STÜBBE

Ball valve

Operating manual

Series C 110

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We reserve the right to make technical changes.
Read carefully before use.
Save for future use.

CE

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1 About this document

This manual
- is part of the fitting
- applies to all series referred to
- describes safe and proper operation during all operating phases

1.1 Target groups

Operating company
- Responsibilities:
  - Keep this manual available at the place of operation, also for future use.
  - Ensure that employees read and observe this manual and other applicable documents, especially the safety instructions and warnings.
  - Observe any additional country-specific rules and regulations that relate to the system.

Qualified personnel, fitter
- Mechanics qualification:
  - Qualified employees with additional training for fitting the respective pipework.
- Electrical qualification:
  - Qualified electrician
- Responsibility:
  - Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

1.2 Other applicable documents

Resistance lists Resistance of materials used to chemicals www.stuebbe.com/pdf/300051.pdf
Data sheet Technical specifications, conditions of operation www.stuebbe.com/pdf/300882.pdf
CE declaration of conformity Conformity with standards www.stuebbe.com/pdf/300168.pdf
Electric drive operating manual
Limit switch box operating manual

Tab. 1 Other application documents, purpose and where found

1.3 Warnings and symbols

Symbol	Meaning
⚠ DANGER	• Immediate acute risk • Death, serious bodily harm
⚠ WARNING	• Potentially acute risk • Death, serious bodily harm
⚠ CAUTION	• Potentially hazardous situation • Minor injury
NOTE	• Potentially hazardous situation • Material damage
	Safety warning sign ▶ Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
▶	Instruction
1., 2., ...	Multiple-step instructions
✓	Precondition
→	Cross reference
	Information, notes

Tab. 2 Warnings and symbols

2 Safety instructions

The manufacturer accepts no liability for damages caused by disregarding any of the documentation.

2.1 Intended use

- Only use the fitting to shut off pipes for appropriate media (→ Resistance list).
- Adhere to the operating limits (→ Data sheet).
- When using media that contains solids, the wear increases.

2.2 General safety instructions

Read and observe the following regulations before carrying out any work.

2.2.1 Obligations of the operating company

Safety-conscious operation

- Only operate the fitting if it is in perfect technical condition and only use it as intended, staying aware of safety and risks, and in adherence to the instructions in this manual.
- Ensure that the following safety aspects are observed and monitored:
  – Intended use
  – Statutory or other safety and accident-prevention regulations
  – Safety regulations governing the handling of hazardous substances
  – Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available.

Qualified personnel

- Make sure all personnel tasked with work on the fitting have read and understood this manual and all other applicable documents, especially the safety, maintenance and repair information, before they start any work.
- Organize responsibilities, areas of competence and the supervision of personnel.
- The following work should be carried out by specialist technicians only:
  – Installation, repair and maintenance work
  – Work on the electrical system
- Make sure that trainee personnel only work on the fitting under supervision of specialist technicians.

2.2.2 Obligations of personnel

- Observe the instructions on the fitting and keep them legible, e.g. type plate, identification marking for fluid connections.
- Only carry out work on the fitting if the following requirements are met:
  – System is empty
  – System has been flushed
  – System is depressurized
  – System has cooled down
  – System is secured against being switched back on again
- Do not make any modifications to the device.

2.3 Specific hazards

2.3.1 Hazardous media

- When handling hazardous media (e.g. hot, flammable, explosive, toxic, hazardous to health or the environment), observe the safety regulations for the handling of hazardous substances.
- Use personal protective equipment when carrying out any work on the fitting.
- Collect leaking pumped liquid and residues in a safe manner and dispose of in accordance with environmental regulations.

3 Layout and Function

3.1 Marking

3.1.1 Type plate

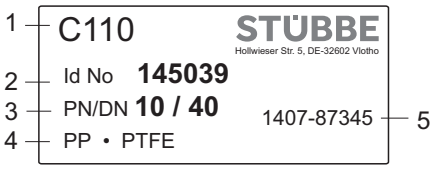


Fig. 1 Type plate (example)

1 Type
2 ID number
3 Nominal pressure [bar] / Nominal diameter [mm]
4 Materials (body, ball seals, other gaskets)
5 Date of manufacture - Series number

3.2 Layout

Manually, electrically or pneumatically driven ball valve for shutting off pipes

- Optional flow direction
- Opening angle OPEN/CLOSE 90°
- Optional installation position
  – Position electric drive laterally or over the fitting.

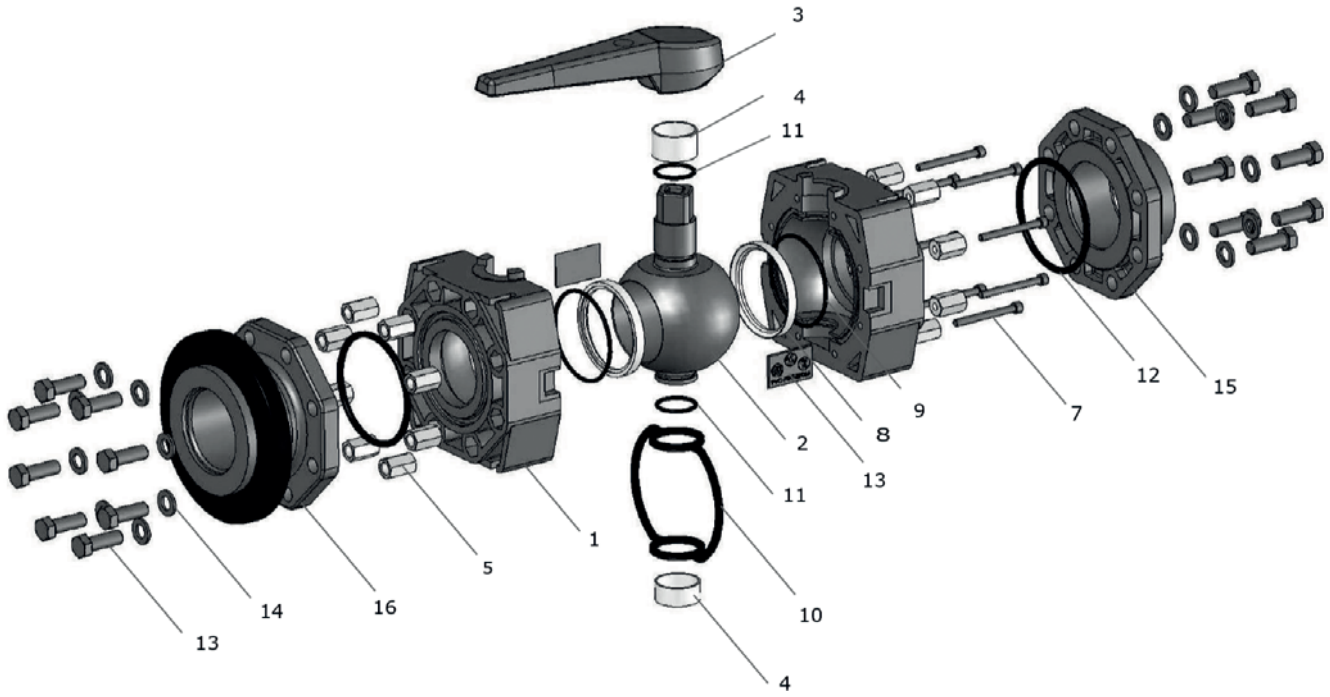


Fig. 2 Layout

1	Housing	7	Hexagon socket screw (MD2)	13	hexagon bolt
2	Ball	8	Ball seal	14	Washer
3	Hand lever	9	O-ring	15	Socket
4	Bearing bush	10	sealing	16	Flange
5	Use	11	O-ring		
6	–	12	O-ring		

4 Transport, Storage and Disposal

4.1 Unpacking and inspection on delivery

1. Unpack the fitting when received and inspect it for transport damage.
2. Report any transport damage to the manufacturer immediately.
3. Ensure that the information on the type plate agrees with the order/design data.
4. For immediate installation, dispose of packaging material according to local regulations.
   – For later installation, leave the fitting in the original packaging.

4.2 Transportation

⚠ DANGER

Death or limbs crushed as a result transported items falling over or tilting.

- ► Do not stand under suspended loads.
- ► Use lifting gear appropriate for the total weight to be transported. Weight specification (→ data sheet).
- ► Attach lifting gear in accordance with the following diagram.

Fig. 3 Attach lifting gear

- ► Lift the fitting with properly installed lifting gear and position it at the place of installation.

4.3 Storage

NOTE

Material damage due to inappropriate storage!

- ► Store the fitting properly.

1. Make sure the storage room meets the following conditions:
   – Dry
   – Frost-free
   – Vibration-free
   – Not in direct sunlight
   – Storage temperature +10 °C to +60 °C
2. Store fitting in “Valve open” state, if possible in the original packaging.

4.4 Disposal

Plastic parts can be contaminated by poisonous or radioactive media to such an extent that cleaning will not be sufficient.

⚠ WARNING

Risk of poisoning and environmental damage from medium.

- ► Use personal protective equipment when carrying out any work on the fitting.
- ► Before disposing of the fitting:
  – Collect escaping medium and dispose separately according to local regulations.
  – Neutralize residues of medium in the fitting.
- ► Remove plastic parts and dispose of them in accordance with local regulations.

- ► Dispose of fitting in accordance with local regulations.

5 Installation and connection

5.1 Preparing for installation

5.1.1 Check operating conditions

1. Ensure the design of the fitting is consistent with the purpose intended:
   – Materials used (→ type plate).
   – Medium (→ order and design data).
2. Ensure the required operating conditions are met:
   – Resistance of body and seal material to the medium (→ resistance lists).
   – Media temperature (→ Data sheet).
   – Operating pressure (→ Data sheet).
3. Consult with the manufacturer regarding any other use of the device.

5.2 Planning pipelines

5.2.1 Designing pipelines

⚠ WARNING

Risk of poisoning and environmental damage from medium.

Leaks due to impermissible pipework forces.

► Ensure that the fitting is not subject to any pulling or thrusting forces or bending moments.

1. Plan pipes safely:
   – No pulling or thrusting forces
   – No bending moments
   – Adjust for changes in length due to temperature changes (compensators, expansion shanks)
   – Optional flow direction
   – Optional installation position and direction
2. Dimensions (→ Data sheet).

5.3 Installing fitting in pipe

⚠ WARNING

Risk of poisoning and environmental damage from medium.

Leak due to faulty installation.

► Installation work on the pipes should only be performed by technicians who have been specially trained for the pipework in question.

NOTE

Material damage due to contamination of the fitting!

► Make sure no contamination reaches the fitting.

► Flush the pipe with a neutral medium.

ⓘ The fitting is installed according to the connection type of the pipes.

Any position of the compressed air drive.

Position electric drive laterally or over the fitting.

5.3.1 Connection wafer type flange variant

ⓘ For installation of the fitting with O-ring, only use flange adapters or welding stubs with smooth sealing surfaces.

1. Open fitting completely.
2. Prepare pipe ends according to connection type.
3. Screw fitting (→ manufacturers' instructions).
   – Observe the maximum screw-in depth (→ Tab. 7 Immersion depth flange screws, Page 12).
   – Observe tightening torques (→ 9.3 Tightening torques, Page 12).

5.3.2 Connection with flange

1. Open fitting completely.
2. Prepare pipe ends according to connection type.
3. Radially position the fitting and flat seal between the flange ends.
4. Screw fitting (flange screws, nuts and washers).
   – Observe tightening torques (→ 9.3 Tightening torques, Page 12).

5.3.3 Connection with sockets or nozzles

1. Open fitting completely.
2. Prepare pipe ends according to connection type.
3. Loosen the screws on the socket or nozzle flange.
4. Connect socket or nozzle flange to pipe ends.
5. Radially position the fitting between the flange ends.
6. Screw fitting (flange screws, nuts and washers).
   – Observe the maximum screw-in depth (→ Tab. 7 Immersion depth flange screws, Page 12).
   – Observe tightening torques (→ 9.3 Tightening torques, Page 12).

5.4 Drive and limit switch box

Limit switch box can only be used with pneumatic drive.

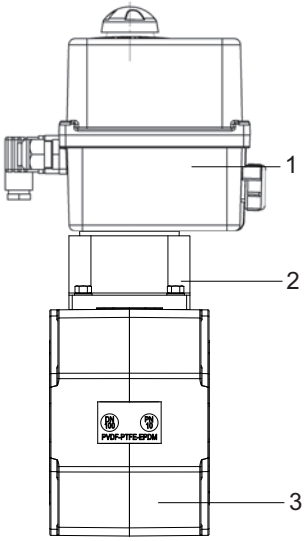


Fig. 4 Electric drive

1 Electric drive
2 Mounting set
3 Housing with ball

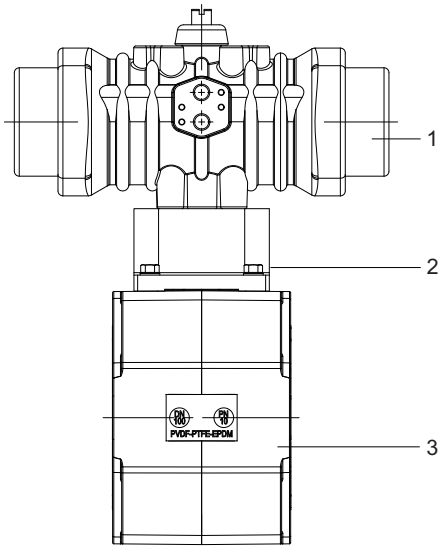


Fig. 5 Pneumatic drive

1 Pneumatic drive
2 Mounting set
3 Housing with ball

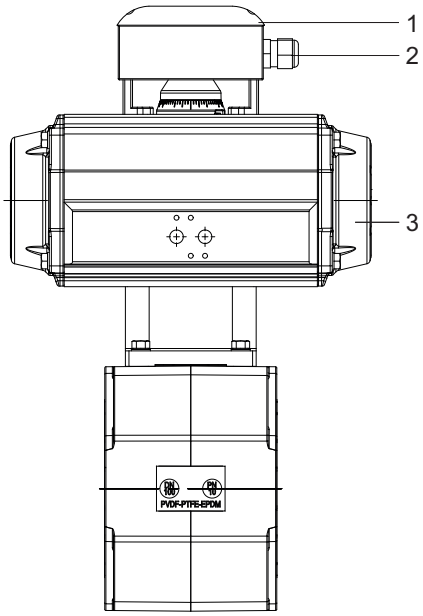


Fig. 6 Pneumatic actuator drive with limit switches

1 Limit switch box
2 Cable gland
3 Pneumatic drive

5.5 Connection

5.5.1 Electrical connection

DANGER

Risk of electrocution!

► All electrical work must be carried out by qualified electricians only.

1. Connect limit switch in electric drive (→ electric drive operating manual).
2. Connect electric drive (→ Operation instructions for electric drive).
3. Connect limit switch in limit switch box (→ limit switch box operating manual).

5.5.2 Pneumatic connection

Solenoid pilot valves are available for control of the pneumatic drive (→ Operating instructions for pilot valve):
- 3/2-way valve for single-acting drives
- 5/2-way valve for double-acting drives

⚠ CAUTION

Risk of injury from compressed air!

► All work on the pneumatic system must be carried out by qualified technicians.

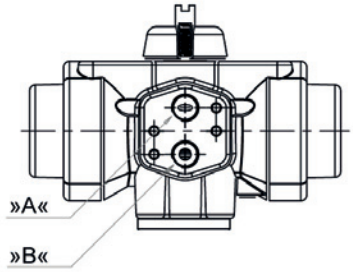


Fig. 7 Connect pneumatics

A Connection A
B Connection B

► Connect compressed air lines to the pneumatic drive (→ Fig. 7 Connect pneumatics, Page 9).

	Control pressure to connection	
Function	**A**	**B**
Normally closed (NC)	–	open
Normally open (NO)	–	close
Double acting (DA)	close	open

Tab. 3 Control pressure connections

5.5.3 Check sense of rotation of drive

1. Open and close fitting once via drive.
2. Check position of the fitting at the flow indicator:
   – Position indicator along the pipe: Fitting opened

5.6 Performing the hydrostatic test

Pressure test using neutral medium, e.g. water.

1. Pressurize the fitting, ensuring
   – Test pressure < permissible system pressure
   – Test pressure < 1.5 PN
   – Test pressure < PN + 5 bar
2. Check the fitting for leaks.

6 Operation

6.1 Commissioning

✓ Fitting correctly installed and connected

⚠ WARNING

Risk of injury and poisoning due to medium spraying out.

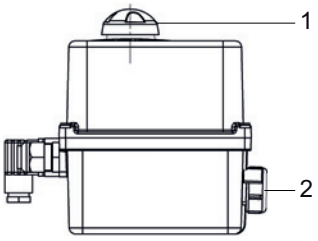
► Use personal protective equipment when carrying out any work on the fitting.

1. Opening and closing the fitting:
   – Hand lever along the pipe: Fitting opened
   – Hand lever perpendicular to the pipe: Fitting closed
2. After the initial stresses due to pressure and operating temperature, check if the fitting is sealed.

6.2 Emergency manual operation

Only with electrically driven ball valve.

6.2.1 Manual emergency operation



1. Ensure that the electricity supply is interrupted for the electric drive.
2. Set the clutch switch (2) from AUTO to MAN and hold it.
3. Remove the protective cap (1).
4. Turn the actuator shaft with the aid of an adjustable spanner until the fitting is in the desired position.
5. Put the protective cap back on.
6. Set the clutch switch back to AUTO.

7 Maintenance

⚠ WARNING

Risk of injury and poisoning due to hazardous media liquids!

- ▶ Use personal protective equipment when carrying out any work on the fitting.

7.1 Servicing

1. Visual and function check (every three months):
   - Normal operating conditions unchanged
   - No leaks
   - No unusual operating noises or vibrations
2. Ensure that fitting functions properly (opening, closing)
3. Clean fitting with a moist cloth if necessary.
4. Fail safe version:
   - Open and close the fitting once in emergency operation (battery operation without supply voltage)
   - in the case of safety-related applications, replace the battery yearly
   - otherwise replace the batteries every 3 years

7.2 Maintenance

⚠ DANGER

Risk of electrocution!

- ▶ All electrical work must be carried out by qualified electricians only.

⚠ WARNING

Risk of injury and poisoning due to hazardous or hot media.

- ▶ Use personal protective equipment when carrying out any work on the fitting.
- ▶ Safely collect the media and dispose of it in accordance with environmental regulations.

⚠ WARNING

Risk of injury during disassembly!

- ▶ Wear protective gloves, components can be very sharp-edged due to wear or damage.
- ▶ Remove components with springs (e.g. pneumatic drive) carefully, since spring tension can cause components to be ejected.

7.2.1 Removing fitting

1. Ensure that:
   - System is empty
   - System has been flushed
   - System is depressurized
   - System has cooled down
   - System is secured against being switched back on again
2. Remove fitting from the pipe.
3. Decontaminate fitting if required.
   - Dead space in the fitting may still contain medium.

7.2.2 Fixing leaks in the port

1. Removing fitting (→ 7.2.1 Removing fitting, Page 10).
2. Replace ball seals and/or ball.
3. Install fitting (→ 5.3 Installing fitting in pipe, Page 7).

7.2.3 Fix leakage at ball valve stem

1. Removing fitting (→ 7.2.1 Removing fitting, Page 10).
2. Replace the O-rings on the ball valve stem.
3. Install fitting (→ 5.3 Installing fitting in pipe, Page 7).

7.3 Replacement parts and return

1. Have the following information ready to hand when ordering spare parts (→ type plate).
   - Fitting type
   - ID number
   - Nominal pressure and diameter
   - Body and seal material
2. Please complete and enclose the document of compliance for returns (→ www.stuebbe.com/en/service/downloads).
3. Only use spare parts from STÜBBE.

8 Troubleshooting

⚠ WARNING

Risk of injury and poisoning due to hazardous or hot media.

- ▶ Use personal protective equipment when carrying out any work on the fitting.
- ▶ Safely collect the media and dispose of it in accordance with environmental regulations.

Consult with the manufacturer regarding faults which are not identified in the following table, or which cannot be traced to the indicated causes.

Error	Possible cause	Corrective action
Medium is leaking out of the flange	Pre-tension of the O-ring too small	▶ Retighten flange fittings (→ 9.2 Flange installation, Page 12).
Medium leakage at the stem	O-ring worn	▶ Replace fitting.
Fitting does not close completely	Ball seals worn Ball worn	▶ (→ 7.2.3 Fix leakage at ball valve stem, Page 10).

Tab. 4 Troubleshooting

9 Appendix

9.1 Technical specifications

Technical data (→ data sheet).

9.1.1 Mechanical specifications

Size	Value
Process conditions (medium)	
Pressure and temperature	→ Data sheet
Pressure loss curve	→ Data sheet
Flow characteristic	→ Data sheet
Materials in contact with medium	
Ball	PVC-U, PP, PVDF
Ball seal	PTFE
Seals	FPM, EDPM
Housing	PVC-U, PP, PVDF

Tab. 5 Mechanical specifications

9.2 Flange installation

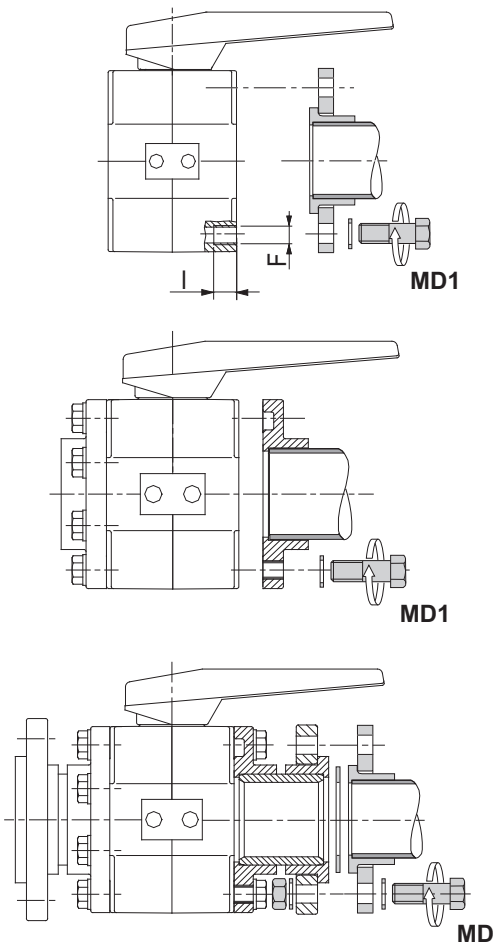


Fig. 8 Tightening torques and immersion depth

		Tightening *1) MD [Nm] for the versions		
d [mm]	DN [mm]	Flat sealing ring max. 10 bar max. 40 °C	Profile seal max. 16 bar	O-ring max. 16 bar
75	65	35	20	20
90	80	35	20	20
110	100	35	20	20
140	125	45	30	25
160	150	55	35	30
		Tightening *1) MD1 [Nm] for the version O-ring max. 16 bar		
Wafer type flange, all sizes		20		

Tab. 6 Tightening torques

1) Use torque wrench

Description	Max. immersion depth flange screws [mm] for the sizes				
	75 (M16)	90 (M16)	110 (M16)	140 (M16)	160 (M20)
Immersion depth (l)	20	20	20	20	30

Tab. 7 Immersion depth flange screws

9.3 Tightening torques

Description	Size	Tightening torque [Nm]
Hexagon socket screws (MD2) (→ Fig. 2 Layout, Page 5).	DN75 DN90 DN110 DN140 DN150	20

Tab. 8 Tightening torques

9.4 Operating torques

The specified values are standard values for a manually operated ball valve under the following conditions:

- Water (H_2O)
- Media temperature 20 °C

Materials	Torque [Nm] for size DN				
	75	90	110	140	150
PVC-U / PP / PVDF	25	40	50	50	80

Tab. 9 Operating torques