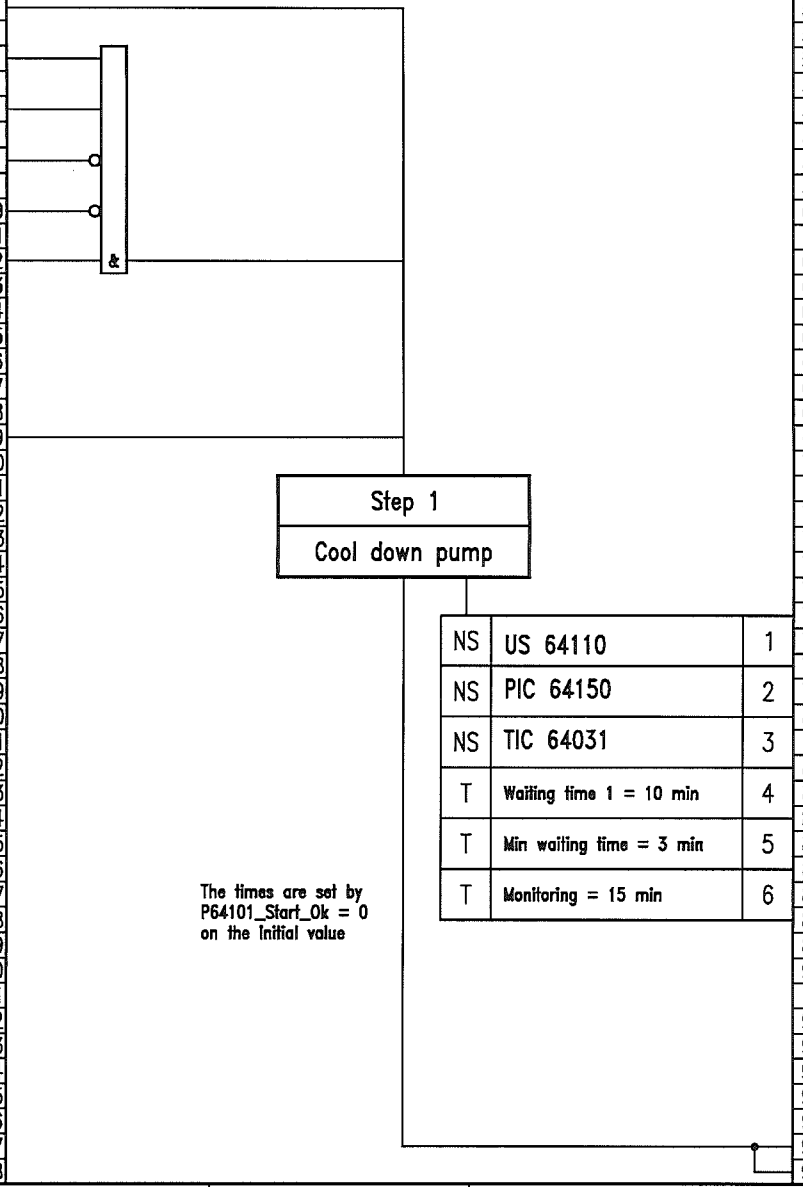
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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75				
76				
77	1	Step1_US64110	to page no. 28/7	Open valve HV64110
78				
79	1	Step1_H64170_R10	to page no. 29/2	Open HV64170 from
80				10% over ramp
81	1	Step1_T64031_W1	to page no. 33/28	Set point W = 30°C
82				
83	1	Waitingtime01	to page no. 20/4	Time over
84				
85	1	Minwaitingtime01	to page no. 20/8	Time over
86				
87	1	KC64101_T001	Alarm OS	"Check time over"
88				
89				
90				
91				
92				
93				
94				
95				
96				
97	1	Step1	to page no. 20/2; 30/12	Cool down pump
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
COOL DOWN PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 19
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Cool down pump	from page no. 19/97	1	Step01	2
				3
Time over	from page no. 19/83	1	Waitingtime01	4
				5
Next step	Software push button	1	HS 64101_1	6
				7
Time over	from page no. 19/85	1	Minwaitingtime01	8
				9
Cool down temp.	Value < Min	1	TL 64130	10
				11
Stop sequence	Software button OS	1	HS 64101_2	12
				13
Enabling after start	from page no.16/68	1	P64101_Start_ok	14
				15
				16
				17
HCV 64110 open	from page no. 28/75	1	HS 64110	18
				19
HCV 64170 open	Y > 50%	1	H 64170_50	20
				21
Liquid valve closed	from page no. 34/61	0	HS 64150	22
				23
				24
				25
				26
				27
				28
				29
				30
				31
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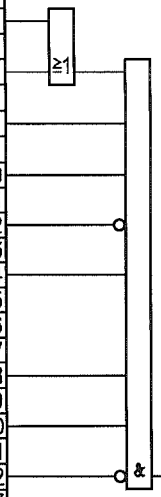
				48

Function



Step 2

HP pump ist cold

NS	US 64110	1
NS	PIC 64150	2
	Spare	3
NS	HS 64101	4
NS	TIC 64031	5
T	Waiting time = 10 min	6
T	Min waiting time = 3 min	7
T	Monitoring = 15 min	8

The times are set by P64101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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76				
77				
78				
79				
80	1	Step2_HS64110	to page no. 28/9	Open valve HV64110
81				
82	1	Step2_H64170_RC50	to page no. 29/12	Close valve HV64170
83				down to 50% over ramp
84				
85				
86	1	Step2_H64101	to page no. 31/12	Pump P64101 on
87				
88	1	Step2_T64031_W1	to page no. 33/30	Set point W = 30°C
89				
90	1	Waitingtime02	to page no. 21/4	time over
91				
92	1	Minwaitingtime02	to page no. 21/8	time over
93				
94	1	KC64101_T002	Alarm OS	"Check time error"
95				
96				
97	1	Step02	to page no. 21/2;	HP LOX pump is cold
98	1		30/14	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
PUMP COLD

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Function

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pump is cold	from page no. 20/97	1	Step02	2
				3
Time over	from page no. 20/90	1	Waitingtime02	4
				5
Next step	Software push button	1	HS 64101_1	6
				7
Time over	from page no. 20/92	1	Minwaitingtime02	8
				9
Cool down temp.	Value < Min	1	TL 64130	10
				11
Stop sequence	Software button OS	1	HS 64101_2	12
				13
Enabling after start	from page no. 17/70	1	P64101_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64101	16
				17
HV 64110 open	from page no. 28/73	1	HS 64110	18
				19
HV 64170 open	Y > 40%	1	H 64170_40	20
				21
Liquid valve closed	from page no. 34/59	0	HS 64150	22
				23
				24
				25
				26
				27
				28
				29
time over	from page no. 26/90	1	Waitingtime08	30
				31
Next step	Software push button	1	HS 64101_1	32
				33
time over	from page no. 26/92	1	Minwaitingtime08	34
				35
Pressure LOX pump	Value > Max1	1	PH 64150	36
				37
Breaking off	from page no. 26/97	1	Step08	38
emergency supply				39
				40
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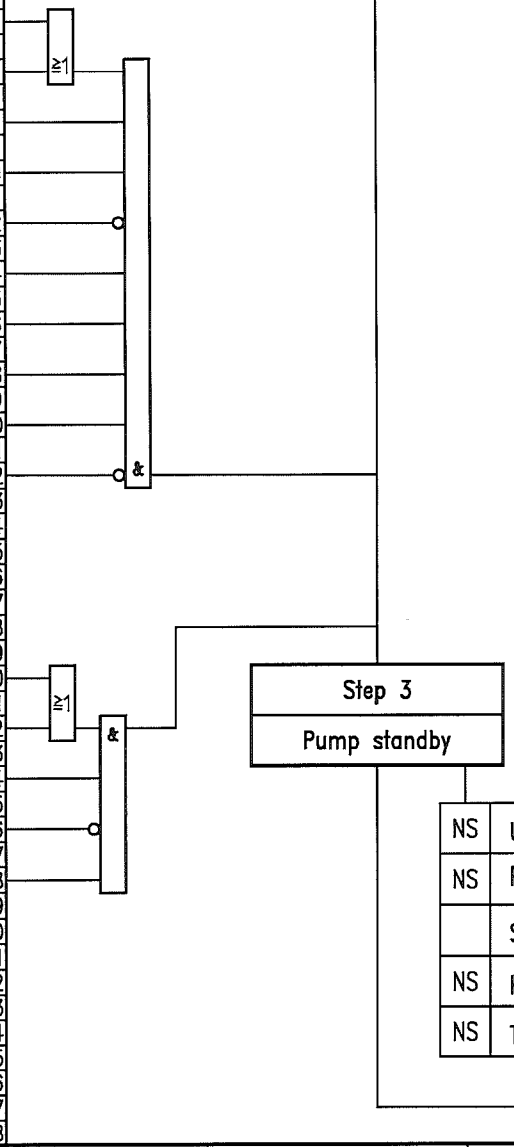

Path	Type	Signal/TAG-No.	Destination	Comment
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79				
80				
81				
82				
83				
84				
85				
86	1	Step3_HS64110	to page no. 28/11	Open valve HV64110
87				
88	1	Step3_H64170_STP	to page no. 29/22	Valve HV64170 stop
89				
90				
91				
92	1	Step3_H64101	to page no. 31/14	Pump P64101 on
93				
94	1	Step3_T64031_W1	to page no. 33/32	Set point W = 30°C
95				
96				
97	1	Step03	to page no. 22/2	HP LOX pump standby
98	1		to page no. 27/2;	30/16

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
PUMP STANDBY

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 21
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
HP LOX pump standby	from page no. 21/97	1	Step03	2
				3
Cool down temp.	Value < Min	1	TL 64130	4
				5
Stop sequence	Software button OS	1	HS 64101_2	6
				7
Enabling after start	from page no. 17/72	1	P64101_Start_ok	8
				9
HP LOX pump on	Check back signal	1	EH 64101	10
				11
HV 64110 open	from page no. 28/71	1	HS 64110	12
				13
HV 64170 open	Y > 40%	1	H 64170_40	14
				15
Liquid valve closed	from page no. 34/57	0	HS 64150	16
				17
Start emergency supply	Software push button	1	HS 64101_1	18
				19
				20
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				25
				26
				27
				28
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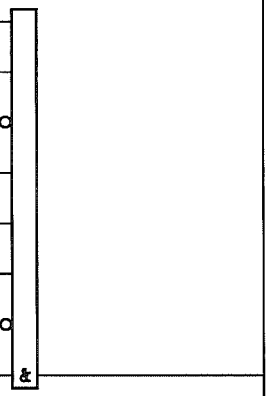
Function



Step 4

Heating up vaporizer

NS	US 64110	1
NS	PIC 64150	2
	Spare	3
NS	HS 64101	4
NS	TIC 64031	5
T	Waiting time = 5 min	6
T	Min waiting time = 1 min	7
T	Monitoring = 8 min	8

The times are set by P64101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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78				
79				
80	1	Step4_HS64110	to page no. 28/13	Open valve HV64110
81				
82	1	Step4_H64170_STP	to page no. 29/23	Valve HV64170 stop
83				
84	1			
85				
86	1	Step4_H64101	to page no. 31/16	Pump P64101 on
87				
88	1	Step4_T64031_W2	to page no. 33/2	Set point W = 60°C
89				
90	1	Waitingtime04	to page no. 23/4	time over
91				
92	1	Minwaitingtime04	to page no. 23/8	time over
93				
94	1	KC64101_T004	Alarm OS	"Check time error"
95				
96				
97	1	Step04	to page no. 23/2;	Heating up vaporizer
98	1		30/18	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
START EMERGENCY SUPPLY
HEATING UP VAPORIZER

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 22
REPLACES:	REPLACED BY:		OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Heating up vaporizer	from page no. 22/97	1	Step04	2
				3
Time over	from page no. 22/90	1	Waitingtime04	4
				5
Next step	Software push button	1	HS 64101_1	6
				7
Time over	from page no. 22/92	1	Minwaitingtime04	8
				9
Liquid valve closed	from page no. 34/55	0	HS 64150	10
				11
Stop sequence	Software button OS	1	HS 64101_2	12
				13
Enabling after start	from page no. 16/74	1	P64101_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64101	16
				17
HV 64110 open	from page no. 28/69	1	HS 64110	18
				19
Temp. vaporizer	Value > Max1	1	TH 64032	20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
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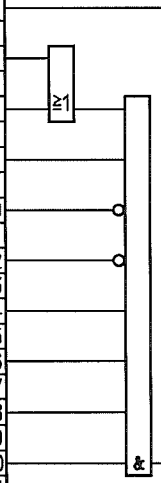
Function



Step 5

Pressuriziation pump

NS	US 64110	1
NS	PIC 64150	2
	Spare	3
NS	HS 64101	4
NS	TIC 64031	5
T	Waiting time = 5 min	6
T	Min waiting time = 4 min	7
T	Monitoring = 6 min	8

The times are set by P64101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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78				
79				
80	1	Step5_HS64110	to page no. 28/15	Open valve HV64110
81				
82	1	Step5_H64170_RC	to page no. 29/25	Close valve HV64170
83				over ramp
84				
85				
86	1	Step5_H64101	to page no. 31/18	Pump P64101 on
87				
88	1	Step5_T64031_W2	to page no. 33/4	Set point W = 60°C
89				
90	1	Waitingtime05	to page no. 24/4	time over
91				
92	1	Minwaitingtime05	to page no. 24/8	time over
93				
94	1	KC64101_T005	Alarm OS	"Check time error"
95				
96				
97	1	Step05	to page no. 24/2;	Pressuriziation pump
98	1		30/20	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
PRESSURIZIATION PUMP

SIZE	A3	FUNKTION DIAGRAM	
DRWG. NO.			
PROJ. NO.	K70101		
REPLACES:		REPLACED BY:	

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	
Page no.	23
Of	160 Pages
BASED:	

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pressurization pump	from page no. 23/97	1	Step05	2
				3
Time over	from page no. 23/90	1	Waitingtime05	4
				5
Next step	Software push button	1	HS 64101_1	6
				7
Time over	from page no. 23/92	1	Minwaitingtime05	8
				9
Liquid valve closed	from page no. 34/53	0	HS 64150	10
				11
Stop sequence	Software button OS	1	HS 64101_2	12
				13
Enabling after start	from page no. 16/76	1	P64101_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64101	16
				17
HV 64110 open	from page no. 28/67	1	HS 64110	18
				19
Pressure HP pump	Value > Max1	1	PH 64150	20
				21
				22
				23
				24
				25
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				27
				28
				29
				30
				31
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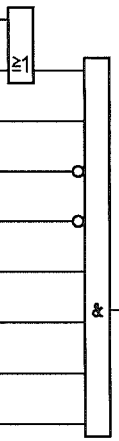
Function



Step 6

Open liquid valves

NS	US 64110	1
NS	PIC 64150	2
	Spare	3
NS	HS 64101	4
NS	TIC 64031	5
NS	HS 64150	6
	Spare	7
NS	PIC 64050	8
T	Waiting time = 2 min	9
T	Min waiting time = 1 min	10
T	Monitoring = 3 min	11

The times are set by P64101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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72				
73				
74	1	Step6_HS64110	to page no. 28/17	Open valve HV64110
75				
76	1	Step6_H64170_RC	to page no. 29/26	Close valve HV64170
77				over ramp
78				
79				
80	1	Step6_H64101	to page no. 31/20	Pump P64101 on
81				
82	1	Step6_T64031_W2	to page no. 33/6	Set point W = 60°C
83				
84	1	Step6_HS64150	to page no. 34/9	Open valve HV64150
85				
86				
87				
88	1	Step6_PC64050	to page no. 35/20	Enable pressure controller
89				W = 40 bar
90	1	Waitingtime06	to page no. 25/4	time over
91				
92	1	Minwaitingtime06	to page no. 25/8	time over
93				
94	1	KC64101_T006	Alarm OS	"Check time error"
95				
96				
97	1	Step06	to page no. 25/2;	Open liquid valves
98	1		30/22	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
OPEN LIQUID VALVES

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Elchler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Open liquid valves	from page no. 24/97	1	Step06	2
				3
Time over	from page no. 24/90	1	Waitingtime06	4
				5
Next step	Software push button	1	HS 64101_1	6
				7
Time over	from page no. 24/92	1	Minwaitingtime06	8
				9
Liquid valve open	from page no. 34/65	1	HS 64150	10
				11
Stop sequence	Software button OS	1	HS 64101_2	12
				13
Enabling after start	from page no. 16/78	1	P64101_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64101	16
				17
HV 64110 open	from page no. 28/65	1	HS 64110	18
				19
HV 64170 closed	Y < 1%	1	HC 64170_0	20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
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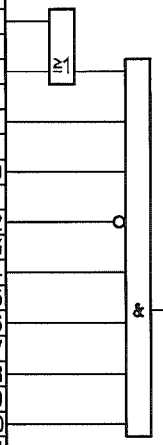
Function



Step 7

GOX in operation

NS	US 64110	1
NS	PIC 64150	2
	Spare	3
NS	HS 64101	4
NS	TIC 64031	5
NS	HS 64150	6
NS	Spare	7
NS	PIC 64050	8
T	Waiting time = 5 min	9

The times are set by P64101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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72				
73				
74	1	Step7_HS64110	to page no. 28/19	Open valve HV64110
75				
76	1	Step7_H64170_RC	to page no. 29/36	Close valve HV64170
77				over ramp
78				
79				
80	1	Step7_H64101	to page no. 31/22	Pump P64101 on
81				
82	1	Step7_T64031_W2	to page no. 33/8	Set point W = 60°C
83				
84	1	Step7_HS64150	to page no. 34/11	Open valve HV64150
85				
86				
87				
88	1	Step7_PC64050	to page no. 35/22	Enable pressure controller
89				W = 40 bar
90	1	Waitingtime07	to page no. 26/20	Time over
91				
92				
93				
94				
95				
96				
97	1	Step07	to page no. 26/2;	GOX in operation
98	1		30/26	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
BACK UP GOX SUPPLY IN OPERATION

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 25
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Function

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
GOX in operation	from page no. 25/97	1	Step07	2
				3
				4
				5
				6
				7
				8
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				12
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				14
				15
				16
				17
				18
				19
Time over	from page no. 25/90	1	Waitingtime07	20
				21
Stop emergency	Software push button	1	HS 64101_1	22
supply				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
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&

Step 8

Depressuriziation pump

NS	US 64110	1
NS	PIC 64150	2
NS	Spare	3
NS	HS 64101	4
NS	TIC 64031	5
T	Waiting time = 2 min	6
T	Min waiting time = 1 min	7
T	Monitoring = 3 min	8

The times are set by P64101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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79				
80	1	Step8_HS64110	to page no. 28/21	Open valve HV64110
81				
82	1	Step8_H64170_R50	to page no. 29/38	Open valve HV64170
83				to 50% over ramp
84				
85				
86	1	Step8_H64101	to page no. 31/24	Pump P64101 on
87				
88	1	Step8_T64031_W1	to page no. 33/34	Set point W = 30°C
89				
90	1	Waitingtime08	to page no. 21/30	time over
91				
92	1	Minwaitingtime08	to page no. 21/34	time over
93				
94	1	KC64101_T008	Alarm OS	"Check time error"
95				
96				
97	1	Step08	to page no. 21/38	Depressuriziation pump
98			30/24	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
STOP EMERGENCY SUPPLY
DEPRESSURIZIATION PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.		K70101	Page no. 26
REPLACES:		REPLACED BY:	OF 160 Pages
			BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
	LOX pump standby	from page no. 21/98	1	Step03	2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
	Stop LOX pump	Software push button	1	HL 64101	15
					16
	Trip P64101	from page no. 15/66	1	US 64101	17
					18
					19
					20
					21
					22
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Function

≥1

Step 9

Stop LOX pump

	Path	Type	Signal/TAG-No.	Destination	Comment
	51				
	52				
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	92				
	93				
	94				
	95				
	96				
	97	1	Step09	to page no 19/19	Stop LOX pump
	98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

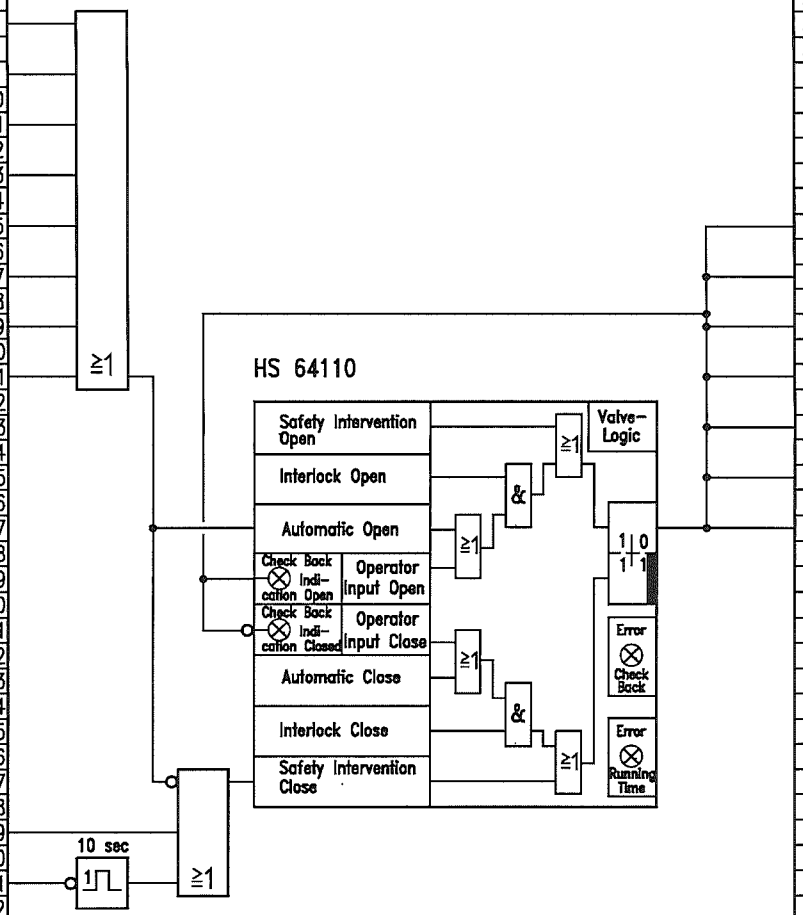
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
STOP PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 27
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
Cool down LOX-pump	from page no. 19/77	1	Step1_US64110	7
				8
LOX-pump cold	from page no. 20/80	1	Step2_US64110	9
				10
LOX-pump standby	from page no. 21/86	1	Step3_US64110	11
				12
Heating up vaporizer	from page no. 22/80	1	Step4_US64110	13
				14
Pressuriziation pump	from page no. 23/80	1	Step5_US64110	15
				16
Open liquid valves	from page no. 24/74	1	Step6_US64110	17
				18
GOX in operation	from page no. 25/74	1	Step7_US64110	19
				20
Depressuriziation	from page no. 26/80	1	Step8_US64110	21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
Trip LOX-pump	from page no. 15/68	1	US 64101	39
				40
LOX-pump off	Check back signal	0	EH 64101	41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
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61				
62				
63				
64				
65	1	US 64110	to page no. 25/18	
66				
67	1	US 64110	to page no. 24/18	
68				
69	1	US 64110	to page no. 23/18	
70				
71	1	US 64110	to page no. 22/14	
72				
73	1	US 64110	to page no. 21/18	
74				
75	0	US 64110	to page no. 20/18	
76				
77	1	UV 64110	Solenoid valve	Open valve HV64110
78				LOX from B62001
79				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

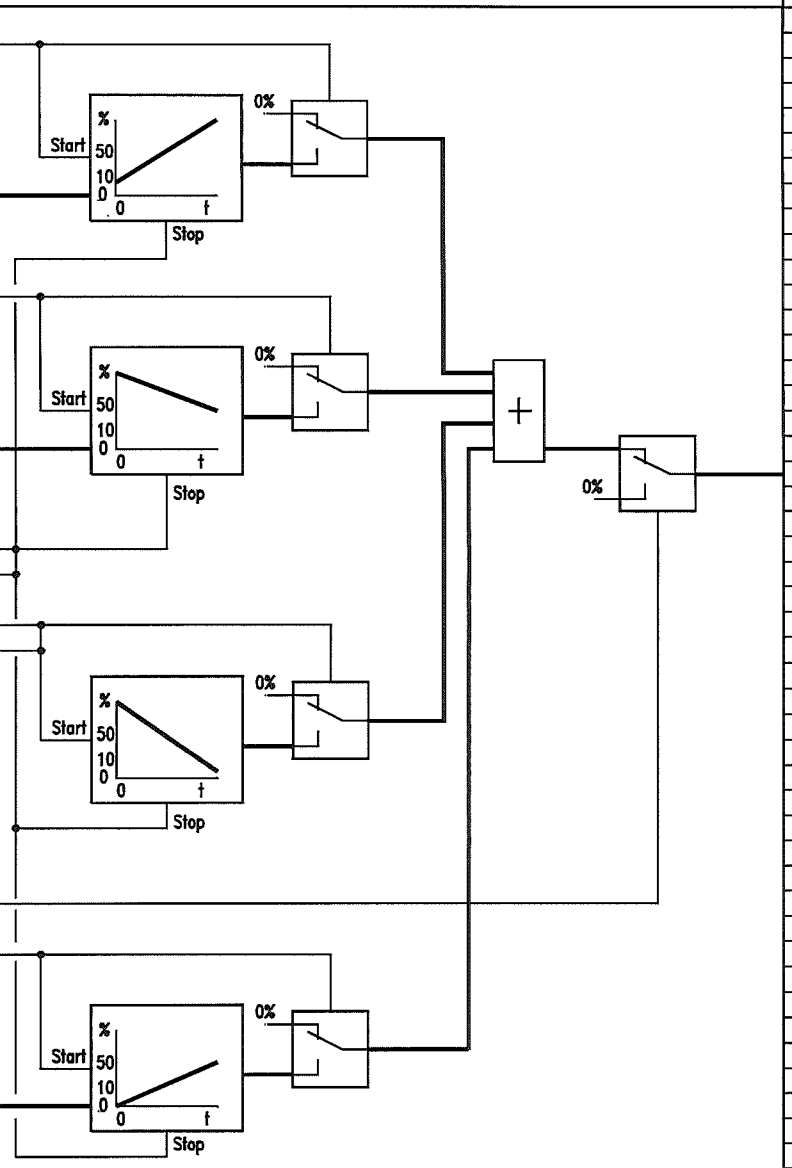
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
LOX FROM LP-TANK B62001
HS 64110

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 28
REPLACES:	REPLACED BY:		OF 160 Pages
			BASED:

Rang.	Text	Herkunft	Typ	Signalbezeichnung	Pfad
					1
	Cool down valve	from page no. 19/79	1	Step1_H64170_R10	2
	ramp upwards				3
					4
					5
					6
					7
	Start value	Control value 10%	E		8
					9
					10
					11
	Cool down valve	from page no. 20/82	1	Step2_H64170_RC50	12
	downwards to 50%				13
					14
					15
					16
					17
	End value	Control value 50%	E		18
					19
					20
					21
	Cool down valve	from page no. 21/88	1	Step3_H64170_STP	22
	ramp stop	from page no. 22/84	1	Step4_H64170_STP	23
					24
	Cool down valve	from page no. 23/82	1	Step5_H64170_RC	25
	closing over ramp	from page no. 24/76	1	Step6_H64170_RC	26
					27
					28
					29
					30
					31
					32
					33
					34
					35
	Cool down valve	from page no. 25/76	1	Step7_H64170_CI	36
	closing immediatly				37
	Cool down valve	from page no. 26/82	1	Step8_H64170_R50	38
	ramp upwards				39
					40
					41
					42
					43
	End value	Control value 50%	E		44
					45
					46
					47
					48

Verknüpfung



Pfad	Typ	Signalbezeichnung	Verwendung	Text	Rang.
51					
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68					
69	E	HC64170_Man	to page no. 30/8	Control value manual	
70					
71					
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73					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
COOL DOWN VALVE HV64170

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.		K70101	Page no. 29
			Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
Discharge P64101	P-transmitter	E	PT 64150	5
				6
				7
Control value manual	from page no. 29/69	E	HC64170_Man	8
				9
				10
				11
Cool down pump	from page no. 19/98	1	Step01	12
				13
HP pump is cold	from page no. 20/98	1	Step02	14
				15
Pump standby	from page no. 21/98	1	Step03	16
				17
Heating up vaporizer	from page no. 22/98	1	Step04	18
				19
Pressurization pump	from page no. 23/98	1	Step05	20
				21
Open liquid valves	from page no. 24/98	1	Step06	22
				23
Depressurization	from page no. 26/98	1	Step08	24
				25
GOX in operation	from page no. 25/98	1	Step07	26
				27
				28
				29
				30
				31
				32
				33
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				35
				36
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				47
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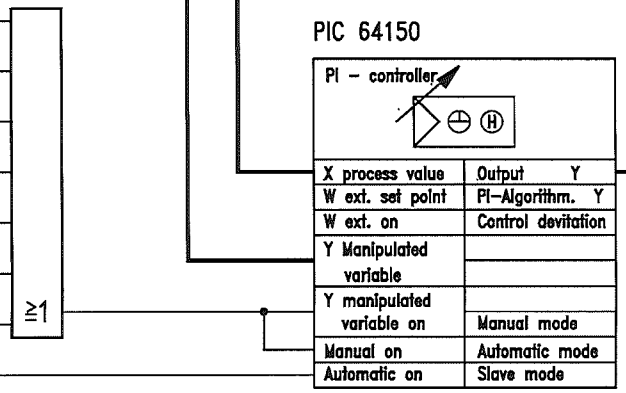
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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66				
67				
68	E	HV 64170	Positioner 0–100%	Cool down valve
69			= 4–20mA	HV64170
70				
71				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX
LOX BACK UP PUMP P64101
DISCHARGE PRESSURE PIC64150
COOL DOWN VALVE HV64170

SIZE A3

FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: REPLACED BY: BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Elchler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
HP pump is cold	from page no. 20/86	1	Step2_HS64101	12
				13
Pump standby	from page no. 21/92	1	Step3_HS64101	14
				15
Heating up vaporizer	from page no. 22/86	1	Step4_HS64101	16
				17
Pressuriziation pump	from page no. 23/86	1	Step5_HS64101	18
				19
Open liquid valves	from page no. 24/80	1	Step6_HS64101	20
				21
GOX in operation	from page no. 25/80	1	Step7_HS64101	22
				23
Depressuriziation	from page no. 26/86	1	Step8_HS64101	24
				25
				26
				27
Ready to start	from page no. 16/80	1	P64101_Start_Ok	28
				29
				30
				31
LOX-pump on	Check back signal	1	EH 64101	32
				33
				34
				35
				36
				37
				38
				39
Trip LOX-Pump	from page no. 15/70	1	US 64101	40
				41
				42
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				44
				45
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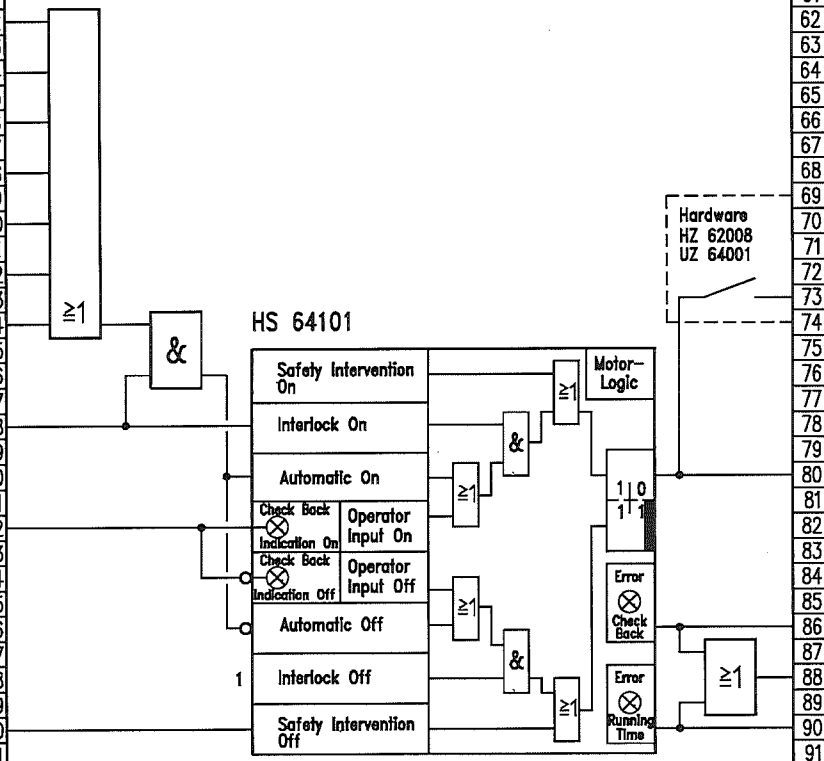
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
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71				
72				
73	1	HS 64101	Signal to MCC	LOX-pump P64101 on
74				
75				
76				
77				
78				
79				
80	1	HS 64101		
81				
82				
83				
84				
85				
86	1	HS 64101_CB	Alarm OS	"Check back error"
87				
88	1	HS 64101_fail	to page no. 15/23	LOX-pump fail
89				
90	1	HS 64101_RT	Alarm OS	"Running time error"
91				
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98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
HS 64101

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path	Function	Path	Type	Signal/TAG-No.	Destination	Comment
				1		51				
				2		52				
				3		53				
				4		54				
				5		55				
				6		56				
				7		57				
				8		58				
				9		59				
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				41		91				
				42		92				
				43		93				
				44		94				
				45		95				
				46		96				
				47		97				
				48		98				

JOB NO.	FILE NO	REV	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

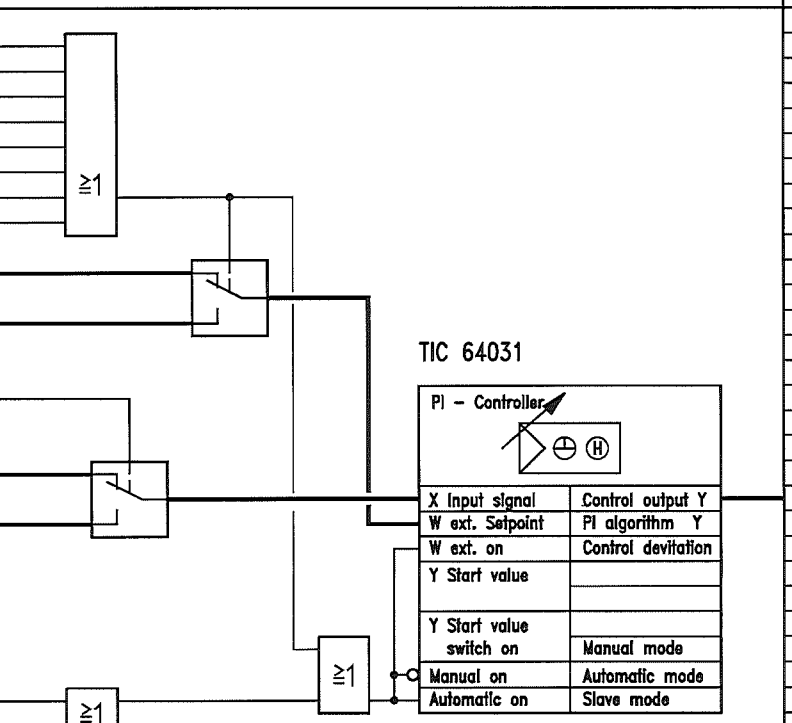
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 32
REPLACES:		REPLACED BY:	OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Heating up vaporizer	from page no. 22/88	1	Step4_T64031_W2	2
Heating up vaporizer	from page no. 43/88	1	Step14_T64031_W2	3
Pressuriziation pump	from page no. 23/88	1	Step5_T64031_W2	4
Pressuriziation pump	from page no. 44/88	1	Step15_T64031_W2	5
Open liquid valves	from page no. 24/82	1	Step6_T64031_W2	6
Open liquid valves	from page no. 45/82	1	Step16_T64031_W2	7
GOX in operation	from page no. 25/82	1	Step7_T64031_W2	8
GOX in operation	from page no. 46/82	1	Step1_T64031_W2	9
				10
Setpoint 30°C	Constant	E	TC64031_W1	11
				12
Setpoint 60°C	Constant	E	TC64031_W2	13
				14
				15
Measure fail	PCS	1	T64031_fail	16
				17
				18
Water bath vaporizer	Pt100	E	TE 64031	19
				20
Water bath vaporizer	Pt100	E	TE 64032	21
				22
				23
				24
				25
				26
				27
Cool down pump	from page no. 19/81	1	Step1_T64031_W1	28
Cool down pump	from page no. 40/81	1	Step11_T64031_W1	29
HP pump is cold	from page no. 20/88	1	Step2_T64031_W1	30
HP pump is cold	from page no. 41/88	1	Step12_T64031_W1	31
Pump standby	from page no. 21/94	1	Step3_T64031_W1	32
Pump standby	from page no. 42/94	1	Step13_T64031_W1	33
Depressuration	from page no. 26/88	1	Step8_T64031_W1	34
Depressuration	from page no. 47/88	1	Step18_T64031_W1	35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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61				
62				
63				
64				
65				
66				
67				
68				
69				
70	1	TV 64181	Positioner 0–100%	Control valve steam
71			= 4–20mA	TV 64181
72				
73				
74				
75				
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80				
81				
82				
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

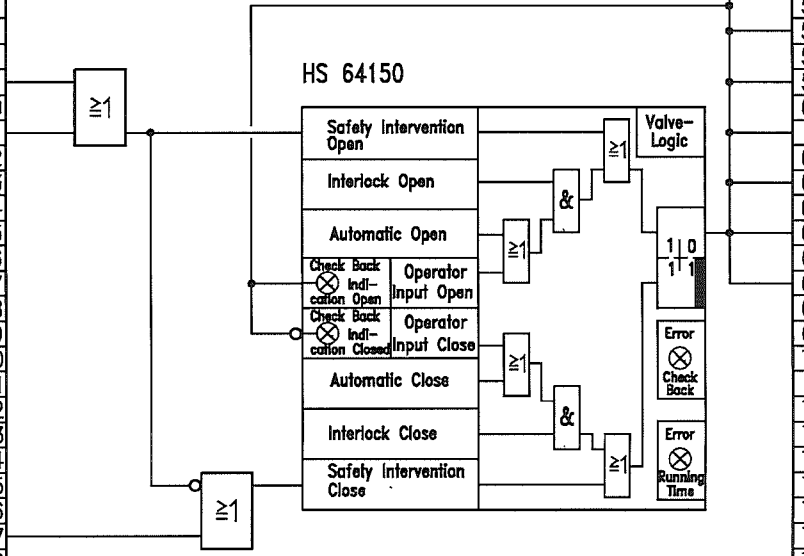
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE GOX BACK UP
WATER BATH VAPORIZER
TIC 64031

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 33
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
Open liquid valves	from page no. 24/84	1	Step6_HS64150	9
				10
GOX in operation	from page no. 25/84	1	Step7_HS64150	11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
Trip P64101	from page no. 15/72	1	US 64101	27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53	0	HS 64150	to page no. 24/10	
54				
55	0	HS 64150	to page no. 23/10	
56				
57	0	HS 64150	to page no. 22/16	
58				
59	0	HS 64150	to page no. 21/22	
60				
61	0	HS 64150	to page no. 20/22	
62				
63	0	HS 64150	to page no. 19/10	
64				
65	1	HS 64150	to pgae no. 25/10	
66				
67	1	HV 64150	Solenoid valve	Open liquid valve
68				HV 64150
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
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96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

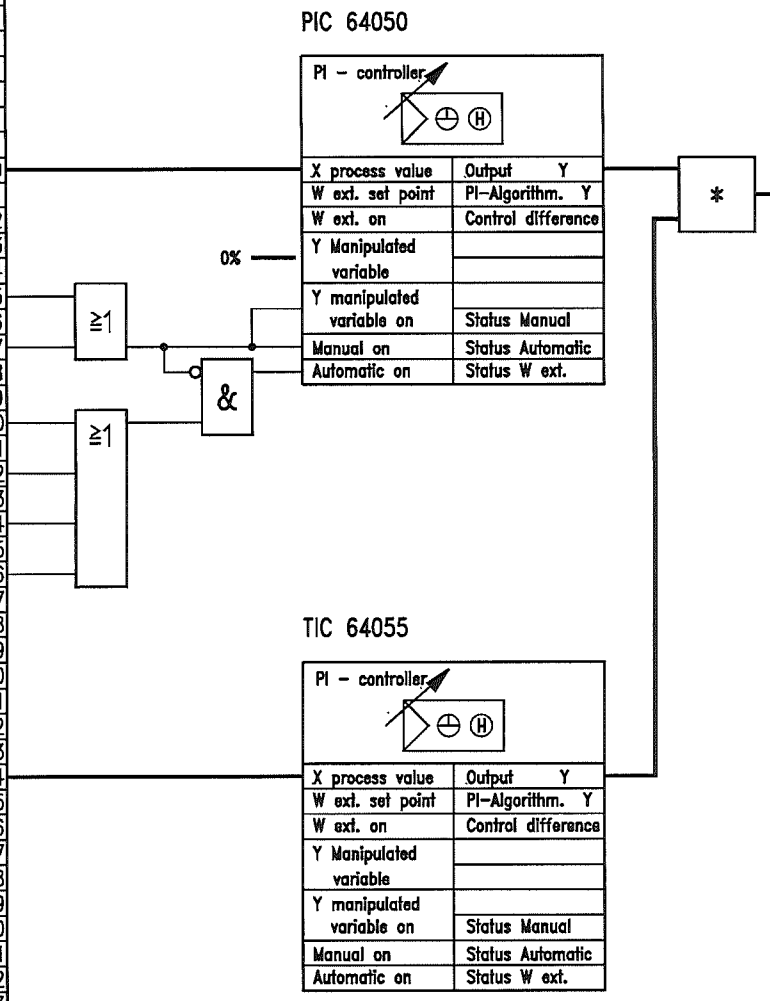
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64101
LIQUID VALVE HV64150

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.		K70101	Page no. 34
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
GOX beh. vaporizer	P-transmitter	E	PT 64050	10
				11
				12
				13
				14
Trip P64201	from page no. 36/74	1	US 64201	15
				16
Trip P64101	from page no. 15/74	1	US 64101	17
				18
				19
Open liquid valves	from page no. 24/88	1	Step6_P64050	20
				21
GOX in operation	from page no. 25/88	1	Step7_P64050	22
				23
Open liquid valves	from page no. 45/88	1	Step16_P64050	24
				25
GOX in operation	from page no. 46/88	1	Step17_P64050	26
				27
				28
				29
				30
				31
				32
				33
GOX beh. vaporizer	Pt100	E	TE 64050	34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	E	UV 64010	Positioner 0-100%	Liquid control valve
62			= 4-20mA	UV 64010
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
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85				
86				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

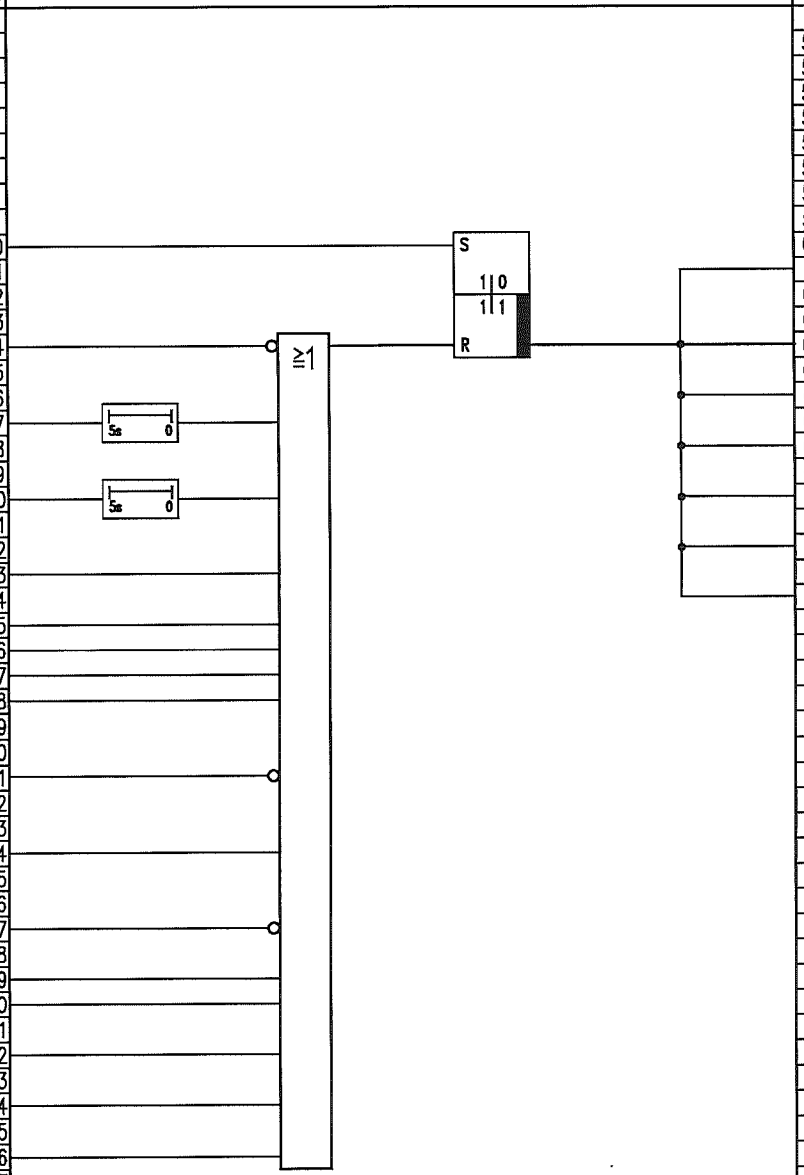
DRAWING NAME:
TANK STORAGE LOX PUMP P64101
GOX CONTROL
PIC64050 / TIC64055

SIZE	A3	FUNKTION DIAGRAM	
DRWG. NO.			
PROJ. NO.	K70101		
REPLACES:		REPLACED BY:	

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	
Page no.	35
Of	160 Pages
BASED:	

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
	Reset trip LOX-pump	Software reset button	1	HS 64201_Res	10
	P64201				11
					12
					13
	Emergency shut down	Contact ESD-relay	0	UZ 64001	14
					15
					16
	GOX temp. trip	Value < Min2	1	TLL 64050	17
					18
					19
	GOX temp. trip	Value < Min2	1	TLL 64051	20
					21
					22
	Fail LOX pump	from page no. 52/88	1	HS 64201_fail	23
					24
	Bearing temp.	Value < Min2	1	TLL 64240	25
	Motor bearing	Value < Min2	1	TLL 64241	26
	Bearing temp.	Value > Max2	1	THH 64240	27
	Motor bearing	Value > Max2	1	THH 64241	28
					29
					30
	Emergency shut down	Contact ESD-relay	0	HZ 62009	31
					32
					33
	Press. outlet pump	Value > Max2	1	PHH 64250	34
					35
					36
	Level vaporizer	Level switch < Min	0	LL 64030	37
					38
	Water bath vaporizer	Value < Min	1	TL 64031	39
	water bath vaporizer	Value < Min	1	TL 64032	40
					41
	GOX beh. vaporizer	Value > Max	1	PHH 64050	42
					43
	Level LP-tank	Value < Min2	1	LLL 62005	44
	B62001				45
	Pressure LP-tank	Value < Min1	1	PL 62005	46
	B62001				47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61	1	UA 64201	Alarm OS	"Trip LOX-pump P64201"	
62					
63					
64	1	US 64201	to page no. 37/16	Trip P64201	
65					
66	1	US 64201	to page no. 48/17		
67					
68	1	US 64201	to page no. 49/39		
69					
70	1	US 64201	to page no. 52/40		
71					
72	1	US 64201	to page no 53/27		
73					
74	1	US 64201	to page no. 35/15		
75					
76					
77					
78					
79					
80					
81					
82					
83					
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88					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

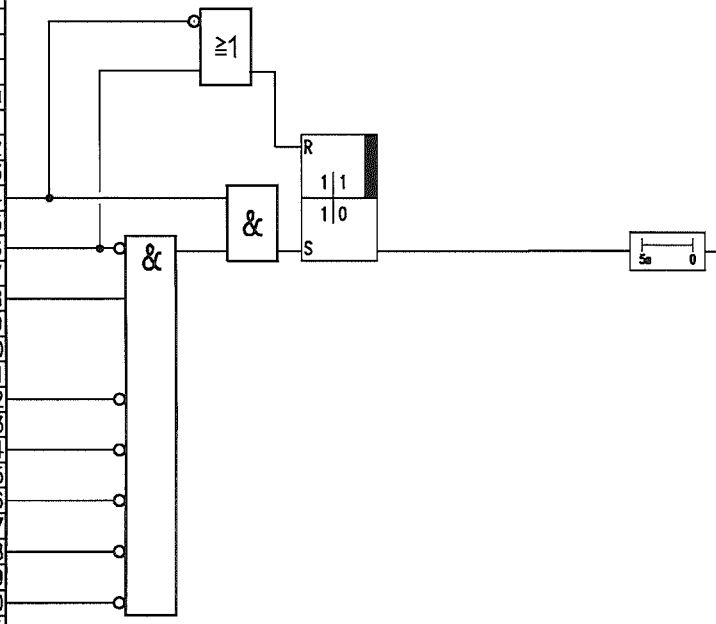
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE, LOX PUMP P64201
TRIP US 64201

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Elchler
			STD.
DRWG. NO.			Page no. 36
PROJ. NO.	K70101		OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
Sequence on/off	Software button OS	1	HS 64201	14
Trip P64201	from page no. 36/64	1	US 64201	16
Bottom valve open	End position switch	1	ZH 62009	18
Steam pressure	Value < Min	1	PL 64080	22
Bearing temp.	Value < Min1	1	TL 64240	24
Motor bearing	Value < Min1	1	TL 64241	26
Bearing temp.	Value > Max1	1	TH 64240	28
Motor bearing	Value > Max1	1	TH 64241	30

Function



Path	Type	Signal/TAG-No.	Destination	Comment
62	1	P64201_Start_ok	Monitoring OS	Enabling after start
66	1	P64201_Start_ok	to page no. 40/6	
68	1	P64201_Start_ok	to page no. 41/14	
70	1	P64201_Start_ok	to page no. 42/14	
72	1	P64201_Start_ok	to page no. 43/8	
74	1	P64201_Start_ok	to page no. 44/14	
76	1	P64201_Start_ok	to page no. 45/14	
78	1	P64201_Start_ok	to page no. 46/14	
80	1	P64201_Start_ok	to page no. 47/28	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
SEQUENCE START / STOP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 37
			Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
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				36
				37
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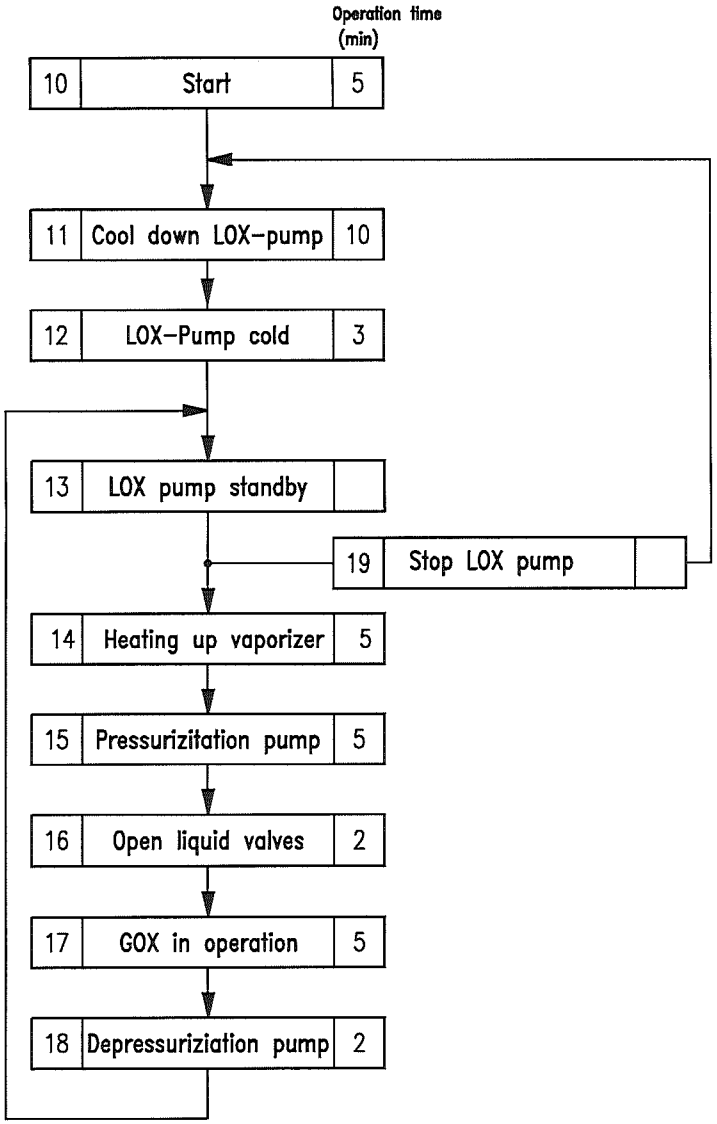
				46
				47

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
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59				
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61				
62				
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64				
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
ALL STEPS OF THE LOX PUMP SEQUENCE CONTROL

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 38
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
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				19
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				29
				30
				31
				32
				33
				34
				35
				36
				37
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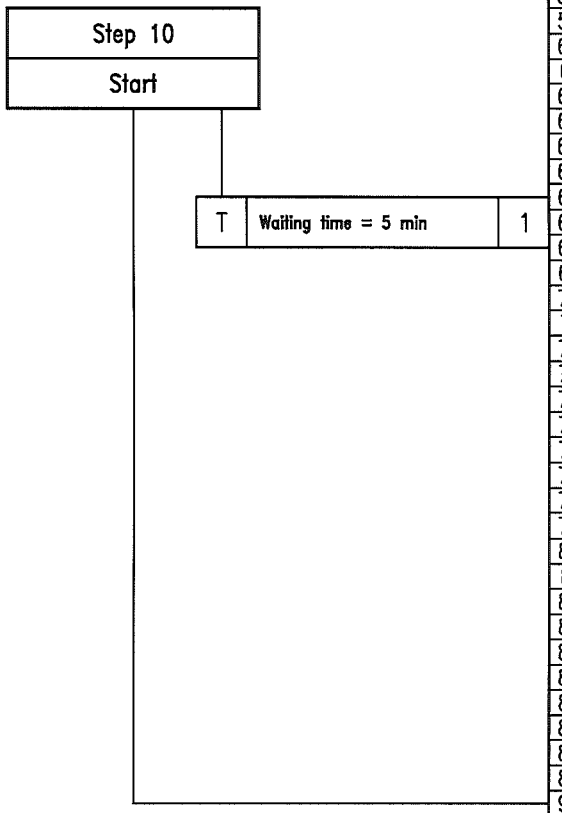
				40
				41
				42
				43
				44
				45
				46
				47

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67	1	Waitingtime10	to page no. 40/4	Time over initial
68				position
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90	1	Step10	to page no. 40/2	Initial position
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
NEW START OF THE SEQUENCE, ALL VALVES AT START POSITION

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

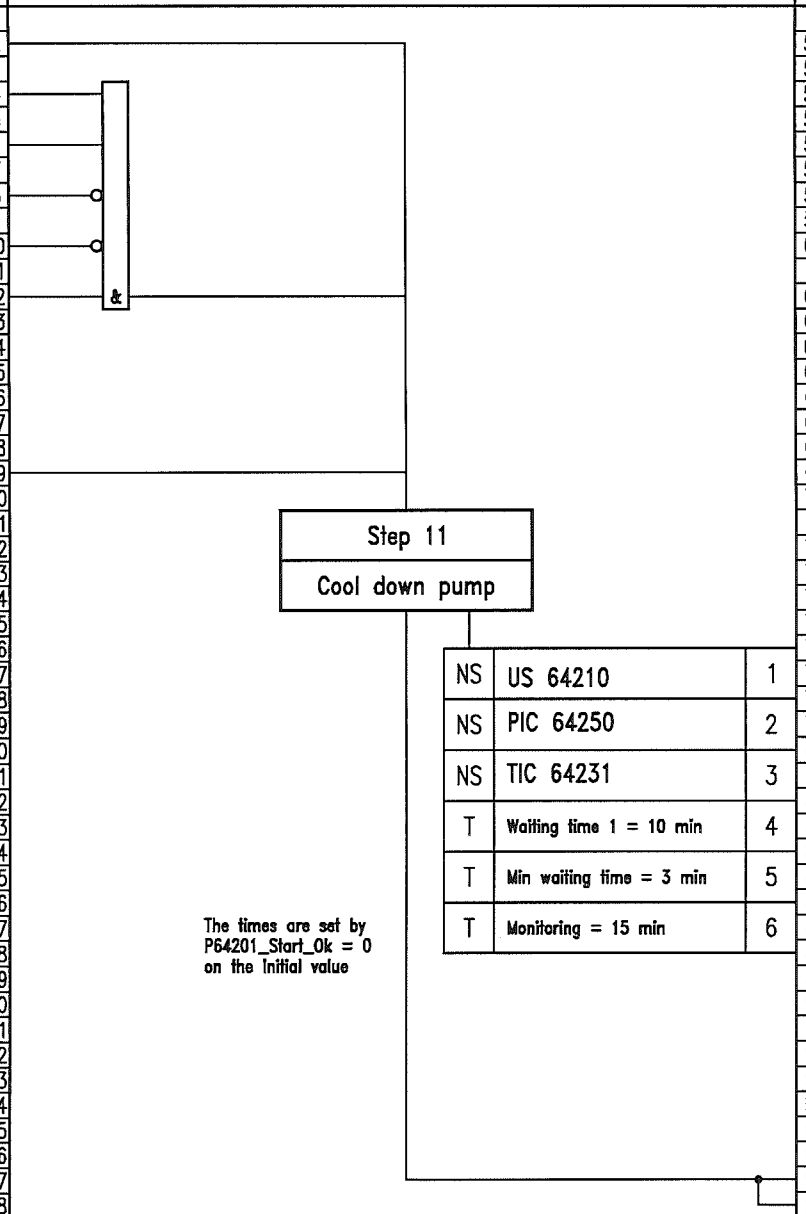
PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Initial position	from page no. 39/90	1	Step10	2
				3
Time over	from page no. 39/67	1	Waitingtime10	4
				5
Enabling after start	from page no. 37/66	1	P64201_Start_ok	6
				7
LOX pump off	Check back signal	0	EH 64201	8
				9
Liquid valve closed	from page no. 53/63	0	HS 64250	10
				11
Start cool down pump	Software button OS	1	HS 64230_CD	12
				13
				14
				15
				16
				17
				18
Stop LOX pump	from page no. 48/97	1	Step19	19
				20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
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57				
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59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77	1	Step11_US64210	to page no. 49/7	Open valve HV64210
78				
79	1	Step11_H64270_R10	to page no. 50/2	Open HV64270 from
80				10% over ramp
81	1	Step11_T64231_W1	to page no. 33/29	Set point W = 30°C
82				
83	1	Waitingtime11	to page no. 41/4	Time over
84				
85	1	Minwaitingtime11	to page no. 41/8	Time over
86				
87	1	KC64201_T011	Alarm OS	"Check time over"
88				
89				
90				
91				
92				
93				
94				
95				
96				
97	1	Step11	to page no. 41/2;	Cool down pump
98			51/12	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

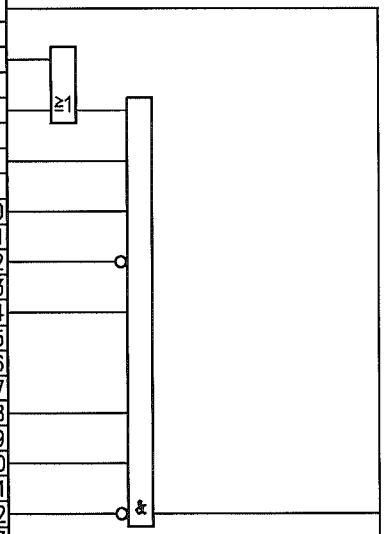
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
COOL DOWN PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 40
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Cool down pump	from page no. 40/97	1	Step11	2
				3
Time over	from page no. 40/83	1	Waitingtime11	4
				5
Next step	Software push button	1	HS 64201_1	6
				7
Time over	from page no. 40/85	1	Minwaitingtime11	8
				9
Cool down temp.	Value < Min	1	TL 64230	10
				11
Stop sequence	Software button OS	1	HS 64201_2	12
				13
Enabling after start	from page no. 37/68	1	P64201_Start_ok	14
				15
				16
				17
HV 64210 open	from page no. 49/75	1	HS 64210	18
				19
HV 64270 open	Y > 50%	1	H 64270_50	20
				21
Liquid valve closed	from page no. 53/69	0	HS 64250	22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Step 12

HP pump ist cold

NS	US 64210	1
NS	PIC 64250	2
NS	Spare	3
NS	HS 64201	4
NS	TIC 64031	5
T	Waiting time = 10 min	6
T	Min waiting time = 3 min	7
T	Monitoring = 15 min	8

The times are set by P64201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
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63				
64				
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72				
73				
74				
75				
76				
77				
78				
79				
80	1	Step12_HS64210	to page no. 49/9	Open valve HV64210
81				
82	1	Step12_H64270_RC50	to page no. 50/12	Close valve HV64270
83				down to 50% over ramp
84				
85				
86	1	Step12_H64201	to page no. 53/12	Pump P64201 on
87				
88	1	Step12_T64131_W1	to page no. 33/31	Set point W = 30°C
89				
90	1	Waitingtime12	to page no. 42/4	time over
91				
92	1	Minwaitingtime12	to page no. 42/8	time over
93				
94	1	KC64201_T012	Alarm OS	"Check time error"
95				
96				
97	1	Step12	to page no. 42/2;	HP LOX pump is cold
98	1		51/14	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
PUMP COLD

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 41
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Function

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pump is cold	from page no. 41/97	1	Step12	2
				3
Time over	from page no. 41/90	1	Waitingtime12	4
				5
Next step	Software push button	1	HS 64201_1	6
				7
Time over	from page no. 41/92	1	Minwaitingtime12	8
				9
Cool down temp.	Value < Min	1	TL 64230	10
				11
Stop sequence	Software button OS	1	HS 64201_2	12
				13
Enabling after start	from page no. 37/70	1	P64201_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64201	16
				17
HV 64210 open	from page no. 49/73	1	HS 64210	18
				19
HV 64270 open	Y > 40%	1	H 64270_40	20
				21
Liquid valve closed	from page no. 53/71	0	HS 64250	22
				23
				24
				25
				26
				27
				28
				29
time over	from page no. 47/90	1	Waitingtime18	30
				31
Next step	Software push button	1	HS 64201_1	32
				33
time over	from page no. 47/92	1	Minwaitingtime18	34
				35
Pressure LOX pump	Value > Max1	1	PH 64250	36
				37
Breaking off	from page no. 47/97	1	Step18	38
emergency supply				39
				40
				41
				42
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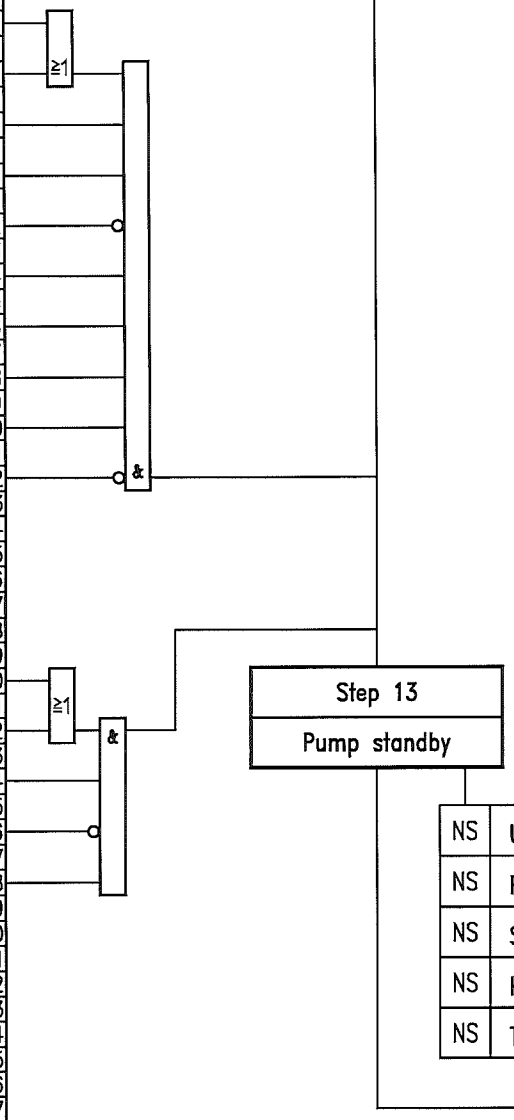
				48



Path	Type	Signal/TAG-No.	Destination	Comment
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85				
86	1	Step13_HS64210	to page no. 49/11	Open valve HV64210
87				
88	1	Step13_H64270_STP	to page no. 50/22	Valve HCV64270 stop
89				
90				
91				
92	1	Step13_H64201	to page no. 52/14	
93				
94	1	Step13_T64031_W1	to page no. 33/33	Set point W = 30°C
95				
96				
97	1	Step13	to page no. 43/2	HP LOX pump standby
98	1		to page no. 48/2;	51/16

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
PUMP STANDBY

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
HP LOX Pump standby	from page no. 42/97	1	Step13	2
				3
Cool down temp.	Value < Min	1	TL 64230	4
				5
Stop sequence	Software button OS	1	HS 64201_2	6
				7
Enabling after start	from page no. 47/72	1	P64201_Start_ok	8
				9
HP LOX pump on	Check back signal	1	EH 64201	10
				11
HV 64210 open	from page no. 49/71	1	HS 64210	12
				13
HV 64270 open	Y > 40%	1	H 64270_40	14
				15
Liquid valve closed	from page no. 53/73	0	HS 64250	16
				17
Start emergency supply	Software push button	1	HS 64201_1	18
				19
				20
				21
				22
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				25
				26
				27
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Function

Step 14

Heating up vaporizer

NS	US 64210	1
NS	PIC 64250	2
NS	Spare	3
NS	HS 64201	4
NS	TIC 64031	5
T	Waiting time = 5 min	6
T	Min waiting time = 1 min	7
T	Monitoring = 8 min	8

The times are set by P64201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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78				
79				
80	1	Step14_HS64210	to page no. 49/13	Open valve HV64210
81				
82	1	Step14_H64270_STP	to page no. 50/23	Valve HV64270 stop
83				
84				
85				
86	1	Step14_H64201	to page no. 52/16	Pump P64201 on
87				
88	1	Step14_T64031_W2	to page no. 33/3	Set point W = 60°C
89				
90	1	Waitingtime14	to page no. 44/4	time over
91				
92	1	Minwaitingtime14	to page no. 44/8	time over
93				
94	1	KC64201_T014	Alarm OS	"Check time error"
95				
96				
97	1	Step14	to page no. 44/2;	Heating up vaporizer
98	1		51/18	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
START EMERGENCY SUPPLY
HEATING UP VAPORIZER

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Function

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Heating up vaporizer	from page no. 43/97	1	Step14	2
				3
Time over	from page no. 43/90	1	Waitingtime14	4
				5
Next step	Software push button	1	HS 64201_1	6
				7
Time over	from page no. 43/92	1	Minwaitingtime14	8
				9
Liquid valve closed	from page no. 53/75	0	HS 64250	10
				11
Stop sequence	Software button OS	1	HS 64201_2	12
				13
Enabling after start	from page no. 37/74	1	P64201_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64201	16
				17
HV 64210 open	from page no. 49/69	1	HS 64210	18
				19
Temp. vaporizer	Value > Max1	1	TH 64032	20
				21
				22
				23
				24
				25
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				27
				28
				29
				30
				31
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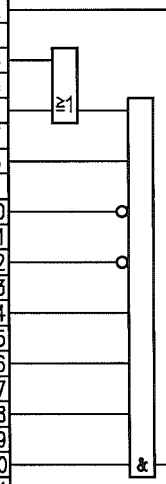

Step 15

Pressuriziation pump

NS	US 64210	1
NS	PIC 64250	2
NS	Spare	3
NS	HS 64201	4
NS	TIC 64031	5
T	Waiting time = 5 min	6
T	Min waiting time = 4 min	7
T	Monitoring = 6 min	8

The times are set by P64201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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78				
79				
80	1	Step15_HS64210	to page no. 49/15	Open valve HV64210
81				
82	1	Step15_H64270_RC	to page no. 50/25	Close valve HV64270
83				over ramp
84				
85				
86	1	Step15_H64201	to page no. 52/18	
87				
88	1	Step15_T64031_W2	to page no. 33/5	Set point W = 60°C
89				
90	1	Waitingtime15	to page no. 45/4	time over
91				
92	1	Minwaitingtime15	to page no. 45/8	time over
93				
94	1	KC64201_T015	Alarm OS	"Check time error"
95				
96				
97	1	Step15	to page no. 45/2;	Pressuriziation pump
98	1		51/20	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füttingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
PRESSURIZIATION PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Elchler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 44
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pressurization pump	from page no. 44/97	1	Step15	2
				3
Time over	from page no. 44/90	1	Waitingtime15	4
				5
Next step	Software push button	1	HS 64201_1	6
				7
Time over	from page no. 44/92	1	Minwaitingtime15	8
				9
Liquid valve closed	from page no. 53/77	0	HS 64250	10
				11
Stop sequence	Software button OS	1	HS 64201_2	12
				13
Enabling after start	from page no. 37/76	1	P64201_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64201	16
				17
HV 64210 open	from page no. 49/67	1	HS 64210	18
				19
Pressure HP pump	Value > Max1	1	PH 64250	20
				21
				22
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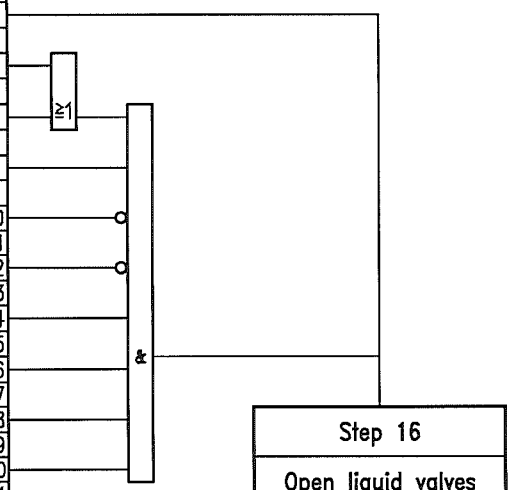
Function



Step 16

Open liquid valves

NS	US 64210	1
NS	PIC 64250	2
NS	Spare	3
NS	HS 64201	4
NS	TIC 64031	5
NS	HS 64250	6
NS	Spare	7
NS	PIC 64050	8
T	Waiting time = 2 min	9
T	Min waiting time = 1 min	10
T	Monitoring = 3 min	11

The times are set by P64201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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73				
74	1	Step16_HS64210	to page no. 49/17	Open valve HV64210
75				
76	1	Step16_H64270_RC	to page no. 50/26	Close valve HV64270
77				over ramp
78				
79				
80	1	Step16_H64201	to page no. 52/20	Pump P64201 on
81				
82	1	Step16_T64031_W2	to page no. 33/7	Set point W = 60°C
83				
84	1	Step16_HS64250	to page no. 53/9	Open valve HV64250
85				
86				
87				
88	1	Step16_PC64050	to page no. 35/24	Enable pressure controller
89				W = 40 bar
90	1	Waitingtime16	to page no. 46/4	time over
91				
92	1	Minwaitingtime16	to page no. 46/8	time over
93				
94	1	KC64201_T016	Alarm OS	"Check time error"
95				
96				
97	1	Step16	to page no. 46/2;	Open liquid valves
98	1		51/22	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
OPEN LIQUID VALVES

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Open liquid valves	from page no. 45/97	1	Step16	2
				3
Time over	from page no. 45/90	1	Waitingtime16	4
				5
Next step	Software push button	1	HS 64201_1	6
				7
Time over	from page no. 45/92	1	Minwaitingtime16	8
				9
Liquid valve open	from page no. 53/65	1	HS 64250	10
				11
Stop sequence	Software button OS	1	HS 64201_2	12
				13
Enabling after start	from page no. 37/78	1	P64201_Start_ok	14
				15
HP LOX pump on	Check back signal	1	EH 64201	16
				17
HV 64210 open	from page no. 49/65	1	HS 64210	18
				19
HV 64270 closed	Y < 1%	1	HC 64270_0	20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
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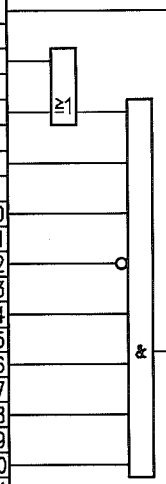
Function



Step 17

GOX in operation

NS	US 64210	1
NS	PIC 64250	2
NS	Spare	3
NS	HS 64201	4
NS	TIC 64031	5
NS	HS 64250	6
NS	Spare	7
NS	PIC 64050	8
T	Waiting time = 5 min	9

The times are set by P64201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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73				
74	1	Step17_HS64210	to page no. 49/19	Open valve HV64210
75				
76	1	Step17_H64270_RC	to page no. 50/36	Close valve HV64270
77				over ramp
78				
79				
80	1	Step17_H64201	to page no. 52/22	Pump P64201 on
81				
82	1	Step17_T64031_W2	to page no. 33/9	Set point W = 60°C
83				
84	1	Step17_HS64250	to page no. 53/11	Open valve HV64250
85				
86				
87				
88	1	Step17_PC64050	to page no. 35/22	Enable pressure controller
89				W = 40 bar
90	1	Waitingtime17	to page no. 47/20	Time over
91				
92				
93				
94				
95				
96				
97	1	Step17	to page no. 47/2;	GOX in operation
98	1		51/26	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
EMERGENCY GOX SUPPLY IN

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.		K70101	Page no. 46
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
GOX in operation	from page no. 46/97	1	Step17	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
Time over	from page no. 46/90	1	Waitingtime17	20
				21
Stop emergency	Software push button	1	HS 64201_1	22
supply				23
				24
				25
				26
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				28
				29
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				31
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Function

&

Step 18
Depressuriziation pump

NS	US 64210	1
NS	PIC 64250	2
NS	Spare	3
NS	HS 64201	4
NS	TIC 64031	5
T	Waiting time = 2 min	6
T	Min waiting time = 1 min	7
T	Monitoring = 3 min	8

The times are set by P64201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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79				
80	1	Step18_HS64210	to page no. 49/21	Open valve HV64210
81				
82	1	Step18_H64270_R50	to page no. 50/38	Open valve HV64270
83				to 50% over ramp
84				
85				
86	1	Step18_H64201	to page no. 53/24	Pump P64201 on
87				
88	1	Step18_T64031_W1	to page no. 33/35	Set point W = 30°C
89				
90	1	Waitingtime18	to page no. 41/30	time over
91				
92	1	Minwaitingtime18	to page no. 41/34	time over
93				
94	1	KC64201_T018	Alarm OS	"Check time error"
95				
96				
97	1	Step18	to page no. 41/38	Depressuriziation pump
98			51/24	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
STOP EMERGENCY SUPPLY
DEPRESSURIZIATION PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 47
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
LOX pump standby	from page no. 42/98	1	Step13	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
Stop LOX pump	Software push button	1	HL 64201	15
				16
Trip P64201	from page no. 36/66	1	US 64201	17
				18
				19
				20
				21
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				26
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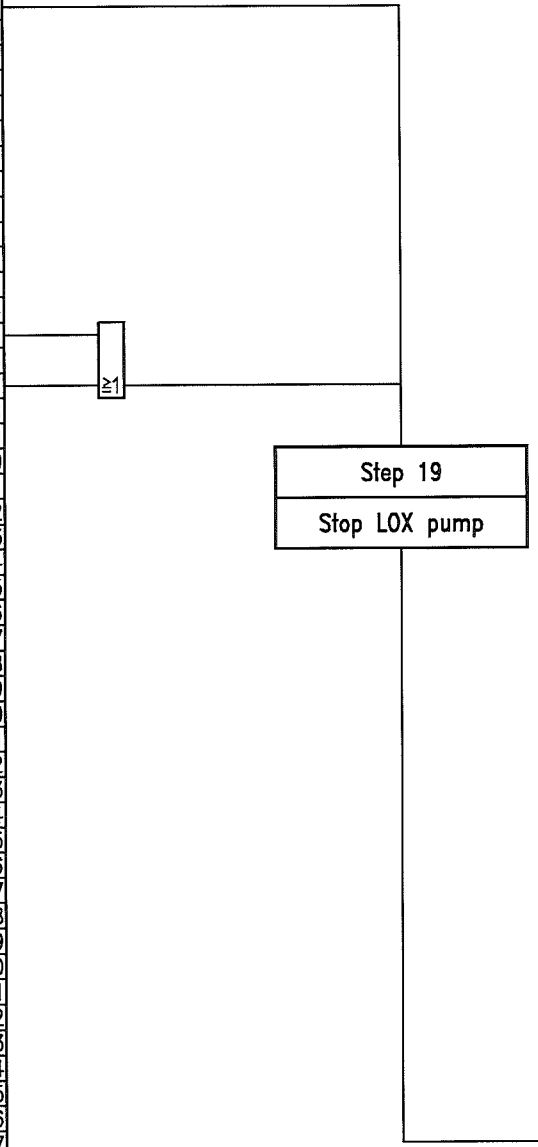
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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92				
93				
94				
95				
96				
97	1	Step19	to page no 40/19	Stop LOX pump
98				

JOB NO.	FILE NO	REV	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

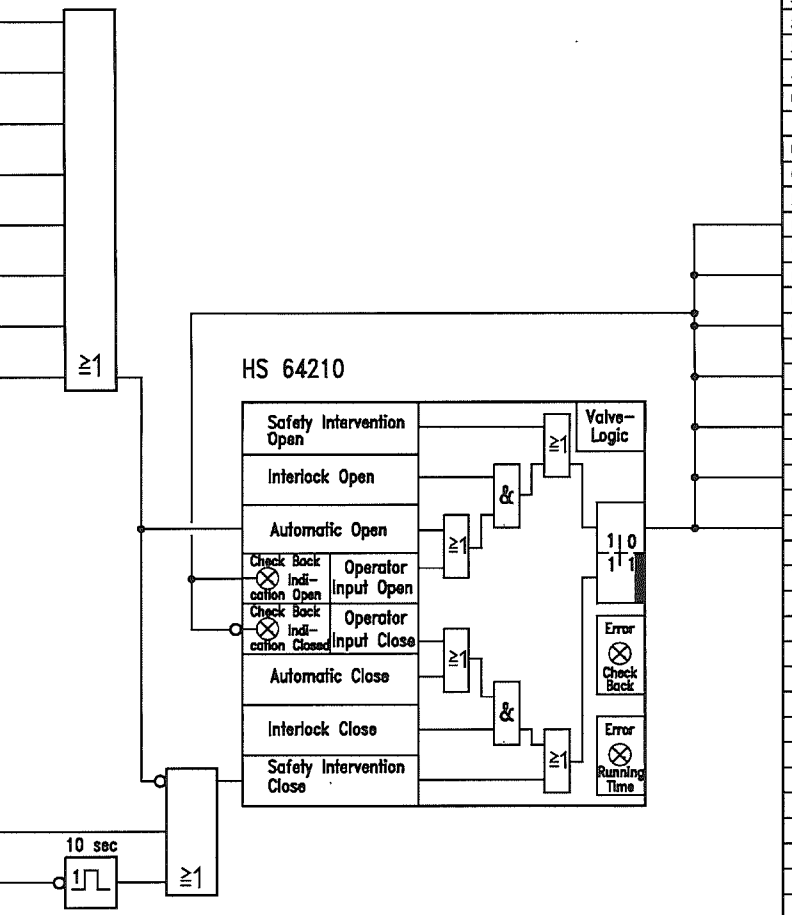
Air Liquide AGS GmbH
Füfingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
STOP PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 48
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
Cool down LOX-pump	from page no. 40/77	1	Step11_US64210	7
				8
LOX-pump cold	from page no. 41/80	1	Step12_US64210	9
				10
LOX-pump standby	from page no. 42/86	1	Step13_US64210	11
				12
Heating up vaporizer	from page no. 43/80	1	Step14_US64210	13
				14
Pressuriziation pump	from page no. 44/80	1	Step15_US64210	15
				16
Open liquid valves	from page no. 45/74	1	Step16_US64210	17
				18
GOX in operation	from page no. 46/74	1	Step17_US64210	19
				20
Depressuriziation	from page no. 47/80	1	Step18_US64210	21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
Trip LOX-pump	from page no. 36/68	1	US 64201	39
				40
LOX-pump off	Check back signal	0	EH 64201	41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
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59				
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61				
62				
63				
64				
65	1	US 64210	to page no. 46/18	
66				
67	1	US 64210	to page no. 45/18	
68				
69	1	US 64210	to page no. 44/18	
70				
71	1	US 64210	to page no. 43/14	
72				
73	1	US 64210	to page no. 42/18	
74				
75	0	US 64210	to page no. 41/18	
76				
77	1	UV 64210	Solenoid valve	Open valve HV64210
78				LOX from B62001
79				
80				
81				
82				
83				
84				
85				
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

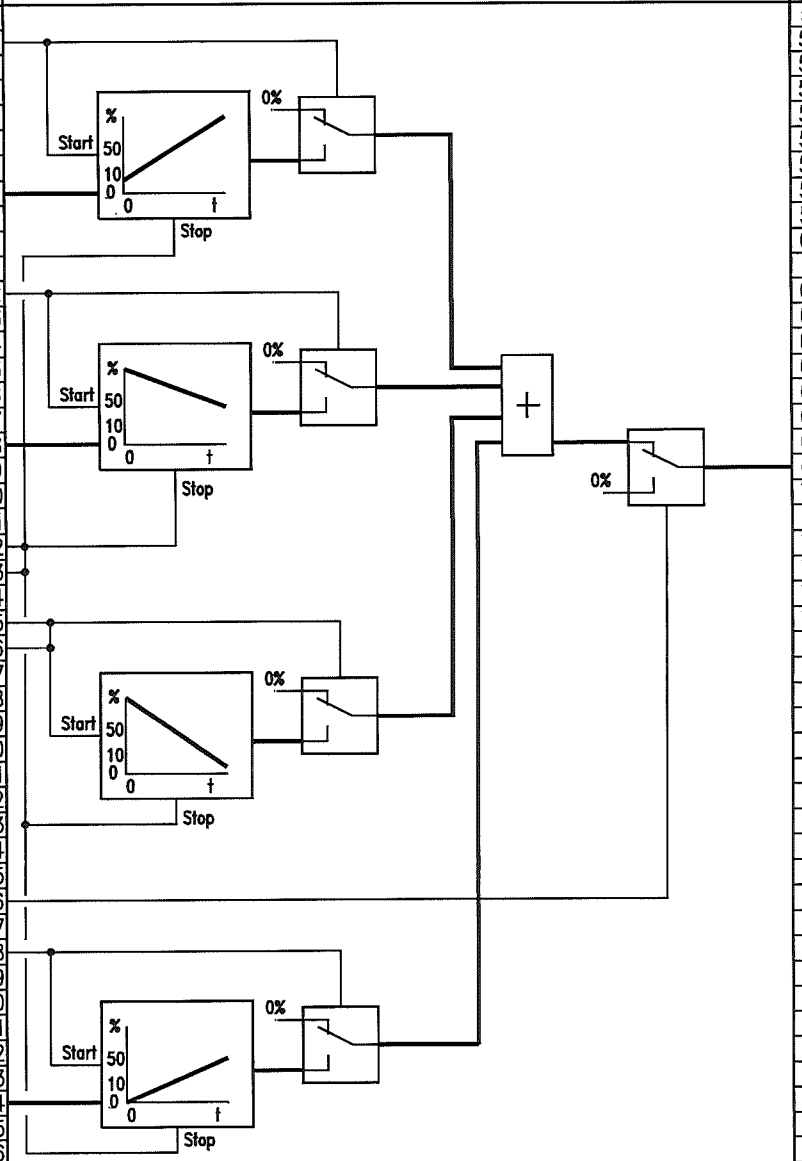
Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
LOX FROM LP-TANK B62001
HS 64210

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 49
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Rang.	Text	Herkunft	Typ	Signalbezeichnung	Pfad
					1
	Cool down valve	from page no.40/79	1	Step11_H64270_R10	2
	ramp upwards				3
					4
					5
					6
					7
	Start value	Control value 10%	E		8
					9
					10
					11
	Cool down valve	from page no. 41/82	1	Step12_H64270_RC50	12
	downwards to 50%				13
					14
					15
					16
					17
	End value	Control value 50%	E		18
					19
					20
					21
	Cool down valve	from page no. 42/88	1	Step13_H64270_STP	22
	ramp stop	from page no. 43/84	1	Step14_H64270_STP	23
					24
	Cool down valve	from page no. 44/82	1	Step15_H64270_RC	25
	closing over ramp	from page no. 45/76	1	Step16_H64270_RC	26
					27
					28
					29
					30
					31
					32
					33
					34
					35
	Cool down valve	from page no. 46/76	1	Step17_H64270_CI	36
	closing immediatly				37
	Cool down valve	from page no. 47/82	1	Step18_H64270_R50	38
	ramp upwards				39
					40
					41
					42
					43
	End value	Control value 50%	E		44
					45
					46
					47

Verknüpfung



Pfad	Typ	Signalbezeichnung	Verwendung	Text	Rang.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69	E	PC64270_Man	to page no. 51/8	Control value manual	
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					
81					
82					
83					
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98					

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füllingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
COOL DOWN VALVE HIC64270

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
	Discharge P65201	P-transmitter	E	PT 64250	5
					6
					7
	Control value manual	from page no. 50/69	E	PC64250_Man	8
					9
					10
					11
	Cool down pump	from page no. 40/98	1	Step11	12
					13
	HP pump is cold	from page no. 41/98	1	Step12	14
					15
	Pump standby	from page no. 42/98	1	Step13	16
					17
	Heating up vaporizer	from page no. 43/98	1	Step14	18
					19
	Pressurization pump	from page no. 44/98	1	Step15	20
					21
	Open liquid valves	from page no. 45/98	1	Step16	22
					23
	Depressurization	from page no. 47/98	1	Step18	24
					25
	GOX in operation	from page no. 46/98	1	Step17	26
					27
					28
					29
					30
					31
					32
					33
					34
					35
					36
					37
					38
					39
					40
					41
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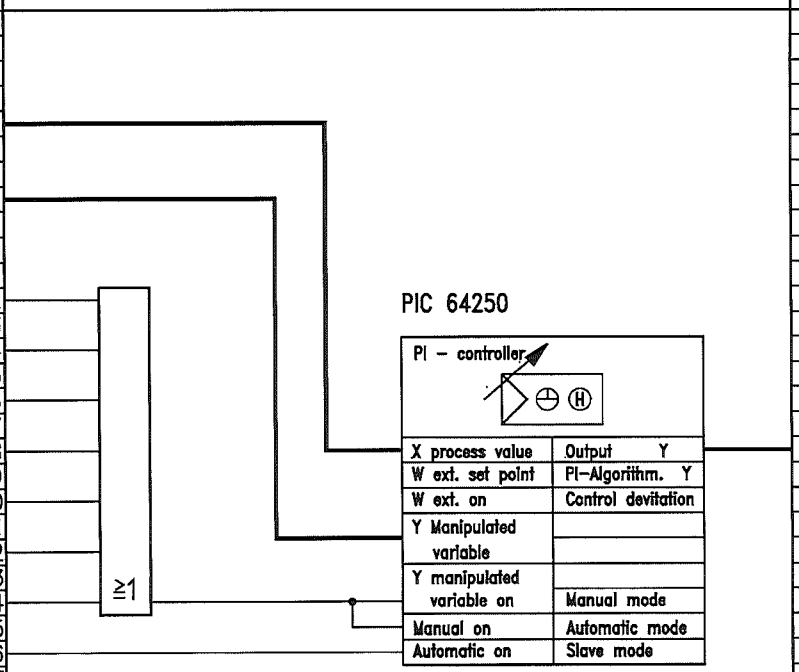
					44
					45
					46
					47
					48

Function



	Path	Type	Signal/TAG-No.	Destination	Comment
	51				
	52				
	53				
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	56				
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	61				
	62				
	63				
	64				
	65				
	66				
	67				
	68	E	HV 64270	Positioner 0-100%	Cool down valve
	69			= 4-20mA	HV64270
	70				
	71				
	72				
	73				
	74				
	75				
	76				
	77				
	78				
	79				
	80				
	81				
	82				
	83				
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JOB NO.	FILE NO	REV	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

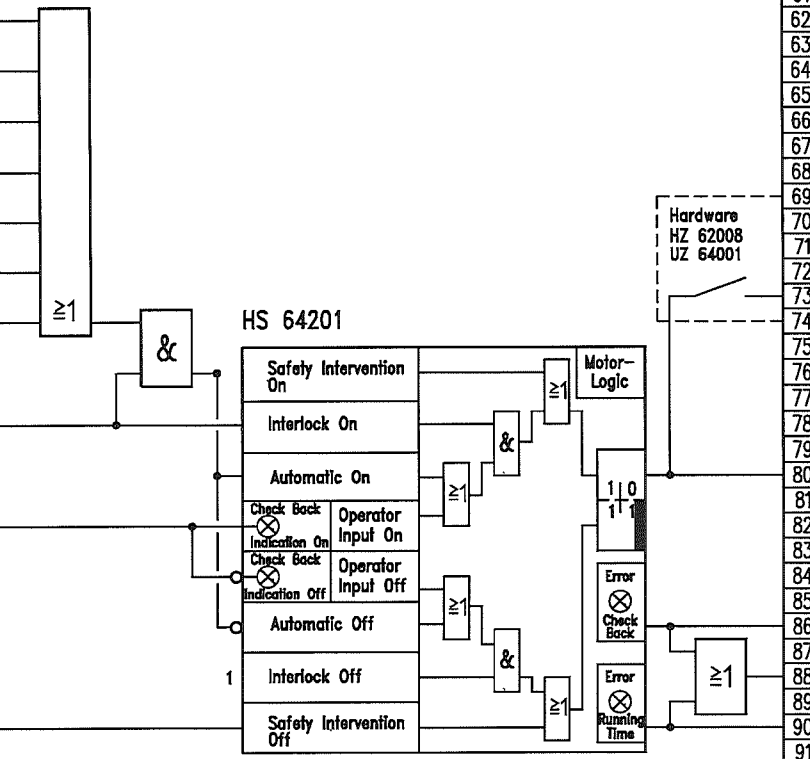
Air Liquide AGS GmbH
Füfingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
PRESSURE CONTROL PIC64250
COOL DOWN VALVE HIC64270

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 51
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
HP pump is cold	from page no. 41/84	1	Step12_HS64201	12
				13
Pump standby	from page no. 42/90	1	Step13_HS64201	14
				15
Heating up vaporizer	from page no. 43/84	1	Step14_HS64201	16
				17
Pressurization pump	from page no. 44/84	1	Step15_HS64201	18
				19
Open liquid valves	from page no. 45/78	1	Step16_HS64201	20
				21
GOX in operation	from page no. 46/78	1	Step17_HS64201	22
				23
Depressurization	from page no. 47/84	1	Step18_HS64201	24
				25
				26
				27
Ready to start	from page no. 37/80	1	P64201_Start_Ok	28
				29
				30
				31
LOX-pump on	Check back signal	1	EH 64201	32
				33
				34
				35
				36
				37
				38
				39
Trip LOX-Pump	from page no. 36/70	1	US 64201	40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
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56				
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59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73	1	HS 64201	Signal to MCC	LOX-pump P64201 on
74				
75				
76				
77				
78				
79				
80	1	HS 64201		
81				
82				
83				
84				
85				
86	1	HS 64201_CB	Alarm OS	"Check back error"
87				
88	1	HS 64201_fail	to page no. 36/23	LOX-pump fail
89				
90	1	HS 64201_RT	Alarm OS	"Running time error"
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

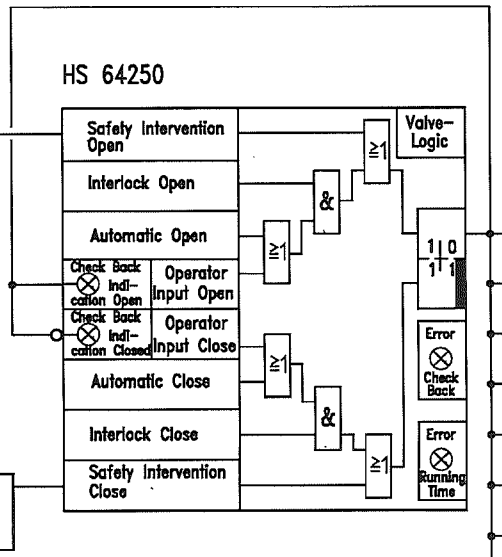
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
HS 64201

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 52
REPLACES:		REPLACED BY:	OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
Open liquid valves	from page no. 45/84	1	Step16_HS64250	9
				10
GOX in operation	from page no. 46/84	1	Step17_HS64250	11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
Trip P64201	from page no. 36/72	1	US 64201	27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65	1	HS 64250	to page no. 46/10	
66				
67	0	HS 64250	to page no. 40/10	
68				
69	0	HS 64250	to page no. 41/22	
70				
71	0	HS 64250	to page no. 42/22	
72				
73	0	HS 64250	to page no. 43/16	
74				
75	0	HS 64250	to page no. 44/10	
76				
77	0	HS 64250	to page no. 45/10	
78				
79				
80				
81				
82				
83				
84				
85	1	HV 64250	Solenoid valve	Open liquid valve
86				HV 64250
87				
88				
89				
90				
91				
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96				
97				
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LOX PUMP P64201
LIQUID VALVE HCV64250

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 53
REPLACES:		REPLACED BY:	OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path	Function	Path	Type	Signal/TAG-No.	Destination	Comment
				1		51				
				2		52				
				3		53				
				4		54				
				5		55				
				6		56				
				7		57				
				8		58				
				9		59				
				10		60				
				11		61				
				12		62				
				13		63				
				14		64				
				15		65				
				16		66				
				17		67				
				18		68				
				19		69				
				20		70				
				21		71				
				22		72				
				23		73				
				24		74				
				25		75				
				26		76				
				27		77				
				28		78				
				29		79				
				30		80				
				31		81				
				32		82				
				33		83				
				34		84				
				35		85				
				36		86				
				37		87				
				38		88				
				39		89				
				40		90				
				41		91				
				42		92				
				43		93				
				44		94				
				45		95				
				46		96				
				47		97				
				48		98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES:

REPLACED BY:

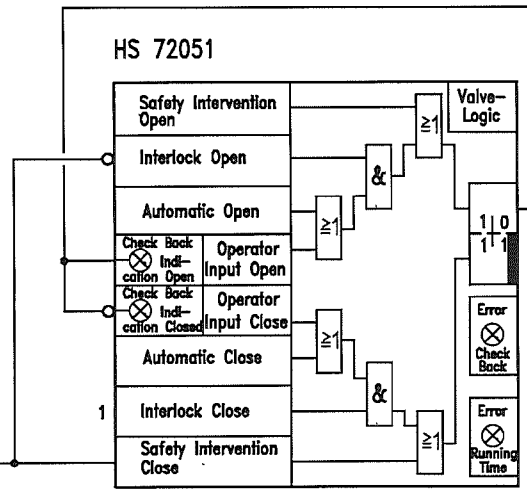
DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

Page no. 54
Of 160 Pages

BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
				28
				29
Level LIN-tank	Value > Max2	1	LHH 72005	30
				31
Level LIN-tank	Value > Max	1	LHH 72006	32
				33
Overflow LIN-tank	Value < Min2	1	TLL 72022	34
				35
Pressure LIN-tank	Value > Max	1	PH 72005	36
				37
Pressure LIN-tank	Value > Max	1	PH 72006	38
				39
Hardware interlock	Contact ESD-relay	0	UZ 72051	40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62	0	HS 72051	to page no.	Trip LIN-product
63				US 23013
64				
65				
66				
67				
68				
69				
70	1	HS 72051		
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86	1	UV 72051	Solenoid Valve	Open inlet valve
87				HV 72051
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B72001
LIN TANK INLET VALVE 1
HS 72051

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY:

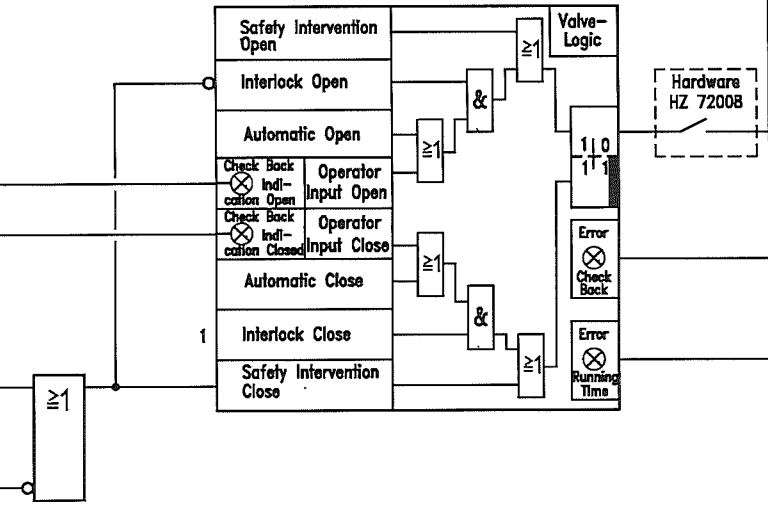
DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
Bottom valve opened	End position switch	1	ZH 72008	22
				23
Bottom valve closed	End position switch	1	ZL 72008	24
				25
				26
				27
				28
				29
Level LIN-tank	Value < Min2	1	LLL 72005	30
				31
				32
				33
Emergency shut down	ESD relay	0	HZ 72008	34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function

HS 72008



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70	1	HS 72008	Solenoid Valve	Open bottom valve
71				HV 72008
72				
73				
74				
75	1	HS 72008_CB	Alarm OS	"Check back error"
76				
77				
78				
79	1	HS 72008_RT	Alarm OS	"Running time error"
80				
81				
82				
83				
84				
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98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

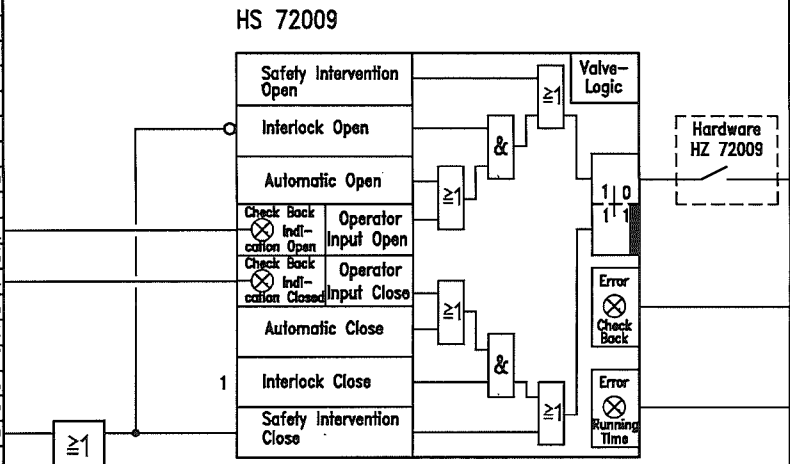
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B72001
LIN TANK BOTTOM VALVE
HS 72008

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 56
REPLACES:	REPLACED BY:		OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
				20
				21
Bottom valve opened	End position switch	1	ZH 72009	22
				23
Bottom valve closed	End position switch	1	ZL 72009	24
				25
				26
				27
				28
				29
Level LIN-tank	Value < Min2	1	LLL 72005	30
				31
				32
				33
Emergency shut down	ESD relay	0	HZ 72009	34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62				
63				
64				
65				
66				
67				
68				
69				
70	1	HS 72009	Solenoid Valve	Open bottom valve
71				HV 72009
72				
73				
74				
75	1	HS 72009_CB	Alarm OS	"Check back error"
76				
77				
78				
79	1	HS 72009_RT	Alarm OS	"Running time error"
80				
81				
82				
83				
84				
85				
86				
87				
88				
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91				
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93				
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98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B62001
LIN TANK BOTTOM VALVE
HS 72009

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 57
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
					15
					16
					17
	Pressure LIN-tank top	P-transmitter	E	PT 72006	18
	B 72001				19
					20
					21
					22
					23
					24
					25
					26
					27
					28
					29
					30
					31
					32
					33
					34
					35
					36
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Function

PIC 72005.1

PI – Controller

X Input signal	Control output Y
W ext. Setpoint	PI algorithm Y
W ext. on	Control devitation
Y Start value	
Y Start value switch on	Manual mode
Manual on	Automatic mode
Automatic on	Slave mode

PIC 72005.2

PI – Controller

X Input signal	Control output Y
W ext. Setpoint	PI algorithm Y
W ext. on	Control devitation
Y Start value	
Y Start value switch on	Manual mode
Manual on	Automatic mode
Automatic on	Slave mode

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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67				
68	E	PV 72005	Positioner 0-100%	Control valve PV72005
69			= 4-20mA	Blow out
70				
71				
72				
73				
74				
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76				
77				
78				
79				
80				
81				
82				
83				
84				
85	E	PV 72040	Positioner 0-100%	Control valve PV72040
86			= 4-20mA	Pressurisation
87				
88				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B72001
PRESSURE CONTROL LIN TANK
PIC 72006

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 58
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
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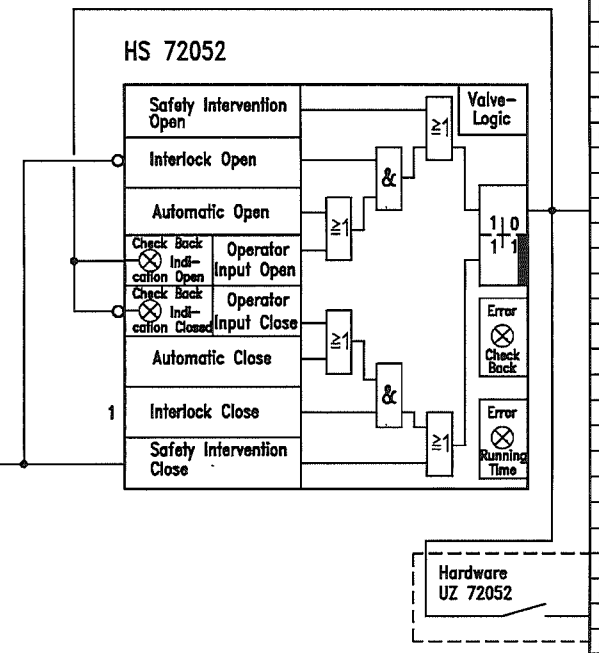
				22
				23
				24
				25
				26
				27
				28
				29
Level LIN-tank	Value > Max2	1	LHH 72005	30
				31
Level LIN-tank	Value > Max	1	LHH 72006	32
				33
Overflow LIN-tank	Value < Min2	1	TLL 72022	34
				35
Pressure LIN-tank	Value > Max	1	PH 72005	36
				37
Pressure LIN-tank	Value > Max	1	PH 72006	38
				39
Hardware Interlock	Contact ESD-relay	0	UZ 72051	40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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61				
62				
63				
64				
65				
66				
67				
68				
69				
70	1	HS 72052		
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
86	1	UV 72051	Solenoid Valve	Open inlet valve
87				HV 72051
88				
89				
90				
91				
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93				
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98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

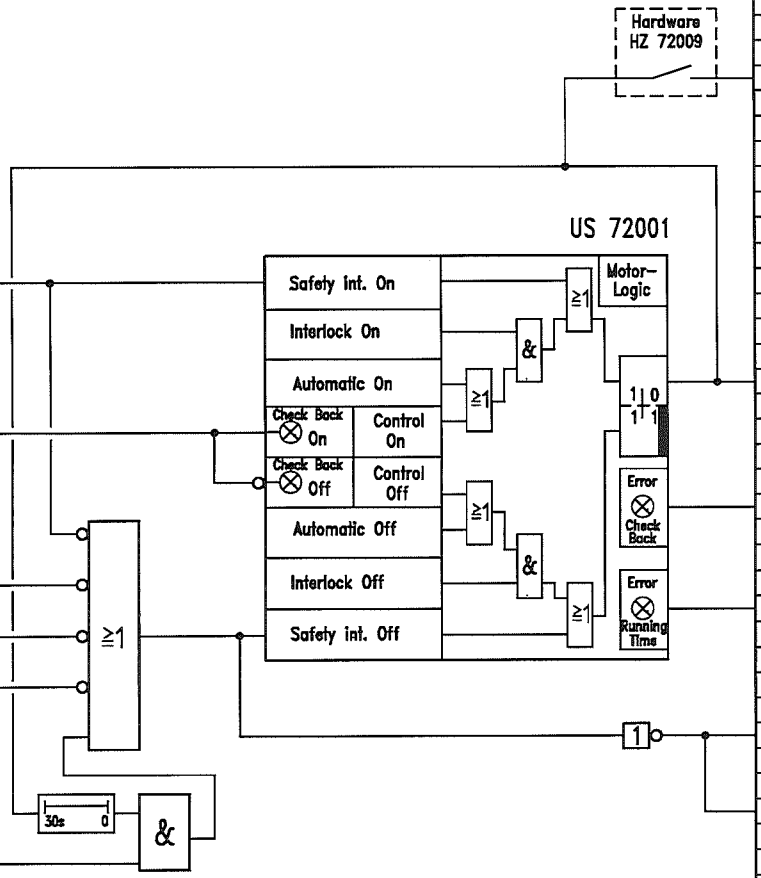
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B72001
LIN TANK INLET VALVE 2
HS 72052

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 59
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
					12
					13
					14
					15
	Death man's handle	from page no. 61/79	1	HS 72011_Out	16
					17
					18
					19
					20
					21
	LIN pump P72001on	Check back signal	1	EH 72001	22
					23
					24
					25
					26
					27
	Bottom valve open	End position switch	1	ZH 72008	28
					29
	Emergency shut down	ESD relay	0	HZ 72008	30
					31
	Temperature pump	Value < Min	1	TL 72001	32
	LIN pump P72001				33
					34
					35
					36
					37
					38
	End pressure	Value < Min	1	PL 72012	39
	LIN pump P72100				40
					41
					42
					43
					44
					45
					46
					47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
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56					
57					
58	1	US 72001	Signal to MCC	LIN pump on	
59					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70	1	US 72001			
71					
72					
73					
74					
75	1	US 72100_CB	Alarm OS	"Check back error"	
76					
77					
78					
79	1	US 72001_RT	Alarm OS	"Running time error"	
80					
81					
82					
83					
84	1	UH 72003	Monitoring OS	"Ready to start"	
85					
86					
87	1	UH 72003	Local lamp	"Ready to start"	
88					
89					
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91					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füfingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B72001
LIN PUMP P72001
US 72001

SIZE	A3	FUNKTION DIAGRAM	
DRWG. NO.			
PROJ. NO.	K70101		
REPLACES:	REPLACED BY:		

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	
Page no.	60
Of	160 Pages
BASED:	

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
Start filling	Local push button	1	HS 72012	3
				4
				5
				6
				7
				8
				9
Enable LIN pump	Software switch OS	1	HS 72010	10
				11
				12
				13
Death man's handle	Contact 1 - 0 - 1	1	HS 72011	14
				15
				16
				17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
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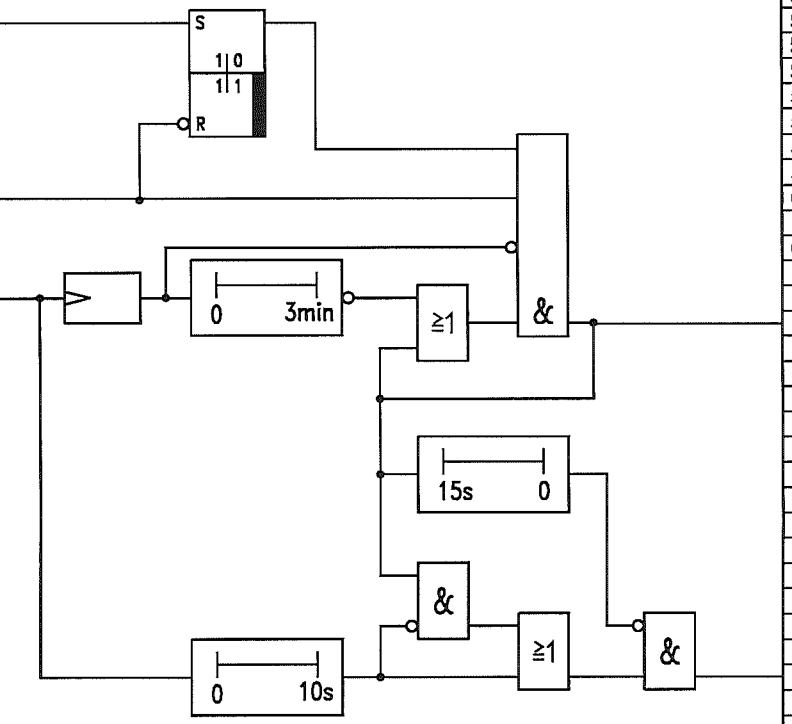
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
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59				
60				
61				
62				
63				
64				
65	1	UO 72011	Local flash lamp	"Push dead man's handle!"
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79	1	HS 72001_Out	to page no. 60/16	LIN-pump on
80				
81				
82				
83				
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85				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE B72001
DEAD MAN'S HANDLE HS72011

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 61
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

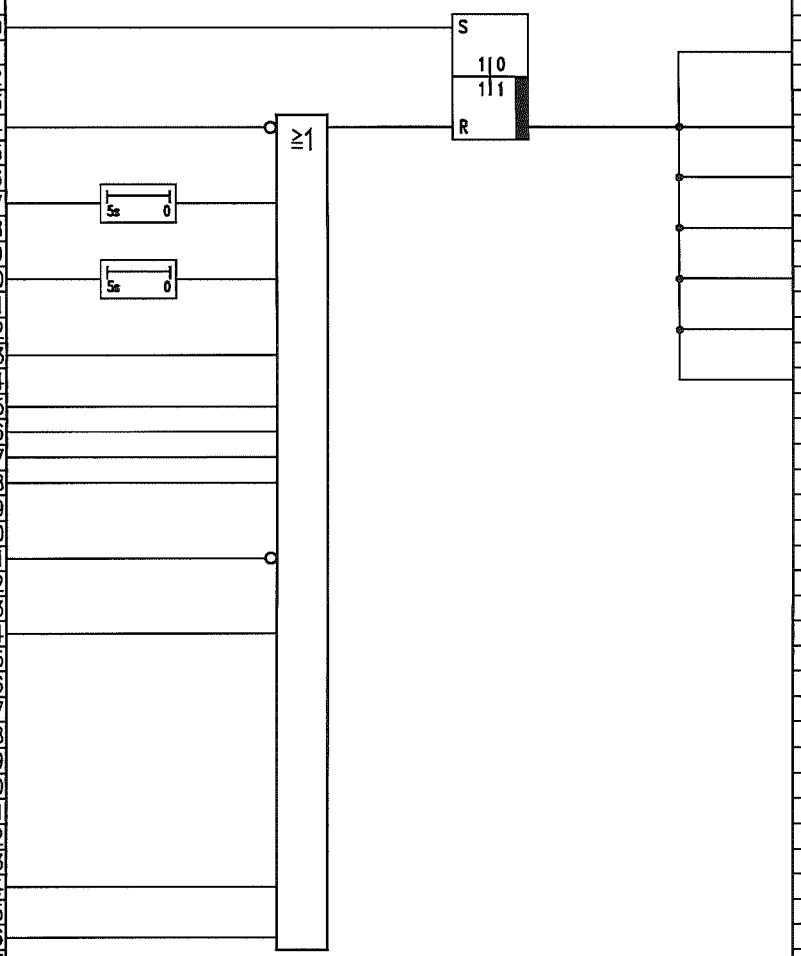
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 62
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
	Reset trip LIN-pump	Software reset button	1	HS 74101_Res	10
	P74101				11
					12
					13
	Emergency shut down	Contact ESD-relay	0	UZ 74090	14
					15
					16
	GAN temp. trip	Value < Min2	1	TLL 74090	17
					18
					19
	GAN temp. trip	Value < Min2	1	TLL 74095	20
					21
					22
	Fail LIN pump	from page no. 79/88	1	HS 74101_fail	23
					24
	Bearing temp.	Value < Min2	1	TLL 74140	25
	Motor bearing	Value < Min2	1	TLL 74141	26
	Bearing temp.	Value > Max2	1	THH 74140	27
	Motor bearing	Value > Max2	1	THH 74141	28
					29
					30
	Emergency shut down	Contact ESD-relay	0	HZ 72009	31
					32
					33
	Discharge pump	Value > Max2	1	PHH 74150	34
					35
					36
					37
					38
					39
					40
					41
					42
					43
	Level LP-tank	Value < Min2	1	LLL 72005	44
	B72001				45
	Pressure LP-tank	Value < Min1	1	PL 72005	46
	B72001				47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
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56					
57					
58					
59					
60					
61	1	UA 74101	Alarm OS	"Trip LIN-pump P74101"	
62					
63					
64	1	UA 74101	to page no. 64/16	Trip P74101	
65					
66	1	UA 74101	to page no. 75/17		
67					
68	1	UA 74101	to page no. 76/39		
69					
70	1	UA 74101	to page no. 79/40		
71					
72	1	UA 74101	to page no 80/27		
73					
74	1	UA 74101	to page no. 81/17		
75					
76					
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78					
79					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN
HP LIN PUMP P74101
TRIP US 74101

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 63
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
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				6
				7
				8
				9
				10
				11
				12
				13
Sequence on/off	Software button OS	1	HS 74101	14
				15
Trip P74101	from page no. 63/64	1	US 74101	16
				17
Bottom valve open	End position switch	1	ZH 72008	18
				19
				20
				21
				22
				23
Bearing temp.	Value < Min1	1	TL 64140	24
				25
Motor bearing	Value < Min1	1	TL 64141	26
				27
Bearing temp.	Value > Max1	1	TH 64140	28
				29
Motor bearing	Value > Max1	1	TH 64141	30
				31
				32
				33
				34
				35
				36
				37
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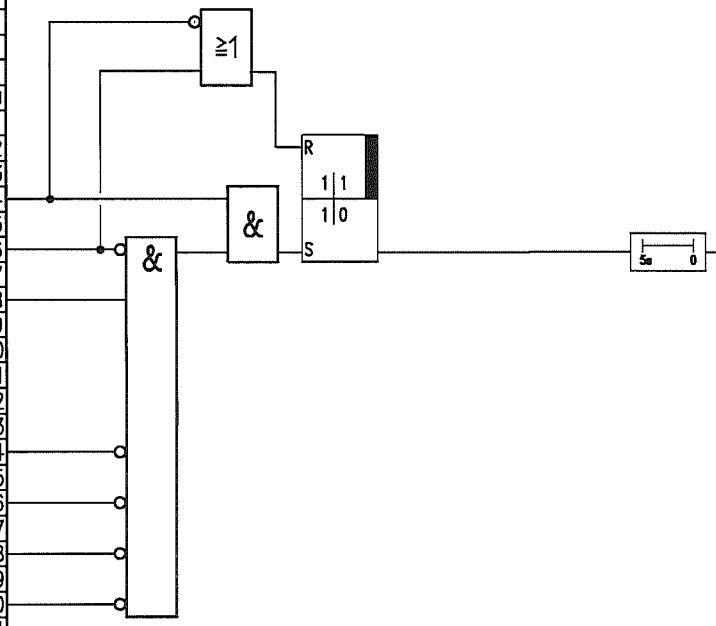
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
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61				
62	1	P74101_Start_ok	Monitoring OS	Enabling after start
63				
64				
65				
66	1	P74101_Start_ok	to page no. 67/6	
67				
68	1	P74101_Start_ok	to page no. 68/14	
69				
70	1	P74101_Start_ok	to page no. 69/14	
71				
72				
73				
74	1	P74101_Start_ok	to page no. 71/14	
75				
76	1	P74101_Start_ok	to page no. 72/14	
77				
78	1	P74101_Start_ok	to page no. 73/14	
79				
80	1	P74101_Start_ok	to page no. 79/28	
81				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN
LIN BACK UP PUMP P74101
SEQUENCE START / STOP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			Page no. 64
PROJ. NO.		K70101	Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
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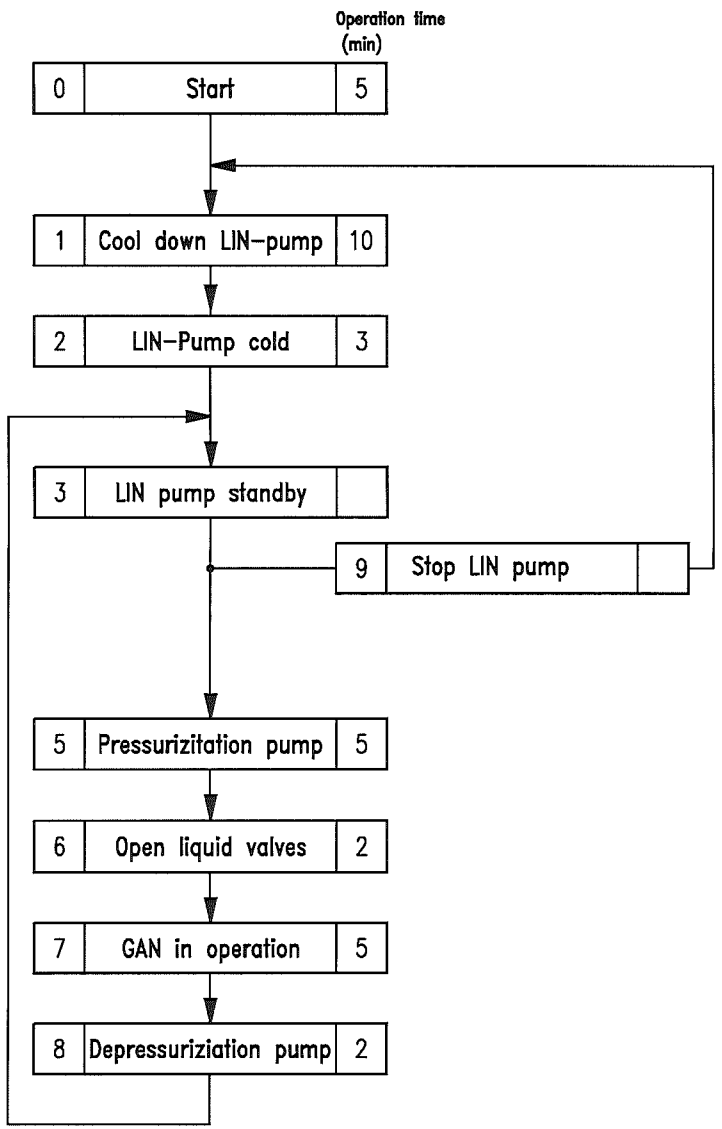
Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
ALL STEPS OF THE LIN PUMP SEQUENCE CONTROL

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 65
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
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					8
					9
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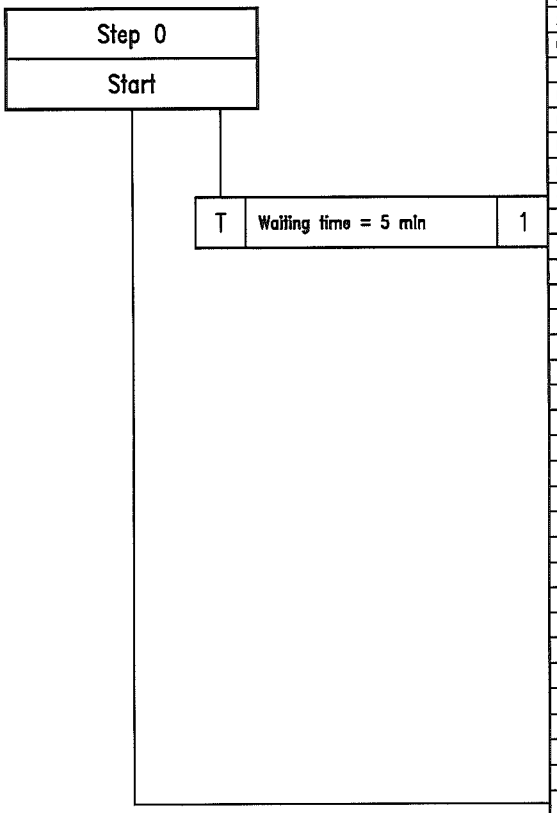
Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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62				
63				
64				
65				
66				
67	1	Waitingtime0	to page no. 67/4	Time over initial
68				position
69				
70				
71				
72				
73				
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77				
78				
79				
80				
81				
82				
83				
84				
85				
86				
87				
88				
89				
90	1	Step0	to page no. 67/2	Initial position
91				
92				
93				
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98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
NEW START OF THE SEQUENCE, ALL VALVES AT START POSITION

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES:

REPLACED BY:

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	
Page no.	66
OF	160 Pages
BASED:	

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Initial position	from page no.66/90	1	Step0	2
				3
Time over	from page no.66/67	1	Waitingtime0	4
				5
Enabling after start	from page no.64/66	1	P74101_Start_ok	6
				7
LIN pump off	Check back signal	0	EH 74101	8
				9
Liquid valve closed	from page no. 80/63	0	HS 74150	10
				11
Start cool down pump	Software button OS	1	HS 74101_CD	12
				13
				14
				15
				16
				17
				18
Stop LIN pump	from page no. 75/97	1	Step09	19
				20
				21
				22
				23
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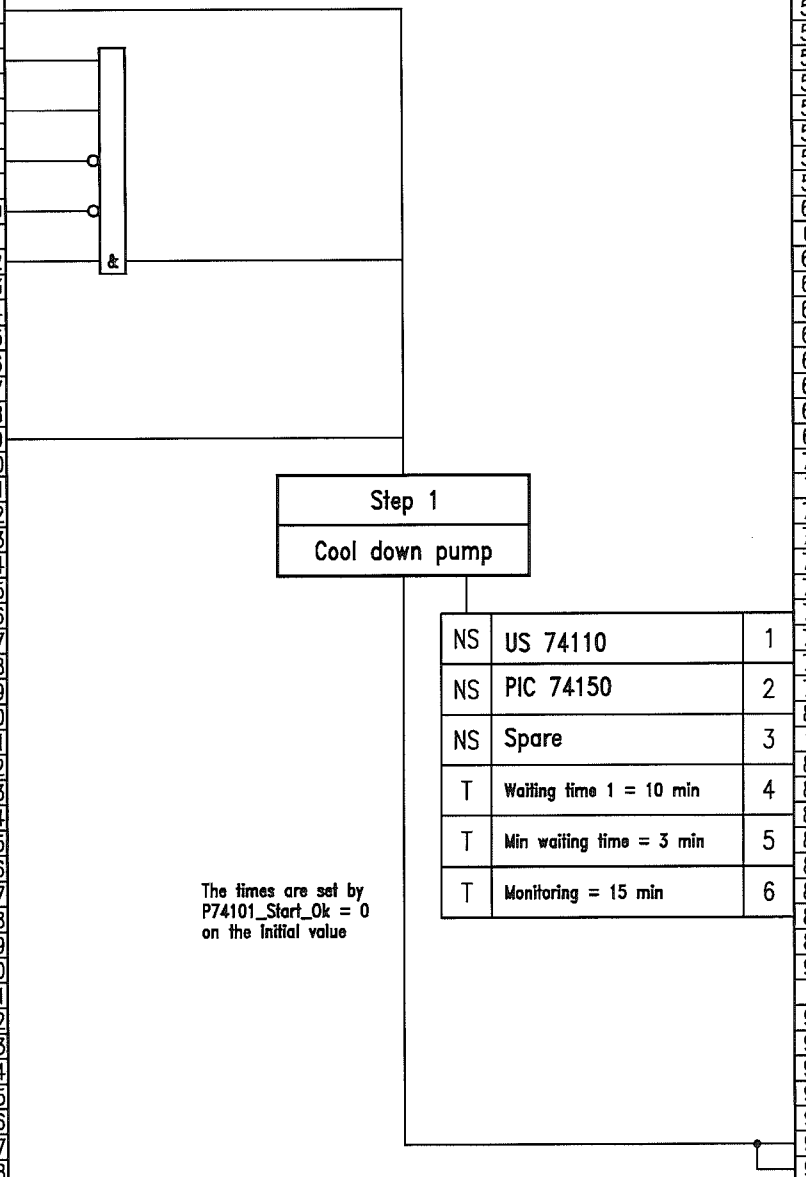
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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63				
64				
65				
66				
67				
68				
69				
70				
71				
72				
73				
74				
75				
76				
77	1	Step1_US74110	to page no. 76/7	Open valve HV74110
78				
79	1	Step1_H74170_R10	to page no. 77/2	Open HV74170 from
80				10% over ramp
81				
82				
83	1	Waitingtime01	to page no. 68/4	Time over
84				
85	1	Minwaitingtime01	to page no. 68/8	Time over
86				
87	1	KC74101_T001	Alarm OS	"Check time over"
88				
89				
90				
91				
92				
93				
94				
95				
96				
97	1	Step1	to page no. 68/2; 78/12	Cool down pump
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
COOL DOWN PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			Page no. 67
PROJ. NO.	K70101		Of 160 Pages
REPLACES:	REPLACED BY:		BASED:

Function

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Cool down pump	from page no. 67/97	1	Step01	2
				3
Time over	from page no. 67/83	1	Waitingtime01	4
				5
Next step	Software push button	1	HS 74101_1	6
				7
Time over	from page no. 67/85	1	Minwaitingtime01	8
				9
Cool down temp.	Value < Min	1	TL 74130	10
				11
Stop sequence	Software button OS	1	HS 74101_2	12
				13
Enabling after start	from page no.64/68	1	P74101_Start_ok	14
				15
				16
				17
HV 74110 open	from page no. 76/75	1	HS 74110	18
				19
HV 74170 open	Y > 50%	1	H 74170_50	20
				21
Liquid valve closed	from page no. 80/61	0	HS 74150	22
				23
				24
				25
				26
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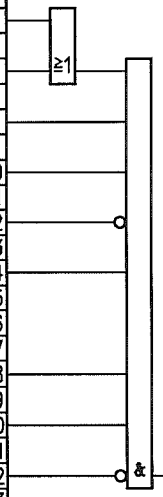

Step 2

HP pump ist cold

NS	US 74110	1
NS	PIC 74150	2
	Spare	3
NS	HS 74101	4
	Spare	5
T	Waiting time = 10 min	6
T	Min waiting time = 3 min	7
T	Monitoring = 15 min	8

The times are set by P74101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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79				
80	1	Step2_HS74110	to page no. 76/9	Open valve HV74110
81				
82	1	Step2_H74170_RC50	to page no. 78/12	Close valve HV74170
83				down to 50% over ramp
84				
85				
86	1	Step2_H74101	to page no. 79/12	Pump P74101 on
87				
88				
89				
90	1	Waitingtime02	to page no. 69/4	time over
91				
92	1	Minwaitingtime02	to page no. 69/8	time over
93				
94	1	KC74101_T002	Alarm OS	"Check time error"
95				
96				
97	1	Step02	to page no. 69/2;	HP LIN pump is cold
98	1		78/14	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
PUMP COLD

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pump is cold	from page no. 68/97	1	Step02	2
				3
Time over	from page no. 68/90	1	Waitingtime02	4
				5
Next step	Software push button	1	HS 74101_1	6
				7
Time over	from page no. 680/921		Minwaitingtime02	8
				9
Cool down temp.	Value < Min	1	TL 74130	10
				11
Stop sequence	Software button OS	1	HS 74101_2	12
				13
Enabling after start	from page no. 65/70	1	P74101_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74101	16
				17
HV 74110 open	from page no. 76/73	1	HS 74110	18
				19
HV 74170 open	Y > 40%	1	H 74170_40	20
				21
Liquid valve closed	from page no. 80/59	0	HS 74150	22
				23
				24
				25
				26
				27
				28
				29
time over	from page no. 74/90	1	Waitingtime08	30
				31
Next step	Software push button	1	HS 74101_1	32
				33
time over	from page no. 74/92	1	Minwaitingtime08	34
				35
Pressure LIN pump	Value > Max1	1	PH 74150	36
				37
Breaking off emergency supply	from page no. 74/97	1	Step08	38
				39
				40
				41
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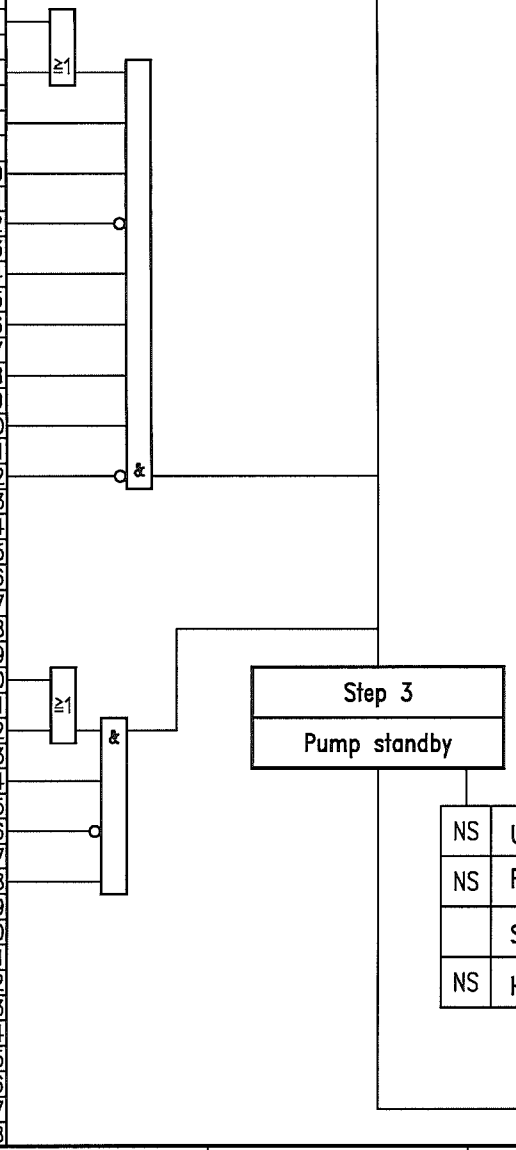
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
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85				
86	1	Step3_HS74110	to page no. 76/11	Open valve HV74110
87				
88	1	Step3_H74170_STP	to page no. 77/22	Valve HV74170 stop
89				
90				
91				
92	1	Step3_H74101	to page no. 79/14	Pump P74101 on
93				
94				
95				
96				
97	1	Step03	to page no. 71/2	HP LIN pump standby
98	1		to page no. 75/2;	78/16

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
PUMP STANDBY

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path	Function	Path	Type	Signal/TAG-No.	Destination	Comment
				1		51				
				2		52				
				3		53				
				4		54				
				5		55				
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				8		58				
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				14		64				
				15		65				
				16		66				
				17		67				
				18		68				
				19		69				
				20		70				
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				26		76				
				27		77				
				28		78				
				29		79				
				30		80				
				31		81				
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				41		91				
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				43		93				
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				45		95				
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				47		97				
				48		98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			Page no. 70
PROJ. NO.	K70101		Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
HP LIN pump standby	from page no. 69/97	1	Step03	2
				3
				4
				5
Cool down temp.	Value < Min	1	TL 74130	6
				7
HV 74170 open	Y > 40%	1	H 74170_40	8
				9
Liquid valve closed	from page no. 80/55	0	HS 74150	10
				11
Stop sequence	Software button OS	1	HS 74101_2	12
				13
Enabling after start	from page no. 64/74	1	P74101_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74101	16
				17
HV 74110 open	from page no. 76/69	1	HS 74110	18
				19
Start emergency supply	Sofware push button	1	HS 74101_1	20
				21
				22
				23
				24
				25
				26
				27
				28
				29
				30
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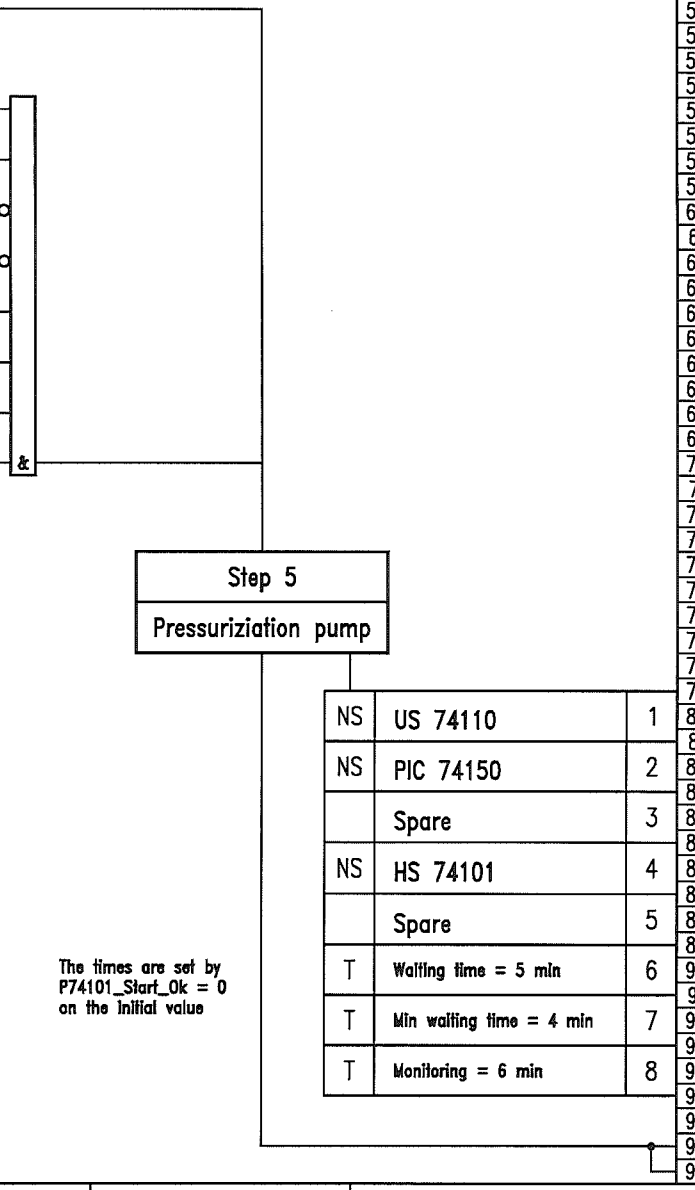
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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78				
79				
80	1	Step5_HS74110	to page no. 76/15	Open valve HV74110
81				
82	1	Step5_H74170_RC	to page no. 77/25	Close valve HV74170
83				over ramp
84				
85				
86	1	Step5_H74101	to page no. 79/18	Pump P74101 on
87				
88				
89				
90	1	Waitingtime05	to page no. 72/4	time over
91				
92	1	Minwaitingtime05	to page no. 72/8	time over
93				
94	1	KC74101_T005	Alarm OS	"Check time error"
95				
96				
97	1	Step05	to page no. 72/2;	Pressuriziation pump
98	1		78/20	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
PRESSURIZIATION PUMP

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pressuriziation pump	from page no. 71/97	1	Step05	2
				3
Time over	from page no. 71/90	1	Waitingtime05	4
				5
Next step	Software push button	1	HS 74101_1	6
				7
Time over	from page no. 71/92	1	Minwaitingtime05	8
				9
Liquid valve closed	from page no. 80/53	0	HS 74150	10
				11
Stop sequence	Software button OS	1	HS 74101_2	12
				13
Enabling after start	from page no. 64/76	1	P74101_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74101	16
				17
HV 74110 open	from page no. 76/67	1	HS 74110	18
				19
Pressure HP pump	Value > Max1	1	PH 74150	20
				21
				22
				23
				24
				25
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				27
				28
				29
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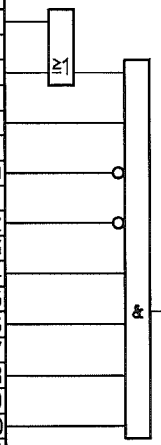
Function



Step 6

Open liquid valves

NS	US 74110	1
NS	PIC 74150	2
	Spare	3
NS	HS 74101	4
	Spare	5
NS	HS 74150	6
	Spare	7
NS	PIC 74090	8
T	Waiting time = 2 min	9
T	Min waiting time = 1 min	10
T	Monitoring = 3 min	11

The times are set by P74101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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73				
74	1	Step6_HS74110	to page no. 76/17	Open valve HV74110
75				
76	1	Step6_H74170_RC	to page no. 77/26	Close valve HV74170
77				over ramp
78				
79				
80	1	Step6_H74101	to page no. 79/20	Pump P74101 on
81				
82				
83				
84	1	Step6_HS74150	to page no. 80/9	Open valve HV74150
85				
86				
87				
88	1	Step6_PC74090	to page no. 81/20	Enable pressure controller
89				W = 25 bar
90	1	Waitingtime06	to page no. 73/4	time over
91				
92	1	Minwaitingtime06	to page no. 73/8	time over
93				
94	1	KC74101_T006	Alarm OS	"Check time error"
95				
96				
97	1	Step06	to page no. 73/2;	Open liquid valves
98	1		78/22	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
OPEN LIQUID VALVES

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Open liquid valves	from page no. 72/97	1	Step06	2
				3
Time over	from page no. 72/90	1	Waitingtime06	4
				5
Next step	Software push button	1	HS 74101_1	6
				7
Time over	from page no. 72/92	1	Minwaitingtime06	8
				9
Liquid valve open	from page no. 80/65	1	HS 74150	10
				11
Stop sequence	Software button OS	1	HS 74101_2	12
				13
Enabling after start	from page no. 64/78	1	P74101_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74101	16
				17
HV 74110 open	from page no. 76/65	1	HS 74110	18
				19
PIC 74090 on "Auto"	from page no. 81/69	1	PIC 74090_Auto	20
				21
				22
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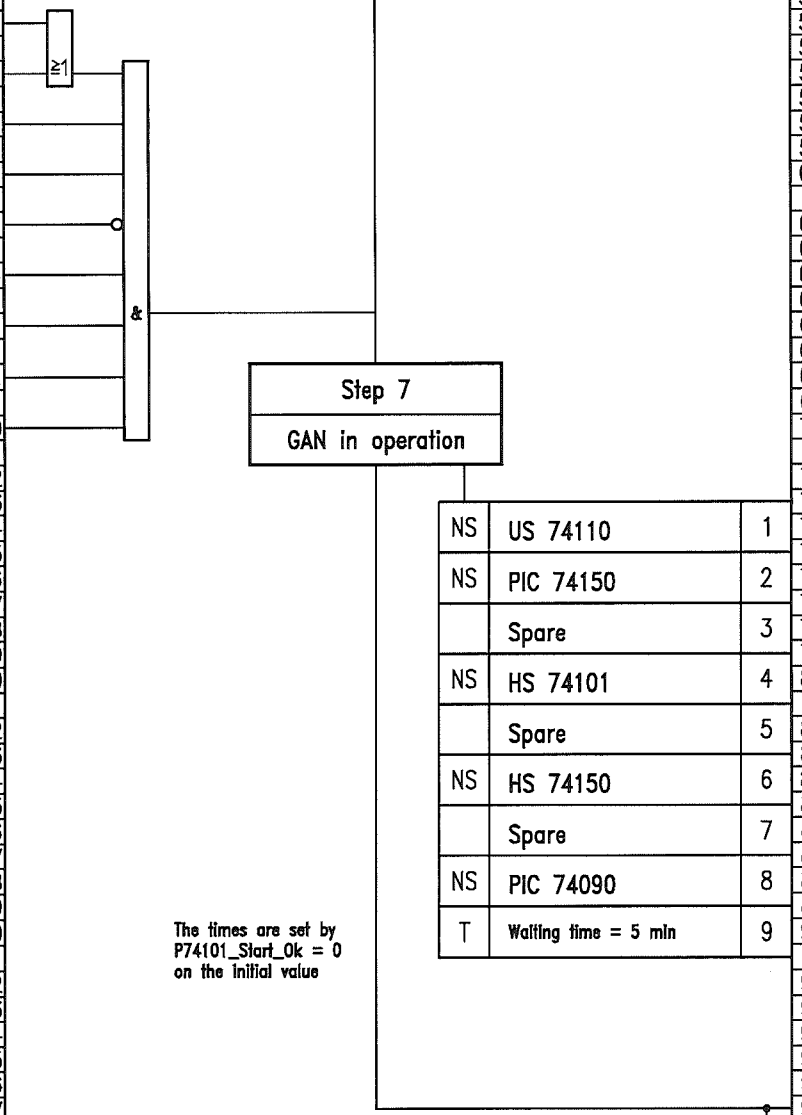
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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72				
73				
74	1	Step7_HS74110	to page no. 76/19	Open valve HV74110
75				
76	1	Step7_H74170_RC	to page no. 77/36	Close valve HV74170
77				over ramp
78				
79				
80	1	Step7_H74101	to page no. 79/22	Pump P74101 on
81				
82				
83				
84	1	Step7_HS74150	to page no. 80/11	Open valve HV74150
85				
86				
87				
88	1	Step7_PC74090	to page no. 81/22	Enable pressure controller
89				W = 40 bar
90	1	Waitingtime07	to page no. 74/20	Time over
91				
92				
93				
94				
95				
96				
97	1	Step07	to page no. 74/2;	GAN in operation
98	1		78/26	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
BACK UP GAN SUPPLY IN OPERATION

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 73
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
GAN in operation	from page no. 73/97	1	Step07	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
Time over	from page no. 73/90	1	Waitingtime07	20
				21
Stop emergency	Software push button	1	HS 64101_1	22
supply				23
				24
				25
				26
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Function

&

Step 8

Depressuriziation pump

NS	US 74110	1
NS	PIC 74150	2
NS	Spare	3
NS	HS 74101	4
NS	Spare	5
T	Waiting time = 2 min	6
T	Min waiting time = 1 min	7
T	Monitoring = 3 min	8

The times are set by P74101_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
51				
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79				
80	1	Step8_HS74110	to page no. 76/21	Open valve HV74110
81				
82	1	Step8_H74170_R50	to page no. 77/38	Open valve HV74170
83				to 50% over ramp
84				
85				
86	1	Step8_H74101	to page no. 79/24	Pump P74101 on
87				
88				
89				
90	1	Waitingtime08	to page no. 69/30	time over
91				
92	1	Minwaitingtime08	to page no. 69/34	time over
93				
94	1	KC74101_TD08	Alarm OS	"Check time error"
95				
96				
97	1	Step08	to page no. 69/38	Depressuriziation pump
98			78/24	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füttingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
STOP EMERGENCY SUPPLY
DEPRESSURIZIATION PUMP

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
LIN pump standby	from page no. 69/98	1	Step03	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
Stop LIN pump	Software push button	1	HL 74101	15
				16
Trip P74101	from page no. 63/66	1	US 74101	17
				18
				19
				20
				21
				22
				23
				24
				25
				26
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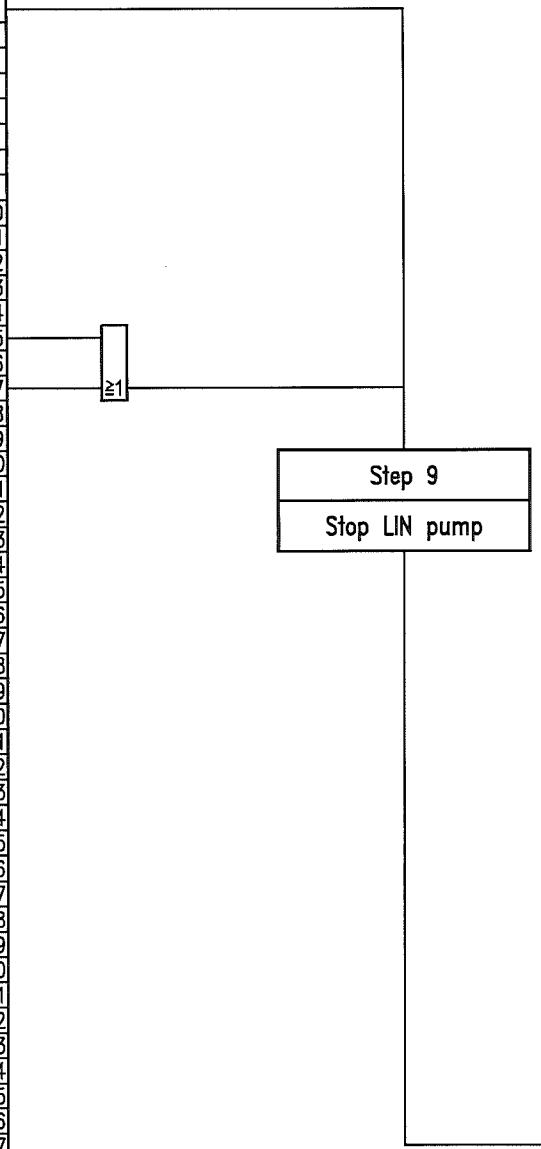
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
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96				
97	1	Step09	to page no 67/19	Stop LIN pump
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
STOP PUMP

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

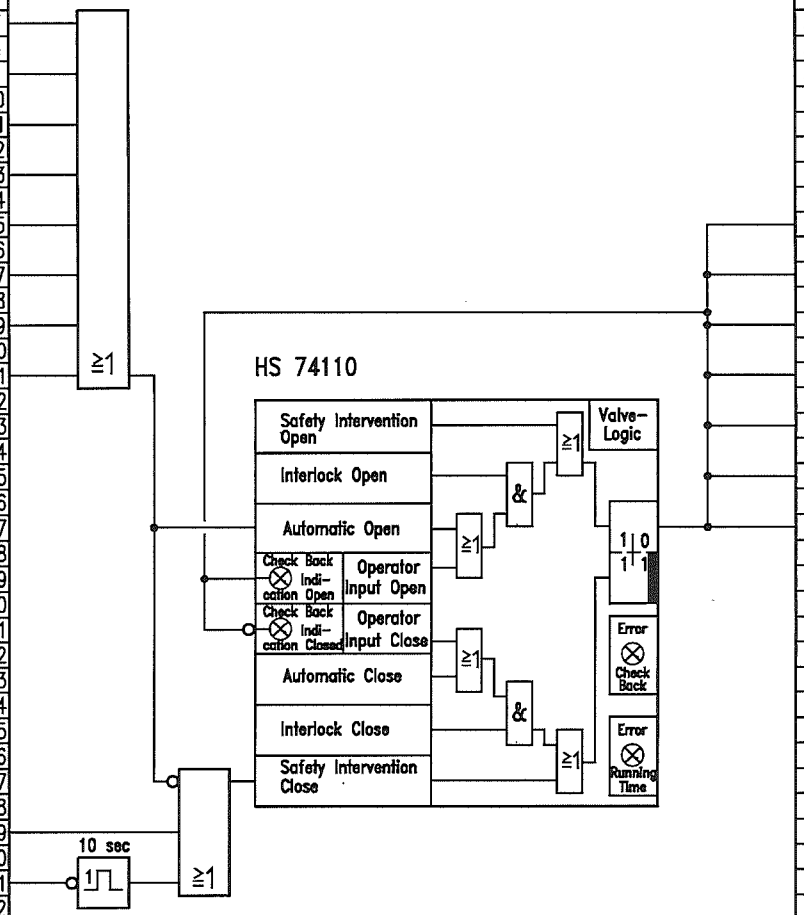
REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Page no. 75
OF 160 Pages

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
Cool down LIN-pump	from page no. 67/77	1	Step1_US74110	7
				8
LIN-pump cold	from page no. 68/80	1	Step2_US74110	9
				10
LIN-pump standby	from page no. 69/86	1	Step3_US74110	11
				12
		1		13
				14
Pressuriziation pump	from page no. 71/80	1	Step5_US74110	15
				16
Open liquid valves	from page no. 72/74	1	Step6_US74110	17
				18
GAN in operation	from page no. 73/74	1	Step7_US74110	19
				20
Depressuriziation	from page no. 74/80	1	Step8_US74110	21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
Trip LIN-pump	from page no. 63/68	1	US 74101	39
				40
LIN-pump off	Check back signal	0	EH 74101	41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
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63				
64				
65	1	US 74110	to page no. 73/18	
66				
67	1	US 74110	to page no. 72/18	
68				
69	1	US 74110	to page no. 71/18	
70				
71	1	US 74110		
72				
73	1	US 74110	to page no. 69/18	
74				
75	1	US 74110	to page no. 68/18	
76				
77	1	US 74110	Solenoid valve	Open valve HV74110
78				LIN from B72001
79				
80				
81				
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87				
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89				
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92	1			
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98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

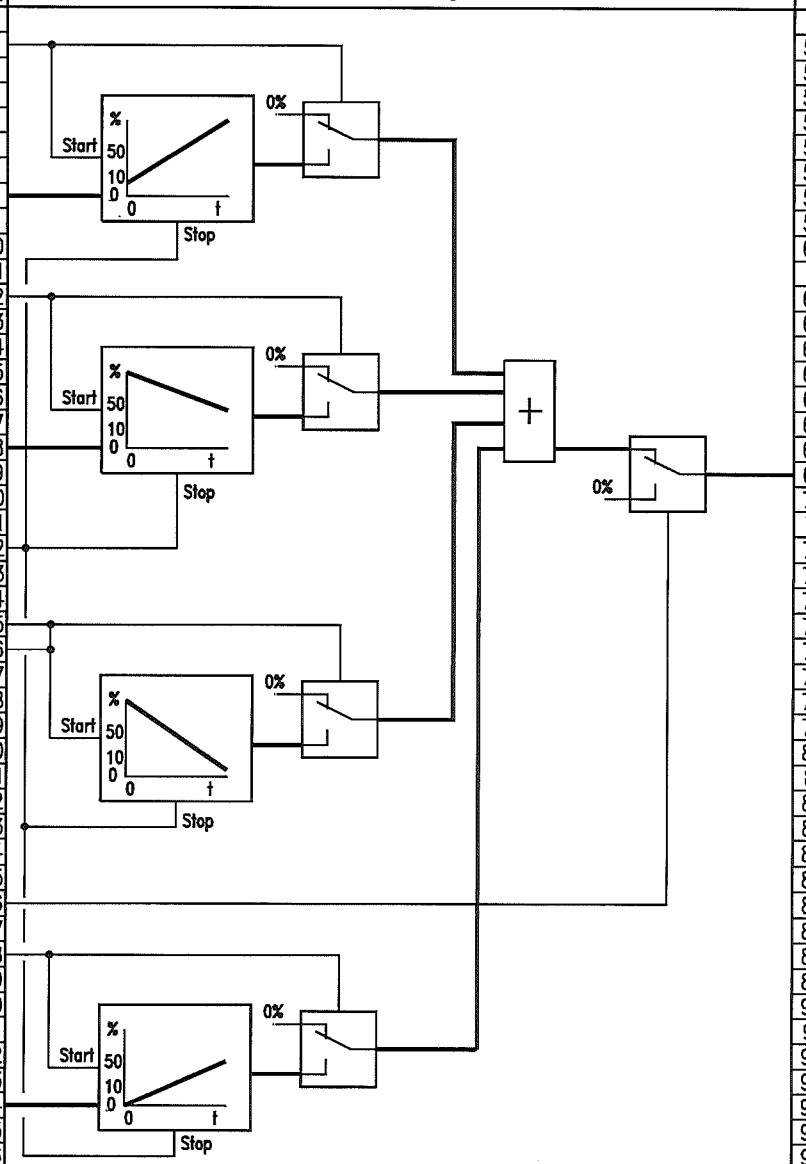
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
LIN FROM LP-TANK B72001
HS 74110

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 76
			Of 160 Pages
REPLACES:	REPLACED BY:		BASED:

Rang.	Text	Herkunft	Typ	Signalbezeichnung	Pfad
					1
	Cool down valve	from page no. 67/79	1	Step1_H74170_R10	2
	ramp upwards				3
					4
					5
					6
					7
	Start value	Control value 10%	E		8
					9
					10
					11
	Cool down valve	from page no. 68/82	1	Step2_H74170_RC50	12
	downwards to 50%				13
					14
					15
					16
					17
	End value	Control value 50%	E		18
					19
					20
					21
	Cool down valve	from page no. 69/88	1	Step3_H74170_STP	22
	ramp stop				23
					24
	Cool down valve	from page no. 71/82	1	Step5_H74170_RC	25
	closing over ramp	from page no. 72/76	1	Step6_H74170_RC	26
					27
					28
					29
					30
					31
					32
					33
					34
					35
	Cool down valve	from page no. 73/76	1	Step7_H74170_CI	36
	closing immediatly				37
	Cool down valve	from page no. 74/82	1	Step8_H74170_R50	38
	ramp upwards				39
					40
					41
					42
					43
	End value	Control value 50%	E		44
					45
					46
					47
					48

Verknüpfung



Pfad	Typ	Signalbezeichnung	Verwendung	Text	Rang.
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61					
62					
63					
64					
65					
66					
67					
68					
69	E	HC74170_Man	to page no. 78/8	Control value manual	
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					
81					
82					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füttingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
COOL DOWN VALVE HV74170

SIZE	A3	FUNKTION DIAGRAM	
DRWG. NO.			
PROJ. NO.	K70101		
REPLACES:		REPLACED BY:	

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	
Page no.	77
Of	160 Pages
BASED:	

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
Discharge P74101	P-transmitter	E	PT 74150	5
				6
				7
Control value manual	from page no. 77/69	E	HC74170_Man	8
				9
				10
				11
Cool down pump	from page no. 67/98	1	Step01	12
				13
HP pump is cold	from page no. 68/98	1	Step02	14
				15
Pump standby	from page no. 69/98	1	Step03	16
				17
		1		18
				19
Pressurization pump	from page no. 71/98	1	Step05	20
				21
Open liquid valves	from page no. 72/98	1	Step06	22
				23
Depressurization	from page no. 74/98	1	Step08	24
				25
GOX in operation	from page no. 73/98	1	Step07	26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
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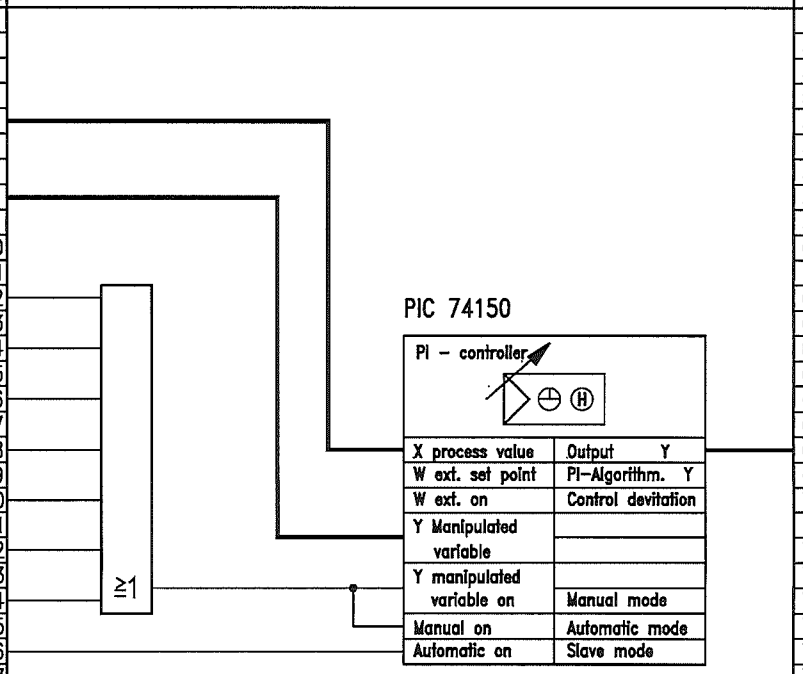
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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66				
67				
68	E	HV 74170	Positioner 0-100%	Cool down valve
69			= 4-20mA	HV74170
70				
71				
72				
73				
74				
75				
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78				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

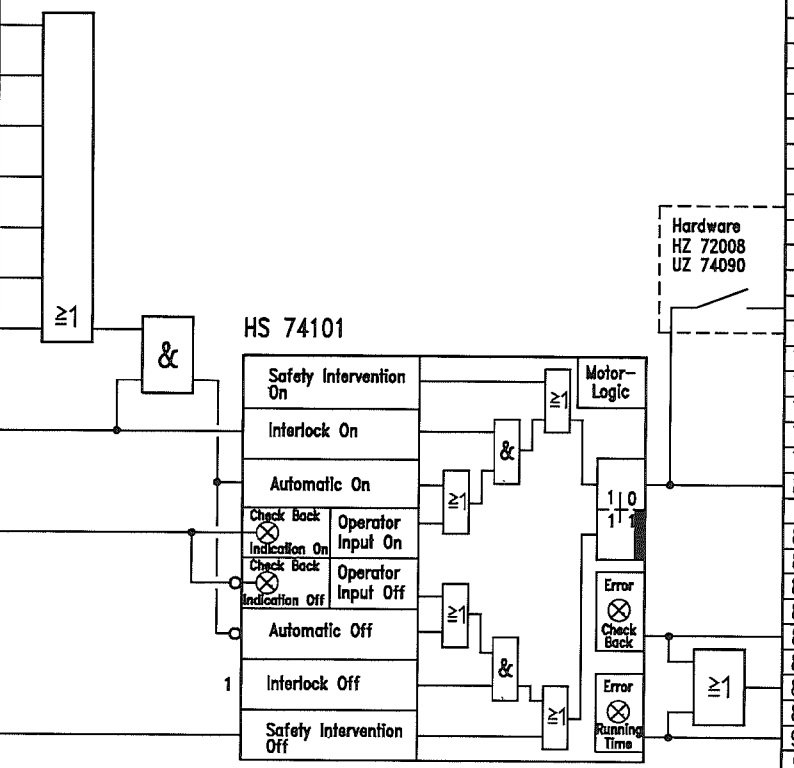
AIR LIQUIDE
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN
LIN BACK UP PUMP P74101
DISCHARGE PRESSURE PIC74150
COOL DOWN VALVE HV74170

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 78
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
					10
					11
	HP pump is cold	from page no. 68/86	1	Step2_HS74101	12
					13
	Pump standby	from page no. 69/92	1	Step3_HS74101	14
					15
			1		16
					17
	Pressurization pump	from page no. 71/86	1	Step5_HS74101	18
					19
	Open liquid valves	from page no. 72/80	1	Step6_HS74101	20
					21
	GAN in operation	from page no. 73/80	1	Step7_HS74101	22
					23
	Depressurization	from page no. 74/86	1	Step8_HS74101	24
					25
					26
					27
	Ready to start	from page no. 64/80	1	P74101_Start_Ok	28
					29
					30
					31
	LIN-pump on	Check back signal	1	EH 74101	32
					33
					34
					35
					36
					37
					38
					39
	Trip LIN-Pump	from page no. 63/70	1	US 74101	40
					41
					42
					43
					44
					45
					46
					47
					48

Function



	Path	Type	Signal/TAG-No.	Destination	Comment
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	71				
	72				
	73	1	HS 74101	Signal to MCC	LIN-pump P74101 on
	74				
	75				
	76				
	77				
	78				
	79				
	80	1	HS 74101		
	81				
	82				
	83				
	84				
	85				
	86	1	HS 74101_CB	Alarm OS	"Check back error"
	87				
	88	1	HS 74101_fail	to page no. 63/23	LIN-pump fail
	89				
	90	1	HS 74101_RT	Alarm OS	"Running time error"
	91				
	92				
	93				
	94				
	95				
	96				
	97				
	98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
HS 74101

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Elchler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 79
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
	Open liquid valves	from page no. 72/84	1	Step6_HS74150	9
					10
	GAN in operation	from page no. 73/84	1	Step7_HS74150	11
					12
					13
					14
					15
					16
					17
					18
					19
					20
					21
					22
					23
					24
					25
					26
	Trip P74101	from page no. 63/72	1	US 74101	27
					28
					29
					30
					31
					32
					33
					34
					35
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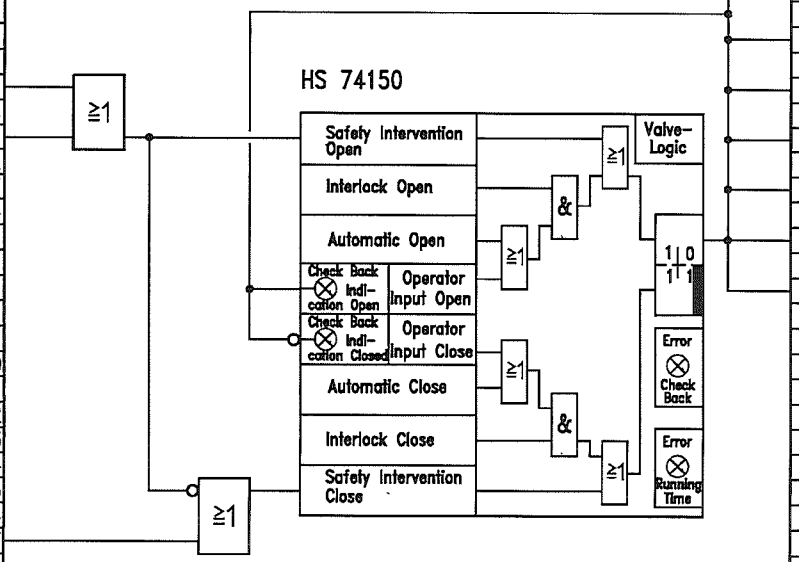
					44
					45
					46
					47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53	0	HS 74150	to page no. 72/10	
54				
55	0	HS 74150	to page no. 71/10	
56				
57	0	HS 74150		
58				
59	0	HS 74150	to page no. 69/22	
60				
61	0	HS 74150	to page no. 68/22	
62				
63	0	HS 74150	to page no. 67/10	
64				
65	1	HS 74150	to page no. 73/10	
66				
67	1	HS 74150	Solenoid valve	Open liquid valve
68				HV 74150
69				
70				
71				
72				
73				
74				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
LIQUID VALVE HV74150

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES:

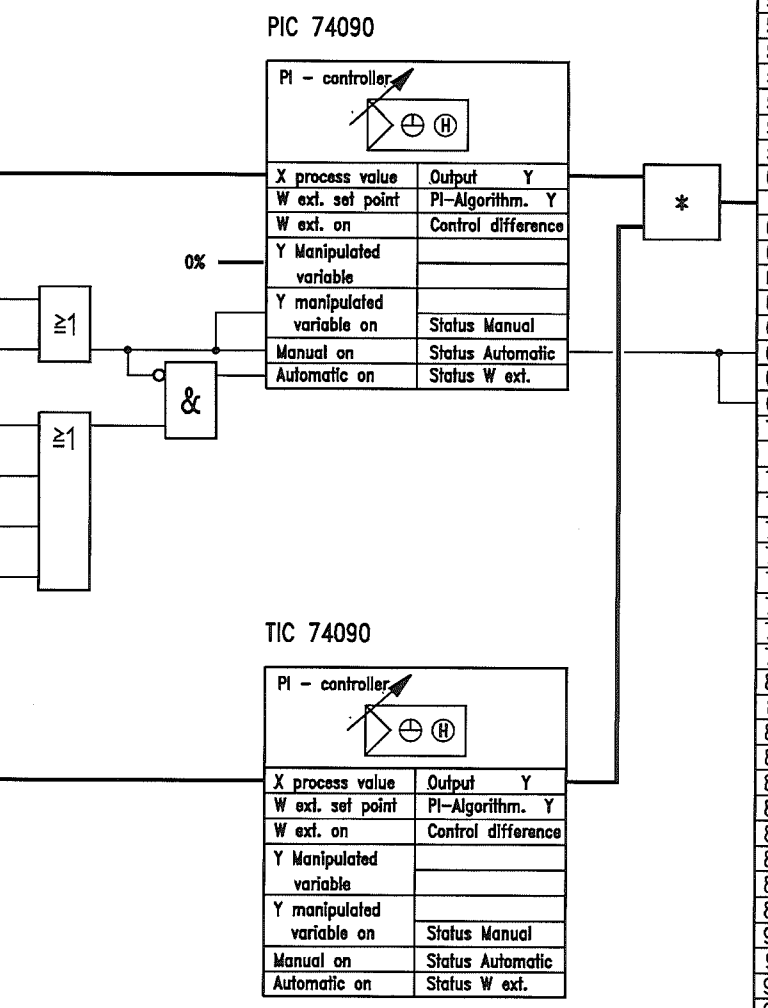
REPLACED BY:

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
GAN beh. vaporizer	P-transmitter	E	PT 74090	10
				11
				12
				13
				14
Trip P74201	from page no. 82/74	1	US 74201	15
				16
Trip P74101	from page no. 63/74	1	US 74101	17
				18
				19
Open liquid valves	from page no. 72/88	1	Step6_P74090	20
				21
GAN in operation	from page no. 73/88	1	Step7_P74090	22
				23
Open liquid valves	from page no. 91/88	1	Step16_P74090	24
				25
GAN in operation	from page no. 92/88	1	Step17_P74090	26
				27
				28
				29
				30
				31
				32
				33
GAN beh. vaporizer	Pt100	E	TE 74090	34
				35
				36
				37
				38
				39
				40
				41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	E	UV 74090	Positioner 0-100%	GAN control valve
62			= 4-20mA	UV 74090
63				
64				
65				
66				
67	1	PIC74090_Auto	to page no. 73/20	
68				
69	1		to page no. 92/20	
70				
71				
72				
73				
74				
75				
76				
77				
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

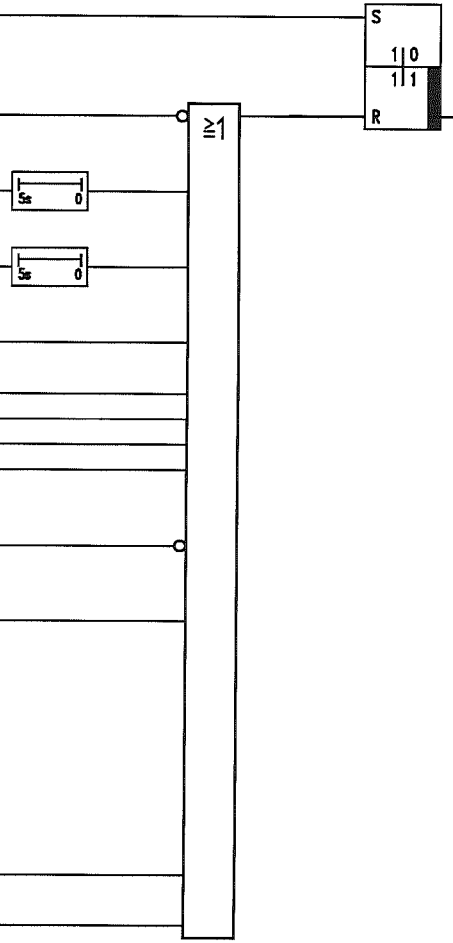
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74101
GAN CONTROL
PIC74090 / TIC74090

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 81
			OF 160 Pages
REPLACES:		REPLACED BY:	BASED:

Rang.	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
					2
					3
					4
					5
					6
					7
					8
					9
	Reset trip LIN-pump	Software reset button	1	HS 74201_Res	10
	P74201				11
					12
					13
	Emergency shut down	Contact ESD-relay	0	UZ 74090	14
					15
					16
	GAN temp. trip	Value < Min2	1	TLL 74090	17
					18
					19
	GAN temp. trip	Value < Min2	1	TLL 74095	20
					21
					22
	Fail LIN pump	from page no. 98/88	1	HS 74201_fail	23
					24
	Bearing temp.	Value < Min2	1	TLL 74240	25
	Motor bearing	Value < Min2	1	TLL 74241	26
	Bearing temp.	Value > Max2	1	THH 74240	27
	Motor bearing	Value > Max2	1	THH 74241	28
					29
					30
	Emergency shut down	Contact ESD-relay	0	HZ 72009	31
					32
					33
	Discharge pump	Value > Max2	1	PHH 74250	34
					35
					36
					37
					38
					39
					40
					41
					42
					43
	Level LP-tank	Value < Min2	1	LLL 72005	44
	B72001				45
	Pressure LP-tank	Value < Min1	1	PL 72005	46
	B72001				47
					48

Function



Path	Type	Signal/TAG-No.	Destination	Comment	Rang.
51					
52					
53					
54					
55					
56					
57					
58					
59					
60					
61	1	UA 74201	Alarm OS	"Trip LIN-pump P74201"	
62					
63					
64	1	UA 74201	to page no. 83/16	Trip P74201	
65					
66	1	UA 74201	to page no. 94/17		
67					
68	1	UA 74201	to page no. 95/39		
69					
70	1	UA 74201	to page no. 98/40		
71					
72	1	UA 74201	to page no 99/27		
73					
74	1	UA 74201	to page no. 81/15		
75					
76					
77					
78					
79					
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81					
82					
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

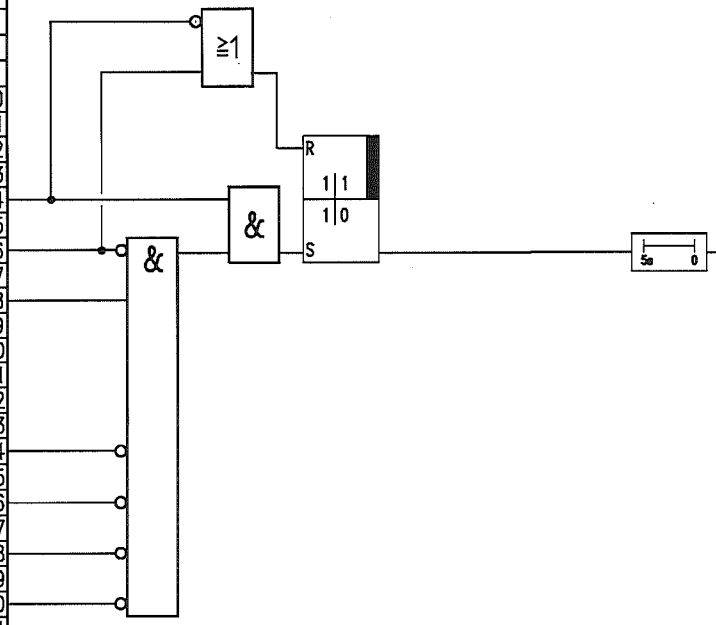
Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN
HP LIN PUMP P74201
TRIP US 74201

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 82
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
Sequence on/off	Software button OS	1	HS 74201	14
Trip P74201	from page no. 82/64	1	US 74201	16
Bottom valve open	End position switch	1	ZH 72008	18
Bearing temp.	Value < Min1	1	TL 64240	24
Motor bearing	Value < Min1	1	TL 64241	26
Bearing temp.	Value > Max1	1	TH 64240	28
Motor bearing	Value > Max1	1	TH 64241	30

Function



Path	Type	Signal/TAG-No.	Destination	Comment
62	1	P74201_Start_ok	Monitoring OS	Enabling after start
66	1	P74101_Start_ok	to page no. 86/6	
68	1	P74101_Start_ok	to page no. 87/14	
70	1	P74101_Start_ok	to page no. 88/14	
74	1	P74101_Start_ok	to page no. 90/14	
76	1	P74101_Start_ok	to page no. 91/14	
78	1	P74101_Start_ok	to page no. 92/14	
80	1	P74101_Start_ok	to page no. 98/28	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN
LIN BACK UP PUMP P74201
SEQUENCE START / STOP

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
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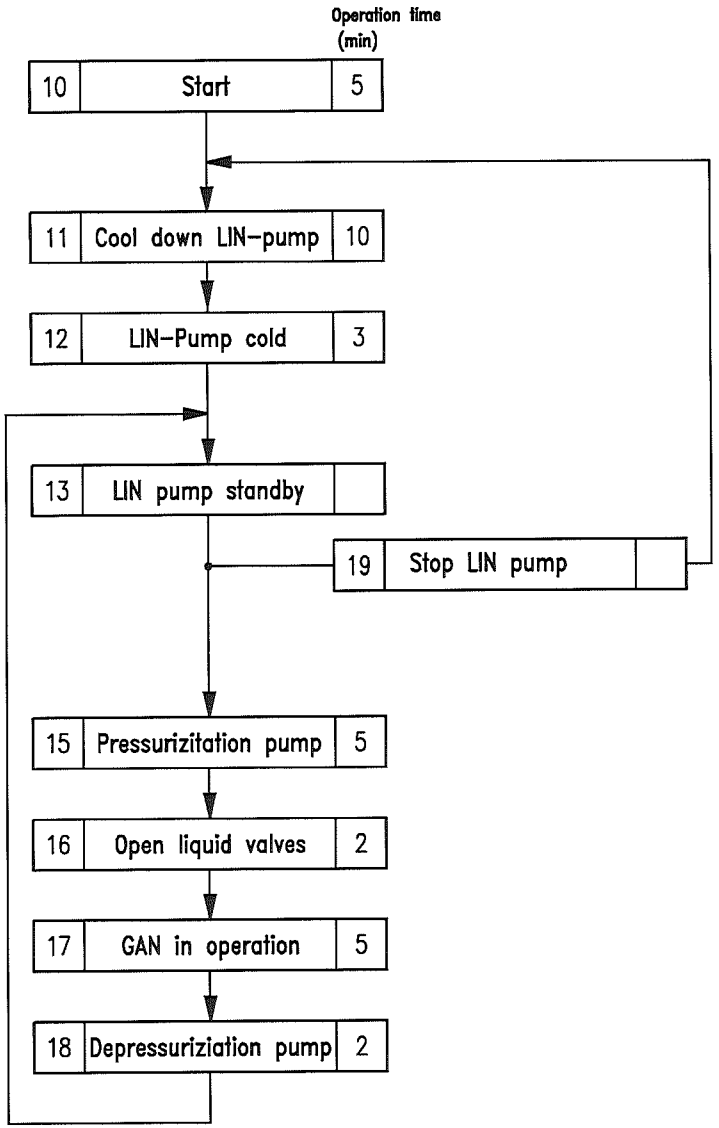
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
ALL STEPS OF THE LIN PUMP SEQUENCE CONTROL

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: REPLACED BY: BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Elchler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
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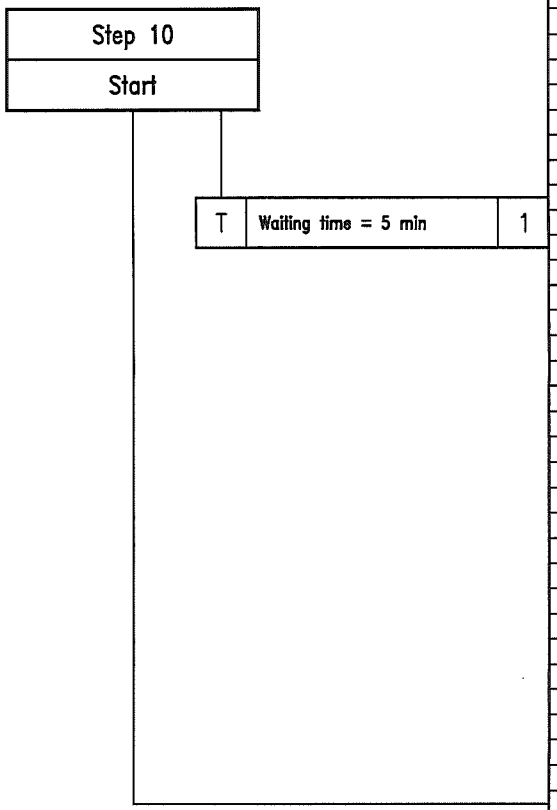
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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66				
67	1	Waitingtime10	to page no. 86/4	Time over initial
68				position
69				
70				
71				
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74				
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77				
78				
79				
80				
81				
82				
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88				
89				
90	1	Step10	to page no. 86/2	Initial position
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
NEW START OF THE SEQUENCE, ALL VALVES AT START POSITION

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Function

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Initial position	from page no. 85/90	1	Step10	2
				3
Time over	from page no. 85/67	1	Waitingtime10	4
				5
Enabling after start	from page no. 83/66	1	P74201_Start_ok	6
				7
LIN pump off	Check back signal	0	EH 74101	8
				9
Liquid valve closed	from page no. 99/63	0	HS 74250	10
				11
Start cool down pump	Software button OS	1	HS 74201_CD	12
				13
				14
				15
				16
				17
				18
Stop LIN pump	from page no. 75/97	1	Step19	19
				20
				21
				22
				23
				24
				25
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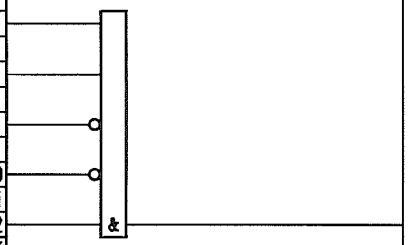

Step 11

Cool down pump

NS	US 74210	1
NS	PIC 74250	2
NS	Spare	3
T	Waiting time 1 = 10 min	4
T	Min waiting time = 3 min	5
T	Monitoring = 15 min	6

The times are set by P74201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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75				
76				
77	1	Step11_US74210	to page no. 95/7	Open valve HV74210
78				
79	1	Step11_H74270_R10	to page no. 96/2	Open HV74270 from
80				10% over ramp
81				
82				
83	1	Waitingtime11	to page no. 87/4	Time over
84				
85	1	Minwaitingtime11	to page no. 87/8	Time over
86				
87	1	KC74201_T011	Alarm OS	"Check time over"
88				
89				
90				
91				
92				
93				
94				
95				
96				
97	1	Step11	to page no. 87/2;	Cool down pump
98			97/12	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
COOL DOWN PUMP

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Cool down pump	from page no. 86/97	1	Step11	2
				3
Time over	from page no. 86/83	1	Waitingtime11	4
				5
Next step	Software push button	1	HS 74201_1	6
				7
Time over	from page no. 86/85	1	Minwaitingtime11	8
				9
Cool down temp.	Value < Min	1	TL 74230	10
				11
Stop sequence	Software button OS	1	HS 74201_2	12
				13
Enabling after start	from page no.83/68	1	P74201_Start_ok	14
				15
				16
				17
HV 74210 open	from page no. 95/75	1	HS 74210	18
				19
HV 74270 open	Y > 50%	1	H 74270_50	20
				21
Liquid valve closed	from page no. 99/61	0	HS 74250	22
				23
				24
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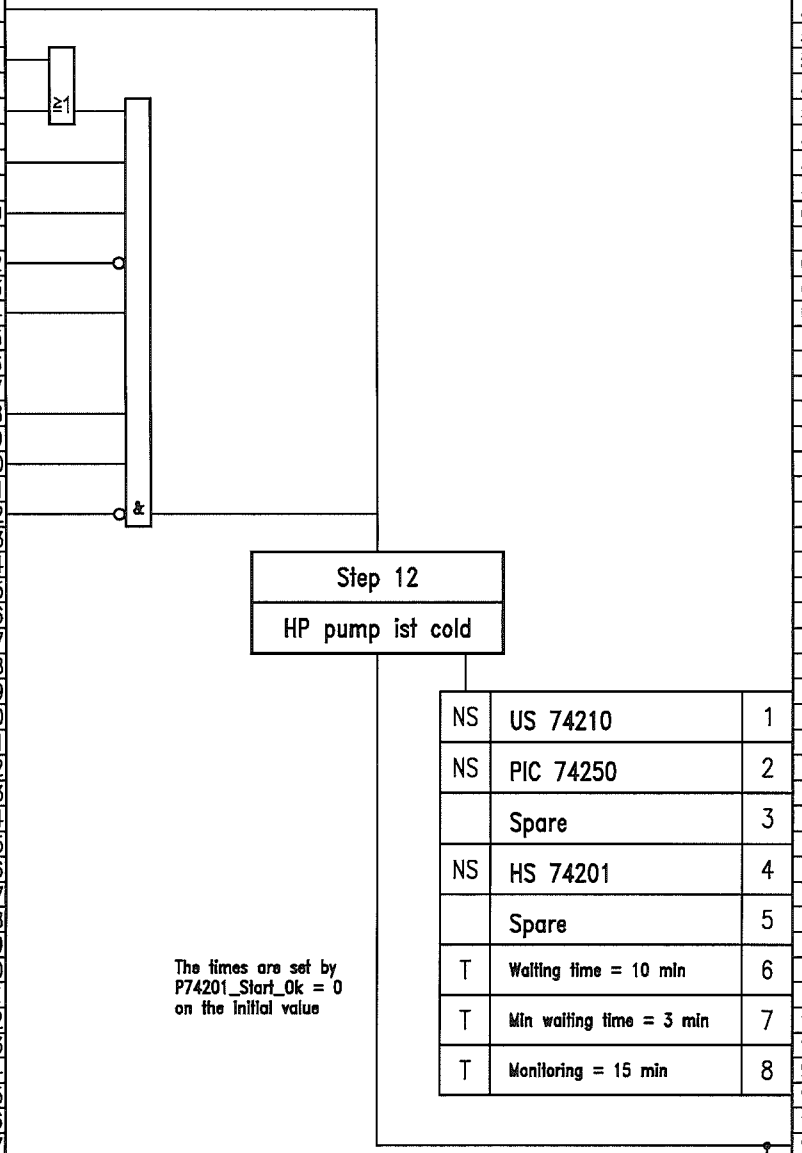
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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78				
79				
80	1	Step12_HS74210	to page no. 95/9	Open valve HV74210
81				
82	1	Step12_H74270_RC50	to page no. 97/12	Close valve HV74270
83				down to 50% over ramp
84				
85				
86	1	Step12_H74201	to page no. 98/12	Pump P74201 on
87				
88				
89				
90	1	Waitingtime12	to page no. 88/4	time over
91				
92	1	Minwaitingtime12	to page no. 88/8	time over
93				
94	1	KC74201_T012	Alarm OS	"Check time error"
95				
96				
97	1	Step12	to page no. 88/2;	HP LIN pump is cold
98	1		97/14	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
PUMP COLD

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			
PROJ. NO.	K70101		Page no. 87
REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pump is cold	from page no. 87/97	1	Step12	2
				3
Time over	from page no. 87/90	1	Waitingtime12	4
				5
Next step	Software push button	1	HS 74201_1	6
				7
Time over	from page no. 87/92	1	Minwaitingtime12	8
				9
Cool down temp.	Value < Min	1	TL 74230	10
				11
Stop sequence	Software button OS	1	HS 74201_2	12
				13
Enabling after start	from page no. 84/70	1	P74201_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74201	16
				17
HV 74210 open	from page no. 95/73	1	HS 74210	18
				19
HV 74270 open	Y > 40%	1	H 74270_40	20
				21
Liquid valve closed	from page no. 99/59	0	HS 74250	22
				23
				24
				25
				26
				27
				28
				29
time over	from page no. 93/90	1	Waitingtime18	30
				31
Next step	Software push button	1	HS 64201_1	32
				33
time over	from page no. 93/92	1	Minwaitingtime18	34
				35
Pressure LIN pump	Value > Max1	1	PH 74250	36
				37
Breaking off	from page no. 93/97	1	Step18	38
emergency supply				39
				40
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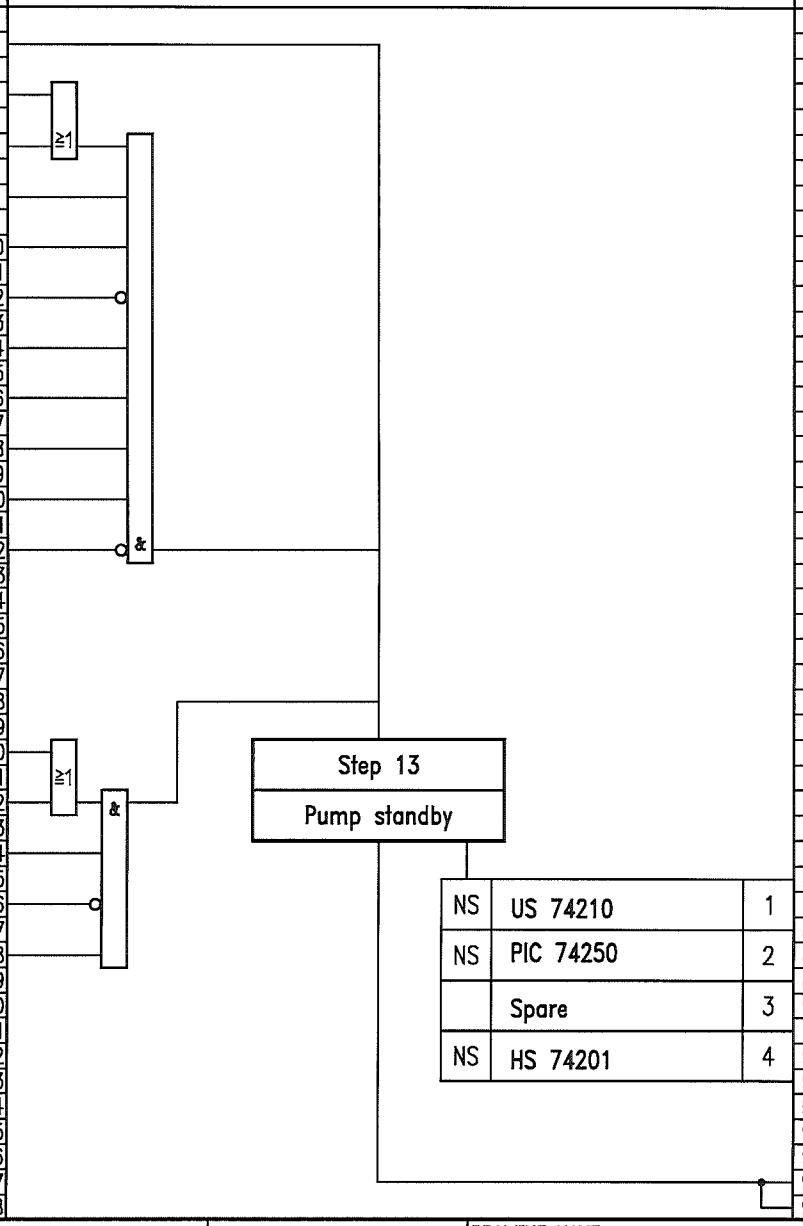
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
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85				
86	1	Step13_HS74210	to page no. 95/11	Open valve HV74110
87				
88	1	Step13_H74270_STP	to page no. 96/22	Valve HV74170 stop
89				
90				
91				
92	1	Step13_H74201	to page no. 98/14	Pump P74101 on
93				
94				
95				
96				
97	1	Step13	to page no. 90/2	HP LIN pump standby
98	1		to page no. 94/2;	97/16

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Füllingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
PUMP STANDBY

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

	Comment	Origin	Type	Signal-/TAG-No.	Path
					1
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Function

Path	Type	Signal/TAG-No.	Destination	Comment
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
DRWG. NO.			Page no. 89
PROJ. NO.		K70101	Of 160 Pages
REPLACES:		REPLACED BY:	BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
HP LIN pump standby	from page no. 88/97	1	Step13	2
				3
				4
				5
Cool down temp.	Value < Min	1	TL 74230	6
				7
HV 74270 open	Y > 40%	1	H 74270_40	8
				9
Liquid valve closed	from page no. 99/55	0	HS 74250	10
				11
Stop sequence	Software button OS	1	HS 74201_2	12
				13
Enabling after start	from page no. 83/74	1	P74201_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74201	16
				17
HV 74210 open	from page no. 95/69	1	HS 74210	18
				19
Start emergency supply	Sofware push button	1	HS 74201_1	20
				21
				22
				23
				24
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				26
				27
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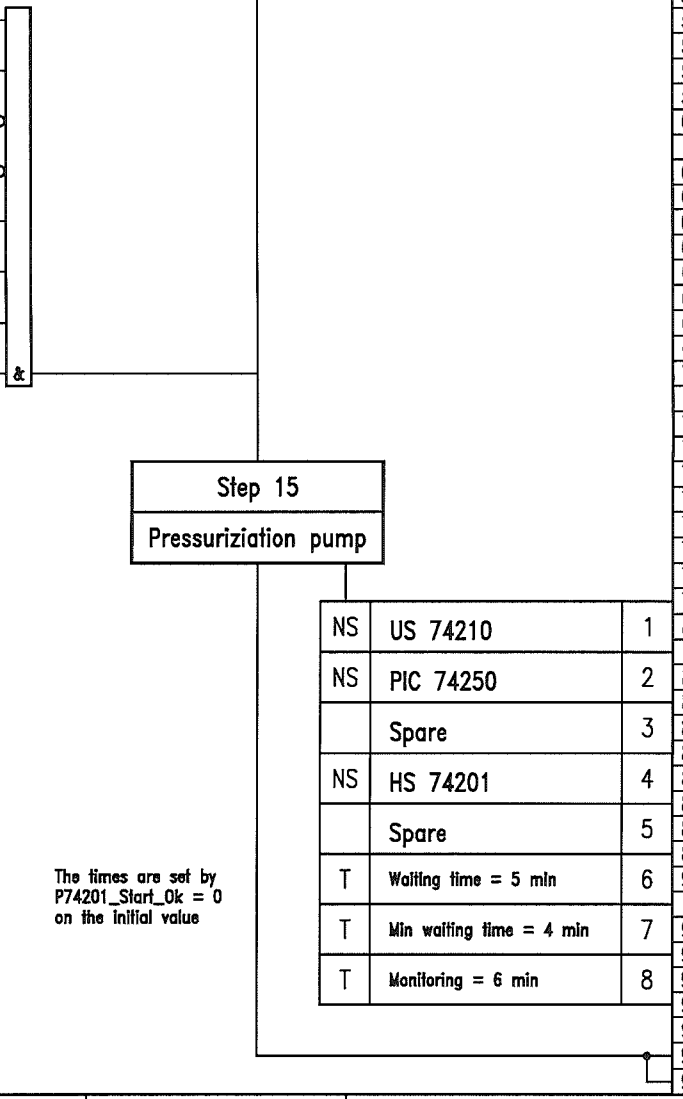
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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79				
80	1	Step15_HS74210	to page no. 95/15	Open valve HV74210
81				
82	1	Step15_H74270_RC	to page no. 96/25	Close valve HV74270
83				over ramp
84				
85				
86	1	Step5_H74201	to page no. 98/18	Pump P74201 on
87				
88				
89				
90	1	Waitingtime15	to page no. 91/4	time over
91				
92	1	Minwaitingtime15	to page no. 91/8	time over
93				
94	1	KC74201_T015	Alarm OS	"Check time error"
95				
96				
97	1	Step15	to page no. 91/2;	Pressuriziation pump
98	1		97/20	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
PRESSURIZIATION PUMP

SIZE A3 | FUNKTION DIAGRAM

DRWG. NO.

PROJ. NO. K70101

REPLACES: | REPLACED BY: | BASED:

DATE 26.11.2004
AUTHOR Frohn
CHECK Eichler
STD.

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Pressurization pump	from page no. 90/97	1	Step15	2
				3
Time over	from page no. 90/90	1	Waitingtime15	4
				5
Next step	Software push button	1	HS 74201_1	6
				7
Time over	from page no. 90/92	1	Minwaitingtime05	8
				9
Liquid valve closed	from page no. 99/53	0	HS 74250	10
				11
Stop sequence	Software button OS	1	HS 74201_2	12
				13
Enabling after start	from page no. 83/76	1	P74201_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74201	16
				17
HV 74210 open	from page no. 95/67	1	HS 74210	18
				19
Pressure HP pump	Value > Max1	1	PH 74250	20
				21
				22
				23
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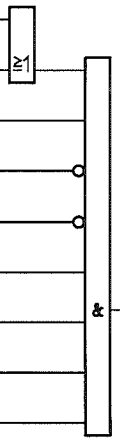
Function



Step 16

Open liquid valves

NS	US 74210	1
NS	PIC 74250	2
	Spare	3
NS	HS 74201	4
	Spare	5
NS	HS 74250	6
	Spare	7
NS	PIC 74090	8
T	Waiting time = 2 min	9
T	Min waiting time = 1 min	10
T	Monitoring = 3 min	11

The times are set by P74201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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73				
74	1	Step16_HS74210	to page no. 95/17	Open valve HV74210
75				
76	1	Step16_H74270_RC	to page no. 96/26	Close valve HV74270
77				over ramp
78				
79				
80	1	Step16_H74201	to page no. 98/20	Pump P74201 on
81				
82				
83				
84	1	Step16_HS74250	to page no. 99/9	Open valve HV74250
85				
86				
87				
88	1	Step16_PC74090	to page no. 81/24	Enable pressure controller
89				W = 25 bar
90	1	Waitingtime16	to page no. 92/4	time over
91				
92	1	Minwaitingtime16	to page no. 92/8	time over
93				
94	1	KC74201_T016	Alarm OS	"Check time error"
95				
96				
97	1	Step16	to page no. 92/2;	Open liquid valves
98	1		97/22	

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
OPEN LIQUID VALVES

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Page no. 91
Of 160 Pages

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
Open liquid valves	from page no. 91/97	1	Step16	2
				3
Time over	from page no. 91/90	1	Waitingtime16	4
				5
Next step	Software push button	1	HS 74201_1	6
				7
Time over	from page no. 91/92	1	Minwaitingtime06	8
				9
Liquid valve open	from page no. 99/65	1	HS 74250	10
				11
Stop sequence	Software button OS	1	HS 74201_2	12
				13
Enabling after start	from page no. 83/78	1	P74201_Start_ok	14
				15
HP LIN pump on	Check back signal	1	EH 74201	16
				17
HV 74210 open	from page no. 95/65	1	HS 74210	18
				19
PIC 74090 on "Auto"	from page no. 81/67	1	PIC 74090_Auto	20
				21
				22
				23
				24
				25
				26
				27
				28
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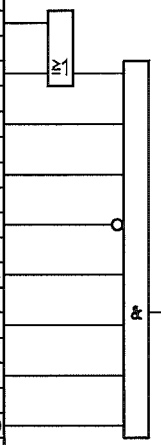
Function



Step 17

GAN in operation

NS	US 74210	1
NS	PIC 74250	2
	Spare	3
NS	HS 74201	4
	Spare	5
NS	HS 74250	6
	Spare	7
NS	PIC 74090	8
T	Waiting time = 5 min	9

The times are set by P74201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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73				
74	1	Step17_HS74210	to page no. 95/19	Open valve HV74210
75				
76	1	Step17_H74270_RC	to page no. 96/36	Close valve HV74270
77				over ramp
78				
79				
80	1	Step17_H74201	to page no. 98/22	Pump P74201 on
81				
82				
83				
84	1	Step17_HS74250	to page no. 99/11	Open valve HV74250
85				
86				
87				
88	1	Step17_PC74090	to page no. 81/26	Enable pressure controller
89				W = 25 bar
90	1	Waitingtime17	to page no. 93/20	Time over
91				
92				
93				
94				
95				
96				
97	1	Step17	to page no. 93/2;	GAN in operation
98	1		97/26	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
BACK UP GAN SUPPLY IN OPERATION

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
GAN in operation	from page no. 92/97	1	Step17	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
				15
				16
				17
				18
				19
Time over	from page no. 92/90	1	Waitingtime17	20
				21
Stop emergency	Software push button	1	HS 64201_1	22
supply				23
				24
				25
				26
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				29
				30
				31
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				48

Function

&

Step 18

Depressuriziation pump

NS	US 74210	1
NS	PIC 74250	2
NS	Spare	3
NS	HS 74201	4
NS	Spare	5
T	Waiting time = 2 min	6
T	Min waiting time = 1 min	7
T	Monitoring = 3 min	8

The times are set by P74201_Start_Ok = 0 on the initial value

Path	Type	Signal/TAG-No.	Destination	Comment
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78				
79				
80	1	Step18_HS74210	to page no. 95/21	Open valve HV74210
81				
82	1	Step18_H74270_R50	to page no. 96/38	Open valve HV74270
83				to 50% over ramp
84				
85				
86	1	Step18_H74201	to page no. 98/24	Pump P74201 on
87				
88				
89				
90	1	Waitingtime18	to page no. 88/30	time over
91				
92	1	Minwaitingtime18	to page no. 88/34	time over
93				
94	1	KC74201_T018	Alarm OS	"Check time error"
95				
96				
97	1	Step18	to page no. 88/38	Depressuriziation pump
98			97/24	

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
STOP EMERGENCY SUPPLY
DEPRESSURIZIATION PUMP

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY: | BASED:

DATE: 26.11.2004
AUTHOR: Frohn
CHECK: Eichler
STD.:

Page no. 93
OF 160 Pages

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
LIN pump standby	from page no. 88/98	1	Step13	2
				3
				4
				5
				6
				7
				8
				9
				10
				11
				12
				13
				14
Stop LIN pump	Software push button	1	HL 74201	15
				16
Trip P74201	from page no. 82/66	1	US 74201	17
				18
				19
				20
				21
				22
				23
				24
				25
				26
				27
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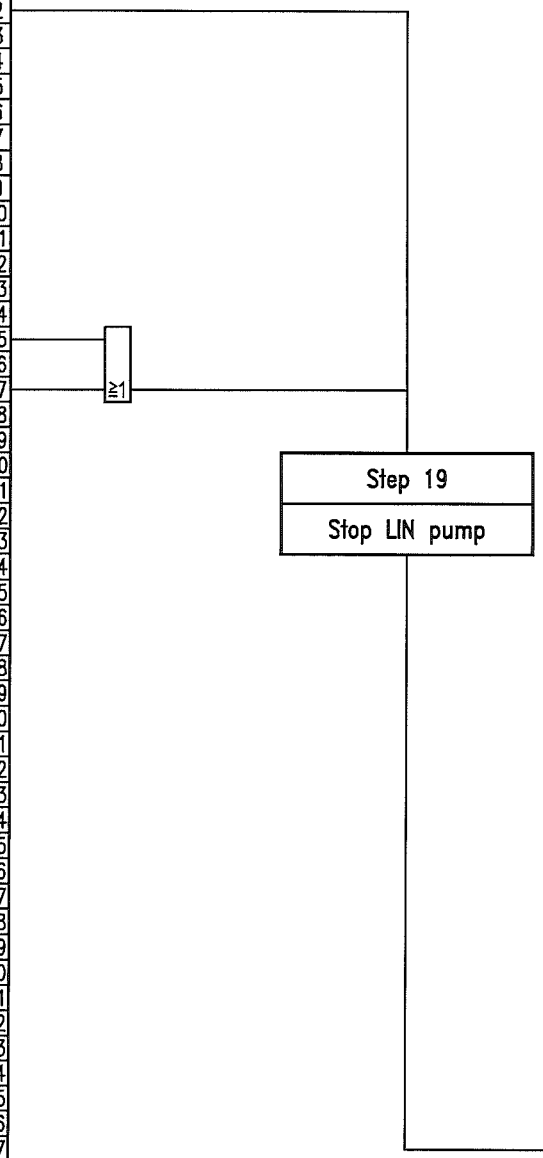
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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94				
95				
96				
97	1	Step19	to page no 86/19	Stop LIN pump
98				

JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

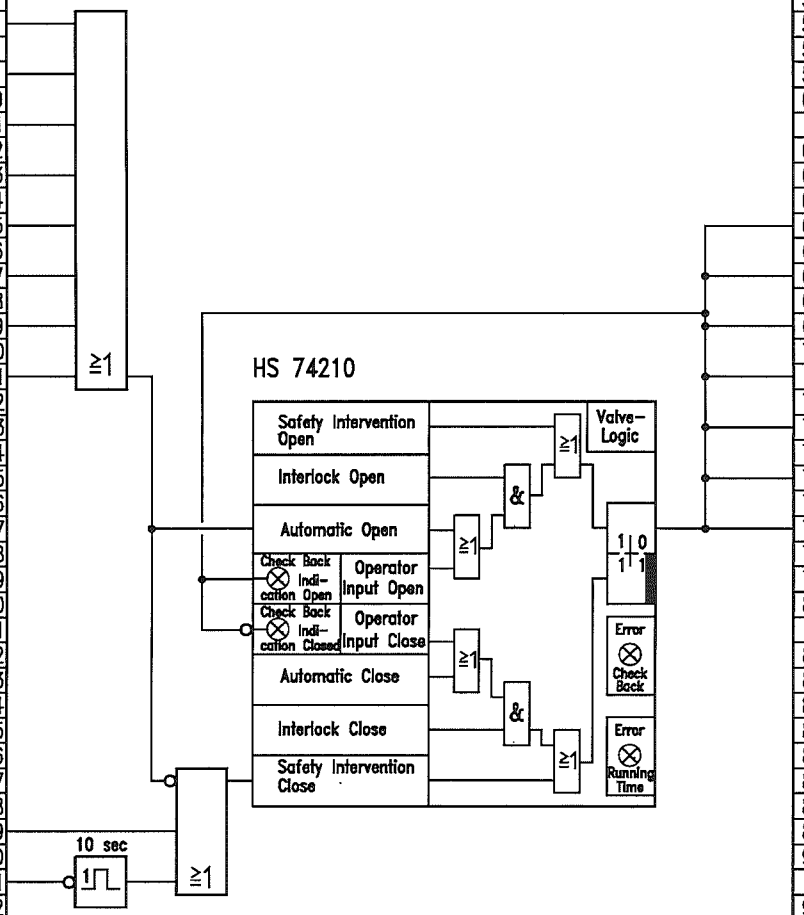
Air Liquide AGS GmbH
Fölingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
STOP PUMP

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 94
			OF 160 Pages
REPLACES:	REPLACED BY:		BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
Cool down LIN-pump	from page no. 86/77	1	Step11_US74210	7
				8
LIN-pump cold	from page no. 87/80	1	Step12_US74210	9
				10
LIN-pump standby	from page no. 88/86	1	Step13_US74210	11
				12
		1		13
				14
Pressuriziation pump	from page no. 90/80	1	Step15_US74210	15
				16
Open liquid valves	from page no. 91/74	1	Step16_US74210	17
				18
GAN in operation	from page no. 92/74	1	Step17_US74210	19
				20
Depressuriziation	from page no. 93/80	1	Step18_US74210	21
				22
				23
				24
				25
				26
				27
				28
				29
				30
				31
				32
				33
				34
				35
				36
				37
				38
Trip LIN-pump	from page no. 82/68	1	US 74201	39
				40
LIN-pump off	Check back signal	0	EH 74201	41
				42
				43
				44
				45
				46
				47
				48

Function



Path	Type	Signal/TAG-No.	Destination	Comment
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63				
64				
65	1	US 74210	to page no. 92/18	
66				
67	1	US 74210	to page no. 91/18	
68				
69	1	US 74210	to page no. 90/18	
70				
71	1	US 74210		
72				
73	1	US 74210	to page no. 88/18	
74				
75	1	US 74210	to page no. 87/18	
76				
77	1	US 74210	Solenoid valve	Open valve HV74210
78				LIN from B72001
79				
80				
81				
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
LIN FROM LP-TANK B72001
HS 74210

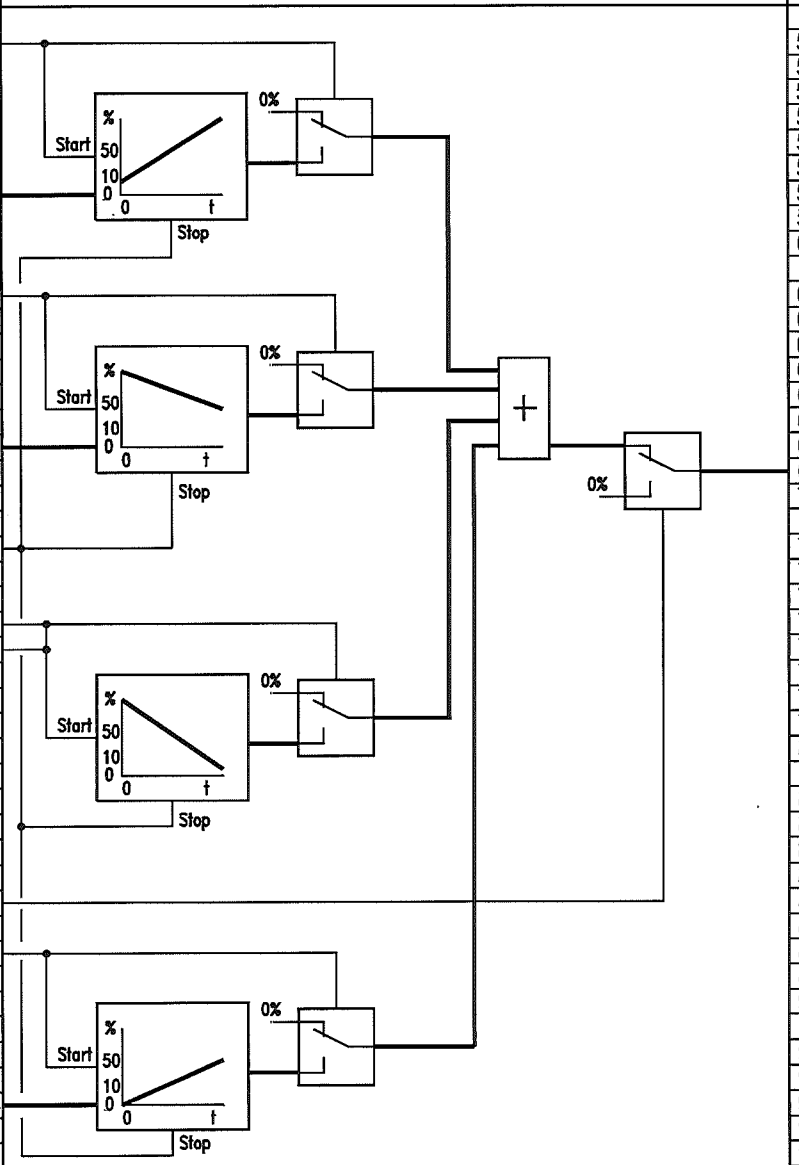
SIZE	A3
DRWG. NO.	
PROJ. NO.	K70101
REPLACES:	
REPLACED BY:	
BASED:	

FUNKTION DIAGRAM

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

Rang.	Text	Herkunft	Typ	Signalbezeichnung	Pfad
					1
	Cool down valve	from page no. 86/79	1	Step11_H74270_R10	2
	ramp upwards				3
					4
					5
					6
					7
	Start value	Control value 10%	E		8
					9
					10
					11
	Cool down valve	from page no. 87/82	1	Step12_H74270_RC50	12
	downwards to 50%				13
					14
					15
					16
					17
	End value	Control value 50%	E		18
					19
					20
					21
	Cool down valve	from page no. 88/88	1	Step13_H74270_STP	22
	ramp stop				23
					24
	Cool down valve	from page no. 90/82	1	Step15_H74270_RC	25
	closing over ramp	from page no. 91/76	1	Step16_H74270_RC	26
					27
					28
					29
					30
					31
					32
					33
					34
					35
	Cool down valve	from page no. 92/76	1	Step17_H74270_CI	36
	closing immediatly				37
	Cool down valve	from page no. 93/82	1	Step18_H74270_R50	38
	ramp upwards				39
					40
					41
					42
					43
	End value	Control value 50%	E		44
					45
					46
					47
					48

Verknüpfung



Pfad	Typ	Signalbezeichnung	Verwendung	Text	Rang.
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68					
69	E	HC74270_Man	to page no. 97/8	Control value manual	
70					
71					
72					
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81					
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JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fürstingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
COOL DOWN VALVE HV74270

SIZE: A3 | FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: | REPLACED BY:

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
Discharge P74201	P-transmitter	E	PT 74250	5
				6
				7
Control value manual	from page no. 96/69	E	HC74270_Man	8
				9
				10
				11
Cool down pump	from page no. 86/98	1	Step11	12
				13
HP pump is cold	from page no. 87/98	1	Step12	14
				15
Pump standby	from page no. 88/98	1	Step13	16
				17
		1		18
				19
Pressurization pump	from page no. 90/98	1	Step15	20
				21
Open liquid valves	from page no. 91/98	1	Step16	22
				23
Depressurization	from page no. 93/98	1	Step18	24
				25
GOX in operation	from page no. 92/98	1	Step17	26
				27
				28
				29
				30
				31
				32
				33
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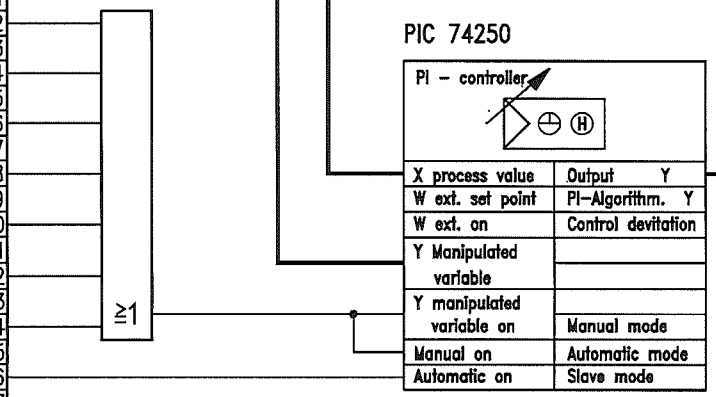
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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68	E	HV 74270	Positioner 0-100%	Cool down valve
69			= 4-20mA	HV74270
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN
LIN BACK UP PUMP P74201
DISCHARGE PRESSURE PIC74250
COOL DOWN VALVE HV74270

SIZE: A3

FUNKTION DIAGRAM

DRWG. NO.:

PROJ. NO.: K70101

REPLACES: REPLACED BY: BASED:

DATE	26.11.2004
AUTHOR	Frohn
CHECK	Eichler
STD.	

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
				9
				10
				11
HP pump is cold	from page no. 87/86	1	Step12_HS74201	12
				13
Pump standby	from page no. 88/92	1	Step13_HS74201	14
				15
		1		16
				17
Pressuriziation pump	from page no. 90/86	1	Step15_HS74201	18
				19
Open liquid valves	from page no. 91/80	1	Step16_HS74201	20
				21
GAN in operation	from page no. 92/80	1	Step17_HS74201	22
				23
Depressuriziation	from page no. 93/86	1	Step18_HS74201	24
				25
				26
				27
Ready to start	from page no. 83/80	1	P74201_Start_Ok	28
				29
				30
				31
LIN-pump on	Check back signal	1	EH 74201	32
				33
				34
				35
				36
				37
				38
				39
Trip LIN-Pump	from page no. 82/70	1	US 74201	40
				41
				42
				43
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				47
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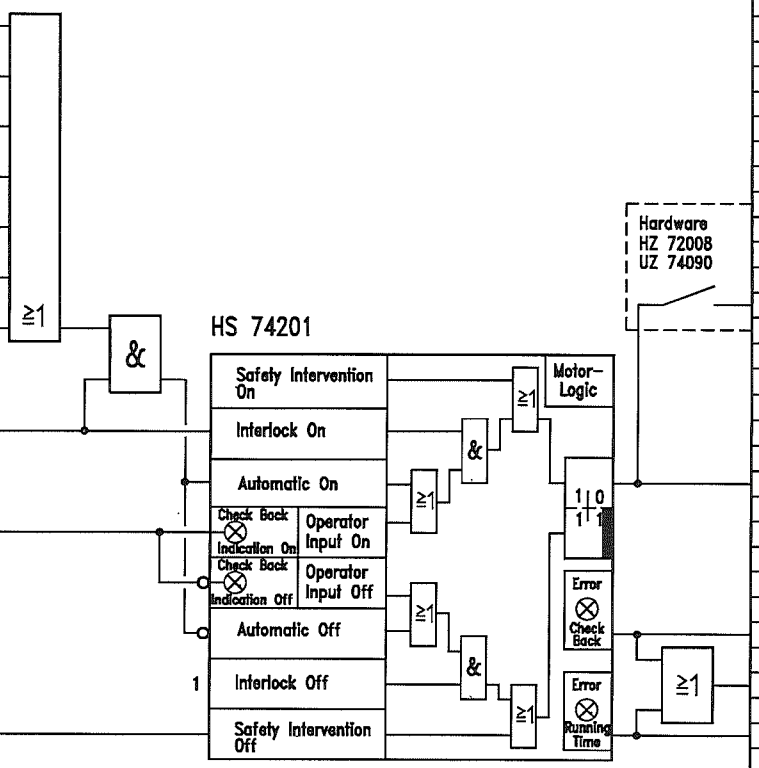
Function



Path	Type	Signal/TAG-No.	Destination	Comment
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72				
73	1	HS 74201	Signal to MCC	LIN-pump P74201 on
74				
75				
76				
77				
78				
79				
80	1	HS 74201		
81				
82				
83				
84				
85				
86	1	HS 74201_CB	Alarm OS	"Check back error"
87				
88	1	HS 74201_fail	to page no. 82/23	LIN-pump fail
89				
90	1	HS 74201_RT	Alarm OS	"Running time error"
91				
92				
93				
94				
95				
96				
97				
98				

JOB NO.	FILE NO.	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fittingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
HS 74201

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
PROJ. NO.	K70101		Page no. 98
REPLACES:		REPLACED BY:	OF 160 Pages
			BASED:

Comment	Origin	Type	Signal-/TAG-No.	Path
				1
				2
				3
				4
				5
				6
				7
				8
Open liquid valves	from page no. 91/84	1	Step16_HS74250	9
				10
GAN in operation	from page no. 92/84	1	Step17_HS74250	11
				12
				13
				14
				15
				16
				17
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				19
				20
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				25
				26
Trip P74101	from page no. 82/72	1	US 74201	27
				28
				29
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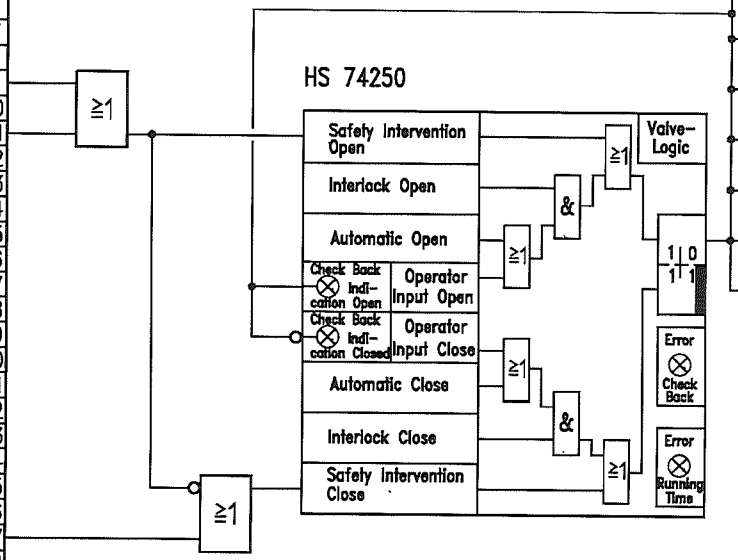
Function



Path	Type	Signal/TAG-No.	Destination	Comment
51				
52				
53	0	HS 74250	to page no. 91/10	
54				
55	0	HS 74250	to page no. 90/10	
56				
57	0			
58				
59	0	HS 74250	to page no. 88/22	
60				
61	0	HS 74250	to page no. 87/22	
62				
63	0	HS 74250	to page no. 86/10	
64				
65	1	HS 74250	to page no. 92/10	
66				
67	1	HS 74250	Solenoid valve	Open liquid valve
68				HV 74250
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JOB NO.	FILE NO	REV.	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME:
TANK STORAGE LIN PUMP P74201
LIQUID VALVE HV74250

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
DRWG. NO.			STD.
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REPLACES:		REPLACED BY:	Of 160 Pages
			BASED:

	Comment	Origin	Type	Signal-/TAG-No.	Path	Function	Path	Type	Signal/TAG-No.	Destination	Comment	
					1		51					
					2		52					
					3		53					
					4		54					
					5		55					
					6		56					
					7		57					
					8		58					
					9		59					
					10		60					
					11		61					
					12		62					
					13		63					
					14		64					
					15		65					
					16		66					
					17		67					
					18		68					
					19		69					
					20		70					
					21		71					
					22		72					
					23		73					
					24		74					
					25		75					
					26		76					
					27		77					
					28		78					
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					38		88					
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					41		91					
					42		92					
					43		93					
					44		94					
					45		95					
					46		96					
					47		97					
					48		98					

JOB NO.	FILE NO	REV	DATE	REVISIONS	BY	CHKD.

PROJECT NAME: ASU KOSICE

PLANT PART: TANK FARM

AIR LIQUIDE

Air Liquide AGS GmbH
Fütingsweg 34
47805 Krefeld

DRAWING NAME: SPARE

SIZE	A3	FUNKTION DIAGRAM	DATE 26.11.2004
			AUTHOR Frohn
			CHECK Eichler
			STD.
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