

## Zwischenflansch-Doppelrückschlagklappe

### Wafer Type Duo Check Valve

**ZRD 1**

#### Einsatzgrenzen (Pressure/Temperature Ratings)

	TMA (°C)	-10	200	300	400
PN 40	PMA (bar)	40	38	32	22

Leckrate nach API598 (met.), DIN 3230 Teil 3, B03 (PTFE)  
 oder B01 (NBR, EPDM, FKM)  
 Leakage acc. to API598 (met./met.), DIN 3230 part 3, B03 (PTFE)  
 or B01 (NBR, EPDM, FKM)

#### Werkstoffe (Materials)

Gehäuse/Body	Klappen/Plates	Federn/Springs	Achse/Hinge
1.0460 (DN50-125) <sup>1)</sup>	1.4581 (DN50-150)	1.4571 <sup>2)</sup>	1.4571
1.0619 (> DN125) <sup>1)</sup>	1.0425 (> DN150) <sup>1)</sup>	1.4571 <sup>2)</sup>	1.4571

<sup>1)</sup> Sitzflächen auf Wunsch gepanzert oder stellitiert

<sup>2)</sup> bei Temperaturen über 300°C bitte Inconel-Feder wählen

<sup>1)</sup> hard faced or stellite seats on request

<sup>2)</sup> when exceeding 300°C operating temperature please use an Inconel spring

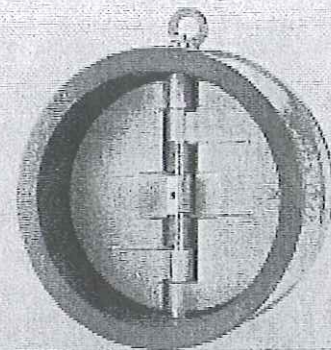
Elastische Dichtung möglich

Elastic seat rings available

#### Öffnungsdrücke (Opening Pressures)

DN	P <sub>0</sub> (mbar)		Ohne Feder/ without spring
	↔	↑	
50	15	25	10
65	15	25	10
80	15	30	15
100	15	30	15
125	15	35	20
150	15	35	20
200	15	35	20
250	15	35	20
300	15	45	30
400	15	45	30
500	15	55	40

↔ ↑ = Durchflussrichtung/Flow direction



DN 50 - 500

PN 6 - 40

#### Verwendung

- Neutrale Flüssigkeiten
- Öle
- Luft
- Fluidgruppe 1 gemäß DGRL 97/23/EG

#### Application

- Neutrally Fluids
- Oil
- Air
- Fluidgroup 1 acc. to PED 97/23/EC



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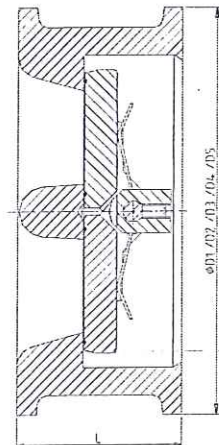
## Zwischenflansch-Doppelrückschlagklappe

### Wafer Type Duo Check Valve

ZRD 1

### Maße und Gewichte (Dimensions and Weights)

DN	L	Maße/dimensions in mm					kg
		D <sub>1</sub> (PN6)	D <sub>2</sub> (PN10)	D <sub>3</sub> (PN16)	D <sub>4</sub> (PN25)	D <sub>5</sub> (PN40)	
50	43	99	110	110	110	110	4,0
65	46	116	130	130	130	130	5,0
80	64	133	145	145	145	145	7,5
100	64	152	165	165	171	171	9,0
125	70	183	195	195	197	197	12,5
150	76	208	221	221	227	227	15,5
200	89	262	276	276	287	294	25,0
250	114	317	331	332	344	356	45,0
300	114	376	381	387	404	421	60,0
400	140	476	492	499	518	550	118,0
500	152	581	597	621	628	632	181,0



Baulänge nach EN 558-1, Reihe 16  
Face/Face dimension acc. to EN 558-1, line 16

Passend zwischen Flansche EN 1092-1, Form B1  
For fitting between flanges acc. to EN 1092-1, form B1

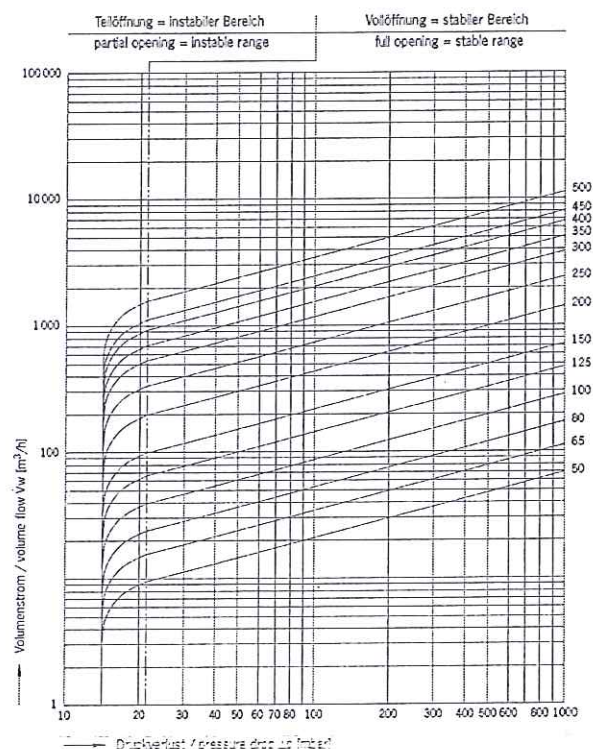
### Druckverlustdiagramm (Pressure Drop Chart)

Die Diagrammwerte gelten für Wasser bei 20°C. Sie resultieren aus Messungen an Ventilen beim Einbau in horizontaler Leitung. Beim Einbau in vertikaler Leitung ergeben sich im Teilöffnungsbereich unbedeutende Abweichungen. Um Druckverluste bei anderen Medien zu ermitteln, ist zuvor der äquivalente Wasservolumenstrom nach folgender Formel zu berechnen:

Graph readings apply to water at 68° F (20° C). They result from measurements on valves installed in horizontal pipes. For installation in vertical pipes insignificant deviations occur in the partial opening. In order to determine pressure losses for other media the equivalent water flow has to be calculated before applying the following formula:

$$\dot{V}_w = \dot{V} \sqrt{\frac{\rho}{1000}}$$

$\dot{V}_w$ [m³/h]	äquivalenter Wasservolumenstrom equivalent water flow
$\rho$ [kg/m³]	Dichte des Mediums (Betriebszustand) density of medium at working conditions
$\dot{V}$ [m³/h]	Volumenstrom des Mediums (Betriebszustand) flow of medium at working conditions



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## Zwischenflansch-Doppelrückschlagklappe

### Wafer Type Duo Check Valve

**ZRD 2**

#### Einsatzgrenzen (Pressure/Temperature Ratings)

	TMA (°C)	-200	-10	200	300	400
PN 40	PMA (bar)	40	40	23	20	17

Leckrate nach API598 (met.), DIN 3230 Teil 3, B03 (PTFE)  
 oder B01 (NBR, EPDM, FKM)  
 Leakage acc. to API598 (met./met.), DIN 3230 part 3, B03 (PTFE)  
 or B01 (NBR, EPDM, FKM)

#### Werkstoffe (Materials)

Gehäuse/Body	Klappen/Plates	Federn/Springs	Achse/Hinge
1.4301 (DN50-125)	1.4308 (DN50-150)	1.4571 <sup>1)</sup>	1.4301
1.4308 (> DN125)	1.4301 (> DN150)	1.4571 <sup>1)</sup>	1.4301

<sup>1)</sup> bei Temperaturen über 300°C bitte Inconel-Feder wählen

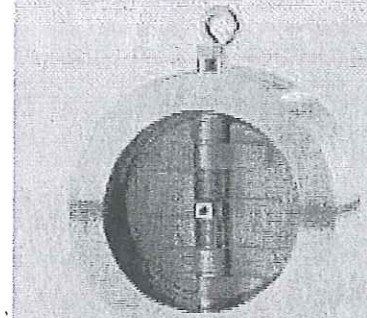
<sup>1)</sup> when exceeding 300°C operating temperature please use an Inconel spring

Elastische Dichtung möglich  
 Elastic seat rings available

#### Öffnungsdrücke (Opening Pressures)

DN	P <sub>0</sub> (mbar)		Ohne Feder/ without spring
	↔	↑	↑
50	15	25	10
65	15	25	10
80	15	30	15
100	15	30	15
125	15	35	20
150	15	35	20
200	15	35	20
250	15	35	20
300	15	45	30
400	15	45	30
500	15	55	40

↔ ↑ = Durchflussrichtung/Flow direction



DN 50 - 500  
 PN 6 - 40

#### Verwendung

- Flüssigkeiten
- Dämpfe
- Gase
- Fluidgruppe 1 gemäß DGRL 97/23/EG

#### Application

- Fluids
- Steam
- Gas
- Fluidgroup 1 acc. to PED 97/23/EC



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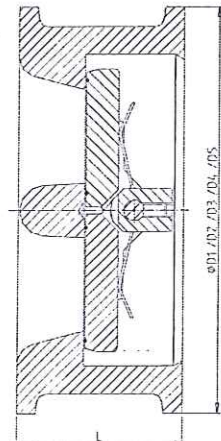
## Zwischenflansch-Doppelrückschlagklappe

Wafer Type Duo Check Valve

ZRD 2

### Maße und Gewichte (Dimensions and Weights)

DN	Maße/dimensions in mm						kg
	L	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	
		(PN6)	(PN10)	(PN16)	(PN25)	(PN40)	
50	43	99	110	110	110	110	4,0
65	46	116	130	130	130	130	5,0
80	64	133	145	145	145	145	7,5
100	64	152	165	165	171	171	9,0
125	70	183	195	195	197	197	12,5
150	76	208	221	221	227	227	15,5
200	89	262	276	276	287	294	25,0
250	114	317	331	332	344	356	45,0
300	114	376	381	387	404	421	60,0
400	140	476	492	499	518	550	118,0
500	152	581	597	621	628	632	181,0



Baulänge nach EN 558-1, Reihe 16  
Face/Face dimension acc. to EN 558-1, line 16

Passend zwischen Flansche EN 1092-1, Form B1  
For fitting between flanges acc. to EN 1092-1, form B1

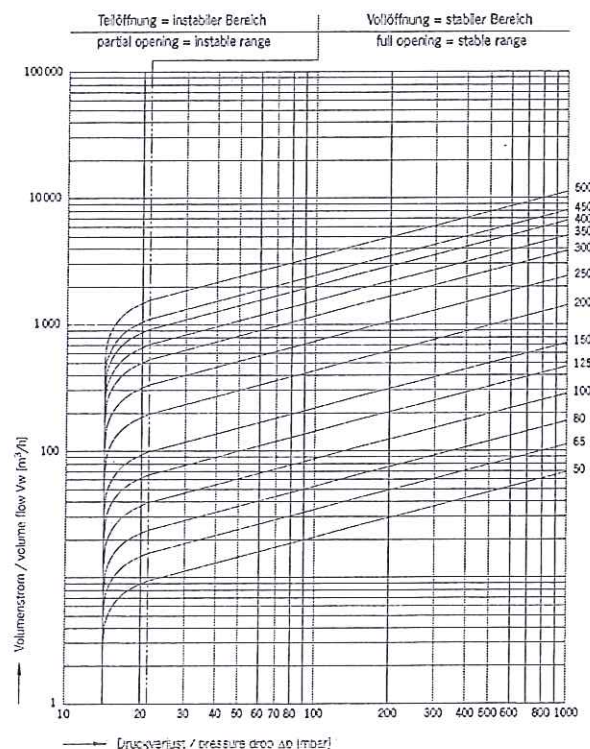
### Druckverlustdiagramm (Pressure Drop Chart)

Die Diagrammwerte gelten für Wasser bei 20°C. Sie resultieren aus Messungen an Ventilen beim Einbau in horizontaler Leitung. Beim Einbau in vertikaler Leitung ergeben sich im Teilöffnungsbereich unbedeutende Abweichungen. Um Druckverluste bei anderen Medien zu ermitteln, ist zuvor der äquivalente Wasservolumenstrom nach folgender Formel zu berechnen:

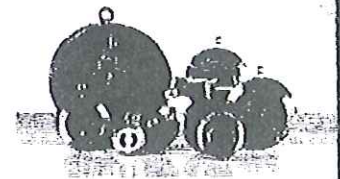
Graph readings apply to water at 68° F (20° C). They result from measurements on valves installed in horizontal pipes. For installation in vertical pipes insignificant deviations occur in the partial opening. In order to determine pressure losses for other media the equivalent water flow has to be calculated before applying the following formula:

$$\dot{V}_w = \dot{V} \sqrt{\frac{\rho}{1000}}$$

$\dot{V}_w$  [m<sup>3</sup>/h] äquivalenter Wasservolumenstrom  
equivalent water flow  
 $\rho$  [kg/m<sup>3</sup>] Dichte des Mediums (Betriebszustand)  
density of medium at working conditions  
 $\dot{V}$  [m<sup>3</sup>/h] Volumenstrom des Mediums (Betriebszustand)  
flow of medium at working conditions



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## Instruction Manual

### Wafer Type Check Valves

SR/HSR  
ZRK/ZRL  
ZRD



Technische Änderungen vorbehalten 05/2003  
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This instruction manual contains important safety instructions. Please read carefully before installation and initial operation. It is hardly recommended to keep this manual within the operation area.





## 1.1 Declaration of Conformity

in acc. to Pressure Equipment Directive 97/23/EC

Name and Address of Manufacturer  
RITAG Ritterhuder Armaturen GmbH & Co. Armaturenwerk KG  
Industriestr. 7-9  
D-27711 Osterholz-Scharmbeck

### Description of the Pressure Equipment

Type	DN	PN	Module	Type	DN	PN	Module	Type	DN	PN	Module	Type	DN	PN	Module
SR10.16	125-200	6-16	A	SR12.16	65-200	6-16	A	ZRK4	65-200	6-16	A	ZRL4	65-200	6-16	A
SR60.06	32-100	6	A	SR70.16	65-100	6-16	A	ZRK1	50-100	10-40	A1	ZRL1	50-100	10-40	A1
SR61.06	32-100	6	A					ZRK1S	50-100	10-40	A1	ZRL1S	50-100	10-40	A1
SR20.40	32-100	6-40	A1	SR33.40	32-100	6-40	A1	ZRK2	50-100	10-40	A1	ZRL2	50-100	10-40	A1
SR20.40Si	32-100	6-40	A1	SR34.40	32-100	6-40	A1	ZRK3	50-100	10-40	A1	ZRL3	50-100	10-40	A1
SR22.40	32-100	6-40	A1	SR35.40	32-100	6-40	A1	ZRK4	250,300	6-16	A1	ZRL4	250,300	6-16	A1
SR30.40	32-100	6-40	A1	SR55.40	32-100	6-40	A1	ZRK5	50-100	10-40	A1	ZRL5	50-100	10-40	A1
SR31.40	32-100	6-40	A1	HSR20.160	32-100	63-160	A1								
SR32.40	32-100	6-40	A1	HSR30.160	32-100	63-160	A1	ZRK1	125-600	10-40	H	ZRL1	125-600	10-40	H
SR40.40	32-100	6-40	A1	SR50.40	32-100	6-40	A1	ZRK1S	125-600	10-40	H	ZRL1S	125-600	10-40	H
SR20.40	125-200	6-40	H	SR30.40	125-200	6-40	H	ZRK2	125-600	10-40	H	ZRL2	125-600	10-40	H
SR20.40ST	125-200	6-40	H	SR34.40	125-200	6-40	H	ZRK3	125-600	10-40	H	ZRL3	125-600	10-40	H
SR22.40	125-200	6-40	H	SR35.40	125-200	6-40	H	ZRK4	350-600	6-16	H	ZRL4	350-600	6-16	H
SR25.40Si	250-350	6-40	H	SR55.40	125-200	6-40	H	ZRK5	125-600	10-40	H	ZRL5	125-600	10-40	H

All valves in size DN ≤25 comply with article 3, paragraph 3 and are not permitted to be marked neither with the CE characters nor with the notified body code.

### Name and Address of the Notified Body

LRQA GmbH Hamburg  
Mönckebergstrasse 27  
20095 Hamburg

The signing manufacturer confirms by this declaration that design, manufacturing and inspection of these pressure equipments meet the requirements of the Pressure Equipment Directive 97/23/EC.

### Applied Harmonized Standards

No harmonized standards available at present

Other Applied Standards and Technical Rules  
AD 2000, DIN3230, DIN3840, VdTÜV1253, VdTÜV100, TRD110

22.01.2002

Date

Herfried Schrader

Authorized Subscriber



## 1.2 Declaration of Conformity

in acc. to Pressure Equipment Directive 97/23/EC

Name and Address of Manufacturer  
 RITAG Ritterhuder Armaturen GmbH & Co. Armaturenwerk KG  
 Industriestr. 7-9  
 D-27711 Osterholz-Scharmbeck

Description of the Pressure Equipment

Type	DN	PN	Module	Type	DN	PN	Module
ZRD G/K3	65 - 200	6 - 16	A	ZRD G/API594	21/2" - 6"	Class125, 150	A
ZRD G4/K3	65 - 200	6 - 16	A	ZRD G4/API594	21/2" - 6"	Class125, 150	A
ZRD 4/K3	65 - 200	6 - 16	A	ZRD 4/API594	21/2" - 6"	Class125, 150	A
ZRD 6/K3	65 - 200	6 - 16	A	ZRD 6/API594	21/2" - 6"	Class125, 150	A
ZRD G/K3	250, 300	6 - 16	A1	ZRD G/API594	8", 10"	Class125, 150	A1
ZRD G4/K3	250, 300	6 - 16	A1	ZRD G4/API594	8", 10"	Class125, 150	A1
ZRD 4/K3	250, 300	6 - 16	A1	ZRD 4/API594	8", 10"	Class125, 150	A1
ZRD 6/K3	250, 300	6 - 16	A1	ZRD 6/API594	8", 10"	Class125, 150	A1
ZRD 1/K3	50 - 100	6 - 40	A1	ZRD 1/API594	2" - 4"	Class150, 300	A1
ZRD 2/K3	50 - 100	6 - 40	A1	ZRD 2/API594	2" - 4"	Class150, 300	A1
ZRD 3/K3	50 - 100	6 - 40	A1	ZRD 3/API594	2" - 4"	Class150, 300	A1
ZRD G/K3	350 - 600	6 - 16	H	ZRD G/API594	12" - 24"	Class125, 150	H
ZRD G4/K3	350 - 600	6 - 16	H	ZRD G4/API594	12" - 24"	Class125, 150	H
ZRD 4/K3	350 - 600	6 - 16	H	ZRD 4/API594	12" - 24"	Class125, 150	H
ZRD 6/K3	350 - 600	6 - 16	H	ZRD 6/API594	12" - 24"	Class125, 150	H
ZRD 1/K3	125 - 600	6 - 40	H	ZRD 1/API594	5" - 24"	Class150, 300	H
ZRD 2/K3	125 - 600	6 - 40	H	ZRD 2/API594	5" - 24"	Class150, 300	H
ZRD 3/K3	125 - 600	6 - 40	H	ZRD 3/API594	5" - 24"	Class150, 300	H

All valves in size DN ≤25 comply with article 3, paragraph 3 and are not permitted to be marked neither with the CE characters nor with the notified body code.

Name and Address of the Notified Body

LRQA GmbH Hamburg  
 Mönckebergstrasse 27  
 20095 Hamburg

The signing manufacturer confirms by this declaration that design, manufacturing and inspection of these pressure equipments meet the requirements of the Pressure Equipment Directive 97/23/EC.

Applied Harmonized Standards

No harmonized standards available at present

Other Applied Standards and Technical Rules  
 AD 2000, DIN3230, DIN3840, VdTÜV1253, VdTÜV100, TRD110

22.01.2002

Date

Herfried Schrader

Authorized Subscriber



## 2. General Notes

This instruction manual applies to the above mentioned valves which are subject to the Quality Management System Standard acc. to DIN/ISO9001 in both the manner of manufacturing as well as testing and which do meet the basic safety requirements of Annex I of the Pressure Equipment Directive 97/23/EC. This instruction manual is intended to support the user of above mentioned valves in installation, operation and maintenance.

<b>Attention</b>	<b>Disregarding the following caution advices could evoke dangerous situations</b> which entail an inefficacy of the manufacturers' warranty. For any questions, please contact the manufacturer and also see chapter 11.
------------------	--

## 3. Intended Use

Wafer type check valves are solely destined for installation within a pipeline system in consideration of the admitted pressure and temperature limits to avoid a backflow of the media.

It is the operators' responsibility to examine the chemical resistance in relation to the specified operation data.

All valid operation data are indicated in chapter 8 respectively in the technical data sheets of the relevant types.

## 4. Safety Instructions

### 4.1 General Safety Instructions

Those safety regulations applying to the pipeline system apply to the valves itself accordingly, i. e. any national or international rules for accident prevention as well as possibly existing operators' working-, production- and safety regulations have to be considered. This instruction manual only points to those safety instructions which have to be considered additionally.

### 4.2 Qualification of Personnel

Only qualified staff is permitted to install and maintain the valves. The operator is obliged to coordinate the competencies, the responsibilities and the surveillance of his staff. Should the staff not have the necessary knowledge, the operator must provide adequate additional training. The operator has to ensure that the content of this instruction manual is comprehended in all its particulars.

### 4.3 Safety Instructions for the Operator

Due to the fact that the following points are not in the responsibility of the valve manufacturer the operator has to ensure when using the valves that

- the valves are solely used in the way described in chapter 3
- the pipeline system is installed in a professional manner. The wall thickness of the valve body is designed in a way that tensions which do exist within the pipeline system are considered in a usual order of magnitude.

- the valves are properly installed between the flanges.
- an usual flow rate within the pipeline system is not exceeded during a continuous operation. For abnormal service conditions, e. g. oscillation, water shock, cavitation or a medium that contains larger solid particles, please contact RITAG for clarification.
- the valves are protected against touch when working at a temperature  $<0^{\circ}\text{C}$  respectively  $>40^{\circ}\text{C}$ .

<b>Danger</b>	Prevention from misusing the valves: It has to be particularly ensured that the selected body materials and inner parts of the valve are suited for the medium that is used. The manufacturer assumes no liability for any damages caused by aggressive media. <b>Disregarding this precaution may evoke dangerous situations for the operating personnel or cause damages to the pipeline system.</b>
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#### 4.4 Special Dangers

<b>Danger to Life</b>	Before disassembling the valve the pipeline has to be depressurized, the pipe has to be totally drained and released. Afterwards the flange screw connections can be unscrewed and the valve can be dismantled. <b>Misusing this precaution means danger to the life of the operating personnel.</b>
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#### 5. Transport and Storage

The valves are provided ready for installation. They need to be treated, conveyed and stored carefully.

- Those valves that are delivered with a protecting packing need to be stored within this packing up to the moment of installation.
- In case of a direct storage at the installation location the valve has to be stored in a closed room and has to be protected against any damaging impacts.
- It is recommended to use up any stock items first in order to achieve short storage periods.
- Those valves that are equipped with a soft sealing need to be protected against sunlight that might hit this soft sealing or any other UV-radiation in order to avoid ageing.
- Lifting tools for transport are only to be fastened on the valve body. Inner parts may not be misused as „carrying devices“.



## 6 Categorisation in acc. to PED 97/23/EC article 9

### Wafer Type Lift Check Valves Type SR / HSR

CE-marking in conjunction with declaration of conformity in acc. to PED 97/23/EC														
Valve type	PN	Fluid group	Nominal Diameter											
			15	20	25	32	40	50	65	80	100	125	150	200
SR10.16	16	2				*	*	*	*	*	CE	CE	CE	*
SR12.16	16	2				no CE	no CE	no CE	CE	CE	CE	CE	CE	*
SR70.06K	6	2				no CE	no CE	no CE	no CE	no CE	no CE	*	*	*
SR70.16	16	2				no CE	no CE	no CE	CE	CE	CE	*	*	*
SR60.06	6	1 u. 2				CE	CE	CE	CE	CE	CE	*	*	*
SR20.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR20.40Si	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR25.40	40	1 u. 2				*	*	*	*	*	*	*	*	CE
SR22.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR30.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR31.40	40	1 u. 2	no CE			CE	CE	CE	CE	CE	CE	CE	CE	*
SR32.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR33.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR34.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR35.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR40.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR50.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
SR55.40	40	1 u. 2				CE	CE	CE	CE	CE	CE	CE	CE	*
HSR20.160	160	1 u. 2				CE	CE	CE	CE	CE	CE	*	*	*
HSR30.160	160	1 u. 2				CE	CE	CE	CE	CE	CE	*	*	*

\* not available in this size

### Wafer Type Swing Check Valves Type ZRK / ZRL

CE-marking in conjunction with declaration of conformity in acc. to PED 97/23/EC																
Valve type	PN	Fluid group	Nominal Diameter													
			50	65	80	100	125	150	200	250	300	350	400	450	500	600
ZRK1, ZRL1, ZRK5	10	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	16	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	25	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	40	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRK1-S, ZRL1-S	10	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	16	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	25	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	40	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRK2, ZRK3	10	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	16	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	25	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	40	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRK4	10	2	no CE	no CE	no CE	kein CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	16	2	no CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE

### Wafer Type Duo Check Valves Type ZRD

CE-marking in conjunction with declaration of conformity in acc. to PED 97/23/EC																
Valve type	PN	Fluid group	Nominal Diameter													
			50	65	80	100	125	150	200	250	300	350	400	450	500	600
ZRD1/K3, ZRD2/K3,	10	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD3/K3	16	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	25	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	40	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD1/API594,	10	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD2/API594,	16	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD3/API594	25	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	40	1 u. 2	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD G/K3, ZRD G4/K3	6	2	no CE	no CE	no CE	no CE	no CE	no CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD4/K3, ZRD6/K3	10	2	no CE	no CE	no CE	no CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
	16	2	no CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD G/API594,	6	2	no CE	no CE	no CE	no CE	no CE	no CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD G4/API594,	10	2	no CE	no CE	no CE	no CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD 4/API594,	16	2	no CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE	CE
ZRD 6/API594																

The conformity in acc. to PED 97/23/EC is documented by the CE-marking on the valve body.

## 7 Specification

The sectional drawings shown in this chapter do exemplary illustrate the basic design of the valves. Detailed information can be found in the technical data sheet of the specific valve type.

### 7.1 Marking

All valves are marked in acc. to PED 97/23/EC, TRB 801 No. 45 or EN19.

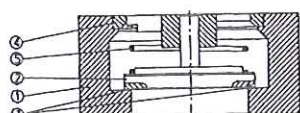
#### General Marking

Manufacturer	RITAG
Valve type	...
Nominal diameter	DN...
Nominal pressure	PN..
Material	...
Batch no. (retraceability of the material)	...
Year of manufacture (month, year, e.g. 5.02)	...
Arrow of flow direction	↑
CE-marking (starting from category I, see chapter 1 u. 6)	CE
Code of the Notified Body (Module A1 und H)	0525
Stamp of inspector	...

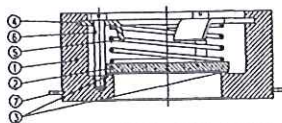
Further special markings, e. g. plant identification code or project name could be additionally affixed on request.

### 7.2 Drawings and Parts Lists

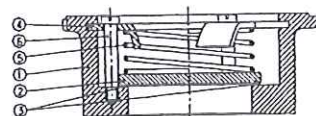
#### Lift Check Valves



SR35.40, SR40.40, SR50.40, SR55.40,  
HSR20.160, HSR30.160



SR20.40, SR20.40Si, SR22.40,  
SR30.40, SR31.40, SR32.40  
SR33.40, SR34.40, SR12.16

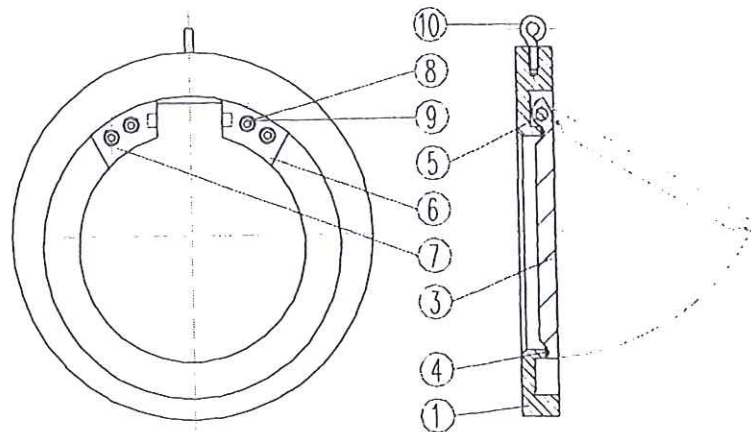


SR70.06, SR70.16,

Item no.	Denomination	Item no.	Denomination
1	Body	2	Plate/disc
3	Sealing (spare part)	4	Guide plate
5	Spring (spare part)	6	Guide screw
7	Centering ring		



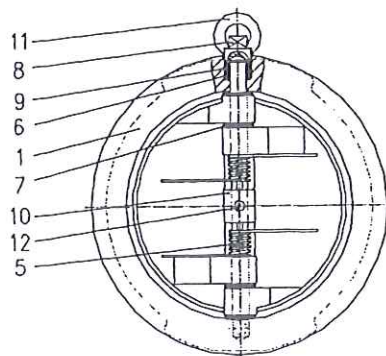
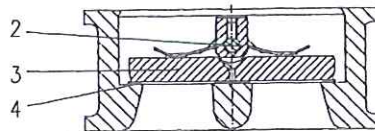
## Swing Check Valve



No spring illustrated

1	Body	7	Hinge (left)
3	Plate	8	Screw
4	Sealing (spare part)	9	Ring
5	Hinge pin	10	Eye screw
6	Hinge (right)		Spring (spare part)

## Duo Check Valve



1	Body	8	Pin retainer
2	Plate	9	Ring
3	Shaft	10	Stop pin
4	Sealing (spare part)	11	Eye bolt
5	Spring (spare part)	12	Set screw
6	Packing (spare part)		
7	Ring		

### 7.3 Functionality

Wafer type non-return valves are valves which are controlled by the backflow of the medium. The obturator (disc, cone, plate) is first lifted and then opened by the flow. In the event of an incipient backflow (e. g. failure of a pump) the obturator closes self-controlled by its dead weight. This closing process can optionally be supported by using a spring.

## 8 Installation

### 8.1 General Information

Positioning within the isometry of the pipeline as well as a proper installation of the valves is basically the responsibility of the engineer or the operator. Any faults in engineering or installation could cause malfunction of the valves and constitute a significant danger.

For the installation of the valves the same safety regulations are to be considered as for connecting pipelines and its components.

<b>Attention</b>	Pipelines have to be laid in such a manner that shearing strain and bending stress are not able to affect the valve body. The flange facings have to be in a parallel position to each other. The facings need to be clean and undamaged.
<b>Danger</b>	Valve bodies in material cast iron EN-JL1040, EN-JS1030 must not be treated by sudden pressure (e. g. hammer blow) because components may be destroyed. Valves working at temperatures <0°C respectively >40°C need to be protected against touch.

### 8.2 Operational Characteristics

#### Wafer Type Lift Check Valves Type SR/HSR

Operating data for SR - valves												
permissible working temperature (°C)			permissible working pressure (bar)									
Type	Material	P/T group EN1092-1, -2	PN	20	100	150	200	250	300	350	400	500
SR10.16	EN-JL1040		16	16	16	14,4	12,8	11,2	9,6			
SR60.06	PTFE		6	6	6	5	4					
SR12.16	CC483K		16	16	16	15	14	13				
SR70.16	2.0401		16	16	16	15	14	13				
SR20.40	1.4021		40	40	40	37,5	35	32,5	30	27,5	25	
SR20.40SI bis DN100	1.0570	1E1	40	40	40	36	33	29	24			
SR20.40SI DN125 bis 200	1.0421		40	40	40	36	33	29	24			
SR25.40	1.0421		40	40	40	36	33	29	24			
SR22.40	1.0460		40	40	40	36	33	29	24	20	16	
SR30.40	1.4571	15EO	40	37	33	31,5	29,7	27,9	25,8	24,9	24	23,3
SR31.40	3.7035		40	40	40	34	28	22	16			
SR32.40	2.4617		40	40	40	38	36	34	32	30	28	
SR40.40	1.0460		40	40	40	37	35	31,5	29	27	26	23
SR33.40	2.4610		40	40	40	38	36	34	32	30	28	
SR34.40	1.4301	11EO	40	34,7	27,9	25,2	22,6	21	19,6	18,5	17,4	16,9
SR35.40	1.0460		40	40	40	37	35	31,5	29	27	26	23
SR55.40	1.4571	15EO	40	37	33	31,5	29,7	27,9	25,8	24,9	24	23,3
HSR20.160	1.0460		160	160	160	145	130	125	100	84	68	53
HSR30.160	1.4571	15EO	160	160	154	148	142	136	130	124	118	110
SR50.40	1.4571	15EO	40	37	33	31,5	29,7	27,9	25,8	24,9	24	23,3



### Wafer Type Swing Check Valves Type ZRK/ZRL

Operating data for ZRK / ZRL - valves											
admissible working temperature (°C)				20	100	150	200	250	300	350	400
Type	Material	P/T group EN1092-1, -2	PN	admissible working pressure (bar)							
ZRK1, ZRL1, ZRK1-S, ZRL1-S	1.0570	1E1	10	10	10	9	8	7	6		
			16	16	16	14,4	12,8	11,2	9,6		
			25	25	25	22,5	20	17,4	15		
			40	40	40	36	33	29	24		
ZRK2, ZRL2	1.4301	11EO	10	8,7	7	6,3	5,6	5,2	4,9	4,6	4,4
			16	13,9	11,2	10,1	9	8,4	7,8	7,4	7
			25	21,7	17,4	15,8	14,1	13,1	12,2	11,6	10,9
			40	34,7	27,9	25,2	22,6	21	19,6	18,5	17,4
ZRK3, ZRL3	1.4571	15EO	10	9,3	8,2	7,9	7,4	7	6,4	6,2	6
			16	14,9	13,2	12,6	11,9	11,2	10,3	10	9,6
			25	23,3	20,6	19,7	18,6	17,4	16,1	15,6	15
			40	37	33	31,5	29,7	27,9	25,8	24,9	24
ZRK4, ZRL4	CC483K		10	16	16	15	14	13			
			16	16	16	15	14	13			
ZRK5, ZRL5	1.0425	3EO	10	10	10	9,8	9,5	9	8	7	5,5
			16	16	16	15,7	15,2	14,4	12,8	11,2	8,8
			25	25	25	24,5	23,8	22,5	20	17,5	13,8
			40	40	40	39	38	36	32	28	22

Lowest working temperature: ZRK1, ZRL1, ZRK4, ZRL4, ZRK5, ZRL5 minus 10°C; ZRK2, ZRL2, ZRK3, ZRL3 minus 200°C

### Wafer Type Duo Check Valves Type ZRD

Operating data for ZRD - valves											
permissible working temperature (°C)				20	100	150	200	250	300	350	400
Type	Material	P/T group EN1092-1, -2	PN	permissible working pressure (bar)							
ZRD G/K3, ZRD G4/K3	EN-JL1040	*	6	6	6	5,4	4,8	4,2	3,6		
ZRD 6/K3	EN-JL1040	*	10	10	10	9	8	7	6		
	EN-JL1040	*	16	16	16	14,4	12,8	11,2	9,6		
ZRD 4/K3	CC483K		6	6	6	5	4	3			
	CC483K		10	10	10	9	8	7			
	CC483K		16	16	16	15	14	13			
ZRD 1/K3	1.0619	3EO	10	10	10	9,8	9,5	9	8	7	5,5
	1.0619	3EO	16	16	16	15,7	15,2	14,4	12,8	11,2	8,8
	1.0619	3EO	25	25	25	24,5	23,8	22,5	20	17,5	13,8
	1.0619	3EO	40	40	40	39	38	36	32	28	22
ZRD 2/K3	1.4308	11EO	10	8,7	7	6,3	5,6	5,2	4,9	4,6	4,4
	1.4308	11EO	16	13,9	11,2	10,1	9	8,4	7,8	7,4	7
	1.4308	11EO	25	21,7	17,4	15,8	14,1	13,1	12,2	11,6	10,9
	1.4308	11EO	40	34,7	27,9	25,2	22,6	21	19,6	18,5	17,4
ZRD 3/K3	1.4581	15EO	10	9,3	8,2	7,9	7,4	7	6,4	6,2	6
	1.4581	15EO	16	14,9	13,2	12,6	11,9	11,2	10,3	10	9,6
	1.4581	15EO	25	23,3	20,6	19,7	18,6	17,4	16,1	15,6	15
	1.4581	15EO	40	37	33	31,5	29,7	27,9	25,8	24,9	24
ZRD G/API594, ZRD G4/API594	EN-JL1040		Class125	16	16	14,4	12,8	11,2	9,6		
ZRD 6/API594	EN-JL1040		Class150	20	20	18,5	16,5	14,5	12,3		
ZRD 4/API594	CC483K		Class125	16	16	15	14	13			
	CC483K		Class150	20	20	18	17	16			
ZRD 1/API594	1.0619	3EO	Class150	20	20	20	19,5	18,5	16,5	14,4	11,3
	1.0619	3EO	Class300	50	50	49,5	48,5	46	41	35,9	28,3
ZRD 2/API594	1.4308	11EO	Class150	20	20	13	11,6	10,7	10	9,5	8,9
	1.4308	11EO	Class300	50	50	32,5	29	26,9	25,3	23,8	21,7
ZRD 3/API594	1.4581	15EO	Class150	20	20	16,2	15,3	14,3	13,2	12,8	12,3
	1.4581	15EO	Class300	50	50	40,7	38,2	36	33	32	31

Lowest working temperature: ZRD G, ZRD G4, ZRD1, ZRD3, ZRD4, ZRD6 minus 10°C; ZRD2 minus 200°C

### 8.3 Range of Applications

Industrial plants, heating systems, fluids, gases and vapour (see also fluid groups in table of article 6), hot water heating systems DIN4751 / DIN4752, heat transmission plants DIN4754, steam boiler plants TRD110, pressure vessel plants TRB801  
No. 45. Potential restrictions by any technical body of legislation are to be considered. The materials of the valves have to be applicative for the medium.

**Opening Pressures p<sub>ö</sub> (mbar)**  
- depending on flow direction -

DN	SR / HSR				ZRK / ZRL				ZRD		
	↔	↓	↑	↑ no spring	↔	↔ with spring	↑	↑ with spring	↔	↑	↑ with spring
15	20	16	24	4							
20	20	16	24	4							
25	20	16	24	4							
32	20	16	24	4							
40	20	15,5	24,5	4,5							
50	20	15	25	5	~0	15	8	23	15	25	10
65	20	14,5	25,5	5,5	~0	15	8	23	15	25	10
80	20	13,5	26,5	6,5	~0	15	8	23	15	30	15
100	20	13,5	26,5	6,5	~0	15	8	23	15	30	15
125	20	-	34	14	~0	10	8	18	15	35	20
150	20	-	33	13	~0	10	8	18	15	35	20
200	20	-	32	12	~0	10	12	22	15	35	20
250	20	-	32	12	~0	10	12	22	15	35	20
300	20	-	32	12	~0	10	12	22	15	45	30
350	20	-	32	12	~0	10	15	25	15	45	30
400	20	-	-	-	~0	10	16	26	15	45	30
450	20	-	-	-	~0	10	16	26	15	55	40
500	20	-	-	-	~0	10	22	32	15	55	40
600	20	-	-	-	~0	10	24	34	15	75	60

### 8.4 Installation Instructions

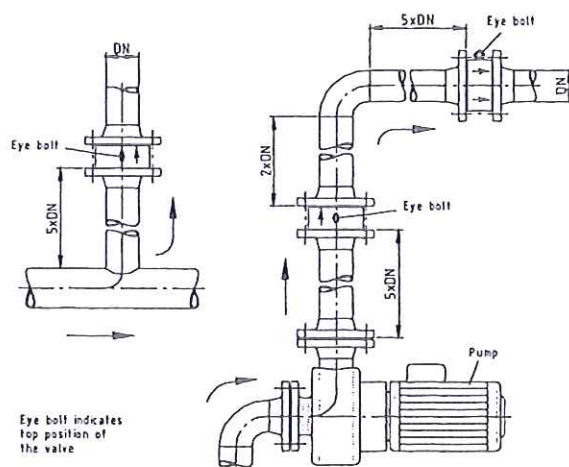
The arrow indicating the flow direction and the flow direction itself need to run in the same direction.

For the valve to open a minimum dynamic pressure is required. Valves without spring can only be installed in vertical lines with upward flow.

#### Installation in

horizontal

vertical pipeline





<b>Attention</b>	Wafer type non-return valves are designed for installation between two pipeline flanges including appropriate flange sealings. The outer diameter of the valve centres itself by the flange bolts. The fasteners require a technical applicability in accordance to the service conditions. They have to comply with the regulations and have to be tightened with the permissible torque. Screws, nuts or flange sealings are not covered by the valve manufacturers' scope of supply.
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## **9 Initial Operation, Shut-down, Maintenance**

### **9.1 Initial Operation**

#### **General information**

Materials and service conditions have to be compared with the pipeline system data before pressure test and initial operation in order to check resistance and load. For new plants or repairs the pipeline system has to be thoroughly rinsed in order to clean it from potential welding residues or any other damaging solid particles.

#### **Pressure tests of pipeline sections**

Since non-return valves are always in a closed position within a filled pipeline section a testing overpressure value of  $1,1 \times PS$  must not be exceeded ( $PS = NP = \text{max. permissible working pressure}$ ).

Throughout the pressure test process the valve and the flange connections have to be examined regarding any leaks. Leakages have to be immediately sealed by retightening all fasteners.

### **9.2 Shut-down**

If the system is out of operation for a lasting period all media which might change its condition (i. e. polymerisation, crystallisation, solidification) have to be drained off the piping system. Rinse the system if necessary.

### **9.3 Maintenance**

The valves are maintenance-free. For safety reasons and in order to avoid unnecessary periods of interruption the operator is advised to examine functionality and reliability of the valves within reasonable and regular intervals (periods to be defined by the operator).

Safety instructions in chapter 4 are to be considered.

## 9.4 Elimination of Failures

Failure definition	Potential reasons	Remedy
High leakage rate	<ul style="list-style-type: none"> <li>Contaminated seat facings</li> <li>Deformation of disc/cone/plate by hammer blow</li> <li>Damaged seat ring</li> <li>Disc/cone/plate does not close, cone is hanging, high activity rate causes a seizing due to friction</li> </ul>	⇒ Clean the seat facings, regrind if necessary ⇒ Replace disc/cone/plate  ⇒ Replace seat ring ⇒ Recheck operating data, reengineer all parts
Inappropriate noises	Insufficient flow rate, turbulent flow, decelerated starting of the pump	⇒ Select reduced sizes ⇒ Recheck the distance between pipe bend and pump (5-7xDN) ⇒ Use lighter plates or springs with reduced opening pressure ⇒ Extend the period of running up the pump
Leaks of stuffing box (ZRL-HG, ZRD)	Stuffing box is inadequately preloaded	⇒ Retighten stuffing box ⇒ Replace stuffing box packings if necessary
No flow	Valve is installed in the wrong way	⇒ Arrow of flow direction has to run in the same direction as the flow itself.
Leaks of flange sealings	Connection flanges are not wired	⇒ Retighten fasteners

## 10 Spare Parts

<b>Attention</b>	For repair work any valve parts must only be replaced by spare parts from the original supplier. Unauthorised conversion as well as spare parts production cause an expiry of the declaration of conformity and may also invalidate any warranty claims.
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Any springs or o-rings (relevant for valves equipped with a soft sealing) can be ordered as spare parts. The full marking of the valve body has to be specified in the purchase order.

## 11 Further Information

For further information such as RITAG technical data sheets, repair instructions, certificates etc. please contact us at [www.ritag.com](http://www.ritag.com) or send your mail to:

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