CR, CRI, CRN, CRT
CRE, CRIE, CRNE, CRTE

Custom-built pumps

50/60 Hz

be
think
innovate

GRUNDFOS

Table of contents

1. Introduction

This catalogue is a supplement to these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CRT, CRTE
- CR, CRN high-pressure pumps.

It gives an overview of some of the customised solutions offered by Grundfos. If the catalogue does not provide a solution to your specific pumping needs, please contact us with a detailed description of your problem, and we will get down to work - for you!

Customised CR pumps

We offer a wide range of customised variants of the CR type range for a variety of demanding industrial applications.

With these multistage in-line pumps, based on the well-known CR type range, we meet the customers' needs for pumps capable of handling special installation requirements and these liquids:

- high-temperature liquids
- crystallising liquids
- high-viscosity liquids such as paints and varnishes
- aggressive liquids
- volatile liquids
- flammable liquids.

Most of the pumps are available with either mains-operated motors (CR, CRI, CRN and CRT) or electronically speed-controlled motors (CRE, CRIE, CRNE and CRTE).

Customised pumps from CR 1s to CR 90 are available for these temperature ranges:

- Water-based liquids: -40 to 180 °C.
- Thermal oils: -20 to 240 °C.

The below pump types are available as customised pumps.

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Note: CRT(E) 2, 4, 8 and 16 are also available as customised pumps.

Pumps for individual requirements

The CR pumps can be customised to meet individual requirements. This is due to the "mix-and-match" approach to customisation, where the many pump features and options are to be regarded as modules that can be combined to create the ideal pump for the job at hand.

Motor options

CR motors are available in many different configurations to meet the requirements presented by the power supply, the pump environment and/or the pumped liquid itself.

- Power supply systems vary in terms of both frequency and voltage, and required protection methods.
- Your environment may be explosive, very hot and/or very humid. Special conditions also apply at high altitudes.
- The pumped liquid can call for a special motor solution. High or low viscosities and/or high or low densities may require non-standard motor sizes. You may also need an explosion-proof variant.
- The installation site of the pump may require alternative positions of pump and motor parts, such as terminal box positions and vent screw positions.

For further information, see section *Overview*.

Shaft seal options

Extreme liquids sometimes call for extreme measures.

- High temperatures damage seal faces unless precautions are taken.
- Concern for safety can necessitate special measures for aggressive, toxic or flammable liquids.
- Liquids can be harmful to shaft seals because they crystallise, harden or are extremely abrasive.

For further information, see section *Overview*.

Pump options

The CR pump elements can handle the most demanding liquids and pressures, and be adapted to suit many other requirements.

- Horizontal installation if height is a limitation.
- Poor inlet conditions mean that NPSH values must be adjusted to avoid cavitation.
- Very high pressures demand special solutions.
- Special surface treatments or certificates may be required.

For further information, see section *Overview*.

Connection options

Your chosen pump elements can be fitted with exactly the connection options you need. All standards are covered, and special connection variants are available for maximum compactness, high liquid pressures etc.

For further information, see section *Overview*.

Features and benefits

Customised CR pumps have the following features and benefits:

GR5357

Grundfos motor

Grundfos motors are remarkably silent and highly efficient.

3-phase pumps from 1.1 to 75 kW have premium efficiency IE3 motors as standard.

Grundfos motors are available with integrated frequency converter designed for speed-controlled operation.

Shaft seal solutions

The specially designed cartridge seal increases reliability, ensures safe handling and enables easy service and access.

The cartridge shaft seal comes in a wide choice of materials. It is available in single and double seal arrangements and magnetic drive configurations.

Connections

The Grundfos CR pump can be connected to any system.

Material options

The Grundfos CR pump is available in four different material variants:

CRT(E): Titanium
CRN(E): Stainless steel AISI 316
CRI(E): Stainless steel AISI 304
CR(E): Stainless steel AISI 304/cast iron.

Wide range of pump sizes

The CR pump comes in 13 flow sizes and hundreds of pressure sizes, ensuring that you can always find exactly the right pump for the job.

High-performance hydraulics

Pump efficiency is maximised by the optimised hydraulics and carefully crafted production technology.

Dry-running protection

The patented Grundfos LiqTec system eliminates the risk of breakdowns due to dry running. If there is no liquid in the pump, the LiqTec will stop the pump immediately.

2. Overview

4-pole motors	Explosion-proof motors	Anti-condensation heater	Multiplug connections	CSA/UL-approved motors
				
See page 27.	See page 21.	See page 24.	See page 22.	See page 20.

Shaft seals	Rubber parts	Titanium	Non-cartridge solution	CR pumps with air-cooled top
				
See page 28.	See page 28.	See page 28.	See page 28.	See page 34.

CR high-pressure pumps	Horizontal mounting	All-stainless steel CR pumps	CRH, horizontal end-suction pumps	Low temperature
				
See page 12 and 38.	See page 17 and 41.	See page 40.	See page 44.	See page 14 and 38.

Aseptic connection (CR)	Oval flanges (CR)	Flanges (CR)	PJE connections (CRI, CRN)	Flanges (CRI, CRN)
				
See page 55.	See page 57.	See page 57.	See page 56.	See page 57.

VIK-approved motors

See page 20.

Motor protection

See page 24.

Oversize or undersize motors

See page 26.

Special voltage

See page 22.

Enclosure class

See page 27.

Terminal box positions

See page 27.

MAGdrive

See page 36.

Back-to-back seal arrangement

See page 29.

CR pump with pressure intensifier

See page 31.

CR pump with barrier liquid

See page 30.

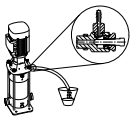
Tandem seal arrangement

See page 32.

Dry-running protection

See page 50.

Accessories



See page 19.

Alternative colour

See page 39.

Bearing flange

See page 48.

Pump rubber parts

See page 48.

CR low-NPSH pumps

See page 13 and 40.

CR deep-well pumps

See page 18 and 47.

Belt-driven CR pumps

See page 17 and 45.

Bearing materials

See page 50.

Surface treatment

See page 39.

Clamp connections (CRI, CRN)

See page 54.

Oval flanges (CRI, CRN)

See page 57.

TriClamp connections (CRN)

See page 52.

Union connections (CRI, CRN)

See page 57.

PJE connections (CRT)

See page 57.

Customised solutions

See page 57.

Certificates

See page 58.

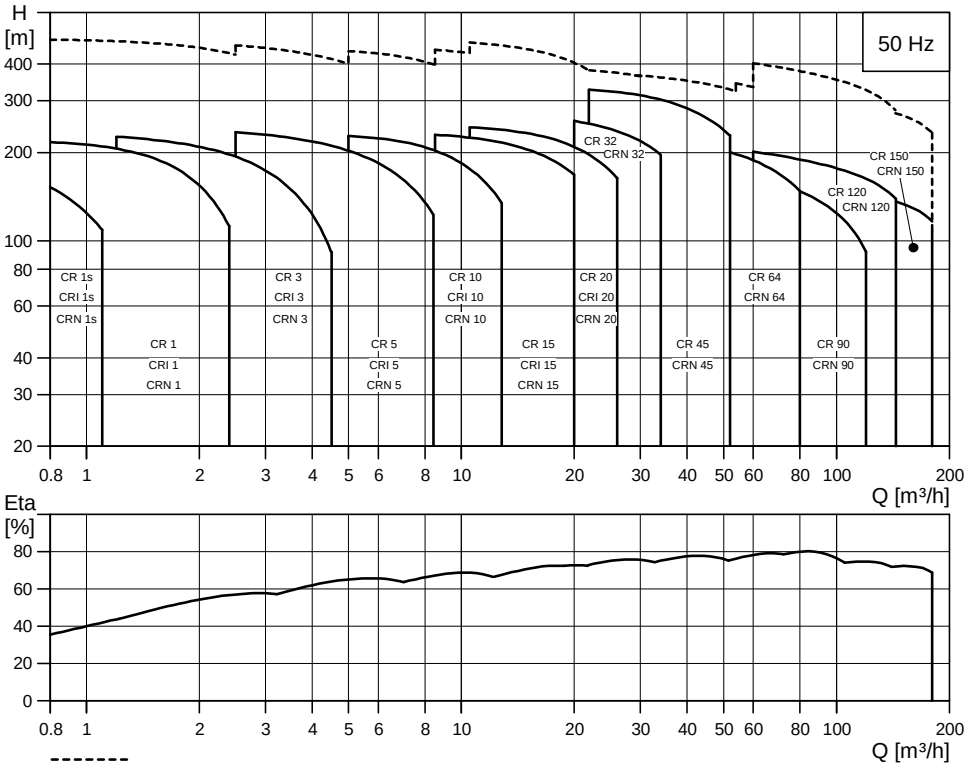
CRE pump solutions

See page 63.

3. Performance range

CR

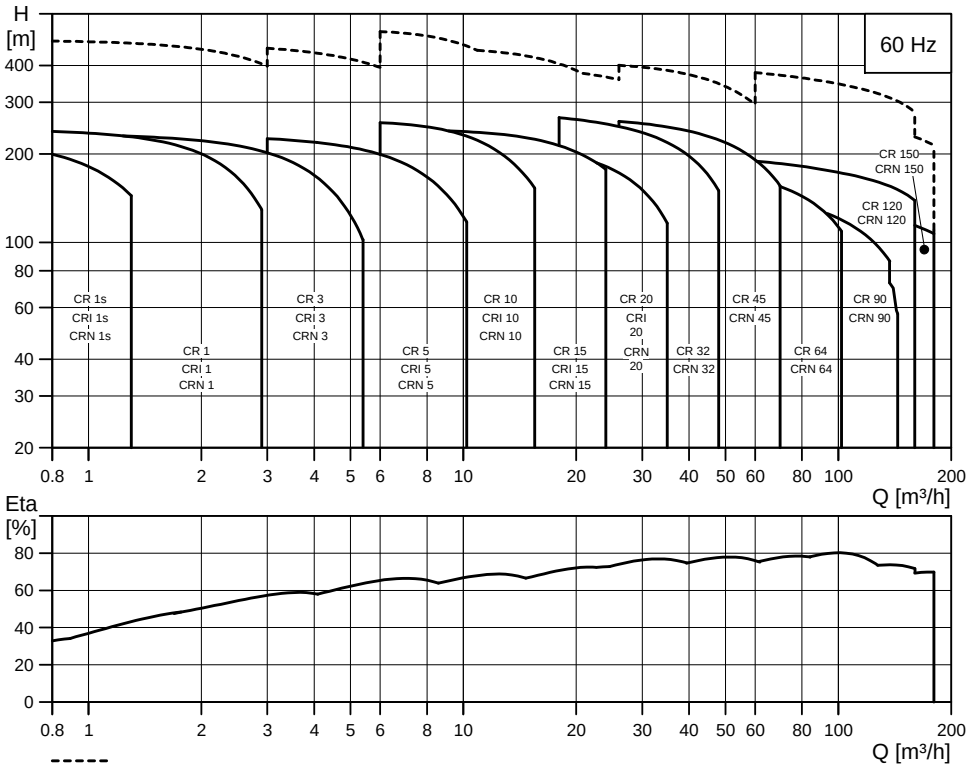
50 Hz



TM02 1192 4708

Note: CRE, CRIE, CRNE pumps are available up to 22 kW.

60 Hz

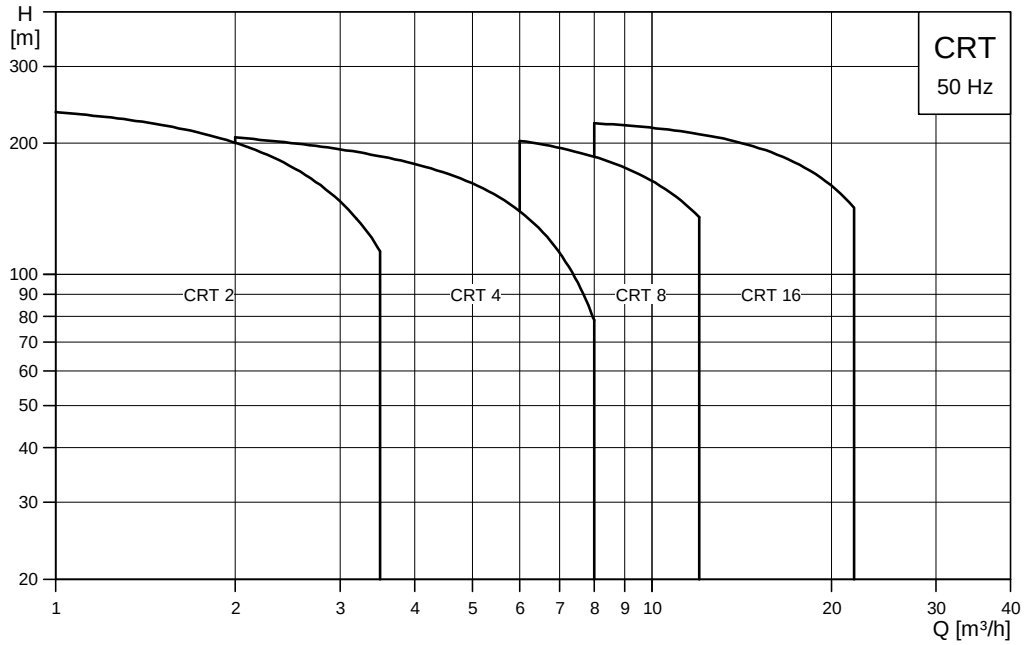


TM02 1530 4408

Note: CRE, CRIE, CRNE pumps are available up to 22 kW.

CRT(E)

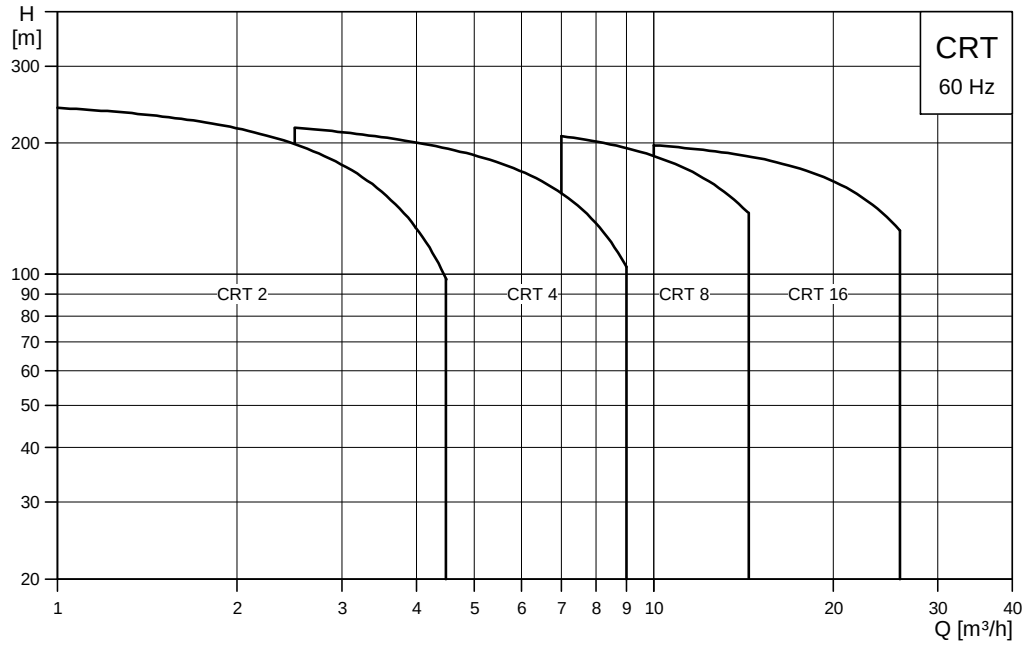
50 Hz



TM03 3817 1106

Note: CRTE pumps are available.

60 Hz



TM03 3818 1106

Note: CRTE pumps are available.

EuP ready

The CR, CRI, CRN pumps are energy-optimised and comply with the EuP Directive (Commission Regulation (EC) No 547/2012) which has been effective since 1 January 2013. As from this date, all pumps will be classified/graduated in a new energy minimum efficiency index (MEI).

Minimum efficiency index

Minimum efficiency index (MEI) means the dimensionless scale unit for hydraulic pump efficiency at best efficiency point (BEP), part load (PL) and overload (OL). The Commission Regulation (EU) sets efficiency requirements to MEI ≥ 0.10 as from 1 January 2013 and MEI ≥ 0.40 as from 1 January 2015. An indicative benchmark for best-performing water pump available on the market as from 1 January 2013 is determined in the Regulation.

- The benchmark for most efficient water pumps is MEI ≥ 0.70.
- The efficiency of a pump with a trimmed impeller is usually lower than that of a pump with the full impeller diameter. The trimming of the impeller will adapt the pump to a fixed duty point, leading to reduced energy consumption. The minimum efficiency index (MEI) is based on the full impeller diameter.
- The operation of this water pump with variable duty points may be more efficient and economic when controlled, for example, by the use of a variable-speed drive that matches the pump duty to the system.
- Information on benchmark efficiency is available at http://europump.eu/efficiencycharts.

MEI index for CR pumps

Pump type	MEI
CR 1s-3	0.54
CR 1-3	> 0.70
CR 3-3	> 0.70
CR 5-3	0.57
CR 10-3	> 0.70
CR 15-3	> 0.70
CR 20-3	> 0.70
CR 32-3	> 0.70
CR 45-3	> 0.70
CR 64-3	> 0.70
CR 90-3	> 0.70

4. Identification

Type keys

Pump

Example	CR	E	32	s	-4	-2	-A	-F	-G	-E	-HQQE

Type range:
CR, CRI, CRN, CRT

Pump with integrated frequency converter

Flow rate [m^3/h]

Undersize impeller (all impellers)
CR 1s, CRI 1s, CRN 1s

Number of impellers

Number of reduced-diameter impellers
CR(E), CRN(E) 32, 45, 64, 90, 120, 150

Code for pump version

Code for pipe connection

Code for materials

Code for rubber parts

Code for shaft seal

Key to codes

Code	Description
Pump version	
A	Basic version
B	Oversize motor
D	Pump with pressure intensifier
DW	Deep-well pump with ejector
E	Pump with certificate or ATEX approval
F	Pump for high temperatures (with air-cooled top)
G	Multi-E slave
H	Horizontal version
HS	High-pressure pump with high-speed MGE motor
I	Different pressure rating
J	Pump with a different maximum speed
K	Pump with low NPSH
M	Magnetic drive
N	With sensor
P	Undersize motor
R	Horizontal version with bearing bracket
SF	High-pressure pump
V	Multi-E master
X	Special version
Pipe connection	
A	Oval flange
B	NPT thread
CA	FlexiClamp
CX	Triclamp
F	DIN flange
FC	DIN flange according to DIN 11853-2
G	ANSI flange
J	JIS flange
N	Changed diameter of ports
P	PJE coupling
X	Special version

Code	Description
Materials	
A	Basic version
AD	Carbon-graphite filled PTFE (bearings)
G	Wetted parts EN 1.4401/AISI 316
GI	All parts stainless steel, wetted parts EN 1.4401/AISI 316
I	Wetted parts EN 1.4301/AISI 304
II	All parts stainless steel, wetted parts EN 1.4301/AISI 304
K	Bronze (bearings)
S	SiC bearings + PTFE neck rings
X	Special version
SX	Carbon-free
Code for rubber parts in pump	
E	EPDM
F	FXM (Fluoraz®)
K	FFKM (Kalrez®)
V	FKM (Viton®)
Shaft seal type designation	
A	O-ring seal with fixed driver
D	Balanced O-ring seal
H	Balanced cartridge seal with O-ring
K	Type M as cartridge seal
O	Double seal, back-to-back
P	Double seal, tandem
X	Special version
Seal face material	
B	Carbon, synthetic resin-impregnated
C	Other types of carbon
H	Cemented tungsten carbide, embedded (hybrid)
U	Cemented tungsten carbide
Q	Silicon carbide
X	Other ceramics
Secondary seal material (rubber parts)	
E	EPDM
F	FXM (Fluoraz®)
K	FFKM (Kalrez®)
V	FKM (Viton®)

Shaft seal

Example	-H	-Q	-Q	-E

Shaft seal type designation

Material of rotating seal face

Material of stationary seal face

Material of secondary seal (rubber parts)

5. Applications

High-pressure applications

GR7767 - TM02 8470 4004

Fig. 1 CR high-pressure pumps

Reference applications

- Filtration
- reverse osmosis
- cleaning and washing
- boiler feed.

Customised solutions

High-pressure applications often expose pumps to a variety of extreme conditions, such as high inlet pressure, high operating pressure, frequent starts/stops and pressure pulsing. Overload of the pump may cause increased wear of pump parts, such as motor bearings and shaft seal, and thus reduce the pump life.

To avoid unexpected breakdowns, we offer customised solutions designed to meet your needs!

High-pressure handling

We offer high-pressure pumps specially designed to cope with pressures up to 50 bar at max. 120 °C.

When necessary, CR high-pressure pumps are fitted with a bearing flange. A bearing flange is an additional flange with an oversize ball bearing designed to absorb axial forces in both directions.

CR high-pressure pumps come in two variants: as a single-pump solution or as a 2-pump solution.
The single-pump solutions is used for flow rates up to 5 m^3/h, the 2-pump solution for flow rates above 5 m^3/h.

Single-pump solution

Our single-pump solutions include the pump types CRNE 1 HS and CRNE 3 HS.

CRNE HS pumps are fitted with a high-speed motor with integrated frequency converter.

To minimise the pressure on the shaft seal, the direction of rotation is the opposite of that of standard pumps, and the chamber stack is turned up-side down. Consequently, the pumped liquid flows in the opposite direction.

2-pump solutions

Our 2-pump solutions are divided into two groups based on pump size:

- CRN 3, 5, 10, 15, 20, 32, 45, 64, 90 SF
- CR(N) 120, 150.

Both solutions consist of two pumps in series. The first pump is a standard pump for feeding. The second pump is either a high-pressure pump (SF) specially designed for high pressure or a standard pump.

To minimise the pressure on the shaft seal, the direction of rotation on CR SF pumps is the opposite of that of standard pumps, and the chamber stack is turned up-side down. Consequently, the pumped liquid flows in the opposite direction.

Further documentation

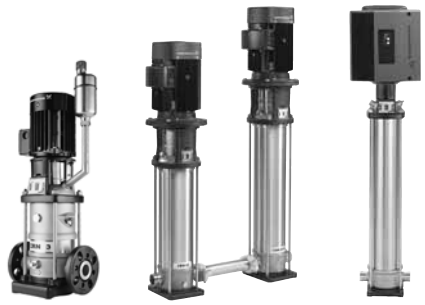
Information about	See page
CR high-pressure pumps (standard documentation)	165
Pumps with bearing flange	48
Customised pump parts	20-66
Special installation requirements	17
E-pump solutions	63
WebCAPS	165

Supplementary Grundfos pumps

For pressures above 50 bar, we recommend Grundfos BM modules or Grundfos BME, BMET pumps.

For further information about BM modules and BME, BMET pumps, see page 165.

Hot-water applications



GR5228 - GR7767 - TM02 8470 4004

Fig. 2 CR pumps for hot-water applications

Reference applications

- Boiler feeding
- applications involving poor inlet/suction conditions
- cleaning and washing applications
- high-temperature applications.

Customised solutions

Hot-water applications often expose pumps to a variety of extreme conditions, such as high temperatures, long operating hours, frequent starts/stops, pressure pulsing, poor inlet conditions and high inlet pressure. Such conditions may result in cavitation and/or cause increased wear of pump parts, for instance motor bearings and shaft seal, and thus reduce the pump life.

To avoid breakdowns, we offer customised solutions designed to meet your needs! We provide solutions for applications involving special requirements:

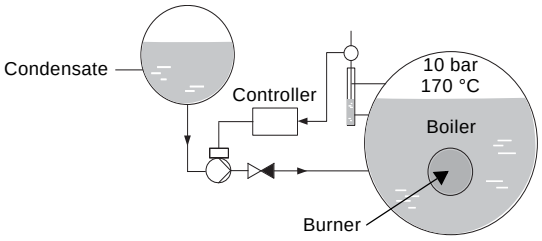
- steady steam production
- poor inlet conditions
- high temperature, etc.

Steady steam production

To ensure a steady steam production and a constant water level in the boiler tank, we recommend speed-controlled pumps.

We recommend speed-controlled pumps because:

- The reaction to changes in the steam consumption is faster compared with mains-operated pumps.
- The water level in the boiler feed tank is kept stable.
- The installation costs are lower compared to systems with mains-operated pumps and valves.
- No bypass pipe is needed.



TM03 2615 4605

Fig. 3 Boiler-feed application with speed-controlled pump

Applications involving poor inlet conditions

Cavitation is often a problem in applications where pumps have to cope with the combination of high liquid temperatures, poor inlet pressure and/or high flow rate.

Low-NPSH pumps eliminate the risk of cavitation and ensure a stable and reliable operation.

The CR low-NPSH pump is a pump with a special first stage design that reduces the NPSH value and prevents erosion and destruction of the pump, pipework and valves.

For further information about NPSH and the calculation of NPSH-value, see these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CR, CRN high pressure
- CRT, CRTE.

High-temperature applications

The pumping of hot liquids demands much of pump parts, such as the shaft seal and rubber parts.

To ensure a reliable and stable production, we offer CR pumps with an air-cooled top.

A CR pump with an air-cooled top has a standard mechanical shaft seal handling liquid temperatures up to 180 °C at 25 bar without external cooling. At the same time the pump delivers a high pressure. As the name implies, the pump is fitted with a special air-cooled shaft seal chamber generating the same insulation effects as that of a vacuum flask.

Further documentation

Information about	see page
CR low-NPSH pumps	40
CR pumps with air-cooled top	34
Pumps with bearing flange	48
CR pumps with under-/oversize motor	26
Customised pump parts	20-66
Special installation requirements	17
E-pump solutions	63
WebCAPS	165

Applications involving temperature control

TM02 7397 3403

Fig. 4 CRE, CRIE, CRNE pumps with sensor

Reference applications

Cooling systems:

- Electronic data processing
- laser equipment
- medical equipment
- industrial cooling and freezing processes, etc.

Temperature-control systems:

- Casting and moulding tools
- oil processing, etc.

Customised solutions

To ensure a safe and reliable operation in applications involving temperature control, we offer customised solutions designed to meet your needs!

We provide solutions for applications involving pumping of the following liquids:

- liquids at temperatures down to -40 °C
- high-temperature liquids
- high-viscous liquids, etc.

Pumping of liquids down to -40 °C

In applications where liquids are pumped at temperatures down to -40 °C, it is crucial for a successful production that pump parts are of the right materials and dimensions.

At such low temperatures, the selection of wrong materials and dimensions may cause deformation because of thermal expansion, and eventually stoppage of operation.

For low-temperature liquids below -20 °C, we recommend CRN pumps.

Pumping of high-temperature liquids

The pumping of hot liquids demands much of pump parts, such as shaft seals and rubber parts.
Examples of such liquids:

- water-based liquids up to 180 °C at PN 25
- thermal oils up to 240 °C at PN 16.

To ensure a reliable and stable production, we offer CR pumps with an air-cooled top and special rubber parts.

A CR pump with an air-cooled top is a pump which can handle high temperatures and deliver a high pressure. The pump is fitted with a special air-cooled shaft seal chamber generating the same insulation effects as that of a vacuum flask.

Pumping of high-viscous liquids

In applications where high-viscous liquids are pumped, precautions must be taken to ensure that the motor of the pump is not overloaded, and that the pump performance is not reduced too much.

The viscosity of a pumped liquid depends strongly on the liquid temperature.

To ensure a stable and reliable operation, we offer CR pumps with oversize motors.

Further documentation

Information about	See page
ATEX-approved pumps	21
CR pumps with air-cooled top	34
Pump rubber parts	48
CR pumps with oversize motor	26
Customised pump parts	20-66
Special installation requirements	17
E-pump solutions	63
WebCAPS	165

Aggressive/hazardous liquids

GR5954 - GR7369 - GR5216

Fig. 5 CR pumps for aggressive/hazardous liquids

Reference applications

- Chemical industry
- pharmaceutical industry
- refineries
- petrochemical industry
- distilling plants
- paint industry
- mining.

Customised solutions

In industries where pumping of dangerous and aggressive liquids is an integrated part of the daily production, safety is top priority. Leaking pumps pose a danger to the environment.

To prevent breakdowns, we offer customised solutions designed to meet your needs!

We provide solutions for the following liquids:

- aggressive and abrasive liquids
- toxic and hazardous liquids
- flammable liquids
- odorous liquids.

To ensure a safe handling of the above liquids, we offer the following pumps:

- pumps with tandem seal arrangement and flushing
- pumps with back-to-back seal arrangement and pressure intensifier
- pumps with magnetic drive (MAGdrive)
- pumps with ATEX approval.

Pumps with tandem seal arrangement

Pumps with tandem seal arrangements connected to a flushing device are used for crystallising, hardening or sticky liquids.

If the primary seal leaks, the leaking liquid will be flushed away by a flushing liquid.

Pumps with back-to-back seal arrangement

We recommend pumps with back-to-back seal arrangements for toxic, aggressive or flammable liquids.

Pumps with back-to-back seal arrangements are connected to systems that provide a higher pressure than the maximum pump pressure preventing leakage from the pump to the atmosphere side.

MAGdrive pumps

We recommend pumps with magnetic drive (MAGdrive) for toxic and hazardous liquids.

The MAGdrive pump is a hermetically sealed pump. In the MAGdrive pump, the power from the motor is transmitted to the pump shaft by means of magnetic force instead of a traditional coupling.

The motor shaft and the pump shaft are hermetically separated from each other.

ATEX-approved pumps

We recommend ATEX-approved pumps for potentially explosive atmospheres. Explosive atmospheres consist of air and combustible material such as gases, vapours, mists or dusts in which the explosion spreads after ignition.

Electropolished pumps

We recommend electropolished pumps for applications with strict requirements concerning corrosion and cleanability.

We offer electropolished pumps in all CRN pump sizes.

Further documentation

Information about	see page
CR pumps with back-to-back seal arrangement	29
CR pumps with tandem seal arrangement	32
Pumps with magnetic drive (MAGdrive)	36
ATEX-approved pumps	21
Customised pump parts	20-66
Special installation requirements	17
E-pump solutions	63
WebCAPS	165

Hygienic applications

TM02 1808 2001 - GR7375 - TM02 8470 4004

Fig. 6 CR pumps for hygienic applications

CR pumps are not designed for the pumping of hygienic and sterile liquids, but their construction and the choice of materials make them an ideal solution for secondary processes in hygienic applications.

Reference applications

- Pharmaceutical industries
- biotechnological industries
- electronics industries
- food and beverage industries
- process industries.

Customised solutions

In hygienic industries, pumps must meet strict requirements on design, materials, surface quality, cleanability, etc.

To ensure a hygienic and reliable production, we offer customised solutions specially designed to meet your requirements!

We provide solutions for applications involving special requirements to hygienic design and cleanability.

Hygienic design

The surface quality of pump parts is of utmost importance - both for corrosion resistance and microbial adhesion and growth.

To meet the strict hygienic requirements to material and surface quality in secondary hygienic processes, we offer electropolished stainless steel CRN pumps with the following surface quality:

Pump type	Cast stainless steel	Stainless-steel parts (not cast)	Surface quality
CRN 1s, 1, 3, 5, 10, 15, 20, 32, 45, 64, 90, 120, 150	•	•	Ra ≤ 0.8 µm

• Available.

Note: CRN pumps are not sanitary pumps regardless of the surface quality.

Furthermore, we offer a wide variety of connections, such as TriClamp connections, specially designed for pharmaceutical, food and beverage industries.
For further information about TriClamp connections, see page 52.

We offer the following pumps:

- cleaned and dried pumps
- mechanically or electropolished pumps.

Electropolished pumps have a higher corrosion resistance than non-polished pumps.

Cleanability

In secondary hygienic applications, it is extremely important to clean the pumps sufficiently to prevent deposits from contaminating the pumped liquid.

For secondary hygienic applications, we recommend CRN(E) pumps which have all pump parts in stainless steel. As the surface and properties of the metal is not affected by cleaning agents, stainless steel is the ideal solution.

ATEX-approved pumps

We recommend ATEX-approved pumps for potentially explosive atmospheres. Explosive atmospheres consist of air and combustible material such as gases, vapours, mists or dusts in which the explosion spreads after ignition.

Further documentation

Information about	see page
Cleaned and dried CR pumps	39
Electropolished CR pumps	39
Stainless steel CRN pumps	40
ATEX-approved pumps	21
Customised pump parts	20-66
Special installation requirements	17
E-pump solutions	63
WebCAPS	165

Supplementary Grundfos pumps

If you need sanitary pumps with a hygienic design, we recommend the following Grundfos sanitary pump types:

- F&B-HYGIA
- Euro-HYGIA®
- Contra
- Sipla.

Most of the Grundfos sanitary pumps comply with the QHD, EHEDG and 3-A sanitary standards.

For further information, see page 165.

Special installation requirements

TM06 0754 0914

Fig. 7 CR pumps for special installations

Reference applications

- Places with limited access and space
- ships
- mobile applications
- fire protection
- earthquake-prone areas
- applications in remote areas.

Customised solutions

Due to safety, location and arrangement requirements some installations require pumps of another design than traditional vertical pumps.

To meet special installation requirements, we offer customised solutions designed to meet your needs!

We provide solutions for the following pump types:

- horizontally mounted pumps
- belt-driven pumps
- pumps with alternative mounting, etc.

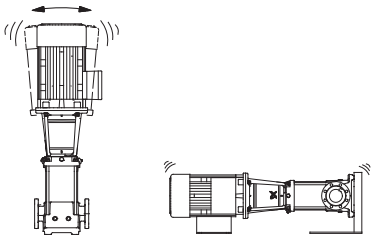
Horizontally mounted pumps

Horizontally mounted pumps are often chosen in the following cases:

- installations with limited access and space, for instance cabinets and compact systems
- earthquake-prone areas
- mobile systems, for instance ships and vehicles.

For installations with limited height, we recommend horizontally mounted pumps.

For earthquake-prone areas, we recommend horizontally mounted pumps to lower the centre of gravity and thus minimise swings during an earthquake. See the example in fig. 8.



TM03 2645 4705

Fig. 8 Vibrations of pumps in earthquake-prone areas

If the chamber stack and staybolts are stressed by repeated swings during an earthquake, they may break and cause stoppage of operation.

For earthquake-prone areas and in mobile systems, we recommend CRN pumps, as stainless steel is more ductile than cast iron.

Horizontal mounting requires special mounting plates. For further details, see *Horizontal in-line pumps* on page 41.

Belt-driven pumps

Belt-driven pumps are often selected in the following cases:

- non-electrically driven applications for instance air-, solar-, wind-, diesel- and pneumatically driven applications
- installations requiring an alternative supply, for instance firefighting systems and emergency pumps.

The construction of belt-driven pumps is like that of electrically driven pumps, but belt-driven pumps have a pulley and belt connected to a combustion motor or other device.

Pumps with alternative mounting

For installations with limited access and space, we offer pumps with alternative mounting of pump parts such as terminal box and vent screw.

Certificates, approvals and reports

We offer customised pumps with a wide variety of certificates and approvals. Examples:

- Inspection certificate 3.1C
  - Lloyds Register of Shipping (LRS)
  - Det Norske Veritas (DNV)
- ATEX, VIK and UL approvals
- Duty-point verification report
  Vibration test report.

Further documentation

Information about	see page
Horizontally mounted CR pumps	41
Belt-driven CR pumps	45
Stainless steel CRN pumps	40
Pump parts designed to match your needs	20-66
CR pumps with certificates	58
E-pump solutions	63
WebCAPS	165

Supplementary Grundfos pumps

For installations with special requirements to a compact design, we recommend CH, CHI pumps or BM booster modules. For further information, see page 165.

Special applications

GR7369 -TM02 8470 - TM02 1808

Fig. 9 CRT, CRNE and CRN pumps

Reference applications

- Off-shore and maritime applications
- cooling applications
- deep-well pumping systems
- pumps operating under special conditions.

Customised solutions

We offer customised solutions for a number of applications not mentioned on the previous pages. Examples:

- Off-shore and maritime applications
- pumping of liquids down to -40 °C
- deep-well pumping in small water supply systems
- special conditions
- special requirements as to approvals, voltage, frequency.

To ensure a stable and reliable operation, we offer customised solutions designed to meet your needs!

Off-shore and maritime applications

In off-shore and maritime applications, pumps must meet stringent requirements to reliability in connection with for instance cooling, firefighting, cleaning and desalination systems. Pumps are often installed in a corrosive environment.

We offer customised pumps with a wide variety of 3.1C inspection certificates, such as Lloyds Register of Shipping (LRS) and Det Norske Veritas (DNV).
For further information, see page 58.

Furthermore, we offer customised pumps with a wide variety of materials, connections, enclosure classes, etc.

For the pumping of seawater, we recommend CRT(E) pumps which have all pump parts in titanium. As the corrosion resistance of CRT(E) pumps is not affected by seawater, titanium is the ideal solution.

Pumping of liquids down to -40 °C

In applications with liquid temperatures down to -40 °C, the material of shaft seal faces, the dimensions of the neck ring and other factors must meet high requirements. At such low temperatures, the selection of wrong materials and dimensions may cause deformation because of thermal expansion, and eventually stoppage of operation.

For liquids below -20 °C, we recommend CRN pumps.

Deep-well pumping in small water supply systems

Water is pumped from depths down to 90 metres. The system consists of a dry-mounted CR pump connected to a submerged ejector.

Pumps operating under special conditions

- Installations at high altitudes:
  > 3,500 metres if fitted with Grundfos MG IE3 motors
  > 2,750 metres if fitted with Siemens IE3 motors
  > 1,000 metres if fitted with Grundfos MGE motors.
- applications with low, high or fluctuating ambient temperatures
- the pumping of high-viscous/-density liquids.

In such cases, the motor may be overloaded and an oversize motor may be required.

Special requirements

We offer customised pumps meeting special requirements as to approvals, voltage, frequency, etc.

Further documentation

Information about	see page
CR pumps for cooling applications	38
CR pumps for deep-well pumping	47
CR pumps with under-/oversize motors	26
Pump parts designed to match your needs	20-66
Special installation requirements	17
E-pump solutions	63
CR pumps with certificates	58
WebCAPS	165

Supplementary Grundfos pumps

If the suction head exceeds 90 metres, we recommend Grundfos SP and SQ submersible pumps.

For further information about SP and SQ pumps, see page 165.

6. Accessories

ATEX-approved dry-running protection

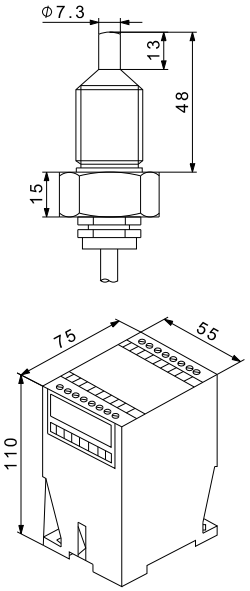
For environments, group II, category 2G, always use dry-running protection.

The link between ATEX groups, categories and zones is explained in the 1999/92/EC directive. Some EEC countries may therefore have stricter local rules.
The user or installer is always responsible for checking that the group and category of the pump correspond to the zone classification of the installation site.

The dry-running protection with ATEX approval mentioned below is offered by Grundfos.

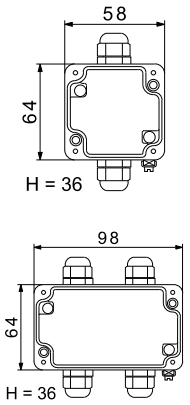
Components

Designation	Ex marking	Connection	[°C]	Product number
Flow sensor	II 2G Ex ib IIC T6	G 1/2 AISI 316Ti	85	96607921
		G 1/2 AISI 316Ti	120	96607922
Amplifier for flow sensor	-		**[V]**	**-**
	II (1) GD [Ex ia] IIC		230	96607923
Extension box	**-**	**Terminals**	**Type**	**-**
	II2GEx e IIT6	4	GKEI 100	97754528
	II 2GEx ia IIC T6		GKI 60	97754527
	II 2GEx e [ia] IIC T6		GKE 60	97752524



TM05 1169 3511

Fig. 10 ATEX-approved flow sensor and amplifier

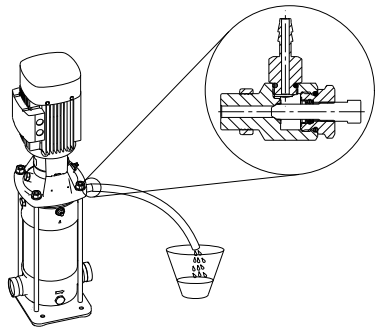


TM05 1120 0611

Fig. 11 ATEX-approved extension box

The extension box is designed for connection of intrinsically safe and/or non-intrinsically safe circuits in explosion-hazardous areas of category 2 (zone 1 and 21).

Venting valve with connecting pipe



TM05 1160 0611

Fig. 12 Venting valve with connecting pipe

The connecting pipe of this special venting valve allows the operator to deaerate the pump into a closed container. This accessory is ideal when pumping aggressive or hazardous liquids.

Designation	Connection	Type	Product number
Venting valve with connecting pipe	G 1/2	EPDM	97773787
		FKM	97775104
		FFKM	97775105
		FXM	97775106

7. Motor

The Grundfos standard range of motors meets a wide variety of application demands. For special applications or operating conditions, we offer various customised solutions:

- a wide range of motor approvals
- motors with special voltage
- motors with anti-condensation heater
- motors with Harting® 10-pin multiplug connection
- motors with built-in PTC sensor
- motors with built-in thermal switch
- undersize and oversize motors
- motors with alternative enclosure class, etc.
- motors with bearings suitable for high-temperature operating conditions (bearings are packed with grease suitable for high temperatures).

VIK-approved motors

We recommend VIK-approved motors for industrial climates where aggressive gasses and/or aggressive vapours, etc., are likely to occur.

The VIK standard applies to three-phase mains-operated motors and three-phase motors connected to a frequency converter.

We offer VIK-approved motors from 0.37 to 75 kW in accordance with the requirements of the German industrial standard, Verband der Industriellen Energie- und Kraftwirtschaft. To comply with the standard, VIK-approved motors must meet these requirements:

- Group II, Category 2, version EEx e or EEx d, temperature class T3 in the ATEX directive. In case of doubt, consult the above standard or contact Grundfos.
- Enclosure class IP55 as a minimum.
- Protected against sucking. This phenomenon may occur when the pressure inside the motor is lower than the atmospheric pressure. In such cases, moisture is sucked from the atmospheric side into the motor through bearing housings, etc.

From 1.1 to 75 kW, all VIK-approved motors are IE2 high-efficiency motors.

For further information about the VIK-standard, see www.vik.de or contact Grundfos.

Tropicalised motors

A tropicalised motor does not contain paper, wood or similar materials containing wood pulp.

Grundfos defines a tropicalised motor as a motor which fulfils the climate group "World-Wide" in DIN/IEC 721-2-1 and has the following characteristics:

- enamel covered windings
- double winding impregnation
- double winding insulation
- FPM V-ring
- terminal board made of polyester
- liquid sealing between frame and flange/end shield
- all outside screws made of stainless steel
- 30 µm paint layer on aluminium stator housings
- 120 µm paint layer on cast-iron stator housings
- heating element.

cURus-, UR- and CSA-approved motors

We offer mains-operated motors with these approvals:

Approval	Motor power - P2 [kW]
cURus	0.37 - 22
UR	30-75
CSA	30-75

Energy

We offer mains-operated motors that comply with these energy standards:

- CEL
- EISA 2007
- KEMCO
- INMETRO
- NOM-016-ENER
- cURus ENERGY.

Other motor approvals

We offer a wide range of motor approvals:

- CCC
- C-tick
- GOST
- BΔ
- TSU
- METI/JQA
- CB
- TSENK
- SASO, etc.

ATEX-approved pumps

TM01 619 4202

ATEX-approved pumps are for use in potentially explosive atmospheres. Explosive atmospheres consists of air and combustible matter, such as gases, vapours, mists or dusts in which the explosion spreads after ignition.

We offer explosion-proof or dust-ignition-proof motors in accordance with the EC directive 94/9/EC, the so-called ATEX directive. The ATEX-approved pumps can be used in areas (zones) classified according to the directive 1999/92/EC. In case of doubt, consult the above-mentioned directives or contact Grundfos.

The nameplates of ATEX-approved pumps are supplied with serial number, ATEX classification, and an "X" indicating that special installation and operating instructions must be followed.

An ATEX certificate is available on request.

Scope of ATEX categories

Group I

	Category M2
Underground installations in mines liable to be endangered by explosive gasses or combustible dust.	Pumps made of materials that do not create sparks and thus do not constitute any danger of explosion.
CR pumps available	CR, CRI, CRN
Motors available	None[1)]

1) Air-driven or hydraulically driven motors are not available from Grundfos.

Group II

	Category 2	
Installation areas liable to be endangered by explosive atmospheres.	Pumps intended for use in areas in which explosive atmospheres are likely to occur.	
	G (gas)	D (dust)
1999/92/EC[1)]	Zone 1	Zone 21
CR pumps available	CR, CRI, CRN, CRT[2)]	CR, CRI, CRN, CRT
Motors available	2G EEx e II T3 2G EEx d IIB T4	2D 125 °C

Group II

	Category 3	
Installation areas liable to be endangered by explosive atmospheres.	Pumps intended for use in areas in which explosive atmosphere only rarely occur.	
	G (gas)	D (dust)
1999/92/EC[1)]	Zone 2	Zone 22
Pumps available	CR, CRI, CRN, CRT	CR, CRI, CRN, CRT
Motors available	2G EEx e II T3 2G EEx d IIB T4	3D 125 °C

1) **Note**: The link between groups, categories and zones is explained in the 1999/92/EC directive. Some EEC countries may therefore have stricter local rules. The user or installer is always responsible for checking that the group and category of the pump correspond to the zone classification of the installation site.

2) For group II, category 2 G (zone 1), the pump must be protected against dry running. Use one of the following methods:

- An ATEX-approved dry-running protection.
  Always use this protection on pumps with MAGdrive or pumps with a single mechanical shaft seal.
- Pumps with double seal system.
  - Back-to-back:
    The system for pressurising the system must be ATEX approved.
  - Tandem:
    Make sure that the flow of flushing liquid is always sufficient, and make sure that the elevated tank never runs dry of flushing liquid.

We offer the following ATEX-approved motors:

Motor [kW]	**Version**			
	(2G EExe II T3)	**(2G EExd IIB T4)**	**(2D T125 °)**	**(3D T125 °)**
0.37 - 1.3	•			
1.85 - 4.6	•			
5.5 - 7.5	•			
10-15	•			
20-28	•			
0.37 - 1.5		•		
2.2 - 4		•		
5.5 - 7.5		•		
11-45		•		
0.37 - 45			•	
0.37 - 45				•

All explosion-proof motors have PTC sensors.
For further information about PTC sensors,
see page 24.

Special voltage

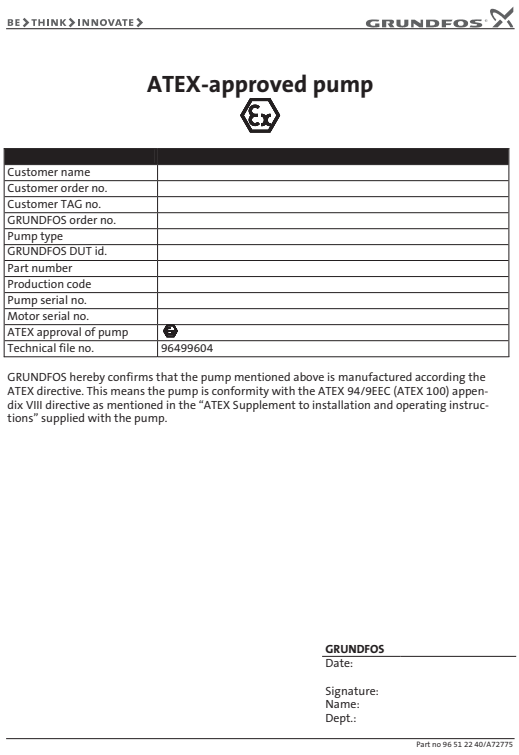
We offer pumps with the following voltages:

Frequency	Voltage
Mains-operated motor	
50 Hz	3 x 220-240 Δ/380-415 YV
	3 x 200-220/346-380 V
	3 x 380-415 ΔV
	3 x 380-415 Δ/660-690 YV
60 Hz	3 x 200-230/346-400 V
	3 x 208-230/460 V
	3 x 220-255 Δ/380-440 YV
	3 x 220-277 Δ/380-480 YV
	3 x 220-277 Δ/380-480 YV
	3 x 380-440 ΔV
	3 x 380-480 ΔV
	3 x 380-480 Δ/660-690 YV
	3 x 575 YV
Motor with integrated frequency converter	
50/60 Hz	1 x 200-240 V
	3 x 380-500 V (0.37 - 2.2 kW)
	3 x 380-480 V (3-22 kW)

Note: Other voltages are available on request.

Certificate

Grundfos offers a certificate for an ATEX-approved pump. The certificate has to be confirmed for every order. If a certificate is needed, please order it when ordering the pump.



BE > THINK > INNOVATE > GRUNDFOS

ATEX-approved pump

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	
Pump serial no.	
Motor serial no.	
ATEX approval of pump	
Technical file no.	96499604

GRUNDFOS hereby confirms that the pump mentioned above is manufactured according the ATEX directive. This means the pump is conformity with the ATEX 94/9EEC (ATEX 100) appendix VIII directive as mentioned in the "ATEX Supplement to installation and operating instructions" supplied with the pump.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 51 22 40/A72775

TM03 4166 1706

The certificate is to be ordered via the product number

Description	Product number
Certificate for ATEX-approved pump	96512240

Motor with multiplug connection

Gr7550

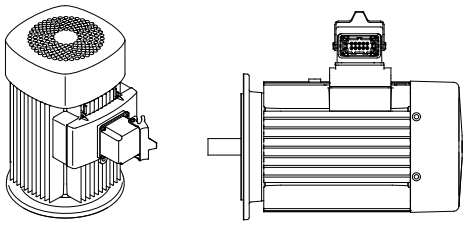
Fig. 13 Mains-operated motor with Harting® 10-pin multiplug

Mains-operated motors fitted with a Harting® 10-pin multiplug connection, HAN 10 ES, enable easy connection to the mains.

Note: For Grundfos motors with integrated frequency converter up to 7.5 kW, we offer the solutions shown on page 23.

The purpose of a multiplug connection is to make the electrical installation and service of the pump easier. The multiplug functions as a plug-and-pump device.

The drawings below show the position of the multiplug on the mains-operated motor.



TM01 8713 0700 - TM02 8518 0304

Fig. 14 Motor with multiplug connection

The multiplug connection is available for the following motor sizes:

Motor power P2 [kW]	Voltage [V], starting method
0.37 - 7.5	3 x 220-240 Δ/380-415 YV
0.37 - 7.5	3 x 380-415 ΔV

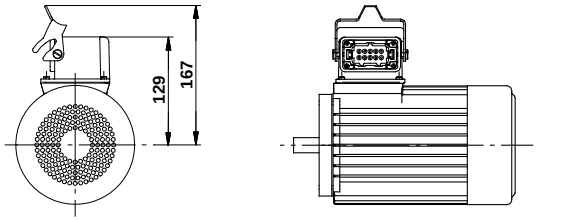
Logo for multiplug

TM02 0470 0700

Fig. 15 Logo

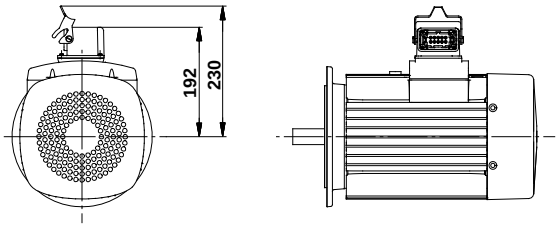
Dimensions

All dimensions are in mm.



TM01 8716 0700

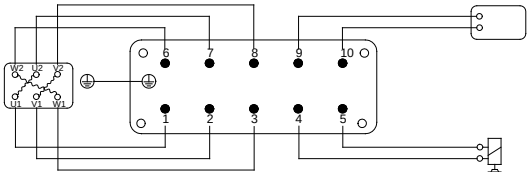
Fig. 16 Dimensions, 0.37 - 1.1 kW



TM01 8714 0700

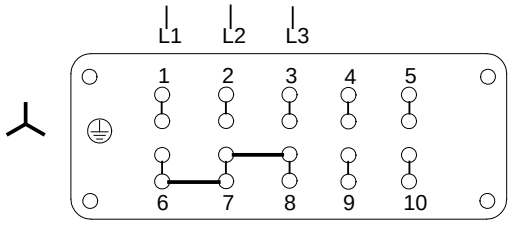
Fig. 17 Dimensions, 1.5 - 7.5 kW

Plug connections



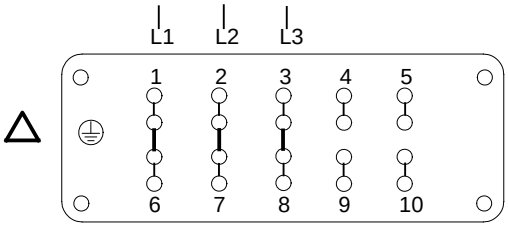
TM01 8702 0700

Fig. 18 Plug connection from motor



TM01 8703 0700

Fig. 19 Plug connection for star connection



TM01 8704 0700

Fig. 20 Plug connection for delta connection

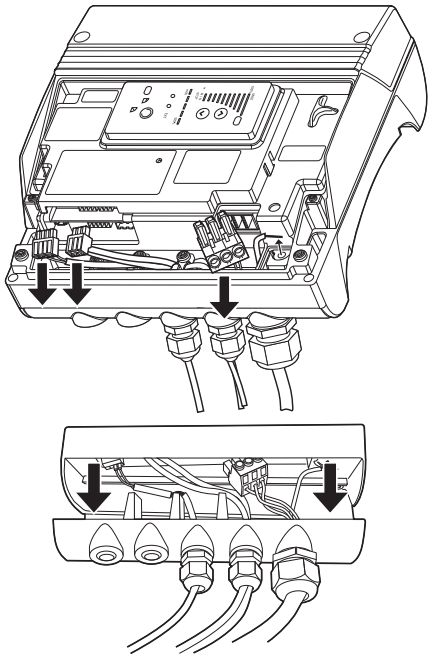
Note: Fishplates for connections are located in the plug.

Plug-and-pump solutions for CRE pumps

To facilitate electrical installation and service of our three-phase CRE pumps from 3-22 kW, all motor terminal boxes are equipped with a detachable cable inlet bar.

When the cable inlet bar is removed, you can disconnect all electrical connections.

Figure 21 shows the location of the detachable cable inlet bar on the motor terminal box as well as plugs for mains connection, sensor and communication.



TM03 1964 3405 - TM03 1962 3405

Fig. 21 Location of the detachable cable inlet bar on the motor terminal box as well as plugs for mains connection, sensor and communication

Motor with anti-condensation heater

TM03 2440 4305

Fig. 22 Mains-operated MG motor with anti-condensation heater

In applications where condensation in the motor may occur, we recommend that you install a motor with an anti-condensation heater on the stator coil ends.
The heater keeps the motor temperature higher than the ambient temperature and prevents condensation.

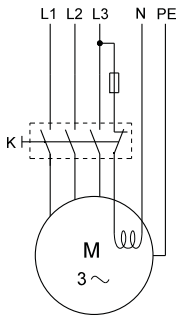
Note: Anti-condensation heater is standard on all MGE motors and can be activated by remote.

High humidity may cause condensation in the motor. Slow condensation occurs as a result of a decreasing ambient temperature; rapid condensation occurs as a result of shock cooling caused by direct sunlight followed by rain. We recommend that you always use motors with anti-condensation heater in areas with ambient temperatures below 0 °C.

Note: Rapid condensation is not to be confused with the phenomenon which occurs when the pressure inside the motor is lower than the atmospheric pressure. In such cases, moisture is sucked from the atmosphere into the motor through bearings, housings etc.

In applications with constant high humidity levels above 85 %, the drain holes in the drive-end flange must be open. This changes the enclosure class to IP44. If IP55 protection is required due to operation in dusty environments, we recommend that you install a motor with anti-condensation heater.

The figure below shows a typical circuit of a three-phase motor with anti-condensation heater.



TM03 4058 1406

Fig. 23 Three-phase motor with anti-condensation heater

Key

Symbol	Designation
K	Contactor
M	Motor

Note: Connect the anti-condensation heater to the supply voltage so that it is on when the motor is switched off.

Motors from 0.37 to 75 kW are available with anti-condensation heater.

Motor size, 50/60 Hz [kW]		Power of heating unit [W]		
2-pole	4-pole	1 x 24 V	1 x 115 V	1 x 190-250 V
0.37 - 1.1	0.25 - 0.75	38	-	23
1.5 - 3.0	1.1 - 3.0			31
4.0 - 5.5	4.0			38
7.5 - 22	5.5 - 15[1)]	2 x 38		2 x 38
30-37	18.5[1)]	-	55	55
45-55	-		92	92
75	-		109	109

[1)] 15 and 18.5 kW 4-pole are oversize motors in the CR pump range.

Motors with PTC sensors

TM02 7038 2403

Fig. 24 PTC sensor incorporated in winding

Built-in PTC sensors (thermistors) protect the motor against rapid as well as steady overload.

We offer motors with temperature-controlled PTC sensors in the motor windings.

Three-phase mains-operated motors from 3 kW and up have PTC sensors as standard.

Note: Temperature-controlled PTC sensors must be connected to an external tripping or LiqTec unit connected to the control circuit. For further information about LiqTec, see page 50.

Protection according to IEC 60034-11:

- TP 111 (steady overload only)
- TP 211 (steady and rapid overload).

PTC sensors comply with DIN 44 082.
Maximum voltage at the terminals, U_{max} = 2.5 VDC.
All tripping units available for DIN 44 082 PTC sensors meet this requirement.

The figure below shows a typical circuit of a three-phase motor with PTC sensors.

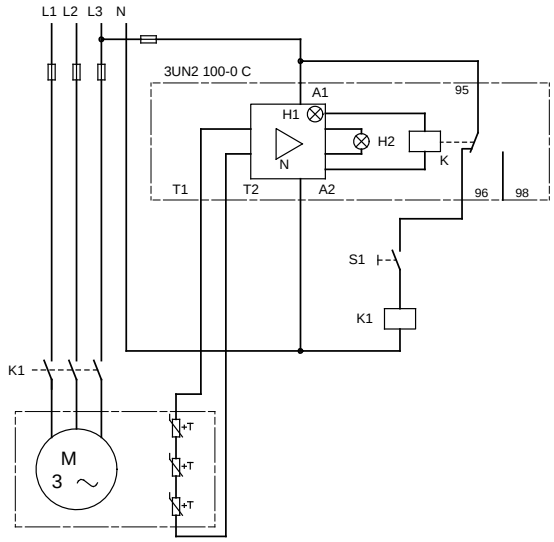


Fig. 25 Three-phase motor with PTC sensors

Key

Symbol	Designation
S1	On/off switch
K1	Contactor
+T	PTC sensor (thermistor) in motor
M	Motor
3UN2 100-0 C	Tripping unit with automatic reset
N	Amplifier
K	Output relay
H1	LED "Ready"
H2	LED "Tripped"
A1, A2	Connection for control voltage
T1, T2	Connection for PTC sensor loop

Motors with thermal switches

Fig. 26 Thermal switch incorporated in winding

Built-in thermal switches protect the motor against rapid as well as steady overload.

We offer three-phase mains-operated motors from 0.37 to 11 kW with built-in thermal switches.

Note: Thermal switches must be connected to an external control circuit to protect the motor against steady overload. The thermal switches require no tripping unit.

Protection according to IEC 60034-11: TP 211 (steady and rapid overload). As protection against seizure, connect the motor to a motor-protective circuit breaker.

Thermal switches tolerate the following maximum loads:

U_{max}	250 VAC
I_N	1.5 A
I_{max}	5.0 A (locked-rotor and breaking current)

Figure 27 below shows a typical circuit of a three-phase motor with built-in bimetallic thermal switches.

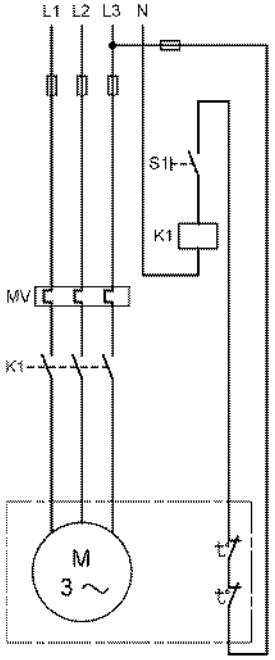


Fig. 27 Three-phase motor with thermal switches

Key

Symbol	Designation
S1	On/off switch
K1	Contactor
t°	Thermal switch in motor
M	Motor
MV	Motor-protective circuit breaker

Oversize motors

We recommend that you use an oversize motor if operating conditions fall outside the operating conditions described in these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CR, CRN high pressure
- CRT, CRTE.

We especially recommend oversize motors in these cases:

- The pump is installed at an altitude above 3,500 m (MG IE3), 2,875 m (Siemens IE3), and 1,000 m (MG IE2).
- The ambient temperature exceeds 60 °C (MG IE3), 55 °C (Siemens IE3) or 40 °C (MG IE2).
- The viscosity or density of the pumped liquid is higher than that of water.

We offer the following oversize motors.

Mains-operated motors

Oversize motors (three-phase)	
2-pole	4-pole
	0.37
0.55	0.55
0.75	0.75
1.1	1.1
1.5	1.5
2.2	2.2
3.0	3.0
4.0	4.0
5.5	5.5
7.5	7.5
11.0	11.0
15.0	15.0
18.5	18.5
22.0	
30.0	
37.0	
45.0	
55.0	
75.0	

Motors with integrated frequency converter

Oversize motors (three-phase)	
2-pole	4-pole
	0.37
0.55	0.55
0.75	0.75
1.1	1.1
1.5	1.5
2.2	2.2
3.0	3.0
4.0	4.0
5.5	5.5
7.5	
11.0	
15.0	
18.5	
22.0	

Undersize motors

We recommend that you use an undersize motor if operating conditions fall much inside the standard conditions described in these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CR, CRN high pressure
- CRT, CRTE.

We especially recommend undersize motors in these cases:

- The viscosity or density is lower than that of water.
- The duty point of the pump is constant, and the flow rate is significantly lower than the maximum recommended flow rate.

We offer the following undersize motors.

Mains-operated motors

Undersize motors (three-phase)	
2-pole	4-pole
	0.25
0.37	0.37
0.55	0.55
0.75	0.75
1.1	1.1
1.5	1.5
2.2	2.2
3.0	3.0
4.0	4.0
5.5	5.5
7.5	7.5
11.0	
15.0	
18.5	
22.0	
30.0	
37.0	
45.0	
55.0	

Motors with integrated frequency converter

Undersize motors (three-phase)	
2-pole	4-pole
	0.25
0.37	0.37
0.55	0.55
0.75	0.75
1.1	1.1
1.5	1.5
2.2	2.2
3.0	3.0
4.0	4.0
5.5	
7.5	
11.0	
15.0	
18.5	

Motor sizes available for pumps

2-pole

Pump type	Undersize motor [kW]	Oversize motor [kW]
CR 1s - CR 5	0.37	7.5
CR 10 - CR 20	0.37	18.5
CR 32 - CR 90	1.5	45
CR 120 - CR 150	7.5	75

4-pole

Pump type	Undersize motor [kW]	Oversize motor [kW]
CR 1s - CR 5	0.25	1.5
CR 10 - CR 20	0.25	4.0
CR 32 - CR 90	1.5	11
CR 120 - CR 150	1.5	18.5

Alternative enclosure class (IP)

The motor enclosure class complies with IEC 60034-5.

The enclosure class states the degrees of protection of the motor against ingress of solid objects and water.

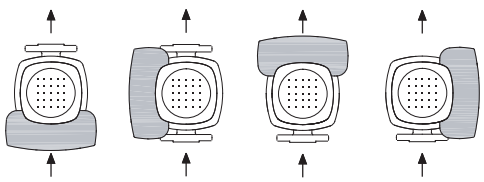
All motors comply with IP55 as standard.

On request, we offer motors with the following enclosure classes:

IP class	Description
IP54	• The motor is protected against the ingress of dust, i.e. harmful layers of dust. • The motor is protected against water splashing from any direction.
IP55	• The motor is protected against the ingress of dust, i.e. harmful layers of dust. • The motor is protected against water being projected by a nozzle from any direction.
IP56	• The motor is protected against the ingress of dust. • The motor is protected against heavy seas or high-pressure water jets from any direction.
IP65	• The motor is completely dust-proof. • The motor is protected against water being projected by a nozzle from any direction.
IP66	• The motor is completely dust-proof. • The motor is protected against heavy seas or high-pressure water jets from any direction.

Alternative terminal box positions

The terminal box is in position 6 o'clock as standard. The possible terminal box positions are shown below.



TM03 3658 0606

Fig. 28 Possible terminal box positions

4-pole motors

TM03 1711 2805

Fig. 29 4-pole motor

We offer all CR pumps with 4-pole motors.

4-pole motors are often preferred in these cases:

- A low sound pressure level is required.
- Inlet conditions are poor.
- Beating of the liquid is not allowed.

Performance curves and technical data of 4-pole CR pumps, see page 117 to 138 and 128 to 138.

Electrical data of 4-pole CR pumps, see pages 160 and 161.

Motor efficiency classes

The new EN standard 60034-30:2009 defines the following efficiency classes of low-voltage three-phase asynchronous motors from 0.75 to 375 kW:

- IE1: standard efficiency
- IE2: high efficiency
- IE3: premium efficiency.

IE = International Efficiency.

Three-phase motors of CR pumps are 0.75 to 75 kW IE3 motors as standard.

CR pumps with IE2 motors are available on request.

Other motor makes

We also offer pumps with a motor of any make which can fulfil requirements such as

- flange dimensions
- bearing specifications
- pump shaft.

Alternatively, Grundfos pumps can be supplied without a motor.

8. Shaft seals

Shaft seal arrangements

Depending on the application, CR pumps are available with these shaft seals:

- single seal arrangement
- double seal arrangement
- magnetic drive.

CR(E), CRI(E), CRN(E) pumps are fitted with a cartridge shaft seal mounted in a single seal arrangement as standard:

- HQQE or HQQV (0.25 - 45 kW)
- HBQE or HBQV (55-75 kW).

CRT(E) are fitted with one AUUE or AUUV O-ring seal as standard.

In applications where the pumped liquid may harm the environment, double seal arrangements or magnetic-drive pumps are selected.

To ensure reliability, these conditions must be considered when selecting a shaft seal:

- operating pressure
- type of pumped liquid
- liquid temperature.

Overview of shaft seals

The below table shows the shaft seals available.

Shaft seal	
As standard	**On request**
CR(E), CRI(E) and CRN(E)	
HQQE HQQV	HQQE*) HQQV*)
	HUBE HUBV
HBQE*) HBQV*)	HUUE HUUV HUUK HUUF
	HUBF HUBK
	HQQK HQQF
	HQBE HQBV HQBK
	KUHE KUHV
	KUUV KUUE
CRT(E)	
	AUUK
AUUE AUUV	AQQE AQQV AQQK
	DQQE DQQV DQQK

*) Only for CR, CRN 120 and 150, 55-75 kW.

Codes for shaft seals, see page 11.

Shaft seal variants

Liquids or applications exceeding the range of normal operating conditions require special-purpose shaft seal solutions.

In order to meet any specific requirements, we offer variants of seal face material and secondary seal material (rubber parts).

The following tables apply to clean water and water containing glycol.

Note: For ultra pure water (conductivity lower than 2 µS/cm), do not use an xQQx seal face combination. Instead, use a xQUx seal face combination.

FKM (xxxV) is limited to 90 °C in water.

If abrasive particles are present, use an xQQx seal face combination.

Shaft seal and seal face variants

Pump type	Shaft seal, seal face variant	Temperature [°C]		Pressure rating [bar]
		Min.	Max.	
CR(E), CRI(E), CRN(E)	HQQx	-40	120	30
	HBQx*)	0	120	30
	HQBx	0	120	30
	HUUx	-40	90	30
	HUBx	0	120	30
CRT(E)	AQQx	-40	90	25
	DQQx	-40	90	25

*) Only for CR, CRN 120 and 150, 55-75 kW.

For explanation of codes, shaft seal types and materials, see the type key on page 11, or see the data booklet "Shaft seals" which is available in WebCAPS.

Single shaft seals with EPDM O-ring material (HxxE)

We recommend single shaft seals with EPDM O-ring material for water and aqueous solutions.
EPDM rubber is not resistant to mineral oils.

Temperature range for rubber material:

- heat resistant from -40 to 150 ° C.
- water and watery medias from -40 to 140 ° C.

Singles shaft seals with FKM O-ring material (HxxV)

We recommend single shaft seals with FKM O-ring material for a wide range of temperatures and pumped liquids, such as acids, saline solutions, mineral oil, vegetable oil and most solvents.

Temperature range for rubber material:

- heat-resistant from -20 °C to +240 °C (oil only)
- water-resistant up to 90 °C.

Single shaft seals with FFKM O-ring material (HxxK)

We recommend single shaft seals with FFKM O-ring material for a wide range of pumped liquids, such as nitric acid, solvents, varnishes, paints and dyes.

Temperature range for rubber material:

- heat-resistant from -20 °C to 250 °C
- water-resistant up to 220 °C.

Single shaft seals with FXM O-ring material (HxxF)

We recommend single shaft seals with FXM O-ring material for high temperatures as well as for acid liquids and gasses within oil and gas extraction.

Temperature range for rubber material:

- -10 to 275 °C. For short periods up to 300 °C.

Plug and sleeve O-rings made of FXM are available for the full range.

For further information about O-ring materials, see the following data booklets available in WebCAPS > www.grundfos.com/webcaps

Data booklet	Publication number	QR code
CR, CRI, CRN (50 Hz)	V7023751	
CR, CRI, CRN (60 Hz)	96488672	
CRT, CRTE (50/60 Hz)	V7149894	
CRE, CRIE, CRNE (50/60 Hz)	98423696	
CR, CRN, CRNE high pressure (50/60 Hz)	V7174003	
Shaft seals	96519875	

Double seal arrangements

We offer two double seal arrangements:

- back-to-back (OQQx)
- tandem (PQQx).

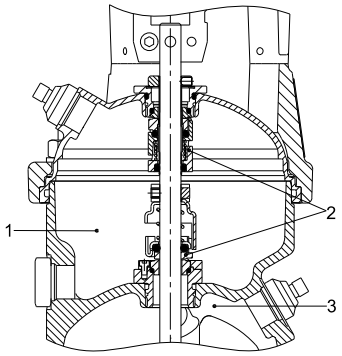
Back-to-back seal arrangement

Back-to-back seal arrangements consist of two Grundfos cartridge shaft seals, type O, fitted back-to-back in a separate seal chamber.

We recommend this type of seal arrangement for handling these types of liquid:

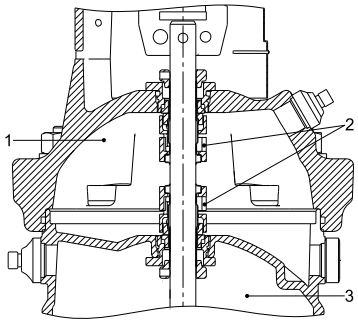
- toxic, aggressive or flammable liquids
- abrasive or sticky liquids which would either wear out, damage or block a mechanical shaft seal.

The back-to-back double seal protects the surrounding environment and the people working in the vicinity of the pump. It is specially designed for operating pressures up to 25 bar and 120 °C with the aim of minimising the risk of leakage from the pump to the environment.



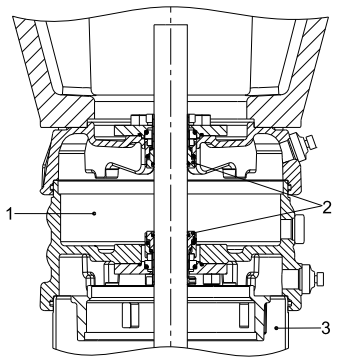
TM04 4404 1609

Fig. 30 CR 1s to 5 with back-to-back seal arrangement



TM04 4405 1609

Fig. 31 CR 10 to 20 with back-to-back seal arrangement



TM04 4406 1609

Fig. 32 CR 32, 45, 64, 90, 120 and 150 with back-to-back seal arrangement

Key to figures 30, 31 and 32

Pos.	Designation
1	Seal chamber
2	Shaft seals
3	Pump

The back-to-back seal arrangement is available for the following CR pumps:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Dimensions

All dimensions are in mm.

Pump type	Additional height of seal chamber
CRI, CRN 1s, 1, 3, 5	108
CRI, CRN 10, 15, 20	90
CR, CRN 32	185
CR, CRN 45	215
CR, CRN 64	141
CR, CRN 90	159
CR, CRN 120, 150	111

Pressurising

In back-to-back seal arrangements, the pressure in the seal chamber must be higher than the pump pressure to prevent the pumped liquid from leaking through the shaft seal to the environment.

Note: The barrier liquid will seep through the lower (primary) shaft seal and be mixed with the pumped liquid. Always use the right barrier liquid.

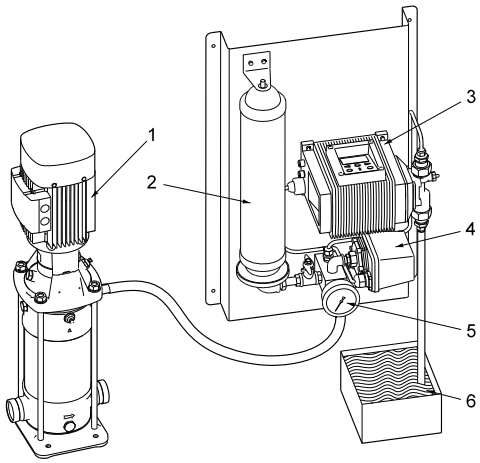
The pressure in the seal chamber can be generated in three ways:

- by an existing pressure source
- by a dosing pump
- by a pressure intensifier.

For further information about Grundfos back-to-back seal arrangements, see the data booklet "Shaft seals" which is available in WebCAPS.

CR pump with dosing pump

The example below shows a CR pump with a back-to-back seal arrangement. The barrier liquid is supplied and pressurised by a dosing pump.



TM03 3810 1106

Fig. 33 CR pump with dosing pump

Key

Pos.	Designation
1	Pump
2	Pressure tank
3	Dosing pump
4	Pressure switch
5	Manometer
6	Reservoir with barrier liquid

The setpoint of the barrier liquid pressure is set by means of pressure switch (4). When the pressure drops below the setpoint, the dosing pump will start and thus maintain a higher pressure in the seal chamber (max. pressure 16 bar). Barrier liquid is supplied from reservoir (6).

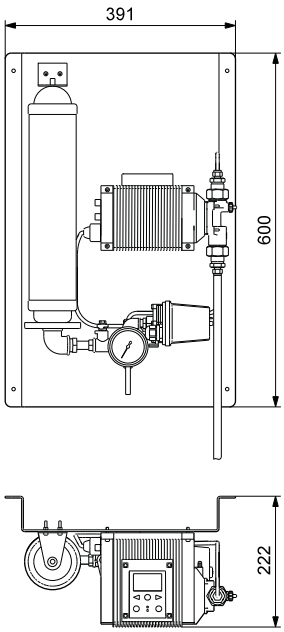
One dosing pump can supply several pumps with back-to-back seal arrangements.

Connections are all RG 1/2".

Note: Connecting pipes/hoses are not included.

Dimensions of back plate with components

All dimensions are in mm.



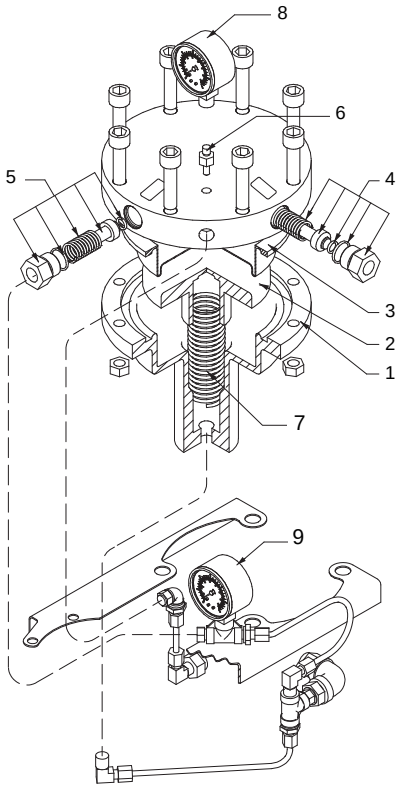
TM03 4660 2406

Fig. 34 Dimensional sketch

CR pump with pressure intensifier

GR5954

Fig. 35 CR pump with pressure intensifier



TM03 8299 1007

Fig. 36 Components of pressure intensifier

Pos.	Designation
1	Pressure intensifier
2	Piston
3	Diaphragm
4	Non-return valve
5	Relief valve
6	Vent screw, Rp 1/8
7	Spring for piston
8	Pressure gauge (barrier liquid)
9	Pressure gauge (pumped liquid)

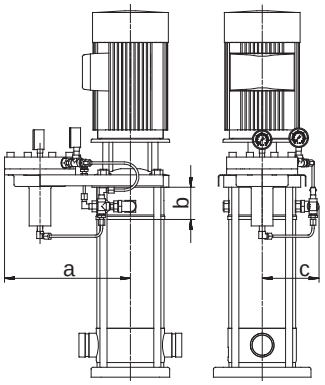
The seal chamber is primed with barrier liquid via non-return valve (4) until pressure gauge (8) reaches 1.5 to 2 bar. The spring (7) is now preloaded with the barrier liquid pressure. The pump is primed and vented. When the pump is started, the pump pressure and the pressure from the preloaded spring will result in a pressure 1.5 to 2 bar higher in the seal chamber.

Note: One pressure intensifier can only supply one pump. The pressure intensifier is fitted on the pump from factory.

Maximum operating pressure: 25 bar.

Dimensions

All dimensions are in mm.



TM01 4459 0399

Fig. 37 Dimensional sketch

Pump type	a	b	c
CR, CRI, CRN 1, 3, 5	297	108	128
CR, CRI, CRN 10, 15, 20	330	90	140
CR, CRN 32	342	185	155
CR, CRN 45	349	215	164
CR, CRN 64	349	141	164
CR, CRN 90	355	159	170
CR, CRN 120, 150	355	111	170

Note: The dimension "b" is the additional height as compared to the standard pump.

Tandem seal arrangement

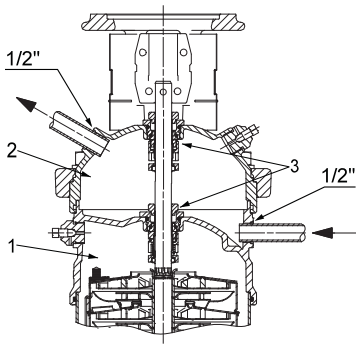
Tandem seal arrangements consist of two Grundfos cartridge shaft seals, type P, mounted tandem in a separate seal chamber.

We recommend tandem seals for crystallising, hardening or sticky liquids.

The tandem seal arrangement is specially designed for operating pressures up to 25 bar and 150 °C.

Note: At temperatures from 120 °C to 150 °C, the O-ring material in the shaft seal must be FXM (Fluoraz).

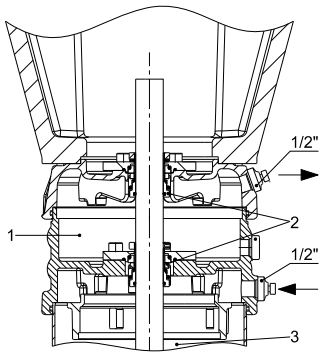
CR 1s, 1, 3, 5, 10, 15 and 20



TM03 3657 0606

Fig. 38 CR 1s to 20 with tandem seal arrangement

CR 32, 45, 64, 90, 120 and 150



TM04 4164 1609

Fig. 39 CR 32, 45, 64, 90, 120 and 150 with tandem seal arrangement

Key

Pos.	Designation
1	Pump
2	Seal chamber
3	Shaft seals

The tandem type of seal is available for these CR pumps:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Dimensions

All dimensions are in mm.

Pump type	Additional height of seal chamber
CRI, CRN 1s, 1, 3, 5	108
CRI, CRN 10, 15, 20	90
CR, CRN 32, 45, 64, 90	140
CR, CRN 120, 150	111

Flushing-liquid systems

CR pumps with tandem seal arrangement must be equipped with a flushing-liquid system.

Note: The pumped liquid will seep through the lower (primary) shaft seal and be mixed with the flushing liquid. Maximum liquid temperature: 120 °C (HxxF 150 °C).

The flushing-liquid flow rate should also be matched to the application (recommended flow rate 25-200 l/h).

The pressure of the flushing liquid must always be lower than the pressure of the pumped liquid.

Note: The flushing-liquid supply must never be connected directly to the public water supply system. Observe the local regulations.

For further information about Grundfos tandem seal arrangements, see the data booklet "Shaft seals" which is available in WebCAPS.

The following figures show examples of flushing systems for tandem seal arrangements.

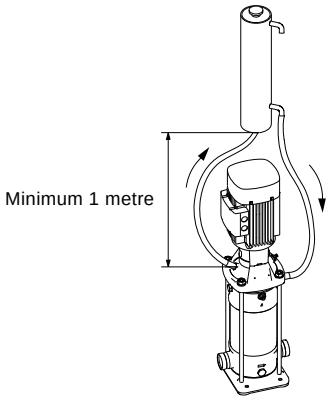


Fig. 40 Tandem seal arrangement with circulating flushing liquid

In figure 40, the flushing liquid circulates between an elevated tank and the pump by natural circulation. Heated flushing liquid rises from the seal chamber to the tank where it cools down. The cooled-down flushing liquid returns to the seal chamber.

At high temperatures, the circulation of flushed liquid through the seal chamber cools the seal faces of the shaft seal and reduces noise.

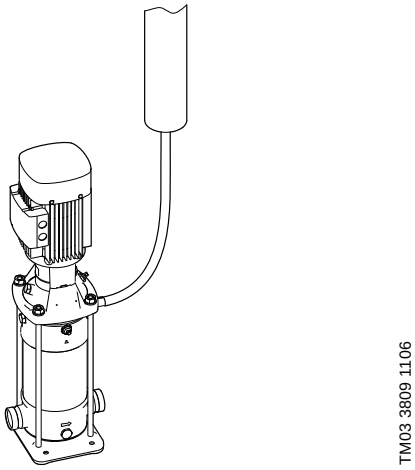


Fig. 41 Tandem seal arrangement with flushing-liquid supply

In figure 41, the flushing liquid enters the seal chamber via a pipe from an elevated tank.

No heat is dissipated from the system.

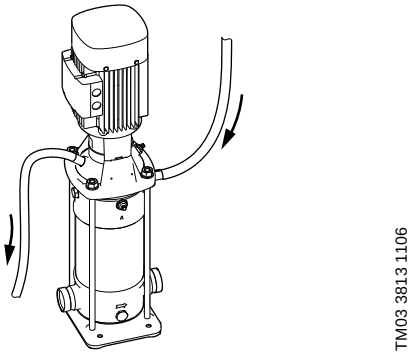


Fig. 42 Tandem seal arrangement with flushing liquid connected to a drain

In figure 42, the flushing liquid enters the seal chamber via a pipe from an elevated tank.

In case of leakage, the pumped liquid is washed away to the drain by the flushing liquid.

Air-cooled top

CR pumps with an air-cooled top are used where the pumping of hot liquids is crucial for a successful production. A CR pump with an air-cooled top is a pump with a special air-cooled shaft seal chamber generating the same insulation effect as that of a vacuum flask. No external cooling is necessary; the ambient temperature is sufficient.

GR5228

Fig. 43 CR pump with an air-cooled top

CR pumps with air-cooled top have a mechanical silicon carbide/silicon carbide/EPDM cartridge shaft seal, type HQQE, as standard.

The pumps are able to handle liquid temperatures up to 180 °C at max. PN 25.

Note: If the pumped liquid is oil, the pumps can handle following liquid temperatures:

- CR 1s to 90: 240 °C at max. PN 16.
- CR 120 and 150: 180 °C at max. PN 16.

The following rubber part variants are available for our air-cooled top solutions:

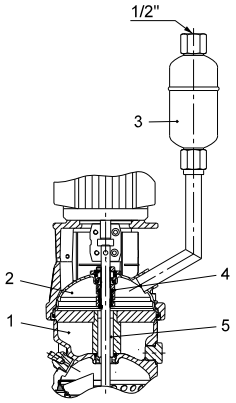
Liquid temperature [°C]	Rubber part material
Water-based liquids	
120-140	EPDM
120-180	FXM/EPDM
Thermal oils	
120-240	FKM

Temperatures above 120 °C normally result in a substantial reduction of seal life due to poor lubrication of the seal faces. As the temperature in the seal chamber does not exceed 120 °C during operation, a standard Grundfos shaft seal can be used.

An automatic air vent is required for venting the pump seal chamber.

Note: For safety reasons, fit a pipe in order to lead away steam from the air vent to a drain. Observe local regulations.

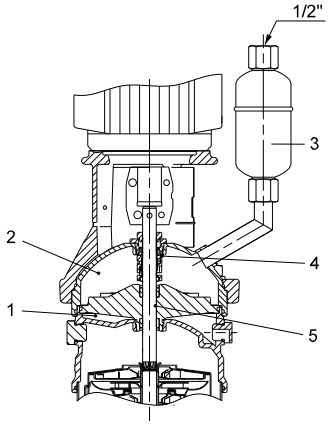
CR 1s, 1, 3 and 5



TM03 9159 3507

Fig. 44 CR 1s, 1, 3 and 5 with air-cooled top

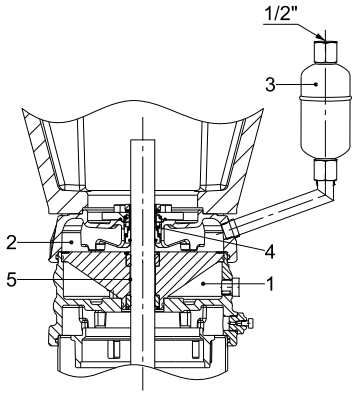
CR 10, 15 and 20



TM03 9160 3507

Fig. 45 CR 10, 15 and 20 with air-cooled top

CR 32, 45, 64, 90, 120 and 150



TM04 4165 0909

Fig. 46 CR 32, 45, 64, 90, 120 and 150 with air-cooled top

Key

Pos.	Designation
1	Air chamber
2	Liquid
3	Air vent
4	Shaft seal
5	Cooling channel

Pump range

The air-cooled top is available for these pump types:

Pump type	CR pumps with air-cooled top												
	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)								•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Note: CRT(E) pumps are not available with air-cooled top.

Bearing flanges for CR pumps with air-cooled top

When pumping hot liquids, the pump requires a net positive inlet pressure according to the vapour pressure of the specific liquid.

For water applications at 180 °C, a bearing flange is incorporated in the following pump types.

50 Hz	60 Hz
CRI, CRN 10-1 - 10-6	CRI, CRN 10-1 - 10-5
CRI, CRN 15-1 - 15-3	CRI, CRN 15-1 - 15-2
CRI, CRN 20-1 - 20-3	CRI, CRN 20-1
CR, CRN 32-1-1 - 32-4	CR, CRN 32-1 - 32-2
CR, CRN 45-1-1 - 45-2	CR, CRN 45-1-1 - 45-1
CR, CRN 64-1-1 - 64-2-2	CR, CRN 64-1-1
CR, CRN 90-1-1 - 90-1	

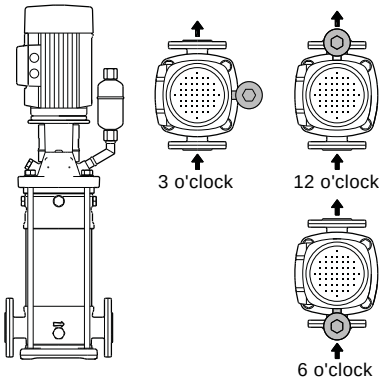
Note: For CR, CRN 32 a bearing flange is not available with motors below 3 kW.

Air vent positions on CR pumps with air-cooled top

The air vent of vertical CR pumps with air-cooled top is in line with the discharge port (12 o'clock position) as standard. The air vent is mounted vertically (12 o'clock position) on horizontal pumps.

The possible air vent positions are shown below.

Vertical CR pumps with air-cooled top

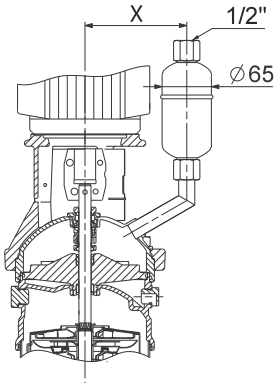


TM03 3659 0606

Fig. 47 Air vent positions on vertical CR pumps

Dimensions

All dimensions are in mm.



TM03 4082 1609

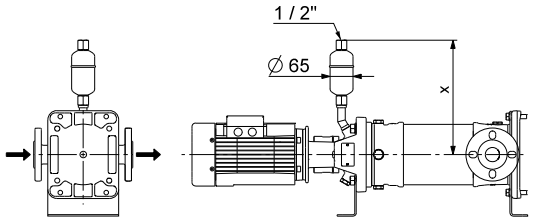
Fig. 48 Air-cooled top

Pump type	X
CRI, CRN 1s, 1, 3, 5 (< 3 kW)	142
CRI, CRN 1s, 1, 3, 5 (3 - 7.5 kW)	172
CRI, CRN 10, 15, 20 (< 4 kW)	156
CRI, CRN 10, 15, 20 (4 - 7.5 kW)	186
CRI, CRN 10, 15, 20 (11 - 18.5 kW)	217
CR, CRN 32	176
CR, CRN 45, 64	186
CR, CRN 90	190
CR, CRN 120, 150 (11-45 kW)	190
CR, CRN 120, 150 (55-75 kW)	243

Additional pump height

Pump type	Additional pump height
CRI, CRN 1, 3, 5	108
CRI, CRN 10, 15, 20	90
CR, CRN 32	185
CR, CRN 45	215
CR, CRN 64	141
CR, CRN 90	159
CR, CRN 120, 150	111

Horizontal CR pumps with air-cooled top



TM03 4084 1609

Fig. 49 Air vent positions on horizontal CR pumps with air-cooled top

Key to fig. 49

Pump type	X
CRI, CRN 1s, 1, 3, 5	308
CRI, CRN 10, 15, 20	324
CR, CRN 32	391
CR, CRN 45, 64	398
CR, CRN 90, 120, 150	404

Note: 75 kW motors are higher than distance x.

Magnetic-drive pump (MAGdrive)

Grundfos CRN MAGdrive pumps operate according to a patented, magnetic-drive system that eliminates the need for shaft seals. The power from the motor is transmitted to the pump by magnetic force and not by a conventional coupling. Combined with a hermetically sealed liquid end, the pump is totally leak-free.

As all axial forces are absorbed in the MAGdrive system, the pump incorporates a standard ICE or NEMA motor with keyway and deep-groove ball bearing.

GrA4445

Fig. 50 CRN MAGdrive pumps

The MAGdrive solution is available for these pumps:

Pump type	CRN pumps with magnetic drive										
	1s	1	3	5	10	15	20	32	45	64	90
CRN(E)	•	•	•	•	•	•	•	•*	•*	•*	•*

• Available.
•* Available up to 22 kW.

As minimum, a soft starter is required for these motors:

- 2-pole motors: 18.5 and 22 kW.
- 4-pole motors: 1.1 kW and up.

Features and benefits

CRN MAGdrive offers the following special features and benefits:

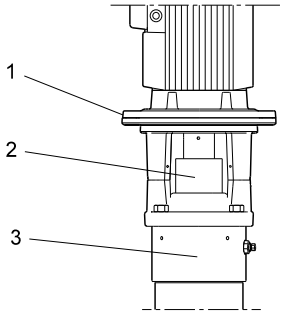
- a hermetically sealed drive system for 100 % leak-free pump operation
- special choice of materials and design for low energy loss
- simple pump design for ease of service
- unique pump design for efficient cooling of magnet by means of the pumped liquid
- ATEX version available.

Applications

The CRN MAGdrive pump is suitable for wide selection of industrial applications such as:

- **Aggressive or corrosive liquids**
  Concentrated sulphuric acid, nitric acid, phosphoric acid, etc.
- **Toxic liquids**
  Trichloroethylene, chloroform, phenol, etc.
- **Flammable and combustible liquids**
  Petrol, jet fuels, LPG, alcohols, etc.
- **Hardening/curing liquids**
  Paint, glue, resins, etc.
- **Crystallising liquids**
  Glycol additives, naphthalene, sugar products, salts, etc.
- **Refrigerants**
  Ammonia, synthetic chemicals (CFC, HCFC, HFC), etc.

Design



TM03 9149 3407

Fig. 51 MAGdrive system

Pos.	Designation	Materials
1	Motor stool	Cast iron. Stainless steel on request
2	MAGdrive	
3	Pump head	Stainless steel (EN 1.4408)

The configuration of the CRN MAGdrive pump is almost identical to that of the standard CRN pump.

The following rubber parts solutions are available:

- EPDM
- FXM (Fluoraz®)
- FFKM (Kalrez®)
- FKM (Viton®).

Connections available for CRN MAGdrive pumps:

Connection type	CRN	
	1s, 1, 3, 5, 10, 15, 20	32, 45, 64, 90
DIN, ANSI, JIS flange	•	•
PJE	•	•
FlexiClamp, union, oval flange, TriClamp	•	

• Available.

Construction

The magnetic field is generated by two magnets; the outer magnet is driven by the motor, and the inner magnet is connected to the pump. The two shafts are not connected.

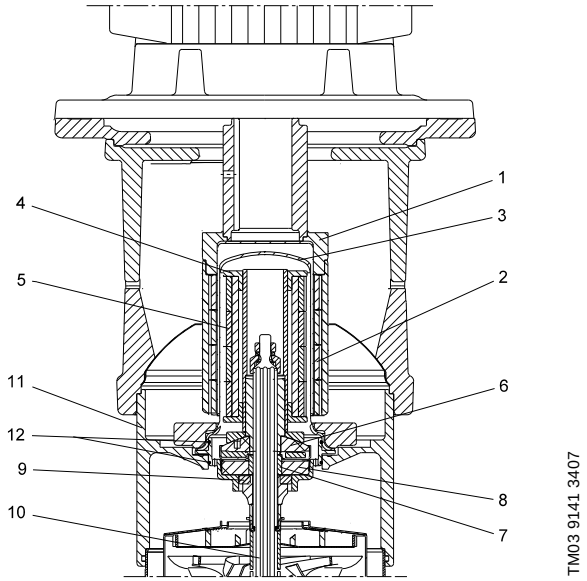


Fig. 52 Sectional drawing of MAGdrive system

Pos.	Designation	Material
1	Outer drive	1.4301
2	Outer magnets	NdFeB (neodymium)
3	Can	1.4539
4	Inner drive	1.4401
5	Inner magnets	NdFeB (Neodymium)
6	Rotating thrust bearing	SiC Q_1^G (silicon carbide, carbon-filled)
7	Stationary thrust bearing	SiC Q_1^G (silicon carbide, carbon-filled)
8	Radial bearing	SiC (silicon carbide)
9	Upthrust bearing	Graflon (carbon-graphite-filled PTFE)
10	Drive/pump shaft	CRN 1s-5: 1.4401 CRN 10-20: 1.4460 CRN 32-90: 1.4462
11	Pump head	1.4408
12	O-ring	EPDM, FKM, FXM, FFKM

Operating conditions

Maximum pressure: 25 bar.

Temperature range: -40 to 120 °C

Viscosity range: 0.15 to 300 mPas.

Technical data

Motor range: 0.37 kW to 22 kW.

Dimensions

The height of the MAGdrive system typically makes the pump a little higher than a standard CRN pump. Some pump sizes have a larger motor than the standard range.

For dimensions and weights for CRN MAGdrive pumps, see page 141 to 152.

Note: When ordering a Grundfos MAGdrive, please state the data:

- liquid temperature [°C]
- liquid viscosity [mPas]
- liquid density [kg/m^3]
- frequency [Hz].

Above information is required for the selection of the correct MAGdrive/motor combination.

9. Pump

PN 25 and PN 40 pumps

We offer customised pump solutions for the following inlet pressures:

- CR 1 to CR 20: up to 25 bar.
- CR 32 to CR 150:up to 40 bar.

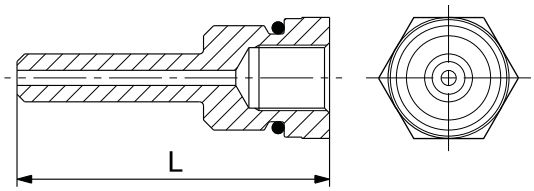
Note: In applications with high inlet pressures, a bearing flange must be fitted. For further information, see the CR, CRN high-pressure data booklet (publication number V7174003).

Measurement of inlet pressure

As CR 1s to CR 20 pumps are not equipped with a connection for the measurement of pump inlet pressure, we offer customised pumps with a tapping for a pressure gauge or pressure sensor.

TM03 4726 2506

Fig. 53 CR pump with pressure gauge



TM03 4091 1606

Fig. 54 Insert for measurement of inlet pressure

The material of the insert is stainless steel (AISI 316).

Designation	Rubber material	Connection	L [mm]	Product number
Insert for measurement of inlet pressure	CR 1s, 1, 3, 5			
	EPDM	RG 1/4"	57	96488082
	FKM			96562250
	FFKM			96562251
	FXM			96562252
	CRI, CRN 1s, 1, 3, 5			
	EPDM	RG 1/4"	51.5	96562253
	FKM			96562254
	FFKM			96562255
	FXM			96562256
	CR 10, 15, 20			
	EPDM	RG 1/4"	62	96584117
	FKM			96584119
	CRI, CRN 10, 15, 20			
	EPDM	RG 1/4"	53	96584121
	FKM			96584122

We offer these pump types with tappings:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•						
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•						

• Available.

Note: CR(E) and CRN(E) 32, 45, 64 and 90 have tappings for measurement of pump inlet pressure as standard.

Pumping of liquids down to -40 °C

We offer customised pumps for the pumping of liquids down to -40 °C. The pumps have an oversize neck ring ensuring that impellers do not seize up as a result of thermal expansion.

We offer the above solution for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	❍	❍	❍	❍	❍	❍

• Available.
❍ Standard CRN 32, 45, 64 and 90 pumps with shaft seal type HQQE are suitable for liquid temperatures down to -40 °C.

Carbon-free pumps

Certain processes, such as pumping of pure water in electronics industries, require pumps that do not contain carbon.

To meet such requirements, we offer these 100 % carbon-free pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	❍	❍	❍	❍	❍	❍	❍	•	•	•	•	•	•
CRI(E)	❍	❍	❍	❍	❍	❍	❍						
CRN(E)	❍	❍	❍	❍	❍	❍	❍	•	•	•	•	•	•

• Available.
❍ Pumps with HQQx shaft seal are carbon-free as standard.

Surface treatment

Application overview

Applications	Surface treatment				
	Cleaned and dried	Vacuum-dried pumps	Electropolished	Alternative colouring	Corrosion protection
Offshore					•
Pharmaceutical industry, food and beverage industry	•		•		
Cooling industry		•			

Cleaned and dried pumps

Cleaned and dried pumps are used in applications involving strict demands to cleanliness and surface quality, such as low content of silicone.

To meet these strict demands, we offer these cleaned dried pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Prior to assembly, all pump parts are cleaned in 60 to 70 °C water with a cleaning agent. All pump parts are then thoroughly rinsed in de-ionised water and air-dried. The pump is assembled without any use of silicone lubricants. Finally, the pump is packed in silicone-free plastic.

Note: Silicone-free shaft seals are available as option.

Cleaned and dried pumps are not performance tested.

Vacuum-dried pumps

In general, all CR products are tested before leaving the assembly line.

After the test, all pumps are drained. Due to the design of the chamber stack, it is not possible to completely drain the product. Primarily within cooling applications, no residual water from the test is accepted in the pump, and all pumps must be completely dry. Therefore after the pump performance test, vacuum-dried pumps are handled as described below:

1. Water is blown out of the pump with compressed air.
2. The pump is ventilated with hot air for a predefined period of time.
3. The pump is exposed to a vacuum for a predefined period of time.
4. The humidity inside the pump is measured.

If necessary, steps 2 and 3 are repeated until the humidity level reaches a predefined value ensuring that no liquid is present inside the pump.

We offer these vacuum-dried pumps:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•						
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•						

• Available.

Electropolished pumps

Electropolished pumps are often used in the pharmaceutical industry and in the food and beverage industry where materials and surface quality must meet strict requirements to hygiene or corrosion resistance.

Electropolishing removes burrs as well as metallic and non-metallic inclusions, providing a smooth, clean and corrosion-resistant stainless steel surface.

First all components are pickled in a mixture of nitric and hydrofluoric acid. Subsequently, the components are electropolished in a mixture of sulphuric and phosphoric acid. Finally, the components are passivated in nitric acid.

All cast parts of CRN are polished mechanically before being electropolished.

Note: The pump incorporates a standard shaft seal which has not been polished.

To meet the strict hygienic requirements to material and surface quality, we offer electropolished stainless steel pumps with the following surface quality:

Pump type	Cast stainless steel	Stainless-steel parts (not cast)	Surface quality
CRN 1s, 1, 3, 5	•	•	Ra ≤ 0.8 µm
CRN 10, 15, 20, 32, 45, 64, 90, 120, 150	•	•	Ra ≤ 1.6 µm

• Available.

We offer these electropolished pumps:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)													
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Alternative colouring

We offer customised pumps in any NCS- or RAL-specified colour to suit your requirements!

The used paint is water-based. Painted parts correspond to corrosion class III.

All pump types and sizes are available with alternative colouring.

Corrosion protection

We offer corrosion protection in the form of painting and in several categories according to the specific requirements of the pump installation.

The categories refer to area/environment, layer thickness and lifetime expectancy.

Corrosion protection will be according to DS/EN ISO standard 12944.

CRN all-stainless steel pumps

We offer customised stainless-steel CRN pumps for maritime applications, very humid environments, etc.:

- pump with stainless-steel motor stool
- pump with stainless-steel base
- pump with stainless-steel flanges.

We offer the above solutions for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)													
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Note: The dimensions of customised stainless-steel CRN pumps do not differ from those of standard CRN pumps.

CR low NPSH

Cavitation is often a problem in applications where pumps have to deal with the combination of high liquid temperatures, poor inlet pressure and/or high flow rate. For further information about NPSH and the calculation of NPSH value, see these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CR, CRN high pressure
- CRT, CRTE.

Low-NPSH pumps are designed to eliminate the risk of cavitation and ensure a stable and reliable operation.

The CR low-NPSH pump is a pump with a special first-stage design that reduces the pump's NPSH value and prevents erosion and destruction of the pump, pipework and valves. Thanks to the improved inlet design, low-NPSH pumps can handle more stress than conventional pumps without affecting the stability of operation.

The CR low-NPSH pump reduces the excess pressure itself and does not require any additional tank to provide supplementary pressure. In boiler feed applications where many large tanks are gathered, a compact system is an advantage.

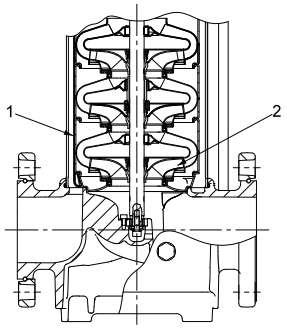


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Fig. 55 Sectional drawing of CR low-NPSH pump

Key

Pos.	Designation
1	Special inlet part
2	Special inlet impeller

Pump range

These pump types are available as low-NPSH pumps:

Pump type	CR low-NPSH pumps												
	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)			•	•	•	•	•	•	•	•			
CRI(E)			•	•	•	•	•						
CRN(E)			•	•	•	•	•	•	•	•			

• Available.

Maximum pressure	25 bar
Maximum liquid temperature	120 °C[1)]

[1)] With air-cooled top, the maximum liquid temperature is +180 °C.

For further information about CR low-NPSH pumps, see pages 77 to 92.

For information about sectional drawings, dimensions and weights, see pages 117 to 127.

Horizontal in-line pumps

GR5379

Fig. 56 Horizontal CR pump

Horizontal pumps are used in applications for safety and/or space-saving reasons.

In earthquake areas, horizontal pumps are more reliable than vertical pumps. In case of earthquake, the design and mounting of the pump will dampen the oscillations of the pump.

In installations with limited access or space, we recommend horizontal pumps to improve installation and service.

Pump range

These Grundfos pumps are available for horizontal mounting:

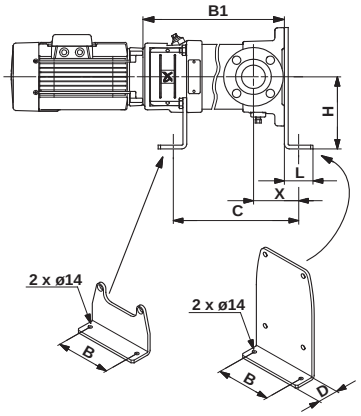
Pump type	Horizontal CR pumps												
	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

CRT(E) 2, 4, 8 and 16 pumps are also available for horizontal mounting. The pumps are supplied with separate mounting plates for support of motor and pump.

Dimensional drawings

CR(E), CRI(E), CRN(E) 1s, 1, 3, 5 (≤ 4 kW)
CR(E), CRI(E), CRN(E) 10, 15, 20 (≤ 4 kW)



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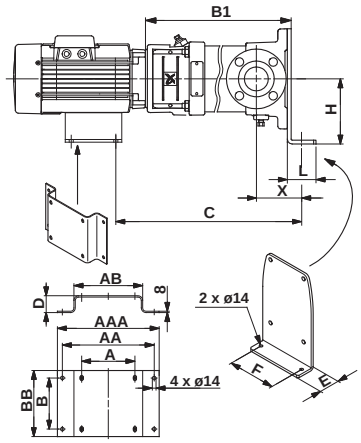
CR(E), CRI(E), CRN(E) 5 (5.5 - 7.5 kW)
CR(E), CRI(E), CRN(E) 10, 15, 20 (≥ 5.5 kW)



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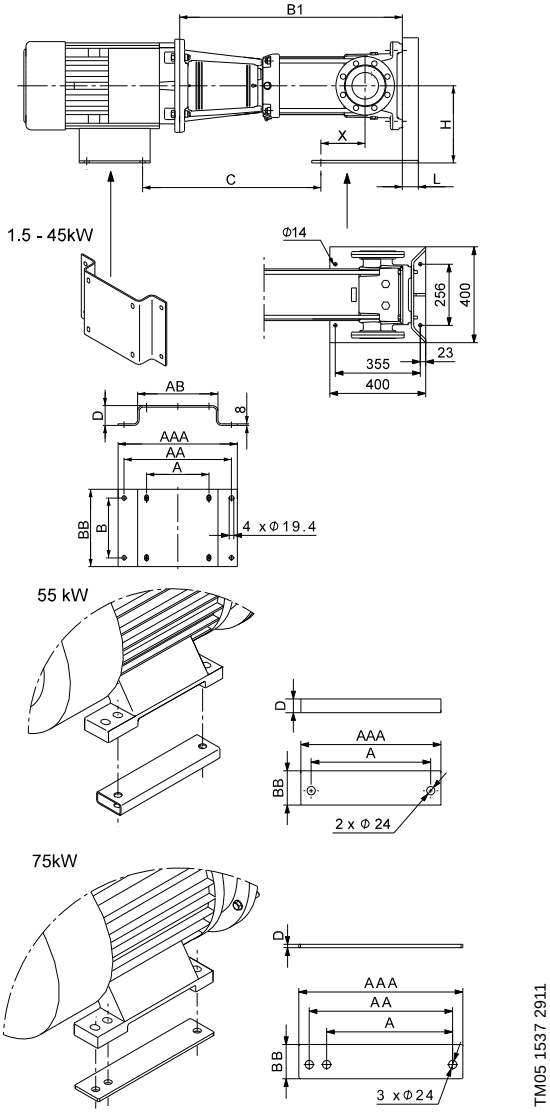
CR(E), CRN(E) 32, 45, 64, 90, 120, 150



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Dimensions

All dimensions are in mm.

CR(E), CRI(E), CRN(E) 1s, 1, 3, 5 (≤ 4 kW), support for base plate and pump head

Motor [kW]	B	C	D	H	L	X	
						Connections	
						DIN	Oval, PJE, FlexiClamp
0.37 - 0.55	138	B1-58	45	140	50	105	80
0.75 - 1.1		B1-64	45				
1.5 - 2.2		B1-80	45				
3 - 4		B1-84	45				

Note: For pump height (B1), see the CR(E), CRI(E), CRN(E) data booklet.

CR(E), CRI(E), CRN(E) 5 (5.5 - 7.5 kW)

Motor [kW]	A	AA	AAA	AB	B	BB	C	D	E	F	H	L	CR(E), CRI(E), CRN(E) 5	
													X	
													Connections	
													DIN	Oval
5.5	216	326	366	276	140	180	B1+119	68	45	138	200	50	105	80
7.5	216	326	366	276	140	180	B1+119	68	45	138	200	50		

Note: For pump height (B1), see the CR(E), CRI(E), CRN(E) data booklet.

CR(E), CRI(E), CRN(E) 10, 15, 20 (≤ 4 kW), support for base plate and pump head

Motor [kW]	B	C	D	H	L	CR(E), CRI(E), CRN(E)	
						10	15, 20
						X	
						Connections	
						DIN, oval, PJE, FlexiClamp	DIN, oval, PJE, FlexiClamp
0.37 - 0.55	170	B1-65	45	174	50	110	120
0.75 - 1.1		B1-69	45				
1.5 - 2.2		B1-84.5	45				
3-4		B1-89.5	45				

Note: For pump height (B1), see the CR(E), CRI(E), CRN(E) data booklet.

CR(E), CRI(E), CRN(E) 10, 15, 20 (≥ 5.5 kW), support for base plate and motor

Motor [kW]	A	AA	AAA	AB	B	BB	C	D	E	F	H	L	CR(E), CRI(E), CRN(E)	
													10	15, 20
													X	
													Connections	
													DIN, oval, PJE, FlexiClamp	DIN, oval, PJE, FlexiClamp
5.5	216	326	366	276	140	180	B1+119	68	45	170	200	50	110	120
7.5	216	326	366	276	140	180	B1+119	68	45	170	200	50		
11	254	384	424	334	210	260	B1+138	40	45	170	200	50		
15	254	384	424	334	210	260	B1+138	40	45	170	200	50		
18.5	254	384	424	334	254	310	B1+138	40	45	170	200	50		

Note: For pump height (B1), see the CR(E), CRI(E), CRN(E) data booklet.

CR(E), CRN(E) 32, 45, 64, 90, 120, 150 (≤ 45 kW), support for base plate and motor

Motor [kW]	A	AA	AAA	AB	B	BB	C	D	E	H	L	CR(E), CRN(E) 32 X Connections DIN	CR(E), CRN(E) 45, 64, 90 X Connections DIN
1.5	140	320	380	220	100	165	B1-261	200	400				
2.2	140	320	380	220	125	165	B1-261	200	400				
3	160	340	400	245	140	180	B1-254	190	400				
4	190	370	430	275	140	180	B1-247	178	400				
5.5	216	395	455	300	140	180	B1-228	158	400				
7.5	216	395	455	300	140	180	B1-228	158	400				
11	254	440	500	340	210	275	B1-209	130	400	290	60	212	177
15	254	455	515	340	210	266	B1-209	130	400				
18.5	254	455	515	340	254	310	B1-209	130	400				
22	279	485	545	365	240	310	B1-196	110	400				
30	318	540	600	410	305	365	B1-184	90	400				
37	318	540	600	410	305	365	B1-184	90	400				
45	356	580	640	450	310	370	B1-168	65	400				

Note: For pump height (B1), see the CR(E), CRI(E), CRN(E) data booklet.

CR, CRN 120, 150 (55-75 kW), support for base plate and motor

Motor [kW]	A	AA	AAA	BB	C	D	E	H	L	CR, CRN 120, 150 X Connections DIN
55	349	-	409	100	B1-189	40	400	290	60	177
75	368	419	479	100	B1-167	10	400	290	60	177

Note: For pump height (B1), see the CR(E), CRI(E), CRN(E) data booklet.

Multistage horizontal end-suction pumps

TM05 1717 3511

Fig. 57 Multistage horizontal end-suction pumps

CRE-H, CRIE-H, CRNE-H 50/60 Hz

CR-H, CRI-H, CRH-N pumps are horizontal end-suction pumps, typically mounted on base plates. The pumps are available in a complete 50 and 60 Hz range with both IEC or NEMA motors.

Interchangeable ANSI solution

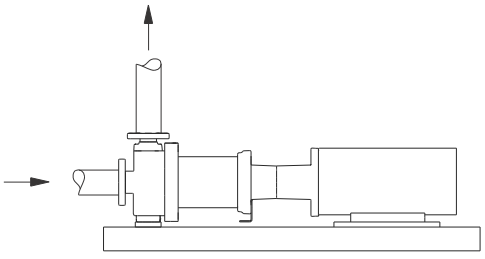
The patented loose flange concept provides easy installation in ANSI, DIN or JIS standard pipework.

Pump connection configurations comply with the ANSI/ASME B73.1 standard and ensure interchangeability with traditional end-suction pumps with axial suction port and radial centre-line discharge port. Therefore, the CR-H is a high-efficiency solution designed for drop-in replacement of ANSI configured pumps. The CR-H design enables service of the pump without removing the pump from the pipework.

CR-H, CRI-H, CRN-H pumps are suitable for a variety of applications from pumping of potable water to pumping of chemicals. The pumps are therefore used in a wide variety of pumping systems where the performance and material of the pump meet specific demands.

Energy efficiency

To reduce loss and thus increase the pump efficiency, CR-H, CRI-H, CRN-H pumps are available in an energy-optimised version with suction and discharge ports with a larger diameter than ANSI specifications.



TM05 1378 3511

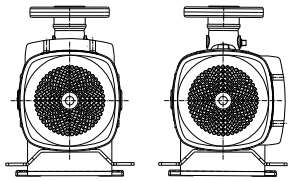
Fig. 58 CRH pump with axial suction port and radial discharge port

Max. pressure: 30 bar.

Max. liquid temperature: 120 °C (air-cooled top 180 °C (oil 240 °C)).

Max. motor size: 45 kW.

Terminal box positions



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IEC motor

Pump type	1	1s	3	5	10	15	20	32	45	64	90	120	150
CR-H	•	•	•	•	•	•	•	•	•	•	•		
CRI-H	•	•	•	•	•	•	•						
CRN-H	•	•	•	•	•	•	•	•	•	•	•		

Dimensions of CR-H pumps with IEC motors, see section *CRH(N) pumps*.

NEMA motor

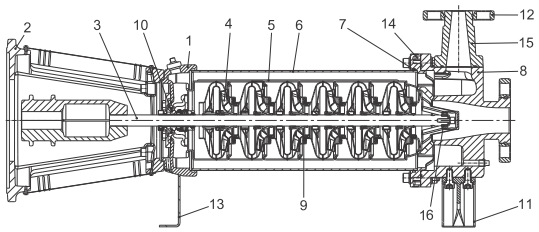
Pump type	1	1s	3	5	10	15	20	32	45	64	90	120	150
CR-H	•	•	•	•	•	•	•	•	•	•	•		
CRN-H	•	•	•	•	•	•	•	•	•	•	•		

Dimensions of CR-H pumps with NEMA motors, see WebCAPS.

Variants

The same variants and accessories are available for the CR-H, CRI-H, CRN-H pump range as for the standard CR pump range. The only difference between the CR horizontal end-suction pump and the CR in-line pump is the base. However, the base for horizontal end-suction pumps is not available in titanium.

Construction



TM05 1989 4111

Fig. 59 Sectional drawing

Pos.	Designation	Pos.	Designation
1	Pump head	9	Neck ring
2	Motor stool	10	Shaft seal
3	Shaft	11	Foot
4	Impeller	12	Flange ring
5	Chamber	13	Support bracket
6	Sleeve	14	Sleeve flange
7	O-ring for sleeve	15	Discharge port
8	Base	16	Bottom bearing ring

Belt-driven pumps

Fig. 60 Belt-driven CR pump

Belt-driven pumps are used in applications for space-saving reasons or where no electrical power is available.

Belt-driven CR pumps are of the same construction as electrically driven CR pumps. They do, however, have a pulley for connection to for instance an internal combustion motor.

Pump range

These Grundfos pumps are available as belt-driven pumps:

Pump type	Belt-driven CR pumps												
	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR	•	•	•	•	•	•	•	•	•	•	•		
CRI	•	•	•	•	•	•	•						
CRN	•	•	•	•	•	•	•	•	•	•	•		

• Available.

CRT 2, 4, 8 and 16 pumps are also available as belt-driven pumps.

An additional bearing has been added on top of an existing bearing flange. The two bearings are fitted back to back. This bearing design makes it possible to withstand the extra radial forces caused by a pulley.

A pulley can be attached to the end of the shaft.

Note: The pulley is not supplied with the pump.

By means of pulley belts, the pump can be driven by a motor mounted next to it rather than on top of it.

The pump can be mounted horizontally or vertically by the extra support plates.

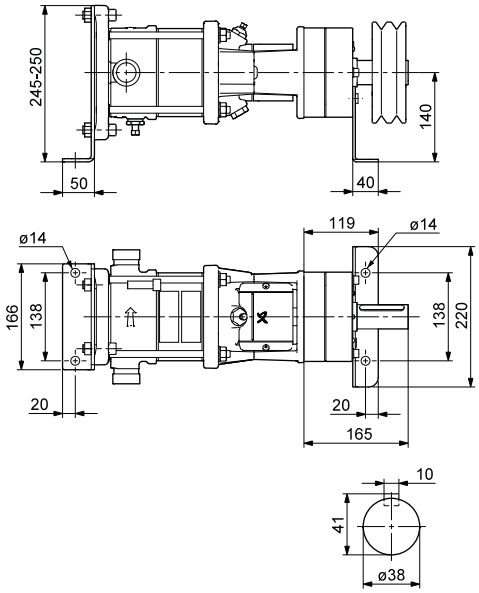
The pulley head is positioned on the motor stool where the motor would normally be fitted. By means of the existing holes in the motor stool, the pulley head can be secured to the motor stool with bolts, washers and nuts. The pulley wheel is then attached to the shaft using an appropriate bush and key.

For extended bearing life, we recommend these pulley wheel sizes:

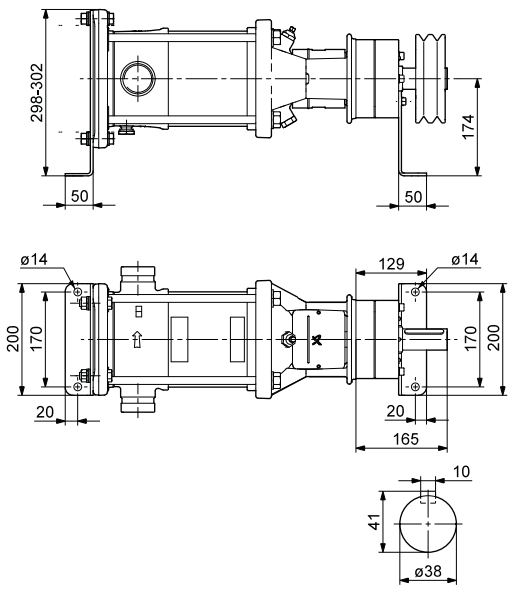
	Type III	Type IV	Type II	Type I
Pulley head	**0.37 - 5.5 [kW]**	**7.5 - 18.5 [kW]**	**1.5 - 7.5 [kW]**	**11 - 45 [kW]**
Pump type	**CR, CRI, CRN**		**CR, CRN**	
	1s, 1, 3, 5, 10, 15, 20	10, 15, 20	32, 45, 64, 90	
Pulley wheel diameter	∅112-135	Min. ∅200	Min. ∅160	Min. ∅200
V-belts	2	Min. 3	Min. 2	Min. 3
Pump speed [min^{-1}]	Max. 3000			

Dimensional drawings

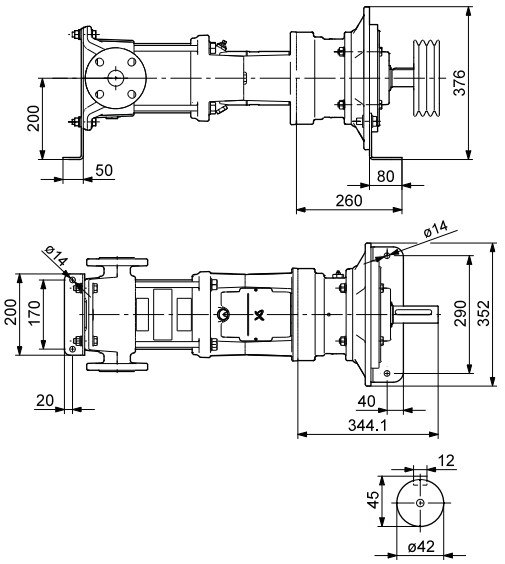
CR, CRI, CRN 1s, 1, 3 and 5 (type III)



CR, CRI, CRN 10, 15 and 20 (type III)

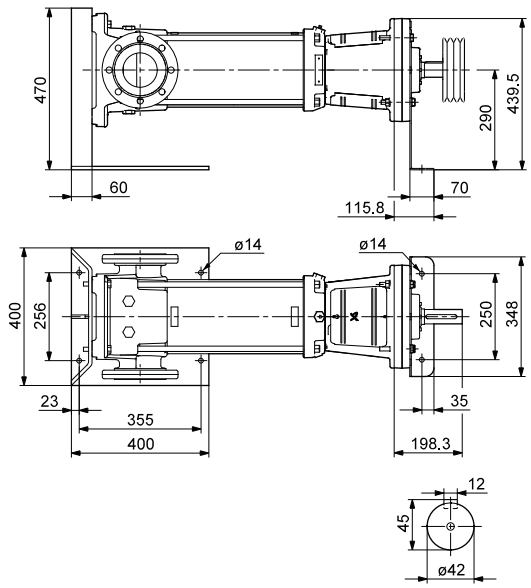


CR, CRI, CRN 10, 15 and 20 (type IV)



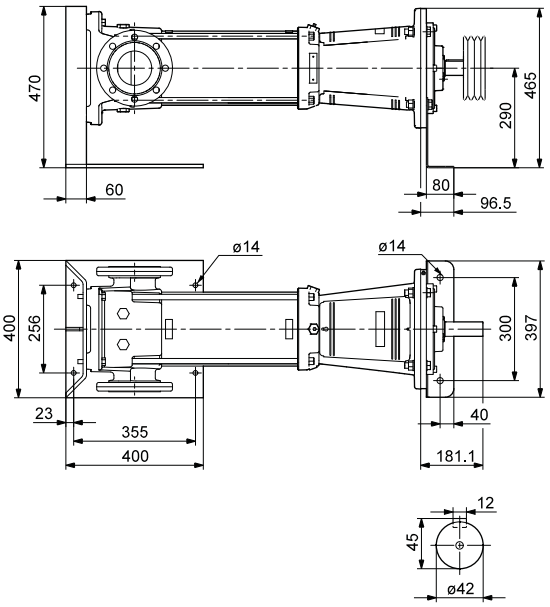
TM03 4169 1706

CR, CRN 32, 45, 64 and 90 (type II)



TM03 4170 1706

CR, CRN 32, 45, 64 and 90 (type I)



TM03 4171 1706

CR(I) deep-well pumps

CR(I) deep-well pumps are used for deep-well pumping in small water supply systems where water is pumped from depths (H_D) down to 90 metres.

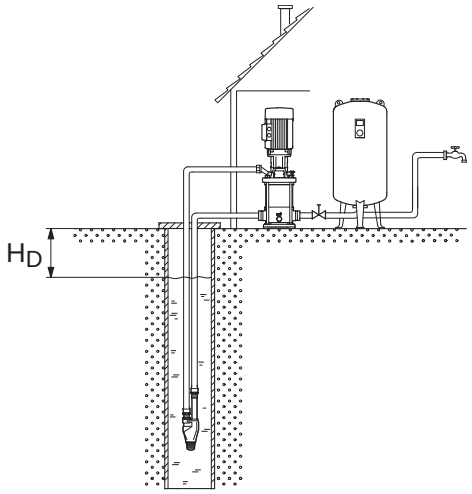


Fig. 61 System with CR(I) deep-well pump

The pump system consists of a dry-installed CR(I) multistage centrifugal pump connected to a one-size submerged ejector via two pipes.

We recommend that you connect a pressure tank to the discharge side of the pump to maintain a suitable pressure at the tapping point.

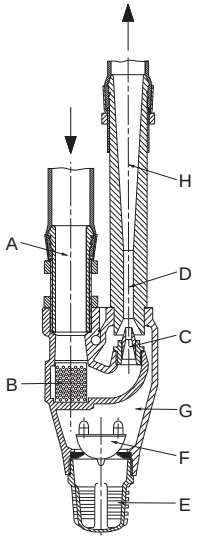


Fig. 62 Sectional drawing of ejector

Water is pumped through the pressure pipe (A) and the strainer (B) to the nozzle (C). The water passes the nozzle at high speed and flows into the diffuser (D). Via the strainer (E) and bottom valve (F), water which is to be pumped up is in connection with the chamber (G).

From the chamber, it is pressed into the diffusor (D) by the water jet from the nozzle (C). There the two water flows mix, and the velocity is converted into pressure, driving the water up through the riser pipe (H) to the suction port of the pump.

Technical data

Maximum system pressure:	16 bar
Maximum ambient temperature:	40 °C
Maximum liquid temperature:	40 °C
Minimum size of borehole:	3"

Pump range

These pumps are available with ejector:

Pump type	CR deep-well pumps											
	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR				•									
CRI				•									
CRN													

• Available.

Use of suction pipe

If the well capacity is lower than the pump capacity, dry running of the pump can be prevented by fitting a suction pipe below the ejector. To enable this, the ejector strainer (E) is replaced with a special threaded nipple.

Performance curves and technical data

For information about the performance curves and technical data of CR deep-well pumps, see page 76 and 139.

Ejectors

Based on the performance curves on page 76, we offer the following ejectors:

Ejector type	Product number
45B	90230045
44B	90230044
29B	90230029
22B	90230022
20B	90230020
11B	90230011

Contact Grundfos for further information about CR(I) ejector pumps.

Pump rubber parts

We offer pumps with a wide range of customised rubber materials such as EPDM, FKM, FFKM and FXM to suit your requirements.

Pump type	Rubber material			
	EPDM	FKM	FFKM	FXM
CR, CRI, CRN 1s, 1, 3, 5	•	•	•	•
CR, CRI, CRN 10, 15, 20	•	•	•	•
CR, CRN 32, 45, 64, 90	•	•	• [1)]	
CR, CRN 120, 150	•	•		

• Available.

1) These pumps are fitted with FXM sleeve gaskets. All other rubber parts are of FFKM.

We offer customised rubber materials for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Empty chambers

We offer customised pumps with empty chambers designed to meet your specific duty point!

CR pumps with a predefined number of chambers are selected from the standard range. See for instance the performance curves of CR 20-14 and CR 20-17 on page 8. In order to avoid the selection of a pump too large for your duty point, we offer customised pumps with empty chambers enabling an optimum match.

We offer pumps with empty chambers for the following pump types:

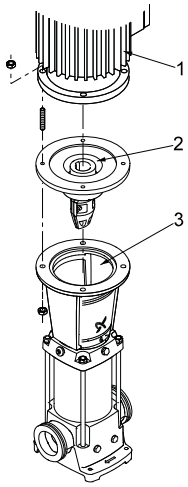
Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•						
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•						

• Available.

Note: CRT(E) 2, 4, 8 and 16 are also available as customised pumps with empty chambers.

Bearing flange

To ensure long pump life and reliable operation, fit a bearing flange between the motor and the pump head.



TM03 4062 1406

Fig. 63 Bearing flange

Key

Pos.	Designation
1	Motor
2	Bearing flange
3	Pump head

A bearing flange is an additional flange with an oversize ball bearing to absorb axial forces in both directions. The coupling is part of the bearing flange fitted to obtain optimum alignment.

Note: The bearing flange requires a motor with keyway and ball bearings according to IEC 34 and NEMA.

A bearing flange is used in two situations:

1. A standard motor with standard ball bearing is required. The bearing flange absorbs the hydraulic load from the pump, ensuring an acceptable motor bearing life.
2. The pump is to run at a higher inlet pressure than the maximum pressure recommended.

Note: For motor sizes above 11 kW, the bearing flange is equipped with grease nipples and must be lubricated regularly. Please follow the instructions on the bearing flange.

Pump range

The following pump types are available with bearing flange:

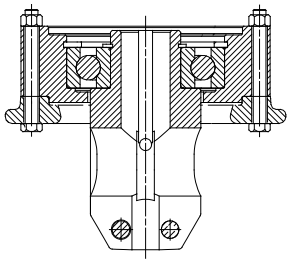
Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•		
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•		

• Available.

Note: CRT(E) 2, 4, 8 and 16 are also available as customised pumps with bearing flange.

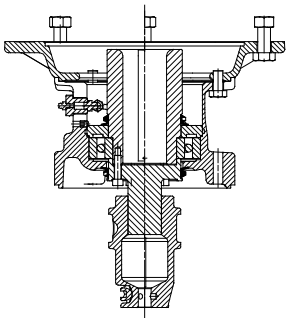
Bearing flange for CR pumps

CR, CRI, CRN 1s, 1, 3, 5 (≤ 7.5 kW)
CR, CRI, CRN 10, 15, 20 (≤ 4 kW)



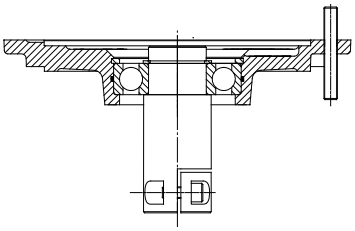
TM02 7436 3403

CR, CRI, CRN 10, 15, 20 (≥ 5.5 kW)



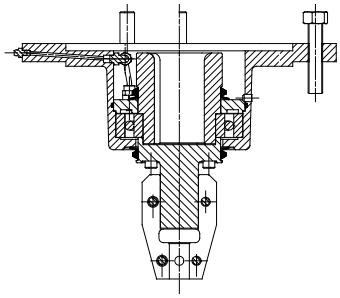
TM02 7437 3403

CR, CRN 32, 45, 64, 90 (≤ 7.5 kW)



TM01 4352 0199

CR, CRN 32, 45, 64, 90 (> 7.5 kW)



TM01 4353 0199

Dimensions

The following additional heights in mm must be added to the total height of the pump.

CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20

Motor power	Additional height
IEC [kW]	
0.37 - 0.55	31
0.75 - 1.1	32
1.5 - 4.0	40
5.5 - 7.5	23[1)]/150[2)]
11.0 - 18.5	180
NEMA [hp]	
0.33 - 2.0	40
3 - 10	45
15 - 40	135

1) CR, CRI, CRN 1s, 1, 3, 5
2) CR, CRI, CRN 10, 15, 20.

CR, CRN 32, 45, 64, 90

Motor power	Additional height
IEC [kW]	
3.0 - 7.5	23
11 - 45	20
NEMA [hp]	
3 - 10	22
15 - 60	17

For information about the total height of a given CR pump, see these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CRT, CRTE
- CR, CRN high pressure.

The above data booklets are available in WebCAPS.
See page 165.

Support bearings

We offer customised pumps with support bearings of bronze for corrosive applications for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)								•	•	•	•		
CRI(E)													
CRN(E)								•	•	•	•		

• Available.

Bearing material

We offer pumps with a wide range of customised bearing materials such as bronze, tungsten carbide and carbon-filled PTFE to suit your requirements.

Pump size	Bearing material
CR, CRN 1, 3, 5, 10, 15, 20	Bronze/tungsten carbide
	EPDM/tungsten carbide
CR, CRN 32, 45, 64, 90	Silicon carbide/tungsten carbide

We offer customised rubber parts for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•		
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•		

• Available.

Pump head positions

The pump head is mounted so that the air vent screw is in line with the discharge port as standard.

The pump head can be mounted in three other positions in steps of 90 °.

Note: The air vent of horizontal pumps must always point upwards.

Customised nameplate

We offer additional customised nameplates attached to the pump:

- A nameplate supplied by you.
- A Grundfos nameplate customised in terms of a specific duty point.
- A Grundfos nameplate with a tag number.

Note: A Grundfos standard nameplate is always fitted on the pump.

Dry-running protection

LiqTec

GR9415

Fig. 64 LiqTec dry-running protection device

The Grundfos LiqTec immediately cuts off the pilot current to the motor protection relay in these cases:

- There is no liquid in the pump.
- The liquid temperature exceeds 130 ± 5 °C.
- The sensor, sensor cable, electronic unit or power supply fails.

When connected to the PTC sensors in the motor, the LiqTec also protects the motor against overheating.

The sensor is easily inserted through the 1/2" connection in the pump head close to the shaft seal. It can, however, also be used externally.

The LiqTec sends a heat impulse through the sensor, measuring the temperature of the sensor. Liquid in the pump cools the sensor as well as the shaft seal and other pump parts.

If there is no liquid present, the LiqTec detects a high temperature in the sensor and cuts out the pump immediately to prevent damage.

The LiqTec also prevents excessive liquid temperatures from damaging the pump. If the LiqTec senses a liquid temperature above 130 °C, it cuts out the pump immediately. The LiqTec is a fail-safe device, meaning that the pump stops as soon as the sensor detects an error on the sensor cable or the electronics, or if the power supply of the control unit is switched off.

Restarting of the pump can be automatic or manual when the sensor detects liquid in the pump again.

Remote restarting is possible via a digital input.

The electronic control unit can also be connected to the PTC sensor measuring the motor temperature. In case of overheating of the motor, the system cuts out the pump.

Figures 65, 66 and 67 show installation examples.

Connection to standard motors

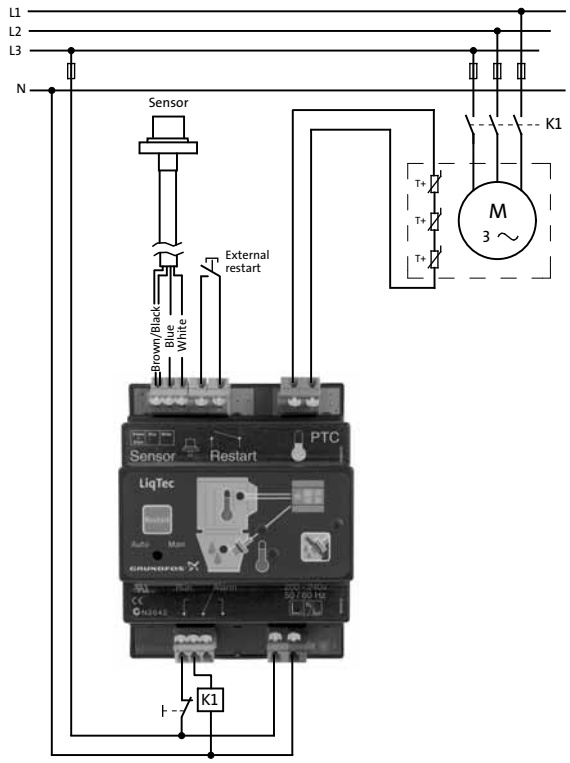


Fig. 65 LiqTec connected to a standard motor

Connection to MGE motors (0.37 - 2.2 kW)

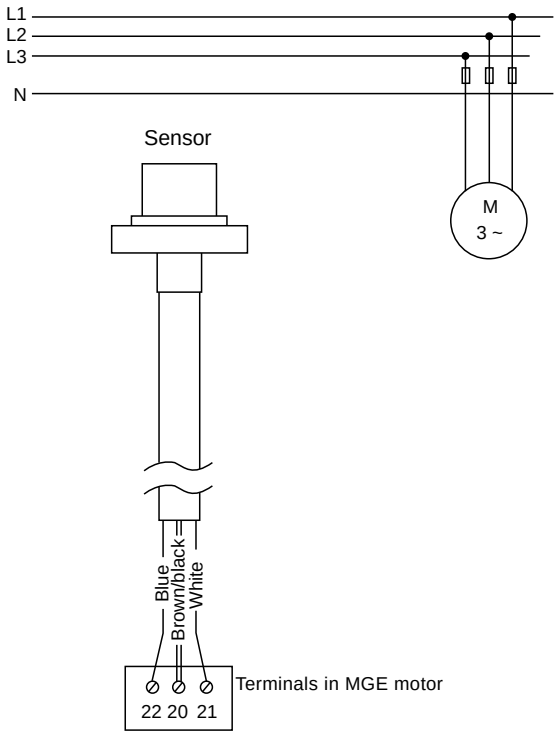


Fig. 66 LiqTec connected to an MGE motor (0.37 - 2.2 kW)

Connection to MGE motors (3-22 kW)

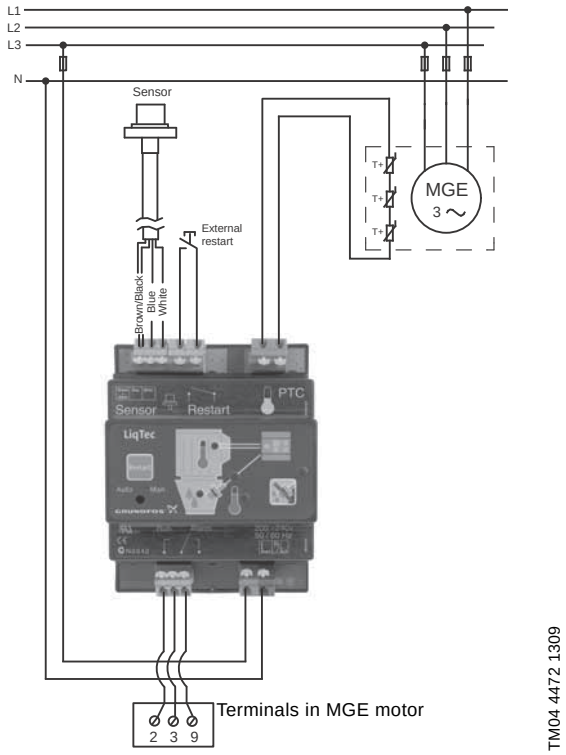


Fig. 67 LiqTec connected to an MGE motor (3-22 kW)

Dimensions

116 x 90 mm. The LiqTec can be mounted on a DIN rail in a control cabinet.

Technical data

Supply voltage	1 x 80-130 V or 1 x 200-240 V
Power consumption	5 W
Max. pressure	40 bar
Min./max. liquid temperature	-20 °C / 120 °C
Max. ambient temperature	50 °C
Humidity	99 %
Enclosure class	IPX0
Pumped liquid	Any water-based liquid handled by Grundfos pumps
Cable length	5 m[1)]

[1)] 15-metres cable is available on request.

Connections

6" base with DIN, JIS or ANSI flange

The 6" base enables connection to DN 150 flanges and is available with either DIN, JIS or ANSI flanges. The flange base consists of a pump base and a set of flanges. The flanges are thread mounted on the discharge and suction ports of the base.

The base is made of stainless steel EN/DIN 1.4408.

The flanges are available in stainless steel EN/DIN 1.4408 or cast iron EN/DIN 1092-2.

Dimensions

All dimensions are in mm.

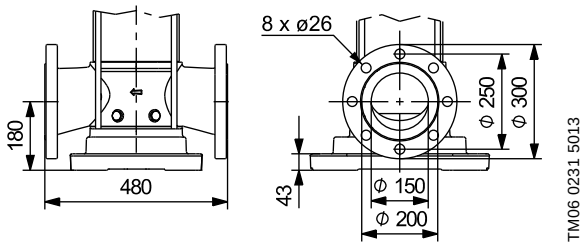


Fig. 68 Base with DN 150, PN 40 flanges

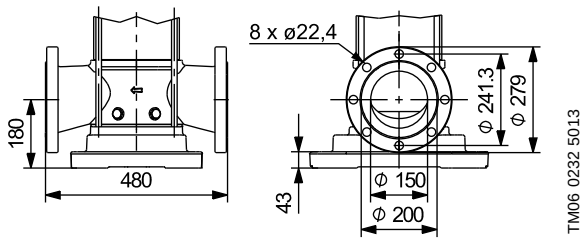


Fig. 69 Base with ANSI B 16.5, class 150 - 6" flanges

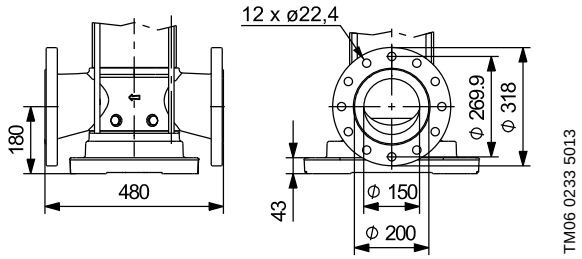


Fig. 70 Base with ANSI B 16.5, Class 300 - 6" flanges

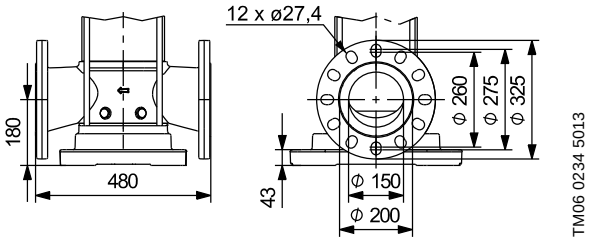


Fig. 71 Base with JIS 2210 20/30, 150 mm flanges

We offer the base with DIN, JIS or ANSI flanges for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)													
CRN(E)											•	•	•

• Available.

CR pumps with TriClamp connection

A base with TriClamp connection is of hygienic design with a sanitary coupling for use in the pharmaceutical and food and beverage industry.

A set consists of one clamping ring, one gasket and one pipe stub.

The connection is in accordance with EN/DIN 32676.

Dimensions

All dimensions are in mm.

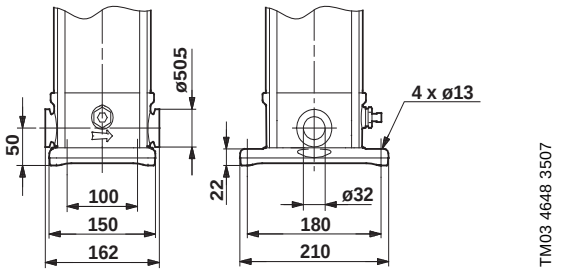


Fig. 72 TriClamp connection for CRI, CRN 1s, 1, 3 and 5

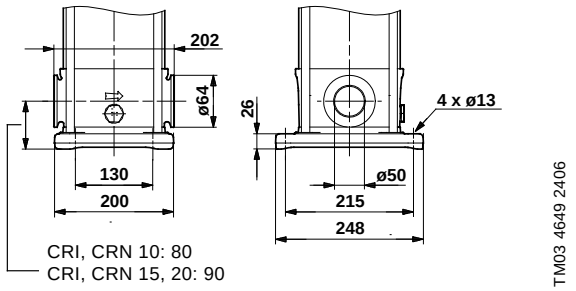
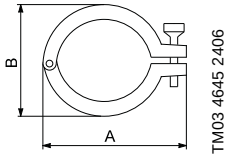
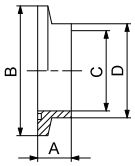
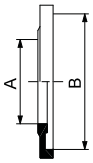


Fig. 73 TriClamp connection for CRI, CRN 10, 15 and 20

	Clamping ring			Port				Gasket		
										
	TM03 4645 2406			TM03 4646 2406				TM03 4647 2406		
Pump type	**PN**	**A**	**B**	**A**	**B**	**C**	**D**	**A**	**B**	
CRI(E), CRN(E) 1s, 1, 3, 5	16	92.0	59.5	21.5	50.5	35.6	38.6	35.3	50.5	
	50	102.0	60.0			32.0	36.0	32.2		
CRI(E), CRN(E) 10, 15, 20	16	104.4	74.0		64.0	48.6	51.6	48.0	64.0	
	50	123.0	75.0		65.0	50.0	54.0	50.2		

The clamping ring is made of stainless steel EN/DIN 1.4301/AISI 304.

The port is made of stainless steel EN/DIN 1.4401/AISI 316.

The gasket is made of PTFE or EPDM.

Connection	Pump type	Pipework connection	Connection material	Gaskets	Pressure [bar]	Coupling sets required	Product number
 GR5840	CRI(E), CRN(E) 1, 3, 5	DN 32	Stainless steel	PTFE	16	2	96515375
				EPDM		2	96515374
					50	2	97549395
	CRI(E), CRN(E) 10, 15, 20	DN 50		PTFE	16	2	96515377
				EPDM		2	96515376
					50	2	97549397

We offer TriClamp connections for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•						

• Available.

CR pumps with FlexiClamp according to EN/DIN 11851

A base with connections according to EN/DIN 11851 is of hygienic design for use in dairies and in the food and beverage industry.

A set consists of one pipe stub with external thread designed for a flexiClamp base with union connection.

Dimensions

All dimensions are in mm.

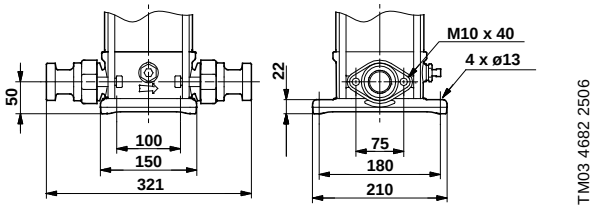


Fig. 74 Connection to EN/DIN 11851 for CRI, CRN 1s, 1, 3 and 5

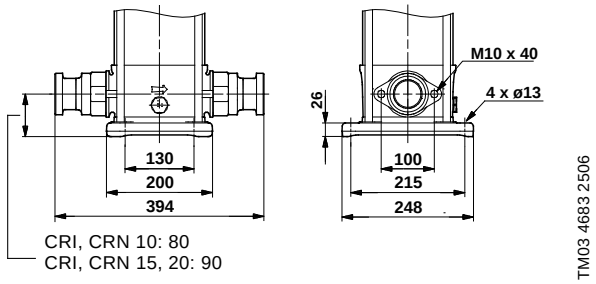


Fig. 75 Connection to EN/DIN 11851 for CRI, CRN 10, 15 and 20

Pump type	Pipework connection	Connection material	Gaskets	Pressure [bar]	Coupling sets required	Product number
CRI(E), CRN(E) 1, 3, 5	DN 32	Stainless steel	EPDM	16	2	96551545
			FKM		2	96551547
CRI(E), CRN(E) 10, 15, 20	DN 50		EPDM		2	96551549
			FKM		2	96551570

We offer the above connections for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)													
CRN(E)	•	•	•	•	•	•	•						

• Available.

CR pumps with aseptic connection

A base with connections according to EN/DIN 11853-2 is of non-sanitary design but is often used in the dairy, food, beverage and pharmaceutical industry.
The aseptic connection is not approved for process use. Instead the aseptic connection is used in secondary systems such as washing and cleaning, CIP cleaning and steam applications.

Dimensions

All dimensions are in mm.

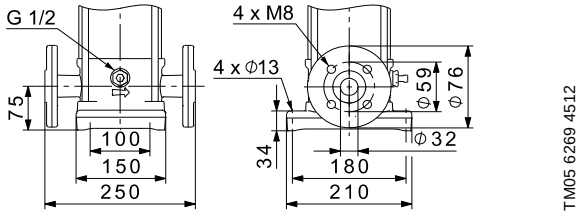


Fig. 76 Aseptic connection for CRI, CRN 1s, 1, 3 and 5

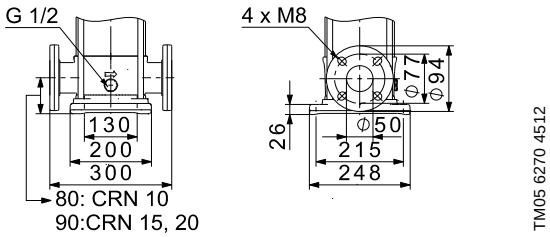


Fig. 77 Aseptic connection for CRI, CRN 10, 15 and 20

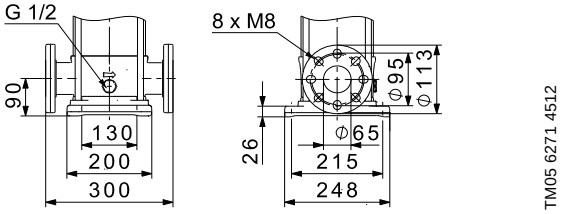


Fig. 78 Aseptic connection for CRI, CRN 15 and 20

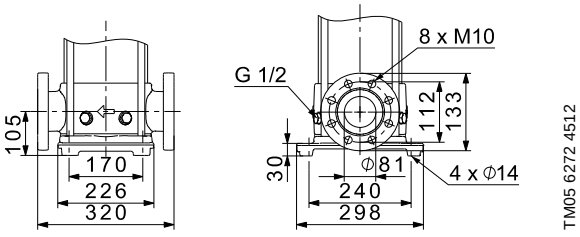


Fig. 79 Aseptic connection for CRI, CRN 32

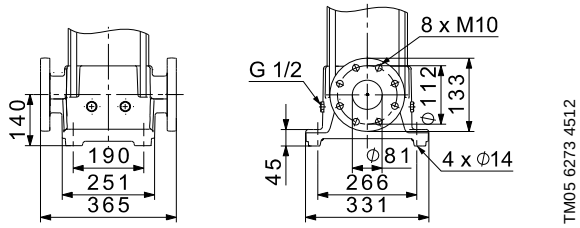


Fig. 80 Aseptic connection for CRI, CRN 45

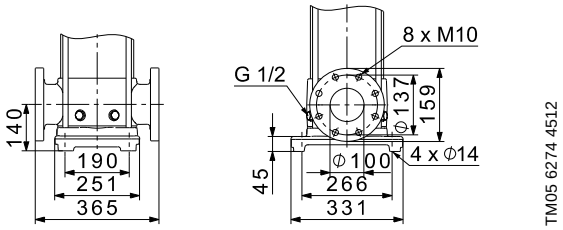


Fig. 81 Aseptic connection for CRI, CRN 64

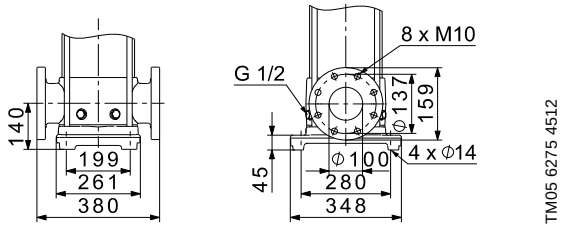


Fig. 82 Aseptic connection for CRI, CRN 90

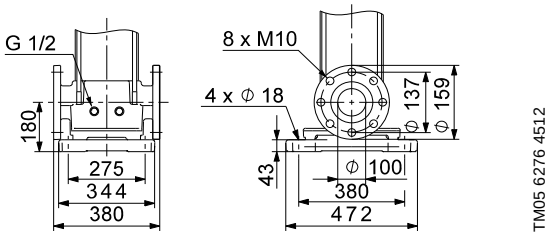


Fig. 83 Aseptic connection for CRI, CRN 120 and 150

Pump type	Pipework connection	Connection material
CRN(E) 1s, 1, 3, 5	DN 32	Stainless steel
CRN(E) 10, 15, 20	DN 50	
CRN(E) 15, 20	DN 65	
CRN(E) 32	DN 80	
CRN(E) 45		
CRN(E) 64	DN 100	
CRN(E) 90		
CRN(E) 120, 150		

We offer the above connections for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)													
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

• Available.

Dimensions of O-ring:

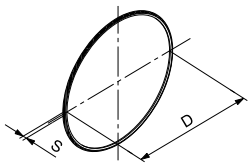


Fig. 84 Dimension sketch of O-ring

DN	Dimensions [mm]	
	Inner diameter (D)	Thickness (S)
32	34	5
50	52	5
65	68	5
80	83	5
100	102	5

CR pump with PJE coupling

A base with PJE couplings is designed for use in a wide range of industrial applications.

A set consists of two coupling halves, one gasket, one coupling liner for welding and bolts and nuts.

Dimensions

All dimensions are in mm.

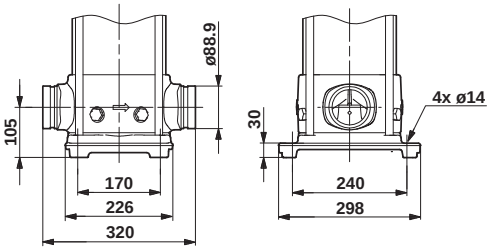


Fig. 85 PJE coupling for CRN 32

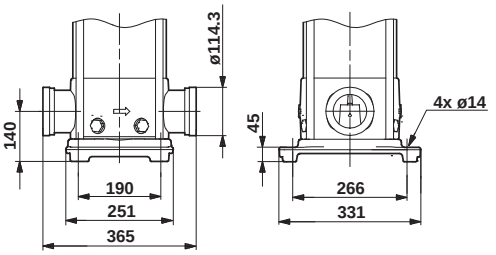


Fig. 86 PJE coupling for CRN 45

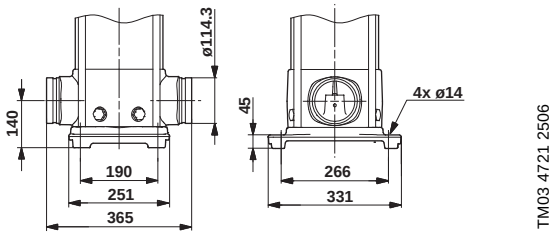


Fig. 87 PJE coupling for CRN 64

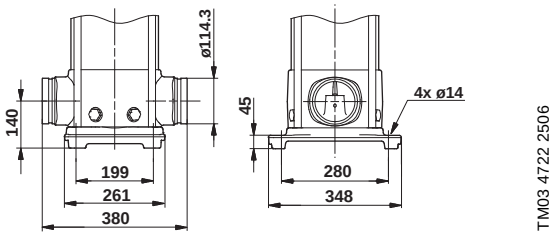


Fig. 88 PJE coupling for CRN 90

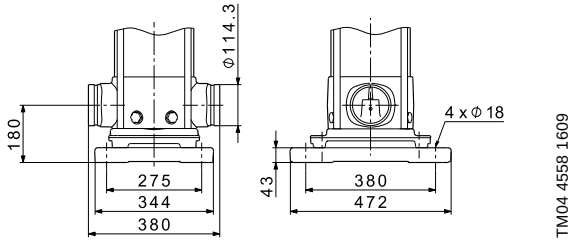


Fig. 89 PJE coupling for CRN 120 and 150

Part	Designation	Designed for pump type	Rubber parts	Product number
 TM00 3712 0894	Victaulic type 77 coupling 3": ∅89 4": ∅114	CRN 32	NBR seal 3"	00ID7664
		CRN 45, 64, 90, 120, 150	NBR seal 4"	96415463
 TM00 3709 0894	Victaulic coupling liner for welding	CRN 32	N version 3"	00150574
		CRN 45, 64, 90, 120, 150	N version 4"	96416743

We offer PJE couplings with NBR rubber parts for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)													
CRI(E)													
CRN(E)								•	•	•	•	•	•

• Available.

Note: PJE connections are available with EPDM and FKM rubber parts on CRI, CRN, 1s to 150 pumps as standard.

CR pumps with ANSI or JIS connection

We offer pumps with ANSI or JIS flanges for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)						•	•	•	•	•	•	•	•
CRI(E)						•	•						
CRN(E)						•	•	•	•	•	•	•	•

- Available.

Note: ANSI and JIS connections are available on CRI, CRN, 1s, 1, 3, 5, 10, 15 and 20 pumps as standard.

Technical data

Connection	Max. rated pressure
ANSI	Class 300
JIS	30 K

Note: CR(E), CRI(E), CRN(E) 1s, 1, 3, 5 and 10 pumps are available with flanges that meet the requirements of both DIN, ANSI and JIS as standard.

The dimensions of pumps with DIN, ANSI or JIS flanges are the same, apart from the flange bolt holes.

Customised connections

We offer a wide range of customised connections for these pump types:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•		
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•		

Contact Grundfos for further information about customised connections.

We also offer these connections:

- oval flanges (BSP)
- DIN flanges
- PJE couplings (Victaulic®) for CRN(E)
- clamp couplings (L-couplings)
- unions (+GF+).

For further information about connections, see these data booklets:

- CR, CRI, CRN, CRE, CRIE, CRNE
- CR, CRN high pressure
- CRT, CRTE.

All data booklets are available in WebCAPS.
See page 165.

10. Certificates

CR pumps with certificates

We offer certificates for a number of applications requiring documentation on the pump quality. Examples:

- pharmaceutical industries
- maritime and offshore applications
- potentially explosive environments
- energy and power suppliers.

Note: The certificates must be ordered with the pump.

These pumps are available with certificates:

Pump type	1s	1	3	5	10	15	20	32	45	64	90	120	150
CR(E)	•	•	•	•	•	•	•	•	•	•	•	•	•
CRI(E)	•	•	•	•	•	•	•						
CRN(E)	•	•	•	•	•	•	•	•	•	•	•	•	•

- Available.

Note: Certified and approved CRT(E) 2, 4, 8 and 16 pumps are also available.

Certificates

Certificate	Description
Certificate of compliance with the order	According to EN 10204, 2.1. Grundfos document certifying that the pump supplied is in compliance with the order specifications.
Test certificate. Non-specific inspection and testing	According to EN 10204, 2.2. Certificate with inspection and test results of a non-specific pump.
Inspection certificate 3.1	Grundfos document certifying that the pump supplied is in compliance with the order specifications. Inspection and test results are mentioned in the certificate.
Inspection certificate	Grundfos document certifying that the pump supplied is in compliance with the order specifications. Inspection and test results are mentioned in the certificate. Certificate from the surveyor is included. We offer the following inspection certificates: • Lloyds Register of Shipping (LRS) • Det Norske Veritas (DNV) • Germanischer Lloyd (GL) • Bureau Veritas (BV) • American Bureau of Shipping (ABS) • Registro Italiano Navale Agenture (RINA) • China Classification Society (CCS) • Russian maritime register of Shipping (RS) • Biro Klassifikasio Indonesia (BKI) • United States Coast Guard (USCG) • Nippon Kaiji Koykai (NKK)
Standard test report	Certifies that the main components of the specific pump are manufactured by Grundfos, and that the pump has been QH-tested, inspected and conforms to the full requirements of the appropriate catalogues, drawings and specifications.
Material specification report	Certifies the material used for the main components of the specific pump.
Material specification report with certificate from raw material supplier	Certifies the material used for the main components of the specific pump. A material specification report with EN 10204 material certificate from the raw materiel supplier will be supplied for each main component.
Duty-point verification report	Certifies a test point specified by the customer. Issued according to ISO 9906 concerning "Duty point verification".
Surface-roughness	Shows the measured roughness of the cast pump base of the specific pump. The report indicates the values measured at the base inlet and outlet according to ISO 1302.
Vibration report	Vibration report indicating the values measured during the performance test of the specific pump according to ISO 10816.
Motor test report	Shows the performance test of the specific motor, including power output, current, temperature, stator windings resistance and insulation test.
Cleaned and dried pump	Confirms that the specific pump has been cleaned and dried, and how it was done.
Vacuum-dried pump	Confirms that the specific pump has been vacuum-dried, and how it was done.
Electropolished pump	Confirms that the specific pump has been electropolished. The maximum surface roughness is specified in the report.
ATEX-approved pump	Confirms that the specific pump is ATEX-approved according to the EU directive 94/9/EC, the "ATEX directive".

See examples of the certificates on pages 59 to 62.

Note: Other certificates are available on request.

Examples of certificates

Certificate of compliance with the order

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GRUNDFOS

Certificate of compliance with the order

EN 10204 2.1

Customer name	
Customer order no.	
Customer Tag no.	
GRUNDFOS order no.	
Product type	

We the undersigned hereby guarantee and certify that the materials and/or parts for the above mentioned product were manufactured, tested, inspected, and conform to the full requirements of the appropriate catalogues, drawings and/or specifications relative thereto.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96 50 78 95/1001002

TM03 4165 1706

Test certificate

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GRUNDFOS

Test certificate
Non-specific inspection and testing

EN 10204 2.2

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	

Pump		
Pump type		Part number
Motor make		Part number
Flow	m^3/h	
Head	m	
Power P2	kW	
Voltage	V	
Frequency	Hz	
Full load current	A	
Motor speed	min^{-1}	

We the undersigned hereby guarantee and certify that the materials and/or parts for the above mentioned product were manufactured, tested, inspected, and conform to the full requirements of the appropriate catalogues, drawings and / or specifications relative thereto.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 50 78 96/1001002

TM03 4163 1706

Inspection certificate 3.1

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GRUNDFOS

Inspection certificate.
GRUNDFOS Authorized Department

Manufactured by	
GRUNDFOS order no.	
GRUNDFOS DUT id.	
Customer order no.	
Customer name and address	
Shipyard / factory	
Ship / new building	
Customer TAG no.	
Classifying society	**GRUNDFOS authorized department**

Pump		Motor	
Pump type		Make	
Part number		Part number	
Serial no.		Serial No.	
Flow rate (m^3/h)		P2 (kW)	
Head (m)		Voltage (V)	
Max. ope. P/t (bar / °C)		Current (A)	
	Din / W. - No.	$n(min^{-1})$	
Base/Pump head cover		Frequency (Hz)	
Impeller/guidevanes		Insulation class	
Shaft/sleeve		Power factor	

Customer's requirement			
Flow rate (m^3/h)		Head (m)	

Test result ref. requirements									
Q(m^3/h)		H(m)		n(min^{-1})		I(A)		P1(kW)	

Hydrostatic test		Bar – no leaks or deformation observed

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96 50 78 97/1014142

TM06 0200 5013

Inspection certificate

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GRUNDFOS

Inspection certificate.
Russian Maritime Register of Shipping

Manufactured by	
GRUNDFOS order no.	
GRUNDFOS DUT id.	
Customer order no.	
Customer name and address	
Shipyard / factory	
Ship / new building	
Customer TAG no.	
Classifying society	**Russian Maritime Register of Shipping (RS)**

Pump		Motor	
Pump type		Make	
Part number		Part number	
Serial no.		Serial No.	
Flow rate (m^3/h)		P2 (kW)	
Head (m)		Voltage (V)	
Max. ope. P/t (bar / °C)		Current (A)	
Service		$n(min^{-1})$	
Medium		Frequency (Hz)	
	Din / W. - No.	Insulation class	
Base/Pump head cover		Power factor	
Impeller/guidevanes			
Shaft/sleeve			

Customer's requirements			
Flow rate (m^3/h)		Head (m)	

Test result ref. requirements									
Q(m^3/h)		H(m)		n(min^{-1})		I(A)		P1(kW)	

Hydrostatic test		Bar – no leaks or deformation observed
The pump has been marked		

Surveyor signature: _____
Tested date: _____

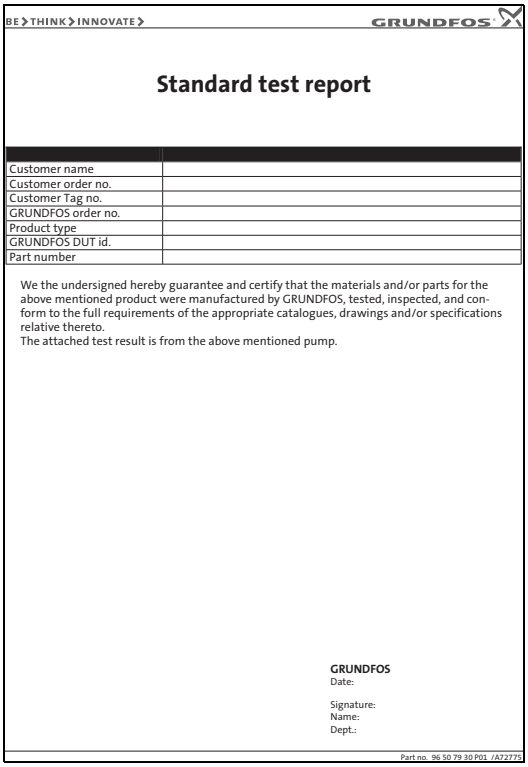
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96 50 79 25/1014142

TM03 4156 3607

Standard test report



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Standard test report

Customer name	
Customer order no.	
Customer Tag no.	
GRUNDFOS order no.	
Product type	
GRUNDFOS DUT id.	
Part number	

We the undersigned hereby guarantee and certify that the materials and/or parts for the above mentioned product were manufactured by GRUNDFOS, tested, inspected, and conform to the full requirements of the appropriate catalogues, drawings and/or specifications relative thereto.
The attached test result is from the above mentioned pump.

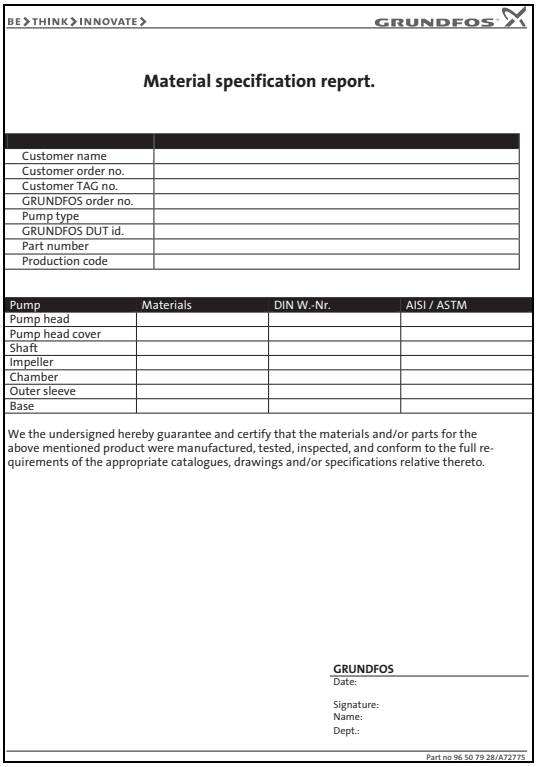
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96 50 79 30 P01 /A72775

TM03 4143 1706

Material specification report



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Material specification report.

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	

Pump	Materials	DIN W.-Nr.	AISI / ASTM
Pump head			
Pump head cover			
Shaft			
Impeller			
Chamber			
Outer sleeve			
Base			

We the undersigned hereby guarantee and certify that the materials and/or parts for the above mentioned product were manufactured, tested, inspected, and conform to the full requirements of the appropriate catalogues, drawings and/or specifications relative thereto.

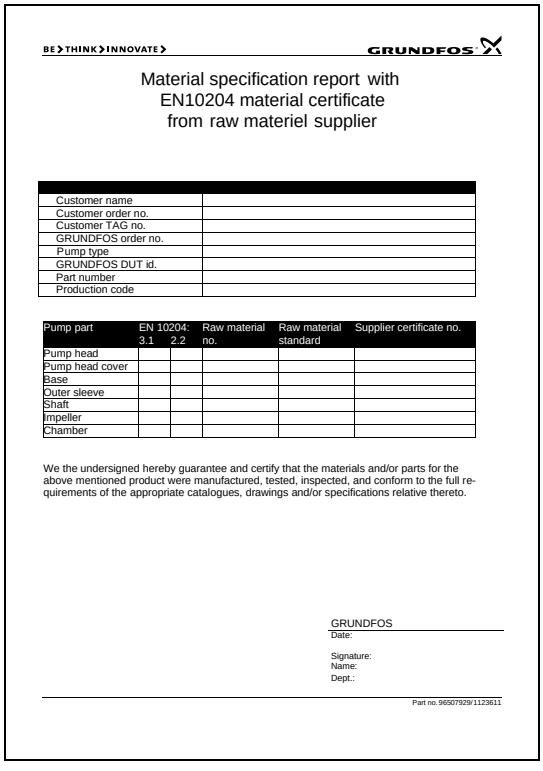
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 50 79 28/A72775

TM03 4150 1706

Material specification report with certificate from raw material supplier



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Material specification report with
EN10204 material certificate
from raw materiel supplier

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	

Pump part	EN 10204: 3.1	2.2	Raw material no.	Raw material standard	Supplier certificate no.
Pump head					
Pump head cover					
Base					
Outer sleeve					
Shaft					
Impeller					
Chamber					

We the undersigned hereby guarantee and certify that the materials and/or parts for the above mentioned product were manufactured, tested, inspected, and conform to the full requirements of the appropriate catalogues, drawings and/or specifications relative thereto.

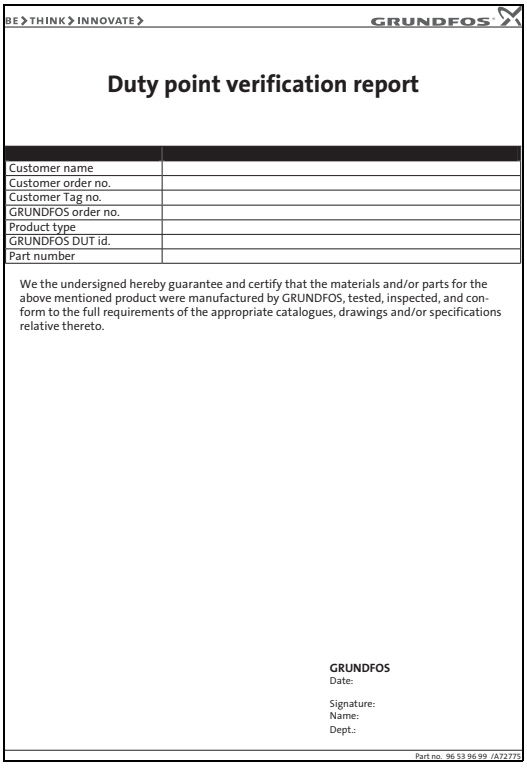
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96507929/1123611

TM06 0753 0914

Duty point verification report



BE › THINK › INNOVATE ›

Duty point verification report

Customer name	
Customer order no.	
Customer Tag no.	
GRUNDFOS order no.	
Product type	
GRUNDFOS DUT id.	
Part number	

We the undersigned hereby guarantee and certify that the materials and/or parts for the above mentioned product were manufactured by GRUNDFOS, tested, inspected, and conform to the full requirements of the appropriate catalogues, drawings and/or specifications relative thereto.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96 53 96 99 /A72775

TM03 4148 1706

Surface-roughness

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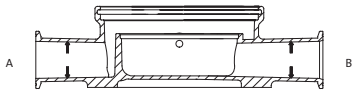
Surface roughness

According to ISO 1302

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
CRN base part number	

The surface roughness is measured as the maximum roughness of the CRN inlet and outlet surface.



Surface Treatment	
None	
Electro-polished	

Measured values A		
R_{max}	[µm]	
R_A	[µm]	
R_z	[µm]	

Measured values B		
R_{max}	[µm]	
R_A	[µm]	
R_z	[µm]	

Roughness value RA [µm]	Roughness degree
50	N 12
25	N 11
12.5	N 10
6.3	N 9
3.2	N 8
1.6	N 7
0.8	N 6
0.4	N 5
0.2	N 4
0.1	N 3
0.05	N 2
0.025	N 1

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 50 79 31/A72775

TM03 4147 3607

Vibration report

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Vibration report

According to ISO 10816

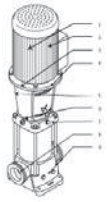
Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
GRUNDFOS DUT id.	

Measured object			
Pump type		Part number	
P2 (kW)		Frequency (Hz)	
Number of poles		Serial no.	

Test conditions				
The pump is floor-mounted on vibration absorbers.	Voltage (V)		Frequency: (Hz)	
	Flow (m³/h)		Head (m)	
	For vibration velocity measurement positions, see figure.			

Remarks	

Result of measurement:



Pos	RMS vibration velocity (mm/s)
1	
2	
3	
4	
5	
6	
7	
8	
9	

Typical zone boundary limits

RMS vibration velocity (mm/s)	Class I	Class II
0.28	A	A
0.45		
0.71		
1.12	B	B
1.8		
2.8	C	C
4.5		
7.1	D	D
11.2		
18		
28		
45		

The machine classifications are as follows:
Class I: Individual parts of engines and machines, integrally connected to the complete machine in its normal operating condition. (Production electrical motors of up to 15 kW are typical examples of machines in this category.)

Class II: Medium-sized machines (typically electrical motors with 15 kW to 75 kW output) without special foundations, rigidly mounted engines or machines (up to 300 kW) on special foundations.

GRUNDFOS
Date: 26-Apr-06

Signature:
Name:
Dept.:

Part no 96 50 79 32/A72775

TM03 4167 1706

Motor test report

BE > THINK > INNOVATE > GRUNDFOS

Motor test report

Customer name	
Customer order no.	
Customer Tag no.	
GRUNDFOS order no.	
GRUNDFOS DUT id.	
Part number	
Motor no.	
Motor serie no.	

We the undersigned hereby guarantee and certify that the above motor has been tested.
The performance of the motor can be seen in the motor test report on the next page.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96 50 79 33 /A72775

TM03 4146 1706

Cleaned and dried pump

BE > THINK > INNOVATE > GRUNDFOS

Cleaned and dried pump

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	

GRUNDFOS hereby confirms that the pump mentioned above is manufactured according the specifications mentioned in the "CR, CRI, CRN Custom-built pumps" data booklet. This means that prior to assembly, pump components are washed in pure, hot soap water, rinsed in de-ionized water and dried.

The pump is wrapped in a plastic bag before being packed.

The pump has not been performance-tested.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 50 79 34/A72775

TM03 4145 1706

Vacuum-dried pump

BE › THINK › INNOVATE › GRUNDFOS

Vacuum Dried Pump

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	

GRUNDFOS hereby confirms that the pump mentioned above is manufactured according to the specifications mentioned in the "CR, CRI, CRN Custom-built pumps" data booklet. This means that after the performance test of the pump, a heat and vacuum drying process will ensure that no liquid water is present inside the pump.

The in- and outlet of the pump is sealed by means of a sticker after the drying process.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 98606312/1126913

TM06 0335 5213

Electropolished pump

BE › THINK › INNOVATE › GRUNDFOS

Electro-polished pump

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	

Grundfos hereby conforms that the pump mentioned above is manufactured according to the specifications mention in the "CR, CRI, CRN Custom-built pumps" data booklet. This means that prior to asembly, pump components are electro-polished in a mixture of sulphuric acid and phosphoric acid. Finally the components are passivated in nitric acid.

The CRN1s, 1, 3, 5, 10, 15, and 20 casted parts are all mechanically polished before being electropolished.

The pump will then optain following surface roughness;

Pump type	Stainless steel casted parts	Stainless steel plate and other non casted parts	Surface roughness (µm)
CRN1s, 1, 3, 5	*	*	equal to or below 0,8
CRN10, 15, 20	*	*	equal to or below 0,8
CRN32, 45, 64, 90	*		between 10 – 15
		*	equal to or below 0,8

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 50 79 35/A72775

TM03 4144 1706

ATEX-approved pump

BE › THINK › INNOVATE › GRUNDFOS

ATEX-approved pump

Customer name	
Customer order no.	
Customer TAG no.	
GRUNDFOS order no.	
Pump type	
GRUNDFOS DUT id.	
Part number	
Production code	
Pump serial no.	
Motor serial no.	
ATEX approval of pump	
Technical file no.	96499604

GRUNDFOS hereby confirms that the pump mentioned above is manufactured according the ATEX directive. This means the pump is conformity with the ATEX 94/9EEC (ATEX 100) appendix VIII directive as mentioned in the "ATEX Supplement to installation and operating instructions" supplied with the pump.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no 96 51 22 40/A72775

TM03 4166 1706

11. CRE pump solutions

Fig. 90 Motors for CRE, CRIE, CRNE, CRTE pumps

Besides continuously variable performance, CRE, CRIE, CRNE, CRTE pumps offer a number of advantages depending on the hardware and software combinations of the motor.

CRE pumps are not dependent on the frequency of the supply voltage and are designed for operation at frequencies between 750 min^{-1} and 6000 min^{-1}. This offers a number of advantages:

- compact pump
- higher performance in relation to physical size
- larger dynamic range
- less noise at reduced speed
- more gentle handling of the pumped liquid at reduced speed.

The speed may be chosen freely, taking into consideration the maximum motor load and the hydraulic properties of the pump. Pumps can be delivered with oversize or undersize motors depending on load profile. Ball bearing configuration can also be altered to fit load and demands.

Customised CRE pump solutions

As an alternative to the standard CRE pump solutions, we offer CRE pumps customised for your requirements.

You can configure CRE pumps as follows:

- Selecting a control panel on the front of the terminal box of the motor.
- Selecting a communication module for bus standards such as GENIbus, LonWorks, Profibus etc. See *Communication with CRE pumps* on page 66.
- Selecting a customised functionality by means of special configuration files (gsc-files).

User interfaces for CRE pumps

Pump settings can be made by means of the following user interfaces:

Control panels

CRE pumps can be delivered with different control panels. The available options depend on the motor type and size. See the table below:

	Control panel type							
	Standard	Blind	Basic		Standard		Advanced	
MGE motor	Without radio module	Without radio module	With radio module	Without radio module	With radio module	Without radio module	With radio module	Without radio module
0.37 - 2.2 kW			❍	❍	•	❍	❍	❍
3 - 22 kW	•	❍						

• Mounted as standard.
❍ Optional.

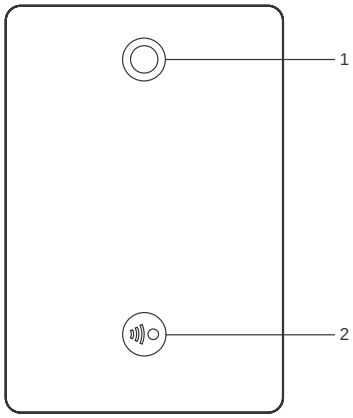
CRE pumps from 0.37 to 2.2 kW

The available control panels enable monitoring and setting of the pump. Settings can either be made directly on the control panel or via the remote controls Grundfos GO Remote or Grundfos R100.

The control panels can be delivered with or without a radio module for communication between the pump and Grundfos GO Remote or communication to other pumps in a multipump system. All control panels enable communication via infrared (IR) connection which can be used in connection with both the Grundfos GO Remote and Grundfos R100.

The different control panels and remote controls are described below.

Basic control panel

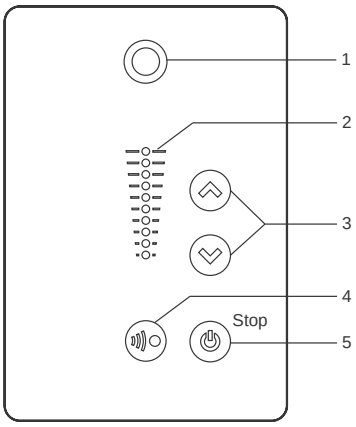


TM05 4847 2712

Fig. 91 Basic control panel

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump.
2		Enables radio communication with the Grundfos GO Remote and other products of the same type.

Standard control panel

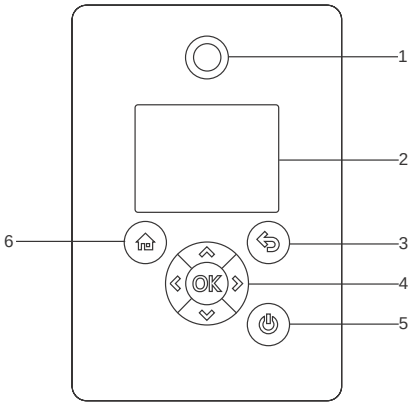


TM05 4848 3512

Fig. 92 Standard control panel

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump.
2	-	Light fields for indication of setpoint.
3		Changes the setpoint and reset of alarms and warnings.
4		Enables radio communication with the Grundfos GO Remote and other products of the same type.
5		Makes the pump ready for operation/starts and stops the pump. **Start:** If the button is pressed when the pump is stopped, the pump will only start if no other functions with higher priority have been enabled. **Stop:** If the button is pressed when the pump is running, the pump will always be stopped. When the pump is stopped via this button, the "Stop" text next to the button will illuminate.

Advanced control panel



TM05 4849 1013

Fig. 93 Advanced control panel

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump.
2	-	Graphical colour display.
3		Goes one step back.
4		Navigates between main menus, displays and digits. When the menu is changed, the display will always show the top display of the new menu.
		Navigates between submenus.
	OK	Saves changed values, resets alarms and expands the value field. Enables communication with the Grundfos GO Remote.
5		Makes the pump ready for operation/starts and stops the pump. **Start:** If the button is pressed when the pump is stopped, the pump will only start if no other functions with higher priority have been enabled. **Stop:** If the button is pressed when the pump is running, the pump will always be stopped. When the pump is stopped via this button, the "Stop" text next to the button will illuminate.
6		Goes to the "Home" menu.

CRE pumps from 3 to 22 kW

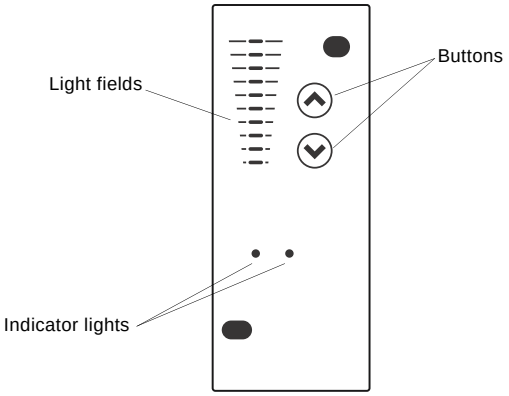


Fig. 94 Standard/advanced control panel

The pump control panel (fig. 94) incorporates the following buttons and indicator lights:

- buttons, ⊛ and ⊛, for setpoint setting
- light fields, yellow, for setpoint indication

Indicator lights, green (operation) and red (fault).

Remote control

Grundfos GO Remote

The Grundfos GO Remote can communicate with CRE pumps using either wireless radio or infrared connection.

The Grundfos GO Remote enables setting of functions and gives access to status overviews, technical product information and actual operating parameters.

The Grundfos GO Remote offers the following mobile interfaces (MI). See fig. 95.

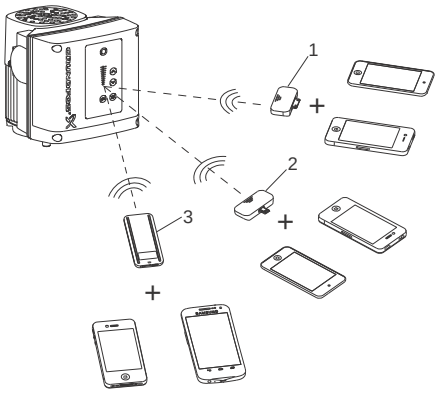


Fig. 95 Grundfos GO Remote communicating with the pump via radio or infrared connection (IR)

Pos.	Description
1	Grundfos MI 202: Add-on module which can be used in conjunction with an Apple iPhone or iPod with 30-pin connector and iOS 5.0 or later, e.g. fourth generation iPhone or iPod.
2	Grundfos MI 204: Add-on module which can be used in conjunction with an Apple iPhone or iPod with lightning connector, e.g. fifth generation iPhone or iPod. (The MI 204 is also available together with an Apple iPod touch and a cover.)
3	Grundfos MI 301: Separate module enabling radio or infrared communication. The module can be used in conjunction with an Android or iOS-based smart device with Bluetooth connection.

Grundfos R100 remote control

The Grundfos R100 remote control can communicate with CRE pumps using infrared connection.

The Grundfos R100 enables setting of functions and gives access to status overviews, technical product information and actual operating parameters.

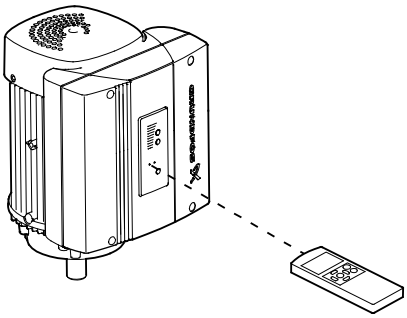


Fig. 96 Grundfos R100 remote control

Communication with CRE pumps

Communication with CRE pumps is possible via a central building management system, remote control or control panel.

Central building management system

The operator can communicate with a CRE pump at a distance. Communication can take place via a central building management system allowing the operator to monitor and change control modes and setpoint settings. Communication between CRE pumps and a central building management system is enabled via a Grundfos CIM module or a Grundfos CIU unit, see fig. 97.

CRE pumps with motor sizes from 3 to 7.5 kW are fitted with a GENIbus module from factory. CRE pumps with motor sizes from 11 to 22 kW are fitted with a CIM 050 GENIbus module from factory.

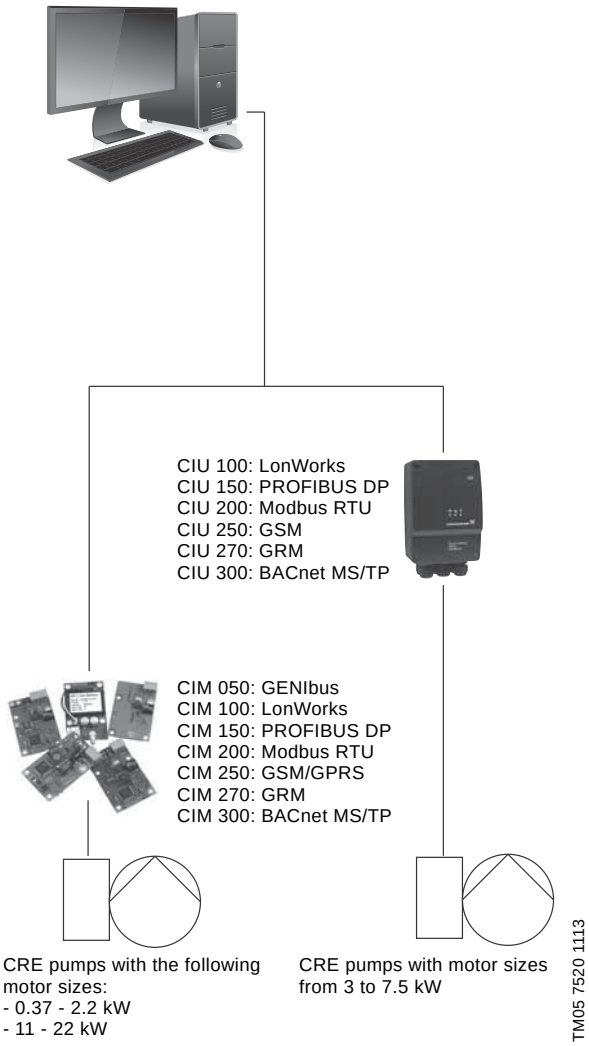


Fig. 97 Structure of a central building management system

*) Grundfos Remote Monitoring. GRM makes it possible to access pump data on the web. Connection to GRM server is done via SMS or GPRS.

Grundfos PC Tool E-products

Connection of a Grundfos PC Tool E-products offers a number of advantages during commissioning, operation and service of E-pumps.

The PC tool E-products enables these functions:

- monitoring of operational status of your E-product
- standard configuration of E-products
- custom configuration of E-products
- saving of logged data from E-products.

Via the PC Tool, it is possible to download special predefined configuration files (gsc files) to the pump. The configuration files may contain application-optimised operating parameters based on your specifications!

Note: When configuration files have been read in, it is still possible to make adjustments.

Description

The Grundfos PC Tool E-products is a common user platform/user interface used throughout the entire production process of an E-pump. Furthermore, PC Tool E-products can be used by the customer for setting up, commissioning and servicing the E-pump.

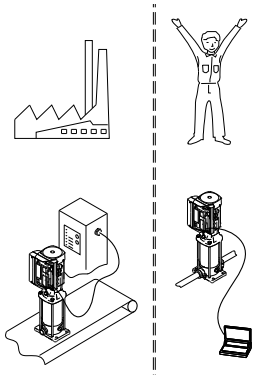
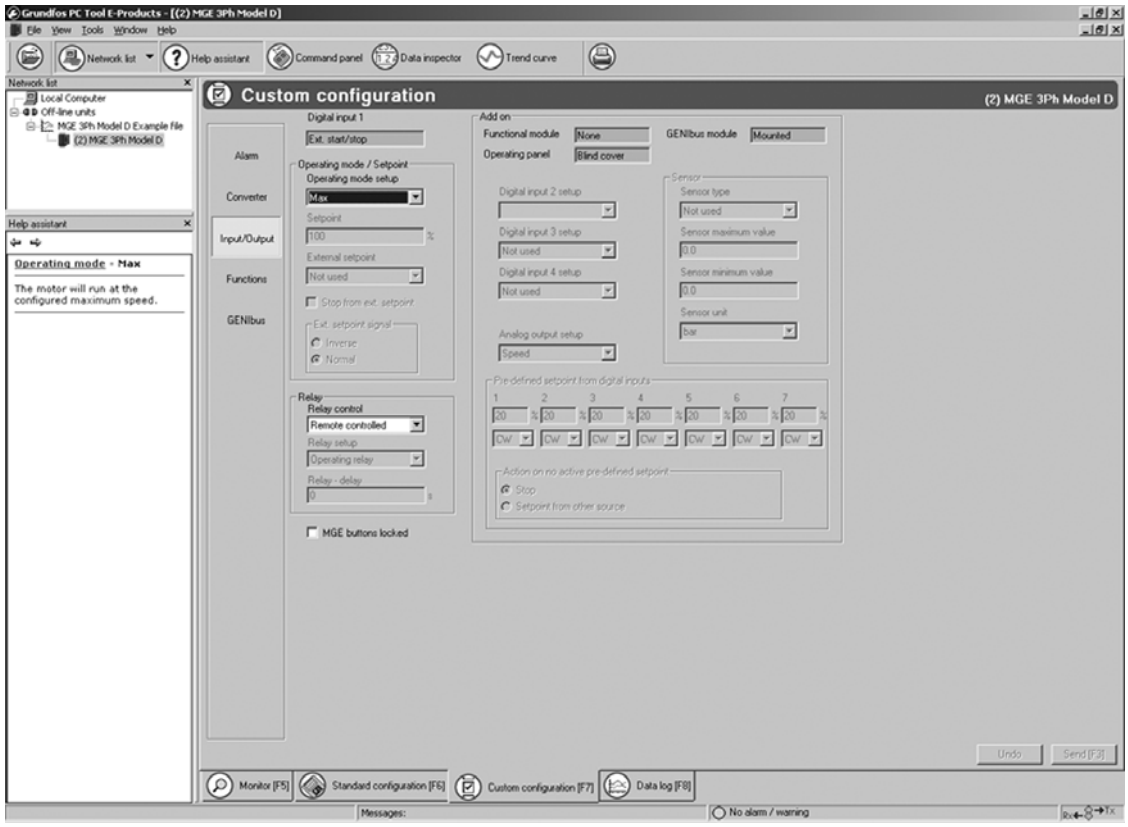


Fig. 98 PC Tool E-products used in production and on site by the customer

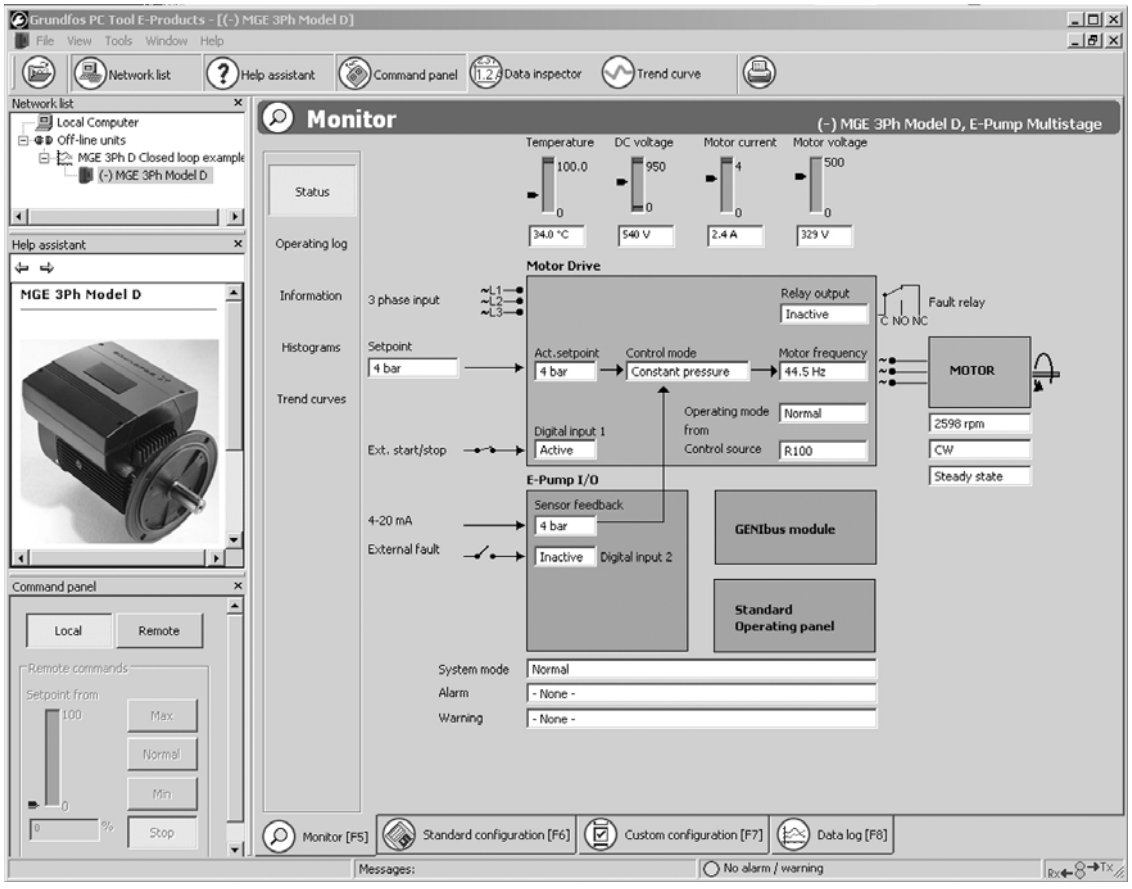
The Grundfos PC Tool E-products thus enables configuration or reconfiguration of your product to optimise it to exactly your application. And it is indispensable for fault finding and service.

The software for Grundfos PC Tool E-products must be ordered with the PC Tool Link package which contains hardware and cables. Contact Grundfos for further information.



TM03 3712 0806

Fig. 99 PC Tool interface



TM04 4607 1809

Fig. 100 Monitoring function

Industrial custom-built E-solutions

Pump running at over-synchronous speed

Pumps running at over-synchronous speed runs at speeds exceeding the standard, maximum speed e.g. 50/60 Hz.

By increasing the pump speed, the pump performance will increase even more due to the laws of affinity.
If you increase the speed of the pump with 20 % from 2,900 rpm to 3,470 rpm, the pump performance will increase by more than 70 %.

Affinity equation

The following affinity equations apply with close approximation to the change of speed of centrifugal pumps:

$$\frac{Q_x}{Q_n} = \frac{n_x}{n_n} \qquad \frac{H_x}{H_n} = \left(\frac{n_x}{n_n}\right)^2 \qquad \frac{P_x}{P_n} = \left(\frac{n_x}{n_n}\right)^3$$

H = pump head
Q = pump flow rate
P = pump input power
n = speed.

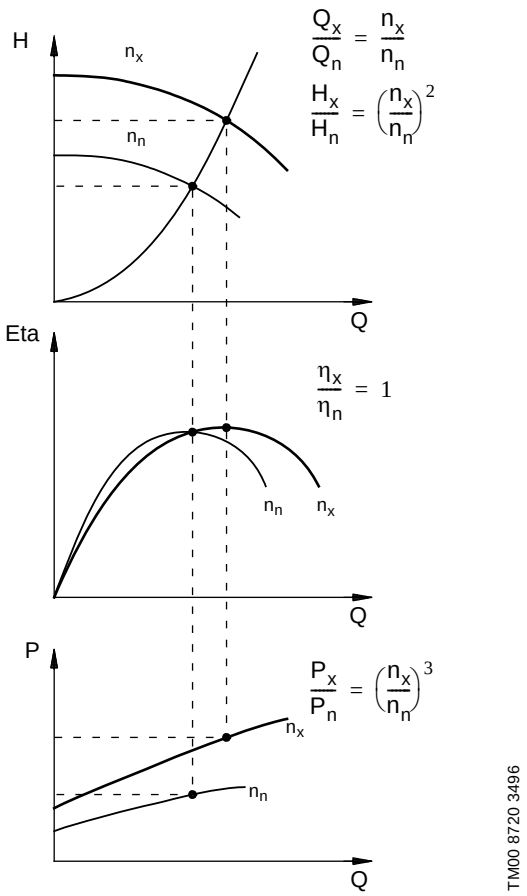


Fig. 101 Affinity equations

Pump hydraulic limitations

Running over-synchronous speed will increase the differential pressure over the chambers and the entire chamber stack. This might affect the lifetime of the pump depending on the application. Therefore, do not exceed the pressure limits stated in the table below. Special chambers and software setup might be required.

Pump type	Maximum differential pressure over the chamber [bar]		
	Standard chamber	Reinforced chamber	Laser-welded chamber
CR, CRI, CRN 1s	0.9	-	-
CR, CRI, CRN 1	0.9	2.2	2.2
CR, CRI, CRN 3	0.9	2.2	2.2
CR, CRI, CRN 5	0.9	1.4	-
CR, CRI, CRN 10	2.2	-	-
CR, CRI, CRN 15	2.2	-	-
CR, CRI, CRN 20	2.2	-	-
CR, CRI, CRN 32	5.0	-	-
CR, CRI, CRN 45	5.0	-	-
CR, CRI, CRN 64	5.0	-	-
CR, CRI, CRN 90	5.0	-	-

The durability of the different chamber types depends on the number of starts/stops of the pump.
The estimated maximum number of pump starts and stops is stated below:

Chamber type	Maximum number of starts and stops
Standard chamber	1,000,000
Reinforced chamber	300,000
Laser-welded chamber	800,000

The table below states the maximum differential pressure over the entire chamber stack.

Pump type	Maximum differential pressure over the entire chamber stack [bar]
CR, CRI, CRN 1-5	50
CR, CRI, CRN 10-20	30
CR, CRI, CRN 32-90	33
CR, CRI, CRN 120-150	21

Purpose and benefits

Traditionally, pumps are sized so that the maximum pressure and flow required in the application can be handled with a standard pump. For pumps working in conditions with various pressure and flow requirements, this can have the effect that the most common duty point is where the pumping efficiency is not optimal. By choosing a pumping solution that can reach over-synchronous speeds, the pump can be sized from most common duty point and speed up when more flow or pressure is required.

- Compact solution. Increasing RPM enables high pressure with few stages, requiring less space.

In applications where a high flow/pressure is needed momentarily, sizing can be done from the most used duty point with the ability to run over-synchronous speed for momentary high flow/pressure.

Applications

This solution is ideal in cases where the pump weight and dimension are to be kept at a minimum and the pump performance is to be maintained.

The figure above illustrates how a pump can be down-sized and still deliver the same performance.

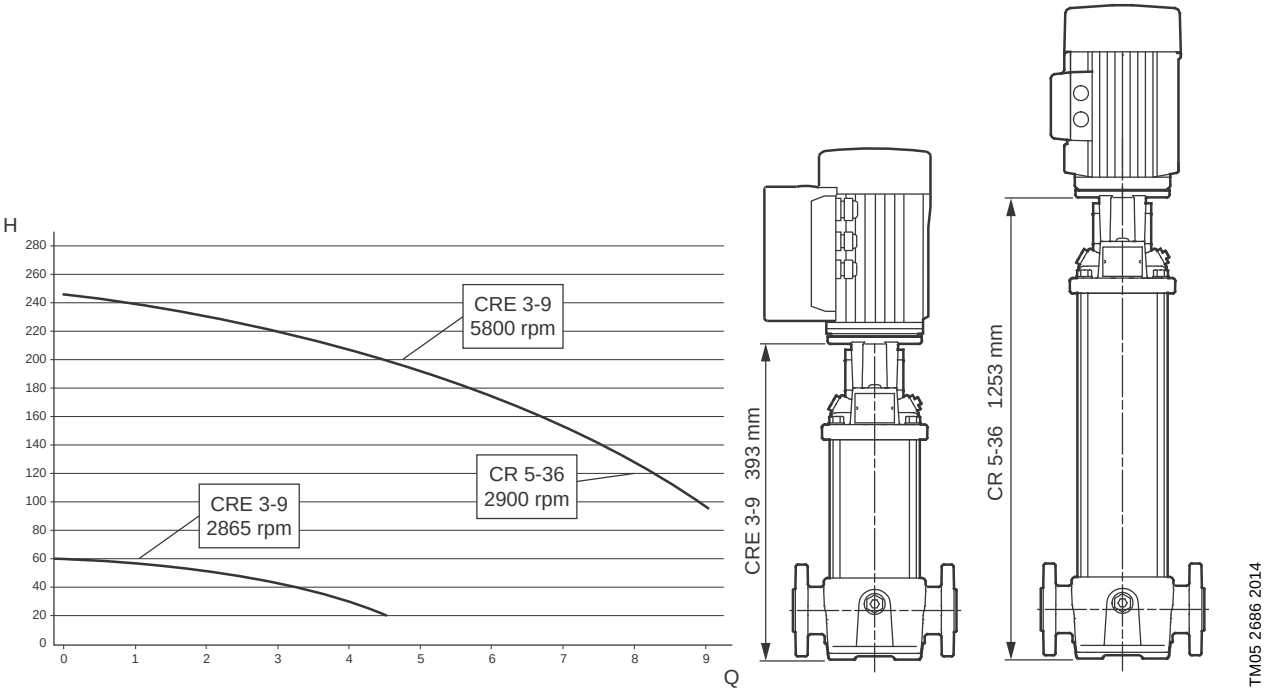


Fig. 102 Comparison of performance: A CRE 3-9 running at over-synchronous speed equals the performance of a CR 5-36 running at rated maximum speed

Availability

This function is available in these pump sizes:

Single-phase pumps	
2-pole	**4-pole**
0.37 - 1.5 kW	**0.25 - 1.1 kW**

Three-phase pumps	
2-pole	**4-pole**
0.37 - 22 kW	**0.55 - 18.5 kW**

Setup

This function is available in factory-configured products.

Note: Running at over-synchronous speed will affect the NPSH value, sufficient inlet pressure is therefore required. Sound pressure level emitted from the pump and motor will increase when increasing the speed.

Pump operating at power limit

When a pump operates at the power limit, the MGE motor will deliver an output corresponding to the maximum load stated on the name plate.
The maximum load will never be exceeded, see fig. 103.

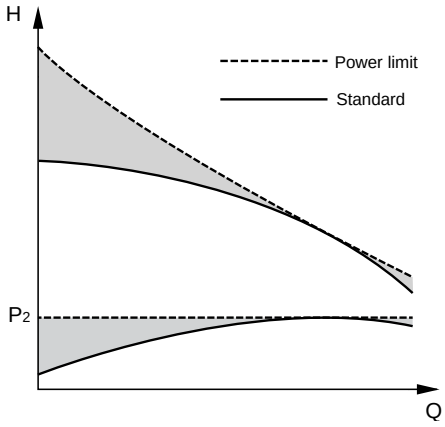


Fig. 103 Curves of a standard E-pump and a pump operating at power limit

Purpose and benefits

When using a standard pump at a low flow, the power consumption will drop and the motor will have excess power available.

By setting the CRE pump to operate at a higher speed, the excess power can be used to provide a higher pressure. The power limit function will make sure that the motor load never exceeds its maximum by decreasing the speed until the motor is at its power limit.

In cases where an undersized motor is used with standard speed, the power limit function will still reduce the speed and protect the motor against overload at high flow. The solution offers the following benefits:

- reduced motor size
- reduced pump size.

Figure 104 shows that a pump operating at low flows and relatively high pressures (1) can be fitted with an undersize motor with a rated power that matches this operating range. At higher flows and relatively lower pressures (2), the motor will reduce its speed when the power limit is exceeded and follow a steeper curve corresponding to the power available.

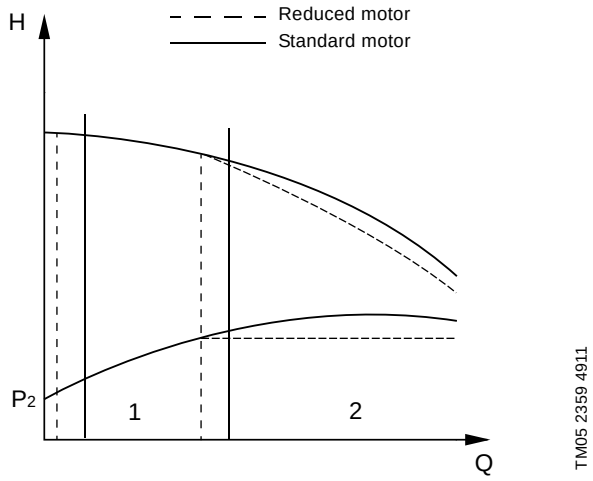


Fig. 104 Standard performance curve compared to a curve for a pump fitted with an undersized MGE motor

The MGE motor can be set to a higher speed than standard, enabling the pump to deliver more pressure. The pump will operate at this higher speed until the pump reaches the flow where the motor is loaded to its full rated power. If the flow is increased further, the motor will reduce its speed so as not to exceed its rated power.

Using this function can in some instances enable use of a smaller pump to reach the desired duty point compared to a pump running with standard maximum speed, see fig. 105.

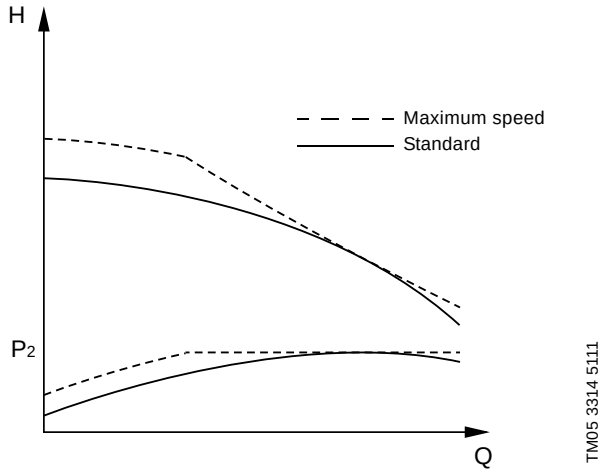


Fig. 105 Standard performance curve (60 Hz) compared to a performance curve for a pump running at maximum speed.

Applications

The power limit function is primarily used in applications where the motor size is dimensioned to be as small as possible to reduce size or cost. Or in applications demanding a high maximum speed to achieve a high pressure at low flow. In both cases, the motor is protected by the power limit function at a higher flow where a lower speed is needed to prevent the motor from overloading.

Examples of application:

- Washing and cleaning
- boiler feed.

Availability

This function is available in these pump sizes:

Single-phase pumps	
2-pole	4-pole
0.37 - 1.5 kW	0.25 - 1.1 kW

Three-phase pumps	
2-pole	4-pole
0.37 - 22 kW	0.55 - 18.5 kW

Setup

The power limit is always active in CRE pumps to protect the motor against overload. Pumps with undersized motor and pumps with higher maximum speed are available as factory-configured products.

Note: Running at over-synchronous speed will affect the NPSH value, sufficient inlet pressure is therefore required.

Sound pressure level emitted from the pump and motor may increase at higher speeds.

Furthermore the differential pressure over the chambers must be taken into consideration, see *Pump hydraulic limitations* on page 68.

Low flow stop function

The stop function ensures that the pump stops when low or no flow is detected e.g. if the pump is pumping against a closed valve.

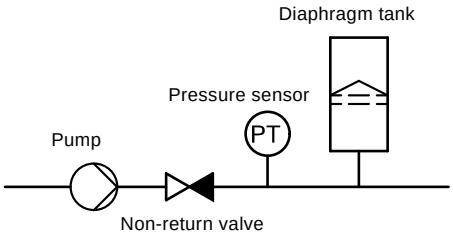
Purpose and benefits

The stop function provides these benefits:

- The energy consumption is limited and the system efficiency is improved.
- Unnecessary heating of the pumped liquid is avoided.
- Wear of the shaft seals is reduced.
- Noise from operation is reduced.

Applications

The stop function is used in systems with a diaphragm tank and where periodically low or no consumption can occur thus preventing the pump from running against closed valve.



Availability

This function is available in these pump sizes:

Single-phase pumps	
2-pole	4-pole
0.37 - 1.5 kW	0.25 - 1.1 kW

Three-phase pumps	
2-pole	4-pole
0.37 - 22 kW	0.55 - 18.5 kW

Setup

This function is available in factory-configured products.

Stabilising unstable pump curves

When the pump curve has a shape where it intersects the system curve at two points (A and B) with identical pressure but at different flows, the pump curve is defined as unstable, see fig. 106. This is especially problematic in systems with a flat system characteristic as it prevents the pump from being controlled to a flow which is lower than the flow at point B.

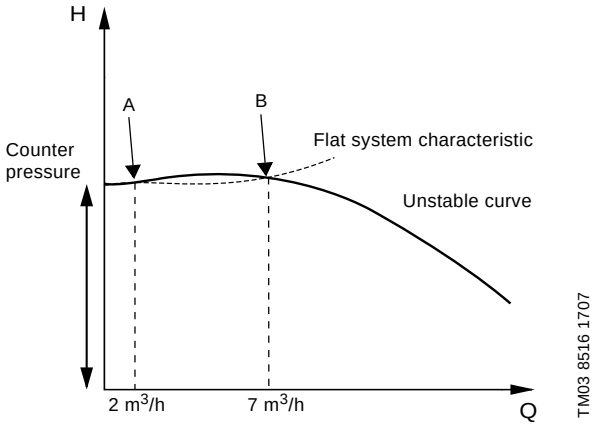


Fig. 106 Unstable pump curve

The E-motor can stabilise an unstable pump curve in the low flow area by changing to a higher speed. Figure 107 illustrates how the pump curve is straightened out in this area. As the flow increases, the E-motor gradually reduces the speed to normal speed and the pump performance will follow the standard pump curve.

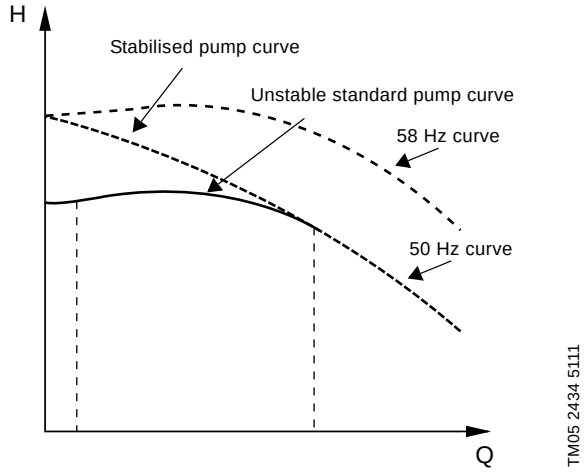


Fig. 107 Pump curve with a stabilised operating range

Purpose and benefits

The purpose of stabilising an unstable pump is to enable normal control throughout the entire operating range. Thus fully stable operation is achieved, even in the low flow range. This enables the use of modern high-efficiency pumps in applications where this would otherwise not be possible.

Applications

As mentioned unstable operation may occur in applications with a high counter pressure and a flat system characteristic.

Examples of application:

- pumping of water to a water tower
- boiler feed.

Note: Sound pressure level emitted from the pump and motor may increase at higher speeds.

Availability

This function is available in these pump sizes:

Single-phase pumps	
2-pole	**4-pole**
0.37 - 1.5 kW	**0.25 - 1.1 kW**

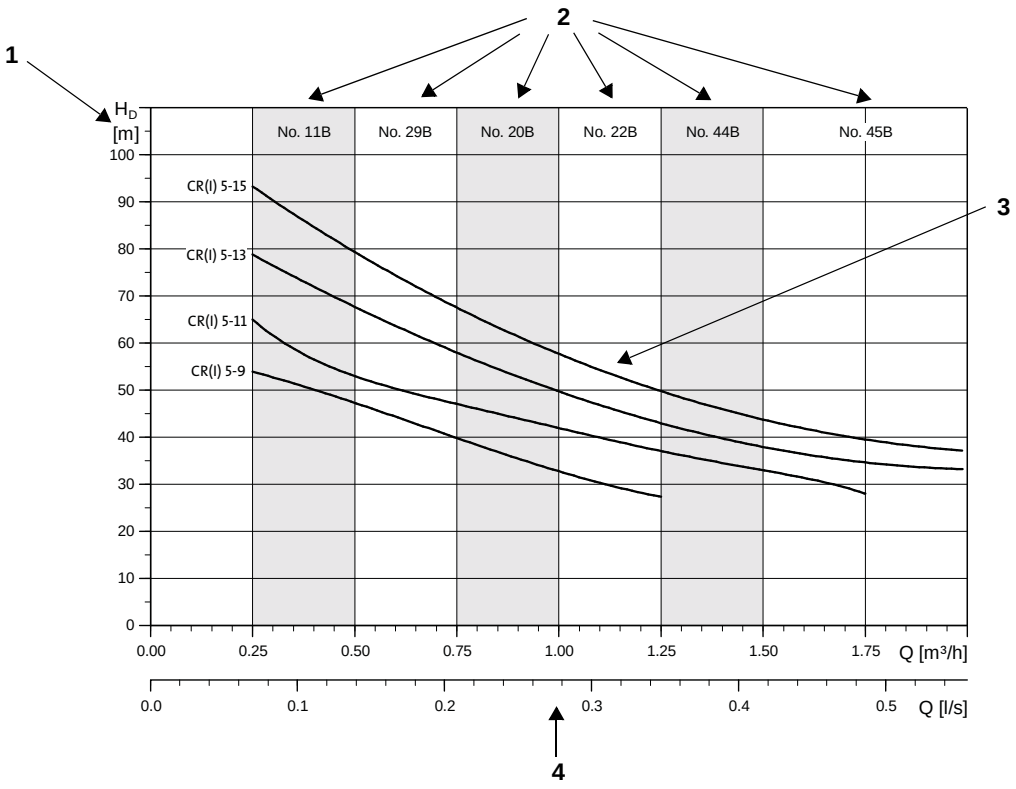
Three-phase pumps	
2-pole	**4-pole**
0.37 - 22 kW	**0.55 - 18.5 kW**

Setup

This function is available in factory-configured products.

12. How to read the curve charts

CR deep-well

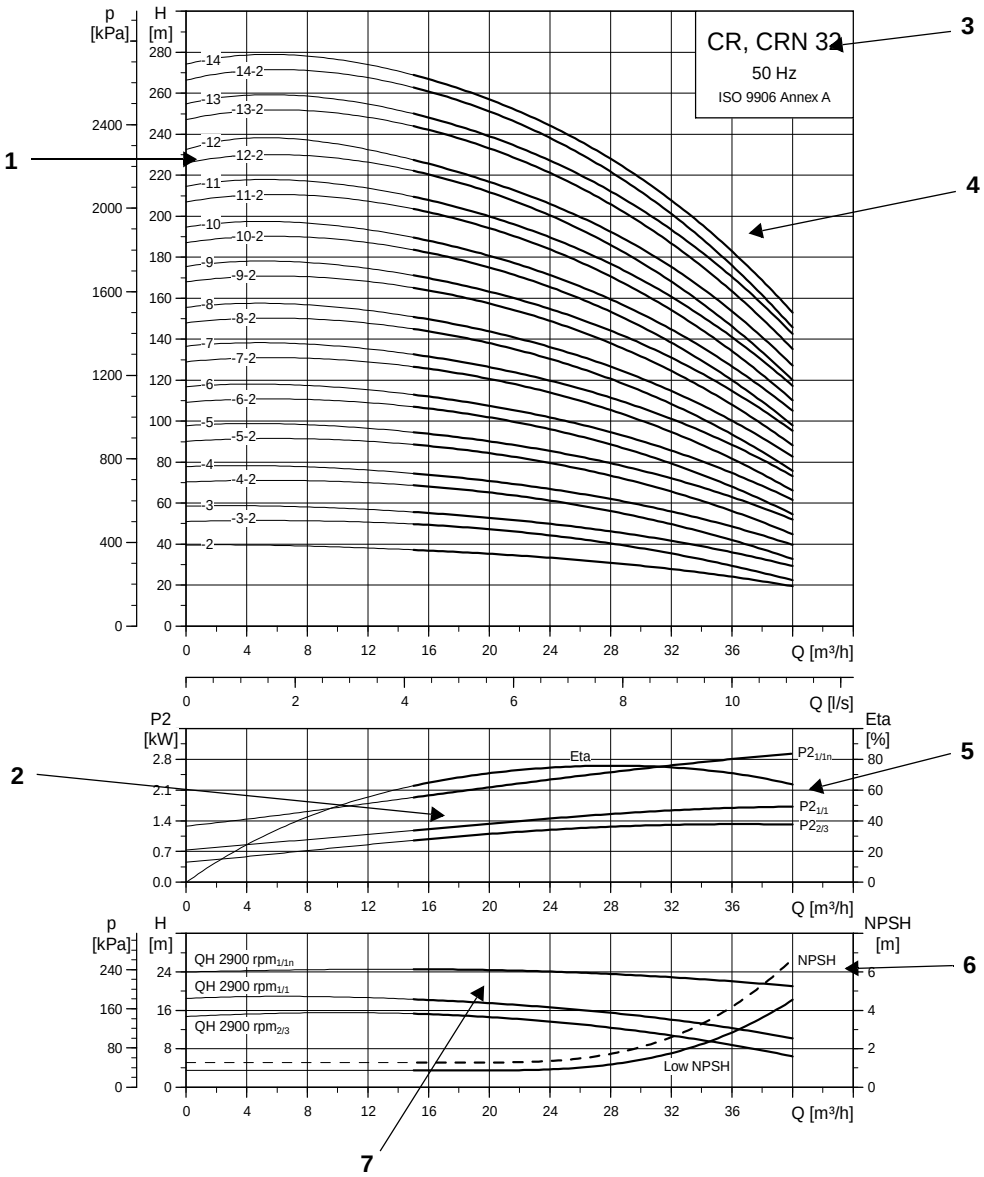


TM01 9129 0303

Fig. 108 Example of curve chart of CR deep-well

Pos.	Description
1	The y-axis indicates the suction depth, H_D, in metres.
2	Ejector numbers.
3	QH curve of the individual pump. The bold curves indicate the recommended performance range for best efficiency.
4	The x-axis indicates the flow rate in m^3/h and l/s.

CR low-NPSH and CR pumps with 4-pole motor



TM01 9129 0303

Fig. 109 Example of curve chart of CR low-NPSH

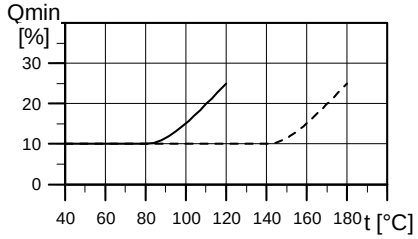
Pos.	Description
1	Number of stages. First figure: Number of stages. Second figure: Number of reduced-diameter impellers.
2	The power curves indicate pump input power per stage. Curves are shown for pump with one stage ($P2_1$), low-NPSH stage ($P2_{1n}$) and reduced-diameter impellers ($P2_{2/3}$).
3	Pump type, frequency and ISO standard.
4	QH curve for the individual pump. The bold curves indicate the recommended duty range for best efficiency.
5	The eta curve shows the efficiency of the pump. The eta curve is an average curve of all the pump types shown in the chart. The efficiency of pumps with reduced-diameter impellers is approx. 2 % lower than the eta curve shown in the chart.
6	The NPSH curve is an average curve for all variants shown. When sizing pumps, add a safety margin of at least 0.5 m.
7	QH curve for each individual impeller. Curves for complete (1/1) and reduced-diameter (2/3) impellers are shown.

Guidelines to curve charts

The guidelines below apply to the curves shown on the following pages:

- Tolerances to ISO 9906:1999, Annex A, if indicated.
- The motors used for the measurements are standard Grundfos motors (MG or MGE).
- Measurements have been made with airless water at a temperature of 20 °C.
- Kinematic viscosity of υ = 1 mm^2/s (1 cSt).
- Due to the risk of overheating, do not use the pumps must at a flow below the minimum flow rate.
  The QH curves apply to a rated motor speed of 2900 min^{-1}. All curves are based on current motor speeds.

The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature. The dotted line shows a CR pump fitted with an air-cooled top assembly.



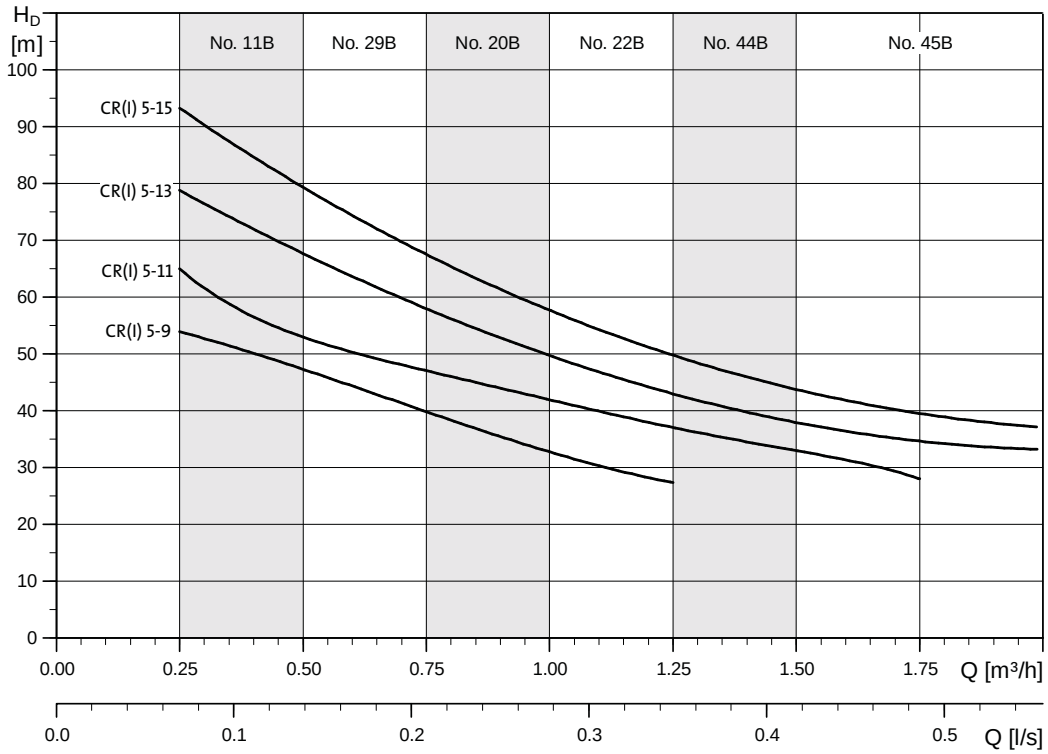
TM01 2816 0303

Fig. 110 Minimum flow rate

13. Performance curves and technical data

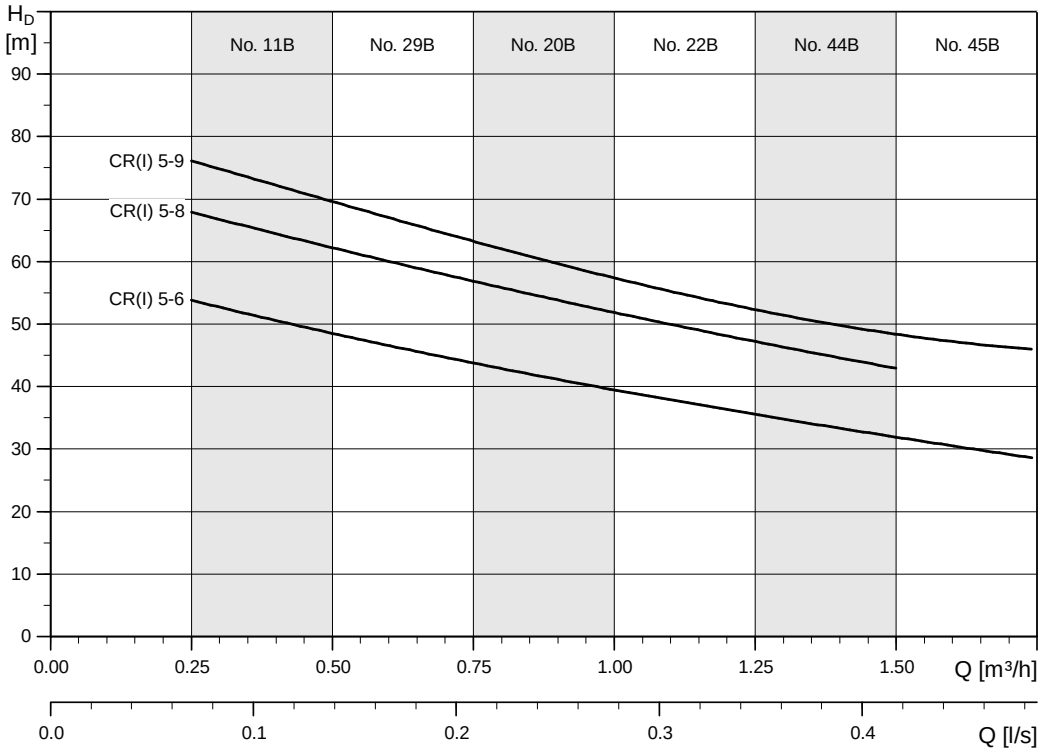
CR deep-well

50 Hz



TM03 3096 1806

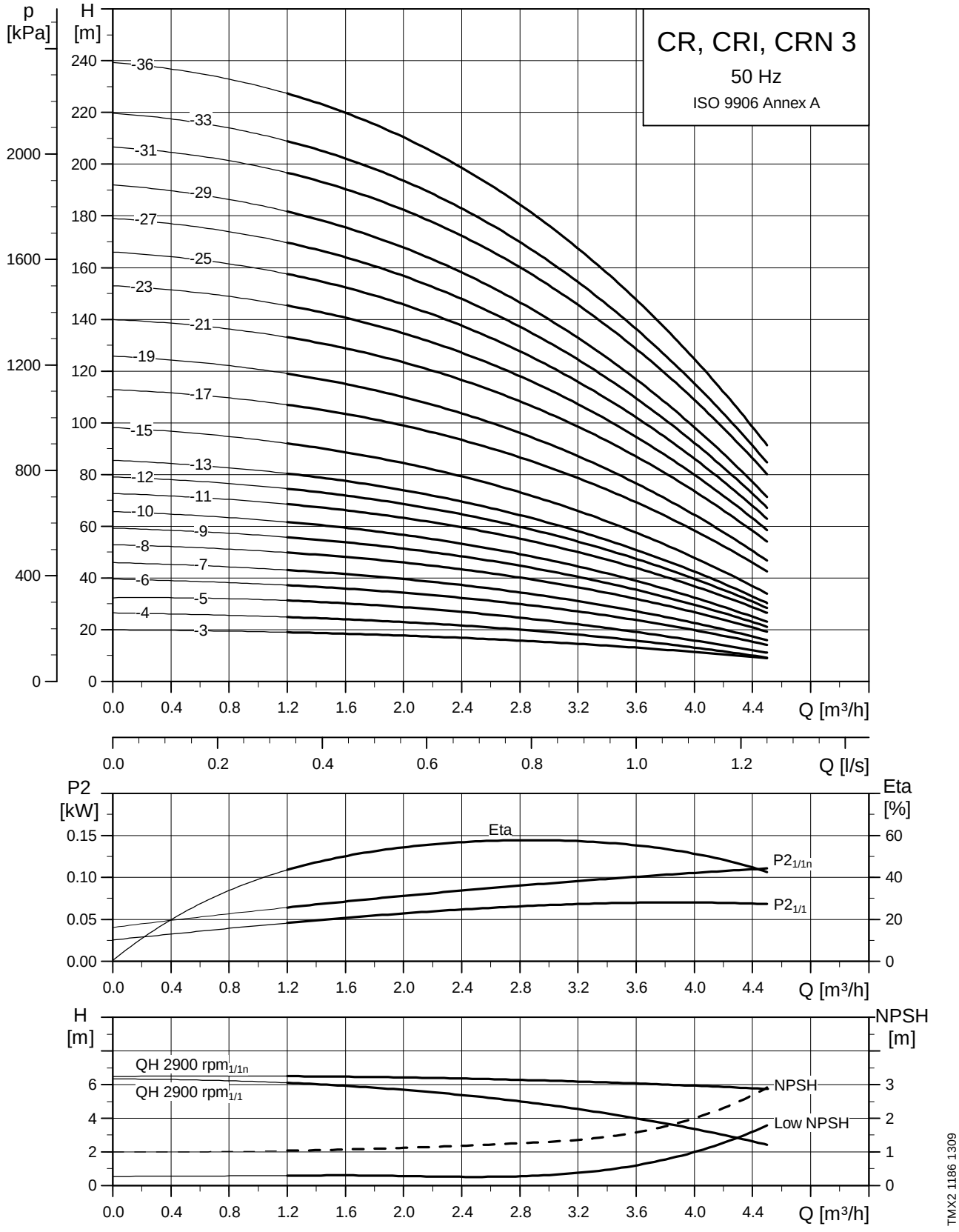
60 Hz



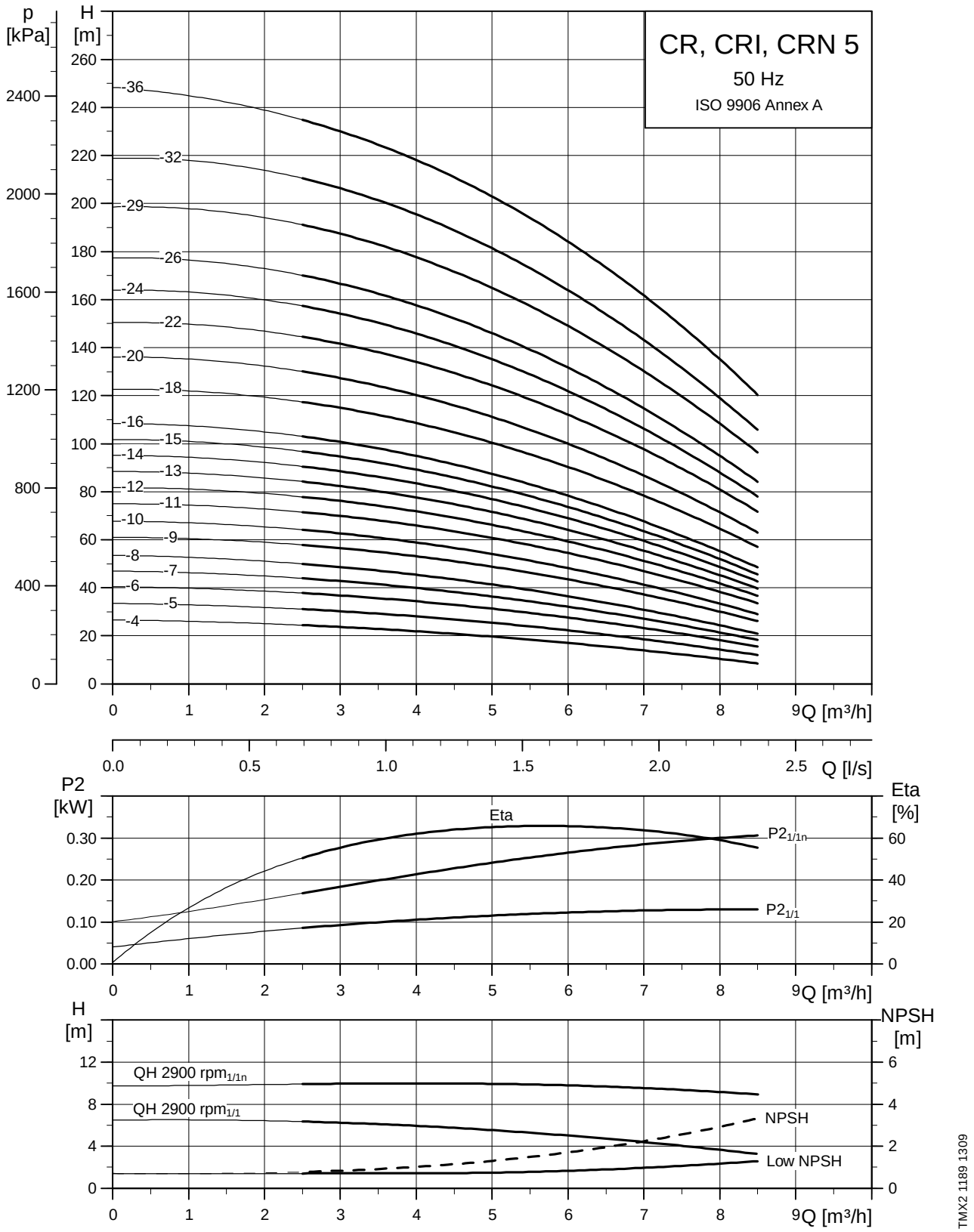
TM03 3971 1806

For information about dimensions of the individual pumps, see page 139.

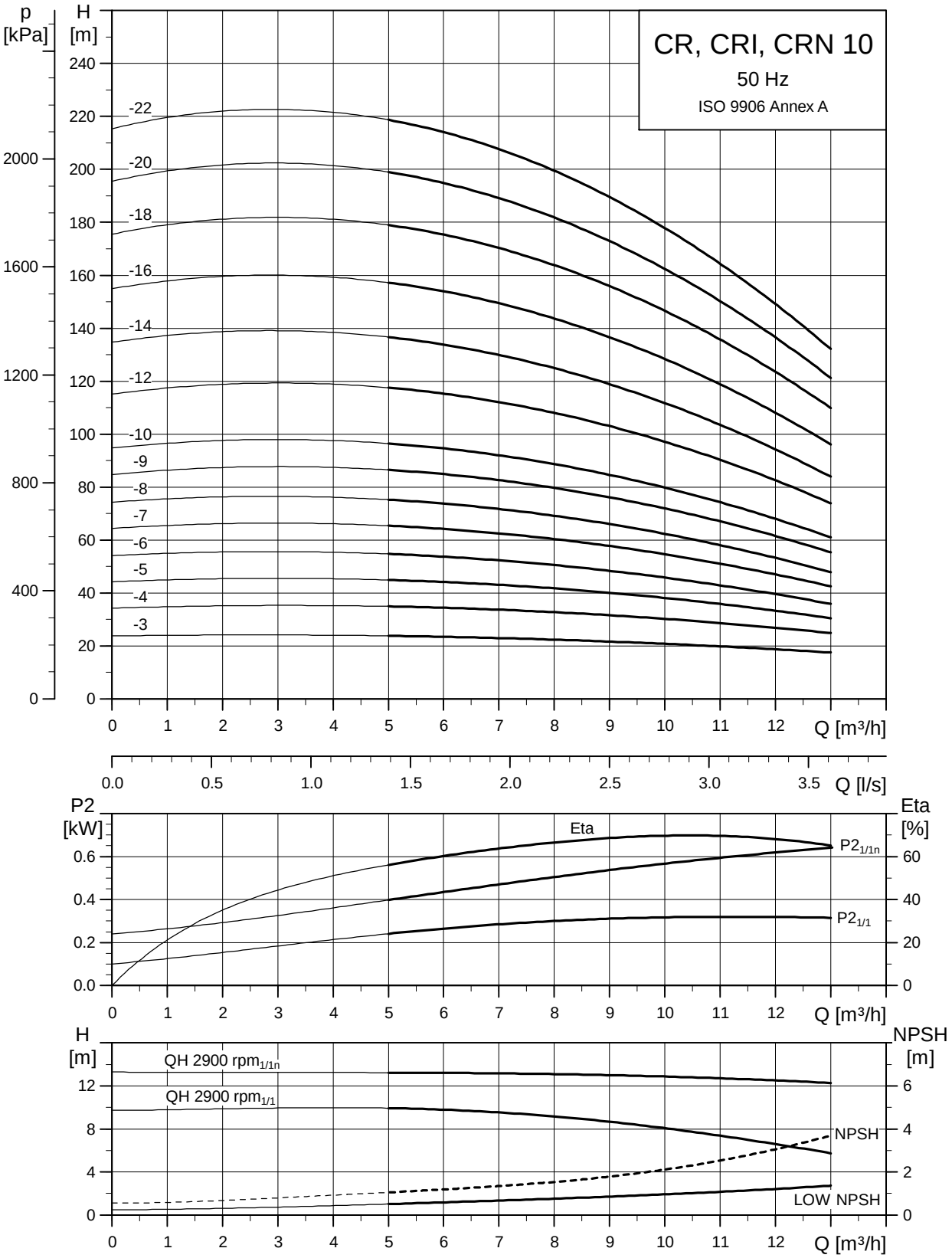
Low-NPSH pumps



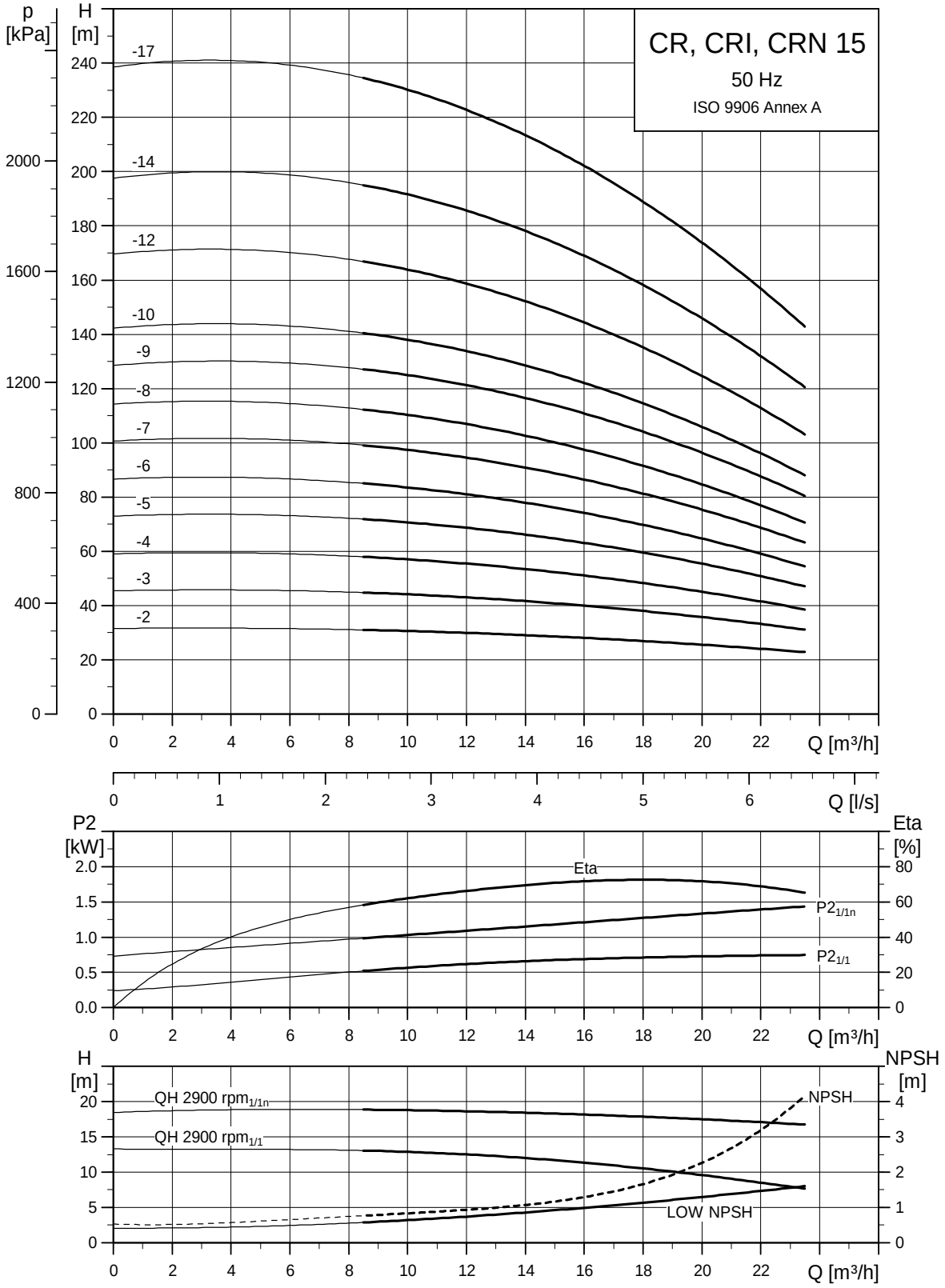
For information about dimensions of the individual pumps, see page 120.



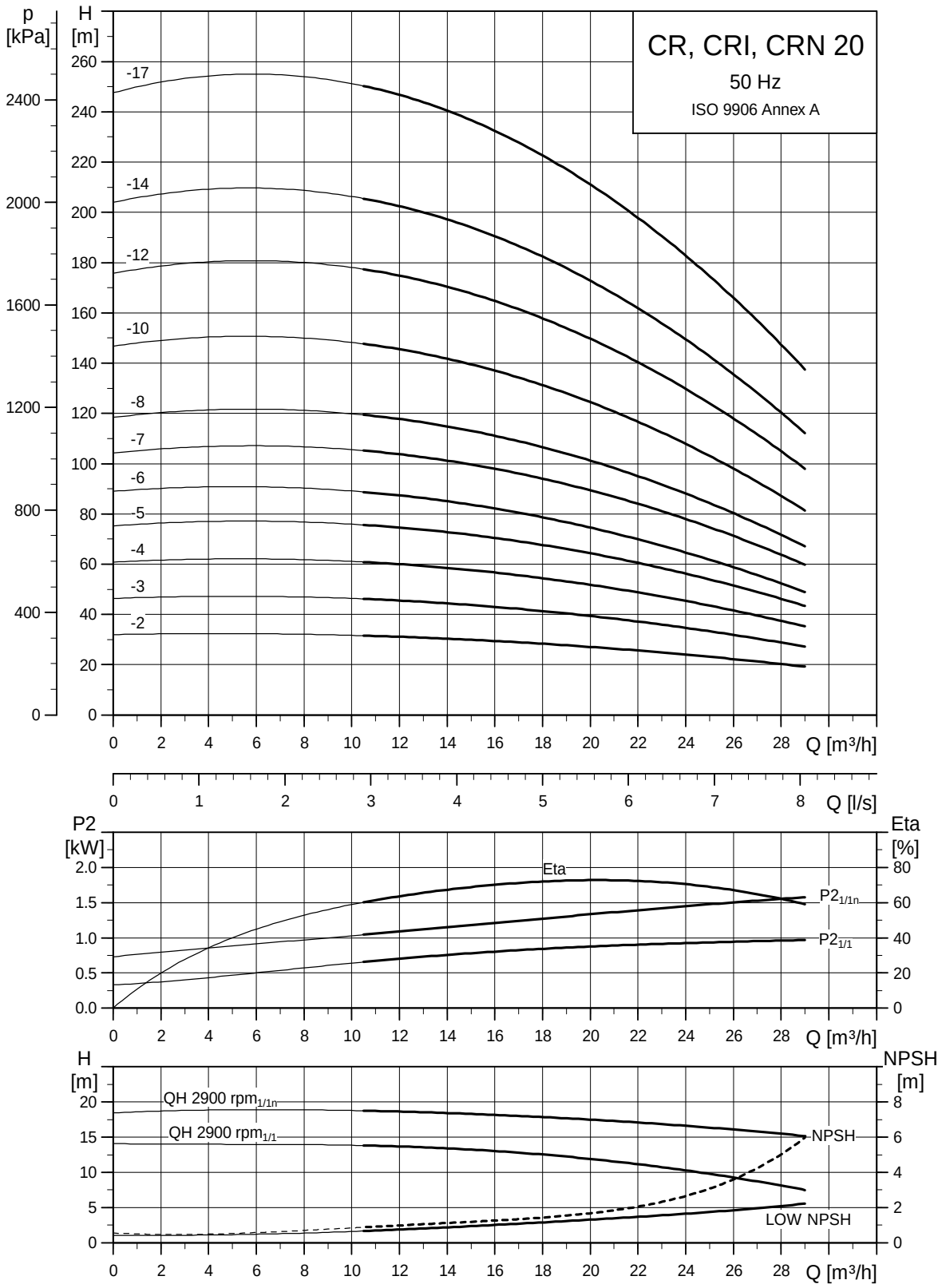
For information about dimensions of the individual pumps, see page 120.



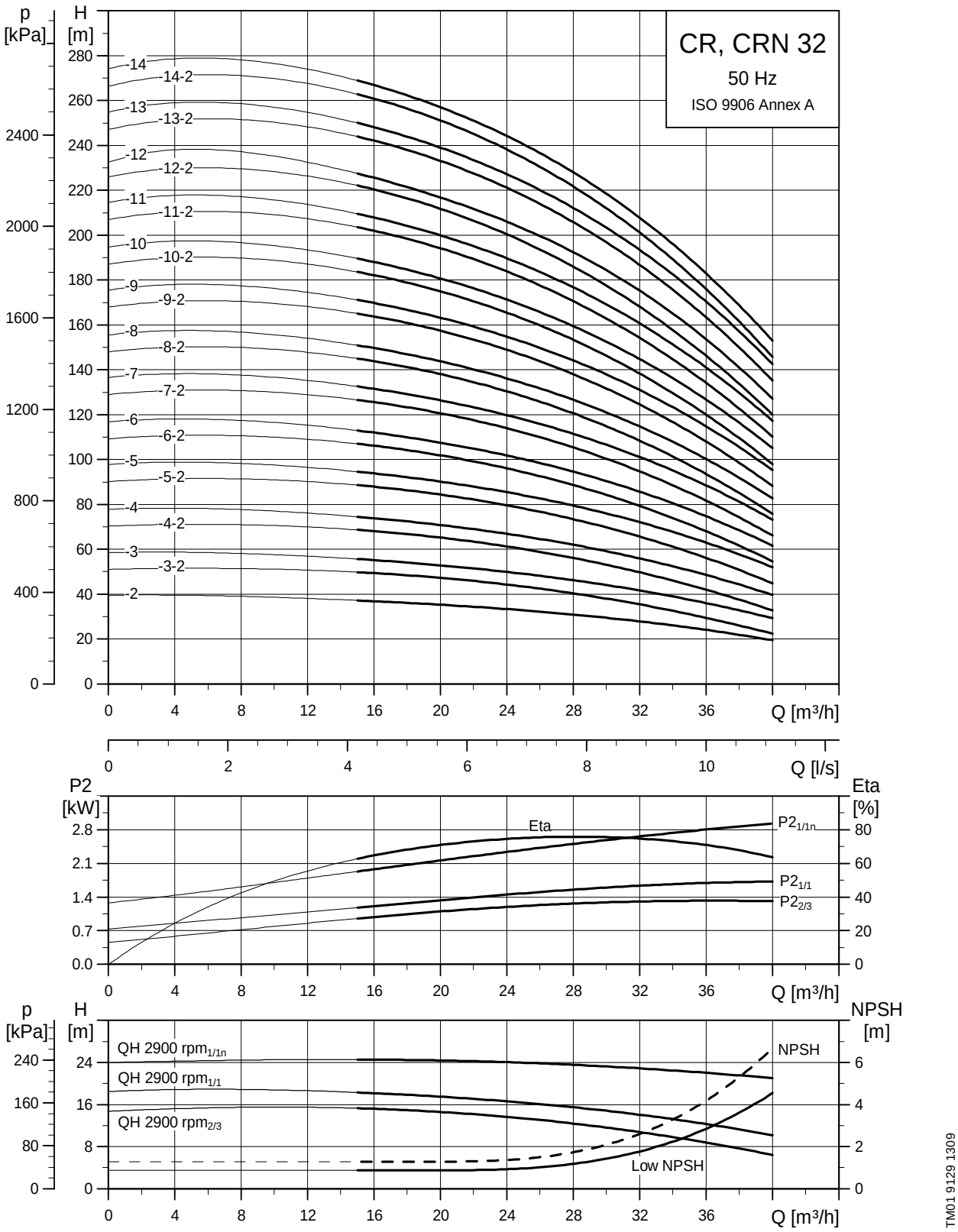
For information about dimensions of the individual pumps, see page 121.



For information about dimensions of the individual pumps, see page 121.



For information about dimensions of the individual pumps, see page 121.



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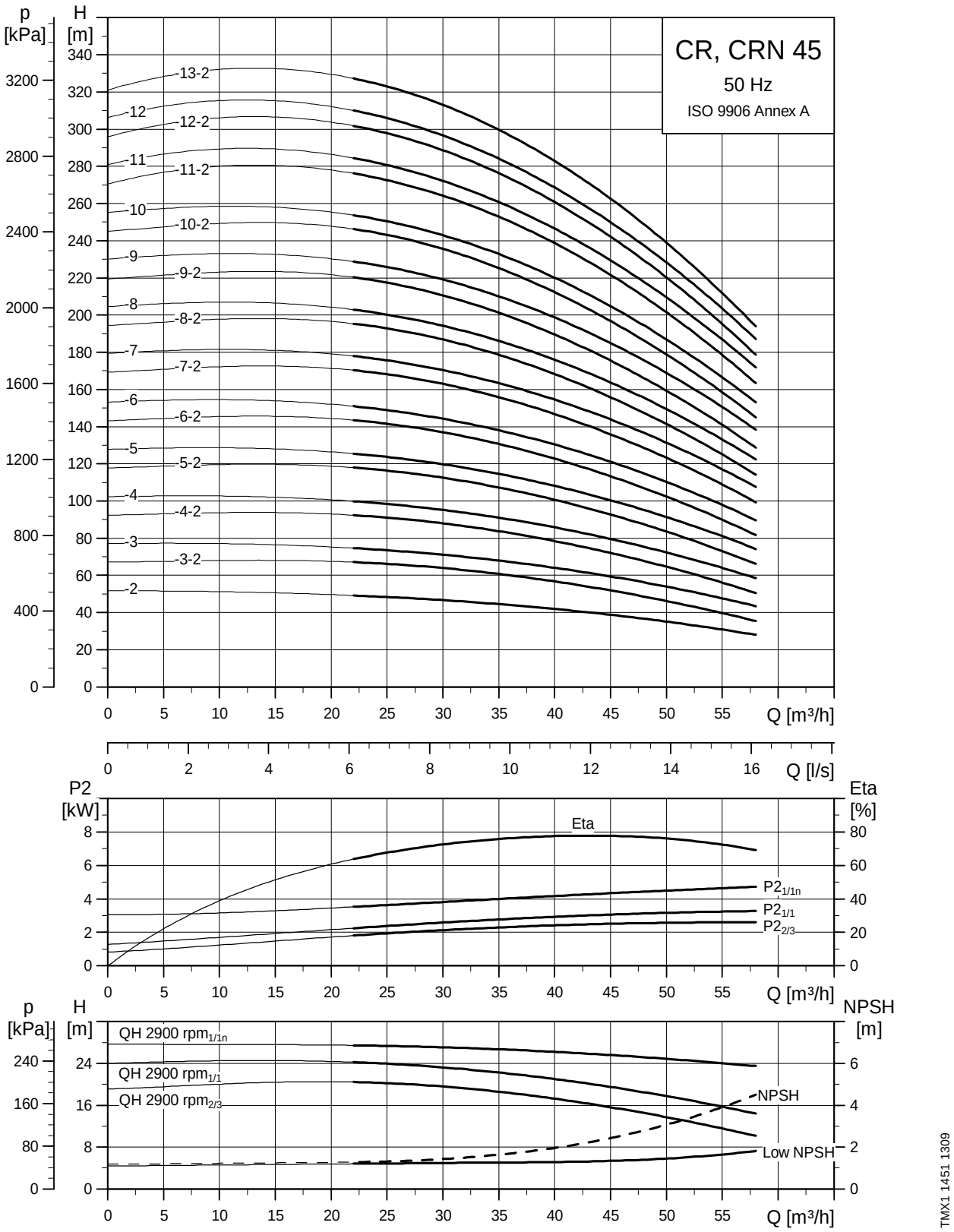

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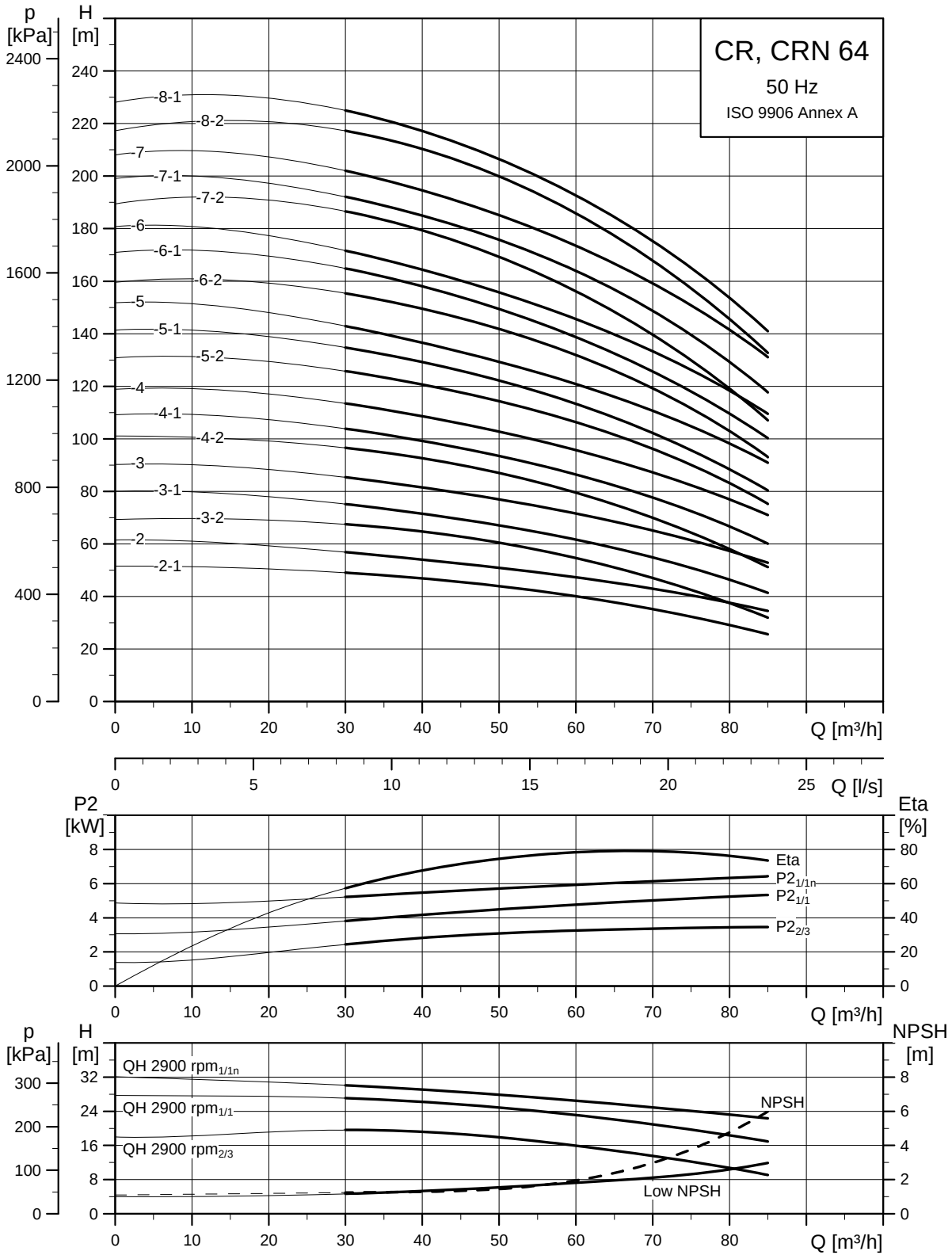
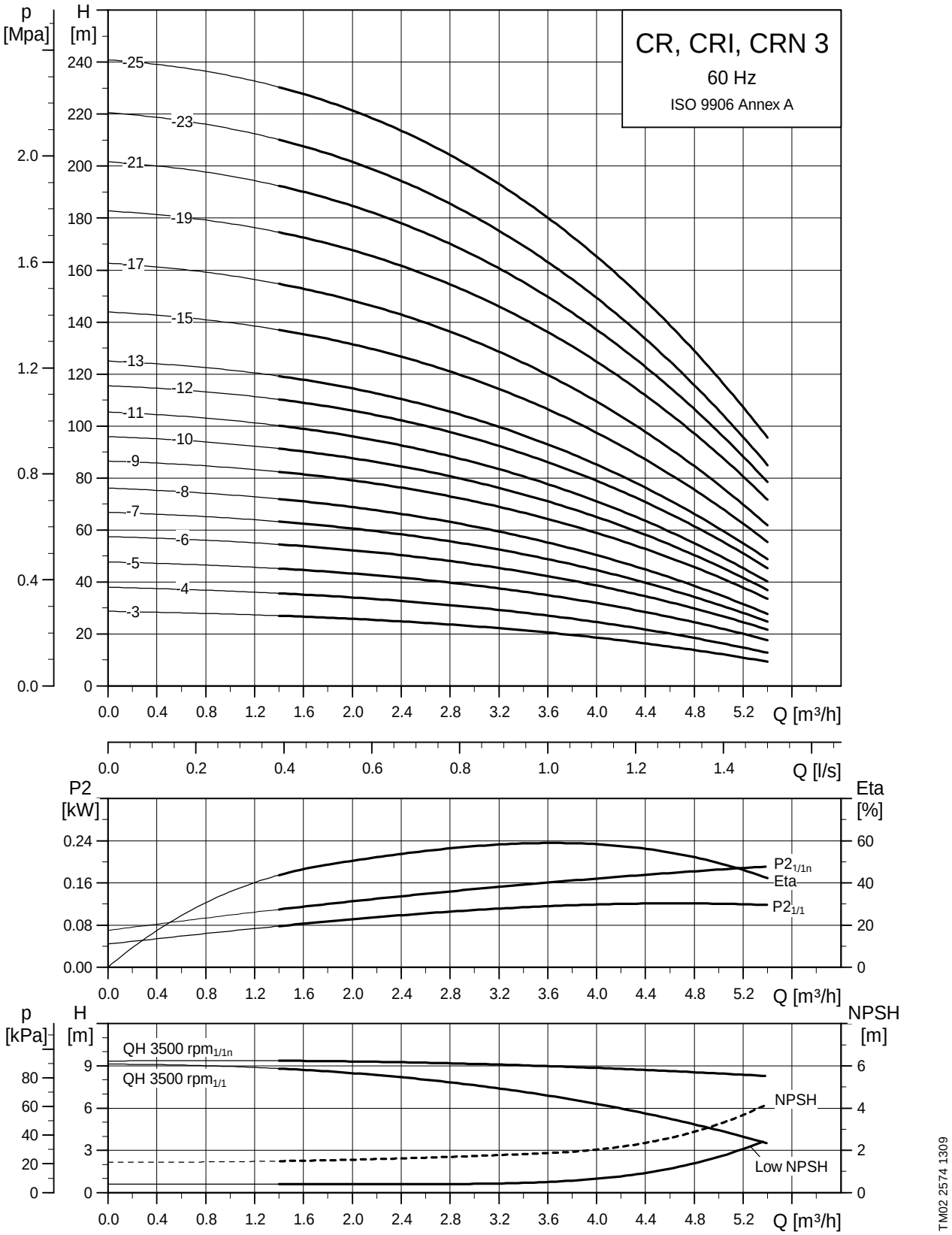


For information about dimensions of the individual pumps, see page 123.

Low-NPSH pumps



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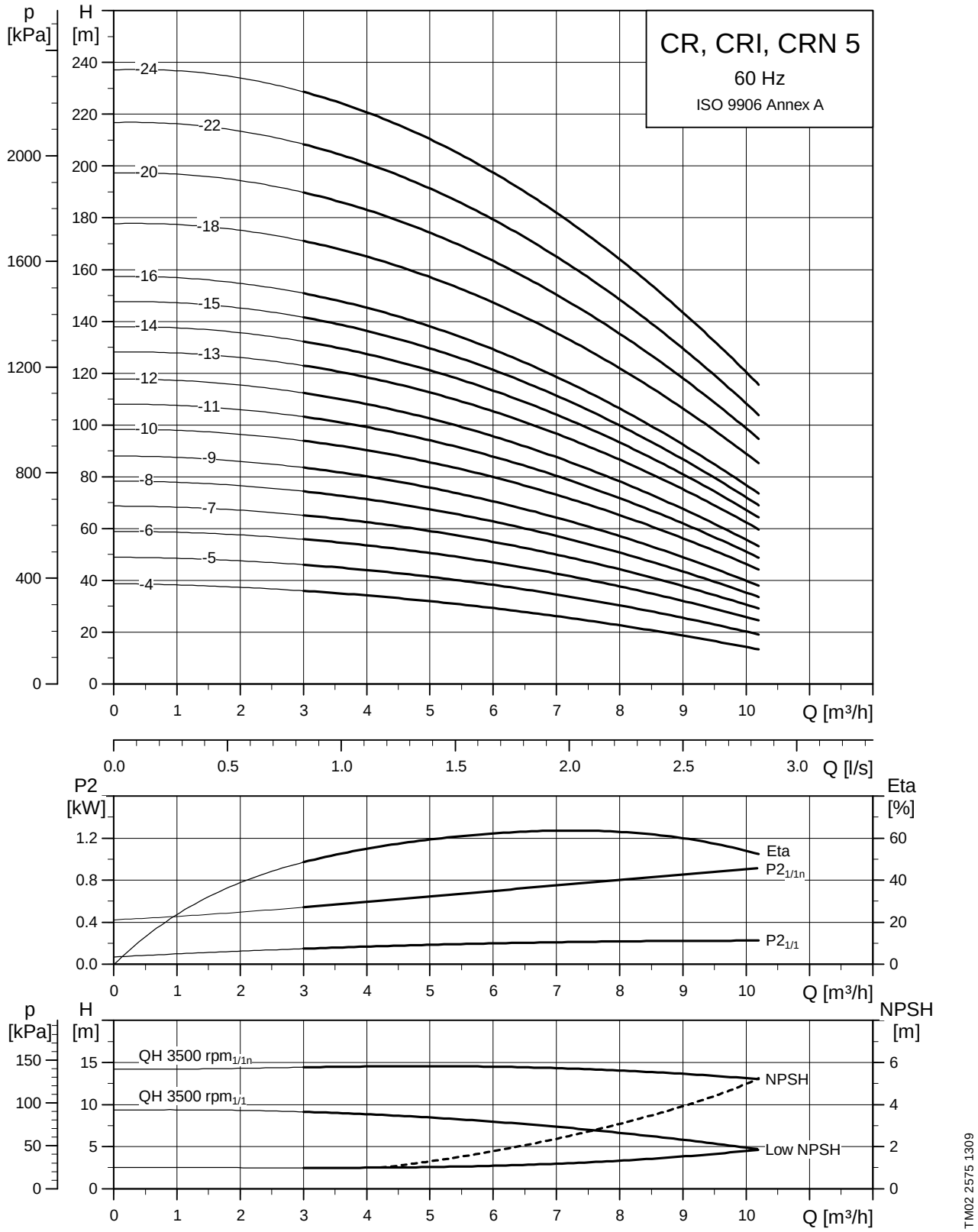

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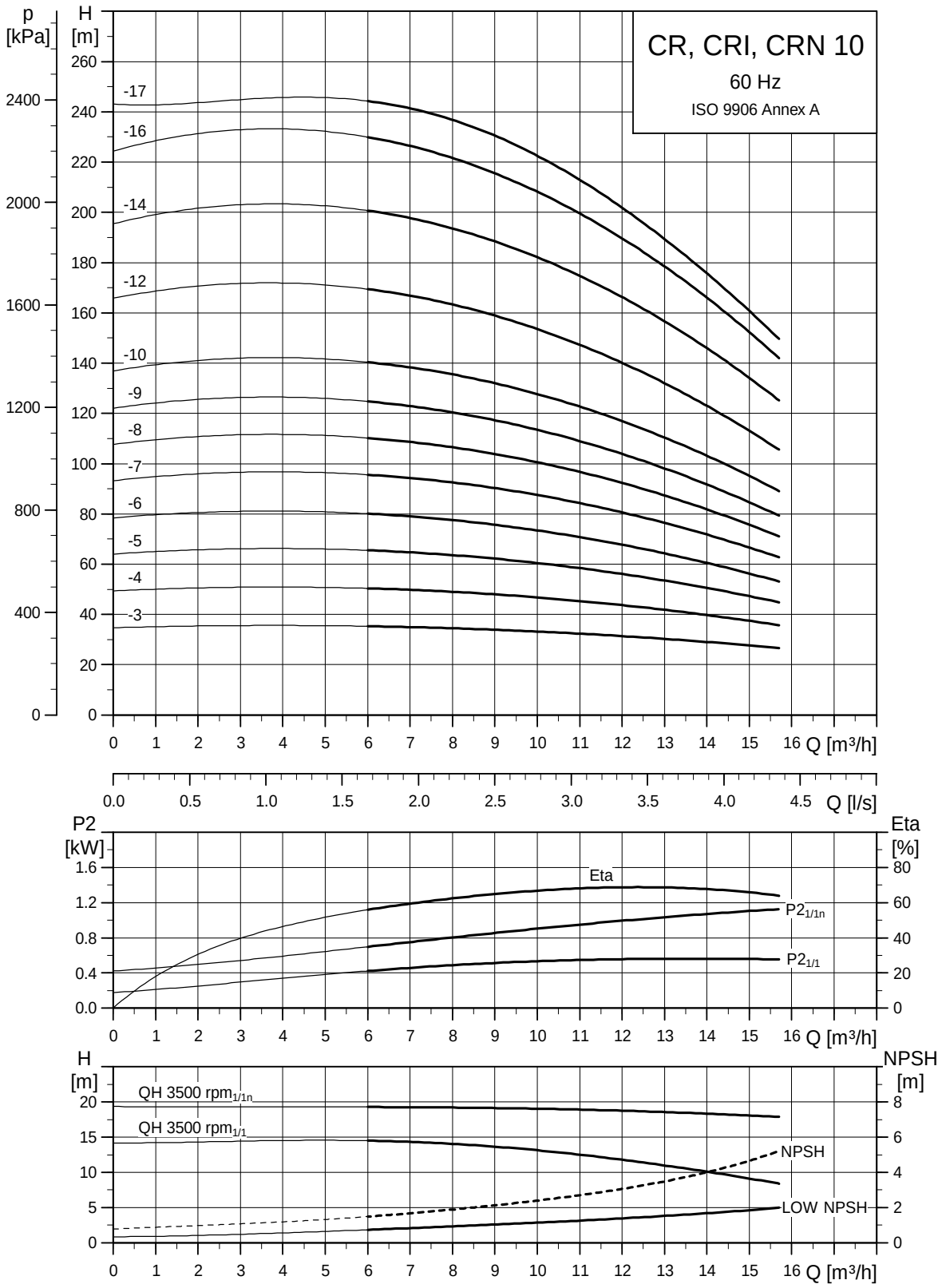
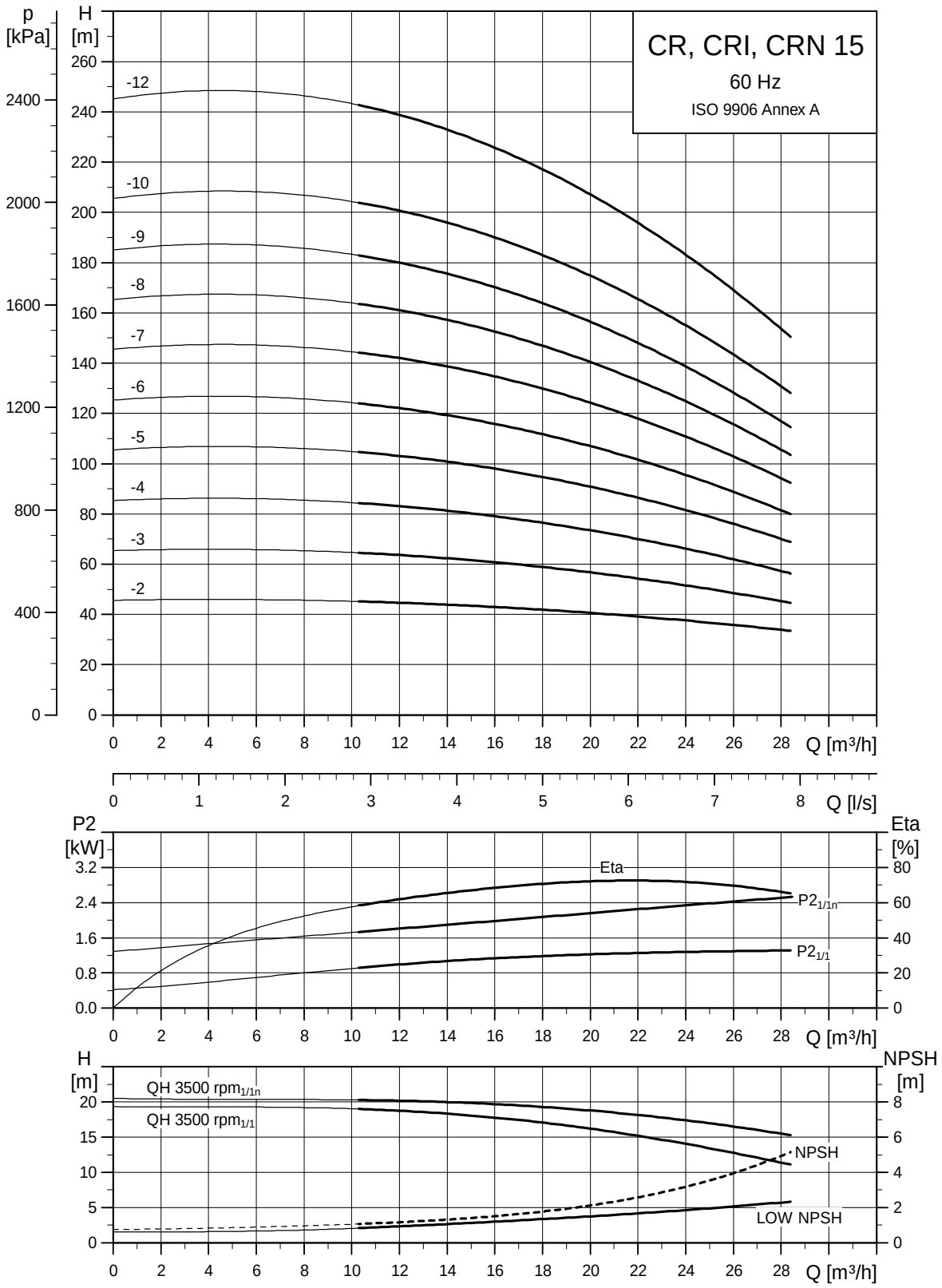


TM02 7394 1309

For information about dimensions of the individual pumps, see page 125.



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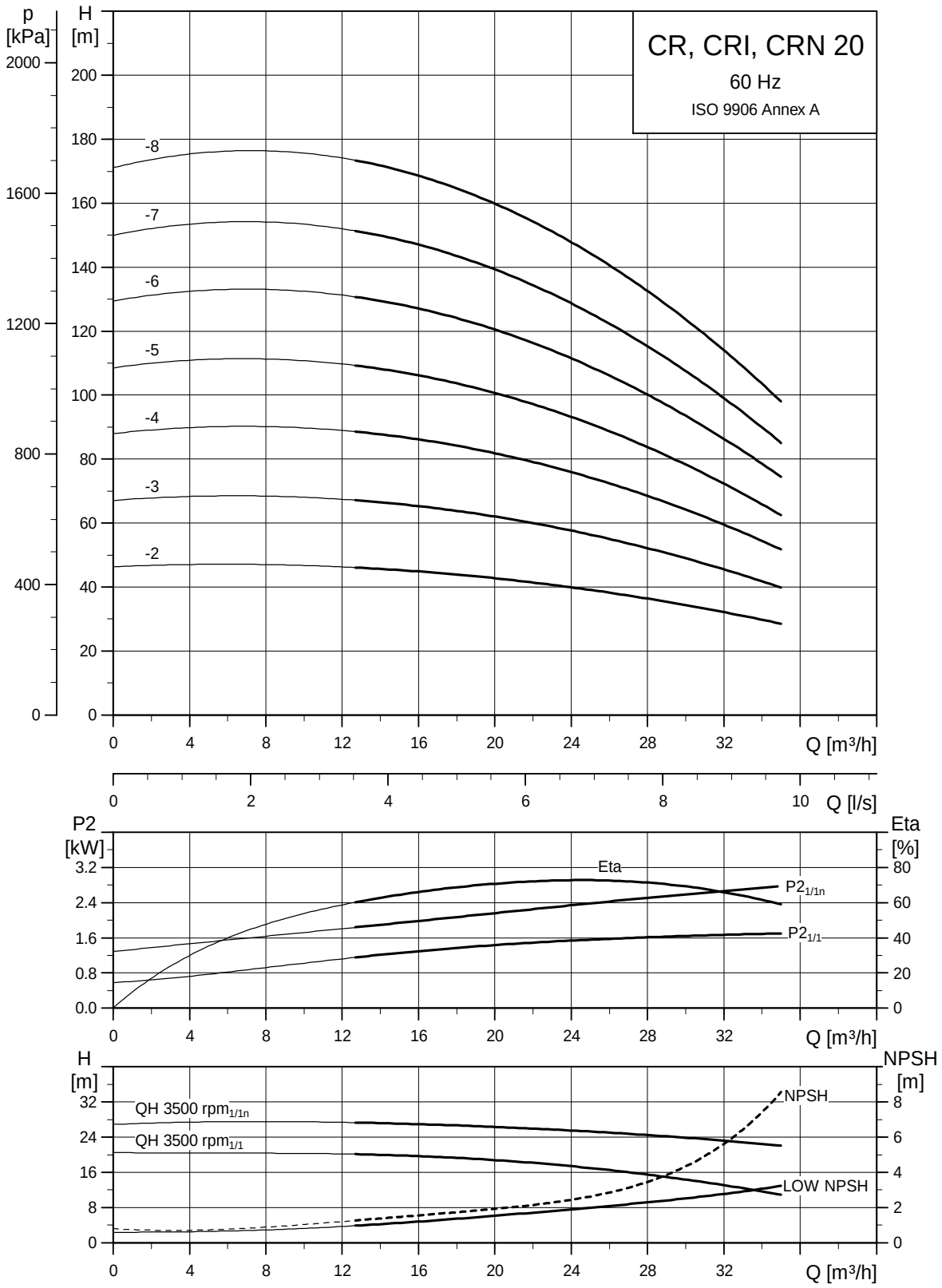

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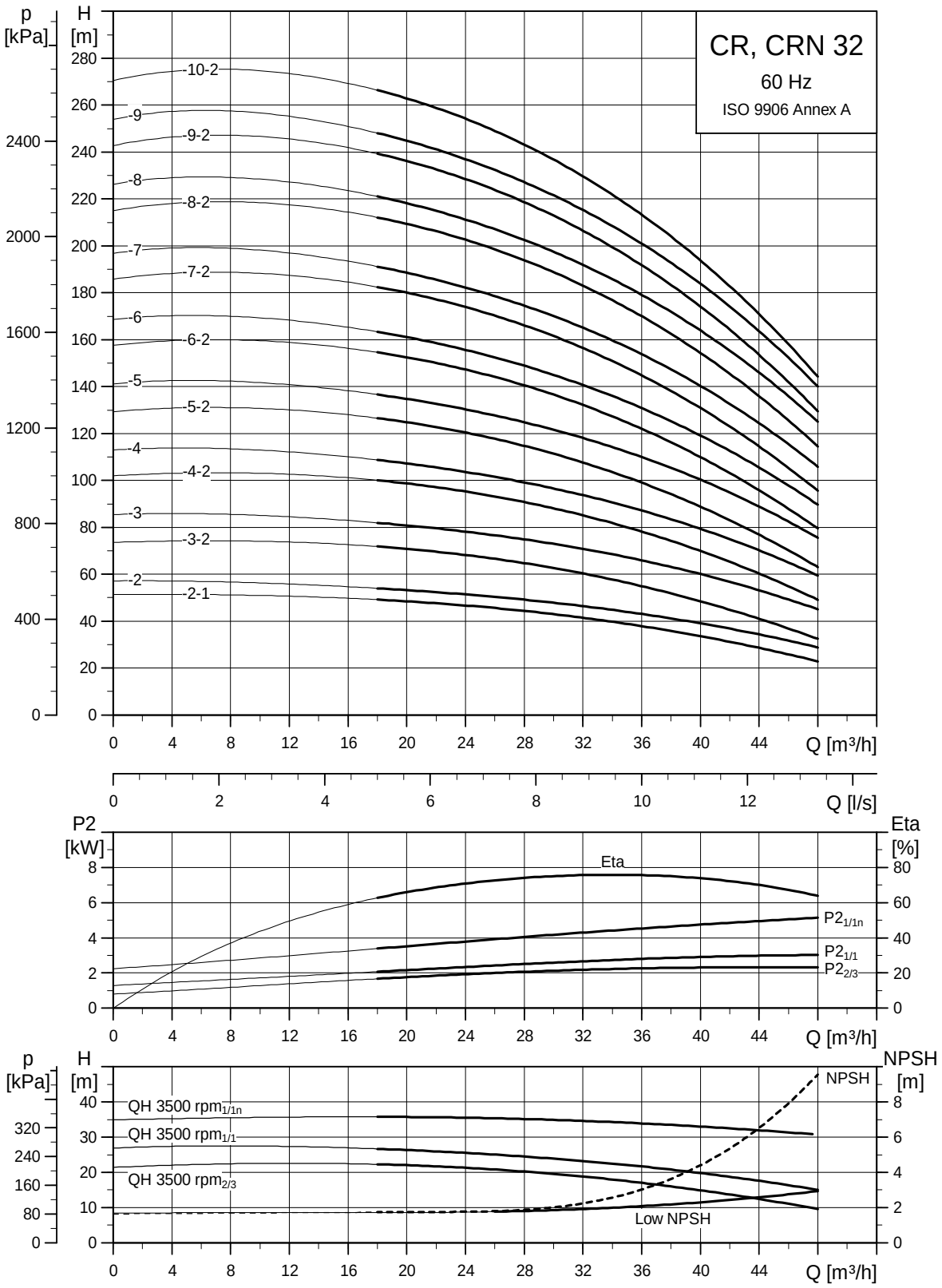

TM02 2578 1309

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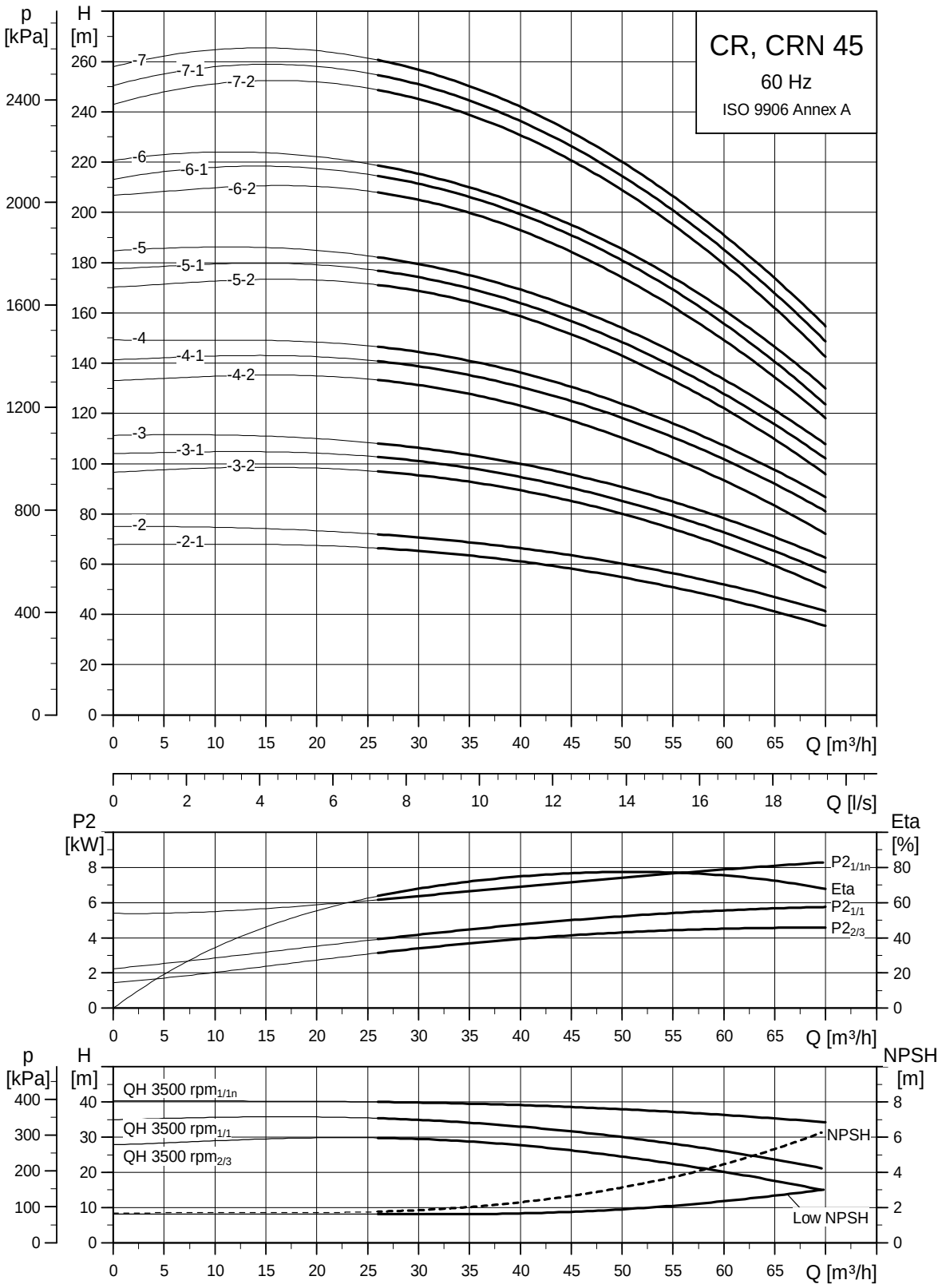

TM02 2579 1309

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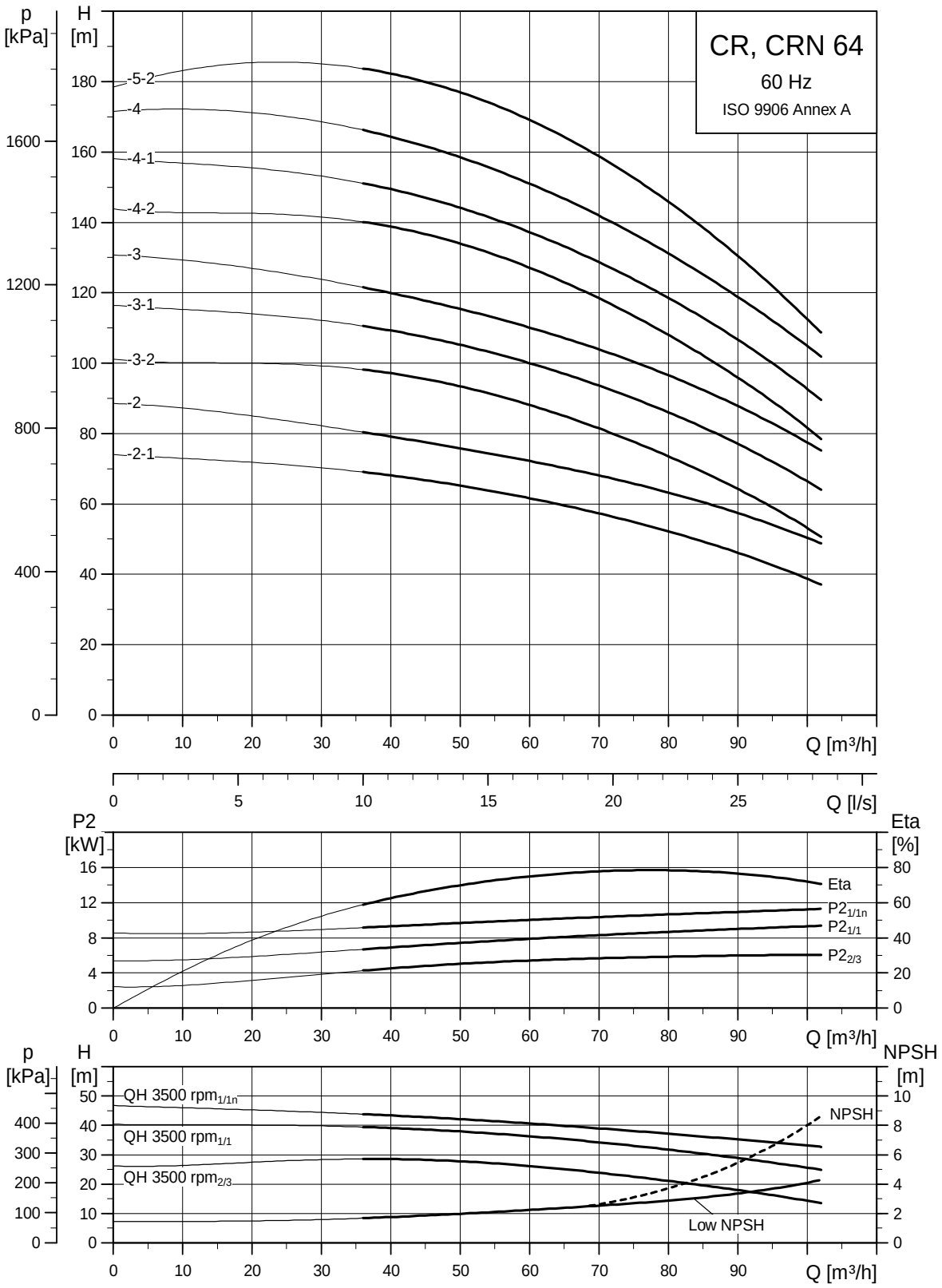
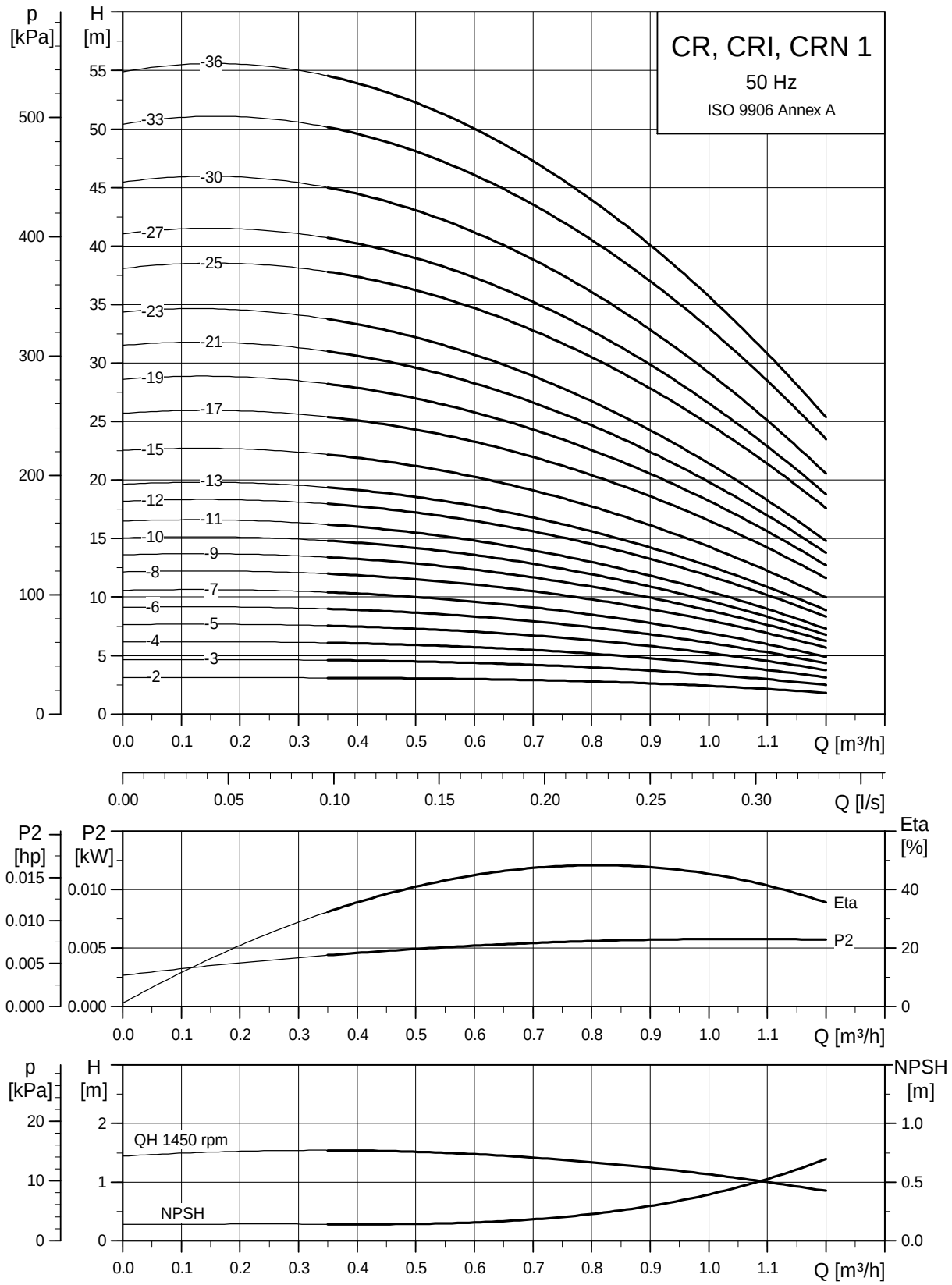


TM02 2580 1309

For information about dimensions of the individual pumps, see page 127.

CR pumps with 4-pole motor



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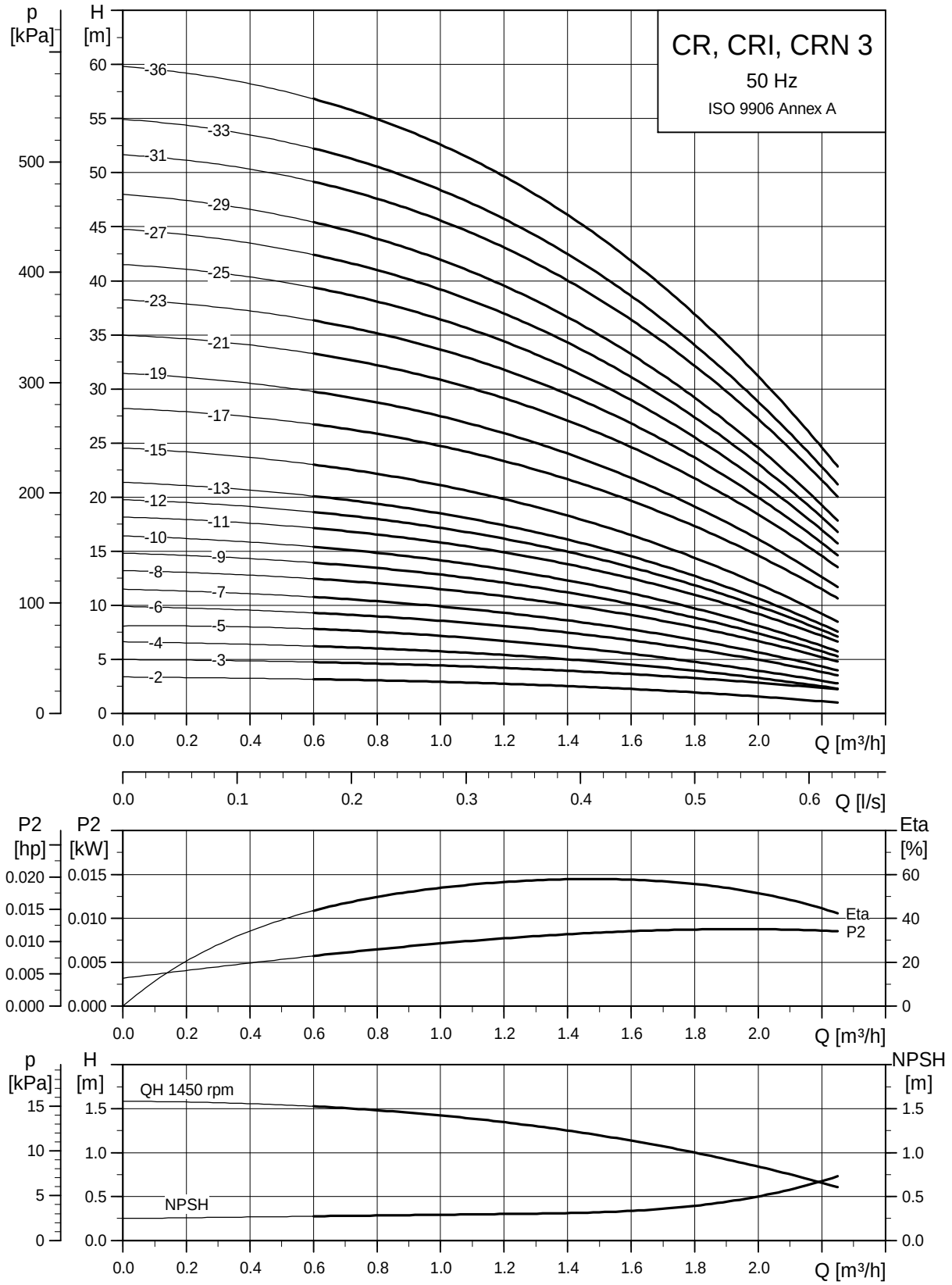

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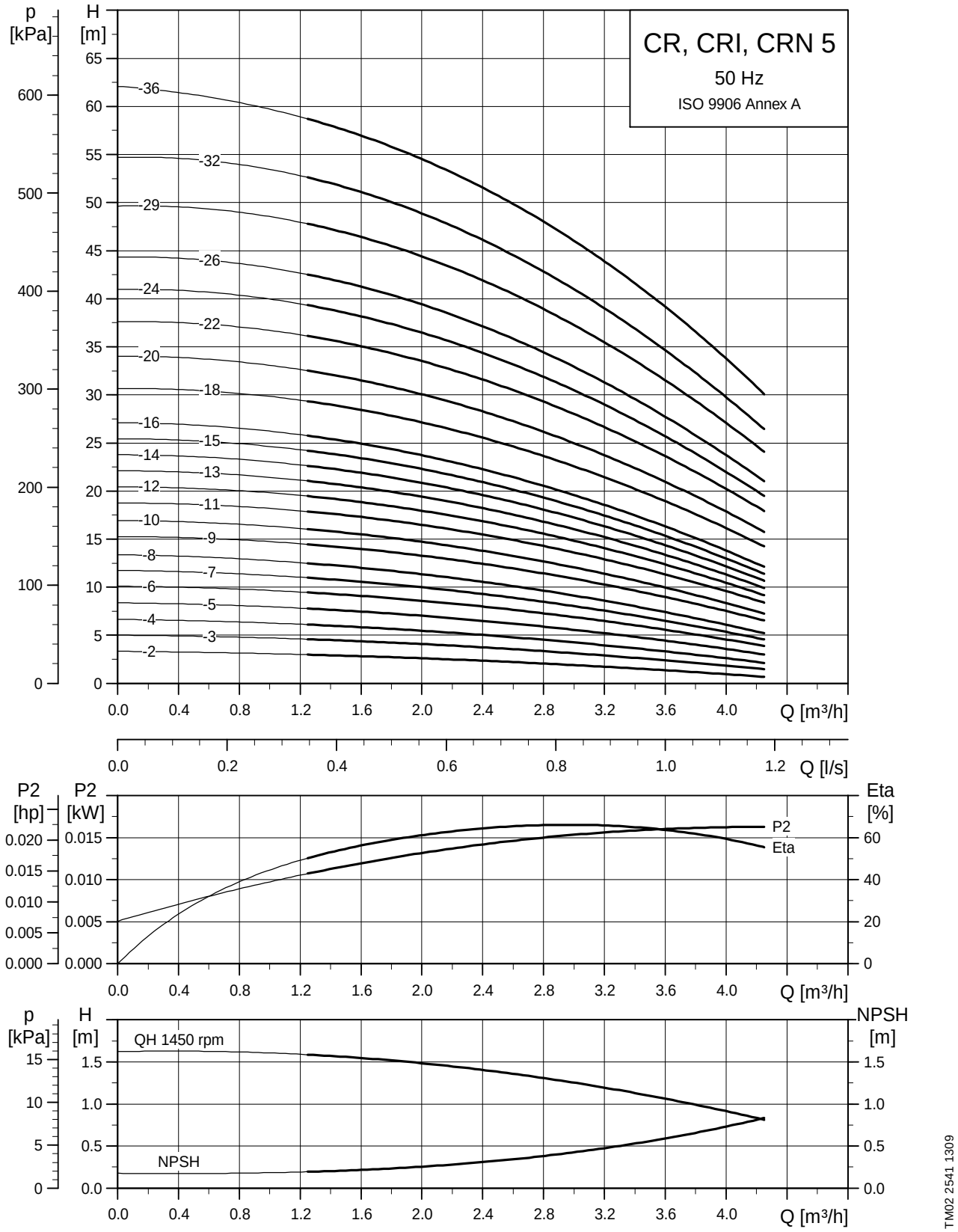

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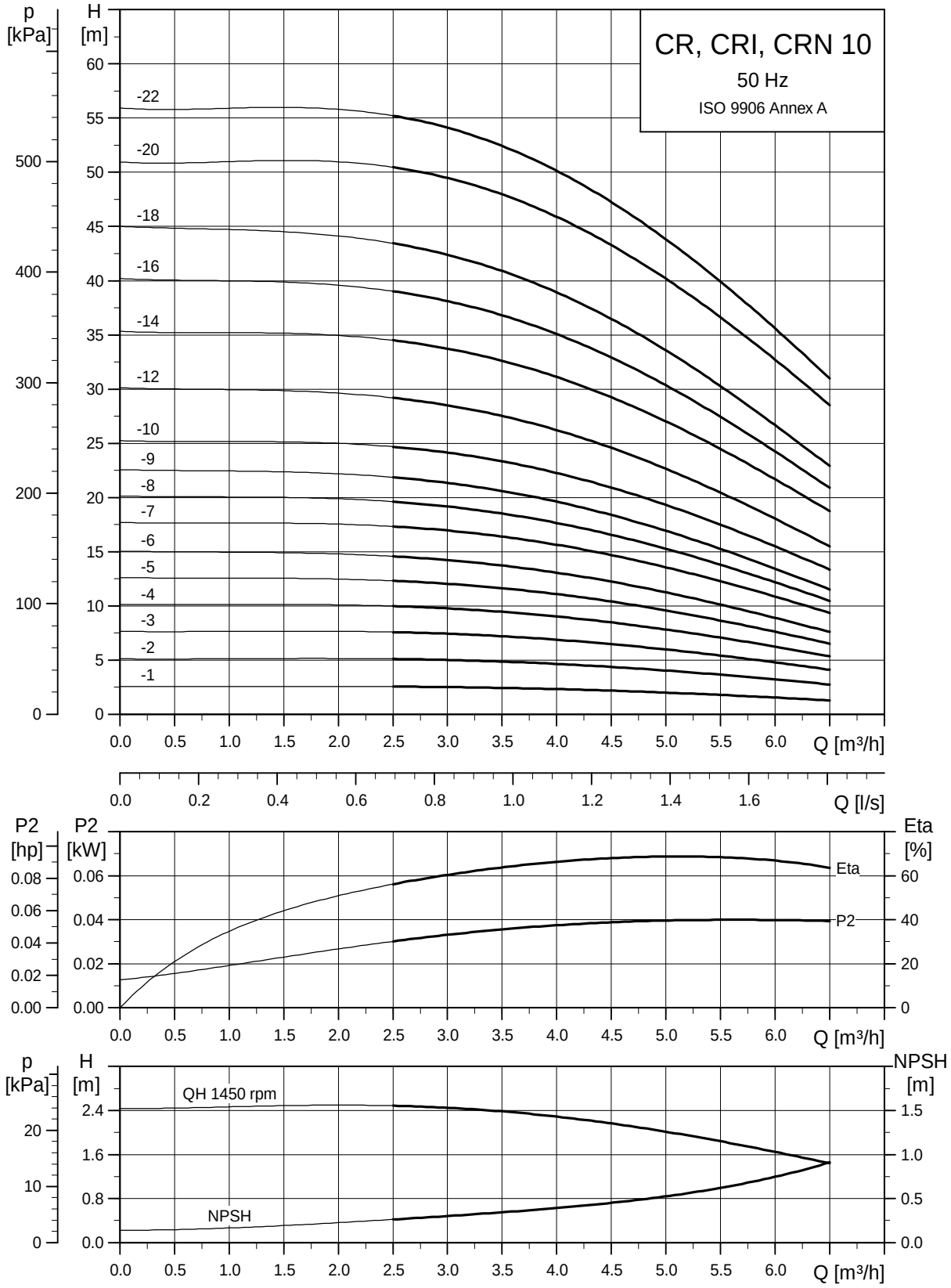

TM02 7273 1309

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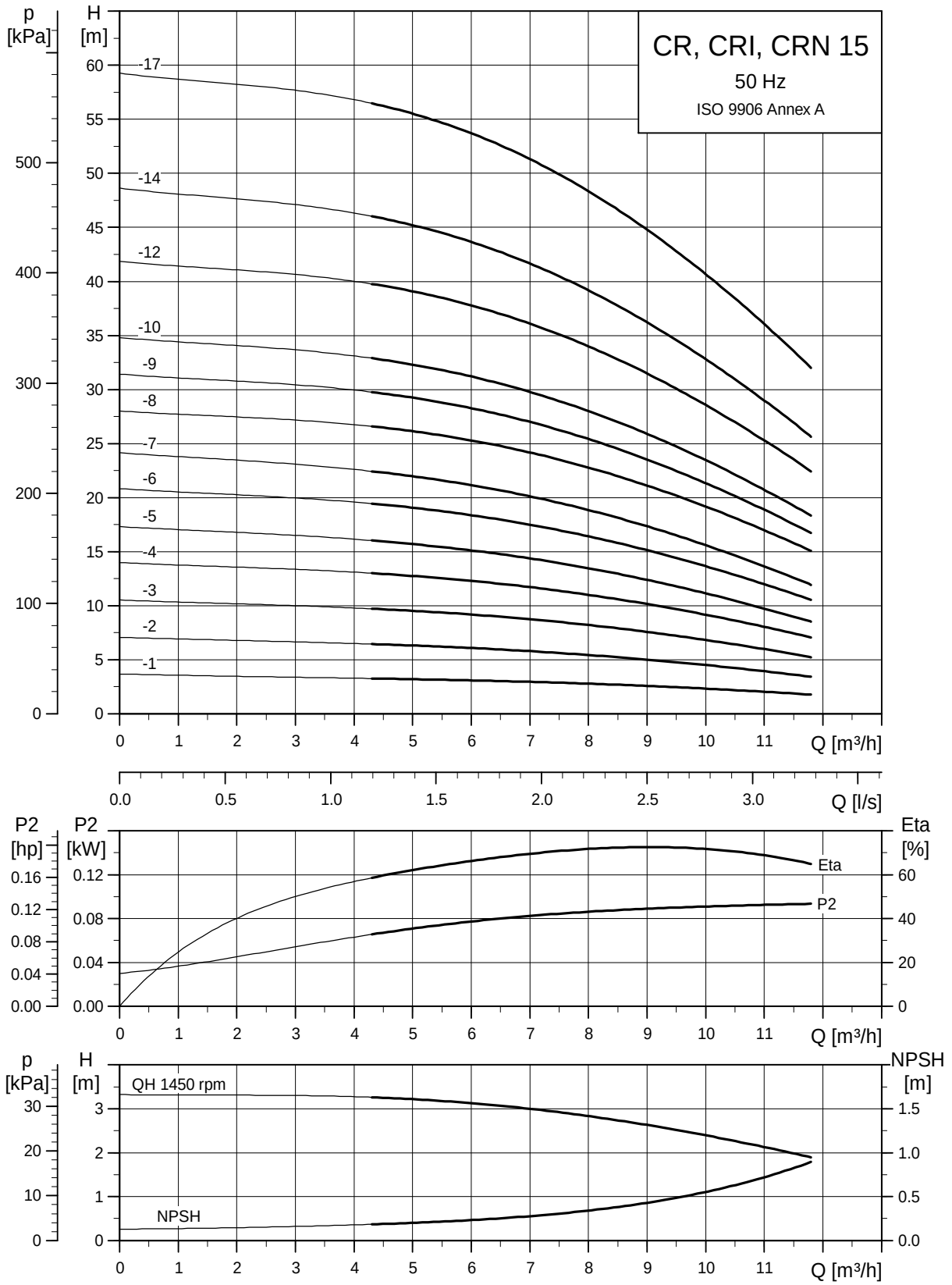

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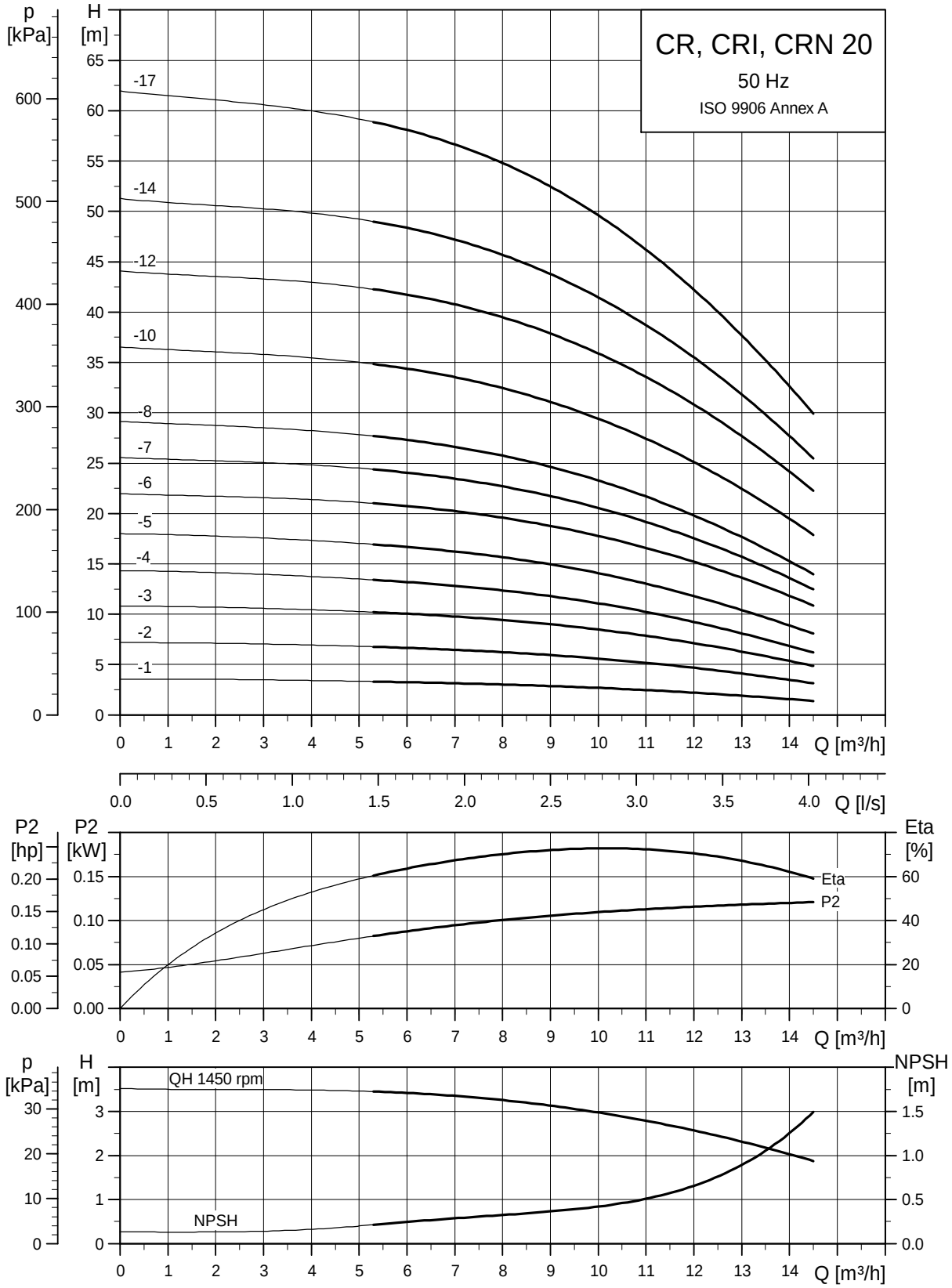

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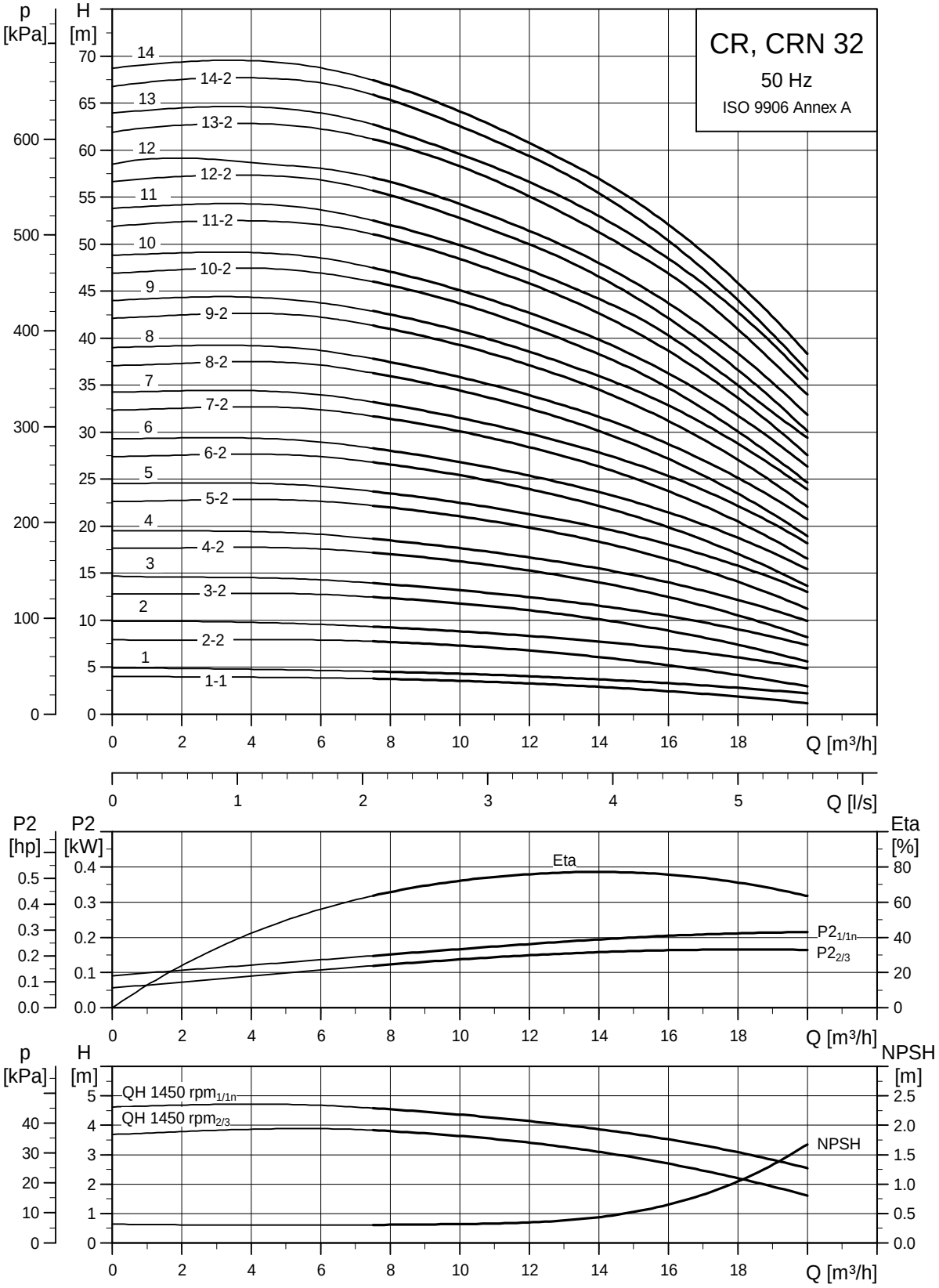

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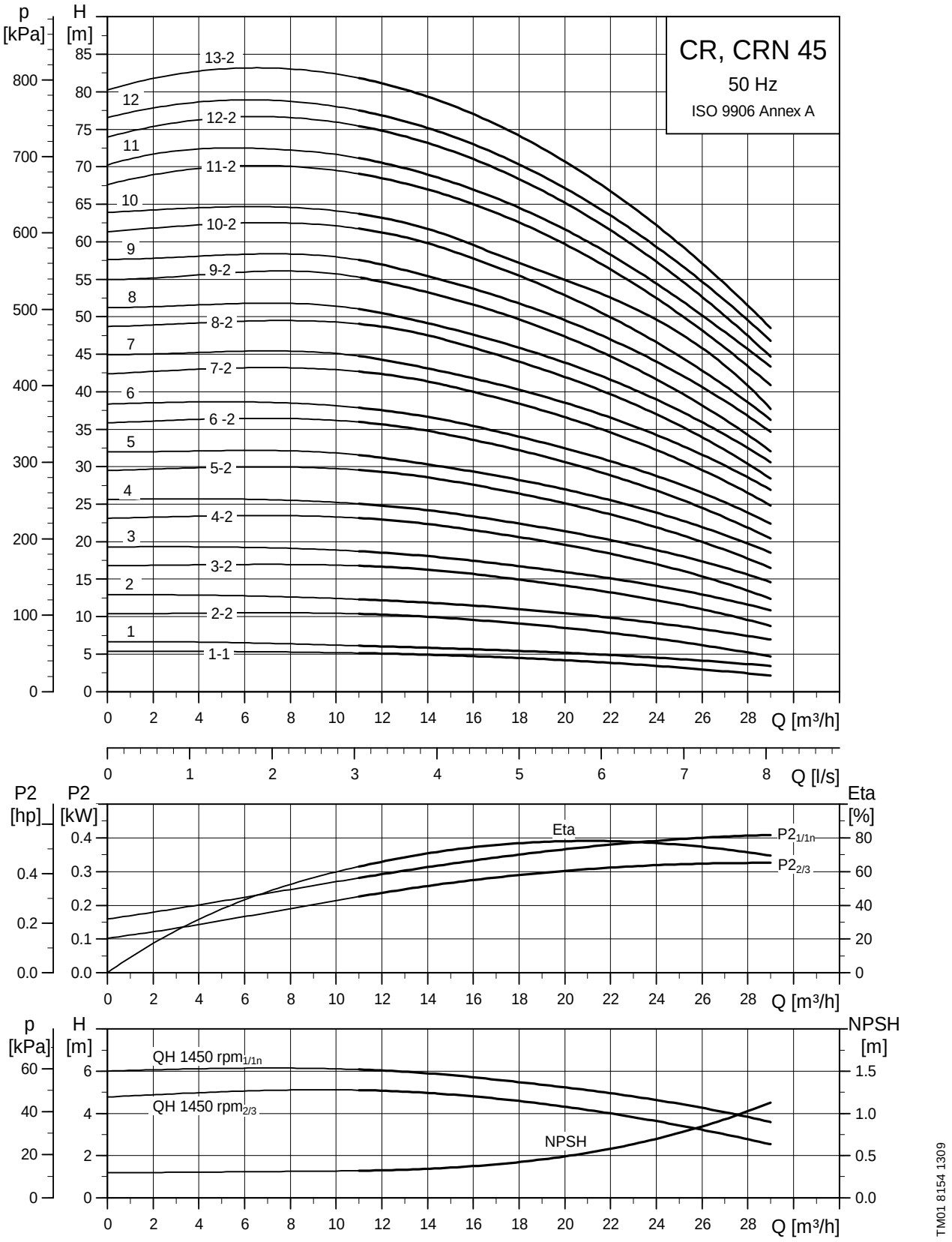

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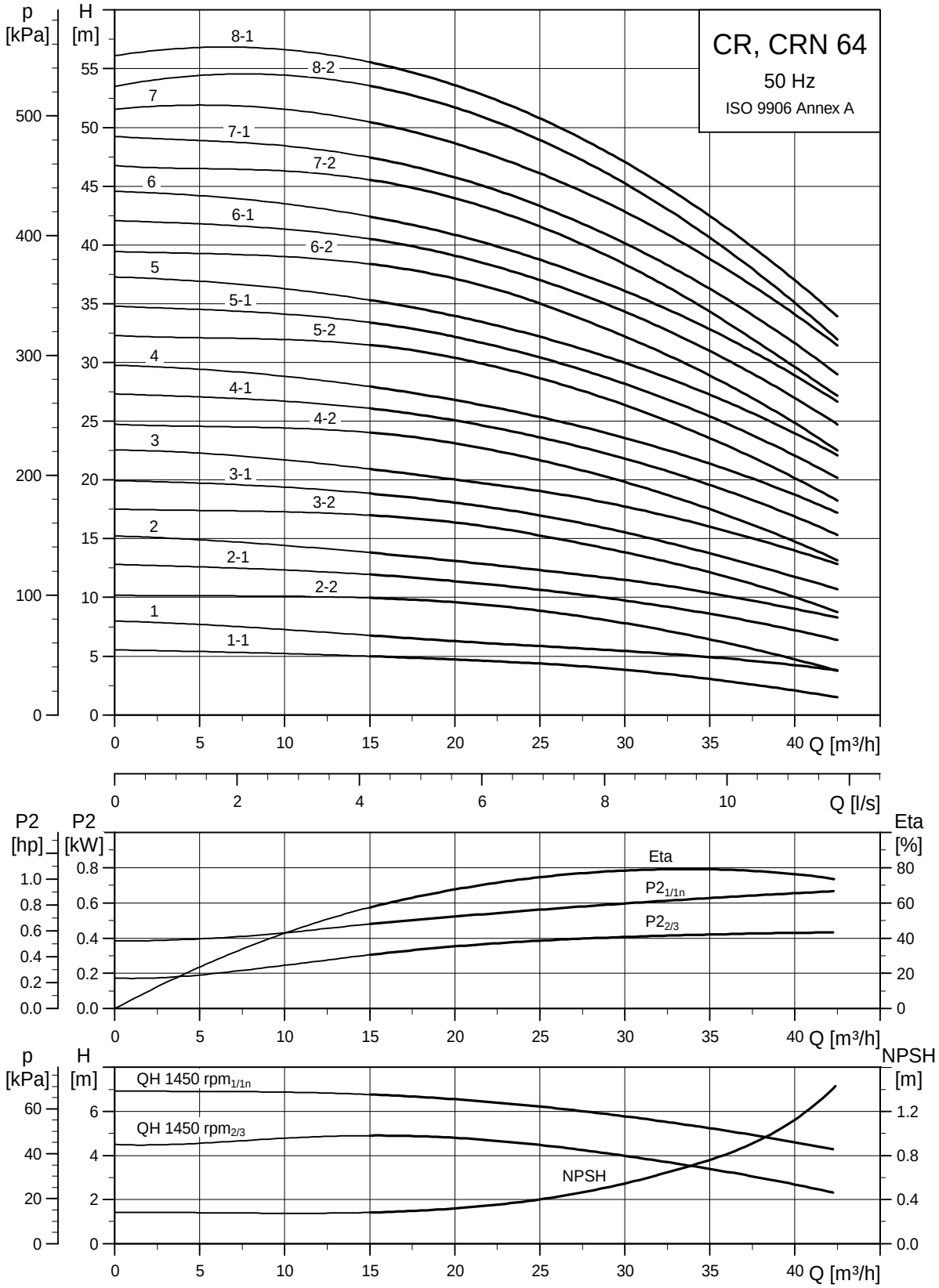

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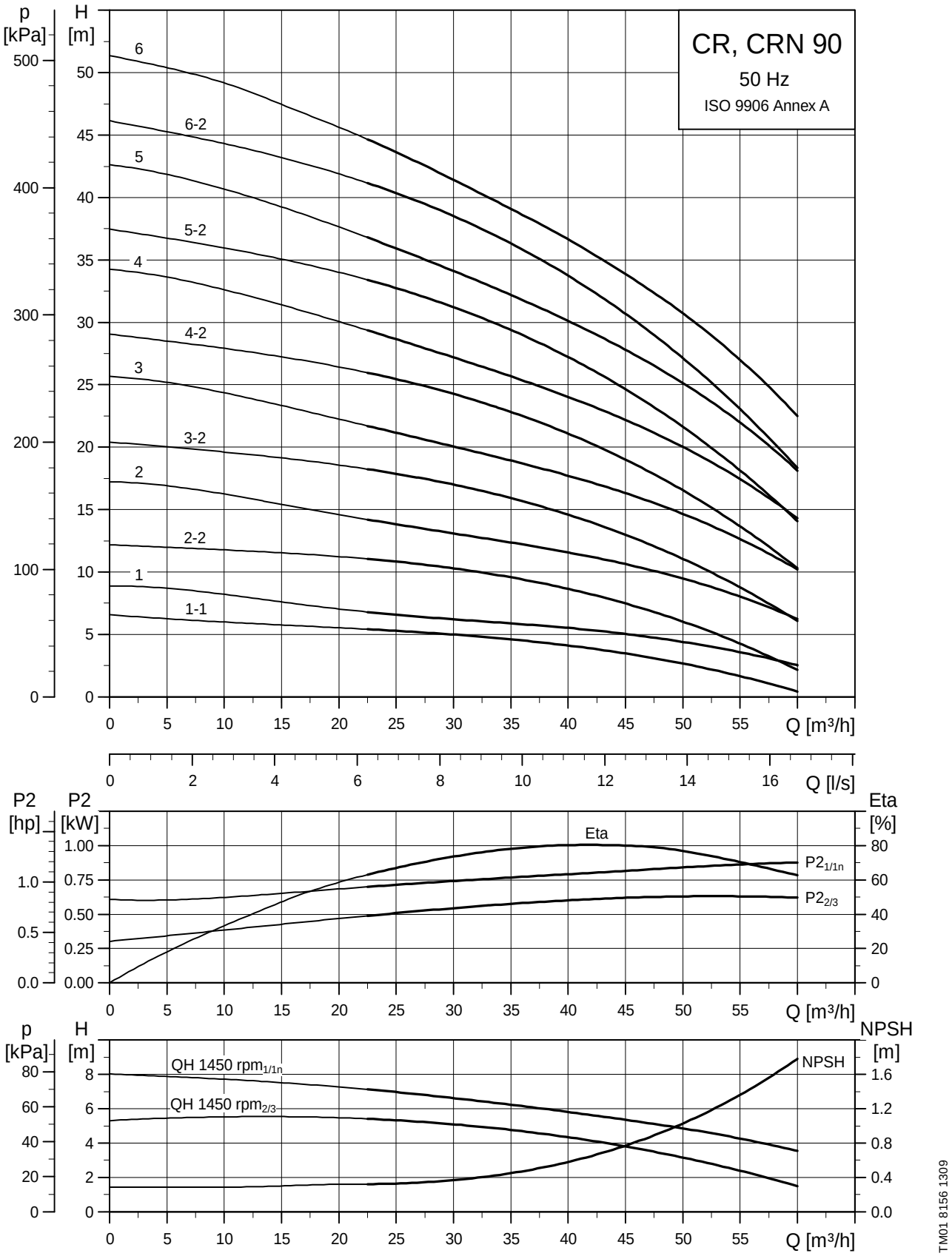

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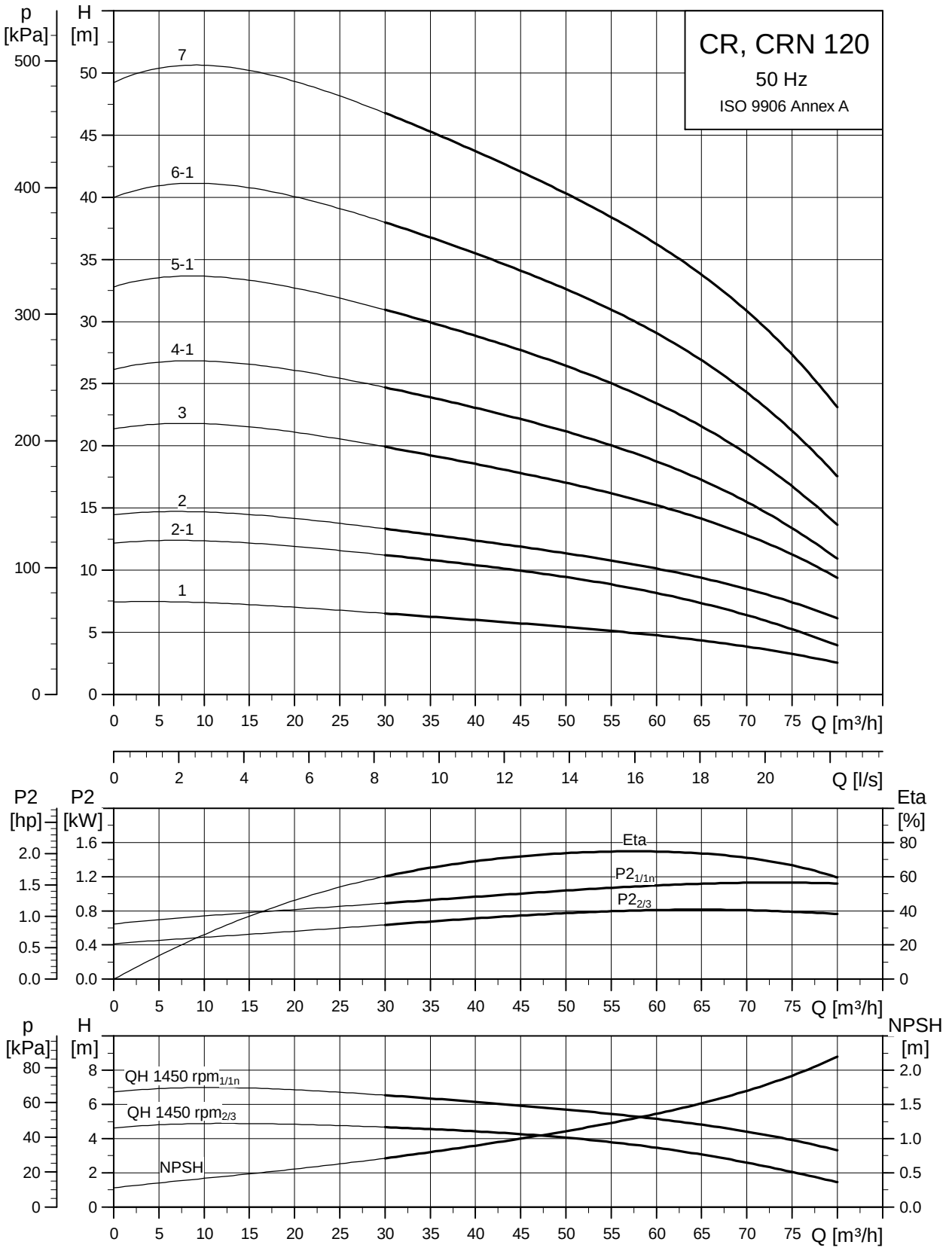

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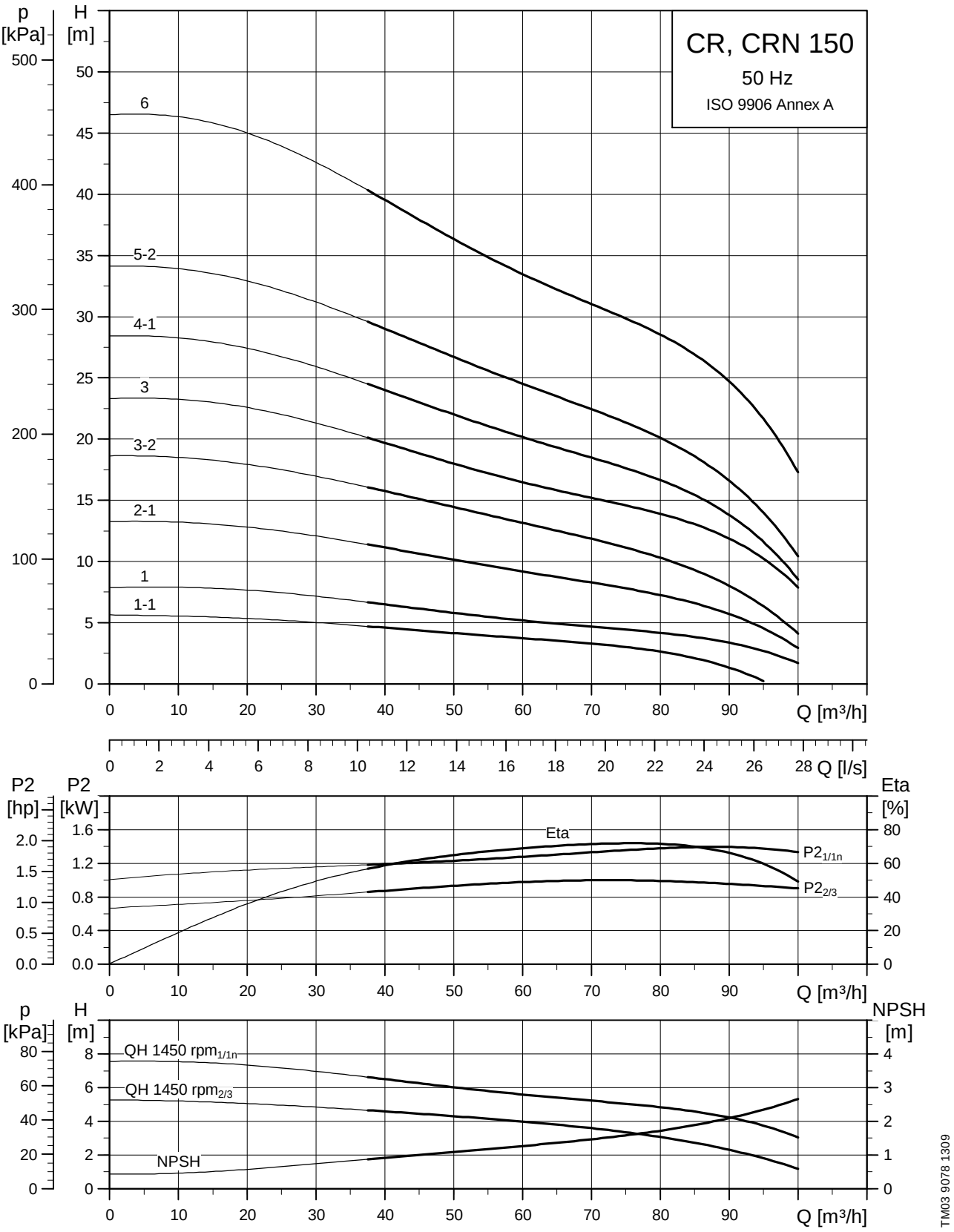
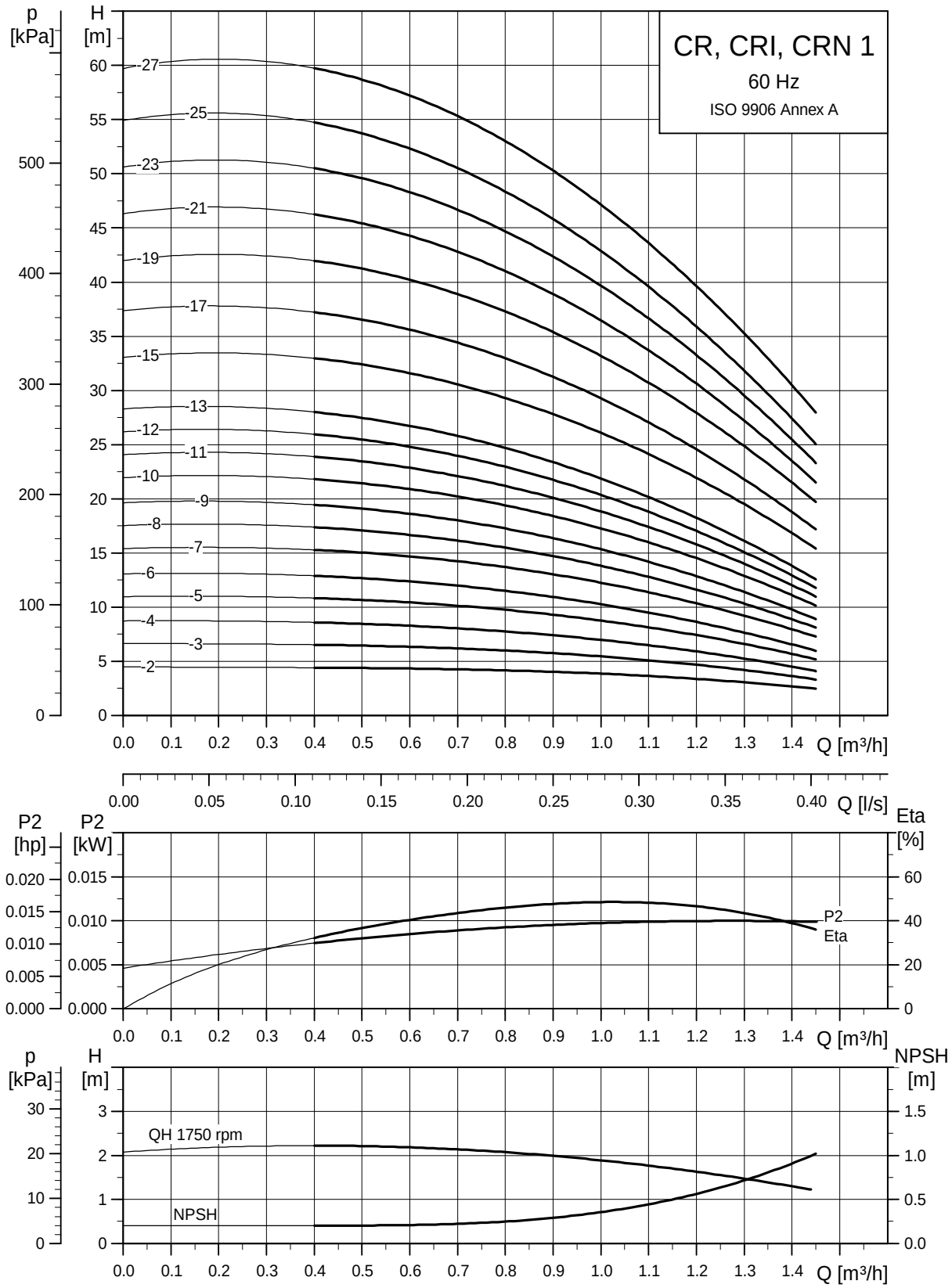


For information about dimensions of the individual pumps, see page 133.

CR pumps with 4-pole motor



TM02 2540 1309

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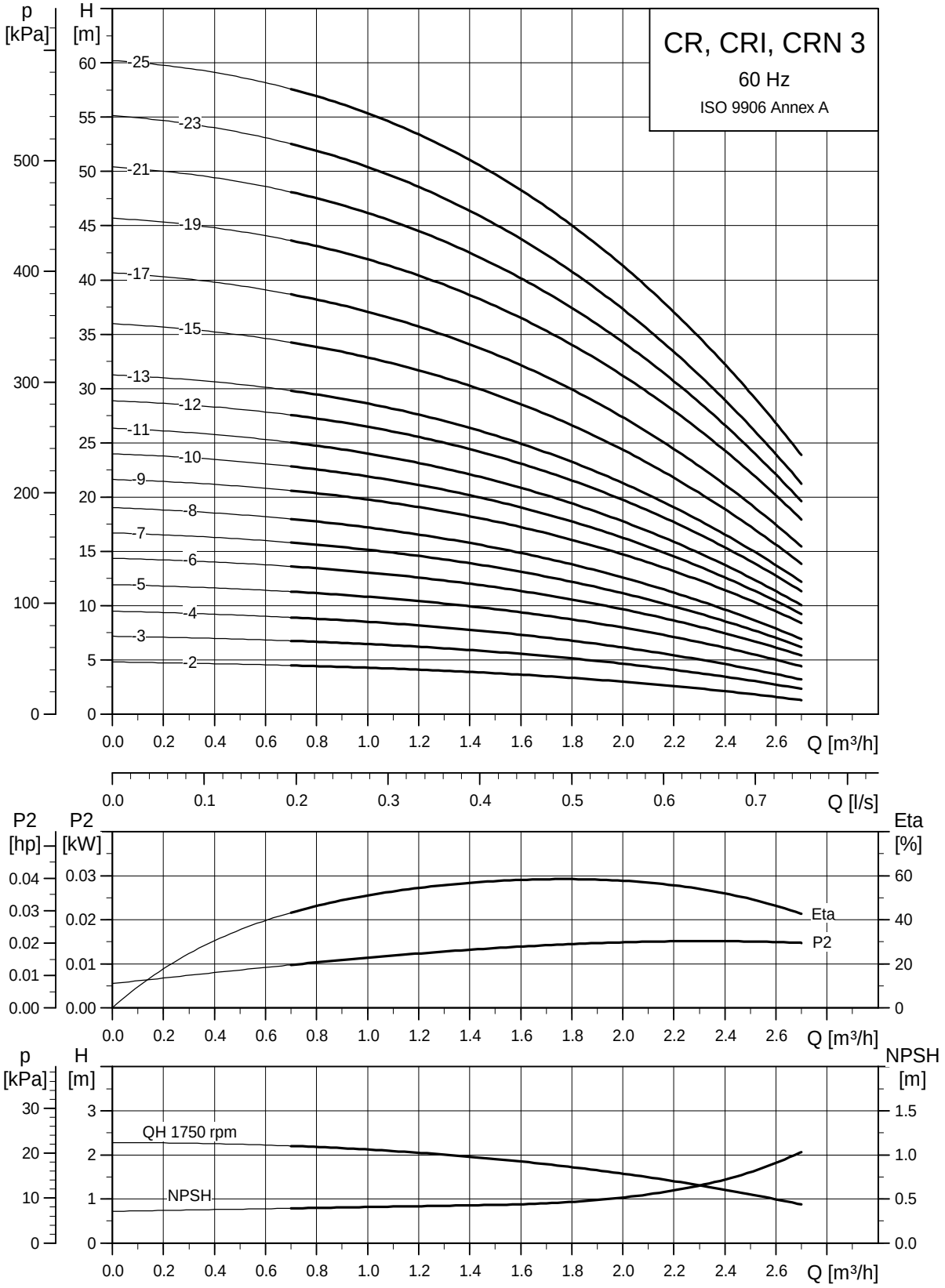
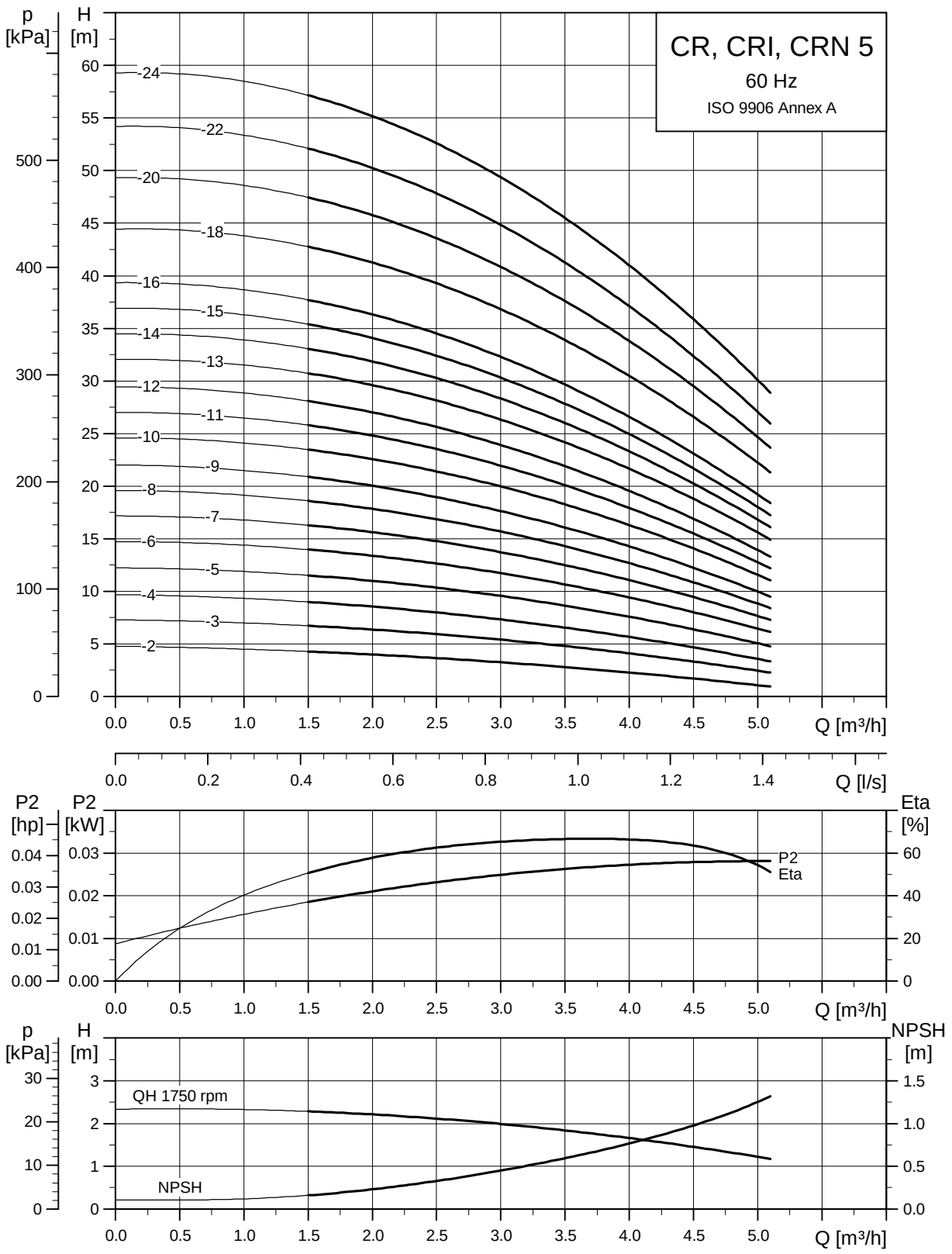


TM02 2539 1309

For information about dimensions of the individual pumps, see page 134.



TM02 2538 1309

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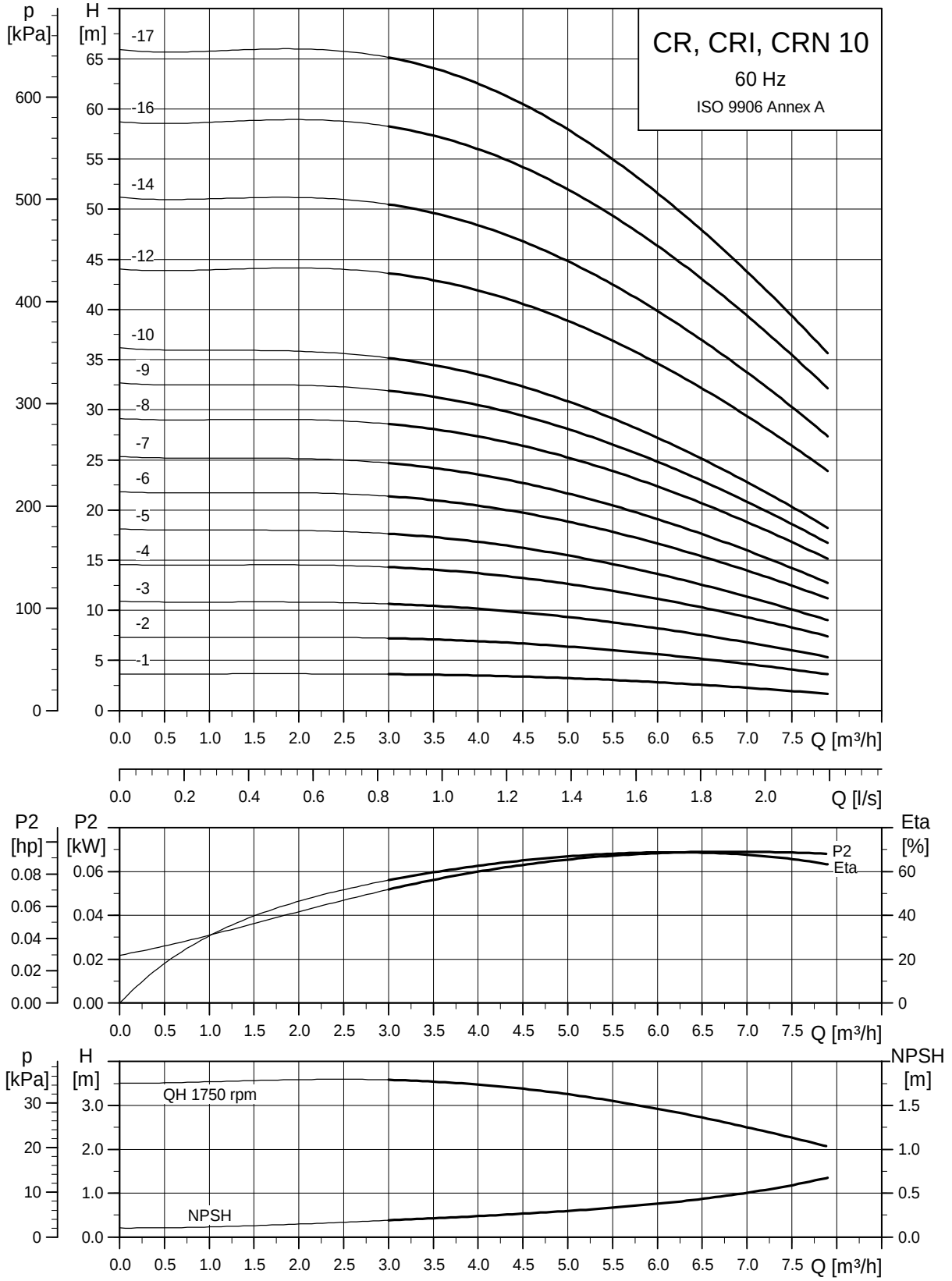

TM02 7276 1309

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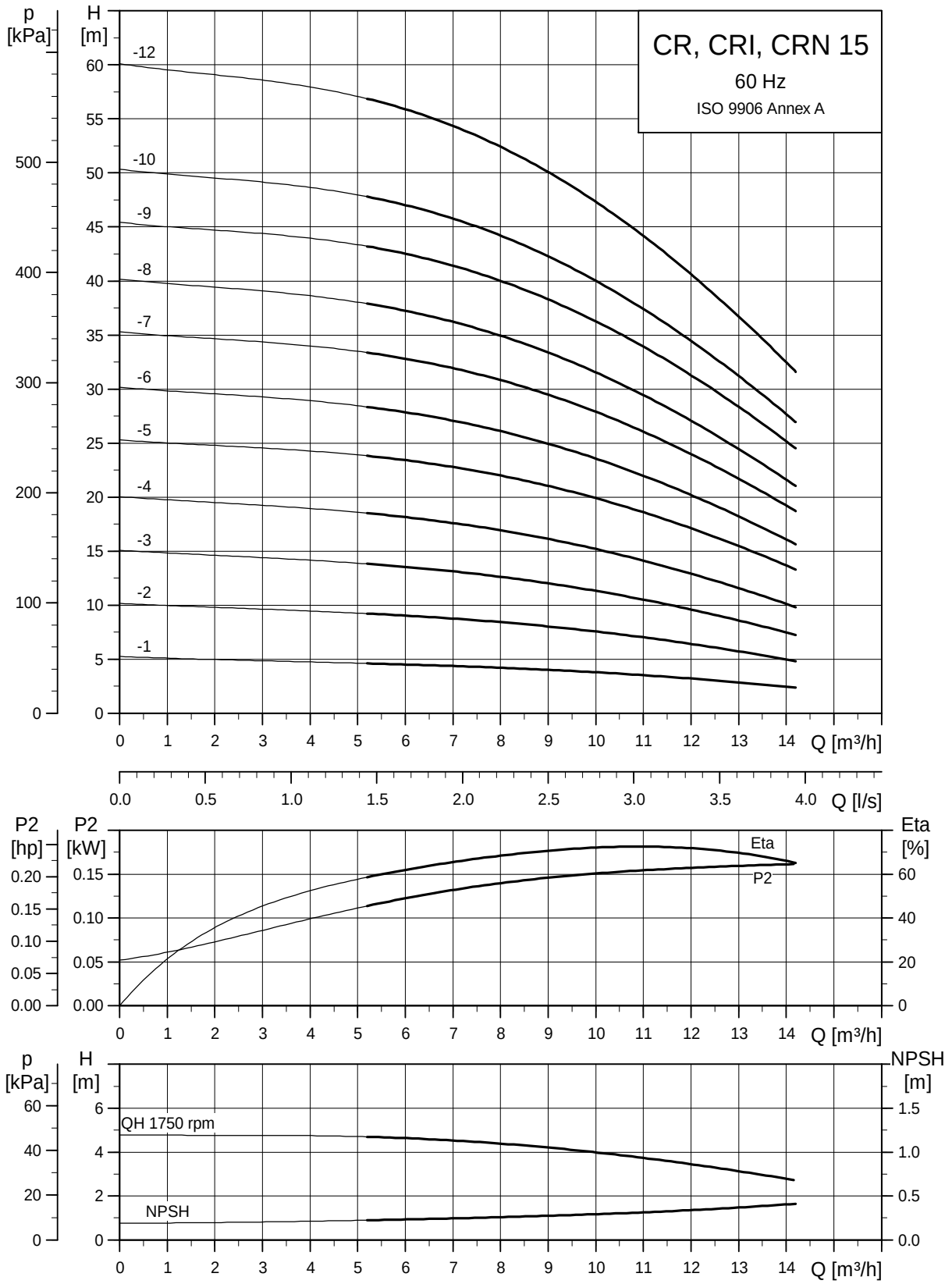

TM02 7277 1309

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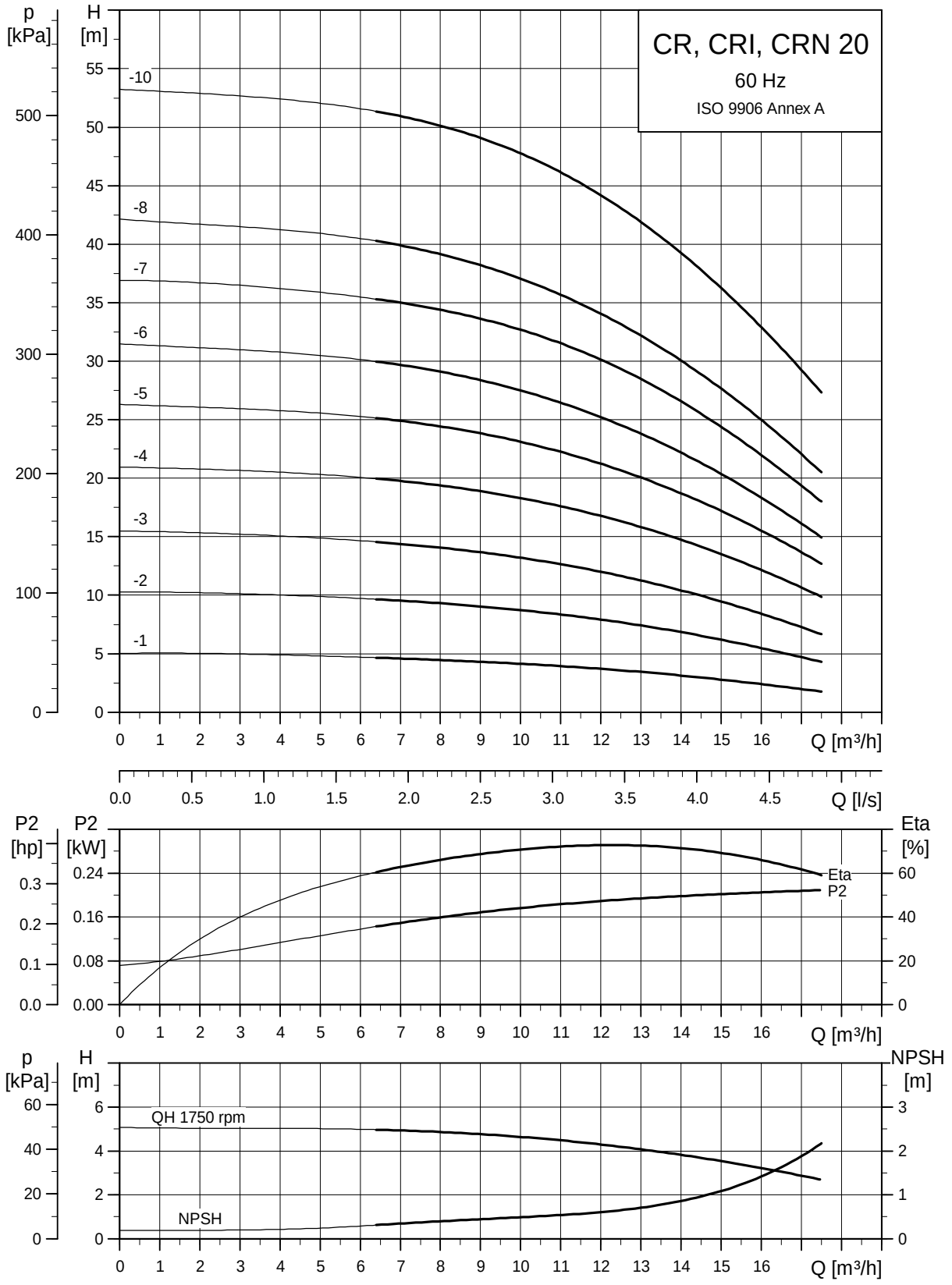

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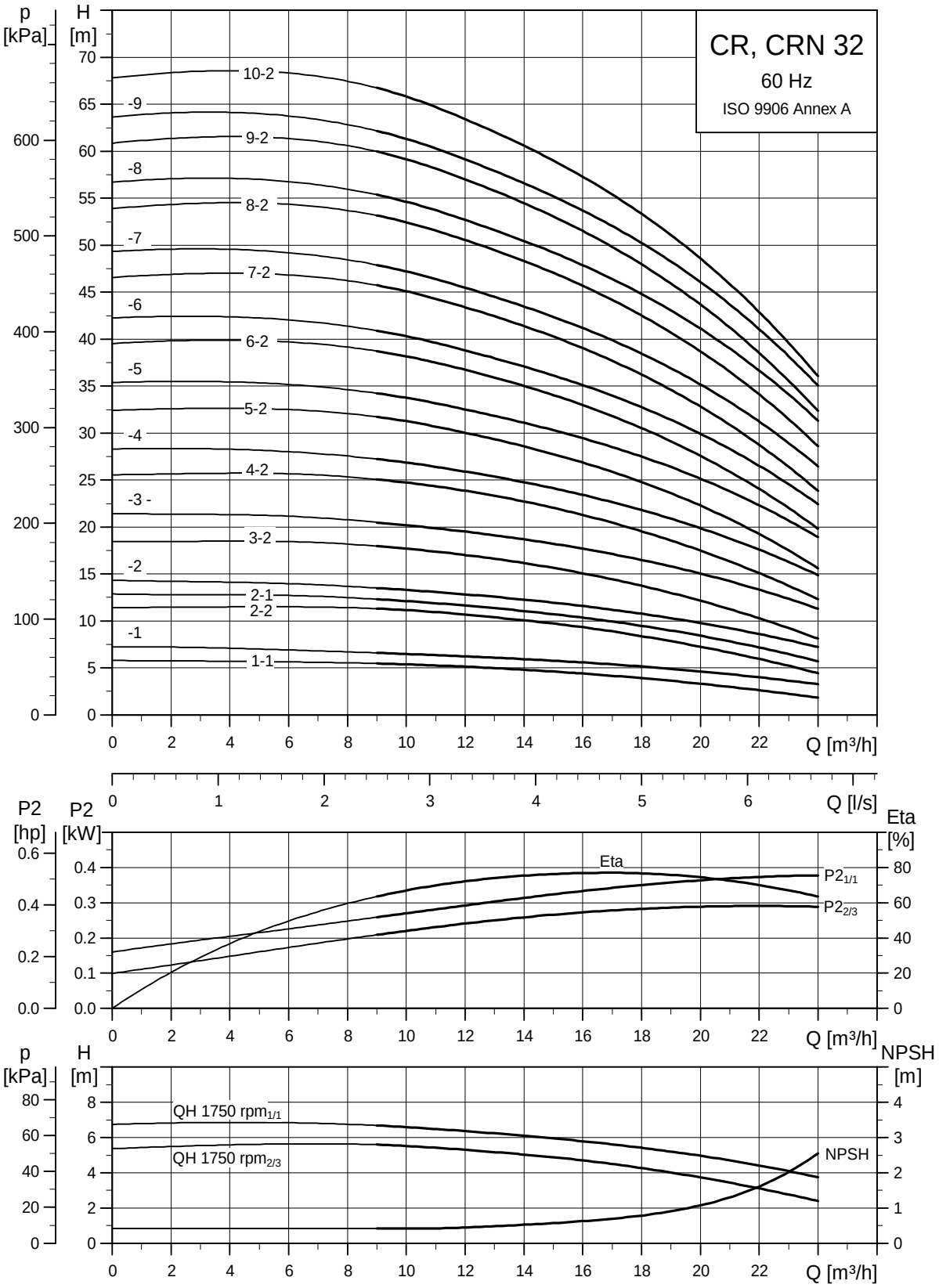
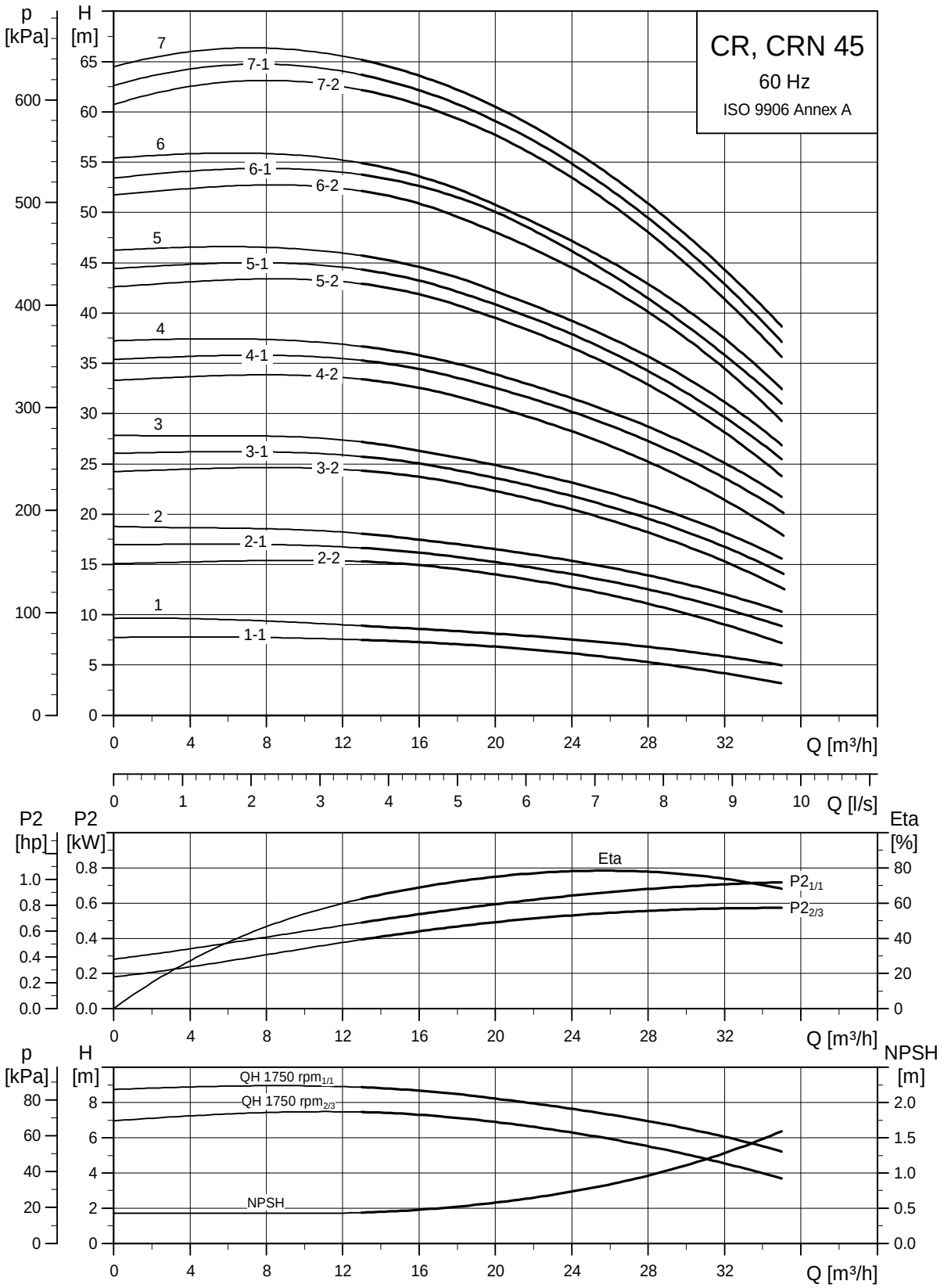


For information about dimensions of the individual pumps, see page 136.



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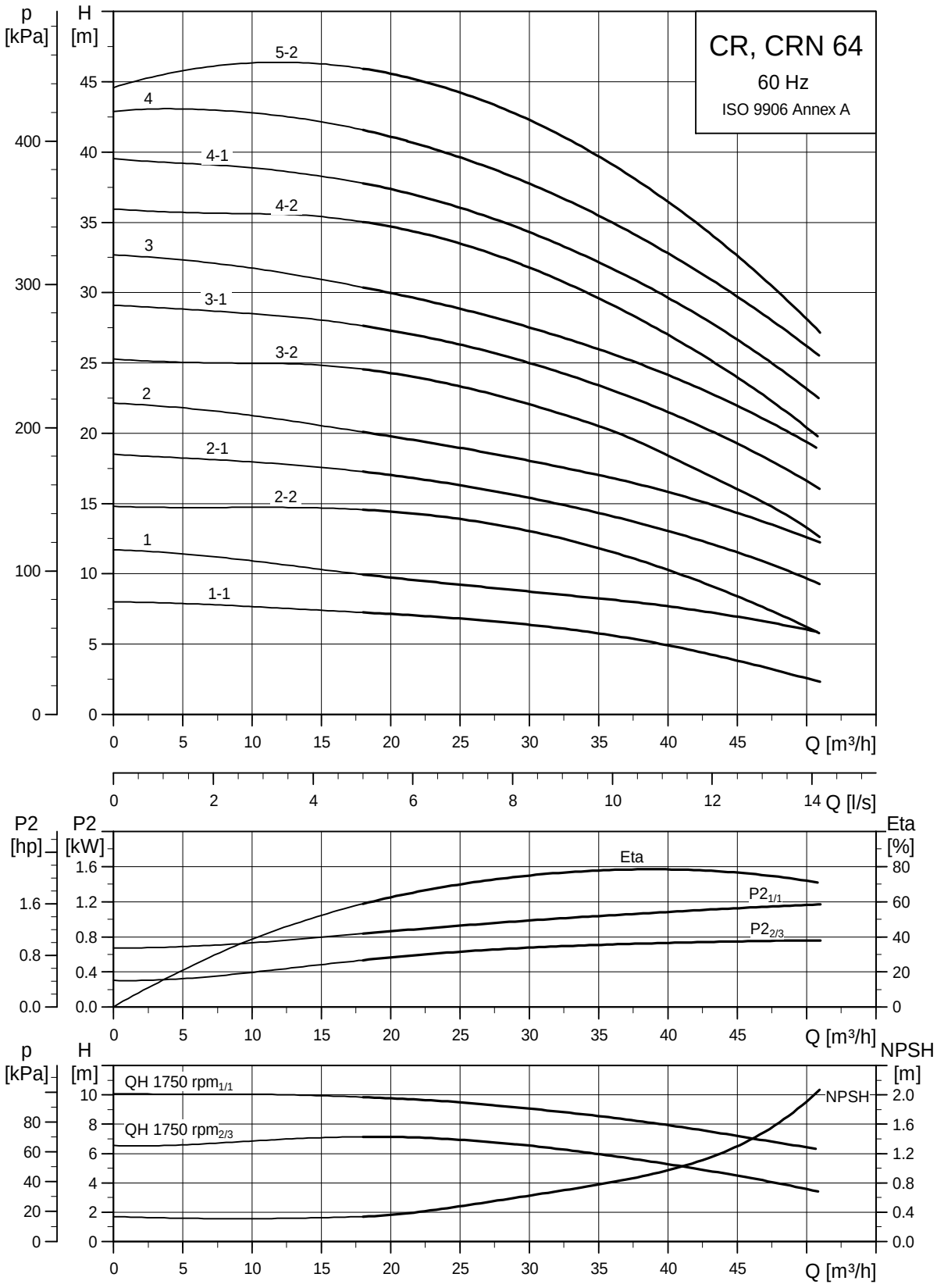
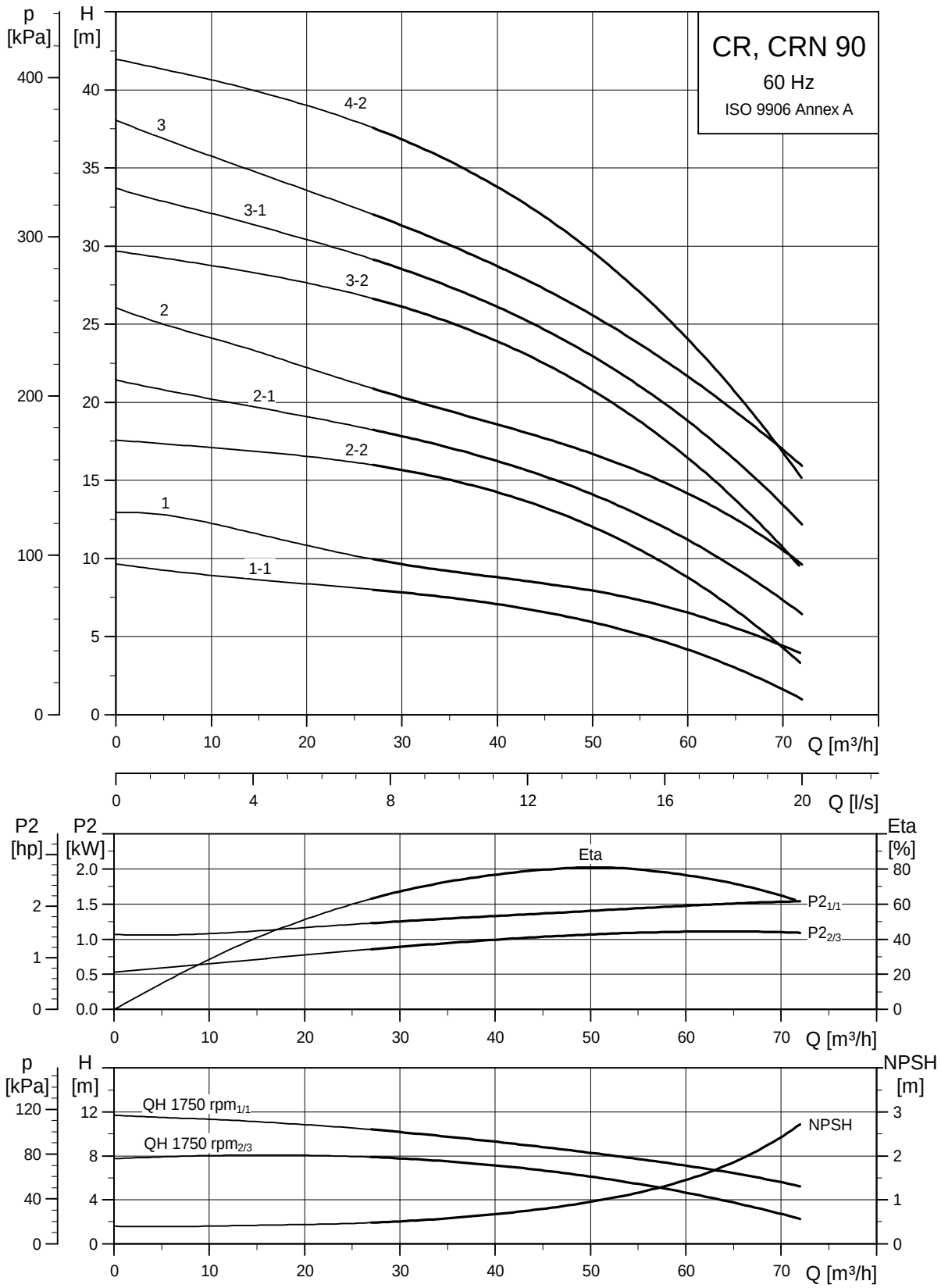
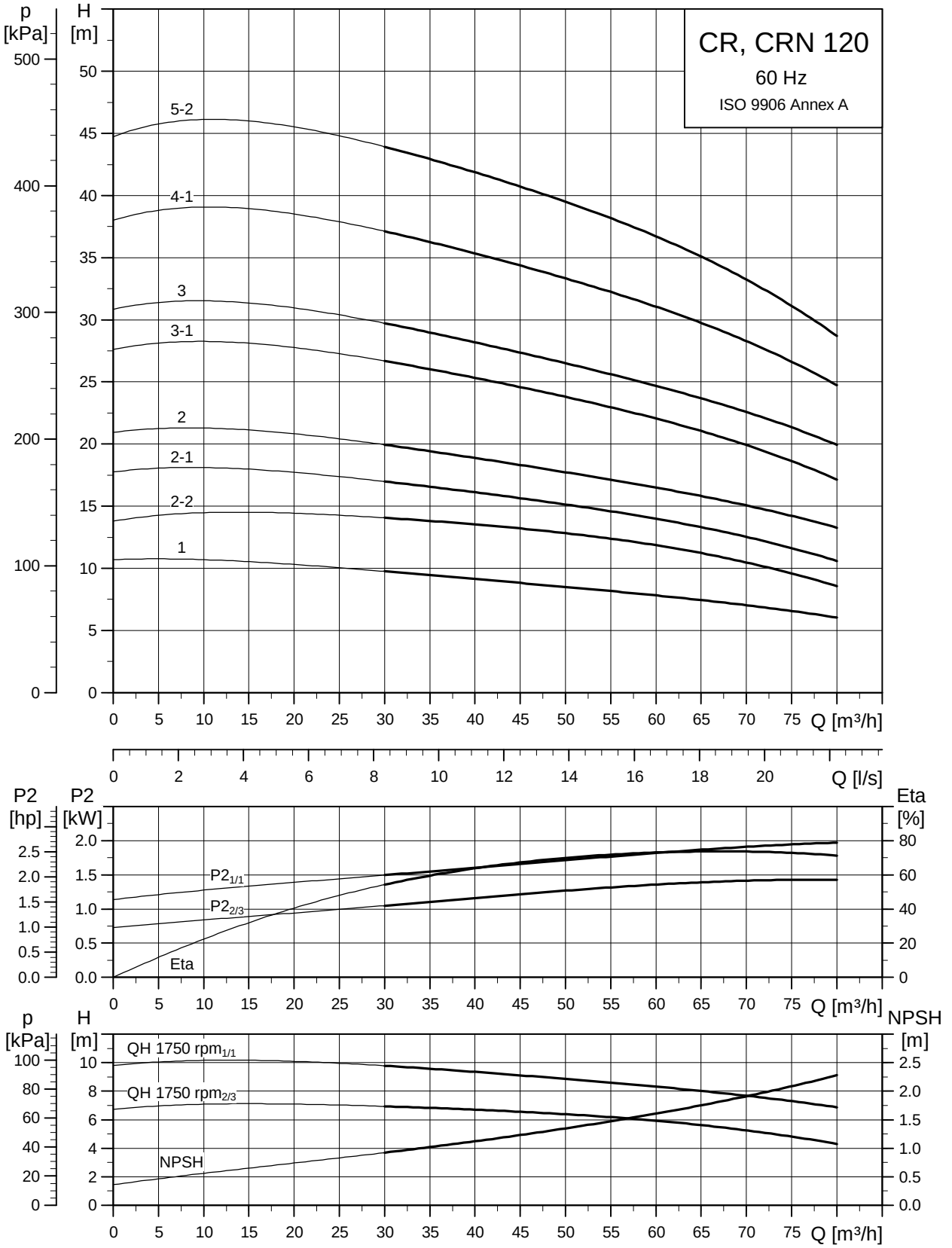


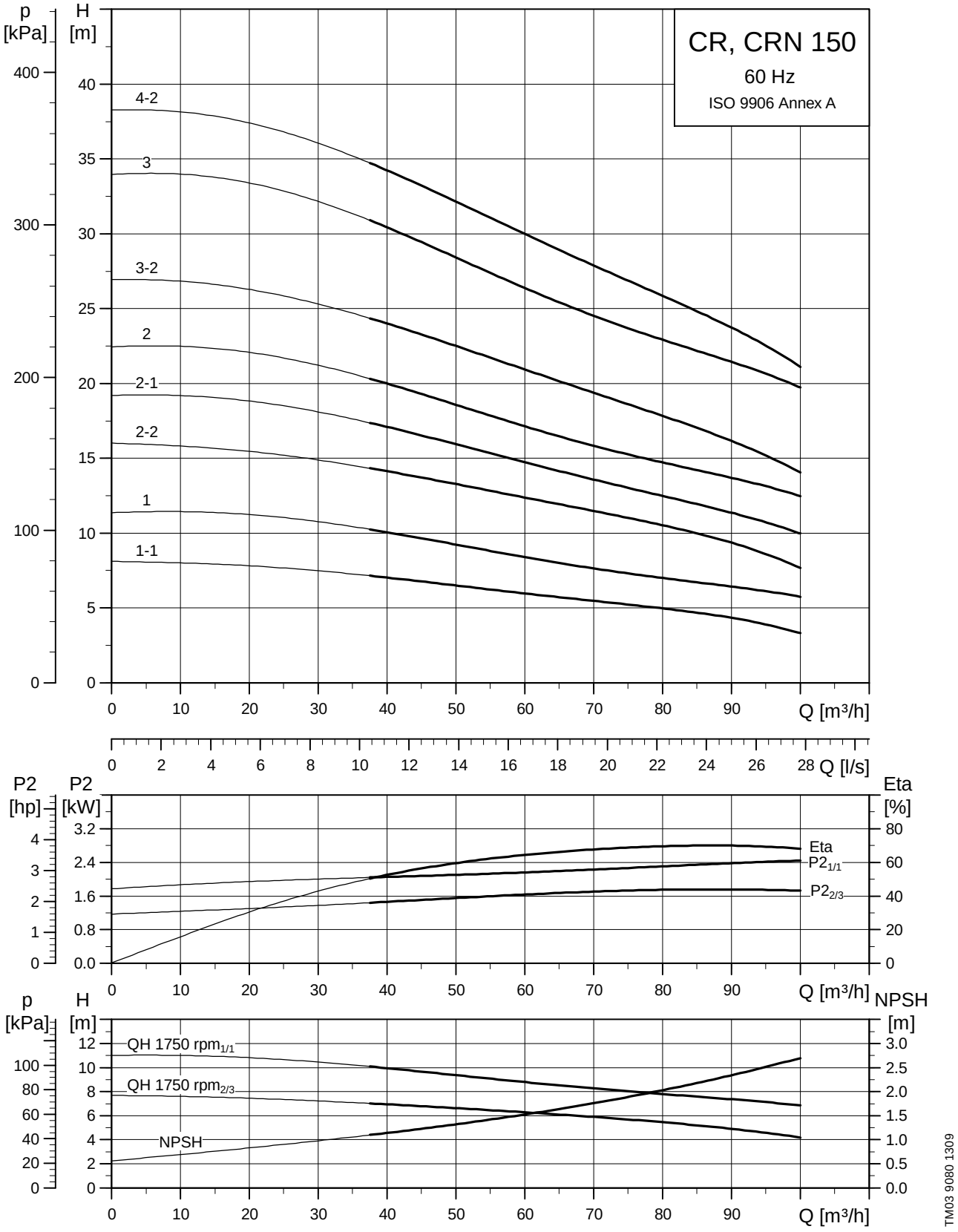
For information about dimensions of the individual pumps, see page 137.



For information about dimensions of the individual pumps, see page 138.



For information about dimensions of the individual pumps, see page 138.

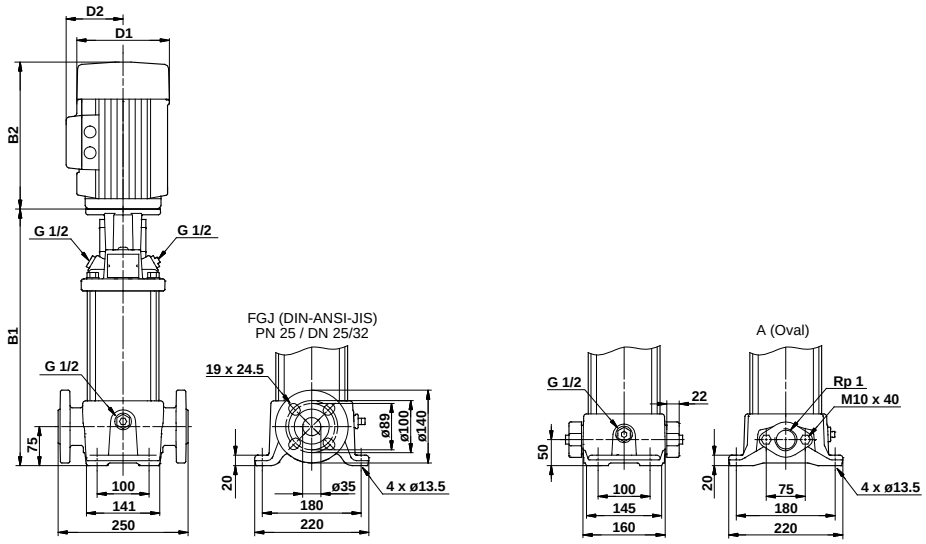


For information about dimensions of the individual pumps, see page 138.

CR low-NPSH pumps

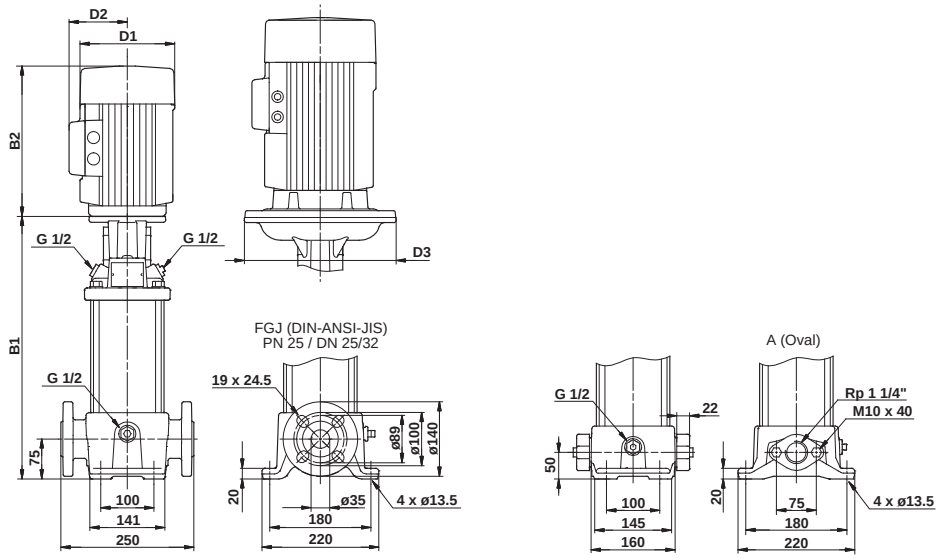
Dimensional drawings

CR 1
CR 3



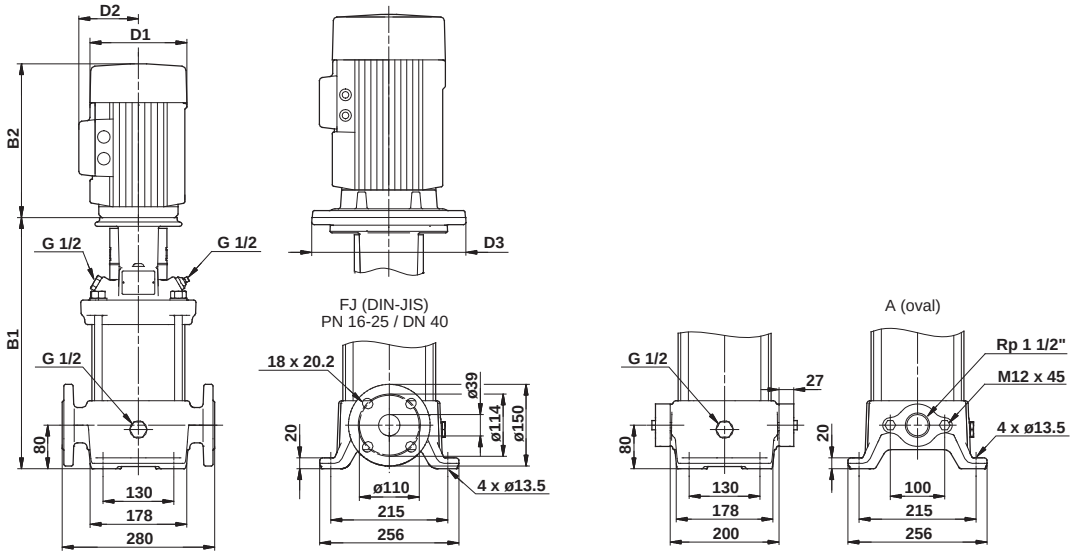
TM03 1721 2805

CR 5



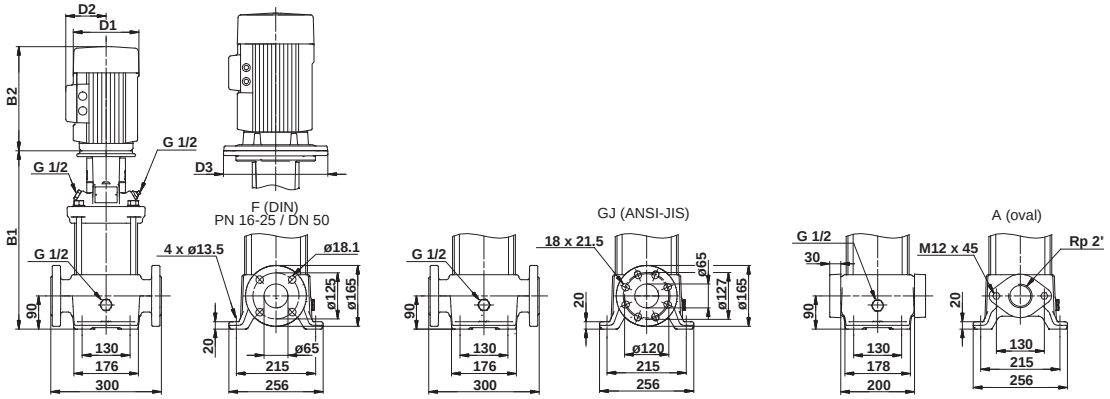
TM03 1723 2805

CR 10



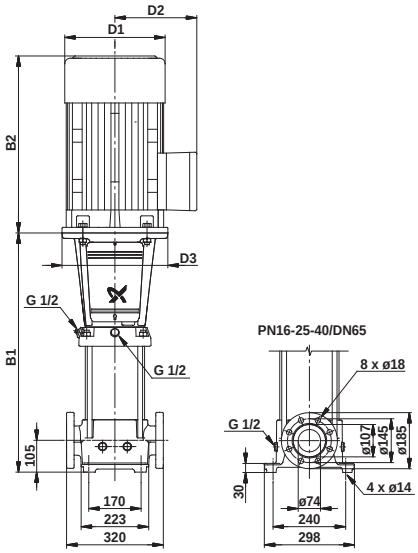
TM03 1725 2805

CR 15
CR 20



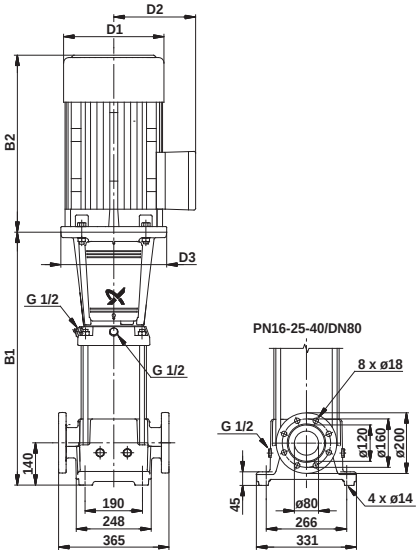
TM03 1727 2805

CR 32



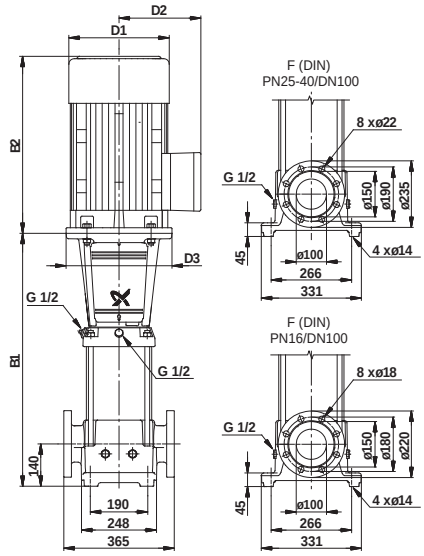
TM01 1749 5197

CR 45



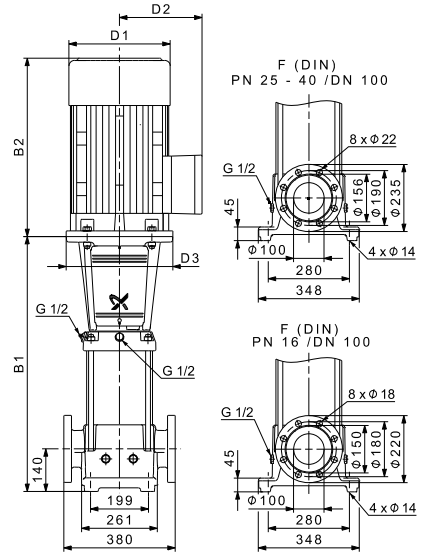
TM01 1751 5197

CR 64



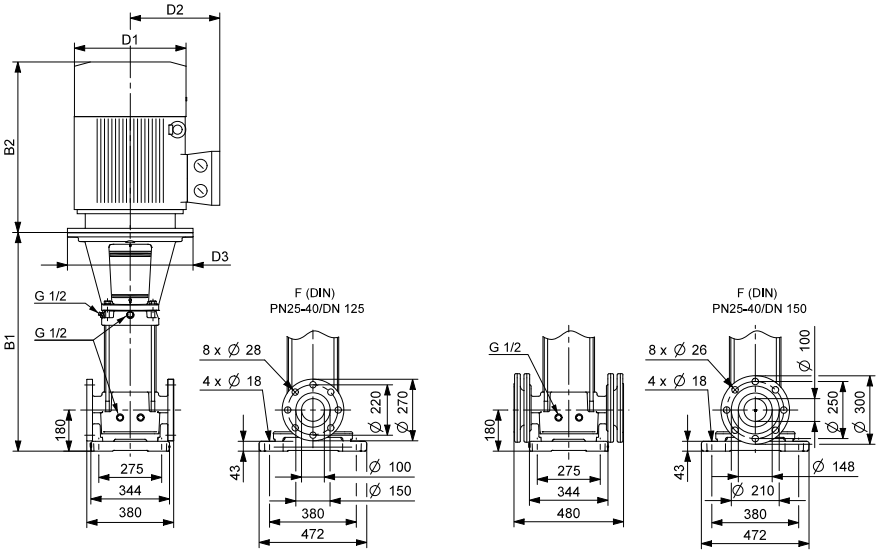
TM01 1753 5197

CR 90



TM01 1755 2203

CR 120
CR 150



TM03 5999 4106

CR low-NPSH pump

Dimensions and weights

CR 3 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 3-3	0.37	279	470	254	445	141	109	-	23	18
CR 3-4	0.37	297	488	272	463	141	109	-	23	19
CR 3-5	0.55	315	506	290	481	141	109	-	24.5	19.5
CR 3-6	0.55	333	524	308	499	141	109	-	25	20
CR 3-7	0.55	351	542	326	517	141	109	-	25	21
CR 3-8	0.75	375	606	350	581	141	109	-	27	23
CR 3-9	0.75	393	624	368	599	141	109	-	28	23
CR 3-10	0.75	411	642	386	617	141	109	-	28	24
CR 3-11	1.1	429	680	404	635	141	109	-	31	26
CR 3-12	1.1	447	698	422	653	141	109	-	31	26
CR 3-13	1.1	465	716	440	671	141	109	-	31	27
CR 3-15	1.1	501	752	476	707	141	109	-	32	28
CR 3-17	1.5	553	834	528	809	178	110	-	40	36
CR 3-19	1.5	589	870	564	845	178	110	-	41	37
CR 3-21	2.2	625	946	600	921	178	110	-	42	38
CR 3-23	2.2	661	982	636	957	178	110	-	43	39
CR 3-25	2.2	697	1018	-	-	178	110	-	44	-
CR 3-27	2.2	733	1054	-	-	178	110	-	45	-
CR 3-29	2.2	769	1090	-	-	178	110	-	46	-
CR 3-31	3	809	1144	-	-	198	120	-	51	-
CR 3-33	3	845	1180	-	-	198	120	-	51	-
CR 3-36	3	899	1234	-	-	198	120	-	53	-

Note: CR 3 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 5 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 5-4	0.75	339	570	308	539	141	109	-	26.5	21.5
CR 5-5	0.75	366	597	341	572	141	109	-	27	22
CR 5-6	1.1	393	644	368	599	141	109	-	30	25
CR 5-7	1.1	420	671	395	626	141	109	-	30	26
CR 5-8	1.1	447	698	422	653	141	109	-	31	26
CR 5-9	1.5	490	771	465	746	178	110	-	38	34
CR 5-10	1.5	517	798	492	773	178	110	-	39	34
CR 5-11	2.2	544	865	519	840	178	110	-	40	36
CR 5-12	2.2	571	892	546	867	178	110	-	41	36
CR 5-13	2.2	598	919	573	894	178	110	-	41	37
CR 5-14	2.2	625	946	600	921	178	110	-	42	37
CR 5-15	2.2	652	973	627	948	178	110	-	43	38
CR 5-16	2.2	679	1000	654	975	178	110	-	43	38
CR 5-18	3	737	1072	712	1047	198	120	-	48	44
CR 5-20	3	791	1126	766	1101	198	120	-	50	45
CR 5-22	4	845	1217	820	1194	220	134	-	62	56
CR 5-24	4	899	1271	-	-	220	134	-	63	-
CR 5-26	4	953	1325	-	-	220	134	-	64	-
CR 5-29	4	1034	1406	-	-	220	134	-	66	-
CR 5-32	5.5	1145	1536	-	-	220	134	300	82	-
CR 5-36	5.5	1253	1644	-	-	220	134	300	84	-

Note: CR 5 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 10 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 10-3	1.1	407	658	407	658	141	109	-	39	37
CR 10-4	1.5	423	704	423	704	178	110	-	47	45
CR 10-5	2.2	453	774	453	734	178	110	-	49	46
CR 10-6	2.2	483	804	483	764	178	110	-	50	47
CR 10-7	3	518	853	518	853	198	120	-	55	52
CR 10-8	3	548	883	548	883	198	120	-	56	53
CR 10-9	4	578	950	578	950	220	134	-	68	65
CR 10-10	4	608	980	608	980	220	134	-	69	66
CR 10-12	4	668	1040	668	1040	220	134	-	71	69
CR 10-14	5.5	760	1151	760	1151	220	134	300	94	91
CR 10-16	5.5	820	1211	820	1211	220	134	300	96	93
CR 10-18	7.5	880	1259	-	-	220	134	300	113	-
CR 10-20	7.5	940	1319	-	-	220	134	300	115	-
CR 10-22	7.5	1000	1379	-	-	220	134	300	117	-

Note: CR 10 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 15 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 15-2	3	420	755	415	750	198	120	-	54	53
CR 15-3	4	465	837	465	837	220	134	-	66	65
CR 15-4	4	510	882	510	882	220	134	-	68	67
CR 15-5	5.5	587	978	555	946	220	134	-	75	74
CR 15-6	5.5	632	1023	632	1023	220	134	300	91	90
CR 15-7	7.5	677	1056	677	1068	220	134	300	108	107
CR 15-8	7.5	722	1101	-	-	220	134	300	109	-
CR 15-9	11	844	1315	-	-	314	204	350	128	-
CR 15-10	11	889	1360	-	-	314	204	350	132	-
CR 15-12	11	979	1450	-	-	314	204	350	136	-
CR 15-14	15	1069	1540	-	-	314	204	350	177	-
CR 15-17	15	1204	1675	-	-	314	204	350	177	-

Note: CR 15 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 20 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 20-2	3	420	755	415	736	178	110	-	50	49
CR 20-3	4	465	837	465	837	220	134	-	66	65
CR 20-4	5.5	542	933	542	933	220	134	300	88	87
CR 20-5	7.5	587	966	587	978	220	134	300	102	101
CR 20-6	7.5	632	1011	632	1023	220	134	300	105	104
CR 20-7	11	754	1225	677	1148	314	204	300	139	138
CR 20-8	11	799	1270	-	-	314	204	350	129	-
CR 20-10	11	889	1360	-	-	314	204	350	132	-
CR 20-12	15	979	1450	-	-	314	204	350	168	-
CR 20-14	15	1069	1540	-	-	314	204	350	172	-
CR 20-17	18.5	1204	1719	-	-	314	204	350	199	-

Note: CR 20 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 32 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 32-2	4	575	947	-	-	220	134	158	87	-
CR 32-3-2	5.5	645	1036	-	-	220	134	298	107	-
CR 32-3	5.5	645	1036	-	-	220	134	298	107	-
CR 32-4-2	7.5	715	1094	-	-	220	134	298	129	-
CR 32-4	7.5	715	1094	-	-	220	134	298	129	-
CR 32-5-2	11	895	1366	-	-	314	204	350	157	-
CR 32-5	11	895	1366	-	-	314	204	350	157	-
CR 32-6-2	11	965	1436	-	-	314	204	350	160	-
CR 32-6	11	965	1436	-	-	314	204	350	160	-
CR 32-7-2	15	1035	1506	-	-	314	204	350	195	-
CR 32-7	15	1035	1506	-	-	314	204	350	195	-
CR 32-8-2	15	1105	1576	-	-	314	204	350	198	-
CR 32-8	15	1105	1576	-	-	314	204	350	198	-
CR 32-9-2	18.5	1175	1690	-	-	314	204	350	223	-
CR 32-9	18.5	1175	1690	-	-	314	204	350	223	-
CR 32-10-2	18.5	1245	1760	-	-	314	204	350	226	-
CR 32-10	18.5	1245	1760	-	-	314	204	350	226	-
CR 32-11-2	22	1315	1856	-	-	314	204	350	247	-
CR 32-11	22	1315	1856	-	-	314	204	350	247	-
CR 32-12-2	22	1385	1926	-	-	314	204	350	251	-
CR 32-12	22	1385	1926	-	-	314	204	350	251	-
CR 32-13-2	30	1455	2066	-	-	415	300	400	322	-
CR 32-13	30	1455	2066	-	-	415	300	400	322	-
CR 32-14-2	30	1525	2136	-	-	415	300	400	325	-
CR 32-14	30	1525	2136	-	-	415	300	400	325	-

Note: CR 32 low-NPSH pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 45 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 45-2	7.5	639	1018	-	-	220	134	298	122	-
CR 45-3-2	11	829	1300	-	-	314	204	350	151	-
CR 45-3	11	829	1300	-	-	314	204	350	151	-
CR 45-4-2	15	909	1380	-	-	314	204	350	189	-
CR 45-4	15	909	1380	-	-	314	204	350	189	-
CR 45-5-2	18.5	989	1504	-	-	314	204	350	216	-
CR 45-5	18.5	989	1504	-	-	314	204	350	216	-
CR 45-6-2	22	1069	1610	-	-	314	204	350	237	-
CR 45-6	22	1069	1610	-	-	314	204	350	237	-
CR 45-7-2	30	1149	1760	-	-	415	300	400	321	-
CR 45-7	30	1149	1760	-	-	415	300	400	321	-
CR 45-8-2	30	1229	1840	-	-	415	300	400	336	-
CR 45-8	30	1229	1840	-	-	415	300	400	336	-
CR 45-9-2	30	1309	1920	-	-	415	300	400	341	-
CR 45-9	37	1309	1945	-	-	415	300	400	361	-
CR 45-10-2	37	1389	2025	-	-	415	300	400	366	-
CR 45-10	37	1389	2025	-	-	415	300	400	366	-
CR 45-11-2	45	1469	2177	-	-	442	325	450	478	-
CR 45-11	45	1469	2177	-	-	442	325	450	478	-
CR 45-12-2	45	1549	2257	-	-	442	325	450	483	-
CR 45-12	45	1549	2257	-	-	442	325	450	483	-
CR 45-13-2	45	1629	2337	-	-	442	325	450	488	-

Note: CR 45 low-NPSH pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 64 low-NPSH pumps, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 64-2-1	11	754	1225	-	-	314	204	350	151	-
CR 64-2	11	754	1225	-	-	314	204	350	151	-
CR 64-3-2	15	836	1307	-	-	314	204	350	194	-
CR 64-3-1	15	836	1307	-	-	314	204	350	194	-
CR 64-3	18.5	836	1351	-	-	314	204	350	216	-
CR 64-4-2	18.5	919	1434	-	-	314	204	350	226	-
CR 64-4-1	22	919	1460	-	-	314	204	350	242	-
CR 64-4	22	919	1460	-	-	314	204	350	242	-
CR 64-5-2	30	1001	1612	-	-	415	300	400	316	-
CR 64-5-1	30	1001	1612	-	-	415	300	400	316	-
CR 64-5	30	1001	1612	-	-	415	300	400	316	-
CR 64-6-2	30	1084	1695	-	-	415	300	400	336	-
CR 64-6-1	37	1084	1720	-	-	415	300	400	356	-
CR 64-6	37	1084	1720	-	-	415	300	400	356	-
CR 64-7-2	37	1166	1802	-	-	415	300	400	376	-
CR 64-7-1	37	1166	1802	-	-	415	300	400	376	-
CR 64-7	45	1166	1874	-	-	442	325	450	440	-
CR 64-8-2	45	1249	1957	-	-	442	325	450	473	-
CR 64-8-1	45	1249	1957	-	-	442	325	450	473	-

Note: CR 64 low-NPSH pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 3 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 3-3	0.55	279	470	254	445	141	109	-	24	19
CR 3-4	0.55	297	488	272	463	141	109	-	24	19
CR 3-5	0.75	321	552	296	527	141	109	-	26	22
CR 3-6	1.1	339	590	314	545	141	109	-	29	24
CR 3-7	1.1	357	608	332	563	141	109	-	29	24
CR 3-8	1.1	375	626	350	581	141	109	-	29	25
CR 3-9	1.5	409	690	384	665	178	110	-	37	32
CR 3-10	1.5	427	708	402	683	178	110	-	37	33
CR 3-11	1.5	445	726	420	701	178	110	-	38	33
CR 3-12	2.2	463	784	438	759	178	110	-	39	34
CR 3-13	2.2	481	802	456	777	178	110	-	39	34
CR 3-15	2.2	517	838	492	813	178	110	-	40	35
CR 3-17	2.2	553	874	528	849	178	110	-	41	36
CR 3-19	3	593	928	-	-	198	120	-	46	-
CR 3-21	3	629	964	-	-	198	120	-	47	-
CR 3-23	3	665	1000	-	-	198	120	-	47	-
CR 3-25	4	701	1073	-	-	220	134	-	59	-

Note: CR 3 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 5 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 5-4	1.1	339	590	314	545	141	109	-	28	24
CR 5-5	1.5	382	663	357	638	178	110	-	36	32
CR 5-6	2.2	409	730	384	705	178	110	-	37	33
CR 5-7	2.2	436	757	411	732	178	110	-	38	33
CR 5-8	2.2	463	784	438	759	178	110	-	38	34
CR 5-9	2.2	490	811	465	786	178	110	-	39	34
CR 5-10	3	521	856	496	831	198	120	-	44	39
CR 5-11	3	548	883	523	858	198	120	-	44	40
CR 5-12	3	575	910	550	885	198	120	-	45	40
CR 5-13	4	602	974	577	949	220	134	-	56	52
CR 5-14	4	629	1001	604	976	220	134	-	57	53
CR 5-15	4	656	1028	631	1003	220	134	-	58	53
CR 5-16	4	683	1055	658	1030	220	134	-	58	54
CR 5-18	5.5	767	1158	-	-	220	134	300	74	-
CR 5-20	5.5	821	1212	-	-	220	134	300	75	-
CR 5-22	5.5	875	1266	-	-	220	134	300	76	-
CR 5-24	7.5	929	1308	-	-	220	134	300	79	-

Note: CR 5 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 10 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 10-3	2.2	423	744	423	744	198	120	-	47	44
CR 10-4	3	428	763	428	763	198	120	-	52	49
CR 10-5	4	458	830	458	830	220	134	-	64	61
CR 10-6	4	488	860	488	860	220	134	-	65	62
CR 10-7	5.5	550	941	550	941	220	134	300	87	84
CR 10-8	5.5	580	971	580	971	220	134	300	88	85
CR 10-9	5.5	610	1001	610	1001	220	134	300	89	86
CR 10-10	7.5	640	1019	640	1019	220	134	300	104	101
CR 10-12	7.5	700	1079	-	-	220	134	300	106	-
CR 10-14	11	837	1308	-	-	314	204	350	129	-
CR 10-16	11	897	1368	-	-	314	204	350	131	-
CR 10-17	11	957	1428	-	-	314	204	350	133	-

Note: CR 10 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 15 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 15-2	5.5	452	843	420	811	220	134	-	71	70
CR 15-3	5.5	497	888	465	856	220	134	-	72	71
CR 15-4	7.5	542	921	542	921	220	134	300	103	102
CR 15-5	11	664	1135	587	1058	314	204	300	136	135
CR 15-6	11	709	1180	-	-	314	204	350	126	-
CR 15-7	15	754	1225	-	-	314	204	350	152	-
CR 15-8	15	799	1270	-	-	314	204	350	154	-
CR 15-9	15	844	1315	-	-	314	204	350	163	-
CR 15-10	18.5	889	1404	-	-	314	204	350	175	-
CR 15-12	18.5	979	1494	-	-	314	204	350	190	-

Note: CR 15 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 20 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 20-2	5.5	452	843	420	811	220	134	-	71	70
CR 20-3	7.5	497	876	497	876	220	134	300	102	101
CR 20-4	11	619	1090	542	1013	314	204	350	134	133
CR 20-5	11	664	1135	664	1135	314	204	350	124	123
CR 20-6	15	709	1180	-	-	314	204	350	151	-
CR 20-7	15	754	1225	-	-	314	204	350	159	-
CR 20-8	18.5	799	1314	-	-	314	204	350	171	-

Note: CR 20 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 32 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 32-2-1	5.5	575	966	-	-	220	148	298	98	-
CR 32-2	7.5	575	954	-	-	220	134	298	112	-
CR 32-3-2	11	755	1226	-	-	314	204	350	146	-
CR 32-3	11	755	1226	-	-	314	204	350	146	-
CR 32-4-2	11	825	1296	-	-	314	204	350	154	-
CR 32-4	15	825	1296	-	-	314	204	350	186	-
CR 32-5-2	15	895	1366	-	-	314	204	350	189	-
CR 32-5	18.5	895	1410	-	-	314	204	350	211	-
CR 32-6-2	18.5	965	1480	-	-	314	204	350	214	-
CR 32-6	18.5	965	1480	-	-	314	204	350	214	-
CR 32-7-2	22	1035	1576	-	-	314	204	350	233	-
CR 32-7	22	1035	1576	-	-	314	204	350	233	-
CR 32-8-2	30	1105	1716	-	-	415	300	400	305	-
CR 32-8	30	1105	1716	-	-	415	300	400	305	-
CR 32-9-2	30	1175	1786	-	-	415	300	400	308	-
CR 32-9	30	1175	1786	-	-	415	300	400	308	-
CR 32-10-2	30	1245	1856	-	-	415	300	400	311	-

Note: CR 32 low-NPSH pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 45 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 45-2-1	11	749	1220	-	-	314	204	350	147	-
CR 45-2	15	749	1220	-	-	314	204	350	179	-
CR 45-3-2	18.5	829	1344	-	-	314	204	350	205	-
CR 45-3-1	18.5	829	1344	-	-	314	204	350	205	-
CR 45-3	18.5	829	1344	-	-	314	204	350	205	-
CR 45-4-2	22	909	1450	-	-	314	204	350	227	-
CR 45-4-1	30	909	1520	-	-	415	300	400	296	-
CR 45-4	30	909	1520	-	-	415	300	400	296	-
CR 45-5-2	30	989	1600	-	-	415	300	400	301	-
CR 45-5-1	30	989	1600	-	-	415	300	400	301	-
CR 45-5	30	989	1600	-	-	415	300	400	301	-
CR 45-6-2	37	1069	1705	-	-	415	300	400	326	-
CR 45-6-1	37	1069	1705	-	-	415	300	400	326	-
CR 45-6	37	1069	1705	-	-	415	300	400	326	-
CR 45-7-2	45	1149	1857	-	-	442	325	450	405	-
CR 45-7-1	45	1149	1857	-	-	442	325	450	405	-
CR 45-7	45	1149	1857	-	-	442	325	450	405	-

Note: CR 45 low-NPSH pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 64 low-NPSH pumps, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 64-2-1	18.5	754	1269	-	-	314	204	350	205	-
CR 64-2	22	754	1295	-	-	314	204	350	221	-
CR 64-3-2	22	836	1377	-	-	314	204	350	232	-
CR 64-3-1	30	836	1447	-	-	415	300	400	301	-
CR 64-3	30	836	1447	-	-	415	300	400	301	-
CR 64-4-2	37	919	1555	-	-	415	300	400	331	-
CR 64-4-1	37	919	1555	-	-	415	300	400	331	-
CR 64-4	45	919	1627	-	-	442	325	450	395	-
CR 64-5-2	45	1001	1709	-	-	442	325	450	400	-

Note: CR 64 low-NPSH pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR pumps with 4-pole motor

Dimensions and weights

CR 1 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 1-2	0.25	279	470	254	445	141	109	160	22	17
CR 1-3	0.25	279	470	254	445	141	109	160	22	17
CR 1-4	0.25	297	488	272	463	141	109	160	22	18
CR 1-5	0.25	315	506	290	481	141	109	160	23	18
CR 1-6	0.25	333	524	308	499	141	109	160	23	19
CR 1-7	0.25	351	542	326	517	141	109	160	24	19
CR 1-8	0.25	369	560	344	535	141	109	160	25	20
CR 1-9	0.25	387	578	362	553	141	109	160	25	20
CR 1-10	0.25	405	596	380	571	141	109	160	25	21
CR 1-11	0.25	423	614	398	589	141	109	160	26	21
CR 1-12	0.25	447	638	422	613	141	109	160	28	23
CR 1-13	0.25	465	656	440	631	141	109	160	28	24
CR 1-15	0.25	501	692	476	667	141	109	160	29	25
CR 1-17	0.25	537	728	512	703	141	109	160	32	28
CR 1-19	0.25	573	764	548	739	141	109	160	33	28
CR 1-21	0.25	609	800	584	775	141	109	160	34	29
CR 1-23	0.25	645	836	620	811	141	109	160	35	30
CR 1-25	0.25	697	888	-	-	141	109	160	43	-
CR 1-27	0.25	733	924	-	-	141	109	160	43	-
CR 1-30	0.25	787	978	-	-	141	109	160	45	-
CR 1-33	0.25	841	1032	-	-	141	109	160	46	-
CR 1-36	0.25	895	1086	-	-	141	109	160	48	-

Note: 4-pole CR 1 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 3 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 3-2	0.25	279	470	254	445	141	109	160	22	17
CR 3-3	0.25	279	470	254	445	141	109	160	22	17
CR 3-4	0.25	297	488	272	463	141	109	160	22	18
CR 3-5	0.25	315	506	290	481	141	109	160	23	18
CR 3-6	0.25	333	524	308	499	141	109	160	24	19
CR 3-7	0.25	351	542	326	517	141	109	160	24	20
CR 3-8	0.25	375	566	350	541	141	109	160	26	22
CR 3-9	0.25	393	584	368	559	141	109	160	27	22
CR 3-10	0.25	411	602	386	577	141	109	160	27	23
CR 3-11	0.25	429	620	404	595	141	109	160	30	25
CR 3-12	0.25	447	638	422	613	141	109	160	30	25
CR 3-13	0.25	465	656	440	631	141	109	160	30	26
CR 3-15	0.25	501	692	476	667	141	109	160	31	27
CR 3-17	0.25	553	744	528	719	141	109	160	39	35
CR 3-19	0.25	589	780	564	755	141	109	160	40	36
CR 3-21	0.25	625	816	600	791	141	109	160	41	37
CR 3-23	0.25	661	852	636	827	141	109	160	42	38
CR 3-25	0.25	697	888	-	-	141	109	160	43	-
CR 3-27	0.25	733	924	-	-	141	109	160	44	-
CR 3-29	0.37	769	960	-	-	141	109	160	46	-
CR 3-31	0.37	809	1000	-	-	141	109	160	51	-
CR 3-33	0.37	845	1036	-	-	141	109	160	51	-
CR 3-36	0.37	899	1090	-	-	141	109	160	53	-

Note: 4-pole CR 3 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 5 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 5-2	0.25	279	470	254	445	141	109	160	22	17
CR 5-3	0.25	306	497	281	472	141	109	160	23	19
CR 5-4	0.25	333	524	308	499	141	109	160	24	19
CR 5-5	0.25	366	557	341	532	141	109	160	26	21
CR 5-6	0.25	393	584	368	559	141	109	160	29	24
CR 5-7	0.25	420	611	395	586	141	109	160	29	25
CR 5-8	0.25	447	638	422	613	141	109	160	30	25
CR 5-9	0.25	490	681	465	656	141	109	160	37	33
CR 5-10	0.25	517	708	492	683	141	109	160	38	33
CR 5-11	0.25	544	735	519	710	141	109	160	39	35
CR 5-12	0.25	571	762	546	737	141	109	160	40	35
CR 5-13	0.25	598	789	573	764	141	109	160	40	36
CR 5-14	0.25	625	816	600	791	141	109	160	41	36
CR 5-15	0.25	652	843	627	818	141	109	160	42	37
CR 5-16	0.37	679	870	654	845	141	109	160	43	38
CR 5-18	0.37	737	928	712	903	141	109	160	48	44
CR 5-20	0.37	791	982	766	957	141	109	160	50	45
CR 5-22	0.37	845	1036	820	1011	141	109	160	62	56
CR 5-24	0.55	899	1130	-	-	141	109	200	62	-
CR 5-26	0.55	953	1184	-	-	141	109	200	63	-
CR 5-29	0.55	1034	1265	-	-	141	109	200	65	-
CR 5-32	0.55	1145	1376	-	-	141	109	200	81	-
CR 5-36	0.75	1253	1534	-	-	178	109	200	83	-

Note: 4-pole CR 5 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 10 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 10-1	0.25	343	534	343	534	141	109	160	33	30
CR 10-2	0.25	347	538	347	538	141	109	160	35	33
CR 10-3	0.25	377	568	377	568	141	109	160	38	36
CR 10-4	0.25	423	614	423	614	141	109	160	46	44
CR 10-5	0.25	453	644	453	644	141	109	160	48	45
CR 10-6	0.25	483	674	483	674	141	109	160	49	46
CR 10-7	0.37	518	709	518	709	141	109	160	55	52
CR 10-8	0.37	548	739	548	739	141	109	160	56	53
CR 10-9	0.37	578	769	578	769	141	109	160	57	54
CR 10-10	0.55	608	839	608	839	141	109	200	68	65
CR 10-12	0.6	668	899	668	899	141	109	200	70	68
CR 10-14	0.75	760	1041	760	1041	178	109	200	93	90
CR 10-16	0.75	820	1101	820	1101	178	109	200	95	92
CR 10-18	0.75	880	1161	-	-	178	109	200	100	-
CR 10-20	1.1	940	1261	-	-	178	110	200	98	-
CR 10-22	1.1	1000	1321	-	-	178	110	200	100	-

Note: 4-pole CR 10 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 15 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 15-1	0.25	400	591	400	591	141	109	160	41	40
CR 15-2	0.25	415	606	415	606	141	109	160	49	48
CR 15-3	0.37	465	656	465	656	141	109	160	55	54
CR 15-4	0.55	510	741	510	741	141	109	200	67	66
CR 15-5	0.55	555	786	555	786	141	109	200	68	67
CR 15-6	0.75	632	913	632	913	178	109	200	90	89
CR 15-7	0.75	677	958	677	958	178	109	200	92	91
CR 15-8	1.1	722	1043	-	-	178	110	200	92	-
CR 15-9	1.1	767	1088	-	-	178	110	200	93	-
CR 15-10	1.1	889	1210	-	-	178	110	200	125	-
CR 15-12	1.5	979	1260	-	-	178	110	200	134	-
CR 15-14	1.5	1069	1350	-	-	178	110	200	138	-
CR 15-17	2.2	1204	1525	-	-	198	120	250	157	-

Note: 4-pole CR 15 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 20 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 20-1	0.25	400	591	400	591	141	109	160	41	40
CR 20-2	0.37	415	606	415	606	141	109	160	50	49
CR 20-3	0.55	465	696	465	696	141	109	200	65	64
CR 20-4	0.6	542	773	542	773	141	109	200	87	86
CR 20-5	0.75	587	868	587	868	178	109	200	89	88
CR 20-6	1.1	632	953	632	953	178	110	200	88	-
CR 20-7	1.1	677	998	677	998	178	110	200	90	-
CR 20-8	1.1	799	1120	-	-	178	110	200	122	-
CR 20-10	1.5	889	1170	-	-	178	110	200	130	-
CR 20-12	2.2	979	1300	-	-	198	120	250	148	-
CR 20-14	2.2	1069	1390	-	-	198	120	250	152	-
CR 20-17	2.2	1204	1525	-	-	198	120	250	187	-

Note: 4-pole CR 20 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 32 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 32-1-1	1.5	505	786	-	-	178	110	200	61	-
CR 32-1	1.5	505	786	-	-	178	110	200	62	-
CR 32-2-2	1.5	575	856	-	-	178	110	200	76	-
CR 32-2	1.5	575	856	-	-	178	110	200	87	-
CR 32-3-2	1.5	645	926	-	-	178	110	200	107	-
CR 32-3	1.5	645	926	-	-	178	110	200	107	-
CR 32-4-2	1.5	715	996	-	-	178	110	200	117	-
CR 32-4	1.5	715	996	-	-	178	110	200	117	-
CR 32-5-2	1.5	895	1176	-	-	178	110	200	155	-
CR 32-5	1.5	895	1176	-	-	178	110	200	155	-
CR 32-6-2	1.5	965	1246	-	-	178	110	200	158	-
CR 32-6	1.5	965	1246	-	-	178	110	200	158	-
CR 32-7-2	1.5	1035	1316	-	-	178	110	200	175	-
CR 32-7	1.5	1035	1316	-	-	178	110	200	175	-
CR 32-8-2	2.2	1105	1426	-	-	198	120	250	178	-
CR 32-8	2.2	1105	1426	-	-	198	120	250	178	-
CR 32-9-2	2.2	1175	1496	-	-	198	120	250	211	-
CR 32-9	2.2	1175	1496	-	-	198	120	250	211	-
CR 32-10-2	2.2	1245	1566	-	-	198	120	250	214	-
CR 32-10	2.2	1245	1566	-	-	198	120	250	214	-
CR 32-11-2	2.2	1315	1636	-	-	198	120	250	250	-
CR 32-11	3	1315	1650	-	-	198	120	250	249	-
CR 32-12-2	3	1385	1720	-	-	198	120	250	253	-
CR 32-12	3	1385	1720	-	-	198	120	250	253	-
CR 32-13-2	3	1455	1790	-	-	198	120	250	321	-
CR 32-13	3	1455	1790	-	-	198	120	250	321	-
CR 32-14-2	3	1525	1860	-	-	198	120	250	324	-
CR 32-14	3	1525	1860	-	-	198	120	250	324	-

Note: 4-pole CR 32 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 45 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 45-1-1	1.5	559	840	-	-	178	110	200	80	-
CR 45-1	1.5	559	840	-	-	178	110	200	91	-
CR 45-2-2	1.5	639	920	-	-	178	110	200	108	-
CR 45-2	1.5	639	920	-	-	178	110	200	110	-
CR 45-3-2	1.5	829	1110	-	-	178	110	200	149	-
CR 45-3	1.5	829	1110	-	-	178	110	200	149	-
CR 45-4-2	1.5	909	1190	-	-	178	110	200	169	-
CR 45-4	2.2	909	1230	-	-	198	120	250	169	-
CR 45-5-2	2.2	989	1310	-	-	198	120	250	204	-
CR 45-5	2.2	989	1310	-	-	198	120	250	204	-
CR 45-6-2	3	1069	1404	-	-	198	120	250	239	-
CR 45-6	3	1069	1404	-	-	198	120	250	239	-
CR 45-7-2	3	1149	1484	-	-	198	120	250	320	-
CR 45-7	3	1149	1484	-	-	198	120	250	320	-
CR 45-8-2	4	1229	1601	-	-	220	134	250	336	-
CR 45-8	4	1229	1601	-	-	220	134	250	336	-
CR 45-9-2	4	1309	1681	-	-	220	134	250	341	-
CR 45-9	4	1309	1681	-	-	220	134	250	361	-
CR 45-10-2	4	1389	1761	-	-	220	134	250	366	-
CR 45-10	4	1389	1761	-	-	220	134	250	366	-
CR 45-11-2	5.5	1469	1860	-	-	260	159	300	487	-
CR 45-11	5.5	1469	1860	-	-	260	159	300	487	-
CR 45-12-2	5.5	1549	1940	-	-	260	159	300	492	-
CR 45-12	5.5	1549	1940	-	-	260	159	300	492	-
CR 45-13-2	5.5	1629	2020	-	-	260	159	300	497	-

Note: 4-pole CR 45 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 64 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 64-1-1	1.5	561	842	-	-	178	110	200	91	-
CR 64-1	1.5	561	842	-	-	178	110	200	102	-
CR 64-2-2	1.5	644	925	-	-	178	110	200	114	-
CR 64-2-1	1.5	754	1035	-	-	178	110	200	149	-
CR 64-2	1.5	754	1035	-	-	178	110	200	149	-
CR 64-3-2	2.2	836	1157	-	-	198	120	250	174	-
CR 64-3-1	2.2	836	1157	-	-	198	120	250	174	-
CR 64-3	2.2	836	1157	-	-	198	120	250	204	-
CR 64-4-2	3	919	1254	-	-	198	120	250	213	-
CR 64-4-1	3	919	1254	-	-	198	120	250	244	-
CR 64-4	3	919	1254	-	-	198	120	250	244	-
CR 64-5-2	3	1001	1336	-	-	198	120	250	315	-
CR 64-5-1	4	1001	1373	-	-	220	134	250	316	-
CR 64-5	4	1001	1373	-	-	220	134	250	316	-
CR 64-6-2	4	1084	1456	-	-	220	134	250	336	-
CR 64-6-1	4	1084	1456	-	-	220	134	250	356	-
CR 64-6	4	1084	1456	-	-	220	134	250	356	-
CR 64-7-2	5.5	1166	1557	-	-	260	159	300	385	-
CR 64-7-1	5.5	1166	1557	-	-	260	159	300	385	-
CR 64-7	5.5	1166	1557	-	-	260	159	300	449	-
CR 64-8-2	5.5	1249	1640	-	-	260	159	300	482	-

Note: 4-pole CR 90 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 90 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 90-1-1	1.5	571	852	-	-	178	110	200	80.4	-
CR 90-1	1.5	571	852	-	-	178	110	200	80.4	-
CR 90-2-2	1.5	773	1054	-	-	178	110	200	85.3	-
CR 90-2	2.2	773	1094	-	-	198	120	250	85.6	-
CR 90-3-2	2.2	865	1186	-	-	198	120	250	90.7	-
CR 90-3	3	865	1200	-	-	198	120	250	94.7	-
CR 90-4-2	4	957	1329	-	-	220	134	250	110.7	-
CR 90-4	4	957	1329	-	-	220	134	250	110.7	-
CR 90-5-2	4	1049	1421	-	-	220	134	250	117.2	-
CR 90-5	5.5	1049	1440	-	-	260	159	300	128.4	-
CR 90-6-2	5.5	1141	1532	-	-	260	159	300	134.1	-
CR 90-6	5.5	1141	1532	-	-	260	159	300	133.4	-

Note: 4-pole CR 90 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 120 with 4-pole motor, 50 HZ

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 120-1	1.5	834	1115	-	-	178	110	200	113	-
CR 120-2-1	2.2	990	1311	-	-	198	120	250	131	-
CR 120-2	3	990	1325	-	-	198	120	250	133	-
CR 120-3	4	1145	1517	-	-	220	134	250	148	-
CR 120-4-1	5.5	1301	1692	-	-	260	159	300	185	-
CR 120-5-1	5.5	1456	1847	-	-	260	159	300	194	-
CR 120-6-1	7.5	1642	2071	-	-	260	159	300	220	-
CR 120-7	11	1797	2342	-	-	314	204	350	267	-

Note: 4-pole CR 120 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 150 with 4-pole motor, 50 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 150-1-1	1.5	834	1115	-	-	178	110	200	113	-
CR 150-1	2.2	834	1155	-	-	198	120	250	122	-
CR 150-2-1	3	990	1325	-	-	198	120	250	133	-
CR 150-3-2	4	1145	1517	-	-	220	134	250	148	-
CR 150-3	5.5	1145	1536	-	-	260	159	300	175	-
CR 150-4-1	5.5	1301	1692	-	-	260	159	300	184	-
CR 150-5-2	7.5	1486	1915	-	-	260	159	300	210	-
CR 150-6	11	1642	2187	-	-	314	204	350	258	-

Note: 4-pole CR 150 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 1 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 1-2	0.25	279	470	254	445	141	109	105	22	17
CR 1-3	0.25	279	470	254	445	141	109	105	22	17
CR 1-4	0.25	297	488	272	463	141	109	105	22	18
CR 1-5	0.25	315	506	290	481	141	109	105	23	19
CR 1-6	0.25	333	524	308	499	141	109	105	24	19
CR 1-7	0.25	357	548	332	523	141	109	105	26	21
CR 1-8	0.25	375	566	350	541	141	109	105	26	22
CR 1-9	0.25	393	584	368	559	141	109	105	27	22
CR 1-10	0.25	411	602	386	577	141	109	105	29	25
CR 1-11	0.25	429	620	404	595	141	109	105	30	25
CR 1-12	0.25	447	638	422	613	141	109	105	30	25
CR 1-13	0.25	465	656	440	631	141	109	105	30	26
CR 1-15	0.25	517	708	492	683	141	109	105	38	34
CR 1-17	0.25	553	744	528	719	141	109	105	39	35
CR 1-19	0.25	589	780	-	-	141	109	105	41	-
CR 1-21	0.25	625	816	-	-	141	109	105	41	-
CR 1-23	0.25	661	852	-	-	141	109	105	42	-
CR 1-25	0.25	697	888	-	-	141	109	105	43	-
CR 1-27	0.37	737	928	-	-	141	109	105	49	-

Note: 4-pole CR 1 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 3 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 3-2	0.25	279	470	254	445	141	109	105	22	17
CR 3-3	0.25	279	470	254	445	141	109	105	23	18
CR 3-4	0.25	297	488	272	463	141	109	105	23	18
CR 3-5	0.25	321	512	296	487	141	109	105	25	21
CR 3-6	0.25	339	530	314	505	141	109	105	28	23
CR 3-7	0.25	357	548	332	523	141	109	105	28	23
CR 3-8	0.25	375	566	350	541	141	109	105	28	24
CR 3-9	0.25	409	600	384	575	141	109	105	36	31
CR 3-10	0.25	427	618	402	593	141	109	105	36	32
CR 3-11	0.25	445	636	420	611	141	109	105	37	32
CR 3-12	0.25	463	654	438	629	141	109	105	38	33
CR 3-13	0.25	481	672	456	647	141	109	105	38	33
CR 3-15	0.25	517	708	492	683	141	109	105	39	34
CR 3-17	0.37	553	744	528	719	141	109	105	41	36
CR 3-19	0.37	593	784	-	-	141	109	105	46	-
CR 3-21	0.37	629	820	-	-	141	109	105	47	-
CR 3-23	0.37	665	856	-	-	141	109	105	47	-
CR 3-25	0.55	701	932	-	-	141	109	120	58	-

Note: 4-pole CR 3 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 5 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 5-2	0.25	279	470	254	445	141	109	105	22	18
CR 5-3	0.25	312	503	287	478	141	109	105	27	22
CR 5-4	0.25	339	530	314	505	141	109	105	27	23
CR 5-5	0.25	382	573	357	548	141	109	105	35	31
CR 5-6	0.25	409	600	384	575	141	109	105	36	32
CR 5-7	0.25	436	627	411	602	141	109	105	37	32
CR 5-8	0.25	463	654	438	629	141	109	105	37	33
CR 5-9	0.25	490	681	465	656	141	109	105	38	33
CR 5-10	0.37	521	712	496	687	141	109	105	44	39
CR 5-11	0.37	548	739	523	714	141	109	105	44	40
CR 5-12	0.37	575	766	550	741	141	109	105	45	40
CR 5-13	0.37	602	793	577	768	141	109	105	56	52
CR 5-14	0.55	629	860	604	835	141	109	120	56	52
CR 5-15	0.55	656	887	631	862	141	109	120	57	52
CR 5-16	0.55	683	914	658	889	141	109	120	57	53
CR 5-18	0.55	767	998	-	-	141	109	120	73	-
CR 5-20	0.75	821	1052	-	-	141	109	120	74	-
CR 5-22	0.75	875	1106	-	-	141	109	120	75	-
CR 5-24	0.75	929	1160	-	-	141	109	120	78	-

Note: 4-pole CR 5 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 10 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 10-1	0.25	347	538	347	538	141	109	105	35	32
CR 10-2	0.25	363	554	363	554	141	109	105	44	42
CR 10-3	0.25	393	584	393	584	141	109	105	46	43
CR 10-4	0.37	428	619	428	619	141	109	105	52	49
CR 10-5	0.37	458	649	458	649	141	109	105	53	50
CR 10-6	0.55	488	719	488	719	141	109	120	64	61
CR 10-7	0.55	550	781	550	781	141	109	120	86	83
CR 10-8	0.75	580	811	580	811	141	109	120	87	84
CR 10-9	0.75	610	841	610	841	141	109	120	88	85
CR 10-10	0.75	640	871	640	871	141	109	120	91	88
CR 10-12	1.1	700	981	-	-	178	110	135	89	-
CR 10-14	1.1	837	1118	-	-	178	110	135	122	-
CR 10-16	1.5	897	1178	-	-	178	110	135	129	-
CR 10-17	1.5	957	1238	-	-	178	110	135	131	-

Note: 4-pole CR 10 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 15 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 15-1	0.25	415	606	415	606	141	109	105	48	47
CR 15-2	0.37	420	611	420	611	141	109	105	54	53
CR 15-3	0.55	465	696	465	696	141	109	120	65	64
CR 15-4	0.75	542	773	542	773	141	109	120	87	86
CR 15-5	1.1	587	868	587	868	178	110	135	87	86
CR 15-6	1.1	709	990	-	-	178	110	135	119	-
CR 15-7	1.5	754	1035	-	-	178	110	135	125	-
CR 15-8	1.5	799	1080	-	-	178	110	135	127	-
CR 15-9	2.2	844	1179	-	-	198	120	160	143	-
CR 15-10	2.2	889	1224	-	-	198	120	160	145	-
CR 15-12	2.2	979	1314	-	-	198	120	160	178	-

Note: 4-pole CR 15 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 20 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 20-1	0.25	415	606	415	606	141	109	105	49	48
CR 20-2	0.55	420	651	420	651	141	109	120	64	63
CR 20-3	0.75	497	728	497	728	141	109	120	86	85
CR 20-4	1.1	542	823	542	823	178	110	135	85	84
CR 20-5	1.5	664	945	664	945	178	110	135	122	121
CR 20-6	1.5	709	990	-	-	178	110	135	124	-
CR 20-7	2.2	754	1089	-	-	198	120	160	139	-
CR 20-8	2.2	799	1134	-	-	198	120	160	141	-
CR 20-10	3	889	1224	-	-	198	120	160	174	-

Note: 4-pole CR 20 pumps are also available as CRI and CRN pumps with PJE and CA connection.
For information about electrical data, see pages 160 to 161.

CR 32 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 32-1-1	1.5	505	786	-	-	178	110	135	62	-
CR 32-1	1.5	505	786	-	-	178	110	135	66	-
CR 32-2-2	1.5	575	856	-	-	178	110	135	98	-
CR 32-2-1	1.5	575	856	-	-	178	110	135	98	-
CR 32-2	1.5	575	856	-	-	178	110	135	100	-
CR 32-3-2	1.5	755	1036	-	-	178	110	135	144	-
CR 32-3	1.5	755	1036	-	-	178	110	135	144	-
CR 32-4-2	1.5	825	1106	-	-	178	110	135	152	-
CR 32-4	2.2	825	1160	-	-	198	120	160	166	-
CR 32-5-2	2.2	895	1230	-	-	198	120	160	169	-
CR 32-5	2.2	895	1230	-	-	198	120	160	199	-
CR 32-6-2	2.2	965	1300	-	-	198	120	160	202	-
CR 32-6	2.2	965	1300	-	-	198	120	160	202	-
CR 32-7-2	3	1035	1370	-	-	198	120	160	235	-
CR 32-7	3	1035	1370	-	-	198	120	160	235	-
CR 32-8-2	3	1105	1440	-	-	198	120	160	304	-
CR 32-8	3	1105	1440	-	-	198	120	160	304	-
CR 32-9-2	4	1175	1547	-	-	220	134	160	308	-
CR 32-9	4	1175	1547	-	-	220	134	160	308	-
CR 32-10-2	4	1245	1617	-	-	220	134	160	311	-

Note: 4-pole CR 32 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 45 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 45-1-1	1.5	559	840	-	-	178	110	135	102	-
CR 45-1	1.5	559	840	-	-	178	110	135	104	-
CR 45-2-2	1.5	749	1030	-	-	178	110	135	145	-
CR 45-2-1	1.5	749	1030	-	-	178	110	135	145	-
CR 45-2	2.2	749	1084	-	-	198	120	160	159	-
CR 45-3-2	2.2	829	1164	-	-	198	120	160	193	-
CR 45-3-1	2.2	829	1164	-	-	198	120	160	193	-
CR 45-3	2.2	829	1164	-	-	198	120	160	193	-
CR 45-4-2	3	909	1244	-	-	198	120	160	229	-
CR 45-4-1	3	909	1244	-	-	198	120	160	295	-
CR 45-4	3	909	1244	-	-	198	120	160	295	-
CR 45-5-2	4	989	1361	-	-	220	134	160	301	-
CR 45-5-1	4	989	1361	-	-	220	134	160	301	-
CR 45-5	4	989	1361	-	-	220	134	160	301	-
CR 45-6-2	4	1069	1441	-	-	220	134	160	326	-
CR 45-6-1	5.5	1069	1448	-	-	260	159	300	335	-
CR 45-6	5.5	1069	1448	-	-	260	159	300	335	-
CR 45-7-2	5.5	1149	1528	-	-	260	159	300	414	-
CR 45-7-1	5.5	1149	1528	-	-	260	159	300	414	-
CR 45-7	5.5	1149	1528	-	-	260	159	300	414	-

Note: 4-pole CR 45 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 64 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 64-1-1	1.5	561	842	-	-	178	110	135	104	-
CR 64-1	1.5	671	952	-	-	178	110	135	139	-
CR 64-2-2	2.2	754	1089	-	-	198	120	160	163	-
CR 64-2-1	2.2	754	1089	-	-	198	120	160	193	-
CR 64-2	3	754	1089	-	-	198	120	160	223	-
CR 64-3-2	3	836	1171	-	-	198	120	160	234	-
CR 64-3-1	4	836	1208	-	-	220	134	160	301	-
CR 64-3	4	836	1208	-	-	220	134	160	301	-
CR 64-4-2	4	919	1291	-	-	220	134	160	331	-
CR 64-4-1	5.5	919	1298	-	-	260	159	300	340	-
CR 64-4	5.5	919	1298	-	-	260	159	300	404	-
CR 64-5-2	5.5	1001	1380	-	-	260	159	300	409	-

Note: 4-pole CR 64 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 90 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 90-1-1	1.5	681	962	-	-	178	110	135	144	-
CR 90-1	2.2	681	1016	-	-	198	120	160	158	-
CR 90-2-2	3	773	1108	-	-	198	120	160	193	-
CR 90-2-1	3	773	1108	-	-	198	120	160	224	-
CR 90-2	4	773	1145	-	-	220	134	160	291	-
CR 90-3-2	4	865	1237	-	-	220	134	160	331	-
CR 90-3-1	5.5	865	1244	-	-	260	159	300	340	-
CR 90-3	5.5	865	1244	-	-	260	159	300	404	-
CR 90-4-2	5.5	957	1336	-	-	260	159	300	419	-

Note: 4-pole pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 120 with 4-pole motor, 60 Hz

Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 120-1	2.2	834	1169	-	-	198	120	270	119	-
CR 120-2-2	3	990	1325	-	-	198	120	270	134	-
CR 120-2-1	4	990	1362	-	-	220	134	270	143	-
CR 120-2	5.5	990	1369	-	-	260	159	300	148	-
CR 120-3-1	5.5	1145	1524	-	-	260	159	300	153	-
CR 120-3	7.5	1175	1604	-	-	260	159	300	168	-
CR 120-4-1	11	1331	1802	-	-	314	204	350	209	-
CR 120-5-2	11	1486	1957	-	-	314	204	350	218	-

Note: 4-pole CR 120 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR 150 with 4-pole motor, 60 Hz

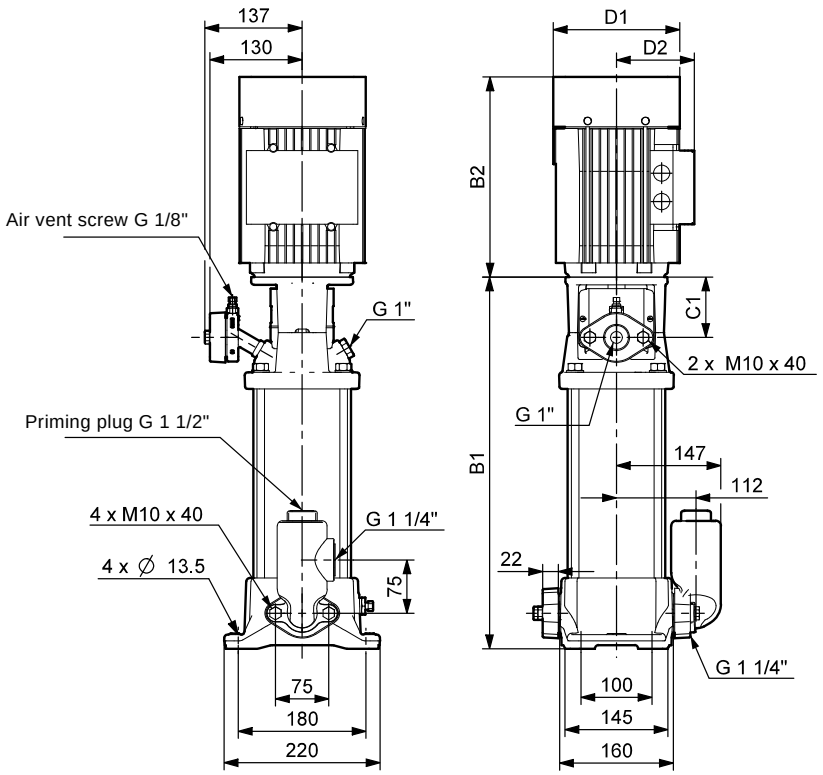
Pump type	Motor P2 [kW]	CR								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CR 150-1-1	2.2	834	1169	-	-	198	120	270	119	-
CR 150-1	3	834	1169	-	-	198	120	270	125	-
CR 150-2-2	4	990	1362	-	-	220	134	270	144	-
CR 150-2-1	5.5	990	1369	-	-	260	159	300	149	-
CR 150-2	5.5	990	1369	-	-	260	159	300	149	-
CR 150-3-2	7.5	1175	1604	-	-	260	159	300	168	-
CR 150-3	11	1175	1646	-	-	314	204	350	199	-
CR 150-4-2	11	1331	1802	-	-	314	204	350	208	-

Note: 4-pole CR 150 pumps are also available as CRN pumps with PJE connection.
For information about electrical data, see pages 160 to 161.

CR deep-well pumps

Dimensional drawing

CR 5



TM03 8261 0907

CR deep-well pumps, 50 Hz

Dimensions and weights

Pump	Motor P2 [kW]	Dimensions [mm]					Suction depth [m]	Flow rate [m^3/h]	Ejector No	Pressure class, plastic pipe [kp/cm^2]	Pipe dimensions [mm]		Largest ejector diameter [mm]
		B1	B1 + B2	C1	D1	D2					Ejector inlet: external/internal	Ejector outlet: external/internal	
CR(I) 5-9	1.5	465	746	85	178	110	54	0.25	11	6 + 6	32/26	40/32.6	76
							42	0.68	29	6 + 6	32/26	40/32.6	76
							35	0.92	20	6 + 6	32/26	40/32.6	76
							27	1.25	22	6 + 6	32/26	40/32.6	76
CR(I) 5-11	2.2	519	840	85	178	110	65	0.25	11	10 + 10	32/22.8	40/28.4	80
							50	0.62	29	10 + 6	32/22.8	40/32.6	76
							45	0.85	20	6 + 6	32/26	40/32.6	76
							40	1.10	22	6 + 6	32/26	40/32.6	76
							35	1.37	44	6 + 6	32/26	40/32.6	76
							28	1.75	45	6 + 6	32/26	40/32.6	76
CR(I) 5-13	2.2	573	894	85	178	110	79	0.25	11	10 + 10	32/22.8	40/28.4	80
							63	0.62	29	10 + 10	32/22.8	40/28.4	80
							54	0.87	20	10 + 6	32/22.8	40/32.6	76
							45	1.17	22	10 + 6	32/22.8	40/32.6	76
							40	1.39	44	6 + 6	32/26	40/32.6	76
							33	1.99	45	6 + 6	32/26	40/32.6	76
CR(I) 5-15	2.2	627	948	85	178	110	93	0.25	11	10 + 10	32/22.8	40/28.4	80
							73	0.63	29	10 + 10	32/22.8	40/28.4	80
							62	0.88	20	10 + 10	32/22.8	40/28.4	80
							53	1.14	22	10 + 6	32/22.8	40/32.6	76
							46	1.40	44	10 + 6	32/22.8	40/32.6	76
							37	1.99	45	10 + 6	32/22.8	40/32.6	76

Note: For information about electrical data, see pages 160 to 161.

CR deep-well pumps, 60 Hz

Dimensions and weights

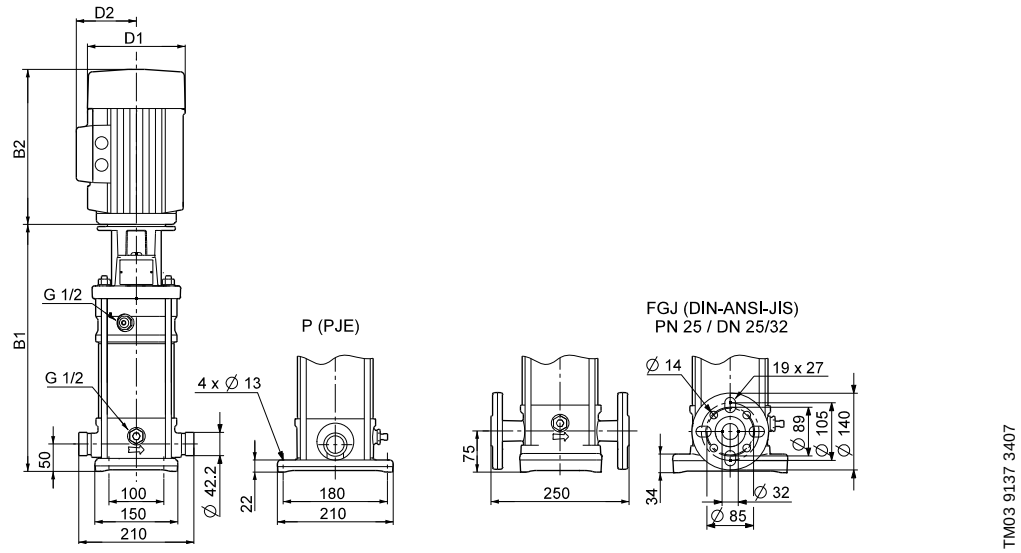
Pump	Motor P2 [kW]	Dimensions [mm]					Suction depth, [m]	Flow rate [m^3/h]	Ejector No	Pressure class, plastic pipe [kp/cm^2]	Pipe dimensions [mm]		Largest ejector diameter [mm]
		B1	B1 + B2	C1	D1	D2					Ejector inlet: external/internal	Ejector outlet: external/internal	
CR(I) 5-6	2.2	384	705	85	179	110	52	0.33	11	6 + 6	32/26	40/32.6	76
							45	0.69	29	6 + 6	32/26	40/32.6	76
							41	0.91	20	6 + 6	32/26	40/32.6	76
							37	1.16	22	6 + 6	32/26	40/32.6	76
							34	1.35	44	6 + 6	32/26	40/32.6	76
							30	1.65	45	6 + 6	32/26	40/32.6	76
CR(I) 5-8	2.2	438	759	85	179	110	65	0.38	11	10 + 10	32/22.8	40/28.4	80
							60	0.60	29	10 + 6	32/22.8	40/32.6	76
							53	0.94	20	6 + 6	32/26	40/32.6	76
							50	1.10	22	6 + 6	32/26	40/32.6	76
							45	1.37	44	6 + 6	32/26	40/32.6	76
CR(I) 5-9	2.2	465	786	85	179	110	73	0.37	11	10 + 10	32/22.8	40/28.4	80
							65	0.68	29	10 + 10	32/22.8	40/28.4	80
							60	0.88	20	10 + 6	32/22.8	40/32.6	76
							55	1.11	22	10 + 6	32/22.8	40/32.6	76
							50	1.39	44	6 + 6	32/26	40/32.6	76
							47	1.63	45	6 + 6	32/26	40/32.6	76

Note: For information about electrical data, see pages 160 to 161.

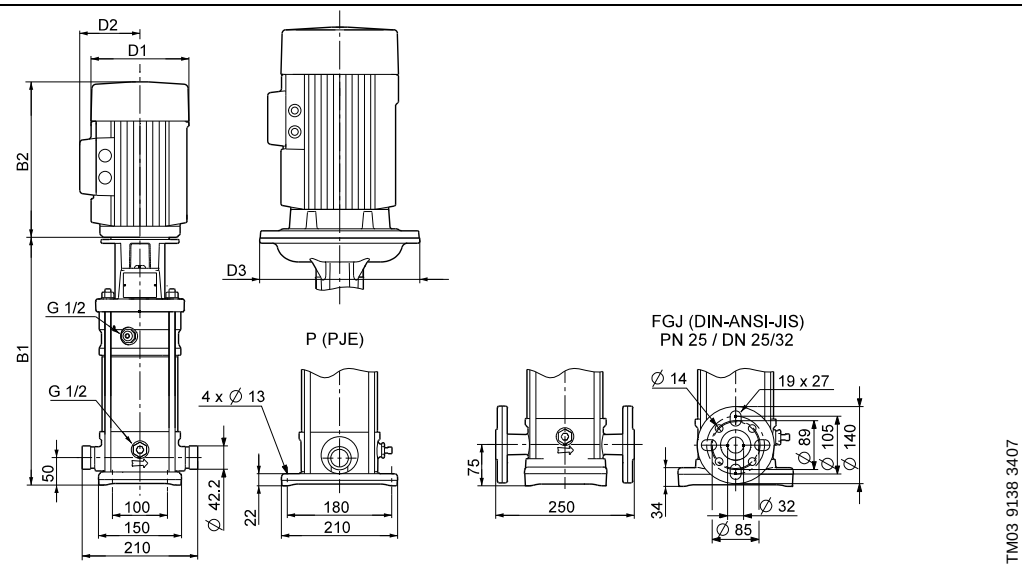
CRN pumps with magnetic drive

Dimensional drawings

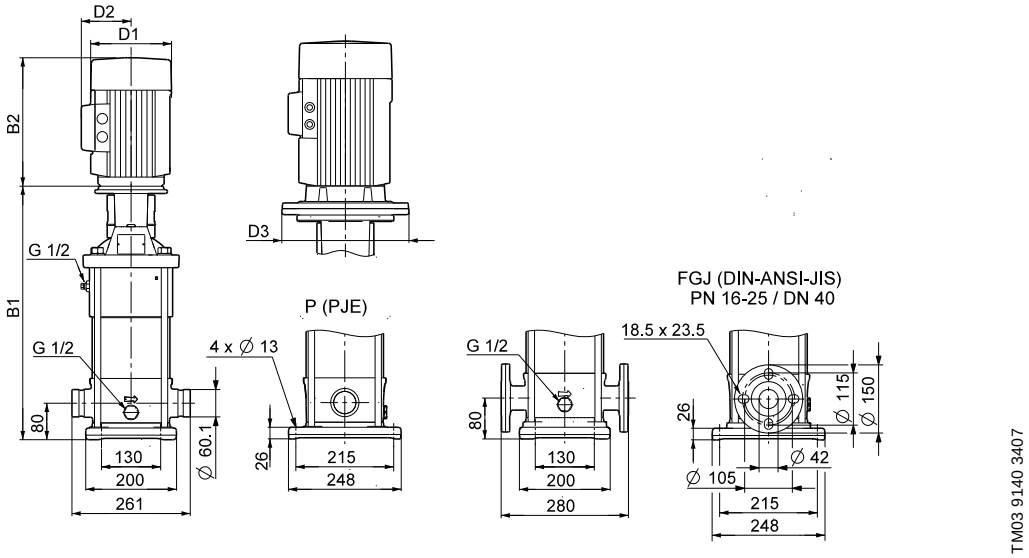
CRN 1
CRN 3



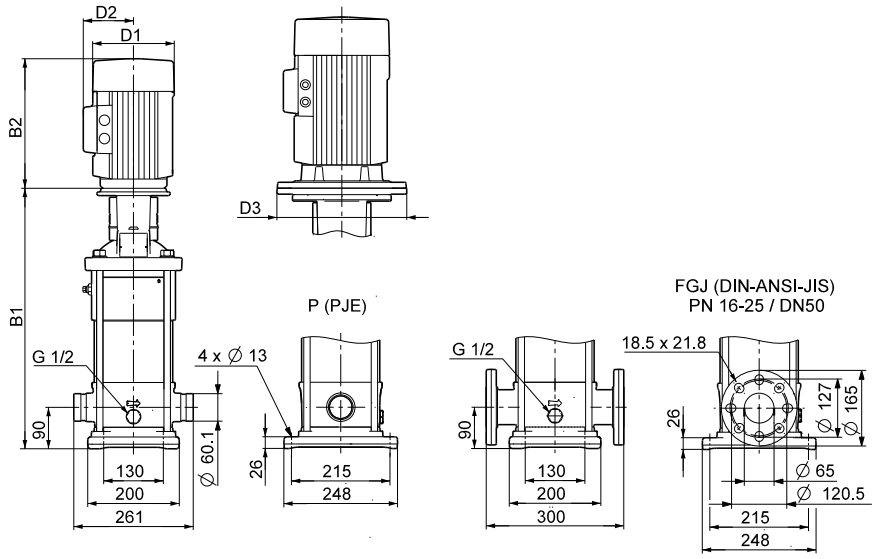
CRN 5



CRN 10

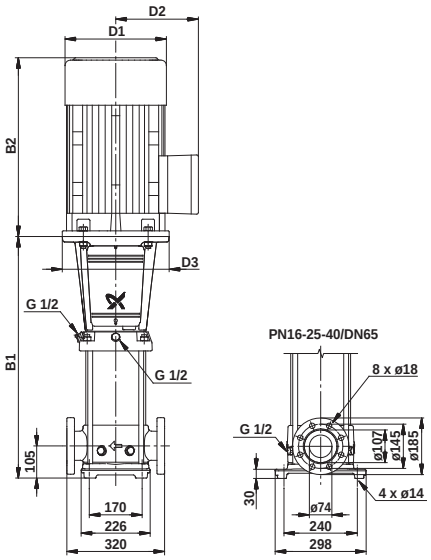


CRN 15
CRN 20



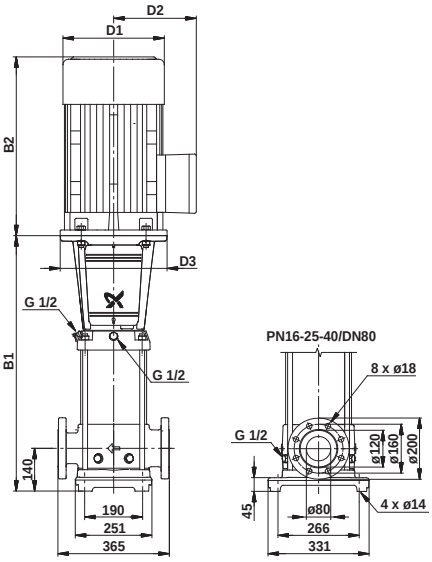
TM03 9139 3407

CRN 32



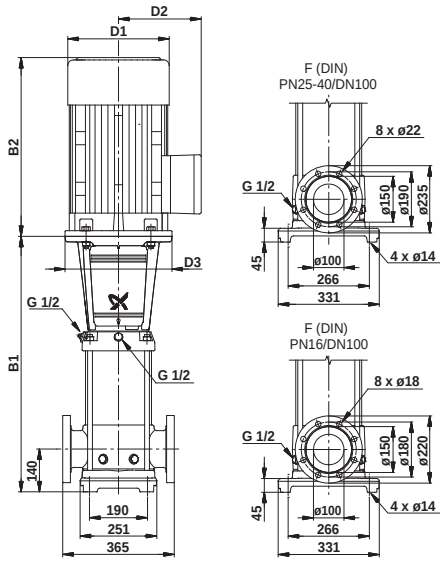
TM01 1750 2203

CRN 45



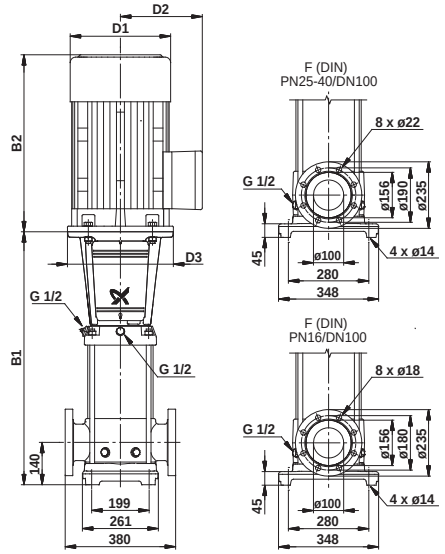
TM01 1752 2203

CRN 64



TM01 1754 0904

CRN 90



TM02 1570 2203

CRN pumps with magnetic drive

Dimensions and weights

CRN 1s - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 1s-2	0.37	367	558	342	533	141	109	-	24	20
CRN 1s-3	0.37	367	558	342	533	141	109	-	25	20
CRN 1s-4	0.37	385	576	360	551	141	109	-	25	21
CRN 1s-5	0.37	403	594	378	569	141	109	-	25	21
CRN 1s-6	0.37	421	612	396	587	141	109	-	26	22
CRN 1s-7	0.37	439	630	414	605	141	109	-	26	22
CRN 1s-8	0.37	457	648	432	623	141	109	-	27	22
CRN 1s-9	0.37	475	666	450	641	141	109	-	27	23
CRN 1s-10	0.37	493	684	468	659	141	109	-	27	23
CRN 1s-11	0.55	511	702	486	677	141	109	-	29	24
CRN 1s-12	0.55	529	720	504	695	141	109	-	29	25
CRN 1s-13	0.55	547	738	522	713	141	109	-	30	25
CRN 1s-15	0.55	583	774	558	749	141	109	-	30	26
CRN 1s-17	0.55	619	810	594	785	141	109	-	31	27
CRN 1s-19	0.75	655	886	630	861	141	109	-	33	28
CRN 1s-21	0.75	697	928	672	903	141	109	-	35	30
CRN 1s-23	0.75	733	964	708	939	141	109	-	35	31
CRN 1s-25	1.1	769	1000	744	975	141	109	-	39	35
CRN 1s-27	1.1	805	1036	780	1011	141	109	-	39	35
CRN 1s-30	1.1	859	1090	834	1065	141	109	-	40	36
CRN 1s-33	1.1	913	1144	888	1119	141	109	-	41	37
CRN 1s-36	1.1	967	1198	942	1173	141	109	-	43	38

For information about electrical data, see pages 160 to 161.

CRN 1 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 1-2	0.37	367	558	342	533	141	109	-	24	20
CRN 1-3	0.37	367	558	342	533	141	109	-	25	20
CRN 1-4	0.37	385	576	360	551	141	109	-	25	21
CRN 1-5	0.37	403	594	378	569	141	109	-	25	21
CRN 1-6	0.37	421	612	396	587	141	109	-	26	22
CRN 1-7	0.55	439	630	414	605	141	109	-	26	22
CRN 1-8	0.55	457	648	432	623	141	109	-	27	22
CRN 1-9	0.55	475	666	450	641	141	109	-	27	23
CRN 1-10	0.55	493	684	468	659	141	109	-	27	23
CRN 1-11	0.75	511	702	486	677	141	109	-	29	24
CRN 1-12	0.75	535	720	504	695	141	109	-	29	25
CRN 1-13	0.75	553	738	522	713	141	109	-	30	25
CRN 1-15	0.75	589	774	558	749	141	109	-	30	26
CRN 1-17	1.1	625	810	594	785	141	109	-	31	27
CRN 1-19	1.1	661	886	630	861	141	109	-	33	28
CRN 1-21	1.1	697	928	672	903	141	109	-	35	30
CRN 1-23	1.1	733	964	708	939	141	109	-	35	31
CRN 1-25	1.5	785	1000	744	975	141	109	-	39	35
CRN 1-27	1.5	821	1036	780	1011	141	109	-	39	35
CRN 1-30	1.5	875	1090	834	1065	141	109	-	40	36
CRN 1-33	2.2	929	1144	888	1119	141	109	-	41	37
CRN 1-36	2.2	983	1198	942	1173	141	109	-	43	38

For information about electrical data, see pages 160 to 161.

CRN 3 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 3-2	0.37	367	558	342	533	141	109	-	24	20
CRN 3-3	0.37	367	558	342	533	141	109	-	25	20
CRN 3-4	0.37	385	576	360	551	141	109	-	25	21
CRN 3-5	0.55	403	594	378	569	141	109	-	26	22
CRN 3-6	0.55	421	612	396	587	141	109	-	27	22
CRN 3-7	0.55	439	630	414	605	141	109	-	27	23
CRN 3-8	0.75	463	694	438	669	141	109	-	30	25
CRN 3-9	0.75	481	712	456	687	141	109	-	30	26
CRN 3-10	0.75	499	730	474	705	141	109	-	30	26
CRN 3-11	1.1	517	748	492	723	141	109	-	33	29
CRN 3-12	1.1	535	766	510	741	141	109	-	33	29
CRN 3-13	1.1	553	784	528	759	141	109	-	34	30
CRN 3-15	1.1	589	820	564	795	141	109	-	35	30
CRN 3-17	1.5	641	922	616	897	178	110	-	43	39
CRN 3-19	1.5	677	958	652	933	178	110	-	44	39
CRN 3-21	2.2	713	1034	688	1009	178	110	-	45	41
CRN 3-23	2.2	749	1070	724	1045	178	110	-	46	42
CRN 3-25	2.2	785	1106	760	1081	178	110	-	47	42
CRN 3-27	2.2	821	1142	796	1117	178	110	-	47	43
CRN 3-29	2.2	857	1178	832	1153	178	110	-	48	44
CRN 3-31	3	897	1232	872	1207	198	120	-	53	49
CRN 3-33	3	933	1268	908	1243	198	120	-	54	50
CRN 3-36	3	987	1322	962	1297	198	120	-	55	51

For information about electrical data, see pages 160 to 161.

CRN 5 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 5-2	0.37	367	558	342	533	141	109	-	26	21
CRN 5-3	0.55	394	585	369	560	141	109	-	27	23
CRN 5-4	0.75	421	652	396	627	141	109	-	28	24
CRN 5-5	0.75	454	685	429	660	141	109	-	30	26
CRN 5-6	1.1	481	712	456	687	141	109	-	33	29
CRN 5-7	1.1	508	739	483	714	141	109	-	33	29
CRN 5-8	1.1	535	766	510	741	141	109	-	34	30
CRN 5-9	1.5	578	859	553	834	178	110	-	41	37
CRN 5-10	1.5	605	886	580	861	178	110	-	42	37
CRN 5-11	2.2	632	953	607	928	178	110	-	43	39
CRN 5-12	2.2	659	980	634	955	178	110	-	43	39
CRN 5-13	2.2	686	1007	661	982	178	110	-	44	40
CRN 5-14	2.2	713	1034	688	1009	178	110	-	45	40
CRN 5-15	2.2	740	1061	715	1036	178	110	-	45	41
CRN 5-16	3	767	1102	742	1077	178	110	-	49	44
CRN 5-18	3	825	1160	800	1135	198	120	-	51	47
CRN 5-20	3	879	1214	854	1189	198	120	-	52	48
CRN 5-22	4	933	1305	908	1280	220	134	-	65	61
CRN 5-24	4	987	1359	962	1334	220	134	-	67	62
CRN 5-26	4	1041	1413	1016	1388	220	134	-	68	64
CRN 5-29	5.5	1122	1513	1097	1488	220	134	300	77	72
CRN 5-32	5.5	1254	1645	1229	1620	220	134	300	92	88
CRN 5-36	5.5	1362	1753	1337	1728	220	134	300	94	90

For information about electrical data, see pages 160 to 161.

CRN 10 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 10-1	0.55	443	634	443	634	141	109	-	40	36
CRN 10-2	0.75	447	678	447	678	141	109	-	41	38
CRN 10-3	1.1	477	708	477	708	141	109	-	45	41
CRN 10-4	1.5	523	804	523	804	178	110	-	53	49
CRN 10-5	2.2	553	874	553	874	178	110	-	55	51
CRN 10-6	2.2	583	904	583	904	178	110	-	56	52
CRN 10-7	3	618	953	618	953	198	120	-	61	57
CRN 10-8	3	648	983	648	983	198	120	-	62	59
CRN 10-9	4	678	1050	678	1050	198	120	-	74	71
CRN 10-10	4	708	1080	708	1080	220	134	-	74	71
CRN 10-12	5.5	768	1159	768	1159	220	134	300	76	73
CRN 10-14	5.5	860	1251	860	1251	220	134	300	99	95
CRN 10-16	5.5	920	1311	920	1311	220	134	300	101	97
CRN 10-18	7.5	980	1359	980	1359	260	159	300	121	118
CRN 10-20	7.5	1040	1419	1040	1419	260	159	300	123	120
CRN 10-22	11	1100	1571	1100	1571	314	204	350	191	157

For information about electrical data, see pages 160 to 161.

CRN 15 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 15-1	1.1	490	721	490	721	141	109	-	45	40
CRN 15-2	2.2	505	826	505	826	178	110	-	53	48
CRN 15-3	3	555	890	555	890	198	120	-	59	54
CRN 15-4	4	600	972	600	972	220	134	-	71	67
CRN 15-5	5.5	645	1036	645	1036	220	134	300	73	68
CRN 15-6	5.5	722	1113	722	1113	220	134	300	95	90
CRN 15-7	7.5	767	1146	767	1146	260	159	300	111	107
CRN 15-8	7.5	812	1191	812	1191	260	159	300	115	110
CRN 15-9	7.5	857	1236	857	1236	260	159	300	117	112
CRN 15-10	11	979	1450	979	1450	314	204	350	141	136
CRN 15-12	11	1069	1540	1069	1540	314	204	350	143	139
CRN 15-14	15	1159	1630	1159	1630	314	204	350	165	161
CRN 15-17	15	1294	1765	1294	1765	314	204	350	184	180

For information about electrical data, see pages 160 to 161.

CRN 20 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 20-1	1.1	487	718	487	718	141	109	-	46	41
CRN 20-2	2.2	503	824	503	824	178	110	-	54	49
CRN 20-3	4	553	925	553	925	220	134	-	71	66
CRN 20-4	5.5	630	1021	630	1021	220	134	300	93	88
CRN 20-5	5.5	675	1066	675	1066	220	134	300	94	89
CRN 20-6	7.5	720	1099	720	1099	260	159	300	113	108
CRN 20-7	7.5	765	1144	765	1144	260	159	300	114	110
CRN 20-8	11	887	1358	887	1358	314	204	350	137	132
CRN 20-10	11	977	1448	977	1448	314	204	350	141	136
CRN 20-12	15	1067	1538	1067	1538	314	204	350	176	171
CRN 20-14	15	1157	1628	1157	1628	314	204	350	179	175
CRN 20-17	18.5	1292	1807	1292	1807	314	204	350	206	202

For information about electrical data, see pages 160 to 161.

CRN 32 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 32-1-1	1.5	505	786	-	-	178	110	270	69	-
CRN 32-1	2.2	505	826	-	-	178	110	270	69	-
CRN 32-2-2	3	575	910	-	-	198	120	270	76	-
CRN 32-2	4	575	947	-	-	220	134	270	87	-
CRN 32-3-2	5.5	666	1057	-	-	220	134	300	102	-
CRN 32-3	5.5	666	1057	-	-	220	134	300	102	-
CRN 32-4-2	7.5	715	1094	-	-	260	159	300	121	-
CRN 32-4	7.5	715	1094	-	-	260	159	300	121	-
CRN 32-5-2	11	895	1366	-	-	314	204	350	148	-
CRN 32-5	11	895	1366	-	-	314	204	350	148	-
CRN 32-6-2	11	965	1436	-	-	314	204	350	151	-
CRN 32-6	11	965	1436	-	-	314	204	350	151	-
CRN 32-7-2	15	1035	1506	-	-	314	204	350	193	-
CRN 32-7	15	1035	1506	-	-	314	204	350	193	-
CRN 32-8-2	15	1105	1576	-	-	314	204	350	199	-
CRN 32-8	15	1105	1576	-	-	314	204	350	199	-
CRN 32-9-2	18.5	1175	1690	-	-	314	204	350	199	-
CRN 32-9	18.5	1175	1690	-	-	314	204	350	199	-
CRN 32-10-2	18.5	1245	1760	-	-	314	204	350	202	-
CRN 32-10	18.5	1245	1760	-	-	314	204	350	202	-
CRN 32-11-2	22	1315	1856	-	-	314	204	350	276	-
CRN 32-11	22	1315	1856	-	-	314	204	350	176	-
CRN 32-12-2	22	1385	1926	-	-	314	204	350	280	-
CRN 32-12	22	1385	1926	-	-	314	204	350	280	-

For information about electrical data, see pages 160 to 161.
Note: CRN 32 pumps are also available with PJE connection.

CRN 45 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 45-1-1	3	559	894	-	-	198	120	270	81	-
CRN 45-1	4	559	931	-	-	220	134	270	92	-
CRN 45-2-2	5.5	660	1051	-	-	220	134	300	107	-
CRN 45-2	7.5	639	1018	-	-	260	159	300	121	-
CRN 45-3-2	11	829	1300	-	-	314	204	350	153	-
CRN 45-3	11	829	1300	-	-	314	204	350	153	-
CRN 45-4-2	15	909	1380	-	-	314	204	350	185	-
CRN 45-4	15	909	1380	-	-	314	204	350	195	-
CRN 45-5-2	18.5	989	1504	-	-	314	204	350	195	-
CRN 45-5	18.5	989	1504	-	-	314	204	350	195	-
CRN 45-6-2	22	1069	1610	-	-	314	204	350	273	-
CRN 45-6	22	1069	1610	-	-	314	204	350	273	-

For information about electrical data, see pages 160 to 161.
Note: CRN 45 pumps are also available with PJE connection.

CRN 64 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 64-1-1	4	561	933	-	-	220	134	270	95	-
CRN 64-1	7.5	561	940	-	-	260	159	300	118	-
CRN 64-2-2	11	644	1115	-	-	314	204	350	152	-
CRN 64-2-1	11	754	1225	-	-	314	204	350	152	-
CRN 64-2	15	754	1225	-	-	314	204	350	170	-
CRN 64-3-2	15	836	1307	-	-	314	204	350	193	-
CRN 64-3-1	18.5	836	1351	-	-	314	204	350	191	-
CRN 64-3	18.5	836	1351	-	-	314	204	350	191	-
CRN 64-4-2	22	919	1460	-	-	314	204	350	266	-
CRN 64-4-1	22	919	1460	-	-	314	204	350	266	-

For information about electrical data, see pages 160 to 161.
Note: CRN 64 pumps are also available with PJE connection.

CRN 90 - MAGdrive, 50 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN 90-1-1	5.5	592	983	-	-	220	134	300	111	-
CRN 90-1	7.5	571	950	-	-	260	159	300	125	-
CRN 90-2-2	15	773	1244	-	-	314	204	350	177	-
CRN 90-2	18.5	773	1288	-	-	314	204	350	192	-
CRN 90-3-2	18.5	865	1380	-	-	314	204	350	197	-

For information about electrical data, see pages 160 to 161.
Note: CRN 90 pumps are also available with PJE connection.

CRN 1s - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN1s-2	0.37	367	558	342	533	141	109	-	24	20
CRN1s-3	0.37	367	558	342	533	141	109	-	25	20
CRN1s-4	0.37	385	576	360	551	141	109	-	25	21
CRN1s-5	0.37	403	594	378	569	141	109	-	25	21
CRN1s-6	0.55	421	612	396	587	141	109	-	27	23
CRN1s-7	0.55	439	630	414	605	141	109	-	27	23
CRN1s-8	0.55	457	648	432	623	141	109	-	28	23
CRN1s-9	0.75	475	666	450	641	141	109	-	29	25
CRN1s-10	0.75	493	684	468	659	141	109	-	29	25
CRN1s-11	0.75	511	702	486	677	141	109	-	30	25
CRN1s-12	0.75	529	720	504	695	141	109	-	30	26
CRN1s-13	0.75	547	738	522	713	141	109	-	31	26
CRN1s-15	1.1	583	774	558	749	141	109	-	40	36
CRN1s-17	1.1	619	810	594	785	141	109	-	40	36
CRN1s-19	1.1	655	886	630	861	141	109	-	41	36
CRN1s-21	1.5	713	994	688	969	178	110	-	44	39
CRN1s-23	1.5	749	1030	724	1005	178	110	-	44	40
CRN1s-25	1.5	785	1066	760	1041	178	110	-	44	40
CRN1s-27	2.2	821	1142	796	1117	178	110	-	45	41

For information about electrical data, see pages 160 to 161.

CRN 1 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN1-2	0.37	367	558	342	533	141	109	-	24	20
CRN1-3	0.37	367	558	342	533	141	109	-	25	20
CRN1-4	0.55	385	576	360	551	141	109	-	26	22
CRN1-5	0.55	403	594	378	569	141	109	-	26	22
CRN1-6	0.75	421	612	396	587	141	109	-	28	24
CRN1-7	0.75	439	630	414	605	141	109	-	28	24
CRN1-8	0.75	457	648	432	623	141	109	-	28	24
CRN1-9	1.1	475	666	450	641	141	109	-	37	33
CRN1-10	1.1	493	684	468	659	141	109	-	37	33
CRN1-11	1.1	511	742	486	717	141	109	-	37	33
CRN1-12	1.1	535	766	510	741	141	109	-	39	35
CRN1-13	1.5	569	850	544	825	178	110	-	41	36
CRN1-15	1.5	605	886	580	861	178	110	-	41	37
CRN1-17	1.5	641	922	616	897	178	110	-	42	38
CRN1-19	2.2	677	998	652	973	178	110	-	42	38
CRN1-21	2.2	713	1034	688	1009	178	110	-	43	39
CRN1-23	2.2	749	1070	724	1045	178	110	-	44	40
CRN1-25	3	790	1125	765	1100	198	120	-	54	50
CRN1-27	3	826	1161	801	1136	198	120	-	55	51

For information about electrical data, see pages 160 to 161.

CRN 3 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN3-2	0.37	367	558	342	533	141	109	-	24	20
CRN3-3	0.55	367	558	342	533	141	109	-	26	21
CRN3-4	0.75	385	576	360	551	141	109	-	27	23
CRN3-5	0.75	403	594	378	569	141	109	-	27	23
CRN3-6	1.1	421	612	396	587	141	109	-	36	31
CRN3-7	1.1	439	630	414	605	141	109	-	36	32
CRN3-8	1.1	463	694	438	669	141	109	-	38	33
CRN3-9	1.5	497	778	472	753	178	110	-	39	35
CRN3-10	1.5	515	796	490	771	178	110	-	39	35
CRN3-11	1.5	533	814	508	789	178	110	-	39	35
CRN3-12	2.2	551	872	526	847	178	110	-	39	35
CRN3-13	2.2	569	890	544	865	178	110	-	40	36
CRN3-15	2.2	605	926	580	901	178	110	-	41	36
CRN3-17	3	646	981	621	956	198	120	-	51	47
CRN3-19	3	682	1017	657	992	198	120	-	52	47
CRN3-21	3	718	1053	693	1028	198	120	-	52	48
CRN3-23	4	754	1126	729	1101	198	120	-	69	65
CRN3-25	4	790	1162	765	1137	198	120	-	70	65

For information about electrical data, see pages 160 to 161.

CRN 5 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN5-2	0.75	367	558	342	533	141	109	-	27	22
CRN5-3	1.1	394	585	369	560	141	109	-	35	31
CRN5-4	1.1	421	652	396	627	141	109	-	35	31
CRN5-5	1.5	470	751	445	726	178	110	-	39	35
CRN5-6	2.2	497	818	472	793	178	110	-	39	35
CRN5-7	2.2	524	845	499	820	178	110	-	39	35
CRN5-8	2.2	551	872	526	847	178	110	-	40	36
CRN5-9	3	583	918	558	893	198	120	-	49	45
CRN5-10	3	610	945	585	920	198	120	-	50	45
CRN5-11	3	637	972	612	947	198	120	-	50	46
CRN5-12	4	664	1036	639	1011	198	120	-	65	61
CRN5-13	4	691	1063	666	1038	198	120	-	66	62
CRN5-14	4	719	1089.6	694	1064.6	198	120	-	67	62
CRN5-15	4	745	1116.6	720	1091.6	198	120	-	67	62
CRN5-16	5.5	817	1208.4	792	1183.4	220	134	300	76	71
CRN5-18	5.5	875	1266.4	850	1241.4	220	134	300	76	72
CRN5-20	5.5	929	1320.4	904	1295.4	220	134	300	77	73

For information about electrical data, see pages 160 to 161.

CRN 10 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN10-1	0.75	443	634	443	634	141	109	-	41	37
CRN10-2	1.5	463	743.5	463	743.5	178	110	-	50	47
CRN10-3	2.2	493	813.5	493	813.5	178	110	-	51	47
CRN10-4	3	528	863	528	863	198	120	-	61	57
CRN10-5	4	558	930	558	930	198	120	-	78	74
CRN10-6	4	588	1026	588	1026	198	120	-	79	75
CRN10-7	5.5	635	1026	635	1026	220	134	300	86	82
CRN10-8	5.5	665	1056	665	1056	220	134	300	87	84
CRN10-9	7.5	695	1074	695	1074	260	159	300	97	94
CRN10-10	7.5	725	1104	725	1104	260	159	300	97	94
CRN10-12	7.5	785	1164	785	1164	260	159	300	97	94
CRN10-14	11	902	1373	902	1373	314	204	350	152	148
CRN10-16	11	962	1433	962	1433	314	204	350	154	150

For information about electrical data, see pages 160 to 161.

CRN 15 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN15-1	1.5	506	786.5	506	786.5	178	110	-	46	41
CRN15-2	3	510	845	510	845	198	120	-	56	51
CRN15-3	5.5	572	963	572	963	220	134	300	75	70
CRN15-4	7.5	617	996	617	996	260	159	300	87	83
CRN15-5	7.5	645	1024	645	1024	260	159	300	87	83
CRN15-6	11	764	1235	764	1235	314	204	350	148	143
CRN15-7	11	809	1280	809	1280	314	204	350	152	148
CRN15-8	15	854	1325	854	1325	314	204	350	173	168
CRN15-9	15	899	1370	899	1370	314	204	350	175	170
CRN15-10	15	979	1450	979	1450	314	204	350	175	170
CRN15-12	18.5	1069	1584	1069	1584	314	204	350	169	164

For information about electrical data, see pages 160 to 161.

CRN 20 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN20-1	2.2	503	823.5	503	823.5	178	110	-	52	47
CRN20-2	4	508	880	508	880	198	120	-	76	71
CRN20-3	7.5	570	949	570	949	260	159	300	87	82
CRN20-4	11	740	1211	740	1211	314	204	350	146	141
CRN20-5	11	785	1256	785	1256	314	204	350	147	142
CRN20-6	15	830	1301	830	1301	314	204	350	170	165
CRN20-7	15	875	1346	875	1346	314	204	350	171	167
CRN20-8	18.5	887	1402	887	1402	314	204	350	163	159

For information about electrical data, see pages 160 to 161.

CRN 32 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN32-1-1	3	505	840	-	-	198	120	-	77	-
CRN32-1	5.5	505	896	-	-	220	134	300	96	-
CRN32-2-2	5.5	575	966	-	-	220	134	300	101	-
CRN 32-2-1	5.5	575	966	-	-	220	134	300	101	-
CRN32-2	7.5	575	954	-	-	260	159	300	108	-
CRN32-3-2	11	690	1161	-	-	314	204	350	155	-
CRN32-3	11	690	1161	-	-	314	204	350	155	-
CRN32-4-2	15	757	1228	-	-	314	204	350	179	-
CRN32-4	15	757	1228	-	-	314	204	350	179	-
CRN32-5-2	15	895	1366	-	-	314	204	350	180	-
CRN32-5	18.5	895	1410	-	-	314	204	350	172	-
CRN32-6-2	18.5	965	1480	-	-	314	204	350	172	-
CRN32-6	22	965	1506	-	-	314	204	350	238	-
CRN32-7-2	22	1035	1576	-	-	314	204	350	266	-
CRN32-7	22	1035	1576	-	-	314	204	350	266	-

For information about electrical data, see pages 160 to 161.
Note: CRN 32 pumps are also available with PJE connection.

CRN 45 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN45-1-1	5.5	559	950	-	-	220	134	300	106	-
CRN45-1	7.5	559	938	-	-	260	159	300	116	-
CRN45-2-2	11	770	1241	-	-	314	204	350	160	-
CRN45-2-1	15	749	1220	-	-	314	204	350	178	-
CRN45-2	15	749	1220	-	-	314	204	350	178	-
CRN45-3-2	18.5	829	1344	-	-	314	204	350	169	-
CRN45-3-1	18.5	829	1344	-	-	314	204	350	169	-
CRN45-3	18.5	829	1344	-	-	314	204	350	169	-
CRN45-4-2	22	909	1450	-	-	314	204	350	268	-

For information about electrical data, see pages 160 to 161.
Note: CRN 45 pumps are also available with PJE connection.

CRN 64 - MAGdrive, 60 Hz

Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN64-1-1	7.5	561	940	-	-	260	159	300	111	-
CRN64-1	11	671	1142	-	-	314	204	350	158	-
CRN64-2-2	15	644	1115	-	-	314	204	350	173	-
CRN64-2-1	18.5	754	1269	-	-	314	204	350	168	-
CRN64-2	22	754	1295	-	-	314	204	350	243	-
CRN64-3-2	22	836	1377	-	-	314	204	350	166	-

For information about electrical data, see pages 160 to 161.
Note: CRN 64 pumps are also available with PJE connection.

CRN 90 - MAGdrive, 60 Hz

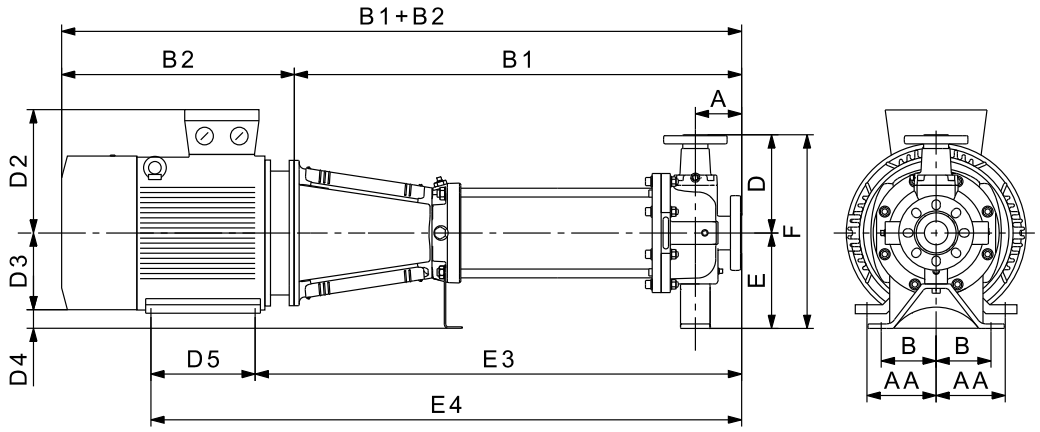
Pump type	Motor P2 [kW]	CRN MAGdrive								
		Dimension [mm]							Net weight [kg]	
		DIN flange		Oval flange		D1	D2	D3	DIN flange	Oval flange
		B1	B1 + B2	B1	B1 + B2					
CRN90-1-1	11	702	1173	-	-	314	204	350	164	-
CRN90-1	15	681	1152	-	-	314	204	350	182	-
CRN90-2-2	22	773	1314	-	-	314	204	350	250	-

For information about electrical data, see pages 160 to 161.
Note: CRN 90 pumps are also available with PJE connection.

CRH(N) pumps

Dimensional drawings

CRH(N) 1s-90



TM05 1523 3211

	CRH(N) 1s-5	CRH(N) 10-20	CRH(N) 32	CRH(N) 45	CRH(N) 64-90
Inlet [mm]	40	50	50	80	100
Outlet [mm]	25	50	50	80	100
Ref.			Dim. [mm]		
A	102	102	102	102	102
B	76	124	124	124	124
AA			According to specifications for CR horizontal pumps.		
D	165	191	191	229	280
E	134	210	210	210	210
F	299	401	401	439	490
Note	**Ref. AA is only applicable with motors 5.5 - 45 kW.**				

CRH(N) pumps

Dimensions and weights

CRH(N) 1s, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)1s-2	0.37	309	191	500	109	71	63	-	-	-	24	21
CRH(N)1s-3	0.37	309	191	500	109	71	63	-	-	-	24	22
CRH(N)1s-4	0.37	327	191	518	109	71	63	-	-	-	25	22
CRH(N)1s-5	0.37	345	191	536	109	71	63	-	-	-	25	22
CRH(N)1s-6	0.37	363	191	554	109	71	63	-	-	-	26	23
CRH(N)1s-7	0.37	381	191	572	109	71	63	-	-	-	26	23
CRH(N)1s-8	0.37	399	191	590	109	71	63	-	-	-	26	23
CRH(N)1s-9	0.37	417	191	608	109	71	63	-	-	-	27	24
CRH(N)1s-10	0.37	435	191	626	109	71	63	-	-	-	27	24
CRH(N)1s-11	0.37	453	191	644	109	71	63	-	-	-	27	25
CRH(N)1s-12	0.37	471	191	662	109	71	63	-	-	-	28	25
CRH(N)1s-13	0.37	489	191	680	109	71	63	-	-	-	28	25
CRH(N)1s-15	0.55	525	191	716	109	71	63	-	-	-	30	27
CRH(N)1s-17	0.55	561	191	752	109	71	63	-	-	-	31	28
CRH(N)1s-19	0.55	597	191	788	109	71	63	-	-	-	31	28
CRH(N)1s-21	0.75	655	231	886	109	80	54	-	-	-	34	32
CRH(N)1s-23	0.75	691	231	922	109	80	54	-	-	-	35	32
CRH(N)1s-25	0.75	727	231	958	109	80	54	-	-	-	35	33
CRH(N)1s-27	1.1	763	231	994	109	80	54	-	-	-	38	36
CRH(N)1s-30	1.1	817	231	1048	109	80	54	-	-	-	40	37
CRH(N)1s-33	1.1	871	231	1102	109	80	54	-	-	-	41	38
CRH(N)1s-36	1.1	925	231	1156	109	80	54	-	-	-	42	40

For information about electrical data, see pages 160 to 161.

CRH(N) 1, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)1-2	0.37	309	191	500	109	71	63	-	-	-	24	21
CRH(N)1-3	0.37	309	191	500	109	71	63	-	-	-	24	22
CRH(N)1-4	0.37	327	191	518	109	71	63	-	-	-	25	22
CRH(N)1-5	0.37	345	191	536	109	71	63	-	-	-	25	22
CRH(N)1-6	0.37	363	191	554	109	71	63	-	-	-	26	23
CRH(N)1-7	0.37	381	191	572	109	71	63	-	-	-	26	23
CRH(N)1-8	0.55	399	191	590	109	71	63	-	-	-	27	24
CRH(N)1-9	0.55	417	191	608	109	71	63	-	-	-	27	25
CRH(N)1-10	0.55	435	191	626	109	71	63	-	-	-	28	25
CRH(N)1-11	0.55	453	191	644	109	71	63	-	-	-	28	25
CRH(N)1-12	0.75	477	231	708	109	80	54	-	-	-	30	28
CRH(N)1-13	0.75	495	231	726	109	80	54	-	-	-	31	28
CRH(N)1-15	0.75	531	231	762	109	80	54	-	-	-	32	29
CRH(N)1-17	1.1	567	231	798	109	80	54	-	-	-	35	32
CRH(N)1-19	1.1	603	231	834	109	80	54	-	-	-	36	33
CRH(N)1-21	1.1	639	231	870	109	80	54	-	-	-	36	34
CRH(N)1-23	1.1	675	231	906	109	80	54	-	-	-	37	35
CRH(N)1-25	1.5	727	321	1048	110	90	44	-	-	-	45	42
CRH(N)1-27	1.5	763	321	1084	110	90	44	-	-	-	46	43
CRH(N)1-30	1.5	817	321	1138	110	90	44	-	-	-	47	44
CRH(N)1-33	2.2	871	321	1192	110	90	44	-	-	-	49	46
CRH(N)1-36	2.2	925	321	1246	110	90	44	-	-	-	50	47

For information about electrical data, see pages 160 to 161.

CRH(N) 3, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)3-2	0.37	309	191	500	109	71	63	-	-	-	24	21
CRH(N)3-3	0.37	309	191	500	109	71	63	-	-	-	24	22
CRH(N)3-4	0.37	327	191	518	109	71	63	-	-	-	25	22
CRH(N)3-5	0.37	345	191	536	109	71	63	-	-	-	25	22
CRH(N)3-6	0.55	363	191	554	109	71	63	-	-	-	26	23
CRH(N)3-7	0.55	381	191	572	109	71	63	-	-	-	27	24
CRH(N)3-8	0.75	405	231	636	109	80	54	-	-	-	29	26
CRH(N)3-9	0.75	423	231	654	109	80	54	-	-	-	29	27
CRH(N)3-10	0.75	441	231	672	109	80	54	-	-	-	30	27
CRH(N)3-11	1.1	459	231	690	109	80	54	-	-	-	32	30
CRH(N)3-12	1.1	477	231	708	109	80	54	-	-	-	33	30
CRH(N)3-13	1.1	495	231	726	109	80	54	-	-	-	33	31
CRH(N)3-15	1.1	531	231	762	109	80	54	-	-	-	34	32
CRH(N)3-17	1.5	583	321	904	110	90	44	-	-	-	42	39
CRH(N)3-19	1.5	619	321	940	110	90	44	-	-	-	43	40
CRH(N)3-21	2.2	655	321	976	110	90	44	-	-	-	44	41
CRH(N)3-23	2.2	691	321	1012	110	90	44	-	-	-	45	42
CRH(N)3-25	2.2	727	321	1048	110	90	44	-	-	-	46	42
CRH(N)3-27	2.2	763	321	1084	110	90	44	-	-	-	46	43
CRH(N)3-29	2.2	799	321	1120	110	90	44	-	-	-	47	44
CRH(N)3-31	3	840	335	1175	120	100	34	-	-	-	54	51
CRH(N)3-33	3	876	335	1211	120	100	34	-	-	-	55	52
CRH(N)3-36	3	930	335	1265	120	100	34	-	-	-	56	53

For information about electrical data, see pages 160 to 161.

CRH(N) 5, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)5-2	0.37	309	191	500	109	71	63	-	-	-	24	21
CRH(N)5-3	0.55	336	191	527	109	71	63	-	-	-	26	23
CRH(N)5-4	0.55	363	191	554	109	71	63	-	-	-	26	23
CRH(N)5-5	0.75	396	231	627	109	80	54	-	-	-	28	26
CRH(N)5-6	1.1	423	231	654	109	80	54	-	-	-	31	29
CRH(N)5-7	1.1	450	231	681	109	80	54	-	-	-	32	29
CRH(N)5-8	1.1	477	231	708	109	80	54	-	-	-	32	30
CRH(N)5-9	1.5	520	321	841	110	90	44	-	-	-	40	37
CRH(N)5-10	1.5	547	321	868	110	90	44	-	-	-	40	38
CRH(N)5-11	2.2	574	321	895	110	90	44	-	-	-	42	39
CRH(N)5-12	2.2	601	321	922	110	90	44	-	-	-	42	39
CRH(N)5-13	2.2	628	321	949	110	90	44	-	-	-	43	40
CRH(N)5-14	2.2	655	321	976	110	90	44	-	-	-	43	40
CRH(N)5-15	2.2	682	321	1003	110	90	44	-	-	-	44	41
CRH(N)5-16	2.2	709	321	1030	110	90	44	-	-	-	45	41
CRH(N)5-18	3	768	335	1103	120	100	34	-	-	-	52	49
CRH(N)5-20	3	822	335	1157	120	100	34	-	-	-	53	50
CRH(N)5-22	4	876	372	1248	134	112	22	-	-	-	63	60
CRH(N)5-24	4	930	372	1302	134	112	22	-	-	-	64	62
CRH(N)5-26	4	984	372	1356	134	112	22	-	-	-	66	63
CRH(N)5-29	4	1065	372	1437	134	112	22	-	-	-	67	64
CRH(N)5-32	5.5	1175	391	1566	134	132	2	140	1294	1434	83	80
CRH(N)5-36	5.5	1283	391	1674	134	132	2	140	1402	1542	86	82

For information about electrical data, see pages 160 to 161.

CRH(N) 10, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)10-1	0.37	414	191	605	109	71	139	-	-	-	58	52
CRH(N)10-2	0.75	430	231	661	109	80	130	-	-	-	60	54
CRH(N)10-3	1.1	464	231	695	109	80	130	-	-	-	63	58
CRH(N)10-4	1.5	494	321	815	109	90	120	-	-	-	71	66
CRH(N)10-5	2.2	524	321	845	110	90	120	-	-	-	73	68
CRH(N)10-6	2.2	584	321	905	110	90	120	-	-	-	74	69
CRH(N)10-7	3	614	335	949	120	100	110	-	-	-	81	76
CRH(N)10-8	3	644	335	979	120	100	110	-	-	-	82	77
CRH(N)10-9	3	674	335	1009	120	100	110	-	-	-	83	78
CRH(N)10-10	4	816	372	1188	134	112	98	-	-	-	93	88
CRH(N)10-12	4	876	372	1248	134	112	98	-	-	-	95	90
CRH(N)10-14	5.5	936	391	1327	134	132	78	140	1055	1195	118	113
CRH(N)10-16	5.5	996	391	1387	134	132	78	140	1115	1255	120	115
CRH(N)10-18	7.5	1056	379	1435	159	132	78	178	1125	1303	133	128
CRH(N)10-20	7.5	1116	379	1495	159	132	78	178	1185	1363	136	130
CRH(N)10-22	7.5	1176	379	1555	159	132	78	178	1245	1423	138	132

For information about electrical data, see pages 160 to 161.

CRH(N) 15, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)15-1	1.1	442	231	673	109	80	130	-	-	-	62	57
CRH(N)15-2	2.2	458	231	689	110	90	120	-	-	-	70	65
CRH(N)15-3	3	508	335	843	120	100	110	-	-	-	77	73
CRH(N)15-4	4	553	372	925	134	112	98	-	-	-	88	83
CRH(N)15-5	4	598	372	970	134	112	98	-	-	-	89	85
CRH(N)15-6	5.5	672	391	1063	134	132	78	140	791	931	111	107
CRH(N)15-7	5.5	717	391	1108	134	132	78	140	836	0	113	108
CRH(N)15-8	7.5	762	379	1141	159	132	78	178	831	0	125	121
CRH(N)15-9	7.5	807	379	1186	159	132	78	178	876	0	127	122
CRH(N)15-10	11	965	471	1436	204	160	50	210	1103	0	169	165
CRH(N)15-12	11	1055	471	1526	204	160	50	210	1193	0	173	168
CRH(N)15-14	11	1145	471	1616	204	160	50	210	1283	0	177	171
CRH(N)15-17	11	1280	471	1751	204	160	50	210	1418	0	195	189

For information about electrical data, see pages 160 to 161.

CRH(N) 20, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)20-1	1.1	509	231	740	109	80	130	-	-	-	62	57
CRH(N)20-2	2.2	525	321	846	110	90	120	-	-	-	70	65
CRH(N)20-3	4	575	372	947	134	112	98	-	-	-	86	82
CRH(N)20-4	5.5	649	391	1040	134	132	78	140	768	908	108	104
CRH(N)20-5	5.5	694	391	1085	134	132	78	140	813	953	110	105
CRH(N)20-6	7.5	739	379	1118	159	132	78	178	808	986	122	117
CRH(N)20-7	7.5	784	379	1163	159	132	78	178	853	1031	123	119
CRH(N)20-8	11	942	471	1413	204	160	50	210	1080	1290	166	161
CRH(N)20-10	11	1032	471	1503	204	160	50	210	1170	1380	169	165
CRH(N)20-12	15	1122	471	1593	204	160	50	210	1260	1470	186	181
CRH(N)20-14	15	1212	471	1683	204	160	50	210	1350	1560	190	184
CRH(N)20-17	18.5	1347	545	1892	204	180	30	254	1485	1739	208	202

For information about electrical data, see pages 160 to 161.

CRH(N) 32, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)32-1-1	1.5	533	321	854	110	90	120	-	-	-	81	77
CRH(N)32-1	2.2	533	321	854	110	90	120	-	-	-	82	77
CRH(N)32-2-2	3	603	335	938	120	100	110	-	-	-	90	86
CRH(N)32-2	4	603	372	975	134	112	98	-	-	-	99	95
CRH(N)32-3-2	5.5	673	391	1064	134	132	78	140	792	932	114	109
CRH(N)32-3	5.5	673	391	1064	134	132	78	140	792	932	114	109
CRH(N)32-4-2	7.5	743	391	1134	159	132	78	178	812	990	129	124
CRH(N)32-4	7.5	743	391	1134	159	132	78	178	812	990	129	124
CRH(N)32-5-2	11	923	471	1394	204	160	50	210	1061	1271	176	171
CRH(N)32-5	11	923	471	1394	204	160	50	210	1061	1271	176	171
CRH(N)32-6-2	11	993	471	1464	204	160	50	210	1131	1341	179	174
CRH(N)32-6	11	993	471	1464	204	160	50	210	1131	1341	179	174
CRH(N)32-7-2	15	1063	471	1534	204	160	50	210	1201	1411	195	190
CRH(N)32-7	15	1063	471	1534	204	160	50	210	1201	1411	195	190
CRH(N)32-8-2	15	1133	471	1604	204	160	50	210	1271	1481	201	196
CRH(N)32-8	15	1133	471	1604	204	160	50	210	1271	1481	201	196
CRH(N)32-9-2	18.5	1203	515	1718	204	160	50	254	1341	1595	217	213
CRH(N)32-9	18.5	1203	515	1718	204	160	50	254	1341	1595	217	213
CRH(N)32-10-2	18.5	1273	515	1788	204	160	50	254	1411	1665	220	216
CRH(N)32-10	18.5	1273	515	1788	204	160	50	254	1411	1665	220	216
CRH(N)32-11-2	22	1343	541	1884	204	180	30	241	1494	1735	238	233
CRH(N)32-11	22	1343	541	1884	204	180	30	241	1494	1735	238	233
CRH(N)32-12-2	22	1413	541	1954	204	180	30	241	1564	1805	241	237
CRH(N)32-12	22	1413	541	1954	204	180	30	241	1564	1805	241	237
CRH(N)32-13-2	30	1483	610	2093	300	200	10	305	1675	1980	347	342
CRH(N)32-13	30	1483	610	2093	300	200	10	305	1675	1980	347	342
CRH(N)32-14-2	30	1553	610	2163	300	200	10	305	1745	2050	350	345
CRH(N)32-14	30	1553	610	2163	300	200	10	305	1745	2050	350	345

For information about electrical data, see pages 160 to 161.

CRH(N) 45, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)45-1-1	3	549	335	884	120	100	154	-	-	-	99	101
CRH(N)45-1	4	549	372	921	134	112	142	-	-	-	108	110
CRH(N)45-2-2	5.5	629	391	1020	134	132	122	140	748	888	123	125
CRH(N)45-2	7.5	629	379	1008	159	132	122	178	698	876	135	137
CRH(N)45-3-2	11	819	471	1290	204	160	94	210	957	1167	182	184
CRH(N)45-3	11	819	471	1290	204	160	94	210	957	1167	182	184
CRH(N)45-4-2	15	899	471	1370	204	160	94	210	1037	1247	199	201
CRH(N)45-4	15	899	471	1370	204	160	94	210	1037	1247	199	201
CRH(N)45-5-2	18.5	979	515	1494	204	160	94	254	1117	1371	216	218
CRH(N)45-5	18.5	979	515	1494	204	160	94	254	1117	1371	216	218
CRH(N)45-6-2	22	1059	541	1600	204	180	74	241	1210	1451	236	238
CRH(N)45-6	22	1059	541	1600	204	180	74	241	1210	1451	236	238
CRH(N)45-7-2	30	1139	610	1749	300	200	54	305	1331	1636	343	345
CRH(N)45-7	30	1139	610	1749	300	200	54	305	1331	1636	343	345
CRH(N)45-8-2	30	1219	610	1829	300	200	54	305	1411	1716	347	349
CRH(N)45-8	30	1219	610	1829	300	200	54	305	1411	1716	347	349
CRH(N)45-9-2	30	1299	610	1909	300	200	54	305	1491	1796	351	353
CRH(N)45-9	37	1299	667	1966	300	200	54	305	1489	1794	381	383
CRH(N)45-10-2	37	1379	667	2046	300	200	54	305	1569	1874	386	387
CRH(N)45-10	37	1379	667	2046	300	200	54	305	1569	1874	386	387
CRH(N)45-11-2	45	1465	709	2174	325	225	29	286	1673	1959	474	476
CRH(N)45-11	45	1459	709	2168	325	225	29	286	1667	1953	474	476
CRH(N)45-12-2	45	1539	709	2248	325	225	29	286	1747	2033	479	480
CRH(N)45-12	45	1539	709	2248	325	225	29	286	1747	2033	479	480
CRH(N)45-13-2	45	1619	709	2328	325	225	29	286	1827	2113	483	485

For information about electrical data, see pages 160 to 161.

CRH(N) 64, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)64-1-1	4	580	372	952	134	112	142	-	-	-	121	114
CRH(N)64-1	5.5	580	391	971	134	132	122	140	699	839	133	125
CRH(N)64-2-2	7.5	662	379	1041	159	132	122	178	731	909	149	142
CRH(N)64-2-1	11	772	471	1243	204	160	94	210	910	1120	193	186
CRH(N)64-2	11	772	471	1243	204	160	94	210	910	1120	193	186
CRH(N)64-3-2	15	854	471	1325	204	160	94	210	992	1202	210	203
CRH(N)64-3-1	15	854	471	1325	204	160	94	210	992	1202	210	203
CRH(N)64-3	18.5	854	515	1369	204	160	94	254	992	1246	223	216
CRH(N)64-4-2	18.5	936	515	1451	204	160	94	254	1074	1328	228	221
CRH(N)64-4-1	22	936	541	1477	204	180	74	241	1087	1328	242	234
CRH(N)64-4	22	936	541	1477	204	180	74	241	1087	1328	242	234
CRH(N)64-5-2	30	1018	610	1628	204	200	54	305	1210	1515	348	341
CRH(N)64-5-1	30	1018	610	1628	300	200	54	305	1210	1515	348	341
CRH(N)64-5	30	1018	610	1628	300	200	54	305	1210	1515	348	341
CRH(N)64-6-2	30	1100	610	1710	300	200	54	305	1292	1597	354	348
CRH(N)64-6-1	37	1100	667	1767	300	200	54	305	1292	1597	384	378
CRH(N)64-6	37	1100	667	1767	300	200	54	305	1292	1597	384	378
CRH(N)64-7-2	37	1182	667	1849	300	200	54	305	1374	1679	389	382
CRH(N)64-7-1	37	1182	667	1849	300	200	54	305	1374	1679	389	382
CRH(N)64-7	45	1188	709	1897	325	225	29	286	1378	1664	473	467
CRH(N)64-8-2	45	1270	709	1979	325	225	29	286	1478	1764	478	471
CRH(N)64-8-1	45	1270	709	1979	325	225	29	286	1478	1764	478	471

For information about electrical data, see pages 160 to 161.

CRH(N) 90, 50 Hz

Pump type	Motor P2 [kW]	CR										
		Dimension [mm]									Net weight [kg]	
		DIN flange			D2	D3	D4	D5	E3	E4	DIN	DIN
		B1	B2	B1 + B2							CR	CRN
CRH(N)90-1-1	5.5	590	391	981	134	132	122	140	709	849	133	127
CRH(N)90-1	7.5	590	379	969	159	132	122	310	659	969	145	139
CRH(N)90-2-2	11	792	471	1263	204	160	94	333	930	1263	193	187
CRH(N)90-2	15	792	471	1263	204	160	94	333	930	1263	206	200
CRH(N)90-3-2	18.5	884	515	1399	204	160	94	377	1022	1399	224	218
CRH(N)90-3	22	884	541	1425	204	180	74	390	1035	1425	238	232
CRH(N)90-4-2	30	976	610	1586	300	200	54	418	1168	1586	345	339
CRH(N)90-4	30	976	610	1586	300	200	54	418	1168	1586	345	339
CRH(N)90-5-2	37	1068	667	1735	300	200	54	477	1258	1735	382	376
CRH(N)90-5	37	1068	667	1735	300	200	54	477	1258	1735	382	376
CRH(N)90-6-2	45	1166	709	1875	325	225	29	501	1374	1875	471	466
CRH(N)90-6	45	1166	709	1875	325	225	29	501	1374	1875	471	466

For information about electrical data, see pages 160 to 161.

14. Motor data

Standard 2-pole motors for CR, CRI, CRN, 50 Hz

Motor P2 [kW]	Frame size	Standard voltage [V]	$I_{1/1}$ [A]	Cos φ 1/1	η [%]	I_{start} [%]	Speed [min^{-1}]	MG
0.37	71	220-240Δ/380-415Y	1.74/1.00	0.80-0.70	78.5	490-530	2850-2880	
0.55	71	220-240Δ/380-415Y	2.50/1.44	0.80-0.70	80.0	580-620	2830-2850	
0.75	80	220-240Δ/380-415Y	3.30/1.90	0.81-0.71	80.7	580-620	2840-2870	
1.1	80	220-240Δ/380-415Y	4.35/2.50	0.83-0.76	82.7	450-500	2840-2870	
1.5	90	220-240Δ/380-415Y	5.45/3.15	0.87-0.82	84.2	850-930	2890-2910	
2.2	90	380-415Δ	4.45	0.89-0.87	85.9	850-950	2890-2910	
3	100	380-415Δ	6.30	0.87-0.82	87.1	840-920	2900-2920	
4	112	380-415Δ	7.90	0.87	88.1	1000-1110	2920-2940	
5.5	132	380-415Δ	11.0	0.87-0.82	89.2	1080-1180	2920-2940	
7.5	132	380-415Δ/660-690Y	14.4-14.0/8.30-8.10	0.88-0.82	90.1	780-910	2910-2920	
11	160	380-415Δ/660-690Y	20.8-19.8/12.0-11.8	0.88-0.84	91.2	660-780	2940-2950	
15	160	380-415Δ/660-690Y	28.0-26.0/16.2-15.6	0.89-0.87	91.9	660-780	2930-2950	
18.5	160	380-415Δ/660-690Y	34.5-32.5/20.0-18.8	0.89-0.85	92.4	830-980	2940-2950	
22	180	380-415Δ/660-690Y	39.5/22.8	0.90	92.7	830-830	2950	

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								Siemens
30	200	380-420Δ/660-725Y	56.0-51.0/32.0-29.5	0.86	93.3	660-660	2955	
37	200	380-420Δ/660-725Y	68.0-63.0/39.0-36.0	0.87	93.7	670-670	2955	
45	225	380-420Δ/660-725Y	81.0-74.0/47.0-43.0	0.89	94.0	690-690	2960	
55	250	380-420Δ/660-725Y	99.0-90.0/57.0-52.0	0.89	94.3	670-670	2975	
75	280	380-420Δ/660-725Y	136-122/78.0-70.0	0.89	94.7	680-680	2975	

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Standard 4-pole motors for CR, CRI, CRN, 50 Hz

Motor P2 [kW]	Frame size	Standard voltage [V]	$I_{1/1}$ [A]	Cos φ 1/1	η [%]	I_{start} [%]	Speed [min^{-1}]	MG
0.25	71	220-240Δ/380-415Y	1.48/0.85	0.75-0.65	69.0	400-440	1400-1420	
0.37	71	220-240Δ/380-415Y	1.90/1.10	0.77-0.67	71.0	400-440	1400-1420	
0.55	80	220-240Δ/380-415Y	2.60/1.50	0.79-0.70	77.0	430-470	1390-1410	
0.75	90	220-240Δ/380-415Y	3.30/1.90	0.76-0.71	82.5	660-720	1440-1450	
1.1	90	220-240Δ/380-415Y	4.85/2.80	0.71-0.64	84.1	820-900	1450-1460	
1.5	90	220-240Δ/380-415Y	6.15-6.30/3.55-3.65	0.75-0.68	85.3	730-790	1450-1460	
2.2	100	380-415Δ	4.90	0.79-0.73	86.7	600-660	1450	
3.0	100	380-415Δ	6.30	0.82-0.76	87.7	700-770	1440-1450	
4.0	112	380-415Δ	9.30	0.75-0.68	88.6	790-870	1460	
5.5	132	380-415Δ/660-690Y	11.0-11.0/6.35-6.35	0.86-0.80	89.6	700-760	1460	
7.5	132	380-415Δ/660-690Y	14.9-14.2/8.60-8.40	0.86-0.82	90.4	680-780	1460	
11.0	160	380-415Δ/660-690Y	21.2-20.4/12.2-12.0	0.86-0.81	91.4	710-810	1470-1475	
15.0	160	380-415Δ/660-690Y	29.0-28.0/16.8-16.4	0.86-0.82	92.1	760-870	1460-1470	

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Standard 2-pole motors for CR, CRI, CRN, 60 Hz

Motor P2 [kW]	Frame size	Standard voltage [V]	$I_{1/1}$ [A]	Cos φ 1/1	η [%]	I_{start} [%]	Speed [min^{-1}]	MG
0.37	71	220-255Δ/380-440Y	1.50-1.44/0.87-0.83	0.85-0.76	79.0-80	550-650	3410-3470	
0.55	71	220-255Δ/380-440Y	2.15-2.05/1.25-1.20	0.85-0.76	81.5-83	500-600	3390-3460	
0.75	80	220-255Δ/380-440Y	2.95-2.75/1.70-1.60	0.86-0.77	77.0	600-740	3410-3470	
1.1	80	220-255Δ/380-440Y	4.15-4.00/2.40-2.30	0.88-0.80	82.5-84.0	430-500	3420-3470	
1.5	90	220-277Δ/380-480Y	5.35-4.70/3.10-2.70	0.90-0.81	84.0-85.5	780-1050	3470-3530	
2.2	90	380-480Δ	4.45-3.70	0.91-0.85	85.5-86.5	780-1100	3470-3530	
3.0	100	380-480Δ	6.20-5.40	0.91-0.84	87.5-88.5	860-1100	3480-3530	
4.0	112	380-480Δ	7.80-6.80	0.91-0.82	88.5	1000-1470	3510-3540	
5.5	132	380-480Δ	10.6-9.30	0.90-0.80	89.5	1020-1480	3510-3550	
7.5	132	380-480Δ/660-690Y	14.2-12.0/8.20-8.10	0.90-0.82	89.5-90.2	680-1050	3490-3530	
11	160	380-480Δ/660-690Y	20.8-17.2/12.0-11.6	0.89-0.83	90.2-91.0	580-890	3520-3550	
15	160	380-480Δ/660-690Y	28.0-22.4/16.2-15.6	0.90-0.86	90.2-91.0	580-890	3520-3550	
18.5	160	380-480Δ/660-690Y	34.5-28.0/20.0-16.6	0.89-0.84	91.0-91.7	670-1100	3520-3560	
22	180	380-480Δ/660-690Y	40.0-32.5/23.0-22.2	0.91	91.7	650-1040	3520-3560	

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Siemens

30*	200	380-420Δ/660-725Y	56.0-50.0/32.0-29.0	0.89	92.4	610-610	3545	
37*	200	380-420Δ/660-725Y	69.0-62.0/38.5-35.0	0.90	93.0	580-580	3540	
45*	225	380-420Δ/660-725Y	81.0-73.0/47.0-43.0	0.90	93.6	560-560	3550	
55*	250	380-420Δ/660-725Y	99.0-90.0/57.0-52.0	0.90	93.6	560-560	3570	
75*	280	380-420Δ/660-725Y	136-122/79.0-72.0	0.90	94.1	550-550	3570	

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* Siemens motors operating at 440-480Δ voltage may be loaded with a service factor of 1.15.

Standard 4-pole motors for CR, CRI, CRN, 60 Hz

Motor P2 [kW]	Frame size	Standard voltage [V]	$I_{1/1}$ [A]	Cos φ 1/1	η [%]	I_{start} [%]	Speed [min^{-1}]	MG
0.25	71	220-255Δ/380-440Y	1.21/0.70	0.80-0.69	71-72	400-470	1680-1720	
0.37	71	220-255Δ/380-440Y	1.72/0.99	0.82-0.72	73-74	400-470	1680-1720	
0.55	80	220-255Δ/380-440Y	2.40/1.40	0.83-0.75	77-80	390-470	1660-1710	
0.75	90	220-277Δ/380-480Y	3.10-2.95/1.80-1.70	0.79-0.67	82.5-85.5	590-750	1730-1760	
1.1	90	220-277Δ/380-480Y	4.50/2.60	0.76-0.60	84.0	710-910	1740-1770	
1.5	90	220-277Δ/380-480Y	5.90-5.65/3.40-3.25	0.78-0.65	84.0-86.5	660-930	1740-1770	
2.2	100	380-480Δ	4.70-4.30	0.83-0.71	87.5	590-760	1740-1760	
3.0	100	380–480Δ	6.10-5.50	0.85-0.73	87.5-89.5	620-880	1730-1760	
4.0	112	380–480Δ	8.60-8.30	0.79-0.64	87.5-89.5	770-910	1750-1770	
5.5	132	380-480Δ/660-690Y	11.0-9.40/6.35-6.20	0.88-0.79	89.5-89.5	670-850	1750-1770	
7.5	132	380-480Δ/660-690Y	14.7-12.5/8.50-8.25	0.88-0.80	89.5-91.7	590-890	1740-1770	
11.0	160	380-480Δ/660-690Y	20.8-17.8/12.0-11.8	0.90-0.81	91.0	650-970	1760-1780	
15.0	160	380-480Δ/660-690Y	29.0-24.2/16.6-16.4	0.88-0.81	91.0-93.0	650-980	1760-1770	

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15. Pumped liquids

Thin, non-explosive liquids, not containing solid particles or fibres. The liquid must not chemically attack the pump materials.

When pumping liquids with a density and/or viscosity higher than that of water, use oversized motors, if required.

Whether a pump is suitable for a particular liquid depends on a number of factors of which the most important are the chloride content, pH value, temperature and content of chemicals, oils, etc.

Please note that aggressive liquids, such as sea water and some acids, may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

CR(E), CRI(E)

CR(E), CRI(E) pumps are suitable for non-corrosive liquids.

Use CR(E), CRI(E) pumps for liquid transfer, circulation and pressure boosting of cold or hot clean water.

CRN(E)

CRN(E) pumps are suitable for industrial liquids.

Use CRN(E) pumps in systems where all parts in contact with the liquid must be made of high-grade stainless steel.

CRT(E)

For saline or chloride-containing liquids such as sea water or for oxidising agents such as hypochlorites, Grundfos offers CRT(E) pumps made of titanium.

See the separate data booklet on CRT(E) available on www.grundfos.com (WebCAPS).

List of pumped liquids

A number of typical liquids are listed below.

Other pump versions may be applicable, but those stated in the list are considered to be the best choices.

The table is intended as a general guide only and cannot replace actual testing of the pumped liquids and pump materials under specific working conditions.

However, use the list with some caution. Factors such as those mentioned below may affect the chemical resistance of a specific pump version:

- concentration of the pumped liquid
- liquid temperature
- pressure.

Take safety precautions when pumping dangerous liquids.

Notes

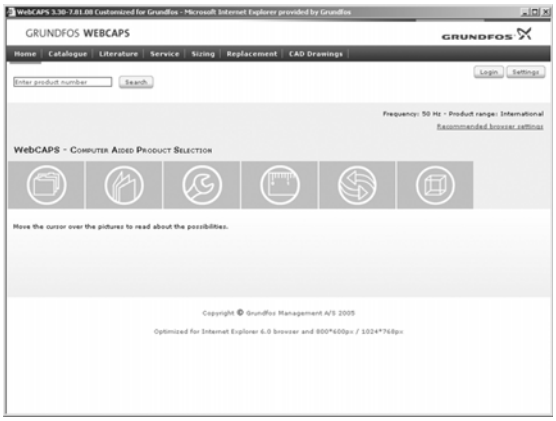
D	Often with additives.
E	The density and/or viscosity differ from that/those of water. Take this factor into account when calculating motor output and pump performance.
F	Pump selection depends on many factors. Contact Grundfos.
H	Risk of crystallisation/precipitation in shaft seal.
1	Highly inflammable liquid.
2	Combustible liquid.
3	Insoluble in water.
4	Low self-ignition point.

Pumped liquid	Chemical formula	Note	Liquid concentration, liquid temperature	CR(E), CRI(E)	CRN(E)
Acetic acid	CH_3COOH	-	5 %, 20 °C	-	HQQE
Acetone	CH_3COCH_3	1, F	100 %, 20 °C	-	HQQE
Alkaline degreasing agent		D, F	-	HQQE	-
Ammonium bicarbonate	NH_4HCO_3	E	20 %, 30 °C	-	HQQE
Ammonium hydroxide	NH_4OH	-	20 %, 40 °C	HQQE	-
Aviation fuel		1, 3, 4, F	100 %, 20 °C	HQBV	-
Benzoic acid	C_6H_5COOH	H	0.5 %, 20 °C	-	HQQV
Boiler water		-	< 120 °C	HQQE	-
		F	120-180 °C	-	-
Calcareous water		-	< 90 °C	HQQE	-
Calcium acetate (as coolant with inhibitor)	$Ca(CH_3COO)_2$	D, E	30 %, 50 °C	HQQE	-
Calcium hydroxide	$Ca(OH)_2$	E	Saturated solution, +50 °C	HQQE	-
Chloride-containing water		F	< 30 °C, max. 500 ppm	-	HQQE
Chromic acid	H_2CrO_4	H	1 %, 20 °C	-	HQQV
Citric acid	$HOC(CH_2CO_2H)_2COOH$	H	5 %, 40 °C	-	HQQE
Completely desalinated water (demineralised water)		-	120 °C	-	HQQE
Condensate		-	120 °C	HQQE	-
Copper sulphate	$CuSO_4$	E	10 %, 50 °C	-	HQQE
Corn oil		D, E, 3	100 %, 80 °C	HQQV	-
Diesel oil		2, 3, 4, F	100 %, 20 °C	HQBV	-
Domestic hot water (potable water)		-	< 120 °C	HQQE	-
Ethanol (ethyl alcohol)	C_2H_5OH	1, F	100 %, 20 °C	HQQE	-
Ethylene glycol	$HOCH_2CH_2OH$	D, E	50 %, 50 °C	HQQE	-
Formic acid	$HCOOH$	-	5 %, 20 °C	-	HQQE
Glycerine (glycerol)	$OHCH_2CH(OH)CH_2OH$	D, E	50 %, 50 °C	HQQE	-
Hydraulic oil (mineral)		E, 2, 3	100 %, 100 °C	HQQV	-
Hydraulic oil (synthetic)		E, 2, 3	100 %, 100 °C	HQQV	-
Isopropyl alcohol	$CH_3CHOHCH_3$	1, F	100 %, 20 °C	HQQE	-
Lactic acid	$CH_3CH(OH)COOH$	E, H	10 %, 20 °C	-	HQQV
Linoleic acid	$C_{17}H_{31}COOH$	E, 3	100 %, 20 °C	HQQV	-
Methanol (methyl alcohol)	CH_3OH	1, F	100 %, 20 °C	HQQE	-
Motor oil		E, 2, 3	100 %, 80 °C	HQQV	-
Naphthalene	$C_{10}H_8$	E, H	100 %, 80 °C	HQQV	-
Nitric acid	HNO_3	F	1 %, 20 °C	-	HQQE
Oil-containing water		-	< 100 °C	HQQV	-
Olive oil		D, E, 3	100 %, 80 °C	HQQV	-
Oxalic acid	$(COOH)_2$	H	1 %, 20 °C	-	HQQE
Ozone-containing water	(O_3)	-	< 100 °C	-	HQQE
Peanut oil		D, E, 3	100 %, 80 °C	HQQV	-
Petrol		1, 3, 4, F	100 %, 20 °C	HQBV	-
Phosphoric acid	H_3PO_4	E	20 %, 20 °C	-	HQQE
Propanol	C_3H_7OH	1, F	100 %, 20 °C	HQQE	-
Propylene glycol	$CH_3CH(OH)CH_2OH$	D, E	50 %, 90 °C	HQQE	-
Potassium carbonate	K_2CO_3	E	20 %, 50 °C	HQQE	-
Potassium formate (as coolant with inhibitor)	$KOOCH$	D, E	30 %, 50 °C	HQQE	-
Potassium hydroxide	KOH	E	20 %, 50 °C	-	HQQE
Potassium permanganate	$KMnO_4$	-	5 %, 20 °C	-	HQQE
Rape seed oil		D, E, 3	100 %, 80 °C	HQQV	-
Salicylic acid	$C_6H_4(OH)COOH$	H	0.1 %, 20 °C	-	HQQE
Silicone oil		E, 3	100 %	HQQV	-

Pumped liquid	Chemical formula	Note	Liquid concentration, liquid temperature	CR(E), CRI(E)	CRN(E)
Sodium bicarbonate	$NaHCO_3$	E	10 %, 60 °C	-	HQQE
Sodium chloride (as coolant)	NaCl	D, E	30 %, < 5 °C, pH > 8	HQQE	-
Sodium hydroxide	NaOH	E	20 %, 50 °C	-	HQQE
Sodium hypochlorite	NaOCl	F	0.1 %, 20 °C	-	HQQV
Sodium nitrate	$NaNO_3$	E	10 %, 60 °C	-	HQQE
Sodium phosphate	Na_3PO_4	E, H	10 %, 60 °C	-	HQQE
Sodium sulphate	Na_2SO_4	E, H	10 %, 60 °C	-	HQQE
Softened water		-	< 120 °C	-	HQQE
Soya oil		D, E, 3	100 %, 80 °C	HQQV	-
Sulphuric acid	H_2SO_4	F	1 %, 20 °C	-	HQQV
Sulphurous acid	H_2SO_3	-	1 %, 20 °C	-	HQQE
Unsalted swimming-pool water		-	Approx. 2 ppm free chlorine (Cl_2)	HQQE	-

16. Further product information

WebCAPS

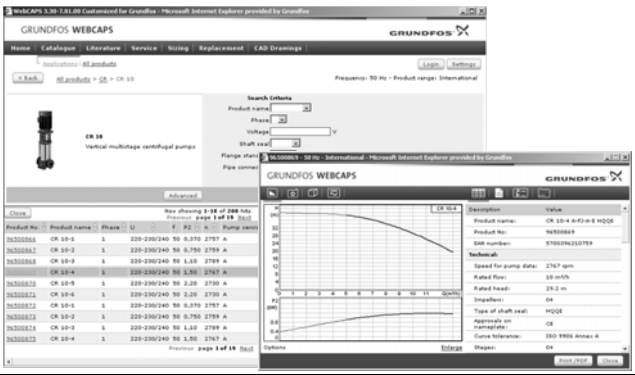


WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

Information in WebCAPS is divided into six sections:

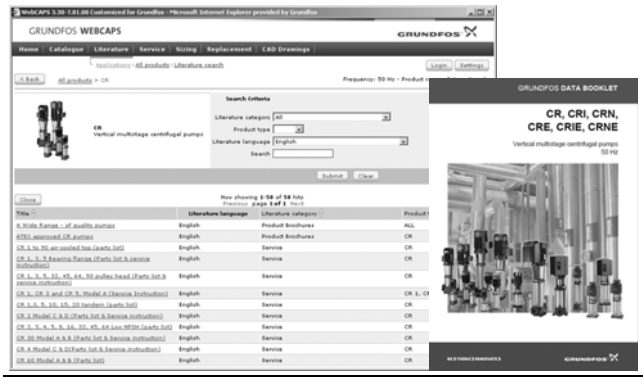
- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.



Catalogue

Based on fields of application and pump types, this section contains the following:

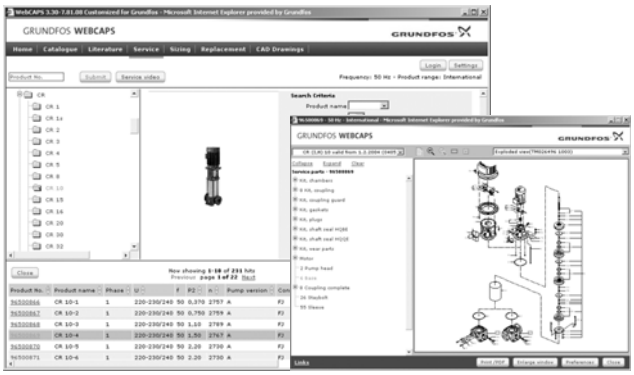
- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

This section contains all the latest documents of a given pump, such as

- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures.



Service

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps.
Furthermore, the section contains service videos showing you how to replace service parts.

Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.

Replacement

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump.
The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.

CAD drawings

In this section, it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

2-dimensional drawings:

- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:

- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

WinCAPS

Fig. 111 WinCAPS DVD

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no internet connection is available.

WinCAPS is available on DVD and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!

CAPS functionality on the mobile workplace.

Available on the App Store

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