

## **14. Level Transmitter Data Sheets**

**Item:** Level Transmitter  
**Plant:** A690 / L110  
**Location:** Kosice  
**Project:** K70101 ASU No. 9 Kosice  
**By:** JJ

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**Date:** 3/14/2005  
**Rev:** 0  
**Vendor:**  
**Spec-ID:** SP425

cover

<u>tag no.</u>	<u>revision no.</u>	<u>date</u>
LT13003	0	14/03/05
LT13013	0	14/03/05
LT14003	0	14/03/05
LT21060	0	14/03/05
LT21003	0	14/03/05
LT22001	0	14/03/05
LT22011	0	14/03/05
LT40053	0	14/03/05
LT40007	0	14/03/05
LT40017	0	14/03/05
LT43023	0	14/03/05
LT43027	0	14/03/05

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0	3/14/2005	JJ			1			
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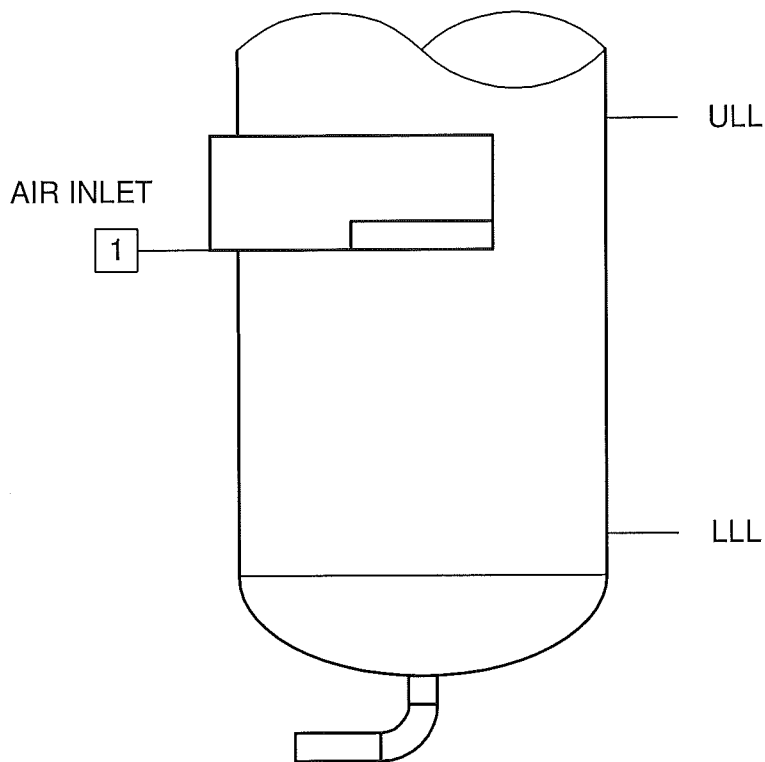
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**AIR LIQUIDE**

Air Liquide AGS GmbH

**Item:** Level Transmitter  
**Plant:** A690 / L110  
**Location:** Kosice  
**Project:** K70101 ASU No. 9 Kosice  
**By:** JJ

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**Vendor:**  
**Spec-ID:** SP425

**Vessel:** W13001**Direct Contact After Cooler****TAG:** LT13003

**Medium:** liquid water  
**Density of the liquid:** 1000 kg/m<sup>3</sup>  
**Transmitter range:** 0 - 206 mbar

	height	level	$\Delta p$		height	level	$\Delta p$
	mm	%	mbar		mm	%	mbar
1	2100	100	206	normal operation	630	30	62
				minimum level	420	20	41
				maximum level	1680	80	165
				emergency level high	1995	95	196
ULL	2100	100	206	emergency level low	-	-	-
LLL	0	0	0				

**Note:**

- 1) Emergency Level High is to protect air inlet nozzle against being submerged.

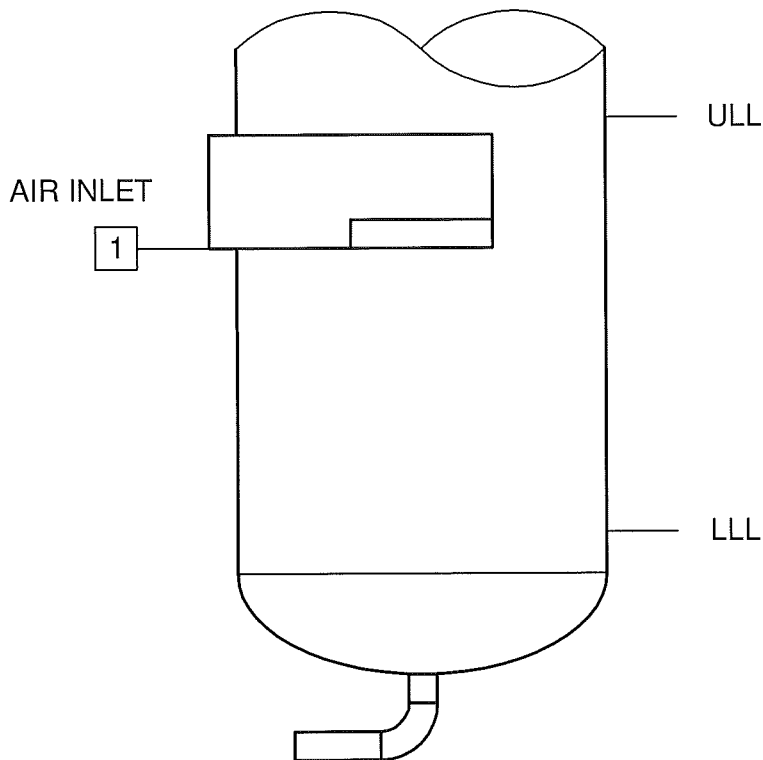
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**Vessel:** W13001

**Direct Contact After Cooler**

**TAG:** LT13013



**Medium:** liquid water  
**Density of the liquid:** 1000 kg/m<sup>3</sup>  
**Transmitter range:** 0 - 206 mbar

	height	level	$\Delta p$		height	level	$\Delta p$
	mm	%	mbar		mm	%	mbar
1	2100	100	206	normal operation	630	30	62
				minimum level	420	20	41
				maximum level	1680	80	165
				emergency level high	1995	95	196
ULL	2100	100	206	emergency level low	-	-	-
LLL	0	0	0				

**Note:**

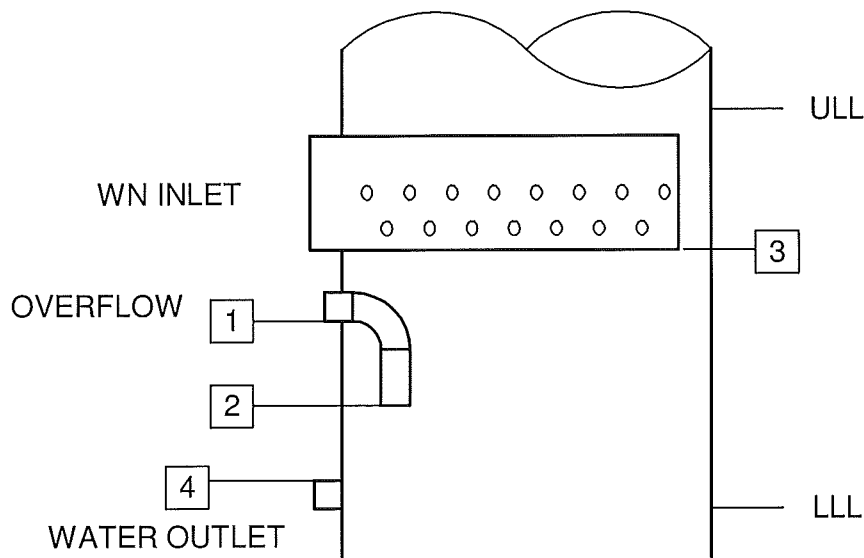
- 1) Emergency Level High is to protect air inlet nozzle against being submerged.

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rev	date	name	checked	rev	date	name	checked

File:

**Vessel:** W14001 **Chill Tower**

**TAG:** LT14003



**Medium:** liquid water  
**Density of the liquid:** 1000 kg/m<sup>3</sup>  
**Transmitter range:** 0 - 206 mbar

	height	level	$\Delta p$		height	level	$\Delta p$
	mm	%	mbar		mm	%	mbar
1	1575	75	155				
2	800	38	78	normal operation	1050	50	103
3	2350	112	231	minimum level	630	30	62
4	125	6	12	maximum level	1365	65	134
				emergency level high	1995	95	196
ULL	2100	100	206	emergency level low	315	15	31
LLL	0	0	0				

**Note:**

- 1) Emergency Level High is to protect gas inlet nozzle against being submerged.
- 2) Emergency Level Low is to protect pump against cavitation.

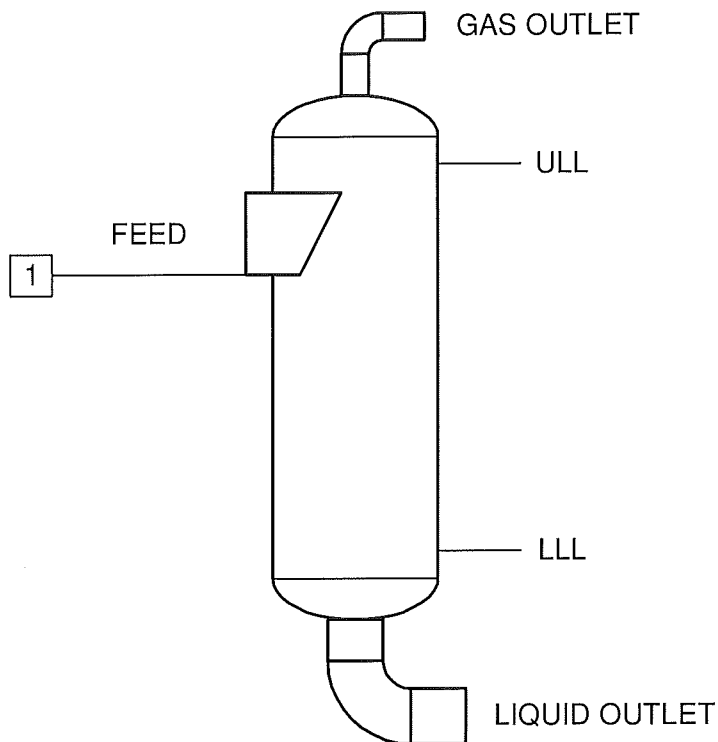
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0	3/14/2005	JJ		1			
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**File:**

**Vessel:** B21001

**Air Separator**

**TAG:** LT21060



**Medium:** Liquid air  
**Density of the liquid:** 780 kg/m<sup>3</sup>  
**Transmitter range:** 0 - 181 mbar

	height	level	$\Delta p$		height	level	$\Delta p$
	mm	%	mbar		mm	%	mbar
1	1755	74	134	normal operation	1416	60	108
				minimum level	354	15	27
				maximum level	1755	74	134
				emergency level high			
				emergency level low			
ULL	2360	100	181				
LLL	0	0	0				
ULL - LLL measured							

**Note:**

4				5			
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rev	date	name	checked	rev	date	name	checked

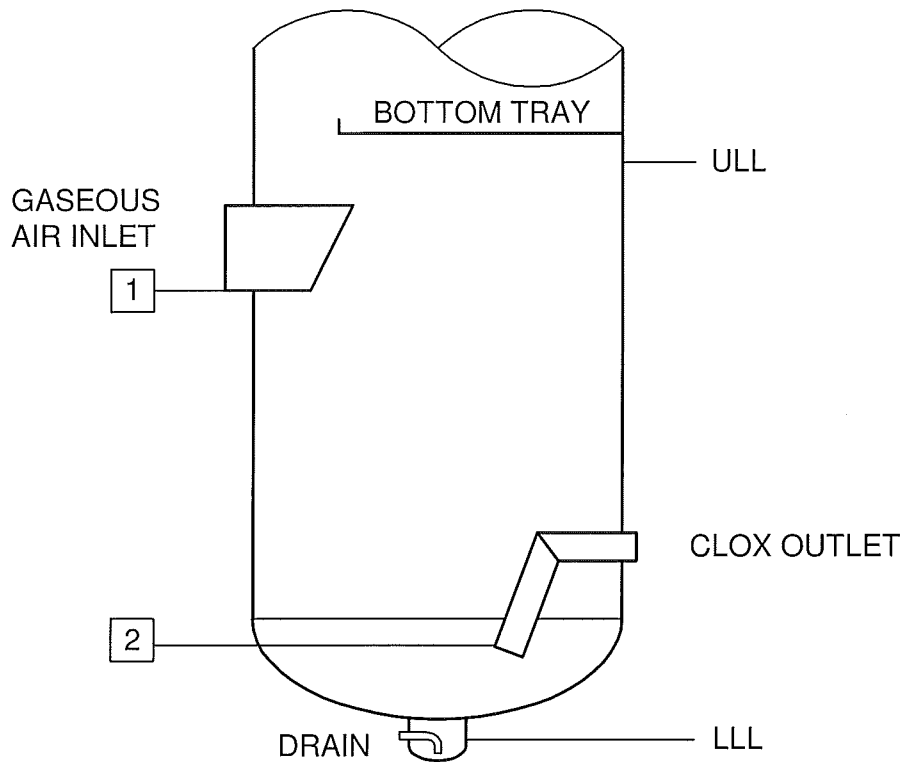
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**AIR LIQUIDE**

Air Liquide AGS GmbH

**Item:** Level Transmitter  
**Plant:** A690 / L110  
**Location:** Kosice  
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**By:** JJ

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**Vessel:** K21001**HP column****TAG:** LT21003

Medium: Crude Oxygen  
Density of the liquid: 822 kg/m<sup>3</sup>  
Transmitter range: 0 - 298 mbar

	height	level	$\Delta p$		height	level	$\Delta p$
	mm	%	mbar		mm	%	mbar
1	3113	84	251	normal operation	1109	30	89
2	492	13	40	minimum level	740	20	60
				maximum level	2219	60	179
ULL	3698	100	298	emergency level high	2958	80	239
LLL	0	0	0				
ULL - LLL measured							

**Note:**

- 1) Emergency Level High is to protect air inlet nozzle against being submerged.

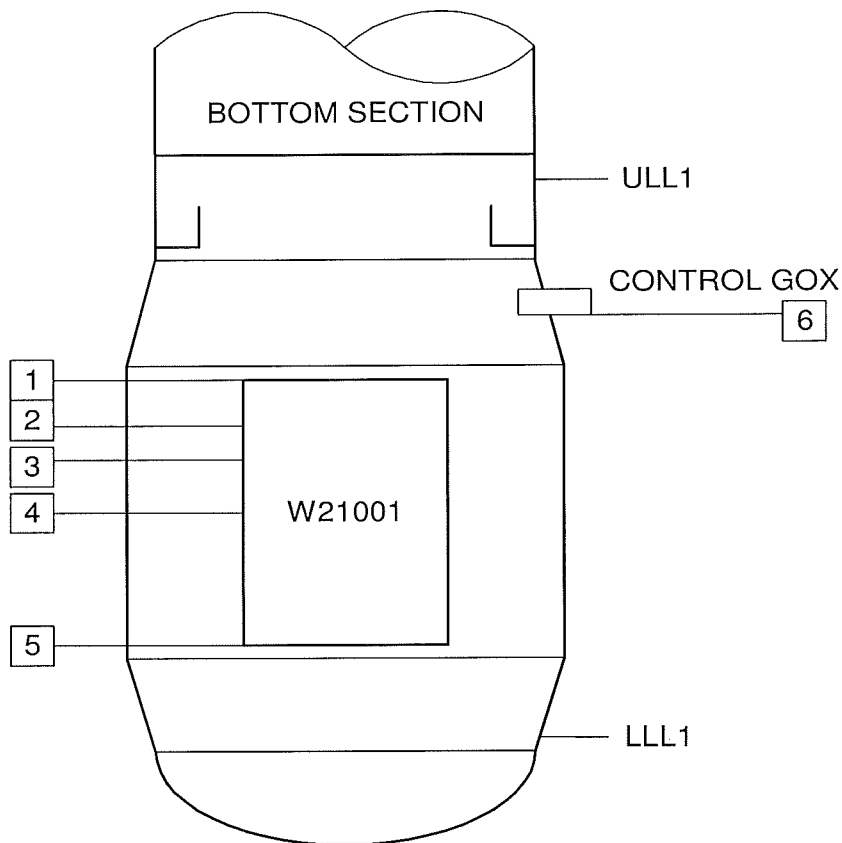
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**Vessel:** K22001

**LP-column / main condenser**

**TAG:** LT22001



**Medium:** LOX **length of condenser:** 2438 mm  
**Density of the liquid:** 1127 kg/m³  
**Transmitter range:** 0 - 754 mbar

item	height mm	level %	Δp mbar		height mm	level %	Δp mbar
1	3625	100	401	normal operation	3625	100	401
2	3381	90	374	minimum level	3381	90	374
3	3137	80	347	maximum level	3868	110	428
4	2406	50	266				
5	1187	0	131	emergency level low 1)	3137	80	347
6	5145	162	569	emergency level high	5088	160	563
ULL1	6823	231	754				
LLL1	0	-49	0				
ULL - LLL measured							

**Note:** 1) submergence ≤ 80 % => shut down after one hour  
2) level indication is equal to submergence of heat exchanger

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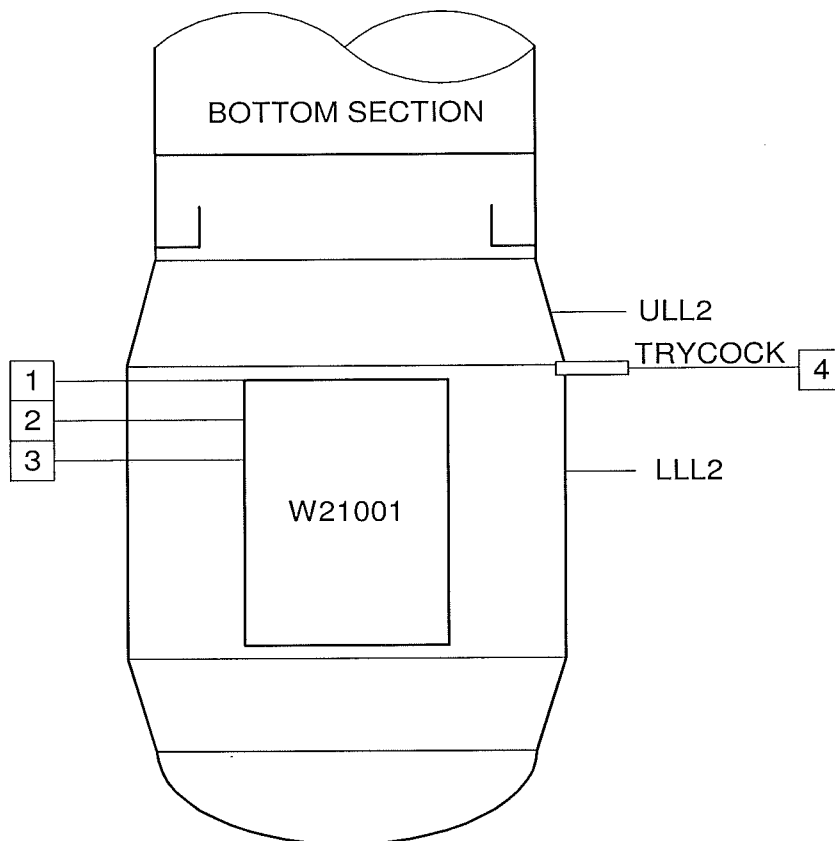
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**Vessel:** K22001

**LP-column / main condenser**

**TAG:** LT22011




**Medium:** LOX **length of condenser:** 2438 mm  
**Density of the liquid:** 1127 kg/m<sup>3</sup>  
**Transmitter range:** 0 - 174 mbar

item	height mm	level %	$\Delta p$ mbar		height mm	level %	$\Delta p$ mbar
1	845	100	93	normal operation	845	100	93
2	601	90	66	minimum level	601	90	66
3	357	80	39	maximum level	1089	110	120
4	895	102	99				
				emergency level low 1)	357	80	39
				emergency level high	-	-	-
ULL2	1576	130	174				
LLL2	0	65	0				
ULL - LLL measured							

**Note:** 1) submergence  $\leq 80\%$   $\Rightarrow$  shut down after one hour  
2) level indication is equal to submergence of heat exchanger

4				5			
2				3			
0	3/14/2005	JJ	TV	1			
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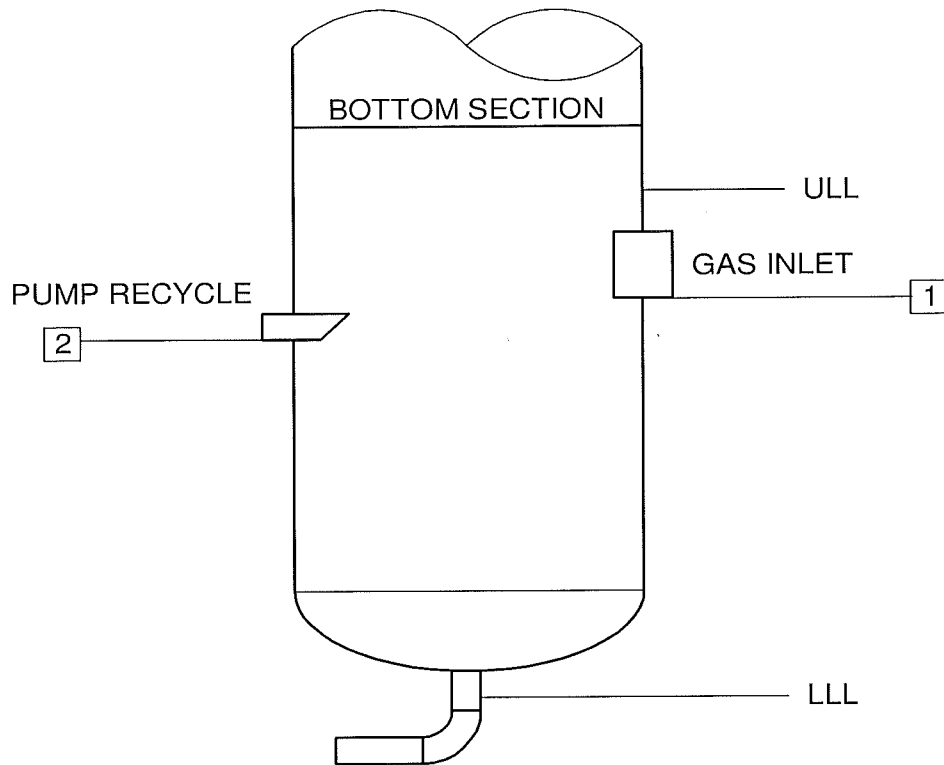
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 <b>AIR LIQUIDE</b> Air Liquide AGS GmbH	<b>Item:</b>	Level Transmitter	<b>Page:</b>	9 of 13
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	<b>Location:</b>	Kosice	<b>Rev:</b>	0
	<b>Project:</b>	K70101 ASU No. 9 Kosice	<b>Vendor:</b>	
	<b>By:</b>	JJ	<b>Spec-ID:</b>	SP425

Vessel: K40001

Crude Argon Column 1

TAG: LT40053



Medium: LOX

Density of the liquid: 1154 kg/m<sup>3</sup>

Transmitter range: 0 - 316 mbar

	height mm	level %	$\Delta p$ mbar		height mm	level %	$\Delta p$ mbar
1	2228	80	252	normal operation	1535	55	174
2	2290	82	259	minimum level	1256	45	142
				maximum level	1814	65	205
				emergency level high	2177	78	246
ULL	2791	100	316	emergency level low 1)	-	-	-
LLL	0	0	0				
ULL - LLL measured							

**Note:**

- 1) Min. required static height for P40100 = 500 mm above LLL = 1300 mm above pump suction nozzle
- 2) Emergency Level High is to protect gas inlet nozzle against being submerged.

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0	3/14/2005	JJ		1			
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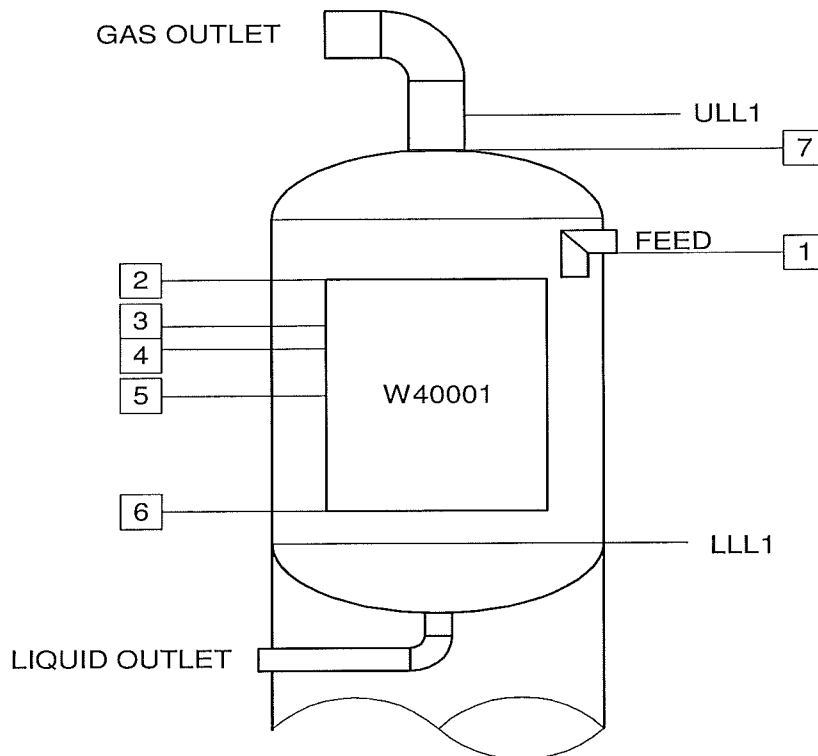
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**AIR LIQUIDE**

Air Liquide AGS GmbH

**Item:** Level Transmitter  
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**Spec-ID:** SP425

**Vessel: B40001****CAR Condenser Vessel****TAG: LT40007**

Medium: Crude Oxygen      length of condenser: 2286 mm  
 Density of the liquid: 985 kg/m<sup>3</sup>  
 Transmitter range: 0 - 616 mbar

Item	height mm	level %	$\Delta p$ mbar		height mm	level %	$\Delta p$ mbar
1	3692	116	357	maximum level	3564	110	344
2	3335	100	322	normal operation	3335	100	322
3	3106	90	300	minimum level	3106	90	300
4	2878	80	278				
5	2192	50	212	emergency level low 1)	2878	80	278
6	1049	0	101	emergency level high	5009	173	484
7	5009	173	484				
ULL1	6370	233	616				
LLL1	0	-46	0				
ULL - LLL measured							

**Note:** 1) submergence  $\leq 80\%$  => shut down after one hour  
 2) level indication is equal to submergence of heat exchanger  
 3) position of ULL1 has to be confirmed

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2				3			
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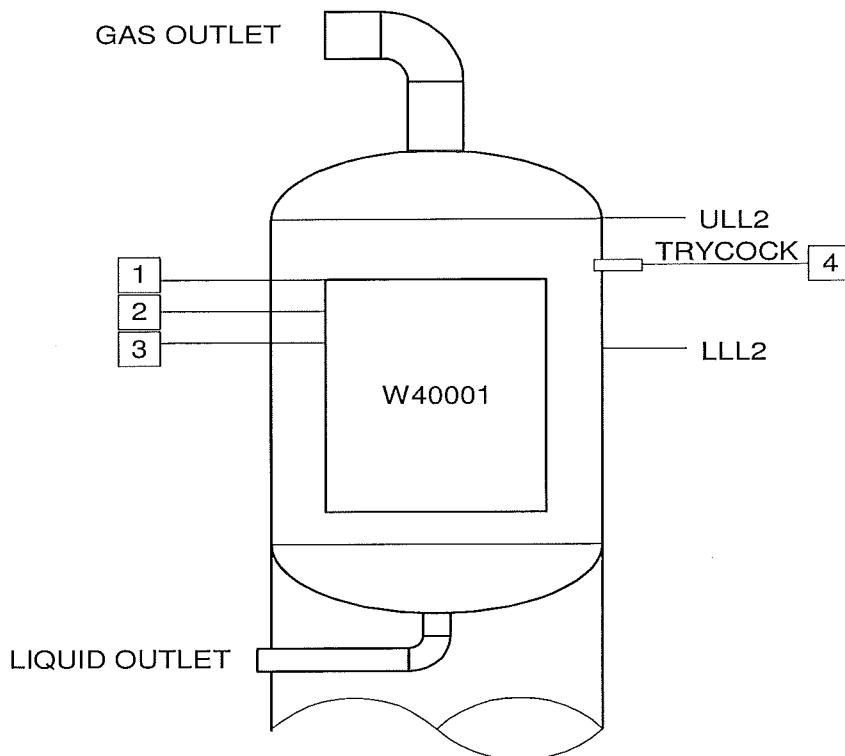
**Item:** Level Transmitter  
**Plant:** A690 / L110  
**Location:** Kosice  
**Project:** K70101 ASU No. 9 Kosice  
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**Vendor:**  
**Spec-ID:** SP425

**Vessel:** B40001

**CAR Condenser Vessel**

**TAG:** LT40017



**Medium:** Crude Oxygen  
**Density of the liquid:** 985 kg/m<sup>3</sup>  
**Transmitter range:** 0 - 142 mbar  
**length of condenser:** 2286 mm

Item	height mm	level %	$\Delta p$ mbar		height mm	level %	$\Delta p$ mbar
1	786	100	76	maximum level	1015	110	98
2	557	90	54	normal operation	786	100	76
3	329	80	32	minimum level	557	90	54
4	836	102	81				
				emergency level low 1)	329	80	32
				emergency level high	-	-	-
ULL2	1472	129	142				
LLL2	0	65	0				
ULL - LLL measured							

**Note:** 1) submergence  $\leq 80\%$   $\Rightarrow$  shut down after one hour  
2) level indication is equal to submergence of heat exchanger

4				5			
2				3			
0	3/14/2005	JJ	TV	1			
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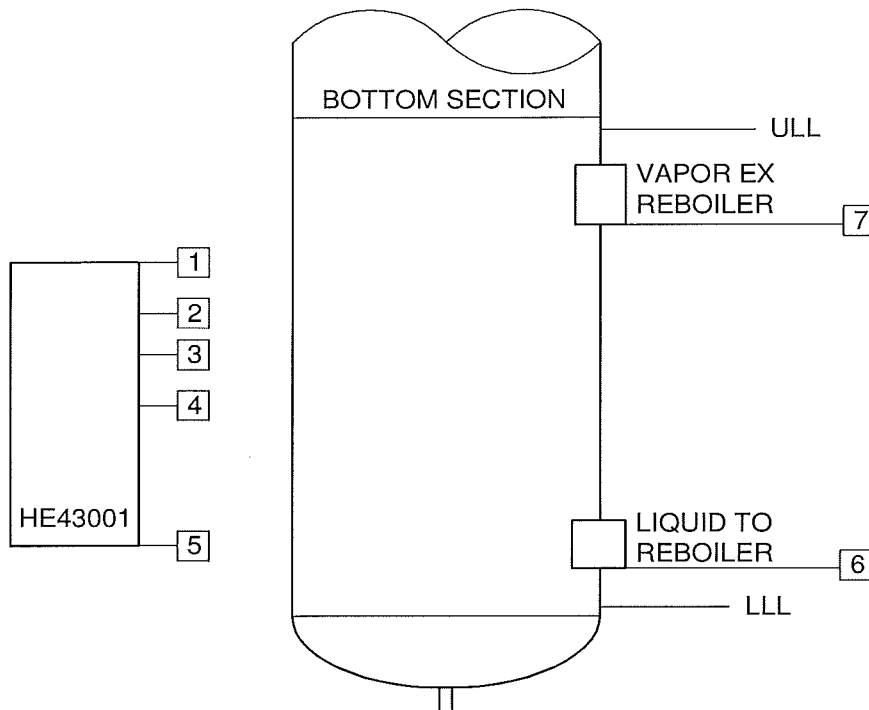
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**AIR LIQUIDE**

Air Liquide AGS GmbH

**Item:** Level Transmitter  
**Plant:** A690 / L110  
**Location:** Kosice  
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**Rev:** 0  
**Vendor:**  
**Spec-ID:** SP425

**Vessel:** K43001**Pure Argon Column****TAG:** LT43023

Medium: Argon      length of reboiler: 1524 mm  
Density of the liquid: 1360 kg/m<sup>3</sup>  
Transmitter range: 0 - 334 mbar

Item	height mm	level %	Δp mbar		height mm	level %	Δp mbar
1	1927	100	257	maximum level	1927	100	257
2	1622	80	216	normal operation	1393	65	186
3	1470	70	196	minimum level	1165	50	155
4	1165	50	155				
5	403	0	54	emergency level high	2400	131	320
6	15	-25	2	emergency level low	-	-	-
7	2251	121	300				
ULL	2500	138	334				
LLL	0	-26	0				
ULL - LLL measured							

**Note:** 1) level indication is equal to submergence of heat exchanger  
2) normal operation level is 990 mm above base of core (vendor specification)

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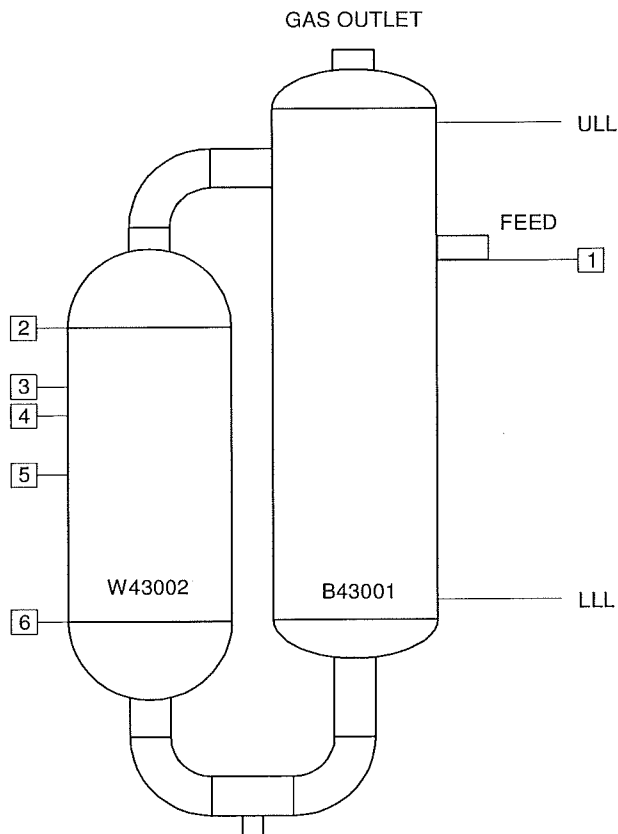
Item: Level Transmitter  
Plant: A690 / L110  
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Vessel: B43001

Pure Argon Condenser Vessel

TAG: LT43027



Medium: Nitrogen  
Density of the liquid: 764 kg/m<sup>3</sup>  
Transmitter range: 0 - 135 mbar  
length of condenser: 1219 mm

Item	height mm	level %	$\Delta p$ mbar		height mm	level %	$\Delta p$ mbar
1	1379	116	103	normal operation	1054	90	79
2	1181	100	89	minimum level	815	70	61
3	937	80	70	maximum level	1303	110	98
4	815	70	61				
5	572	50	43	emergency level high	1730	145	130
6	-38	0	-	emergency level low	572	50	43
ULL	1804	151	135				
LLL	0	3	0				
ULL - LLL measured							

**Note:**

- level indication is equal to submergence of heat exchanger
- normal operation level is 1092 mm above base of core (vendor specification)

4				5			
2				3			
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