MOUNTING AND OPERATING INSTRUCTIONS

EB 28m

Translation of the original manual

BR 28m pig • DIN and ANSI version

For use in piggable pipes

July 2024 edition

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Note regarding this installation and operating manual

This Installation and Operating Manual (EB) provides guidance for safe assembly and operation.

The notes and instructions in this EB are binding when handling PFEIFFER pigs. The figures and illustrations in this EB are examples and must therefore be considered as such.

⇨ For safe and correct use, read this EB carefully prior to use and keep it for later reference.

⇨ In the case of questions that go beyond the scope of this EB, please contact the After Sales Service at PFEIFFER Chemie-Armaturenbau GmbH.

⇨ This manual only applies to the pig itself, the respective additional manuals apply for the valves in the pig system.

Definition of signal words

DANGER

Hazardous situations that lead to death or serious injuries

WARNING

Situations that can lead to death or serious injuries

NOTE

Property damage and malfunctions

Info

Additional information

Tip

Recommended action

Content

1 Safety instructions and safety measures

Intended use

The BR 28m pig is a close wall clearance fitting and displacement body made of dimensionally stable plastic, which is moved through a pig pipe system with a propellant (e.g. gaseous or liquid).

- The pig depends on the type used for the bidirectional conveyance of liquid or gaseous media.
- The pig is suitable for curve travel and can run through T-pieces. The conveying speed should be about one meter per second.
- Various products are conveyed through a system with the pig, without the need for separate pipes for each medium. This prevents mixing and contamination.
- The material properties of the used medium and the pending operating conditions are crucial for selecting the correct pig.
- The pig is designed for precisely defined conditions (e.g. operating pressure, medium used, temperature).

  Therefore the operator must ensure that the pig is only used when the conditions of use comply with the design criteria defined in the order.

  If the operator would like to use the pig in other applications or environments, they must contact PFEIFFER.
- The data sheet contains the permissible pressure and temperature range for these pigs ▶ TB 28m
- The same safety regulations for the pipe system they are used in also apply for pigs.

  This manual only provides safety instructions that are to be observed additionally for pigs.

  There may be additional safety instructions in the manuals of the valves installed in the pig pipe system.
- It is assumed that this chapter is observed when using the valve as intended.

Reasonably foreseeable erroneous use and unintended use

The pig is not suitable for the following areas of use:

- Use outside of the technical data and the limits defined by the design.
- Use in pipe systems that do not comply with standards.
- Use in external systems.

Furthermore, the following activities are considered unintended use:

- Use of third-party spare parts.

Qualification of operating personnel

The pig may only be disassembled, dismantled, assembled and commissioned by qualified specialist personnel trained in pressurised pig pipes who are familiar with the assembly and operation of this product.

- Specialist personnel in terms of this installation and operating manual are persons who, on the basis of their vocational education, knowledge and experience and knowledge of the relevant standards, are capable of evaluating the assigned tasks and identifying possible hazards.

Personal protective equipment

Depending on the medium used, PFEIFFER recommends the following protective equipment:

- Protective garments, protective gloves and eye protection when using hot, cold, aggressive and/or corrosive media.
- Hearing protection when working near the valves.
- Request additional protective equipment from the plant operator.

Prohibition of modifications

Changes to the product are not permitted without consulting PFEIFFER. Non-compliance invalidates the product guarantee. PFEIFFER shall not be held liable for any resulting property damage or personal injury.

Warning of residual risks

To prevent personal injury or property damage, the operator and operating personnel must use suitable measures to prevent the hazards that can result from the flow medium and operating pressure of the pig.

- Therefore, the operator and operating personnel must observe all the hazard information, warning information and information in this installation and operating manual.

Obligation of the operator to exercise diligence

The operator is responsible for proper operation as well as compliance with the safety regulations.

- The operator is responsible for providing operating personnel with this installation and operating manual as well as the applicable documents and to provide instructions on proper operation.
- Furthermore, the operator must ensure that operating personnel and third parties are not endangered.

It is not the responsibility of PFEIFFER, and therefore when using the pig ensure that:

- The pig is only used as intended as described in this chapter.
- The pipe system and control system are properly installed and regularly checked.
- The usual flow rates in continuous operation are not exceeded in the pig pipe system.
- PFEIFFER shall be contacted in the case of abnormal operating conditions, such as vibrations, hydraulic shock, cavitation and also small amounts of solid matter in the medium, especially abrasive matter.

Obligation of operating personnel to exercise diligence

Operating personnel must be familiar with this installation and operating manual and the applicable documents and comply with the indicated hazard information, warning information and other information. Furthermore, operating personnel must be familiar with the applicable regulations concerning occupational safety and accident prevention and observe them.

Applicable standards and directives

– DIN 2430 for pig-enabled pipes.

1.1 Notes regarding possible severe personnel injury

⚠ DANGER

Hazards and ineffectiveness of the warranty!

In the case of non-compliance with the following hazard and warning information, hazards may arise and the warranty provided by PFEIFFER may become invalid.

⇨ *Observe the following hazards and warning information.*

⇨ *Contact PFEIFFER in the case of questions:*

Hazards and damage due to unsuitable pigs!

Pigs whose permissible properties and technical data are not sufficient for the operating conditions can pose a danger to the user and cause damage to the pipe system.

⇨ *Only use pigs whose permissible properties and technical data are sufficient for the operating conditions, see the data sheet ▶ TB 28m.*

1.2 Notes regarding possible personnel injury

⚠ WARNING

Danger of burning due to hot or cold pigs!

Depending on the medium used, pigs can become very hot or very cold and cause burns upon contact.

⇨ *Let pigs cool down or warm up with the lock-in or lock-out process.*

⇨ *Wear protective garments and protective gloves.*

Danger of injury due to residual medium on the pig!

When a pig is locked-out from a pipe, medium from the pipe may still be on the pig.

⇨ *Wear protective garments and protective gloves with hazardous or dangerous media.*

⇨ *Pay attention to the afterflow of residuals from the pipe or the pig valve.*

⚠ WARNING

Hazards due to incorrect pig use!

The incorrect use of the pig can create a hazard for the user and can damage the pipe system, for which PFEIFFER is then no longer responsible.

⇨ *The material selected for the parts of the pig that come into contact with the media must be suitable for the media, pressures and temperatures used.*

Health hazard caused by magnet in the pig

Magnets can influence the function of pacemakers and implanted defibrillators. Pacemakers could switch here to test mode and cause a sudden failure. A defibrillator could stop working.

1.3 Notes regarding possible property damage

NOTE

Damage to the pig due to unsuitable medium properties!

The pig is designed for a medium with certain properties. Other media can damage it.

⇨ *Only use a medium that meets the design criteria.*

Damage to the pig caused by mechanical effects!

Damage in the pipe system or incorrect positions of valves can damage the pig.

⇨ *Regular system maintenance is recommended.*

Damage to the pig due to unsuitable tools!

Unsuitable tools can damage the pig.

⇨ *Suitable tools are required to work on the pig, see chapter "12.1.2 Tools".*

Electronic devices can be damaged by pigs!

The integrated magnets mean the pig can damage or destroy sensitive electronic devices, cards with magnetic strips, etc.

⇨ *Do not place or store pigs close to sensitive electronic devices.*

⇨ *Do not place or store pigs close to magnetic cards, magnetic tapes or disks, etc.*

2 Markings on the device

2.1 Marking guidelines for TWIN 1 and TWIN 2 pigs

The TWIN 1 and TWIN 2 pigs generally have the following markings. The markings are cast in relief on the pig.

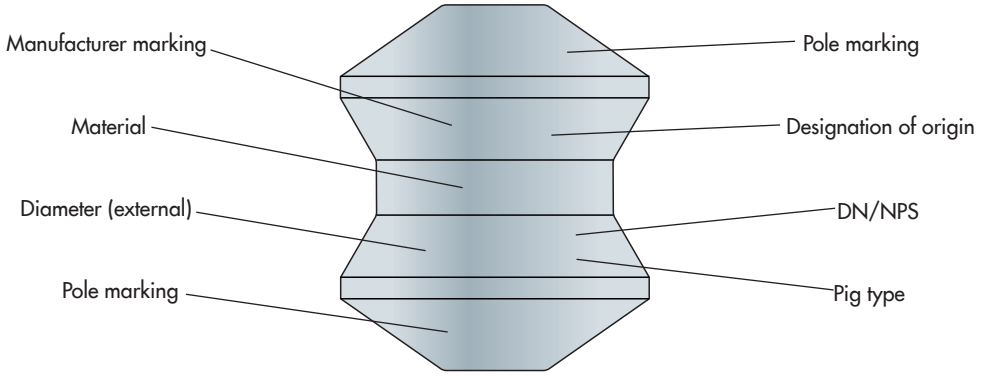

Figure 2-1: *Markings on TWIN 1 and TWIN 2 pigs*

Table 2-1: *Marking location and type of marking with the TWIN 1 and TWIN 2 pigs*

Item	For	Marking	Remark
1	Manufacturer marking	PFEIFFER	Address see chapter "15.3 Service"
2	Pig type	TWIN 1 or TWIN 2	e.g. TWIN 1 = Series 28m, see the PFEIFFER catalogue
3	Designation of origin	MADE IN GERMANY	Made in Germany
4	DN/NPS	DN (and number value)	Number value in [mm], e,g, DN 80/ number value in [inches], e.g. NPS3
5	Material	e.g. FKM	Material designation (optional)
6	Diameter (external)	e.g. ED 73.4 mm	Number value in [mm] (optional)
7	Pole marking	S or N	Position of the magnet pole (optional) or via pole meter

2.2 Marking guidelines for TWIN 3 pig

The TWIN 3 pig generally carries the following markings. The markings are engraved on the pig.

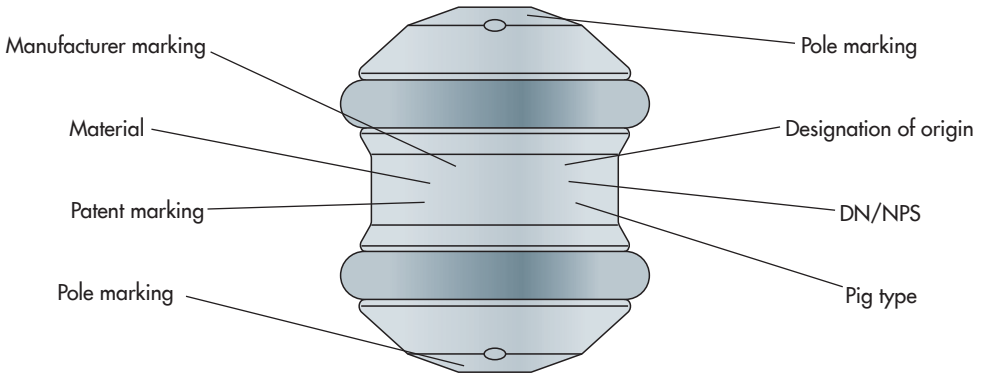

Figure 2-2: *Markings on TWIN 3 pig*

Table 2-2: *Marking location and type of marking with the TWIN 3 pigs*

Item	For	Marking	Remark
1	Manufacturer marking	PFEIFFER	Address see chapter “15.3 Service”
2	Pig type	TWIN 1 or TWIN 2	e.g. TWIN 1 = Series 28m, see the PFEIFFER catalogue
3	Designation of origin	MADE IN GERMANY	Made in Germany
4	DN/NPS	DN (and number value)	Number value in [mm], e,g, DN 80/ number value in [inches], e.g. NPS3
5	Material	e.g. RCH 1000	Material designation (optional)
6	Patent marking	e.g. PATENTED	(optional)
7	Pole marking	S or N	Position of the magnet pole (optional) or via pole meter

Info

Markings on the pig must be maintained, so it remains identifiable.

3 Design and principle of operation

Properties

- High cleaning power without additional rinsing processes
- Long run times
- Chemical resistance, also against aggressive media
- Even running of the pig, also in bends and valves
- Bidirectional running, i.e. the pig is symmetrical and therefore can be used for both running directions
- The pig can be detected by magnetic core for automated systems

These aforementioned requirements for pigs can only be met with a proven and special pig design:

- Two strong seals and centred midsection for problem-free bend run
- Seal diameter with approx. 4% excess compared with internal pipe diameter for high scraping performance
- Partial magnet with powder filling, so absolutely no danger of magnet discharge
- Special pigs for aggressive media made of highly-resistant materials, such as HDPE, PTFE

Versions

The different pig types can be divided into 2 large groups:

- Pigs produced as solid elastomer elements with two seals and a strong midsection. They have an excess of up to 4% with regard to the internal diameter of the pig pipe and are the best choice for most applications, both from a financial point of view and for cleaning effectiveness, service life and running behaviour.
- Pigs made of diverse special materials and in special designs, e.g.:
  - Multi-piece screwed
  - With swappable seals
  - Made of highly-resistant materials

Function and principle of operation

The pig completely fills the line cross-section and either moves simply with the product flow through the pipe or is pressed through the pipe with extra applied pressure.

Different variants are used according to the required use.

3.1 Variants

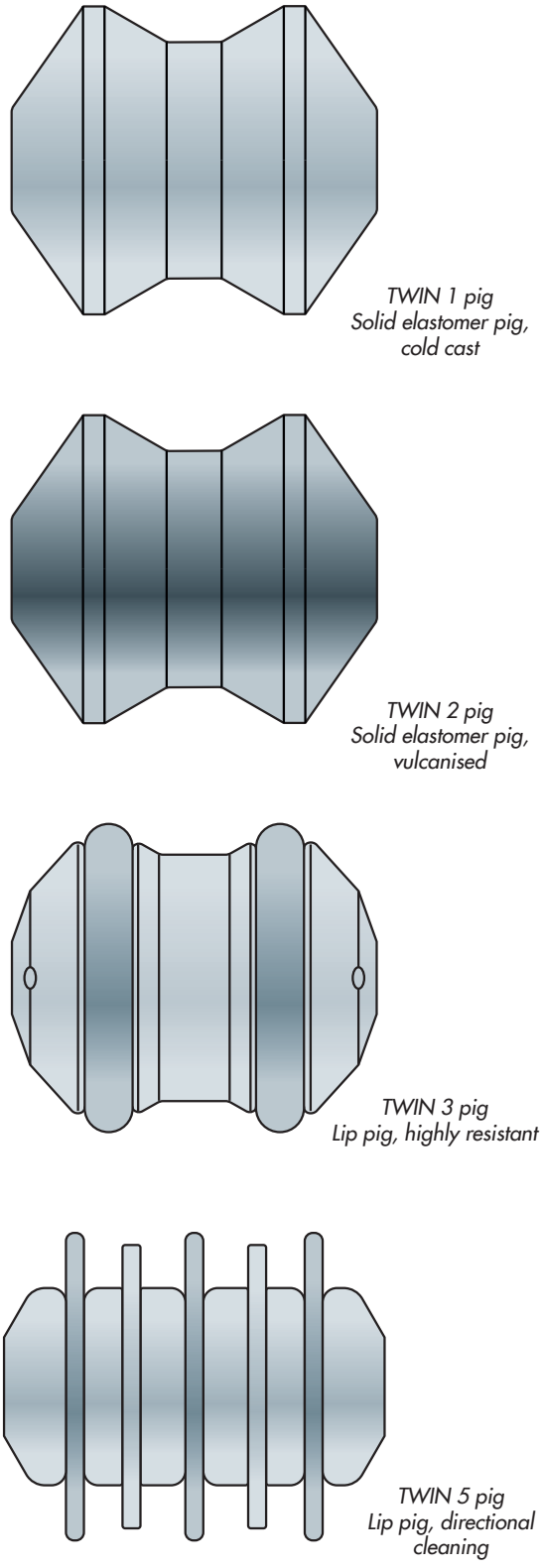

Figure 3-1: *Pig variants*

3.2 Technical data

The imprints on the pig provide information about the version, see chapter "2 Markings on the device".

Info

– Detailed information is available on the data sheet ▶ TB 28m.
– The documentation for special pigs BR 28m that are not described in this chapter can be requested from PFEIFFER.

3.3 Assembling the pigs

The pig variants have design differences so that they cannot be documented in one construction manual.

– Due to the design the **TWIN 1** and **TWIN 2** pigs do not require an assembly manual.
– The assembly of the **TWIN 3** pigs is described in chapter 3.3.2.
– The assembly of the **TWIN 5** pigs is described in chapter 3.3.3.

Before assembly

To assemble the pig, all parts must be prepared, e.g. the parts are carefully cleaned and placed on a soft mat (rubber mat or other).

Keep in mind that plastic parts are almost always very soft and very delicate, and the sealing lips in particular must not be damaged.

3.3.1 TWIN 1 and TWIN 2 pigs

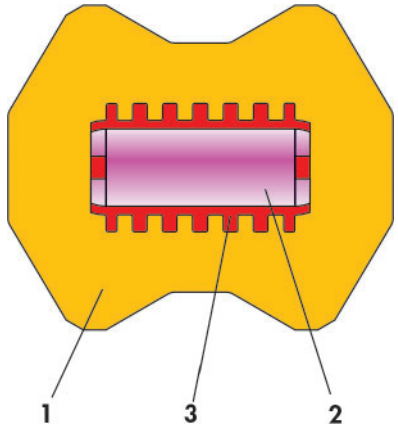

Figure 3-2: *Sectional view of the TWIN 1 and TWIN 2 pigs*

Table 3-1: *Parts list of the TWIN 1 and TWIN 2 pigs*

Item	Amount	Designation
1	1	Basic body
2	1	Magnet
3	1	Magnet encapsulation

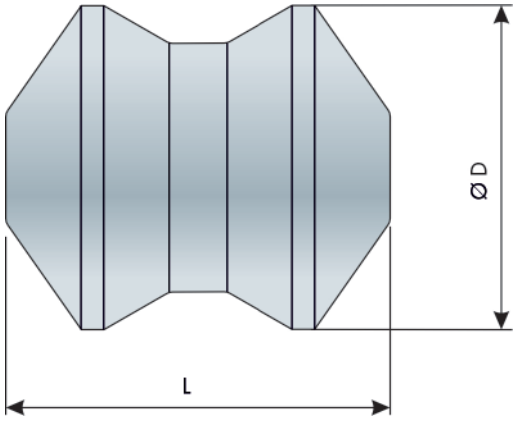

Figure 3-3: *Dimensional drawing of the TWIN 1 and TWIN 2 pigs*

Table 3-2: *Dimensions of the TWIN 3 and TWIN 2 pigs*

Nominal size		L	D
DN	NPS		
50	2	68	54.5
80	3	102	82.5
100	4	128	107.1
125	5	163	131.7
150	6	212	159.3
200	8	268	206.5

3.3.2 Assembly of the TWIN 3 pig

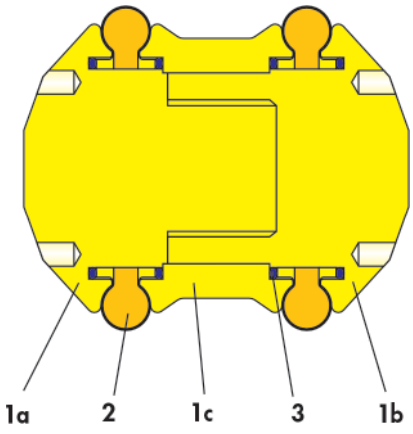

Figure 3-4: *Sectional view of the TWIN 3 pig*

Info

The position and arrangement of the individual parts shown in Figure 3-4 must be observed during assembly.

Table 3-3: *TWIN 3 pig parts list*

Item	Amount	Designation
1a	1	Basic body, complete with magnet
1b		
1c		
2	2	Sealing lip
3	4	O-ring

⇨ Insert the first O-ring (3) into each of the end caps of the basic body (1a and 1b).

⇨ Insert sealing lip (2) into each of the end caps of the basic body and push up to the O-ring.

⇨ Insert the second O-ring (3) into each of the end caps of the basic body and push up to the sealing lip.

⇨ Put the pre-mounted end caps (1a and 1b) together with middle section of the basic body and screw tight by hand.

⇨ Screw basic body together with special tool and torque spanner.

NOTE

⇨ *Consider tolerances and tightening torques when assembling, see figure 3-5 and table 3-4.*

⇨ *Do not not strip plastic threads by tightening too much.*

⇨ *Check dimensions and tighten again as required.*

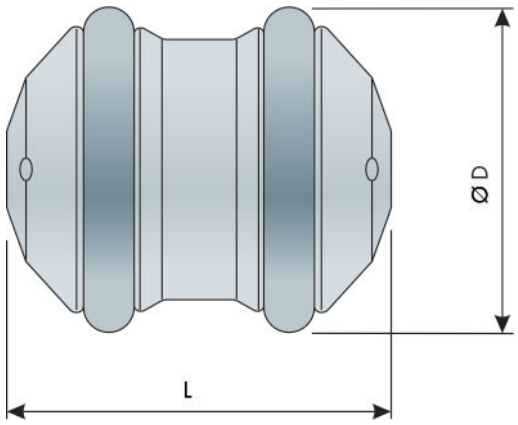

Figure 3-5: *Dimensional drawing of the TWIN 3 pig*

Table 3-4: *Dimensions and tightening torques of the TWIN 3 pig*

Nominal size DN	Nominal size NPS	L ±1	D ±0.5	Tightening torque
50	2	67	56.5	7.5 Nm
80	3	100.5	85.5	22 Nm
100	4	126	110	40 Nm
125	5	163	135.5	47 Nm
150	6	217	164	60 Nm
200	8	268	215	60 Nm

3.3.3 Assembly of the TWIN 5 pig

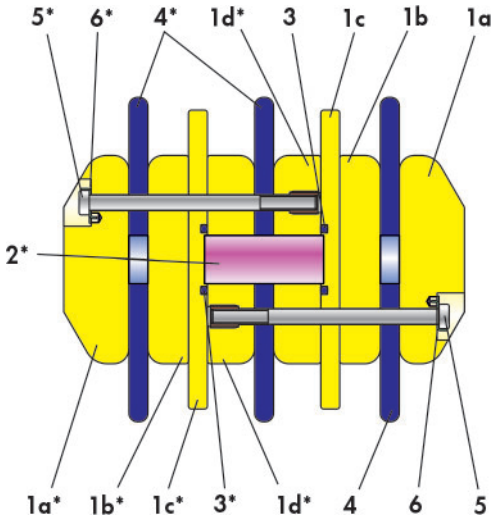

Figure 3-6: *Sectional view of the TWIN 3 pig*

Info

The position and arrangement of the individual parts shown in Figure 3-6 must be observed during assembly.

Table 3-5: *TWIN 3 pig parts list*

Item	Amount	Designation
1a	1	Basic body, complete with magnet
1b		
1c		
1d		
2	1	Magnet
3	2	O-ring
4	3	Sealing lip
5	6	Screw
6	6	Locking plate

⇨ Mount pig from inside to outside, see figure 3-6. * For the required purposes begin with the marked components.

NOTE

Incorrect assembly will damage the pigs!

⇨ *Do not mix up the basic body parts that are very similar or do not install them reversed/on the wrong side.*

⇨ *Do not mix up the basic body parts or assemble them reversed/on the wrong side (observe radii).*

Info

⇨ *With pigs with nominal sizes DN 50 and DN 80 the basic body parts (1b, 1c and 1d) are not produced 3-piece but rather from one part.*

⇨ Tighten all screws (5) with a torque spanner.

⇨ Place locking plates (6) on hexagon.

NOTE

⇨ *Consider tolerances and tightening torques when assembling, see figure 3-7 and table 3-6.*

⇨ *Check dimensions and tighten again as required.*

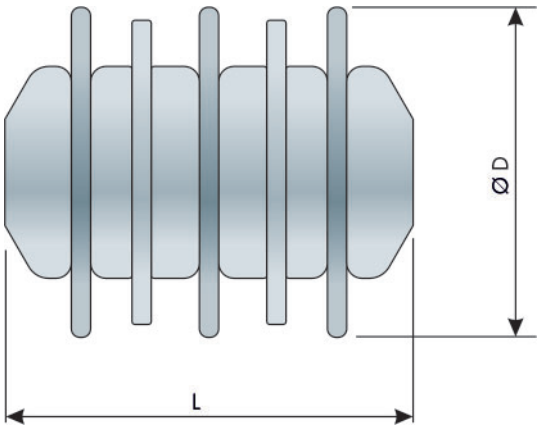

Figure 3-7: *Dimensional drawing of the TWIN 3 pig*

Table 3-6: *Dimensions and tightening torques of the TWIN 3 pig*

Nominal size		L	D	Wear limit	Tightening torque
DN	NPS				
50	2	68	58	56	5 Nm
80	3	102	88	86	10 Nm
100	4	128	113	111	15 Nm
150	6	212	171	168	15 Nm
200	8	On request			

4 Shipment and on-site transport

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

NOTE

Damage to the pig due to improper transport and storage!

⇨ *Pigs must be handled, transported and stored with care.*

4.1 Accepting delivery

Perform the following steps after receiving the goods:

⇨ Check the scope of supply. Compare the delivered goods with the delivery note.

⇨ Check the delivery for transport damage. Report transport damage to PFEIFFER and the transport company (see the delivery note).

4.2 Unpacking pigs

Carry out the following steps:

⇨ Only unpack pigs immediately before locking into the pipes, and if necessary follow separate instructions in the product description.

Info

Do not leave Vulcocell pigs in film. These pigs should be stored unpacked in a clean environment.

⇨ Dispose of the packaging properly.

4.3 Transporting and lifting pigs

The pigs generally weigh less than 10 kg. They can therefore be easily lifted and carried. Special aids are not required.

⇨ The packaging should protect the pig from damage.

⇨ Comply with the transport conditions.

Transport conditions

⇨ Protect the pig from external influences, such as impacts.

⇨ Protect the pig from moisture and dirt.

4.4 Storing pigs

NOTE

Pigs can be damaged by improper storage!

⇨ *Comply with the storage conditions*

⇨ *Prevent longer storage (TWIN 2 pig)*

⇨ *In the case of deviating storage conditions and a longer storage period, contact PFEIFFER.*

NOTE

Electronic devices can be damaged by pigs!

The integrated magnets mean the pig can damage or destroy sensitive electronic devices, cards with magnetic strips, etc.

⇨ *Do not place or store pigs close to sensitive electronic devices.*

⇨ *Do not place or store pigs close to magnetic cards, magnetic tapes or disks, etc.*

Info

PFEIFFER recommends checking the pig and the storage conditions regularly with longer storage periods.

⇨ With storage prior to use, the pig should normally be stored in a closed room where it is protected against harmful influences such as impacts, dirt or moisture. A room temperature of 25°C ±15°C is recommended.

⇨ Do not stack pigs.

⇨ Prevent condensation in damp rooms. Use a desiccant or heater.

⇨ The pig must be stored in its protective packaging.

⇨ Do not place any objects on the pig.

⇨ The pig must not be stored airtight (TWIN 2 pig).

5 Start-up, locking-in/locking-out and operation

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

The following instructions apply additionally for pigs. Observe chapter "4.3 Transporting and lifting the pigs" for transport to the installation site.

5.1 Start-up

Pigs must be handled, transported and stored with care, see chapter "4 Delivery and on-site transport".

Perform the following steps after receiving the goods:

⇨ Check the scope of supply. Compare the delivered goods with the delivery note.

⇨ Check the delivery for transport damage. Report transport damage to PFEIFFER and the transport company (see the delivery note).

Ensure the following conditions prior to locking-in:

⇨ Transport the pigs in their original packaging to the locking-in point and only unpack them there.

⇨ Check pig for transport damage. Do not lock-in damaged pigs.

⇨ Lock in clean pigs.

⇨ Only use pigs that comply with the system conditions (nominal size and nominal pressure of the pipe, medium temperature, etc.). For details about the marking, see chapter "2 Markings on the device".

NOTE

Damage due to exceeding the limits of use!

Exceeding the limits of use can cause damage in the pig pipe system.

⇨ *Pigs whose permissible pressure/temperature range is not sufficient for the operating conditions may not be installed.*

⇨ *The permissible limits of use are listed on the data sheet, see ▶ TB 28m.*

⇨ *The permissible range is defined in chapter "1 Safety instructions and safety measures".*

5.2 Locking-in and locking-out

As soon as the commissioning work is complete (see chapter 5.1), the pig is ready for operation.

WARNING

Danger of burning due to hot or cold components and pipe!

Lock-in valve and pipes can become very hot or very cold during operation and cause burns upon contact.

⇨ *Let the components and pipes cool down or warm up.*

⇨ *Wear protective garments and protective gloves.*

Operator level

⇨ The operator level for the pig's lock-in and lock-out is the front view on all operating elements of the lock-in valve including the attachments from the perspective of operating personnel.

The plant operator must ensure that operating personnel can carry out all required work safely and can do it with easy access from the operator level.

Lock-in and lock-out process

⇨ Before locking-in the pig, clean the lock-in valve and the connected pipe of any contamination, in particular solid foreign matter.

⇨ The lock-in/lock-out process can be performed with the BR 28s "Control Unit" of a conventional pipe system using manually operated ball valves.

⇨ Operation of a single pig system and a double pig system differs according to the general operating principle.

5.3 Example operation

5.3.1 Pig change with single pig system

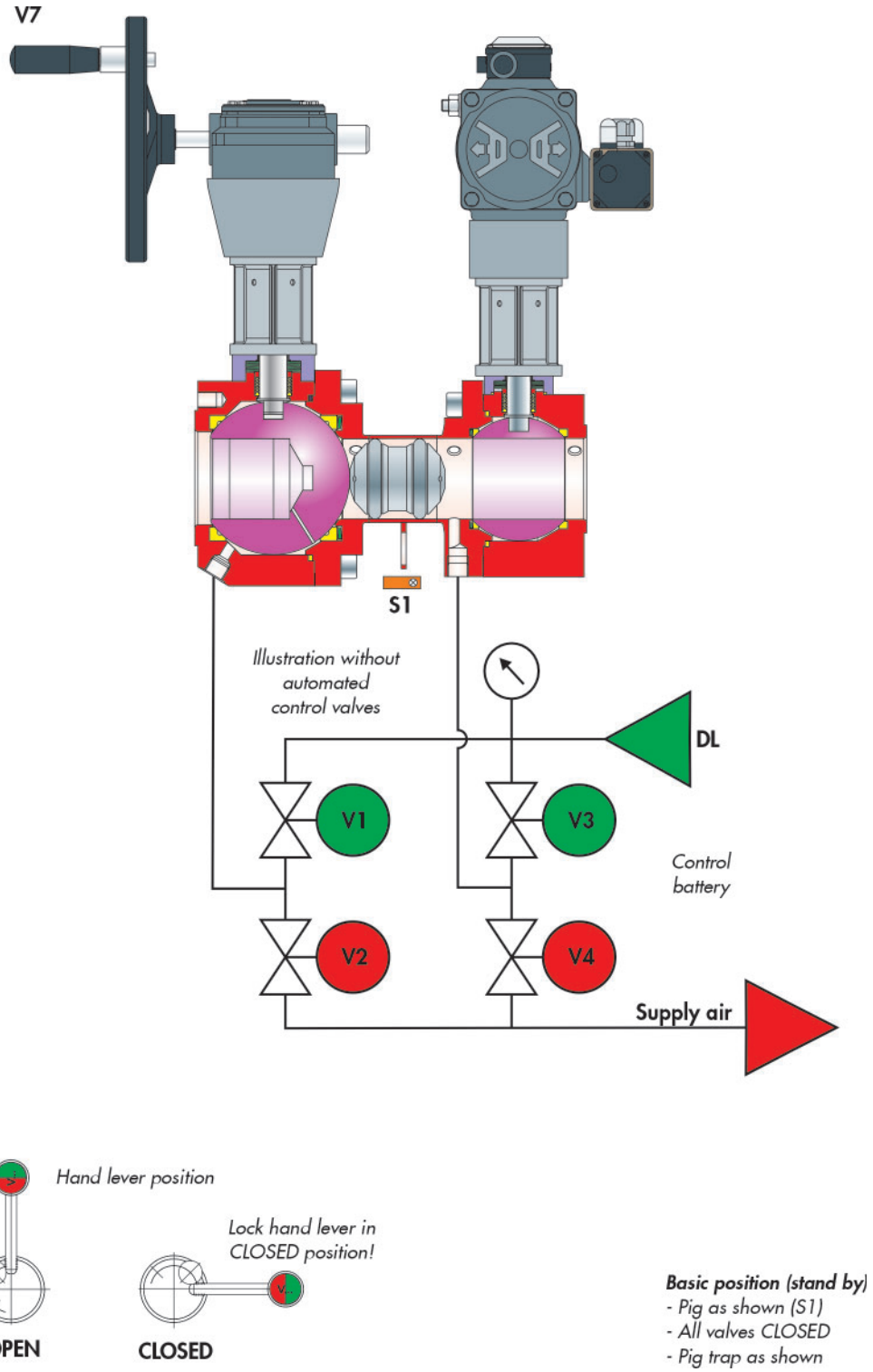

Figure 5-1: *Pig launch station, single pig system*

5.3.1.1 Pig output

– Basic position
⇨ Open V4 – wait 5 seconds
⇨ Close V4
– Station is vented
⇨ Turn V7 pig trap in
⇨ Open V2
⇨ Open V3
– Pig runs into trap, LED S1 goes off
⇨ Close V2+V3
⇨ Open V4 – wait 5 seconds
⇨ Close V4
– Station is vented
⇨ Turn V7 pig trap out
⇨ Open V1 slowly
⇨ Hold running out pig firmly
⇨ Close V1

5.3.1.2 Pig input

– V7 pig trap is on the outside
– There is no pig in the station – LED S1 are off
⇨ Open V2
⇨ Manually push pig into trap
⇨ Close V2
⇨ Open V4
⇨ Turn V7 pig trap in
⇨ Open V1
– Pig runs up to ball valve, LED S1 lights
⇨ Close V1+V4
⇨ Open V2 – wait 5 seconds
⇨ Close V2
– Station is vented
⇨ Turn V7 pig trap completely out
– Pig in basic position
– Basic position reached
  – Pig as shown (S1)
  – All valves CLOSED
  – Pig trap as shown

5.3.2 Pig change with double pig system

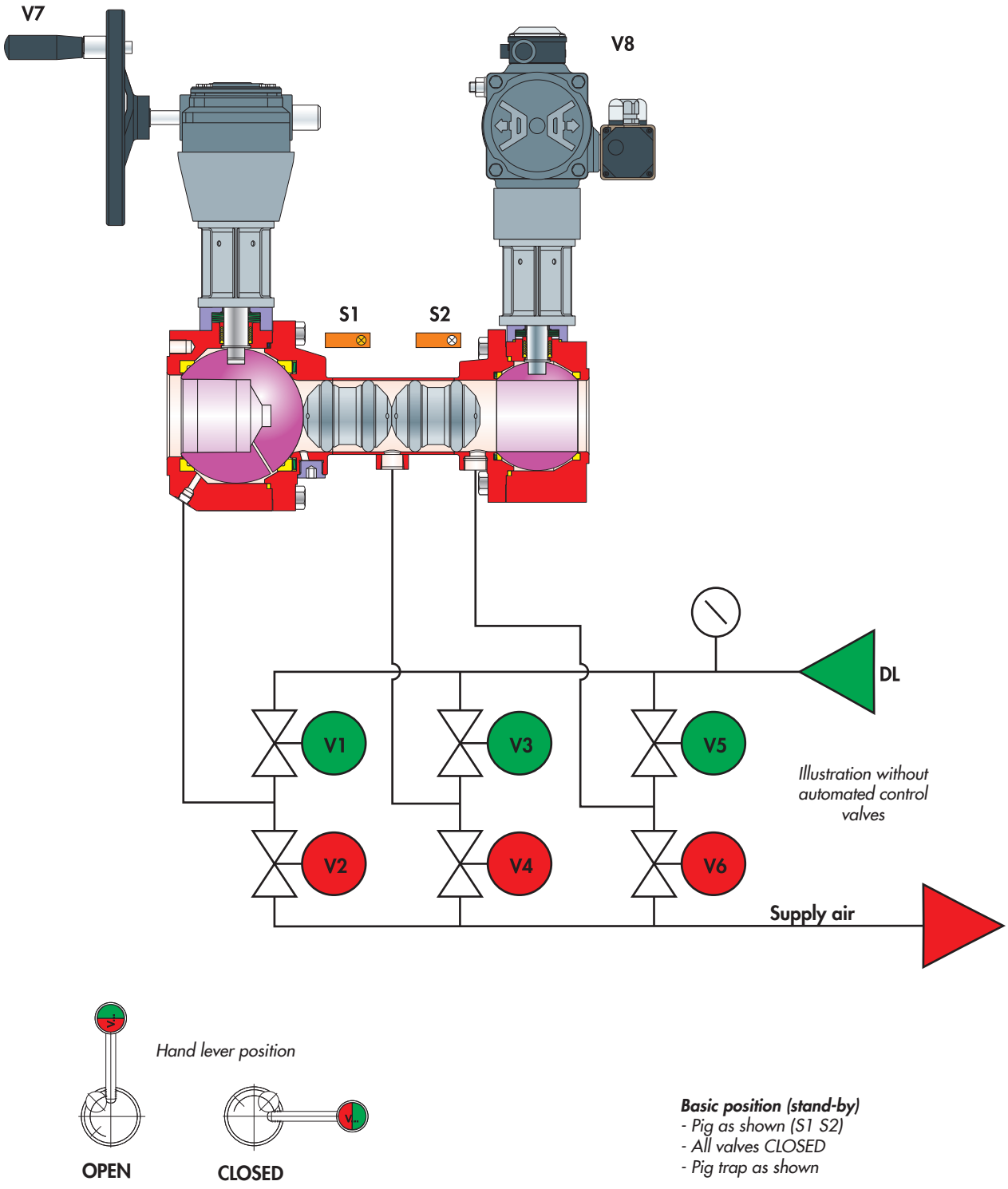

Figure 5-2: *Pig launch station, double pig system*

5.3.2.1 Pig output

– Basic position
⇨ Open V4+V6 – wait 5 seconds
⇨ Close V4+V6
– Station is vented
⇨ Turn pig trap in
⇨ Open V2
⇨ Open V3
⇨ Pig 1 runs into V7 trap, LED S1 goes off
⇨ Close V2+V3
⇨ Open V4 – wait 5 seconds
⇨ Close V4
– Station is vented
⇨ Turn pig trap out
⇨ Open V1 slowly
⇨ Hold running out pig 1 firmly
⇨ Close V1
⇨ Turn pig trap in
⇨ Open V2
⇨ Open V5
– Pig 2 runs into V7 trap, LED S2 goes off
⇨ Close V2+V5
⇨ Open V6
– Station is vented
⇨ Turn pig trap out
⇨ Open V1 slowly
⇨ Hold running out pig 2 firmly
⇨ Close V1

5.3.2.2 Pig input

– V7 pig trap is on the outside
– V6 is open
– V8 is closed
– There is no pig in the station – LED S1+S2 are off
⇨ Open V2
⇨ Manually push pig 2 into V7 trap
⇨ Close V2
⇨ Turn pig trap in
⇨ Open V1
– Pig 2 runs up to V8 ball valve, LED S2 lights
⇨ Close V1+V6
⇨ Open V2
– Station is vented
⇨ Turn V7 pig trap out
⇨ Manually push pig 1 into trap
⇨ Close V2
⇨ Turn V7 pig trap in
⇨ Open V4
⇨ Open V1
– Pig 1 runs up to pig 2, LED S1 lights
⇨ Close V1+V4
⇨ Open V2
– Station is vented
⇨ Turn V7 pig trap out
– Pigs in basic position
– Basic position reached
  – Pig as shown (S1 S2)
  – All valves CLOSED
  – Pig trap as shown

6 Malfunction

When rectifying the malfunctions, chapter “1 Safety instructions and safety measures” must be observed.

6.1 Detecting and rectifying errors

Type of fault	Possible cause	Measure
Increased residual medium in the pig pipes	Sealing lips with pig TWIN 1 or TWIN 2 worn or damaged	Repairs are not possible with TWIN 1 and TWIN 2 pigs The pigs must be replaced.
	Sealing lips with pig TWIN 3 or TWIN 5 worn or damaged	Repairs are necessary Replace sealing lips Request spare parts from PFEIFFER, see chapter “12.2 Spare parts”. For the required repair instructions, see chapter “9 Repairs”
Damage on sealing lips (scratches, cracks)	Mechanical damage caused by solid matter in the pipes	Pipes rinsing, maintenance or camera inspection by PFEIFFER if required.
	Mechanical damage caused by incorrect position of valves or flange connections	Maintenance including camera inspection of the complete pig system.
Pig does not run into end position	Supply air/exhaust air to launch or receiver station not tight or blocked	Check of the supply air/exhaust air lines, including valves for supply air/exhaust air
Pig breaks, cracks	Pig TWIN 1 and TWIN 2, spallings on one side	Adjust supply air/exhaust air again
	Pig TWIN 3 breaks in the middle	

Info

– In the case of faults that are not listed in the table, contact the After Sales Service at PFEIFFER.

– Spare parts must be ordered indicating all the data according to the pig marking. Only original parts from PFEIFFER may be installed.

– If it is determined that the pig materials are not sufficiently resistant for the medium, pig and components made of a suitable material must be selected.

6.2 Carrying out emergency measures

– Diagnose faults, see chapter “6.1 Detecting and rectifying errors”.

– Rectify the fault that can be fixed as indicated in the instructions provided in this installation and operating manual. For faults that cannot be fixed, contact the After Sales Service at PFEIFFER.

7 Servicing

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

⚠ WARNING

Danger of injury due to residual medium on the pig!
There can be residual medium on the pig, which, depending on the medium properties, can cause injuries (e.g. scalding, chemical burns).

⇨ *Wear protective garments, protective gloves and eye protection.*

NOTE

Damage to the pig due to excessively high or low tightening torques!
The basic body of the TWIN 3 and TWIN 5 pigs must be tightened with specific tightening torques. Tightening a basic body too much can damage it. If not tightened enough it can loosen and fall apart in the pipes.

⇨ *Observe the tightening torques, see table 12-1 and table 12-2 in chapter "12.1.1 Tightening torques".*

Damage to the pig-enabled ball valve due to unsuitable tools!

⇨ *Only use tools approved by PFEIFFER, see chapter "12.1.3 Tools".*

Damage to the pig-enabled ball valve due to unsuitable lubricants!

⇨ *Only use lubricants approved by PFEIFFER, see chapter "12.1.2 Lubricants".*

Info

The pig was checked by PFEIFFER before delivery.
– *Certain test results certified by PFEIFFER are no longer valid when disassembling the pig.*
– *If maintenance and repair work is performed without approval from the After Sales Service of PFEIFFER, the product guarantee will be voided.*
– *Only use original parts from PFEIFFER as spare parts that correspond to the original specification.*
– *Wear parts are not covered by the warranty.*

7.1 Periodic tests

⇨ Depending on the conditions of use, the pig must be checked at defined intervals in order to take remedial measures before possible malfunctions. The plant operator is responsible for preparing a suitable test plan

⇨ PFEIFFER recommends the following checks:

Test	Measures in the case of a negative test result
Diameter with TWIN 1 and TWIN 2 pig	Contact the After Sales Service at PFEIFFER for repairs, see chapter "9 Repairs".
Length and diameter with TWIN 3 and TWIN 5 pig	

7.2 Maintenance work

⇨ The pig must be prepared before all maintenance work, see chapter 6 "Malfunction".

7.2.1 Maintenance with TWIN 1 and TWIN 2 pigs

Due to the design the TWIN 1 and TWIN 2 pigs do not require maintenance.

Signs of wear do, however, appear with use, e.g. external diameter is reduced.

⇨ Perform regular visual checks of the pig.

Worn pigs cannot be repaired and should be replaced in good time.

7.2.2 Maintenance on TWIN 3 pig

The design of the pig means the usual signs of wear with conventional pigs do not appear.

The PTFE cover of the sealing lips is applied very thin-walled. Wear must be checked with regular pig checks, before the cover is worked through.

Info

These checks can only be performed by personnel that have been instructed accordingly.

⇨ Check the condition of the sealing lips.

⇨ Remove sealing lips (2) as described in chapter 9.2. Check sealing lips as well as all plastic parts for damage and if in doubt replace them.

7.2.3 Maintenance on TWIN 5 pig

The TWIN 5 lip pig has swappable sealing lips, which are provided in different elastomers, depending on the version.

⇨ Check sealing lips (4) regularly for wear and damage.

Info

These checks can only be performed by personnel that have been instructed accordingly.

⇨ Replace sealing lips at the latest when the wear limit is reached or there is visible damage, e.g. breaks.

7.3 Ordering spare parts and consumables

Information about spare parts, lubricants and tools can be received from the After Sales Service at PFEIFFER.

Spare parts

Information on spare parts can be found in chapter "12.2 Spare parts".

8 Decommissioning and removal

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

⚠ WARNING

Danger of burning due to hot or cold components and pipe!
Lock-in valve and pipes can become very hot or very cold during operation and cause burns upon contact.
⇨ *Let the components and pipes cool down or warm up.*
⇨ *Wear protective garments and protective gloves.*

Danger of crushing due to moving actuator- and switching shafts!
⇨ *Do not reach into the bracket of the lock-in valve as long as the pneumatic power is connected to the actuator.*
⇨ *Do not allow the jamming of objects in the bracket to hinder the operation of the actuator- and switching shaft of the lock-in valve.*
⇨ *If the actuator- and switching shaft are blocked (e.g. due to "seizure" if not actuated for a long period of time"), release the residual energy of an optional actuator (spring tension) before releasing the blockage, see the corresponding actuator documentation.*

Danger of injury due to escaping exhaust air!
During operation, when regulating or when opening and closing the lock-in valve, exhaust air can escape, for example from the optional actuator.
⇨ *Wear eye protection when working near the valves and hearing protection as required.*

To decommission the pig for maintenance and repair work or for disassembly, perform the following steps:

⇨ Let the pig cool down or warm up.

⇨ Remove the pig from the lock-in valve.

⚠ WARNING

If a used pig is sent to PFEIFFER for service:
⇨ *Decontaminate the pig properly beforehand.*

⇨ When returning a used pig, include the safety data sheet for the medium as well as confirmation of decontamination of the pig. Otherwise the pig will not be accepted.

Tip
PFEIFFER recommends documenting the contamination data in the form FM 8.7-6 "Declaration regarding the contamination of PFEIFFER valves and components".

9 Repairs

If the pig no longer works properly or if it does not work at all, it is defective and must be repaired or replaced.

NOTE

Damage to the pig due to improper maintenance and repair!

⇨ *Do not perform maintenance and repair work on your own.*

⇨ *Contact the After Sales Service at PFEIFFER for maintenance and repair work.*

In special cases, certain maintenance and repair work may be performed.

The work described in this chapter may only be performed by specialist personnel qualified to perform the corresponding task.

The following instructions apply additionally for pigs. For decommissioning and disassembly, also observe chapter "8 Decommissioning and disassembly".

9.1 Signs of wear on TWIN 1 and TWIN 2 pig

Worn pigs cannot be repaired and should be replaced in good time.

9.2 Signs of wear on TWIN 3 pig

Info

⇨ *Only use original PFEIFFER spare parts.*

⇨ *Always replace sealing lips (2) in pairs.*

⇨ *Insert new O-rings (3).*

In addition to 2 new sealing lips the spare parts set also includes the O-rings in the corresponding material.

⇨ Clean pig.

⇨ Check the condition of the sealing lips (2).

⇨ With worn or damaged sealing lips (2), always replace the sealing lips (2) and O-rings (3).

⇨ Place one of the special tools into the vice.

⇨ Place the pig in the tool.

⇨ Unscrew the pig anticlockwise and disassemble into its individual parts.

⇨ Do **not** disassemble the magnet fixed into the end cap (1a).

⇨ Clean the individual parts and check for damage.

⇨ Replace sealing lips (2) and O-rings with new parts.

⇨ Assemble the pig as described in chapter 3.3.2.

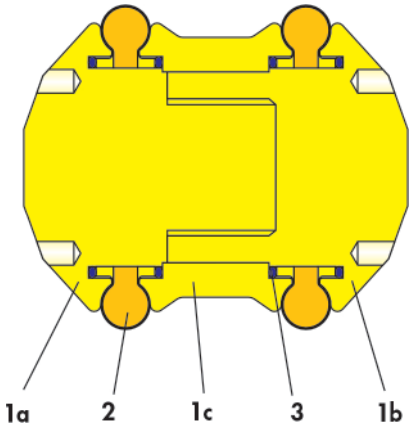

Figure 9-1: *Sectional view of the TWIN 3 pig*

Table 9-1: *TWIN 3 pig parts list*

Item	Amount	Designation
1a	1	Basic body, complete with magnet
1b		
1c		
2	2	Sealing lip
3	4	O-ring

9.3 Signs of wear on TWIN 5 pig

Info

⇨ *Only use original PFEIFFER spare parts.*

⇨ *Always replace all sealing lips (4).*

⇨ *Insert new O-rings (3) and locking plates (6).*

The spare parts set for the pig includes all required parts.

⇨ Clean pig.

⇨ Check the condition of the sealing lips (4).

Info

If the external diameter is below the wear limit or the sealing lips are damaged, they must be replaced.

⇨ Loosen locking plates (6) and screw out screws (5).

⇨ Disassemble pig into individual parts.

Info

With pigs with nominal sizes DN 50 and DN 80, the body parts (1b, 1c and 1d) are not produced 3-piece but rather from one part.

⇨ Clean the individual parts and check for damage.

⇨ Replace sealing lips (4), O-rings (3) and locking plates (6) with new parts.

⇨ Assemble the pig as described in chapter 3.3.3.

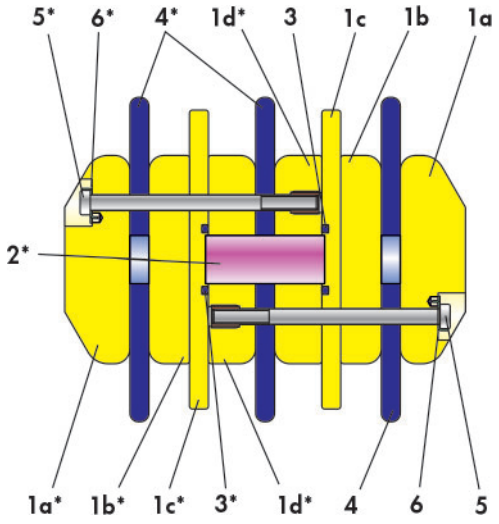

Figure 9-2: *Sectional view of the TWIN 3 pig*

Table 9-2: *TWIN 3 pig parts list*

Item	Amount	Designation
1a	1	Basic body, complete with magnet
1b		
1c		
1d		
2	1	Magnet
3	2	O-ring
4	3	Sealing lip
5	6	Screw
6	6	Locking plate

9.4 Additional repairs

⇨ In the case of additional major damage, it is recommended to have repairs performed by PFEIFFER.

9.5 Sending pigs to PFEIFFER

Defective pigs can be sent to PFEIFFER for repair.

Proceed as follows to send pigs:

⚠ WARNING

Danger due to a contaminated pig!

⇨ *When returning a used pig to PFEIFFER for service, decontaminate it properly beforehand.*

⇨ *When returning a used pig, include the safety data sheet for the medium as well as confirmation of decontamination of the pig. Otherwise the pig will not be accepted.*

Tip

PFEIFFER recommends documenting the contamination data in the form FM 8.7-6 "Declaration regarding the contamination of PFEIFFER valves and components".

⇨ Include the following information for returns:

- Manufacturer number
- BR 28m pig, TWIN...
- Nominal size
- Material choice
- Medium (designation and consistency)
- Medium pressure and temperature
- Miscellaneous:
- Completed declaration regarding contamination. This form is available at ▶ www.pfeiffer-armaturen.com.

10 Disposal

⇨ For disposal, observe the local, national and international regulations.

⇨ Do not dispose of old components, lubricant and hazardous materials with domestic waste.

11 Annex

11.1 Tightening torques and tools

11.1.1 Tightening torques

11.1.1.1 TWIN 3 pig

For the connection of the basic body, these are tightened in a criss-cross pattern with the following tightening torques.

Table 11-1: *Basic body tightening torques*

Nominal size		Basic body (1a and 1b)	Tightening torque
DN	NPS		
50	2	M24x1.5	7.5 Nm
80	3	M36x2.5	22 Nm
100	4	M48x2.5	40 Nm
125	5	M60x2.5	47 Nm
150	6	M64x2.5	60 Nm
200	8	M72x2.5	60 Nm

11.1.1.2 TWIN 5 pig

For the assembly of the pig, the screw connections are tightened in a criss-cross pattern with the tightening torques indicated below.

Table 11-2: *Screws tightening torque*

Nominal size		Amount	Screws (5)	Tightening torque
DN	NPS			
50	2	6	M4 x 40	5 Nm
80	3	6	M6 x 70	10 Nm
100	4	6	M6 x 80	15 Nm
150	6	6	M8 x 120	15 Nm
200	8	On request		

11.1.2 Tools

Suitable tools are required to work on the pigs. Unsuitable tools can cause damage.

A special tool, which can be purchased from PFEIFFER, is required for assembling the TWIN 3 pig.

Table 11-3: *Special tools*

Nominal size		Special tool
DN	NPS	
50	2	k28m0001
80	3	k28m0002
100	4	k28m0003
150	6	k28m0010
200	8	On request

11.2 Spare parts

Due to the design the TWIN 1 and TWIN 2 pigs do not require spare parts. The pig will be replaced as required.

For the TWIN 3 and TWIN 5 pigs PFEIFFER recommends spare part sets, see chapter:

– "11.2.1 TWIN 3 pig spare parts" on page 11-2.
– "11.2.2 TWIN 5 pig spare parts" on page 11-4.

11.2.1 TWIN 3 pig spare parts

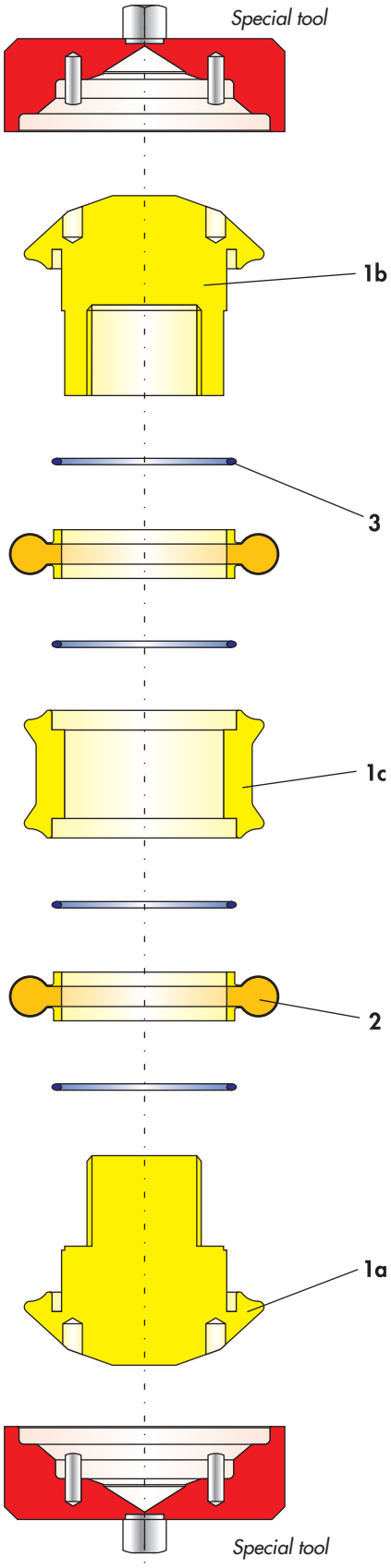

Figure 11-1: *Exploded view of the TWIN 3 pig*

Table 11-4: *Recommended TWIN 3 pig spare parts*

Item	Amount	Designation	Material	Spare parts set
1a	1	Basic body, complete with magnet	PE-UHMW PVDF	
1b				
1c				
2	2	Sealing lip	PE-UHMW TFM	•
3	4	O-ring	FKM FFKM EPDM etc.	•

11.2.2 TWIN 5 pig spare parts

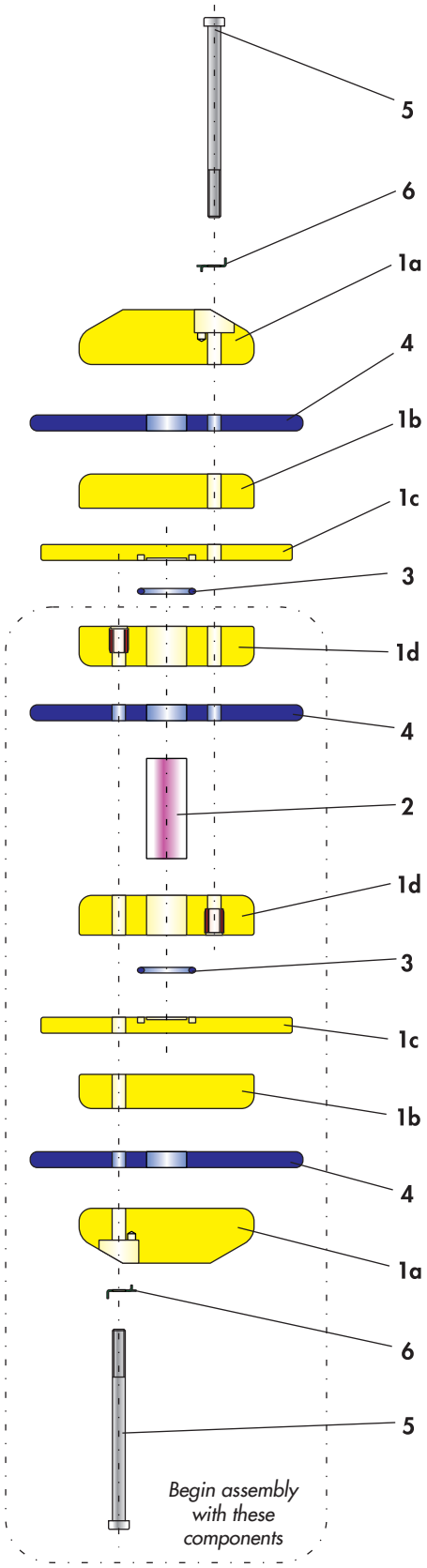

Figure 11-2: *Exploded view of the TWIN 5 pig*

Table 11-5: *Recommended TWIN 5 pig spare parts*

Item	Amount	Designation	Material	E-part
1a	1	Complete basic body	PEEK PVDF PTFE	
1b				
1c				
1d				
2	1	Magnet	Ferrite	
3	2	O-ring	Elastomer	•
4	3	Sealing lip	Elastomer	•
5	6	Screw	A2-70	
6	6	Locking plate	1.4305	•

11.3 Service

For maintenance and repair work as well as malfunctions or defects, contact the After Sales Service at PFEIFFER for support.

E-mail

The After Sales Service can be reached at the e-mail address: sales-pfeiffer-de@samsongroup.com.

Necessary data

Provide the following information in the case of questions and for troubleshooting:

- Manufacturer number
- BR 28m pig, TWIN...
- Nominal size
- Material choice
- Medium (designation and consistency)
- Medium pressure and temperature
- Miscellaneous:
- Completed declaration regarding contamination. This form is available at ▶ www.pfeiffer-armaturen.com.

Further information

The indicated data sheets and further information are available, also in English, at the following address:

PFEIFFER Chemie-Armaturenbau GmbH
Hooghe Weg 41 • 47906 Kempen
Phone: 02152 / 2005-0 • Fax: 02152 / 1580
E-mail: sales-pfeiffer-de@samsongroup.com
Internet: www.pfeiffer-armaturen.com

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