



MASTER THE CHALLENGES OF PROPERLY INSTALLING A CRYOGENIC VALVE

WEKA AG, 05.05.2026

DANIEL WEBER

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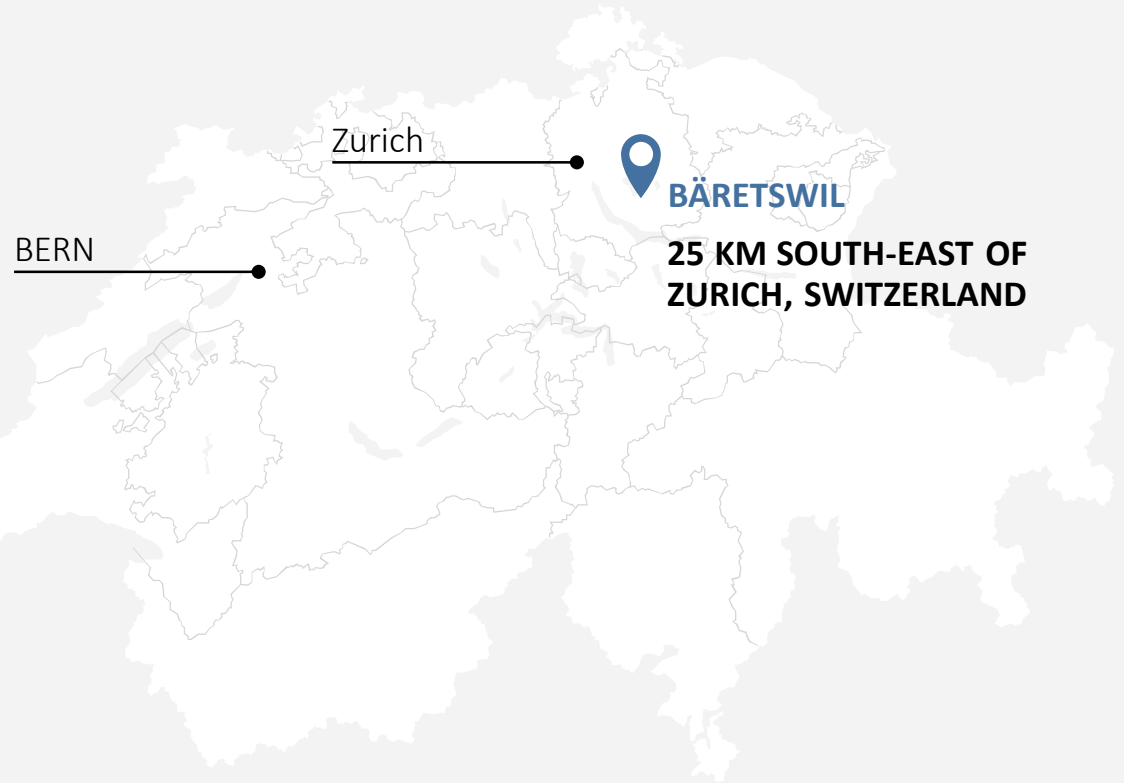


WEKA AG

1
PART

THE COMPANY

LOCATION BÄRETSWIL



THE COMPANY

WELCOME!



OUR PRODUCTS

OVERVIEW



VALVES & CRYOGENIC COMPONENTS

LEVEL MEASUREMENT TECHNOLOGY

SERVICE & SUPPORT

VALVE TECHNOLOGY

CRYO COMPONENTS

MAGNETIC LEVEL INDICATOR VLI

TANK CONTENT MEASURING SYSTEMS TLI

ENGINEERING

DEVELOPMENT & PROJECT MANAGEMENT

SERVICE & SUPPORT

OUR PRODUCTS – VALVES AND CRYOGENIC COMPONENTS

VALVES AND CRYOGENIC COMPONENTS

OUR CERTIFICATIONS



VALVE TECHNOLOGY



CRYOGENIC COMPONENTS



CRYO-COMPONENTS

- Cryogenic Valves and components for service temperatures down to 1.8K (-271°C)
- Cryogenic control and shut-off valves, bellow sealed towards outer environment
 - DN2 to DN250, high flow rate relative to nominal size due to optimized valve design
 - Standard PN25 and PN40 (specific types up to PN1000)
 - Low mass design for minimal heat loss, reducing operating costs
 - Seat sealing function and flow control function clearly separated
 - 316L for pressure bearing parts, connections usually welded
- Johnston couplings, multi coaxial couplings, warm and cold check valves
- Customer specific development according to requirements



APPLICATION AREAS

- Main fluids He (Helium), H₂ (Hydrogen), N₂ (Nitrogen), O₂ (Oxygen), etc.
- Industrial cryogenics (gas liquefaction, refrigeration, distribution)
- Space (ground systems and satellites)
- Basic research, future technologies, plasma and fusion power
- Special applications in highly radiant ambient or high magnetic fields





WELDING OPERATIONS

2
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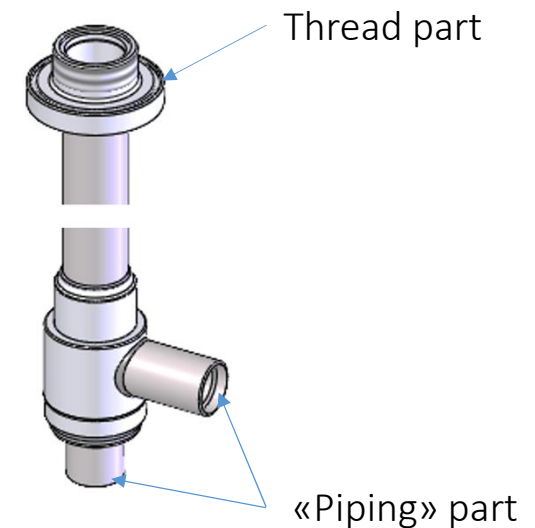
WELDING OPERATIONS



Important before welding

- Inserts and actuator must be dismantled before welding
- WEKA recommends using only the “housing” during welding work
- All dismantled parts must be stored and packed in a dry and dust-free place

This helps prevent damage to the sealings or sealing surfaces



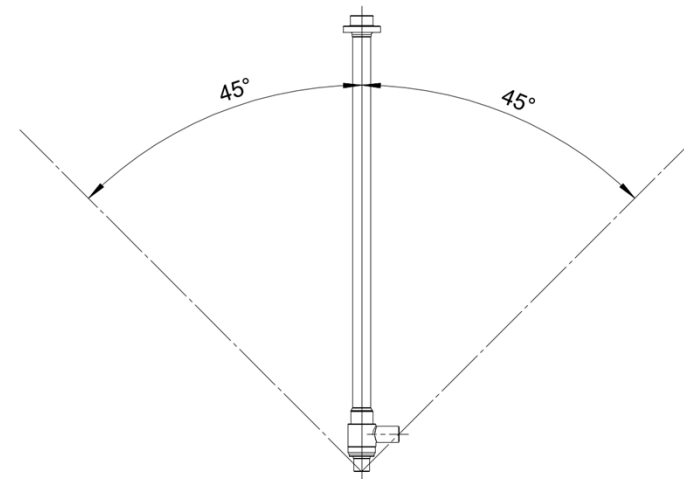
Read and follow Installation, Operating and Maintenance Manual “WEKA_IOM_C-0059_CryogenicValves_EN” available on www.weka-ag.com

WELDING OPERATIONS



Installation position for cryogenic valve

- A vertical installation position is preferred
- Valves used in cryogenic applications can be installed at an angle of $\pm 45^\circ$



WELDING OPERATIONS



Important during welding

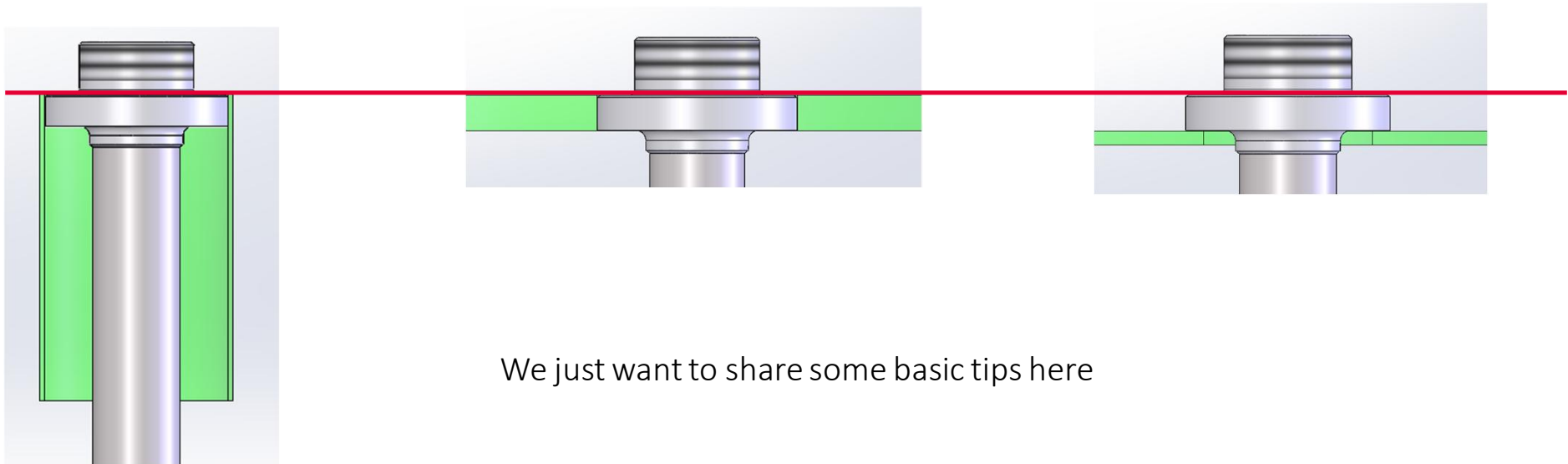
- Weld with minimum energy input to avoid deformation due to thermal distortion of the housing (experienced welder)
- Valve housing may be cooled with a damp cloth (or others) during welding
- Ensure cleanliness during work and after the work. This has a big impact on the functionality and tightness of the valve

WELDING OPERATIONS



Different solutions

→ WEKA knows that there are various solutions and techniques for welding cryogenic valves into vacuum chamber

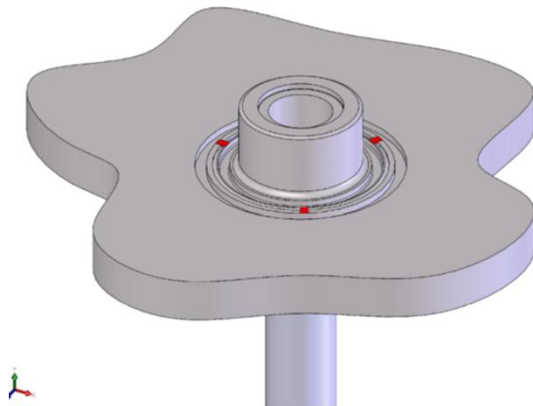


We just want to share some basic tips here

WELDING OPERATIONS



Step 1



Fix the threaded part in the valve plate with 3 welding spots.

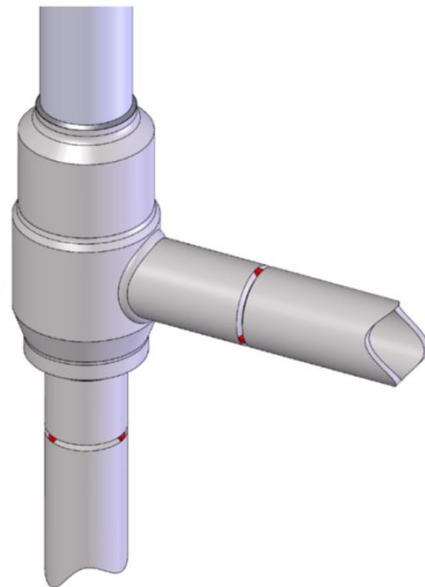
Please note:

For a later step, we recommend to have some air gap between the threaded part and the vacuum chamber

WELDING OPERATIONS



Step 2

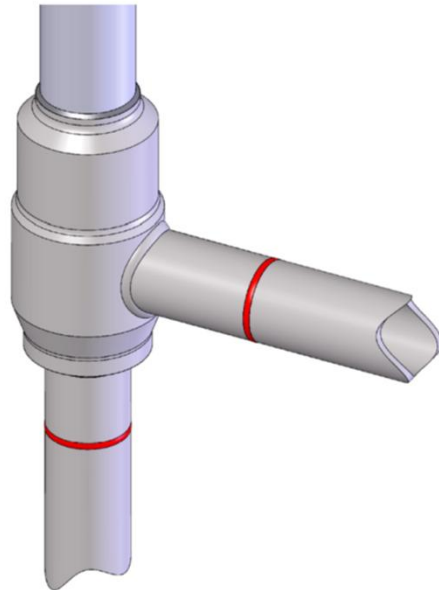


Spot-welding of pipes with 3 spots around the circumference.

WELDING OPERATIONS



Step 3

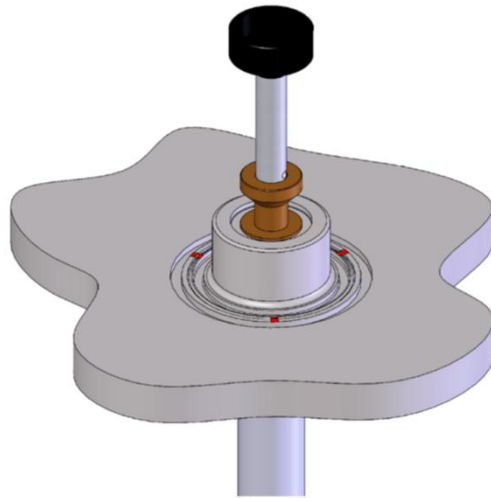


- Weld the pipes with as low heat input as possible
- If required, cool with a damp cloth

WELDING OPERATIONS



Step 4



Check the straightness from the housing by using:

- straightness test mandrels
- valve insert

If you feel friction or the mechanism gets stuck, it's a sign that the housing pipe is bent too much

If the housing tubes are bent, the three weld points should be removed and welded again

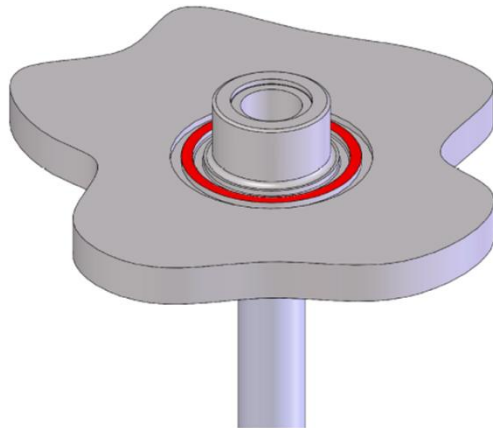
Please note:

Bending of the housing tube can lead to strength issues, installation problems or leakage issues.

WELDING OPERATIONS



Step 5



Finish the welding

Please note:

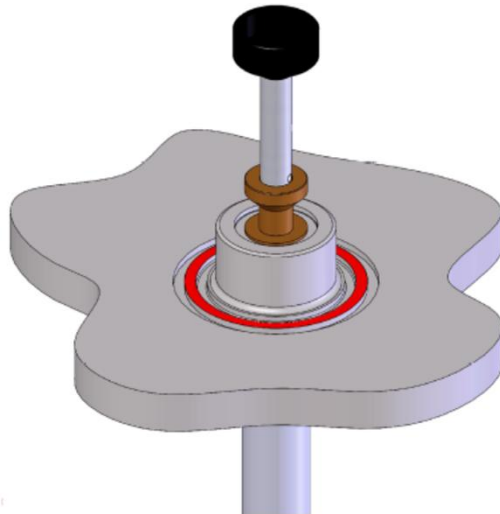
Excessive heat can damage the guide diameter and the sealing surface of the O-ring

Work with as little heat as possible

WELDING OPERATIONS



Step 6



Check the straightness from the housing by using:

- straightness test mandrels
- valve insert

WELDING OPERATIONS



Additional information

For welding procedure 141, TIG welding:

- Ensure low heat input
- For welding with 2mm wall thickness, use approx. 48-52 amps.
- The diameter of the filler wire should be 1-2mm

These values are only intended as guidelines.

Depending on the welder and the welding process, the values need to / may be adjusted.

WELDING OPERATIONS

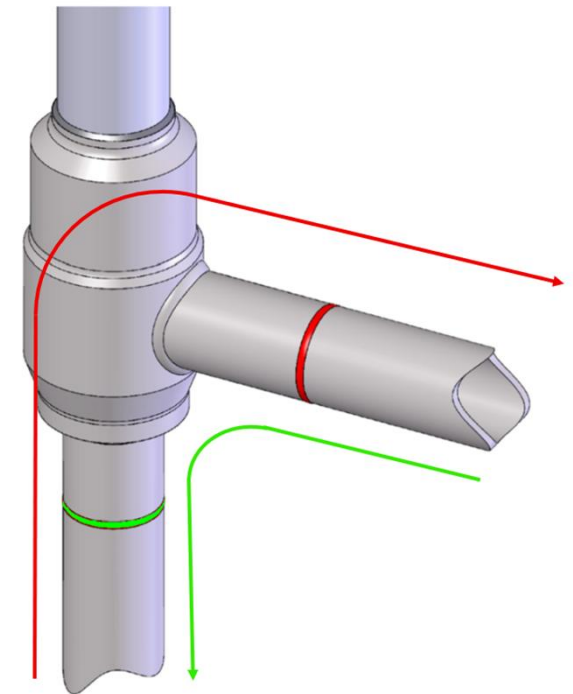


Additional information

Shielding gas

The flow direction of the shielding gas should always be from the valve into the pipe.

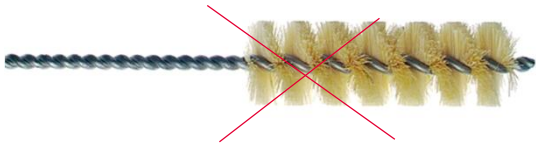
- Welding at the seat connection: The shielding gas input must be from the output connector
- Welding at the output connection: The shielding gas input must be from the seat connector



WELDING OPERATIONS



not protection tip



with an INOX wire & protected tip



Additional information

Cleaning the valve

- Use acetone to clean the housing
- With a rubber plug and a lint free clothes



Not clean, not ok



Clean, ok





PIPING AND LOADS

3
PART

PIPING AND LOADS



- Cryogenic valves are designed to have the smallest heat load as possible → thin wall thickness on the valve housing

- Too high forces can deform/bent the valve and lead to
 - malfunction of the valve
 - tightness problems on the seat
 - friction inside the valve
 - plastic deformation of the valve

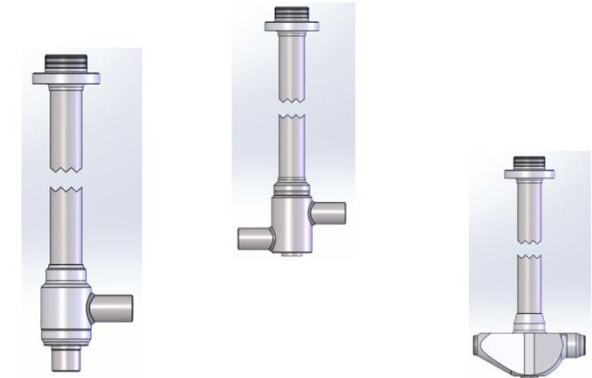
- This forces can come from:
 - External loads from the piping system
 - Actuators not correctly installed or handled

- Precautions:
 - Do not exceed maximal external loads given from WEKA
 - Do not exceed declared maximal air pressure in the pneumatic actuator

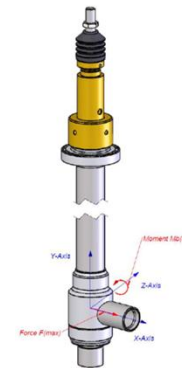
PIPING AND LOADS



- WEKA has provided a reference table in the IOM.
- These values depend on the body pattern or other cryo-lengths.
 - E / D / G / Z body pattern
- Please contact WEKA if you have any questions or for 3D-Models



Line DN	Pressure PN	Outside Dia. body tube	Wall thickness body tube	Moment of inertia of stem	Section modulus Wb	r max for reference only	Cryogenic length	E	Flmax	Mflmax	Wbmax
mm	MPa	mm	mm	mm ⁴ /10 ⁸	mm ³ /10 ³	mm	mm	10 ¹⁰ /N	N	Nm/10 ³	10 ⁶ /mm ²
DN2	PN25	14.0	1.00	0.9	0.1	3.0	875.0	200000	0.002	0.002	16.87
DN4	PN25	14.0	1.00	0.9	0.1	3.0	875.0	200000	0.002	0.002	16.87
DN6	PN25	14.0	1.00	0.9	0.1	3.0	875.0	200000	0.002	0.002	16.87
DN8	PN25	16.0	1.00	1.3	0.2	3.0	875.0	200000	0.004	0.003	19.28
DN10	PN25	18.0	1.00	1.9	0.2	3.0	875.0	200000	0.005	0.005	21.69
DN15	PN25	24.0	1.00	4.8	0.4	3.0	875.0	200000	0.013	0.012	26.92
DN20	PN25	32.5	1.00	12.3	0.8	3.0	875.0	200000	0.034	0.030	36.16
DN25	PN25	38.0	1.20	23.5	1.2	3.0	875.0	200000	0.065	0.057	45.79
DN32	PN25	43.5	1.50	43.7	2.0	3.0	875.0	200000	0.120	0.105	52.41
DN40-cb	PN25	48.3	1.60	64.1	2.7	3.0	875.0	200000	0.176	0.154	56.20
DN40	PN25	55.2	2.00	118.4	4.3	3.0	875.0	200000	0.326	0.285	66.51
DN50	PN25	68.2	2.00	226.1	6.7	2.5	875.0	200000	0.523	0.458	68.48
DN65	PN25	85.8	2.50	568.0	13.2	2.0	875.0	200000	1.043	0.912	68.92
DN80	PN10	99.6	2.60	922.5	18.7	1.7	875.0	200000	1.495	1.273	68.00
PN25	PN10	101.6	3.00	1332.4	26.2	1.7	875.0	200000	2.079	1.819	69.37
DN100	PN10	121.9	2.50	1934.4	27.0	1.9	1000.0	200000	1.910	1.910	70.69
PN25	PN10	121.9	4.00	2918.7	41.6	1.9	1000.0	200000	2.943	2.943	70.69
DN125	PN10	139.7	2.60	2932.1	37.7	1.7	1000.0	200000	2.752	2.752	73.03
PN25	PN10	141.3	3.40	3903.4	49.6	1.7	1000.0	200000	3.663	3.663	73.86
DN150	PN10	168.3	2.60	4946.3	56.2	2.0	1200.0	200000	3.307	3.969	71.88
PN25	PN10	168.3	4.00	6970.9	82.8	2.0	1200.0	200000	4.962	5.954	71.88
DN200	PN10	219.1	2.90	11510.7	105.1	1.5	1200.0	200000	6.145	7.374	70.18
DN250	PN10	273.0	2.90	22743.0	164.4	1.3	1200.0	200000	8.968	11.861	72.87



Read and follow Installation, Operating and Maintenance Manual “WEKA_IOM_C-0059_CryogenicValves_EN” available on www.weka-ag.com

PIPING AND LOADS



Allowed maximal piping loads are too small?

We have a solution!

NEW

DN15-6: DN15 Housing with DN6 bore

DN15-10: DN15 Housing with DN10 bore

DN25-15: DN25 housing with DN15 bore

WEKA WEKA AG - Switzerland
Schürlistrasse 9 · CH-8244 Bäretswil · Phone +41 43 833 43 43 · info@weka-ag.ch · www.weka-ag.ch
WEKA datasheet 930219

Standard bellow sealed cryogenic valves PN25 with reduced seat bore and pneumatic or manual actuator

Valve size DN25 (1")

Nominal DN	DN25 (1")
Nominal pressure	PN25
Design temperature	-270°C to +50°C
Kv min (Cv min)	0.025 (0.032)
Kv max (Cv max) as control valve	5.80 (6.73)
Kv max (Cv max) as Shut/OFF-valve	6.00 (6.96)

Dimension performance:

Vacuum weld in flange aa1 (mm)	60
Butt weld end. exds (mm)	21.3x2.0
Connection dimension E (mm)	50
Standard cryogenic length h (mm)	650
Minimum cryogenic length h (mm)	100
Heat load 300 to 4.2K @ indicated length h (W)	< 0.64
Mass to cool down (m=650) (kg)	0.9

Actuator:

	PM - Po		Hic		HL	
	10	25	10	25	25	25
Valve shut-off pressure (<=bar)	10	25	10	25	25	25
oB (mm)	180	180	100	100	100	100
L2 (valve with open manual actuator) (mm)	362	362	142	142	372	372
Total weight (kg)	7.8	7.8	3.4	3.4	7.9	7.9
Supply air	6.0 bar, G1/4"	-	-	-	-	-
Minimum liter of air supply per travel (NTP)	1.8	1.8	-	-	-	-

Maximum dimensions with SIEMENS or SAMSON positioner

w (mm)	255	-	-
x (mm)	185	-	-
y (mm)	190	-	-
z (mm)	255	-	-
Additional weight (kg)	2.5	-	-

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WEKA datasheet 930219

Standard bellow sealed cryogenic valves PN25 with reduced seat bore and pneumatic or manual actuator

Valve size DN15 (1/2")

Nominal DN	DN15 (1/2")
Nominal pressure	PN25
Design temperature	-270°C to +50°C
Kv min (Cv min)	0.010 (0.012)
Kv max (Cv max) as control valve	1.10 (1.28)
Kv max (Cv max) as Shut/OFF-valve	1.20 (1.39)

Dimension performance:

Vacuum weld in flange aa1 (mm)	60
Butt weld end. exds (mm)	21.3x2.0
Connection dimension E (mm)	50
Standard cryogenic length h (mm)	650
Minimum cryogenic length h (mm)	100
Heat load 300 to 4.2K @ indicated length h (W)	< 0.64
Mass to cool down (m=650) (kg)	0.9

Actuator:

	PM - Po		Hic		HL	
	10	25	10	25	25	25
Valve shut-off pressure (<=bar)	10	25	10	25	25	25
oB (mm)	180	180	100	100	100	100
L2 (valve with open manual actuator) (mm)	362	362	142	142	372	372
Total weight (kg)	7.8	7.8	3.4	3.4	7.9	7.9
Supply air	6.0 bar, G1/4"	-	-	-	-	-
Minimum liter of air supply per travel (NTP)	1.8	1.8	-	-	-	-

Maximum dimensions with SIEMENS or SAMSON positioner

w (mm)	255	-	-
x (mm)	185	-	-
y (mm)	190	-	-
z (mm)	255	-	-
Additional weight (kg)	2.5	-	-

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WEKA datasheet 930219

Standard bellow sealed cryogenic valves PN25 with reduced seat bore and pneumatic or manual actuator

Valve size DN25 (1")

Nominal DN	DN25 (1")
Nominal pressure	PN25
Design temperature	-270°C to +50°C
Kv min (Cv min)	0.025 (0.032)
Kv max (Cv max) as control valve	5.80 (6.73)
Kv max (Cv max) as Shut/OFF-valve	6.00 (6.96)

Dimension performance:

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Standard cryogenic length h (mm)	650
Minimum cryogenic length h (mm)	100
Heat load 300 to 4.2K @ indicated length h (W)	< 0.64
Mass to cool down (m=650) (kg)	0.9

Actuator:

	PM - Po		Hic		HL	
	10	25	10	25	25	25
Valve shut-off pressure (<=bar)	10	25	10	25	25	25
oB (mm)	180	180	100	100	100	100
L2 (valve with open manual actuator) (mm)	362	362	142	142	372	372
Total weight (kg)	7.8	7.8	3.4	3.4	7.9	7.9
Supply air	6.0 bar, G1/4"	-	-	-	-	-
Minimum liter of air supply per travel (NTP)	1.8	1.8	-	-	-	-

Maximum dimensions with SIEMENS or SAMSON positioner

w (mm)	255	-	-
x (mm)	185	-	-
y (mm)	190	-	-
z (mm)	255	-	-
Additional weight (kg)	2.5	-	-

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WEKA datasheet 930219

Standard bellow sealed cryogenic valves PN25 with reduced seat bore and pneumatic or manual actuator

Valve size DN15 (1/2")

Nominal DN	DN15 (1/2")
Nominal pressure	PN25
Design temperature	-270°C to +50°C
Kv min (Cv min)	0.010 (0.012)
Kv max (Cv max) as control valve	1.10 (1.28)
Kv max (Cv max) as Shut/OFF-valve	1.20 (1.39)

Dimension performance:

Vacuum weld in flange aa1 (mm)	60
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Connection dimension E (mm)	50
Standard cryogenic length h (mm)	650
Minimum cryogenic length h (mm)	100
Heat load 300 to 4.2K @ indicated length h (W)	< 0.64
Mass to cool down (m=650) (kg)	0.9

Actuator:

	PM - Po		Hic		HL	
	10	25	10	25	25	25
Valve shut-off pressure (<=bar)	10	25	10	25	25	25
oB (mm)	180	180	100	100	100	100
L2 (valve with open manual actuator) (mm)	362	362	142	142	372	372
Total weight (kg)	7.8	7.8	3.4	3.4	7.9	7.9
Supply air	6.0 bar, G1/4"	-	-	-	-	-
Minimum liter of air supply per travel (NTP)	1.8	1.8	-	-	-	-

Maximum dimensions with SIEMENS or SAMSON positioner

w (mm)	255	-	-
x (mm)	185	-	-
y (mm)	190	-	-
z (mm)	255	-	-
Additional weight (kg)	2.5	-	-

Problems with higher heat load?

there is the option to implement a G10 compound in the valve insert.



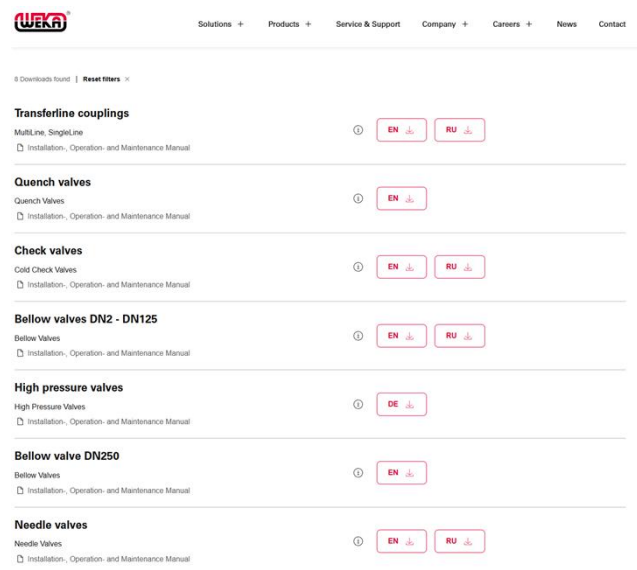
MOUNTING AND DISMOUNTING

4
PART

MOUNTING AND DISMOUNTING



Installation-, Operation- and Maintenance Manual can be downloaden from the WEKA website www.weka-ag.com/en/products/downloads/



WEKA offers training courses.
Please contact: info@weka-ag.ch

MOUNTING AND DISMOUNTING



Correctly initialize the positioner

- WEKA sends the default settings for each valve
 - If the data is lost, WEKA can resend it
- The positioner should be reinitialized after each assembly

Please note:

Each positioner is configured differently.

WEKA also offers training courses for this

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 Phone +41 43 833 43 43
 info@weka-ag.ch - www.weka-ag.ch

REGELVENTIL MIT SAMSON STELLUNGSREGLER Trovis 3730-1 Po
 CONTROL VALVE WITH SAMSON POSITIONER Trovis 3730-1 Po

Kunde / Customer	Auftrag / Order no.
Kundenbestellnummer / Customer order no.	Positionier- / Positioning no.
Kundenmaterialnummer / Customer material no.	Laufnr. / Sequence no.
Material / Type	Positioniermenge / Position qty.

Einstellung bei Ablieferung / Valve adjustment at delivery		Ventilnacheinstellung / Valve re-adjustment		Ventilnacheinstellung / Valve re-adjustment	
P0	-	P0		P0	
P1	124	P1		P1	
P2	OPEN	P2		P2	
P3	ATO	P3		P3	
P4	35mm	P4		P4	
P5	MAX	P5		P5	
P6	0	P6		P6	
P7	4-20	P7		P7	
P8	>>	P8		P8	
P9	50	P9		P9	
P10	PD	P10		P10	
P11	OFF	P11		P11	
P12	ON	P12		P12	
P13	OFF	P13		P13	
P14	NO/NO	P14		P14	
P15	2%	P15		P15	
P16	98%	P16		P16	
P17	T&L&S	P17		P17	
P18		P18		P18	
P19		P19		P19	
P20		P20		P20	
P21	-	P21		P21	
P22	INT	P22		P22	
P23	ZERO	P23		P23	
P24	MAN	P24		P24	
P25	RY	P25		P25	
P26	BOOT	P26		P26	
P27	V3.00	P27		P27	

Stellzeit / positioning time	u	s (open)	Stellzeit / positioning time	u	s (open)	Stellzeit / positioning time	u	s (open)
Zuluftdruck / supply pressure	bar		Zuluftdruck / supply pressure	bar		Zuluftdruck / supply pressure	bar	
Vorspannung / preload	mm		Vorspannung / preload	mm		Vorspannung / preload	mm	
Ventilhub / stroke	mm		Ventilhub / stroke	mm		Ventilhub / stroke	mm	

Bemerkungen / Remarks

Datum 15.10.2024 Datum _____ Datum _____
 Name F. Reinbinder Name _____ Name _____

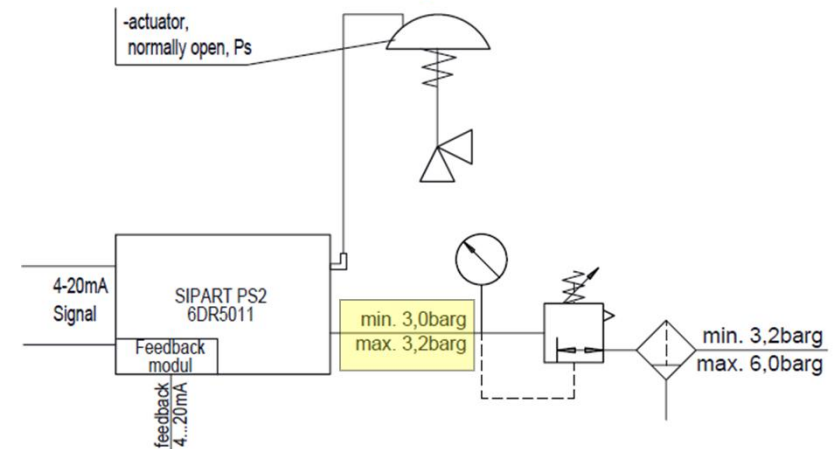
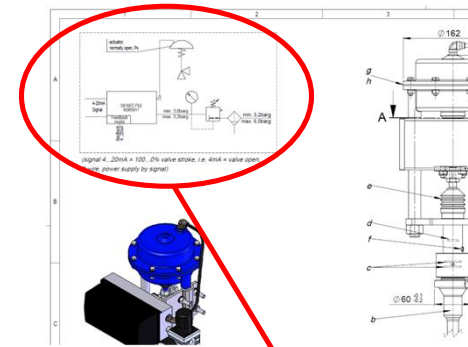
Hersteller / Manufacturer: WEKA AG, CH-8344 Bäretswil

MOUNTING AND DISMOUNTING



The compressed air for the actuator

- values must comply with the pneumatic diagram in the customer drawing or technical specification
- If you have a Ps (normally open) actuator check maximal allowed air pressure on customer drawing or technical specification
 - Too much force can permanently deform the valve



MOUNTING AND DISMOUNTING



Equipment and tools

- Acetone for metal parts
 - Ethanol for gaskets / plastics
 - lint free clothes
 - Vacuum grease for o-rings
 - for example : Rhodorsil
 - Lubrication of metal friction surfaces
 - For example: Gleitmo 599
- Cleanliness is a key factor in cryogenic valves
- The necessary tools are described in the IOM

MOUNTING AND DISMOUNTING



Tools for flow plugs

Valve size	DN2	DN4	DN6	DN8	DN10	DN15	DN20	DN25 / DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150
WEKA Part. No	34091	34092	34093	34094	34051	34055	34305	34992	31490	31491	31492	open end wrench 24mm			
Mounting tool															

Coupling of valve

Adjustable face spanner	
Valve size	14-100/6mm
DN80 and larger	

O-Ring tool




O-Ring installation tool	
Valve size	
> DN2	

Lift the insert using the hand-held mounting tool or a crane mounting tool

Hand-held mounting tool		
Valve size		
DN	WEKA Part. No	
40 to 65	2479	
80 to 200		1750

MOUNTING AND DISMOUNTING



Union nut of valve				Nut yoke of valve					
									
Valve size	Ø Union nut	adjustable pin wrench		Ønut	pin wrench		Ønut	hook wrenches	
DN	Øpin hole boring	DIN 1816 (pin)	WEKA Part. No.	Øpin hole boring	DIN 1810B (pin)	WEKA Part. No.	Øpin hole boring	DIN 1810A(nose)	WEKA Part. No.
6	55/5	35-60/4mm	83629	36/4	34-36/4	86032			
10	55/5	35-60/4mm	83629	36/4	34-36/4	86032			
15	55/5	35-60/4mm	83629	36/4	34-36/4	86032			
20	55/5	35-60/4mm	83629	36/4	34-36/4	86032			
25	55/5	35-60/4mm	83629	36/4	34-36/4	86032			
32	74/6	35-60/4mm	83629	36/4	34-36/4	86032			
40	104/8	95-155/6	82074				60	58-62mm	80257
50	104/8	95-155/6	82074				60	58-62mm	80257
65	110/8	95-155/6	82074				60	58-62mm	80257
80	150/8	95-155/6	82074				91	80-90mm	87136
100-200	Innen 6-KT s=10mm						91	80-90mm	87136



INFLUENCE ON SEAT TIGHTNESS

5
PART

INFLUENCE ON SEAT TIGHTNESS



Different factors can have influence on the seat tightness of the valve:

- bending of the housing
- Cleanliness during the whole welding and mounting process of the valve
- Cleanliness of the plant/valve
- Correct preload of the actuator
- Available spare parts: often it is observed that during first commissioning seals must be replaced



CONCLUSION

CONCLUSION



Correct welding is critical

→ Prevents deformation and ensures proper function

Cleanliness is essential

→ Contamination directly affects valve tightness

External loads must be controlled

→ Excessive forces can damage or destroy the valve





**THANK
YOU!**

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