Straight-Tube Heat Exchanger baelz 111 / baelz 112

BA_111_00_DEF_MJ_0419

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1. SAFETY

Read these operating instructions, in particular the following safety instructions, carefully before installation and operation.

Beware
Potentially hazardous situation that could result in minor injury.
Also indicates a hazard that may result in property damage.

Caution
Potentially harmful situation in which the product or an object in its vicinity may be damaged.

Danger
Imminent danger of death or serious injury.

Warning
Potentially hazardous situation that may result in death or serious injury.

Tip: Application instructions and other useful information.

Info: Informative explanations.

1.1 Intended use

The straight tube heat exchanger baelz 111 / baelz 112 is used in warm water heating systems.
To ensure proper use, make sure that the above type designation corresponds to the name plate on the heat exchanger before starting any measures. The technical data of the heat exchanger and the permissible values for operating pressure and operating temperature apply as specified on the name plate.
Any use for tasks deviating from the above-mentioned intended use as well as operation under other than the permissible pressure or temperature conditions is deemed to be improper use. The operator then bears responsibility for risk to personnel and equipment as well as to other material assets in case of improper use!
Intended use also includes compliance with accident prevention and DIN VDE regulations as well as safe working practices for all measures described in these operating instructions, taking into account the usual technical regulations.

1.2 Instructions for the operator

Always keep the operating instructions available at the place where the heat exchanger is used!
During installation, operation and maintenance, observe the applicable occupational safety, accident prevention and DIN VDE regulations. If necessary, observe additional regional, local or internal safety regulations.
Make sure that every person entrusted with one of the measures described in these operating instructions has read and understood these instructions.

1.3 Personnel

Only qualified personnel may work on this heat exchanger or in its vicinity. Qualified persons are deemed to be persons who are familiar with the installation, assembly, commissioning and operation or maintenance of the heat exchangers and have the appropriate qualifications for their job. Necessary or prescribed qualifications include, but are not limited to:

- Safety-relevant instruction or training in this field and obligation to comply with regional and internal safety technology standards.
- Training or instruction in the care and use of appropriate safety and work protection equipment in accordance with safety technology standards.
- First aid training.

Work in a safe manner and avoid any operation that would endanger the safety of persons or damage the heat transfer station or other property in any way.

1.4 Before starting work

Before carrying out any work, check whether the types specified here correspond to the information on the name plate of the heat exchanger: **baelz 111 / baelz 112**

1.5 During operation

Safe operation is only possible if transport, storage, assembly, operation and maintenance is carried out in a safe, proper and professional manner.

1.5.1 Transport, installation and assembly

Observe the general installation and safety regulations for heating, ventilation, air conditioning and piping systems. Use tools only for their intended purpose. Wear the required personal and other protective equipment.

1.5.2 Maintenance and repair

Ensure that qualified personnel take the heat exchanger out of operation before carrying out maintenance or repair work. As a rule, work must only be carried out on heat exchangers when they are not under pressure.
For maintenance and cleaning procedures, see chapter 6.
Immediately after completion of maintenance work, all safety and protective devices must be refitted or put into operation.
For the recommissioning procedure, see chapter 5.

1.5.3 Hazard prevention

Components of the heat exchanger which may become hot or cold must be protected against contact. Use warning signs to indicate possible dangers, e.g. caused by hot or cold surfaces or operating errors.

1.6 Working environment

Note the specifications for the working environment in the technical data.

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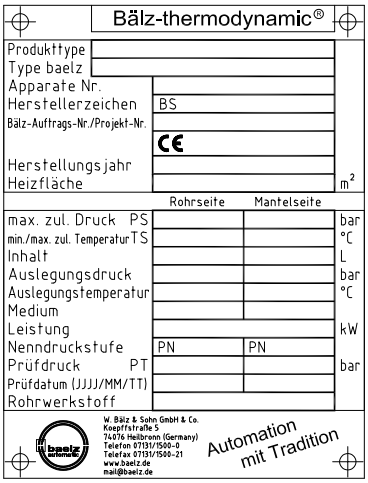
2. PRODUCT DESCRIPTION

2.1 Identification



Every baelz 111 / baelz 112 heat exchanger is equipped with a name plate. It contains information on the operating conditions of the device as well as the device and serial number of the manufacturer.

Fig. 1: Example of a Baelz name plate for a heat exchanger

2.2 Straight-tube heat exchanger

The baelz 111 / baelz 112 is a steam-heated straight-tube heat exchanger in vertical design, suitable for output reglation using condensate backup. The water to be heated flows through the tubes, while steam is fed through the housing.
The tube bundle is firmly welded in. Removable head covers allow the inspection and possible repair of the tube plates and tube expanded positions.

baelz 111	vertical straight-tube heat exchanger available in various sizes
baelz 112	as baelz 111, but suitable for drinking water

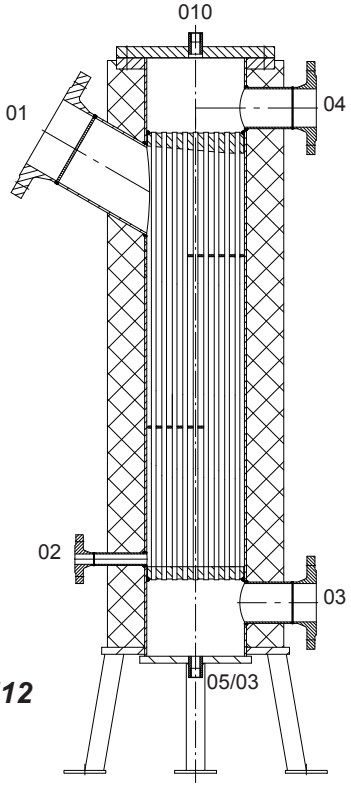


Fig. 2: Connections of baelz 111 / baelz 112

baelz 111 / 112:

01	= heating medium inlet
02	= condensate outlet
03	= secondary inlet (return)
04	= secondary outlet (feed)
05/03	= secondary discharge (G ½“)
010	= vent (G ½“)

2.3 Technical data

Tabelle 2. Technical data, baelz 111 / 112

	baelz 111	baelz 112
Tubes	Steel / Copper / Stainless steel	1.4571
Tube plate	Steel / Stainless steel	Steel (Cu / VA plated) or stainless steel
Head	Steel	Steel stove enamelled / Stainless steel
Shell	Steel	Parts in contact with the fluid 1.4571
Insulation	Mineral wool with galvanized sheet metal jacket 50 / 80 mm	
Housing height	min. 1000, max. 8000 mm	
Diameter	Ø 114 mm - Ø 1200 mm	
Fluids on tube side	Heating water, glycol, hot oil, neutral liquids. Other fluids on inquiry	Drinking water
Fluids on shell side	Steam and condensate	Steam and condensate

2.4 Pressure equipment directive

Tabelle 1. baelz 111 / baelz 112 Manufacturing and testing according to PED 2014/68/EU

Baelz type	tested according to	Execution
baelz 111	PED 2014/68/EU, Category / Module: I/A, II/A2, III/G or IV/G or Art. 4(3) and AD 2000 regulation	standard
baelz 112		Suitable for drinking water, otherwise identical to baelz 111

2.5 Water quality

To prevent corrosion in heat exchangers, water qualities must be checked and recorded at regular intervals. Requirements for water quality can be found in our corrosion brochure, which we will be pleased to send you.

Hot water fluid: Required water quality according to VDI 2035 - Prevention of damage in hot water heating systems according to DIN EN 12828

3. TRANSPORT AND STORAGE

Risk of injury due to non-compliance with safety regulations!

Beware

- Wear the required personal and other protective equipment.
- Avoid shocks, blows, vibrations and the like on the heat exchanger.
- Store the heat exchanger (and if necessary the complete station) in a dry place.
- Store the heat exchanger emptied and dried.
- For storage, provide unconnected heat exchangers with blind plugs.
- Any protective caps and blind plugs on the device openings must not be removed until the device is mounted.

4. ASSEMBLY

Info: See also: "Application Notes for Baelz Heat Exchanger Systems" for important and useful information on assembly and operation.

4.1 Assembly instructions

Caution

- **Make sure that the data on the name plate matches that on the order documents!**
- **Observe the specified maximum values for pressure and temperature!**

- The baelz 111 / baelz 112 is a vertical heat exchanger. The static calculation of the area on which it stands must be based on the maximum operating weight (= own weight + water weight). The floor must be level. Fixing to the floor is to be carried out with sufficiently dimensioned stone bolts.
- The feet of the heat exchanger are dimensioned for the maximum operating weight. Additional loads are not permitted.
- For transport reasons, control valves are often installed "upside-down", i.e. with the actuator below the valve. Please install them upright or horizontally, if the local conditions permit.
- Ensure that pipelines are connected free of tension.
- All connecting pieces and sockets must be connected free of load in accordance with AD 2000.

Caution

To protect the heat transfer surfaces from deposits, Baelz recommends installing a baelz 70200 strainer on the inlet side of the heating medium and, if necessary, on the inlet side of the fluid to be heated.

Tip:

- When installing the heat exchanger, bear in mind that later removal may be necessary, e.g. for maintenance. Provide sufficient space for this and install appropriate connections and isolating valves.
- To ensure that the heat exchanger can be chemically cleaned without having to dismantle it, Baelz recommends that additional connections be made to the heat exchanger, i.e. to all inlet and outlet pipes. In addition, isolating valves are to be provided on these pipes.
- Welding work on the heat exchanger is only possible after consultation with the manufacturer.

4.2 Measuring equipment

- For Baelz heat exchangers 111 / 112, provide sockets in the pipes for pressure and / or temperature measurement. The temperature measuring points in the vicinity of the heating surface have the advantage that even with strongly reduced water flow, temperature measurement is still possible. So close to the heating surface, however, a stable mean temperature cannot yet be reached. This affects control accuracy and can lead to the safety temperature limiter responding prematurely. It is therefore advisable to provide measuring points in the next pipe elbow so that the temperature measuring points can be easily changed when commissioning the heat exchanger.
- When selecting the measuring points, make sure that the full active sensor length is flushed by the water flow. This prevents incorrect measurements.
- Immersion wells increase the dead time. Should these nevertheless be indispensable, they must be arranged vertically or diagonally upwards so that the air gap between the sensor shaft and the well can be filled with a contact liquid.

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- For an accurate measurement of static pressure, select a location with steady flow. For the best measurement conditions, arrange deburred holes of 3 to 5 mm diameter in straight pipelines and perpendicular to the direction of flow. The distance to fittings or deflections should be at least 10 to 20 times the pipeline diameter.

The performance and correct functioning of a heat exchanger system must be monitored by measuring pressure, temperature and flow rate with sufficiently accurate measuring equipment. The data collected in this way is indispensable for possible service cases. Baelz therefore recommends installing the following measuring equipment in addition to the supply sensors and limit thermostats:

1. 1 thermometer each for steam inlet and condensate outlet.
2. 1 thermometer each for secondary inlet and secondary outlet.
3. 1 manometer each for steam inlet and condensate outlet.
4. 1 manometer each for secondary inlet and secondary outlet, or at least suitable measuring connection piece for the later connection of a manometer.
5. 1 condensate meter, or at least one fitting piece for a condensate meter, so that a temporary meter for maximum quantity setting can be installed during initial commissioning.
6. 1 warm or hot water meter or one measuring orifice for the secondary circuit.

i ***Info:*** The necessary calming section must be available for all quantity measuring devices.

4.3 Arrangement of the control system

- The assembly plan specifies the arrangement and functioning of the control system. A sample assembly plan can be found in Fig. 5, page 20.
- Proper drainage of the steam inlet pipe is particularly important for steam heat transfer stations. This is the only way to prevent water hammer, which shortens the service life of the system. The minimum flow rate on the secondary side in low load operation must also be guaranteed.
- Do not switch off circulating pumps until the condensate valve is closed and the condensate backup has completely covered the heating surface.
- Night setbacks may not all take effect simultaneously when several circuits are present. The heat exchanger can also be controlled according to the coldest circuit depending on the weather. This ensures a minimum water flow rate.
- See the operating instructions for each device to learn more about its control function.

4.4 Electrical wiring of the measuring and control devices as well as the automatic fittings

- An operating manual is enclosed with each individual device. If this individual device requires electrical auxiliary power, you will find the electrical circuit diagram in the operating instructions.
- If you have ordered a Baelz switchboard or a Baelz switch cabinet, the circuit diagram tailored to your individual control circuit will also be supplied. Examples of typical system diagrams can be found on pages 22 and 23.
- However, if you would like to receive an introduction to the system components supplied by us, please contact Baelz customer service.

4.5 Filling of the system

- The quality requirements for the filling water depend on the temperature and heating surface load.
- For information on the required water quality, please see Chapter 2.5

5. COMMISSIONING

i ***Info:*** See also: "Application instructions for Baelz heat exchanger stations" for important and useful information on assembly and operation.

5.1 Operating conditions

Observe the limiting values stated on the name plate for the operation of the baelz 111 / baelz 112.

Danger

Risk of personal injury or material damage if the values on the name plate are disregarded!
Pressure vessel with two pressure chambers!

Caution

Make sure that the system is filled with the intended fluids and deaerated. Check the system for leaks.
Check electrical components and control for operability.

5.2 During commissioning:

Caution

Start up the heat exchanger or the station as evenly as possible.
Avoid pressure peaks and thermal shocks!

Caution

Ensure that the secondary pump is connected in the correct direction of rotation and in operation when the heating medium is flowing. After-running of this pump is important!

1. Observe the operating instructions of the fittings attached to the heat exchanger and other components of the system.
2. Check that the connections of the heat exchanger correspond to the order confirmation. See also chapter 2.1 of these operating instructions.
3. Setting the temperature sensor on the secondary outlet thermostat and the overtemperature thermostat:
   - If a resistance thermometer is used as a temperature sensor at the secondary outlet (04), the setpoint is adjusted at the controller with Baelz control.
   - Use a special key to set the safety temperature limiter in the supply pipe to a temperature of approx. 10 °C above the temperature at the secondary outlet, unless the fixed value has already been set in the factory.
   - To limit the temperature of the condensate, set the thermostat to a temperature approx. 15 °C above the desired temperature.
4. Make sure that the system is not under pressure. Deaerate the heat exchanger. If water escapes, screw the plug back in. A vent valve is suitable here for the purpose of deaerating.
5. Pressure monitoring:
   Typically a setting range of 0.5 - 6 bar is sufficient for heating systems.
   - Max. pressure limiter: The pressure limiter must be set so that it responds upstream of the security valve.
   - Min. pressure limiter: If the pressure drops below the set limiting value, the heat supply system is switched off.

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6. Open all valves in the secondary circuit, including those at the consumers.
7. Switch on the circulation pump of the secondary circuit and throttle it to the required quantity. If the consumers are not yet ready for operation, another way of reducing capacity should be provided so that the safety devices are not triggered unintentionally.
8. Slowly open the fittings on the steam inlet side (01). The primary side of the device is now under the full pressure of the heating medium as the condensate control valve is still closed. You can now check whether all connections are tight.
9. If a pressure limitation valve is used on site on the steam inlet side, adjust the operating pressure to suit the operating conditions.
10. For all water heaters, make sure that at the given max. steam temperature the existing min. water pressure on the secondary side is sufficient to prevent the formation of steam. See Fig. 3 (below).

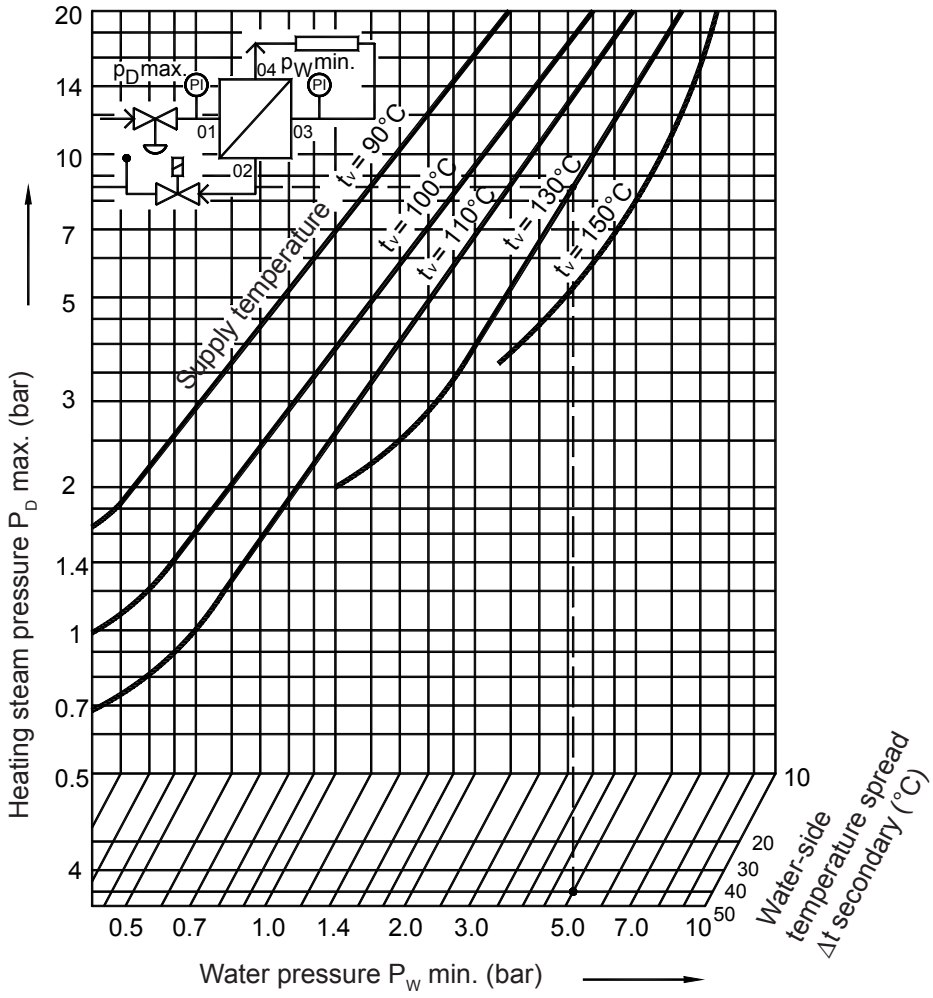

Fig. 3: Pressure / temperature diagram for steam-heated heat exchangers

11. Check the desired setpoint adjustment on the controller. Leave the manual control and isolating valve in the condensate pipe closed. Press the "On" key on the controller. If the wiring is correct, the condensate motor valve opens.

Beware

Observe the following instructions for safe commissioning!

12. Open the condensate manual control and isolating valve very slowly to put the steam heat transfer station into operation: First open the manual control valve by only one turn. After 15 minutes, check the resulting temperature rise. If the maximum supply temperature (secondary output, 04) is already exceeded, the condensate control valve is too large. Turn the manual control valve back accordingly. If the supply temperature is not reached, open the manual control valve by one more turn. Wait another 15 minutes and repeat the temperature check and, if necessary, correct the hand wheel position. Now secure the manual control valve so that it cannot be unintentionally misadjusted.
13. Since the temperature provides only limited information about the heat output, the correct condensate discharge rate must in certain cases be set on the manual control valve using a condensate meter. The approx. condensate discharge capacity in l/min, which must flow at nominal capacity, is obtained by dividing the heat output in kcal/h by the numerical value 33000. If the capacity is given in kW, it must be divided by the numerical value 38 in order to obtain the approx. condensate quantity in l/min. Particularly advantageous is when the condensate control valve contains a built-in flow limiter. It can be easily adjusted to the maximum flow rate.
14. Now you can switch on the automatic operation. The automatic condensate control valve is controlled by the controller by means of Open and Close pulses depending on the power consumption. Observe the system for a few more hours and note the pressure and temperature values. Check the safety devices for correct function by simulating controls as they may occur during operation.

Caution

After 1-2 hours of operation, tighten the screws of the seals!

15. It is imperative to tighten the screw connections of all seals gradually and evenly after 1-2 hours of operation. See also chapter 6.4. This measure is necessary because seals change under the influence of heat. If the retightening is not carried out in time, the seals may be damaged and the device may leak. This can result in seals having to be replaced and, under certain circumstances, sealing surfaces having to be reworked.

Caution

In new systems, strainers must be cleaned after the first few days.

16. Clean the strainers to remove debris that may have been flushed from the system's recently put into service pipes and fittings.
17. Security valves are usually set for the pressure value ordered. Corrections must be made at the manufacturer's factory. Installations subject to inspection must be inspected after completion by the body designated in accordance with the PED. The certificate of a factory construction and water pressure test must be submitted.

5.3 During operation

If vibration, noise, reduced power or other disturbances occur during operation, please refer to the Troubleshooting table on page 16 and contact Baelz customer service if necessary.

6. MAINTENANCE AND CLEANING

Tip: Baelz recommends concluding a maintenance contract with our technical customer service. This ensures regular maintenance of your heat transfer system, extends its service life and ensures reliable and safe operation.

Danger **Risk of scalding! Before cleaning and maintenance work, check whether the device is depressurized and whether the fluid temperatures have dropped so low that scalding is ruled out.**

- Only use Baelz original spare parts!

6.1 Regular inspections and maintenance of the heat exchanger

If you have not signed a maintenance contract with Baelz technical service, you must otherwise ensure that regular inspections and maintenance are carried out in accordance with the relevant national regulations.

6.2 Switching off the system

If the system is switched off, only the condensate control valve receives a Close impulse and remains closed. The secondary pump continues to run briefly to reduce or prevent heat accumulation in the heat exchanger. However, the steam valve remains open and thus the steam pressure is on the heat exchanger as well as on the condensate rail. This prevents oxygen from entering the heat exchanger/condensate rail when the system is switched off (risk of corrosion). The system self-checks with the condensate level probe at the steam inlet (01).

6.3 Cleaning the heat exchanger

- See chapter 2.5 for water quality requirements. If the water quality requirements are not met, it may be necessary to clean the heat exchanger. Contamination restricts the performance of the system and endangers the material. Hard incrustations in particular hinder the expansion of the heating system and can thus cause material damage.
- Have dirt removed at an early stage by a qualified specialist company. Limescale can be removed with acid. Do not use cleaning agents that attack the material. Make sure that no residues of the cleaning agent remain in the heat exchanger.
- Only easily soluble hardeners (e.g. carbonate hardness) can be removed with acid mixtures. Poorly soluble hardeners (e.g. gypsum) require a correspondingly greater effort. Only a chemical examination of the contamination by a specialist company provides information about the potential success of a cleaning.
- If sludge deposits are present in addition to limescale, the solvents must be mixed with special additives. Normal acid mixtures are generally not suitable for the removal of sludge deposits. In this case, consult a specialist company.

6.4 Repair work on the heat exchanger

Tip: Procure replacement seals before starting repair work. Refer to the construction drawing or order directly from Baelz stating the order and / or device number.

- Removable head covers enable both ends of each tube to be inspected and repaired. In the case of leaking tube connections, it may suffice to rework the tube sheet connection with a special mandrel. However, it is more practical to drive in a guide bushing or a plug.
- Pipe openings can be sealed by shutting down the affected heating pipe using blind plugs.

Beware

Take care when tightening the flange couplings! Observe the following remarks.

- Tighten the flange screws crosswise and particularly evenly. Too forceful and uneven retightening distorts the flanges and leads to permanent leakage. Tightening too tightly can also cause the seals to flow. Always observe the permissible surface pressure of the seals. Use a torque wrench and ensure that the thread runs smoothly by applying heat-resistant lubricant on clean screws. Please refer to the Baelz data sheet DS 80900...81100 for tightening torques depending on screw size and material.

7. DECOMMISSIONING AND DISPOSAL

Danger

Hot surfaces when insulation is removed! Risk of burns if touched!

7.1 Decommissioning

- When decommissioning, first shut off the heating medium.
- Shut down the ancillary equipment according to the relevant documentation.
- Empty the heat exchanger completely.
- Let the heat exchanger dry out as completely as possible to avoid standing liquids.

7.2 Disposal

- Dispose of or recycle the heat exchanger in accordance with national regulations.
- Do not dispose of lubricants and hazardous substances in household waste.

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8. TROUBLESHOOTING

Problem	Possible cause	Solution
temperature / pressure too high	heating capacity too high	check control system and correct if necessary
	leaking control valve	check valves and repair or replace if necessary
	greatly reduced power requirement or manual control valve designed too large	throttle by means of manual control valve or replace manual control valve (see also chapter 5.2: During commissioning)
reduced heat exchanger performance	intended operating conditions not fulfilled	check temperature, pressure and flow of heating medium
	too little heating medium flows through heat exchanger	● check strainer and clean if necessary ● check opening of the isolating valves and correct if necessary. ● check pipeline resistance
	differential pressure too low / control valve and associated fittings designed too small	re-design all fittings according to existing differential pressure
	increased flow rate on the secondary side (lower temperature difference is not due to reduced heat exchanger performance)	reduce flow rate on the secondary side
	heat transfer surface dirty	clean heat exchanger (see chapter 6.3: Cleaning the heat exchanger)
control valve remains in OPEN position only very briefly	condensate limiting thermostat set too low or defective	check the setting or function and correct it
	cooling of the heating medium too low	Check whether the secondary return temperature corresponds to the design temperature, if so, contamination of the heat transfer surface is probable (see chapter 6.3: Cleaning the heat exchanger)

Problem	Possible cause	Solution
heat exchanger not running smoothly	air in the system	provide ventilation
	steam formation on the secondary side	check steam pressure limitation
	heat transfer surface dirty	clean heat exchanger (see chapter 6.3: Cleaning the heat exchanger)
	leakage inside the heat exchanger	see chapter 6.4 of these operating instructions
	defective valves or pumps	Locate and repair or replace device. If necessary, contact Baelz customer service
leakage	leakage to the outside	Remove insulation, locate leakage. If necessary, contact Baelz customer service
	leakage inside the heat exchanger	see chapter 6.4 of these operating instructions

9. DIMENSIONAL DRAWING, ASSEMBLY PLAN, SYSTEM DIAGRAMS (EXAMPLES)

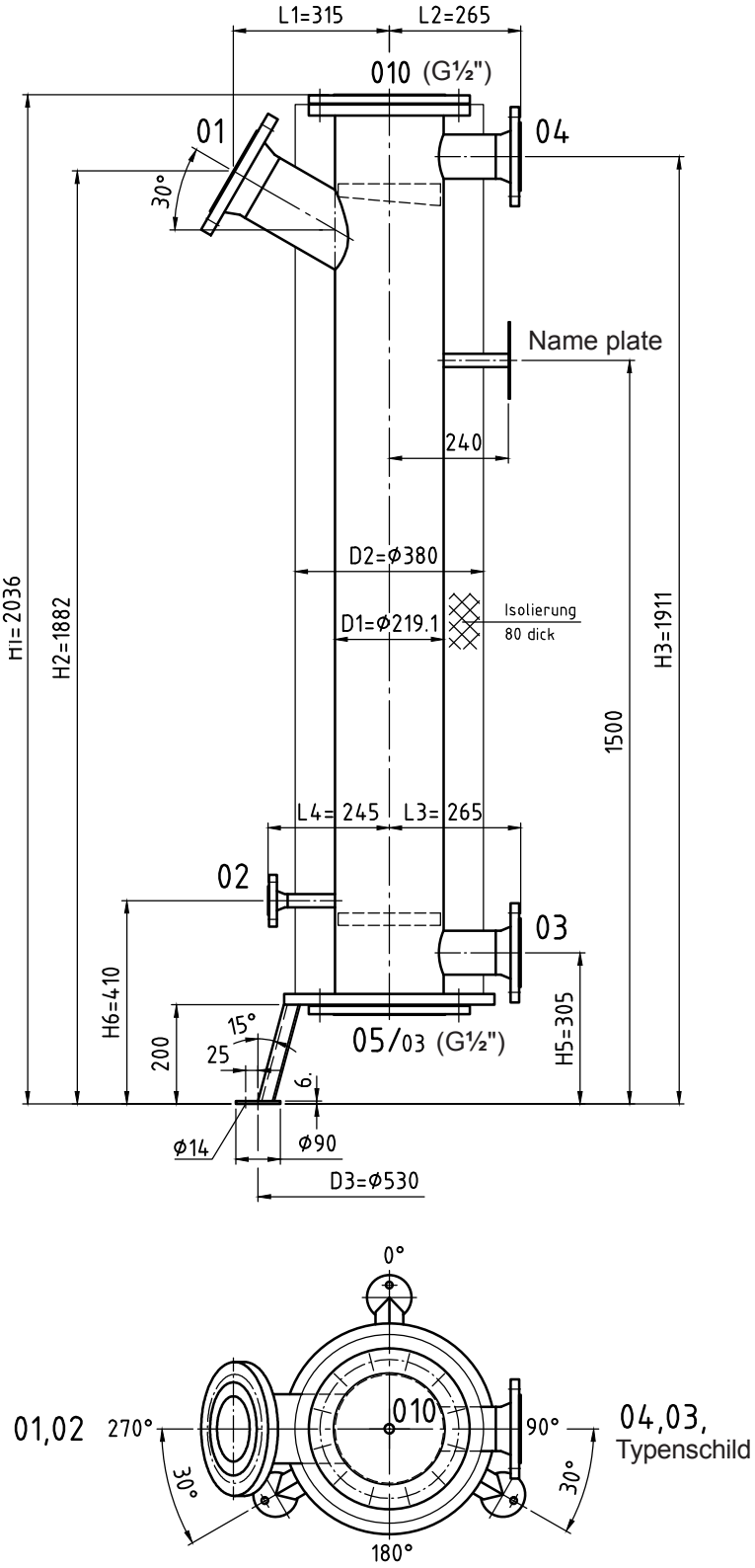

Fig. 4: Dimensional drawing baelz 111 / 112 - here type 111-219-195-15

For dimensions and connection pieces of all standard types, see page 19

Dimensions are approximate and may vary according to individual technical requirements!

9.1 Tables baelz 111 /112 with tube length 1500 mm

Dimensions are approximate and may vary according to individual technical requirements!

Tabelle 4. Dimension table baelz 111 /112 standard versions (dimensions in mm)												
Baelz type	**D1**	**D2**	**D3**	**H1**	**H2**	**H3**	**H5**	**H6**	**L1**	**L2**	**L3**	**L4**
111-114-40-15	114.3	275	410	1976	1864	1866	290	375	230	190	190	185
111-139-60-15	139.7	300	435	2006	1872	1891	295	390	240	215	215	198
111-168-105-15	168.3	330	480	2006	1872	1891	295	395	280	233	233	220
111-219-195-15	219.1	380	530	2036	1882	1911	305	410	315	265	265	245
111-273-312-15	273.0	435	585	2106	1917	1961	325	447	340	295	295	270
111-324-448-15	323.9	485	655	2150	1929	1991	335	480	380	325	325	300

Tabelle 3. Connecting piece table baelz 111 /112 standard versions								
	Heating medium inlet		**Condensate outlet**		**Secondary inlet**		**Secondary outlet**	
Baelz type	**DN 01**	**PN 01**	**DN 02**	**PN 02**	**DN 03**	**PN 03**	**DN 04**	**PN 04**
111-114-40-15	65	40	15	40	50	16	50	16
111-139-60-15	80	40	15	40	65*	16	65*	16
111-168-105-15	100	40	20	40	65*	16	65*	16
111-219-195-15	125	40	20	40	80	16	80	16
111-273-312-15	125	40	25	40	100	16	100	16
111-324-448-15	150	40	40	40	125	16	125	16
All connecting pieces acc. to EN 1092-1 type 11, sealing surface form B1								

* Connecting pieces 03 and 04 (DN 65, PN 16) in 4-hole execution

9.2 baelz 111 /112 with tube lengths 1000 mm and 2000 mm

- The types in the tables (above) end with "15", e.g. 111-114-40-15 and have a tube length of 1500 mm.

- Types ending in "10" have a pipe length of 1000 mm. The total height H1 and the height dimensions H2 and H3 are **approx.** 500 mm less than for the corresponding type with a tube length of 1500 mm. For example:
  for 111-114-40-15: total height H1 = 1976 mm;
  for 111-114-40-10: total height H1 = approx. 1476 mm (= 1976-500)

- Types ending in "20" have a pipe length of 2000 mm. The total height H1 and the height dimensions H2 and H3 are **approx.** 500 mm more than for the corresponding type with a tube length of 1500 mm. For example:
  for 111-114-40-15: total height H1 = 1976 mm;
  for 111-114-40-20: total height H1 = approx. 2476 mm (= 1976+500)

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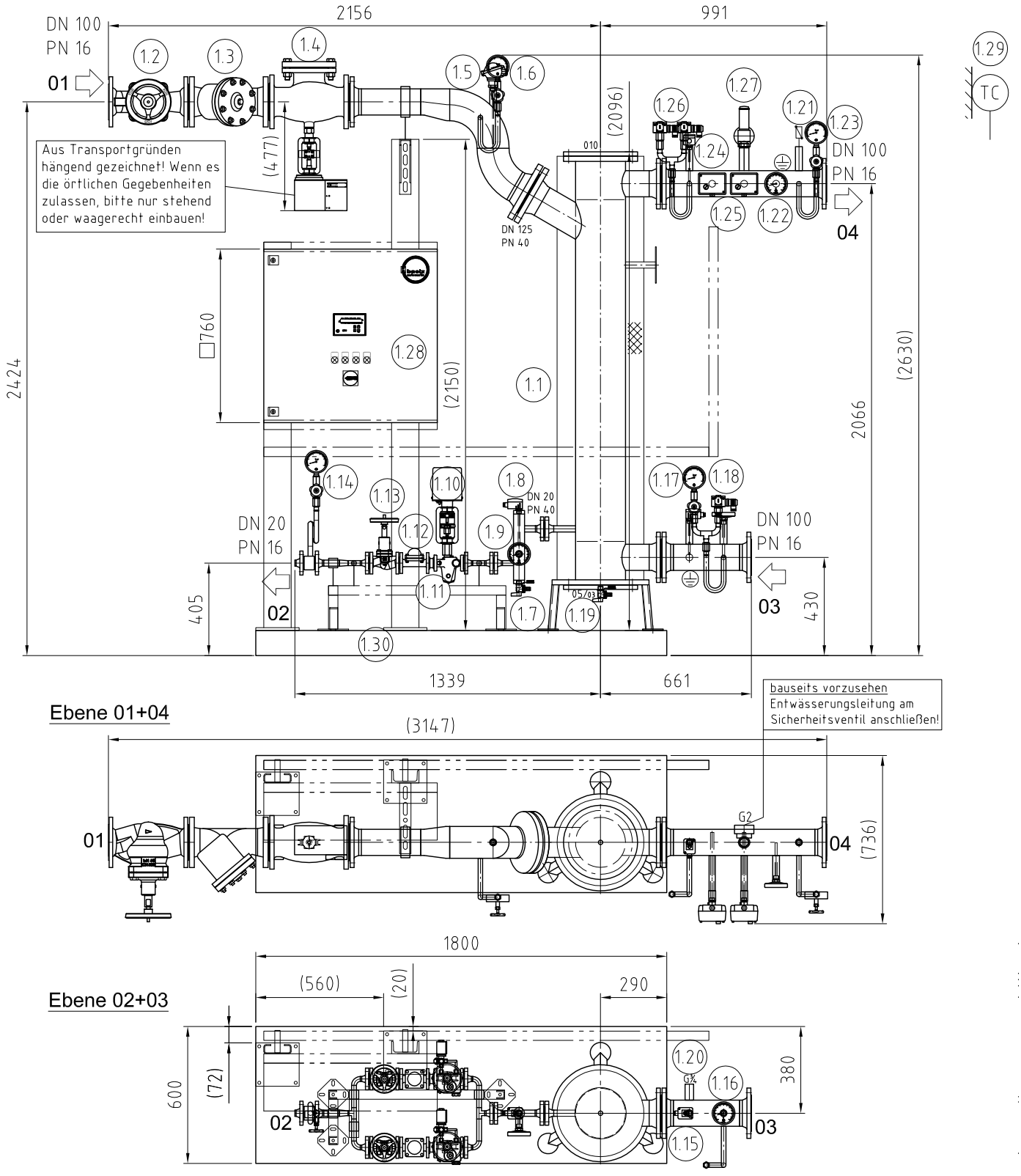

Fig. 5: Example assembly plan Steam Terminal "Luxese Instant Heat" with baelz 111

9.3 Example assembly plan with baelz 111 - Legend

1.1 Straight-tube heat exchanger baelz 111-219-195-15
1.2 Isolating valve baelz 70028R
1.3 Strainer baelz 70200
1.4 2-way control valve baelz 340-B with actuator baelz 373-E65
1.5 Level probe baelz 1782
1.6 Manometer baelz 70802, baelz 85850
1.7 Boiler filling and drain valve, baelz 70586
1.8 Immersion temperature sensor baelz baelz 24-PT-150
1.9 Thermometer baelz 71150
1.10 2 x control valve baelz 185 with actuator baelz 373-E07
1.11 2 x stainless steel wafer-type check valve baelz 70084-E-VA
1.12 2 x condensate controller baelz 70316
1.13 2 x isolating valve 70028R
1.14 Manometer baelz 70802, baelz 85860
1.15 Immersion temperature sensor, baelz 24-PT-150
1.16 Thermometer baelz 71150
1.17 Manometer baelz 70802, baelz 85881
1.18 Safety pressure switch baelz 834/2
1.19 Boiler filling and drain valve, baelz 70586
1.20 Socket G¾ for MAG
1.21 Vent plug baelz 70796
1.22 Thermometer baelz 71150
1.23 Manometer baelz 70802, baelz 85850
1.24 Immersion temperature sensor baelz baelz 24-PT-150
1.25 2 x double thermostat "Pilot" baelz 231/2
1.26 2 x safety pressure switch baelz 834/1
1.27 Security valve baelz 70625
1.28 Switch cabinet baelz 3592
1.29 Outdoor temperature sensor baelz 23-PT (supplied loose)
1.30 Console baelz KT25824, accessories and assembly

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9.4 Examples of system diagrams

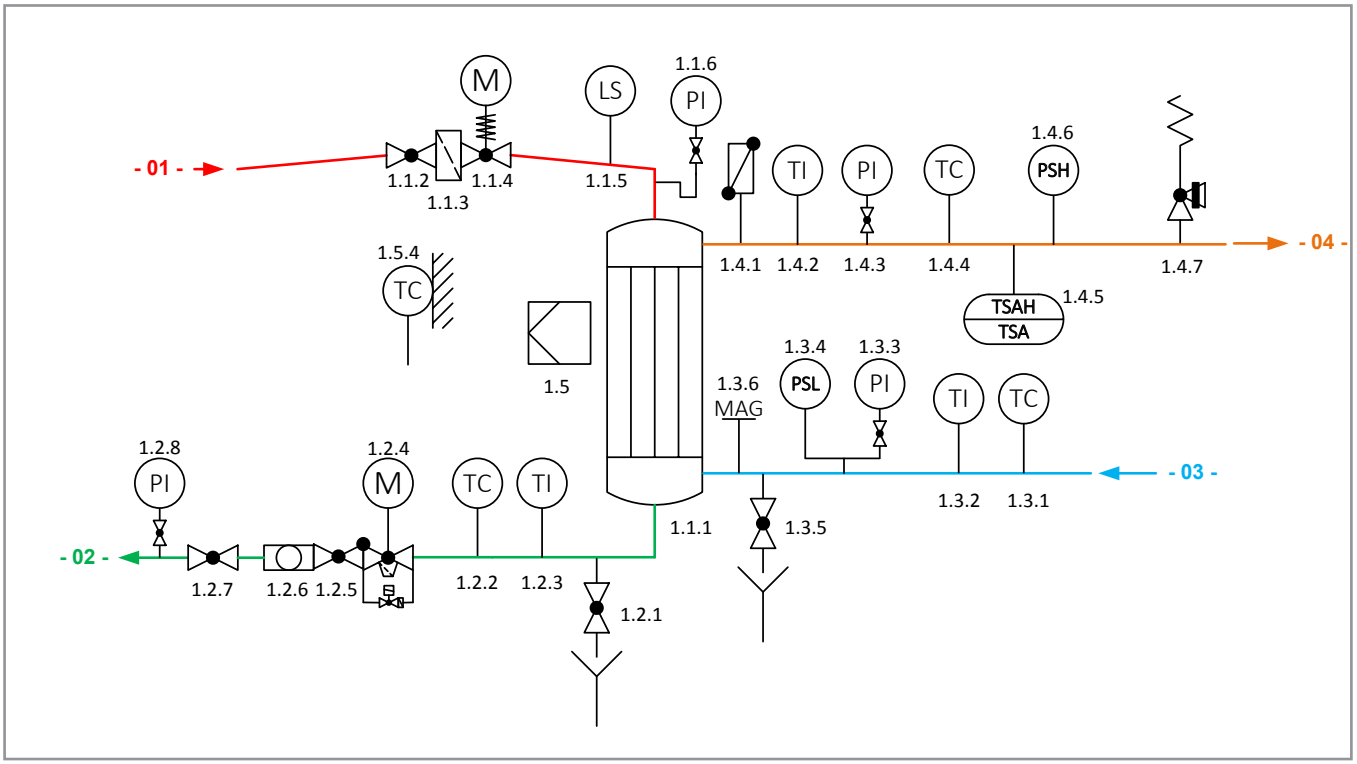

Fig. 6: Example system diagram: 150 kW - 200 kW (≥ 3 bar)

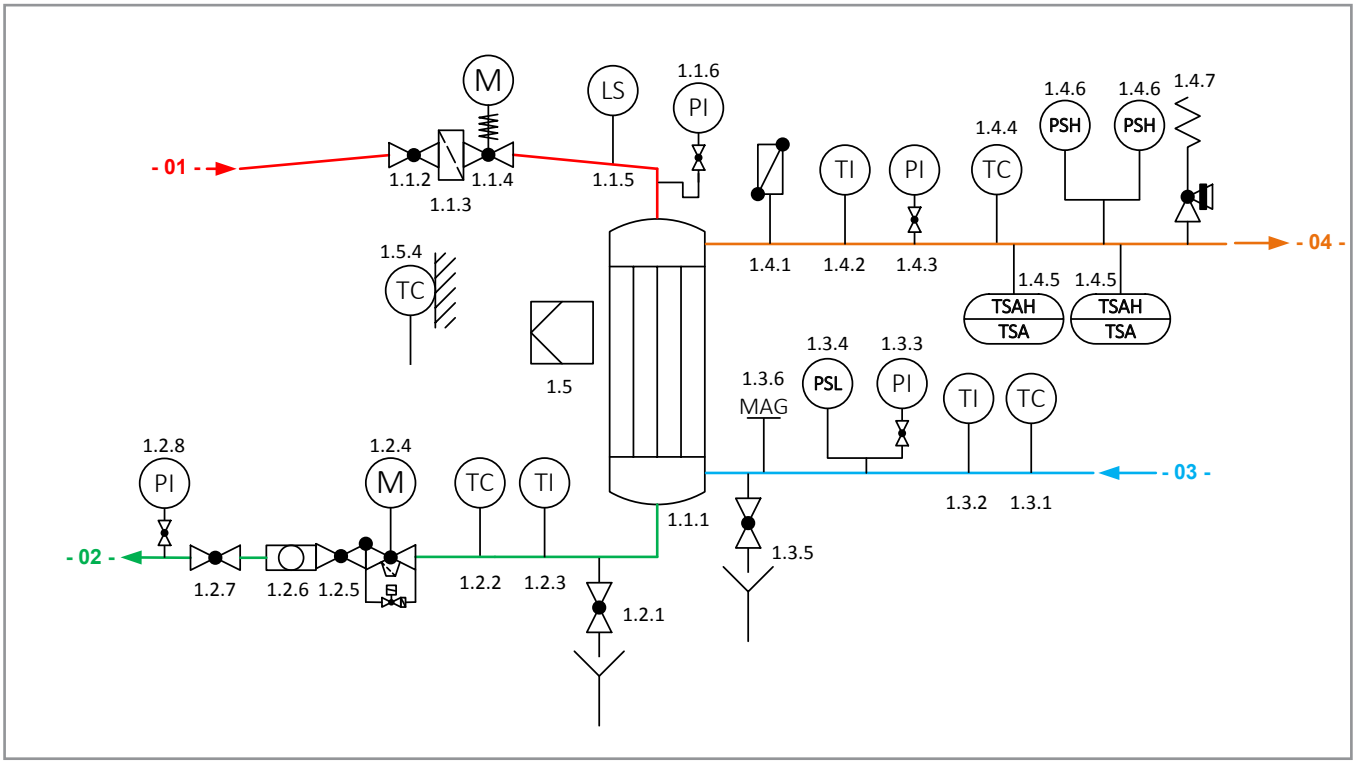

Fig. 7: Example system diagram: 300 kW - 500 kW (≥ 3 bar)

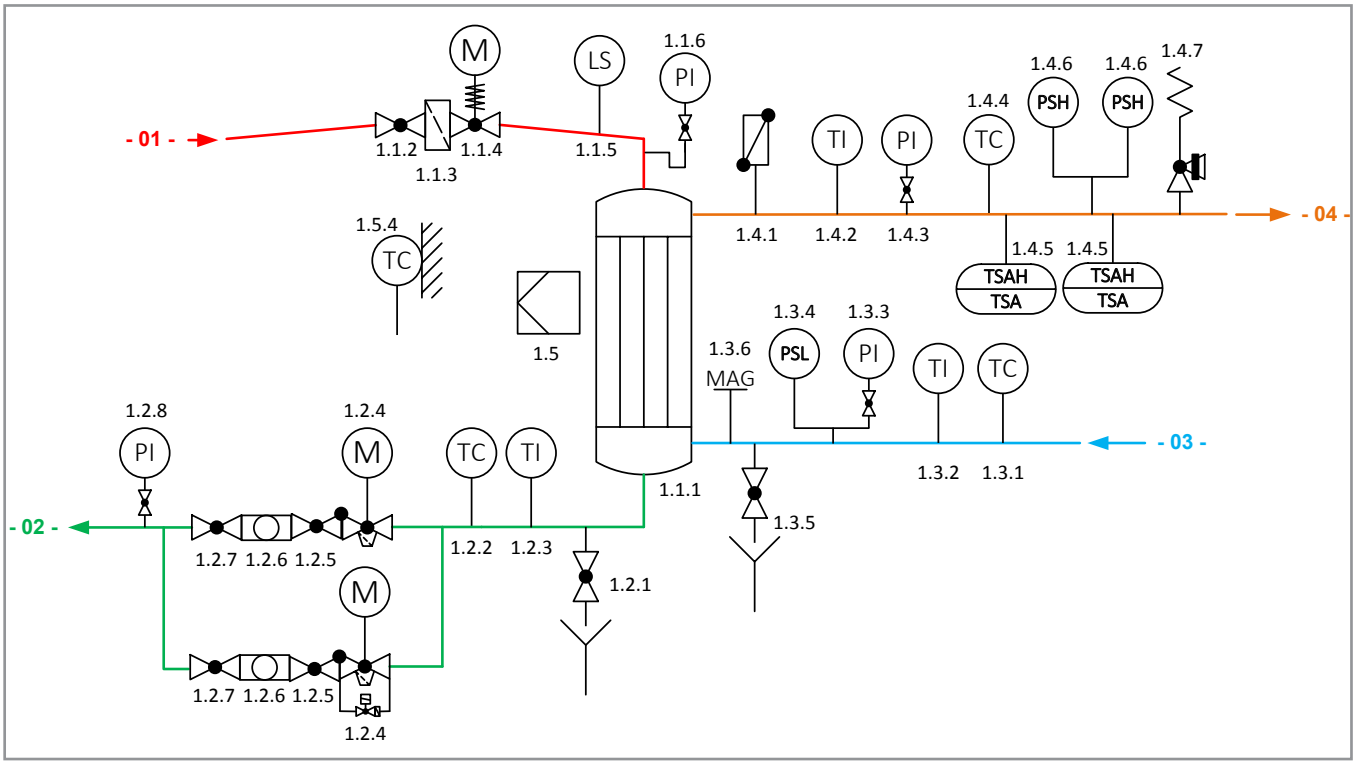

Fig. 8: Example system diagram: 750 kW - 1300 kW (≥ 3 bar)

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