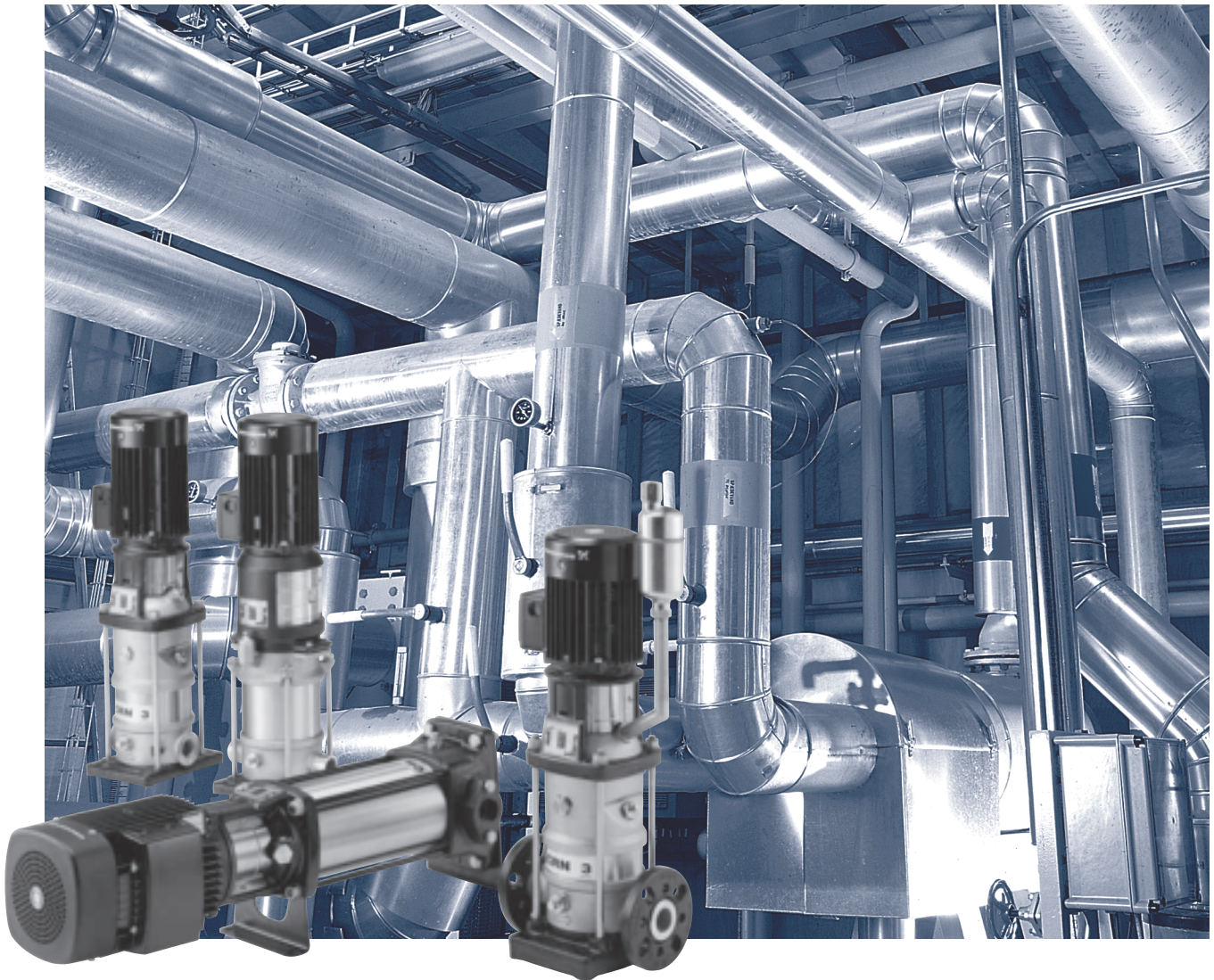


CR, CRI, CRN

Custom-built pumps
60 Hz



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Custom-built pumps

Grundfos offers a wide range of custom-built variants of the CR type range for a variety of demanding industrial applications. Featuring superior reliability like the standard products, the custom-built pumps meet the strictest demands for durability and trouble-free operation.

With these multistage in-line pumps, based on the well-known CR type range, Grundfos meets the customers' needs for pumps capable of handling

- high-temperature liquids
- high-viscosity liquids such as paints and varnishes
- volatile and explosive liquids and
- aggressive liquids
- special installation requirements.

The Grundfos CR range

Material versions:

- Cast iron/stainless steel, AISI 304 = CR
- Stainless steel, AISI 304 = CRI
- Stainless steel, AISI 316 = CRN
- Titanium = CRT

Pump types:

CR 1s, 1, 3, 5, 10, 15, 20, 32, 45, 64 and 90.

Pumped liquid temperature:

−40°F to +356°F.

This product guide gives an overview of some of the custom-built solutions offered by Grundfos. If the product guide does not provide a solution to your specific pumping needs, please contact your local Grundfos company with a detailed description of your application!



GR5357

Variant overview

The overview of custom-built solutions refers only to the CR, CRI, CRN range.

The overview is divided into the following parts:

- **Motors**
- **Shaft seals**
- **Pumps.**

Motors

The standard range of motors meets a wide variety of application demands.

For special applications or operating conditions, Grundfos offers custom-built motors such as

- explosion-proof motors for hazardous atmospheres (including ATEX approved motors)
- motors with anti-condensation heating unit for humid environments
- High efficiency motors
- Motors with different enclosure class
- Oversized motors
- motors with thermal protection.

Shaft seals

Grundfos offers a wide range of special-purpose shaft seals and shaft seal arrangements for the pumping of liquids such as

- aggressive or corrosive liquids
- particle-carrying liquids
- toxic or explosive liquids
- high-viscosity or sticky liquids

and for operating under conditions such as

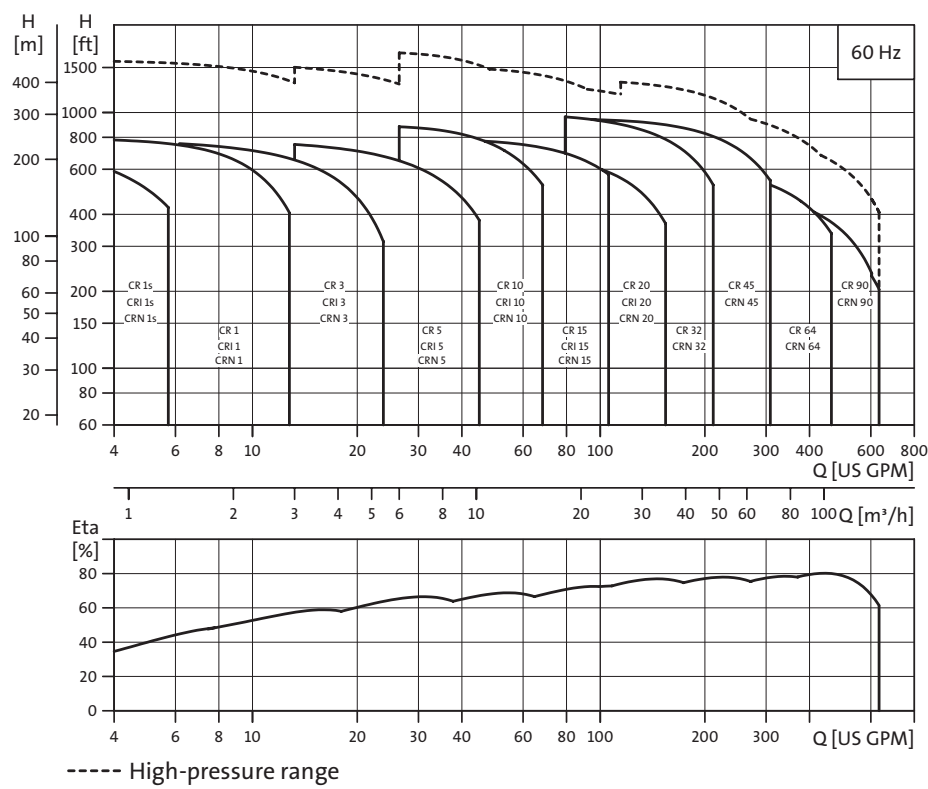
- extremely high pressures
- extremely high or low temperatures.

Pumps

The pump can be custom-built for special operating conditions and applications such as

- high inlet pressures
- high-pressure systems up to 725 psi
- horizontal mounting
- applications demanding belt-driven pumps
- pharmaceutical and biotechnological applications
- applications requiring low NPSH.

Performance range



TM02 8376 5103

Type keys

CR(E), CRI(E), CRN(E)

Example	CR	E	32	(s)	-4	-2	-A	-G	-G	-E	-HQQE
Type range: CR, CRI, CRN											
Pump with integrated frequency control											
Flow rate [m ³ /h]											
All impellers with reduced diameter (applies only to CR, CRI, CRN 1s)											
Number of impellers											
Number of reduced diameter impellers (CR(E), CRN(E) 32, 45, 64, 90)											
Code for pump version											
Code for pipe connection											
Code for materials											
Code for rubber parts											
Code for shaft seal											

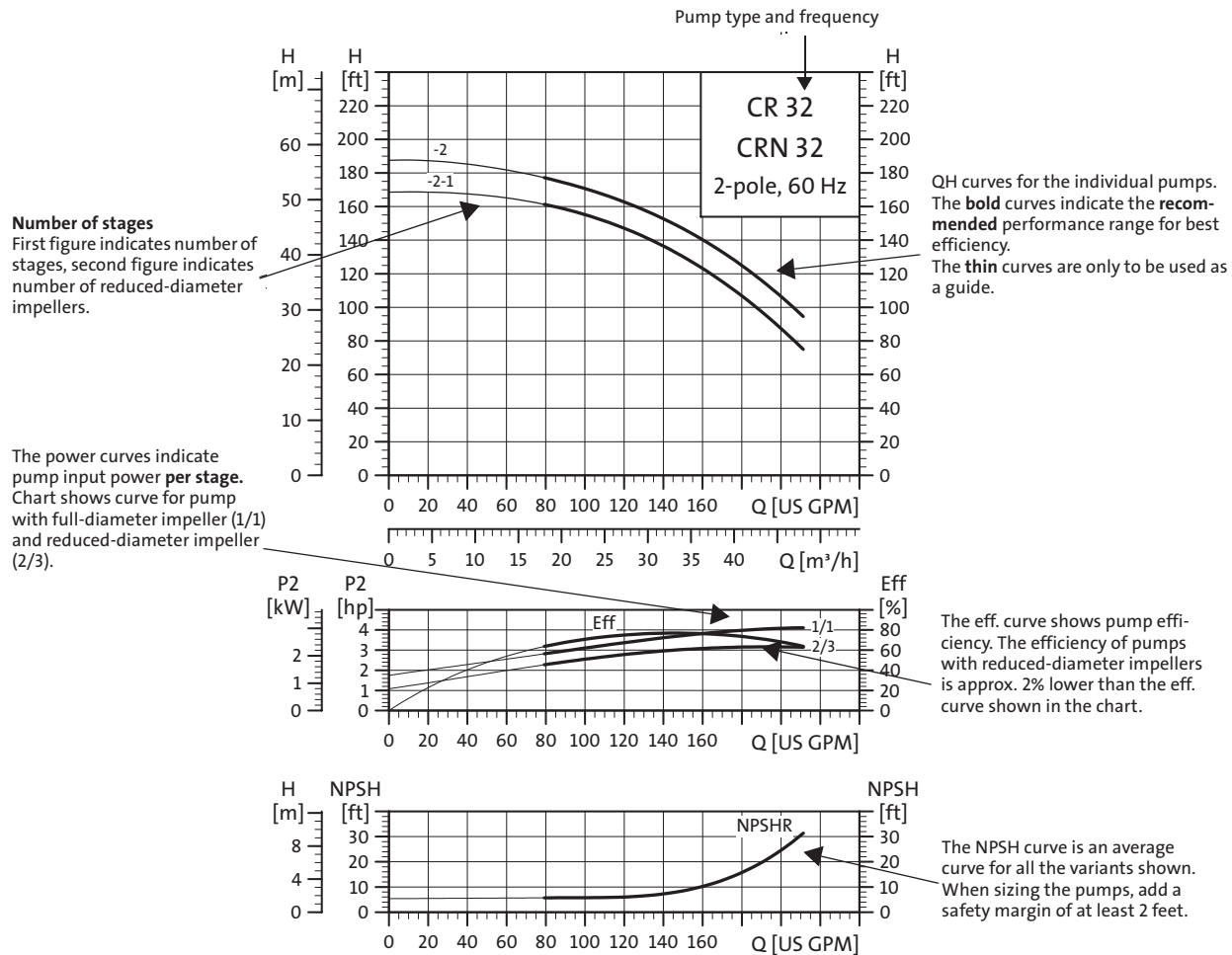
Codes

Example	A	-G	-G	-E	-H	QQ	E
Pump version							
A Basic version ¹⁾							
B Oversize motor							
E Certificate/approval							
F CR pump for high temperatures (air-cooled top assembly)							
H Horizontal version							
HS High-pressure pump with high speed MLE motor							
I Different pressure rating							
J Pump with different max speed							
K Pump with low NPSH							
M Magnetic drive							
N Fitted with sensor							
P Undersize motor							
R Horizontal version with bearing bracket							
SF High pressure pump							
T Over size motor (two flange sizes bigger)							
U NEMA version ¹⁾							
X Special version							
Pipe connection							
A Oval flange							
B NPT thread							
CA FlexiClamp (CRI(E), CRN(E) 1, 3, 5, 10, 15, 20)							
CX Triclap (CRI(E), CRN(E) 1, 3, 5, 10, 15, 20)							
F DIN flange							
G ANSI flange							
J JIS flange							
N Changed diameter of ports							
P PJE coupling							
X Special version							

Example	A	-G	-G	-E	-H	QQ	E
Materials							
A Basic version							
D Carbon-graphite filled PTFE (bearings)							
G Wetted parts AISI 316							
GI All parts stainless steel, wetted parts AISI 316							
I Wetted parts AISI 304							
II All parts stainless steel, wetted parts AISI 304							
K Bronze (bearings)							
S SiC bearings + PTFE neck rings							
X Special version							
Code for rubber parts							
E EPDM							
F FXM							
K FFKM							
V FKM							
Shaft seal							
A O-ring seal with fixed driver							
B Rubber bellows seal							
E Cartridge seal with O-ring							
H Balanced cartridge seal with O-ring							
K Metal bellows cartridge seal							
O Double seal, back-to-back							
P Double seal, tandem							
X Special version							
B Carbon, synthetic resin-impregnated							
H Cemented tungsten carbide, embedded (hybrid)							
Q Silicon carbide							
U Cemented tungsten carbide							
X Other ceramics							
E EPDM							
F FXM							
K FFKM							
V FKM							

¹⁾ In August 2003 the NEMA version pump code was discontinued for all material numbers created by Grundfos manufacturing companies in North America. The NEMA version pump code will still remain in effect for existing material numbers. NEMA version pumps built in North America after this change will have either an A or U as the pump version code depending on the date the material number was created.

How to read a curve chart



TM02 8377 5103

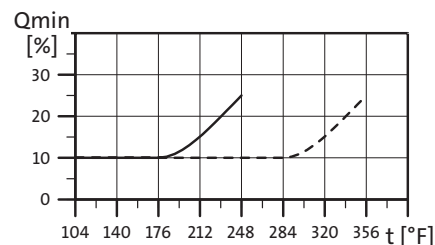
Curve conditions

The guidelines below apply to the curves shown in this data booklet.

1. The motors used for the measurements are the same as the motors used in the standard range.
2. Performance may vary based on motor selection.
3. Measurements have been made with airless water at a temperature of 68°F.
4. The curves apply to a kinematic viscosity of $\nu = 1 \text{ mm}^2/\text{s}$ (1 cSt).
5. Due to the risk of overheating, the pumps should not be used at a flow below the minimum flow rate.

The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature.

The dotted curve represents a pump fitted with an air-cooled top.



TM02 7538 3703

General information

The Grundfos standard range of motors covers a wide variety of application demands. For special applications or operating conditions, Grundfos offers custom-built motors, such as:

Variant	Description
Different motor brand	If technically possible, Grundfos can fit the pump with a motor of a brand other than the standard. This will normally increase the time of delivery. Alternatively, the pump can be supplied without a motor (motor thrust rating must be checked).
Different position of motor	Where possible, the terminal box can be placed on either side of the pump.
Explosion-proof motor	For operation in hazardous atmospheres.
Different enclosure class	As standard, Grundfos can supply: <ul style="list-style-type: none"> • ODP: open drip-proof; TEFC: total-enclosed fan-cooled On request, we can supply: <ul style="list-style-type: none"> • Chemical processing/mill and chem duty • Washdown duty (Up through 10 hp only) • Other
Anti-condensation heating (space heaters)	Built-in heating unit, especially for humid environments. All heating units are supplied with 1 x 115V, 60Hz.
Integrated variable speed drive	All Grundfos CR pumps 10 hp and below are available as standard with an integrated variable speed drive (type MLE) motor.
Special supply voltage	Motors suitable for other voltages are available upon request.
Motor insulation class	Upgrade from Class F to Class H.
Efficiency class	<ul style="list-style-type: none"> • EPAct/NRC — motor efficiency according to EPAct/NRC standards • Premium efficiency
Oversized motor	Ambient temperatures above 104° F or installation at altitudes of more than 3,300 feet above sea level may require the use of an oversized motor (i.e. derating).
Tropicalized windings	Motors recommended for operating in areas with high humidity.
Wye/Delta starting	Motor wired for Wye/Delta starting (6 leads).
Test sheets	Grundfos' laboratory is authorized to issue test sheets for motors; for instance, for insurance companies.

Efficiency class

Grundfos offers motors with Energy Efficient EAct/NRC class and Premium Efficiency class. When Premium Efficiency motors are ordered, the Baldor Super-E® motor is supplied which in most cases exceeds the NEMA Premium Efficiency standards.

Benefits offered by high efficiency motors

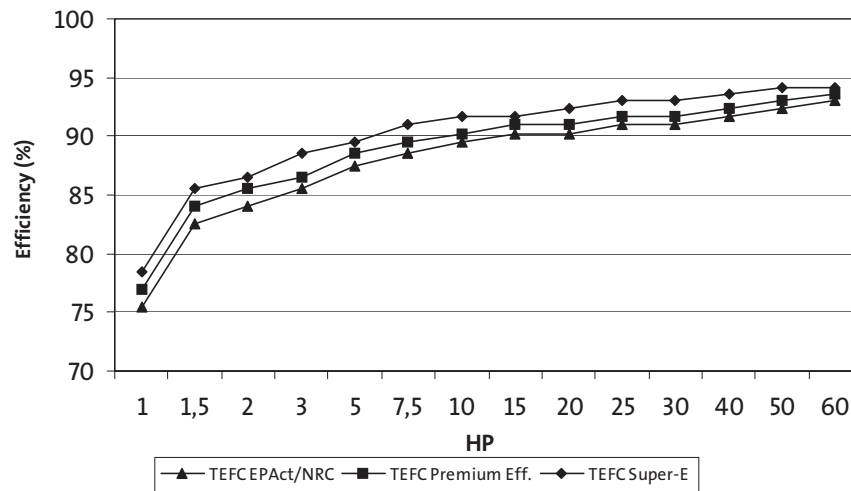
- Improved efficiency (see graph below)
- Lower noise level
- Higher permissible ambient temperature
- Longer bearing life due to reduced temperature

Pump range

Energy Efficient and Premium Efficiency motors are available for all Grundfos CR pumps.

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

NEMA TEFC Motor Efficiency Standards & Baldor TEFC Super-E Efficiency



Note: ODP Efficiency points are in table below.

HP	ODP			TEFC		
	EAct/NRC	Premium Eff.	Super-E	EAct/NRC	Premium Eff.	Super-E
1	--	77.0	84.0	75.5	77.0	78.5
1 1/2	82.5	84.0	85.5	82.5	84.0	85.5
2	84.0	85.5	86.5	84.0	85.5	86.5
3	84.0	85.5	87.5	85.5	86.5	88.5
5	85.5	86.5	90.2	87.5	88.5	89.5
7 1/2	87.5	88.5	90.2	88.5	89.5	91.0
10	88.5	89.5	91.7	89.5	90.2	91.7
15	89.5	90.2	91.7	90.2	91.0	91.7
20	90.2	91.0	92.4	90.2	91.0	92.4
25	91.0	91.7	93.0	91.0	91.7	93.0
30	91.0	91.7	93.6	91.0	91.7	93.0
40	91.7	92.4	94.1	91.7	92.4	93.6
50	92.4	93.0	93.6	92.4	93.0	94.1
60	93.0	93.6	94.5	93.0	93.6	94.1

Notes:

1. The term "High Efficiency" is commonly used but is not recognized in the NEMA standards (MG 1-1198, Part 12).
2. Some standard CR pump motors already meet the EAct/NRC requirement. See the CR, CRI, CRN Product Guide.

Double seal (tandem)

General information

Double seals mounted in tandem are recommended for use with crystallizing, hardening or sticky liquids.

Reference applications

- Pharmaceutical industry (production of dextran)
- Negative pressure deaeration systems (vacuum)
- Industries handling potentially hardening oil products
- Caustic soda (sodium hydroxide - NaOH)
- Hydrated lime (calcium hydroxide - $\text{Ca}(\text{OH})_2$).

Pump range

The tandem type of seal is available for the following Grundfos pumps:

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

Technical description

This type of double seal consists of two shaft seals mounted in a tandem arrangement in a separate seal chamber. Only Grundfos cartridge shaft seals can be used.

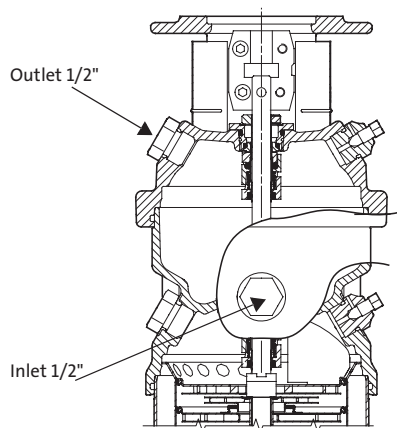
If the primary seal is leaking, the pumped liquid will be flushed away by the flushing liquid. The flushing liquid pressure must always be lower than the pumped liquid pressure.

Recommended flushing liquid conditions:

- $Q = 6.6\text{--}52.8$ gallon/hour
- $p = 58\text{--}87$ psi

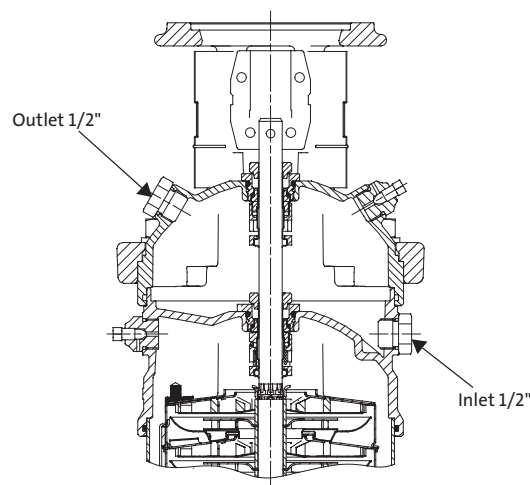
Sectional drawings

CR, CRI, CRN 1s, 1, 3 and 5



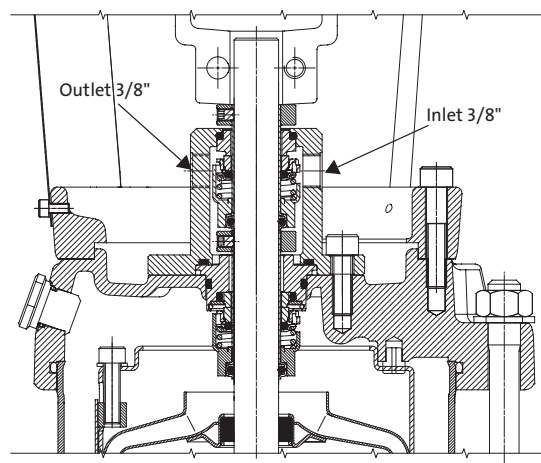
TM02 2139 3701

CR, CRI, CRN 10, 15 and 20



TM02 7386 3403

CR, CRN 32, 45, 64 and 90



TM01 6204 1699

Dimensions

Pump type	Additional height of seal chamber * [in]
CR, CRI, CRN 1s, 1, 3 and 5	4 1/4
CR, CRI, CRN 10, 15 and 20	3 1/2
CR, CRN 32, 45, 64 and 90	0

*This dimension is the additional height as compared to the standard pump.

Reference numbers

Pump type	Reference number
CR, CRI, CRN 1s, 1, 3 and 5	98 97 08
CR, CRI, CRN 10, 15 and 20	98 94 70
CR, CRN 32, 45, 64 and 90	98 98 05

Double seal (back-to-back)

General information

Double seals mounted "back-to-back" are recommended for use with toxic, aggressive or explosive liquids. The back-to-back double seal protects the surrounding environment and the people working in the vicinity of the pump.

This type of seal is the optimum solution for handling abrasive or sticky liquids which would either wear out, damage or block a mechanical shaft seal.

Reference applications

- Paint industry
- Distilling plants
- Petrochemical industry.

Pump range

The back-to-back type of seal is available for the following Grundfos pumps:

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

Technical description

The back-to-back double seal consists of two shaft seals mounted in a back-to-back arrangement in a separate seal chamber.

The pressure in the seal chamber must be higher than the pump pressure. The pressure in the seal chamber can be generated by

- a pressure intensifier when the operating pressure is above 232 psi (see page 12)
- a separate pump, e.g. a dosing pump, when the operating pressure is less or equal to 232 psi (see page 12) or
- an existing, separate pressure source. Many applications incorporate pressurized systems.

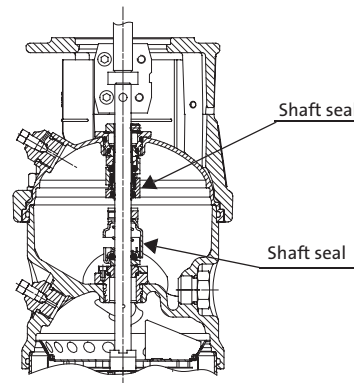
The back-to-back double seal arrangement with pressurized seal chamber prevents the pumped liquid from leaking through the shaft seal to the environment.

Reference numbers

Pump type	Reference number
CR, CRI, CRN, 1s, 1, 3 and 5	98 97 09
CR, CRI, CRN, 10, 15 and 20	98 94 71
CR 32, 45, 64 and 90	98 98 10
CRN 32, 45, 64 and 90	98 97 87

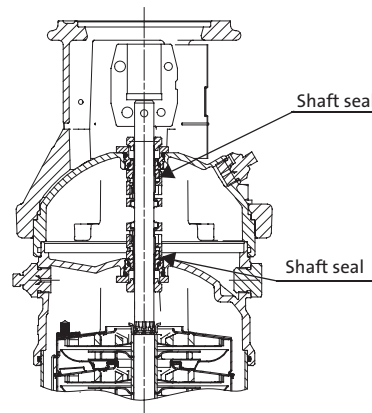
Sectional drawings

CR, CRI, CRN 1s, 1, 3 and 5



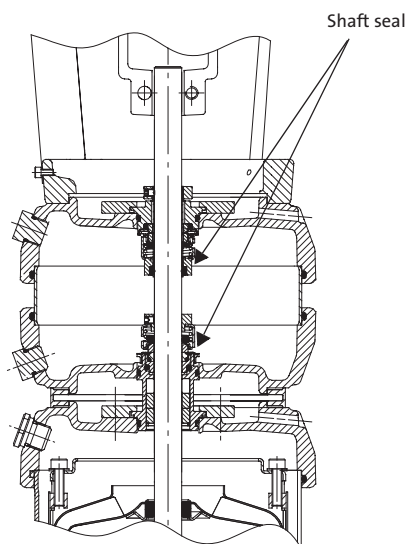
TM02 1691 1801

CR, CRI, CRN 10, 15 and 20



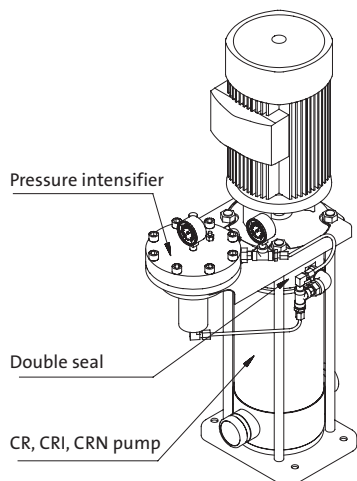
TM02 7385 3403

CR, CRN 32, 45, 64 and 90



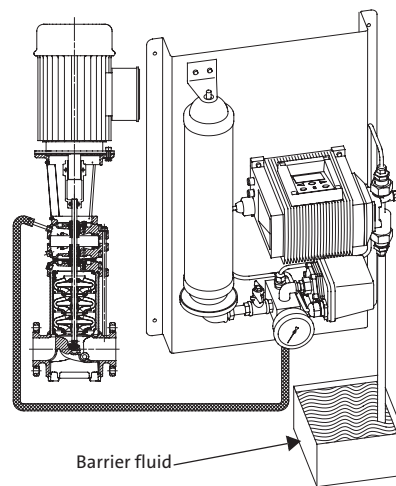
TM02 5000 2002

Back-to-back double seal with pressure intensifier



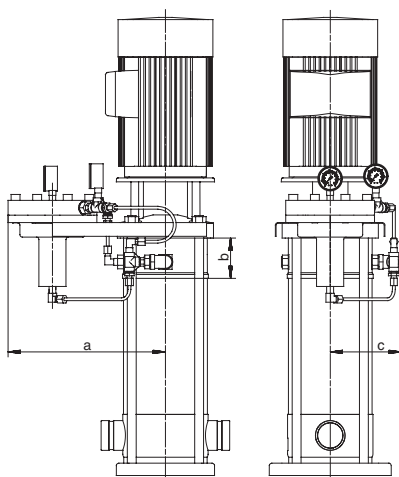
TM01 4455 0399

Back-to-back double seal with dosing pump



tm01 9099 1701

Dimensions



TM01 4459 0399

Pump type	a [in]	b [in]	c [in]
CR, CRI, CRN 1s, 1, 3 and 5	11 3/4	4 1/4	5
CR, CRI, CRN, 10, 15 and 20	12 3/4	3 1/2	5 1/2
CR, CRN 32	13 1/2	8 1/4	6
CR, CRN 45	13 3/4	9 1/2	6 1/2
CR, CRN 64	13 3/4	6 1/2	6 1/2
CR, CRN 90	14	7 1/4	6 3/4

The dimension **b** is the additional height as compared to the standard pump.

Reference numbers

	Material	Reference number
Pressure intensifier (not available for CRT)	AISI 316, FKM	98 98 92
	AISI 316, EPDM	98 98 91

Note: One dosing pump installation can supply several pumps fitted with back-to-back double seal.

Connections are all 1/2".

Note: Connecting pipes/hoses are not included.

Dimensions

Pump type	Additional height of seal chamber * [in]
CR, CRI, CRN 1s, 1, 3, 5	4 1/4
CR, CRI, CRN, 10, 15 and 20	3 1/2
CR, CRN 32	8 1/4
CR, CRN 45	9 1/2
CR, CRN 64	6 1/2
CR, CRN 90	7 1/4

*This dimension is the additional height as compared to the standard pump.

Reference numbers

	Reference number
Dosing pump, max. 232 psi	98 98 09



Cool-Top® (high temperatures)



GR5228

General information

The unique Grundfos air-cooled top shaft seal solution is recommended for applications involving high temperatures from 248°F to 356°F.

The Cool-Top pumps are equipped with FXM rubber parts.

Reference applications

- Boiler feeding
- Temperature control, e.g. in molding processes
- Circulation of transmission oils.

Pump range

The Cool-Top is available for the following Grundfos pumps:

248-356°F

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

Technical description

The air-cooled top separates the seal chamber from the pump by an air-cooled chamber, generating an insulating effect similar to that of a thermos.

Via the narrow passage between the pump and the air-cooled top, a small quantity of the pumped liquid recirculates by natural circulation.

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

The Grundfos air-cooled top does **not** require any external cooling. An automatic air vent is required to vent the pump seal chamber.

Air-cooled top with bearing flange

For applications involving pumping of water up to 356°F, the pump requires a net positive inlet pressure, according to the vapor pressure of water.

To prevent the axial thrust generated by the inlet pressure from being transmitted to the motor shaft and bearings, a bearing flange can be fitted between pump and motor.

A bearing flange may be required if the application inlet pressure exceeds the maximum inlet pressure of the pump. This is common for pumps with 1 or 2 impellers. Refer to the CR, CRI, CRN Product Guide for maximum permissible inlet pressures for all CR pumps.

The max. permissible operating pressure of pumps with air-cooled top for temperatures up to 356°F is 362 psi.

Dimensions

Pump type	Additional pump height * [in]
CRI, CRN 1s, 1, 3 and 5	4 1/4
CRI, CRN 10, 15 and 20	3 1/2
CR, CRN 32	8 1/4
CR, CRN 45	9 1/2
CR, CRN 64	6 1/2
CR, CRN 90	7 1/4

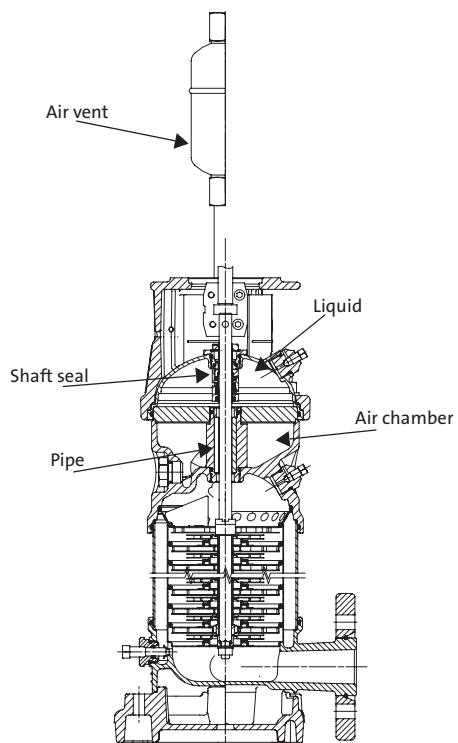
*This dimension is the additional height as compared to the standard pump.

Reference numbers, air-cooled top for 248-356°F

Pump type	Reference number
CRI, CRN 1s, 1, 3 and 5	98 96 40
CRI, CRN, 10, 15 and 20	98 94 73
CR 32, 45, 64 and 90	98 96 38
CRN 32 and 45	98 96 37
CRN 64 and 90	98 96 36

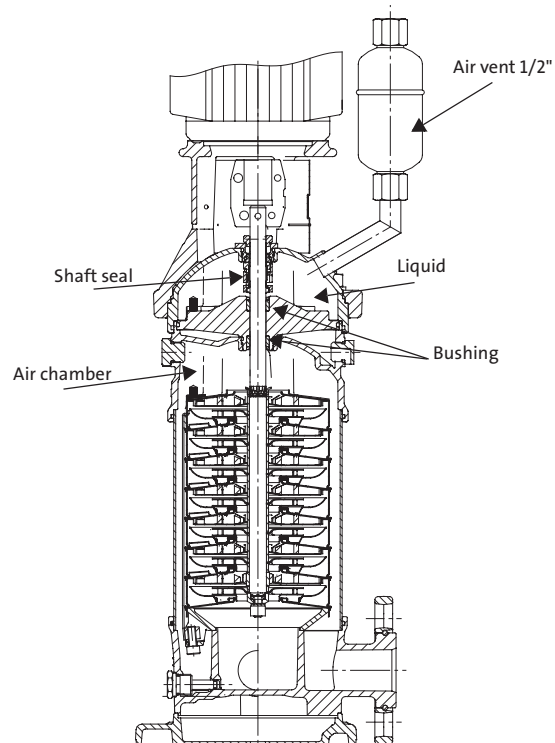
Sectional drawings

CRI, CRN 1s, 1, 3 and 5



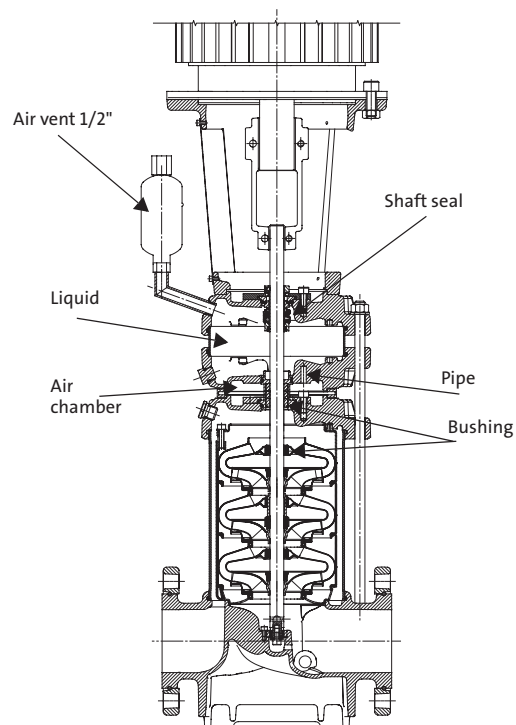
TM02 1693 1801

CRI, CRN 10, 15 and 20



TM02 7384 3403

CR, CRN 32, 45, 64 and 90



TM01 4785 0899

Shaft seals

General information

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

To ensure reliability and avoid untimely breakdowns, the following conditions must be considered:

- temperature,
- pressure,
- pumped liquid.

In order to meet any specific requirements, Grundfos offers the following variants:

1. Shaft seals with FFKM or FXM O-ring material
2. Hybrid shaft seals

Recommended operating range

The actual operating range of the shaft seal depends on the operating pressure, pump type, type of shaft seal and liquid temperature. The following table applies to clean water and water containing glycol.

For explanation of codes, see the type key on page 5.

Pump type	Shaft seal	Min. temp. [°F]	Max. temp. [°F]	Pressure rating [psi]
CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20, 32, 45, 64, and 90	HUBx	32	248	435
	HUUx	−40	194	435
	HQQx	−40	248	435
	HQBx	0	248	435

Rubber type	Min. temperature [°F]	Max. temperature [°F]
EPDM	−40	248
FKM	−4	194
FXM	14	527★
FFKM	−4	527★

★ Maximum operation temperature is 248°F for the standard range.

For pumps equipped with a Cool-Top the maximum operation temperature is 356°F.

Shaft seal with FFKM or FXM O-ring material

General information

Shaft seals with FFKM or FXM O-ring material are recommended for applications where the pumped liquids may damage the standard O-ring material.

See the list of pumped liquids in the CR, CRI, CRN data booklet.

Reference applications, FFKM (Kalrez®)

- Chemical industry (aggressive liquids)
- Petrochemical industry (oils)
- High-temperature applications.

Plug and sleeve O-rings made of FFKM are also available for CR, CRI, CRN 1s, 1, 3, 5, 10, 15 and 20.

Reference applications, FXM (Flouraz®)

- High-temperature applications (instead of FKM).

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

Pump range

Shaft seals with FFKM or FXM O-ring are available for the following Grundfos pumps:

Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64	CR 90
FFKM	•	•	•	•	•	•	•	•	•	•	•
FXM	•	•	•	•	•	•	•	•	•	•	•

Technical description

The FFKM and FXM O-rings replace the standard shaft seal O-rings.

Dimensions

Dimensions are identical to those of the standard shaft seal.

Reference numbers

Pump type	Reference number	
	FFKM	FXM
CR, CRI, CRN 1s, 1, 3 and 5	98 99 72	98 96 78
CR, CRI, CRN 10, 15 and 20	98 94 74	98 94 75
CR, CRN 32, 45, 64 and 90	98 98 15	98 96 77

Hybrid shaft seal

General information

Hybrid shaft seals are recommended for applications involving a risk of dry running and are available as a standard shaft seal on CR, CRN 32, 45, 64 and 90; seal type KUHE.

Reference applications

- Boiler-feed applications
- Applications involving degassing of liquids
- Industrial applications involving frequent priming.

Pump range

Hybrid shaft seals are available for the following Grundfos pumps:

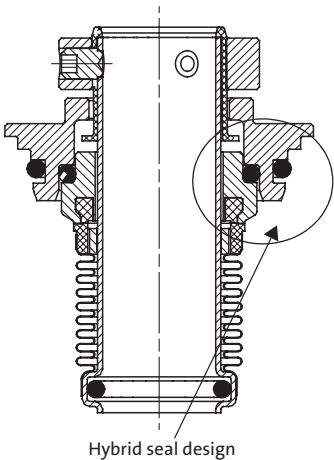
Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64	CR 90
CR								•	•	•	•
CR I											
CRN								•	•	•	•

Technical description

The stationary seat of the shaft seal is equipped with an extra, special-carbon seal face, expanding at high temperatures as a result of dry running or similar conditions.

This eliminates the usual damaging effects of dry running, such as leakage and noise.

Sectional drawing



TM02 4279 0402

Dimensions

Dimensions are identical to those of the standard shaft seal.

Reference numbers

Pump type	Reference number
CR, CRN 32, 45, 64 and 90	Standard

Certificates



GR5381

General information

Grundfos offer a number of certificates for different purposes. The following types are available...

- **material certificates**
(certificates stating material components or material specifications)
- **performance certificates**
(printed test reports guaranteeing and certifying test data of QH performance, current consumption curves, rpm, etc.)
- **authorized test by third party**
(surveyed performance test)
- **ATEX approved CR pumps**
(according to ATEX-directive 94/9/EC)

The certificates must be ordered with the pump.

Reference applications

- Pharmaceutical industries
- Ships and offshore
- Big contractors
- Areas exposed to explosive atmosphere

Pump range

Certificates are available for the following pump types:

[illegible][illegible]

Certificate	Standard
Material specification report	
Material report with certificate	
Report ATEX-approved pump	
Inspection certificate	EN 10.204 3.1.B
Inspection certificate - Lloyds Register of Shipping (LRS), - Det Norske Veritas (DNV) - Germanischer Lloyd (GL) - Bureau Veritas (BV) - Etc.....	EN 10.204 3.1.C
Surface roughness report	
Motor test report	
Standard test report	ISO 9906
Vibration report	
Certificate of compliance with the order	EN 10.204 2.1
Test report - non specific inspection and testing	EN 10.204 2.2
Report Cleaned and dried pump	
Report Electro-polished pump	

ATEX-approved CR pumps



General information

The CR pumps can be approved according to EC directive 94/9/EC, the so-called ATEX directive.

The pumps can be used in areas (zones) classified according to the directive 1999/92/EC. In case of doubt, please consult the above-mentioned directives or contact Grundfos.

ATEX-approved pumps will be supplied with serial number, special installation and operating instructions and a nameplate including the ATEX classification.

An ATEX-approved pump report is available on request.

Scope of ATEX categories for CR pumps

Group I	
Category M2	
Underground installations in mines liable to be endangered by explosive gases 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*

* Air or hydraulic motors are not available from Grundfos.

Group II				
	Category 2		Category 3	
Installation areas liable to be endangered by explosive atmospheres.	Pumps intended for use in areas in which explosive atmospheres are likely to occur.		Pumps intended for use in areas in which explosive atmospheres only rarely occur.	
	G (gas)	D (dust)	G (gas) ²⁾	D (dust)
CR pumps available	CR, CRI, CRN ¹⁾	CR, CRI, CRN, CRT	CR, CRI, CRN, CRT	CR, CRI, CRN, CRT
Motors available	VEM 2G EEx e IIT3 CEMP 2G EEx d IIB T4	VEM 2D 125°C	VEM 2G EEx e IIT3 CEMP 2G EEx d IIB T4	VEM 3D 125°C

¹⁾ Solutions including MAGdrive or double shaft seal.

²⁾ **Note:** To enable the use of category 3 G CR pumps in zone 1 areas, the minimum requirement is a dry-running protection approved for zone 1. The dry-running protection **must** stop the pumps if the liquid supply ceases.

Magnetic-drive pump (MAGdrive)

General information

The zero-leakage, custom-built pump with magnetic drive (MAGdrive) is recommended for the pumping of hazardous or aggressive liquids. Grundfos MAGdrive protects the surrounding environment and the people working in the vicinity of the pump.

Reference applications

- Chemical industry (aggressive or toxic liquids)
- Petrochemical industry (volatile liquids)
- Pharmaceutical industry.

Pump range

The following Grundfos pumps are available with MAGdrive:

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

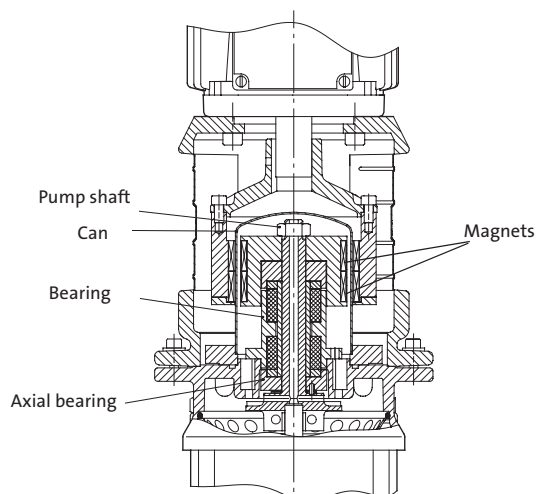
Technical description

In the Grundfos MAGdrive pump, the power from the motor is transmitted to the pump shaft by means of magnetic force instead of by a traditional coupling. 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. Due to the power loss, the MAGdrive is cooled by the pumped liquid.

As all axial forces are absorbed in the MAGdrive, a standard motor with key hole must be used.

Grundfos MAGdrive is based on a standard MAK 66 magnetic Burgmann coupling.

Sectional drawing



TMO2 17721 1901

Dimensions

Standard motor [Hp]	MAGdrive motor [Hp]	Additional height [in]
1/2	3/4	3 1/8
1/2	1	4 3/4
1/2	1 1/2	4 3/4
3/4	1 1/2	4 3/4
3/4	2	7 1/3
1	1 1/2	2 7/8
1	2	5 1/2
1 1/2	1 1/2	2 7/8
1 1/2	2	5 1/2
1 1/2	3	5 1/2
2	2	2 7/8
2	3	2 7/8
3	3	2 7/8
3	4	5
4	4	2 3/4
4	5 1/2	4 3/4
5 1/2	5 1/2	2 3/4
5 1/2	7 1/2	4
7 1/2	7 1/2	2
7 1/2	10	2
10	10	2

Operating range

Pump type	Viscosity range [cp]	Max. pressure [psi]	Temp. range [°F]
CRN 1s, 1, 3 and 5	0.3 - 150	232/362	-22 to +356

Reference numbers

Pump type	Reference number
CRN 1s-2 to CRN 1s-27	98 94 82
CRN 1-2 to CRN 1-27	98 97 07
CRN 3-2 to CRN 3-25	98 97 05
CRN 5-2 to CRN 5-12	98 97 03
CRN 5-13 to CRN 5-24	98 97 02

The following rubber part solutions are available:

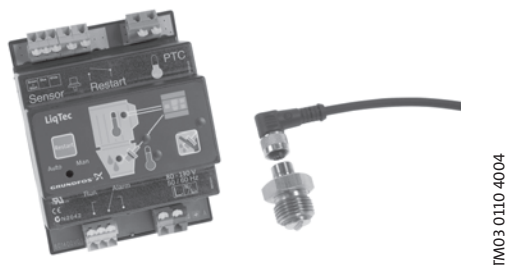
- EPDM
- FXM
- FFKM
- FKM.

Note: When ordering a Grundfos MAGdrive, please provide the following:

- liquid temperature [°F]
- liquid viscosity [cp]
- frequency [Hz]
- voltage [V].

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

LiqTec™ dry-running sensor



General information

The Grundfos LiqTec dry-running sensor stops the pump immediately if

- there is no liquid in the pump (dry-running)
- the liquid temperature exceeds $266^{\circ}\text{F} \pm 9^{\circ}\text{F}$
- 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 pump head close to the shaft seal.

Reference applications

Any application involving a risk of dry running.

Pump range

The LiqTec is available for the following Grundfos pumps:

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

Technical description

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

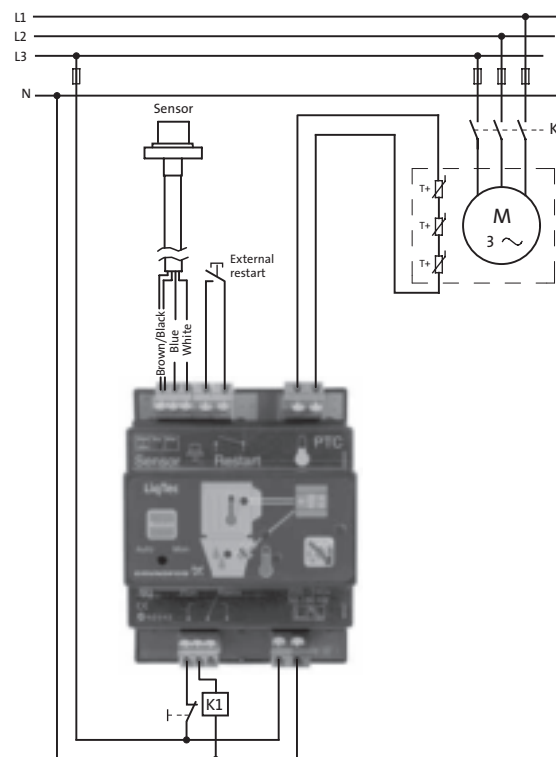
If there is no liquid present, the LiqTec detects a high temperature in the sensor and cuts out the pump immediately. The risk of pump breakdown is thus further reduced by up to 50%.

The LiqTec also prevents excessive liquid temperatures from damaging the pump. If the LiqTec senses a liquid temperature above 266°F , it cuts out the pump immediately. Further the LiqTec is a failsafe device, meaning that the pump stops as soon as the sensor detects an error on the sensor cable, the electronics or if the power supply of the control unit is cut off.

Restarting after a pump cut-out can be done automatically or manually when liquid in the pump is again detected by the sensor. Remote restarting is possible via a digital input.

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

Installation example



Dimensions

4 5/8 x 3 9/16 in. The LiqTec can be fitted to a DIN rail to be incorporated in a control cabinet.

Operating range

Power supply	1 x 80-130 V, 50/60 Hz or 1 x 200-240 V, 50/60 Hz
Power consumption	5 W
Max. pressure	580 psi
Min./max. liquid temperature	$-4^{\circ}\text{F}/266^{\circ}\text{F}$
Max. ambient temperature	104°F
Humidity	99%
Pumped liquid	Any water based liquid handled by Grundfos pumps
Cable length	16 1/2 / 49 1/4 feet

Reference numbers

Pump type	Reference number
CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20, 32, 45, 64 and 90	99 96 82

Horizontally mounted pumps



GR5379

General information

For safety and space-saving reasons, the pump can be mounted in the horizontal position.

Reference applications

- Ships
- Earthquake areas (low center of gravity)
- Places with limited access and space.

Pump range

The following Grundfos pumps are available for horizontal mounting:

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

Also available for CRT 2, 4, 8, 16.

Technical description

The pumps are supplied with separate mounting plates for support of pump and motor.

Note: The following pump types are fitted with a B3 / B5 foot/flange mounted motor:

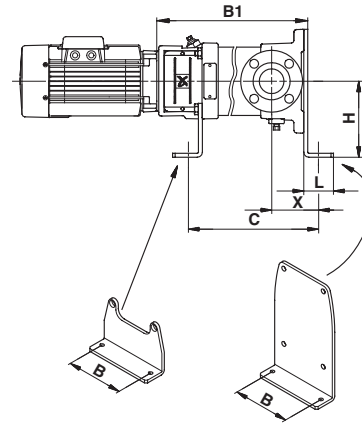
- CR, CRI, CRN 1 to 20 with motors ≥ 10 Hp and
- CR, CRN 32, 45, 64 and 90.

Reference numbers

Pump type	Reference number
CR, CRI, CRN 1s, 1, 3 and 5	98 99 51
CR, CRI, CRN 10, 15 and 20 ≤ 5 Hp	98 94 76
CR, CRI, CRN 10, 15 and 20 ≥ 7.5 Hp	98 94 77
CR, CRN 32, 45, 64 and 90	98 98 53

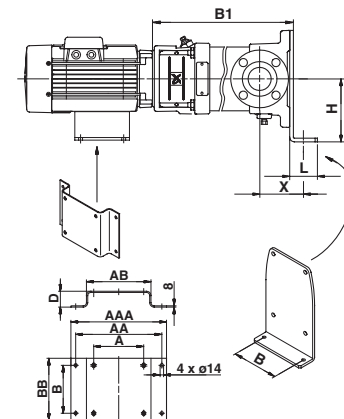
Dimensional drawings

CR, CRI, CRN 1s, 1, 3, 5,
CR, CRI, CRN 10, 15 and 20 ≤ 5 Hp



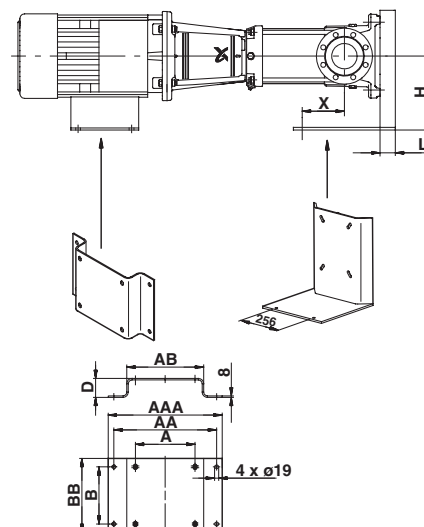
TM02 8372 5003

CR, CRI, CRN 10, 15 and 20 ≥ 7.5 Hp



TM02 8373 5003

CR, CRN 32, 45, 64 and 90



TM02 7426 3403

Dimensions

CR, CRI, CRN 1s, 1 , 3 and 5, support for base plate and pump head

Motor [hp]	B [in]	H [in]	L [in]	C [in]	X [in]	X [in]
					Connections	
					ANSI	Oval, PJE, FlexiClamp
1/2-2				B1-3 3/8		
3-5	5 1/2	5 1/2	2	B1-3 1/4	4 1/8	3 1/8
7 1/2-10				B1-4 7/8		

For pump height B1, see the CR, CRI, CRN Product Guide.

CR, CRI, CRN 10, 15 and 20, support for base plate and pump head

Motor [hp]	B [in]	H [in]	L [in]	C [in]	Connections	
					CR, CRI, CRN 10	
					X [in]	
					CR, CRI, CRN 15/20	
1/2-2				B1-3 1/4	ANSI, Oval, PJE, Flexiclamp	
3-5	6 3/4	6 7/8	2	B1-4 3/8	4 3/8	4 3/4

For pump height B1, see the CR, CRI, CRN Product Guide.

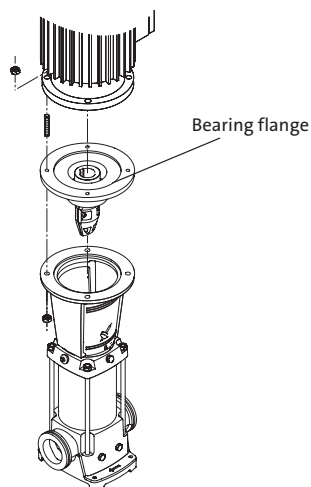
CR, CRI, CRN 10, 15 and 20, support for base plate and motor

Motor [hp]	A [in]	AA [in]	AAA [in]	B [in]	BB [in]	D [in]	H [in]	L [in]	AB [in]	Connections	
										CR, CRI, CRN 10	
										X [in]	
										CR, CRI, CRN 15/20	
7 1/2	8 1/2	2 7/8	14 1/2	5 1/2	7 1/8	2 5/8	7 7/8	1 4	10 7/8	ANSI, Oval, PJE, Flexiclamp	
10	8 1/2	2 7/8	14 1/2	5 1/2	7 1/8	2 5/8	7 7/8	1 4	10 7/8	ANSI, Oval, PJE, Flexiclamp	
15	10	5 1/8	16 3/4	8 1/4	10 1/4	1 1/2	7 7/8	1 4	12 3/4	4 3/8	4 3/4
20	10	5 1/8	16 3/4	8 1/4	10 1/4	1 1/2	7 7/8	1 4	13 1/8		
25	10	5 1/8	16 3/4	10	12 1/4	1 1/2	7 7/8	1 4	13 1/8		

CR, CRN 32, 45, 64 and 90, support for base plate and motor

Motor [hp]	A [in]	AA [in]	AAA [in]	B [in]	BB [in]	D [in]	AB [in]	H [in]	L [in]	Connections	
										CR, CRN 32	
										X [in]	
										CR, CRN 45, 64, 90	
2	5 1/2	12 5/8	15	5	6 1/2	7 7/8	8 5/8	11 3/8	2 3/8	Connection	
3	5 1/2	12 5/8	15	5	6 1/2	7 7/8	8 5/8	11 3/8	2 3/8	ANSI	
5	7 1/2	14 1/2	17	5 1/2	7 1/8	7	10 7/8	11 3/8	2 3/8		
7 1/2	8 1/2	15 1/2	18	5 1/2	7 1/8	6 1/4	11 7/8	11 3/8	2 3/8		
10	8 1/2	15 1/2	18	5 1/2	7 1/8	6 1/4	11 7/8	11 3/8	2 3/8		
15	10	17 3/8	19 5/8	8 1/4	10 7/8	5 1/8	13 3/8	11 3/8	2 3/8		
20	10	18	20 1/4	8 1/4	10 1/2	5 1/8	13 3/8	11 3/8	2 3/8		
25	10	18	20 1/4	10	12 1/4	5 1/8	13 3/8	11 3/8	2 3/8		
30	11	19	21 1/2	9 1/2	12 1/4	4 3/8	14 3/8	11 3/8	2 3/8		
40	12 1/2	21 1/4	23 5/8	12	14 3/8	3 1/2	16 1/8	11 3/8	2 3/8		
50	12 1/2	21 1/4	23 5/8	12	14 3/8	3 1/2	16 1/8	11 3/8	2 3/8		
60	14	22 7/8	25 1/4	12 1/4	14 1/2	2 1/2	17 3/4	11 3/8	2 3/8		

Pumps with bearing flange



TM01 4354 0199

General information

A bearing flange is used in two situations:

- *A standard motor with standard ball bearing configuration is required:*
The bearing flange absorbs the hydraulic load from the pump, ensuring an acceptable motor bearing life.
- *The pump is required to run at a higher inlet pressure than the maximum pressure recommended:*
The bearing flange prevents movement of the angular contact bearing in the motor.

Reference applications

High-pressure applications such as

- cleaning
- boiler-feed water treatment
- reverse osmosis.

Pump range

The following Grundfos pumps are available with bearing flange:

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

Also available for CRT 2, 4, 8, 16.

Technical description

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 in order to obtain optimum alignment.

The bearing flange requires a standard motor with keyway.

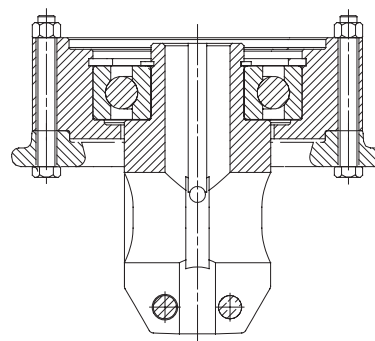
Note: For motor sizes above 15 hp, the bearing flange is equipped with grease nipples and must be lubricated regularly. Please follow the instructions on the bearing flange.

Sectional drawings

CR, CRI, CRN 1s, 1, 3, 5, <= 7.5 Hp

CR, CRI, CRN 10, 15 and 20, <= 5 Hp

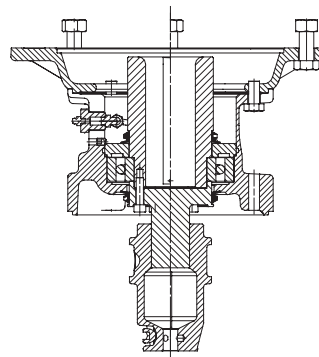
NEMA 56 C - NEMA 213-5 TC



TM02 7436 3403

CR, CRI, CRN 10, 15 and 20, > 5 Hp

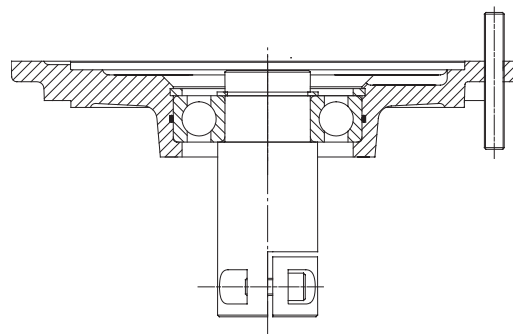
NEMA 254 TC - NEMA 284 TC



TM02 7437 3403

CR, CRN 32, 45, 64 and 90, <= 10.0 Hp

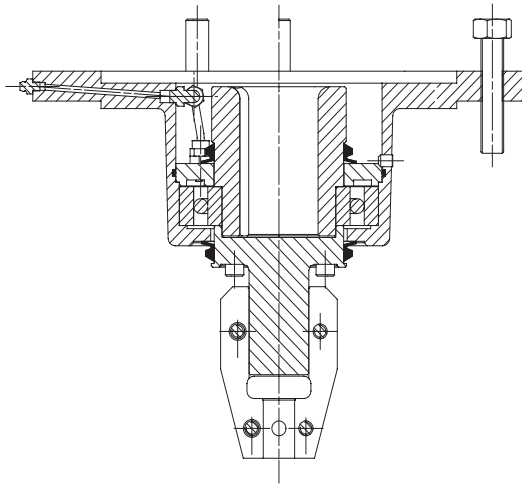
NEMA 182 TC - NEMA 215 TC



TM01 4352 0199

CR, CRN 32, 45, 64 and 90, >10 Hp

NEMA 254 TSC - NEMA 365 TSC



TM01 4353 0503

Dimensions

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

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

Motor type	Motor power	Additional height [in]
NEMA 56C/148.2	1/3 - 2 [Hp]	1 1/2
NEMA F182 TC	3 - 5 [Hp]	1 3/4
NEMA 213-5 TC	7 1/2 [Hp]	1 3/4
NEMA 254-6	15 [Hp]	3 7/8
NEMA 284-6	20-40 [Hp]	5 1/3

CR, CRN 32, 45, 64 and 90

Motor type	Motor power	Additional height [in]
NEMA 182 TC - NEMA 215 TC	3 - 10 [Hp]	7/8
NEMA 254 TSC - NEMA 365 TSC	15 - 60 [Hp]	5/8

Reference numbers

CR, CRI, CRN 1s, 1, 3, 5, <= 7.5 Hp

CR, CRI, CRN 10, 15 and 20, <= 5 Hp

Motor type	Motor power	Bearing type in flange	Reference number
NEMA 56C/148.2	1/3 - 2 [Hp]	6308 2RS C3	98 96 51
NEMA F182 TC	3 - 5 [Hp]	6310 2RS C3	98 96 50
NEMA 213-5 TC	7 1/2 [Hp]	6310 2RS C3	98 96 49

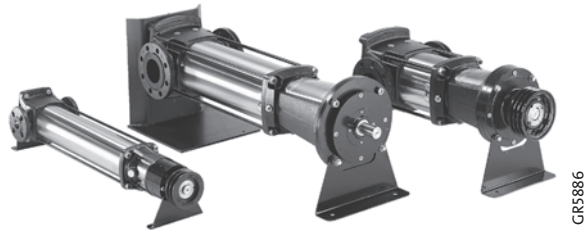
CR, CRI, CRN 10, 15 and 20, > 5 Hp

Motor type	Motor power	Bearing type in flange	Reference number
NEMA 254-6	15 [Hp]	QJ 216 MPA	98 94 87
NEMA 284-6	20-40 [Hp]	QJ 216 MPA	98 94 88

CR, CRN 32, 45, 64 and 90

Motor type	Motor power	Bearing type in flange	Reference number
NEMA 182 TC	3-5 [Hp]	6310 2RS	98 98 45
NEMA 213 TC	7 1/2-10 [Hp]	6310 2RS	98 98 14
NEMA 215 TC			
NEMA 254 TSC	15 [Hp]	QJ 216 MPA	98 98 42
NEMA 256 TSC	20-40 [Hp]	QJ 216 MPA	98 98 41
NEMA 284 TSC			
NEMA 286 TSC			
NEMA 324 TSC	50-60 [Hp]	QJ 216 MPA	98 98 40
NEMA 326 TSC			
NEMA 364 TSC			
NEMA 365 TSC			

Belt-driven pumps



CR5886

General information

A belt-driven pump is designed to operate in places with limited space or where no electrical power is available.

Reference applications

Diesel-engine-driven or steam-turbine-driven applications such as:

- applications in remote/distant areas
- mobile applications
- fire protection.

Pump range

The following Grundfos pumps are available as belt-driven pumps:

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

Also available for CRT 2, 4, 8, 16.

Technical description

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

A pulley wheel is attached to the end of the shaft.

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 using the extra support plates.

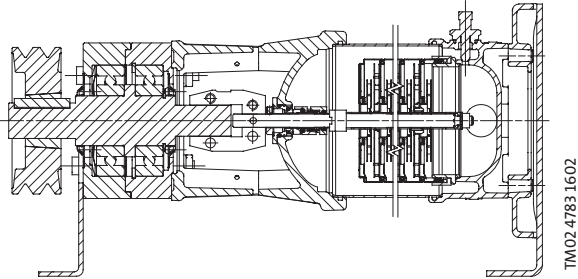
The pulley head is positioned on the motor stool where the motor would normally be fitted. Using the existing holes in the motor stool, the pulley head can be secured to the motor stool with bolts, washers and nuts. The pulley wheel is then attached to the shaft using an appropriate bush and key.

For extended bearing life, the following pulley wheel sizes are recommended:

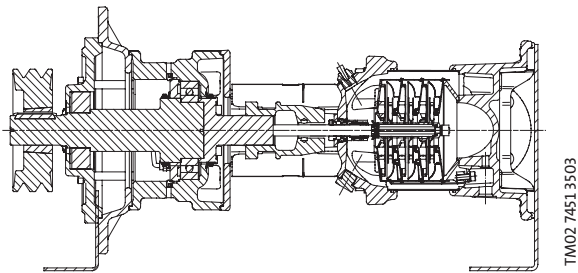
Pulley head	Type III	Type IV	Type II	Type I
	1/2 - 7 1/2 Hp	10 - 25 Hp	2 - 10 Hp	15 - 60 Hp
Pump type	CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20	CR, CRI, CRN 10, 15, 20	CR, CRN 32, 45, 64, 90	
Pulley wheel diameter	ø4 3/8 - 5 3/8	Min. ø7 7/8	Min. ø6 1/4	Min. ø7 7/8
Number of belts	2	Min. 3	Min. 2	Min. 3
Pump speed [rpm]	Max 3000			

Sectional drawings

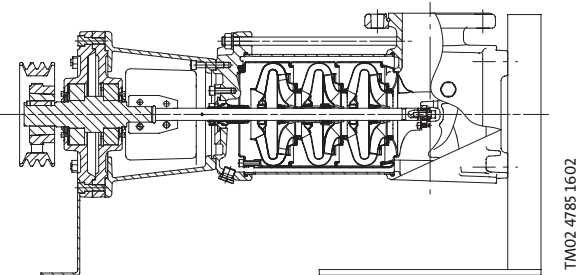
CR, CRI, CRN 1s, 1, 3, 5, 10, 15 and 20 (type III)



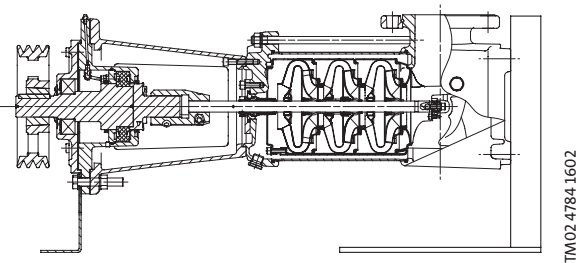
CR, CRI, CRN 10, 15 and 20 (type IV)



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



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



Dimensions

Pump type	Pulley head	Additional height from top of motor stool [in]
CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20	Type III	5 3/4
CR, CRI, CRN 10, 15, 20	Type IV	12 1/4
CR, CRN 32, 45, 64 and 90	Type II	4 7/8
	Type I	5 7/8

Reference numbers

Pump type	Pulley head	Reference number
CR, CRI, CRN 1s, 1, 3, 5, 10, 15, 20	Small	98 96 48
CR, CRI, CRN 10, 15, 20	Type II	98 94 89
CR, CRN 32, 45, 64 and 90	Type II	98 96 47
	Type I	98 96 46

For horizontal installation, the belt-driven pumps are supplied with both brackets as standard.

Pumps for liquid temperatures down to -40°F



GR5219

General information

Grundfos offers pumps suitable for the pumping of liquids of extreme temperatures down to -40°F.

Reference applications

- Cooling systems with antifreeze and brines
- Ventilation systems
- Industrial processes.

Pump range

The following Grundfos pumps are available for liquid temperatures down to -40°F:

Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64	CR 90
CR											
CRI	•	•	•	•	•	•	•				
CRN	•	•	•	•	•	•	•	★	★	★	★

★ The standard CRN 32, 45, 64 and 90 pumps fitted with shaft seal type HQQE are capable of operating at liquid temperatures down to -40°F.

Technical description

CRI, CRN 1s, 1, 3, 5, 10, 15 and 20 feature

- PTFE neck rings with inner diameter exceeding standard dimensions.

Please note that pumped liquids containing antifreeze often require the use of oversize motors due to the higher viscosity of these liquids.

Dimensions

Dimensions are identical to those of a standard pump.

Reference numbers

Pump type	Reference number
CRI, CRN 1s, 1, 3 and 5	98 98 75
CRI, CRN 10, 15 and 20	98 94 78

Carbon-free pumps

General information

Certain processes such as industrial processes in the electronics industry require the use of pumps containing absolutely no carbon fibers.

Reference applications

- Ultra-purification processes
- Flushing processes in the electronics industry.

Pump range

The following Grundfos pumps are available as carbon-free pumps:

Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64	CR 90
CR	★	★	★	★	★	★	★	●	●	●	●
CRI	★	★	★	★	★	★	★				
CRN	★	★	★	★	★	★	★	●	●	●	●

★ CR, CRI, CRN 1s, 1, 3, 5, 10, 15 and 20 are carbon-free as standard if non-carbon seal face material is chosen.

Technical description

A carbon-free pump differs from a standard pump in the following ways:

- Bearings are made of SiC/SiC.
- Neck rings and bushes are made of carbon-free PTFE (white PTFE).

Dimensions

Dimensions are identical to those of a standard pump.

Reference numbers

Pump type	Number of stages	Reference number
	1 - 2	98 98 02
CR, CRN 32, 45, 64 and 90	3 - 7	98 96 94
	8 - 14	98 96 93

Silicon-free pumps

General information

Silicon-free pumps are suitable for processes requiring the use of pumps not containing silicon.

Reference applications

- Production of paint and varnish
- Cleaning processes in the electronics industry.

Pump range

The following Grundfos pumps are available as silicon-free pumps:

Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64	CR 90
CR	●	●	●	●	●	●	●	●	●	●	●
CRI	●	●	●	●	●	●	●				
CRN	●	●	●	●	●	●	●	●	●	●	●

Technical description

A silicon-free pump differs from a standard pump in the following ways:

- Only FKM rubber is used.
- All components, except the electric motor, are washed in "DX 380 Low-Voc cleaner".
- Spare parts ordered together with the pump are also washed in "DX 380 Low-Voc cleaner".
- The pump is assembled in a room separated from the production area.
- Tools used for the assembly of the pump do not contain silicon.
- The assembled pump is checked visually; performance is not tested.
- The pump is wrapped in silicon-free plastic before being packing.

Dimensions

Dimensions are identical to those of the standard pump.

Reference numbers

Pump type	Reference number
CR, CRI, CRN 1s, 1, 3, 5, 10, 15 and 20	98 99 54
CR, CRN 32, 45, 64 and 90	

Pumps for pharmaceutical and biotechnological applications

General information

The Grundfos CRN range is designed for applications requiring the sterilization and CIP capability of pipes, valves and pumps. (CIP = Cleaning-In-Place).

In addition, some applications make special demands on the system in terms of safety or process technology.

Certificates can be ordered on request for

- WRC
- FDA (rubber parts)
- different material certificates, see page 16.

Solutions

Grundfos offers the following solutions to meet these special requirements:

- TriClamp connection
- Cleaned and dried pumps
- Electropolished pumps.

TriClamp

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

The gasket is made of PTFE or EPDM.

Pump range

The base with TriClamp connection is available for the following Grundfos pumps:

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



Reference numbers

Base with TriClamp connection

Pump type	Reference number
CRI, CRN 1s, 1, 3 and 5	98 96 92
CRI, CRN 10, 15 and 20	98 94 79



Part numbers

Two gaskets and two couplings

Pump type	Pipework connection	Gasket parts	Part number
CRI, CRN 1s, 1, 3 and 5	1 1/2"	EPDM	96 51 53 74
CRI, CRN 1s, 1, 3 and 5	1 1/2"	PTFE	96 51 53 75
CRI, CRN 10, 15 and 20	2"	EPDM	96 51 53 76
CRI, CRN 10, 15 and 20	2"	PTFE	96 51 53 77

Cleaned and dried pumps

Pump range

The following Grundfos pumps are available as cleaned and dried pumps:

Pump type	CR 1s	CR 1	CR 3	CR 5	CR 10	CR 15	CR 20	CR 32	CR 45	CR 64
CR	•	•	•	•	•	•	•	•	•	•
CRI	•	•	•	•	•	•	•			
CRN	•	•	•	•	•	•	•	•	•	•

Also available for CRT 2, 4, 8, 16.

Technical description

Prior to assembly, the pump components are washed in pure, hot soap water, rinsed in de-ionized water, and dried.

Note: Cleaned and dried pumps are not performance tested in a test bed.

The pumps are wrapped in a plastic bag before being packed.

Reference numbers

Pump type	Reference number
CR, CRN 1s, 1, 3, 5, 10, 15 and 20	98 98 70
CR, CRN 32, 45, 64, 90	98 96 41

Electropolished pumps

General information

To substantially reduce the risk of corrosion of the materials and improve the cleanability.

Reference applications

The pharmaceutical-/food-/electronic industry.

Pump range

The following Grundfos pumps are available as electropolished pumps:

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

Technical description

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

Electro-polishing removes burrs as well as metallic and non-metallic inclusions, providing an extremely smooth, clean and corrosion-resistant stainless steel surface.

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

The CRN 1s, 1, 3, 5, 10, 15 and 20 cast parts are all mechanically polished before being electropolished.

Pump type	Stainless steel cast parts	Stainless steel plate parts	Surface roughness [μ in]
CRN 1s, 1, 3, 5, 10, 15 and 20	•		equal to or below 32
CRN 32, 45, 64, 90	•	•	400-600 equal to or below 32

Dimensions

Dimensions are identical to those of the standard pump.

Reference numbers

Pump type	Reference number
CRN 1s, 1, 3, 5	98 97 60
CRN 10, 15, 20	98 94 80
CRN 32, 45, 64, 90	98 96 25

Low-NPSH pumps

General information

The low-NPSH pumps are designed for poor suction conditions and/or high application temperatures.

The pumps are specially suited for handling poor inlet flows and liquid temperatures above 140°F.

Reference applications

- Boiler-feed applications
- Applications involving a risk of poor inlet/suction conditions
- High-temperature applications.

Pump range

The following Grundfos pumps are available as low-NPSH pumps:

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

Technical description

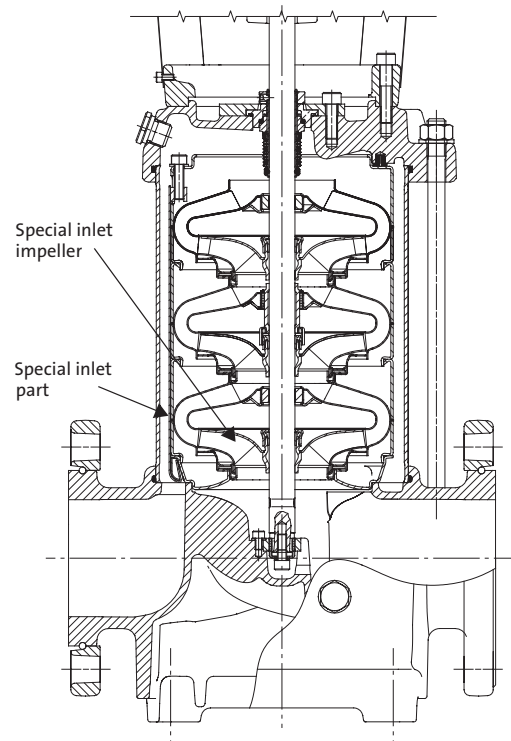
The low-NPSH pump are standard pumps provided with a special, oversized inlet impeller and chamber. This reduces the NPSH value and prevents erosion and destruction of pump, piping system and valves.

The improved inlet design may expose the low-NPSH pump to a higher level of stress as compared to conventional pumps, without affecting the stability of operation.

Dimensions and weights

Low-NPSH pumps have the same dimensions and weights as standard CR, CRI, CRN pumps. This information can be found in the CR(E), CRI(E), CRN(E) Product Guide.

Sectional drawing



TM01 8865 1200

Operating range

Max. pressure	362 psi
Max. liquid temperature	248°F ★
Max. ambient temperature	104°F

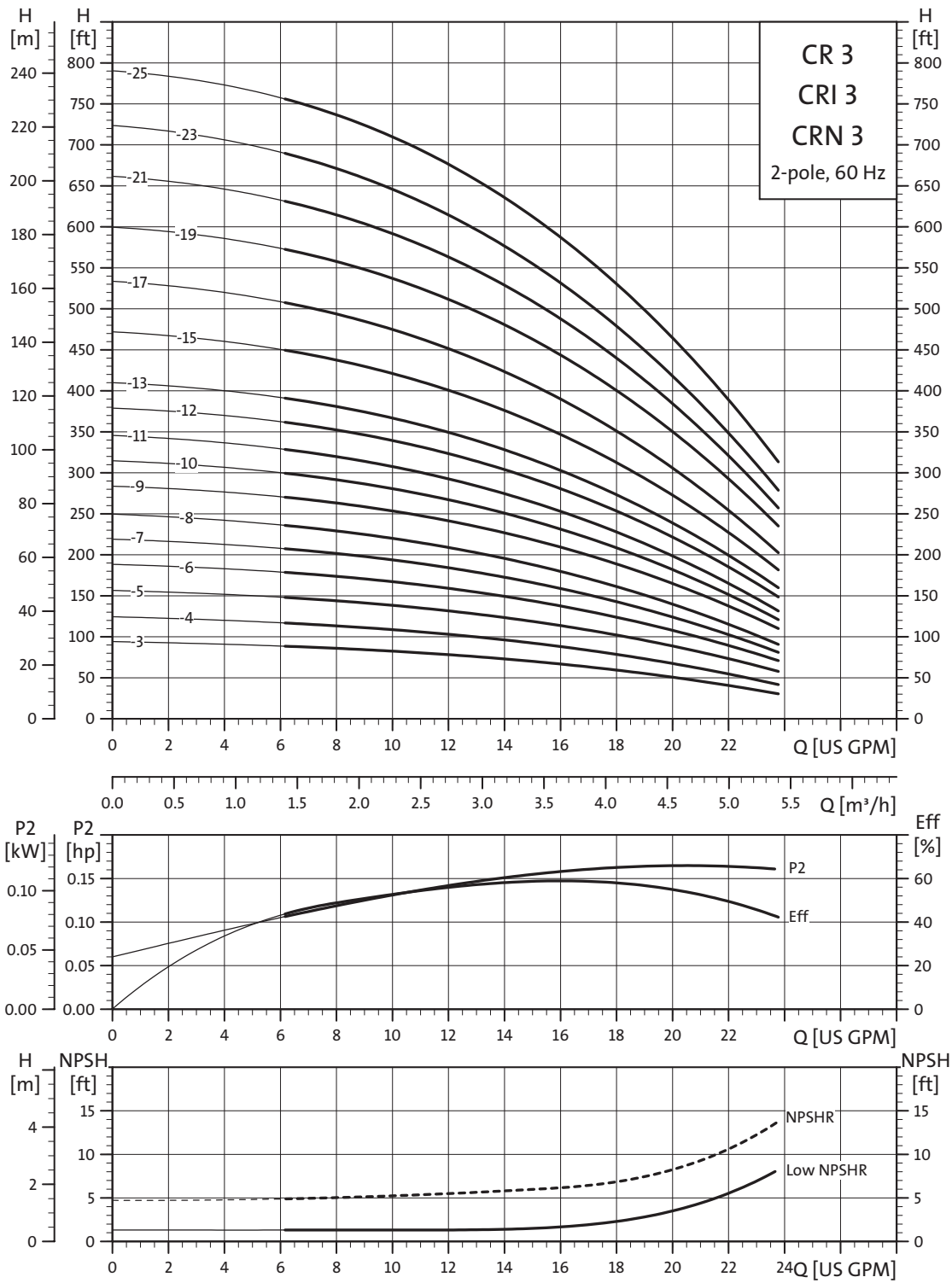
★ Max. liquid temperature is 356°F combined with the Cool-Top.

Reference numbers

Pump type	Reference number
CR, CRI, CRN 3	98 96 76
CR, CRI, CRN 5	98 96 84
CR, CRI, CRN 10, 15, 20	98 94 81
CR, CRN 32, 45, 64	98 97 64

Performance curves

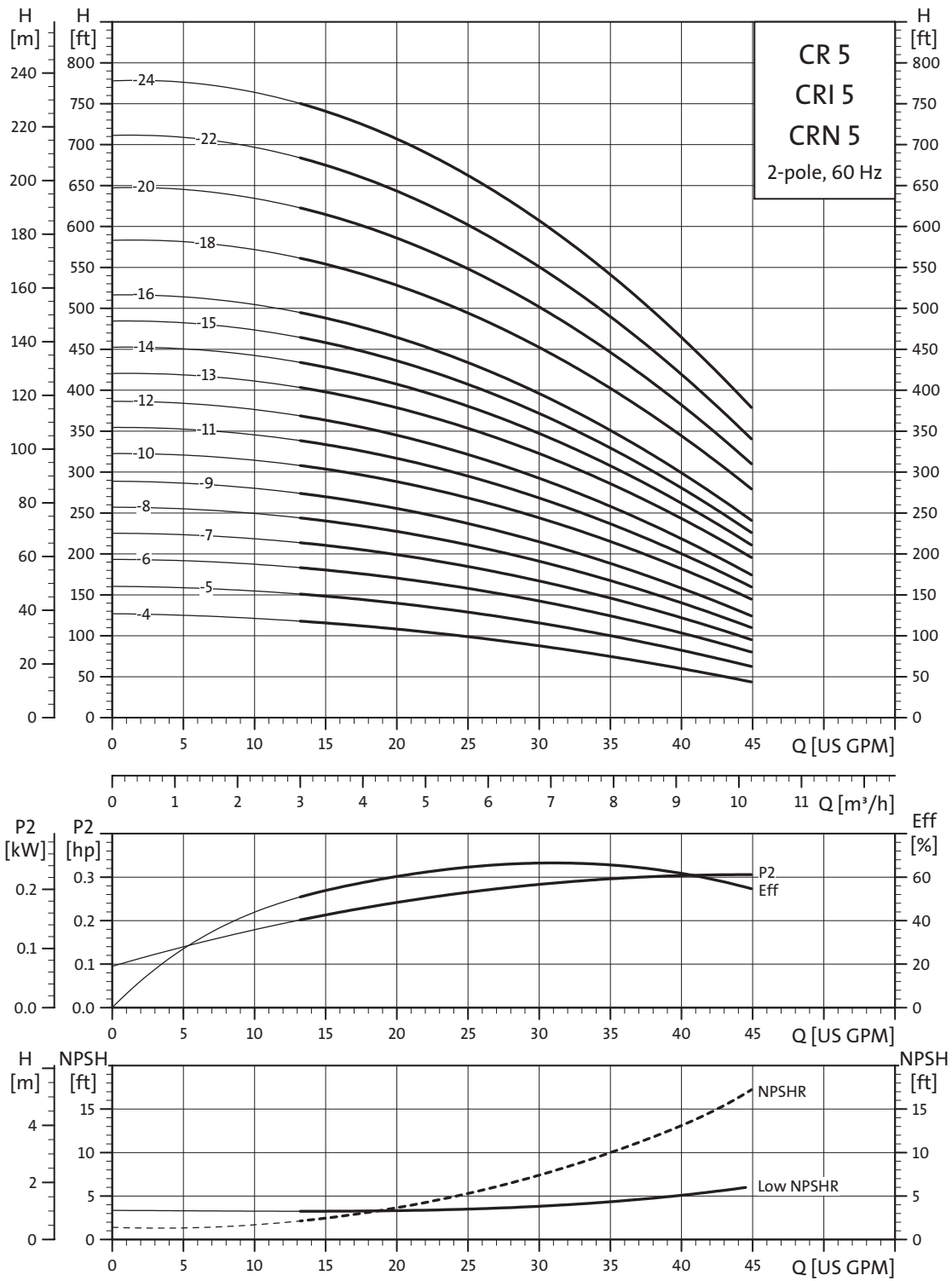
Low-NPSH pumps
CR 3, CRI 3, CRN 3



TM02 8378 5103

Performance curves

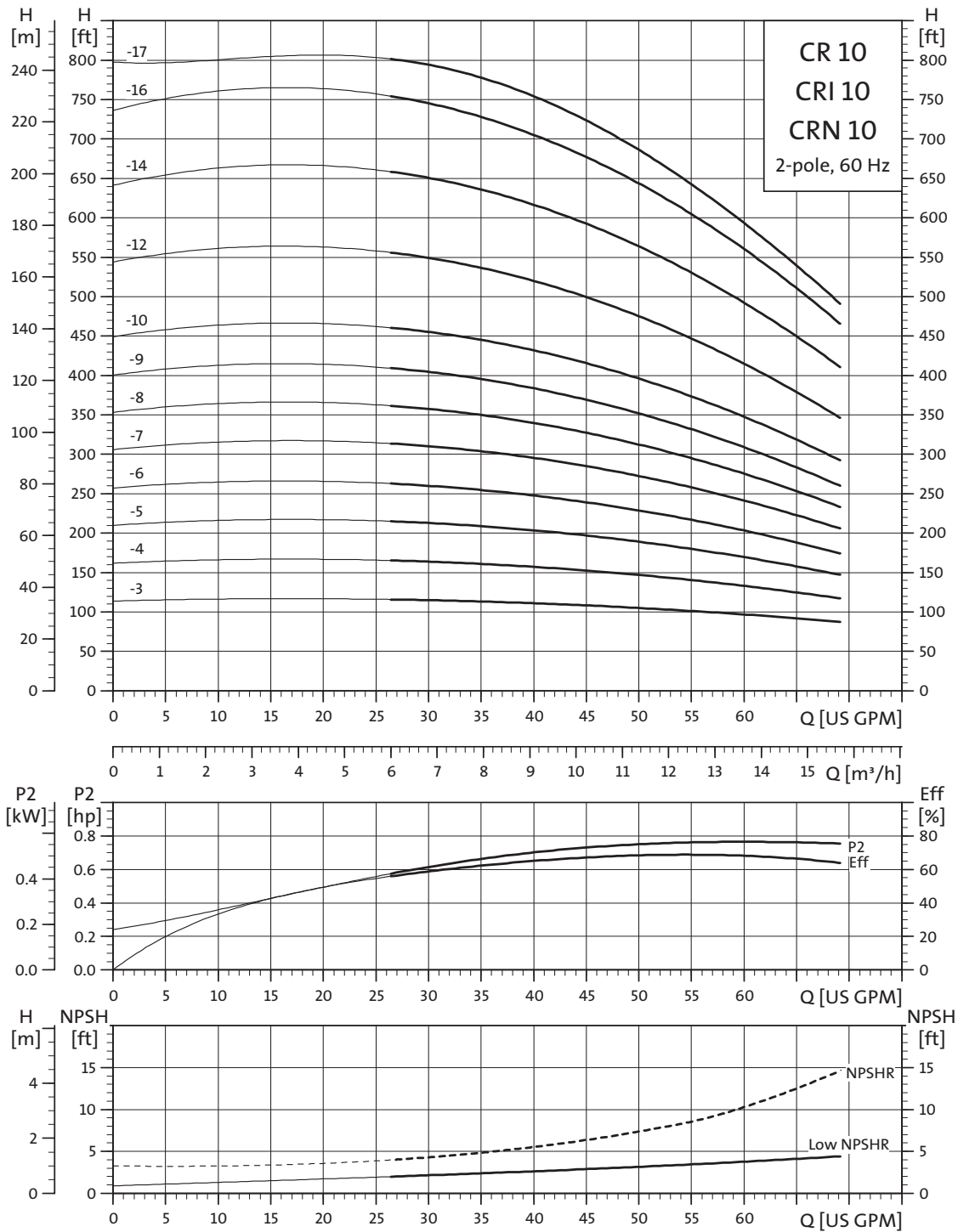
Low-NPSH pumps
CR 5, CRI 5, CRN 5



TM02 8379 5103

Performance curves

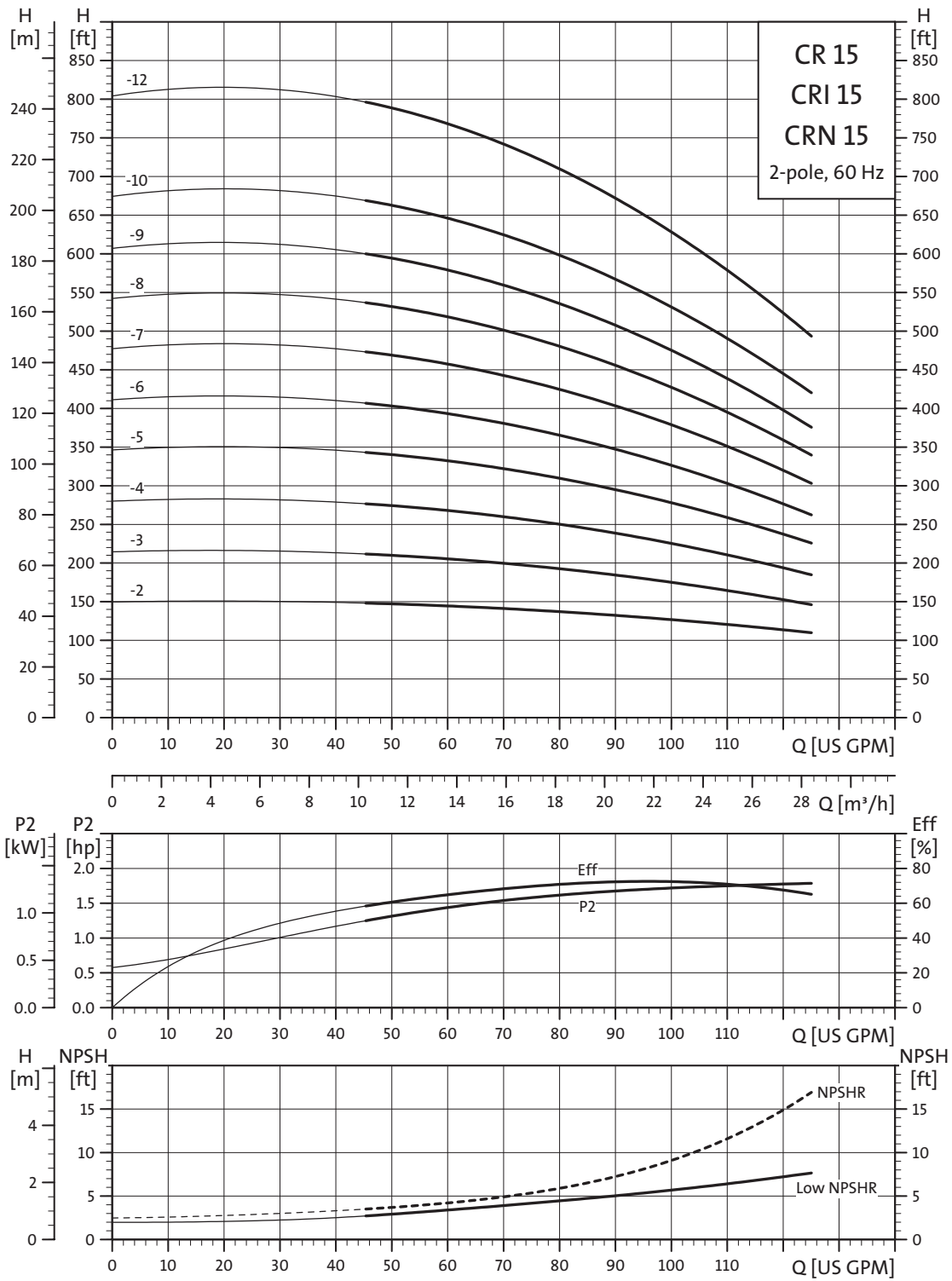
Low-NPSH pumps
CR 10, CRI 10, CRN 10



TM02 8380 2004

Performance curves

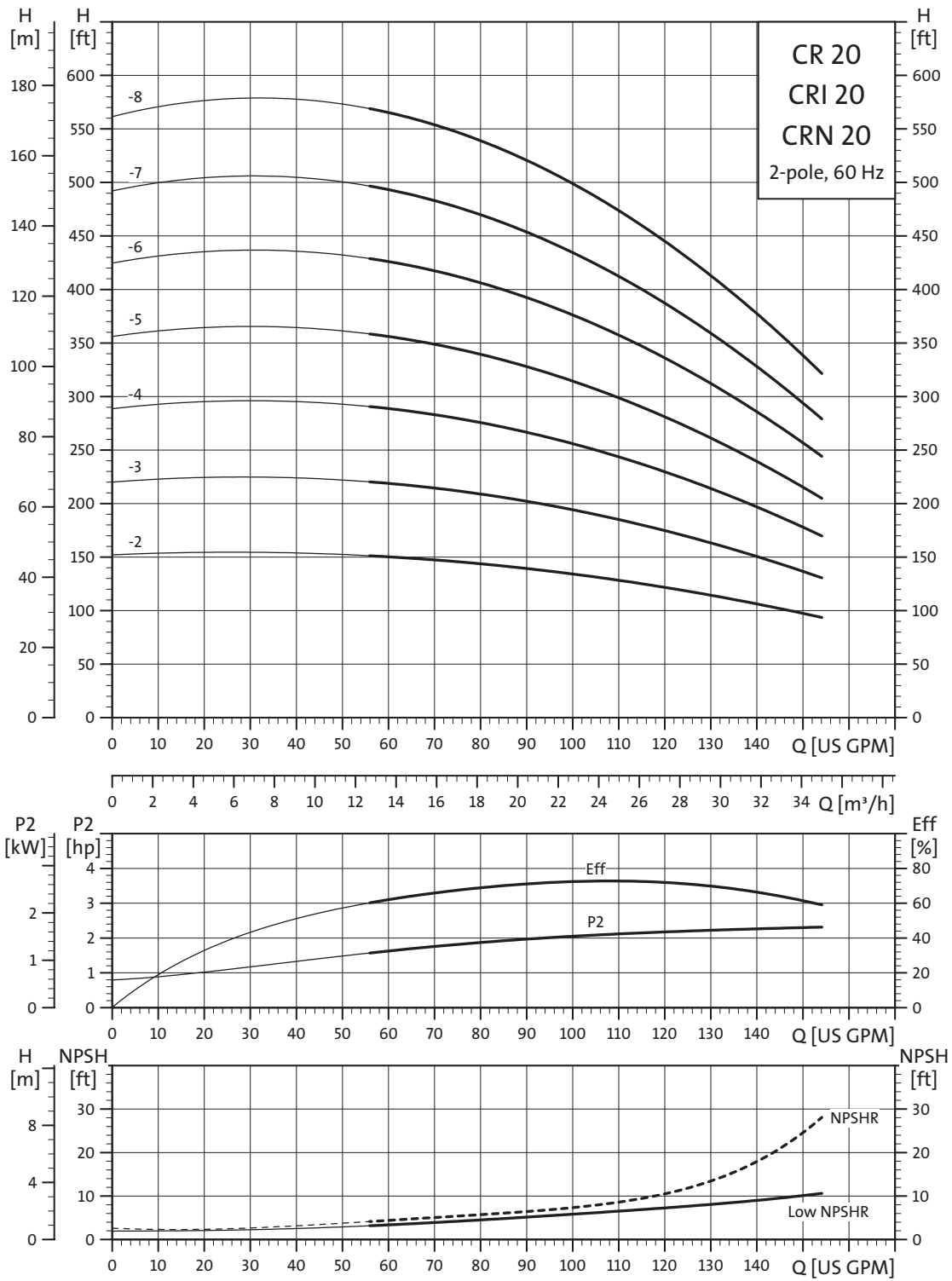
Low-NPSH pumps
CR 15, CRI 15, CRN 15



TM02 8381 5103

Performance curves

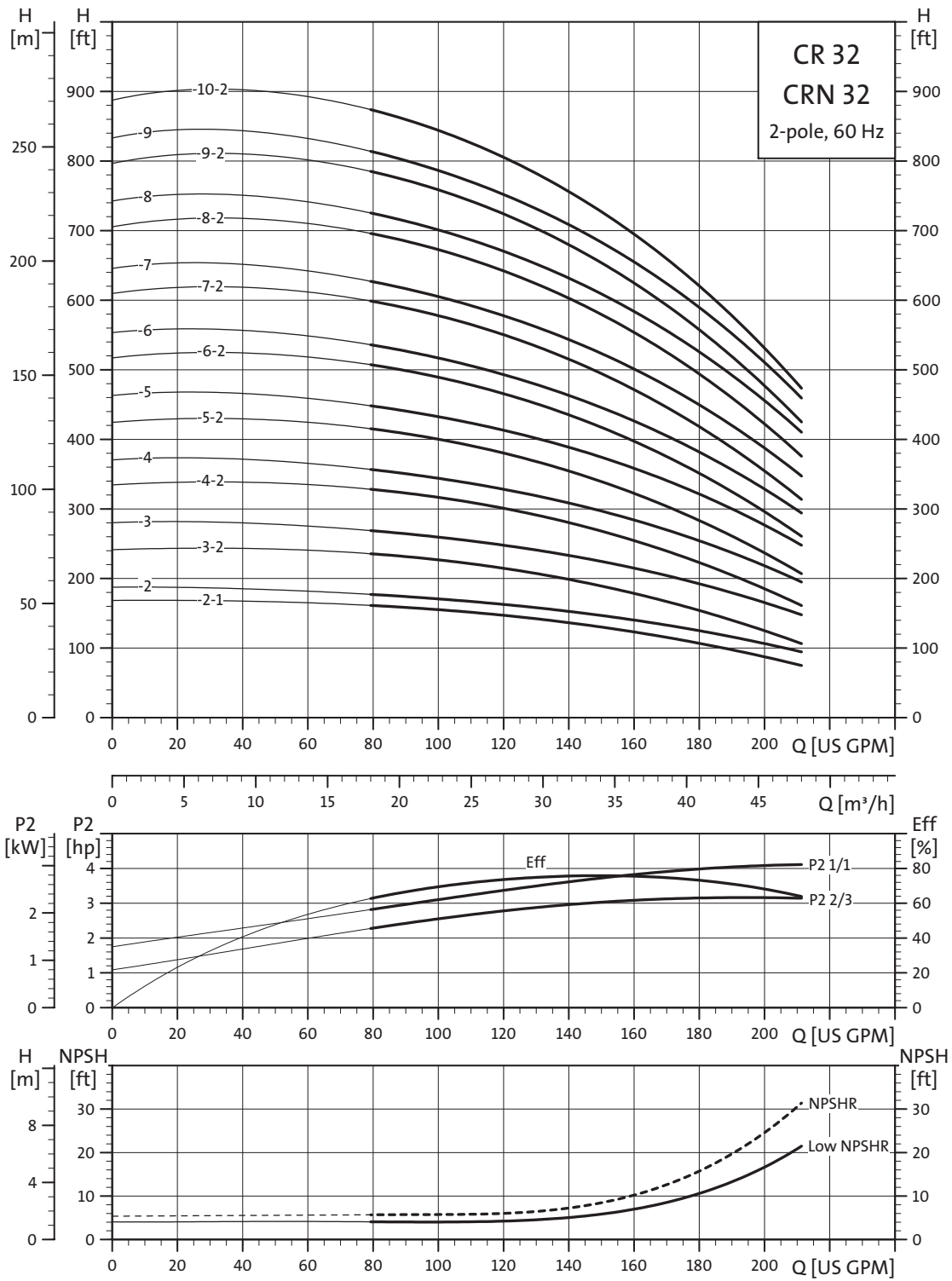
Low-NPSH pumps
CR 20, CRI 20, CRN 20



TM02 8382 5103

Performance curves

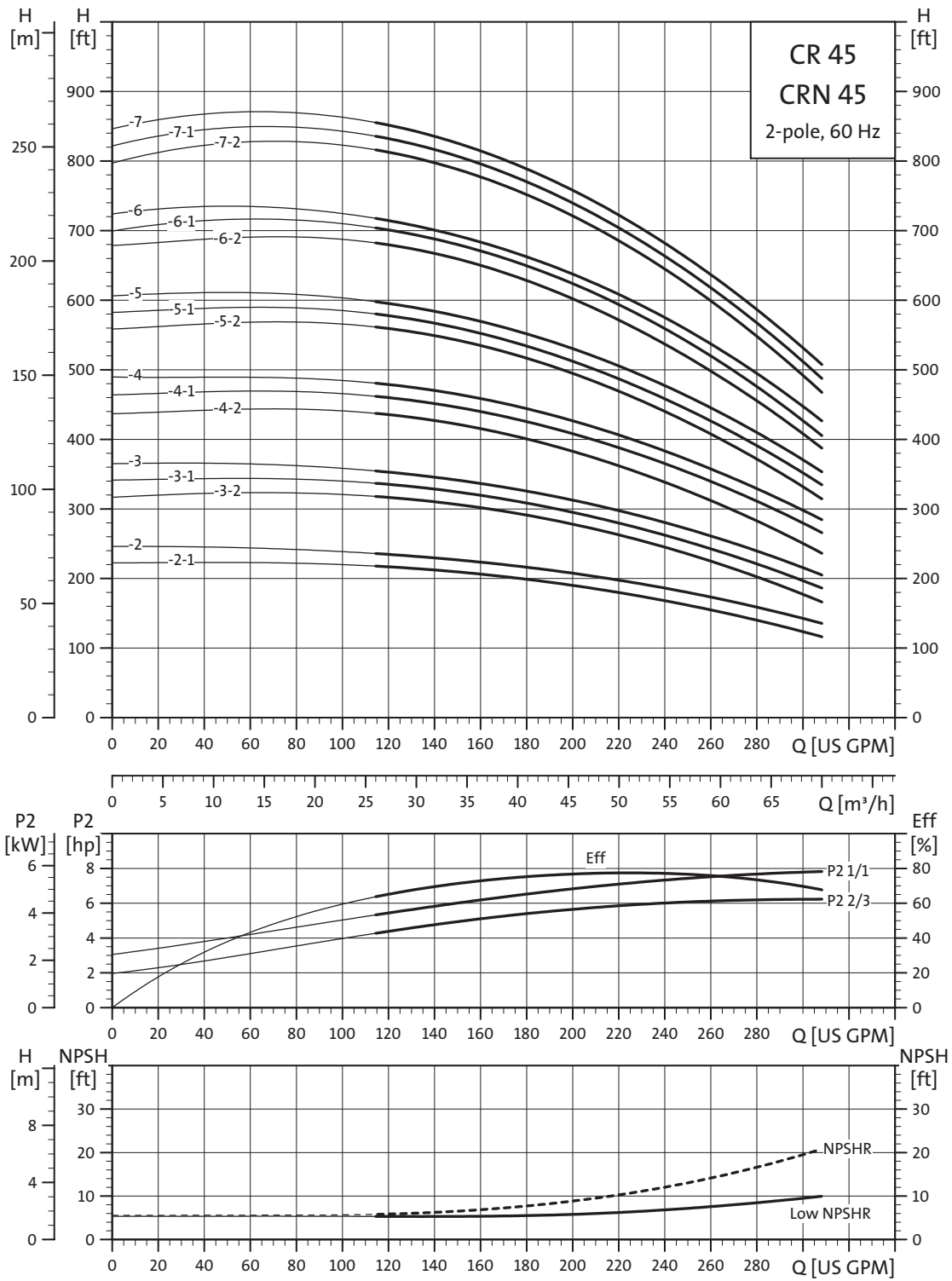
Low-NPSH pumps
CR 32, CRN 32



TM02 8383 5103

Performance curves

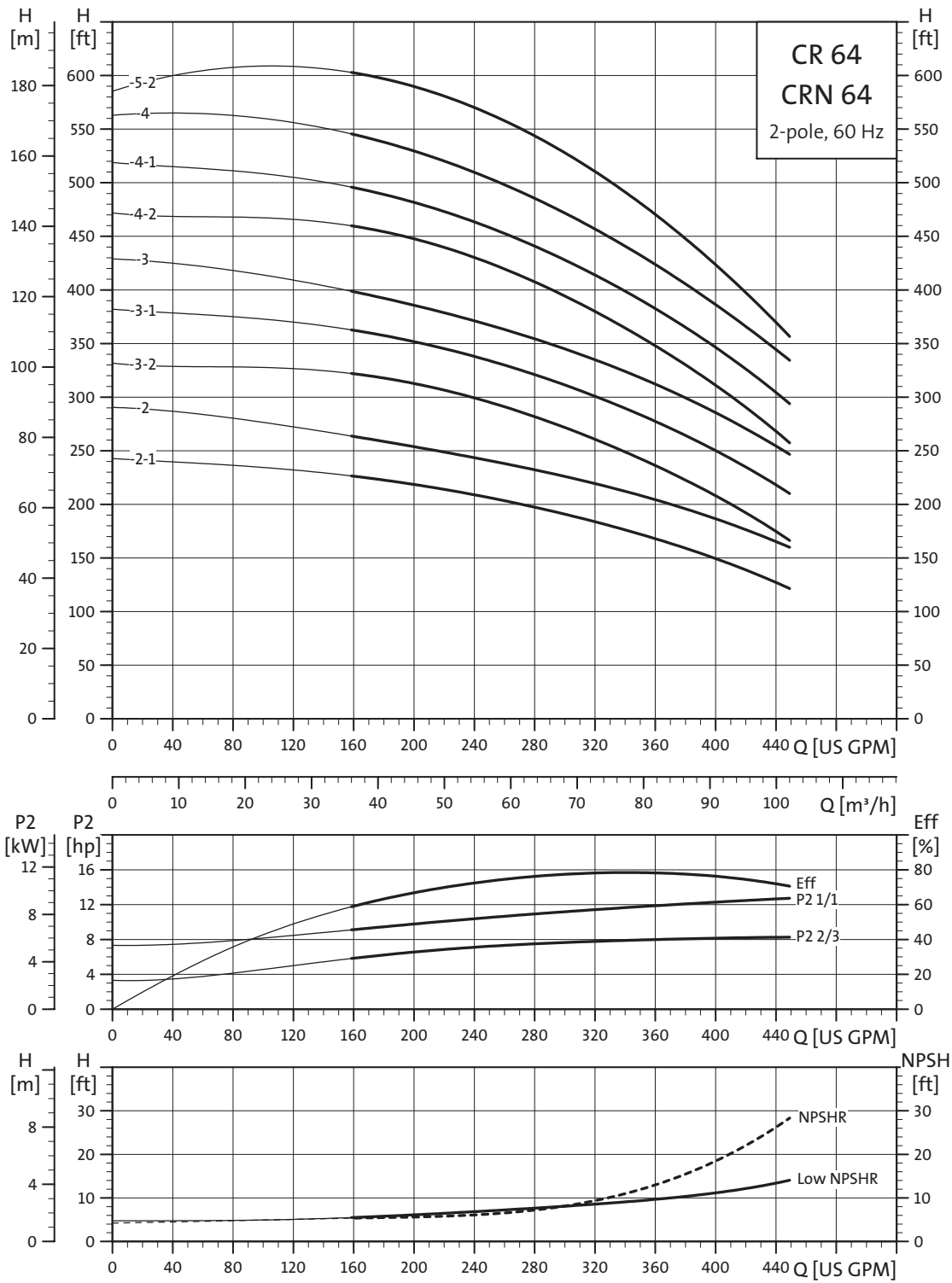
Low-NPSH pumps
CR 45, CRN 45



TM02 8384 5103

Performance curves

Low-NPSH pumps
CR 64, CRN 64



TM02 8385 5103

CR pumps with 4-pole motors



CR5381

General information

CR standard pumps fitted with 4-pole motors.

Reference applications

- Applications where a low sound pressure level is required
- Applications with poor inlet conditions.

Pump range

The following Grundfos pumps are available as 4-pole versions:

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

Technical description

Calculation of motor size:

Use the P2 curve on the following curve sheets to calculate the 4-pole motor size.

The minimum motor size available for each pump type is shown in the table.

Pump size	Motor size [HP]
CR 1	1/3
CR 3	1/3
CR 5	1/3
CR 10	1/3
CR 15	1/3
CR20	1/3
CR 32	3
CR 45	3
CR 64	3
CR 90	3

Reference numbers

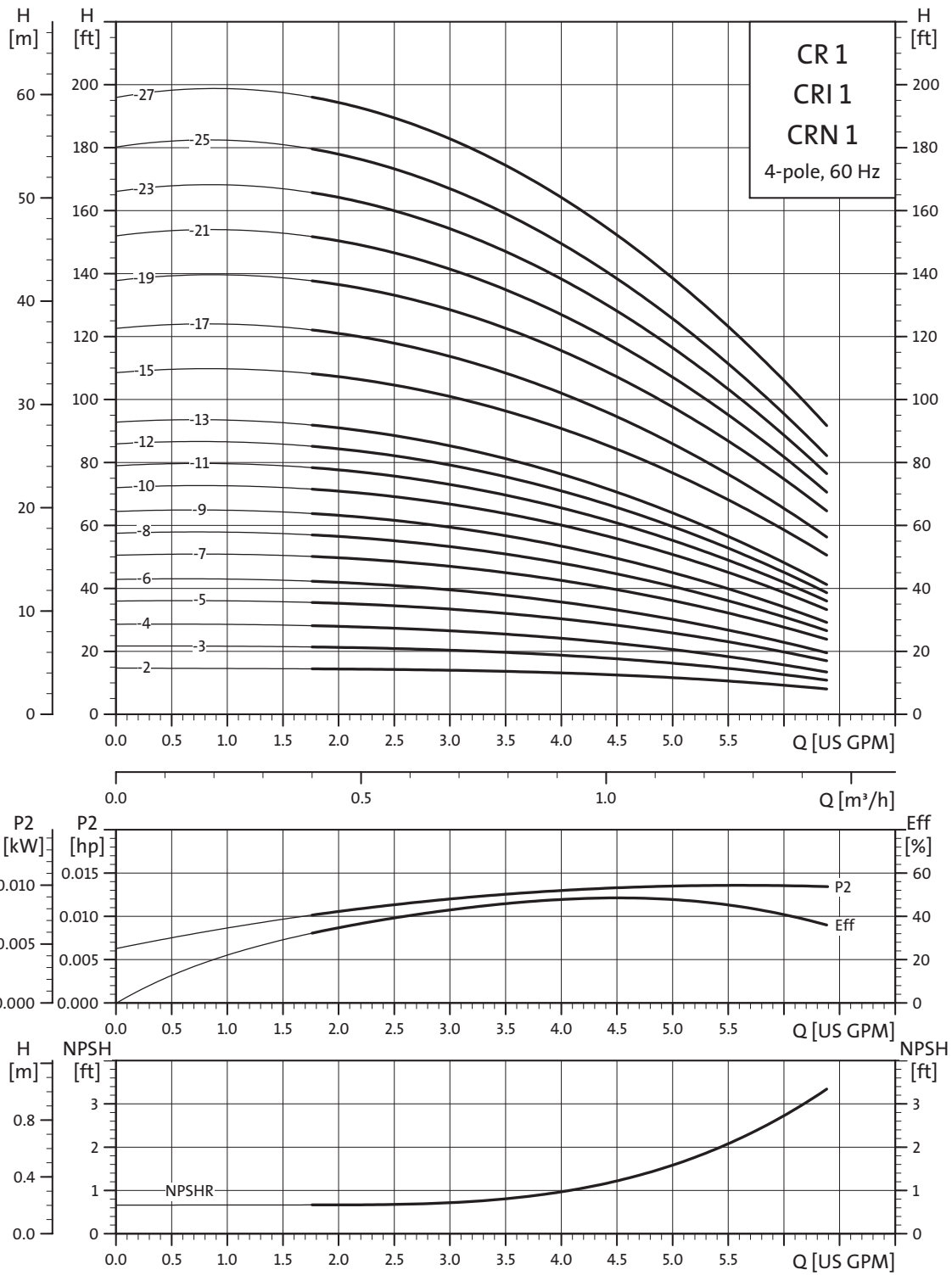
Pump type	Reference number
CR, CRI, CRN 1, 3, 5, 10, 15 and 20	99 97 24
CR, CRN 32, 45 and 64	

Dimensions and weights

CR pumps with 4-pole motors will be shorter in height and weigh less than standard Grundfos CR pumps. This is due to the smaller horsepower motors and motor stools required to power the pump at 4-pole performance.

Performance curves

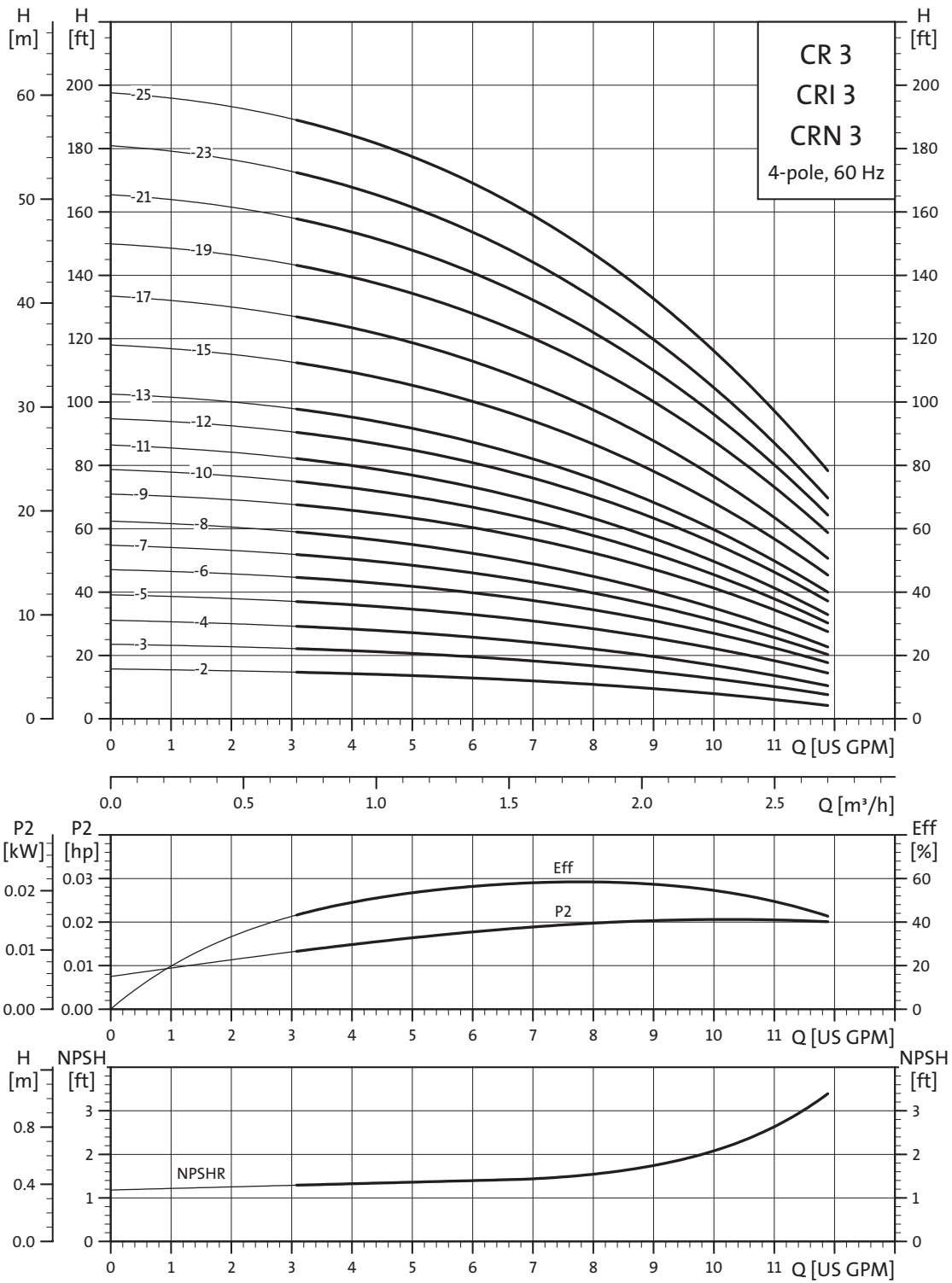
4-pole versions
CR 1, CRI 1, CRN 1



TM02 8386 5103

Performance curves

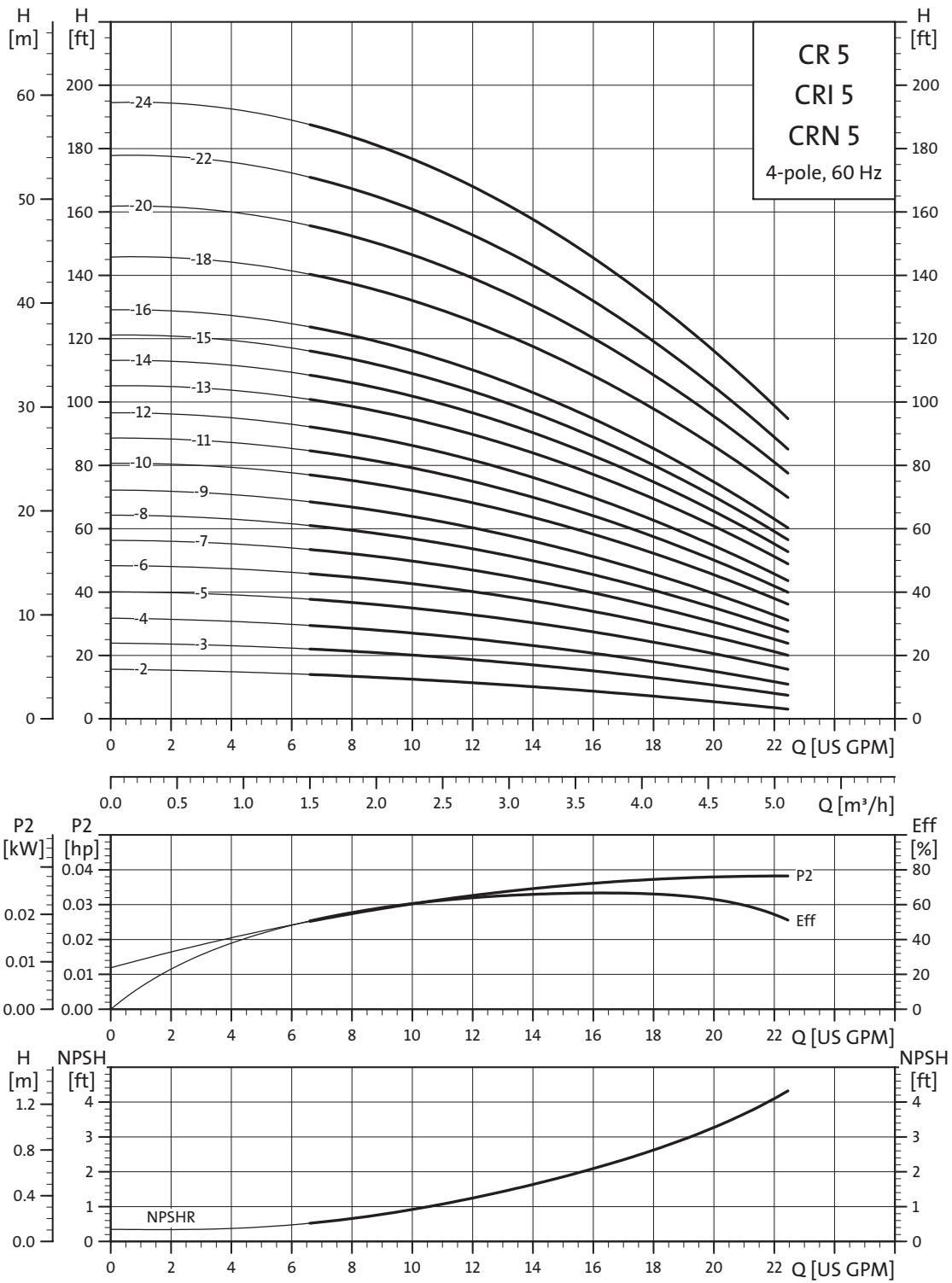
4-pole versions
CR 3, CRI 3, CRN 3



TM02 8387 5103

Performance curves

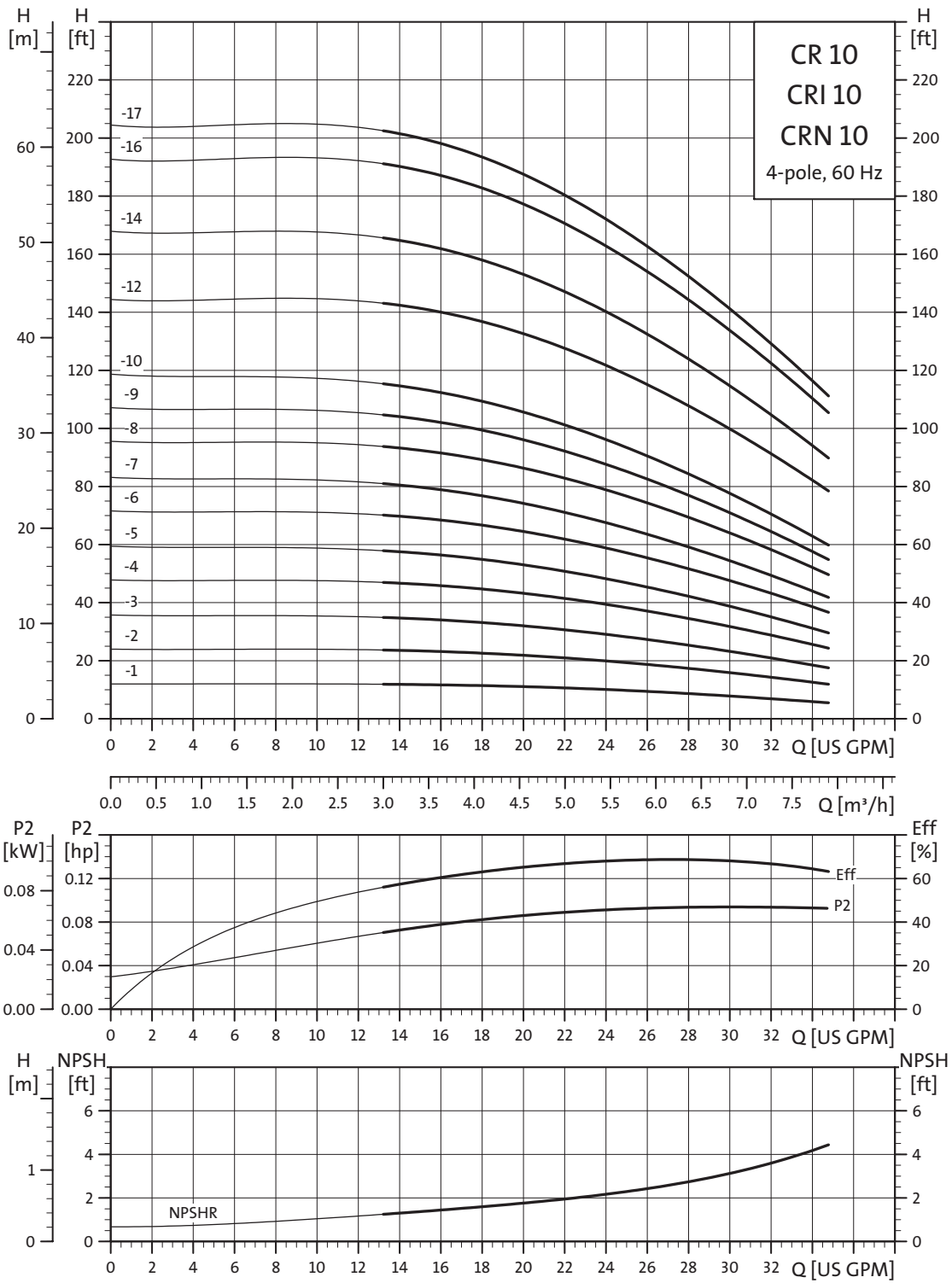
4-pole versions
CR 5, CRI 5, CRN 5



TM02 8388 5103

Performance curves

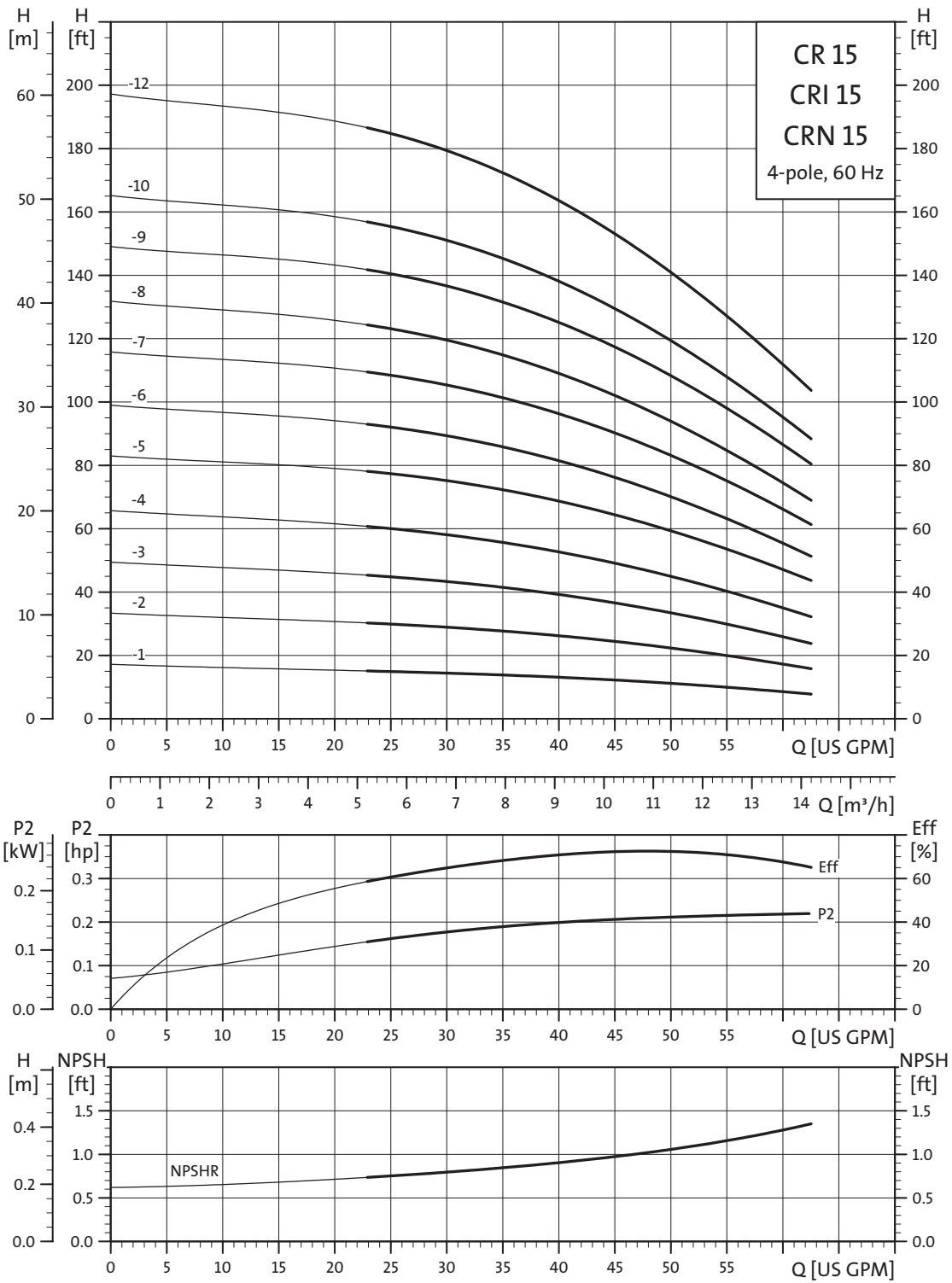
4-pole versions
CR 10, CRI 10, CRN 10



TM02 8389 5103

Performance curves

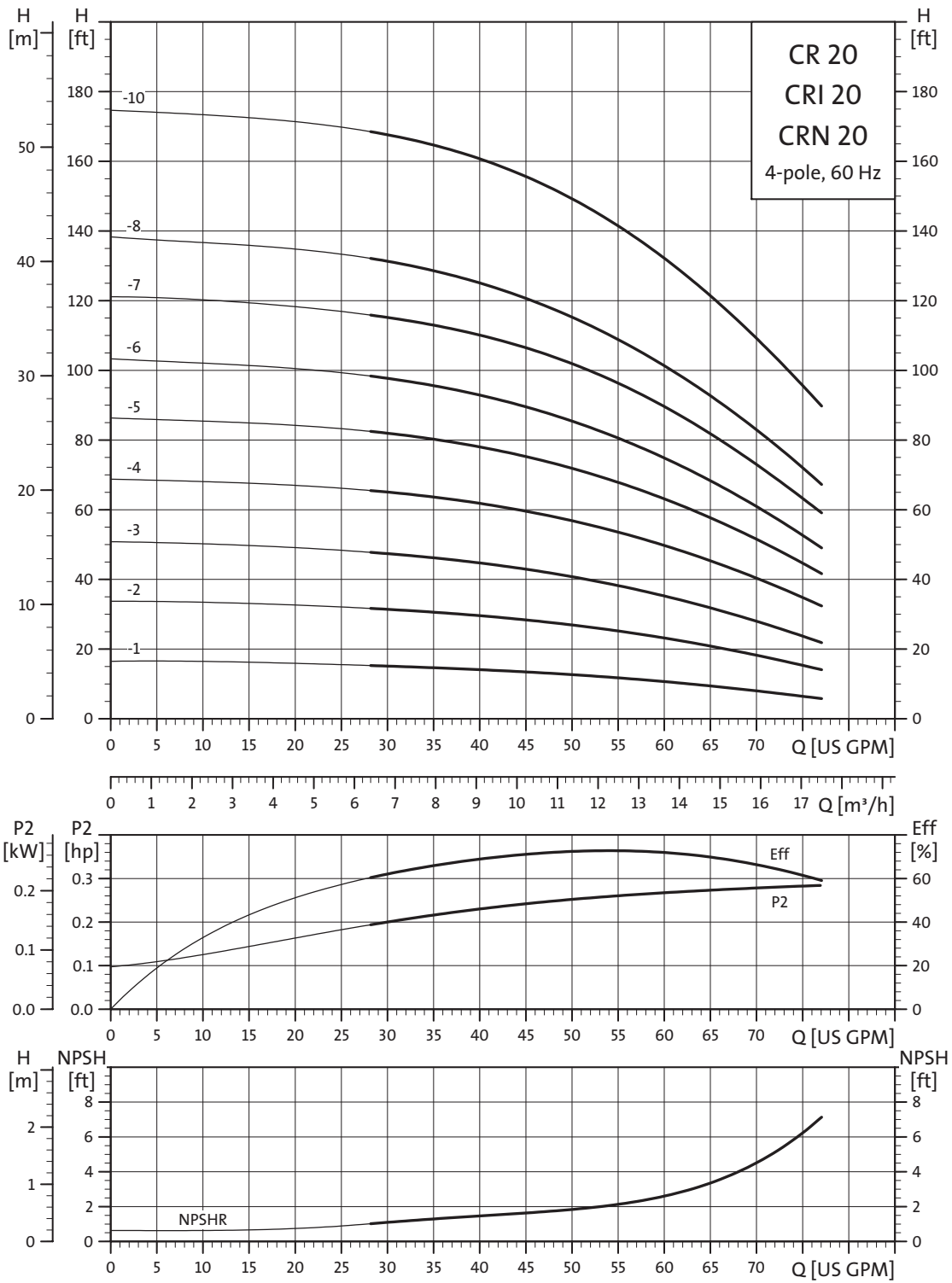
4-pole versions
CR 15, CRI 15, CRN 15



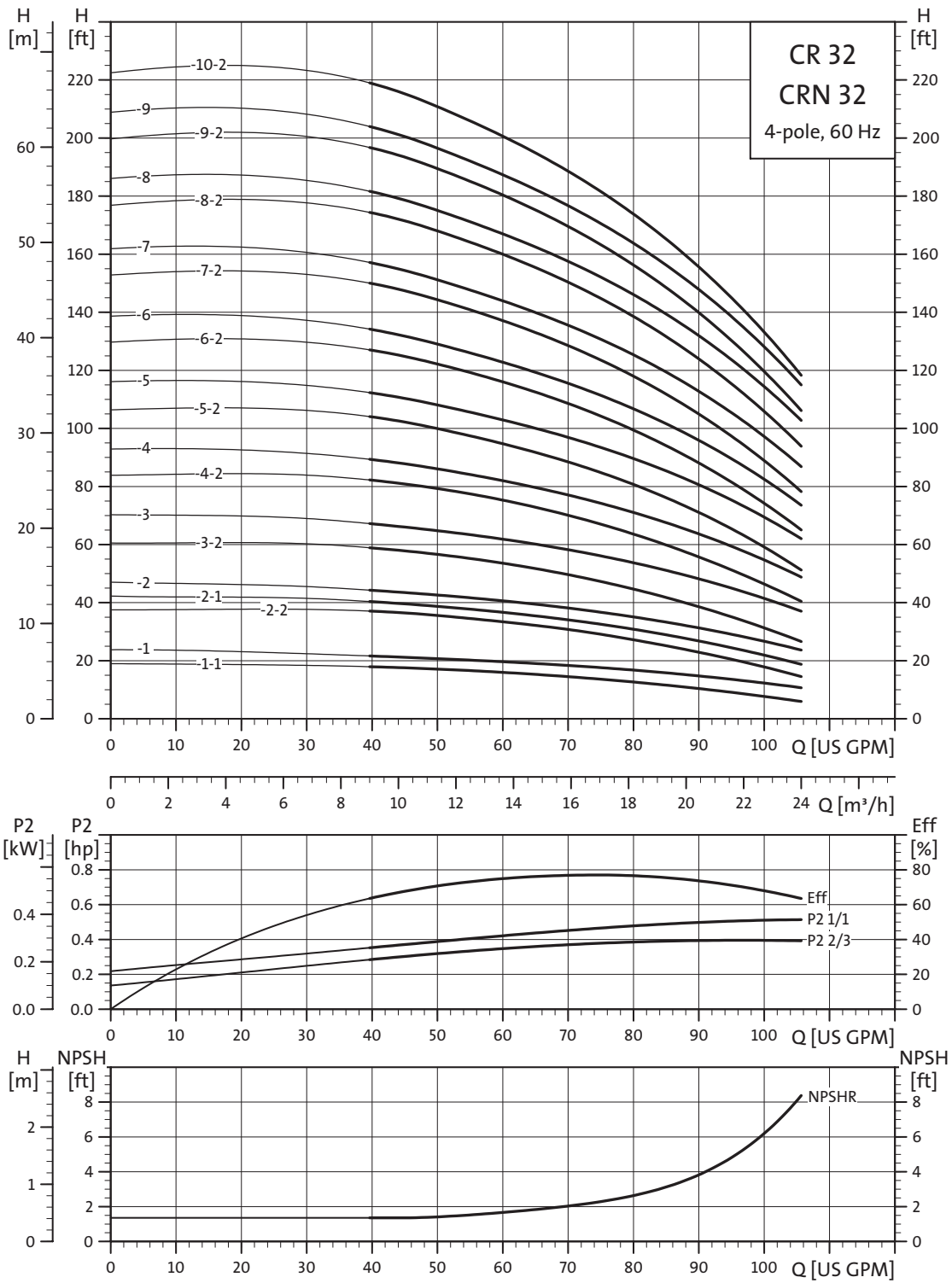
TM02 8390 5103

Performance curves

4-pole versions
CR 20, CRI 20, CRN 20



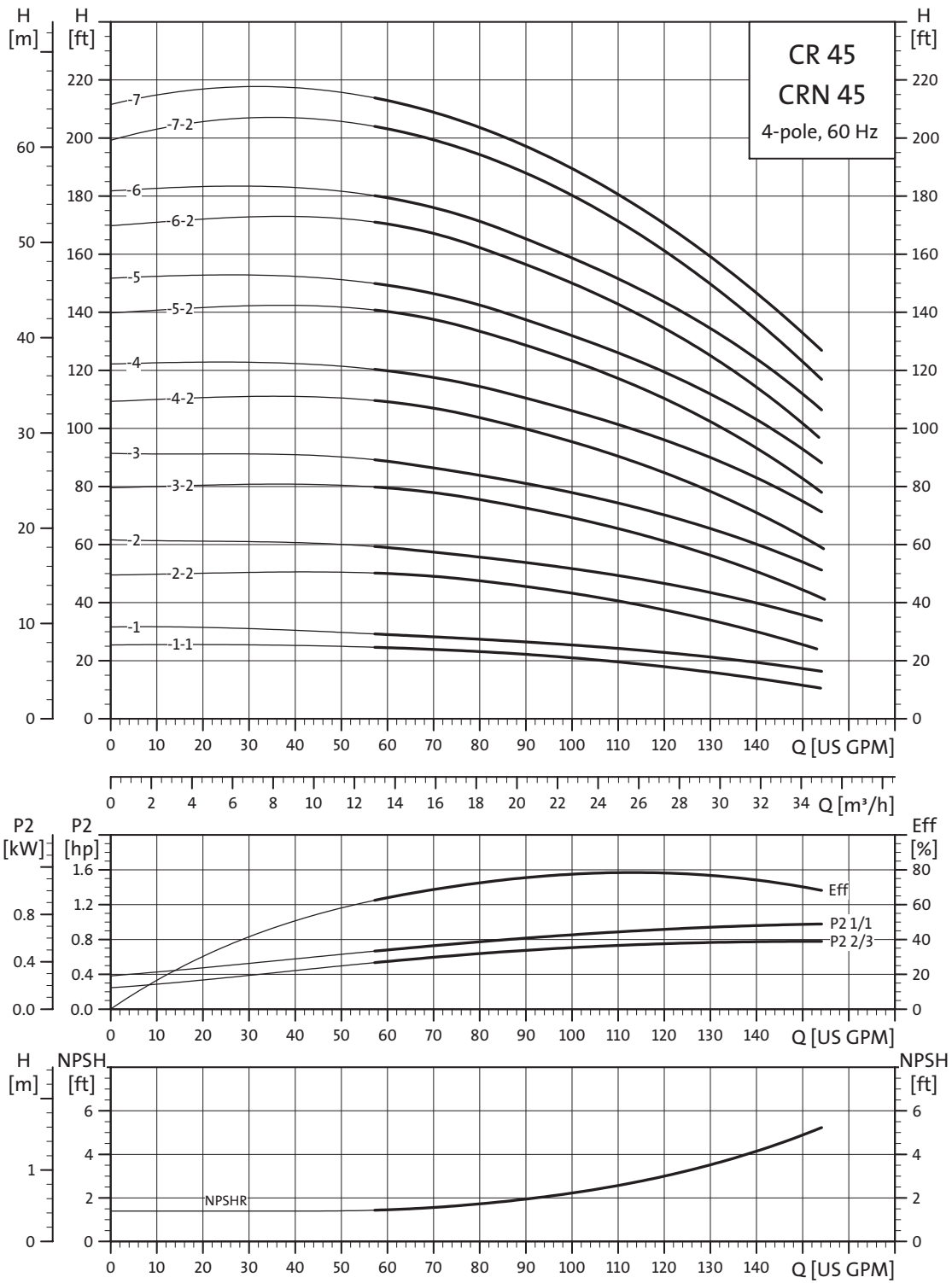
TM02 83915103



TM02 8392 5103

Performance curves

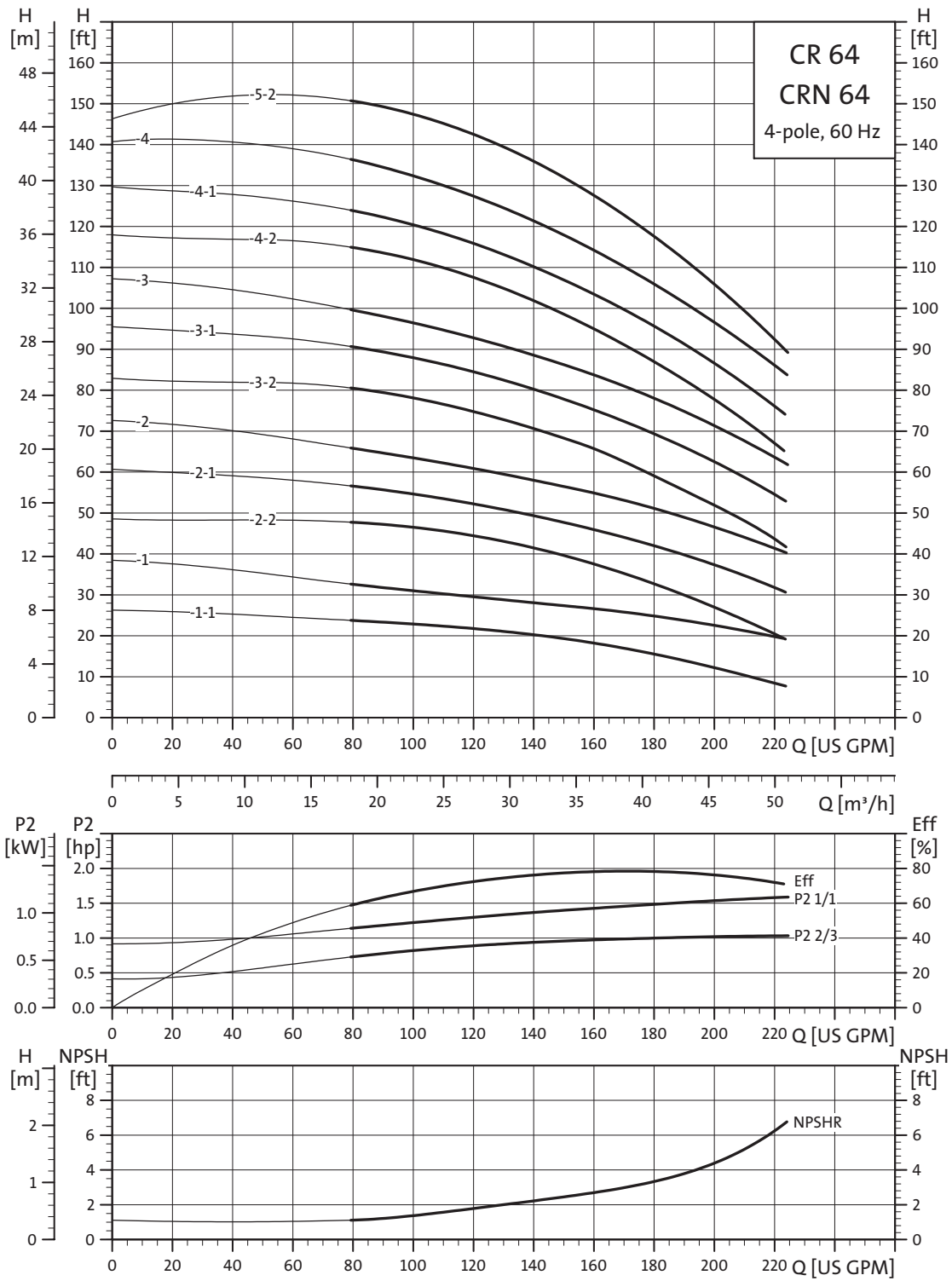
4-pole versions
CR 45, CRN 45



TM02 8393 5103

Performance curves

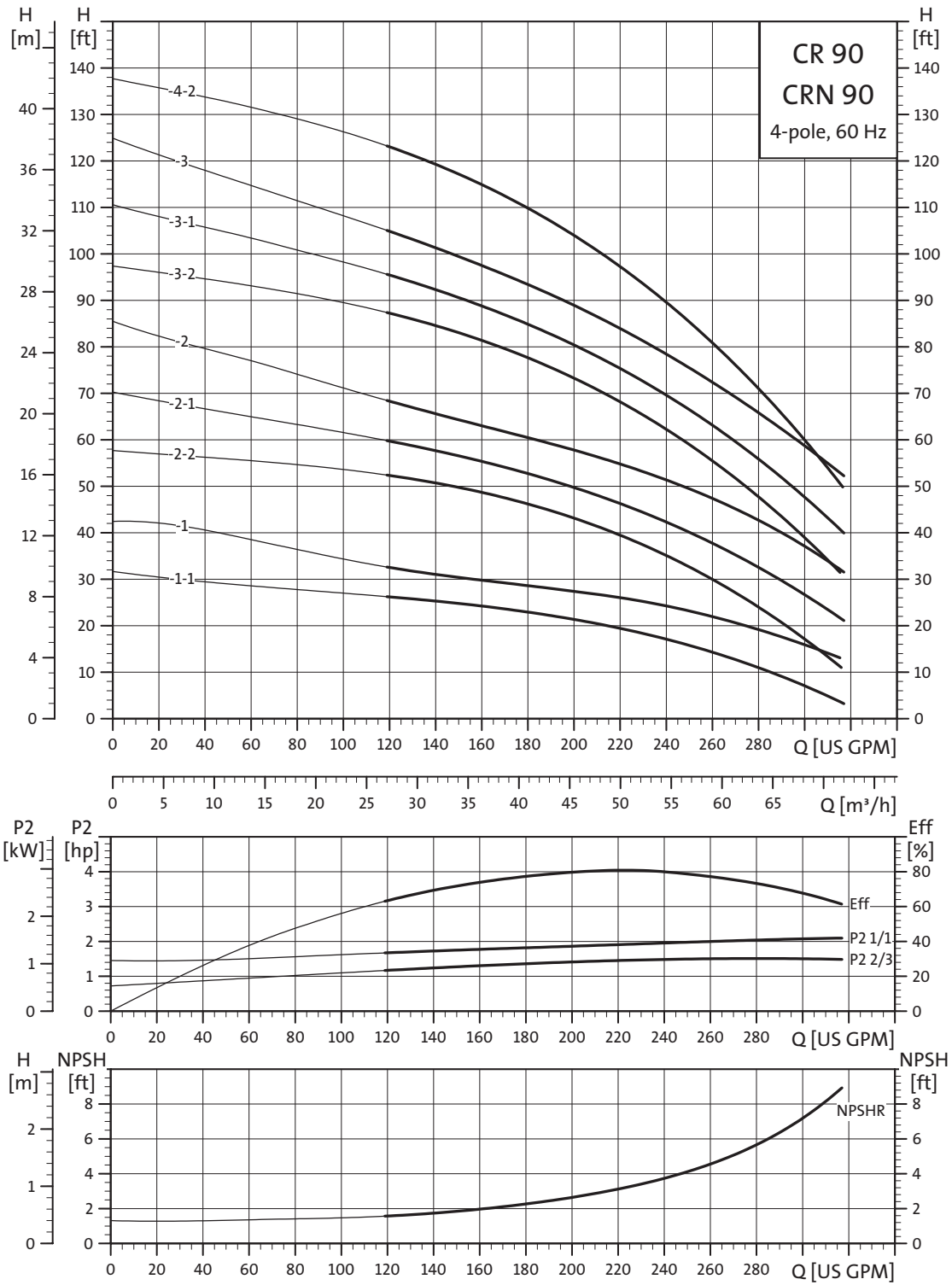
4-pole versions
CR 64, CRN 64



TM02 8394 5103

Performance curves

4-pole versions
CR 90, CRN 90



TM02 8395 5103

L-CR-PG-002 02/05	US
Repl. L-CR-PG-002 2/04	

Subject to alterations

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