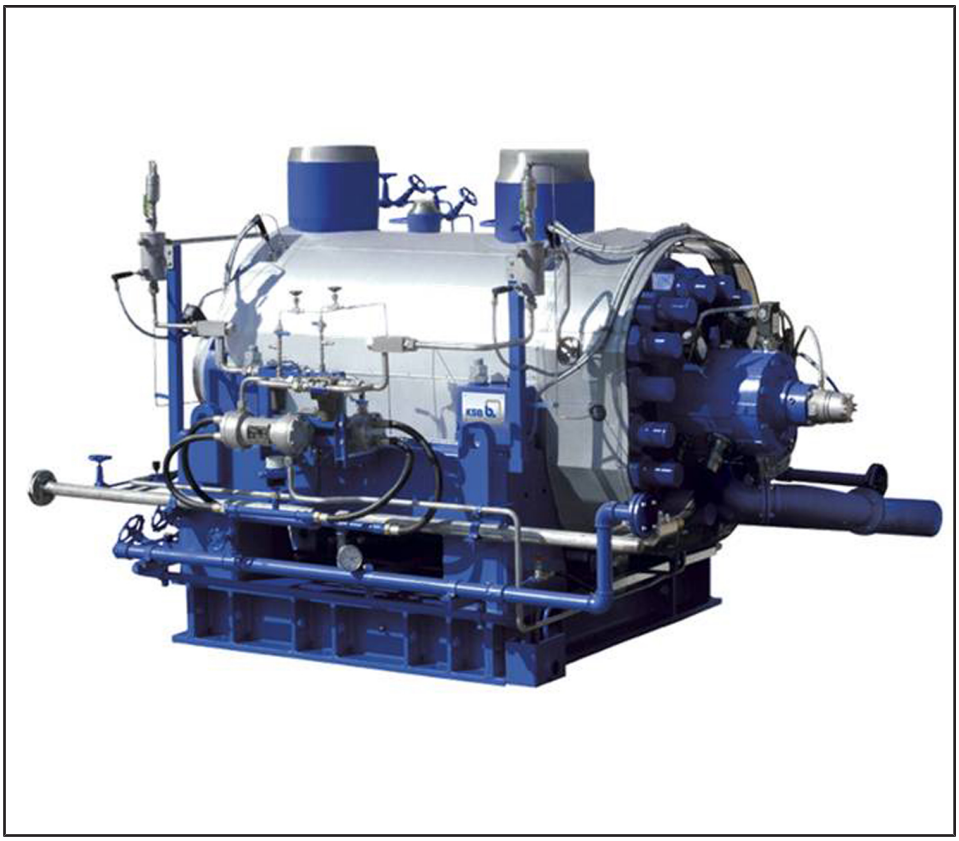
Barrel-type Pump

CHTD

With Single-entry Inlet

Type Series Booklet



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Type Series Booklet CHTD

Contents

Energy

Barrel Casing Pump

CHTD

Main applications

- Pumping boiler feed water and condensate in power stations and industrial plants
- Generation of pressurised water for descaling units

Fluids handled

- Boiler feed water
- Condensate
- Clean hot or cold water

Operating data

Table 1: Operating properties

Characteristic		Value
Flow rate	Q [m³/h]	≤ 5700
	Q [l/s]	≤ 1580
Head	H [m]	≤ 5400
Fluid temperature	T [°C]	≤ +270
Pump inlet pressure	p_s [bar]	≤ 40
Pump discharge pressure[1)]	p_d [bar]	≤ 560
Speed	n [rpm]	≤ 6750
Power input	P [kW]	≤ 55000

Designation

Example: CHT D 7/6

Table 2: Designation key

Code	Description
CHT	Type series group
D	Type series
7	Size

Code	Description	
7	6	CHTD 6
	7	CHTD 7
6	Number of stages	

Design details

Design

- Horizontal installation
- Radially split pump
- Single-entry or double-entry
- Multistage
- Profile seals for static sealing within the pump and to atmosphere, stage casings with metal contact faces, O-rings for areas in contact with oil
- Nozzles always arranged radially
  - Nozzles available with weld end or flange
  - Positions: suction nozzle/discharge nozzle top or bottom, or opposite to each other
    Tapping nozzle top or bottom, angles 45° and 170°
- Sizes and number of stages
  - Sizes 3 to 11, selection to flow rate at a nominal speed of 4060 rpm-
  - Number of stages: 3 minimum, 9 maximum
- Individual support of shrink-fitted impellers and split ring for axial force transmission

Impeller type

- Radial impellers

Bearings

Plain bearings with forced oil lubrication

- Radial bearing
  - 2 grooved multi-lobe plain bearings
- Thrust bearing
  - 1 bi-directional tilting-pad thrust bearing
- Measurement of the residual axial force via wire strain gauges on cardanic ring
- Cardanic ring desigend as flexible component, adaptation to rotor deflection line, measurement of residual thrust

Balancing device

- Double drum: 2 radial clearances of fixed width and 1 axial clearance of adjustable width
- The residual axial thrust is absorbed by the thrust bearing, which forms one functional unit with the double drum.

Shaft seal

Depending on pump size and design:

- Mechanical seal:
  cartridge design with circulation and jacket cooling (API plan 23)
- Dosing might be required at high circumferential speed.
- Floating ring seal:
  Throttling seal in cartridge design with several narrow, radially flexible throttling distances in a line
- External supply with sealing condensate required.
- Shaft equipped with replaceable shaft sleeve in the shaft seal area

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1 At Q = 0, T = 20 °C

Flanges

- Mating dimensions to ASME and DIN

Options

- Adaptation to customer specifications
- 2. tapping
- Kicker stage
- 2. shaft end (discharge side) for driving a booster pump
- Interstage bushes with grooved or cellular surface
- Direction of rotation clockwise or anti-clockwise
- Connection for a temperature balance valve
- Type series is cold/heat shock resistant

Hydraulic systems:

- 4 basic hydraulic systems (C, H, N and S) with individual adaptation of the balancing device
- Suction impeller and suction elbow, adapted to the available NPSH conditions
- End volute available for increasing the efficiency

Geometry:

- The outer dimensions depend on the hydraulic system, the pressure enclosure including nozzle projection and positions, the shaft seal type, and the measurement instruments fitted.

Pump set components

Drive

- Variable-speed condensing turbine
- Electric motor with geared variable speed coupling
- Electric motor with Vorecon gear
- Electric motor with frequency inverter and fixed-ratio gear
- Curved tooth and flexible disc couplings, low weight decisive for rotor dynamics

Installation:

- Pump on its own baseplate or together with the gear unit
- Booster pump (slow rotation due to step-down gear) at the same shaft assembly or with its own drive
- Booster pump on suction side or discharge side of the main pump (direction of rotation)

Additional systems

- Minimum flow system
  - Separate pump set skid
  - Self-regulating valve
- Dosing system for mechanical seals
- Barrier fluid supply system for floating ring seals
  - - Relatively independent or strongly integrated in the power station system
- Balancing liquid return to the feed water tank or in intermediate pipe

Materials

Table 3: Material variants

Description	Material
Barrel casing	Carbon steel, plated
Stage casing	Chrome steel
Nozzle	Steel which is creep-resistant at elevated temperatures, plated
Cover	Chrome steel
Hydraulic components	Chrome steel
Shaft seal housing	Chrome steel
Bearing housing	Grey cast iron or cast steel

Product benefits

- High operating reliability:
  - For balancing by double drum: residual axial thrust absorbed by pivoted segmental thrust bearing
  - Optimised casing design regarding the distribution of forces
  - Adaptation of pump casing to rotor deflection line
- Long service life
  - Prevention of wear at the thrust bearing by axial forces being transmitted to the bearing housing via a cardanic ring
  - Low NPSH value by using suction impeller as standard
- Service-friendly: pump cartridge can be replaced without dismantling the pump, and wear parts can be serviced without opening the pump.
- Reduced operating costs by high efficiency (cellular surface wear rings)

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General drawings with list of components

CHTD 6/6, pump with mechanical seal

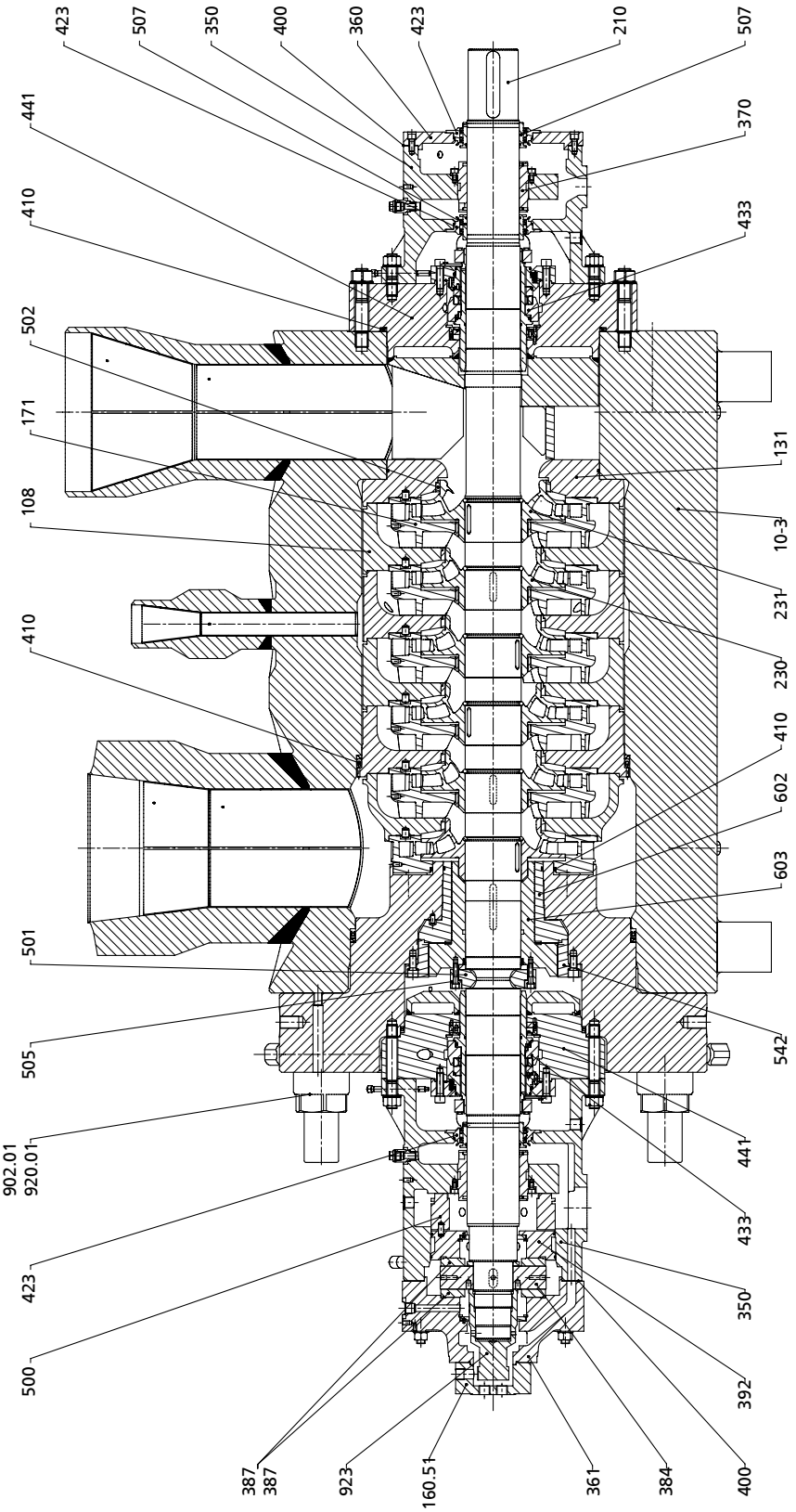

Fig. 1: General assembly drawing with list of components

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CHTD 7/5, pump with floating ring seal

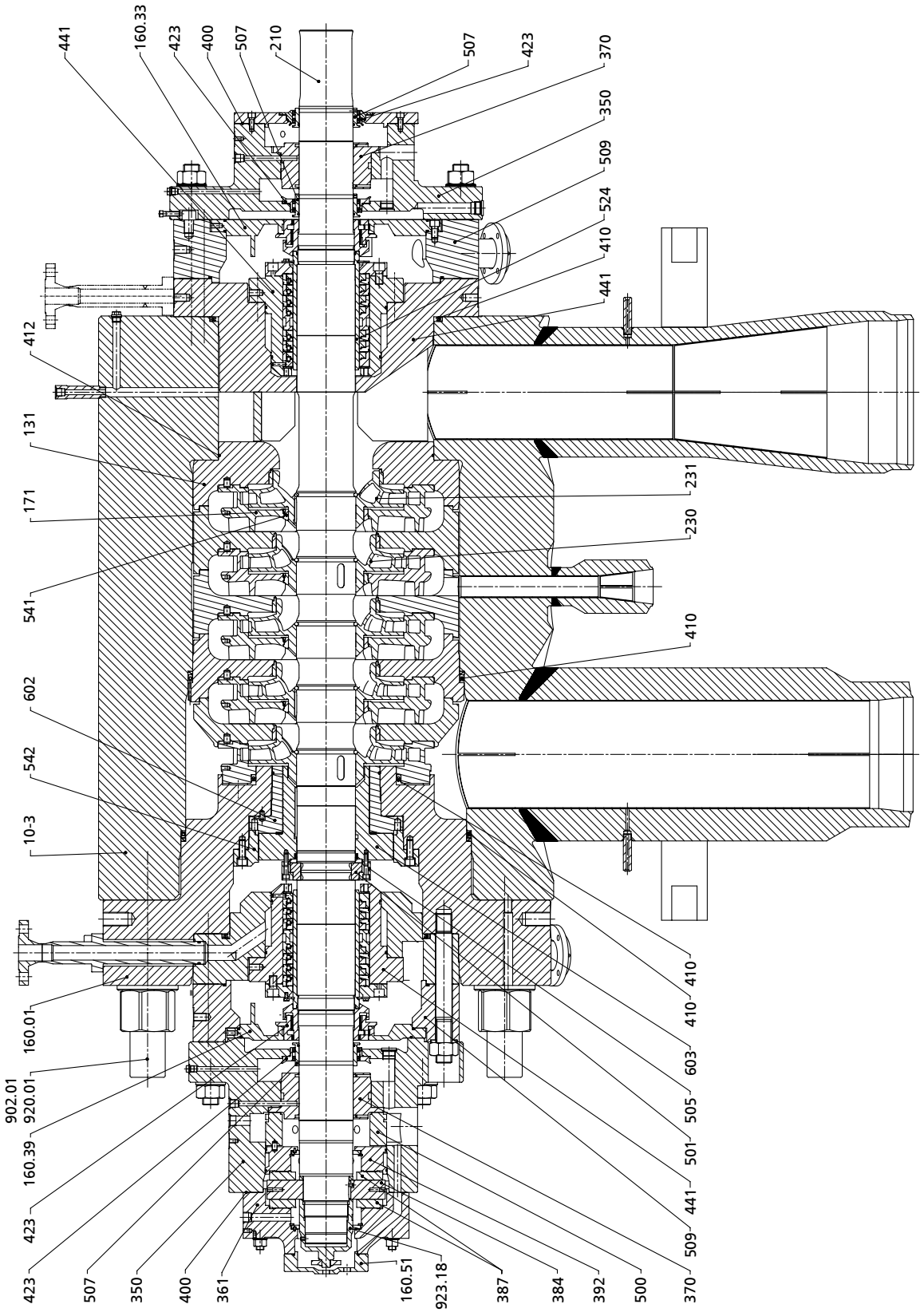

Fig. 2: General assembly drawing with list of components

Table 4: List of components and materials

Part No.	Description	Material selection
10-3	Barrel	Carbon steel, plated
108	Stage casing	Chrome steel
131	Inlet ring	Chrome steel

Part No.	Description	Material selection
160.01	Cover	Chrome steel
160.33	Cover	Structural steel
160.39	Cover	Structural steel
160.51	Cover	Carbon steel
171	Diffuser	Chrome steel
210	Shaft	Chrome steel
230	Impeller	Chrome steel
231	Suction stage impeller	Chrome steel
350	Bearing housing	Grey cast iron / cast steel
360	Bearing cover	Carbon steel, plated
361	Non-drive-end bearing cover	Grey cast iron
370	Bearing shell	Case-hardened steel, plated
384	Thrust collar	Tempered steel
387	Thrust bearing segment	Carbon steel, plated
392	Bearing segment carrier	Tempered steel
400	Gasket	Synthetic fibre
410	Profile seal	PTFE compound
412	O-ring	Elastomer seal
423	Labyrinth ring	Bronze alloy
433	Mechanical seal (complete)	-
441	Shaft seal housing	Chrome steel
500	Ring	Tempered steel
501	Segmental ring	Chrome steel
502	Casing wear ring	Chrome steel
505	Loose collar	Chrome steel
507	Thrower	Chrome steel / tempered steel
509	Intermediate ring	Structural steel
524	Shaft protecting sleeve	Chrome steel
541	Interstage bush	Chrome steel
542	Throttling bush	Chrome steel
602	Balance disc seat	Chrome steel
603	Balance drum	Chrome steel
902.01	Stud	Tempered steel
920.01	Nut	Tempered steel
923	Shaft nut	Tempered steel

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05/08/2021

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