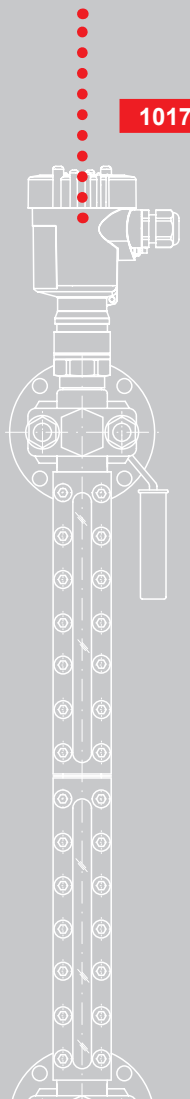




## KSR Glass Level Gauges

1017-1





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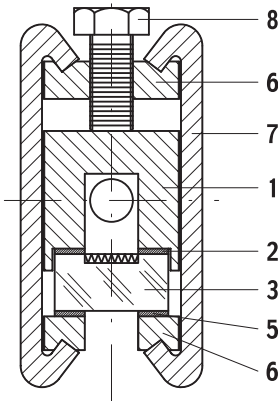
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# KSR Glass Level Gauges

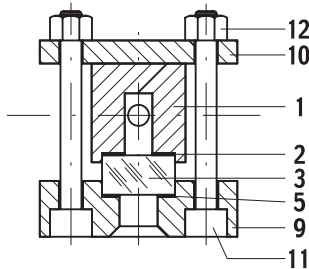
## Description



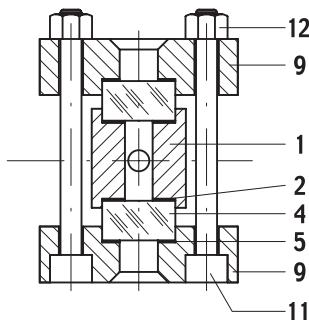
### KSR Reflex Glass Level Gauges Cover Box Type



### KSR Reflex Glass Level Gauges Cover Plate Type



### KSR Transparent Glass Level Gauges Double Cover Plate Type



Pos.	Description	Pos.	Description
1	Body	7	Cover box
2	Sealing gasket	8	Machine bolt
3	Reflex glass	9	Cover plate
4	Transparent glass	10	Rear plate
5	Cushion gasket	11	Internal hex. head bolt
6	Front & rear fixing rails	12	Nut

KSR KUEBLER supplies glass level gauges, which can suit most of the applications found in the steam generation as well as in the process industries. The two main types of glass level gauges are the reflex type and the transparent type.

### KSR Reflex Glass Level Gauges

The principle of the reflex glass lies in the reflection of the outer light. In the gas or steam phase, the light is reflected by the prismatic grooves of the glass, which therefore gives a clear appearance. In the liquid phase, the light is absorbed, thus providing a dark indication of the level.

KSR reflex glass level gauges are available as cover box type in ANSI pressure class 150 and as cover plate type in ANSI pressure class 150 to 600. They are the most suitable and most economical gauges for steam service below 35 barg, but can also find their utility in a great number of applications in the process industries.

### KSR Transparent Glass Level Gauges

In this type of level gauges, the liquid is contained between two transparent glasses. This permits a through vision of the fluid(s), thus providing a perfect indication of the level.

KSR transparent glass level gauges are available as double cover plate type in ANSI pressure class 150 to 600. They are the most suitable gauges for steam service above 35 barg, where Mica shields must be used in order to protect the glasses from the corrosion of the boiler water. But they can also find their utility in a great number of applications and particularly in the observation of interface or fluid color. Finally, a backlight illuminator can be mounted on their rear side, thereby improving the visibility.

### Further KSR Level Gauges

In addition to the reflex and transparent types, KSR supplies the following types of level gauges:

- Tubular glass level gauges, which are normally used on non-pressurized and non-dangerous fluid systems, offer an economical alternative;
- Weld-on glass level gauges, which are designed to become an integral part of the vessel;
- Bull's eyes glass level gauges, available in ANSI pressure class 2500, and which are used on the highest pressure systems found in the process industries;
- And last, but not least, magnetic level gauges, for which the complete line is described in a separate catalogue.

### Pressure Equipment Directive 97/23/EC

According to the definition of Article 1 Paragraph 2.1.4, KSR glass level gauges are pressure accessories. On the basis of their small internal volume  $V (<1L)$  and small nominal size DN, these level gauges fall under the requirements of Article 3 Paragraph 3, referred to as Sound Engineering Practice (SEP). Therefore, and in the context of PED, CE Marking of such level gauges is prohibited, and KSR must not draw up an EC declaration of conformity.

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# KSR Glass Level Gauges

## Type Code



### Code

1		Basic Type					
<b>LG</b>	KSR Glass Level Gauge						
2		1 <sup>st</sup> Key = Gauge Column Type		2 <sup>nd</sup> Key = No. of Section		3 <sup>rd</sup> Key = Glass Size	
...	<b>RB</b>	Reflex, Cover Box Type	..	e.g. <b>2</b> = 2 Sections	..	e.g. <b>9</b> = Glass Size No. 9	
	<b>RBR</b>	Reflex, Cover Box Type, Rotating					<b>Optional Code</b> for 3 <sup>rd</sup> Key
	<b>R</b>	Reflex, Cover Plate Type			<b>/MS</b>	Glasses with Mica Shield	
	<b>T</b>	Transparent, Double Cover Plate Type			<b>/KS</b>	Glasses with PCTFE Shield	
	<b>RW</b>	Reflex, Weld-On Type			<b>/B or /H</b>	Type B or H Glasses	
	<b>TW</b>	Transparent, Weld-On Type			<b>/RV</b>	Right View	
	<b>TUB</b>	Tubular Glass Type			<b>/LV</b>	Left View	
3		Process Connections					
.../...	.../	<b>Flange</b> 1 <sup>st</sup> Key = Nom. Size	.../	2 <sup>nd</sup> Key = Nom. Pressure	...	3 <sup>rd</sup> Key = Flange Face	
		ANSI <b>½"</b> to <b>4"</b>		Class <b>150</b> to <b>2500</b>		Standard Optional	
		EN/DIN <b>DN10</b> to <b>DN100</b>		PN6 to <b>PN400</b>		Form <b>RF RTJ, FF, ST, SG</b>	
		JIS <b>DN10</b> to <b>DN100</b>		<b>5K</b> to <b>63K</b>		Form <b>C E, A, F, N</b>	
	..NPT..	Threaded Unions to NPT	.."	1 <sup>st</sup> Key = Thread Size		2 <sup>nd</sup> Key = Male or Female	
	..BSP..	Threaded Unions to BSP	.."			e.g. <b>¾"NPTM</b> or <b>½"BSPF</b>	
	..BW	Butt Weld Ends	.."	1 <sup>st</sup> Key = Nominal Pipe Size	...	2 <sup>nd</sup> Key = Pipe Schedule	
	..SW	Socket Weld Ends	.."			e.g. <b>1"40SBW</b> or <b>¾"SW</b>	
4		1 <sup>st</sup> Key = Gauge Cocks Type		2 <sup>nd</sup> and 3 <sup>rd</sup> Keys = Drain and Vent Connections			
.../...	<b>0</b>	None	<b>0</b>	None (Blind)	<b>D12</b>	Drain/Vent Cock ½"NPTM	
	<b>D18</b>	Standard Cylinder Type	<b>P</b>	Drain/Vent Plug ½"NPTF	<b>D12B</b>	Drain/Vent Cock ½"BSPM	
	<b>MD18</b>	Monobloc Cylinder Type	<b>PB</b>	Drain/Vent Plug ½"BSPF	<b>X</b>	Specify in Text	
	<b>X</b>	Specify in Text	<b>FL</b>	Drain/Vent Flange			
5		Distance Centre-to-Centre					
...	<b>M...</b>	Distance between flange centres in mm					
6		1 <sup>st</sup> Key = Wetted Parts Material		2 <sup>nd</sup> Key = Non-Wetted Parts			
.../...	<b>CS</b>	Carbon Steel A105 Galv.	<b>HB</b>	Hastelloy B	<b>CS</b>	Carbon Steel Galvanized	
	<b>SS</b>	Stainless Steel 316L	<b>HC</b>	Hastelloy C	<b>SS</b>	Stainless Steel 316L	
	<b>T</b>	Titanium Grade 2	<b>D</b>	22 Cr Duplex			
	<b>MO</b>	6Mo	<b>SD</b>	25 Cr Super Duplex			
7		Accessories					
.../...	<b>LC</b>	Lower Check Ball	<b>LUC</b>	Lower & Upper Check Balls	<b>PUSH</b>	Check Ball Pusher(s)	
	<b>SK</b>	Plastic Scale	<b>SG</b>	Aluminium Engraved Scale	<b>VSG</b>	SS 316 Engraved Scale	
	<b>P..</b>	Non-Frosting Extension	<b>EVA50</b>	Bulb Type illuminator	<b>TNCLS</b>	Diode Type illuminator	
	<b>GP</b>	Tubular Glass Protector	<b>GT611</b>	Level Transmitter (TDR)			
8		Approvals					
...	<b>RINA</b>	R.I.N.A.					

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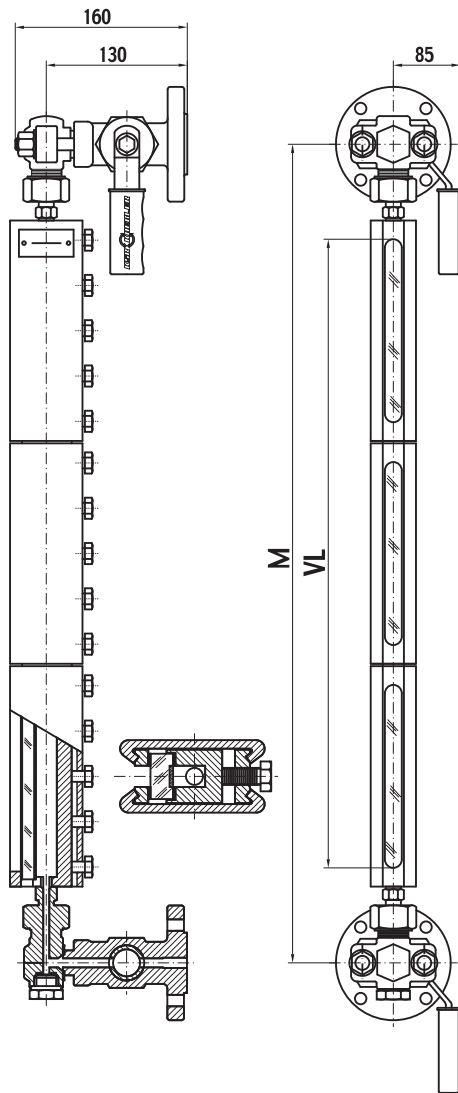
### Ordering Example:

Code	Basic Type	Gauge Type & Sections	Process Connections	Cocks Type/ Drain/Vent	Distance C-to-C	Materials	Accessories	Approvals
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
	<b>LG</b>	<b>R29</b>	<b>½"/150/RF</b>	<b>D18/D12/P</b>	<b>M840</b>	<b>SS/CS</b>	<b>LUC/SK</b>	

# KSR Reflex Glass Level Gauges Cover Box Type - Rotating Class 150 (PN6 - PN25)



Type: LG-RBR...-/150/RF-D18/...-M...-CS/CS



## Application

KSR complete line of rotating, cover box type, reflex glass level gauges are normally used on low-pressure systems. The gauge column is rotating (360°) in such a way that it can be set to the best visible direction.

## Technical Data

### Service Conditions

Pressure: A105 Max. 19.7 barg @ 38°C  
316(L) Max. 19.0 barg @ 38°C  
Temperature: Max. 300°C

### Process Connections

Side-side (See options page 18)  
Flanges: ½" to 2" ANSI B16.5 Class 150  
DN10 to DN50, PN6 to PN25  
Threaded Unions: NPT or BSP, ½" to 1", male or female  
Butt Weld Ends: ½" to 1", schedule 10S to 160  
Socket Weld Ends: ½" to 1" ANSI B16.11

**Distance Centre-to-Centre M...** Min. 235 mm to max. 2625 mm  
Further dimensions with reinforcement brackets upon request

### Vent Connection

(See options page 18)  
Standard: None (Blind)  
Options: Vent plug ½"NPT or ½"BSP, vent cock or vent flange

### Drain Connection

(See options page 18)  
Standard: Drain plug ½"NPT or ½"BSP  
Options: Drain cock, drain flange or blind

### Gauge Cocks

Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves replaceable  
Gauge dismantling possible

### Materials

Body and Wetted Parts: Type CS/...: carbon steel A105 galv.  
Type SS/...: stainless steel 316L  
Other materials upon request

Cover Boxes: Carbon steel epoxy painted  
Reflex Glasses: Borosilicate glass, "extra hard" and thermally pre-stressed, type A

Sealing Gaskets: Armoured graphite (Option: PTFE)

Cushion Gaskets: Universal Carbo (Option: Graphite)

Cocks Packing Sleeves: Graphite (Option: PTFE)

Bolts / Nuts: Carbon steel zinc plated

### Accessories

(See page 15)  
Check Ball & Pusher: Lower & upper, made of SS 316  
Graduated Scale: Plastic or aluminium

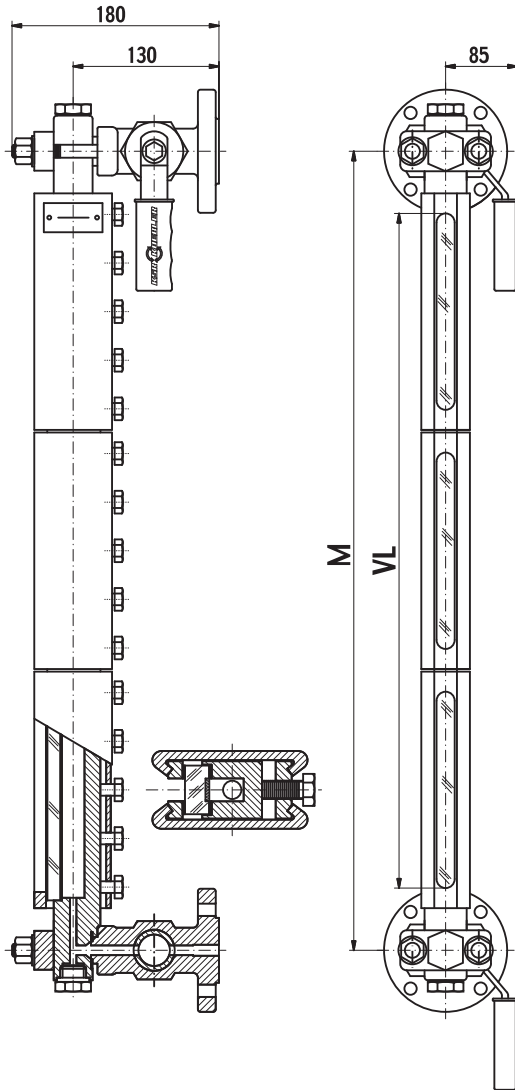
Type	M min.	VL	Type	M min.	VL	Type	M min.	VL
RBR.. [mm]	[mm]	[mm]	RBR.. [mm]	[mm]	[mm]	RBR.. [mm]	[mm]	[mm]
11	235	90	25	575	430	48	1445	1300
12	260	115	26	635	490	49	1545	1395
13	285	140	27	695	550	57	1580	1435
14	310	165	28	775	630	58	1780	1635
15	340	195	29	825	675	59	1905	1755
16	370	225	36	900	755	68	2115	1970
17	400	255	37	990	845	69	2265	2115
18	440	295	38	1110	965	78	2450	2305
19	465	315	39	1185	1035	79	2625	2475
24	515	370	47	1285	1140			

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# KSR Reflex Glass Level Gauges Cover Box Type - Fixed C-to-C Class 150 (PN6 - PN25)



Type: LG-RB.../150/RF-D18/...-M...-CS/CS



Type	M min.	VL	Type	M min.	VL	Type	M min.	VL
RB..	[mm]	[mm]	RB..	[mm]	[mm]	RB..	[mm]	[mm]
11	170	90	26	570	490	57	1515	1435
12	195	115	27	630	550	58	1715	1635
13	220	140	28	710	630	59	1840	1755
14	245	165	29	760	675	68	2050	1970
15	275	195	36	835	755	69	2200	2115
16	305	225	37	925	845	78	2385	2305
17	335	255	38	1045	965	79	2560	2475
18	375	295	39	1120	1035	88	2720	2640
19	400	315	47	1220	1140	89	2920	2835
24	450	370	48	1380	1300	98	3055	2975
25	510	430	49	1480	1395	99	3280	3195

## Application

KSR complete line of cover box type, reflex glass level gauges are normally used on low-pressure systems. As standard, the gauge column is delivered front view oriented. Right or left view units can also be supplied upon request.

## Technical Data

### Service Conditions

Pressure: A105 Max. 19.7 barg @ 38°C  
316(L) Max. 19.0 barg @ 38°C

Temperature: Max. 300°C

### Process Connections

Side-side (See options page 18)  
Flanges: ½" to 2" ANSI B16.5 Class 150  
DN10 to DN50, PN6 to PN25

Threaded Unions: NPT or BSP, ½" to 1", male or female

Butt Weld Ends: ½" to 1", schedule 10S to 160

Socket Weld Ends: ½" to 1" ANSI B16.11

### Distance

Centre-to-Centre M... Min. 170 mm to max. 3280 mm  
Further dimensions with reinforcement brackets upon request

### Orientation

Standard: Front view

Options: Right or left view

### Vent Connection

(See options page 18)

Standard: Vent plug ½"NPT or ½"BSP

Options: Vent cock or vent flange

### Drain Connection

(See options page 18)

Standard: Drain plug ½"NPT or ½"BSP

Options: Drain cock or drain flange

### Gauge Cocks

Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves replaceable  
Gauge dismantling possible

### Materials

Body and Wetted Parts: Type CS...: carbon steel A105 galv.  
Type SS...: stainless steel 316L  
Other materials upon request

Cover Boxes: Carbon steel epoxy painted

Reflex Glasses: Borosilicate glass, "extra hard" and thermally pre-stressed, type A

Sealing Gaskets: Armoured graphite (Option: PTFE)

Cushion Gaskets: Universal Carbo (Option: Graphite)

Cocks Packing Sleeves: Graphite (Option: PTFE)

Bolts / Nuts: Carbon steel zinc plated

### Accessories

(See page 15 and 17)

Check Ball & Pusher: Lower & upper, made of SS 316

Graduated Scale: Plastic or aluminium

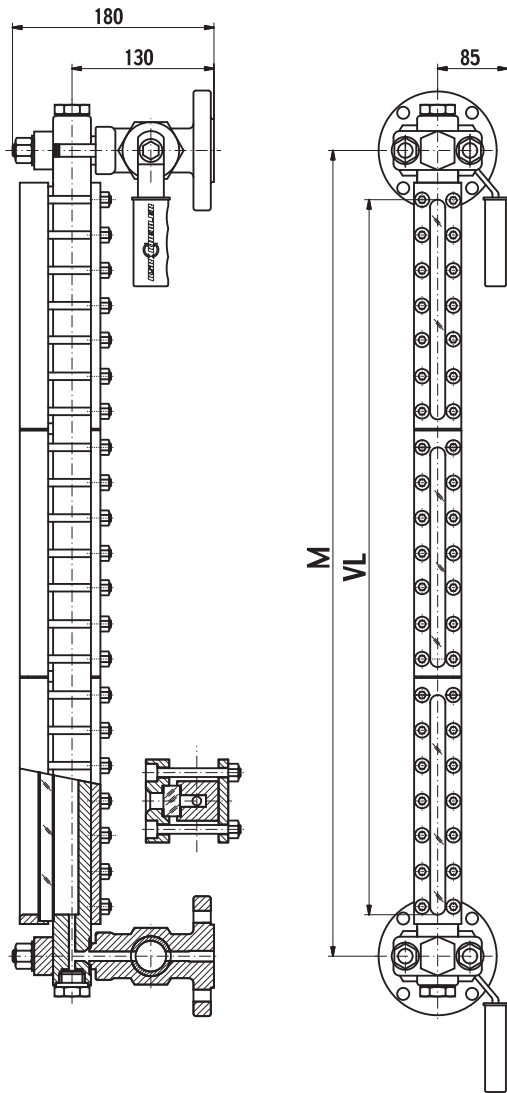
Level Transmitter: Guided microwave (TDR)

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# KSR Reflex Glass Level Gauges Cover Plate Type Class 150 and 300 (PN6 - PN40)



Type: LG-R.../300/RF-D18/...-M...-CS/CS



Type R..	M min. [mm]	VL [mm]	Type R..	M min. [mm]	VL [mm]	Type R..	M min. [mm]	VL [mm]
11	170	90	26	570	490	57	1515	1435
12	195	115	27	630	550	58	1715	1635
13	220	140	28	710	630	59	1840	1755
14	245	165	29	760	675	68	2050	1970
15	275	195	36	835	755	69	2200	2115
16	305	225	37	925	845	78	2385	2305
17	335	255	38	1045	965	79	2560	2475
18	375	295	39	1120	1035	88	2720	2640
19	400	315	47	1220	1140	89	2920	2835
24	450	370	48	1380	1300	98	3055	2975
25	510	430	49	1480	1395	99	3280	3195

## Application

KSR complete line of cover plate type, class 300, reflex glass level gauges are normally used on low-pressure systems. As standard, the gauge column is delivered front view oriented. Right or left view units can also be supplied upon request.

## Technical Data

### Service Conditions

Pressure: A105 Max. 51.0 barg @ 38°C  
316(L) Max. 49.6 barg @ 38°C

Temperature: Max. 300°C

**Process Connections** Side-side (See options page 18)  
Flanges: ½" to 2" ANSI B16.5 Class 150-300  
DN10 to DN50, PN6 to PN40

Threaded Unions: NPT or BSP, ½" to 1", male or female

Butt Weld Ends: ½" to 1", schedule 10S to 160

Socket Weld Ends: ½" to 1" ANSI B16.11

**Distance Centre-to-Centre M...** Min. 170 mm to max. 3280 mm  
Further dimensions with reinforcement brackets upon request

### Orientation

Standard: Front view

Options: Right or left view

**Vent Connection** (See options page 18)

Standard: Vent plug ½"NPT or ½"BSP

Options: Vent cock or vent flange

**Drain Connection** (See options page 18)

Standard: Drain plug ½"NPT or ½"BSP

Options: Drain cock or drain flange

### Gauge Cocks

Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves replaceable  
Gauge dismantling possible

### Materials

**Body and Wetted Parts:** Type CS/...: carbon steel A105 galv.  
Type SS/...: stainless steel 316L  
Other materials upon request

**Non-Wetted Parts:** Type ./CS: carbon steel galv.  
Type ./SS: stainless steel 316L

**Reflex Glasses:** Borosilicate glass, "extra hard" and thermally pre-stressed, type A

**Sealing Gaskets:** Armoured graphite (Option: PTFE)

**Cushion Gaskets:** Universal Carbo (Option: Graphite)

**Cocks Packing Sleeves:** Graphite (Option: PTFE)

**Bolts / Nuts:** CS zinc plated (Option: SS 316)

**Accessories** (See page 15 and 17)

**Check Ball & Pusher:** Lower & upper, made of SS 316

**Graduated Scale:** Plastic, aluminium or SS 316

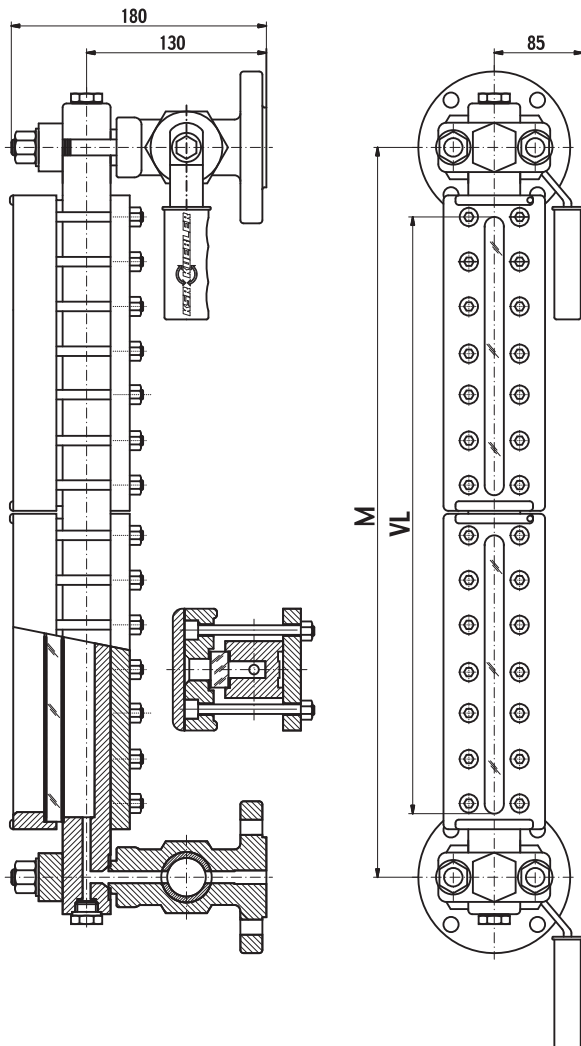
**Level Transmitter:** Guided microwave (TDR)

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# KSR Reflex Glass Level Gauges Cover Plate Type Class 600 (PN64 and PN100)



Type: LG-R.../600/RF-D18/...-M...-CS/CS



Type	M min.	VL	Type	M min.	VL	Type	M min.	VL
R..	[mm]	[mm]	R..	[mm]	[mm]	R..	[mm]	[mm]
11	170	90	24	450	370	39	1120	1035
12	195	115	25	510	430	47	1220	1140
13	220	140	26	570	490	48	1380	1300
14	245	165	27	630	550	49	1480	1395
15	275	195	28	710	630	57	1515	1435
16	305	225	29	760	675	58	1715	1635
17	335	255	36	835	755	59	1840	1755
18	375	295	37	925	845			
19	400	315	38	1045	965			

## Application

KSR complete line of cover plate type, class 600, reflex glass level gauges are normally used on medium-pressure systems. As standard, the gauge column is delivered front view oriented. Right or left view units can also be supplied upon request.

## Technical Data

### Service Conditions

Pressure: A105 Max. 102.0 barg @ 38°C  
316(L) Max. 99.3 barg @ 38°C  
Temperature: Max. 300°C

### Process Connections

Side-side (See options page 18)  
Flanges: ½" to 2" ANSI B16.5 Class 600  
DN10 to DN50, PN64 to PN100  
Threaded Unions: NPT or BSP, ½" to 1", male or female  
Butt Weld Ends: ½" to 1", schedule 40S to 160  
Socket Weld Ends: ½" to 1", ANSI B16.11

Distance Centre-to-Centre M... Min. 170 mm to max. 1840 mm  
Further dimensions with reinforcement brackets upon request

### Orientation

Standard: Front view  
Options: Right or left view

### Vent Connection

(See options page 18)  
Standard: Vent plug ½"NPT or ½"BSP  
Options: Vent cock or vent flange

### Drain Connection

(See options page 18)  
Standard: Drain plug ½"NPT or ½"BSP  
Options: Drain cock or drain flange

### Gauge Cocks

Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves replaceable  
Gauge dismantling possible

### Materials

Body and Wetted Parts: Type CS/...: carbon steel A105 galv.  
Type SS/...: stainless steel 316L  
Other materials upon request  
Non-Wetted Parts: Type ./CS: carbon steel galv.  
Type ./SS: stainless steel 316L  
Reflex Glasses: Borosilicate glass, "extra hard" and thermally pre-stressed, type A  
Sealing Gaskets: Armoured graphite (Option: PTFE)  
Cushion Gaskets: Universal Carbo (Option: Graphite)  
Cocks Packing Sleeves: Graphite (Option: PTFE)  
Bolts / Nuts: CS zinc plated (Option: SS 316)

### Accessories

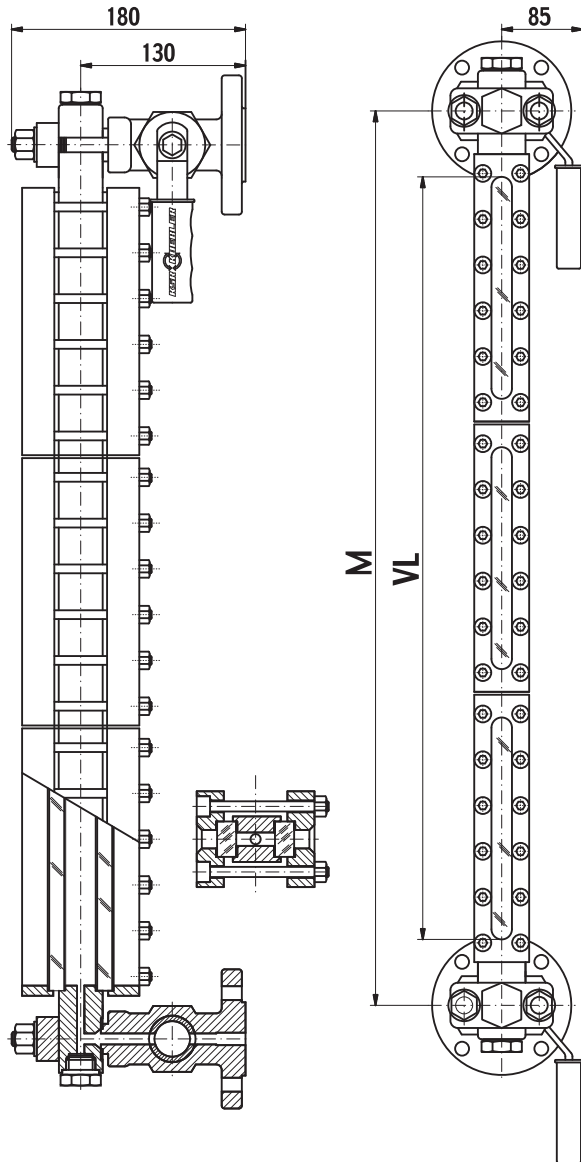
(See page 15 and 17)  
Check Ball & Pusher: Lower & upper, made of SS 316  
Graduated Scale: Plastic, aluminium or SS 316  
Level Transmitter: Guided microwave (TDR)

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# KSR Transparent Glass Level Gauges Double Cover Plate Type Class 150 and 300 (PN6 - PN40)



Type: LG-T.../300/RF-D18/...-M...-CS/CS



Type	M min. [mm]	VL [mm]	Type	M min. [mm]	VL [mm]	Type	M min. [mm]	VL [mm]
11	170	90	25	510	430	48	1380	1300
12	195	115	26	570	490	49	1480	1395
13	220	140	27	630	550	57	1515	1435
14	245	165	28	710	630	58	1715	1635
15	275	195	29	760	675	59	1840	1755
16	305	225	36	835	755	68	2050	1970
17	335	255	37	925	845	69	2200	2115
18	375	295	38	1045	965	78	2385	2305
19	400	315	39	1120	1035	79	2560	2475
24	450	370	47	1220	1140			

## Application

KSR complete line of cover plate type, class 300, transparent glass level gauges are normally used on low-pressure systems. Their double plate column permits a through vision of the fluid and the use of glass shields (Mica or PCTFE). They can also find their utility in the observation of interface or fluid color.

## Technical Data

### Service Conditions

Pressure: A105 Max. 51.0 barg @ 38°C  
316(L) Max. 49.6 barg @ 38°C  
Temperature: Max. 300°C

**Process Connections** Side-side (See options page 18)  
**Flanges:** ½" to 2" ANSI B16.5 Class 150-300  
DN10 to DN50, PN6 to PN40  
**Threaded Unions:** NPT or BSP, ½" to 1", male or female  
**Butt Weld Ends:** ½" to 1", schedule 10S to 160  
**Socket Weld Ends:** ½" to 1" ANSI B16.11

**Distance Centre-to-Centre M...** Min. 170 mm to max. 2560 mm  
Further dimensions with reinforcement brackets upon request

### Orientation

Standard: Front view  
Options: Right or left view

### Vent Connection

(See options page 18)  
Standard: Vent plug ½"NPT or ½"BSP  
Options: Vent cock or vent flange

### Drain Connection

(See options page 18)  
Standard: Drain plug ½"NPT or ½"BSP  
Options: Drain cock or drain flange

### Gauge Cocks

Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves replaceable  
Gauge dismantling possible

### Materials

**Body and Wetted Parts:** Type CS/...: carbon steel A105 galv.  
Type SS/...: stainless steel 316L  
Other materials upon request  
**Non-Wetted Parts:** Type ./CS: carbon steel galv.  
Type ./SS: stainless steel 316L  
**Transparent Glasses:** Borosilicate glass, "extra hard" and thermally pre-stressed, type A  
**Sealing Gaskets:** Armoured graphite (Option: PTFE)  
**Cushion Gaskets:** Universal Carbo (Option: Graphite)  
**Cocks Packing Sleeves:** Graphite (Option: PTFE)  
**Bolts / Nuts:** CS zinc plated (Option: SS 316)

### Accessories

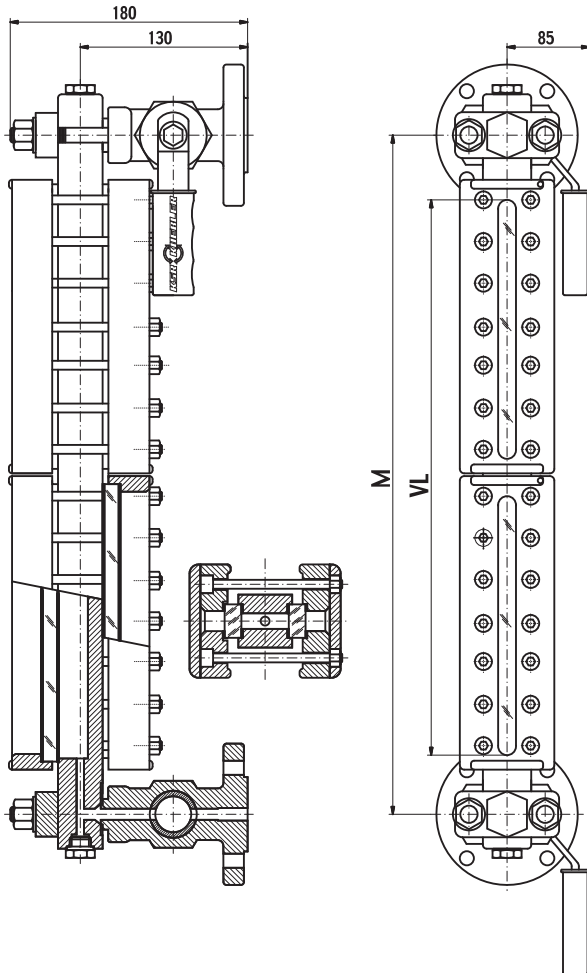
(See page 15, 16, 17 and 19)  
**Check Ball & Pusher:** Lower & upper, made of SS 316  
**Graduated Scale:** Plastic, aluminium or SS 316  
**Backlight illuminator:** Bulb or diode type  
**Level Transmitter:** Guided microwave (TDR)  
**Glass Shields:** Mica or PCTFE (Kel-F™)

1017-1

# KSR Transparent Glass Level Gauges Double Cover Plate Type Class 600 (PN64 and PN100)



Type: LG-T.../600/RF-D18/...-M...-CS/CS



Type	M min.	VL	Type	M min.	VL	Type	M min.	VL
T..	[mm]	[mm]	T..	[mm]	[mm]	T..	[mm]	[mm]
11	170	90	24	450	370	39	1120	1035
12	195	115	25	510	430	47	1220	1140
13	220	140	26	570	490	48	1380	1300
14	245	165	27	630	550	49	1480	1395
15	275	195	28	710	630	57	1515	1435
16	305	225	29	760	675	58	1715	1635
17	335	255	36	835	755	59	1840	1755
18	375	295	37	925	845			
19	400	315	38	1045	965			

## Application

KSR complete line of cover plate type, class 600, transparent glass level gauges are normally used on medium-pressure systems. Their double plate column permits a through vision of the fluid and the use of glass shields (Mica or PCTFE). They can also find their utility in the observation of interface or fluid color.

## Technical Data

### Service Conditions

Pressure: A105 Max. 102.0 barg @ 38°C  
316(L) Max. 99.3 barg @ 38°C  
Temperature: Max. 300°C

### Process Connections

Side-side (See options page 18)  
Flanges: ½" to 2" ANSI B16.5 Class 600  
DN10 to DN50, PN64 to PN100  
Threaded Unions: NPT or BSP, ½" to 1", male or female  
Butt Weld Ends: ½" to 1", schedule 40S to 160  
Socket Weld Ends: ½" to 1" ANSI B16.11

**Distance** Min. 170 mm to max. 1840 mm  
**Centre-to-Centre M...** Further dimensions with reinforcement brackets upon request

### Orientation

Standard: Front view  
Options: Right or left view

**Vent Connection** (See options page 18)  
Standard: Vent plug ½"NPT or ½"BSP  
Options: Vent cock or vent flange

**Drain Connection** (See options page 18)  
Standard: Drain plug ½"NPT or ½"BSP  
Options: Drain cock or drain flange

**Gauge Cocks** Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves replaceable  
Gauge dismantling possible

### Materials

**Body and Wetted Parts:** Type CS/...: carbon steel A105 galv.  
Type SS/...: stainless steel 316L  
Other materials upon request  
**Non-Wetted Parts:** Type ..CS: carbon steel galv.  
Type ..SS: stainless steel 316L  
**Transparent Glasses:** Borosilicate glass, "extra hard" and thermally pre-stressed, type A  
**Sealing Gaskets:** Armoured graphite (Option: PTFE)  
**Cushion Gaskets:** Universal Carbo (Option: Graphite)  
**Cocks Packing Sleeves:** Graphite (Option: PTFE)  
**Bolts / Nuts:** CS zinc plated (Option: SS 316)

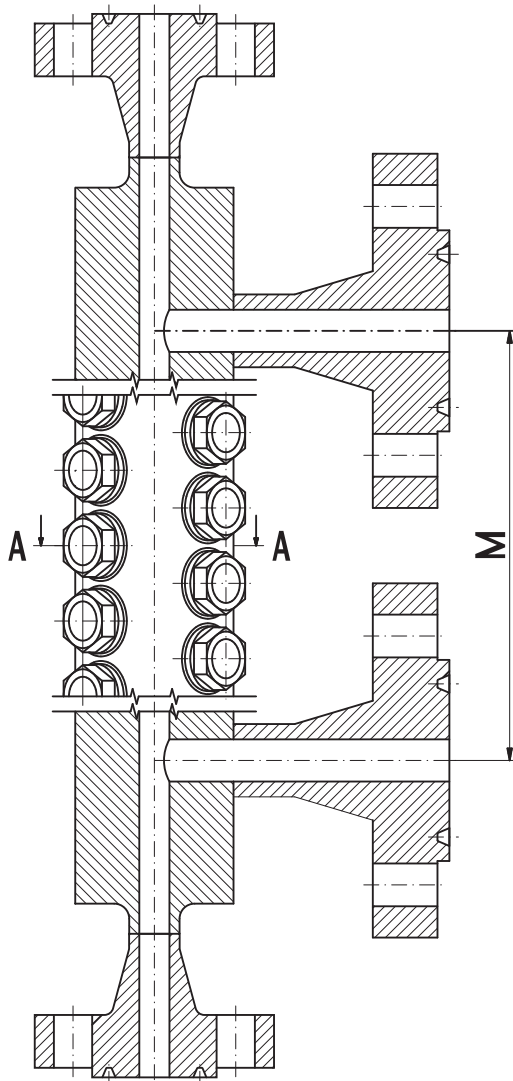
**Accessories** (See page 15, 16, 17 and 19)  
**Check Ball & Pusher:** Lower & upper, made of SS 316  
**Graduated Scale:** Plastic, aluminium or SS 316  
**Backlight illuminator:** Bulb or diode type  
**Level Transmitter:** Guided microwave (TDR)  
**Glass Shields:** Mica or PCTFE (Kel-F™)

1017-1

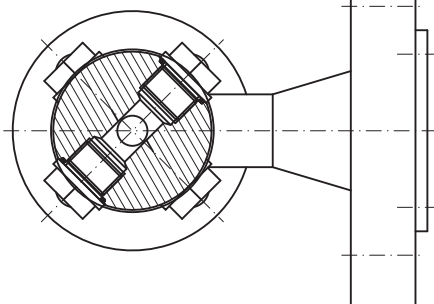
# KSR Transparent Glass Level Gauges Bull's Eyes Type Class 2500 (PN320 and PN400)



Type: LG-BE.../2500/RTJ-0/FL/FL-M...-CS



A - A



## Application

KSR complete line of bull's eyes type, class 2500, transparent glass level gauges are used on very high pressure systems. This design uses metal-fused bull's eyes that are screwed into a column manufactured from a solid bar. They are mounted in pairs on opposite sides of the column with adjacent pairs being at a 90° angle. This design enables visibility from four sides with a through vision feature.

## Technical Data

### Service Conditions

Pressure:	Max. 600 barg
Test pressure:	Max. 1000 barg
Temperature:	Max. 150°C

### Process Connections

Flanges:	Side-side (See options page 18) ½" to 2" ANSI B16.5 Class 2500 DN15 to DN50, PN320 to PN400 API Spec. 6A, 10,000 & 15,000 psi
----------	--

Clamp connectors: Techlok® or G-Lok®

Threaded Unions: NPT or BSP, ½" to 2", male or female

Butt Weld Ends: ½" to 2", Schedule 160 and XXS

Socket Weld Ends: ½" to 2" ANSI B16.11

### Distance

Centre-to-Centre M... Min. 200 mm to max. 3000 mm

### Other dimensions upon request

### Vent Connection

(See options page 18)  
Vent plug ¼"NPT or ¼"BSP  
Vent flange

### Drain Connection

(See options page 18)  
Drain plug ¼"NPT or ¼"BSP  
Drain flange

### Body and Wetted Parts:

Type CS: Carbon steel A105 galv.

Type SS: Stainless steel 316L

Other materials upon request

### Bull's Eyes

Threaded Glass Ring: 1"BSP, made of Hastelloy

Sight Glass: Fused to the glass ring  
OD 22 mm, thickness 39 mm  
Made of soda lime glass

### Sealing O-Rings:

FPM (Viton)

### Isolation, Drain and Vent Valves

Upon request and according to customer's specifications (e.g. gate valves, globe valves, needle valves, or ball valves)

### Accessories

(See page 15)

### Graduated Scale:

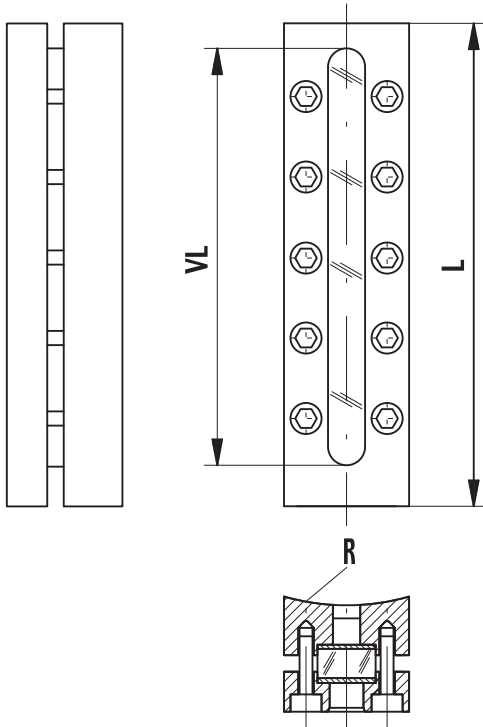
Plastic, aluminium or SS 316

1017-1

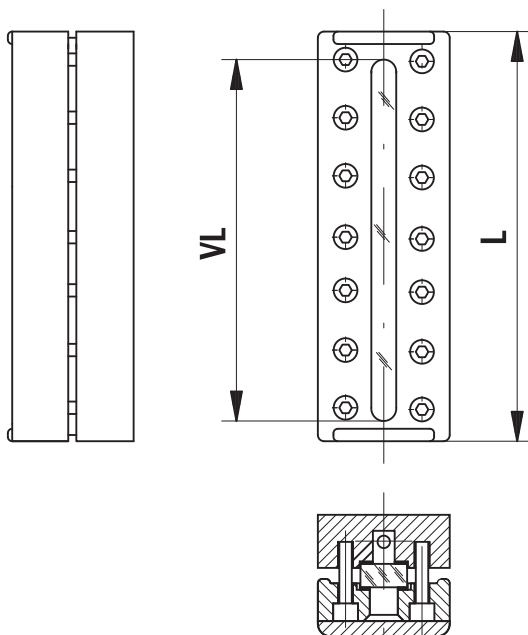
# KSR Weld-On Glass Level Gauges Reflex or Transparent Class 300 and 600 (PN40 and PN100)



Type: LG-.W1./R...-300-CS/CS



Type: LG-.W1.-600-CS/CS



### Dimensions:

Type W..	11	12	13	14	15	16	17	18	19
VL [mm]	90	115	140	165	195	225	255	295	315
L [mm]	130	155	180	205	235	265	295	335	360

### Application

KSR complete line of class 300 and class 600 weld-on glass level gauges are designed to become an integral part of the vessel. Manufactured from carbon steel or stainless steel, they can be furnished with either reflex or transparent glasses, although reflex glasses are recommended in order to achieve the best visibility.

### Technical Data

#### Service Conditions

Pressure max. @ 38°C:	A105	316(L)
300#	51.0 barg	49.6 barg
600#	102.0 barg	99.3 barg

Temperature: Max. 300°C

#### Weld-On Face

For welding on flat or curved tank walls. For curved tank walls, please specify the radius of the tank (R...)

#### Visible Length VL...

Min. 90 mm to max. 315 mm acc. to below table  
Greater visible length made from multiple sections upon request

#### Materials

Body (Wetted Part):	Type CS/...: carbon steel A105 galv. Type SS/...: stainless steel 316L Other materials upon request
Cover Plate:	Type ..CS: carbon steel galv. Type ..SS: stainless steel 316L
Gauge Glass:	Reflex or transparent type made of borosilicate glass, "extra hard" and thermally pre-stressed, type A
Sealing Gasket:	Armoured graphite (Option: PTFE)
Cushion Gasket:	Universal Carbo (Option: Graphite)
Internal Hex. Head Bolts:	CS zinc plated (Option: SS 316)

#### Accessories

Graduated Scale:	(See page 15 and 19) Plastic, aluminium or SS 316
Glass Shield:	Mica or PCTFE (Kel-F™) (Transparent type only)

Integral Isolation Valves: Needle type, bottom and/or top

### Installation

KSR weld-on glass level gauges are designed to withstand the pressure inside the gauge itself. But they are not designed to compensate the vessel strength loss due to the slot in the vessel wall. The vessel manufacturer shall therefore provide the necessary wall reinforcement in order to avoid the gauge to be distorted during service.

During the welding operation, special care shall be taken not to affect the gauge with high temperatures over a long period of time. This could damage the gauge sealing face flatness and therefore lead to leakages during service.

### Pressure Equipment Directive 97/23/EC

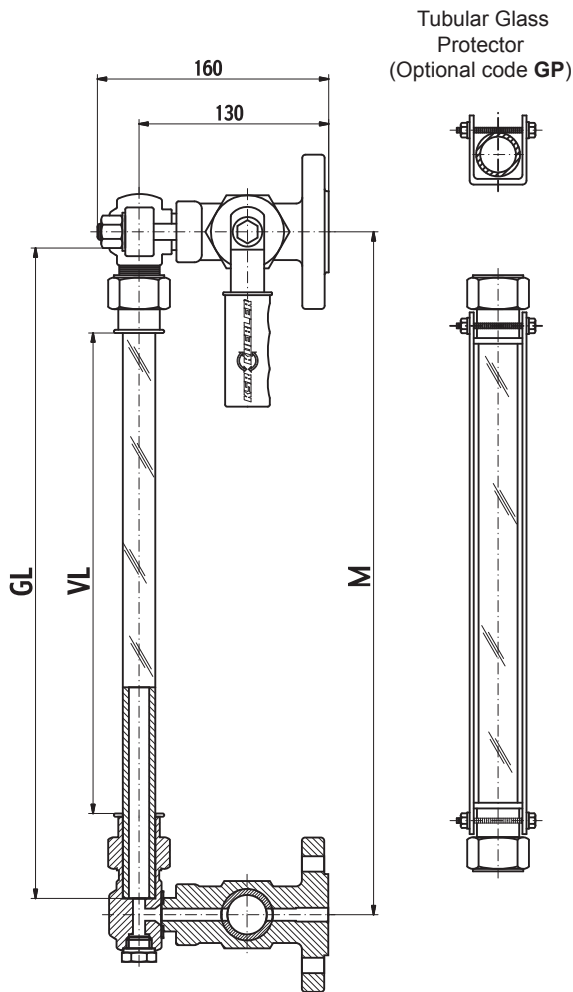
KSR weld-on glass level gauges are component parts and as such do not meet the definition of pressure equipment in Article 1. Paragraph 2.1. Therefore they shall not bear the CE mark.

It is the responsibility of the pressure equipment manufacturer to ensure that the component parts enable the pressure equipment to meet the essential safety requirements of the directive.

# KSR Tubular Glass Level Gauges Class 150 (PN6 - PN16)



Type: LG-TUB1-../150/RF-D18/...-M...-CS/CS



M = Centre-to-Centre Process Connections  
GL = Glass Tube Length = M - 30 mm  
VL = Visible Length = M - 135 mm

## Application

KSR complete line of carbon steel and stainless steel tubular glass level gauges offers an economical alternative. They are normally used on non-pressurized and non-dangerous fluid systems, but can also find their utility in the observation of interface or fluid color. An optional glass protector is recommended in order to protect the glass tube from damages.

## Technical Data

### Service Conditions

Pressure max @ 38°C: 5 barg for glass OD 16 x 2.5 mm  
8 barg for glass OD 16 x 4 mm  
(Max. pressure also function of the length and the temperature)

Temperature: Max. 250°C

### Process Connections

Side-side (See options page 18)  
Flanges: ½" to 2" ANSI B16.5 Class 150  
DN10 to DN50, PN6 to PN16

Threaded Unions: NPT or BSP, ½" to 1", male or female

Butt Weld Ends: ½" to 1", schedule 5S to 80S

Socket Weld Ends: ½" to 1" ANSI B16.11

### Tubular Glass Dimensions

Type TUB.1: OD 16 x 2.5 mm

Type TUB.2: OD 16 x 4 mm

Distance Centre-to-Centre M... Max. 3000 mm for OD 16 x 2.5 mm  
Max. 1500 mm for OD 16 x 4 mm  
Greater distances available with one or more glass coupling

### Vent Connection

(See options page 18)

Standard: None (Blind)

Options: Vent plug ½"NPT or ½"BSP

Vent cock or vent flange

### Drain Connection

(See options page 18)

Standard: Drain plug ½"NPT or ½"BSP

Options: Drain cock, drain flange or blind

### Gauge Cocks

Two way cylinder type  
Right or left hand operation  
Quick 90° lever operation  
Packing sleeves renewable  
Gauge dismantling possible

### Materials

Tubular Glass: Pyrex® borosilicate glass

Wetted Parts: Type CS/...: carbon steel A105 galv.  
Type SS/...: stainless steel 316L  
Other materials upon request

Non-Wetted Parts: Type ../CS: carbon steel galv.  
Type ../SS: stainless steel 316(L)

Cocks Packing Sleeves: Graphite (Option: PTFE)

### Accessories

(See page 15 and 17)

Tubular Glass Protector: U-shaped, made of SS 316

Check Ball & Pusher: Lower & upper, made of SS 316

Graduated Scale: Plastic, aluminium or SS 316

Level Transmitter: Guided microwave (TDR)

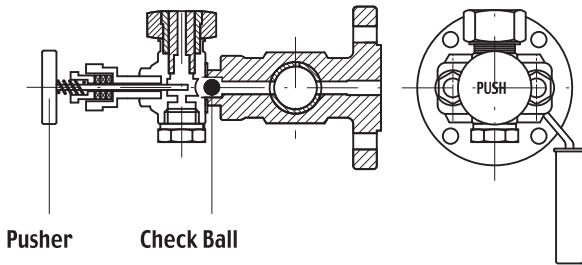
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# KSR Glass Level Gauges

## Accessories: Check Balls, Pushers, Scales and Non-Frosting Extensions



Type: LC, LUC and PUSH



### Check Balls and Pushers

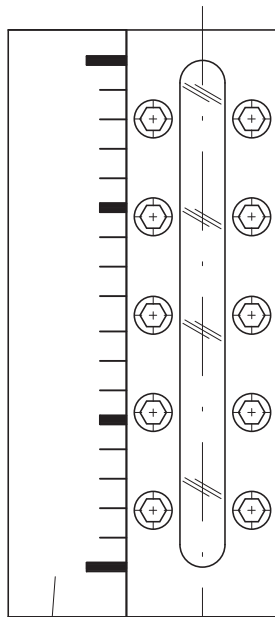
KSR glass level gauges can be equipped with lower and upper stainless steel check balls, which automatically shut off the flow of fluid in the event of glass breakage. These check balls are located downstream from the gauge cocks, allowing the balls to be cleaned or changed without shutting down the vessel. Should the process fluid be viscous or dirty, a check ball pusher is recommended. This pusher, made of stainless steel as standard, will permit to release the stuck check ball.

- Type **LC** = Lower Check Ball
- LUC** = Lower and Upper Check Balls
- PUSH** = Check Ball(s) with Pusher(s)

### Graduated Scales

In order to facilitate the read out in height or volume, KSR glass level gauges can be provided with graduated scales.

Type	Material	Graduations
<b>SK</b>	Aluminium with adhesive foil Temperature: Max. 100°C	Cm, feet and inches, or 10 <sup>th</sup> of %
<b>SG</b>	Aluminium engraved and black filled	Acc. to customer's specifications
<b>VSG</b>	Stainless steel 316 engraved and black filled	Acc. to customer's specifications

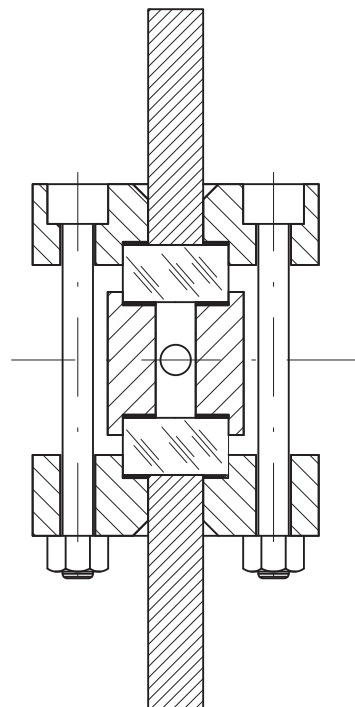


Scale

### Non-Frosting Extensions

For low temperature applications where frost has a tendency to build up on the level gauge, KSR can provide non-frosting extensions which permit to keep a clear visibility. These extensions, made of acryl glass, are in direct contact with the gauge glasses and extend beyond the insulation. The thickness of the extensions is determined according to the process temperature and insulation thickness. Please contact your nearest KSR representative for further information.

#### Non-Frosting Extension (Transparent Type)

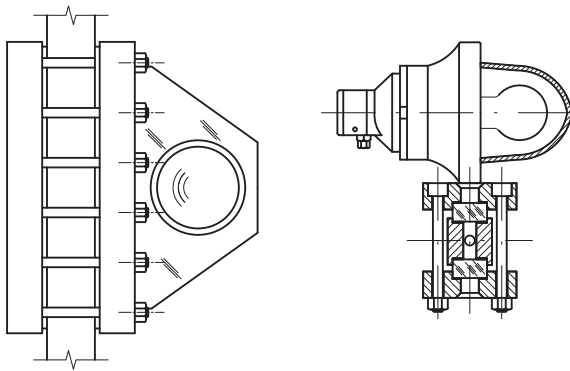


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# KSR Glass Level Gauges Accessories Backlight illuminators



Type: EVA50



### Application

KSR bulb type backlight illuminators are used to improve the visibility in transparent glass level gauges. The light from an incandescent, halogen or fluorescent bulb is reflected and diffused through the transparent glass level gauge via a diffuser.

### Technical Data

#### Material

Bulb Housing: Aluminium (Option: SS 316)  
 Bulb Cover: Thermal and impact resistant glass  
 Diffuser: Plexiglas (Option: glass)

**Supply Voltage** 230 or 115 VAC, 50-60 Hz  
 or 12-24 VAC/DC

#### Power Consumption

Incandescent bulb: 50 or 100 watts (Temp. class T3)  
 Halogen bulb: 100 watts (Temp. class T3)  
 Fluorescent bulb: 15 watts (Temp. class T6)

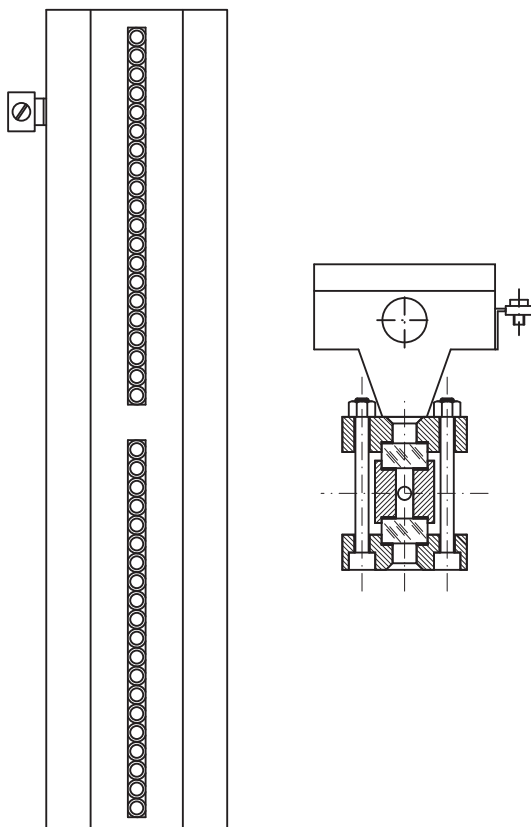
**Cable Entry** 3/4"NPT(F)

**Ingress Protection** Water and dust tight to IP65

**Explosion Protection** ATEX II 2 GD EEx d IIC T6 or T3

Type: TNCLS-...

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### Application

KSR diode type backlight illuminators have been specially designed for offshore applications. They are based on the use of diodes (LEDs), which are molded into the housing, and therefore provide low power consumption and extended life.

### Technical Data

**Housing Material** Stainless steel 316L

#### Power Supply

Supply voltage: 230 VAC or 115 VAC, 50-60 Hz  
 Power consumption: Approx. 3 VA per module

**Lumination Color** Yellow (Option: red)

**Cable Entries** M25 x 1.5 mm, top and bottom

**Ambient Temperature** -20 to +45°C

**Ingress Protection** Water and dust tight to IP66

**Explosion Protection** ATEX II 2 G EEx em II T4

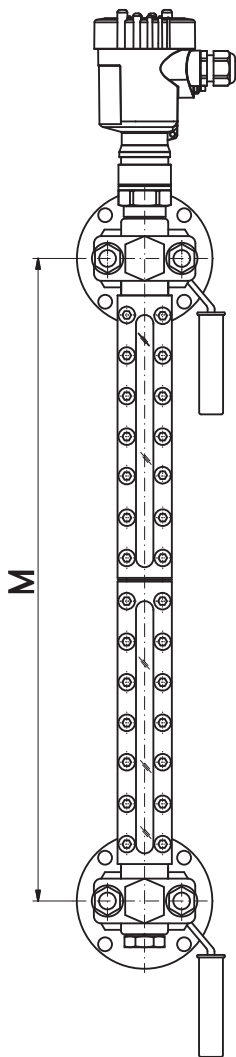
Gauge Size	TNCLS	Gauge Size	TNCLS	Gauge Size	TNCLS	Gauge Size	TNCLS
17	30-1	27	30-2	38	34-3	57	30-5
18	34-1	28	34-2	39	36-3	58	34-5
19	36-1	29	36-2	47	30-4	59	36-5
25	24-2	36	27-3	48	34-4	68	34-6
26	27-2	37	30-3	49	36-4	69	36-6

Illuminators for other gauge sizes upon request

# KSR Glass Level Gauges Accessories Level Transmitter - Guided Microwave (TDR)

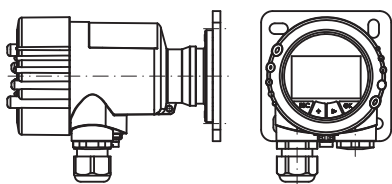


Type: GT611-...



## Remote Display & Calibration Unit

As an alternative or a supplement to the integral display, a remote display and calibration unit can also be connected to the level transmitter. This arrangement, which does not require any extra power supply, can be realized via a four-wire, screened standard cable with a length of max. 25 m. Please contact your nearest KSR representative for further information.



## Application

The KSR Level Transmitter GT611 is a guided microwave (TDR) transmitter which has been specially modified for use in combination with KSR Glass Level Gauges. It provides a continuous and accurate level measurement and is suitable for most fluids.

## Measuring Principle

High frequency microwave impulses are coupled to a cable situated in the centerline of the gauge body. The impulses are reflected by the fluid surface and received by the processing electronics. A microcontroller identifies these level echoes, evaluates them and converts them into a level information.

## Technical Data

### Materials

Cable:	Stainless steel 316, OD 1 mm
Seal:	FPM (Viton), EPDM or Kalrez 6375
Process Fitting:	Stainless steel 316L, 3/4" BSP Other materials upon request

### Housing

Plastic PBT,  
Die-cast aluminium,  
or stainless steel 316L

### Cable Entry

M20 x 1.5 mm or 1/2" NPT

### Service Conditions

Pressure:	Vacuum to 40 barg
Process temperature:	-40 to +150°C
Ambient temperature:	-40 to +80°C (without display) -20 to +80°C (with display)

### Output Signal

Standard:	4 to 20 mA superimposed with Hart® protocol communication
Options:	Profibus PA Foundation Fieldbus

### Measuring Range

Preset to the ordered C-to-C  
distance M...

### Accuracy

+/- 5 mm (IEC 60770-1)

### Power Supply

(4-20 mA/Hart® loop powered)

Standard (Non-Ex):

14-36 VDC

EEx ia version:

10-30 VDC

EEx d ia version:

20-36 VDC

### Integral Display & Calibration Module (Option)

LCD with full dot matrix  
Mountable in 90° increments  
Calibration via 4 keys  
Measured value with unit  
Echo and trend curve available

### Ingress Protection

Water and dust tight to IP67

### Explosion Protection (depends on version)

ATEX II 1G, 1/2G, 2G EEx ia IIC T6  
ATEX II 1/2G, 2G EEx d ia IIC T6

### European Patent No.

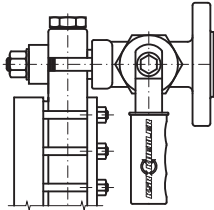
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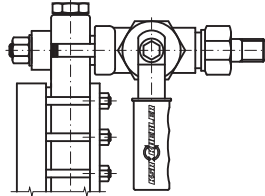
# KSR Glass Level Gauges Process, Drain and Vent Connections



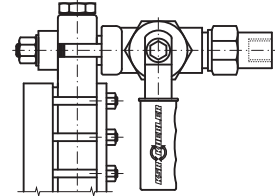
## Process Connections Options (Code 3)



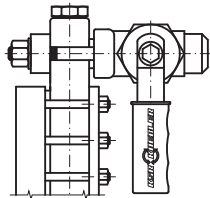
Flanges ANSI, DIN or JIS  
Code ../150/RF, ../16/C or ../5K/RF



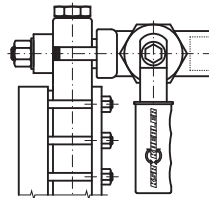
Threaded Unions NPT or BSP Male  
Code ../NPTM or ../BSPM



Threaded Unions NPT or BSP Female  
Code ../NPTF or ../BSPF



Butt Weld Ends  
Code ../BW



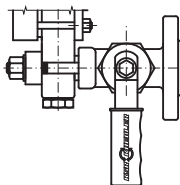
Socket Weld Ends to ANSI B16.11  
Code ../SW

## Drain and Vent Connections Options (Code 4, 2<sup>nd</sup> and 3<sup>rd</sup> Keys)

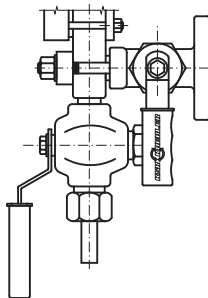
The figures below are only showing the drain connection options.

Vent connection options can be obtain by vertical flip of these figures.

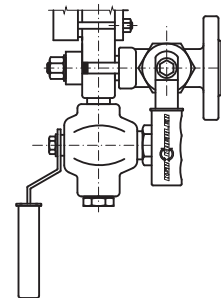
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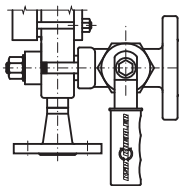
Drain (Vent) Plug 1/2"NPT or 1/2"BSP  
Code D18/P/.. or D18/PB/..



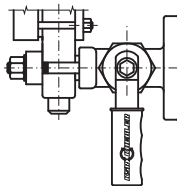
Drain (Vent) Cock 1/2"NPT-M or 1/2"BSP-M  
Code D18/D12/.. or D18/D12B/..



Drain (Vent) Cock 1/2"NPT-F or 1/2"BSP-F  
Code D18/D12F/.. or D18/D12FB/..



Drain (Vent) Flange  
Code D18/FL/..



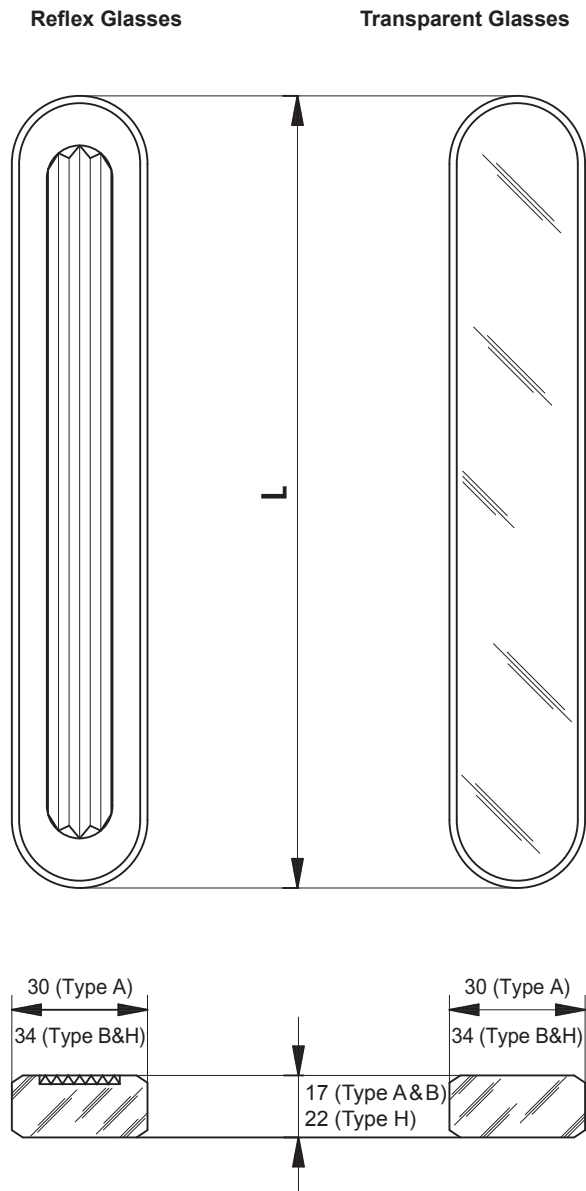
Drain (Vent) Butt Weld Ends  
Code D18/BW/..

Other type of process, drain and vent connections upon request.

# KSR Reflex and Transparent Glasses



KSR Reflex and Transparent Glasses are manufactured according to high quality standards. They are exclusively made of "extra hard" thermally pre-stressed borosilicate glass. Transparent glasses are ground and polished on both faces, while reflex glasses are provided with molded prismatic grooves on their internal face.



### Dimensions:

Size	1	2	3	4	5	6	7	8	9
L [mm]	115	140	165	190	220	250	280	320	340

Most of KSR reflex and transparent level gauges are fitted with type A sight glasses as standard. Type B and H glasses can be fitted upon request, or can be supplied as spares to refurbish other makers' gauges.

### Technical Data

<b>Material</b>	Borosilicate glass, "extra hard" and thermally pre-stressed	
<b>Resistance to bending strain</b>	> 120 N/mm <sup>2</sup>	
<b>Transition temperature</b>	T <sub>g</sub> = 500°C - DIN 52 324	
<b>Acid resistance</b>	Class 1 - DIN 12 116	
<b>Alkali resistance</b>	Class 2 - DIN 52 322 and ISO 695	
<b>Hydrolytic resistance</b>	Class 1 - DIN 12 111 and ISO 719	
<b>Standards</b>	DIN 7081	BS 3463
	JIS B 8211	ÖNORMM7354
	ÖMV H 2009	MIL-G-16356 D
	TGL 7210	S.O.D. Spec. 123
	Esso Eng. Spec. 123	

### Protection of Glasses

In order to protect the glasses from medium corrosion, Mica or PCTFE (Kel-F™) shields can be supplied upon request. Because of their flat internal face, only transparent glasses can be fitted with these shields. Mica shields are generally reserved to high temperature applications (for instance a must for steam service above 35 barg), while PCTFE shields are used on lower temperatures (< 150°C) and for highest corrosive liquids.

### Gaskets

All KSR reflex and transparent spare glasses are normally provided with a set of sealing and cushion gaskets. When supplied with spare glasses, both gaskets are made of armoured graphite as standard. Gaskets made of Universal Carbo, PTFE or to customer's specifications are also available upon request.

### Aluminumsilicate Glasses

For very high temperature applications, the use of aluminumsilicate transparent glasses is recommended. This type of glass, which has a higher transition temperature than borosilicate glass, can be used at highest steam pressure and temperature ratings. Please contact your nearest KSR representative for further information.



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