CR, CRI, CRN, CRT, CRE, CRIE, CRNE, CRTE custom-built pumps

60 Hz NEMA

be
think
innovate

GRUNDFOS

Table of contents

1. Introduction 4
Customized CR pumps 4
Pumps for specific requirements 4
Features and benefits 5
Motors 5
Pump Energy Index (PEI) 6
Further documentation 7

2. Performance range 8
CR, CRI, CRN - 60 Hz 8
CRE, CRIE, CRNE - 60 Hz 9
CRT, CRTE, 60 Hz 10
CR, CRN High Pressure - 60 Hz 11

3. Identification 12
Type key 12

4. Applications 14
High-pressure applications 14
Hot-water applications 15
Temperature control applications 16
Aggressive/hazardous liquids 17
Hygienic applications 18
Special installation requirements 19
Special applications 20

5. Accessories 21
ATEX-approved dry-running protection for EEC countries 21
Venting valve with connecting pipe 21
Dosing pump system for barrier fluid 21

6. Motors 22
Customized motor solutions 22
Standard WEG motors 22
Tropicalized motors 22
Energy 22
Other motor approvals 22
Explosion proof motors 23
Special voltage 24
Motor with multiplug connection 24
Motor with space heater 25
Motors with PTC sensors 26
Motors with thermal switches 27
Oversize motors 28
Alternative enclosure class (IP) 28
Alternative terminal box positions 28
4-pole motors 29
Motor efficiency classes 29
Alternate NEMA motors 29

7. Shaft seals 30
Shaft seal arrangements 30
Shaft seal variants 30
Overview of shaft seals 31
Single shaft seals 32
Double seal arrangements 32
Back-to-back seal arrangement 33
Tandem seal arrangement 37
CR with air-cooled top 39
Magnetic-drive pump (MAGdrive) 42

8. Pump 44
Measurement of inlet pressure 44
Pumping of liquids down to -40 °F 44
Carbon-free pumps 45
CRN all-stainless-steel pumps 45
Surface treatment 46
CR low NPSH 48
Horizontal in-line pumps 49
Horizontal end-suction pumps 54
Belt-driven pumps 56
Pump rubber parts 58
Bearing flange 59
Support bearings 60
Bearing material 60
Pump head positions 60
Customized nameplate 60
Dry-running protection 61
Pipe connections 62
Base plate for CR 95 with CR 90 footprint 67

9. Certificates 68
CR pumps with certificates 68
Examples of certificates 70

10. CRE pump solutions 74
Customized CRE pump solutions 74
Outdoor installation 76
Communication with CRE pumps 77
CIU communication interface units 79
CIM communication interface modules 79
Industrial custom-built E-solutions 80

11. How to read the curve charts 86
Guidelines to performance curves 87

12. Performance curves 88
Low-NPSH pumps with 2-pole motor 88
CR pumps with 4-pole motor 96

13. Technical data 111
Dimensional drawings for CR low-NPSH pumps . . 111

CR low-NPSH pumps dimensions 114
CRE low-NPSH pumps dimensional data 119
CR pumps with 4-pole motor 128
Boiler feed pumps 131
Bypass orifices dimensions 137
CRN pumps with magnetic drive 138

14. Motor data 145
Standard motors in the CR range 145
2-pole TEFC motors (WEG) 146
4-pole TEFC motors (WEG) 148
2-pole ODP motors (WEG) 149
Motors for CRE pumps (Grundfos MLE) 150
2-pole TEFC motors (Grundfos ML) 151

15. Pumped liquids 153
List of pumped liquids 153

16. Grundfos Product Center 156
Grundfos GO Remote 157

1. Introduction

This catalogue gives an overview of some of the customized CR pump 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 application.

Related information

Further documentation

Customized CR pumps

We offer a wide range of customized 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
- crystallizing 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).

The below pump types are available as customized pumps.

Pump type	CR	CRI	CRN
1s, 1, 3, 5	•	•	•
10, 15, 20	•	•	•
32, 45, 64	•		•
95, 125, 155	•		•
185, 215, 255	•		•

Note: CRT, CRTE 2, 4, 8 and 16 are also available as customized pumps.

Pumps for specific requirements

The CR pumps can be customized to meet customer-specific requirements. This is due to the "mix-and-match" approach to customization, where the many pump features and options are to be regarded as modules that can be combined to create the ideal pump.

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.
- The 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.

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 crystallize, harden or are extremely abrasive.

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.

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.

Features and benefits

Customized CR pumps have the following features and benefits:

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, CRTE:	Titanium
CRN, CRNE:	Stainless steel AISI 316
CRI, CRIE:	Stainless steel AISI 304
CR, CRE:	Stainless steel AISI 304/cast iron.

Wide range of pump sizes

The CR pump comes in 16 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 maximized by the optimized 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.

GR5357

Motors

CR pumps are fitted with a Grundfos specified motor. The pumps are supplied with WEG motors as standard. Grundfos ML motors are available on request. The CRE pumps are fitted with a high-speed Grundfos MLE motor with integrated frequency converter. Three-phase motors comply with EISA requirements.

WEG motors 0.25 to 20 HP

- rolled steel construction
- service factor 1.15
- suitable for VFD operation per NEMA MG 1 part 31.4.4.2
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

WEG motors 25 to 300 HP

- cast iron frame
- rated for severe duty
- service factor 1.25 (25 to 100 HP)
- service factor 1.15 (125 to 300 HP)
- Inverter rated per NEMA MG 1 part 31
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G.

Pump Energy Index (PEI)

Pump Energy Index (PEI) was established by the U.S. Department of Energy (DOE) and adopted by Canada as the standard metric used to evaluate pump efficiency. The value is the ratio of the pump efficiency rating (PER) divided by the calculated minimally compliant PER (PER_{STD}) for the pump type. This provides a representation of a pump's actual performance compared to the minimal standard performance required by regulation. The lower the PEI value, the more efficient a pump is at the tested operating points.

PER is determined by defined testing parameters required by the DOE. This includes testing a particular pump model at its best efficiency point (BEP).

For PEI values there are two different versions:

- PEI_{CL} (constant load): Applies to a bare-shaft pump and a pump sold with a motor
- PEI_{VL} (variable load): Applies to pumps sold with a motor and controller (such as VFD, VSD)

The DOE has set the maximum PEI value as 1.00. Any pump, pump and motor, or pump, motor and controller that exceeds a PEI value of 1.00 can no longer be manufactured after January 26, 2020.

PEI is a generalized efficiency value. PEI cannot be used to determine the efficiency of a pump in a specific application.

PEI for standard and low-NPSH CR pumps

PEI values for standard CR pumps

Product type	Poles	PEI_{CL} bare-shaft pump	PEI_{CL} pump with motor	PEI_{VL} pump with motor plus controller[1)]	Impeller diameter [in (mm)]
CR, CRN, CRI 10	2	0.87	0.87	0.48	3.66 (92.9)
CR, CRN, CRI 15	2	0.91	0.91	0.48	4.13 (104.8)
CR, CRN, CRI 20	2	0.91	0.91	0.47	4.13 (104.8)
CR, CRN 32	2	0.87	0.87	0.45	4.66 (118.4)
	4	0.90	0.90	0.50	
CR, CRN 45	2	0.89	0.89	0.46	5.34 (136)
	4	0.91	0.91	0.47	
CR, CRN 64	2	0.93	0.93	0.46	5.59 (142)
	4	0.94	0.94	0.48	
CR, CRN 95	2	0.92	0.93	0.45	6.07 (154)
	4	0.94	0.94	0.47	
CR, CRN 125	2	0.92	0.93	0.59	6.38 (162)
	4	0.94	0.94	0.47	
CR, CRN 155	2	0.93	0.93	0.59	6.64 (169)
	4	0.95	0.95	0.47	
CR, CRN 185[2)]	4	0.95	0.95	0.46	7.36 (187)
CR, CRN 215[2)]	4	0.96	0.96	0.47	7.80 (198)
CR, CRN 255[2)]	4	0.97	0.97	0.48	7.72 (196)

1) Grundfos CUE continuous controls.

2) 2-pole CR, CRN 185, 215, 255: Out of scope for DOE PEI.

PEI values for CR low-NPSH pumps

Product type	Poles	PEI_{CL} bare-shaft pump	PEI_{CL} pump with motor	PEI_{VL} pump with motor plus controller[1)]	Impeller diameter [in (mm)]
CR, CRN, CRI 5	2	0.94	0.94	0.54	2.88 (73.2)
CR, CRN, CRI 10	2	0.93	0.94	0.50	3.66 (92.9)
CR, CRN, CRI 15	2	0.93	0.93	0.48	4.13 (104.8)
CR, CRN, CRI 20	2	0.96	0.96	0.49	4.13 (104.8)
CR, CRN, CRI 32	2	0.87	0.87	0.45	4.66 (118.4)
CR, CRN, CRI 45	2	0.89	0.89	0.46	5.34 (136)
CR, CRN, CRI 64	2	0.93	0.93	0.46	5.59 (142)

1) Grundfos CUE continuous controls.

PEI values for CRE low-NPSH pumps

Product type	Poles	PEI_{VL}	Impeller diameter
CRE, CRNE, CRIE 5	2	See dimensional data for CRE 5 low-NPSH pumps.	
CRE, CRNE, CRIE 10	2	See dimensional data for CRE 10 low-NPSH pumps.	
CRE, CRNE, CRIE 15	2	See dimensional data for CRE 15 low-NPSH pumps.	
CRE, CRNE, CRIE 20	2	See dimensional data for CRE 20 low-NPSH pumps.	
CRE, CRNE, CRIE 32	2	See dimensional data for CRE 32 low-NPSH pumps.	
CRE, CRNE, CRIE 45	2	See dimensional data for CRE 45 low-NPSH pumps.	
CRE, CRNE, CRIE 64	2	See dimensional data for CRE 64 low-NPSH pumps.	

Related information

CRE 5 low-NPSH pumps dimensional data
CRE 10 low-NPSH pumps dimensional data
CRE 15 low-NPSH pumps dimensional data
CRE 20 low-NPSH pumps dimensional data
CRE 32 low-NPSH pumps dimensional data
CRE 45 low-NPSH pumps dimensional data
CRE 64 low-NPSH pumps dimensional data

Further documentation

This product guide is a supplement to the product guides listed below. It gives an overview of some of the customized solutions offered by Grundfos. If the product guide does not provide a solution to your specific pumping needs, please contact us with a detailed description of your application.

The following product guides are available in the Grundfos Product Center.

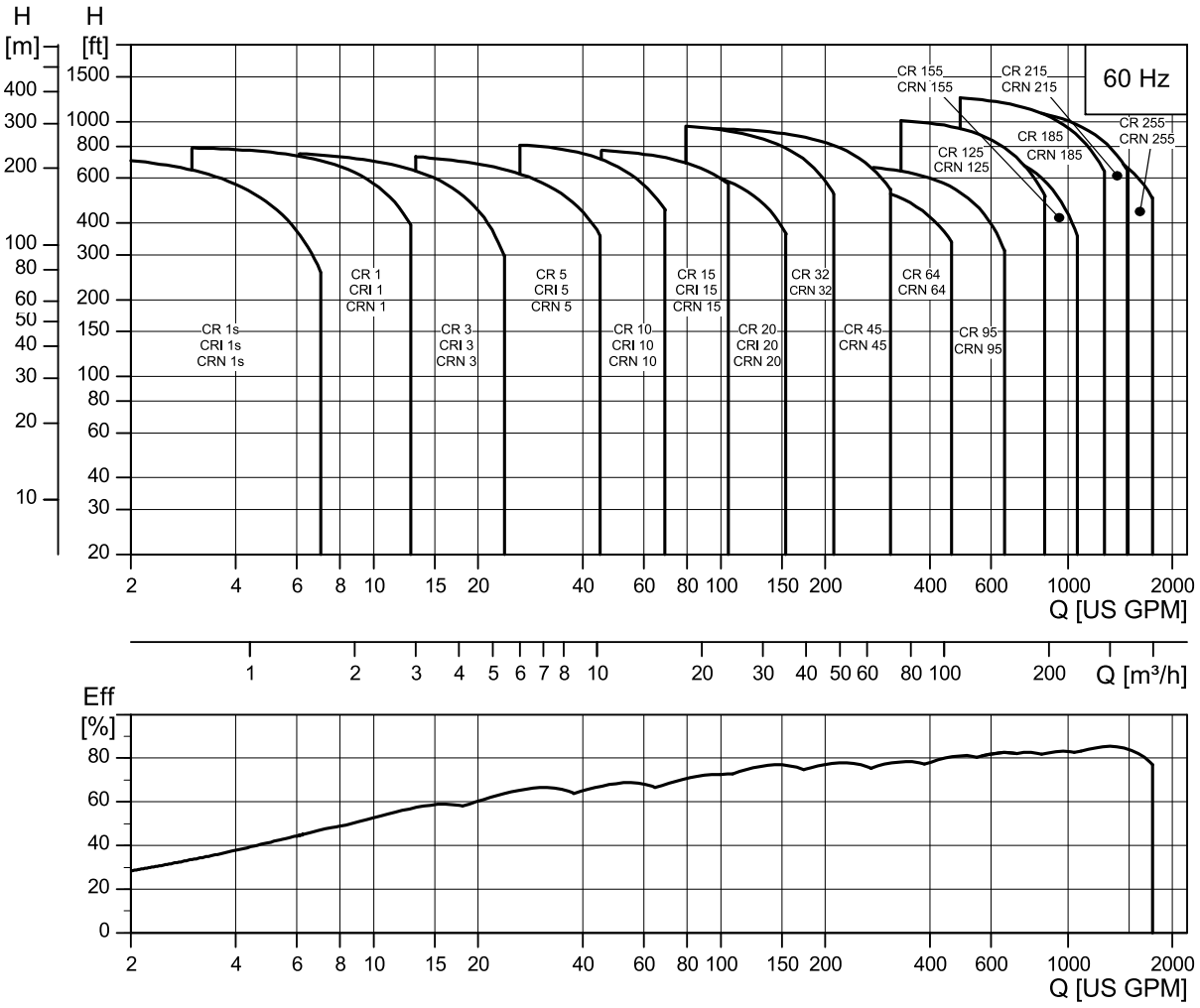
Product guide	Link and publication number
CR, CRI, CRN	http://net.grundfos.com/qr/i/98446676
CR, CRN 95-255	http://net.grundfos.com/qr/i/99407996
CRE, CRIE, CRNE	http://net.grundfos.com/qr/i/98556115
CRT, CRTE	http://net.grundfos.com/qr/i/99401478
CR, CRN High pressure	http://net.grundfos.com/qr/i/98561453
CRN-H, CRE-H, CRNE-H	http://net.grundfos.com/qr/i/98665987
Mechanical shaft seals for pumps	http://net.grundfos.com/qr/i/97506935

Related information

16. Grundfos Product Center

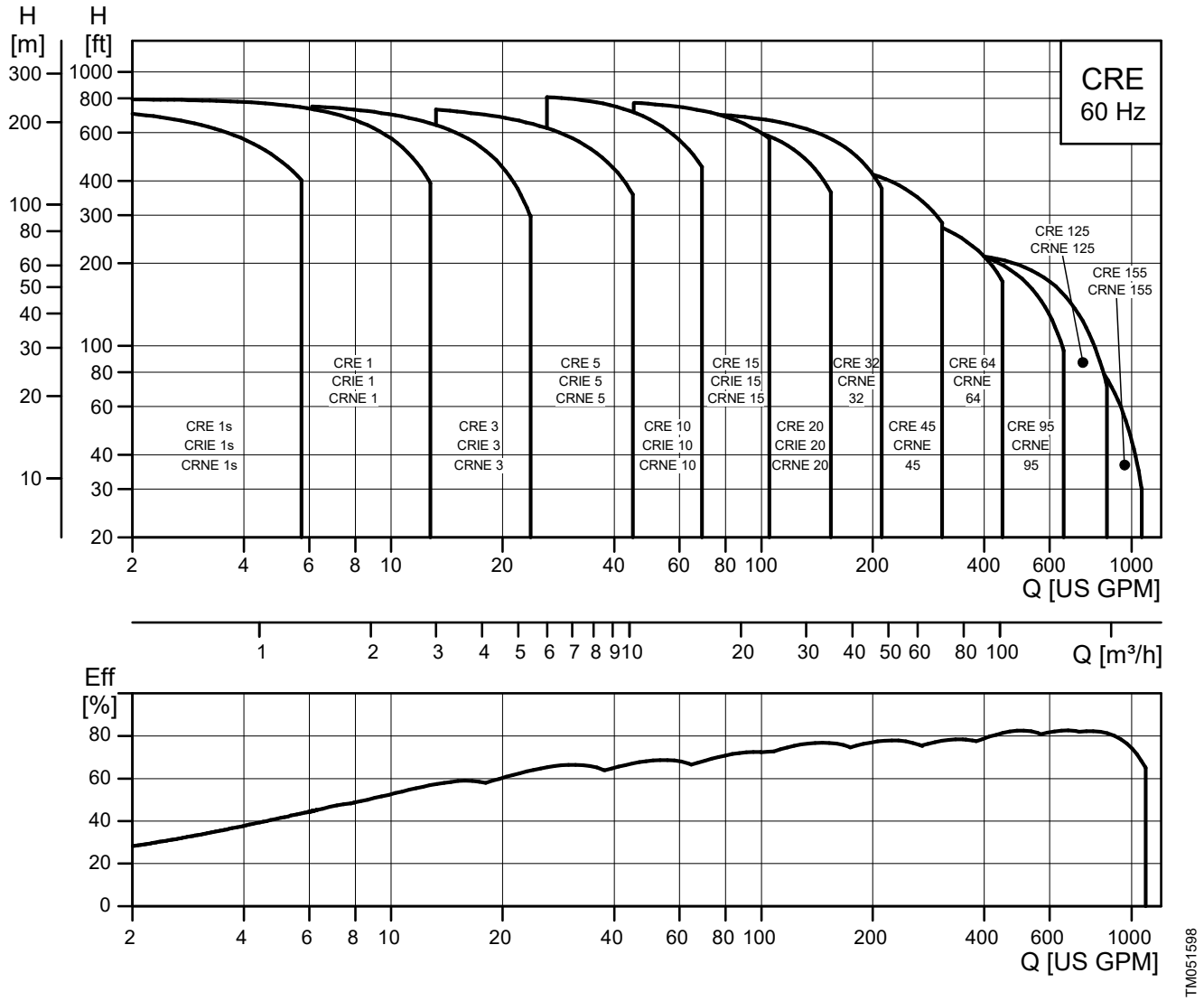
2. Performance range

CR, CRI, CRN - 60 Hz



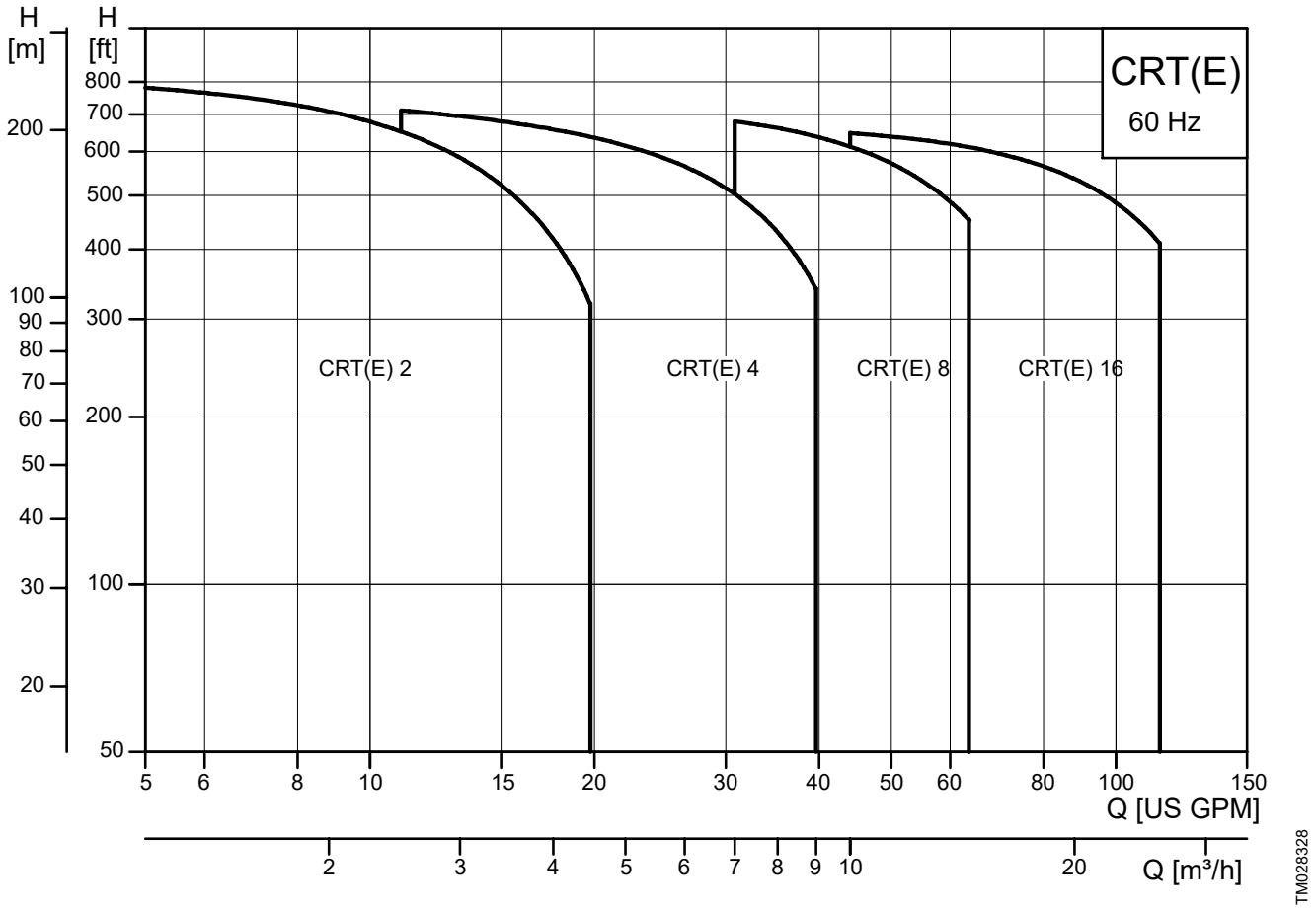
TM025518

CRE, CRIE, CRNE - 60 Hz

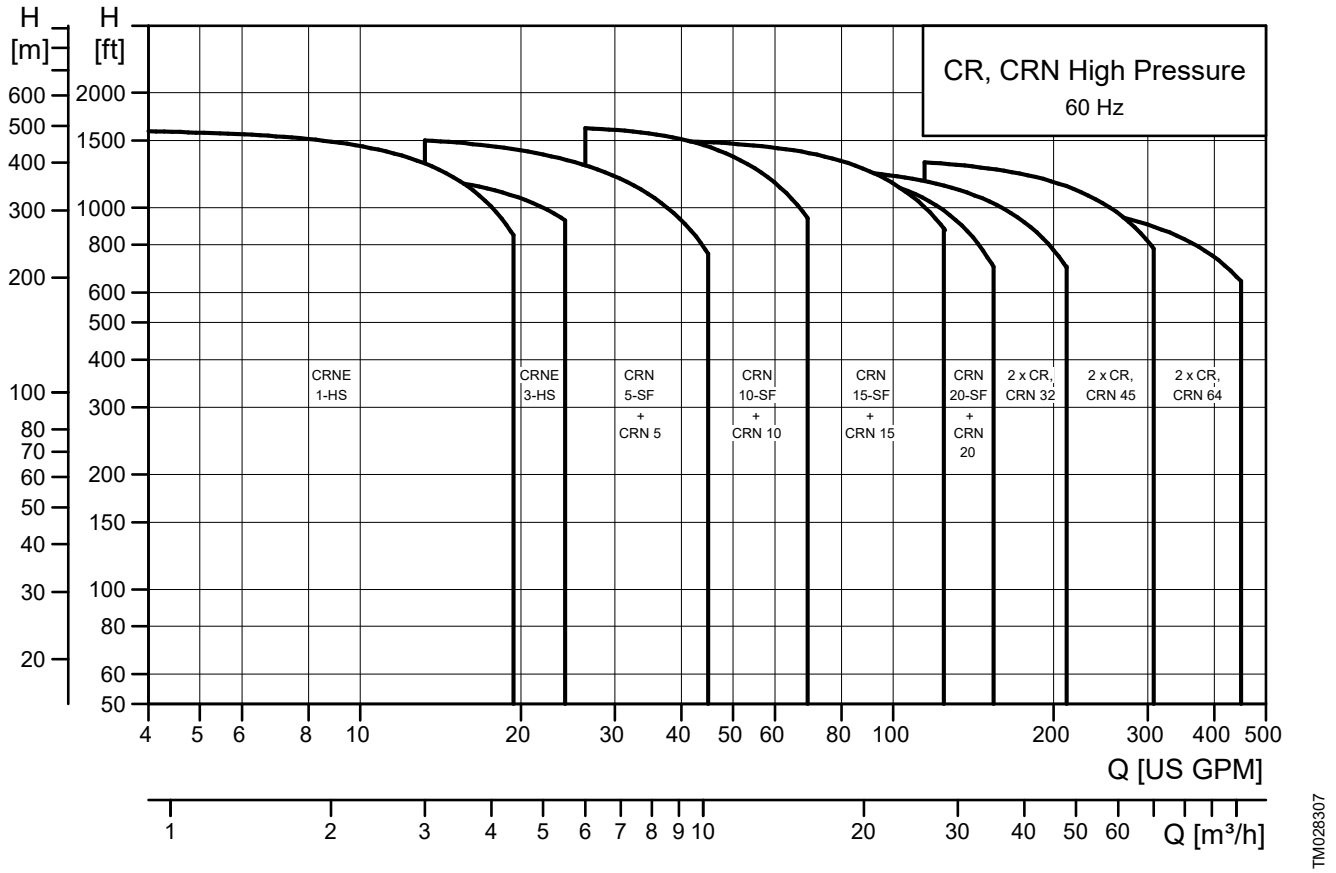


Note that CRE, CRIE, CRNE pumps are available up to 30 HP (22 kW).

CRT, CRTE, 60 Hz



CR, CRN High Pressure - 60 Hz



3. Identification

Type key

Example

CRE 32-4-2 A-G-A-E-HQQE-N-C-B

Code	Explanation
CR	Type range: CR, CRI, CRN, CRT
E	Pump with integrated frequency converter
32	Flow rate [gpm (m^3/h)]
4	Number of impellers
2	Number of reduced-diameter impellers
A	Code for pump version
G	Code for pipe connection
A	Code for materials
E	Code for rubber parts
H Q Q E	Code for shaft seal: • Shaft seal type designation • Seal face material (rotating seal face) • Seal face material (stationary seal face) • Secondary seal material (rubber parts)
N	Code for motor: P2 [HP (kW)]
C	Code for motor: phase and voltage [V]
B	Code for motor: speed variant [rpm]

Key to codes

Code	Description
Pump version	
A	Basic version
B	Oversize motor
C	CR compact
D	Pump with pressure intensifier
E	Pump with certificate
F	Pump for high temperatures (with air-cooled top)
G	E-pump without operating panel
H	Horizontal version
I	Different pressure rating
J	E-pump with a different maximum speed
K	Pump with low NPSH
L	Pump including Grundfos CUE and certificate
M	Magnetic drive
N	With sensor
O	Cleaned and dried
P	Undersize motor
Q	High-pressure pump with high-speed MGE motor
R	Belt-driven pump
S	High-pressure pump
T	Thrust handling device
U	ATEX-approved pump
V	Cascade function
W	Deep-well pump with ejector
X	Special version
Y	Electropolished
Z	Pumps with bearing flange
Pipe connection	
A	Oval flange
B	NPT thread
CA	FlexiClamp
CX	TriClamp
F	DIN flange
FC	DIN 11853-2 flange (collar flange)
FE	EN 1092-1, type E
G	ANSI flange
J	JIS flange
N	Changed diameter of ports
P	PJE coupling (Victaulic type)
X	Special version
Materials	
A	Basic version
C	Carbon-free pump
D	Carbon-graphite-filled PTFE (bearings)/tungsten carbide
E	Pickled and passivated (Only Japan)
H	Flanges and base plate EN 1.4408
K	Bronze (bearings)/tungsten carbide
L	Motor stool, base plate and flanges EN 1.4408
M	Motor stool, base plate, coupling and flanges EN 1.4408 and coupling guards in cobber. Bolts, nuts and spacing pipes EN 1.4401 or higher grade
N	Flanges EN 1.4408
P	PEEK neck ring
Q	Silicon carbide/silicon carbide bearing in pump and silicon carbide/silicon carbide seal faces in thrust handling device
R	Silicon carbide/silicon carbide bearing
S	PTFE neck rings
T	Base plate EN 1.4408
U	Silicon carbide/silicon carbide bearing in pump and silicon carbide/tungsten carbide seal faces in thrust handling device
W	Tungsten carbide/tungsten carbide
X	Special version
Rubber parts in pump	
E	EPDM
F	FXM (Fluoraz®)
K	FFKM (Kalrez®)
N	CR (Neoprene)
V	FKM (Viton®)
Shaft seal type designation	
A	O-ring seal with fixed driver
H	Balanced cartridge seal with O-ring
O	Double seal, back-to-back
P	Double seal, tandem

Code	Description
X	Special version
Seal face material (rotating and stationary seal face)	
B	Carbon, synthetic resin-impregnated
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®)

Codes for motor

Code	Description
P2 [HP (kW)]	
C	0.33 (0.25)
D	0.5 (0.37)
E	0.75 (0.55)
F	1 (0.75)
G	1.5 (1.1)
H	2 (1.5)
I	3 (2.2)
K	5 (4)
L	7.5 (5.5)
M	10 (7.5)
N	15 (11)
O	20 (15)
P	25 (18.5)
Q	30 (22)
R	40 (30)
S	50 (37)
T	60 (45)
U	75 (55)
V	100 (75)
W	120 (90)
1	150 (110)
2	175 (132)
3	215 (160)
4	270 (200)
5	335 (250)
Phase and voltage (V)	
A	1 x 200-240 V
B	3 x 200-240 V
C	3 x 440-480 V
D	3 x 380-500 V
X	Not defined
Speed variant (rpm)	
A	1450-2000
B	2900-4000
C	4000-5900
2	2-pole
4	4-pole

4. Applications

High-pressure applications

CR high-pressure pumps

Reference applications

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

Customized 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 customized solutions designed to meet your needs!

High-pressure handling

We offer high-pressure pumps specially designed to cope with pressures up to 725 psi (50 bar) at maximum 248 °F (120 °C).

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 24 gpm, the 2-pump solution for flow rates above 24 gpm.

Single-pump solutions

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 minimize 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.

Two-pump solutions

We offer two-pump solutions for the following pumps:

- CRN 5, 10, 15, 20, 32, 45, 64 SF

The solution consists of two pumps in series. The first pump is a standard pump for feeding. The second pump is a high-pressure pump (SF) especially designed for high pressure.

To minimize 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.

Supplementary Grundfos pumps

For pressures above 725 psi (50 bar), we recommend Grundfos BM modules or Grundfos BME, BMET pumps.

Further documentation

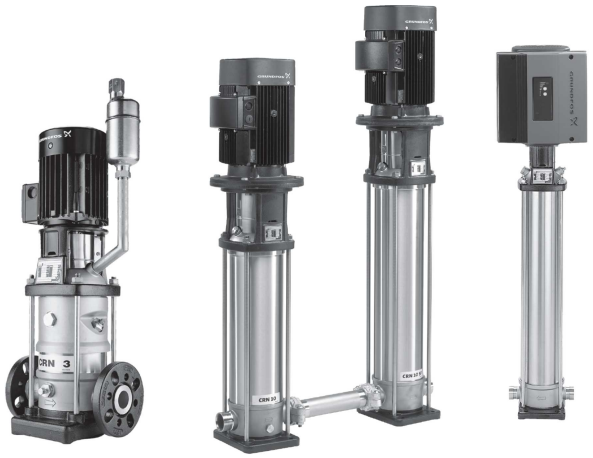
The following product guide is available in the Grundfos Product Center.

Product guide	Link and publication number
CR, CRN High pressure	http://net.grundfos.com/qr/i/98561453

Related information

Special installation requirements
10. CRE pump solutions
16. Grundfos Product Center

Hot-water applications



TM078857

CR pumps for hot-water applications

Reference applications

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

Customized 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 customized solutions designed to meet your needs and special requirements:

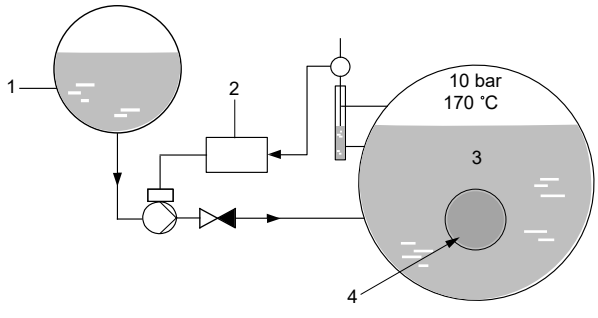
- steady steam production
- poor inlet conditions
- high temperature.

Steady steam production

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

Why we recommend speed-controlled pumps:

- Steady and continuous flow of water increases efficiency of the boiler.
- The reaction to changes in the steam consumption is faster compared to the on/off pump control.
- The water level in the boiler feed tank is kept stable, which ensures higher steam quality and less humidity in the steam.
- The installation and maintenance costs are lower compared to systems with on/off controlled pumps and valves as well as systems with level control and modulating feed valves.
- No bypass pipe is needed.



TM032615

Boiler-feed application with speed-controlled pump

Pos.	Description
1	Condensate
2	Controller
3	Boiler
4	Burner

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 pump's NPSH value and prevents erosion and destruction of the pump.

For further information about NPSH and the calculation of NPSH-value, see the product guides available in Grundfos Product Center.

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 356 °F (180 °C) at 363 psi (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.

Related information

Special installation requirements
Oversize motors
CR with air-cooled top
CR low NPSH
10. CRE pump solutions
16. Grundfos Product Center

Temperature control applications

TM027397

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.

Customized solutions

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

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

- liquids at temperatures down to -40 °F (-40 °C)
- high-temperature liquids
- high-viscous liquids and similar.

Pumping of liquids down to -40 °F (-40 °C)

In applications where liquids are pumped at temperatures down to -40 °F (-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 -4 °F (-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 356 °F (180 °C) at 363 psi (25 bar)
- thermal oils up to 464 °F (240 °C) at 232 psi (16 bar).

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 viscous liquids

In applications where 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.

Related information

Special installation requirements
ATEX-approved pumps for EEC countries
Oversize motors
CR with air-cooled top
Pump rubber parts
10. CRE pump solutions
16. Grundfos Product Center

Aggressive/hazardous liquids

CR pumps for aggressive/hazardous liquids

Reference applications

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

Customized 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 customized solutions designed to meet your needs!

We provide solutions for the following liquids:

- aggressive 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 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 a pressure intensifier preventing leakage from the pump to the atmosphere side.

Pumps with tandem seal arrangement

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

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

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.

ATEX-approved pumps

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

Electropolished pumps

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

We offer electropolished pumps in all CRN pump sizes.

Related information

Special installation requirements
ATEX-approved pumps for EEC countries
Back-to-back seal arrangement
Tandem seal arrangement
Magnetic-drive pump (MAGdrive)
10. CRE pump solutions
16. Grundfos Product Center

Hygienic applications

TM078859

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.

Customized solutions

We provide solutions for applications involving special requirements to hygienic design, materials, surface quality 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	•	•	Ra ≤ 0.8 µm
CRN 10, 15, 20	•	•	Ra ≤ 0.8 µm
CRN 32, 45, 64	•		Ra ≤ 8.0 µm
		•	Ra ≤ 0.8 µm
CRN 95, 125, 155	•		Ra ≤ 8.0 µm
		•	Ra ≤ 0.8 µm
CRN 185, 215, 255	•		Ra ≤ 8.0 µm
		•	Ra ≤ 0.8 µm

• Available.

Note that 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 section about TriClamp connections.

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

For secondary hygienic applications, for example non-food contact applications, we recommend CRN, CRNE pumps which have all wetted 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, vapors, mists or dusts in which the explosion spreads after ignition. Grundfos ATEX-approved pumps comply with the ATEX directive for EEC countries.

Related information

Special installation requirements
ATEX-approved pumps for EEC countries
Back-to-back seal arrangement
Tandem seal arrangement
Magnetic-drive pump (MAGdrive)
TriClamp connection
10. CRE pump solutions
16. Grundfos Product Center

Special installation requirements

TM060754

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.

Customized 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 customized solutions designed to meet your needs!

We provide solutions for the following pump types:

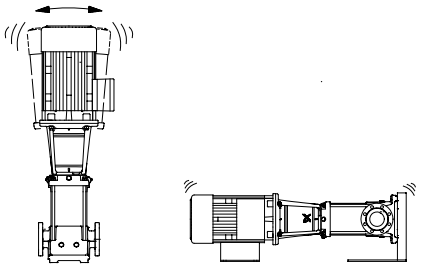
- horizontally mounted pumps
- belt-driven pumps
- pumps with alternative mounting.

Horizontally mounted pumps

We recommend horizontally mounted pumps in the following cases:

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

Horizontally mounted pumps lower the center of gravity and thus minimize swings during an earthquake. See the example in the figure below.



TM032645

Vibrations of pumps in earthquake-prone areas

Horizontal mounting requires special mounting plates, and foot-mounted motors are required on pumps with a motor size of 7 1/2 HP or larger.

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 engine or other device.

Alternative mounting for limited access and space

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 customized 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.

Related information

CRN all-stainless-steel pumps
Belt-driven pumps
CR pumps with certificates
10. CRE pump solutions
16. Grundfos Product Center

Special applications

TM078860

CRT, CRNE and CRN pumps

Reference applications

- Off-shore and maritime applications
- cooling applications
- pumps operating under special conditions.

Customized solutions

To ensure a stable and reliable operation, we offer customized solutions for a number of special applications that can be designed to meet your needs. Examples:

- Off-shore and maritime applications
- pumping of liquids down to -40 °F (-40 °C)
- special conditions
- special requirements as to approvals, voltage and frequency.

Off-shore and maritime applications

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

We offer customized pumps with a wide variety of 3.1C inspection certificates, such as Lloyds Register of Shipping (LRS), Det Norske Veritas (DNV), American Bureau of Shipping (ABS), and US Coast Guard (USCG).

Furthermore, we offer customized pumps with a wide variety of materials, connections and enclosure classes.

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

Pumping of liquids down to -40 °F (-40 °C)

In applications with liquid temperatures down to -40 °F (-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 -4 °F (-20 °C), we recommend CRN pumps.

Pumps operating under special conditions

- Installations at high altitudes above 3280 ft (1000 m).
- applications with low, high or fluctuating ambient temperatures
- the pumping of high-viscous/high-density liquids.

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

Special requirements

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

Related information

Special installation requirements
Oversize motors
Pumping of liquids down to -40 °F
CR pumps with certificates
10. CRE pump solutions
16. Grundfos Product Center

5. Accessories

ATEX-approved dry-running protection for EEC countries

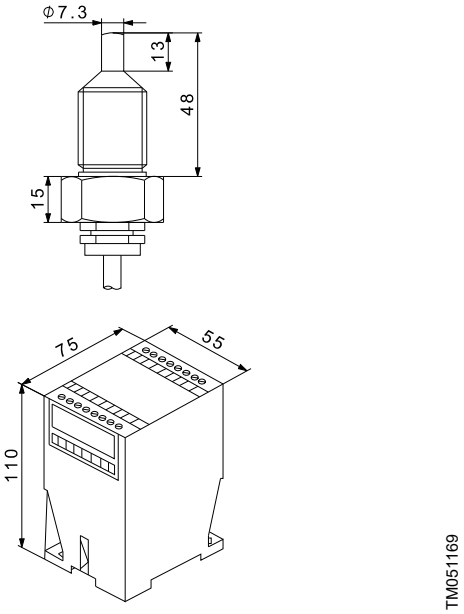
For environments, group II, category 2G, always use the ATEX-approved dry-running protection described below.

The link between ATEX groups, categories and zones is explained in the 1999/92/EC directive. Please note that this is a minimum 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.

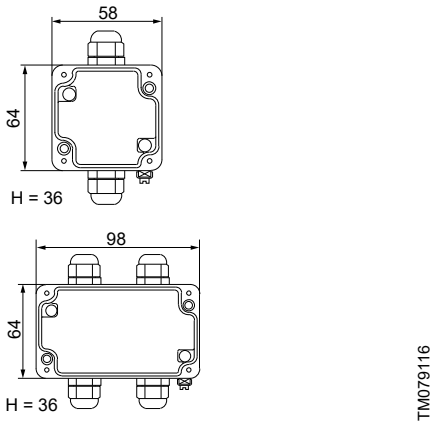
The dry-running protection with ATEX approval mentioned below is offered by Grundfos.

Components

Designation	Ex marking	Connection	[°C]	Product number
Flow sensor	II 2G Ex ib IIC T6	G 1/2 AISI316Ti	85	96607921
		G 1/2 AISI316Ti	120	96607922
Amplifier for flow sensor	-		[V]	-
	II (1) GD [Ex ia] IIC		230	96607923
Extension box	-	Terminals	Type	-
	II 2GEx e IIT6	4	GKEI 100	97754528
	II 2GEx ia IIC T6	4	GKI 60	97754527
	II 2GEx e [ia] IIC T6	4	GKE 60	97752524



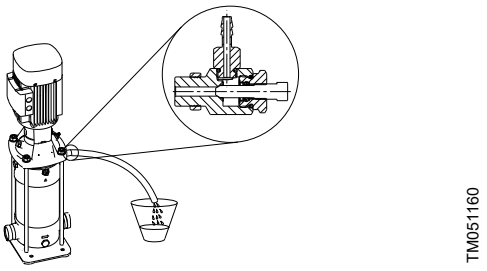
ATEX-approved flow sensor and amplifier



ATEX-approved extension box (mm)

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



Venting valve with connecting pipe

The connecting pipe of this special venting valve allows the operator to de-aerate 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

Dosing pump system for barrier fluid

The dosing pump system is used to supply pressurised barrier liquid to a CR pump with a back-to-back seal arrangement.

Related information

Back-to-back seal arrangement

6. Motors

CR pumps are fitted with a Grundfos specified motor. The pumps are supplied with WEG motors as standard. Grundfos ML motors are available on request. The CRE pumps are fitted with a high-speed Grundfos MLE motor with integrated frequency converter. Three-phase motors comply with EISA requirements.

Customized motor solutions

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

- a wide range of motor approvals
- motors with special voltage
- motors with space heater
- motors with built-in PTC sensor
- motors with built-in thermal switch
- oversize motors
- motors with alternative enclosure class
- tropicalized motor windings
- explosion proof motors
- custom NEMA motor

Standard WEG motors

WEG motors 0.25 to 20 HP

- rolled steel construction
- service factor 1.15
- suitable for VFD operation per NEMA MG 1 part 31.4.4.2
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

WEG motors 25 to 300 HP

- cast iron frame
- rated for severe duty
- service factor 1.25 (25 to 100 HP)
- service factor 1.15 (125 to 300 HP)
- Inverter rated per NEMA MG 1 part 31
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G.

Tropicalized motors

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

Grundfos defines a tropicalized 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.

Energy

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

- CEL
- EISA
- 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.

Explosion proof motors

ATEX-approved pumps for EEC countries

TM016193

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

We offer explosion-proof motors in accordance with the directive 2014/34/EU, 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.

ATEX-approved pumps are supplied with serial number, special installation and operating instructions, and a nameplate showing the ATEX classification. The nameplate includes an "X" to indicate that the product is subject to special conditions for safe use.

A pump report 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	II 2G Ex eb IIC T3 Gb II 2G Ex db IIC T4 Gb	II 2D Ex tb IIIC T125 °C Db (257 °F)
	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)[1)]
1999/92/EC[1)]	Zone 2	Zone 22
CR pumps available	CR, CRI, CRN, CRT	CR, CRI, CRN, CRT
Motors available	II 2G Ex eb IIC T3 Gb II 2G Ex db IIC T4 Gb	II 2D Ex tb IIIC T125 °C Db

1) The link between groups, categories and zones is explained in the 1999/92/EC directive. Please note that this is a minimum 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 [HP (kW)]	**Version**			
	II 2G Ex eb IIC T3 Gb	**II 2G Ex db IIC T4 Gb**	**II 2D Ex tb IIIC T125 °C Db (257 °F)**	**II 3D Ex tc IIIC T125 °C Dc (257 °F)**
0.5-38 (0.37-28)	•			
0.5-272 (0.37-200)		•	•	•

All explosion-proof motors have PTC sensors.

Related information

Motors with PTC sensors

Special voltage

We offer pumps with the following voltages:

Frequency	Voltage
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 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	
60 Hz	1 x 200-240 V
	3 x 200-240 V
	3 x 440-480 V 3 x 460-480 V

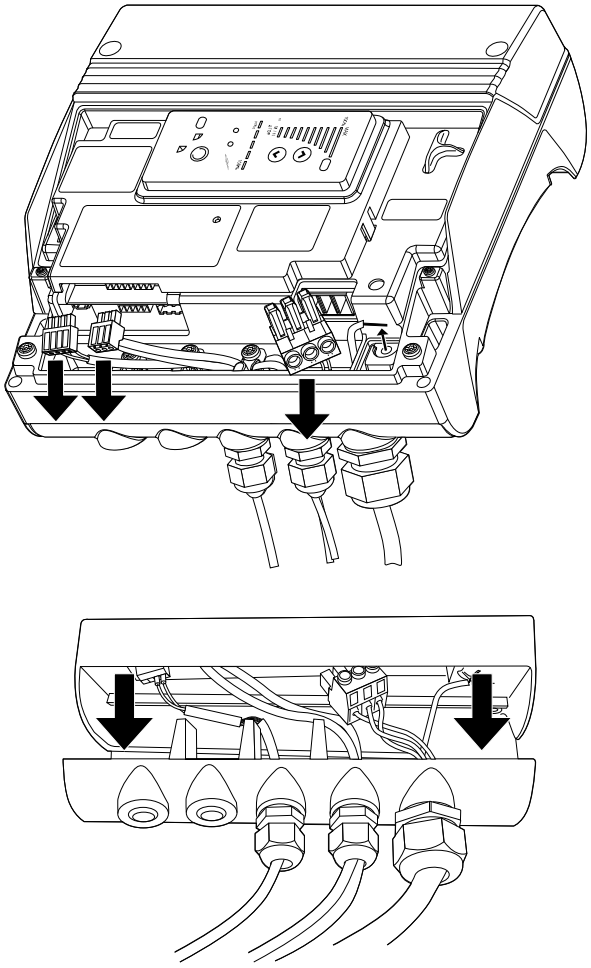
Note that other voltages are available on request.

Motor with multiplug connection

Plug-and-pump solutions for CRE pumps

To facilitate electrical installation and service of our three-phase CRE pumps fitted with integrated frequency converter, all motor terminal boxes are equipped with a detachable cable inlet bar. This plug-and-pump solution is available for CRE pumps up to 30 HP.

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



TM078862

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

Motor with space heater

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

High humidity may cause condensation in the motor. 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 always to use motors with space heater in areas with ambient temperatures below 32 °F (0 °C).

Note that 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 for example bearings and housing.

Motors from 1/2 - 150 HP (0.37 to 110 kW) are available with a space heater, also called anti-condensation heater. Space heater power supply is 1/60/110 or 1/60/230.

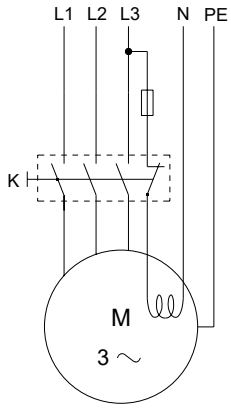
TM032440

Mains-operated ML motor with a space heater

Note that a space heater is standard on all MLE motors and can be activated remotely.

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 to install a motor with space heater.

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



TM034058

Three-phase motor with space heater

Key

Symbol	Designation
K	Contactor
M	Motor

Connect the space heater to the supply voltage so that it is on when the motor is switched off.

Motor size, 50/60 Hz [HP (kW)]		Power of heating unit [W]		
2-pole	4-pole	1 x 24 V	1 x 115 V	1 x 190-250 V
1/2 - 1 1/2 (0.37 - 1.1)	1/3 - 1 (0.25 - 0.75)	38	-	23
2 - 5 (1.5 - 3.0)	1 1/2 - 5 (1.1 - 3.0)	38	-	31
5 - 7 1/2 (4.0 - 5.5)	5 (4.0)	38	-	38
10 - 30 (7.5 - 22)	7 1/2 - 20[1] (5.5 - 15)[1]	38	-	2 x 38
40 - 50 (30 - 37)	25[1] (18.5)[1]	-	55	55
60 - 75 (45 - 55)	-	-	92	92
100 (75)	-	-	109	109

1) 20 and 25 HP (15 and 18.5 kW) 4-pole are oversize motors in the CR pump range.

Motors with PTC sensors

TM027038

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.

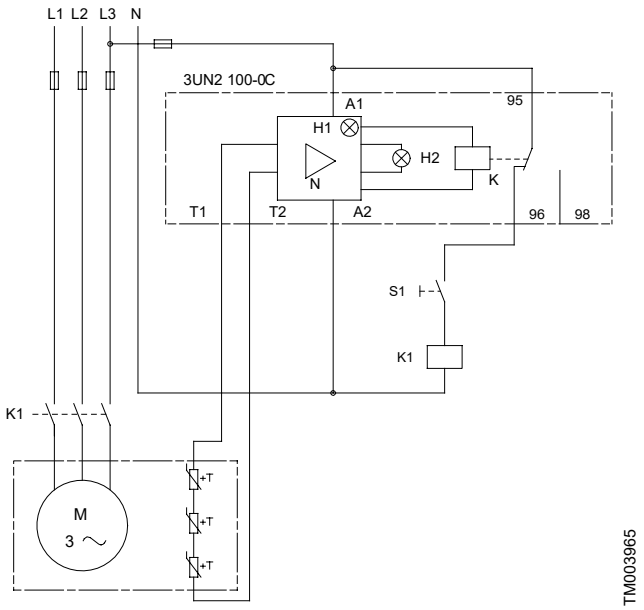
Three-phase mains-operated Grundfos ML motors from 5 HP (3 kW) and up have PTC sensors as standard.

Note that 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 section about LiqTec.

- PTC sensors offer protection against steady and rapid overload. PTO sensors offer protection against steady 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.



TM003965

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

Related information

LiqTec

Motors with thermal switches

TM027042

Thermal switch incorporated in winding

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

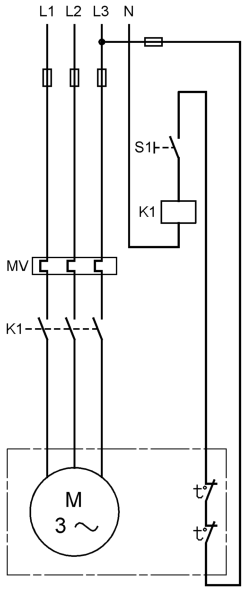
We offer three-phase mains-operated motors from 1/2 to 15 HP (0.37 to 11 kW) with built-in thermal switches.

Note that 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)



TM003964

Typical circuit of a three-phase motor with built-in bimetallic thermal switches

Key

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

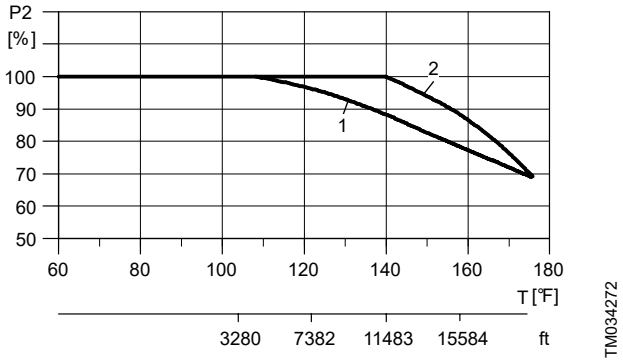
Oversize motors

We recommend using an oversize motor if operating conditions fall outside the operating conditions described in the relevant product guides available in Grundfos Product Center.

Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air at high altitudes. In such cases, it may be necessary to use a motor with a higher rated output (P2).

If the ambient temperature exceeds the maximum temperature limits of the pump or the pump is installed at an altitude exceeding the altitude values in the chart below, the motor must not be fully loaded due to the risk of overheating.

Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air at high altitudes. In such cases, it may be necessary to use a motor with a higher rated output (P2).



Relationship between motor output (P2) and ambient temperature (T) and altitude (ft)

Legend

Pos.	Description
1	NEMA energy-efficient motors
2	NEMA premium-efficiency motors

Example: From fig. Relationship between motor output (P2) and ambient temperature (T) and altitude (ft) it appears that P2 must be reduced to 88 % when a pump with a NEMA premium-efficiency Grundfos ML motor is installed at 15,584 ft (4750 m) above sea level. At an ambient temperature of 167 °F (75 °C), P2 of a standard-efficiency motor must be reduced to 74 % of rated output.

In cases where both the maximum temperature and the maximum altitude are exceeded, the derating factors must be multiplied. Example: 0.89 x 0.89 = 0.79.

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.

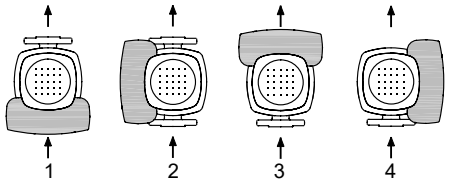
All motors comply with IP55 as standard.

On request, we offer motors in accordance with IP54, IP56, IP65 and IP66.

IP class	Description
IP54	• The motor is protected against the ingress of dust, meaning harmful layers of dust. • The motor is protected against water splashing from any direction.
IP55	• The motor is protected against the ingress of dust, meaning 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.



Possible terminal box positions

Pos.	Description
1	Position 6 o'clock (standard)
2	Position 9 o'clock
3	Position 12 o'clock
4	Position 3 o'clock

4-pole motors

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.

For performance curves of 4-pole CR pumps, see section about CR pumps with 4-pole motor.

For electrical data of 4-pole CR pumps, see section about standard motors in the CR range.

For pump types and motor ranges of 4-pole CR pumps, see section about CR pumps with 4-pole motor.

Related information

CR pumps with 4-pole motor

Standard motors in the CR range

Motor efficiency classes

North America

Motors fitted to CR pumps for use in North America comply with the US Energy Independence and Security Act (EISA).

EEC Countries

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.
- IE4: super premium efficiency
- IE5: ultra premium efficiency

IE = International Efficiency.

Three-phase motors of CR pumps are 0.75 to 200 kW IE3 motors as standard.

CR pumps with IE2, IE4 and IE5 motors are available on request.

Alternate NEMA motors

Explosion Proof: Motors are UL and CSA approved for Class I, Div I, Group D and Class II, Div I, Groups F&G as defined by NEC article 500. Explosion proof motors are all cast iron construction and corrosion resistant epoxy finish. 1.0 service factor when operated with sinewave power. Consult factory when explosion proof motors are operated via variable frequency.

Inverter Duty: Meets or exceeds requirements for variable torque applications as defined by MG-1 part 31 and premium efficiency per NEMA table 12-12 as well as class H insulation, ISR wire, thermostats and precision balance.

Inverter Ready: Energy efficiency and premium efficiency, TEFC motors are suitable for operation with VFD. Likewise ODP motors that are built with class F insulation. The motors meet or exceed requirements for spike resistance as defined by MG-1 part 31 section 4.4.2 as well as including class F insulation and ISR wire.

Severe Duty: Corrosion resistant hardware, double dip and bake winding varnish, epoxy finish, Marine duty with IEEE 45/USCG 259 label, moisture sealant between frame and end bell, neoprene gaskets, regreasable ball bearings, stainless steel nameplate, and v-ring shaft slinger seal. All cast iron construction. 182TC frames and larger.

Chemical Processing/Mill and Chem Duty: See Severe duty.

Dirty Duty: 416 stainless steel shaft extension, corrosion resistant hardware, double dip and bake winding varnish, epoxy finish, neoprene gaskets, stainless steel nameplate, and v-ring shaft slinger seal. Typically smaller, rolled steel, 56C frame motors.

IEEE-841 Mill and Chem Duty: Corrosion resistant hardware, division 2 nameplate markings, double dip and bake winding varnish, epoxy finish, foot pad planarity within 0.005 inches, Inpro seals, IP56 enclosure, conductor lugs, moisture sealant between frame and end bell, neoprene gaskets, precision balance, regreasable ball bearings, stainless steel nameplate, and v-ring shaft slinger seal.

Marine Duty per IEEE-45: See severe duty.

Washdown Duty: 300 series stainless steel hardware, autophoretic primer, double dip and bake winding varnish, double sealed ball bearings, epoxy finish, lip seal on drive end, moisture sealant between frame and end bell, neoprene gaskets, stainless steel shaft extension, and v-ring slinger seal on drive end.

7. Shaft seals

Shaft seal arrangements

CR pumps are available with these shaft seals to meet a wide variety of applications:

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

CR, CRE, CRI, CRIE, CRN, CRNE pumps are fitted with a cartridge shaft seal mounted in a single seal arrangement as standard:

- HQQE or HQQV, 0.3 - 300 HP (0.25 - 110 kW)

CRT, CRTE 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.

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 recommendations apply to clean water and water containing glycol.

For ultra pure water (conductivity lower than 5 µS/cm), do not use an xQQx seal face combination. Instead, use an xQUx seal face combination.

FKM (xxxV) is limited to 194 °F (90 °C) in water.

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

Further information on shaft seals

For explanation of codes, shaft seal types and materials, see the type key section, or see the product guide on mechanical shaft seals available in Grundfos Product Center.

Product guide	Link and publication number
Mechanical shaft seals for pumps	http://net.grundfos.com/qr/i/97506935

Overview of shaft seals

The below table shows the shaft seals available.
For information about codes for shaft seals, see section about type key.

		x = E		x = V		x = K		x = F	
Shaft seal type	**Shaft diameter [inch (mm)]**	**[psi] [°F]**	**[bar] [°C]**	**[psi] [°F]**	**[bar] [°C]**	**[psi] [°F]**	**[bar] [°C]**	**[psi] [°F]**	**[bar] [°C]**
HQQx	∅0.47, ∅0.63 (∅12, ∅16)	435 -40 to +248	30 -40 to +120	435 -4 to +194	30 -20 to +90	435 41 to 248	30 -5 to +120	435 14 to 248	30 -10 to +120
	∅0.87 (∅22)	435 -40 to +248	30 -40 to +120	435 -4 to +194	30 -20 to +90	435 41 to 248	30 -5 to +120	435 14 to 248	30 -10 to +120
		435-580 -40 to +176	30-40 -40 to +80	435-580 -4 to +176	30-40 -20 to +80	435-580 41 to 176	30-40 -5 to +80	435-580 14 to 176	30-40 -10 to +80
	∅1.1, ∅1.42 (∅28, ∅36)	363 -40 to +248	25 -40 to +120	363 -4 to +194	25 -20 to +90	-	-	363 14 to 248	25 -10 to +120
		363-580 -40 to +176	25-40 -40 to +80	363-580 -4 to +176	25-40 -20 to +80	-	-	-	--
HUUx[1]	∅0.47, ∅0.63 (∅12, ∅16)	435 -40 to +194	30 -40 to +90	435 -4 to +194	30 -20 to +90	435 41 to 194	30 -5 to +90	435 14 to 194	30 -10 to +90
	∅0.87 (∅22)	435 -40 to +194	30 -40 to +90	435 -4 to +194	30 -20 to +90	435 41 to 194	30 -5 to +90	435 14 to 194	30 -10 to +90
		435-580 -40 to +158	30-40 -40 to +70	435-580 -4 to +158	30-40 -20 to +70	435-580 41 to 158	30-40 -5 to +70	435-580 14 to 158	30-40 -10 to +70
	∅1.1, ∅1.42 (∅28, ∅36)	363 -40 to +176	25 -40 to +80	363 -4 to +176	25 -20 to +80	-	--	-	-
		363-580 -40 to +140	25-40 -40 to +60	363-580 -4 to 140	25-40 -20 to +60	-	-	-	-
HQUx[2] HUQx[3]	∅0.47, ∅0.63 (∅12, ∅16)	435 -40 to +230	30 -40 to +110	435 -4 to +194	30 -20 to +90	435 41 to 230	30 -5 to +110	435 14 to 230	30 -10 to +110
	∅0.87 (∅22)	435 -40 to +230	30 -40 to +110	435 -4 to +194	30 -20 to +90	435 41 to 230	30 -5 to +110	435 14 to 230	30 -10 to +110
		435-580 -40 to +158	30-40 -40 to +70	435-580 -4 to +158	30-40 -20 to +70	435-580 41 to 158	30-40 -5 to +70	435-580 14 to 158	30-40 -10 to +70
	∅1.1, ∅1.42 (∅28, ∅36)	363 -40 to +230	25 -40 to +110	363 -4 to +194	25 -20 to +90	-	-	-	-
		363-580 -40 to +158	25-40 -40 to +70	363-580 -4 to +158	25-40 -20 to +70	-	-	-	-
HQBx HUBx	∅0.47, ∅0.63 (∅12, ∅16)	435 32 to 248	30 0 to +120	435 32 to 194	30 0 to +90	435 32 to 248	30 0 to +120	435 32 to 248	30 0 to +120
	∅0.87 (∅22)	435 32 to 248	30 0 to +120	435 32 to 194	30 0 to +90	435 32 to 248	30 0 to +120	435 32 to 248	30 0 to +120
		435-580 32 to 176	30 to 40 0 to +80	435-580 32 to 176	30-40 0 to +80	435-580 32 to 176	30-40 0 to +80	435-580 32 to 176	30-40 0 to +80
	∅1.1, ∅1.42 (∅28, ∅36)	363 32 to 248	25 0 to +120	363 32 to 194	25 0 to +90	-	-	-	-
		363-580 32 to 176	25-40 0 to +80	363-580 32 to 176	25-40 0 to +80	-	-	-	-

1) HUUF ∅0.87 inches (∅22 mm) shaft diameter is available for CR pump sizes 1s-64.

2) HQUx shaft seal types are available for shaft diameters ∅0.47, ∅0.63 and ∅0.87 inches (∅12, ∅16 and ∅22 mm).

3) HUQx shaft seal types are available for shaft diameters ∅0.87, ∅1.1 and ∅1.42 inches (∅22, ∅28 and ∅36 mm).

Related information

Type key

Single shaft seals

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:

- water and watery medias from -40 to +248 °F (-40 to +120 °C).

Single 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 -4 to +464 °F (-20 to +240 °C) (oil only)
- water-resistant from -4 to +194 °F (-20 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:

- water-resistant from 23 to 527 °F (-5 to +275 °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:

- 14 to 428 °F (-10 to +220 °C).

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

Further information on O-ring materials

Further information about O-ring materials is available in our standard product guides in Grundfos Product Center.

Related information

Further documentation
Type key

Double seal arrangements

We offer two double seal arrangements:

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

Related information

Further documentation

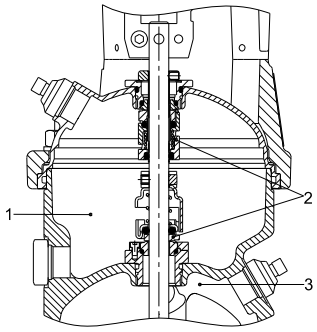
Back-to-back seal arrangement

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:

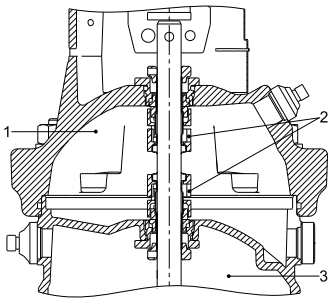
- toxic, aggressive or flammable liquids
- abrasive or sticky liquids which would either wear out, damage or block a mechanical shaft seal.

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 363 psi (25 bar) and 248 °F (120 °C) with the aim of minimizing the risk of leakage from the pump to the environment.



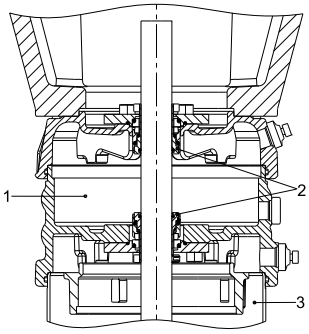
TM044404

CR 1s to 5 with a back-to-back seal arrangement



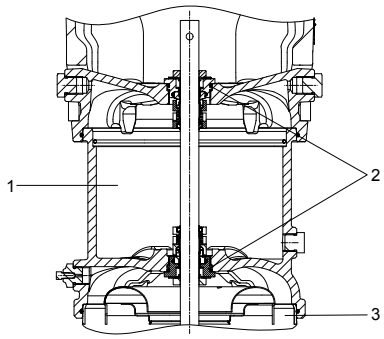
TM044405

CR 10 to 20 with a back-to-back seal arrangement



TM044406

CR 32 to 64 with a back-to-back seal arrangement



TM072100

CR 95, 125 and 155 with a back-to-back seal arrangement

Key to the above figures

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	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●		●
95[1)], 125[1)], 155[1)]	●		●
185, 215, 255			

● Available.

1) Available for pumps up to and including 75 HP (55 kW).

Dimensions

Pump type	Additional height of seal chamber [inches (mm)]
CRI, CRN 1s, 1, 3, 5	4.25 (108)
CRI, CRN 10, 15, 20	3.54 (90)
CR, CRN 32	5.51 (140)
CR, CRN 45	6.30 (160)
CR, CRN 64	6.54 (166)
CR, CRN 95	8.23 (209)
CR, CRN 125	9.61 (244)
CR, CRN 155	9.61 (244)

Pressurizing

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 that the barrier liquid will seep through the lower (primary) shaft seal and be mixed with the pumped liquid. Always use a barrier liquid that is compatible with the pumped 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.

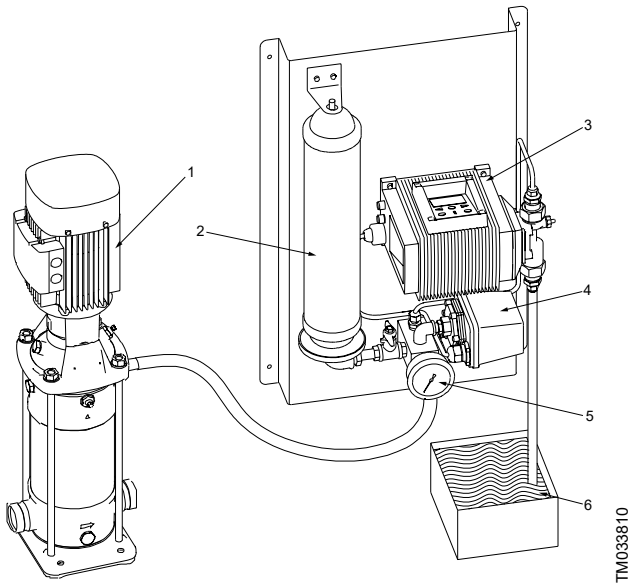
Further information

For further information about back-to-back seal arrangements, see the product guide on mechanical shaft seals available in Grundfos Product Center.

Product guide	Link and publication number
Mechanical shaft seals for pumps	http://net.grundfos.com/qr/i/97506935

CR pump with a dosing pump in a back-to-back seal arrangement

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



CR pump with dosing pump

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 the 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 (maximum pressure: 232 psi [16 bar]). Barrier liquid is supplied from a reservoir (6).

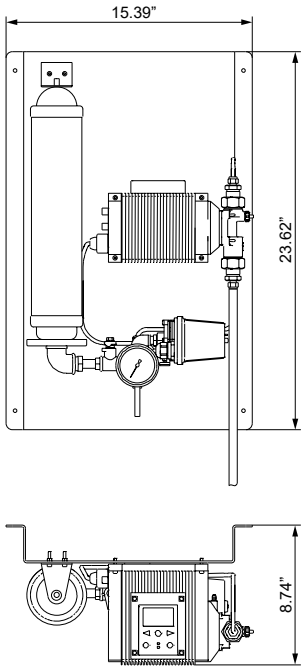
One dosing pump can supply several pumps with back-to-back seal arrangements.

Connections are all RG 1/2".

Note that connecting pipes and hoses are not included.

Dimensions of back plate with components

All dimensions are in inches.

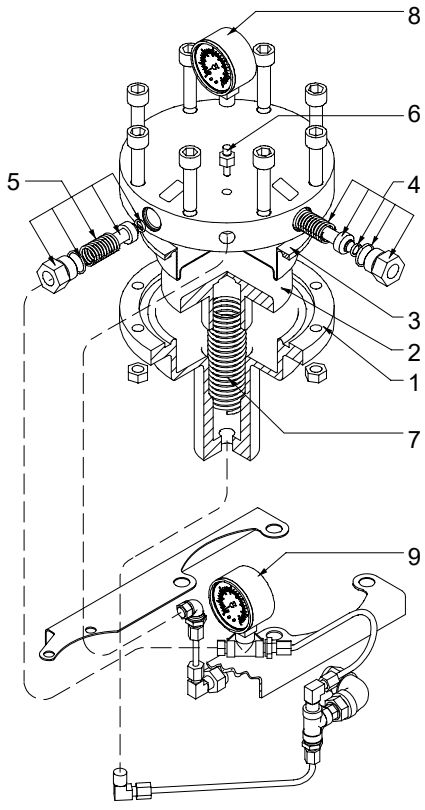


Dimensional sketch of a back plate

CR pump with a pressure intensifier in a back-to-back seal arrangement

GR5954P_W

CR pump with a pressure intensifier



TM038299

Components of a pressure intensifier

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

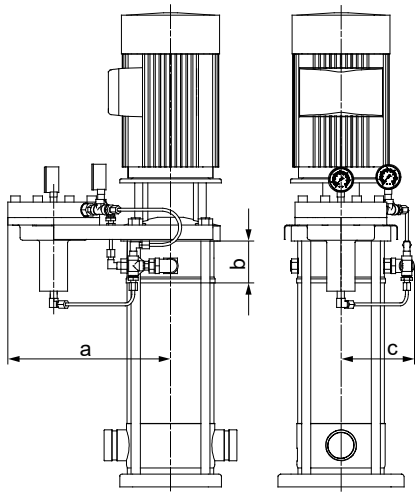
The seal chamber is primed with barrier liquid via a check valve (4) until the pressure gauge (8) reaches 21.7 to 29 psi (1.5 to 2 bar). The spring (7) is now preloaded with the barrier liquid pressure. The pump is primed and vented. When the pump is started, the pump pressure plus the pressure from the preloaded spring will result in a pressure 21.7 to 29 psi (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: 363 psi (25 bar).

Dimensions

All dimensions are in inches.



TM0144459

Dimensional sketch of a pump with a pressure intensifier

Pump type	a	b	c
CR, CRI, CRN 1, 3, 5	11.69	4.25	5.04
CR, CRI, CRN 10, 15, 20	12.99	3.54	5.51
CR, CRN 32	13.46	8.27	6.10
CR, CRN 45	13.74	9.45	6.46
CR, CRN 64	13.74	6.54	6.46

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

Tandem seal arrangement

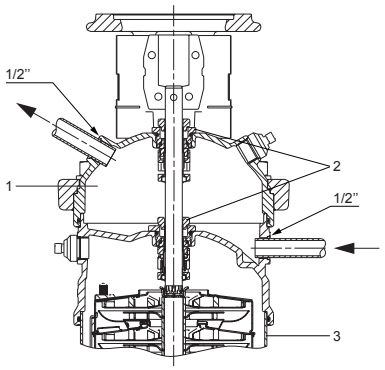
Tandem seal arrangements consist of two Grundfos cartridge shaft seals, type P, mounted tandem in a separate seal chamber.

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

The tandem seal arrangement is specially designed for operating pressures up to 363 psi (25 bar) and 248 °F (120 °C).

Note that for CR 1s-64 pumps, an option is available for temperatures from 248 to 302 °F (120 to 150 °C). The O-ring material in the shaft seal must be FXM (Fluoraz).

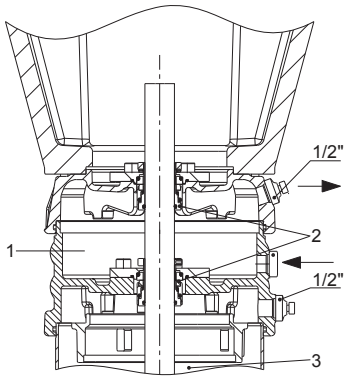
CR 1s, 1, 3, 5, 10, 15 and 20



TM033657

CR 1s to 20 with a tandem seal arrangement

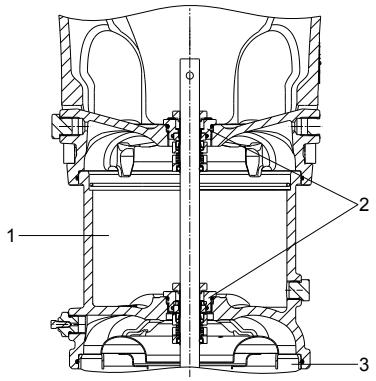
CR 32, 45 and 64



TM044164

CR 32 to 64 with a tandem seal arrangement

CR 95, 125 and 155



TM072101

CR 95, 125 and 155 with a tandem seal arrangement

Key

Pos.	Designation
1	Seal chamber
2	Shaft seals
3	Pump

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

Pump type	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●		●
95[1)], 125[1)], 155[1)]	●		●
185, 215, 255			

● Available.

1) Available for pumps up to and including 75 HP (55 kW).

Dimensions

Pump type	Additional height of seal chamber [inches (mm)]
CRI, CRN 1s, 1, 3, 5	4.25 (108)
CRI, CRN 10, 15, 20	3.54 (90)
CR, CRN 32	5.51 (140)
CR, CRN 45	6.30 (160)
CR, CRN 64	6.54 (166)
CR, CRN 95	8.23 (209)
CR, CRN 125	9.61 (244)
CR, CRN 155	9.61 (244)

Flushing-liquid systems

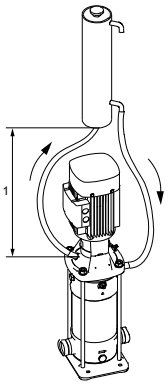
CR pumps with tandem seal arrangement must be equipped with a flushing-liquid system.

Note that the pumped liquid will seep through the lower (primary) shaft seal and be mixed with the flushing liquid.

The flushing-liquid flow rate must also be matched to the application (recommended flow rate 0.1 - 0.9 gpm). The pressure of the flushing liquid must always be lower than the pressure of the pumped liquid.

Note that the flushing-liquid supply must never be connected directly to the public water supply system. Local regulations must be observed.

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



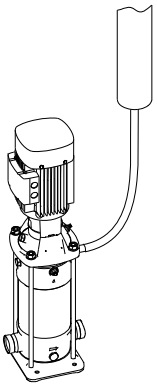
TM078889

Tandem seal arrangement with circulating flushing liquid

Pos.	Description
1	Minimum 3 ft.

In tandem seal arrangements with circulating flushing liquid, 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.

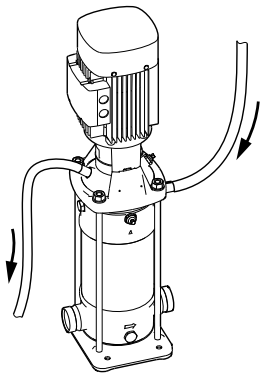


TM078890

Tandem seal arrangement with a flushing-liquid supply

In tandem seal arrangements with a flushing-liquid supply, the flushing liquid enters the seal chamber via a pipe from an elevated tank.

No heat is dissipated from the system.



TM033813

Tandem seal arrangement with flushing liquid connected to a drain

In tandem seal arrangements with flushing liquid connected to a drain, 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.

Further information

For further information about Grundfos tandem seal arrangements, see the product guide on mechanical shaft seals available in Grundfos Product Center.

Product guide	Link and publication number
Mechanical shaft seals for pumps	http://net.grundfos.com/qr/i/97506935

CR with 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. No external cooling is necessary; the ambient temperature is sufficient.

GR5228

CR pump with an air-cooled top

CR pumps with an 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 356 °F (180 °C) at a maximum pressure of 363 psi (25 bar) for CR 1s-64 pumps and 435 psi (30 bar) for CR 95-155 pumps. If the pumped liquid is oil, the pumps can handle liquid temperatures up to 464 °F (240 °C) at maximum 232 psi (16 bar).

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

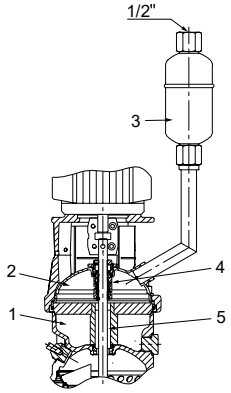
Pump size	Maximum pressure [psi (bar)]	Liquid temperature [°F (°C)]	Rubber part material
Water-based liquids			
CR 1s - 155	580 (40)	248-284 °F (120-140 °C)	EPDM
CR 1s - 64	363 (25)	248-356 °F (120-180 °C)	FXM/EPDM
CR 95 - 155	435 (30)		
Thermal oils			
CR 1s - 155	232 (16)	248-464 °F (120-240 °C)	FKM

Temperatures above 248 °F (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 248 °F (120 °C) during operation, a standard Grundfos shaft seal can be used.

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

Note that for safety reasons, you must fit a pipe in order to lead away steam from the vent to a drain. Local regulations must be observed.

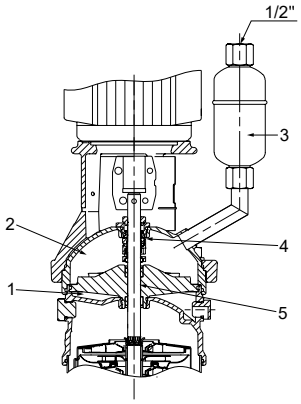
CR 1s, 1, 3 and 5



TM039159

CR 1s, 1, 3 and 5 with an air-cooled top

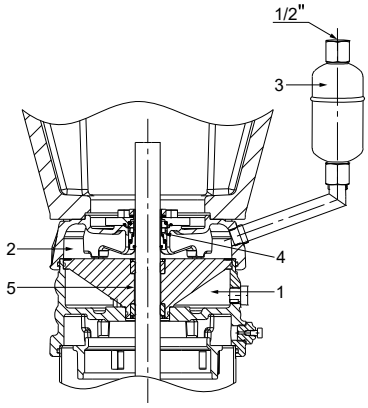
CR 10, 15 and 20



TM039160

CR 10, 15 and 20 with an air-cooled top

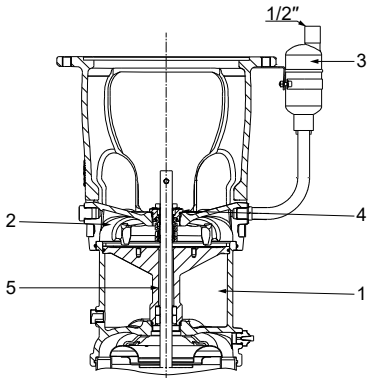
CR 32, 45 and 64



TM044165

CR 32, 45 and 64 with an air-cooled top

CR 95, 125 and 155



TM072099

CR 95, 125 and 155 with an air-cooled top

Key

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

Pump range

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

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	●	●
10, 15, 20	-	●	●
32, 45, 64	●	-	●
95[1)], 125[1)], 155[1)]	●	-	●
185, 215, 255	-	-	-

● Available.

1) Available for pumps up to and including 75 HP (55 kW).

Note that CRT and CRTE pumps are not available with an air-cooled top.

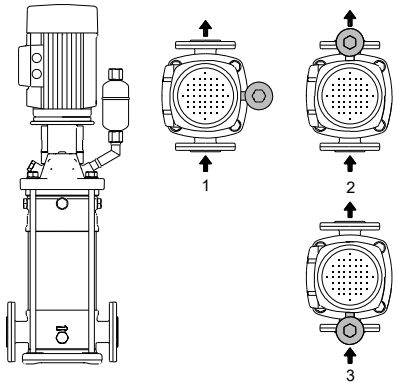
Bearing flanges for CR pumps with an air-cooled top

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

If the vapor pressure of the liquid exceeds the maximum inlet pressure of the pump, a bearing flange is required.

Vertical CR pumps with an air-cooled top

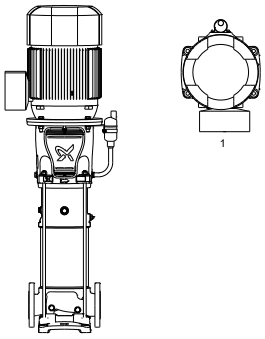
The vent of vertical CR pumps with an air-cooled top is in line with the outlet port (12 o'clock position) as standard. See possible vent positions in the figures below.



TM033659

Vent positions on vertical CR 1s-64 pumps

Pos.	Description
1	3 o'clock
2	12 o'clock
3	6 o'clock



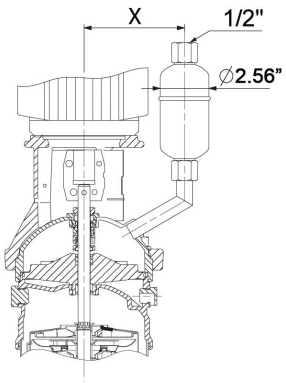
TM073057

Vent positions on vertical CR 95-155 pumps

Pos.	Description
1	12 o'clock

Dimensions

All dimensions are in inches.



TM057333

Dimensions of vertical CR pumps with air-cooled top

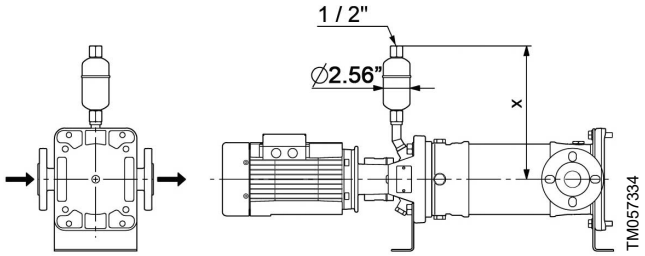
Pump type		X [inches (mm)]
CRI, CRN 1s, 1, 3, 5	(≤3 HP) (< 3 kW)	5.59 (142)
CRI, CRN 1s, 1, 3, 5	(3-10 HP) (3 - 7.5 kW)	6.77 (172)
CRI, CRN 10, 15, 20	(≤5 HP) (< 4 kW)	6.14 (156)
CRI, CRN 10, 15, 20	(7.5 - 10 HP) (4 - 7.5 kW)	7.32 (186)
CRI, CRN 10, 15, 20	(15-25 HP) (11 - 18.5 kW)	8.54 (217)
CR, CRN 32		6.93 (176)
CR, CRN 45, 64		7.32 (186)
CR, CRN 95, 125, 155	(7.5 - 10 HP) (5.5 - 7.5 kW)	8.66 (220)
CR, CRN 95, 125, 155	(15-30 HP) (11-22 kW)	9.65 (245)
CR, CRN 95, 125, 155	(40-50 HP) (30-37 kW)	10.63 (270)
CR, CRN 95, 125, 155	(75 HP) (55 kW)	12.60 (320)

Additional pump height

Pump type	Additional pump height [inches (mm)]
CRI, CRN 1, 3, 5	4.25 (108)
CRI, CRN 10, 15, 20	3.54 (90)
CR, CRN 32	5.51 (140)
CR, CRN 45	6.30 (160)
CR, CRN 64	6.54 (166)
CR, CRN 95	8.23 (209)
CR, CRN 125, 155	9.61 (244)

Horizontal CR pumps with an air-cooled top

On horizontal pumps, the vent is mounted on top.



TM057334

Vent position and dimensions of horizontal CR pumps with an air-cooled top

Dimensions

Pump type	X [inches (mm)]
CRI, CRN 1s, 1, 3, 5	12.13 (308)
CRI, CRN 10, 15, 20	12.76 (324)
CR, CRN 32	15.39 (391)
CR, CRN 45, 64	15.67 (398)
CR, CRN 95	14.02 (356)
CR, CRN 125, 155	15.04 (382)

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 semi-hermetically sealed liquid end, the pump is essentially leak-free.

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

GRA4445

CRN MAGdrive pumps

The MAGdrive solution is available for these pumps:

Pump type	CRN
1s, 1, 3, 5	●
10, 15, 20	●
32[1)], 45[1)], 64[1)]	●
95, 125, 155	-
185, 215, 255	-

● Available.

1) Available up to 30 HP (22 kW).

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

- 2-pole motors: 25 and 30 HP.
- 4-pole motors: 1 1/2 HP and up.

Features and benefits

CRN MAGdrive offers the following special features and benefits:

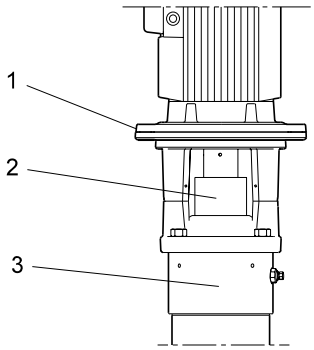
- a semi-hermetically sealed drive system for essentially leak-free pump operation
- special choice of materials and design for low energy loss
- simple pump design for ease of service
- unique pump design for efficient cooling of magnet by means of the pumped liquid
- ATEX version available for EEC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

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, and similar.
- **Toxic liquids**
  Trichloroethylene, chloroform, phenol, and similar.
- **Flammable liquids**
  Petrol, jet fuels, LPG, alcohols, and similar.
- **Hardening/curing liquids**
  Paint, glue, resins, and similar.
- **Crystallizing liquids**
  Glycol additives, naphthalene, sugar products, salts, and similar.
- **Refrigerants**
  Ammonia and synthetic chemicals (HCFC, HFC).

Design



TM039149

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®)
- CR (Neoprene) (Available for CRN 1 - 20).

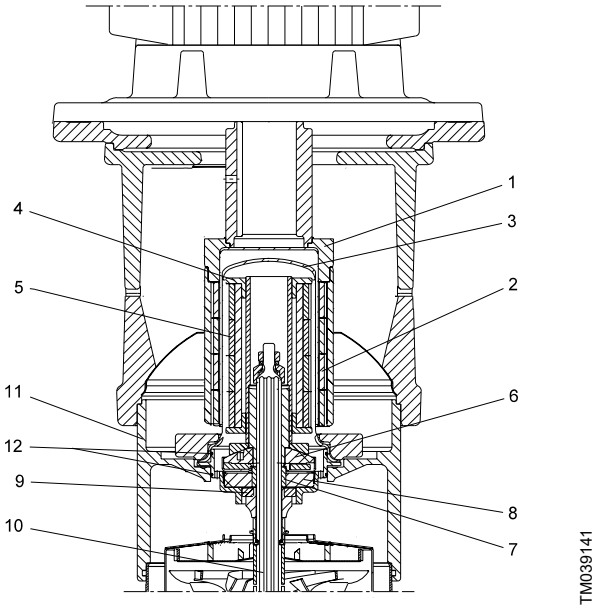
Connections available for CRN MAGdrive pumps:

Connection type	CRN	
	1s, 1, 3, 5, 10, 15, 20	32, 45, 64
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.



Sectional drawing of a MAGdrive system

Pos.	Designation	Material
1	Outer drive	AISI 304 SS
2	Outer magnets	NdFeB (neodymium)
3	Can	AISI 904L SS
4	Inner drive	AISI 316 SS
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: AISI 316 SS CRN 10-20: AISI 329 SS CRN 32-64: SAF 2205
11	Pump head	CF 8M (cast equiv. of AISI 316 SS)
12	O-ring	EPDM, FKM, FXM, FFKM

Operating conditions

Maximum pressure: 363 psi (25 bar).

Temperature range: -40 to +248 °F (-40 to +120 °C).

Viscosity range: 0.15 - 300 centipoise.

Technical data

Motor range: 1/2 to 30 HP (0.37 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 section about dimensional drawings for CRN pumps with magnetic drive.

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

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

- liquid temperature [°F]
- liquid viscosity [centipoise or mPas]
- liquid density [lb./ft.^{3}]
- frequency [Hz].

Related information

Dimensional drawings - CRN pumps with magnetic drive

8. Pump

We offer customized pump solutions for the following maximum allowed operating pressures:

Pump type	CR	CRI	CRN
	[psi (bar)]	[psi (bar)]	[psi (bar)]
1s, 1, 3, 5,	363 (25)	363 (25)	363 (25)
10, 15, 20	363 (25)	363 (25)	363 (25)
32, 45, 64	580 (40)	-	580 (40)
5, 125, 155	435 (30)	-	580 (40)
185, 215, 255	580 (40)		580 (40)

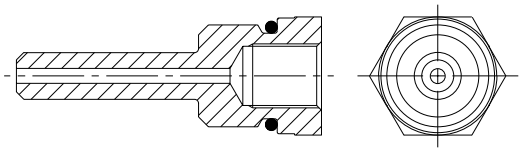
Note: In applications with high inlet pressures, a bearing flange must be fitted or a high pressure pump (CR SF) must be used. For further information please see the high-pressure product guide available in Grundfos Product Center.

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 customized pumps with a tapping for a pressure gauge or pressure sensor.

TM034726

CR pump with a pressure gauge



TM034091_US

Insert for measurement of inlet pressure

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

Designation	Rubber material	Connection	Product number
Insert for measurement of inlet pressure	CR 1s, 1, 3, 5		
	EPDM	NPT 1/4"	99566644
	FKM		99566646
	CRI, CRN 1s, 1, 3, 5		
	EPDM	NPT 1/4"	99566645
	FKM		99566647
	CR 10, 15, 20		
	EPDM	NPT 1/4"	99566673
	FKM		99566674
	CRI, CRN 10, 15, 20		
	EPDM	NPT 1/4"	99566661
	FKM		99566662

We offer these pump types with tappings:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

CR, CRE, CRN, CRNE 32, 45, 64, 95, 125, 155, 185, 215 and 255 have pressure gauge ports for measurement of pump inlet pressure as standard.

Pumping of liquids down to -40 °F

We offer customized pumps for the pumping of liquids down to -40 °F (-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	CR	CRI	CRN
1s, 1, 3, 5	-	●	●
10, 15, 20	-	●	●
32, 45, 64	-	-	●
95, 125, 155	-	-	●
185, 215, 255	-	-	●

● Available.

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	CR	CRI	CRN
1s, 1, 3, 5	❍	❍	❍
10, 15, 20	❍	❍	❍
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	●	-	●

● Available.

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

CRN all-stainless-steel pumps

We offer customized stainless-steel CRN pumps for maritime applications and very humid environments:

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

The dimensions of customized stainless-steel CRN pumps do not differ from those of standard CRN pumps.

We offer the above solutions for these pump types:

Pump type	CR	CRI	CRN
1s, 1, 3, 5			●
10, 15, 20			●
32, 45, 64			●
95*, 125*, 155*			●
185*, 215*, 255*			●

● Available.

* For CR, CRN 95 - 255, we do not offer a stainless-steel motor stool. Instead we offer improved corrosion protection in form of painted coating. See corrosion protection standard and categories in the section on surface treatment.

Surface treatment

Overview of applications and corresponding surface treatments.

	Surface treatment					
Applications	**Cleaned and dried**	**Cleaned and dried, PWIS free**	**Vacuum-dried**	**Electropolished**	**Alternative colouring**	**Corrosion protection**
Offshore						•
Pharmaceutical industry, food and beverage industry	•	•		•		
Automotive 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	CRI	CRN
1s, 1, 3, 5	•	•
10, 15, 20	•	•
32, 45, 64	-	•
95, 125, 155	-	-
185, 215, 255	-	-

• Available.

Prior to assembly, all pump parts are cleaned in 140 to 158 °F (60 to 70 °C) water with a cleaning agent. All pump parts are then thoroughly rinsed in de-ionized water and air-dried. The pump is assembled without any use of silicone lubricants. Finally, the pump is packed in silicone-free plastic.

De-oiled shaft seals are available as an option for CRI and CRN 1s to 64 pumps.

CRN 95 to 255 pumps which are ordered as cleaned and dried, PWIS free, are fitted with a de-oiled shaft seal as standard.

PWIS means Paint-Wetting Impairment Substances.

The term is used to describe substances that inhibit or destroy the ability of paint to adhere to surfaces.

A PWIS-free environment is mainly required in the automotive industry and in paint shops.

PWIS-free pumps are manufactured according to the specifications below:

- All components of the pump including shaft seal, motor, rubber materials for shaft seals, do not contain or release PWIS.
- Before being assembled, pump components are washed in pure, hot soap water, rinsed in de-ionized water and dried.
- Consumables like oil, grease and soap water not containing PWIS, are used during assembly.
- Tools for product assembly do not contain any PWIS.
- The product is not performance tested.
- The finished product is wrapped in a special PWIS-free plastic bag before being packed for shipment.

We offer these PWIS-free pumps:

Pump type	CRI	CRN
1s, 1, 3, 5	-	•
10, 15, 20	-	•
32, 45, 64	-	•
95, 125, 155	-	•
185, 215, 255	-	•

• Available.

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. After the pump performance test, vacuum-dried pumps are therefore 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 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	CR	CRI	CRN
1s, 1, 3, 5	•	•	•
10, 15, 20, 32	•	•	•
45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

• 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 1s-20 pumps are polished mechanically before being electropolished.

Note that 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 CRN pumps with the following surface quality:

Pump type	Cast stainless-steel parts	Stainless-steel parts (not cast)	Surface quality
CRN 1s, 1, 3, 5	●	●	Ra ≤ 0.8 µm
CRN 10, 15, 20	●	●	Ra ≤ 0.8 µm
CRN 32, 45, 64	●	-	Ra ≤ 8.0 µm
	-	●	Ra ≤ 0.8 µm
CRN 95, 125*, 155*	●	-	Ra ≤ 8.0 µm
	-	●	Ra ≤ 0.8 µm

● Available.

* Available for pumps up to and including 75 HP (55 kW).

We offer these electropolished pumps:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	-	●
10, 15, 20	-	-	●
32, 45, 64	-	-	●
95, 125, 155	-	-	●
185, 215, 255	-	-	-

● Available.

Alternative coloring

We offer customized pumps in any NCS- or RAL-specified color 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 coloring.

Corrosion protection

We offer corrosion protection in 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.

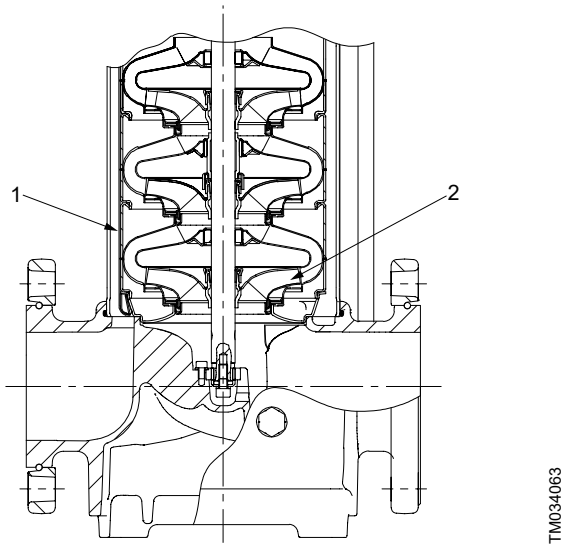
Corrosion category	Validity	Chemical resistance test	Tropical test	Salt mist test
		[hours]	[hours]	[hours]
C2	Low	-	48	-
	Medium	-	48	-
	High	-	120	-
C3	Low	-	48	120
	Medium	-	120	240
	High	-	240	480
C4	Low	-	120	240
	Medium	-	240	480
	High	-	480	720
C5-I	Low	168	240	480
	Medium	168	480	720
	High	168	720	1440
C5-M	Low	-	240	480
	Medium	-	480	720
	High	-	720	1440

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. Low-NPSH pumps are designed to reduce the risk of cavitation and ensure 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, pipes 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 an additional tank to provide supplementary pressure. In boiler feed applications where many large tanks are gathered, a compact system is an advantage.



Sectional drawing of a 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	CRI	CRN
1s, 1	-	-	-
3, 5	•	•	•
10, 15, 20	•	•	•
32, 45, 64	•	-	•
95, 125, 155	-	-	-
185, 215, 255	-	-	-

• Available.

Maximum pressure	363 psi (25 bar)
Maximum liquid temperature	248 °F* (120 °C)

* With air-cooled top, the maximum liquid temperature is 356 °F (180 °C).

Further information about CR low NPSH

- Performance curves are provided in section about Low-NPSH pumps with 2-pole motor.
- Dimensions and weights are provided in section about dimensional drawings for CR low-NPSH pumps.
- The continuous feed boiler pumps require a bypass orifice to be placed on the outlet side of the pump to maintain a minimum flow rate. See the bypass orifice chart for continuous feed boilers.
- CR low-NPSH pump sizing charts are available for on-off feed boilers and for continuous feed boilers.

The pump selection must be verified to account for specific boiler application and local, state, and federal codes.

Due to the larger first stage impeller, some CR low-NPSH pumps will require a larger motor than the standard CR pumps.

Some CR low-NPSH pump ends have a taller overall pump height than the standard CR pump ends. The taller overall pump height is due to a larger motor stool on some CR low-NPSH pump models.

Related information

Low-NPSH pumps with 2-pole motor

Dimensional drawings for CR low-NPSH pumps

Bypass orifices for CR, CRI, CRN 1s-20, continuous feed boilers

CR low-NPSH pump sizing chart for on-off feed boilers, 60 Hz

CR low-NPSH pump sizing chart for continuous feed boilers, 60 Hz

Continuous feed boiler chart

The design flow rate is based on 1.5 times the evaporation rate plus the by-pass flow. The pump design pressure is 10 to 15 psi (0.68 to 1.03 bar) higher than the boiler pressure. Some pumps will need to be throttled to meet the flow rate for which it was sized.

The pump NPSH required is available on the performance curve. The NPSH available must be checked for each system.

A bypass orifice must be placed on the outlet to maintain minimum flow rate.

On-off feed boiler chart

The design flow rate is based on 2.0 times the evaporation rate. The pump design pressure is 10 to 15 psi (0.68 to 1.03 bar) higher than the boiler pressure. Some pumps will need to be throttled to meet the flow rate for which it was sized.

The pump NPSH required is available on the performance curve. The NPSH available must be checked for each system.

Horizontal in-line pumps

GR5379_HORIZONTAL

Horizontal CR pump

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

In areas prone to earthquakes, 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	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	●	-	●

● Available.

CRT, CRTE 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.

Foot mounted motors are required on CR, CRE, CRI, CRIE, CRN, CRNE 5, 10, 15, 20 pumps with a motor size of 7 1/2 HP or larger.

A foot mounted motor is required for all CR, CRE, CRI, CRIE, CRN, CRNE 32, 45, 64, 95, 125, 155, 185, 215 and 255 pumps.

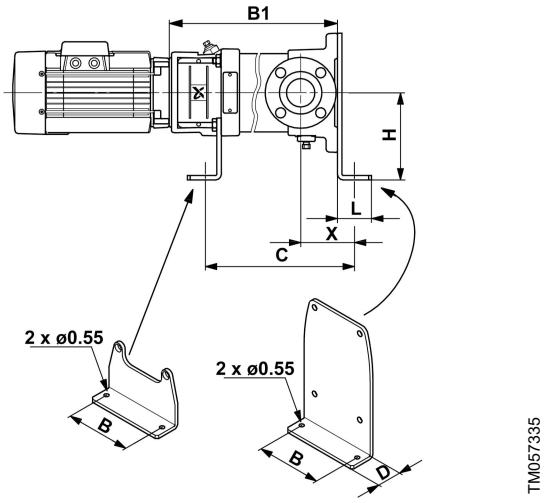
Horizontal mounting kits

Material Number	Description
91134594	Horizontal mount kit CR 1s, 1, 3, 5
91136738	Horizontal mount kit CR(N) 1, 3, 5, 213TC
91136734	Horizontal kit (CR(N) 10, 15, 20, 56C, 182TC
91136733	Horizontal mount kit CR(N) 10, 15, 20, 213TC
91136731	Horizontal mount kit CR(N) 10, 15, 20, 254TC
91136739	Horizontal mount kit CR(N) 10, 15, 20, 284TC
99072958	Horizontal mount kit LACR(N), 182/184TC
99072960	Horizontal mount kit LACR(N), 213/215TC
99046164	Horizontal mount kit LACR(N), 254/256TC
99046165	Horizontal mount kit LACR(N), 284/286TSC
99046166	Horizontal mount kit LACR(N), 324/326TSC
99046167	Horizontal mount kit LACR(N), 364/365TSC

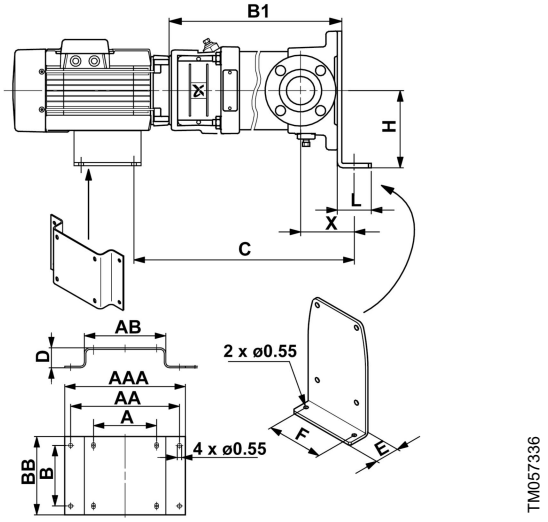
Dimensions of horizontal in-line pumps

All dimensions are in inches.

CR, CRE, CRI, CRIE, CRN, CRNE 1s, 1, 3, 5 (≤ 5 HP) and 10, 15, 20 (≤ 5 HP)



CR, CRE, CRI, CRIE, CRN, CRNE 5 (7 1/2 - 10 HP) and 10, 15, 20 (≥ 7 1/2 HP)



CR, CRE, CRI, CRIE, CRN, CRNE 1s, 1, 3, 5 (≤ 5 HP), support for base plate and pump head

Motor [HP]	B	C	D	H	L	X	
						ANSI	Oval, PJE, FlexiClamp
1/2 - 2	5.43	B1 - 3.25	1.77	5.51	1.97	4.18	3.18
3-5	5.43	B1 - 4.15	1.77	5.51	1.97	4.18	3.18

Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRI, CRN or the CRE, CRIE, CRNE product guide.

CR, CRE, CRI, CRIE, CRN, CRNE 5 (7 1/2 - 10 HP)

Motor [HP]	A	AA	AAA	AB	B	BB	C	D	E	F	H	L	X	
													ANSI	Oval, PJE, Flexiclamp
7 1/2	8.50	12.83	14.41	10.87	5.51	7.09	B1 + 4.69	2.68	1.77	5.43	7.87	1.97	4.18	3.18
10	8.50	12.83	14.41	10.87	5.51	7.09	B1 + 4.69	2.68	1.77	5.43	7.87	1.97	4.18	3.18

Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRI, CRN or the CRE, CRIE, CRNE product guide.

CR, CRE, CRI, CRIE, CRN, CRNE 10, 15, 20 (≤ 5 HP), support for base plate and pump head

Motor [HP]	B	C	D	H	L	X
						ANSI, Oval, PJE, FlexiClamp
1/3 - 2	6.69	B1 - 3.44	1.77	6.85	1.97	4.68
3-5	6.69	B1 - 9.88	1.77	6.85	1.97	4.68

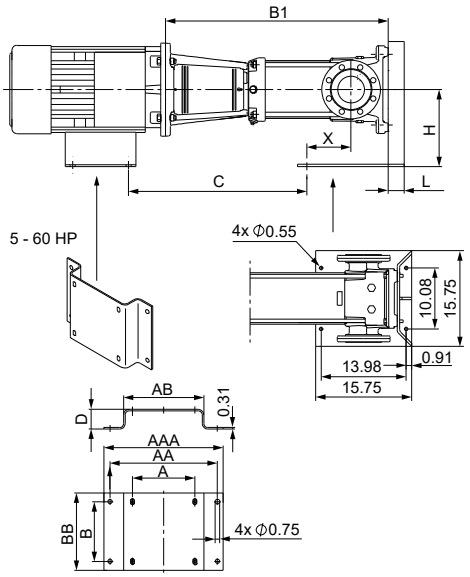
Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRI, CRN or the CRE, CRIE, CRNE product guide.

CR, CRE, CRI, CRIE, CRN, CRNE 10, 15, 20 (≥ 7 1/2 HP), support for base plate and motor

Motor [HP]	A	AA	AAA	AB	B	BB	C	D	E	F	H	L	X
													ANSI, Oval, PJE, Flexi-Clamp
7 1/2	8.50	12.83	14.41	10.87	5.51	7.08	B1 + 4.69	2.68	1.77	6.69	7.87	1.97	4.68
10	8.50	12.83	14.41	10.87	5.51	7.08	B1 + 4.69	2.68	1.77	6.69	7.87	1.97	4.68
15	10.00	15.11	16.69	13.15	8.27	10.24	B1 + 5.44	1.57	1.77	6.69	7.87	1.97	4.68
20	10.00	15.11	16.69	13.15	8.27	10.24	B1 + 5.44	1.57	1.77	6.69	7.87	1.97	4.68
25	10.00	15.11	16.69	13.15	8.27	10.24	B1 + 6.12	1.57	1.77	6.69	7.87	1.97	4.68
30	10.98	16.89	18.46	14.92	9.88	12.24	B1 + 6.12	0.87	1.77	6.69	7.87	1.97	4.68

Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRI, CRN or the CRE, CRIE, CRNE product guide.

CR, CRE, CRN, CRNE 32, 45, 64, support for base plate and motor

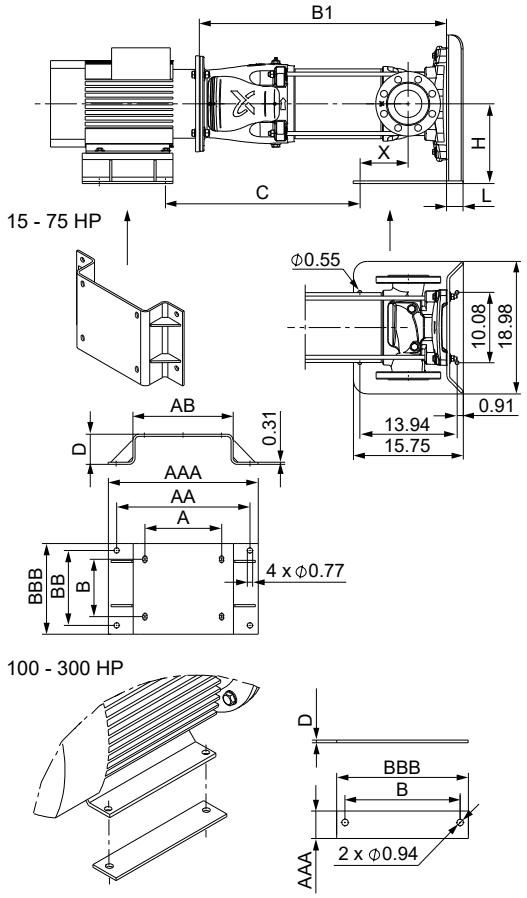


TM057337

Motor [HP]	A	AA	AAA	AB	B	BB	C	D	H	L	X	
											CR 32 ANSI	CR 45, 64 ANSI
5	7.52	14.57	16.93	10.83	5.51	7.09	B1 - 9.22	6.93	11.42	2.36	8.36	6.98
7 1/2	8.50	15.55	17.91	11.81	7.09	8.66	B1 - 8.19	6.18	11.42	2.36	8.36	6.98
10	8.50	15.55	17.91	11.81	7.09	8.66	B1 - 8.19	6.18	11.42	2.36	8.36	6.98
15	10.00	17.91	20.28	13.39	10.04	12.20	B1 - 7.35	5.16	11.42	2.36	8.36	6.98
20	10.00	17.91	20.28	13.39	10.04	12.20	B1 - 7.35	5.16	11.42	2.36	8.36	6.98
25	11.02	19.09	21.46	14.37	11.02	13.39	B1 - 6.97	4.41	11.42	2.36	8.36	6.98
30	11.02	19.09	21.46	14.37	11.02	13.39	B1 - 6.97	4.41	11.42	2.36	8.36	6.98
40	11.02	19.09	21.46	14.37	11.02	13.39	B1 - 6.48	4.41	11.42	2.36	8.36	6.98
50	12.52	21.26	23.62	16.14	12.01	14.37	B1 - 6.48	3.43	11.42	2.36	8.36	6.98
60	14.02	22.83	25.20	17.72	12.28	14.65	B1 - 6.09	2.40	11.42	2.36	8.36	6.98

Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRI, CRN or the CRE, CRIE, CRNE product guide.

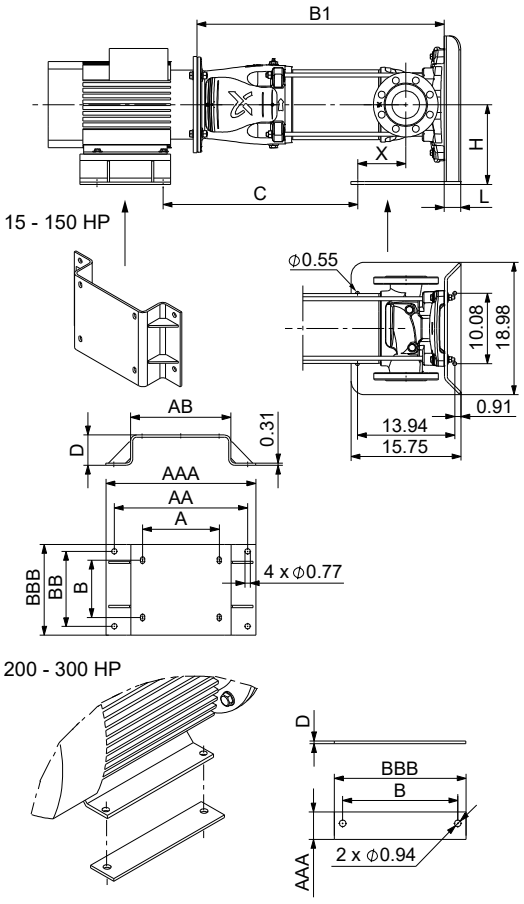
CR, CRE, CRN, CRNE 95, 125, 155, support for base plate and motor



Motor [HP]	A	AA	AAA	AB	B	BB	BBB	C	D	H	L	X	
												CR 95 ANSI	CR 125, 155 ANSI
15	10.00	17.91	20.28	13.39	9.15	9.15	12.20	B1 - 7.34	5.16	11.42	2.36	6.97	5.39
20	10.00	17.91	20.28	13.39	9.15	9.15	12.20	B1 - 7.34	5.16	11.42	2.36	6.97	5.39
25	11.02	19.09	21.46	14.37	10.24	10.24	13.39	B1 - 6.97	4.41	11.42	2.36	6.97	5.39
30	11.02	19.09	21.46	14.37	10.24	10.24	13.39	B1 - 6.97	4.41	11.42	2.36	6.97	5.39
40	12.52	21.26	23.62	16.14	11.22	11.22	14.37	B1 - 6.48	3.43	11.42	2.36	6.97	5.39
50	12.52	21.26	23.62	16.14	11.22	11.22	14.37	B1 - 6.48	3.43	11.42	2.36	6.97	5.39
60	14.02	22.83	25.2	17.72	11.75	11.75	14.65	B1 - 6.09	2.40	11.42	2.36	6.97	5.39
75	14.02	22.83	25.2	17.72	11.75	11.75	14.65	B1 - 6.09	2.40	11.42	2.36	6.97	5.39
100	-	-	3.50	-	13.74	-	16.65	B1 - 5.46	-	11.42	2.36	-	5.39
125	-	-	4.72	-	16.50	-	23.62	B1 - 4.63	-	11.42	2.36	-	5.39
150	-	-	4.72	-	16.50	-	23.62	B1 - 4.63	-	11.42	2.36	-	5.39
200	-	-	4.72	-	25.00	-	32.28	B1 - 4.98	-	11.42	2.36	-	5.39
250	-	-	4.72	-	25.00	-	32.28	B1 - 4.98	-	11.42	2.36	-	5.39
300	-	-	4.72	-	25.00	-	32.28	B1 - 4.98	-	11.42	2.36	-	5.39

Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRN 95-255 or the CRE, CRIE, CRNE product guide.

CR, CRN 185, 215, 255 support for base plate and motor



TM078133

Motor [HP]	A	AA	AAA	AB	B	BB	BBB	C	D	H	L	X CR 185, 215, 255 ANSI
40	12.52	21.26	23.62	16.14	11.22	11.22	14.37	B1 - 6.48	5.20	13.19	2.36	4.61
50	12.52	21.26	23.62	16.14	11.22	11.22	14.37	B1 - 6.48	5.20	13.19	2.36	4.61
60	14.02	22.83	25.20	17.72	11.75	11.75	14.65	B1 - 6.09	4.17	13.19	2.36	4.61
75	14.02	22.83	25.20	17.72	11.75	11.75	14.65	B1 - 6.09	4.17	13.19	2.36	4.61
100	15.98	25.59	27.95	20.47	13.74	13.74	18.50	B1 - 5.46	3.19	13.19	2.36	4.61
125	18.00	27.56	29.92	22.44	16.50	16.50	20.47	B1 - 4.63	2.19	13.19	2.36	4.61
150	18.00	27.56	29.92	22.44	16.50	16.50	20.47	B1 - 4.63	2.19	13.19	2.36	4.61
200	-	-	4.72	-	25.00	-	32.28	B1 - 4.98	-	13.19	2.36	4.61
250	-	-	4.72	-	25.00	-	32.28	B1 - 4.98	-	13.19	2.36	4.61
300	-	-	4.72	-	25.00	-	32.28	B1 - 4.98	-	13.19	2.36	4.61

Note: For pump height (B1) and for combined pump and motor height (B1+B2), see the CR, CRN 95-255 or the CRE, CRIE, CRNE product guide.

Horizontal end-suction pumps

TM051717

Horizontal end-suction pumps

CR-H, CRN-H, 60 Hz

CR-H, CRE-H, CRN-H and CRNE-H pumps are horizontal end-suction pumps, typically mounted on base plates. The pumps are available in a 60 Hz range with NEMA motors.

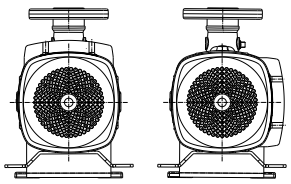
Interchangeable ANSI solution

The patented loose-flange concept provides easy installation in ANSI pipes.

Pump connection configurations comply with the ANSI/ASME B73.1 standard and ensure interchangeability with traditional end-suction pumps with axial inlet port and radial center-line outlet port. This makes the CR-H a high-efficiency solution designed for ANSI-specified applications and drop-in replacement of ANSI configured pumps. The back pull-out design enables service of most versions without removing the base from the pipes.

CR-H and CRN-H pumps are suitable for a variety of applications from pumping of drinking 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.

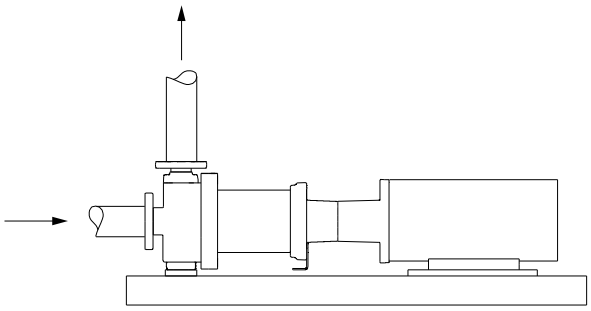
Terminal box positions



TM051988

Energy efficiency

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



TM051378

CR-H pump with axial inlet port and radial outlet port

Maximum pressure:	435 psi (30 bar).
Maximum liquid temperature:	248 °F (120 °C) (air-cooled top: 356 °F (180 °C)) (oil: 464 °F (240 °C)).
Maximum motor size:	60 HP.

NEMA motor

Pump type	CR-H	CRN-H
1s, 1, 3, 5	•	•
10, 15, 20	•	•
32, 45, 64	•	•
95, 125, 155	-	-
185, 215, 255	-	-

Variants

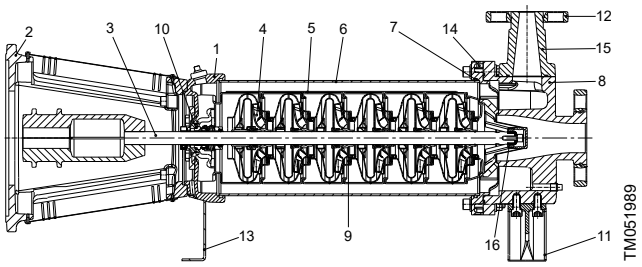
The same variants and accessories are available for the CR-H, CRN-H pump range as for the standard CR pump range.

Further information on CR-H pumps

For dimensions of CR-H pumps with NEMA motors, see Grundfos Product Center. For further information about CR-H pumps, see the relevant product guide available in Grundfos Product Center.

Product guide	Link and publication number
CRN-H, CRE-H, CRNE-H	http://net.grundfos.com/qr/i/98665987

Construction



Sectional drawing of horizontal end-suction pump

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	Outlet port
8	Base	16	Bottom bearing ring

Belt-driven pumps

Belt-driven CR pump

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

The belt driven pump has a pulley for connection to an internal combustion engine. The belt-driven CR pumps are of the same construction as electrically driven CR pumps.

Pump range

These Grundfos pumps are available as belt-driven pumps:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●	-	●
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● 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 that 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.

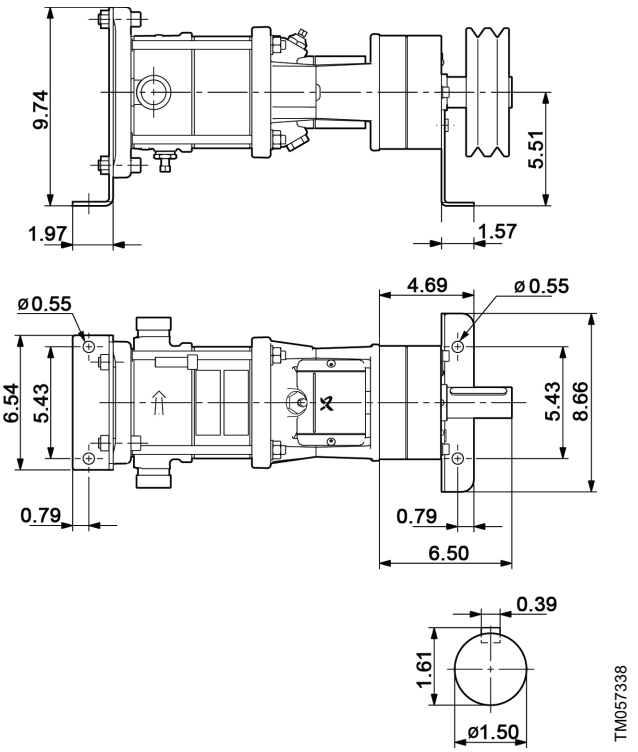
The maximum pump speed is 3000 RPM. Size and select the CR pumps from the CR 50 Hz performance curves.

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

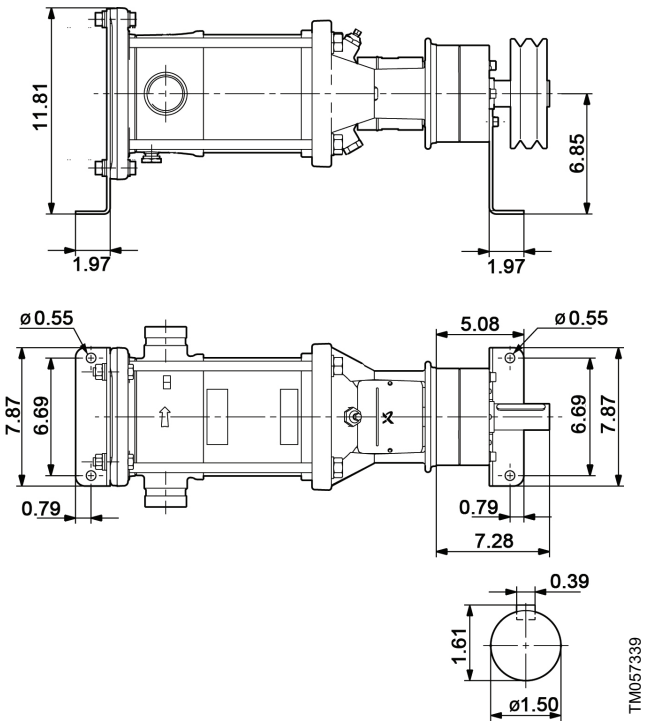
	Type III	Type IV	Type II	Type I
Pulley head	**1/2 - 7 1/2 [HP]**	**10-25 [HP]**	**2-10 [HP]**	**15-60 [HP]**
Pump type	**CR, CRI, CRN**		**CR, CRN**	
	1s, 1, 3, 5, 10, 15, 20	10, 15, 20	32, 45, 64	
Pulley wheel diameter	∅4.41 - 5.31	Min. ∅7.87	Min. ∅6.30	Min. ∅7.87
V-belts	2	Min. 3	Min. 2	Min. 3
Pump speed [RPM]	Max. 3000			

Dimensional drawings

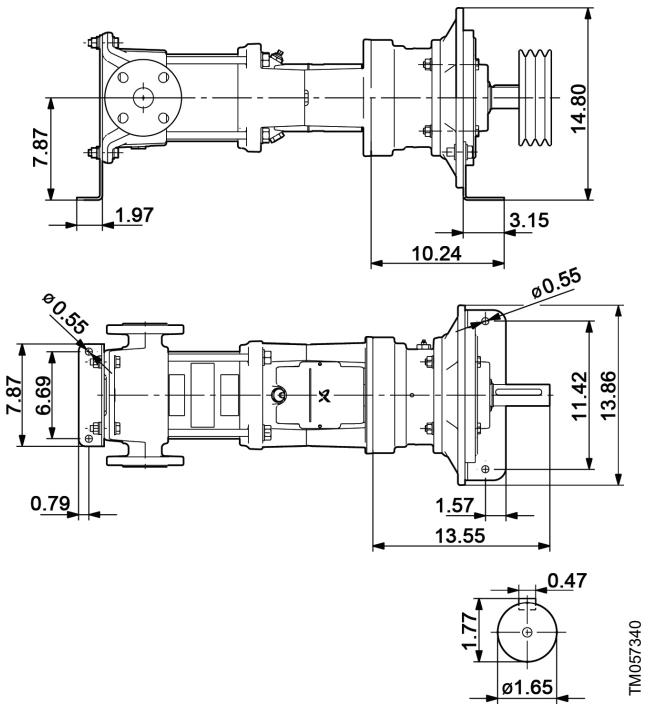
CR, CRI, CRN 1s, 1, 3 and 5 (type III)



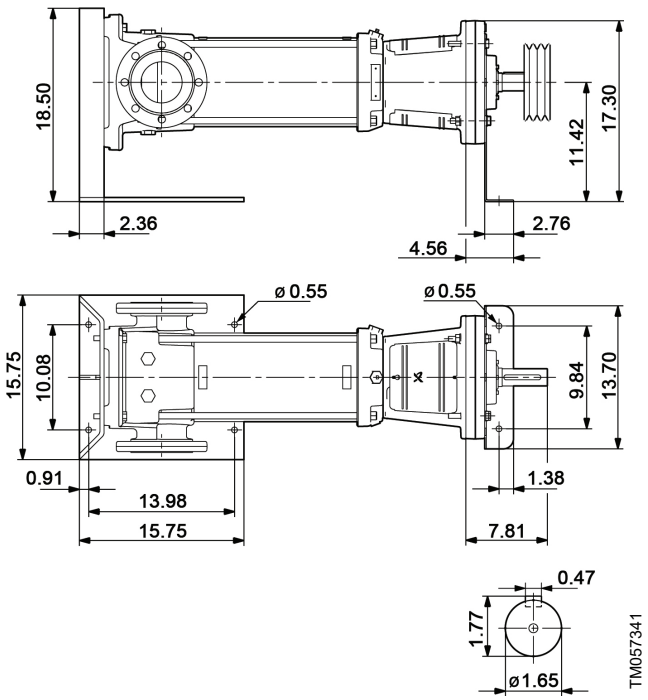
CR, CRI, CRN 10, 15 and 20 (type III)



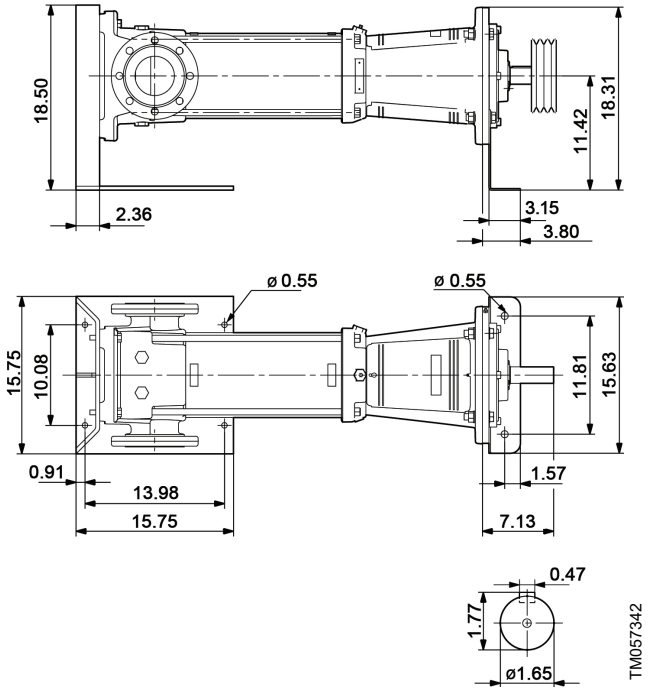
CR, CRI, CRN 10, 15 and 20 (type IV)



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



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



Pump rubber parts

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

Pump type	Rubber material				
	EPDM	FKM	FFKM	FXM	CR[2)]
CR, CRI, CRN 1s, 1, 3, 5	●	●	●	●	●
CR, CRI, CRN 10, 15, 20	●	●	●	●	●
CR, CRN 32, 45, 64	●	●	●[1)]	●	-
CR, CRN 95, 125, 155	●	●	●[1)]	●	-
CR, CRN 185, 215, 255	●	●	-	-	-

● Available.

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

2) Only available for CRN MAGDrive pumps.

We offer customized rubber materials for these pump types:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	-	--	-

Rubber materials

The table below shows the resistance of pump rubber materials to low and high temperatures and to a selection of pumped liquids.

Factors	EPDM	FKM	FFKM	FXM
Low temperatures (temp. < 32 °F [0 °C])	+	-	-	-
High temperatures (temp. > 194 °F [90 °C])	+	-	+	+
Acids	±	±	+	±
Alkalis	+	-	+	+
Glycols	+		+	+
Oils and fuels	-	+	+	±
Solvents	-	±	+	-

+	Suitable
±	Suitable under certain conditions
-	Not suitable

EPDM

EPDM is a rubber quality especially suitable for water and aqueous solutions, but non-resistant to mineral oils.

- Good mechanical properties at low temperatures
- Resistant to water up to 248 °F (120 °C)
- Resistant to polar solvents (alcohols, ketones and esters)
- Resistant to ozone and weather
- Resistant to glycol
- Partly resistant to vegetable oils at low temperatures
- Not resistant to mineral oils

FKM

FKM rubber covers a very wide range of liquids and temperatures.

- Poor mechanical properties at low temperature
- Resistant to water up to 194 °F (90 °C)
- Resistant to acids and saline solutions
- Resistant to mineral oils and vegetable oils
- Resistant to most solvents (toluene, petrol, trichloroethylene, etc.)
- Resistant to ozone and weather
- Not resistant to certain polar solvents (for instance alcohols, ketones and esters)
- Not resistant to alkaline liquids at high temperatures

FFKM

FFKM (perfluoroelastomer) is chemically resistant to a wide range of liquids. FFKM rubber corresponds to PTFE, but offers considerably better mechanical properties.

- Good mechanical properties
- Resistant to water up to 302 °F (150 °C)
- Especially suitable for use in chemical processing plants, in the production of dyes, paints, varnishes, solvents, nitric acid, etc.
- Resistant to ozone and weather

Not entirely resistant to amines and strongly alkaline liquids at high temperatures

FXM

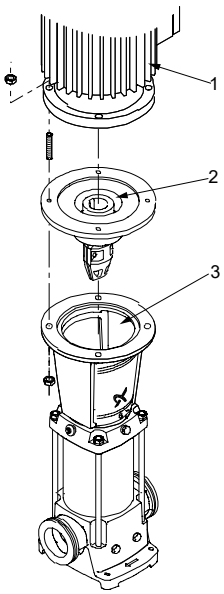
FXM (fluorinated copolymer) is particularly suitable for extremely high temperatures and pressures as well as for use in acid liquids and gasses within oil and gas extraction (in boreholes, on land and at sea). Its resistance to chemicals and high temperatures has been considerably improved as compared to flourized rubber, with excellent resistance to hot water and steam.

- Elastic seal material
- Temperature range: 14 to 356 °F (-10 to 180 °C)
- Excellent hot water and steam resistance
- Available in material resistant to sudden decompression. Consisting of a modified structure of tetrafluoroethylene (TFE) and propylene copolymers, FXM is widely used within:

- the chemical and petrochemical industry
- the aviation and space industry
- mechanical engineering
- refineries

Bearing flange

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



TM034062

Bearing flange

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 that the bearing flange requires a motor with keyway and deep-groove ball bearings. 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.

Lubrication

For motor sizes above 15 HP (11 kW), the bearing flange is equipped with grease nipples and must be lubricated regularly. Follow the instructions on the bearing flange.

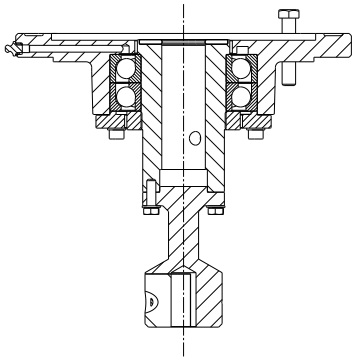
Pump range

The following pump types are available with bearing flange:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	-	-
10, 15, 20	-	-	--
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	●	-	●

● Available.

Additional height of bearing flange



TM073754

Bearing flange for CR pumps

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

CR, CRN 32, 45, 64

Motor power	Additional height
NEMA [HP]	[inches (mm)]
15 - 60	0.75 (19)

CR, CRN 95, 125, 155, 185, 215, 255

Motor power	Additional height
NEMA [HP]	[inches (mm)]
15 - 75	0.83 (21)
100 - 300	0.98 (25)

For information about the total height of a given CR pump, see the relevant product guides available in Grundfos Product Center.

Related information

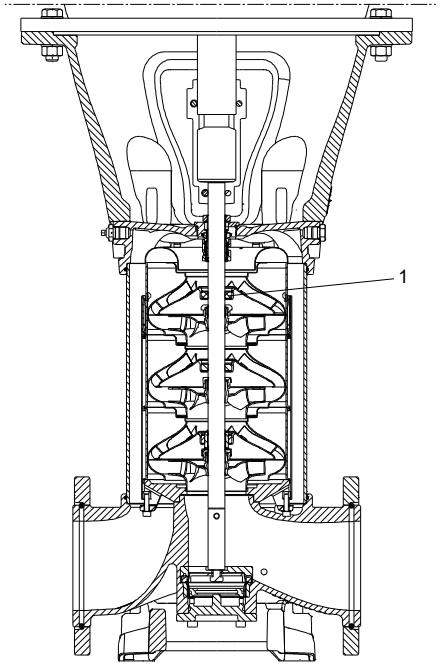
Further documentation

Support bearings

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

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	-	-
10, 15, 20	-	-	-
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	-	-	-

● Available.



Placement of the support bearings on a CR pump

Pos	Description
1	Support bearing

Bearing material

We offer pumps with a wide range of customized 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
	Graflon/tungsten carbide
CR, CRN 32, 45, 64	Tungsten carbide/tungsten carbide
CR, CRN 95, 125, 155	Silicon carbide/silicon carbide

We offer customized bearing materials for these pump types:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	-	-	-

● Available.

Pump head positions

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

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

Note that the vent of horizontal pumps must always point upwards.

Customized nameplate

We offer additional customized nameplates attached to the pump:

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

A Grundfos standard nameplate is always fitted on the pump.

Dry-running protection

LiqTec

GR9415

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 266 ± 9 °F (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.

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

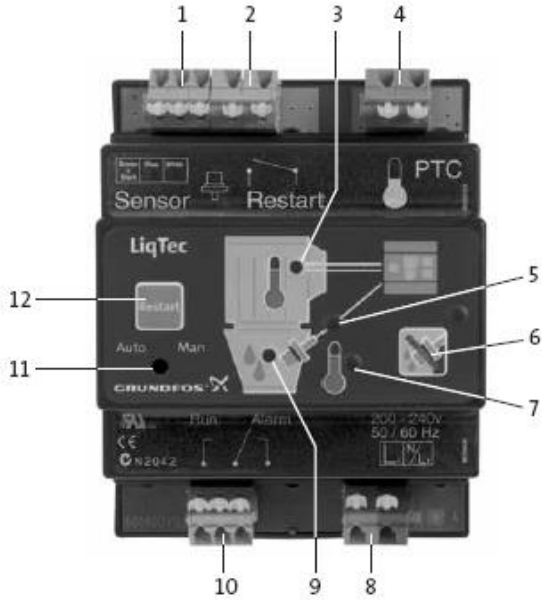
If there is no liquid present, LiqTec detects a high temperature in the sensor and turns off the pump motor immediately to prevent damage. LiqTec also prevents excessive liquid temperatures from damaging the pump.

If LiqTec senses a liquid temperature above 266 °F (130 °C), it turns off the pump motor immediately. 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 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 turns off the pump motor.



TM058867

LiqTec connected to a standard motor

1. Connection for Grundfos dry-running sensor
2. Connection for external restarting switch
3. Motor PTC indicator light
4. Connection for motor PTC sensor
5. Sensor indicator light
6. Deactivation of the dry-running monitoring function
7. High liquid temperature indicator light
8. Connection for supply voltage
9. Dry-running indicator light
10. Connection for Alarm/Run relay output
11. Auto/Manual restart switch
12. Restart button

Dimensions

4.57" x 3.54". 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
Maximum pressure	580 psi (40 bar)
Minimum/maximum liquid temperature	-4 °F / 248 °F (-20 °C / 120 °C)
Maximum ambient temperature	122 °F (50 °C)
Humidity	99 %
Enclosure class	IPX0
Pumped liquid	Any water-based liquid handled by Grundfos pumps
Cable length *	16.4 ft. (5 m)*

* 49.2 ft. (15 m) cable is available on request.

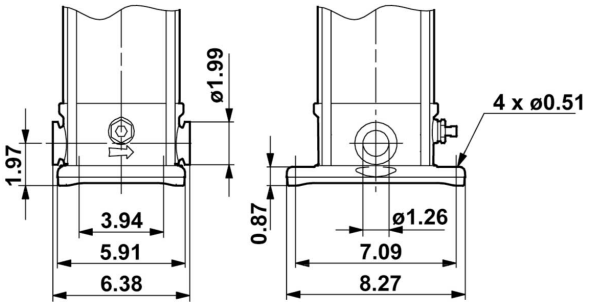
Pipe connections

TriClamp connection

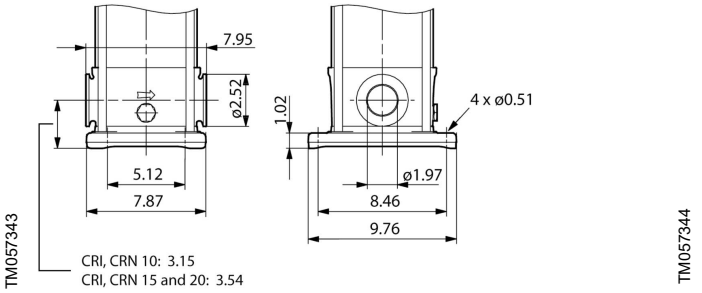
A base with TriClamp connection is a hygienic design with a sanitary coupling for use in the pharmaceutical, food and beverage industry. The connection is in accordance with EN/DIN 32676.

A set consists of one clamping ring, one gasket and one pipe stub. The clamping ring is made of stainless steel EN/DIN 1.4301/AISI 304. The pipe stub is made of stainless steel EN/DIN 1.4401/AISI 316. The gasket is made of PTFE or EPDM.

Dimensions [inches]



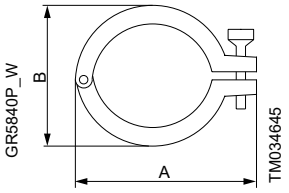
TriClamp connection for CRI, CRN 1s, 1, 3 and 5



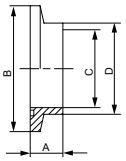
TriClamp connection for CRI, CRN 10, 15 and 20

Dimensions [mm]

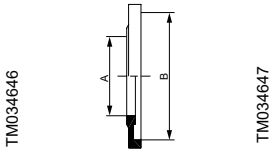
Clamping ring



Pipe stub



Gasket



Pump type	Nominal diameter	A	B	A	B	C	D	A	B
CRI, CRIE, CRN, CRNE 1s, 1, 3, 5	38.0	92.0	59.5	21.5	50.5	35.6	38.6	35.3	50.5
	32.0	102.0	60.0		50.5	32.0	36.0	32.2	50.5
CRI, CRIE, CRN, CRNE 10, 15, 20	51.0	104.4	74.0		64.0	48.6	51.6	48.0	64.0
	50.0	123.0	75.0		65.0	50.0	54.0	50.2	64.0

Pump type	Pipe connection	Connection material	Gaskets	Pressure [psi (bar)]	Coupling sets required	Product number
CRI, CRIE, CRN, CRNE 1, 3, 5	1 1/2"	Stainless steel	PTFE	232 (16 bar)	2	96515375
			EPDM	232 (16 bar)	2	96515374
				725 (50 bar)	2	97549395
CRI, CRIE, CRN, CRNE 10, 15, 20	2"	Stainless steel	PTFE	232 (16 bar)	2	96515377
			EPDM	232 (16 bar)	2	96515376
				725 (50 bar)	2	97549397

We offer TriClamp connections for these pump types:

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	●	●
10, 15, 20	-	●	●
32, 45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

Oval connection (NPT)

A base with oval connections is designed for use in a wide range of industrial applications. Oval NPT connections for CRN pumps are available on request.

GR7573P_W

Oval connection (CR)

GR7570P_W

Oval connection (CRI, CRN)

We offer oval connections for these CRN pump types:

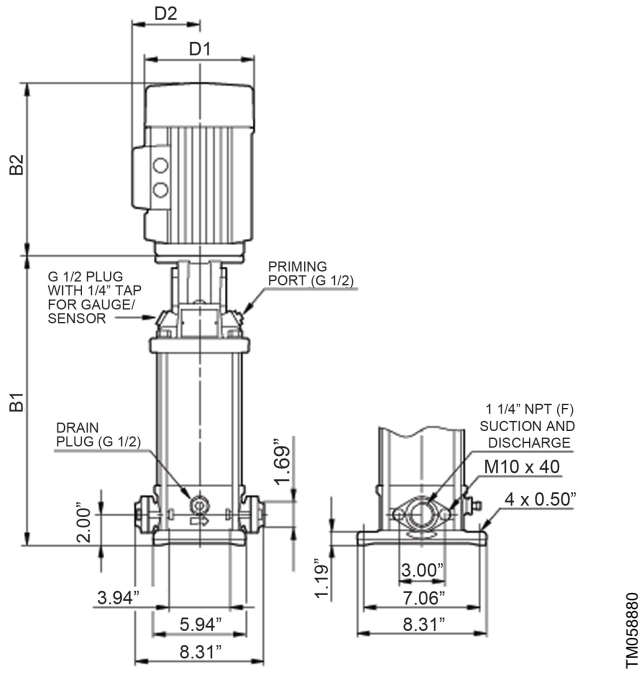
Pump type	CR	CRI	CRN
1s, 1, 3, 5*	-	-	●
10, 15, 20*	-	-	●
32, 45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

* Oval connections are available as standard for CR, CRI 1s, 1, 3, 5, 10, 15 and 20 pumps.

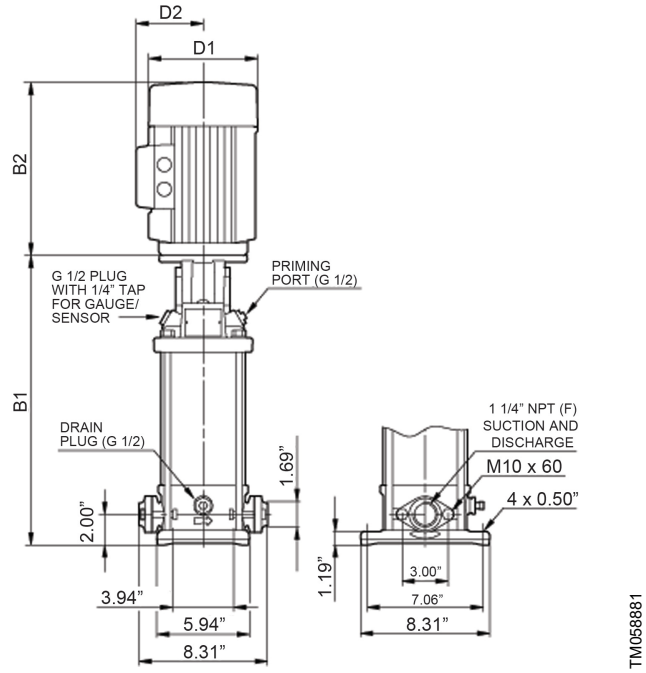
Dimensions for CRN

All dimensions are in inches.



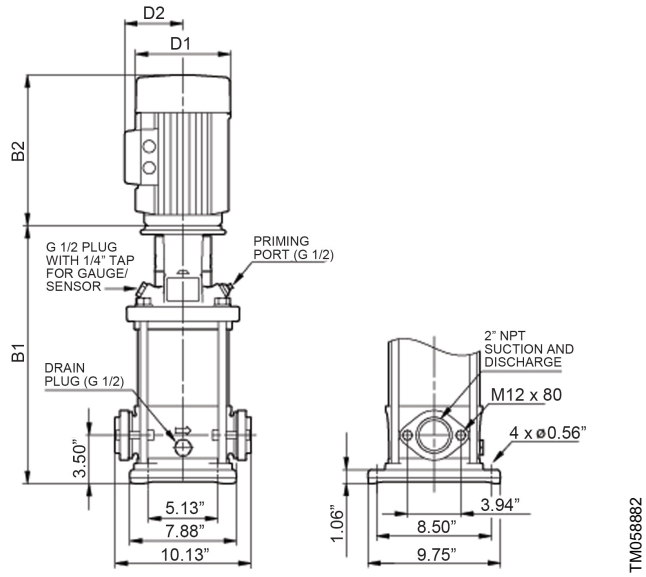
TM058880

CRN 1s - CRN 3



TM058881

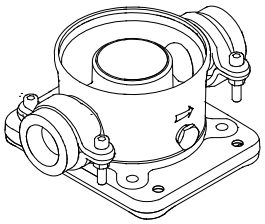
CRN 5



TM058882

CRN 10 - CRN 20

Union and clamp connection

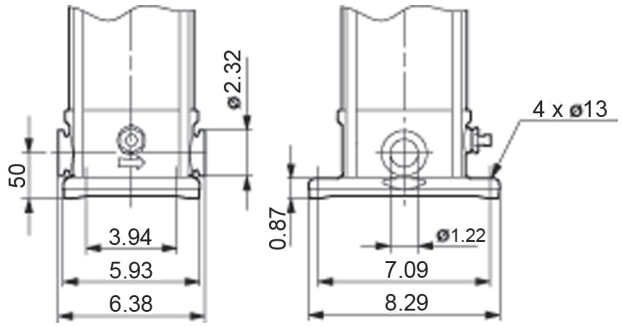


TM027239

Union and Clamp connection (CRI, CRN)

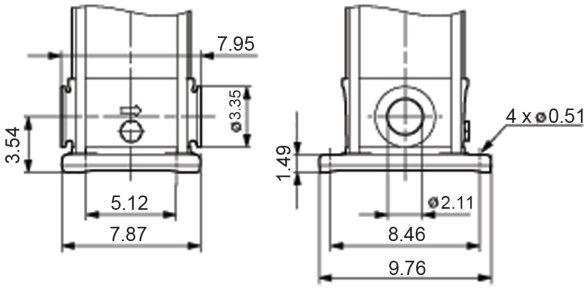
Dimensions

All dimensions are in inches.



TM058883

Union and clamp connection for CRI, CRN 1s, 1, 3 and 5

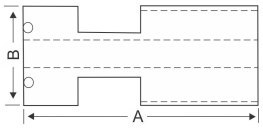


TM058884

Clamp connection for CRI, CRN 10, 15 and 20

Union connection, external NPT thread

Union Adapter



TM058885

Pump type	Nominal diameter	A	B
CRI(E), CRN(E) 1s, 1, 3, 5	2" NPT	1.30	2.35

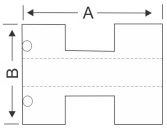
We offer clamp connections for these pump types:
Union connection *(external NPT thread)*

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	●	●
10, 15, 20	-	-	-
32, 45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

Clamp connection, internal NPT thread

Socket



TM058886

Pump type	Nominal diameter	A	B
CRI(E), CRN(E) 1s, 1, 3, 5	1" NPT	0.90	2.32
	1 1/4" NPT	0.90	2.32
CRI(E), CRN(E) 10, 15, 20	1 1/2" NPT	1.12	3.50
	2" NPT	1.12	3.50

We offer union connections for these pump types:
Clamp connection *(internal NPT thread)*

Pump type	CR	CRI	CRN
1s, 1, 3, 5	-	●	●
10, 15, 20	-	●	●
32, 45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

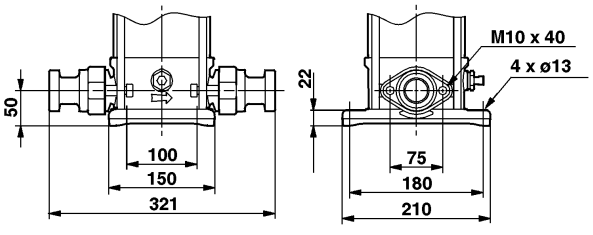
FlexiClamp according to EN/DIN 11851

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

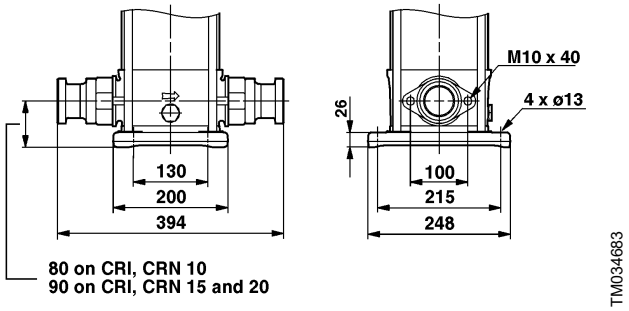
A set consists of one pipe stub with external thread designed for a FlexiClamp base with union connection.

Dimensions

All dimensions are in millimeters.



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



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

Pump type	Pipe 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	CR	CRI	CRN
1s, 1, 3, 5	-	-	●
10, 15, 20	-	-	●
32, 45, 64	-	-	-
95, 125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

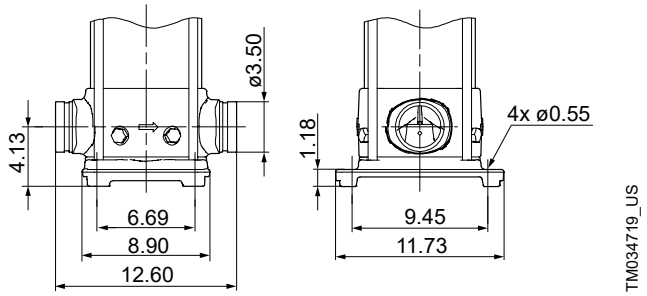
PJE couplings with NBR rubber parts

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

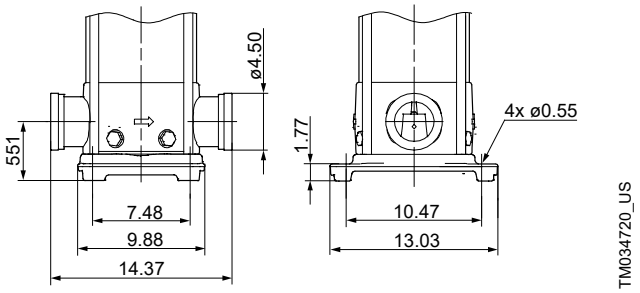
A PJE coupling set consists of two coupling halves, one gasket, one coupling liner for welding and bolts and nuts.

Dimensions

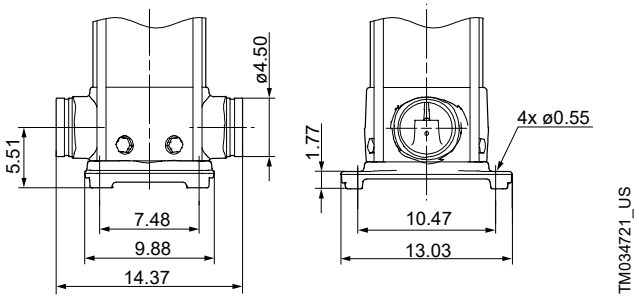
All dimensions are in inches.



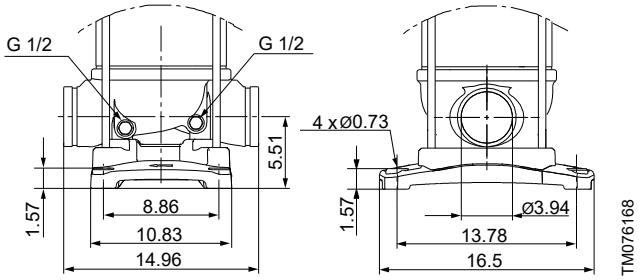
PJE coupling for CRN 32



PJE coupling for CRN 45



PJE coupling for CRN 64



PJE coupling for CRN 95

Part		Designation	Designed for pump type	Size	Product number
	TM003712	Victaulic type 77 coupling 3" 4"	CRN 32	3" (NBR seal)	00ID7664
			CRN 45, 64, 95	4" (NBR seal)	96415463
	TM003709	Victaulic coupling liner for welding	CRN 32	3" 316 SS	00150574
			CRN 45, 64, 95	4" 316 SS	96416743

PJE couplings with NBR rubber parts are available on request for CRN, CRNE.

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

Pump type	CR, CRE	CRI, CRIE	CRN, CRNE
1s, 1, 3, 5	-	-	-
10, 15, 20	-	-	-
32, 45, 64, 95	-	-	●
125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

Note that PJE connections with EPDM and FKM rubber parts are available on CRN, 1s, 1, 3, 5, 10, 15 and 20 pumps as standard.

DIN or JIS connection

We offer pumps with DIN or JIS connections for these pump types:

Pump type	CR	CRI	CRN
1s, 1, 3, 5*			
10*			
15, 20*	●	●	●
32, 45, 64	●		●
95, 125, 155	●		●
185, 215, 255	●		●

● Available.

* As standard, CR, CRE, CRI, CRIE, CRN, CRNE 1s, 1, 3, 5 and 10 pumps are available with connections that meet the requirements of ANSI, DIN and JIS.

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

Customized connections

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

Pump type	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64, 95	●	-	●
125, 155	-	-	-
185, 215, 255	-	-	-

● Available.

Examples of customized connections:

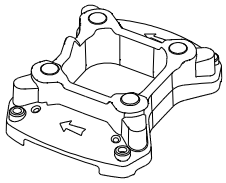
- oval flanges (Rp or BSP)
- DIN connection (DN)
- PJE couplings (Victaulic®) for CRN, CRNE
- clamp couplings (L-couplings)
- unions (+GF+).

Contact Grundfos for further information about customized connections. Standard connections are described in the relevant product guides available in Grundfos Product Center.

Base plate for CR 95 with CR 90 footprint

It is possible to use a CR 95 pump as drop-in replacement of a CR 90 pump and still have the same footprint.

A special base plate with the same small footprint as the CR 90 pump is available for CR 95 pumps up to and including 75 HP (55 kW).The material is ductile cast iron EN-GJS-500-7.



TM072495

Base plate for CR 95 with a small CR 90 footprint

9. 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	CR	CRI	CRN
1s, 1, 3, 5	●	●	●
10, 15, 20	●	●	●
32, 45, 64	●	-	●
95, 125, 155	●	-	●
185, 215, 255	●	-	●

● 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.
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.

Certificate	Description
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.
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".

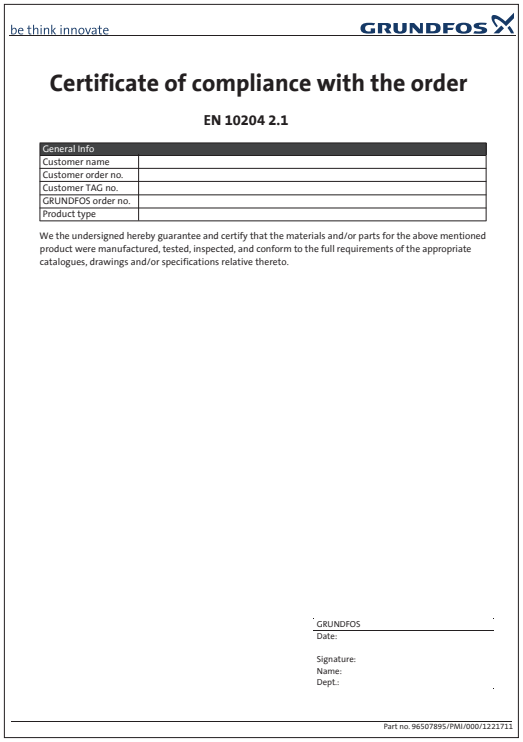
Note: Other certificates are available on request.

Related information

Examples of certificates

Examples of certificates

Certificate of compliance with the order



be think innovate

GRUNDFOS

Certificate of compliance with the order

EN 10204 2.1

General Info	
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.

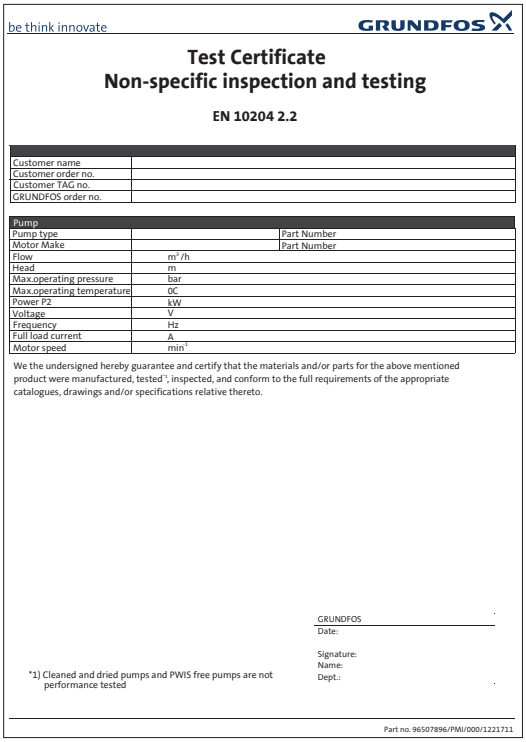
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96507895/PMI/000/1221711

TM034165

Test certificate



be think innovate

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	
Max.operating pressure	bar	
Max.operating temperature	0C	
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 *1), inspected, and conform to the full requirements of the appropriate catalogues, drawings and/or specifications relative thereto.

GRUNDFOS
Date:

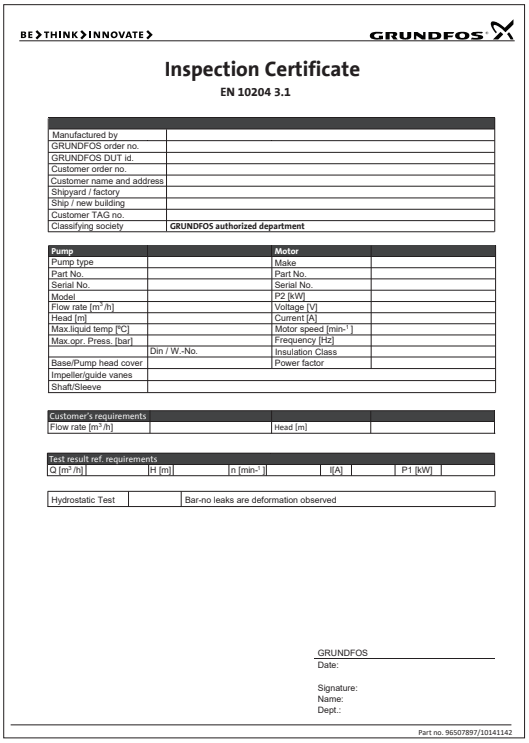
Signature:
Name:
Dept.:

*1) Cleaned and dried pumps and PWIS free pumps are not performance tested

Part no. 96507896/PMI/000/1221711

TM034163

Inspection certificate 3.1



BE›THINK›INNOVATE›

GRUNDFOS

Inspection Certificate

EN 10204 3.1

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 No.		Part No.	
Serial No.		Serial No.	
Model		P2 [kW]	
Flow rate [m^3/h]		Voltage [V]	
Head [m]		Current [A]	
Max.liquid temp [°C]		Motor speed [min^{-1}]	
Max.opr. Press. [bar]		Frequency [Hz]	
	Din / W.-No.	Insulation Class	
Base/Pump head cover		Power factor	
Impeller/guide vanes			
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 are deformation observed

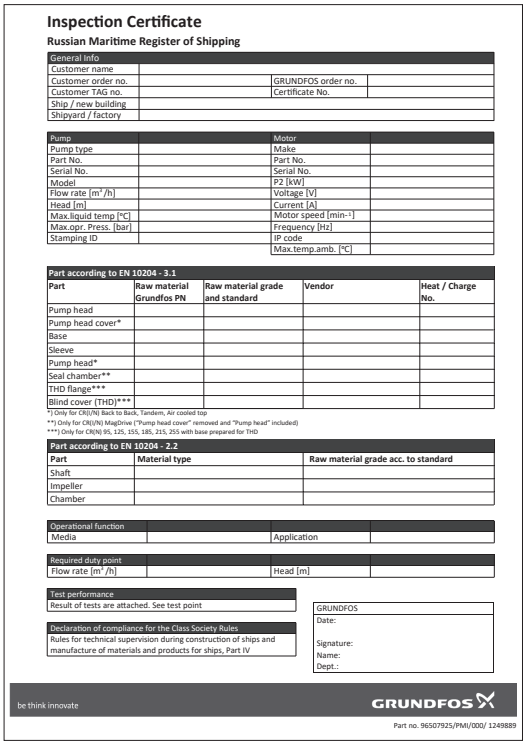
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 96507897/10141142

TM034162

Inspection certificate



Inspection Certificate

Russian Maritime Register of Shipping

General Info			
Customer name			
Customer order no.		GRUNDFOS order no.	
Customer TAG no.		Certificate No.	
Ship / new building			
Shipyard / factory			

Pump		Motor	
Pump type		Make	
Part No.		Part No.	
Serial No.		Serial No.	
Model		P2 [kW]	
Flow rate [m^3/h]		Voltage [V]	
Head [m]		Current [A]	
Max.liquid temp [°C]		Motor speed [min^{-1}]	
Max.opr. Press. [bar]		Frequency [Hz]	
Stamping ID		IP code	
		Max.temp.amb. [°C]	

Part according to EN 10204 - 3.1

Part	Raw material Grundfos PN	Raw material grade and standard	Vendor	Heat / Charge No.
Pump head				
Pump head cover*				
Base				
Sleeve				
Pump head*				
Seal chamber**				
THD flange***				
Blind cover (THD)***				

*) Only for CR(I)(N) Back to Back, Tandem, Air cooled top
**) Only for CR(I)(N) MagDrive ("Pump head cover" removed and "Pump head" included)
***) Only for CR(N) 95, 125, 155, 185, 215, 255 with base prepared for THD

Part according to EN 10204 - 2.2

Part	Material type	Raw material grade acc. to standard
Shaft		
Impeller		
Chamber		

Operational function			
Media		Application	

Required duty point			
Flow rate [m^3/h]		Head [m]	

Test performance
Result of tests are attached. See test point

Declaration of compliance for the Class Society Rules
Rules for technical supervision during construction of ships and manufacture of materials and products for ships, Part IV

GRUNDFOS
Date:

Signature:
Name:
Dept.:

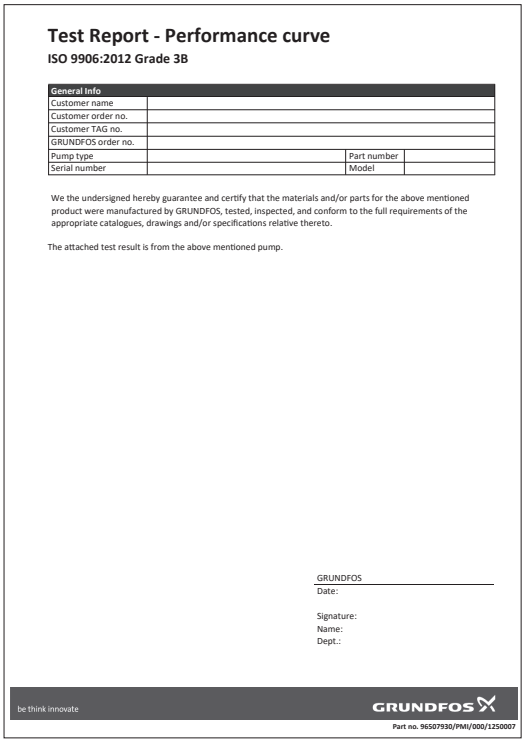
be think innovate

GRUNDFOS

Part no. 96507925/PMI/000/ 1249889

TM034156

Standard test report



Test Report - Performance curve

ISO 9906:2012 Grade 3B

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

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:

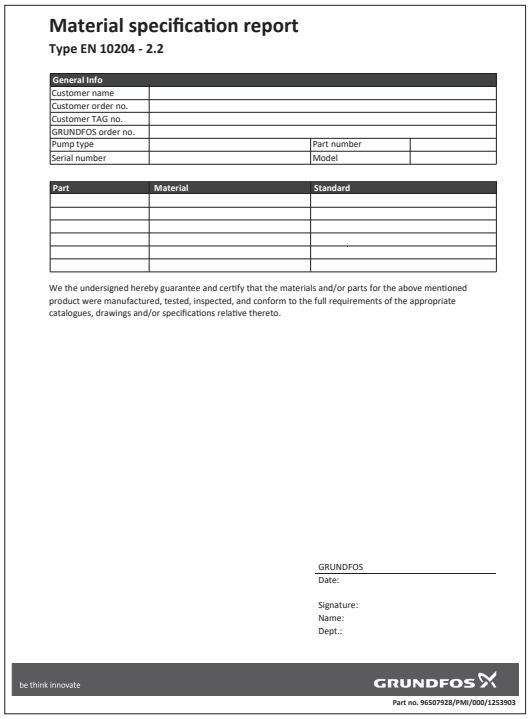
Signature:
Name:
Dept.:

be think innovate GRUNDFOS

Part no. 96507930/PMI/000/1250007

TM034143

Material specification report



Material specification report

Type EN 10204 - 2.2

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

Part	Material	Standard

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:

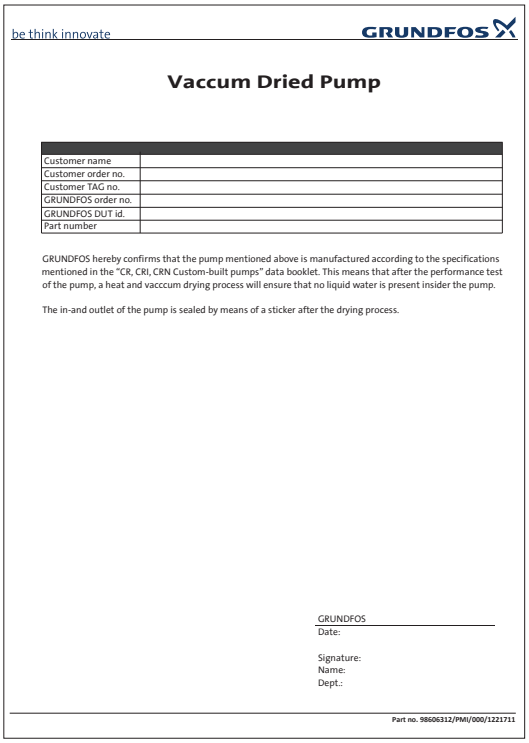
Signature:
Name:
Dept.:

be think innovate GRUNDFOS

Part no. 96507928/PMI/000/1253903

TM034150

Vacuum-dried pump



be think innovate GRUNDFOS

Vaccum Dried Pump

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

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 vacccum drying process will ensure that no liquid water is present insider the pump.

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

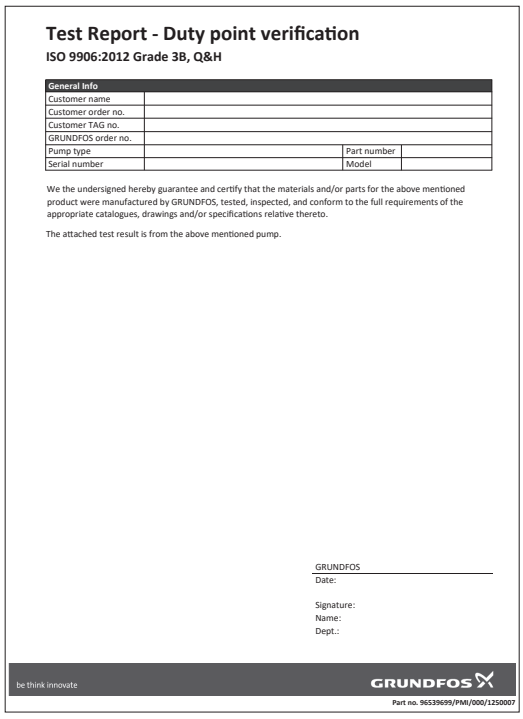
GRUNDFOS
Date:

Signature:
Name:
Dept.:

Part no. 98606312/PMI/000/1221711

TM060335

Duty point verification report



Test Report - Duty point verification

ISO 9906:2012 Grade 3B, Q&H

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

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.:

be think innovate GRUNDFOS

Part no. 96539699/PMI/000/1250007

TM034148

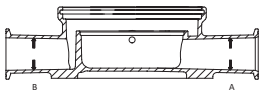
Surface-roughness

Report – Surface roughness

According to ISO 1302

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	
Base part number			

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



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.:

be think innovate GRUNDFOS

Part no. 96507931/PMI/000/1252874

TM034147

Vibration report

Vibration report

According to ISO 20816-1 / ISO 10816-7

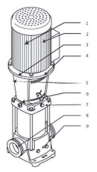
General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

Test Conditions: The pump is floor mounted on a steel plate supported by Sylomer foam. For vibration measurement positions see Figure.

P2 [kW]		Voltage [V]	
Frequency [Hz]		Number of Poles	
Flow rate [m^3 /h]		Head [m]	
Remarks:			

Result of Measurement:

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



Typical Zone boundary - ISO 20816-1:

Vel. (mm/s)	Range of typical zone boundary values for non-rotating parts.		
0,28			
0,45			
0,71	Zone boundry A/B 0,71 to 4,5		
1,12			
1,80		Zone boundry B/C 1,8 to 9,3	
2,80			
4,50			Zone boundry C/D 4,5 to 14,7
7,10			
9,30			
11,2			
14,7			
18,0			
28,0			
45,0			

GRUNDFOS
Date:

Signature:
Name:
Dept.:

be think innovate GRUNDFOS

Part no. 96507932/PMI/000/ 1249870

TM034167

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. 96507933P01/PMI/000/1135258

TM034146

Cleaned and dried pump

Report

Cleaned and dried pump

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

We the undersigned hereby confirm that the above-mentioned product is manufactured according to specifications mentioned in data booklet for the relevant product type. This means that prior to assembly, pump components are washed in pure, hot soapy 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.:

be think innovate GRUNDFOS

Part no. 96507934/PMI/000/1252874

TM034145

Electropolished pump

Report

Electro-polished pump

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

Grundfos hereby conforms that the pump mentioned above is manufactured according to below specifications prior to assembly.

All components are treated according listed steps:
1) Degreased in a mechanical washing tunnel with soap.
2) Pickled in a mixture of nitric-or hydrofluoric acid (HF)
3) Electropolished in Sulfuric acid (H2SO4) and Phosphoric acid (H3PO4)
4) Passivated in 10-12% Nitric acid (HNO3)
5) Washed in a mechanical washing tunnel without soap

The casted parts for a CRN 1s to a CRN 20, are all mechanically polished before being electropolished.

The pump will then obtain following surface roughness

Pump type	Stainless steel casted parts	Stainless steel plate and other non-casted parts	Surface roughness Ra [µm]
CRN1s,1, 3, 5	X	X	Equal to or below 0,8
CRN10, 15, 20	X	X	Equal to or below 0,8

GRUNDFOS
Date:

Signature:
Name:
Dept.:

be think innovate

Part no. 96507935/PMI/000/1250017

TM034144

ATEX-approved pump

Report

ATEX approved pump

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type			
Serial number		Model	
Pump part No.		Serial No.	
Motor part No.		Serial No.	
ATEX Approval of pump		Technical File No.	

GRUNDFOS hereby confirms that the pump mentioned above is manufactured according the ATEX directive.
This means the pump is conformity with the ATEX 2014/34/EU ANNEX VIII directive as mentioned in the "ATEX Supplement to installation and operating instructions" supplied with the pump.

GRUNDFOS
Date:

Signature:
Name:
Dept.:

be think innovate

Part no. 96512240/PMI/000/1281066

TM034166

Inspection certificate 3.1

Inspection Certificate

Type EN 10204 3.1

General Info			
Customer name			
Customer order no.		GRUNDFOS order no.	
Customer TAG no.			
Ship / new building			
Shipyard / factory			

Pump		Motor	
Pump type		Make	
Part No.		Part No.	
Serial No.		Serial No.	
Model		P2 [kW]	
Flow rate [m³/h]		Voltage [V]	
Head [m]		Current [A]	
Max.liquid temp [°C]		Motor speed [min⁻¹]	
Max.opr. Press. [bar]		Frequency [Hz]	
		IP code	
		Max.temp.amb. [°C]	

Required duty point			
Flow rate [m³/h]		Head [m]	

Test performance
Result of tests are attached. See test point

GRUNDFOS
Date:

Signature:
Name:
Dept.:

be think innovate

Part no. 96507897/PMI/000/1252874

TM060200

Material specification report with certificate from raw material supplier

Material specification report

Type EN 10204 – 3.1/2.2

General Info			
Customer name			
Customer order no.			
Customer TAG no.			
GRUNDFOS order no.			
Pump type		Part number	
Serial number		Model	

Part according to EN 10204 - 3.1				
Part	**Raw material Grundfos PN**	**Raw material grade and standard**	**Vendor**	**Heat / Charge No.**
Pump head				
Pump head cover*				
Base				
Sleeve				
Pump head*				
Seal chamber**				
THD flange***				
Blind cover (THD)***				

*) Only for CR(I/N) MagDrive ("Pump head cover" removed and "Pump head" included)
**) Only for CR(I/N) Back to Back, Tandem, Air cooled top
***) Only for CR(N) 95, 125, 155, 185, 215, 255 with base prepared for THD

Part according to EN 10204 - 2.2		
Part	**Material type**	**Raw material grade acc. to standard**
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.:

be think innovate

Part no. 96507929/PMI/000/1249525

TM060753

10. CRE pump solutions

TM027397

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 rpm and 6000 rpm.

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.

Customized CRE pump solutions

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

You can configure CRE pumps as follows:

- Selecting an operating panel on the front of the terminal box of the motor
- Selecting a communication module for bus standards such as GENIbus, LONWorks and PROFIBUS.
- Selecting a customized functionality by means of special configuration files (GSC files).

Related information

Communication with CRE pumps

User interfaces for CRE pumps

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

- the operating panel on the pump
- remote control via Grundfos GO Remote

Operating panels

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

	Operating panel type	
	Standard panel	**Advanced panel**
MLE motor	With radio module. Advanced functional module.	With radio module. Advanced functional module.
1/2-15 HP	❍	●
20-30 HP	●	

● Mounted as standard.

❍ Optional.

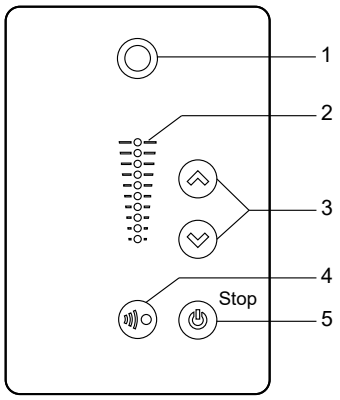
Operating panels for CRE pumps from 1/2 to 15 HP

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

The operating 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 operating panels enable communication via infrared (IR) connection which can be used in connection with Grundfos GO Remote.

The different operating panels and remote controls are described below.

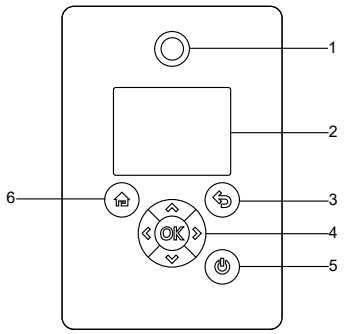
Standard operating panel, MLE 1/2 to 15 HP



TM054848

Pos.	Symbol	Description
1		**Grundfos Eye:** The indicator light shows the operating status of the product.
2	-	Light fields for indication of the setpoint.
3		**Up**/**Down**: The buttons change the setpoint.
4		**Radio communication**: The button enables radio communication with Grundfos GO Remote and other products of the same type.
5		**Start**/**Stop**: Press the button to make the product ready for operation or to start and stop the product. **Start**: If you press the button when the product is stopped, the product starts if no other functions with higher priority have been enabled. **Stop**: If you press the button when the product is running, the product always stops. When you press the button, the stop icon appears at the bottom of the display.

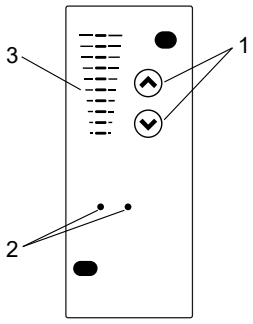
Advanced operating panel, MLE 1/2 to 15 HP



TM054849

Pos.	Symbol	Description
1		**Grundfos Eye:** The indicator light shows the operating status of the product.
2	-	Graphical colour display.
3		**Back**: Press the button to go one step back.
4		**Left**/**Right**: Press the buttons to navigate between main menus, displays and digits. When you change the menu, the display shows the top display of the new menu.
		Up/**Down**: Press the buttons to navigate between submenus or change the value settings. If you have disabled the possibility to make settings with the **Enable/disable settings** function, you can enable it again temporarily by pressing these buttons simultaneously for at least 5 seconds.
	OK	**OK**: Press the button to do as follows: • save changed values, reset alarms and expand the value field • enable radio communication with Grundfos GO Remote and other products of the same type. When you try to establish radio communication between the product and Grundfos GO Remote or another product, the green indicator light in Grundfos Eye flashes. In the controller display, a note states that a wireless device wants to connect to the product. Press **OK** on the product operating panel to allow radio communication with Grundfos GO Remote and other products of the same type.
5		**Start/Stop**: Press the button to make the product ready for operation or to start and stop the product.**Start**: If you press the button when the product is stopped, the product starts if no other functions with higher priority have been enabled.**Stop**: If you press the button when the product is running, the product always stops. When you press the button, the stop icon appears at the bottom of the display.
6		**Home**: Press the button to go to the **Home** menu.

Operating panel, MLE 20 to 30 HP



TM058590

Pos.	Symbol	Description
1	^ v	**Up**/**Down**: The buttons change the setpoint.
2	•	Indicator lights: Green = operation. Red = fault.
3	-	Light fields for indication of the setpoint. Yellow = setpoint indication.

Remote control

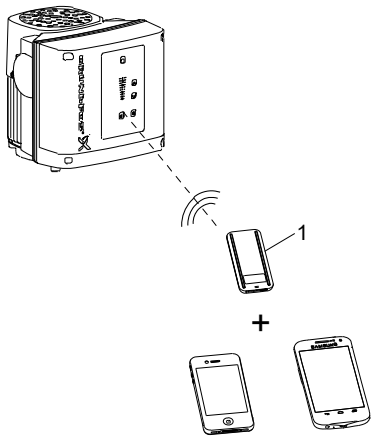
Grundfos GO Remote

The product is designed for wireless radio or infrared communication with Grundfos GO Remote.

Grundfos GO Remote enables you to set functions and gives you access to status overviews, technical product information and current operating parameters.

Use Grundfos GO Remote together with this mobile interface:

- Grundfos MI 301.



TM066256

Pos.	Description
	Grundfos MI 301:
1	Separate module enabling radio or infrared communication. Use the module together with an Android or iOS-based smart device via a Bluetooth connection.

Outdoor installation

According to UL 778 and C22.2 No. 108-14, pumps that are intended for outdoor use must be marked enclosure type 3 and the product must be tested at a rated surface temperature down to -31 °F (-35 °C). The MLE enclosure is approved for type 3 or 4 and a rated surface temperature down to 32 °F (0 °C), and thus only for indoor uses in UL 778 and C22.2 No. 108-14 pump applications. See the Installation and Operating Instructions for additional details.

Communication with CRE pumps

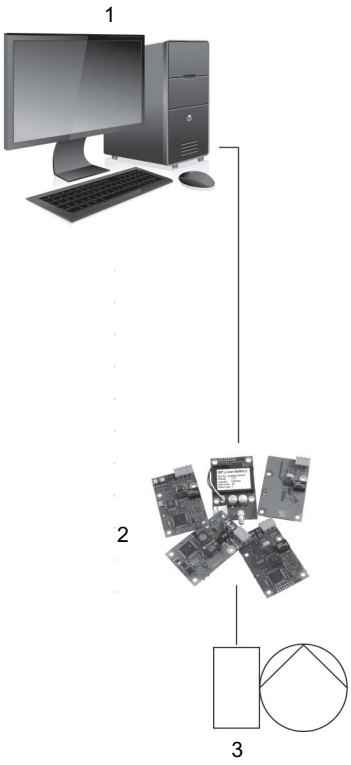
Communication with CRE pumps is possible via a central building management system, remote control or control panel.

Central management system

The operator can communicate with a CRE pump at a distance.

Communication is enabled by connecting the E-pump to a central building management system. This allows the operator to monitor the pump and change the control modes and setpoint settings.

Communication between CRE pumps and a central building management system is enabled via a Grundfos CIM module.



Structure of a central management system

Pos.	Description
1	Control management system
2	CIM modules
3	E-pump

Related information

Grundfos PC Tool E-products

Grundfos PC Tool E-products

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

PC Tool E-products offers these functions:

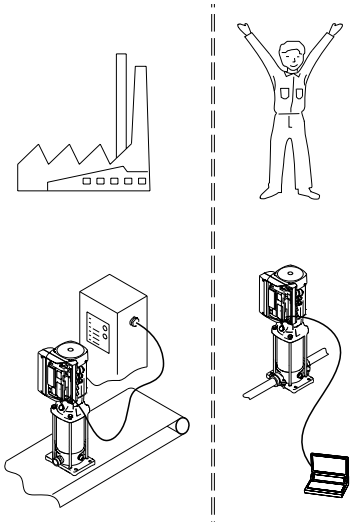
- monitoring of operational status of your E-product
- standard configuration of E-products
- custom configuration of E-products
- saving of logged data from E-products.

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

When configuration files have been imported, 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.

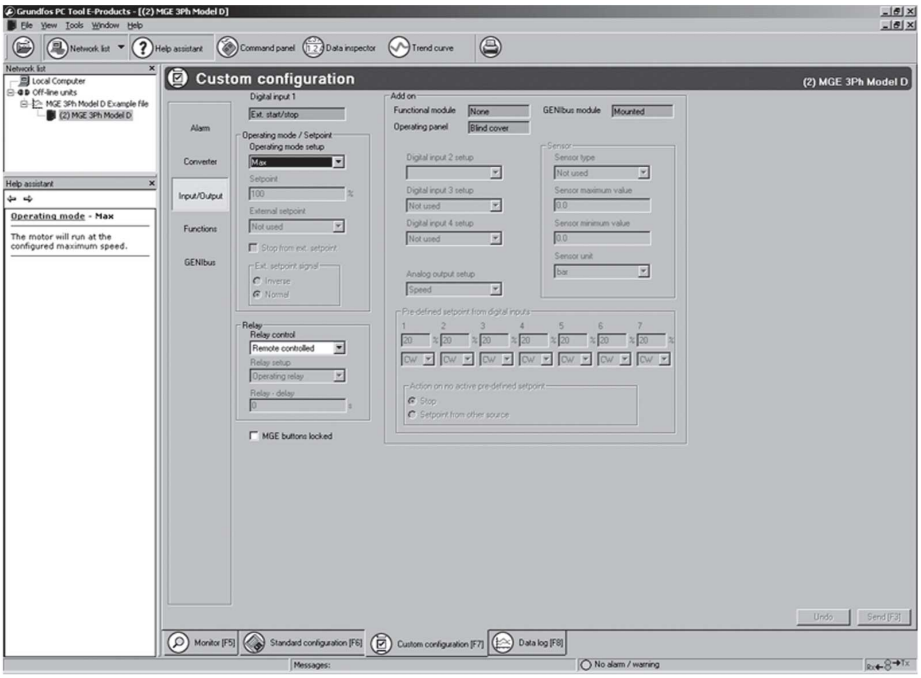


PC Tool E-products used in production and on site by the customer

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

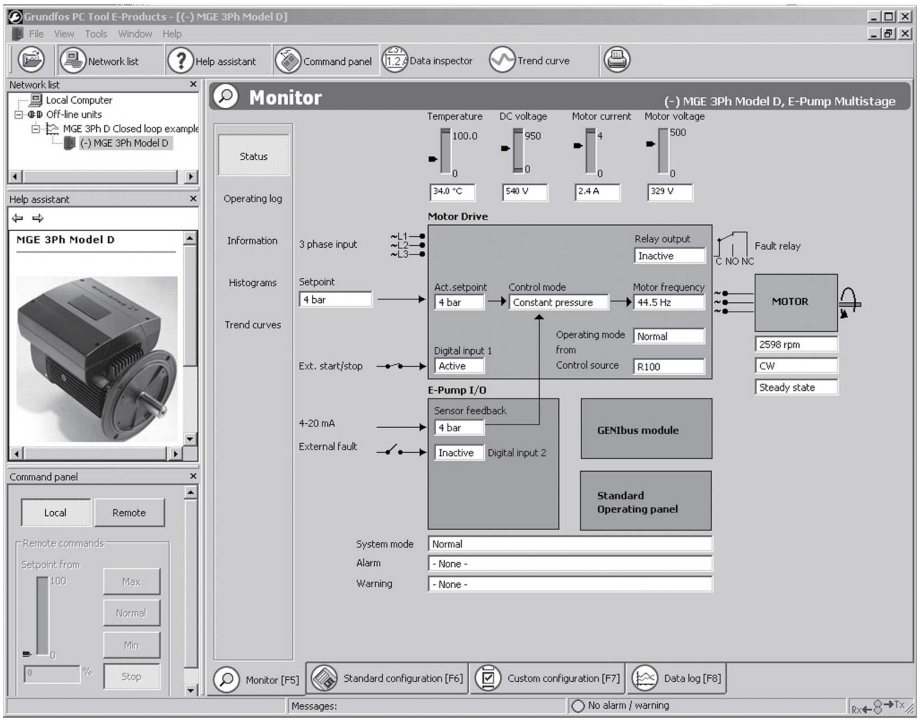
Examples of PC Tool interfaces are shown below.

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.



TM033712

PC Tool interface



TM044607

PC Tool interface, monitoring function

CIU communication interface units

GRA6118

Grundfos CIU communication interface unit

The CIU standard interface units with internal power supply are suitable for Grundfos products that do not support the internal mounting of a communication

interface module (CIM).

The CIU unit incorporates a 24-240 VAC/VDC power supply module. The CIU unit can either be mounted on a DIN rail or on a wall.

We offer the following CIU units:

CIU 900

For mounting an add-on CIM module. CIU 900 includes an internal power supply.

A CIM module is required.

CIU 901

For mounting an add-on CIM 200, CIM 280 or CIM 500 module.

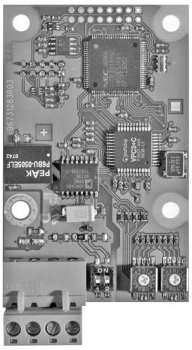
CIM 500 only supports Modbus TCP/IP and GiC/GRM IP when mounted in the CIU 901.

CIU 901 includes an internal power supply and an integrated input/output board. The built-in multi-purpose input/output board enables monitoring of standard pumps, sensors, meters and switches.

A CIM module is required.

Description	Fieldbus protocol	Product number
CIU 900	CIU unit only	99448387
CIU 901	CIU unit with input/output board	99448389

CIM communication interface modules



GRA6121

Grundfos CIM communication interface module

The CIM modules enable communication of operating data, such as measured values and setpoints, between CRE, CRIE or CRNE pumps of 15-30 HP (11-22 kW) and a building management system. The CIM modules are add-on communication modules which are fitted in the terminal box of CRE, CRIE, CRNE pumps of 15-30 HP (11-22 kW).

CIM modules must be fitted by authorized persons.

We offer the following CIM modules:

CIM 100

For communication via LonWorks.

CIM 150

For communication via PROFIBUS DP.

CIM 200

For communication via Modbus RTU.

CIM 280

For connection to Grundfos iSOLUTIONS Cloud/GRM.

CIM 300

For communication via BACnet MS/TP.

CIM 500

Ethernet module for communication via PROFINET, Modbus TCP/IP, BACnet IP, GiC/GRM IP, EtherNet/IP, Grundfos iSOLUTIONS Cloud.

Description	Fieldbus protocol	Product number
CIM 100	LonWorks	96824797
CIM 150	PROFIBUS DP	96824793
CIM 200	Modbus RTU	96824796
CIM 280*	US GiC/GRM 3G/4G	99439725
CIM 300	BACnet MS/TP	96893770
CIM 500	Modbus TCP/IP, BACnet IP, PROFINET, GiC/GRM IP, EtherNet IP	98301408

* Antenna is not included. See below.

Antennas for CIM 280

Description	Product number
Antenna forGRM 3G/4G, flush mount	99606613
External mounting bracket for antenna. Optional.	99606614
Directional antenna for 3G/4G High gain. Includes mount and 25 ft cable.	98851149
Battery for CIM 280 3G/4G. For power loss to CIU. Optional.	99499908

For further information about data communication via CIM modules and fieldbus protocols, see the CIM documentation available at www.grundfos.com (Grundfos Product Center).

Industrial custom-built E-solutions

Pump running at over-synchronous speed

Pumps running at over-synchronous speed run at speeds exceeding the standard, maximum speed, for example 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 equations

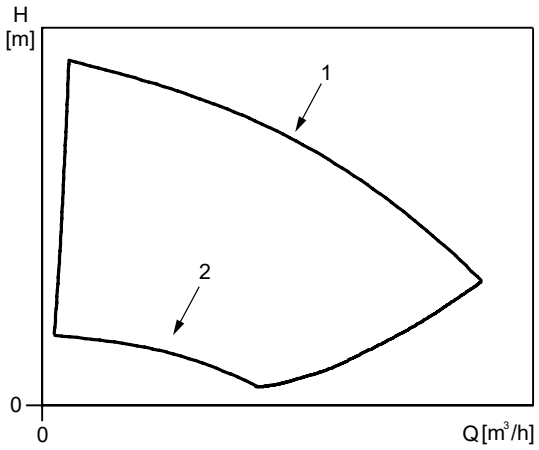
Normally, E-pumps are used in applications characterized by a variable flow rate. Consequently, you cannot select a pump that is constantly operating at its optimum efficiency.

In order to achieve optimum operating economy, select the pump on the basis of the following criteria:

- The maximum duty point must be as close as possible to the QH curve of the pump.
- The required duty point must be positioned so that P2 is close to the maximum point of the QH curve.

The flow rate of the required duty point must be close to the optimum efficiency (eta) for most operating hours.

Between the minimum and maximum performance curves, E-pumps have an infinite number of performance curves, each representing a specific speed. You may therefore not be able to select a duty point close to the maximum curve.



TM014916

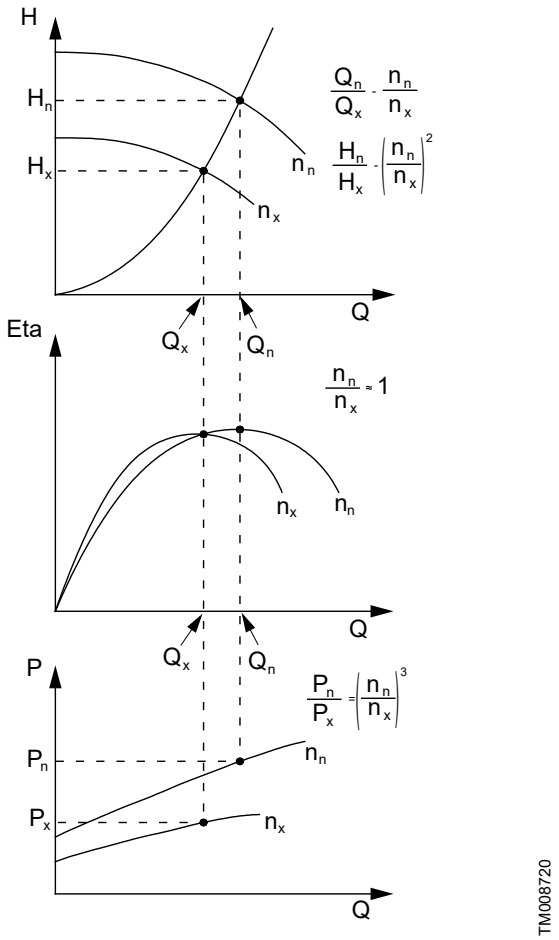
Maximum (1) and minimum (2) performance curves

In situations where you cannot select a duty point close to the maximum curve, use the affinity equations below. The head (H), the flow rate (Q) and the input power (P) are the appropriate variables for calculating the motor speed (n).

Note that the approximated formulas apply on condition that the system characteristic remains unchanged for n_n and n_x and that it is based on the formula $H = k \times Q^2$ where k is a constant.

The power equation implies that the pump efficiency is unchanged at the two speeds. In practice, this is not quite correct.

Finally, the efficiency of the frequency converter and the motor must be taken into account if you want a precise calculation of the power saving resulting from a reduction of the pump speed.



TM008720

Affinity equations

Legend

H_n	Rated head [m]
H_x	Current head [m]
Q_n	Rated flow rate [m^3/h]
Q_x	Current flow rate [m^3/h]
n_n	Rated motor speed [min^{-1}]
n_x	Current motor speed [min^{-1}]
η_n	Rated efficiency [%]
η_x	Current efficiency [%]
P_n	Rated power [kW]
P_x	Current power [kW]

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 [psi/bar]					
	Standard chamber		Reinforced chamber		Laser-welded chamber	
CR, CRI, CRN 1s	13.1	0.9	-	-	-	-
CR, CRI, CRN 1	13.1	0.9	31.9	2.2	31.9	2.2
CR, CRI, CRN 3	13.1	0.9	31.9	2.2	31.9	2.2
CR, CRI, CRN 5	13.1	0.9	31.9	2.2	-	-
CR, CRI, CRN 10	31.9	2.2	-	-	-	-
CR, CRI, CRN 15	31.9	2.2	-	-	-	-
CR, CRI, CRN 20	31.9	2.2	-	-	-	-
CR, CRI, CRN 32	72.5	5.0	-	-	-	-
CR, CRI, CRN 45	72.5	5.0	-	-	-	-
CR, CRI, CRN 64	72.5	5.0	-	-	-	-
CR, CRN 95	65.3	4.5	-	-	-	-
CR, CRN 125	69.6	4.8	-	-	-	-
CR, CRN 155	76.9	5.3	-	-	-	-

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 [psi/bar]	
CR, CRI, CRN 1-5	725	50
CR, CRI, CRN 10-20	435	30
CR, CRI, CRN 32-64	478	33
CR, CRN 95	451.12	31.1
CR, CRN 125	568.1	39.2
CR, CRN 155	577.3	39.8

Purpose and benefits

Traditionally, pumps are sized so that the maximum pressure and flow rate required in the application can be handled with a standard pump. For pumps working in conditions with various pressure and flow rate 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 a higher flow rate or pressure is required.

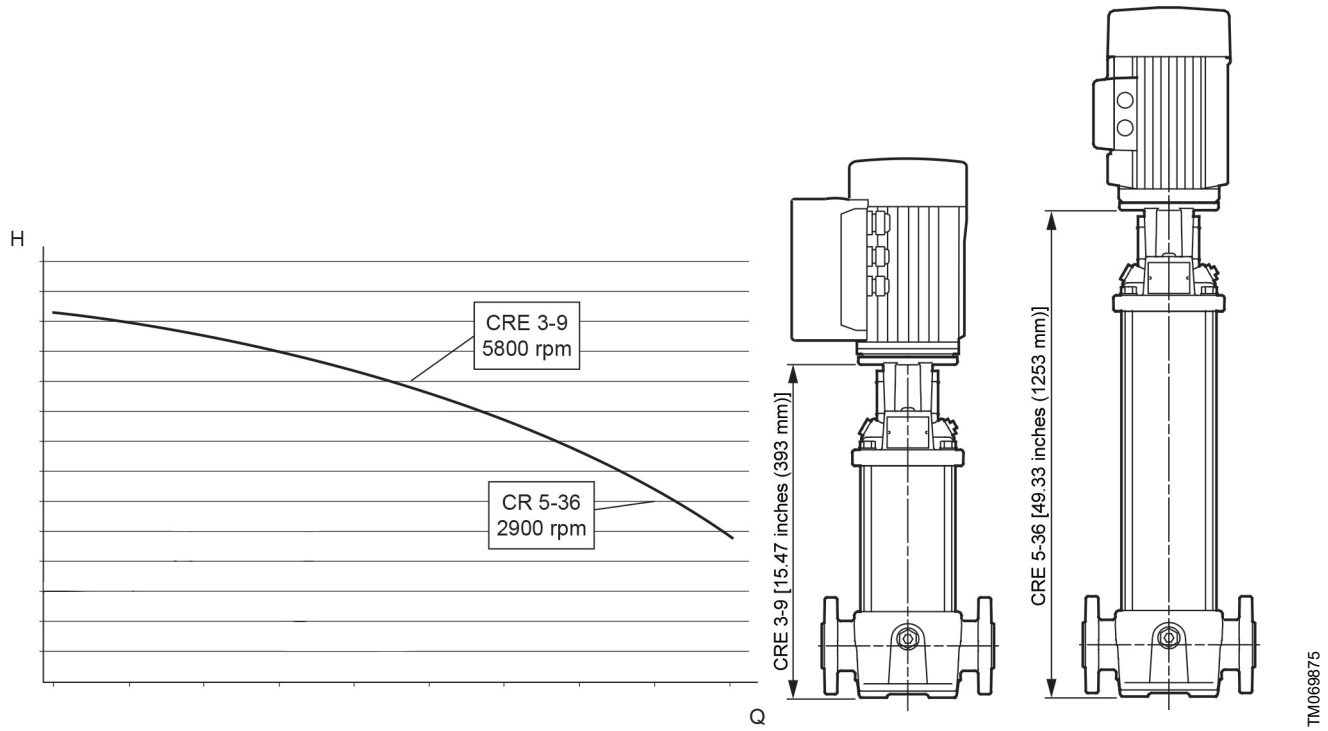
- Compact solution. Increasing rpm enables high pressure with few stages, requiring less space.

In applications where a high flow rate/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 rate or 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 below illustrates how a pump can be down-sized and still deliver the same performance.



Comparison of performance: A CRE 3-9 running at over-synchronous speed equals the performance of a CR 5-36 running at 2900 rpm.

Availability

This function is available in these pump sizes:

	2-pole
Single-phase pumps	1/2 - 2 HP (0.37 - 1.5 kW)
Three-phase pumps	1-15 HP (0.75 - 11 kW)

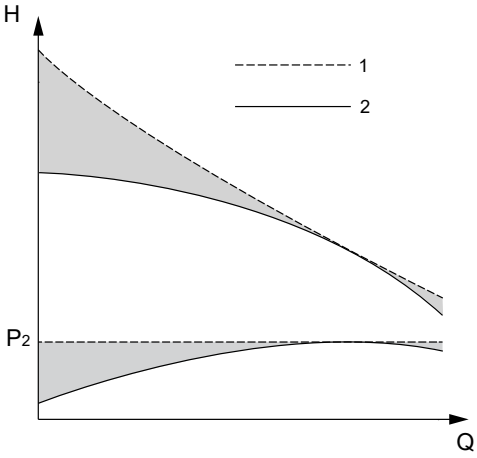
Setup

This function is available in factory-configured products.

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 MLE motor will deliver an output corresponding to the maximum load stated on the nameplate. The maximum load will never be exceeded.



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

Pos.	Description
1	Power limit
2	Standard

Purpose and benefits

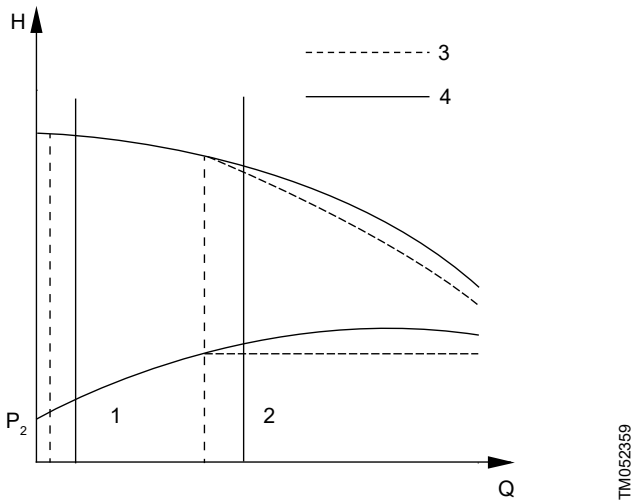
When using a standard pump at a low flow rate, the power consumption will drop, and the motor will have excess power available.

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 rates. The solution offers the following benefits:

- reduced motor size
- reduced pump size.

The section about affinity equations shows that a pump operating at low flow rates and relatively high pressures (1) can be fitted with an undersize motor with a rated power that matches this operating range. At higher flow rates 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.

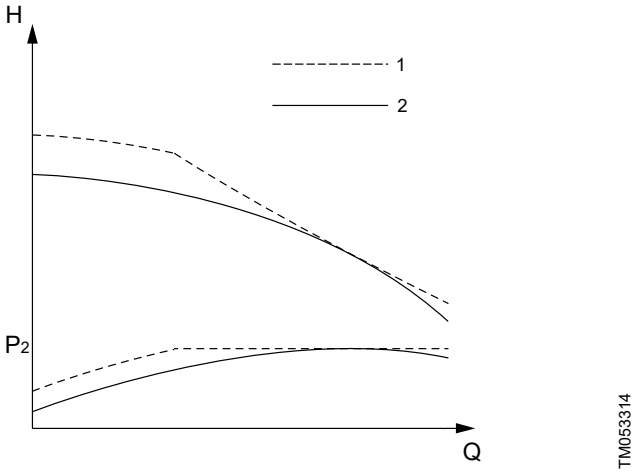


Standard performance curve compared to a curve for a pump fitted with an undersized MLE motor

Pos.	Description
3	Reduced motor
4	Standard motor

The MLE 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 rate where the motor is loaded to its full rated power. If the flow rate 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.



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

Pos.	Description
1	Maximum speed
2	Standard

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, it is used in applications demanding a high maximum speed to achieve a high pressure at low flow rates. In both cases, the motor is protected by the power limit function at a higher flow rate 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:

	2-pole
Single-phase pumps	1/2 - 2 HP (0.37 - 1.5 kW)
Three-phase pumps	1-15 HP (0.75 - 11 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 that running at over-synchronous speed will affect the NPSH value, and 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.

Related information

Pump hydraulic limitations

Affinity equations

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.

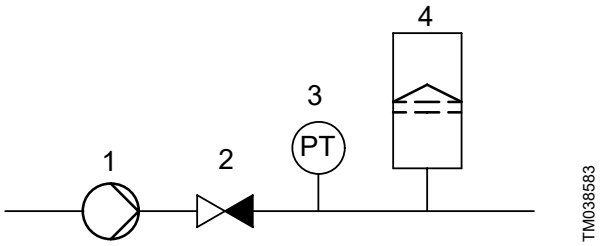
Purpose and benefits

The stop function provides these benefits:

- Energy consumption is limited and 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 a closed valve.



Pos.	Description
1	Pump
2	Check valve
3	Pressure sensor
4	Diaphragm bank

Availability

This function is available in these pump sizes:

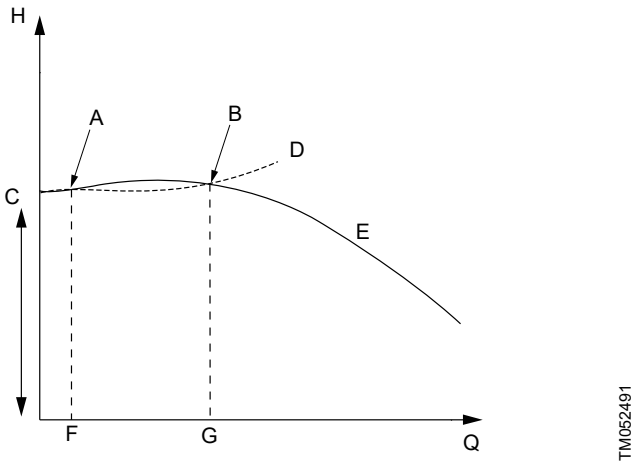
	2-pole
Single-phase pumps	1/2 - 2 HP (0.37 - 1.5 kW)
Three-phase pumps	1 - 30 HP (0.75 - 22 kW)

Setup

This function is available in factory-configured products.

Stabilizing unstable pump curves

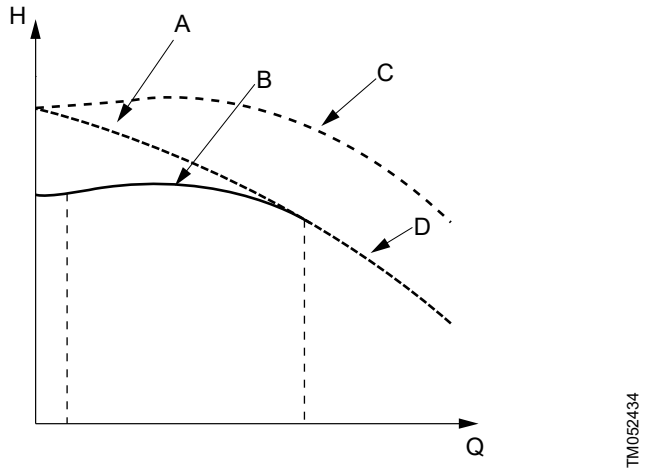
When the pump curve has a shape where it intersects the system curve at two points (A and B) with identical pressure but at different flow rates, the pump curve is defined as unstable. This is especially problematic in systems with a flat system characteristic as it prevents the pump from being controlled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



Unstable pump curve

Pos.	Description
A	Intersection between pump curve and system curve
B	Intersection between pump curve and system curve
C	Counter pressure
D	Flat system characteristic
E	Unstable curve
F	2 m3/h
G	7 m3/h

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



Pump curve with a stabilized operating range

Pos.	Description
A	Stabilized pump curve
B	Unstable standard pump curve
C	65 Hz curve
D	60 Hz

Purpose and benefits

The purpose of stabilizing 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

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

Availability

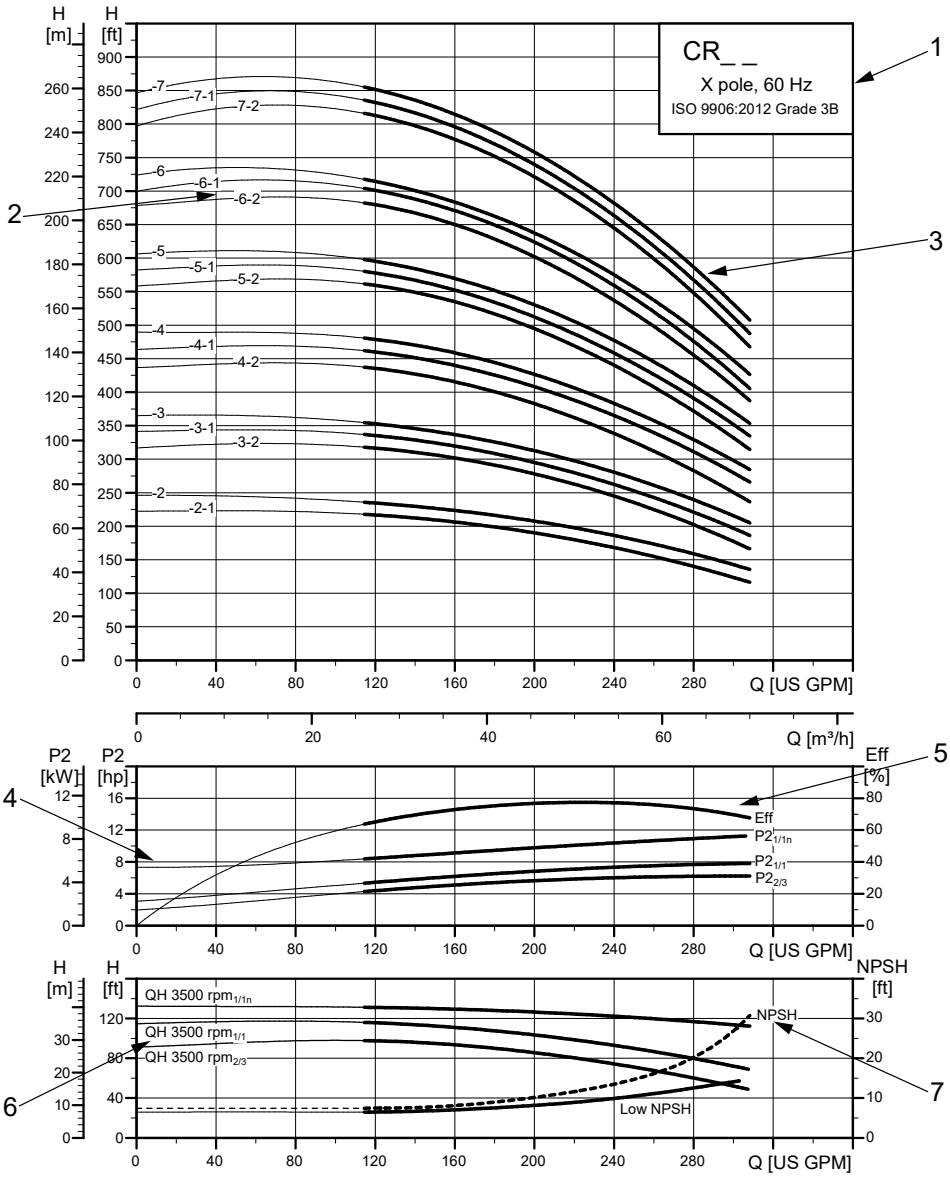
This function is available in these pump sizes:

	2-pole
Single-phase pumps	1/2 - 2 HP (0.37 - 1.5 kW)
Three-phase pumps	1-15 HP (0.75 - 11 kW)

Setup

This function is available in factory-configured products.

11. How to read the curve charts



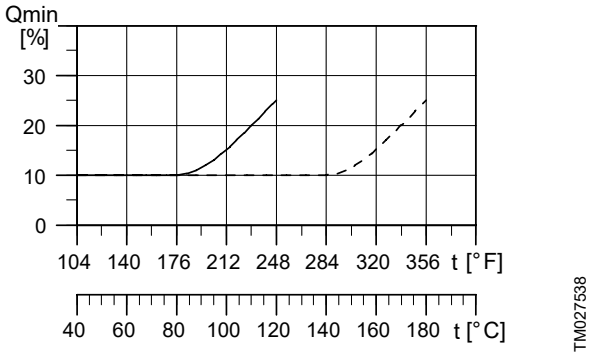
Pos.	Description
1	Pump type. Frequency, poles or speed. ISO or ANSI standard.
2	Number of stages. First figure: number of stages. Second figure: number of reduced-diameter impellers.
3	QH curve of the individual pump. The bold curves indicate the recommended duty range for best efficiency.
4	The power curves indicate pump input power **per stage**. Curves are shown for a pump with one stage (1/1), low-NPSH stage (1/1n) and reduced-diameter impellers (2/3).
5	The Eff curve shows the efficiency of a pump with three full size impellers. The efficiency of pumps with reduced-diameter impellers is approximately 2 % lower than the Eff curve shown in the chart.
6	QH curve for each individual impeller. Curves are shown for a pump with one stage (1/1), low-NPSH stage (1/1n) and reduced-diameter impellers (2/3).
7	The NPSH curve is a maximum curve for all the variants shown.

Guidelines to performance curves

The guidelines below apply to the performance curves:

- Tolerances to ANSI or ISO standards, such as ISO 9906:2012, Grade 3B, if indicated on the curve chart.
- The motors used for the measurements are standard Grundfos specified motors.
- Measurements have been made with airless water at a temperature of 68 °F (20 °C).
- The curves apply to the following kinematic viscosity: υ = 1 mm^2/s (1 cSt).
- Due to the risk of overheating, the pumps must not be used at a flow rate below the minimum flow rate.
- The QH curves apply to a rated motor speed of a three-phase mains-operated motor. For realistic curves, go to Grundfos Product Center (http://product-selection.grundfos.com), and insert data.

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

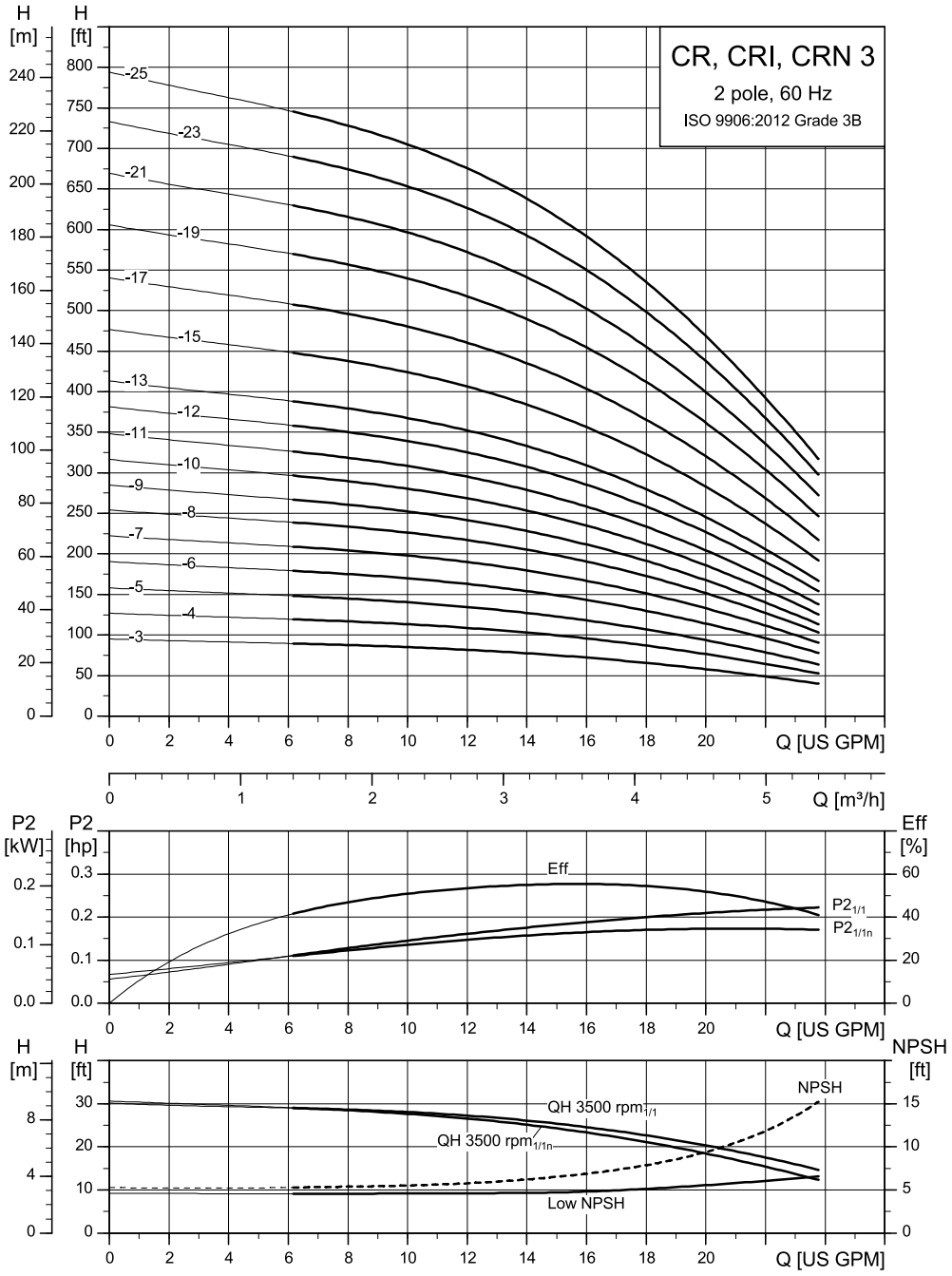


Minimum flow rate

12. Performance curves

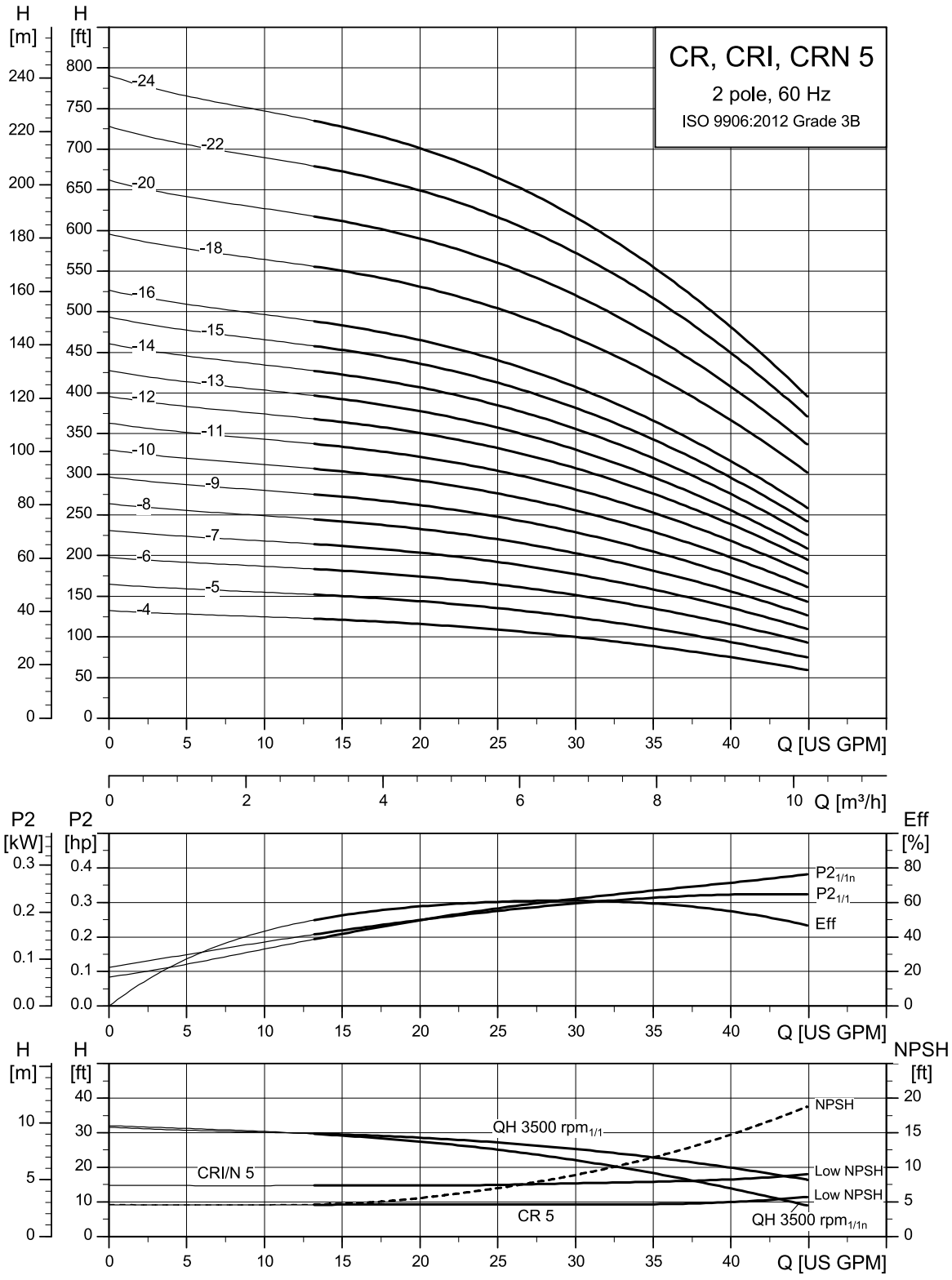
Low-NPSH pumps with 2-pole motor

CR, CRI, CRN 3



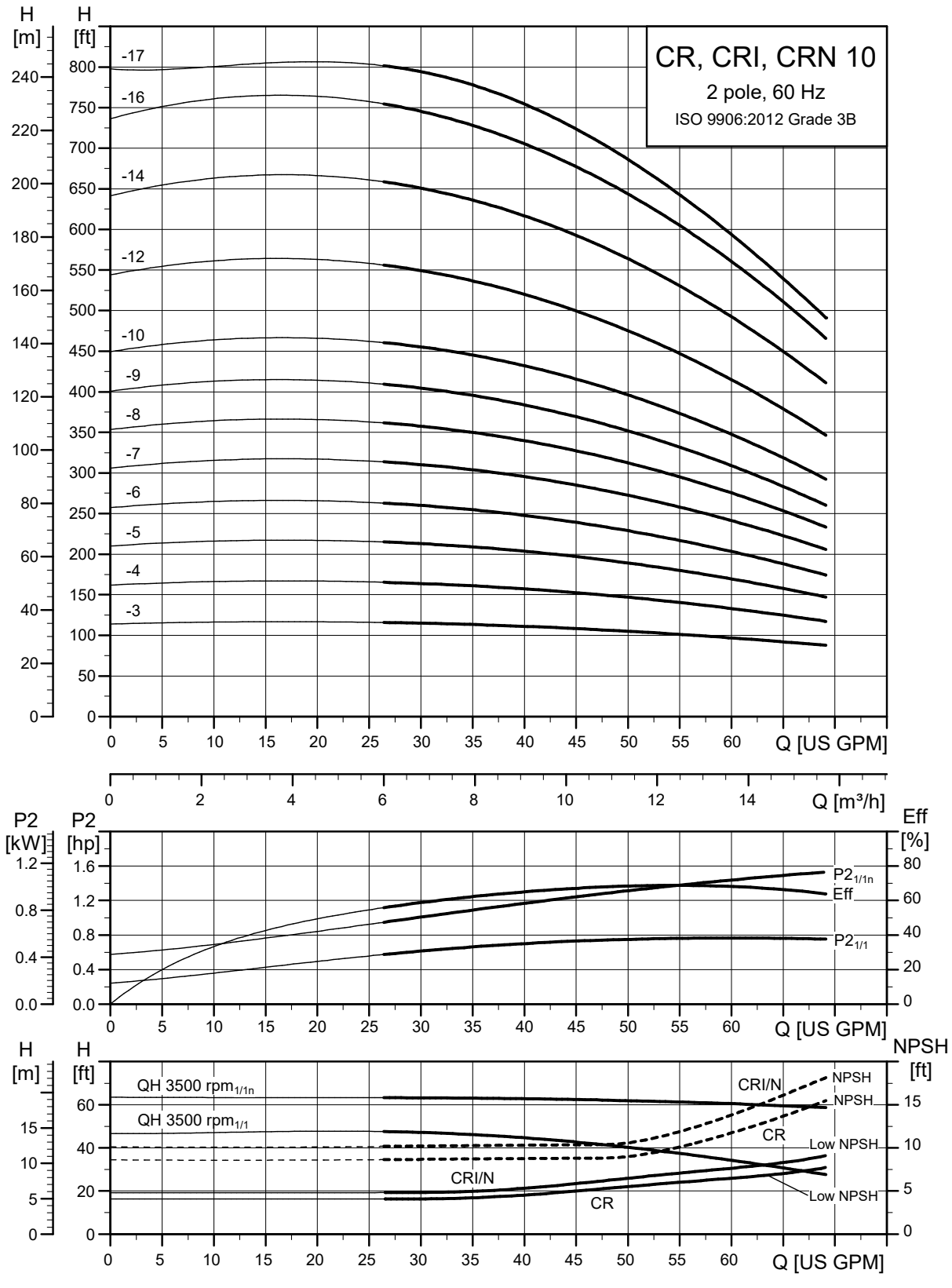
TM057078

Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 5

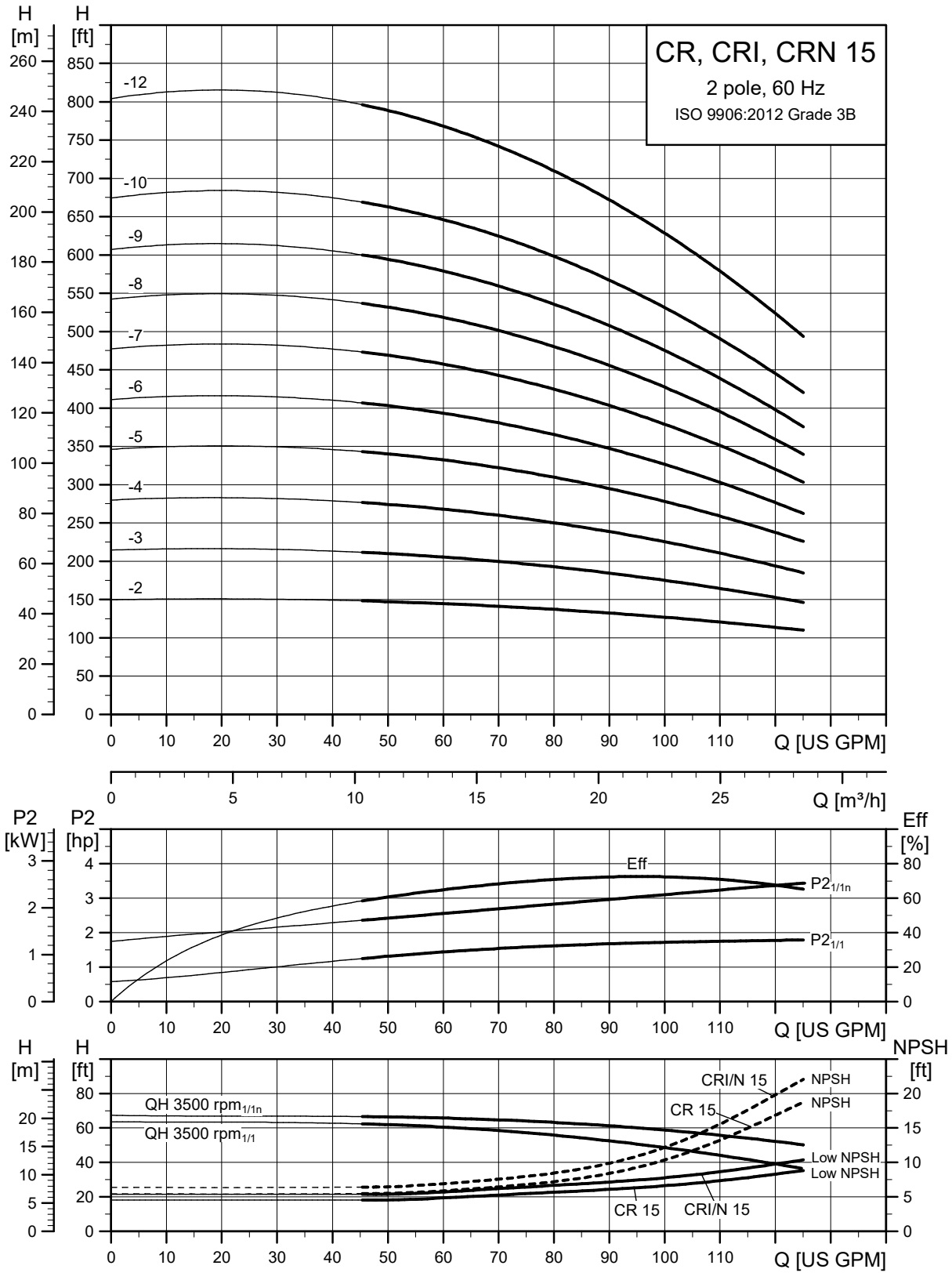


TM057079

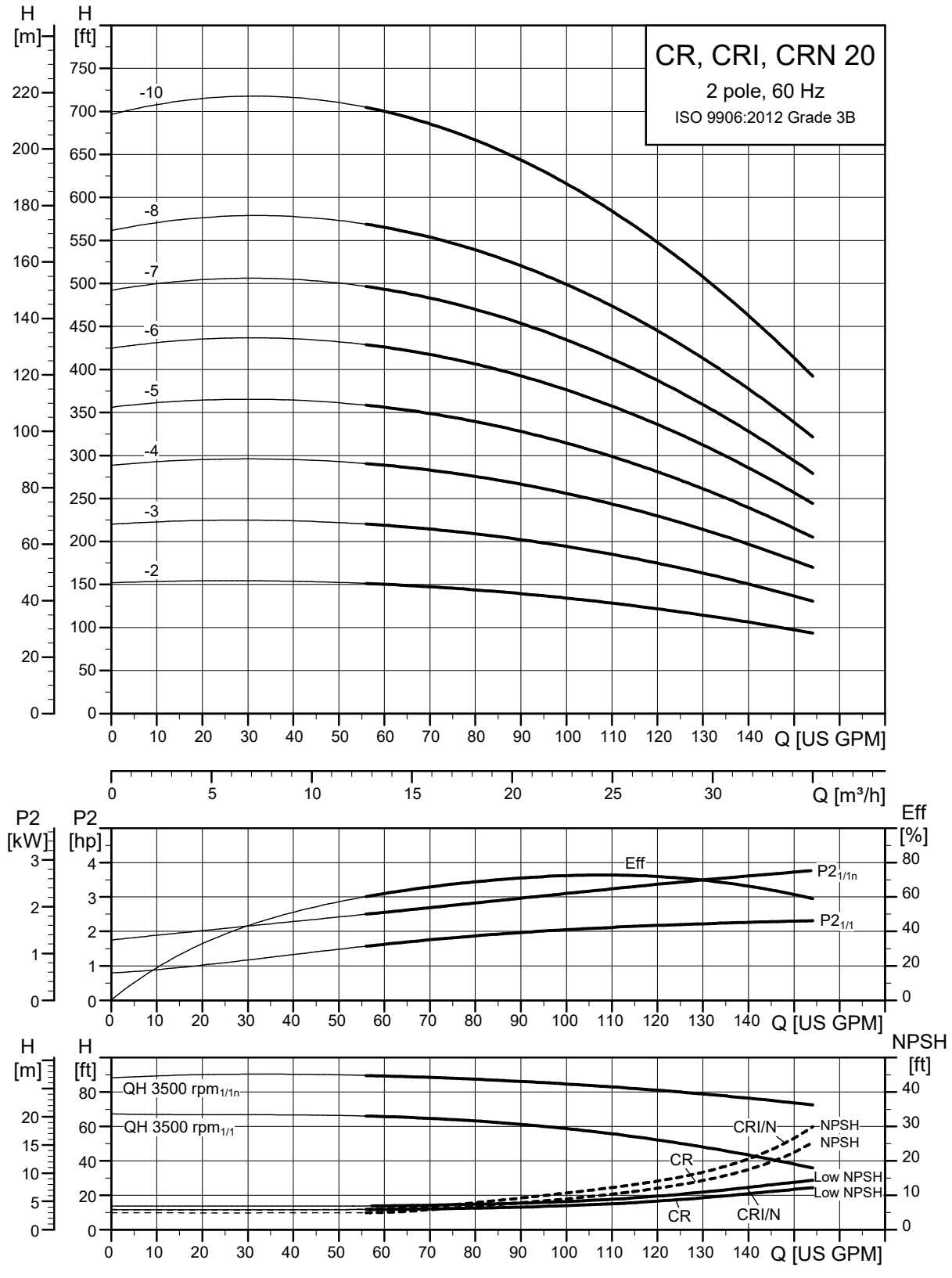
Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 10



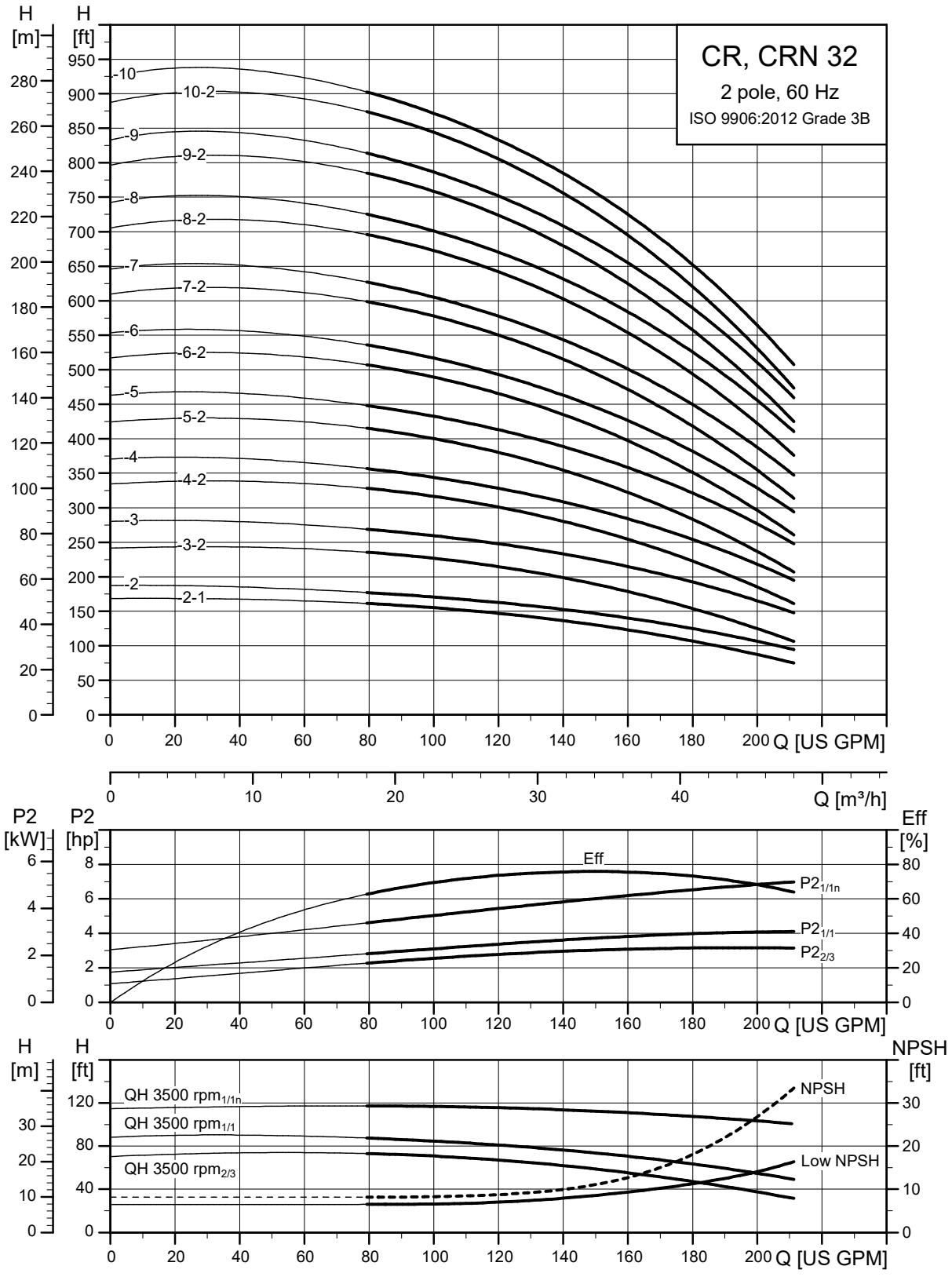
Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 15



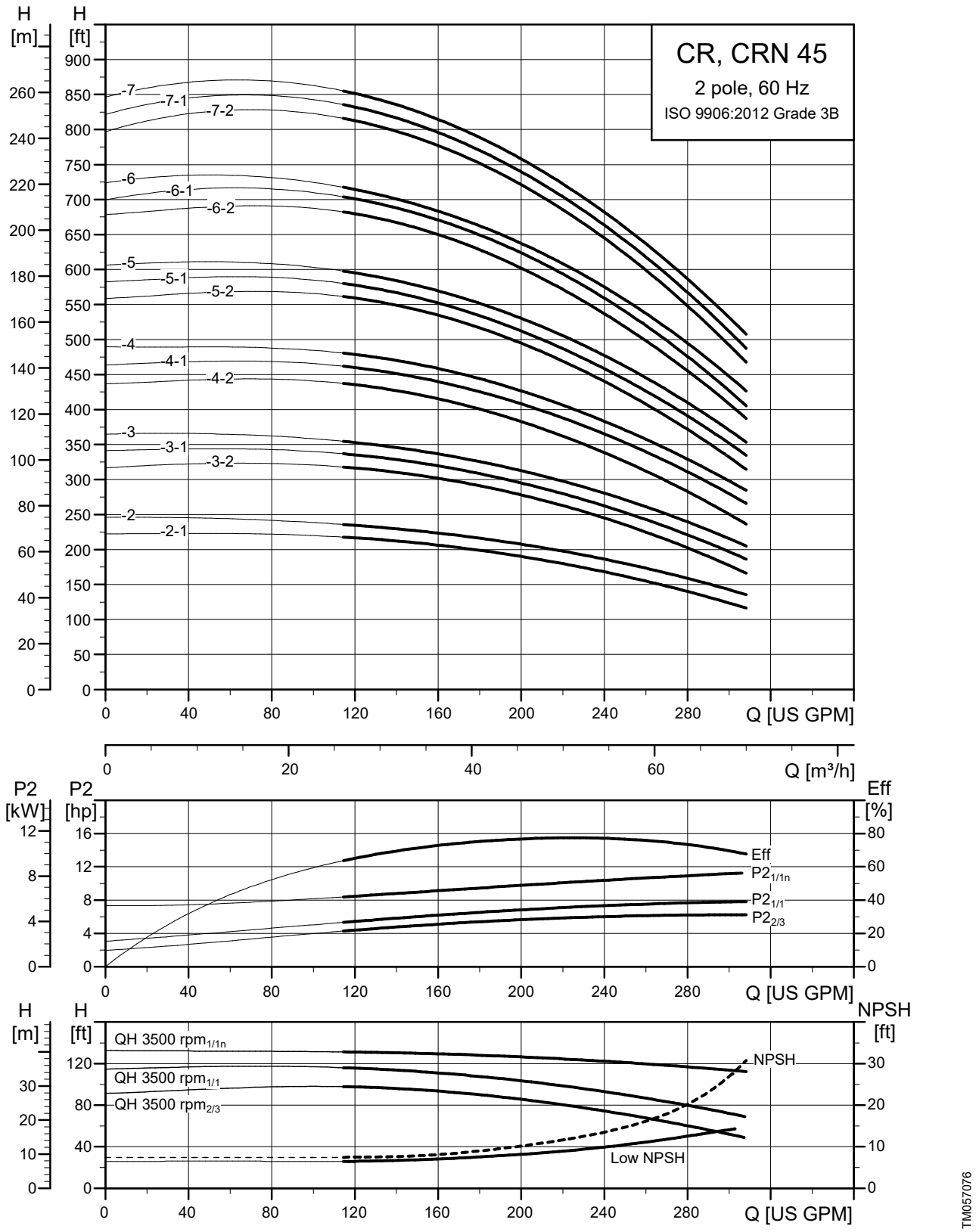
Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 20



Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 32

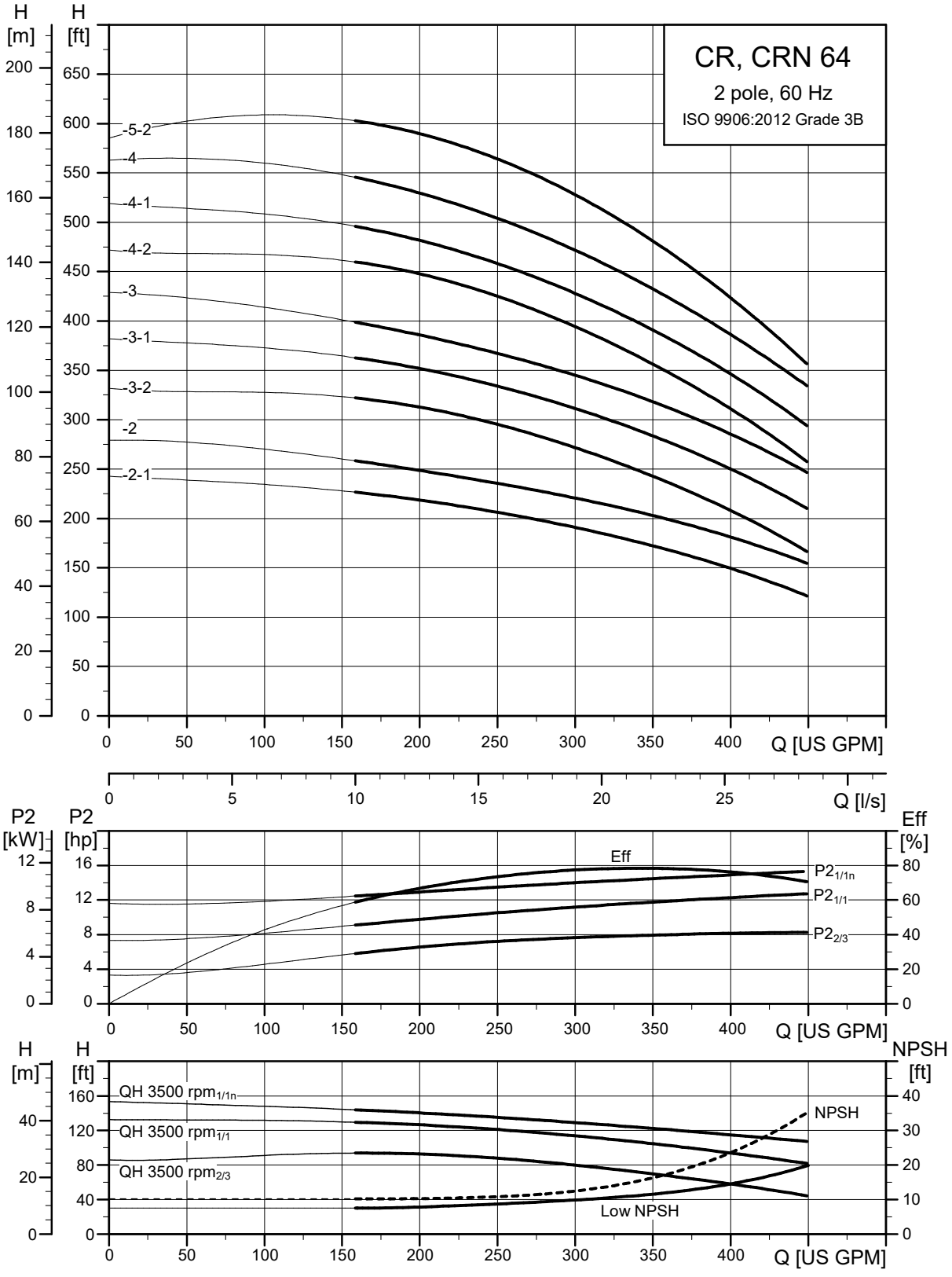


Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 45



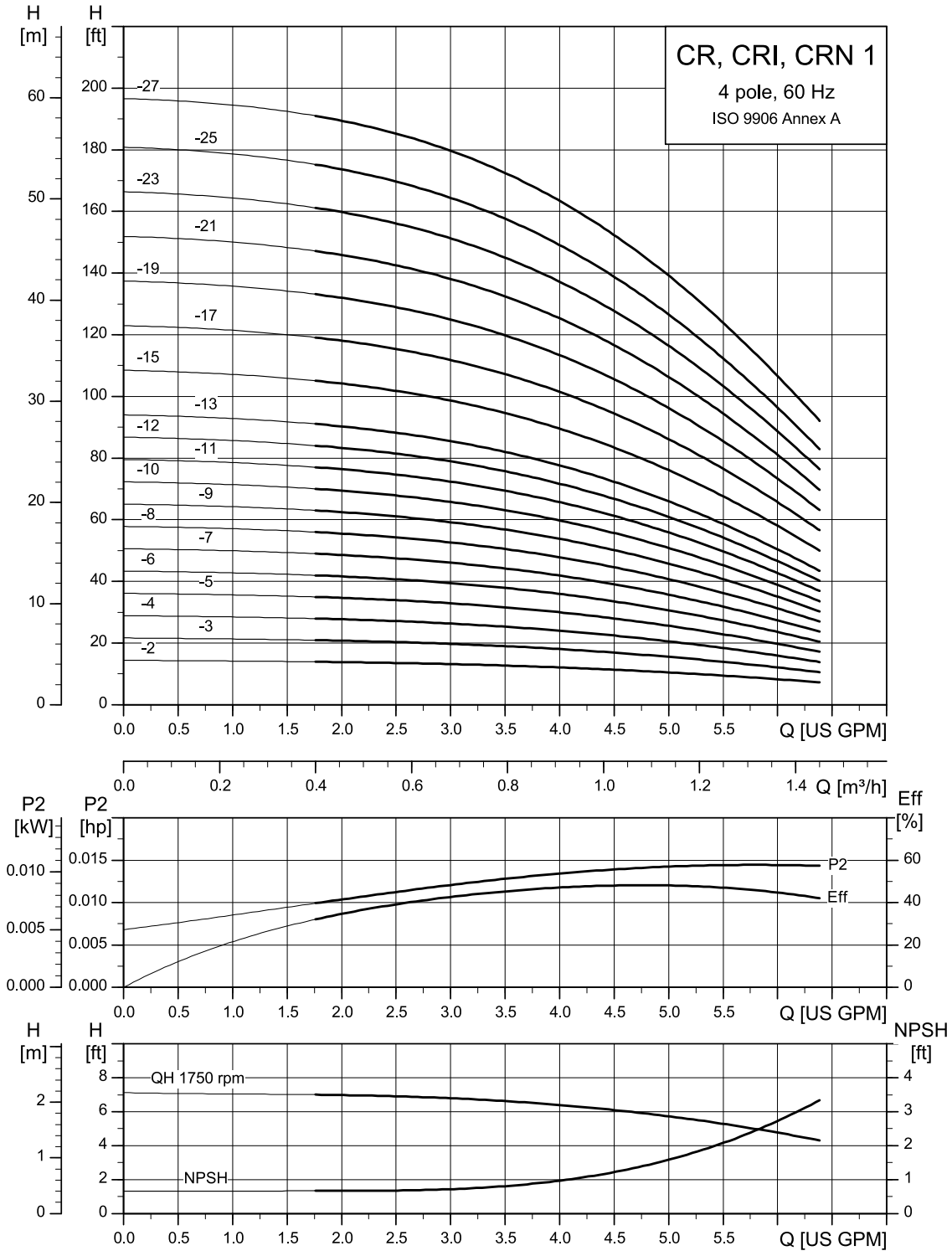
TM057076

Low-NPSH pumps with 2-pole motor: CR, CRI, CRN 64



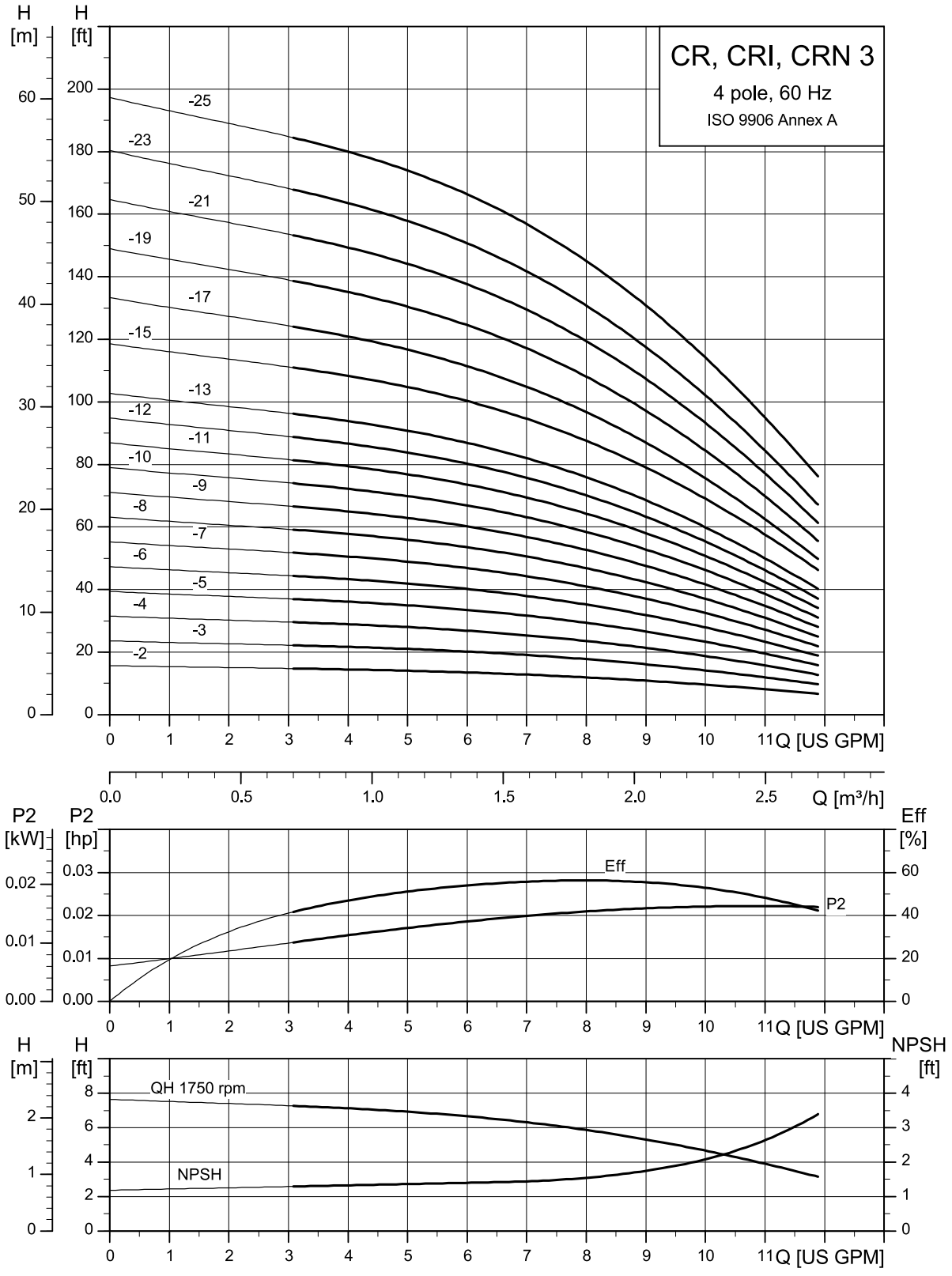
CR pumps with 4-pole motor

CR, CRI, CRN 1



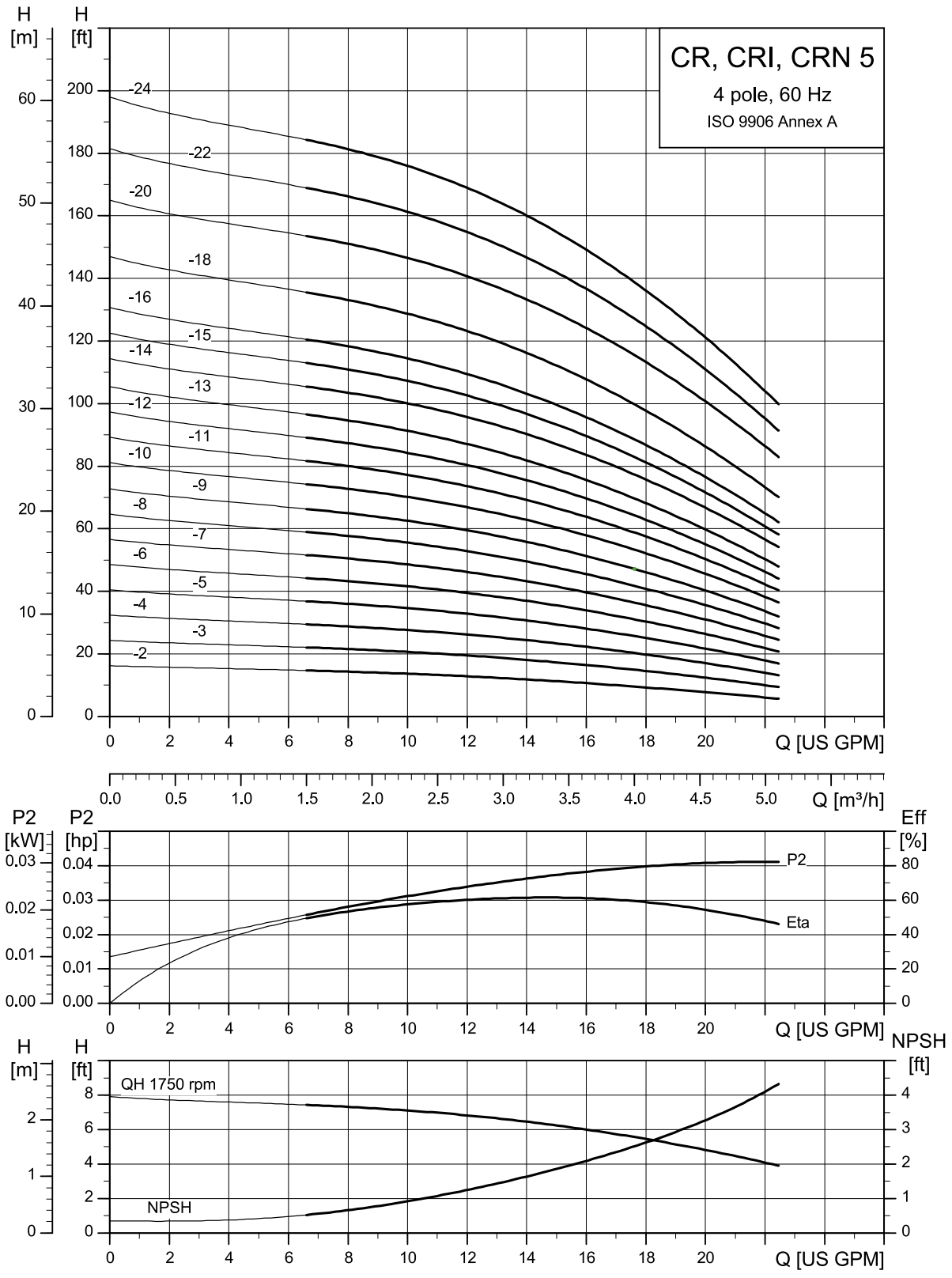
TM057073

CR pumps with 4-pole motor: CR, CRI, CRN 3



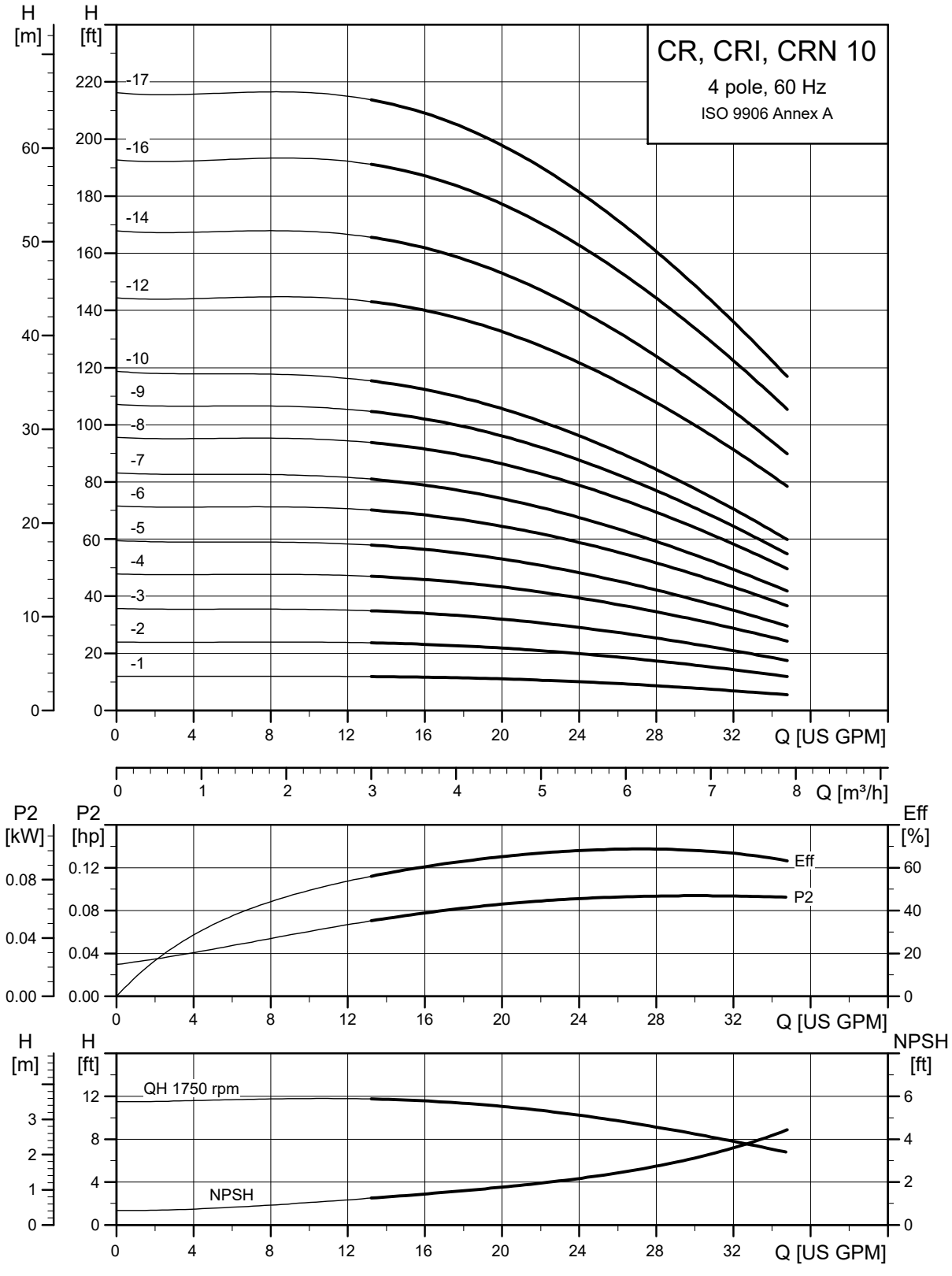
TM057074

CR pumps with 4-pole motor: CR, CRI, CRN 5



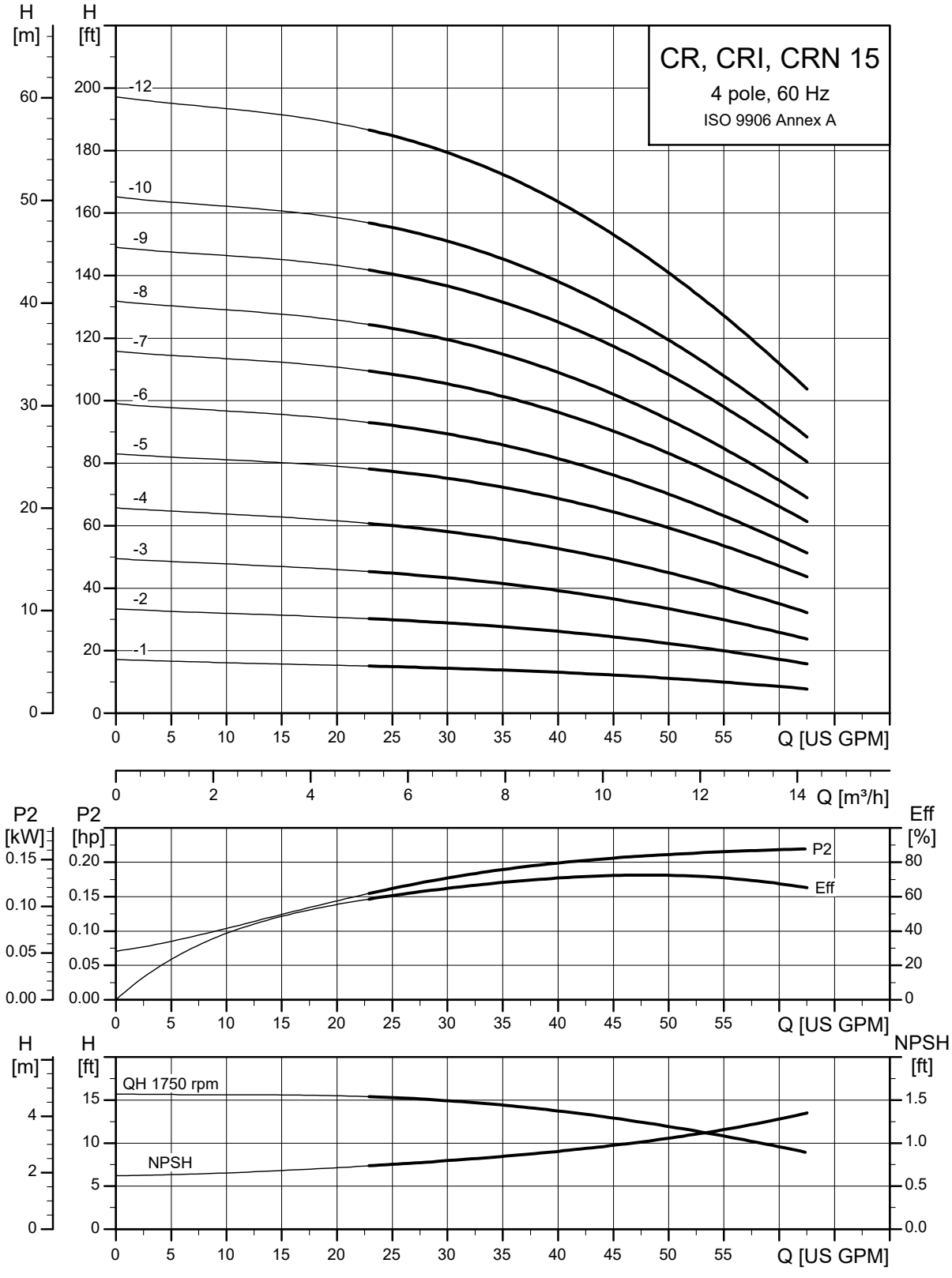
TM057080

CR pumps with 4-pole motor: CR, CRI, CRN 10



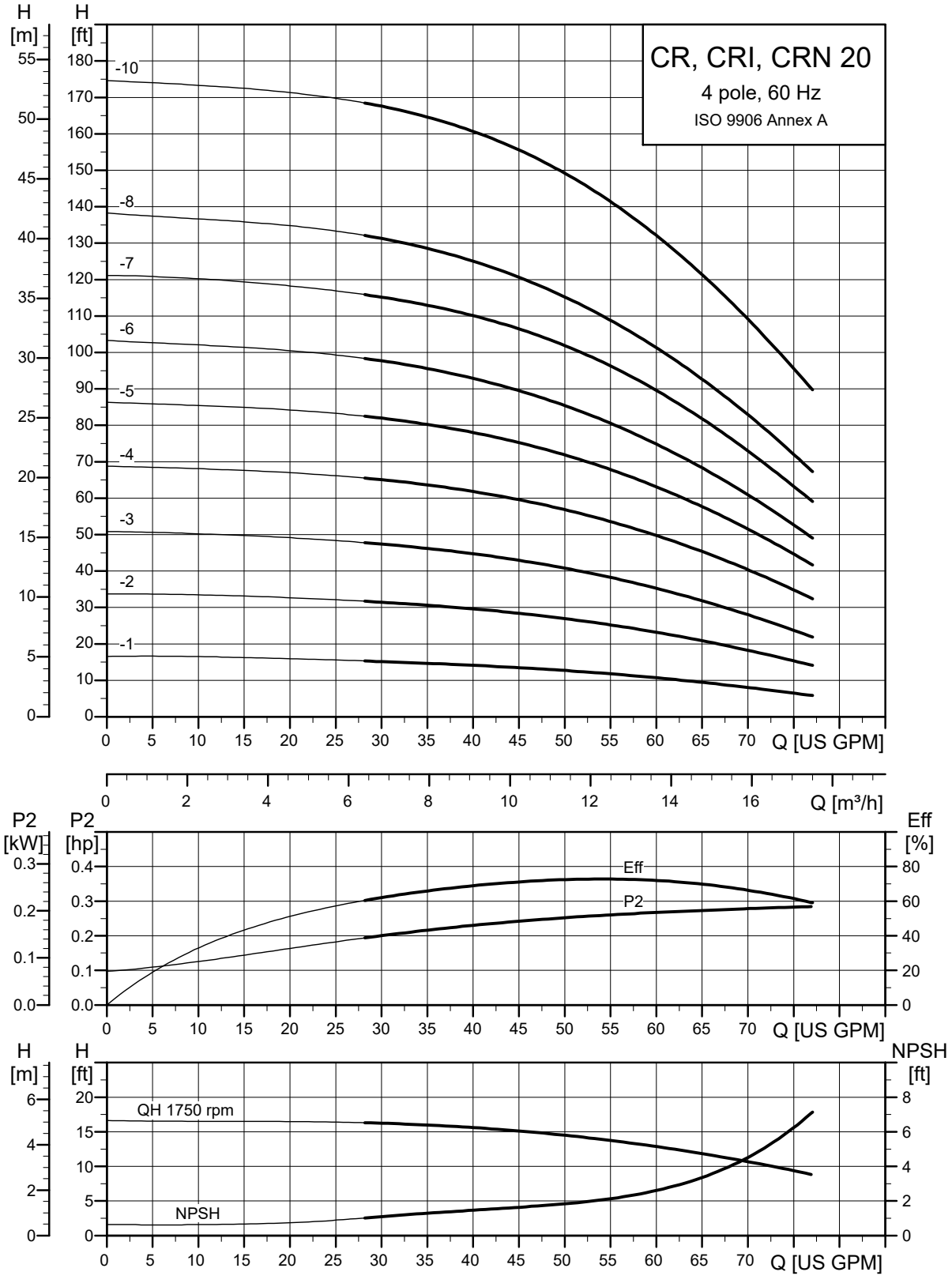
TM057082

CR pumps with 4-pole motor: CR, CRI, CRN 15



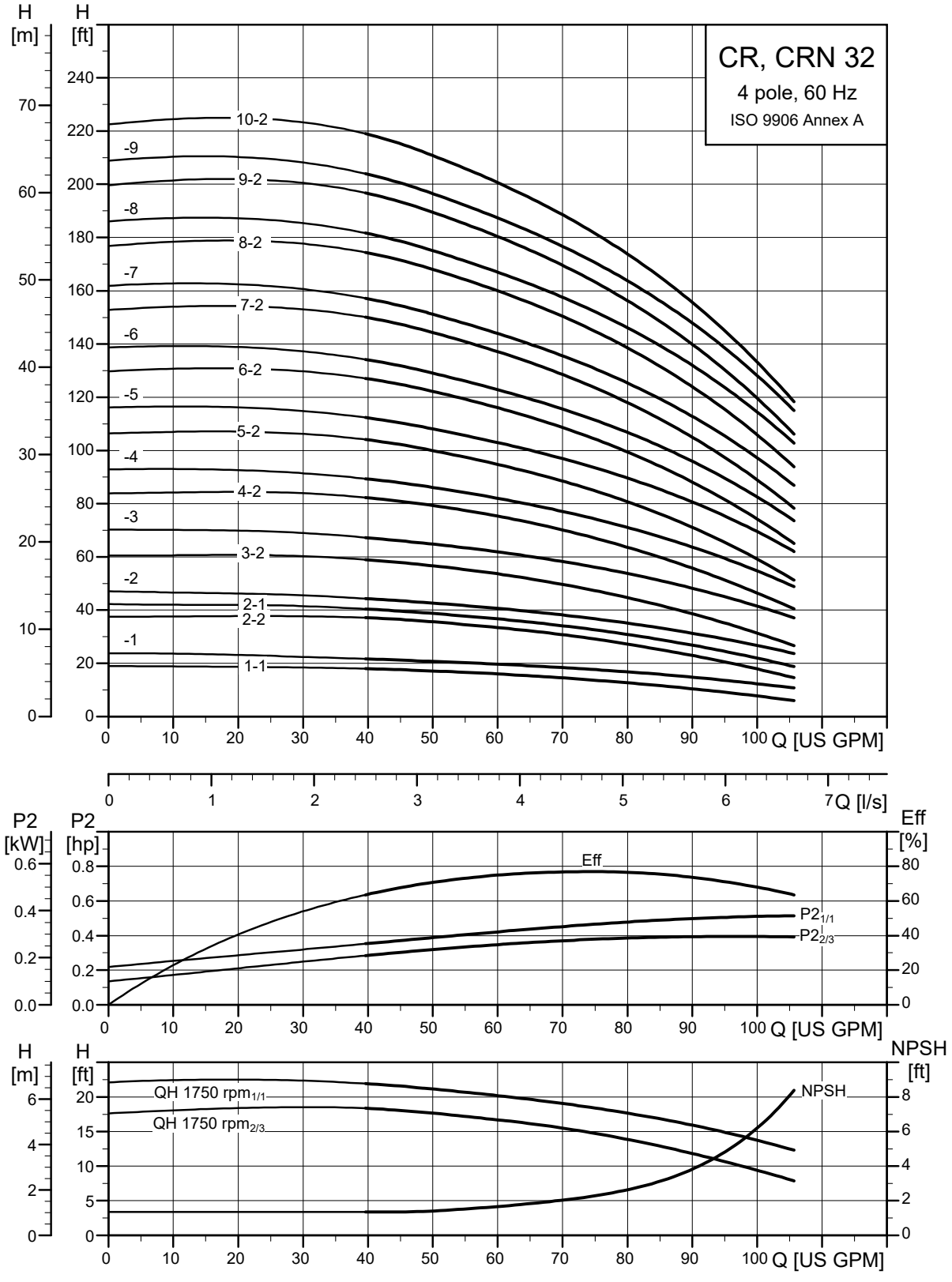
TM057084

CR pumps with 4-pole motor: CR, CRI, CRN 20

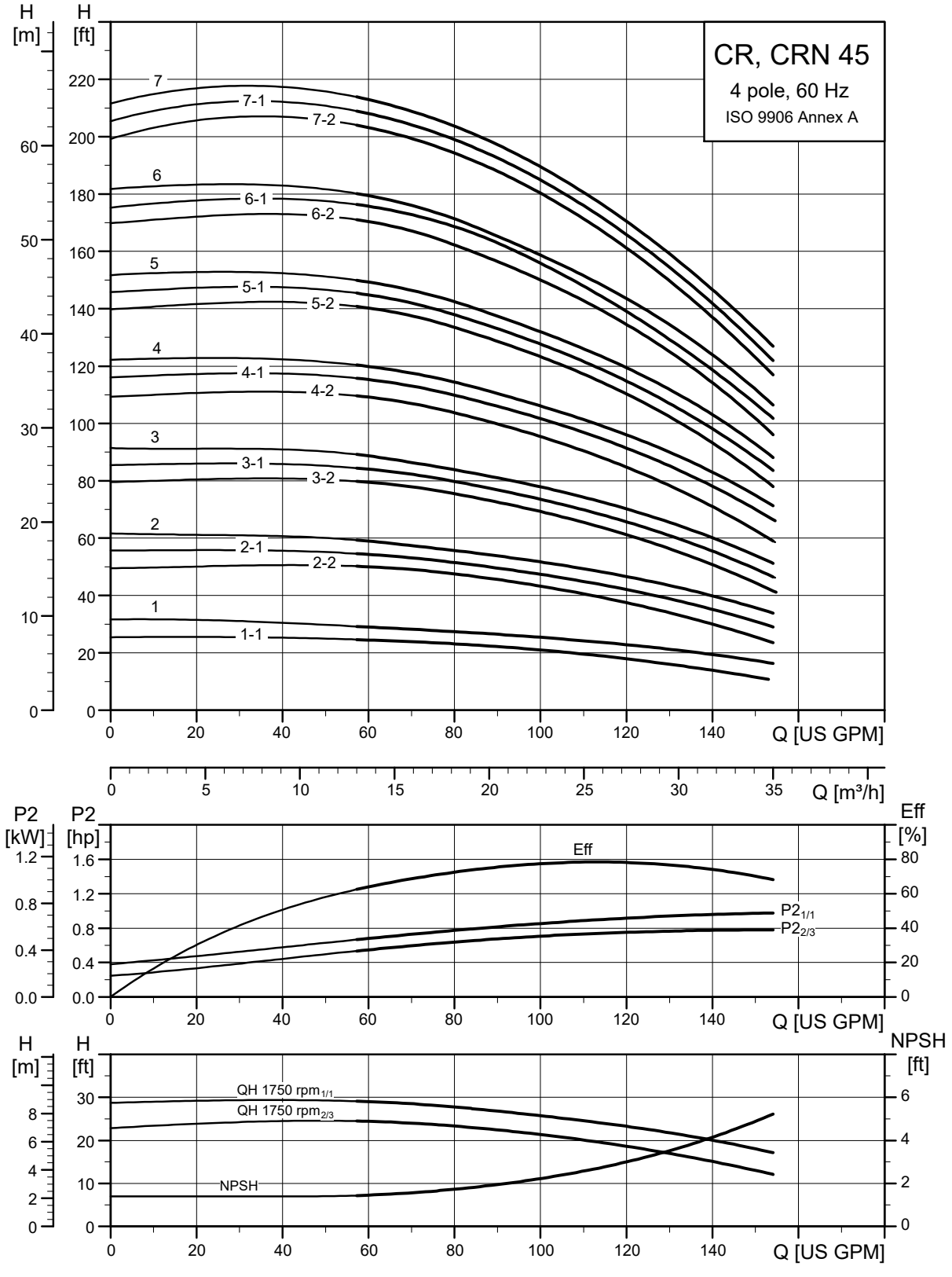


TM057086

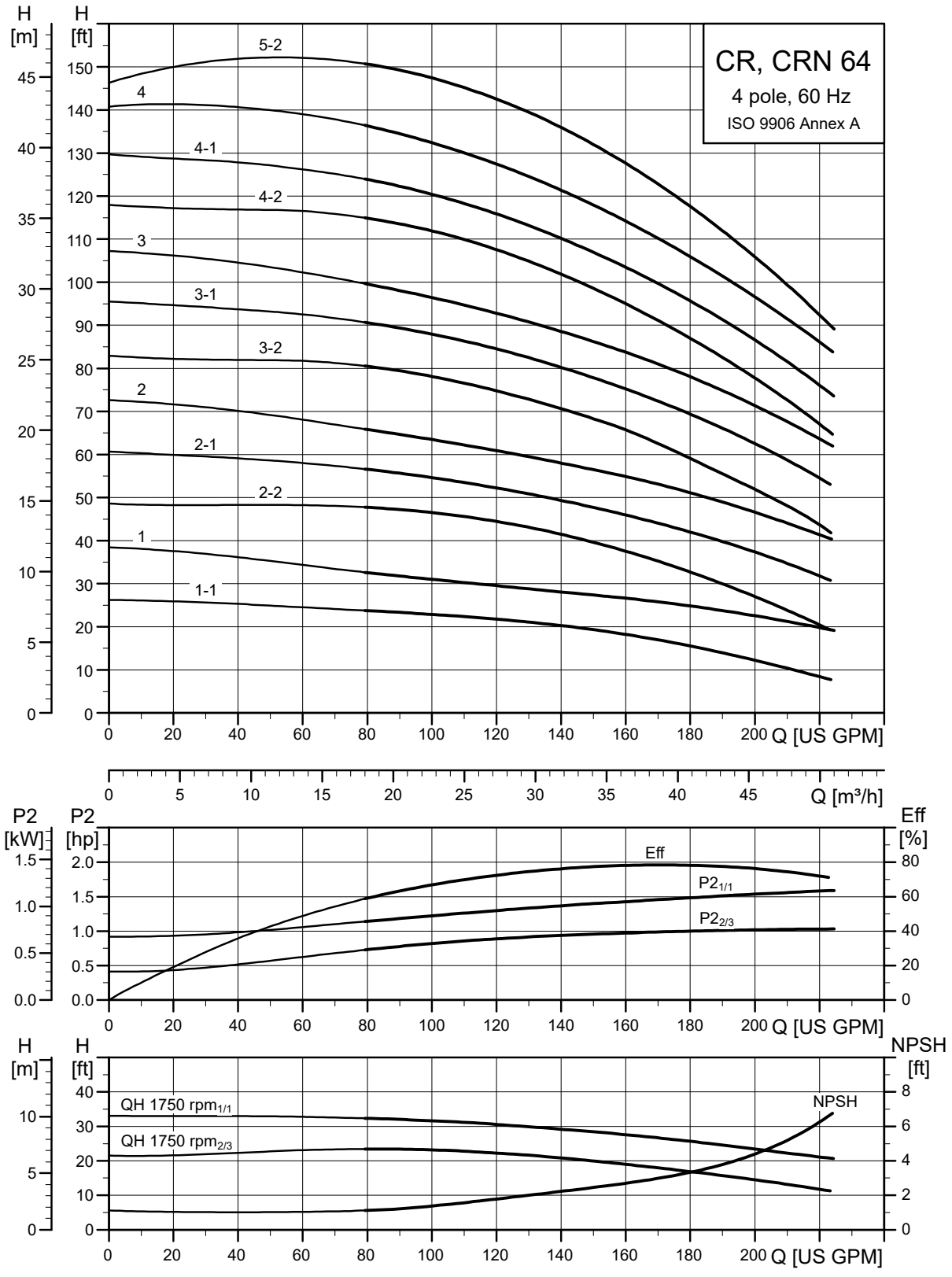
CR pumps with 4-pole motor: CR, CRI, CRN 32



CR pumps with 4-pole motor: CR, CRI, CRN 45

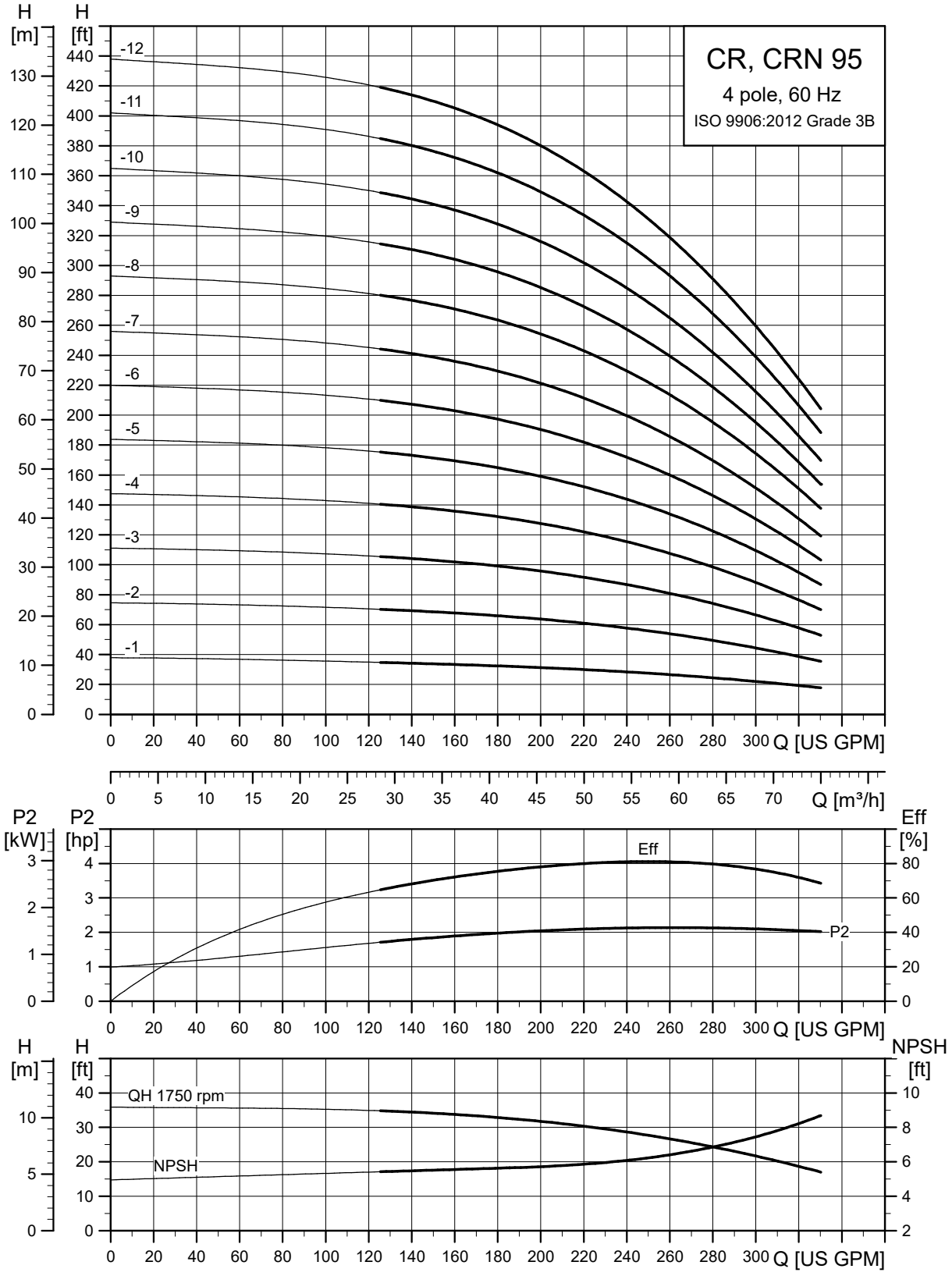


CR pumps with 4-pole motor: CR, CRI, CRN 64

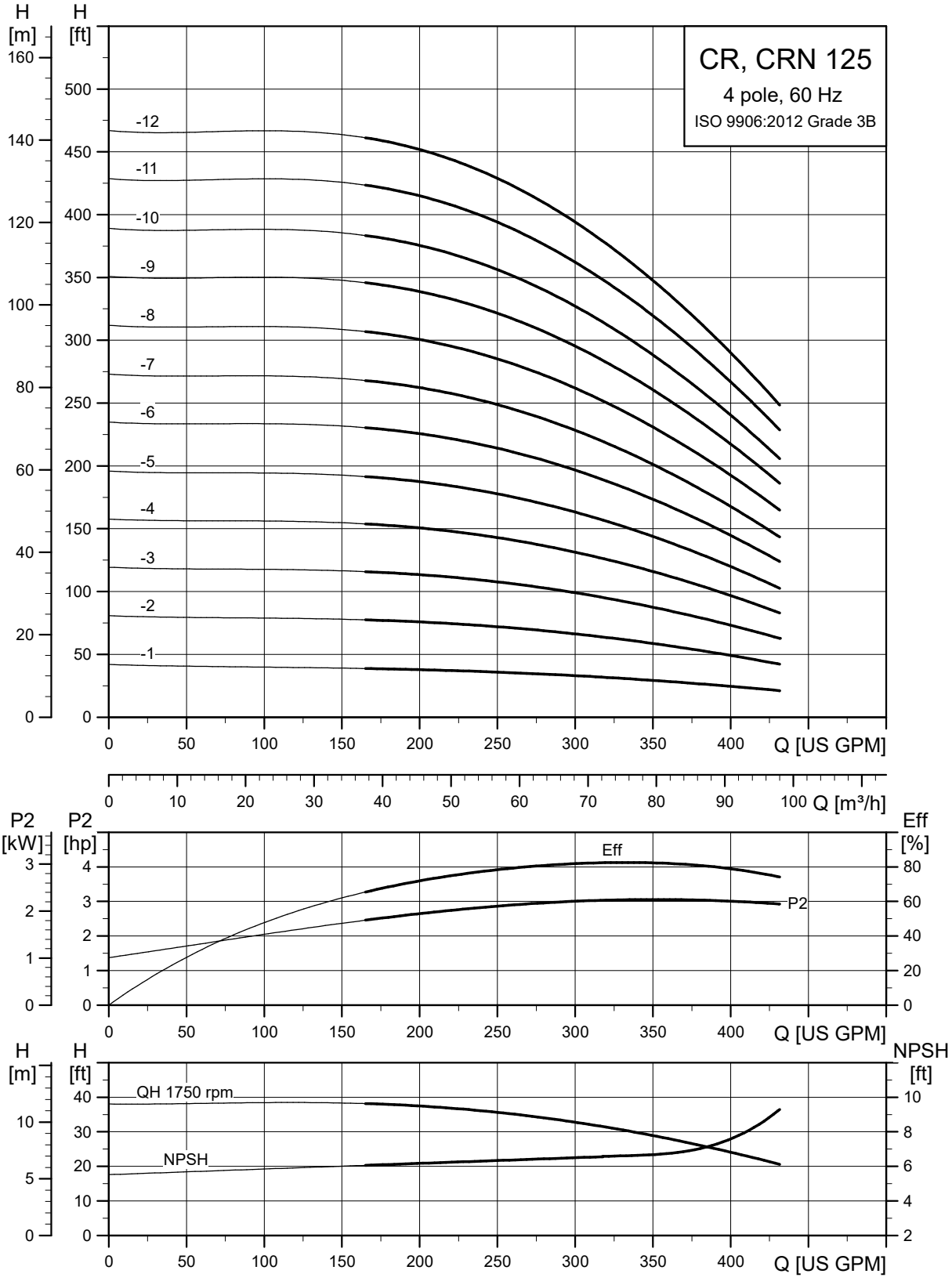


TM057089

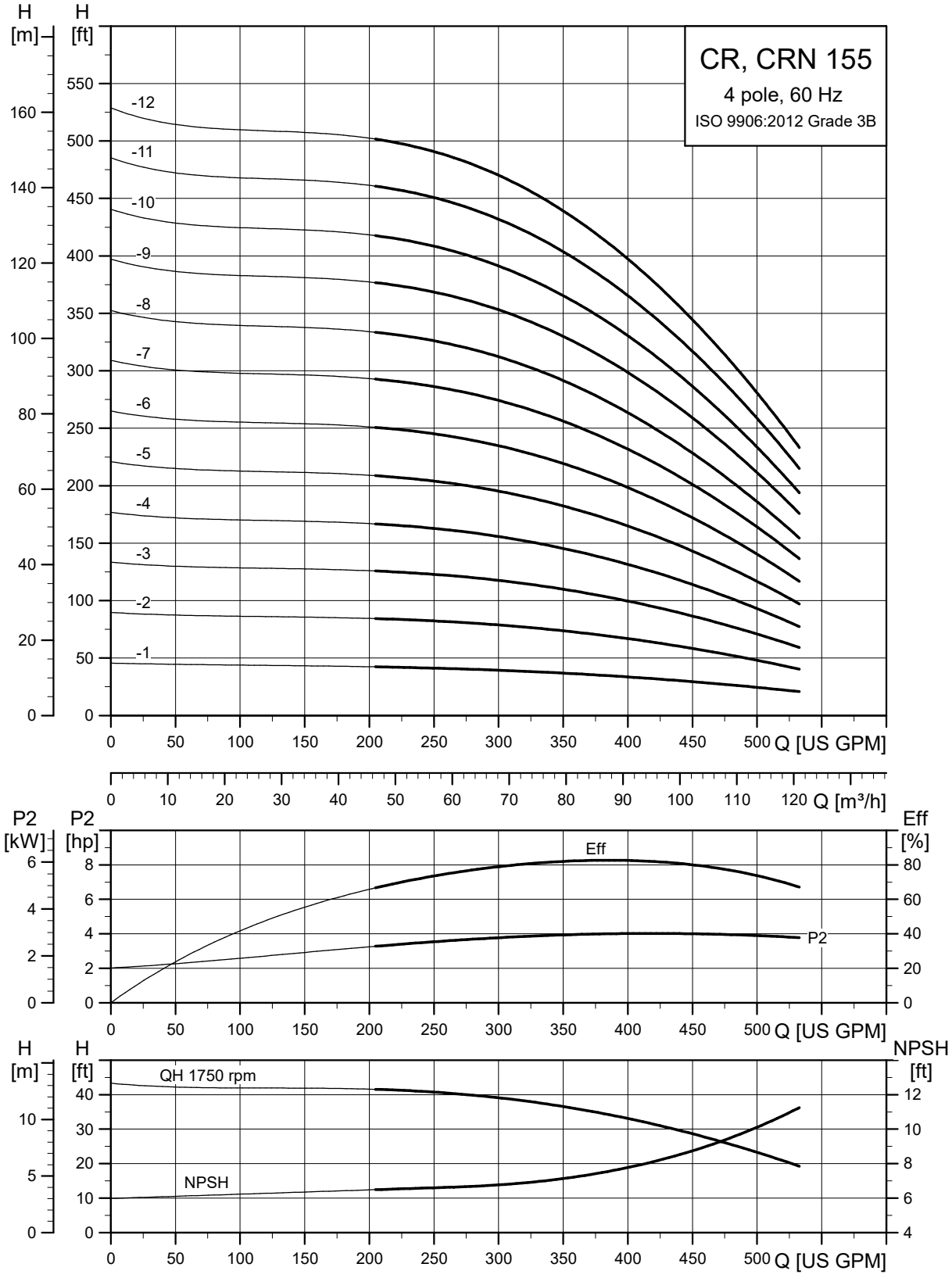
CR pumps with 4-pole motor: CR, CRN 95



CR pumps with 4-pole motor: CR, CRN 125

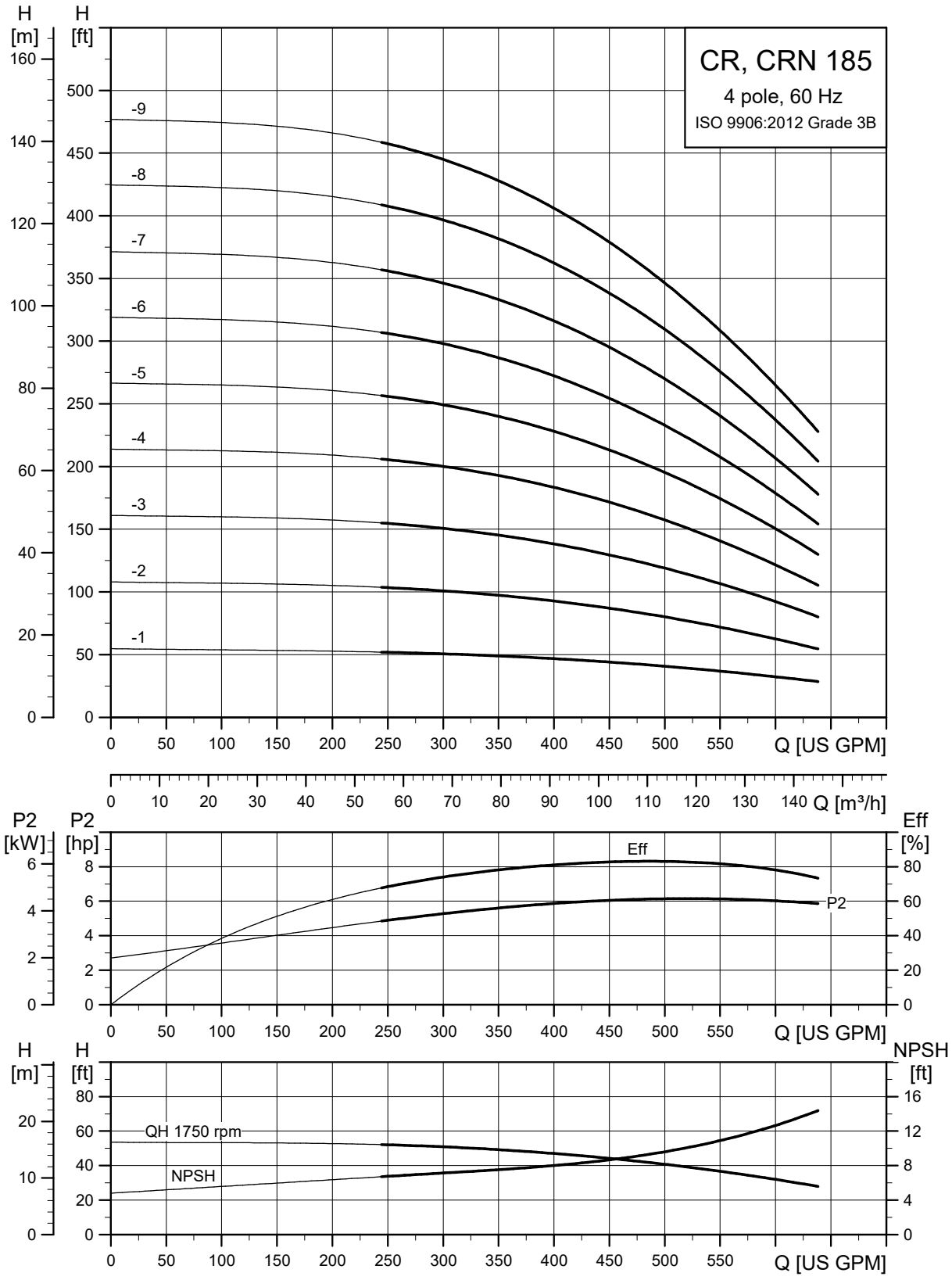


CR pumps with 4-pole motor: CR, CRN 155



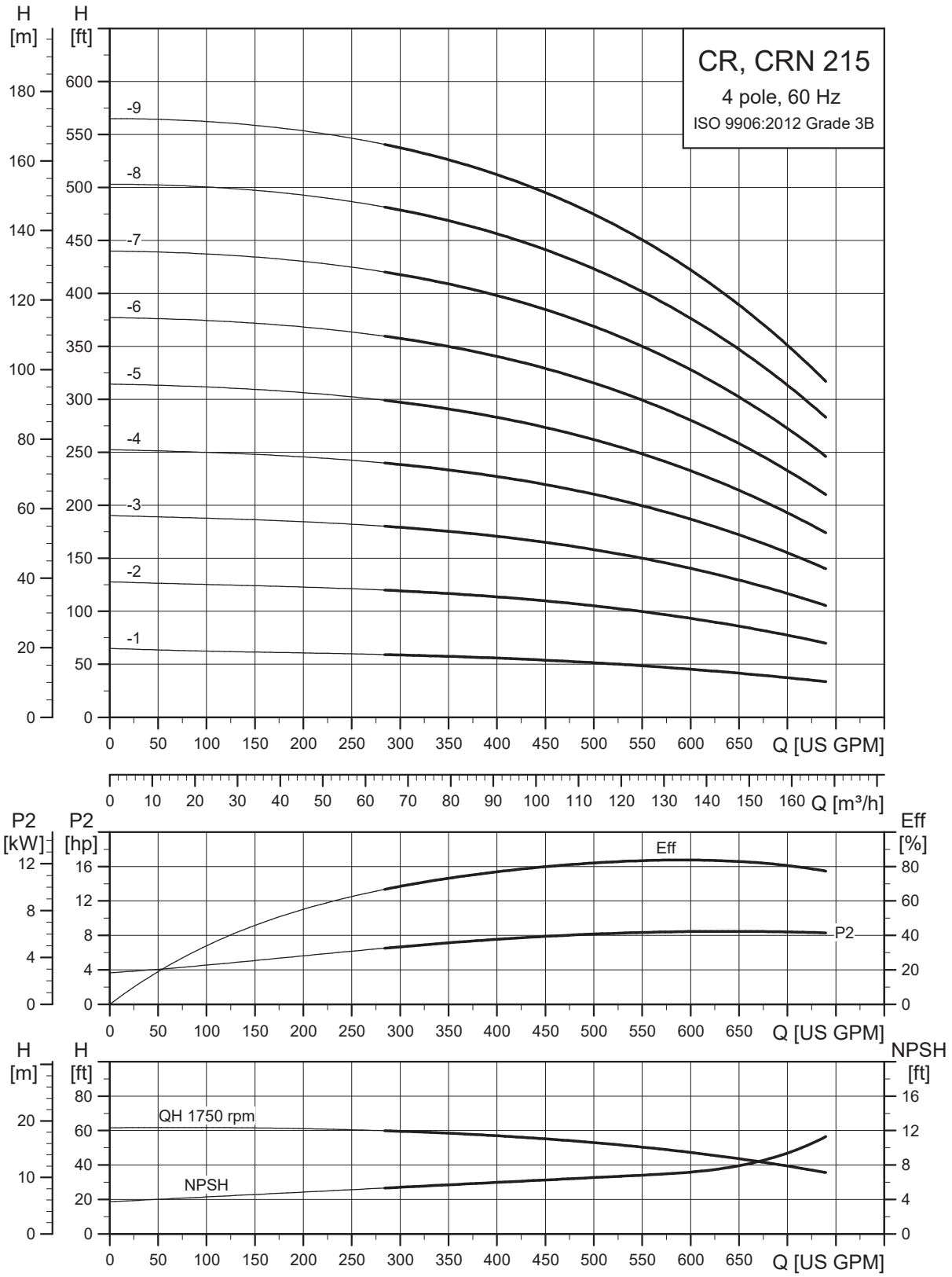
TM077589

CR pumps with 4-pole motor: CR, CRN 185



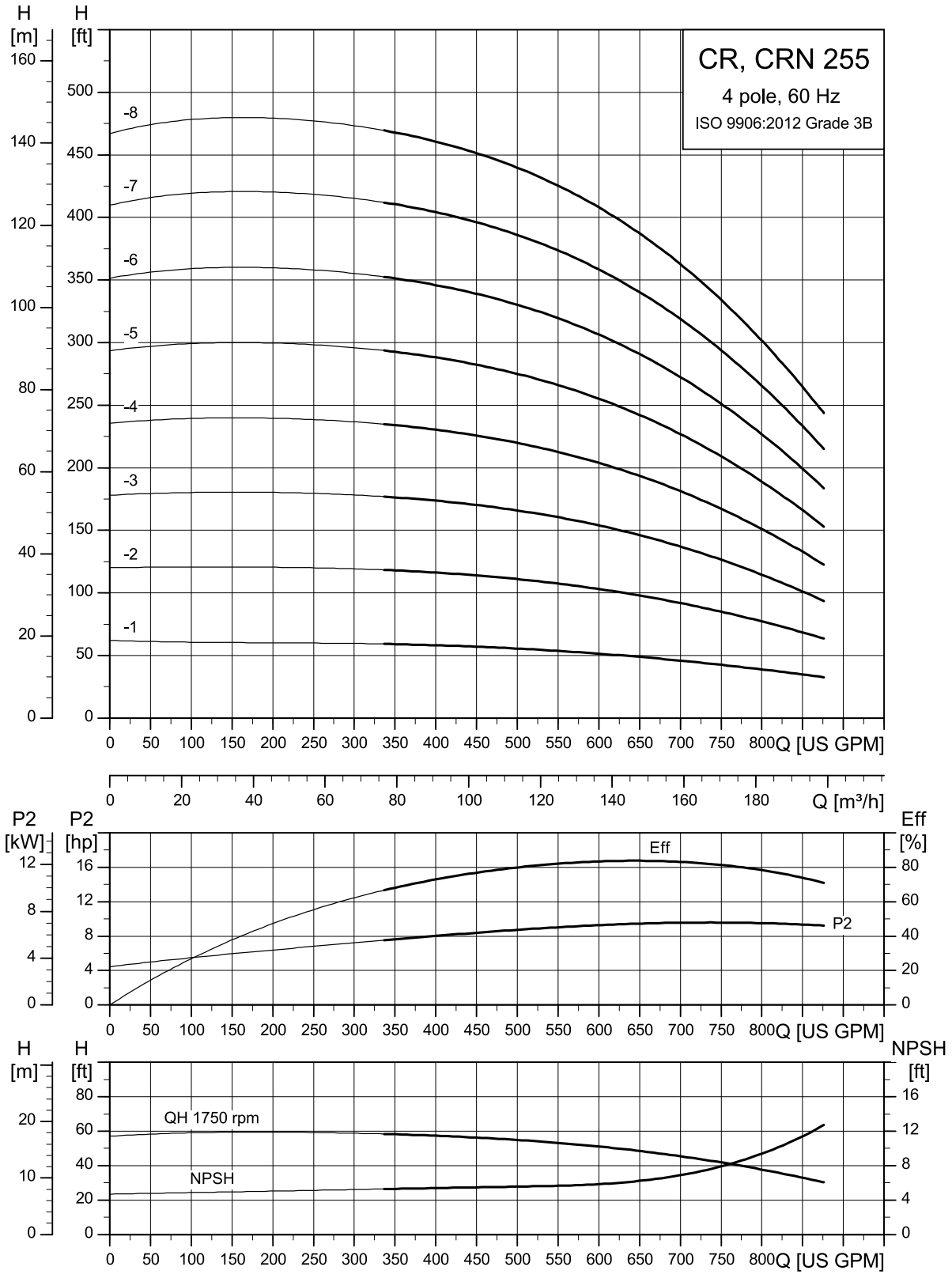
TM077590

CR pumps with 4-pole motor: CR, CRN 215



TM079896

CR pumps with 4-pole motor: CR, CRN 255

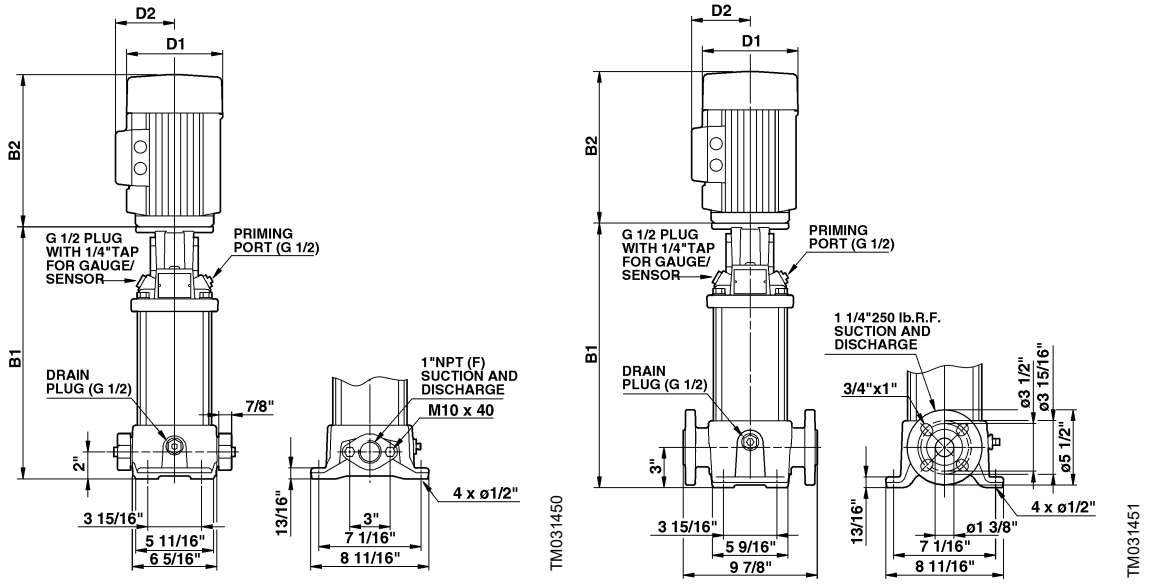


TM081000

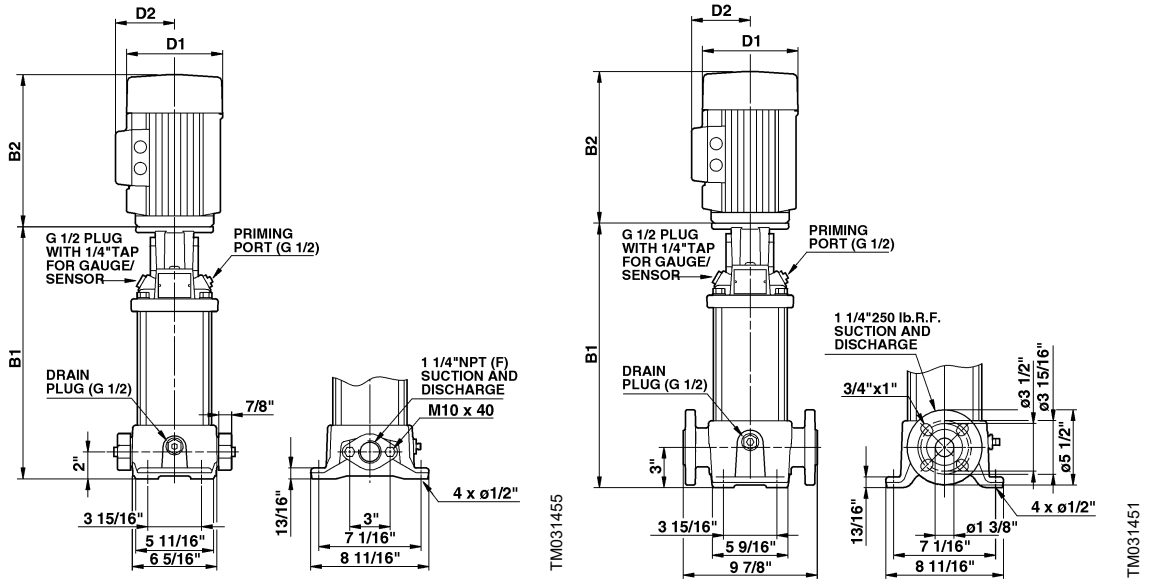
13. Technical data

Dimensional drawings for CR low-NPSH pumps

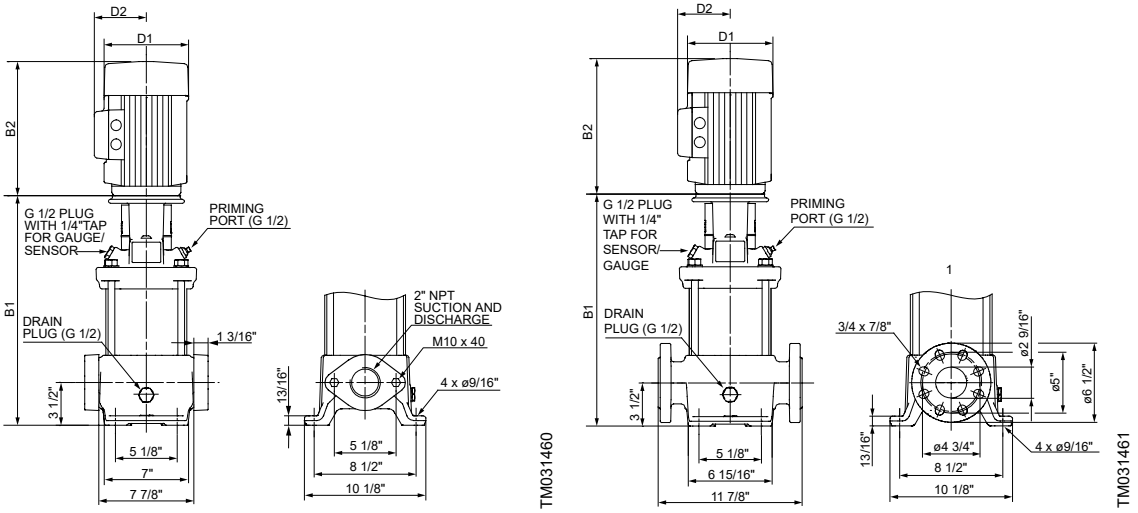
CR 3



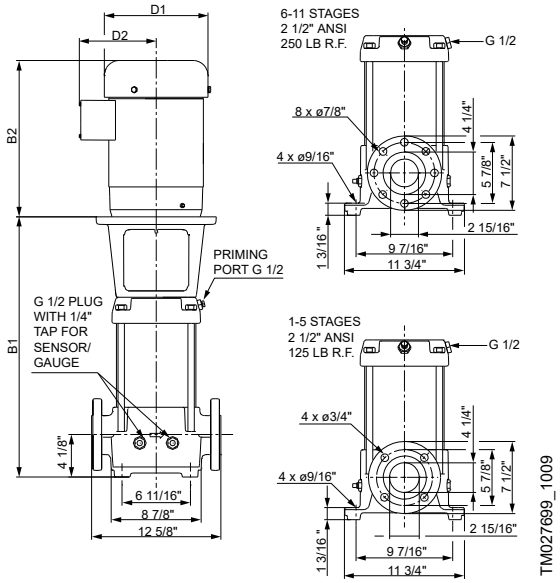
CR 5



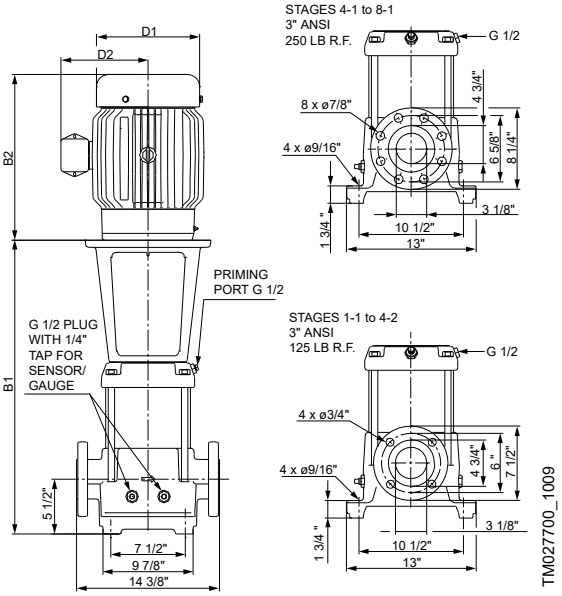
CR 10
CR 15
CR 20



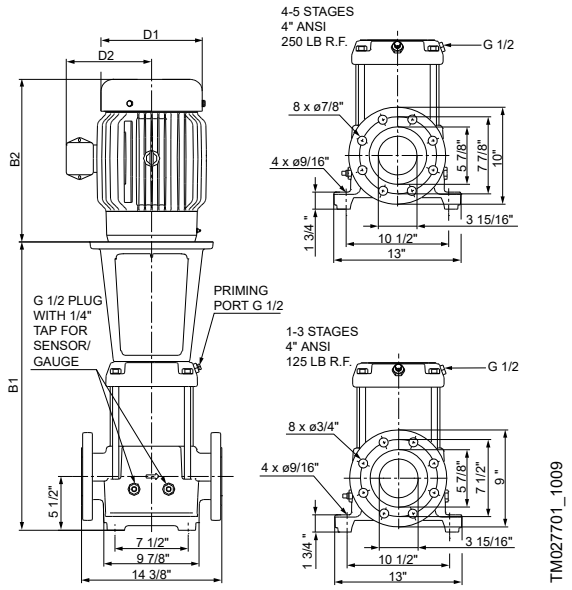
CR 32



CR 45



CR 64


D1
D2
B2
B1
G 1/2 PLUG WITH 1/4" TAP FOR SENSOR/ GAUGE
PRIMING PORT G 1/2
5 1/2"
7 1/2"
9 7/8"
14 3/8"
4-5 STAGES
4" ANSI
250 LB R.F.
G 1/2
8 x ø7/8"
4 x ø9/16"
5 7/8"
7 7/8"
10"
1 3/4 "
3 15/16"
10 1/2"
13"
1-3 STAGES
4" ANSI
125 LB R.F.
G 1/2
8 x ø3/4"
4 x ø9/16"
5 7/8"
7 1/2"
9 "
1 3/4 "
3 15/16"
10 1/2"
13"
TM027701_1009

CR low-NPSH pumps dimensions

CR 3 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2
CR3-3	3/4	1	56C	11.97	7.64	5.88	23.26
		3	56C	11.97	6.69	5.52	20.63
CR3-4	1	1	56C	12.68	7.64	5.88	24.38
		3	56C	12.68	6.69	5.52	21.73
CR3-5	1	1	56C	13.39	7.64	5.88	25.09
		3	56C	13.39	6.69	5.52	22.44
CR3-6	1 1/2	1	56C	14.09	7.64	5.88	26.56
		3	56C	14.09	7.64	5.88	25.78
CR3-7	1 1/2	1	56C	14.80	7.64	5.88	27.27
		3	56C	14.80	7.64	5.88	26.49
CR3-8	1 1/2	1	56C	15.51	7.64	5.88	27.98
		3	56C	15.51	7.64	5.88	27.2 0
CR3-9	2	1	56C	16.22	7.64	5.88	29.09
		3	56C	16.22	7.64	5.88	28.70
CR3-10	2	1	56C	16.93	7.64	5.88	29.80
		3	56C	16.93	7.64	5.88	29.41
CR3-11	2	1	56C	17.64	7.64	5.88	30.51
		3	56C	17.64	7.64	5.88	30.12
CR3-12	3	1	182TC	19.45	9.45	8.06	35.91
		3	182TC	19.45	9.45	6.69	33.15
CR3-13	3	1	182TC	20.16	9.45	8.06	36.62
		3	182TC	20.16	9.45	6.69	33.86
CR3-15	3	1	182TC	21.57	9.45	8.06	38.03
		3	182TC	21.57	9.45	6.69	35.27
CR3-17	3	1	182TC	22.99	9.45	8.06	39.45
		3	182TC	22.99	9.45	6.69	36.69
CR3-19	5	1	213TC	24.41	10.96	8.41	43.75
		3	184TC	24.41	9.45	6.69	39.68
CR3-21	5	1	213TC	25.83	10.96	8.41	45.17
		3	184TC	25.83	9.45	6.69	41.1 0
CR3-23	5	1	213TC	27.24	10.96	8.41	46.58
		3	184TC	27.24	9.45	6.69	42.51
CR3-25	5	1	213TC	28.66	10.96	8.41	48
		3	184TC	28.66	9.45	6.69	43.93

All dimensions in inches unless otherwise noted.

Note: CR 3 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.

CR 5 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2
CR5-4	2	1	56C	14.09	7.64	5.88	26.08
		3	56C	14.09	7.64	5.88	23.97
CR5-5	3	1	182TC	16.26	9.45	8.06	30.63
		3	182TC	16.26	9.45	6.69	27.95
CR5-6	3	1	182TC	17.32	9.45	8.06	31.69
		3	182TC	17.32	9.45	6.69	29.01
CR5-7	3	1	182TC	18.39	9.45	8.06	34.85
		3	182TC	18.39	9.45	6.69	32.09
CR5-8	5	1	213TC	19.45	10.96	8.41	37.92
		3	184TC	19.45	9.45	6.69	32.44
CR5-9	5	1	213TC	20.51	10.96	8.41	38.98
		3	184TC	20.51	9.45	6.69	33.50
CR5-10	5	1	213TC	21.57	10.96	8.41	40.91
		3	184TC	21.57	9.45	6.69	36.84
CR5-11	5	1	213TC	22.64	10.96	8.41	41.98
		3	184TC	22.64	9.45	6.69	37.91
CR5-12	5	1	213TC	23.70	10.96	8.41	43.04
		3	184TC	23.70	9.45	6.69	38.97
CR5-13	5	1	213TC	24.76	10.96	8.41	44.1 0
		3	184TC	24.76	9.45	6.69	40.03
CR5-14	5	1	213TC	25.83	10.96	8.41	45.17
		3	184TC	25.83	9.45	6.69	41.1 0
CR5-15	7 1/2	1	213TC	27.41	10.96	8.41	46.75
		3	213TC	27.41	10.96	7.97	44.38
CR5-16	7 1/2	1	213TC	28.47	10.96	8.41	47.81
		3	213TC	28.47	10.96	7.97	45.44
CR5-18	7 1/2	1	213TC	30.59	10.96	8.41	49.94
		3	213TC	30.59	10.96	7.97	47.56
CR5-20	7 1/2	1	213TC	32.72	10.96	8.41	52.07
		3	213TC	32.72	10.96	7.97	49.69
CR5-22	7 1/2	1	213TC	34.84	10.96	8.41	54.19
		3	213TC	34.84	10.96	7.97	51.81
CR5-24	10	1	215TC	36.97	10.96	8.41	55.77
		3	215TC	36.97	10.96	7.97	55.79

All dimensions in inches unless otherwise noted.

Note: CR 5 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.

CR 10 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	PEI_{CL}	Impeller diameter (in)	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2	ODP D1	ODP D2	ANSI ODP B1 + B2
CR10-3	3	1	182TC	0.94	3.66	17.20	9.45	8.06	33.66	-	-	-
		3		0.94	3.66	17.20	9.45	6.69	3.90	-	-	-
CR10-4	5	1	213TC	0.94	3.66	18.39	10.96	8.41	36.86	-	-	-
		3	184TC	0.94	3.66	18.39	9.45	6.69	31.38	-	-	-
CR10-5	5	1	213TC	0.94	3.66	19.57	10.96	8.41	38.91	-	-	-
		3	184TC	0.94	3.66	19.57	9.45	6.69	34.84	-	-	-
CR10-6	5	1	213TC	0.94	3.66	20.75	10.96	8.41	40.09	-	-	-
		3	184TC	0.94	3.66	20.75	9.45	6.69	36.02	-	-	-
CR10-7	7 1/2	1	213TC	0.94	3.66	22.25	10.96	8.41	41.60	-	-	-
		3		0.94	3.66	22.25	10.96	7.97	39.22	-	-	-
CR10-8	7 1/2	1	213TC	0.94	3.66	23.43	10.96	8.41	42.78	-	-	-
		3		0.94	3.66	23.43	10.96	7.97	40.40	-	-	-
CR10-9	7 1/2	1	213TC	0.94	3.66	24.61	10.96	8.41	43.96	-	-	-
		3		0.94	3.66	24.61	10.96	7.97	41.58	-	-	-
CR10-10	10	1	215TC	0.94	3.66	25.79	10.96	8.41	44.59	-	-	-
		3		0.94	3.66	25.79	10.96	7.97	44.61	-	-	-
CR10-12	10	1	215TC	0.94	3.66	28.15	10.96	8.41	47.49	-	-	-
		3		0.94	3.66	28.15	10.96	7.97	46.97	-	-	-
CR10-14	15	3	254TC	0.94	3.66	33.06	13.18	9.45	51.89	11.58	9.45	51.73
CR10-16	15	3	254TC	0.94	3.66	35.43	13.18	9.45	54.25	11.58	9.45	54.1 0
CR10-17	15	3	254TC	0.94	3.66	37.80	13.18	9.45	56.61	11.58	9.45	56.46

All dimensions in inches unless otherwise noted.

Note: CR 10 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.

CR 15 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	PEI_{CL}	Impeller diameter (in)	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2	ODP D1	ODP D2	ANSI ODP B1 + B2
CR15-2	7 1/2	1	213TC	0.93	4.13	17.52	10.96	8.41	36.87	-	-	-
		3		0.93	4.13	17.52	10.96	7.97	34.49	-	-	-
CR15-3	7 1/2	1	213TC	0.93	4.13	19.29	10.96	8.41	38.64	-	-	-
		3		0.93	4.13	19.29	10.96	7.97	36.26	-	-	-
CR15-4	10	1	215TC	0.93	4.13	21.06	10.96	8.41	40.40	-	-	-
		3		0.93	4.13	21.06	10.96	7.97	39.88	-	-	-
CR15-5	15	3	254TC	0.93	4.13	25.40	13.18	9.45	44.21	11.58	9.45	44.06
CR15-6	15	3	254TC	0.93	4.13	27.17	13.18	9.45	45.98	11.58	9.45	45.83
CR15-7	15	3	254TC	0.93	4.13	28.94	13.18	9.45	47.75	11.58	9.45	47.6 0
CR15-8	20	3	256TC	0.93	4.13	30.71	13.18	9.45	50.32	11.58	9.45	49.37
CR15-9	20	3	256TC	0.93	4.13	32.48	13.18	9.45	52.09	11.58	9.45	51.14
CR15-10	20	3	256TC	0.93	4.13	34.25	13.18	9.45	53.86	11.58	9.45	52.91
CR15-12	25	3	284TSC	0.93	4.13	37.17	14.17	11.08	60.79	16.21	11.93	59.33

All dimensions in inches unless otherwise noted.

Note: CR 15 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.

CR 20 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	PEI_{CL}	Impeller diameter (in)	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2	ODP D1	ODP D2	ANSI ODP B1 + B2
CR20-2	7 1/2	1	213TC	0.96	4.13	17.52	10.96	8.41	36.87	-	-	-
		3		0.96	4.13	17.52	10.96	7.97	34.49	-	-	-
CR20-3	10	1	215TC	0.96	4.13	19.29	10.96	8.41	38.63	-	-	-
		3		0.96	4.13	19.29	10.96	7.97	38.11	-	-	-
CR20-4	15	3	254TC	0.96	4.13	23.62	13.18	9.45	42.44	11.58	9.45	-
CR20-5	15	3	254TC	0.96	4.13	25.39	13.18	9.45	44.21	11.58	9.45	44.06
CR20-6	15	3	254TC	0.96	4.13	27.17	13.18	9.45	45.98	11.58	9.45	45.83
CR20-7	20	3	256TC	0.96	4.13	28.94	13.18	9.45	48.54	11.58	9.45	47.6 0
CR20-8	20	3	256TC	0.96	4.13	30.71	13.18	9.45	50.32	11.58	9.45	49.37
CR20-10	25	3	284TSC	0.96	4.13	33.62	14.17	11.08	57.21	16.21	11.93	55.82

All dimensions in inches unless otherwise noted.

Note: CR 20 low-NPSH pumps are also available as CRI and CRN pumps with PJE and CA connection.

CR 32 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	PEI_{CL}	Impeller diameter (in)	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2	ODP D1	ODP D2	ANSI ODP B1 + B2
CR32-2-1	10	1	215TC	0.87	4.66	22.83	10.96	8.41	42.17	-	-	-
		3		0.87	4.66	22.83	10.96	7.97	41.65	-	-	-
CR32-2	15	3	254TC	0.87	4.66	26.96	13.18	9.45	45.79	11.58	9.45	-
CR32-3-2	15	3	254TC	0.87	4.66	29.72	13.18	9.45	48.54	11.58	9.45	-
CR32-3	15	3	254TC	0.87	4.66	29.72	13.18	9.45	48.54	11.58	9.45	-
CR32-4-2	20	3	256TC	0.87	4.66	32.48	13.18	9.45	52.09	11.58	9.45	-
CR32-4	20	3	256TC	0.87	4.66	32.48	13.18	9.45	52.09	11.58	9.45	-
CR32-5-2	25	3	284TSC	0.87	4.66	35.24	14.17	11.08	58.86	16.21	11.93	-
CR32-5	25	3	284TSC	0.87	4.66	35.24	14.17	11.08	58.86	16.21	11.93	-
CR32-6-2	25	3	284TSC	0.87	4.66	37.99	14.17	11.08	61.58	16.21	11.93	-
CR32-6	30	3	286TSC	0.87	4.66	37.99	14.17	11.08	61.57	16.21	11.93	-
CR32-7-2	30	3	286TSC	0.87	4.66	40.75	14.17	11.08	64.33	16.21	11.93	-
CR32-7	40	3	324TSC	0.87	4.66	40.75	15.83	12.58	66.85	17.67	13.39	64.91
CR32-8-2	40	3	324TSC	0.87	4.66	43.50	15.83	12.58	69.60	17.67	13.39	67.66
CR32-8	40	3	324TSC	0.87	4.66	43.50	15.83	12.58	69.60	17.67	13.39	67.66
CR32-9-2	40	3	324TSC	0.87	4.66	46.26	15.83	12.58	72.36	17.67	13.39	70.42
CR32-9	40	3	324TSC	0.87	4.66	46.26	15.83	12.58	72.36	17.67	13.39	70.42
CR32-10-2	50	3	326TSC	0.87	4.66	49.02	15.83	12.58	75.14	17.67	13.39	73.19
CR32-10	50	3	326TSC	0.87	4.66	49.02	15.83	12.58	75.14	17.67	13.39	73.19

All dimensions in inches unless otherwise noted.

Note: CR 32 low-NPSH pumps are also available as CRN pumps with PJE connection.

CR 45 low-NPSH pumps, 60 Hz

Pump type	HP	PH	NEMA Frame size	PEI_{CL}	Impeller diameter (in)	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2	ODP D1	ODP D2	ANSI ODP B1 + B2
CR45-2-1	20	3	256TC	0.89	5.34	29.49	13.18	9.45	49.10	11.58	9.45	48.15
CR45-2	20	3	256TC	0.89	5.34	29.49	13.18	9.45	49.10	11.58	9.45	48.15
CR45-3-2	25	3	284TSC	0.89	5.34	32.64	14.17	11.08	56.22	16.21	11.93	54.84
CR45-3-1	25	3	284TSC	0.89	5.34	32.64	14.17	11.08	56.22	16.21	11.93	54.84
CR45-3	30	3	286TSC	0.89	5.34	32.64	14.17	11.08	56.22	16.21	11.93	54.8
CR45-4-2	40	3	324TSC	0.89	5.34	35.79	15.83	12.58	61.89	17.67	13.39	59.95
CR45-4-1	40	3	324TSC	0.89	5.34	35.79	15.83	12.58	61.89	17.67	13.39	59.95
CR45-4	40	3	324TSC	0.89	5.34	35.79	15.83	12.58	61.89	17.67	13.39	59.95
CR45-5-2	40	3	324TSC	0.89	5.34	38.94	15.83	12.58	65.04	17.67	13.39	63.1
CR45-5-1	50	3	326TSC	0.89	5.34	38.94	15.83	12.58	65.06	17.67	13.39	63.11
CR45-5	50	3	326TSC	0.89	5.34	38.94	15.83	12.58	65.06	17.67	13.39	63.11
CR45-6-2	50	3	326TSC	0.89	5.34	42.09	15.83	12.58	68.21	17.67	13.39	66.26
CR45-6	50	3	326TSC	0.89	5.34	42.09	15.83	12.58	68.21	17.67	13.39	66.26
CR45-7-2	60	3	364TSC	0.89	5.34	45.24	17.91	16.02	74.06	17.67	13.39	69.4 0
CR45-7	60	3	364TSC	0.89	5.34	45.24	17.91	16.02	74.06	17.67	13.39	69.40

All dimensions in inches unless otherwise noted.

Note: CR 45 low-NPSH pumps are also available as CRN pumps with PJE connection.

CR 64 low-NPSH pumps, 60 Hz

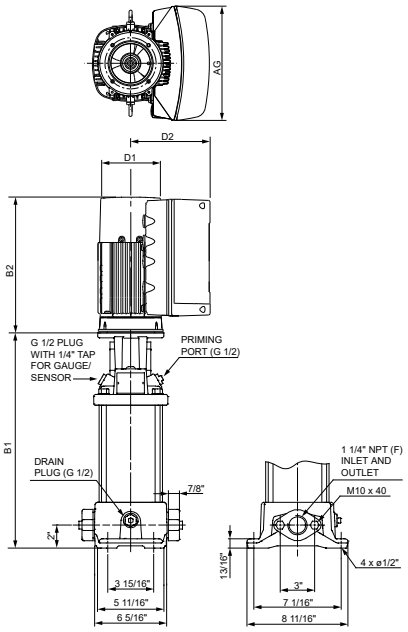
Pump type	HP	PH	NEMA Frame size	PEI_{CL}	Impeller diameter (in)	ANSI B1	TEFC D1	TEFC D2	ANSI TEFC B1 + B2	ODP D1	ODP D2	ANSI ODP B1 + B2
CR64-2-1	25	3	284TSC	0.93	5.59	29.69	14.17	11.08	53.31	16.21	11.93	51.85
CR64-2	30	3	286TSC	0.93	5.59	29.69	14.17	11.08	53.27	16.21	11.93	51.85
CR64-3-2	40	3	324TSC	0.93	5.59	32.91	15.83	12.58	59.01	17.67	13.39	57.07
CR64-3-1	40	3	324TSC	0.93	5.59	32.91	15.83	12.58	59.01	17.67	13.39	57.07
CR64-3	40	3	324TSC	0.93	5.59	32.91	15.83	12.58	59.01	17.67	13.39	57.07
CR64-4-2	50	3	326TSC	0.93	5.59	36.18	15.83	12.58	62.30	17.67	13.39	60.35
CR64-4-1	50	3	326TSC	0.93	5.59	36.18	15.83	12.58	62.30	17.67	13.39	60.35
CR64-4	60	3	364TSC	0.93	5.59	36.18	17.91	16.02	65	17.67	13.39	60.34
CR64-5-2	60	3	364TSC	0.93	5.59	39.41	17.91	16.02	68.23	17.67	13.39	63.57

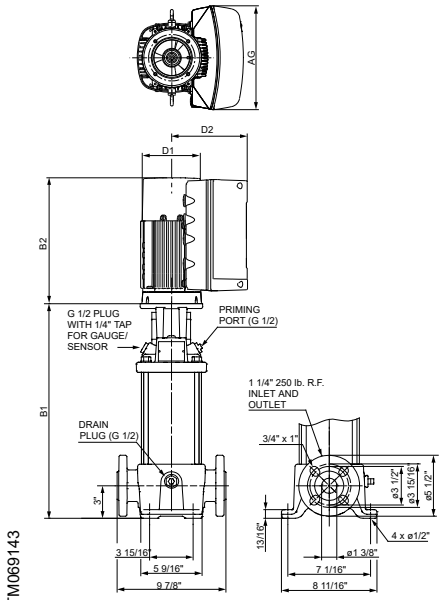
All dimensions in inches unless otherwise noted.

Note: CR 64 low-NPSH pumps are also available as CRN pumps with PJE connection.

CRE low-NPSH pumps dimensional data

CRE 5 low-NPSH pumps dimensional data





TM069143

TM069137

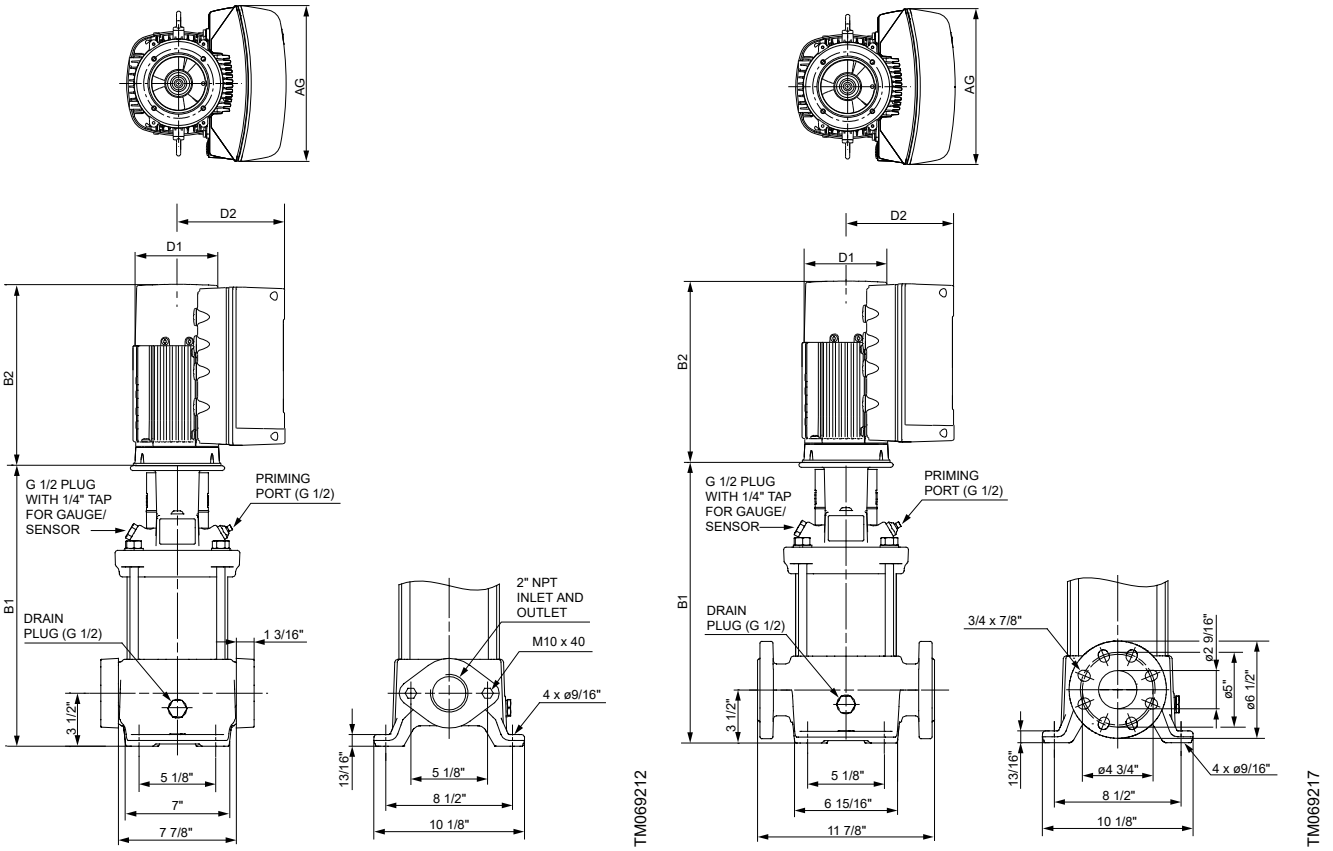
Pump type	HP	PH	Voltage [V]	NEMA frame size	Oval[1)]	PEI_{vL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 5-4	2	1	200-240	56C	•	0.45	2.88	14.09 (357.89)	4.80 (121.92)	6.22 (157.99)	8.34 (212)	23.34 (592.83)	82 (37)
		3	200-240	56C	•	0.44	2.88	14.09 (357.89)	4.80 (121.92)	6.22 (157.99)	10.56 (268)	24.92 (632.96)	85 (38)
		3	440-480	56C	•	0.45	2.88	14.09 (357.89)	4.80 (121.92)	6.22 (157.99)	10.56 (268)	24.92 (632.96)	85 (38)
CRE 5-5	3	3	200-240	182TC	•	0.41	2.88	16.26 (413)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	29.41 (747.01)	101 (46)
		3	440-480	182TC	•	0.41	2.88	16.26 (413)	4.80 (121.92)	6.22 (157.98)	10.56 (268.22)	27.09 (688.08)	93 (42)
CRE 5-7	3	3	200-240	182TC	•	0.41	2.88	18.39 (467)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	31.54 (801.11)	115 (52)
		3	440-480	182TC	•	0.41	2.88	18.39 (467)	4.80 (121.92)	6.22 (157.99)	10.56 (268.22)	29.22 (742.18)	107 (48)
CRE 5-8	5	3	200-240	182TC	•	0.41	2.88	19.45 (494.03)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	32.60 (828.04)	130 (59)
		3	440-480	182TC	•	0.41	2.88	19.45 (494.03)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	32.60 (828.04)	141 (64)
CRE 5-14	5	3	200-240	182TC	•	0.41	2.88	25.83 (656.08)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	38.98 (990.09)	132 (60)
		3	440-480	182TC	•	0.41	2.88	25.83 (656.08)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	38.98 (990.09)	143 (65)

Pump type	HP	PH	Voltage [V]	NEMA frame size	Oval[1)]	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 5-15	7 1/2	3	200-240	213TC	•	0.41	2.88	27.41 (696.21)	10.04 (255.02)	9.33 (236.98)	13.62 (346)	42.72 (1085.08)	172 (78)
		3	440-480	213TC	•	0.41	2.88	27.41 (696.21)	7.53 (191.26)	7.91 (200.91)	11.46 (291)	41.78 (1196.09)	163 (74)
CRE 5-22	7 1/2	3	200-240	213TC	-	0.41	2.88	34.84 (884.93)	10.04 (255.02)	9.33 (236.98)	13.62 (346)	50.15 (1273.81)	261 (118)
		3	440-480	213TC	-	0.41	2.88	34.82 (884.42)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	49.21 (1249.93)	252 (114.30)
CRE 5-24	10	3	440-480	213TC	-	0.41	2.88	36.97 (939.04)	10.04 (255.02)	9.33 (236.98)	13.62 (346)	52.28 (1327.91)	279 (127)

● Available.

1) For oval flanged pumps, the B1 and B1+B2 dimensions are one inch less than for ANSI flanged pumps, and the weight is approximately 9 lbs. (4 kg) less.

CRE 10 low-NPSH pumps dimensional data



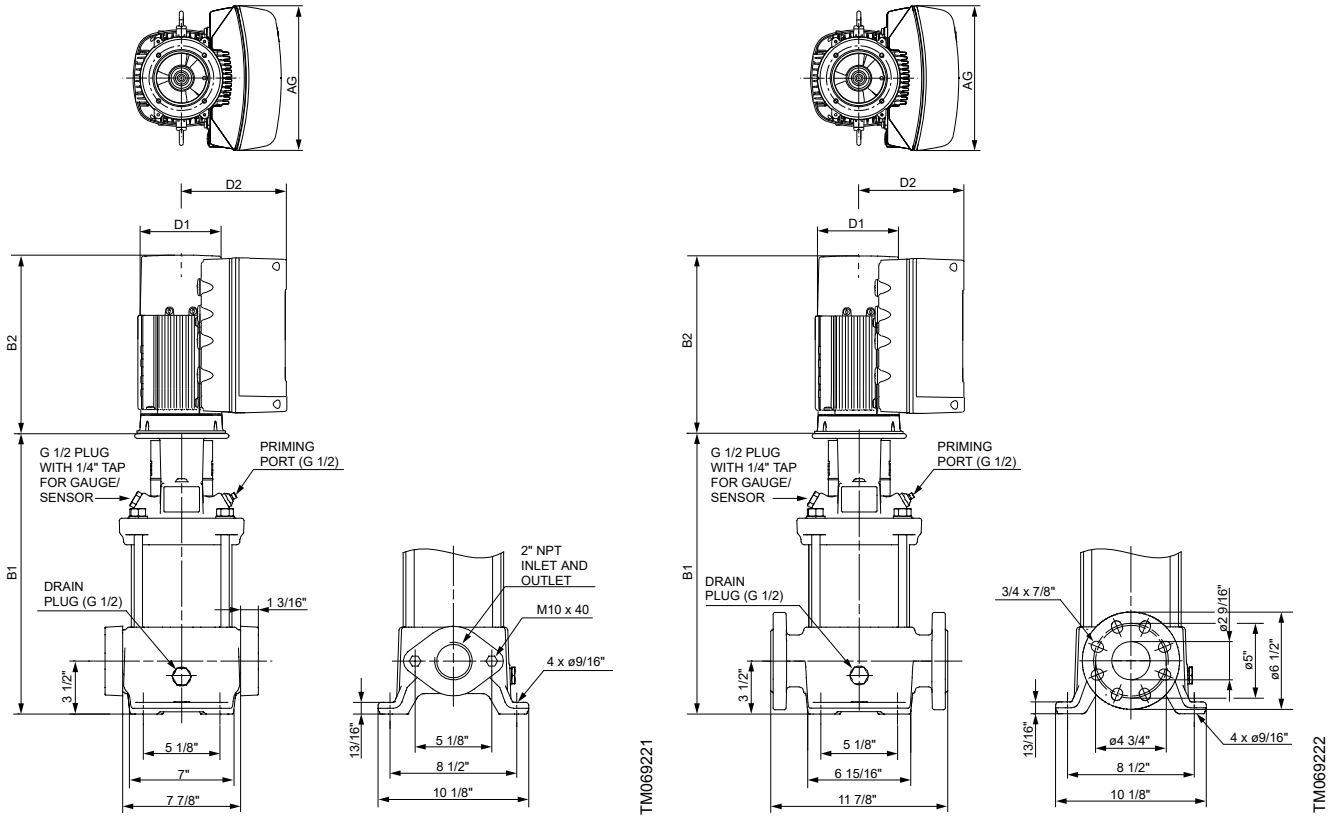
Pump type	HP	PH	Voltage [V]	NEMA frame size	Oval[1)]	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 10-3	3	3	200-240	182TC	•	0.42	3.66 (92.90)	17.20 (436.88)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	30.35 (770.89)	150 (68)
		3	440-480	182TC	•	0.43	3.66 (92.90)	17.20 (436.88)	4.80 (121.92)	6.22 (157.99)	10.56 (268.22)	28.03 (711.96)	142 (64)
CRE 10-4	5	3	200-240	182TC	•	0.42	3.66 (92.90)	18.39 (467.10)	7.53 (121.26)	7.91 (200.91)	11.46 (291.08)	31.54 (801.11)	159 (72)
		3	440-480	182TC	•	0.43	3.66 (92.90)	18.39 (467.10)	7.53 (121.26)	7.91 (200.91)	11.46 (291.08)	31.54 (801.11)	170 (77)
CRE 10-6	5	3	200-240	182TC	•	0.42	3.66 (92.90)	20.75 (527.05)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	33.90 (861.06)	164 (74)
		3	440-480	182TC	•	0.43	3.66 (92.90)	20.75 (527.05)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	33.90 (861.06)	175 (79)
CRE 10-7	7 1/2	3	200-240	213TC	-	0.42	3.66 (92.90)	22.25 (565.15)	10.04 (255.01)	9.93 (252.22)	13.62 (345.94)	37.56 (954.02)	205 (93)
		3	440-480	213TC	-	0.43	3.66 (92.90)	22.25 (565.15)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	36.62 (930.14)	196 (89)
CRE 10-9	7 1/2	3	200-240	213TC	-	0.42	3.66 (92.90)	24.61 (625.09)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	39.92 (1013.96)	218 (98)
		3	440-480	213TC	-	0.43	3.66 (92.90)	24.61 (625.09)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	38.98 (990.09)	209 (94)

Pump type	HP	PH	Voltage [V]	NEMA frame size	Oval[1)]	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 10-10	10	3	440-480	213TC	-	0.43	3.66 (92.90)	25.79 (655.07)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	41.10 (1043.94)	235 (106)
CRE 10-12	10		440-480	213TC	-	0.43	3.66 (92.90)	28.15 (715.01)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	43.46 (1103.88)	324 (147)
CRE 10-14	15	3	440-480	254TC	-	0.43	3.66 (92.90)	33.06 (839.72)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	49.04 (1245.62)	356 (161)
CRE 10-17	15	3	440-480	254TC	-	0.43	3.66 (92.90)	37.80 (960.12)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	53.78 (1366.01)	372 (169)

● Available.

1) For oval flanged pumps, the B1 and B1+B2 dimensions are one inch less than ANSI flanged pumps, and the weight is approximately 3 lbs (1.3 kg) less.

CRE 15 low-NPSH pumps dimensional data

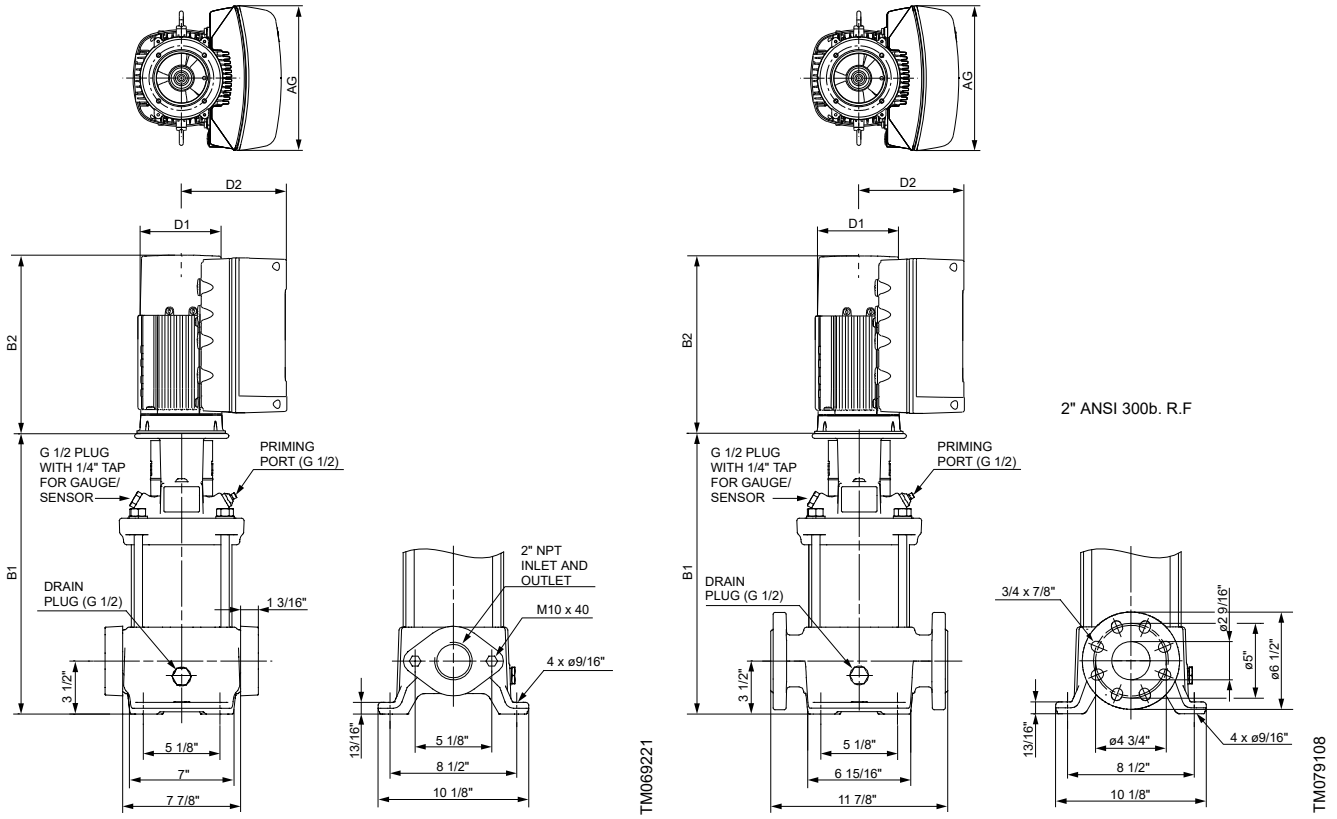


Pump type	HP	PH	Voltage [V]	NEMA frame size	Oval[1)]	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 15-2	7 1/2	3	200-240	213TC	●	0.43	4.13 (104.80)	17.52 (445)	10.04 (255.01)	9.33 (200.91)	13.62 (345.94)	32.83 (833.88)	196 (89)
		3	440-480	213TC	●	0.42	4.13 (104.80)	17.52 (445)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	31.89 (810)	187 (85)
CRE 15-3	7 1/2	3	200-240	213TC	●	0.43	4.13 (104.80)	19.29 (489.97)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	34.60 (878.84)	200 (91)
		3	440-480	213TC	●	0.42	4.13 (104.80)	19.29 (489.97)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	33.66 (854.96)	192 (87)
CRE 15-4	10	3	440-480	213TC	●	0.42	4.13 (104.80)	21.06 (534.92)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	36.37 (923.79)	226 (103)
CRE 15-5	15	3	440-480	254TC	●	0.42	4.13 (104.80)	25.40 (645.16)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	41.38 (1051.05)	252 (114)
CRE 15-7	15	3	440-480	254TC	-	0.42	4.13 (104.80)	28.94 (735.07)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	44.92 (1140.96)	348 (158)
CRE 15-8	20	3	460-480	256TC	-	0.48	4.13 (104.80)	30.71 (780.03)	13.55 (344.11)	12.13 (308.10)	16.54 (420.11)	49.92 (1268.04)	507 (230)
CRE 15-10	20	3	460-480	256TC	-	0.48	4.13 (104.80)	34.25 (869.95)	13.55 (344.11)	12.13 (308.10)	16.54 (420.11)	53.46 (1357.96)	516 (234)
CRE 15-12	25	3	460-480	284TSC	-	0.48	4.13 (104.80)	37.17 (944.12)	13.55 (344.11)	12.13 (308.10)	16.54 (420.11)	60.32 (1532.21)	551 (250)

● Available.

1) For oval flanged pumps, the B1 and B1+B2 dimensions are one inch less than for ANSI flanged pumps, and the weight is approximately 3 lbs. (1.3 kg) less.

CRE 20 low-NPSH pumps dimensional data

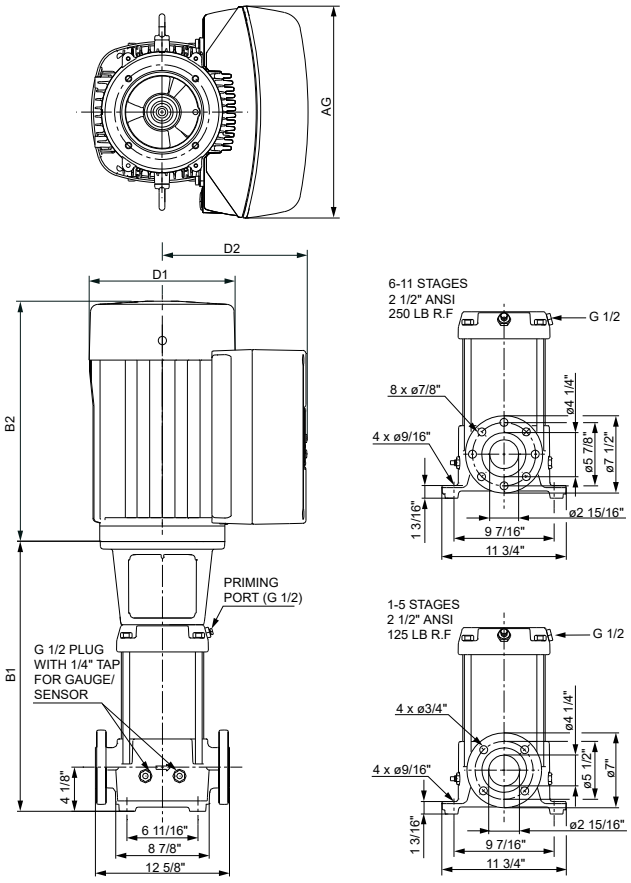


Pump type	HP	PH	Voltage [V]	NEMA frame size	Oval[1)]	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 20-2	7 1/2	3	200-240	213TC	•	0.43	4.13 (104.80)	17.52 (445)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	32.83 (833.88)	196 (89)
		3	440-480	213TC	•	0.44	4.13 (104.80)	17.52 (445)	7.53 (191.26)	7.91 (200.91)	11.46 (291.08)	31.89 (810)	187 (85)
CRE 20-3	10		440-480	213TC	•	0.44	4.13 (104.80)	19.29 (489.97)	10.04 (255.02)	9.33 (236.98)	13.62 (345.94)	34.60 (878.84)	221 (100)
CRE 20-4	15	3	440-480	254TC	•	0.44	4.13 (104.80)	23.62 (599.94)	10.04 (255.02)	9.33 (236.98)	13.62 (346)	39.60 (1005.84)	256 (116)
CRE 20-5	15	3	440-480	254TC	•	0.44	4.13 (104.80)	25.39 (644.91)	10.04 (255.02)	9.33 (236.98)	13.62 (346)	41.37 (1050.80)	341 (155)
CRE 20-6	15	3	440-480	254TC	-	0.44	4.13 (104.80)	27.17 (690.12)	10.04 (255.02)	9.33 (236.98)	13.62 (346)	43.15 (1096.01)	343 (156)
CRE 20-7	20	3	460-480	256TC	-	0.47	4.13 (104.80)	28.94 (735.07)	13.55 (344.11)	12.13 (308.10)	16.54 (420)	48.15 (1223.08)	498 (226)
CRE 20-8	20	3	460-480	256TC	-	0.47	4.13 (104.80)	30.71 (780.03)	13.55 (344.11)	12.13 (308.10)	16.54 (420)	49.92 (1268.05)	507 (230)
CRE 20-10	25		460-480	284TSC	-	0.47	4.13 (104.80)	33.62 (853.95)	13.55 (344.11)	12.13 (308.10)	16.54 (420)	56.77 (1442.04)	542 (246)

• Available.

1) For oval flanged pumps, the B1 and B1+B2 dimensions are one inch less than for ANSI flanged pumps, and the weight is approximately 3 lbs (1.3 kg). less.

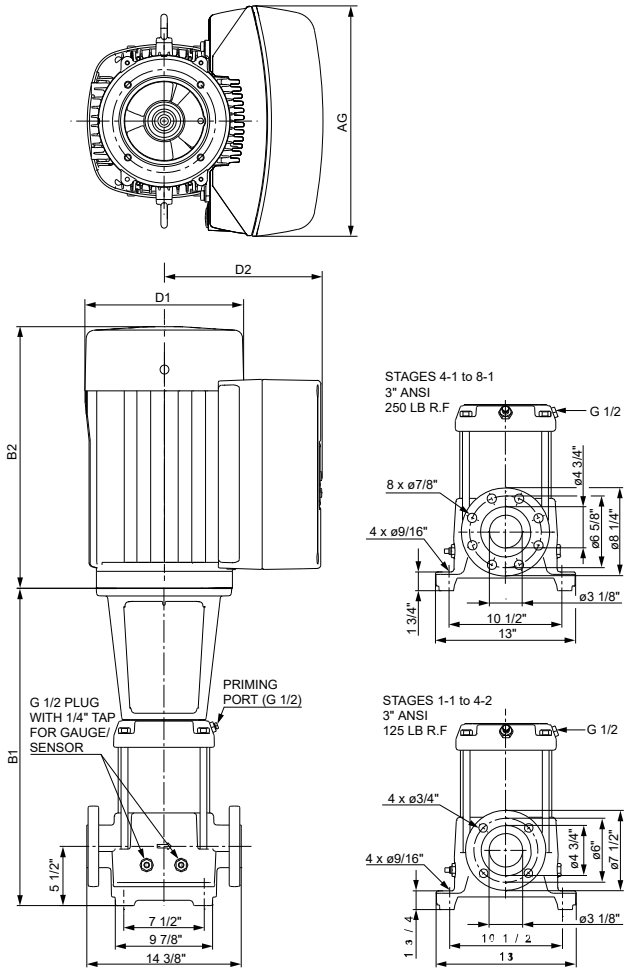
CRE 32 low-NPSH pumps dimensional data



TM069224

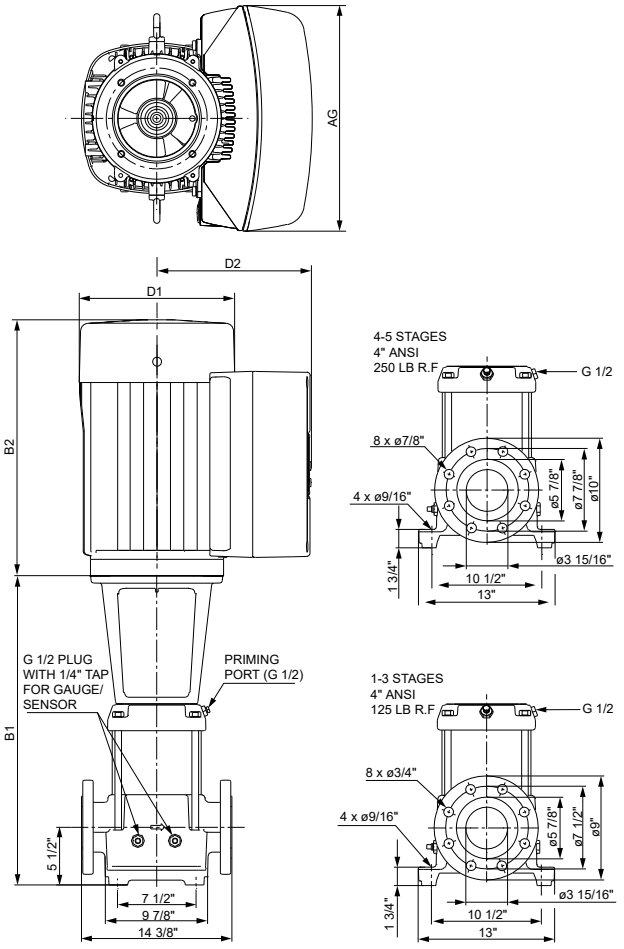
Pump type	HP	PH	Voltage [V]	NEMA frame size	PEI_{vL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 32-2-1	10	3	440-480	213TC	0.40	4.66 (118.40)	22.83 (579.88)	10.04 (255.01)	9.33 (236.98)	13.62 (345.94)	38.14 (968.75)	229 (104)
CRE 32-2	15	3	440-480	254TC	0.40	4.66 (118.40)	26.96 (684.78)	10.04 (255)	9.33 (236.98)	13.62 (345.94)	42.94 (1090.67)	253 (115)
CRE 32-3	15	3	440-480	254TC	0.40	4.66 (118.40)	29.72 (754.88)	10.04 (255)	9.33 (237)	13.62 (345.94)	45.70 (1034)	387 (176)
CRE 32-4-2	20	3	460-480	256TC	0.45	4.66 (118.40)	32.48 (825)	13.54 (344)	12.13 (308)	16.54 (420.11)	51.69 (1313)	544 (247)
CRE 32-4	20	3	460-480	256TC	0.45	4.66 (118.40)	32.48 (825)	13.54 (344)	12.13 (308)	16.54 (420.11)	51.69 (1313)	544 (247)
CRE 32-5-2	25	3	460-480	284TSC	0.45	4.66 (118.40)	35.24 (895.09)	13.54 (344)	12.13 (308)	16.54 (420.11)	58.39 (1483)	580 (263)
CRE 32-6-2	25	3	460-480	284TSC	0.45	4.66 (118.40)	37.99 (964.94)	13.54 (344)	12.13 (308)	16.54 (420.11)	61.14 (1553)	623 (283)
CRE 32-6	30		460-480	286TSC	0.45	4.66 (118.40)	37.99 (964.94)	13.54 (344)	12.13 (308)	16.54 (420.11)	61.14 (1553)	650 (295)
CRE 32-7-2	30	3	460-480	286TSC	0.45	4.66 (118.40)	40.75 (1035.05)	13.54 (344)	12.13 (308)	16.54 (420.11)	63.90 (1623)	657 (298)

CRE 45 low-NPSH pumps dimensional data



Pump type	HP	P69	Voltage [V]	NEMA frame size	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 45-2-1	20	3	460-480	256TC	0.46	5.34 (135.63)	29.49 (749.04)	13.54 (344)	12.13 (308.10)	16.54 (420.11)	48.70 (1237)	553 (251)
CRE 45-2	20	3	460-480	256TC	0.46	5.34 (135.63)	29.49 (749.04)	13.54 (344)	12.13 (308.10)	16.54 (420.11)	48.70 (1237)	553 (251)
CRE 45-3-2	25	3	460-480	284TSC	0.46	5.34 (135.63)	32.64 (829.05)	13.54 (344)	12.13 (308.10)	16.54 (420.11)	55.79 (1417)	590 (268)
CRE 45-3-1	25	3	460-480	284TSC	0.46	5.34 (135.63)	32.64 (829.05)	13.54 (344)	12.13 (308.10)	16.54 (420.11)	55.79 (1417)	588 (267)
CRE 45-3	30	3	460-480	286TSC	0.46	5.34 (135.63)	32.64 (829.05)	13.54 (344)	12.13 (308.10)	16.54 (420.11)	55.79 (1417)	614 (279)

CRE 64 low-NPSH pumps dimensional data



TM069241

Pump type	HP	Ph	Voltage [V]	NEMA frame size	PEI_{VL}	Impeller diameter [in (mm)]	ANSI B1 [in (mm)]	MLE D1 [in (mm)]	MLE D2 [in (mm)]	AG [in (mm)]	ANSI MLE B1+B2 [in (mm)]	ANSI ship wt. [lbs (kg)]
CRE 64-2-1	25	3	460-480	284TSC	0.46	5.59 (142)	29.69 (754)	13.54 (344)	12.13 (308)	16.54 (420)	52.83 (1342)	592 (269)
CRE 64-2	30	3	460-480	286TSC	0.46	5.59 (142)	29.69 (754)	13.54 (344)	12.13 (308)	16.54 (420)	52.83 (1342)	619 (281)

CR pumps with 4-pole motor

CR 1 with 4-pole motor, 60 Hz	
Pump type	**Motor [HP]**
CR 1-2	1/2
CR 1-3	1/2
CR 1-4	1/2
CR 1-5	1/2
CR 1-6	1/2
CR 1-7	1/2
CR 1-8	1/2
CR 1-9	1/2
CR 1-10	1/2
CR 1-11	1/2
CR 1-12	1/2
CR 1-13	1/2
CR 1-15	1/2
CR 1-17	1/2
CR 1-19	1/2
CR 1-21	1/2
CR 1-23	1/2
CR 1-25	1/2
CR 1-27	1/2

CR 3 with 4-pole motor, 60 Hz	
Pump type	**Motor [HP]**
CR 3-2	1/2
CR 3-3	1/2
CR 3-4	1/2
CR 3-5	1/2
CR 3-6	1/2
CR 3-7	1/2
CR 3-8	1/2
CR 3-9	1/2
CR 3-10	1/2
CR 3-11	1/2
CR 3-12	1/2
CR 3-13	1/2
CR 3-15	1/2
CR 3-17	1/2
CR 3-19	1/2
CR 3-21	1/2
CR 3-23	1/2
CR 3-25	3/4

CR 5 with 4-pole motor, 60 Hz	
Pump type	**Motor [HP]**
CR 5-2	1/2
CR 5-3	1/2
CR 5-4	1/2
CR 5-5	1/2
CR 5-6	1/2
CR 5-7	1/2
CR 5-8	1/2
CR 5-9	1/2
CR 5-10	1/2
CR 5-11	1/2
CR 5-12	1/2
CR 5-13	3/4
CR 5-14	3/4
CR 5-15	3/4
CR 5-16	3/4
CR 5-18	3/4
CR 5-20	1
CR 5-22	1
CR 5-24	1

CR 10 with 4-pole motor, 60 Hz	
Pump type	**Motor [HP]**
CR 10-1	1/2
CR 10-2	1/2
CR 10-3	1/2
CR 10-4	1/2
CR 10-5	1/2
CR 10-6	3/4
CR 10-7	3/4
CR 10-8	1
CR 10-9	1
CR 10-10	1
CR 10-12	1 1/2
CR 10-14	1 1/2
CR 10-16	2
CR 10-17	2
CR 10-18	2
CR 10-20	2
CR 10-22	3

CR 15 with 4-pole motor, 60 Hz	
Pump type	**Motor [HP]**
CR 15-1	1/2
CR 15-2	1/2
CR 15-3	3/4
CR 15-4	1
CR 15-5	1 1/2
CR 15-6	1 1/2
CR 15-7	1 1/2
CR 15-8	2
CR 15-9	2
CR 15-10	3
CR 15-12	3

CR 20 with 4-pole motor, 60 Hz	
Pump type	**Motor [HP]**
CR 20-1	1/2
CR 20-2	3/4
CR 20-3	1
CR 20-4	1 1/2
CR 20-5	2
CR 20-6	2
CR 20-7	3
CR 20-8	3
CR 20-10	5

CR 32 with 4-pole motor, 60 Hz			
Pump type	**Motor [HP]**	**PEI_{CL} pump with motor**	**Impeller diameter [in]**
CR 32-1-1	3	0.90	4.66
CR 32-1	3	0.90	4.66
CR 32-2-2	3	0.90	4.66
CR 32-2-1	3	0.90	4.66
CR 32-2	3	0.90	4.66
CR 32-3-2	3	0.90	4.66
CR 32-3	3	0.90	4.66
CR 32-4-2	3	0.90	4.66
CR 32-4	3	0.90	4.66
CR 32-5-2	3	0.90	4.66
CR 32-5	3	0.90	4.66
CR 32-6-2	3	0.90	4.66
CR 32-6	5	0.90	4.66
CR 32-7-2	5	0.90	4.66
CR 32-7	5	0.90	4.66
CR 32-8-2	5	0.90	4.66
CR 32-8	5	0.90	4.66
CR 32-9-2	5	0.90	4.66
CR 32-9	5	0.90	4.66
CR 32-10-2	5	0.90	4.66
CR 32-10	7 1/2	0.90	4.66
CR 32-11-2	7 1/2	0.90	4.66

CR 45 with 4-pole motor, 60 Hz			
Pump type	**Motor [HP]**	**PEI_{CL} pump with motor**	**Impeller diameter [in]**
CR 45-1-1	3	0.91	5.34
CR 45-1	3	0.91	5.34
CR 45-2-2	3	0.91	5.34
CR 45-2-1	3	0.91	5.34
CR 45-2	3	0.91	5.34
CR 45-3-2	3	0.91	5.34
CR 45-3-1	3	0.91	5.34
CR 45-3	3	0.91	5.34
CR 45-4-2	5	0.91	5.34
CR 45-4-1	5	0.91	5.34
CR 45-4	5	0.91	5.34
CR 45-5-2	5	0.91	5.34
CR 45-5-1	5	0.91	5.34
CR 45-5	5	0.91	5.34
CR 45-6-2	7 1/2	0.91	5.34
CR 45-6	7 1/2	0.91	5.34
CR 45-7-2	7 1/2	0.91	5.34
CR 45-7	7 1/2	0.91	5.34
CR 45-8-1	10	0.91	5.34

CR 64 with 4-pole motor, 60 Hz			
Pump type	**Motor [HP]**	**PEI_{CL} pump with motor**	**Impeller diameter [in]**
CR 64-1-1	3	0.94	5.59
CR 64-1	3	0.94	5.59
CR 64-2-2	3	0.94	5.59
CR 64-2-1	3	0.94	5.59
CR 64-2	5	0.94	5.59
CR 64-3-2	5	0.94	5.59
CR 64-3-1	5	0.94	5.59
CR 64-3	5	0.94	5.59
CR 64-4-2	7 1/2	0.94	5.59
CR 64-4-1	7 1/2	0.94	5.59
CR 64-4	7 1/2	0.94	5.59
CR 64-5-2	7 1/2	0.94	5.59

CR 95 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 95-1	15	0.94	6.07
CR 95-2	15	0.94	6.07
CR 95-3	15	0.94	6.07
CR 95-4	15	0.94	6.07
CR 95-5	15	0.94	6.07
CR 95-6	15	0.94	6.07
CR 95-7	15	0.94	6.07
CR 95-8	20	0.94	6.07
CR 95-9	20	0.94	6.07
CR 95-10	20	0.94	6.07
CR 95-11	25	0.94	6.07
CR 95-12	25	0.94	6.07

CR 125 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 125-1	15	0.94	6.38
CR 125-2	15	0.94	6.38
CR 125-3	15	0.94	6.38
CR 125-4	15	0.94	6.38
CR 125-5	15	0.94	6.38
CR 125-6	20	0.94	6.38
CR 125-7	20	0.94	6.38
CR 125-8	25	0.94	6.38
CR 125-9	30	0.94	6.38
CR 125-10	30	0.94	6.38
CR 125-11	40	0.94	6.38
CR 125-12	40	0.94	6.38

CR 155 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 155-1	15	0.95	6.64
CR 155-2	15	0.95	6.64
CR 155-3	15	0.95	6.64
CR 155-4	15	0.95	6.64
CR 155-5	20	0.95	6.64
CR 155-6	25	0.95	6.64
CR 155-7	30	0.95	6.64
CR 155-8	30	0.95	6.64

CR 155 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 155-9	40	0.95	6.64
CR 155-10	40	0.95	6.64
CR 155-11	50	0.95	6.64
CR 155-12	50	0.95	6.64

CR 185 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 185-1	40	0.95	7.36
CR 185-2	40	0.95	7.36
CR 185-3	40	0.95	7.36
CR 185-4	40	0.95	7.36
CR 185-5	40	0.95	7.36
CR 185-6	40	0.95	7.36
CR 185-7	40	0.95	7.36
CR 185-8	50	0.95	7.36
CR 185-9	50	0.95	7.36

CR 215 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 215-1	40	0.96	7.80
CR 215-2	40	0.96	7.80
CR 215-3	40	0.96	7.80
CR 215-4	40	0.96	7.80
CR 215-5	40	0.96	7.80
CR 215-6	50	0.96	7.80
CR 215-7	60	0.96	7.80
CR 215-8	75	0.96	7.80
CR 215-9	75	0.96	7.80

CR 255 with 4-pole motor, 60 Hz

Pump type	Motor [HP]	PEI_{CL} pump with motor	Impeller diameter [in]
CR 255-1	40	0.97	7.72
CR 255-2	40	0.97	7.72
CR 255-3	40	0.97	7.72
CR 255-4	40	0.97	7.72
CR 255-5	50	0.97	7.72
CR 255-6	60	0.97	7.72
CR 255-7	75	0.97	7.72
CR 255-8	75	0.97	7.72

Boiler feed pumps

CR low-NPSH pump sizing chart for on-off feed boilers, 60 Hz

Pump PSI	20 PSI	35 PSI	60 PSI	85 PSI	110 PSI	137 PSI	165 PSI	190 PSI	215 PSI	265 PSI	315 PSI
Boiler PSI	10 PSI	25 PSI	50 PSI	75 PSI	100 PSI	125 PSI	150 PSI	175 PSI	200 PSI	250 PSI	300 PSI
Boiler HP	Boiler Evaporation rate GPM										
15	1.0	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-11 2 HP 96580361	CR 3-13 3 HP 97786050	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-21 5 HP 97786064	CR 3-25 5 HP 97786067
20	1.4	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-11 2 HP 96580361	CR 3-13 3 HP 97786050	CR 3-15 3 HP 97786061	CR 3-19 5 HP 97786063	CR 3-21 5 HP 97786064	CR 3-25 5 HP 97786067
25	1.7	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-11 2 HP 96580361	CR 3-13 3 HP 97786050	CR 3-15 3 HP 97786061	CR 3-19 5 HP 97786063	CR 3-21 5 HP 97786064	CR 3-25 5 HP 97786067
30	2.1	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-11 2 HP 96580361	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 3-25 5 HP 97786067
40	2.8	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-24 10 HP 97786105
50	3.5	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-24 10 HP 97786105
60	4.1	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-25 5 HP 97786066	CR 10-16 15 HP 97786105
80	5.5	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-13 3 HP 97786050	CR 3-15 3 HP 97786061	CR 3-19 5 HP 97786063	CR 3-21 5 HP 97786064	CR 3-25 5 HP 97786067	CR 10-16 15 HP 97786805
100	6.9	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 96777669	CR 3-6 1.5 HP 96654135	CR 3-11 2 HP 96580361	CR 3-17 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-21 5 HP 97786064	CR 5-22 7.5 HP 97786104	CR 10-16 15 HP 97786805
125	8.6	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-10 2 HP 91129894	CR 3-13 3 HP 97786050	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-22 7.5 HP 97786104	CR 10-16 15 HP 97786805
150	10.4	CR 3-4 1 HP 97786047	CR 3-6 1.5 HP 96777669	CR 3-9 2 HP 96654135	CR 3-13 3 HP 97786050	CR 3-17 3 HP 97786062	CR 3-21 5 HP 97786064	CR 3-25 5 HP 97786067	CR 5-18 7.5 HP 97786103	CR 5-24 10 HP 97786105	CR 10-17 15 HP 97786808
200	13.8	CR 5-4 2 HP 97786069	CR 5-4 2 HP 97786069	CR 5-6 3 HP 97786081	CR 5-9 5 HP 97786085	CR 5-11 5 HP 97786087	CR 5-14 5 HP 97713914	CR 5-16 7.5 HP 97786102	CR 5-18 7.5 HP 97786103	CR 10-14 15 HP 97786127	CR 10-17 15 HP 97786808
250	17.3	CR 5-4 2 HP 97786069	CR 5-5 3 HP 97786070	CR 5-8 5 HP 97786083	CR 5-10 5 HP 97786086	CR 5-13 5 HP 96758079	CR 5-16 7.5 HP 97786102	CR 5-20 7.5 HP 96994432	CR 5-22 7.5 HP 97786104	CR 10-16 15 HP 97786805	CR 10-17 15 HP 97786808
300	20.7	CR 5-4 2 HP 97786069	CR 5-6 3 HP 97786081	CR 5-9 5 HP 96758079	CR 5-13 5 HP 97786102	CR 5-16 7.5 HP 96994432	CR 5-20 7.5 HP 97786105	CR 5-24 10 HP 96645542	CR 10-12 10 HP 97786127	CR 10-16 15 HP 97786805	CR 15-12 25 HP 96621673
350	24.2	CR 10-3 3 HP 97786106	CR 10-3 3 HP 97786106	CR 10-4 5 HP 96771299	CR 10-6 5 HP 97786108	CR 10-7 7.5 HP 97786109	CR 10-9 7.5 HP 97786110	CR 10-10 10 HP 96765677	CR 10-12 10 HP 96645542	CR 10-14 15 HP 97786127	CR 10-16 15 HP 97786805	CR 15-12 25 HP 96621673
400	27.6	CR 10-3 3 HP 97786106	CR 10-3 3 HP 97786106	CR 10-5 5 HP 97786107	CR 10-6 5 HP 97786108	CR 10-8 7.5 HP 96580366	CR 10-10 10 HP 96765677	CR 10-12 10 HP 96645542	CR 10-14 15 HP 97786127	CR 10-16 15 HP 97786805	CR 10-10 20 HP 97786838	CR 15-12 25 HP 96621673
500	34.5	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-6 15 HP 97786834	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-9 20 HP 97786837	CR 15-12 25 HP 96621673	CR 32-9-2 40 HP 97786890
600	41.4	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-6 15 HP 97786834	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-9 20 HP 97786837	CR 15-12 25 HP 96621673	CR 32-9-2 40 HP 97786890
700	48.3	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-9 20 HP 97786837	CR 15-10 20 HP 97786838	CR 32-8-2 40 HP 97786885	CR 32-9-2 40 HP 97786890
750	51.8	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-10 20 HP 97786838	CR 15-12 25 HP 96621673	CR 32-8-2 40 HP 97786885	CR 32-9 40 HP 97786892
800	55.2	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-3-2 15 HP 97786847	CR 32-4-2 20 HP 97786855	CR 32-5-2 25 HP 97786871	CR 32-5-2 25 HP 96627357	CR 32-6-2 25 HP 29Z53602	CR 32-7-2 30 HP 96869369	CR 32-8-2 40 HP 97786885	CR 32-10-2 50 HP 97786894
900	62.1	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-2 15 HP 97786846	CR 32-3 15 HP 97786849	CR 32-4-2 20 HP 97786855	CR 32-5-2 25 HP 97786871	CR 32-6-2 25 HP 29Z53602	CR 32-6 30 HP 97786872	CR 32-7-2 30 HP 96869369	CR 32-8 40 HP 97786887	CR 32-10-2 50 HP 97786894
1000	69.0	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-2 15 HP 97786846	CR 32-3 15 HP 97786849	CR 32-4-2 20 HP 97786855	CR 32-5-2 25 HP 97786871	CR 32-6-2 25 HP 29Z53602	CR 32-7-2 30 HP 96869369	CR 32-7 40 HP 97786883	CR 32-9-2 40 HP 97786890	CR 45-7-2 60 HP 97787962
1100	75.9	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-3-2 25 HP 96631054	CR 45-3 30 HP 97787933	CR 45-4-2 40 HP 97787934	CR 45-5-2 40 HP 97787937	CR 45-5-2 40 HP 97787937	CR 45-6-2 50 HP 96698363	CR 45-7-2 60 HP 97787962
1200	82.8	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2 20 HP 97787932	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4-2 40 HP 97787934	CR 45-5-2 40 HP 97787937	CR 45-5-1 50 HP 97787938	CR 45-6 50 HP 35Z53482	CR 45-7 60 HP 97787963
1300	89.7	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2 20 HP 97787932	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4-1 40 HP 97787935	CR 45-5-2 40 HP 97787937	CR 45-5 50 HP 97787939	CR 45-6 50 HP 35Z53482	CR 45-7 60 HP 97787963
1400	96.6	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2 20 HP 97787932	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4-1 40 HP 97787935	CR 45-4-1 40 HP 97787937	CR 45-5-2 50 HP 97787939	CR 45-6 50 HP 35Z53482	CR 45-7 60 HP 97787963
1500	103.5	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-2 25 HP 96631054	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4 40 HP 97787936	CR 45-5-2 40 HP 97787937	CR 45-6-2 50 HP 96698363	CR 45-7-2 60 HP 97787962	-

BOILER_FEED_PUMP_SIZING_CHARTS_ON-OFF

CR low-NPSH pump sizing chart for continuous feed boilers, 60 Hz

Pump PSI		20 PSI	35 PSI	60 PSI	85 PSI	110 PSI	137 PSI	165 PSI	190 PSI	215 PSI	265 PSI	315 PSI
Boiler PSI		10 PSI	25 PSI	50 PSI	75 PSI	100 PSI	125 PSI	150 PSI	175 PSI	200 PSI	250 PSI	300 PSI
Boiler HP	Boiler Evaporation rate GPM											
15	1.0	CR 3-3 0.75 HP 96640808	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-24 10 HP 97786105
20	1.4	CR 3-3 0.75 HP 96640808	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-24 10 HP 97786105
25	1.7	CR 3-3 0.75 HP 96640808	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-24 10 HP 97786105
30	2.1	CR 3-3 0.75 HP 96640808	CR 3-3 0.75 HP 96640808	CR 3-6 1.5 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 10-17 15 HP 97786808
40	2.8	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 97786047	CR 3-6 1.5 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 10-17 15 HP 97786808
50	3.5	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 97786047	CR 3-6 1.5 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 10-17 15 HP 97786808
60	4.1	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 97786047	CR 3-6 1.5 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-10 2 HP 91129894	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-25 5 HP 97786067	CR 10-17 15 HP 97786808
80	5.5	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 97786047	CR 3-6 1.5 HP 96777669	CR 3-8 1.5 HP 96585990	CR 3-11 2 HP 96580361	CR 3-13 3 HP 97786050	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-21 5 HP 97786064	CR 3-25 5 HP 97786067	CR 10-17 15 HP 97786808
100	6.9	CR 3-3 0.75 HP 96640808	CR 3-4 1 HP 97786047	CR 3-7 1.5 HP 96575984	CR 3-9 2 HP 96654135	CR 3-12 3 HP 97786048	CR 3-15 3 HP 97786061	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-22 7.5 HP 97786104	CR 10-17 15 HP 97786808
125	8.6	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-7 1.5 HP 96575984	CR 3-10 2 HP 91129894	CR 3-13 3 HP 97786050	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 3-25 5 HP 97786067	CR 5-24 10 HP 97786105	CR 10-17 15 HP 97786808
150	10.4	CR 3-3 0.75 HP 96640808	CR 3-5 1 HP 96734615	CR 3-9 2 HP 96654135	CR 3-12 3 HP 97786048	CR 3-17 3 HP 97786062	CR 3-19 5 HP 97786063	CR 3-23 5 HP 97786066	CR 5-18 7.5 HP 97786103	CR 5-20 7.5 HP 96994432	CR 5-24 10 HP 97786105	CR 10-17 15 HP 97786808
200	13.8	CR 5-4 2 HP 97786069	CR 5-4 2 HP 97786069	CR 5-6 3 HP 97786081	CR 5-9 5 HP 97786085	CR 5-11 5 HP 97786087	CR 5-14 5 HP 97713914	CR 5-16 7.5 HP 97786102	CR 5-18 7.5 HP 97786103	CR 5-22 7.5 HP 97786104	CR 10-16 15 HP 97786805	CR 10-17 15 HP 97786808
250	17.3	CR 5-4 2 HP 97786069	CR 5-5 3 HP 97786070	CR 5-8 5 HP 97786083	CR 5-10 5 HP 97786086	CR 5-13 5 HP 96758079	CR 5-16 7.5 HP 97786102	CR 5-20 7.5 HP 96994432	CR 5-22 7.5 HP 97786104	CR 5-24 10 HP 97786105	CR 10-16 15 HP 97786805	CR 10-17 15 HP 97786808
300	20.7	CR 5-4 2 HP 97786069	CR 5-6 3 HP 97786081	CR 5-9 5 HP 97786085	CR 5-12 5 HP 97786088	CR 5-15 7.5 HP 97786090	CR 5-18 7.5 HP 97786103	CR 5-22 7.5 HP 97786104	CR 5-24 10 HP 97786105	CR 10-14 15 HP 97786127	CR 10-16 15 HP 97786805	CR 15-12 25 HP 96621673
350	24.2	CR 5-5 3 HP 97786070	CR 5-7 3 HP 97786082	CR 5-11 5 HP 97786087	CR 5-14 5 HP 97713914	CR 5-18 7.5 HP 97786103	CR 5-22 7.5 HP 97786104	CR 10-10 10 HP 96765677	CR 10-12 10 HP 96645542	CR 10-14 15 HP 97786127	CR 10-16 15 HP 97786805	CR 15-12 25 HP 96621673
400	27.6	CR 10-3 3 HP 97786106	CR 10-3 3 HP 97786106	CR 10-5 5 HP 97786107	CR 10-6 5 HP 97786108	CR 10-8 7.5 HP 96580366	CR 10-10 10 HP 96765677	CR 10-12 10 HP 96645542	CR 10-14 15 HP 97786127	CR 10-16 15 HP 97786805	CR 15-12 25 HP 96621673	CR 32-9-2 40 HP 97786890
500	34.5	CR 10-3 3 HP 97786106	CR 10-3 3 HP 97786106	CR 10-5 5 HP 97786107	CR 10-7 7.5 HP 97786109	CR 10-9 7.5 HP 97786110	CR 10-12 10 HP 96645542	CR 10-14 15 HP 97786127	CR 10-16 15 HP 97786805	CR 10-17 15 HP 97786808	CR 15-12 25 HP 96621673	CR 32-9-2 40 HP 97786890
600	41.4	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-6 15 HP 97786834	CR 15-7 15 HP 97786835	CR 15-9 20 HP 97786837	CR 15-10 20 HP 97786838	CR 15-12 25 HP 96621673	CR 32-9 40 HP 97786892
700	48.3	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-9 20 HP 97786837	CR 15-10 20 HP 97786838	CR 32-8-2 40 HP 97786885	CR 32-9 40 HP 97786892
750	51.8	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-9 20 HP 97786837	CR 15-10 20 HP 97786838	CR 32-8-2 40 HP 97786885	CR 32-9 40 HP 97786892
800	55.2	CR 15-2 7.5 HP 96620406	CR 15-2 7.5 HP 96620406	CR 15-3 7.5 HP 97786811	CR 15-4 10 HP 97684764	CR 15-5 15 HP 97786816	CR 15-7 15 HP 97786835	CR 15-8 20 HP 97786836	CR 15-10 20 HP 97786838	CR 15-12 25 HP 96621673	CR 32-8-2 40 HP 97786885	CR 32-10-2 50 HP 97786894
900	62.1	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-2 15 HP 97786846	CR 32-3 15 HP 97786849	CR 32-4-2 20 HP 97786855	CR 32-5-2 25 HP 97786871	CR 32-6-2 25 HP 29Z53602	CR 32-6 30 HP 97786872	CR 32-7-2 30 HP 96869369	CR 32-8 40 HP 97786887	CR 32-10-2 50 HP 97786894
1000	69.0	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-2 15 HP 97786846	CR 32-3 15 HP 97786849	CR 32-4-2 20 HP 97786855	CR 32-5-2 25 HP 97786871	CR 32-6-2 25 HP 29Z53602	CR 32-7-2 30 HP 96869369	CR 32-7 40 HP 97786883	CR 32-9-2 40 HP 97786890	CR 32-10 50 HP 97786896
1100	75.9	CR 32-2-1 10 HP 97781873	CR 32-2-1 10 HP 97781873	CR 32-2 15 HP 97786846	CR 32-3 15 HP 97786849	CR 32-4-2 20 HP 97786855	CR 32-5-2 25 HP 97786871	CR 32-6-2 25 HP 29Z53602	CR 32-7-2 30 HP 96869369	CR 32-7 40 HP 97786883	CR 32-9-2 40 HP 97786890	CR 45-7 60 HP 97787963
1200	82.8	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2 20 HP 97787932	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4-1 40 HP 97787935	CR 45-5-2 40 HP 97787937	CR 45-5 50 HP 97787939	CR 45-6 50 HP 35Z53482	CR 45-7 60 HP 97787963
1300	89.7	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2 20 HP 97787932	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4-1 40 HP 97787935	CR 45-5-2 40 HP 97787937	CR 45-5 50 HP 97787939	CR 45-6 50 HP 35Z53482	CR 45-7 60 HP 97787963
1400	96.6	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-3-2 25 HP 96631054	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4 40 HP 97787936	CR 45-5-2 40 HP 97787937	CR 45-6-2 50 HP 96698363	CR 45-7-2 60 HP 97787962	-
1500	103.5	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-2-1 20 HP 97787931	CR 45-3-2 25 HP 96631054	CR 45-3-2 25 HP 96631054	CR 45-4-2 40 HP 97787934	CR 45-4 40 HP 97787936	CR 45-5-2 40 HP 97787937	CR 45-6-2 50 HP 96698363	CR 45-7-2 60 HP 97787962	-

Bypass orifices for continuous feed boilers

Bypass orifices for CR, CRI, CRN 1s-20, continuous feed boilers

303 Stainless steel bypass orifices for continuous feed boilers

Grundfos pump model		Temperature range [°F (°C)]	Min. flow rate	Min. required bypass line size[1]	Grundfos orifice size[2)+3)]	For 1/2" tap material no.	For 3/4" NPT tap material no.
CR, CRI, CRN 1s	2 to 3 4 to 36	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	0.5 GPM	3/8"	3/32" 1/16"	91128255 91128254	- -
CR, CRI, CRN 1s	2 to 8 8 to 36	177-210 (80-99) w/Cool Top: 281-320 (138-160)	0.7 GPM	3/8"	3/32" 1/16"	91128255 91128254	- -
CR, CRI, CRN 1s	2 to 4 5 to 21 23 to 36	211-250 (99-121) w/Cool Top: 321-356 (160-180)	1.1 GPM	3/8"	1/8" 3/32" 1/16"	9600190K 91128255 91128254	- - -
CR, CRI, CRN 1	2 3 to 12 13 to 36	5-176 (-15-80) w/Cool Top: 251-280 (121-138)	0.9 GPM	3/8"	1/8" 3/32" 1/16"	9600190K 91128255 91128254	- - -
CR, CRI, CRN 1	2 to 5 6 to 36	177-210 (80-99) w/Cool Top: 281-320 (138-160)	1.3 GPM	3/8"	1/8" 3/32"	9600190K 91128255	- -
CR, CRI, CRN 1	2 to 4 5 to 13 15 to 36	211-250 (99-121) w/Cool Top: 321-356 (160-180)	2.1 GPM	1/2"	5/32" 1/8" 3/32"	91128256 9600190K 91128255	- - -
CR, CRI, CRN 3	2 to 6 7 to 36	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	1.6 GPM	1/2"	1/8" 3/32"	9600190K 91128255	- -
CR, CRI, CRN 3	2 to 5 6 to 15 17 to 36	177-210 (80-99) w/Cool Top: 281-320 (138-160)	2.4 GPM	1/2"	5/32" 1/8" 3/32"	91128256 9600190K 91128255	- - -
CR, CRI, CRN 3	2 to 6 7 to 13 15 to 36	211-250 (99-121) w/Cool Top: 321-356 (160-180)	4.0 GPM	1/2"	3/16" 5/32" 1/8"	9600191K 91128256 9600190K	- - -
CR, CRI, CRN 5	2 to 3 4 to 7 8 to 36	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	3.0 GPM	1/2"	3/16" 5/32" 1/8"	9600191K 91128256 9600190K	- - -
CR, CRI, CRN 5	2 to 3 4 to 6 7 to 16 18 to 36	177-210 (80-99) w/Cool Top: 281-320 (138-160)	4.5 GPM	1/2"	1/4" 3/16" 5/32" 1/8"	9600192K 9600191K 91128256 9600190K	- - - -
CR, CRI, CRN 5	2 to 9 10 to 18 20 to 36	211-250 (99-121) w/Cool Top: 321-356 (160-180)	7.5 GPM	1/2"	1/4" 3/16" 5/32"	9600192K 9600191K 91128256	- - -
CR, CRI, CRN 10	1 to 2 3 to 6 7 to 14 16 to 17	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	5.0 GPM	3/4"	1/4" 3/16" 5/32" 1/8"	9600192K 9600191K 91128256 9600190K	9600072 9600062 - 9600052
CR, CRI, CRN 10	1 to 3 4 to 10 12 to 17	177-210 (80-99) w/Cool Top: 281-320 (138-160)	7.5 GPM	3/4"	1/4" 3/16" 5/32"	9600192K 9600191K 91128256	9600072 9600062 -
CR, CRI, CRN 10	1 2 to 3 4 to 14 16 to 17	211-250 (99-121) w/Cool Top: 321-356 (160-180)	12.5 GPM	1"	3/8" 5/16" 1/4" 3/16"	9600194K 9600193K 9600192K 9600191K	9600092 9600082 9600072 9600062
CR, CRI, CRN 15	1 2 to 6 7 to 12	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	9.0 GPM	1"	5/16" 1/4" 3/16"	9600193K 9600192K 9600191K	9600082 9600072 9600062

303 Stainless steel bypass orifices for continuous feed boilers

Grundfos pump model		Temperature range [°F (°C)]	Min. flow rate	Min. required bypass line size[1)]	Grundfos orifice size[2)+3)]	For 1/2" tap material no.	For 3/4" NPT tap material no.
CR, CRI, CRN 15	1	177-210 (80-99) w/Cool Top: 281-320 (138-160)	13.5 GPM	1"	3/8"	9600194K	9600092
	2 to 4				5/16":	9600193K	9600082
	5 to 12				1/4":	9600192K	9600072
CR, CRI, CRN 15	1 to 2	211-250 (99-121) w/Cool Top: 321-356 (160-180)	22.5 GPM	1 1/4"	7/16"	9600195K	9600102
	3 to 4				3/8"	9600194K	9600092
	5 to 10				5/16"	9600193K	9600082
	12				1/4"	9600192K	9600072
CR, CRI, CRN 20	1 to 2	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	10.5 GPM	1"	5/16"	9600193K	9600082
	3 to 7				1/4"	9600192K	9600072
	8 to 10				3/16"	9600191K	9600062
CR, CRI, CRN 20	1	177-210 (80-99) w/Cool Top: 281-320 (138-160)	16.0 GPM	1 1/4"	3/8"	9600194K	9600092
	2 to 5				5/16"	9600193K	9600082
	6 to 10				1/4"	9600192K	9600072
CR, CRI, CRN 20	1	211-250 (99-121) w/Cool Top: 321-356 (160-180)	26.0 GPM	1/1/4"	1/2"	9600196K	9600112
	2 to 3				7/16"	9600195K	9600102
	4 to 7				3/8"	9600194K	9600092
	8 to 10				5/16"	9600193K	9600082

NOTES:

1) Bypass line recommendations are based on the orifice size, the pump's minimum flow rate requirement, and the friction losses in 50 ft. (1524 m) of the recommended bypass line shown.

2) Orifices other than those supplied by Grundfos may have different flow/head characteristics.

3) Orifice sizes 9/16" to 3/4" have 1" NPT threads and orifice sizes 13/16" to 1" have 1 1/2" NPT threads.

Bypass orifices for CR, CRN 32- 155, continuous feed boilers

303 Stainless steel bypass orifices for continuous feed boilers

Grundfos pump model		Temperature range [°F (°C)]	Min. flowrate	Min. required bypass line size[1)]	Grundfos orifice size[2)+3)]	For 1" or 1 1/2" tap material no.	For 3/4" NPT tap material no.
CR, CRN 32	1-1 to 1	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	14.0 GPM	1 1/4"	7/16"	-	9600102
	2-2 to 4-2				5/16"	-	9600082
	4 to 14				1/4"	-	9600072
CR, CRN 32	1-1 to 1	177-210 (80-99) w/Cool Top: 281-320(138-160)	21.0 GPM	1 1/4"	1/2"	-	9600112
	2-2 to 3				3/8"	-	9600092
	4-2 to 8				5/16"	-	9600082
	9-2 to 14				1/4"	-	9600072
CR, CRN 32	1-1 to 1	211-250 (99-121) w/Cool Top: 321-356 (160-180)	35.0 GPM	1 1/2"	9/16"	91122293	-
	2-2 to 3-2				1/2"	-	9600112
	3 to 5-2				7/16"	-	9600102
	5 to 14				3/8"	-	9600092
CR, CRN 45	1-1 to 1	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	22.0 GPM	1 1/4"	7/16"	-	9600102
	2-2 to 3				3/8"	-	9600092
	4-2 to 10				5/16"	-	9600082
CR, CRN 45	1-1 to 2-2	177-210 (80-99) w/Cool Top: 281-320(138-160)	33.0 GPM	1 1/2"	1/2"	-	9600112
	2-1 to 3				7/16"	-	9600102
	4-2 to 6				3/8"	-	9600092
	7-2 to 10				5/16"	-	9600082
CR, CRN 45	1-1 to 2-2	211-250 (99-121) w/Cool Top: 321-356 (160-180)	55.0 GPM	1 1/2"	5/8"	91122294	-
	2-1 to 3-1				9/16"	91122293	-
	3 to 5-2				1/2"	-	9600112
	5-1 to 10				7/16"	-	9600102
CR, CRN 64	1-1 to 2-2	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	34.0 GPM	1 1/2"	1/2"	-	9600112
	2-1 to 3-1				7/16"	-	9600102
	3 to 7-1				3/8"	-	9600092
CR, CRN 64	1-1 to 1	177-210 (80-99) w/Cool Top: 281-320(138-160)	51.0 GPM	1 1/2"	5/8"	91122294	-
	2-2 to 2				9/16"	91122293	-
	3-2 to 4-2				1/2"	-	9600112
	4-1 to 7-1				7/16"	-	9600102
CR, CRN 64	1-1 to 2-2	211-250 (99-121) w/Cool Top: 321-356 (160-180)	85.0 GPM	2"	13/16"	91122297	-
	2-1 to 2				11/16"	91122295	-
	3-2 to 4-2				5/8"	91122294	-
	4-1 to 7-1				9/16"	91122293	-
CR, CRN 95	1-1 to 1	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	50.0 GPM	1 1/2"	5/8"	91122294	-
	2-2 to 2				9/16"	91122293	-
	3-2 to 3				1/2"	-	9600112
	4-2 to 5-1				7/16"	-	9600102
CR, CRN 95	1-1 to 1	177-210 (80-99) w/Cool Top: 281-320 (138-160)	75.0 GPM	2"	3/4"	91122296	-
	2-2 to 2-1				11/16"	91122295	-
	3-2 to 3				5/8"	91122294	-
	4-2 to 4				9/16"	91122293	-
	5-2 to 5-1				1/2"	-	9600112
CR, CRN 95	1-1 to 1	211-250 (99-121) w/Cool Top: 321-356 (160-180)	125.0 GPM	2"	1"	91122299	-
	2-1 to 2				7/8"	91122298	-
	3-2 to 3				3/4"	91122296	-
	4-2 to 5-2				11/16"	91122295	-
CR, CRN 125	1-1	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	68.0 GPM	2"	3/4"	91122296	-
	1				11/16"	91122295	-
	2-2 to 2-1				5/8"	91122294	-
	2 to 4				9/16"	91122293	-
	5-2 to 7-2				1/2"	-	9600112

303 Stainless steel bypass orifices for continuous feed boilers

Grundfos pump model		Temperature range [°F (°C)]	Min. flowrate	Min. required bypass line size[1)]	Grundfos orifice size[2)+3)]	For 1" or 1 1/2" tap material no.	For 3/4" NPT tap material no.
CR, CRN 125	1-1	177-210 (80-99) w/Cool Top: 281-320 (138-160)	102.0 GPM	2"	7/8"	91122298	-
	1				13/16"	91122297	-
	2-2 to 2				3/4"	91122296	-
	3-2 to 3				11/16"	91122295	-
	4-2 to 5-2				5/8"	91122294	-
	5-1 to 7-2				9/16"	91122293	-
CR, CRN 125	1-1	211-250 (99-121) w/Cool Top: 321-356 (160-180)	170.0 GPM	2 1/2"	1 1/8"	Call Factory	-
	1				1 1/16"	Call Factory	-
	2-2 to 2				1"	91122299	-
	3-2 to 3-1				7/8"	91122298	-
	3 to 4				13/16"	91122297	-
	5-2 to 6-1				3/4"	91122296	-
	6 to 7-2				11/16"	91122295	-
CR, CRN 155	1-1	5-176 (-15-80) w/Cool Top: 251-280 (122-138)	75.0 GPM	2"	3/4"	91122296	-
	1				11/16"	91122295	-
	2-2 to 2				5/8"	91122294	-
	3-2 to 3				9/16"	91122293	-
	4-2 to 5-2				1/2"	-	9600112
CR, CRN 155	1-1	177-210 (80-99) w/Cool Top: 281-320 (138-160)	113.0 GPM	2"	1"	91122299	-
	1				7/8"	91122298	-
	2-2 to 2				3/4"	91122296	-
	3-2 to 3				11/16"	91122295	-
	4-2 to 5-1				5/8"	91122294	-
CR, CRN 155	1-1	211-250 (99-121) w/Cool Top: 321-356 (160-180)	188.0 GPM	3"	1 3/16"	Call Factory	-
	1				1 1/8	Call Factory	-
	2-2 to 2				"	91122299	-
	3-2 to 3				1"	91122298	-
	4-2 to 4				7/8"	91122297	-
	5-2 to 5-1				13/16"	91122296	-
					3/4"	-	-

NOTES:

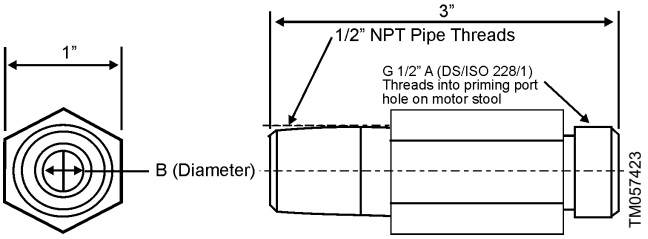
1) Bypass line recommendations are based on the orifice size, the pump's minimum flow rate requirement, and the friction losses in 50 ft. (1524 m) of the recommended bypass line shown.

2) Orifices other than those supplied by Grundfos may have different flow/head characteristics.

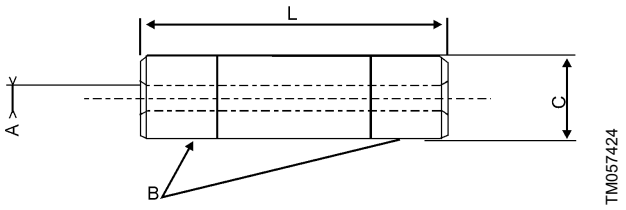
3) Orifice sizes 9/16" to 3/4" have 1" NPT threads and orifice sizes 13/16" to 1" have 1 1/2" NPT threads.

Bypass orifices dimensions

303 stainless steel bypass orifices for continuous feed boilers



Material number	B
91128254	1/16"
91128255	3/32"
91128256	5/32"
9600190K	1/8"
9600191K	3/16"
9600192K	1/4"
9600193K	5/16"
9600194K	3/8"
9600195K	7/16"

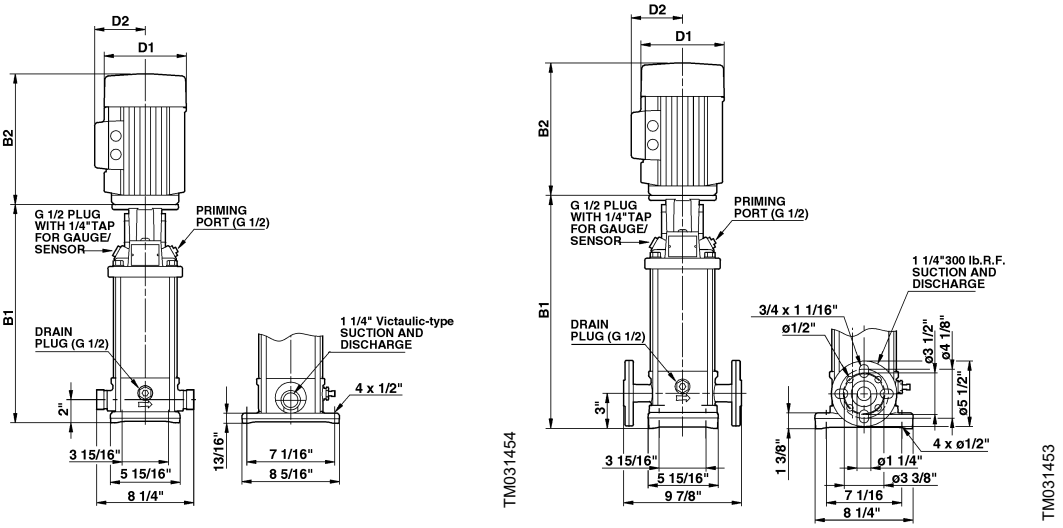


Material number	A	B	C	L
9600052	1/8"	3/4" NPT	1"	3"
9600062	3/16"	3/4" NPT	1"	3"
9600072	1/4"	3/4" NPT	1"	3"
9600082	5/16"	3/4" NPT	1"	3"
9600092	3/8"	3/4" NPT	1"	3"
9600102	7/16"	3/4" NPT	1"	3"
9600112	1/2"	3/4" NPT	1"	3"
91122293	9/16"	1" NPT	1.33"	4"
91122294	5/8"	1" NPT	1.33"	4"
91122295	11/16"	1" NPT	1.33"	4"
91122296	3/4"	1" NPT	1.33"	4"
91122297	13/16"	1.5" NPT	1.9"	4"
91122298	7/8"	1.5" NPT	1.9"	4"
91122299	1"	1.5" NPT	1.9"	4"

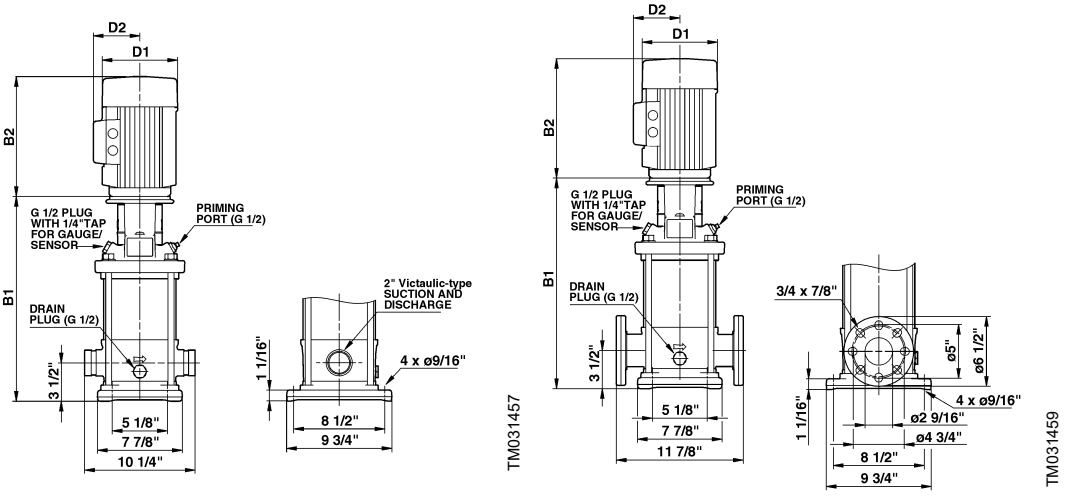
CRN pumps with magnetic drive

Dimensional drawings - CRN pumps with magnetic drive

CRN 1s
CRN, CRNE 1
CRN, CRNE 3
CRN, CRNE 5

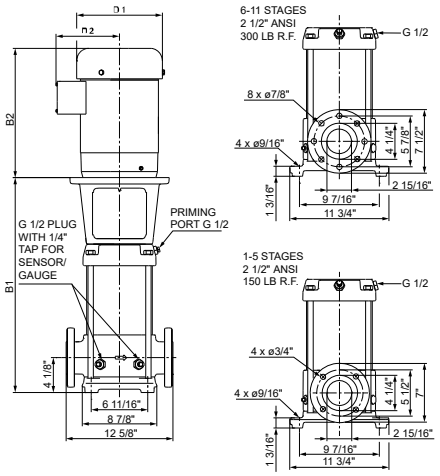


CRN, CRNE 10
CRN, CRNE 15
CRN, CRNE 20



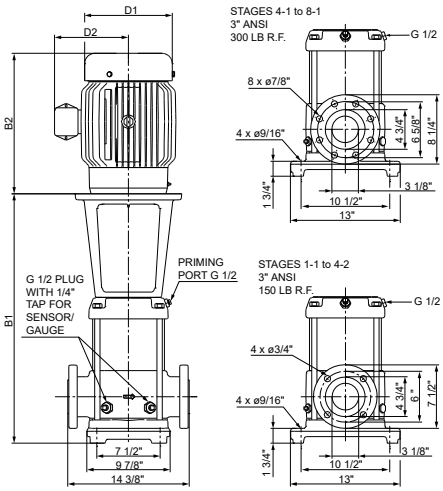
Dimensional drawings - CRN pumps with magnetic drive

CRN, CRNE 32



TM027703_1009

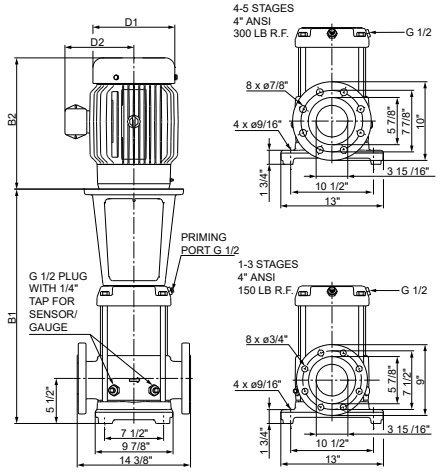
CRN, CRNE 45



TM027704_1009

Dimensional drawings - CRN pumps with magnetic drive

CRN, CRNE 64



TM027705_1009

Dimensions and weights - CRN pumps with magnetic drive

CRN 1s MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN 1s-2	1/2	3	●	15.47	8.65	6.69	5.52	24.12	74
CRN 1s-3	1/2	3	●	15.47	8.65	6.69	5.52	24.12	74
CRN 1s-4	1/2	3	●	16.18	8.65	6.69	5.52	24.83	75
CRN 1s-5	1/2	3	●	16.88	8.65	6.69	5.52	25.53	76
CRN 1s-6	3/4	3	●	17.59	9.04	6.69	5.52	26.63	82
CRN 1s-7	3/4	3	●	18.30	9.04	6.69	5.52	27.34	83
CRN 1s-8	3/4	3	●	19.01	11.68	7.64	5.88	30.69	100
CRN 1s-9	3/4	3	●	19.72	11.68	7.64	5.88	31.4	101
CRN 1s-10	1	3	●	20.43	11.68	7.64	5.88	32.11	96
CRN 1s-11	1	3	●	21.14	11.68	7.64	5.88	32.82	98
CRN 1s-12	1	3	●	21.84	12.46	7.64	5.88	34.3	88
CRN 1s-13	1 1/2	3	●	22.55	12.46	7.64	5.88	35.01	90
CRN 1s-15	1 1/2	3	●	23.97	12.46	7.64	5.88	36.43	110
CRN 1s-17	1 1/2	3	●	25.39	13.72	9.45	6.69	40.23	143
CRN 1s-19	2	3	●	26.81	13.72	9.45	6.69	40.53	147
CRN 1s-21	2	3	●	28.22	13.72	9.45	6.69	43.04	187
CRN 1s-23	2	3	●	29.64	15.29	9.45	6.69	46.03	191
CRN 1s-25	3	3	●	32.18	15.29	9.45	6.69	47.45	193
CRN 1s-27	3	3	●	33.59	15.29	9.45	6.69	48.87	195

● Available.

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 1 MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN 1-2	1/2	3	●	15.47	8.65	6.69	5.52	24.12	74
CRN 1-3	1/2	3	●	15.47	8.65	6.69	5.52	24.12	74
CRN 1-4	3/4	3	●	16.18	8.65	6.69	5.52	24.83	75
CRN, CRNE 1-5	3/4	3	●	16.88	8.65	6.69	5.52	25.53	76
CRN 1-6	1	3	●	17.59	9.04	6.69	5.52	26.63	82
CRN, CRNE 1-7	1	3	●	18.30	9.04	6.69	5.52	27.34	83
CRN 1-8	1 1/2	3	●	19.01	11.68	7.64	5.88	30.69	100
CRN 1-9	1 1/2	3	●	19.72	11.68	7.64	5.88	31.40	101
CRN, CRNE 1-10	1 1/2	3	●	20.43	11.68	7.64	5.88	32.11	96
CRN 1-11	1 1/2	3	●	21.14	11.68	7.64	5.88	32.82	98
CRN 1-12	2	3	●	21.84	12.46	7.64	5.88	34.30	88
CRN, CRNE 1-13	2	3	●	22.55	12.46	7.64	5.88	35.01	90
CRN, CRNE 1-15	2	3	●	23.97	12.46	7.64	5.88	36.43	110
CRN 1-17	3	3	●	26.51	13.72	9.45	6.69	40.23	143
CRN, CRNE 1-19	3	3	●	26.81	13.72	9.45	6.69	40.53	147
CRN 1-21	3	3	●	29.32	13.72	9.45	6.69	43.04	187
CRN, CRNE 1-23	5	3	●	30.74	15.29	9.45	6.69	46.03	191
CRN 1-25	5	3	●	32.16	15.29	9.45	6.69	47.45	193
CRN, CRNE 1-27	5	3	●	33.58	15.29	9.45	6.69	48.87	195

● Available

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 3 MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN 3-2	1/2	3	●	15.47	8.65	6.69	5.52	24.12	74
CRN, CRNE 3-3	3/4.75	3	●	15.47	8.65	6.69	5.52	24.12	74
CRN 3-4	1	3	●	16.18	9.04	6.69	5.52	25.22	80
CRN, CRNE 3-5	1	3	●	16.88	9.04	6.69	5.52	25.92	81
CRN, CRNE 3-6	1 1/2	3	●	17.59	11.68	7.64	5.88	29.27	98
CRN 3-7	1 1/2	3	●	18.30	11.68	7.64	5.88	29.98	98
CRN 3-8	2	3	●	19.01	12.46	7.64	5.88	31.47	85
CRN 3-9	2	3	●	19.72	12.46	7.64	5.88	32.18	85
CRNE 3-9	2	3	●	19.72	12.46	7.64	5.88	32.18	90
CRN 3-10	2	3	●	20.43	12.46	7.64	5.88	32.89	103
CRN 3-11	3	3	●	22.26	13.72	9.45	6.69	35.98	143
CRN, 3-12	3	3	●	22.96	13.72	9.45	6.69	36.68	143
CRNE 3-12	3	3	●	22.96	13.72	9.45	6.69	36.68	148
CRN 3-13	3	3	●	23.66	13.72	9.45	6.69	37.38	176
CRN, CRNE 3-15	5	3	●	25.07	15.29	9.45	6.69	40.36	181
CRN 3-17	5	3	●	26.49	15.29	9.45	6.69	41.78	183
CRN, CRNE 3-19	5	3	●	27.91	15.29	9.45	6.69	43.20	184
CRN 3-21	5	3	●	29.32	15.29	9.45	6.69	44.61	233
CRN 3-23	5	3	●	30.74	15.29	9.45	6.69	46.03	234
CRN, CRNE 3-25	5	3	●	32.16	15.29	9.45	6.69	47.45	236

● Available.

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 5 MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN, CRNE 5-2	1	3	●	15.47	9.04	6.69	5.52	24.51	79
CRN, CRNE 5-3	1 1/2	3	●	16.53	11.68	7.64	5.88	28.21	96
CRN 5-4	1 1/2	3	●	17.59	11.68	7.64	5.88	29.27	98
CRN 5-5	2	3	●	18.66	12.46	7.64	5.88	31.12	99
CRNE 5-5	2	3	●	18.66	12.46	7.64	5.88	31.12	104
CRN 5-6	3	3	●	20.84	13.72	9.45	6.69	34.56	136
CRN 5-7	3	3	●	21.89	13.72	9.45	6.69	35.61	141
CRNE 5-7	3	3	●	21.89	13.72	9.45	6.69	35.61	145
CRN 5-8	5	3	●	22.95	15.29	9.45	6.69	38.24	177
CRN 5-9	5	3	●	24.01	15.29	9.45	6.69	39.30	179
CRN, CRNE 5-10	5	3	●	25.07	15.29	9.45	6.69	40.36	182
CRN 5-11	5	3	●	26.14	15.29	9.45	6.69	41.43	224
CRN 5-12	5	3	●	27.20	15.29	9.45	6.69	42.49	229
CRN, CRNE 5-13	5	3	●	28.26	15.29	9.45	6.69	43.55	230
CRN 5-14	7 1/2	3	●	30.69	16.95	10.96	7.97	47.64	305
CRN 5-15	7 1/2	3	●	31.76	16.95	10.96	7.97	48.71	306

CRN, CRNE 5-16	7 1/2	3	●	32.82	16.95	10.96	7.97	49.77	307
CRN 5-18	7 1/2	3	●	34.96	16.95	10.96	7.97	51.91	309
CRN, CRNE 5-20	7 1/2	3	●	37.08	16.95	10.96	7.97	54.03	311
CRN 5-22	10	3	●	34.96	18.83	10.96	7.97	53.79	368

● Available.

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 10 MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN, CRNE 10-1	1	3	●	18.70	9.04	6.69	5.52	27.74	112
CRN10-2	2	3	●	18.70	12.46	7.64	5.88	31.16	116
CRNE 10-2	2	3	●	18.70	12.46	7.64	5.88	31.16	121
CRN 10-3	3	3	●	20.63	13.72	9.45	6.69	34.35	213
CRN, CRNE 10-4	5	3	●	21.81	15.29	9.45	6.69	37.10	216
CRN 10-5	5	3	●	22.99	15.29	9.45	6.69	38.28	218
CRN, CRNE 10-6	7 1/2	3	●	24.67	16.95	10.96	7.97	41.62	260
CRN 10-7	7 1/2	3	●	25.67	16.95	10.96	7.97	42.62	265
CRN, CRNE 10-8	7 1/2	3	●	26.85	16.95	10.96	7.97	43.80	268
CRN 10-9	10	3	●	28.03	18.83	10.96	7.97	46.86	307
CRN, CRNE 10-10	10	3	●	29.21	18.83	10.96	7.97	48.04	309
CRN 10-12	15	3	●	34.20	18.81	13.18	9.45	53.01	271
CRNE 10-12	15	3	●	34.20	18.81	13.18	9.45	53.01	271
CRN 10-14	15	3	●	36.45	18.81	13.18	9.45	55.26	444
CRNE 10-14	15	3	●	36.45	18.81	13.18	9.45	55.26	444
CRN 10-16	15	3	●	38.81	18.81	13.18	9.45	57.62	454
CRN 10-17	20	3	●	41.18	19.60	13.18	9.45	60.78	450

● Available.

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 15 MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN 15-1	3	3	●	19.88	13.72	9.45	6.69	33.60	165
CRNE 15-1	3	3	●	19.88	13.72	9.45	6.69	33.60	170
CRN, CRNE 15-2	5	3	●	20.63	15.29	9.45	6.69	35.92	205
CRN, CRNE 15-3	7 1/2	3	●	22.71	16.95	10.96	7.97	39.66	256
CRN, CRNE 15-4	10	3	●	24.48	18.83	10.96	7.97	43.31	296
CRN 15-5	15	3	●	28.89	18.81	13.18	9.45	47.70	260
CRNE 15-5	15	3	●	28.89	18.81	13.18	9.45	47.70	260
CRN 15-6	15	3	●	30.55	18.81	13.18	9.45	49.36	377
CRNE 15-6	15	3	●	30.55	18.81	13.18	9.45	49.36	377
CRN 15-7	15	3	●	32.32	18.81	13.18	9.45	51.13	410
CRN 15-8	20	3	●	34.09	19.60	13.18	9.45	53.69	434
CRN 15-9	20	3	●	35.86	19.60	13.18	9.45	55.46	450
CRN 15-10	25	3	●	36.76	23.58	14.17	11.08	60.34	538
CRN 15-12	25	3	●	40.55	23.58	14.17	11.08	64.13	558

● Available.

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 20 MAGdrive, 60 Hz

Pump type	HP	PH	PJE[1)]	Dimensions [in]					Ship Wt. [lbs]
				B1	B2	D1	D2	B1 + B2	
CRN 20-1	3	3	●	20.63	13.72	9.45	6.69	34.35	171
CRNE 20-1	3	3	●	20.63	13.72	9.45	6.69	34.35	176
CRN, CRNE 20-2	7 1/2	3	●	21.13	16.95	10.96	7.97	38.08	279
CRN, CRNE 20-3	10	3	●	22.71	18.83	10.96	7.97	41.54	300
CRN 20-4	15	3	●	27.11	18.81	13.18	9.45	45.92	254
CRNE 20-4	15	3	●	27.11	18.81	13.18	9.45	45.92	254
CRN 20-5	15	3	●	28.78	18.81	13.18	9.45	47.59	406
CRN 20-6	20	3	●	30.55	19.60	13.18	9.45	50.15	399
CRN 20-7	20	3	●	32.32	19.60	13.18	9.45	51.92	413
CRN 20-8	25	3	●	33.22	23.58	14.17	11.08	56.80	553

● Available.

1) PJE flanged pump B1 and B1+B2 dimension is one inch less than ANSI flanged pump and weight is approximately 9 lbs. less.

CRN, CRNE 32 MAGdrive, 60 Hz

Pump type	HP	PH	Dimensions [in]					Ship Wt. [lbs]
			B1	B2	D1	D2	B1 + B2	
CRN, CRNE 32-1-1	5	3	19.88	15.29	9.45	6.69	35.17	233
CRN, CRNE 32-1	7 1/2	3	20.76	16.95	10.96	7.97	37.71	281
CRN 32-2-2	7 1/2	3	23.52	16.95	10.96	7.97	40.47	285
CRN 32-2-1	10	3	22.64	18.83	10.96	7.97	41.47	322
CRN, CRNE 32-2	10	3	22.64	18.83	10.96	7.97	41.47	331
CRN 32-3-2	15	3	29.52	18.81	13.18	9.45	48.33	287
CRNE 32-3-2	15	3	29.52	18.81	13.18	9.45	48.33	287
CRN 32-3	15	3	29.72	18.81	13.18	9.45	48.53	378
CRN 32-4-2	20	3	32.48	19.60	13.18	9.45	52.08	375
CRN 32-4	20	3	32.48	19.60	13.18	9.45	52.08	387
CRN 32-5-2	25	3	35.24	23.58	14.17	11.08	58.82	497
CRN 32-5	25	3	35.24	23.58	14.17	11.08	58.82	506
CRN 32-6-2	30	3	37.99	23.58	14.17	11.08	61.57	518
CRN 32-6	30	3	37.99	23.58	14.17	11.08	61.57	530
CRN 32-7-2	30	3	40.75	23.58	14.17	11.08	64.33	675

CRN, CRNE 45 MAGdrive, 60 Hz

Pump type	HP	PH	Dimensions [in]					Ship Wt. [lbs]
			B1	B2	D1	D2	B1 + B2	
CRN 45-1-1	10	3	22.01	18.83	10.96	7.97	40.84	332
CRN, CRNE 45-1	10	3	22.01	18.83	10.96	7.97	40.84	341
CRN 45-2-2	15	3	29.49	18.81	13.18	9.45	48.30	388
CRN 45-2-1	20	3	29.49	19.60	13.18	9.45	49.09	379
CRN 45-2	20	3	29.49	19.60	13.18	9.45	49.09	389
CRN 45-3-2	25	3	32.64	23.58	14.17	11.08	56.22	503
CRN 45-3-1	25	3	32.64	23.58	14.17	11.08	56.22	513
CRN 45-3	30	3	32.64	23.58	14.17	11.08	56.22	517

CRN, CRNE 64 MAGdrive, 60 Hz

Pump type	HP	PH	Dimensions [in]					Ship Wt. [lbs]
			B1	B2	D1	D2	B1 + B2	
CRN 64-1-1	10	3	22.09	18.83	10.96	7.97	40.92	319
CRN 64-1	15	3	26.42	18.81	13.18	9.45	45.23	390
CRN 64-2-2	20	3	29.69	19.60	13.18	9.45	49.29	375
CRN 64-2-1	25	3	29.69	23.58	14.17	11.08	53.27	506
CRN 64-2	30	3	29.69	23.58	14.17	11.08	53.27	520

14. Motor data

Standard motors in the CR range

Motors used in the CR and CRE pump range are:

- Grundfos-specified WEG motors
- Grundfos ML motors
- Grundfos MLE motors with integrated frequency converter.

Type	Phase	Motor range [HP]	Enclosure
WEG	1	1/3 - 10	TEFC
	3	1/3 - 300	TEFC
	3	15 - 300	ODP
ML	3	1/3 - 30	TEFC
MLE	1	1/2 - 2	TEFC
	3	1 -30	TEFC

WEG motors 0.25 to 20 HP

- rolled steel construction
- service factor 1.15
- suitable for VFD operation per NEMA MG 1 part 31.4.4.2
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G (three phase only).

WEG motors 25 to 300 HP

- cast iron frame
- rated for severe duty
- service factor 1.25 (25 to 100 HP)
- service factor 1.15 (125 to 300 HP)
- Inverter rated per NEMA MG 1 part 31
- certified Class I Division 2, Groups A, B, C, D
- certified Class II, Division 2, Groups F, G.

Grundfos-specified motors

Grundfos CR pumps are supplied with heavy-duty 2-pole, NEMA energy-efficient C-frame motors built or selected according to rigid Grundfos specifications. All CR pump motors have heavy-duty bearings for maximum thrust requirements.

We do not recommend that you use an off-the-shelf standard WEG motor on a Grundfos pump. Ideally, the best motor choice would be the Grundfos-specified motor.

Three-phase Grundfos-specified motors are NEMA Premium Efficiency (EISA compliant).

Single-phase Grundfos-specified motors up to 7 1/2 HP have a built-in thermal overload switch.

Other motor types are available, for example Explosion-proof, inverter-duty, IEEE 841. Contact your local Grundfos company for more information.

Motor dimensions and data on pumps supplied by Grundfos Canada may vary. Contact your local Grundfos company for more information. All values are subject to change without notice.

2-pole TEFC motors (WEG)

Totally Enclosed Fan Cooled, constant speed

TM077440

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor Cos $\varphi_{1/1}$	Speed [rpm]
1/3	1	56C	1.15	115/208-230	54.0	5.2/2.87-2.6	5.98/2.87-2.99	36.4/20.1-18.2	0.76	3490
	3	56C	1.15	208-230/460	72.0	1.31-1.15/0.57	1.31-1.32/0.66	9.3-8.17/4.05	0.76	3450
	3	56C	1.15	575	72.0	0.46	0.53	3.25	0.76	3450
1/2	1	56C	1.15	115/208-230	60.0	7/3.87-3.5	8.05/3.87-4.03	56/31.0-28.0	0.76	3500
	3	56C	1.15	208-230/460	74.0	1.73-1.57/0.78	1.73-1.81/0.9	13.3-12.1/6.01	0.80	3435
	3	56C	1.15	575	74.0	0.63	0.72	4.83	0.80	3435
3/4	1	56C	1.15	115/208-230	66.0	8/4.42-4.0	9.2/4.42-4.6	64/35.4-32.0	0.91	3500
	3	56C	1.15	208-230/460	77.0	2.48-2.24/1.12	2.48-2.58/1.29	20.1-18.1/9.07	0.80	3440
	3	56C	1.15	575	77.0	0.896	1.03	7.26	0.80	3440
1	1	56C	1.15	115/208-230	70.0	10.1/5.64-5.06	11.6/5.64-5.82	84.8/47.4-42.5	0.92	3500
	3	56C	1.15	208-230/460	78.5	3.32-3.0/1.5	3.32-3.45/1.73	29.2-26.4/13.2	0.80	3435
	3	56C	1.15	575	78.5	1.2	1.38	10.6	0.80	3435
1 1/2	1	56C	1.15	115/208-230	75.0	13.2/7.3-6.6	15.2/7.3-7.59	106/58.4-52.8	0.97	3500
	3	56C	1.15	208-230/460	84.0	4.14-3.74/1.87	4.14-4.3/2.15	37.7-34.0/17	0.88	3520
	3	56C	1.15	575	84.0	1.5	1.73	13.7	0.88	3520
2	1	56C	1.15	115/208-230	77.0	17.5/9.62-8.73	20.1/9.62-10.0	137/75.0-68.1	0.97	3495
	3	56C	1.15	208-230/460	85.5	5.46-4.94/2.47	5.46-5.68/2.84	54.1-48.9/24.5	0.89	3520
	3	56C	1.15	575	85.5	1.98	2.28	19.6	0.89	3520
3	1	182TC	1.15	115/208-230	80.0	24.2/19.7-12.1	27.8/19.7-13.9	169/138-84.7	0.99	3510
	3	182TC	1.15	208-230/460	86.5	8.12-7.34/3.67	8.12-8.44/4.22	71.5-64.6/32.3	0.87	3515
	3	182TC	1.15	575	86.5	2.94	3.38	25.9	0.87	3515
5	1	184TC	1.15	208-230	84.0	31.7-25.3	31.7-27.0	254-202	0.98	3515
	3	184TC	1.15	208-230/460	88.5	13.1-11.8/5.9	13.1-13.6/6.79	102-92/46	0.89	3500
	3	184TC	1.15	575	88.5	4.72	5.43	36.8	0.89	3500
7 1/2	1	213TC	1.15	208-230	84.0	31.7-38.8	31.7-44.6	225-275	0.99	3515
	3	213TC	1.15	208-230/460	89.5	19.2-17.3/8.67	19.2-19.9/9.97	33.3-131.0/65.9	0.89	3530
	3	213TC	1.15	575	89.5	6.94	7.98	52.7	0.89	3530
10	1	215TC	1.15	208-230	86.5	42.5-38.1	42.5-43.8	306-274	0.99	3510
	3	215TC	1.15	208-230/460	90.2	25.4-23.0/11.5	25.4-26.5/13.2	191-173/86.3	0.91	3530
	3	215TC	1.15	575	90.2	9.2	10.6	69	0.91	3530
15	3	254TC	1.15	208-230/460	91.0	38.5-34.8/17.4	38.5-40.0/20	262-237/118	0.87	3525
	3	254TC	1.15	575	91.0	13.9	16.0	114	0.89	3520
20	3	256TC	1.15	208-230/460	91.0	50.2-45.4/22.7	50.2-52.2/26.1	331-300/150	0.91	3515
	3	256TC	1.15	575	91.0	18.2	20.9	120	0.91	3515
25	3	284TSC	1.25	208-230/460	91.7	63.6-57.6/28.8	63.6-72.0/36	401-363/181	0.88	3545
	3	284TSC	1.25	575	91.7	23	28.8	145	0.88	3545

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor Cos $\varphi_{1/1}$	Speed [rpm]
30	3	286TSC	1.25	208-230/460	91.7	73.8-67.6/33.8	73.8-84.5/42.3	465-426/213	0.89	3540
	3	286TSC	1.25	575	91.7	27	33.8	170	0.89	3540
40	3	324TSC	1.25	208-230/460	92.4	101-92.6/46.3	101-116/57.9	636-583/292	0.88	3560
	3	324TSC	1.25	575	92.4	37	46.3	233	0.88	3560
50	3	326TSC	1.25	208-230/460	93.0	124-112/56.1	124-140/70.1	769-694/348	0.89	3550
	3	326TSC	1.25	575	93.0	44.9	56.1	278	0.89	3550
60	3	364TSC	1.25	208-230/460	93.6	148-134/67	148-168/83.8	977-884/442	0.90	3560
	3	364TSC	1.25	575	93.6	53.6	67.0	354	0.90	3560
75	3	365TSC	1.25	208-230/460	93.6	181-164/81.9	181-205/102	1213-1099/549	0.90	3555
	3	365TSC	1.25	575	93.6	65.6	82	440	0.90	3555
100	3	405TSD	1.25	460	94.1	112	140	728	0.89	3545
	3	405TSD	1.25	575	94.1	89.6	112	582	0.89	3545
125	3	444TSD	1.15	460	95.0	134	154	884	0.89	3570
	3	444TSD	1.15	575	95.0	107	123	706	0.89	3570
150	3	445TSD	1.15	460	95.0	163	187	1060	0.89	3570
	3	445TSD	1.15	575	95.0	130	150	845	0.89	3570
200	3	447TSD	1.15	460	95.4	222	255	1443	0.89	3570
	3	447TSD	1.15	575	95.4	178	205	1157	0.89	3570
250	3	447TSD	1.15	460	95.8	269	309	1802	0.90	3573
	3	447TSD	1.15	575	95.8	215	247	1441	0.90	3573
300	3	449TSD	1.15	460	95.8	320	368	2176	0.90	3570
	3	449TSD	1.15	575	95.8	256	294	1741	0.90	3570

Note: Motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

4-pole TEFC motors (WEG)

Totally Enclosed Fan Cooled, constant speed

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor Cos $\varphi_{1/1}$	Speed [rpm]
1/4	1	56C	1.15	115/208-230	57.0	4.6/2.54-2.3	5.29/2.54-2.65	24.4/13.5-12.2	0.60	1735
	3	56C	1.15	208-230/460	70.0	1.06-0.94/0.47	1.06-1.08/0.54	5.94-5.26/2.63	0.69	1740
1/3	1	56C	1.15	115/208-230	61.0	6/3.32-3.0	6.9/3.32-3.45	33.6/18.6-16.8	0.59	1735
	3	56C	1.15	208-230/460	74.0	1.38-1.25/0.62	1.38-1.44/0.72	8.56-7.75/3.84	0.68	1740
1/2	1	56C	1.15	115/208-230	64.0	8/4.42-4.0	9.2/4.42-4.6	45.6/25.2-22.8	0.63	1730
	3	56C	1.15	208-230/460	78.5	1.72-1.56/0.78	1.72-1.79/0.89	11.0-9.98/4.99	0.76	1730
3/4	1	56C	1.15	115/208-230	68.5	10.6/5.86-5.3	12.2/5.86-5.3	67.8/37.5-33.9	0.67	1745
	3	56C	1.15	208-230/460	81.5	2.63-2.38/1.19	2.63-2.74/1.37	20.3-18.3/9.16	0.71	1760
1	1	56C	1.15	115/208-230	71.0	13.6/7.52-6.8	15.6/7.52-7.82	91.1/50.4-45.6	0.68	1745
	3	56C	1.15	208-230/460	85.5	3.25-2.94/1.47	3.25-3.38/1.69	28.0-25.3/12.6	0.75	1765
1 1/2	1	56C	1.15	115/208-230	77.0	15/8.27-7.48	17.3/8.27-8.6	120/66.2-59.8	0.83	1745
	3	56C	1.15	208-230/460	86.5	4.47-4.04/2.02	4.47-4.65/2.32	36.7-33.1/16.6	0.79	1750
2	1	56C	1.15	115/208-230	78.5	20/11.1-10.0	23/11.1-11.5	160/88.8-80.0	0.82	1745
	3	56C	1.15	208-230/460	86.5	6.02-5.44/2.72	6.02-6.26/3.13	49.4-44.6 / 22.3	0.80	1745
3	1	182TC	1.15	115/208-230	81.5	24.7/13.7-12.4	28.4/13.7-14.3	173/95.9-86.8	0.95	1755
	3	182TC	1.15	208-230/460	89.5	8.43-7.62/3.81	8.43-8.76/4.38	74.2-67.1/33.5	0.81	1765
5	1	213TC	1.15	208-230	82.5	22.1-19.9	22.1-22.9	175-157	0.98	1755
	3	184TC	1.15	208-230/460	89.5	14.4-13/6.49	14.4-15.0/7.46	101-91/45.4	0.80	1750
7.5	1	213TC	1.15	208-230	84.0	32.3-28.8	32.3-33.1	220-196	0.99	1745
	3	213TC	1.15	208-230/460	91.7	20.1-18.1/9.07	20.1-20.8/10.4	147-132/66.2	0.82	1770
10	3	215TC	1.15	208-230/460	91.7	27.4-24.8/12.4	27.4-28.5/14.3	175-159/79.4	0.83	1765
15	3	254TC	1.15	208-230/460	92.4	40.3-36.4/18.2	40.3-41.9/20.9	262-237/118	0.82	1770
20	3	256TC	1.15	208-230/460	93.0	54.6-49.4/24.7	54.6-56.8/28.4	366-331/165	0.82	1765
25	3	284TSC	1.25	208-230/460	93.6	65.2-59/29.5	65.2-73.8/36.9	404-366/183	0.84	1765
30	3	286TSC	1.25	208-230/460	93.6	77.6-70.2/35.1	77.6-87.8/43.9	473-428/214	0.84	1765
40	3	324TSC	1.25	208-230/460	94.1	104-94.2/47.1	104-117/58.9	634-575/287	0.85	1770
50	3	326TSC	1.25	208-230/460	94.5	131-118/59.2	131-148/74	812-732/367	0.83	1775
60	3	364TSC	1.25	208-230/460	95.0	151-143/71.6	151-179/89.5	936-887/444	0.83	1780
75	3	365TSC	1.25	208-230/460	95.4	186-174/87.2	186-218/109	1190-1114/558	0.83	1780

2-pole ODP motors (WEG)

Open Drip Proof, constant speed

TM077440

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor Cos $\varphi_{1/1}$	Speed [rpm]
15	3	254TC	1.15	208-230/460	90.2	38.9-35.2/17.6	38.9-40.5/20.2	292-264/132	0.87	3545
	3	254TC	1.15	575	90.2	14.1	16.2	106	0.87	3545
20	3	256TC	1.15	208-230/460	91.0	52.6-47.6/23.8	52.6-54.7/27.4	316-286/143	0.87	3525
	3	256TC	1.15	575	91.0	19.0	21.9	114	0.87	3525
25	3	284TSC	1.25	208-230/460	91.7	64.4-58.2/29.1	64.4-72.8/36.4	425-384/192	0.87	3544
	3	284TSC	1.25	575	91.7	23.3	29.1	154	0.87	3544
30	3	284TSC	1.25	208-230/460	91.7	77.4-70.0/35	77.4-87.5/43.8	488-441/221	0.86	3550
	3	284TSC	1.25	575	91.7	28.0	35.0	176	0.86	3550
40	3	324TSC	1.25	208-230/460	92.4	104-93.7/46.8	104-117/58.5	634-572/285	0.87	3557
	3	324TSC	1.25	575	92.4	37.5	46.9	229	0.87	3557
50	3	324TSC	1.25	208-230/460	93.0	131-119/59.4	131-149/74.3	825-750/374	0.84	3560
	3	324TSC	1.25	575	93.0	47.5	59.4	299	0.85	3560
60	3	326TSC	1.25	208-230/460	93.6	157-142/71	157-178/88.8	989-895/447	0.85	3560
	3	326TSC	1.25	575	93.6	56.8	71.0	358	0.85	3560
75	3	365TSC	1.25	208-230/460	93.6	188-170/84.8	188-213/106	1241-1122/560	0.87	3555
	3	365TSC	1.25	575	93.6	67.8	84.8	447	0.87	3555
100	3	404TSD	1.25	460	93.6	115	144	782	0.87	3557
125	3	405TSD	1.25	460	94.1	136	170	925	0.88	3557
150	3	444TSD	1.15	460	94.1	169	194	1099	0.86	3570
200	3	444TSD	1.15	460	95.0	225	259	1463	0.88	3570
250	3	445TSD	1.15	460	95.0	278	320	1863	0.88	3570
300	3	445TSD	1.15	460	95.4	329	378	2139	0.88	3570

Note: Motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

Motors for CRE pumps (Grundfos MLE)

Totally Enclosed Fan Cooled, constant speed

TM069830

HP	Ph	Voltage [V]	Frame	Service factor	Motor full load efficiency [%]	Full load current** [A]	Service factor current [A]	Power factor	Full load speed [rpm]	Sound pressure level [dB(A)]
1/2[1)]	1	200-240	56C	1	84*	2.40-2.10	-	0.96	3400	58
3/4[1)]	1	200-240	56C	1	85.3*	3.45-2.90	-	0.98	3400	58
1[1)]	1	200-240	56C	1	85.2*	4.70-3.90	-	0.99	3400	58
1[1)]	3	440-480	56C	1.25	86.4*	1.65	2.10	0.73	3480	58
1 1/2[1)]	1	200-240	56C	1	86.9*	6.70-5.60	-	0.99	3400	58
1 1/2[1)]	3	200-240	56C	1.15	89.3*	4.00-3.40	4.60-3.90	0.91	3480	55
1 1/2[1)]	3	440-480	56C	1.15	89.6*	2.05	2.40	0.84	3480	58
2[1)]	1	200-240	56C	1	87.4*	9.10-7.60	-	0.99	3400	64
2[1)]	3	200-240	56C	1.00	88.90*	5.40-4.50	-	0.92	3480	55
2[1)]	3	440-480	56C	1.15	89.4*	2.65	3.00	0.87	3480	64
3[1)]	3	200-240	182TC	1.15	88.70*	7.90 6.60	9.10-7.60	0.94	3480	62
3[1)]	3	440-480	182TC	1.15	90.7*	3.8	4.30	0.89	3480	64
5[1)]	3	200-240	182TC	1.15	90.90*	13.2 - 10.9	14.90-12.40	0.94	3480	66
5[1)]	3	440-480	182TC	1.15	92.5*	6.20 - 5.80	7.00-6.60	0.90	3500	60
7 1/2[1)]	3	200-240	213TC	1.15	90.20*	20.0 - 16.6	23.0-19.3	0.94	3480	70
7 1/2[1)]	3	440-480	213TC	1.15	92.4*	9.10 - 8.50	10.4-9.7	0.91	3500	60
10[1)]	3	440-480	213TC	1.15	92.5*	12.4 - 11.5	14.2-13.0	0.91	3500	65
15[1)]	3	440-480	254TC	1.15	93.2*	17.9 - 16.6	20.5-19.0	0.92	3500	65
20[2)]	3	460-480	256TC	1.15	91	24.00	27.50	0.89	3540	68
25[2)]	3	460-480	284TC	1.15	91.7	30.50	35.00	0.88	3540	70
30[2)]	3	460-480	286TC	1.15	91.7	36.50	42.00	0.88	3540	70

* Efficiency of motor and VFD.

** At 460 V for 460-480 V motors.

1) Permanent magnet motor.

2) Asynchronous motor.

2-pole TEFC motors (Grundfos ML)

Totally Enclosed Fan Cooled, constant speed


GR7848SH


GR7848SH


TM042512

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. η [%]	Full-load current $I_{1/1}$ [A]	Service-factor current [A]	Starting current I_{start} [A]	Power factor Cos $\varphi_{1/1}$	Speed [rpm]
1/3	3	56C	1.35	208-230/460	79.3	1.12-1.10/0.55	1.5-1.45/0.75	7.1 - 7.7 / 3.9	0.81-0.75	3450-3480
1/2	3	56C	1.25	208-230/460	80.6	1.64-1.55/0.78	2.0-1.9/0.95	9.7 - 10.1 / 5.1	0.84-0.78	3430-3460
3/4	3	56C	1.25	208-230/460	80.1	2.4-2.3/1.2	2.9-2.75/1.4	14.2 - 15 / 7.8	0.84-0.78	3430-3460
1	3	56C	1.25	208-230/460	77.0	3.25-3.35/1.68	4.0-3.9/1.95	19.2 - 21.8 / 10.9	0.81-0.72	3430-3460
1 1/2	3	56C	1.15	208-230/460	84.1	4.45-4.30/2.16	5.1-4.95/2.48	32-31/15.6	0.84-0.78	3440-3480
2	3	56C	1.15	208-230/460	85.5	6.0-5.8/2.9	6.8-6.6/3.3	48.0-52.8/26.4	0.81-0.78	3500-3520
3	3	182TC	1.15	208-230/460	86.5	8.5-8.2/4.1	9.6-9.2/4.6	72.3-79.5/39.8	0.85-0.82	3500-3520
5	3	182TC	1.15	208-230/460	88.5	14.1-13.1/7.29	16.2-15.0/8.4	141.0-192.6/107.2	0.89-0.86	3525-3540
7 1/2	3	213TC	1.15	208-230/460	89.5	19.5-18.1/9.09	22.4-20.8/10.4	198.9-267.9/134.5	0.89-0.86	3490-3520
10	3	215TC	1.15	208-230/460	90.2	26.5-24.6/12.4	30.5-28.3/14.3	180.2-221.4/111.6	0.87	3480-3500
15	3	254TC	1.15	208-230/460	91.0	37.5-34.0/17	43-39/19.6	255-306/153	0.91-0.89	3490-3530
20	3	256TC	1.15	208-230/460	91.0	50.5-46.0/23	58-53/26.5	308-373/186	0.92-0.90	3490-3530
25	3	284TSC	1.15	208-230/460	91.7	62-56/28	71.5-64.5/32	341-420/210	0.92-0.91	3490-3530
30	3	286TSC	1.15	208-230/460	91.7	74-67/33.5	85-77/38.5	400-489/245	0.92-0.91	3490-3540

Note: Motors with a nameplate stating 230/460 V are suitable for operation at 208 V.

2-pole ML motors, 230/460 V (60 Hz, IEC)

ML type designation	KW	60 Hz voltage	Full load current	Power factor	NEMA Efficiency	Speed	Full load Torque	Locked Rotor current	Locked Rotor torque	Breakdown Torque
				(Cos Phi)	%	RPM	NM	%	%	%
ML71AB	0.37	220-255/380-440	1.50 - 1.44 / 0.87 - 0.83	0.85 - 0.76	80.0*	3410-3470	1.04 - 1.04	550-650	260-350	300-400
ML71BA	0.55	220-255/380-440	2.15 - 2.05 / 1.25 - 1.20	0.85 - 0.76	83.0*	3390-3460	1.54 - 1.54	500-600	290-390	320-430
ML80AA-H3	0.75	220-255/380-440	2.95 - 2.75 / 1.70 - 1.60	0.86 - 0.77	77.0	3410-3470	2.10 - 2.10	600-740	280-380	330-440
ML80CA-H3	1.1	220-255/380-440	4.15 - 4.00 / 2.40 - 2.30	0.88 - 0.80	84.0	3420-3470	3.10 - 3.05	430-500	240-310	280-380
ML90CC-H3	1.5	220-277/380-480	5.35 - 4.70 / 3.10 - 2.70	0.90 - 0.81	85.5	3470-3530	4.10 - 4.10	780-1050	270-430	330-530
ML90FA-H3	2.2	220-277/380-480	7.70 - 6.35 / 4.45 - 3.70	0.91 - 0.85	86.5	3470-3530	6.00 - 6.00	780-1100	280-450	330-530
ML100DA-H3	3.0	220-277/380-480	10.8 - 9.35 / 6.20 - 5.40	0.91 - 0.84	87.5	3480-3530	8.25 - 8.10	860-1100	280-450	370-540
ML112CA-H3	4.0	220-277/380-480	13.6 - 11.8 / 7.80 - 6.80	0.91 - 0.82	88.5	3510-3540	10.8 - 10.8	1000-1470	330-530	420-670
ML132DA-H3	5.5	220-277/380-480	18.4 - 16.2 / 10.6 - 9.30	0.90 - 0.80	89.5	3510-3550	15.0 - 15.0	1020-1480	320-530	400-660
ML132EA-H3	7.5	220-277/380-480	24.6 - 20.8 / 14.2 - 12.0	0.90 - 0.82	90.2	3490-3530	20.6 - 20.6	680-1050	200-310	240-370
ML160BA-H3	11	220-277/380-480	36.0 - 30.0 / 20.8 - 17.2	0.89 - 0.83	91.0	3520-3550	30.0 - 30.0	580-890	220-350	240-390
ML160BB-H3	15	220-277/380-480	48.5 - 39.0 / 28.0 - 22.4	0.90 - 0.86	91.0	3520-3550	40.5 - 40.5	580-890	200-330	230-370
ML160BC-H3	18.5	220-277/380-480	59.5 - 48.5 / 34.5 - 28.0	0.89 - 0.84	91.7	3520-3560	50.0 - 50.0	670-1100	140-260	280-490
ML180BA-H3	22	220-277/380-480	69.5 - 56.5 / 40.0 - 32.5	0.91 - 0.91	91.7	3520-3560	59.5 - 59.5	650-1040	210-340	250-390

2-pole ML motors, 460 V (60 Hz, IEC)

ML type designation	KW	60 Hz voltage	Full load current	Power factor	NEMA Efficiency	Speed	Full load Torque	Locked Rotor current	Locked Rotor torque	Breakdown Torque
				(Cos Phi)	%	RPM	NM	%	%	%
ML80AA-H3	0.75	380-440	1.70 - 1.60	0.86 - 0.77	77.0	3410-3470	2.10 - 2.10	600-740	280-380	330-440
ML80CA-H3	1.1	380-440	2.40 - 2.30	0.88 - 0.80	84.0	3420-3470	3.10 - 3.05	430-500	240-310	280-380
ML90CC-H3	1.5	380-480	3.10 - 2.70	0.90 - 0.81	85.5	3470-3530	4.10 - 4.10	780-1050	270-430	330-530
ML90FA-H3	2.2	380-480	4.45 - 3.70	0.91 - 0.85	86.5	3470-3530	6.00 - 6.00	780-1100	280-450	330-530
ML100DA-H3	3.0	380-480	6.20 - 5.40	0.91 - 0.84	87.5	3480-3530	8.25 - 8.10	860-1100	280-450	370-540
ML112CA-H3	4.0	380-480	7.80 - 6.80	0.91 - 0.82	88.5	3510-3540	10.8 - 10.8	1000-1470	330-530	420-670
ML132DA-H3	5.5	380-480	10.6 - 9.30	0.90 - 0.80	89.5	3510-3550	15.0 - 15.0	1020-1480	320-530	400-660
ML132EA-H3	7.5	380-480	14.2 - 12.0	0.90 - 0.82	90.2	3490-3530	20.6 - 20.6	680-1050	200-310	240-370
ML160BA-H3	11	380-480	20.8 - 17.2	0.89 - 0.83	91.0	3520-3550	30.0 - 30.0	580-890	220-350	240-390
ML160BB-H3	15	380-480	28.0 - 22.4	0.90 - 0.86	91.0	3520-3550	40.5 - 40.5	580-890	200-330	230-370
ML160BC-H3	18.5	380-480	34.5 - 28.0	0.89 - 0.84	91.7	3520-3560	50.0 - 50.0	670-1100	140-260	280-490
ML180BA-H3	22	380-480	40.0 - 32.5	0.91 - 0.91	91.7	3520-3560	59.5 - 59.5	650-1040	210-340	250-390

2-pole ML motors, 200 V (60 Hz, IEC)

ML type designation	KW	60 Hz voltage	Full load current	Power factor	NEMA Efficiency	Speed	Full load Torque	Locked Rotor current	Locked Rotor torque	Breakdown Torque
				(Cos Phi)	%	RPM	NM	%	%	%
ML71AB	0.37	200-230/346-400	1.65 - 1.50 / 0.96 - 0.87	0.85 - 0.76	80.0	3410-3470	1.04 - 1.04	550-650	260-350	300-400
ML71BA	0.55	200-230/346-400	2.36 - 2.14 / 1.36 - 1.24	0.85 - 0.76	83.0	3390-3460	1.54 - 1.54	500-600	290-390	320-430
ML80AA-H3	0.75	200-255/346-440	3.25 - 3 / 1.86 - 1.76	0.86 - 0.77	77.0	3410-3470	2.10 - 2.10	600-740	280-380	330-440
ML80CA-H3	1.1	200-255/346-440	4.55 - 4.4 / 2.65 - 2.5	0.88 - 0.80	84.0	3420-3470	3.10 - 3.05	430-500	240-310	280-380
ML90CC-H3	1.5	200-255/346-440	5.85 - 4.95 / 3.4 - 2.85	0.90 - 0.81	85.5	3470-3530	4.10 - 4.10	780-1050	270-430	330-530
ML90FA-H3	2.2	200-230/346-400	8.45 - 7.65 / 4.85 - 4.45	0.91 - 0.87	86.5	3470-3530	6.00 - 6.00	780-1100	280-450	330-530
ML100DA-H3	3.0	200-230/346-400	11.8 - 11 / 6.80 - 6.30	0.91 - 0.87	87.5	3480-3530	8.25 - 8.10	860-1100	280-450	370-540
ML112CA-H3	4.0	200-230/346-400	15.0 - 13.8 / 8.55 - 7.95	0.91 - 0.82	88.5	3510-3540	10.8 - 10.8	1000-1470	330-530	420-670
ML132DA-H3	5.5	200-230/346-400	20.2 - 18.8 / 11.7 - 10.8	0.90 - 0.85	89.5	3510-3550	15.0 - 15.0	1020-1480	320-530	400-660
ML132EA-H3	7.5	200-230/346-400	22.2 - 24.7 / 15.5 - 14.3	0.90 - 0.86	90.2	3490-3530	20.6 - 20.6	680-1050	200-310	240-370
ML160BA-H3	11	200-230/346-400	39.5 - 35.9 / 22.8 - 21	0.89 - 0.86	91.0	3520-3550	30.0 - 30.0	580-890	220-350	240-390
ML160BB-H3	15	200-230/346-400	53.5 - 47.6 / 30.7 - 28.7	0.90 - 0.88	91.0	3520-3550	40.5 - 40.5	580-890	200-330	230-370
ML160BC-H3	18.5	200-230/346-400	65 - 58.6 / 37.8 - 34	0.89 - 0.87	91.7	3520-3560	50.0 - 50.0	670-1100	140-260	280-490
ML180BA-H3	22	200-230/346-400	76 - 68.5 / 44 - 39.5	0.91 - 0.91	91.7	3520-3560	59.5 - 59.5	650-1040	210-340	250-390

Notes to 2-pole ML motors, 200 V (60 Hz, IEC):

0.75 to 22 kW motors meet EISA requirements

1.0 Service factor motors

Flange B14/V18 (0.37 - 4 kW)

Flange B5/V1 (5.5 - 22 kW)

15. Pumped liquids

The pumps are suitable for pumping thin, non-explosive liquids, not containing solid particles or fibers. 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.

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.

The CR, CRI, CRN pump types are suitable for the following liquids:

CR, CRE, CRI, CRIE

- Non-corrosive liquids.

For liquid transfer, circulation and pressure boosting of cold or hot clean water.

CRN, CRNE

- Industrial liquids.

In systems where all parts in contact with the liquid must be made of high-grade stainless steel.

CRT, CRTE

- Saline liquids
- hypochlorites
- acids.

For saline or chloride-containing liquids such as sea water or for oxidizing agents such as hypochlorites, Grundfos offers CRT, CRTE pumps made of titanium. See the separate data booklet on CRT, CRTE available at www.grundfos.com (Grundfos Product Center).

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 crystallization/precipitation in shaft seal.
1	Highly flammable liquid.
2	Combustible liquid.
3	Insoluble in water.
4	Low self-ignition point.

Pumped liquid	Note	Liquid concentration, liquid temperature	CR		CRN	
			1s, 1, 3, 5, 10, 15, 20, 95, 125, 155, 185, 215, 255	32, 45, 64	1s, 1, 3, 5, 10, 15, 20, 95, 125, 155, 185, 215, 255	32, 45, 64
Acetic acid CH_3COOH		5 %, 68 °F			HQQE	HQQE/HBQE
Acetone CH_3COCH_3	1, F	100 %, 68 °F			HBQE[1)] HQQE[2)]	HQQE/HBQE
Alkaline degreasing agent	D, F		HQQE	HQQE/HBQE		
Ammonium bicarbonate NH_4HCO_3	E	20 %, 86 °F			HQQE	HQQE/HBQE
Ammonium hydroxide NH_4OH		20 %, 104 °F	HQQE	HQQE/HBQE		
Aviation fuel	1, 3, 4, F	100 %, 68 °F	HQBV	HQQV/HBQV		
Benzoic acid C_6H_5COOH	H	0,5 %, 68 °F			HQQV	HQQV/HBQV
Boiler water		< 248 °F	HQQE	HQQE/HBQE		
	F	248 °F - 356 °F	-	-		
Calcareous water		< 194 °F	HQQE	HQQE		
Calcium acetate (as coolant with inhibitor) $Ca(CH_3COO)_2$	D, E	30 %, 122 °F	HQQE	HQQE		
Calcium hydroxide $Ca(OH)_2$	E	Saturated solution, 122 °F	HQQE	HQQE		
Chloride-containing water	F	< 86 °F, max. 500 ppm			HQQE	HQQE
Chromic acid H_2CrO_4	H	1 %, 68 °F			HQQV	HQQV/HBQV
Citric acid $HOC(CH_2CO_2H)_2COOH$	H	5 %, 104 °F			HQQE	HQQE/HBQE
Completely desalinated water (demineralized water)		< 248 °F			HQQE	HQQE/HBQE
Condensate		< 194 °F	HQQE	HQQE/HBQE		
Copper sulfate $CuSO_4$	E	10 %, 122 °F			HQQE	HQQE
Corn oil	D, E, 3	100 %, 176 °F	HQQV	HQQV/HBQV		
Diesel oil	2, 3, 4, F	100 %, 68 °F	HQBV	HQQV/HBQV		
Domestic hot water (potable water)		< 248 °F	HQQE	HQQE/HBQE		
Ethanol (ethyl alcohol) C_2H_5OH	1, F	100 %, 68 °F	HQQE	HQQE/HBQE		
Ethylene glycol $HOCH_2CH_2OH$	D, E	50 %, 122 °F	HQQE	HQQE		
Formic acid HCOOH		5 %, 68 °F			HQQE	HQQE/HBQE
Glycerine (glycerol) $OHCH_2CH(OH)CH_2OH$	D, E	50 %, 122 °F	HQQE	HQQE/HBQE		
Hydraulic oil (mineral)	E, 2, 3	100 %, 212 °F	HQQV	HQQV/HBQE		
Hydraulic oil (synthetic)	E, 2, 3	100 %, 212 °F	HQQV	HQQV/HBQE		
Isopropyl alcohol $CH_3CHOHCH_3$	1, F	100 %, 68 °F	HQBV[1)] HQQE[2)]	HQQV/HBQV		
Lactic acid $CH_3CH(OH)COOH$	E, H	10 %, 68 °F			HQQE[1)] HQQV[2)]	HQQE/HBQE
Linoleic acid $C_{17}H_{31}COOH$	E, 3	100 %, 68 °F	HQQV	HQQV/HBQV		
Methanol (methyl alcohol) CH_3OH	1, F	100 %, 68 °F	HQQE	HQQE/HBQE		
Motor oil	E, 2, 3	100 %, 176 °F	HQQV	HQQV/HBQV		
Naphthalene $C_{10}H_8$	E, H	100 %, 176 °F	HQQV	HQQV/HBQV		
Nitric acid HNO_3	F	1 %, 68 °F			HQQE	HQQE/HBQE
Oil-containing water		< 212 °F	HQQV	HQQV/HBQV		
Olive oil	D, E, 3	100 %, 176 °F	HQQV	HQQV/HBQV		
Oxalic acid $(COOH)_2$	H	1 %, 68 °F			HQQE	HQQE/HBQE
Ozone-containing water (O_3)		1 PPM, < 105 °F			HQQE	HQQE/HBQE
Peanut oil	D, E, 3	100 %, 194 °F	HQQV	HQQV/ HBQV		
Petrol/gasoline	1, 3, 4, F	100 %, 68 °F	HQBV	HQQV/HBQV		

Pumped liquid	Note	Liquid concentration, liquid temperature	CR		CRN	
			1s, 1, 3, 5, 10, 15, 20, 95, 125, 155, 185, 215, 255	32, 45, 64	1s, 1, 3, 5, 10, 15, 20, 95, 125, 155, 185, 215, 255	32, 45, 64
Phosphoric acid H_3PO_4	E	20 %, 68 °F			HQQV[1)] HQQE[2)]	HQQV/HBQV
Propanol C_3H_7OH	1, F	100 %, 68 °F	HQQV[1)] HQQE[2)]	HQQV/HBQV		
Propylene glycol $CH_3CH(OH)CH_2OH$	D, E	50 %, 194 °F	HQQE	HQQE		
Potassium carbonate K_2CO_3	E	20 %, 122 °F	HQQE	HQQE		
Potassium formate (as coolant with inhibitor) KOOCH	D, E	30 %, 122 °F	HQQE	HQQE		
Potassium hydroxide KOH	E	20 %, 122 °F			HQQE	HQQE
Potassium permanganate $KmnO_4$		5 %, 68 °F			HQQE	HQQE/HBQE
Rape seed oil	D, E, 3	100 %, 176 °F	HQQV	HQQV/HBQV		
Salicylic acid $C_6H_4(OH)COOH$	H	0,1 %, 68 °F			HQQE	HQQE/HBQE
Silicone oil	E, 3	100 %	HQQV	HQQV/HBQV		
Sodium bicarbonate $NaHCO_3$	E	10 %, 140 °F			HQQE	HQQE/HBQE
Sodium chloride (as coolant) NaCl	D, E	30 %, < 41 °F, pH > 8	HQQE	HQQE		
Sodium hydroxide NaOH	E	20 %, 122 °F			HQQE	HQQE
Sodium hypochlorite NaOCl	F	0,1 %, 68 °F			HQQE[1)] HQQV[2)]	HQQE
Sodium nitrate $NaNO_3$	E	10 %, 140 °F			HQQE	HQQE/HBQE
Sodium phosphate Na_3PO_4	E, H	10 %, 140 °F			HQQE	HQQE
Sodium sulfate Na_2SO_4	E, H	10 %, 140 °F			HQQE	HQQE/HBQE
Softened water		< 248 °F			HQQE	HQQE/HBQE
Soybean oil	D, E, 3	100 %, 176 °F	HQQV	HQQV/HBQV		
Sulfuric acid H_2SO_4	F	1 %, 68 °F			HQQV	HQQV/HQQV
Sulfurous acid H_2SO_3		1 %, 68 °F			HQQE	HQQE/HBQE
Swimming pool water (low chloride)		Max. 5 ppm free chlorine (Cl_2)	HQQE	HQQE/HBQE		

1) CR 1s, 1, 3, 5, 10, 15, 20.

2) CR 95, 125, 155, 185, 215, 255.

16. Grundfos Product Center

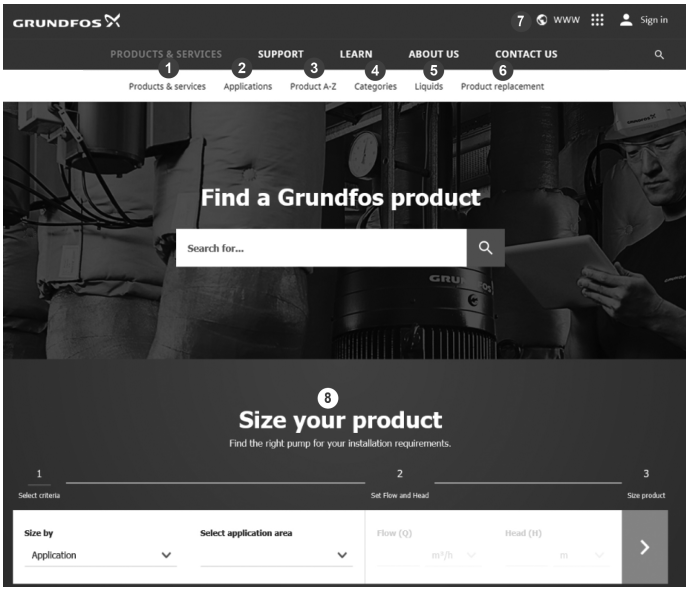
Online search and sizing tool to help you make the right choice.
From the international view, you can select your specific country to view the product range available to you.
International view: *https://product-selection.grundfos.com*

All the information you need in one place

Performance curves, technical specifications, pictures, dimensional drawings, motor curves, wiring diagrams, spare parts, service kits, 3D drawings, documents, system parts. The Product Center displays any recent and saved items - including complete projects - right on the main page.

Downloads

On the product pages, you can download installation and operating instructions, data booklets, service instructions, etc., in PDF format.



When you select your country, you will see the menus below. Note that some menus may not be available depending on the country.
Example: *https://product-selection.grundfos.com/us*

Pos.	Description
1	**Products & services** enables you to find products and documents by typing a product number or name into the search field.
2	**Applications** enables you to choose an application to see how Grundfos can help you design and optimize your system.
3	**Products A-Z** enables you to look through a list of all the Grundfos products.
4	**Categories** enables you to look for a product category.
5	**Liquids** enables you to find pumps designed for aggressive, flammable or other special liquids.
6	**Product replacement** enables you to find a suitable replacement.
7	**WWW** enables you to select the country, which changes the language, the available product range and the structure of the website.
8	**Sizing** enables you to size a product based on your application and operating conditions.

Grundfos GO Remote

Mobile solution for professionals on the GO!

Grundfos GO Remote is the mobile tool box for professional users on the go. It is the most comprehensive platform for mobile pump control and pump selection, including sizing, replacement and documentation. It offers intuitive, handheld assistance and access to Grundfos online tools, and it saves valuable time for reporting and data collection.

GET IT ON Google play

Available on the App Store

U.S.A.

GRUNDFOS Water Utility Headquarters
856 Koomey Road
Brookshire, Texas 77423 USA

GRUNDFOS CBS Inc.
902 Koomey Road
Brookshire, TX 77423 USA
Phone: 281-994-2700
Toll Free: 1-800-955-5847
Fax: 1-800-945-4777

GRUNDFOS Pumps Corporation
9300 Loiret Boulevard
Lenexa, Kansas 66219 USA
Tel.: +1 913 227 3400
Fax: +1 913 227 3500

Canada

GRUNDFOS Canada inc.
2941 Brighton Road
Oakville, Ontario
L6H 6C9
Tel.: +1-905 829 9533
Fax: +1-905 829 9512

Mexico

Bombas GRUNDFOS de México
S.A. de C.V.
Boulevard TLC No. 15
Parque industrial Stiva Aeropuerto
Apodaca, N.L. 66600
Tel.: +52-81-8144 4000
Fax: +52-81-8144 4010

Revision Info

Last revised on 04-2021

98522834 **03.2022**
ECM: 1336034

GRUNDFOS