

По вопросам продаж и поддержки обращайтесь:

Архангельск (8182)63-90-72	Краснодар (861)203-40-90	Санкт-Петербург (812)309-46-40
Астана (7172)727-132	Красноярск (391)204-63-61	Саратов (845)249-38-78
Астрахань (8512)99-46-04	Курск (4712)77-13-04	Севастополь (8692)22-31-93
Барнаул (3852)73-04-60	Липецк (4742)52-20-81	Симферополь (3652)67-13-56
Белгород (4722)40-23-64	Магнитогорск (3519)55-03-13	Смоленск (4812)29-41-54
Брянск (4832)59-03-52	Москва (495)268-04-70	Сочи (862)225-72-31
Владивосток (423)249-28-31	Мурманск (8152)59-64-93	Ставрополь (8652)20-65-13
Волгоград (844)278-03-48	Набережные Челны (8552)20-53-41	Сургут (3462)77-98-35
Вологда (8172)26-41-59	Нижний Новгород (831)429-08-12	Тверь (4822)63-31-35
Воронеж (473)204-51-73	Новокузнецк (3843)20-46-81	Томск (3822)98-41-53
Екатеринбург (343)384-55-89	Новосибирск (383)227-86-73	Тула (4872)74-02-29
Иваново (4932)77-34-06	Омск (3812)21-46-04	Тюмень (3452)66-21-18
Ижевск (3412)26-03-58	Орел (4862)44-53-42	Ульяновск (8422)24-23-59
Казань (843)206-01-48	Оренбург (3532)37-68-04	Уфа (347)229-48-12
Калининград (4012)72-03-81	Пенза (8412)22-31-16	Хабаровск (4212)92-98-04
Калуга (4842)92-23-67	Пермь (342)205-81-47	Челябинск (351)202-03-61
Кемерово (3842)65-04-62	Ростов-на-Дону (863)308-18-15	Череповец (8202)49-02-64
Киров (8332)68-02-04	Рязань (4912)46-61-64	Ярославль (4852)69-52-93
	Самара (846)206-03-16	

Единый адрес: kbs@nt-rt.ru **Веб-сайт:** www.kbs.nt-rt.ru

Насосы сверхвысокого давления KSB. Техническое описание



**Hochdruck-
Kreiselpumpe**
**High-pressure
centrifugal pump**

Baugrößen 1 - 6
Pump sizes 1 - 6

Einsatzgebiete

- Speisewasser- und Kondensatförderung in Kraftwerken und Industrieanlagen
- Druckwassererzeugung, z.B. für Press-, Entrindungs-, Entzunderungsanlagen und Schneekanonen

Fields of Application

- Handling feed water and condensate in power stations and industrial plants
- Generation of pressurized water, e.g. for presses, decorticator, descaling plants and snow generators

Betriebsdaten

Förderstrom bei max. Drehzahl	Q bis	400 l/s
Förderhöhen	H bis	4200 m
Förderguttemperatur	T bis	200 °C
Pumpenzulaufdruck	p_s bis	30 bar
Pumpenenddruck	p_d bis	420 bar
Drehzahlen	n bis	7000 min ⁻¹

Operating Data

Capacity at max. speed	Q up to	400 l/s
Heads	H up to	4200 m
Temperature of medium handled	T up to	200 °C
Pump suction pressure	p_s up to	30 bar
Pump discharge pressure	p_d up to	420 bar
Speeds	n up to	7000 min ⁻¹

Bauart

Horizontale, quergeteilte Gliederpumpe mit Radialrädern, ein- oder zweiströmig, mehrstufig. Die Gehäuse sind untereinander mit O-Ringen oder metallisch an den Stirnflächen abgedichtet und durch Verbindungsschrauben verspannt.

Design

Horizontal, radially split, ring-section pump with radial impellers, single or double-flow entry, multistage. The stages are sealed against each other by O-rings or by metallic sealing faces and fastened by tie bolts.

PumpenfüÙe

HG 1	1.StufengehaÙe und DruckgehaÙe	/ unten
HG 2	1.StufengehaÙe und DruckgehaÙe	/ unten
HG 2	1.StufengehaÙe und DruckgehaÙe	/ Achsmitte
HG 3	1.StufengehaÙe und DruckgehaÙe	/ Achsmitte
HG 3	SauggehaÙe und DruckgehaÙe	/ Achsmitte
HG 3-6	SauggehaÙe und DruckgehaÙe	/ Achsmitte

Radiallager, Schmierung

Walzlager ungekuhlt, Ringschmierung
 Walzlager gekuhlt, Ringschmierung
 Gleitlager ungekuhlt, Ringschmierung
 Gleitlager gekuhlt, Ringschmierung
 Gleitlager, Druckolschmierung

Axiallager, Schmierung

Walzlager gekuhlt, Ringschmierung (HG 1-3)
 Gleitlager, Druckolschmierung (HG 1-6)

Entlastungseinrichtung

Axialschubausgleich durch die hydraulische Entlastungseinrichtung an der Druckseite. Entlastung durch Scheibe oder Doppelkolben.

Wellendichtung

Packungsstopfbuchse ungekuhlt oder gekuhlt.
 Gleitringdichtung ungekuhlt, mit Mantelkuhlung, Gegenringkuhlung, Injektion oder Zirkulation.
 Die Welle ist im Bereich der Dichtung mit auswechselbarer Wellenhulse versehen.

Stutzenstellung

Saugstutzen: Radial, senkrecht nach oben oder unten
 Druckstutzen: Radial, senkrecht nach oben
 Anzapfung: Radial, in allen StufengehaÙen, in verschiedenen Richtungen, auf Anfrage.

Flansche

AnschlussmaÙe nach EN oder ASME.

Antrieb

Direkt durch E-Motor, Turbine oder Verbrennungsmotor oder indirekt ber Getriebe, hydraulische Regelkupplung oder Getrieberegelpkupplung.

Ort / Stellung

Pump Feet

HG 1	1st stage casing and discharge casing	/ bottom
HG 2	1st stage casing and discharge casing	/ bottom
HG 2	1st stage casing and discharge casing	/ centerline
HG 3	1st stage casing and discharge casing	/ centerline
HG 3	Suction casing and discharge casing	/ centerline
HG 3-6	Suction casing and discharge casing	/ centerline

Location / Position

Radial Bearing, Lubrication

Rolling element bearing uncooled, oil ring lubrication
 Rolling element bearing cooled, oil ring lubrication
 Plain bearing uncooled, oil ring lubrication
 Plain bearing cooled, oil ring lubrication
 Plain bearing, forced oil lubrication

Thrust Bearing, Lubrication

Rolling element bearing cooled, oil ring lubrication (HG 1-3)
 Plain bearing, forced oil lubrication (HG 1-6)

Balancing Device

Thrust compensation by the hydraulic balancing device located at the discharge side. Balancing by disc or double piston.

Shaft Seal

Packed stuffing box uncooled or cooled.
 Mechanical seal uncooled, with jacket cooling, seat ring cooling, injection or circulation.
 The shaft is provided with exchangeable shaft sleeve in the shaft seal area.

Nozzle Orientation

Suction nozzle: radially, vertically upwards or vertically downwards
 Discharge nozzle: radially, vertically upwards
 Tapping nozzle: radially, in all stage casings, in various directions, upon request.

Flanges

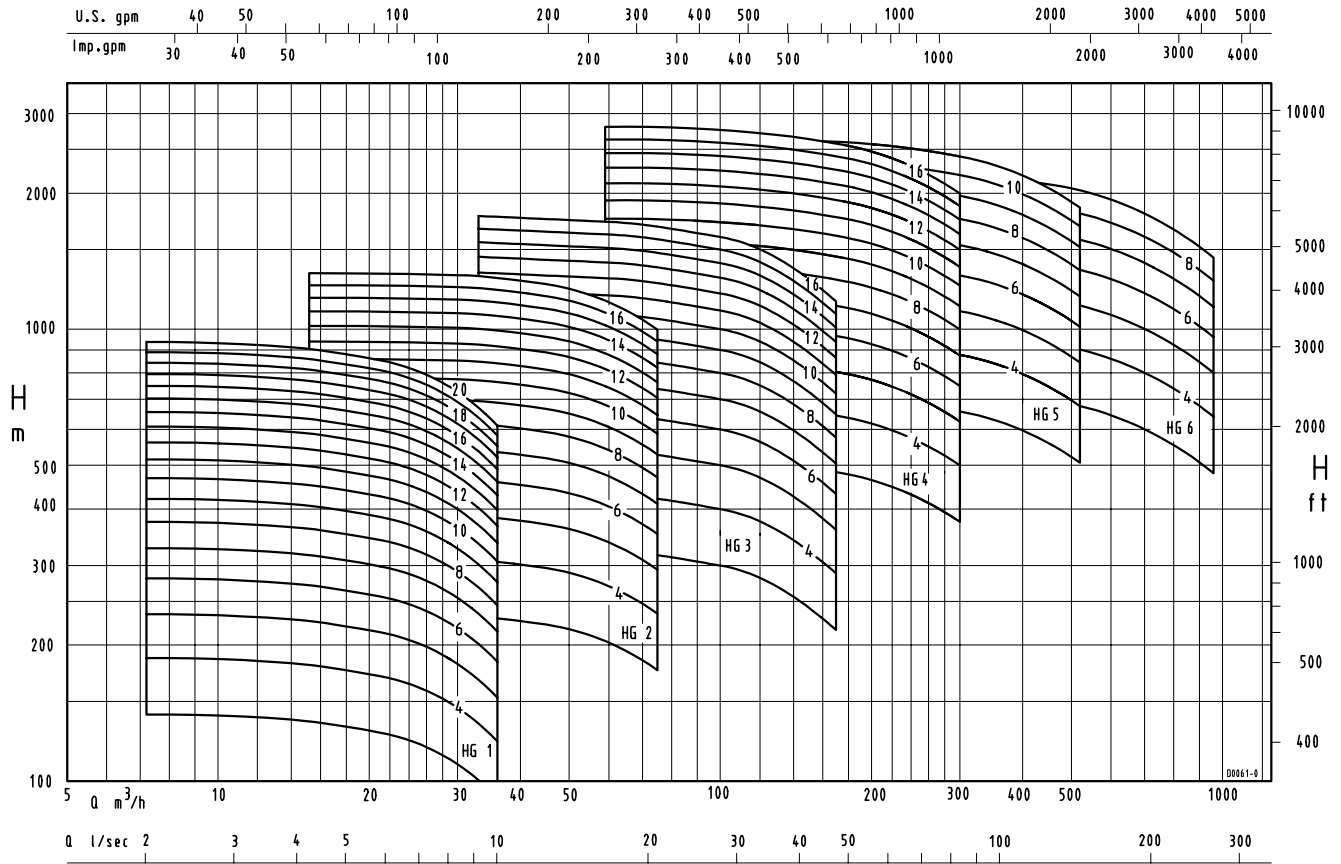
Connection dimensions according to EN or ASME.

Drive

Direct by electric motor, turbine or combustion engine, or indirect through a gearbox, hydraulic coupling or variable speed coupling.

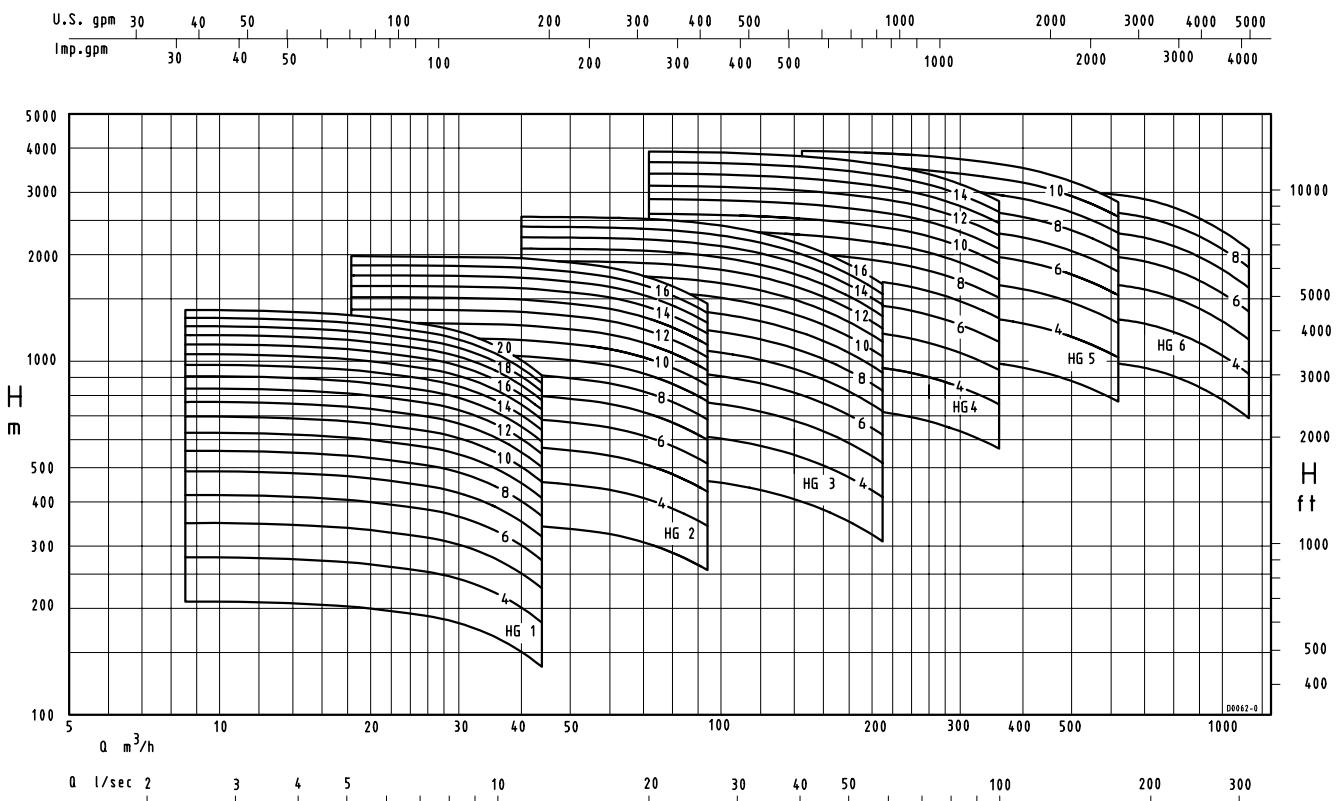
Sammelkennfeld 50 Hz $n = 2950 \text{ min}^{-1}$

Selection Chart 50 Hz

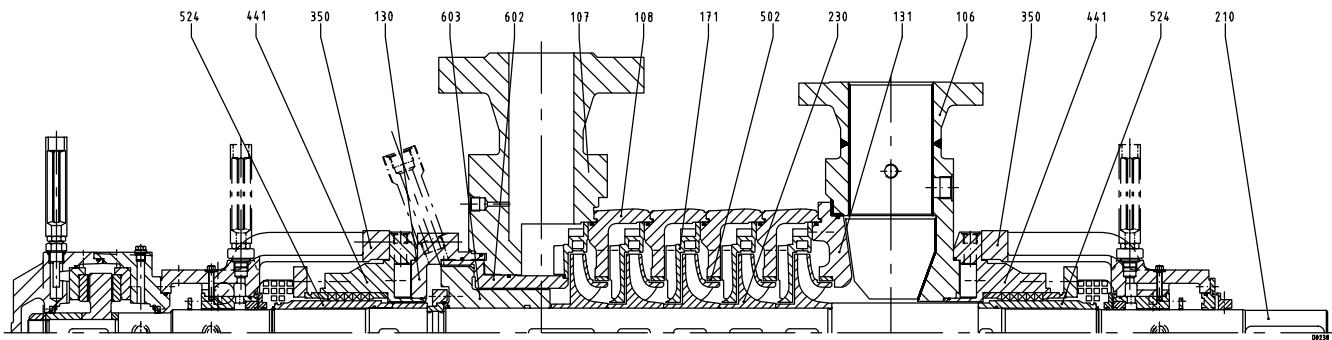


Sammelkennfeld 60 Hz $n = 3550 \text{ min}^{-1}$

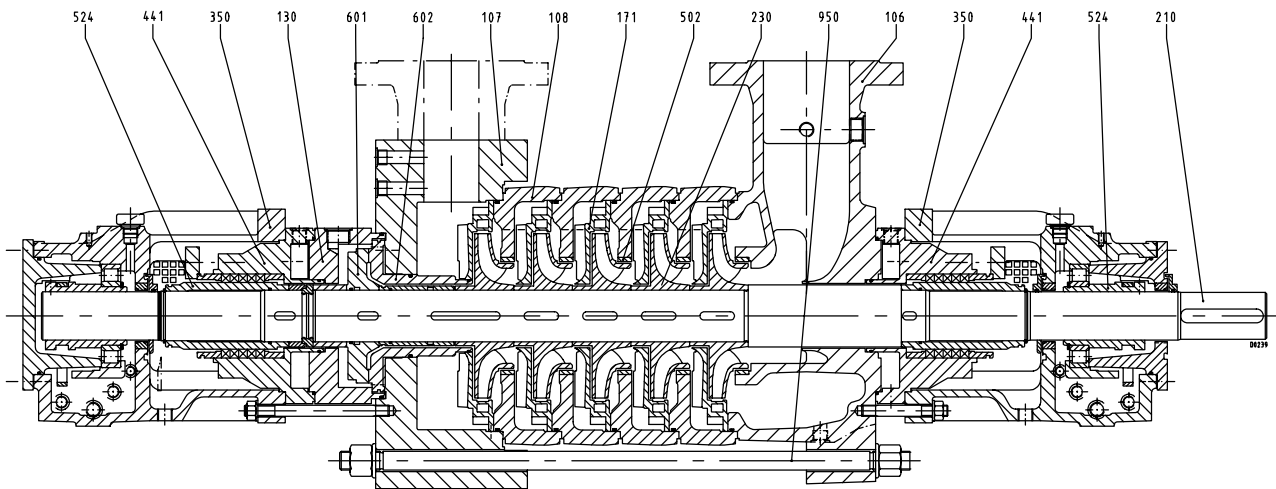
Selection Chart 60 Hz



Teilverzeichnis / List of Components



Beispiel: Gleitlager, Entlastungskolben, Packung gekühlt, Sauggehäuse Stahl, Druckgehäuse mit Vorschweißflansch,
 Example: Plain bearing, Balance drum, Packed stuffing box cooled, Suction casing forged, Discharge casing with welding neck flange,



Beispiel: Wälzlager, Entlastungsscheibe, Packung gekühlt, Sauggehäuse Guß, Druckgehäuse mit Blockflansch,
 Example: Rolling element bearing, Balance disc, Packed stuffing box cooled, Suction casing cast, Discharge casing with integral flange

Werkstoffe / Materials

Teile-Nr. Part No.	Benennung Designation	Werkstoffauswahl / Material Selection	
		HGB	HGC
106	Sauggehäuse - suction casing	C-Stahl / C-steel	C-Stahl plattiert, Cr-Stahl / C-steel plated, Cr-steel
107	Druckgehäuse - discharge casing	C-Stahl / C-steel	C-Stahl plattiert, Cr-Stahl / C-steel plated, Cr-steel
108	Stufengehäuse - stage casing	C-Stahl / C-steel	Cr-Stahl / Cr-steel
130	Gehäuseteil - casing part	C-Stahl / C-steel	Cr-Stahl / Cr-steel
131	Einlauftring - inlet ring	C-Stahl, Cr-Stahl / C-steel, C-steel, Cr-steel	
171	Leitrad - diffuser	Grauguß, Cr-Stahl / Cast iron, Cr-steel	
210	Welle - shaft	C-Stahl, Cr-Stahl / C-steel, C-steel, Cr-steel	
230	Lauftrad - impeller	Grauguß, Cr-Stahlguß / Cast iron, Cr-steel casting	
350	Lagergehäuse - bearing housing	Grauguß / Cast iron	
441	Gehäuse für Dichtung - shaft seal housing	C-Stahl, Cr-Stahl / C-steel, Cr-steel	
502	Spaltring - casing wear ring	Cr-Stahl / Cr-steel	
524	Wellenschutzhülse - shaft protecting sleeve	Cr-Stahl / Cr-steel	
601	Entlastungsscheibe - balance disc	Cr-Stahl / Cr-steel	
602	Entlastungsgegenscheibe - balance disc seat	Cr-Stahl / Cr-steel	
603	Entlastungskolben - balance drum	Cr-Stahl / Cr-steel	
905	Verbindungsschraube - tie bolt	Vergütungsstahl / quenched and tempered steel	

Technische Änderungen bleiben vorbehalten.
Subject to technical modifications

XBS

05.10

1850.1/08-90

Barrel Casing Pump

CHTD

With Single-entry Inlet

Type Series Booklet



Contents

Energy	4
Barrel Casing Pump	4
CHTD	4
Main applications	4
Fluids handled	4
Operating data	4
Designation	4
Design details	4
Materials	5
Product benefits	5
General assembly drawings with list of components	6
CHTD 6/6, pump with mechanical seal	6
CHTD 7/5, pump with floating ring seal	7

Energy

Barrel Casing Pump

CHTD



Main applications

- Feed water transport in power stations
- New and retrofitted installations
- Boiler feed applications

Fluids handled

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

Operating data

Operating properties

Characteristic		Value
Flow rate	Q [m ³ /h]	≤ 3600
	Q [l/s]	≤ 355
Head	H [m]	≤ 5500
Fluid temperature	T [°C]	≤ 210
Inlet pressure	p _s [bar]	≤ 70
Discharge pressure ¹⁾	p _d [bar]	≤ 560
Discharge pressure ²⁾	p _d [bar]	≤ 490
Speed	n [rpm]	≤ 6500
Power input	P [kW]	≤ 40000
Max. circumferential speed at the impeller	[m/s]	≤ 130
Max. circumferential speed at Q _{min}	[m]	≤ 1000

1) At Q = 0, T = 20 °C

2) At Q = 0, T = 210 °C

Designation

Example: CHT D 7/6

Designation key

Code	Description	
CHT	Type series group	
D	Type series	
7	Size	
	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 10, 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

Depending on pump size and design:

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 designed 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 a replaceable shaft sleeve in the shaft seal area

Flanges

- Mating dimensions to ASME and DIN

Options

- Adaptation to customer specifications
- Single-piece cover
- 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

Material variants

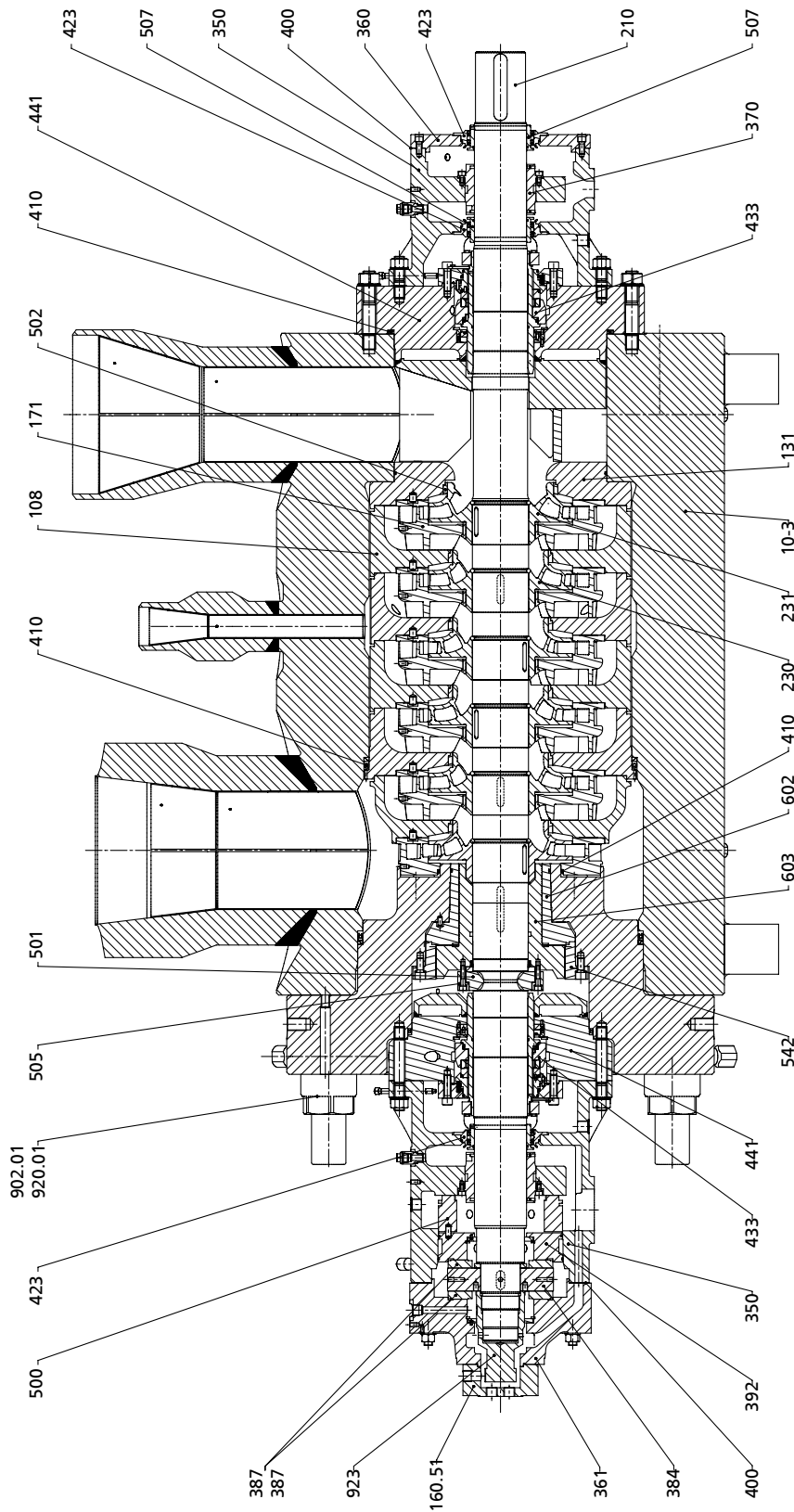
Description	Material
Barrel casing	Carbon steel, plated
Stage casing	Chrome steel
Nozzle	Steel which is creep-resistant at elevated temperatures, plated
Cover	Chrome steel
Hydraulic components	Chrome steel
Shaft seal housing	Chrome steel
Bearing housing	Grey cast iron or cast steel

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)

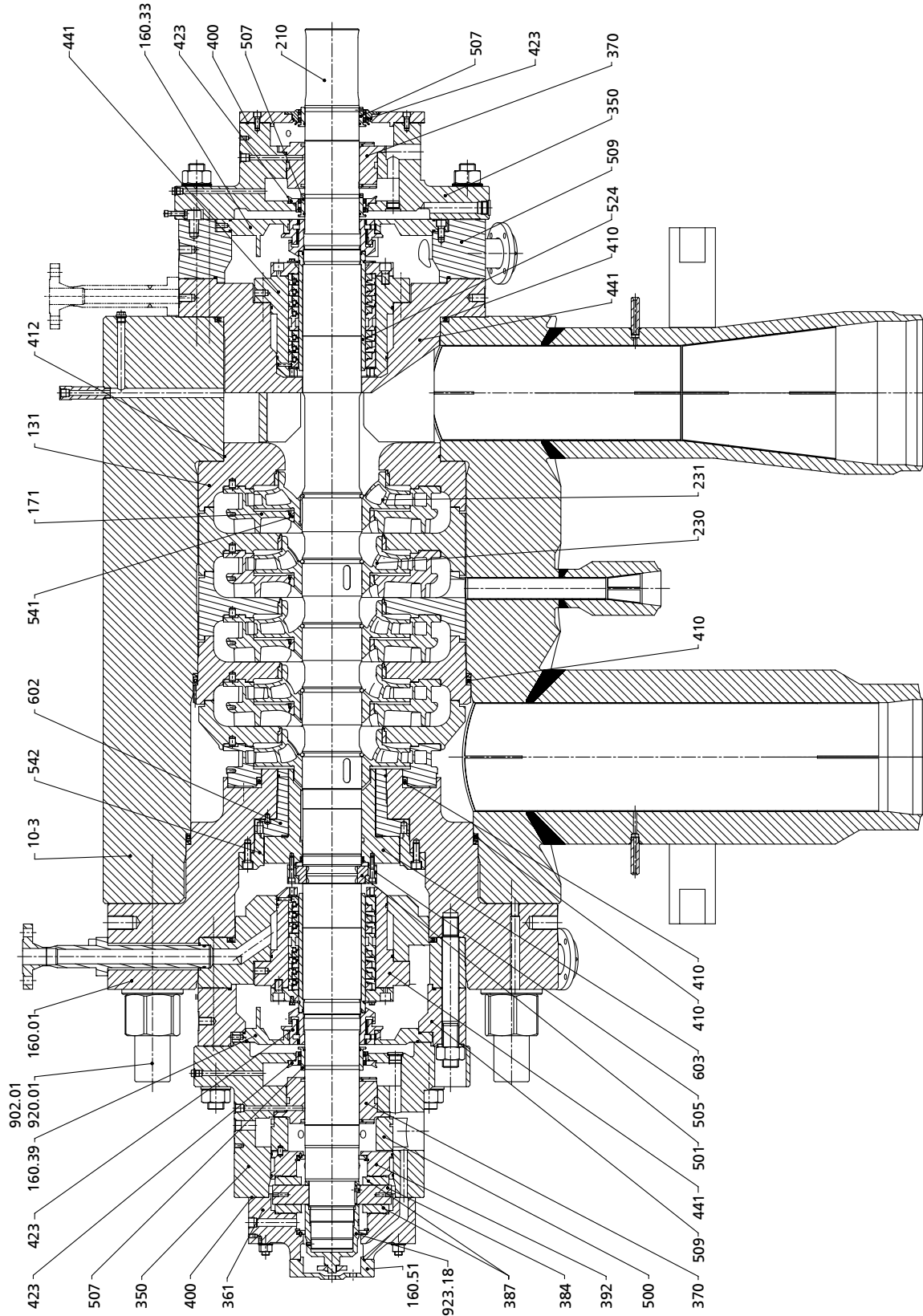
General assembly drawings with list of components

CHTD 6/6, pump with mechanical seal



General assembly drawing with list of components

CHTD 7/5, pump with floating ring seal

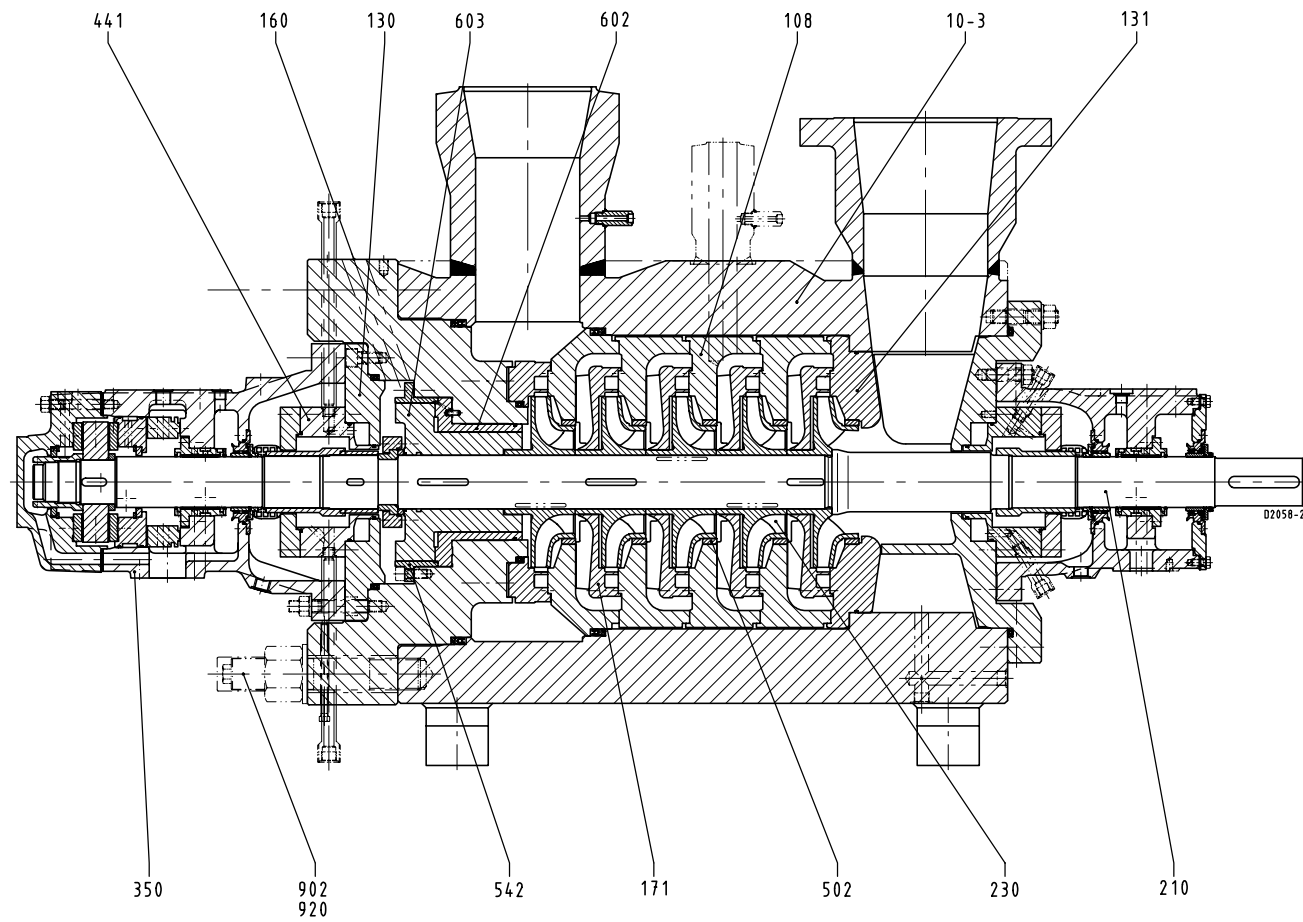


General assembly drawing with list of components

List of components and materials

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

Teileverzeichnis/List of Components



Werkstoffe/Materials

Teile-Nr. / Part No.	Benennung / Designation	Werkstoffauswahl / Material Selection
10-3	Mantelgehäuse - barrel	C-Stahl plattiert / C-steel plated
108	Stufengehäuse - stage casing	Cr-Stahl / Cr-steel
130	Gehäuseteil - casing part	Cr-Stahl / Cr-steel
131	Einlaufring - inlet ring	Cr-Stahl / Cr-steel
160	Deckel - cover	Cr-Stahl / Cr-steel
171	Leitrad - diffuser	Cr-Stahl / Cr-steel
210	Welle - shaft	Cr-Stahl / Cr-steel
230	Laufgrad - impeller	Cr-Stahl / Cr-steel
350	Lagergehäuse - bearing housing	Grauguß / cast iron
441	Gehäuse für Dichtung - seal casing	Cr-Stahl / Cr-steel
502	Spaltring - casing wear ring	Cr-Stahl / Cr-steel
542	Drosselbuchse - throttle bush	Cr-Stahl / Cr-steel
602	Entlastungsgegenscheibe - balance counter disc	Cr-Stahl / Cr-steel
603	Entlastungskolben - balance drum	Cr-Stahl / Cr-steel
902	Stiftschraube - stud	Vergütungsstahl / quenched a. tempered steel
920	Mutter - nut	Vergütungsstahl / quenched a. tempered steel

Technische Änderungen bleiben vorbehalten.
 We reserve the right to alter specification

XBS

05.10

1860.1/02-90



Hochdruck-Mantelgehäusepumpe
High-Pressure Barrel-Type Pump

Baugrößen 3 - 6
Pump sizes 3 - 6

Einsatzgebiete

- Speisewasser- und Kondensatförderung in Kraftwerken
- Kesselspeisung und Kondensatförderung in Industrieanlagen
- Druckwassererzeugung in Press-, Entrindungs- und Endzunderungsanlagen

Fields of Application

- Handling feed water and condensate in power stations
- Boiler feeding and condensate handling in industrial plants
- generation of pressurized water, e.g. for presses, decorticator and descaling plants

Betriebsdaten

Förderstrom bei max. Drehzahl	Q bis 1278 m ³ /h (Q bis 355 l/s)
Förderhöhen	H bis 4000 m
Förderguttemperatur	t bis 200 °C
Pumpenzulaufdruck	p _s bis 30 bar
Pumpenenddruck	p _d bis 400 bar
Drehzahlen	n bis 6750 min ⁻¹

Operating Data

Capacity at max. speed	Q up to 1278 m ³ /h (Q up to 355 l/s)
Heads	H up to 4000 m
Temperature of medium handled	t up to 200 °C
Pump suction pressure	p _s up to 30 bar
Pump discharge pressure	p _d up to 400 bar
Speeds	n up to 6750 min ⁻¹

Bauart

Horizontale Mantelgehäusepumpe mit Radialrädern, einströmig, mehrstufig. Einlauf einströmig

Design

Horizontal barrel type pump with radial impellers, single flow, multistage. Single flow entry

Pumpenfüße

Mantelgehäuse

Ort / Stellung

Achsmitte

Pump Feet

Barrel

Location / Position

centerline

Radiallager, Schmierung

Gleitlager, Druckölschmierung

Journal Bearing, Lubrication

Plain bearing, forced oil lubrication

Axiallager, Schmierung

Gleitlager, Druckölschmierung

Thrust Bearing, Lubrication

Plain bearing, forced oil lubrication

Entlastungseinrichtung

Axialschubausgleich durch die hydraulische Entlastungseinrichtung an der Druckseite. Entlastung durch Doppelkolben.

Balancing Device

Thrust compensation by hydraulic balancing device located at the discharge side. Balancing by double piston.

Wellendichtung

Gleitringdichtung mit Zirkulation bzw. Zirkulation und Mantelkühlung in Cartridge-Bauweise
Die Gleitringdichtung ist mit Wellenhülse und Dichtungsdeckel ohne Einstellarbeiten auswechselbar.

Shaft Seal

Mechanical seal with circulation or with circulation and shroud cooling
The mechanical seal including shaft sleeve and seal cover can be replaced without further adjustments.

Stutzenstellung

Saugstutzen: Radial, senkrecht nach oben oder unten
Druckstutzen: Radial, senkrecht nach oben oder unten
Anzapfung: Radial 45° oben rechts (Blickrichtung vom Antrieb)

Nozzle Orientation

Suction nozzle: radially, vertically upwards or vertically downwards
Discharge nozzle: radially, vertically upwards or vertically downwards
Tapping nozzle: radially 45° top right (as viewed from suction side)

Schweißstutzen/Flansche

Anschlussmaße nach EN oder ASME.

Weld Nozzles/Flanges

Connection dimensions according to EN or ASME.

Antrieb

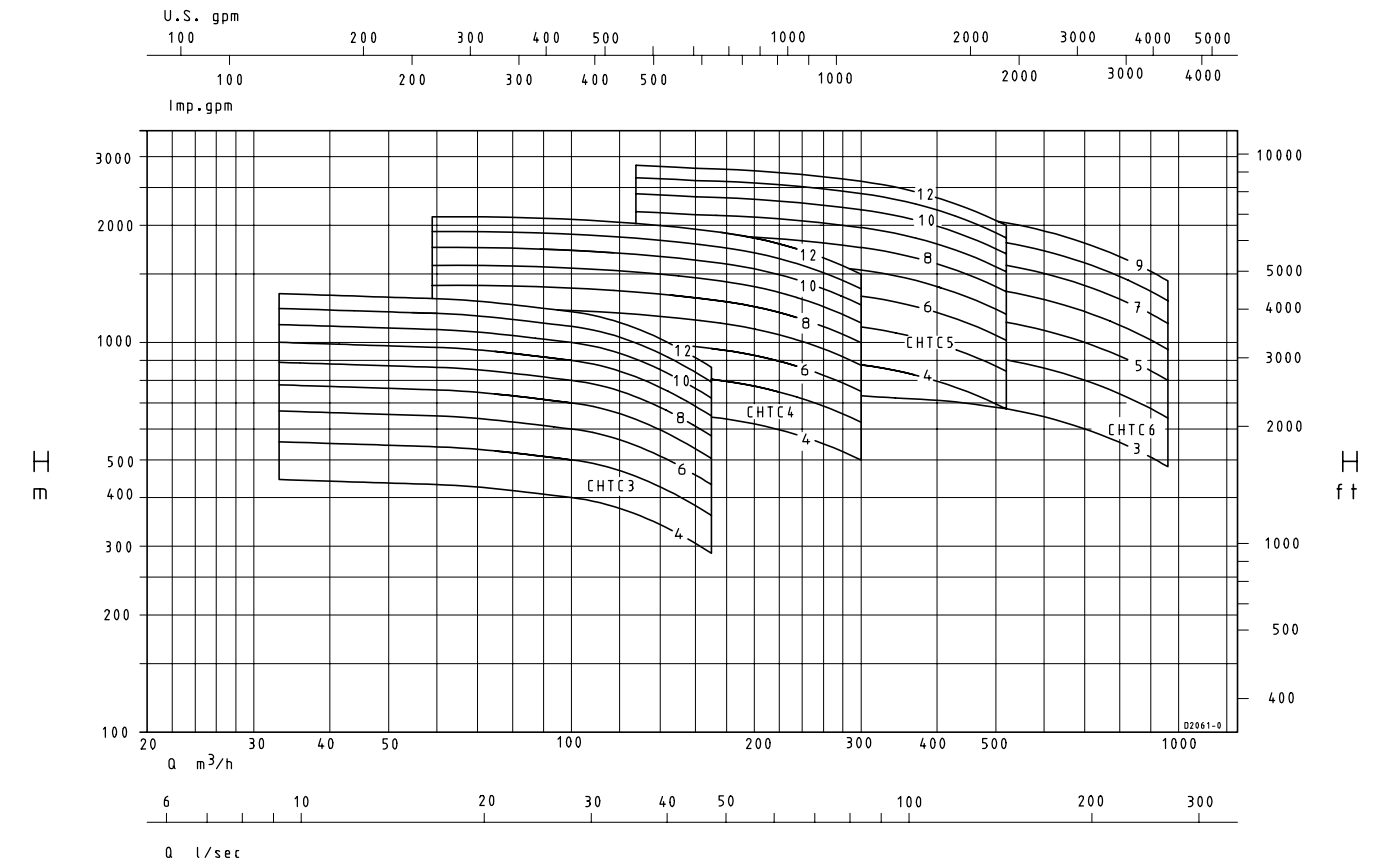
Direkt durch E-Motor, Turbine oder Verbrennungsmotor, oder indirekt über Getriebe, hydraulische Regelkupplung oder Getrieberegelnkupplung.

Drive

Direct drive by electric motor, turbine or combustion engine, or indirectly through a gearbox, hydraulic coupling or variable speed coupling.

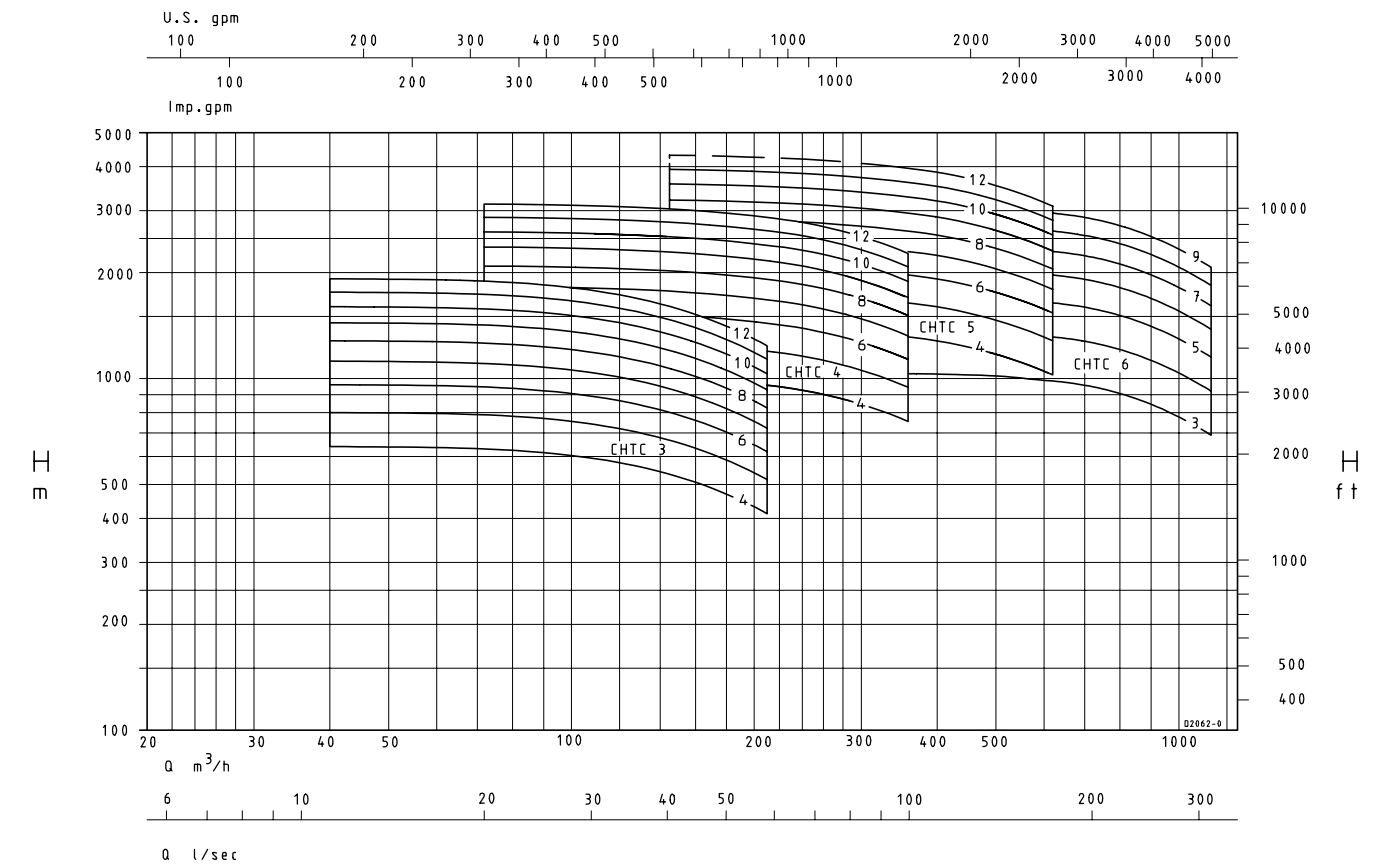
Sammelkennfeld 50 Hz n = 2950 min⁻¹

Selection Chart 50 Hz



Sammelkennfeld 60 Hz n = 3550 min⁻¹

Selection Chart 60 Hz



По вопросам продаж и поддержки обращайтесь:

Архангельск (8182)63-90-72	Краснодар (861)203-40-90	Санкт-Петербург (812)309-46-40
Астана (7172)727-132	Красноярск (391)204-63-61	Саратов (845)249-38-78
Астрахань (8512)99-46-04	Курск (4712)77-13-04	Севастополь (8692)22-31-93
Барнаул (3852)73-04-60	Липецк (4742)52-20-81	Симферополь (3652)67-13-56
Белгород (4722)40-23-64	Магнитогорск (3519)55-03-13	Смоленск (4812)29-41-54
Брянск (4832)59-03-52	Москва (495)268-04-70	Сочи (862)225-72-31
Владивосток (423)249-28-31	Мурманск (8152)59-64-93	Ставрополь (8652)20-65-13
Волгоград (844)278-03-48	Набережные Челны (8552)20-53-41	Сургут (3462)77-98-35
Вологда (8172)26-41-59	Нижний Новгород (831)429-08-12	Тверь (4822)63-31-35
Воронеж (473)204-51-73	Новокузнецк (3843)20-46-81	Томск (3822)98-41-53
Екатеринбург (343)384-55-89	Новосибирск (383)227-86-73	Тула (4872)74-02-29
Иваново (4932)77-34-06	Омск (3812)21-46-04	Тюмень (3452)66-21-18
Ижевск (3412)26-03-58	Орел (4862)44-53-42	Ульяновск (8422)24-23-59
Казань (843)206-01-48	Оренбург (3532)37-68-04	Уфа (347)229-48-12
Калининград (4012)72-03-81	Пенза (8412)22-31-16	Хабаровск (4212)92-98-04
Калуга (4842)92-23-67	Пермь (342)205-81-47	Челябинск (351)202-03-61
Кемерово (3842)65-04-62	Ростов-на-Дону (863)308-18-15	Череповец (8202)49-02-64
Киров (8332)68-02-04	Рязань (4912)46-61-64	Ярославль (4852)69-52-93
	Самара (846)206-03-16	

Единый адрес: kbs@nt-rt.ru **Веб-сайт:** www.ksb.nt-rt.ru