Best Availability

LESER Change-over Valves

Type 330, Type 320

LESER

Valve finder

Your path to the right product group

High operating to set pressure ratio, high backpressure or low total height? — Yes → **High Efficiency**

No

Clean Service application? — Yes → **Clean Service**

No

Critical Service / highly corrosive application? — Yes → **Critical Service**

No

API specified application? — Yes → **API**

No

Steam, gas and liquid application with low capacity in relation to valve size? — Yes → **Modulate Action**

No

Required Orifice letter?

Orifice ≥ F → **High Performance**

Orifice ≤ F → **Compact Performance**

High plant availability important? — Yes → **Best Availability**

Medium-controlled

Spring loaded

Safety Relief Valves

Change-over valves

Bursting disc

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Type 330, Type 320

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Type 330 Compact

Type 320 Flow

LESER Change-over Valves

Applications

Change-over valves are used in various industries in order to

- ensure uninterrupted operation
- minimise safety risks due to unplanned shutdown periods.

These industries are

- Petrochemical industry
- Oil and gas industry
- Technical gasses
- Chemicals industry
- Refrigeration

Change-over valves are used to connect two safety valves with a pipe connection to a pressure system, in order to increase operational availability. One safety valve is in operation and one safety valve is on standby.

The standby safety valve can be disassembled and serviced, for example during running operation. The pressure system continues to be protected against impermissible pressure. This way, shutdown periods of the plant can be planned independent of the maintenance cycles of the safety valves.

LESER Change-over Valves – The advantages

Most economic solution

– flow-optimized design for minimal inlet pressure loss

– **Type 330 Compact** for standard requirements, **Type 320 Flow** for high requirements of inlet pressure loss

– variable inlet body on the piping side to adjust to existing piping nominal sizes and to reduce the inlet pressure loss

– smart coupling: standardized solution for lockable combination with change-over valves of different nominal size and pressure ratings with definite dimensions and precise pressure loss coefficients

Safe operation 24/7

– precise pressure loss coefficients for any configuration enable a reliable calculation of the inlet pressure loss

– simple and fail-safe switch-over

– robust and maintenance-free design

Fast availability

– short delivery times synchronised with the safety valves

– complete optimized combination from one supplier

General information
Type 330, Type 320

Two change-over valve types

Type 330 Compact
offers the solution for low-pressure loss requirements

Type 320 Flow
has an optimal flow path for highest pressure loss requirements

Both valve types are available as:
– single change-over valve
– inlet-side combination: A change-over valve is installed at the inlet of two safety valves
– lockable combination: One change-over valve is installed at the inlet and one at the outlet of two safety valves

When providing combinations, the connecting elements of change-over valve and safety valve are not included.

Design features

Valve sizes
DN 25 – DN 100 / NPS 1" – 4"
DN 125 – DN 400 / NPS 5" – 16" (available as of end 2017)

Pressure ratings
Type 330 Compact: PN 10 – PN 40 / CL150 – CL300
Type 320 Flow: PN 10 – PN 250 / CL150 – CL1500

Flange drillings
in accordance with DIN EN 1092 and ASME B16.5

Body materials

Type 330 / 320	Steel	Low-temperature steel	Stainless steel
acc. to DIN EN	1.0619	–	1.4408
acc. to ASME	WCB/WCC	LCB	CF8M

Other materials for special requirements available upon request.

Temperature limits for use
Temperature limits correspond to the material limits according to DIN EN and ASME.

Type 330 / 320	[°C]		[°F]	
acc. to DIN EN	- 273	+ 450	- 459	+ 842
acc. to ASME	- 268	+ 450	- 450	+ 842

Options
Change-over valves can be customised to the plant situation with a variety of options (see Pages 26 – 27), such as:
– Seal:
Fulfilment of tightness requirements according to TA Luft (”Technical Instructions on Air Quality Control“)
– NACE compliant design

Approvals
LESER Change-over Valves can be used worldwide and satisfy the regulatory requirements with the approvals in accordance with:

Technical regulations	Approval / designation
Pressure Equipment Directive PED 2014/68/EU	CE (except for DN 25)[1)]
AD 2000-Merkblatt	
ASME B16.34	no approval required
TR-CU 010, TR-CU 032	EAC

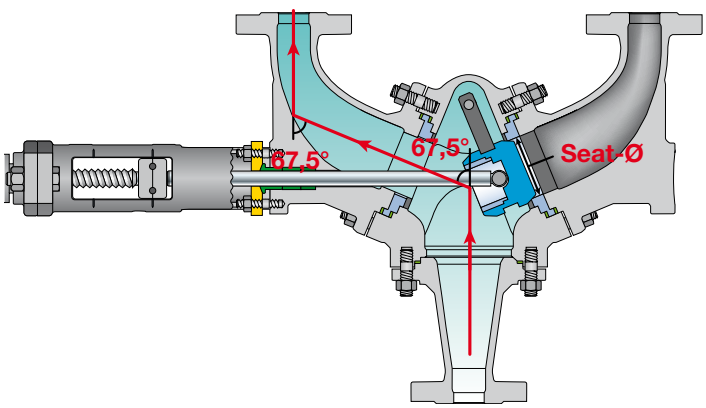
[1)] Change-over valves with a nominal diameter of DN 25 and smaller are designed and manufactured with the sound engineering practices of Germany according to PED 2014/68/EU Article 4 paragraph 3 and may not bear the CE mark.

Basics
Design and pressure loss coefficient

Basics
Pressure loss in the inlet line is considered to be the pressure difference between the pressure in the system to be safeguarded and the pressure in front of the safety valve during discharge.

When a safety valve is activated, the flow losses in the inlet line cause a pressure loss. The pressure loss in the inlet line may not exceed 3% of the set pressure in accordance with applying international standards. If the 3% limit is exceeded, the safety valve may not show a stable function any longer (chatter). As a consequence, the full power may not be discharged and there is a danger of excessive pressure within the system.

Design
The pressure loss caused by the change-over valve is primarily determined by the design of the flow geometry and the flow area. Due to the nominal size on the safety valve side, the maximum possible expansion across the change-over valve is limited.
In this regard, the LESER Chance-over Valve has been optimised with respect to its flow geometry:
Using the incline of the seating surfaces and the motion of the disc on a circular path, a contour favourable for flow was created for the medium. The result is a low deviation of the flow and thus to the lowest possible pressure loss.

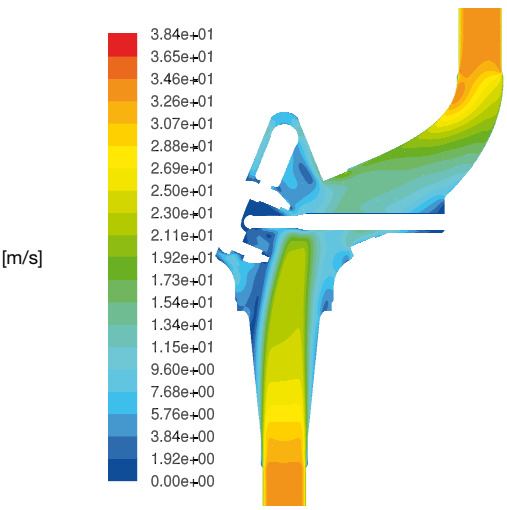


Favourable flow design through incline of seats

Pressure loss coefficient
To calculate the inlet pressure loss, the pressure loss coefficient, zeta value (ζ), is required as input size. It is a dimension-less coefficient for the flow resistance. Only in conjunction with a flow diameter is the pressure loss coefficient a useful indication. LESER provides the zeta values in relation to the nominal diameter on the safety valve side, for example the specification for DN 50 is in reference to 50 mm. The lower the zeta value for a change-over valve, the less pressure loss it creates in the inlet line to the safety valve. The following formula for the pressure loss of a change-over valve illustrates how it depends on zeta value the flow area.

$$\Delta p_{WV} = \frac{\rho \cdot (\frac{\dot{m}}{\rho \cdot A_{WV}})^2}{2} \cdot \zeta_{WV}$$

There are further coefficients which can be calculated from the zeta value and the flow area, such as the Kv value or the Cv value. Such flow coefficients determine an achievable mass flow of a certain medium in a defined state. The zeta values of the LESER Change-over Valve were calculated and optimised using CFD-simulations and measured and validated by an independent test lab.



Flow simulation: Velocity distribution in a change-over valve

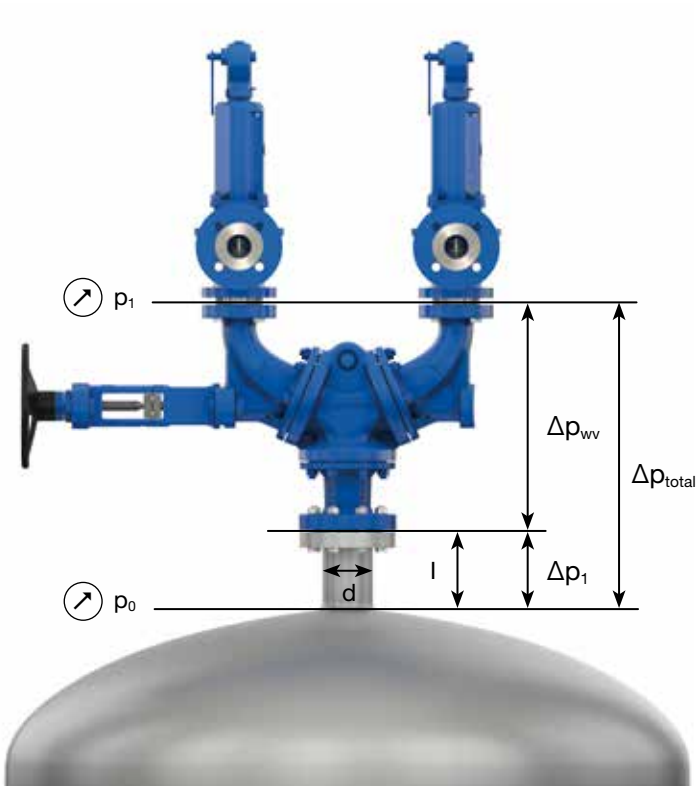
Formula symbols

Δp_{wv}	Pressure loss of a change-over valve	A	Flow area
Δp_1	Pressure loss in piping section	ω	Flow rate $\omega = \dot{m}/(\rho \cdot A)$
p_{set}	Set pressure of the safety valve	ζ	Pressure loss coefficient
$\dot{m}$	Mass flow	l	Length of piping
ρ	Density	d	Flow diameter
		λ	Pipe friction coefficient

Basics
Calculation of pressure loss

To calculate the pressure loss in the inlet line to the safety valve entrance, the change-over valve as well as possible addition piping sections and installations must be considered. To do so, the inlet pipe system is divided into sections. A section is formed for each flow or reference diameter.

In the following example, two sections can be formed. One for the change-over valve (Δp_{wv}) and one for the connected piping (Δp_1).



The general formula for the calculation of pressure loss in pipes is as follows:

$$\Delta p_{total} = (\lambda \cdot \frac{l}{d} + \sum\zeta) \cdot \frac{\rho}{2} \cdot \omega^2$$

There is a difference between a part for installations and a part for piping sections

$$\Delta p_{total} = \underbrace{\sum\zeta \cdot \frac{\rho}{2} \cdot \omega^2}_{\text{Installations}} + \underbrace{\lambda \cdot \frac{l}{d} \cdot \frac{\rho}{2} \cdot \omega^2}_{\text{Piping}}$$

Installations
– all installations including the change-over valve
– standard values for pressure loss coefficients of installations can be extracted from the applying standards
– zeta values of piping components relating to the same diameter may be added.

Piping
– all piping sections
– separate pressure loss calculation for different flow diameters
– reducers for connecting pipes of different sizes, are engaged within the installations part

Applying this to the selected example results in two sections which create a pressure loss in the inlet line. One section for the change-over valve and one section for the piping piece in a certain nominal size.

$$\Delta p_{total} = \Delta p_{WV} + \Delta p_1$$

$$\Delta p_{total} = \frac{\rho}{2} \cdot \omega_{WV}^2 \cdot \zeta_{WV} + \lambda_1 \cdot \frac{l_1}{d_1} \cdot \frac{\rho}{2} \cdot \omega_1^2$$

It is then checked whether the calculated pressure loss falls under the 3%-criterion.
According to applying standards, the 3%-criterion refers to the set pressure. The AD regulations, however, references the 3% to the difference between set pressure and superimposed backpressure.

$$\Delta p_{total} \leq 0{,}03 \cdot p_{set}$$

Inlet pressure loss exceeding 3% are only permitted in accordance with the standards if the manufacturer is able to confirm the function and performance of the safety valves with higher degrees of pressure loss through trials.

The example selected here represents a normal installation situation. In reality, much more complex installations may occur due to various pipe nominal sizes which make the calculation of pressure loss more difficult.

Calculating pressure loss with VALVESTAR®
VALVESTAR® makes it possible to calculate the pressure loss in the inlet line of the safety valve. In the case of different flow areas of the individual sections in the inlet line, the zeta value of the change-over valves must reference a common calculation diameter, which is then used by VALVESTAR® to calculate the pressure loss.

Designs
Type 330, Type 320

Type 330 Compact
The change-over valve Type 330 Compact is flow-optimized and at the same time compact for installation. It is the best solution if the requirements of the combined safety valves or the additional piping of the pressure loss are not unusually high. Due to its compact design, it is cost-efficient so that it represents the most economical solution for a safety valve/change-over valve combination.
In lockable combinations, it can be selected as standard at the outlet since there are no increased requirements of the pressure loss via the change-over valve (see Page 22).

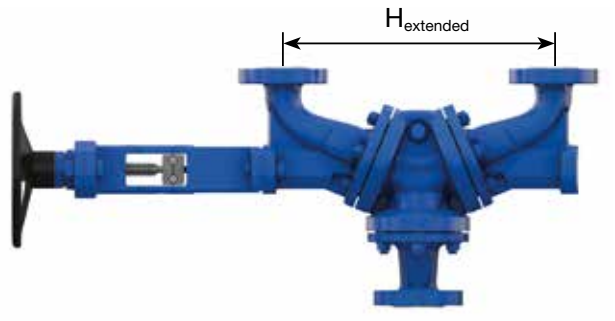
Type 320 Flow
The change-over valve Type 320 Flow is flow-optimized to its max. It should always be selected when the requirements of the combined safety valves to the pressure loss are extremely high or if other installations increase the pressure loss in the inlet line so far that the change-over valve used may only create very little pressure loss. The Type 320 Flow is available up to a pressure rating of PN 250 / CL1500.

Type 330

Type 320

Extended flange distance
In order to be able to create standards for lockable combinations with change-over valves in different nominal sizes and pressure ratings, different sets of elbows are available for Type 330. They result in two flange distances of different size (dimension H). The flange distance is determined as follows:
– inlet-side combination with spring-loaded safety valves: Standard flange distance (dimension $H_{standard}$)
– inlet-side combination with pilot-operated safety valves: Balancing flange distance (dimension $H_{extended}$) due to the installation parts
– lockable combination: see Page 22

Variable inlet body
For Type 320 Flow as well as for Type 330 Compact, there is the option of enlarging the inlet body. This measure significantly optimizes the pressure loss coefficient so that the pressure loss created by the change-over valve is reduced. In addition, the smaller change-over valve (fitting with the safety valve inlet) can be adjusted to larger connection pipes without having to select the change-over valve in a larger nominal size, or welded reducers need to be used.



Type 330 with extended flange distance

Safety valve side DN 40 / 1 $^1/_2$"

Piping side DN 50 / 2"

How to Order
Type 330, Type 320

Composition of the article number

3300.0010

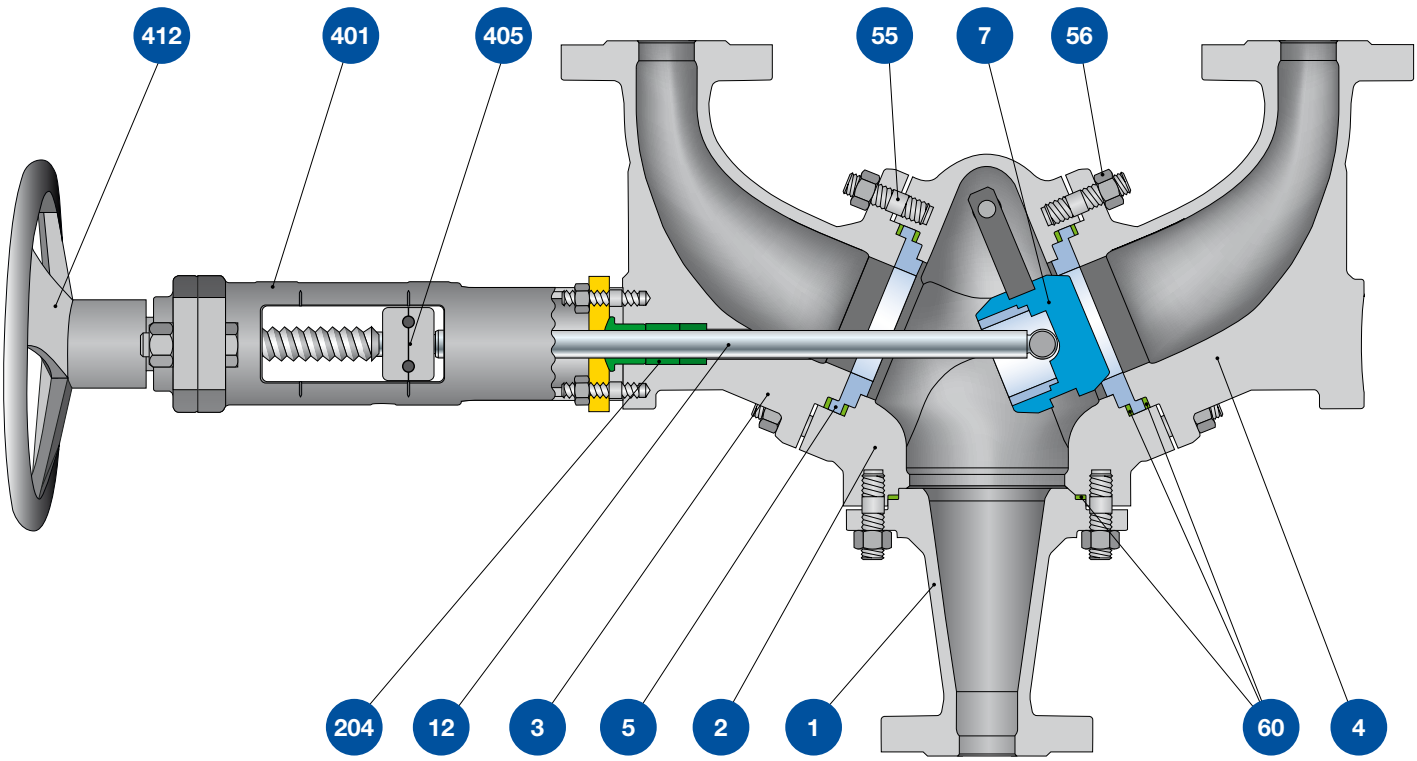
- **0**: Global Configuration
- **001**: Counting number (nominal size, pressure rating)
- **0**: Configurable base material
  - Q09: Steel, body material 1.0619 / WCB
  - Q10: Low-temperature steel, body material LCB
  - Q11: Stainless steel, body material 1.4408 / CF8M
- **330**: Type

Order specification

In order to clearly specify a change-over valve, the following information is required:

Base construction					
	Article number		_ _ _ _-_ _ _ _		
	Operating temperature		_____	___	[°C / °F / K ...]
	Operating pressure		_____	___	[barg / psig ...]
	Body materials	Q09	1.0619 / WCB	☐	
		Q10	LCB	☐	
		Q11	1.4408 / CF8M	☐	
		-	Other materials	_____	
	Design regulations	ASME B16.34 + PED 2014/68/EU		☐	
		PED 2014/68/EU		☐	
		ASME B16.34		☐	
Connections					
Safety valve side					
	Nominal size	DN	_____	NPS	_____
	Pressure rating	PN	_____	CL	_____
	Flange facing	DIN EN 1092	_____	ASME B16.5	_____
Piping side					
	Nominal size	DN	_____	NPS	_____
	Pressure rating	PN	_____	CL	_____
	Flange facing	DIN EN 1092	_____	ASME B16.5	_____
Combination					
	H dimension	standard	☐		
	H dimension	extended	☐		
	Combined safety valves	LESER Type	_ _ _ _-_ _ _ _	others	☐
	Lockable combination	no ☐	yes →	☐ Inlet CoV	☐ Outlet CoV
Options					
Documentation					

Designs
Type 330, Type 320



Materials
Type 330, Type 320

Item	Component	Option Code	Steel Q09	Low-temperature steel Q10	Stainless steel Q11
1	Inlet body		1.0619 SA 216 WCB	– SA 352 LCB	1.4408 SA 351 CF8M
2	Body		1.0619 SA 216 WCB	– SA 352 LCB	1.4408 SA 351 CF8M
3	Elbows – Activation side		1.0619 SA 216 WCB	– SA 352 LCB	1.4408 SA 351 CF8M
4	Elbows		1.0619 SA 216 WCB	– SA 352 LCB	1.4408 SA 351 CF8M
5	Seat	< PN 100	1.4404	1.4404	1.4404
		< CL600	316 L	316 L	316 L
		≥ PN 100	1.4404 stellited	1.4404 stellited	1.4404 stellited
		≥ CL600	316 L stellited	316 L stellited	316 L stellited
7	Disc	< PN 100	1.4404	1.4404	1.4404
		< CL600	SA182 316 L	SA182 316 L	SA182 316 L
		≥ PN 100	1.4404 stellited	1.4404 stellited	1.4404 stellited
		≥ CL600	SA182 316L stellited	SA182 316L stellited	SA182 316L stellited
12	Spindle		1.4021 Chrome steel	1.4021 Chrome steel	1.4404 316L
204	Packing gland		1.4541 / graphite Stainless steel / graphite	1.4541 / graphite Stainless steel / graphite	1.4541 / graphite Stainless steel / graphite
401	Yoke		1.0619 WCB	1.0619 WCB	1.4408 CF8M
405	Position indicating device		1.4408 CF8M	1.4408 CF8M	1.4408 CF8M
412	Hand wheel		1.0335 Steel	1.0335 Steel	1.0335 Steel
55	Stud	Design regulations:			
		PED	1.7225 / SA 193 B7	A4-70[1)]	A4-70[1)]
		ASME	1.7225 / SA 193 B7	A4-70 / B8M[1)]	A4-70 / B8M[1)]
		PED / ASME	1.7225 / SA 193 B7	A4-70 / B8M[1)]	A4-70 / B8M[1)]
56	Nut	PED	1.7225 / SA 194 Gr. 7	A4-70[1)]	A4-70[1)]
		ASME	1.7225 / SA 194 Gr. 7	A4-70 / 8M[1)]	A4-70 / 8M[1)]
		PED / ASME	1.7225 / SA 194 Gr. 7	A4-70 / 8M[1)]	A4-70 / 8M[1)]
60	Gasket		Graphite Graphite	Graphite Graphite	Graphite Graphite

[1)] Type 320 DN 80/3" and DN 100 / 4" in PN 250/CL1500:
– PED: 1.4980 / Gr. 660B
– ASME: Gr. 660B
– PED / ASME: 1.4980 / Gr. 660B

Please note
– LESER reserves the right to make changes
– LESER may use higher quality materials without giving prior notice
– Every part can be replaced by other material according to customer specification

Type 330 Compact
Article numbers and technical data
Metric units

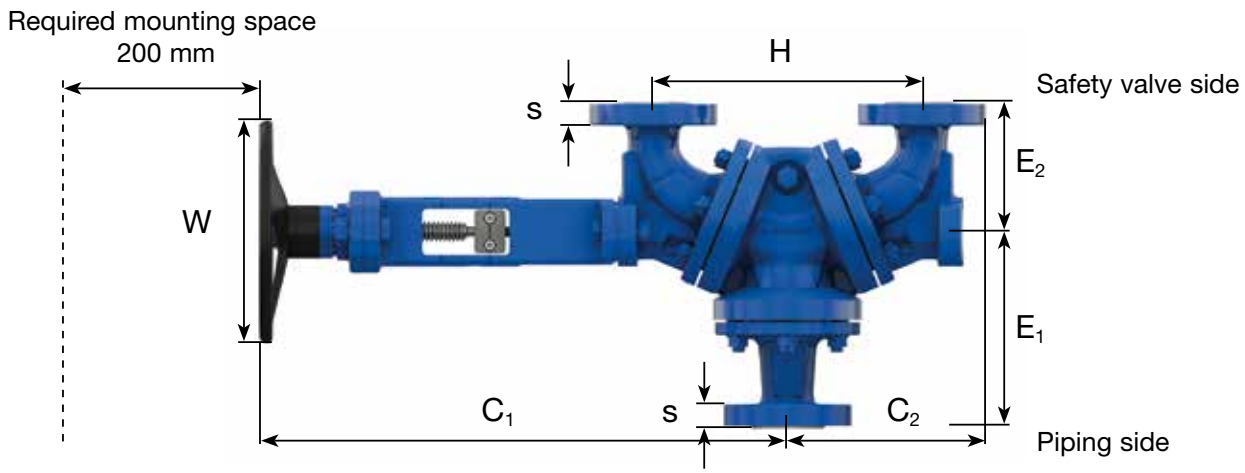
	Safety valve side	DN	25	40	50	65	80	100
	Art. No. 3300.		**0010**	**0050**	**0070**	**0090**	**0100**	**0120**
Pressure rating body basic construction			PN 40					
Standard	Piping side	DN	25	40	50	65	80	100
	Pressure loss coefficient (zeta)	[–]	0.56	0.7	0.88	0.7	0.89	0.52
	K_{VS} (rt, water)	[m³/h]	33	76	107	202	271	555
	Dimensions and weights							
	E_1	[mm]	252	242	252	275	275	330
	E_2	[mm]	160	160	160	245	245	270
	C_1	[mm]	650	650	650	760	760	816
	C_2	[mm]	216	244	247	334	344	366
	s [1) 2)]	[mm]	26	30	33	35	38	42
	W	[mm]	250	250	250	250	250	400
	H dimension standard	[mm]	270	330	330	475	475	475
	Weight H dimension standard	[kg]	73	78	79	117	125	185
	H dimension extended	[mm]	330	475	475		560	560
	E_2 H dimension extended	[mm]	180	180	180		265	270
	C_1 H dimension extended	[mm]	650	714	714		760	815
	C_2 H dimension extended	[mm]	230	316	320		386	409
	Weight H dimension extended	[kg]	74	85	87		125	190
Expansion piping side	Safety valve side	DN	25	40		65		Available as of end 2017
	Piping side	DN	40	50		80		
	Pressure loss coefficient (zeta)	[–]	0.2	0.51		0.56		
	K_{VS} (rt, water)	[m³/h]	56	90		226		
	Dimensions and weights							
	E_1	[mm]	242	252		245		
	s piping side [1) 2)]	[mm]	30	33		38		
	Weight H dimension standard	[kg]	74	78		121		
	Weight H dimension extended	[kg]	75	86		–		
	Safety valve side	DN	25					
	Piping side	DN	50					
	Pressure loss coefficient (zeta)	[–]	0.18					
	K_{VS} (rt, water)	[m³/h]	59					
	Dimensions and weights							
	E_1	[mm]	252					
	s piping side [1) 2)]	[mm]	33					
	Weight H dimension standard	[kg]	75					
	Weight H dimension extended	[kg]	76					

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / $^3/_{16}$ inch.

	Safety valve side	DN	125	150	200	250	300	350	400
	Art. No. 3300.		**0140**	**0150**	**0170**	**0180**	**0190**	**0200**	**0210**
Pressure rating body basic construction			PN 40					PN 25	PN 16
Standard	Piping side	DN							
	Pressure loss coefficient (zeta)	[–]							
	K_{VS} (rt, water)	[m³/h]							
	Dimensions and weights								
	E_1	[mm]							
	E_2	[mm]							
	C_1	[mm]							
	C_2	[mm]							
	s [1) 2)]	[mm]							
	W	[mm]							
	H dimension standard	[mm]							
	Weight H dimension standard	[kg]							
	H dimension extended	[mm]							
	E_2 H dimension extended	[mm]							
	C_1 H dimension extended	[mm]							
	C_2 H dimension extended	[mm]							
	Weight H dimension extended	[kg]							

Available as of end 2017

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / $^3/_{16}$ inch.



Type 330 Compact
Article numbers and technical data
US units

	Safety valve side	Valve size	1"	1 1/2"	2"	2 1/2"	3"	4"
		Art. No. 3300.	**0010**	**0050**	**0070**	**0090**	**0100**	**0120**
Pressure rating body basic construction			CL300					
Standard	Piping side	NPS	1"	1 1/2"	2"	2 1/2"	3"	4"
	Pressure loss coefficient (zeta)	[–]	0.56	0.7	0.88	0.7	0.89	0.52
	C_V (rt, water)	[US-G.PM]	38	88	123	233	314	641
	Dimensions and weights							
	E_1	[inch]	9 15/16	9 1/2	9 15/16	10 13/16	10 13/16	13
	E_2	[inch]	6 5/16	6 5/16	6 5/16	9 5/8	9 5/8	10 5/8
	C_1	[inch]	25 9/16	25 9/16	25 9/16	29 15/16	29 15/16	32 1/8
	C_2	[inch]	8 1/2	9 5/8	9 3/4	13 1/8	13 9/16	14 7/16
	s [1) 2)]	[inch]	1	1 3/16	1 5/16	1 3/8	1 1/2	1 5/8
	W	[inch]	9 13/16	9 13/16	9 13/16	9 13/16	9 13/16	15 3/4
	H dimension standard	[inch]	10 5/8	13	13	18 11/16	18 11/16	18 11/16
	Weight H dimension standard	[lb]	161	172	174	258	276	408
	H dimension extended	[inch]	13	18 11/16	18 11/16		22 1/16	22 1/16
	E_2 H dimension extended	[inch]	7 1/16	7 1/16	7 1/16		10 7/16	10 5/8
	C_1 H dimension extended	[inch]	25 9/16	28 1/8	28 1/8		29 7/8	32 1/16
	C_2 H dimension extended	[inch]	9 1/16	12 7/16	12 5/8		15 3/16	16 1/8
	Weight H dimension extended	[lb]	163	187	192		276	419

Expansion piping side	Safety valve side	Valve size	1"	1 1/2"		2 1/2"		Available as of end 2017
	Piping side	NPS	1 1/2"	2"		3"		
	Pressure loss coefficient (zeta)	[–]	0.2	0.51		0.56		
	C_V (rt, water)	[US-G.PM]	65	104		261		
	Dimensions and weights							
	E_1	[inch]	9 1/2	9 15/16		9 2/3		
	s piping side [1) 2)]	[inch]	1 3/16	1 5/16		1 1/2		
	Weight H dimension standard	[lb]	163	172		267		
	Weight H dimension extended	[lb]	165	190		–		

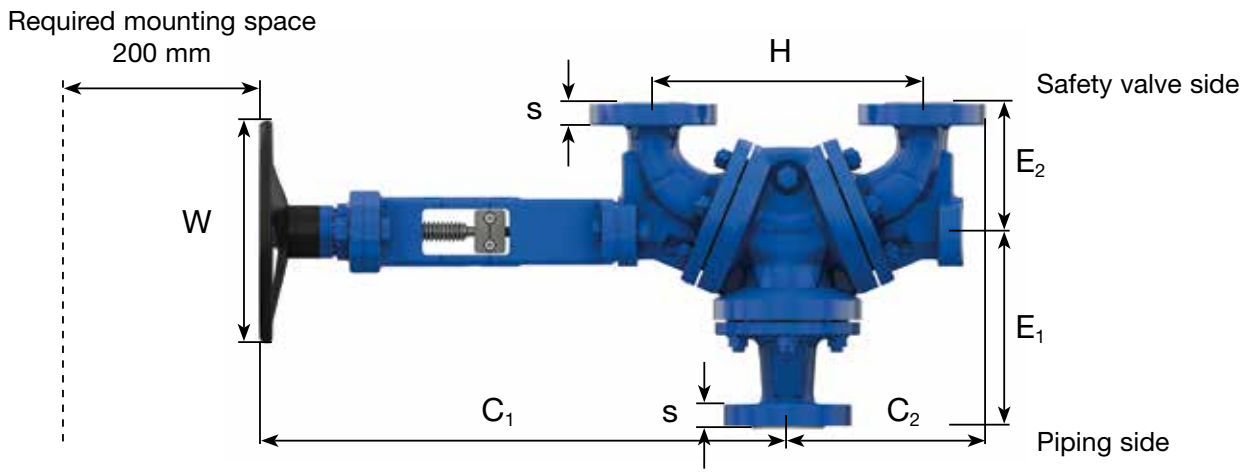
	Safety valve side	Valve size	1"					
	Piping side	NPS	2"					
	Pressure loss coefficient (zeta)	[–]	0.18					
	C_V (rt, water)	[US-G.PM]	68					
	Dimensions and weights							
	E_1	[inch]	9 15/16					
	s piping side [1) 2)]	[inch]	1 5/16					
	Weight H dimension standard	[lb]	165					
	Weight H dimension extended	[lb]	168					

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / 3/16 inch.

	Safety valve side	Valve size	5"	6"	8"	10"	12"	14"	16"
		Art. No. 3300.	**0140**	**0150**	**0170**	**0180**	**0190**	**0200**	**0210**
Pressure rating body basic construction			CL300					CL150	CL150
Standard	Piping side	NPS							
	Pressure loss coefficient (zeta)	[–]							
	C_V (rt, water)	[US-G.PM]							
	Dimensions and weights								
	E_1	[inch]							
	E_2	[inch]							
	C_1	[inch]							
	C_2	[inch]							
	s [1) 2)]	[inch]							
	W	[inch]							
	H dimension standard	[inch]							
	Weight H dimension standard	[lb]							
	H dimension extended	[inch]							
	E_2 H dimension extended	[inch]							
	C_1 H dimension extended	[inch]							
	C_2 H dimension extended	[inch]							
	Weight H dimension extended	[lb]							

Available as of end 2017

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / $^3/_{16}$ inch.



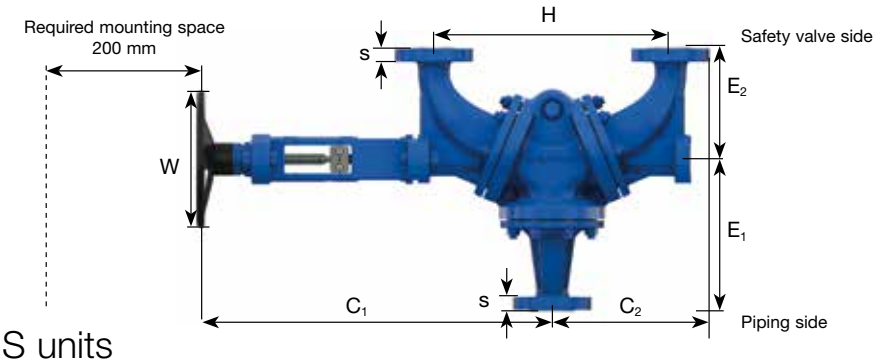
Type 320 Flow
Article numbers and technical data

Metric units

	Safety valve side	DN	40	50	65	80	100	125	150	200	250	300	400
	Art. No. 3200.		**0050**	**0070**	**0090**	**0100**	**0120**	**0140**	**0150**	**0170**	**0190**	**0200**	**0230**
	Pressure rating body basic construction		PN 40								PN 25		PN 16
Standard	Piping side	DN	40	50	80	80	100						
	Pressure loss coefficient (zeta)	[–]	0.59	0.53	0.37	0.51	0.49						
	K_{VS} (rt, water)	[m³/h]	83	137	278	358	571						
	Dimensions and weights												
	E_1	[mm]	305	305	410	330	432						
	E_2	[mm]	225	225	260	270	245						
	C_1	[mm]	714	714	816	816	852						
	C_2	[mm]	316	319	376	386	409						
	s [1) 2)]	[mm]	29	32	38	38	42						
	W	[mm]	250	250	400	400	400						
	H dimension standard	[mm]	475	475	560	560	560						
	Weight	[kg]	103	105	169	174	240						
Expansion piping side	Safety valve side	DN	40	50	65	80							
	Piping side	DN	50	65	100	100							
	Pressure loss coefficient (zeta)	[–]	0.32	0.35	0.27	0.35							
	K_{VS} (rt, water)	[m³/h]	113	169	325	433							
	Dimensions and weights												
	E_1	[mm]	305	275	330	330							
	s piping side [1) 2)]	[mm]	32	35	42	42							
	Weight	[kg]	104	107	172	177							
	Safety valve side	DN	40	50									
	Piping side	DN	65	80									
	Pressure loss coefficient (zeta)	[–]	0.23	0.28									
	K_{VS} (rt, water)	[m³/h]	133	189									
	Dimensions and weights												
	E_1	[mm]	275	275									
	s piping side [1) 2)]	[mm]	35	38									
	Weight	[kg]	108	109									
	Safety valve side	DN	40										
	Piping side	DN	80										
	Pressure loss coefficient (zeta)	[–]	0.22										
	K_{VS} (rt, water)	[m³/h]	136										
	Dimensions and weights												
	E_1	[mm]	275										
	s piping side [1) 2)]	[mm]	38										
	Weight	[kg]	106										

Available as of end 2017

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / $^3/_{16}$ inch.



US units

	Safety valve side	NPS	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	16"
	Art. No. 3200.		**0050**	**0070**	**0090**	**0100**	**0120**	**0140**	**0150**	**0170**	**0190**	**0200**	**0230**
	Pressure rating body basic construction		CL300								CL150		CL150
Standard	Piping side	NPS	1 1/2"	2"	3"	3"	4"						
	Pressure loss coefficient (zeta)	[–]	0.59	0.53	0.37	0.51	0.49						
	C_V (rt, water)	[US-G.PM]	96	158	321	414	660						
	Dimensions and weights												
	E_1	[inch]	12	12	16 1/8	13	17						
	E_2	[inch]	8 7/8	8 7/8	10 1/4	10 5/8	9 5/8						
	C_1	[inch]	28 1/8	28 1/8	32 1/8	32 1/8	33 9/16						
	C_2	[inch]	12 7/16	12 9/16	14 13/16	15 3/16	16 1/8						
	s [1) 2)]	[inch]	1 1/8	1 1/4	1 1/2	1 1/2	1 5/8						
	W	[inch]	9 13/16	9 13/16	15 3/4	15 3/4	15 3/4						
	H dimension standard	[inch]	18 11/16	18 11/16	22 1/16	22 1/16	22 1/16						
	Weight	[lb]	227	231	373	384	529						
Expansion piping side	Safety valve side	NPS	1 1/2"	2"	2 1/2"	3"							
	Piping side	NPS	2"	2 1/2"	4"	4"							
	Pressure loss coefficient (zeta)	[–]	0.32	0.35	0.27	0.35							
	C_V (rt, water)	[US-G.PM]	131	195	376	501							
	Dimensions and weights												
	E_1	[inch]	12	10 13/16	13	13							
	s piping side [1) 2)]	[inch]	1 1/4	1 3/8	1 5/8	1 5/8							
	Weight	[lb]	229	236	379	390							
	Safety valve side	NPS	1 1/2"	2"									
	Piping side	NPS	2 1/2"	3"									
	Pressure loss coefficient (zeta)	[–]	0.23	0.28									
	C_V (rt, water)	[US-G.PM]	154	219									
	Dimensions and weights												
	E_1	[inch]	10 13/16	10 13/16									
	s piping side [1) 2)]	[inch]	1 3/8	1 1/2									
	Weight	[lb]	238	240									
	Safety valve side	NPS	1 1/2										
	Piping side	NPS	3"										
	Pressure loss coefficient (zeta)	[–]	0.22										
	C_V (rt, water)	[US-G.PM]	136										
	Dimensions and weights												
	E_1	[inch]	10 13/16										
	s piping side [1) 2)]	[inch]	1 1/2										
	Weight	[lb]	234										

Available as of end 2017

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / 3/16 inch.

Type 320 Flow
Article numbers and technical data

Metric units

	Safety valve side	DN	25	40	50	80	100	150	200
	Art. No. 3200.		**0020**	**0060**	**0080**	**0110**	**0130**	**0160**	**0180**
	Pressure rating body basic construction		PN 250					PN 100	
Standard	Piping side	DN	25	40	50	80	100		
	Pressure loss coefficient (zeta)	[–]	0.6	0.6	0.52	0.6	0.53		
	K_{VS} (rt, water)	[m³/h]	32	83	89	330	549		
	Dimensions and weights								
	E_1	[mm]	380	380	350	536	536		
	E_2	[mm]	225	265	265	310	310		
	C_1	[mm]	714	760	760	852	852		
	C_2	[mm]	280	330	346	414	437		
	s [1) 2)]	[mm]	36	39	46	56	62		
	W	[mm]	250	250	250	400	400		
	H dimension standard	[mm]	330	475	475	560	560		
	Weight	[kg]	145	164	175	400	435		
Expansion piping side	Safety valve side	DN	25	40		80			
	Piping side	DN	40	50		100			
	Pressure loss coefficient (zeta)	[–]	0.19	0.3		0.39			
	K_{VS} (rt, water)	[m³/h]	57	117		410			
	Dimensions and weights								
	E_1	[mm]	380	350		536			
	C_2	[mm]	280	330		414			
	s piping side [1) 2)]	[mm]	39	46		62			
	Weight	[kg]	148	166		410			
	Safety valve side	DN	25						
	Piping side	DN	50						
	Pressure loss coefficient (zeta)	[–]	0.15						
	K_{VS} (rt, water)	[m³/h]	65						
	Dimensions and weights								
	E_1	[mm]	350						
	s piping side [1) 2)]	[mm]	46						
	Weight	[kg]	151						

Available as of end 2017

Available as of end 2017

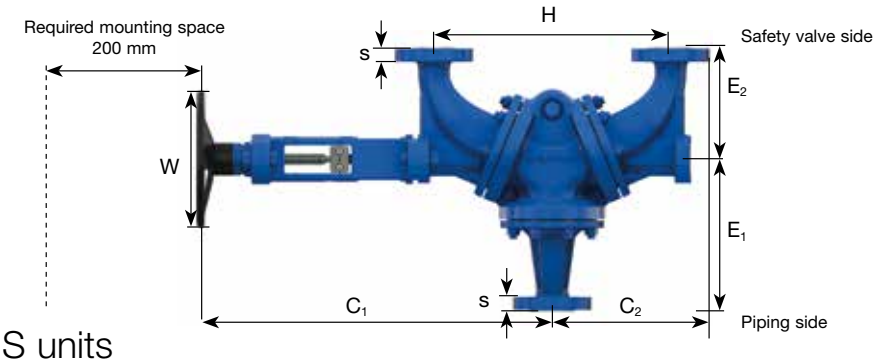
[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / $^3/_{16}$ inch.

Material-conditioned pressure temperature limits of use [°C] in high-pressure ranges

Application limits for 1.0619 DN 25, 40, 50		
Pressure rating	1.0619	1.7357
PN 100	450°C	450°C
PN 160	450°C	450°C
PN 250	<200°C	450°C

Application limits for 1.4408 DN 25, 40, 50		
Pressure rating	1.4408	1.4470
PN 100	400°C	400°C
PN 160	400°C	400°C
PN 250	x	<300°C

Application limits for 1.4408 DN 80, 100			
Pressure rating	1.4408	1.4581	1.4470
PN 100	400°C	400°C	400°C
PN 160	<300°C	400°C	400°C
PN 250	x	x	<300°C



US units

	Safety valve side	NPS	1"	1 1/2''	2''	3"	4"	6"	8"
	Art. No. 3200.		**0020**	**0060**	**0080**	**0110**	**0130**	**0160**	**0180**
	Pressure rating body basic construction		CL1500					CL600	
Standard	Piping side	NPS	1"	1 1/2"	2"	3"	4"		
	Pressure loss coefficient (zeta)	[–]	0.6	0.6	0.52	0.6	0.53		
	C_V (rt, water)	[US-G.PM]	37	95	103	382	635		
	Dimensions and weights								
	E_1	[inch]	14 15/16	14 15/16	13 3/4	21 1/8	21 1/8		
	E_2	[inch]	8 7/8	10 7/16	10 7/16	12 3/16	12 3/16		
	C_1	[inch]	28 1/8	29 15/16	29 15/16	33 9/16	33 9/16		
	C_2	[inch]	11	13	13 5/8	16 5/16	17 3/16		
	s [1) 2)]	[inch]	1 7/16	1 9/16	1 13/16	2 3/16	2 7/16		
	W	[inch]	9 13/16	9 13/16	9 13/16	15 3/4	15 3/4		
	H dimension standard	[inch]	13	18 11/16	18 11/16	22 1/16	22 1/16		
	Weight	[lb]	320	362	386	882	959		
Expansion piping side	Safety valve side	NPS	1"	1 1/2"		3"			
	Piping side	NPS	1 1/2"	2"		4"			
	Pressure loss coefficient (zeta)	[–]	0.19	0.3		0.39			
	C_V (rt, water)	[US-G.PM]	66	135		474			
	Dimensions and weights								
	E_1	[inch]	14 15/16	13 3/4		21 1/8			
	C_2	[inch]	11	13		16 5/16			
	s piping side [1) 2)]	[inch]	1 9/16	1 13/16		2 7/16			
	Weight	[lb]	326	366		904			
	Safety valve side	NPS	1"						
	Piping side	NPS	2"						
	Pressure loss coefficient (zeta)	[–]	0.15						
	C_V (rt, water)	[US-G.PM]	75						
	Dimensions and weights								
	E_1	[inch]	13 3/4						
	s piping side [1) 2)]	[inch]	1 13/16						
	Weight	[lb]	333						

Available as of end 2017

Available as of end 2017

[1)] The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.
[2)] The dimensions are subject to a casting tolerance of max. ± 5 mm / 3/16 inch.

Material-conditioned pressure temperature limits of use [°F] in high-pressure ranges

Application limits for WCB 1", 1 1/2", 2"		
Pressure rating	WCB	WC6
CL600	842 °F	842 °F
CL900	842 °F	842 °F
CL1500	< 392°F	842 °F

Application limits for CF8M 1", 1 1/2", 2"		
Pressure rating	CF8M	CD3MN
CL600	752°F	752°F
CL900	752°F	752°F
CL1500	x	< 572°F

Application limits for CF8M 3", 4"			
Pressure rating	CF8M	CF10M	CD3MN
CL600	752°F	752°F	752°F
CL900	< 572°F	752°F	752°F
CL1500	x	x	< 572°F

Flange drillings
Type 330, Type 320

Connection dimensions
The flange drillings and the flange facings meet the requirements of DIN EN 1092 and ASME B16.5/ASME B16.34, so that the change-over valves can be connected with counter flanges without any problems in accordance with these standards. The flange thickness and the outer diameter of the connection flanges may be larger than specified by the norm.

DN	**25 – 400**	**25 – 400**
NPS	**1" – 16"**	**1" – 16"**
Pressure rating DIN EN 1092	**Option code safety valve side**	**Option code piping side**
PN 10	Q2A	Q2L
PN 16	Q2B	Q2M
PN 25	Q2C	Q2N
PN 40	Q2D	Q2O
PN 63	Q2E	Q2P
PN 100	Q2F	Q2Q
PN 160	Q2G	Q2R
PN 250	Q05	Q07
Pressure rating ASME B16.5	**Option code safety valve side**	**Option code piping side**
CL150	Q2H	Q2S
CL300	Q2I	Q2T
CL600	Q2J	Q2U
CL900	Q2K	Q2V
CL1500	Q06	Q08

Flange facings
Type 330, Type 320

DIN EN 1092		Safety valve side	Piping side
		Option code	Option code
Facing	Raised face, Form B1 (standard ≤ PN 40)	Y64	Y63
	Raised face, Form B2 (standard > PN 40)	Y21	Y09
	Spring, Form C	Y22	Y10
	Groove, Form D	Y25	Y11
	Male face, Form E	Y28	Y12
	Female face, Form F	Y29	Y15
	O-ring male face, Form G	Y30	Y18
	O-ring groove, Form H	Y37	Y19
ASME B16.5		**Safety valve side**	**Piping side**
		Option code	**Option code**
	Flat Face FF	Y82	Y81
	Raised face, RF (standard)	Y84	Y83
	Ring Joint Face, RTJ	Y86	Y85
	Small Tongue Face, STF	Y73	Y65
	Small Groove Face, SGF	Y74	Y66
	Long Tongue Face, LTF	Y75	Y67
	Long Groove Face, LGF	Y76	Y68
	Small Male Face, SMF	Y77	Y69
	Small Female Face, SFF	Y78	Y70
	Long Male Face, LMF	Y79	Y71
	Long Female Face, LFF	Y80	Y72

Lockable combination
Type 330, Type 320

Lockable combination
A lockable combination is present if a change-over valve has been installed at the inlet as well as at the outlet of the safety valves. The inlet-side combination is expanded by the outlet-side change-over valve and the change-over valves are connected or locked so that improper operation is impossible.

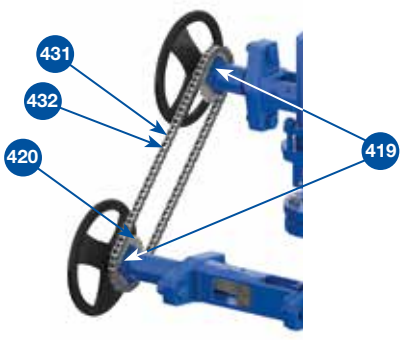
Inlet-side combination

Lockable combination

Applications
The lockable combination is used if the combined safety valves are not discharge into the atmosphere. This situation is the case with valuable media or media dangerous to persons and the environment. The safety valves are connected to a joint blow-off line through the lockable combination, while a safety valve is isolated and the other active safety valve secures the system. Due to the combination of two change-over valves with two safety valves, the entire unit only requires one piping at inlet and outlet.

The two change-over valves are supplemented through combination components for the combination and connected via a chain so as to ensure synchronised opening and closing.

Item	Component	Material
419	Tolerance compensation	1.0619
		WCB/WCC
420	Chain wheel	1.0503
		C45
431, 432	Chain with chain lock	Steel
		Steel

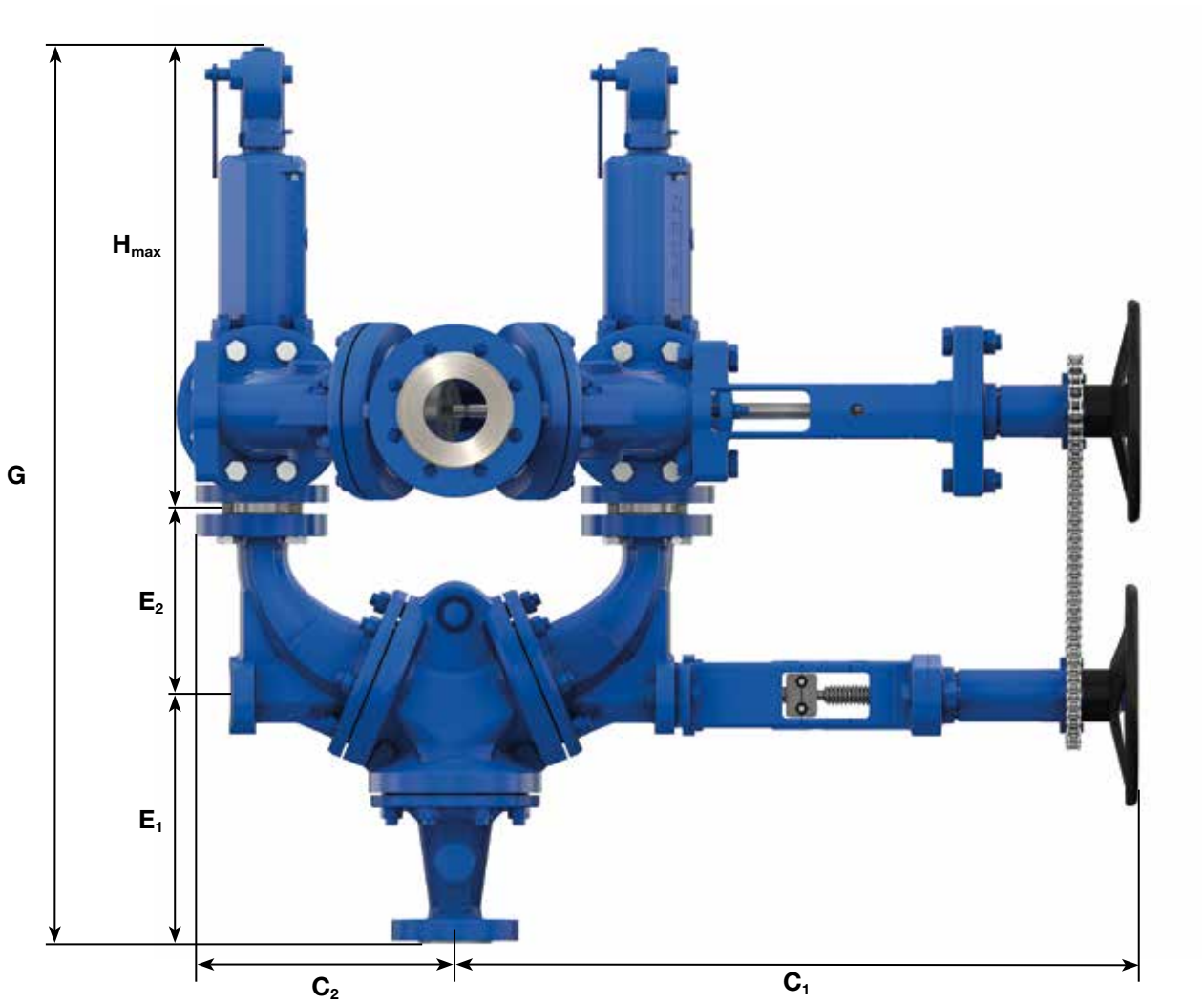


Combinatorics and variable flange distance
LESER Change-over Valves are available in the same pressure ratings and nominal sizes as safety valve inlet and outlet in lockable combinations. This is made possible by the variable flange distance of the inlet-side change-over valve and a compansation of the adjustment range using different chain wheel transmissions.

Lockable combination
Type 330, Type 320

Dimensions
The dimensions of the lockable combination result from the selected safety valves and the change-over valves. The total height G is the sum of dimensions E_1 + E_2 of the change-over valve and the total height of the safety valves H_{max}. The total width of the lockable combination is larger than the inlet-side combination due to the combination components.

Deviating C1 dimension in lockable combinations



Lockable combination
Dimensions
Metric units

						Outlet-side change-over valve											
						Lockable combination with spring-loaded safety valves						Lockable combination with pilot-operated safety valves					
					DN	25	40	50	65	80	100	25	40	50	65	80	100
					Art. No. 3300.	**0010**	**0050**	**0070**	**0090**	**0100**	**0120**	**0010**	**0050**	**0070**	**0090**	**0100**	**0120**
					Pressure rating body basic construction	PN 40						PN 40					
	Type	DN	**Art. No.**	Pressure rating body basic construction	Flange distance / width												
Inlet-side change-over valve	**330 Compact**	25	**3300.0010**	PN 40	H dimension [mm]	270	330	330						330			
					max. C_1 [mm]	694	694	694						694			
		40	**3300.0050**		H dimension [mm]		330	330	475	475				475		475	
					max. C_1 [mm]		694	694	840	840				759		804	
		50	**3300.0070**		H dimension [mm]			330		475						475	
					max. C_1 [mm]			694		804						804	
		65	**3300.0090**		H dimension [mm]				475		475						
					max. C_1 [mm]				804		861,5						
		80	**3300.0100**		H dimension [mm]					475	475						560
					max. C_1 [mm]					804	861,5						861,5
		100	**3300.0120**		H dimension [mm]						475						
					max. C_1 [mm]						861,5						
	320 Flow	40	**3200.0050**	PN 40	H dimension [mm]		475	475	475	475				475		475	
					max. C_1 [mm]		759	759	804	804				759		804	
		50	**3200.0070**		H dimension [mm]			475		475						475	
					max. C_1 [mm]			759		804						804	
		65	**3200.0090**		H dimension [mm]						560						
					max. C_1 [mm]						861,5						
		80	**3200.0100**		H dimension [mm]					560	560						560
					max. C_1 [mm]					849	861,5						861,5
		100	**3200.0120**		H dimension [mm]						560						
					max. C_1 [mm]						900						
	320 Flow	25	**3200.0020**	PN 250	H dimension [mm]	330	330	330						330			
					max. C_1 [mm]	759	759	759						759			
		40	**3200.0060**		H dimension [mm]		475	475	475	475				475		475	
					max. C_1 [mm]		804	804	804	804				804		804	
		50	**3200.0080**		H dimension [mm]			475		475						475	
					max. C_1 [mm]			804		804						804	
		80	**3200.0110**		H dimension [mm]					560	560						560
					max. C_1 [mm]					869	900						906,5
		100	**3200.0130**		H dimension [mm]						560						
					max. C_1 [mm]						900						

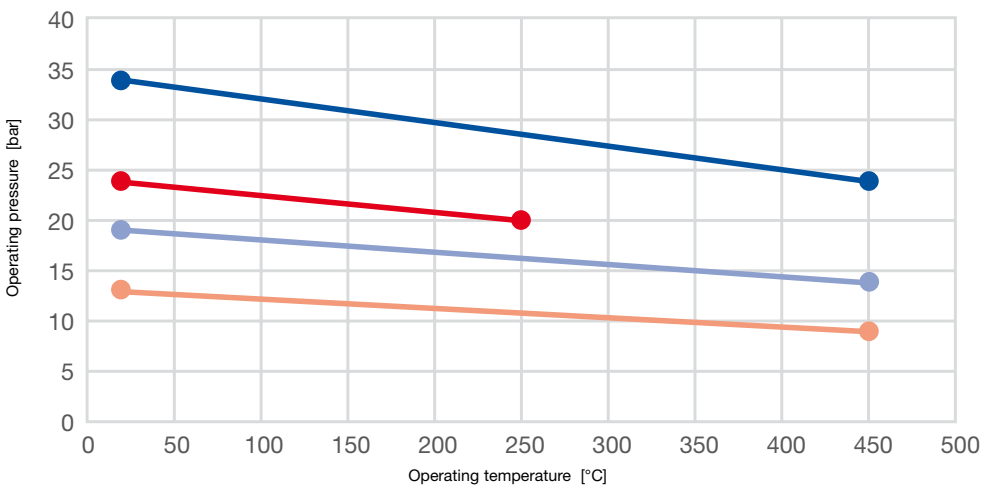
Lockable combination
Dimensions
US units

					Outlet-side change-over valve											
					Lockable combination with spring-loaded safety valves						Lockable combination with pilot-operated safety valves					
				NPS	1"	1 1/2"	2"	2 1/2"	3"	4"	1"	1 1/2"	2"	2 1/2"	3"	4"
				Art. No. 3300.	**0010**	**0050**	**0070**	**0090**	**0100**	**0120**	**0010**	**0050**	**0070**	**0090**	**0100**	**0120**
				Pressure rating body basic construction	CL300						CL300					
	Type	NPS	**Art. No.**	Pressure rating body basic construction	Flange distance / width											
Inlet-side change-over valve	**330 Compact**	1"	**3300.0010**	CL300	H dimension [inch]	10 10/16	13	13						13			
					max. C_1 [inch]	27 5/16	27 5/16	27 5/16						27 5/16			
		1 1/2"	**3300.0050**		H dimension [inch]		13	13	18 11/16	18 11/16				18 11/16		18 11/16	
					max. C_1 [inch]		27 5/16	27 5/16	33 1/16	33 1/16				29 7/8		31 5/8	
		2"	**3300.0070**		H dimension [inch]			13		18 11/16						18 11/16	
					max. C_1 [inch]			27 5/16		31 5/8						31 5/8	
		2 1/2"	**3300.0090**		H dimension [inch]				18 11/16		18 11/16						
					max. C_1 [inch]				31 5/8		33 15/16						
		3"	**3300.0100**		H dimension [inch]					18 11/16	18 11/16						22 1/16
					max. C_1 [inch]					31 5/8	33 15/16						33 15/16
		4"	**3300.0120**		H dimension [inch]						18 11/16						
					max. C_1 [inch]						33 15/16						
	320 Flow	1 1/2"	**3200.0050**	CL300	H dimension [inch]		18 11/16	18 11/16	18 11/16	18 11/16				18 11/16		18 11/16	
					max. C_1 [inch]		29 7/8	29 7/8	31 5/8	31 5/8				29 7/8		31 5/8	
		2"	**3200.0070**		H dimension [inch]			18 11/16		18 11/16							
					max. C_1 [inch]			29 7/8		31 5/8							
		2 1/2"	**3200.0090**		H dimension [inch]						22 1/16						
					max. C_1 [inch]						33 15/16						
		3"	**3200.0100**		H dimension [inch]					22 1/16	22 1/16						22 1/16
					max. C_1 [inch]					33 7/16	33 15/16						33 15/16
		4"	**3200.0120**		H dimension [inch]						22 1/16						
					max. C_1 [inch]						35 3/8						
	320 Flow	1"	**3200.0020**	CL1500	H dimension [inch]	13	13	13						13			
					max. C_1 [inch]	29 7/8	29 7/8	29 7/8						29 7/8			
		1 1/2"	**3200.0060**		H dimension [inch]		18 11/16	18 11/16	18 11/16	18 11/16				18 11/16		18 11/16	
					max. C_1 [inch]		31 5/8	31 5/8	31 5/8	31 5/8				31 5/8		31 5/8	
		2"	**3200.0080**		H dimension [inch]			18 11/16		18 11/16						18 11/16	
					max. C_1 [inch]			31 5/8		31 5/8						31 5/8	
		3"	**3200.0110**		H dimension [inch]					22 1/16	22 1/16						22 1/16
					max. C_1 [inch]					34 1/4	35 3/8						35 11/16
		4"	**3200.0130**		H dimension [inch]						22 1/16						
					max. C_1 [inch]						35 3/8						

Options

Designation / option code	Application	Technical design
Valve design TA-Luft conformity Q69	Reduction of emissions to the outside.	Valve design with TA-Luft conformity sealing systems for body seals (Pos. 60) and compression gland (Pos. 204) to the outside.
Expansion of the piping side Q5Q (DN 40) Q5C (NPS 1 1/2") Q5R (DN 50) Q5D (NPS 2") Q5S (DN 65) Q5E (NPS 2 1/2") Q5T (DN 80) Q5F (NPS 3") Q5U (DN 100) Q5G (NPS 4")	Increase of the nominal size at the piping side to adjust to larger piping nominal sizes or to reduce the pressure loss through the change-over valve. Available expansions, see Pages 12 and 14 for Type 330 and Pages 16 – 19 for Type 320.	Change-over valve is equipped with inlet bodies with different nominal sizes to the piping.
Stellited sealing surfaces Q67 (Disc) Q68 (Seats)	Increase of wear resistance of seat and disc.	Optional up to PN 63 or CL300. From PN 100 or CL600, the sealing surfaces are stellited by default.
Spindle material Q39 (1.4404/316L)	Higher quality spindle material for the change-over valve optional. Available in steel cast configuration (Q09) upon customer request.	Spindle in 1.4404/316L.
Studs and nuts material Q45 (Studs A4-70) Q4A (Nuts A4-70)	Optional higher quality stuts and nuts material for the change-over valve in steel cast configuration (Q09).	Studs and nuts in stainless steel.
NACE MR0175 / NACE MR0103 Z78 Z77	Use in sour gas applications (upstream). Use in sour gas applications (downstream).	Use of NACE-compliant materials for all pressurised components.
Pickled version Q77	Removal of residues on the casting surface as well as reconstruction of an even passive layer.	Inlet body, body and elbows in stained design. Only available for the stainless-steel configuration (Q11)
Free of oil and grease J85	Available as of early 2018	
Drain hole Q2W (G1/4) Q2Y (G1/2) Q2X (NPT 1/4") Q2Z (NPT 1/2")	The drain holes enable discharge of the enclosed medium on the locked side of the change-over valve. Especially for steam protection, the condensate may be discharged through the boreholes.	A borehole each on the bottom side of the elbows (different depending on installation position for inlet-side and outlet-side change-over valves).
Pressure relief with needle valve Q71 – for 10 mm pipe Q75 – Thread NPT 1/2" Q72 – Flange connection DN 15 PN 40 Q7A – Flange connection DN 15 PN 250 Q7B – Flange connection 1/2" CL300/600	The clearance to the inactive safety valve can be relieved using the relief valve. Attention: pressure relief must occur before beginning revision.	Assembly of one needle valve each in the elbow.

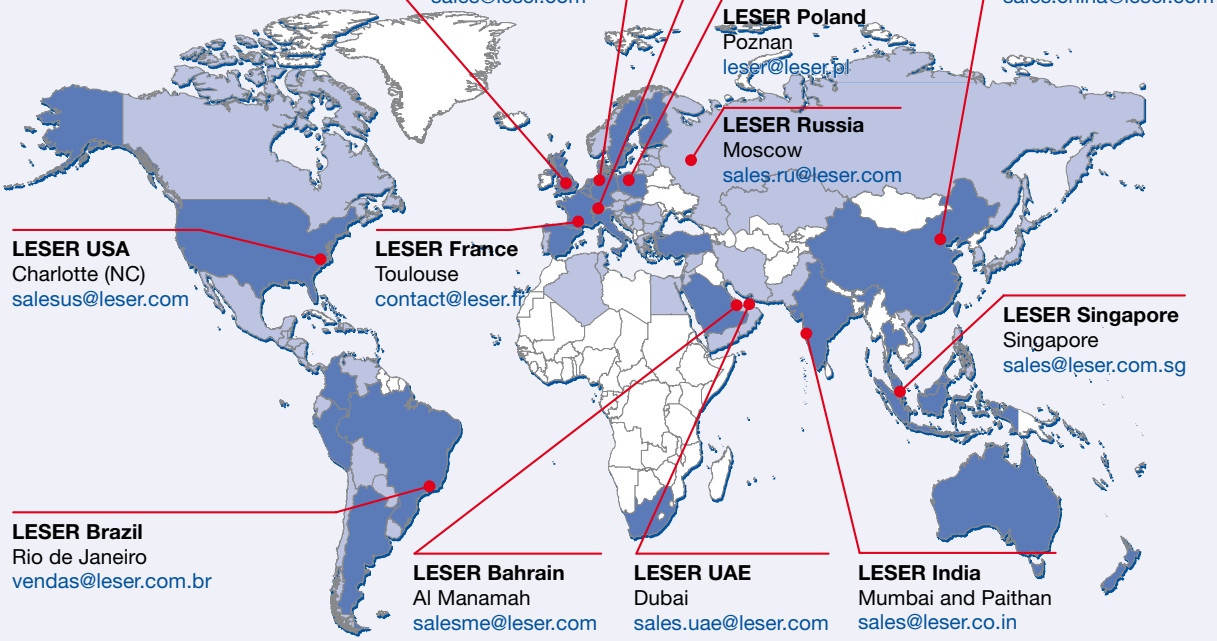
Designation / option code	Application	Technical design
Remote sensing Q73 (in the inlet body for POSV)	Remote sensing connection for POSV in order to reduce the pressure directly in the inlet of the change-over valve and thereby bridge the pressure loss via the change-over valve.	Connection borehole on the back side of the inlet body inclusiv piping between inlet body and the two elbows. In addition, a switch valve is supplied for remote sensing line to switch between both sides in order to prevent medium from discharging.
Purge and manometer connection Q3A (NPT 1/2") Q3B (G1/2)	The purge and manometer connection is used for cleaning and/or purging the locked elbow. As an alternative, the connection for pressure monitoring in the locked elbow may be used by connecting a manometer. It can then display pressure increase due to leaks or the general locked pressure in order to demount the safety valve on the locked side without danger.	One connection each on the front side of the elbows locked with a plastic plug.
Proximity switch Q76 Adaptor M12x1) J93 (N M12x1/M18X1 direct current)	The proximity switches provide an electronic signal indicating on which side (left or right) the disc of the change-over valve is located and therefore which safety valve is active and which one is set to stand-by.	Two proximity switches are screwed into the two end positions in the yoke above the position indicator.
Adjustment guard manual wheel Q3C	Protection against unauthorised switching	Padlock in the boreholes of the yoke.
Pressure balancing unit Q70	Simplification of the switch via manual wheel even with high pressures. As of the following pressure values, LESER recommends the pressure balancing unit in order to prevent damages to the change-over valve:	Connection with a pipe on the back sides of the elbows, including a switch valve. As an alternative, the operating pressure can be reduced below the mentioned limits so as to enable switching without any danger.



Art. No.	Designation
3300.0090	Compact DN 65 / 2 1/2"
3300.0100	Compact DN 80 / 3"
3200.0020	Flow DN 25 / 1" PN 250 / CL1500
3200.0050	Flow DN 40 /1 1/2" PN 40 / CL300
3200.0060	Flow DN 40 / 1 1/2" PN 250 / CL1500
3200.0070	Flow DN 50 / 2" PN 40 / CL300
3200.0080	Flow DN 50 / 2" PN 250 / CL1500
3300.0010	Compact DN 25 / 1"
3300.0050	Compact DN 40 / 1 1/2"
3300.0070	Compact DN 50 / 2"
3300.0120	Compact DN 100 / 4"
3200.0090	Flow DN 65 / 2 1/2" PN 40 / CL300
3200.0100	Flow DN 80 / 3" PN 40 / CL300
3200.0110	Flow DN 80 / 3" PN 250 / CL1500
3200.0120	Flow DN 100 / 4" PN 40 / CL300
3200.0130	Flow DN 100 / 4" PN 250 / CL1500

LESER worldwide

LESER has subsidiaries in Europe, America, the Middle East and Asia, and further representatives in more than 80 countries. Thanks to our extensive experience and our 100% focus on safety valves, LESER is one of the top companies in its market – the largest producer in Europe and among the market leaders worldwide.
LESER – The Safety Valve Company.



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