CR, CRN High Pressure

Vertical multistage centrifugal pumps
60 Hz

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Table of contents

1. Product introduction

This data booklet deals with CR, CRN, CRNE pumps for high-pressure applications.

A high pressure can be achieved in two ways:

- One pump with frequency-controlled high-speed motor:
  - CRNE-HS, pump sizes 1 and 3.
- Feed pump and high-pressure pump connected in series:
  - CRN-SF, pump sizes 3 to 64.

The high-pressure pump is available in two designs, depending on pump size.

- CRNE-HS and CRN-SF:
  - The chamber stack is upside down compared to a CR standard pump.
- CR, CRN:
  - Standard pump with or without a bearing flange.

The pumps described in this data booklet are CR or CRN standard pumps used as feed pumps connected in series with a larger pump, the high-pressure pump.

For use of other CR pumps as high-pressure pumps, see the CR data booklet "Custom-built pumps" in Grundfos Product Center at www.grundfos.com.

The pressure generated by the high-pressure pump makes special demands on the design.

This data booklet primarily describes the following aspects where the high-pressure pump differs from the standard pump:

- design
- operating conditions
- performance curves
- dimensions.

The performance curves and dimensional sketches in section *4. Performance curves and technical data* starting on page 16 show the high-pressure pump connected in series with a standard pump with various numbers of stages.

Motors

CR, CRN, CRNE pumps are fitted with a Grundfos specified motor. The motors are all heavy-duty 2-pole, NEMA C-face motors.The pumps are supplied with WEG motors as standard. Grundfos ML motors are available on request. The CRE and CRNE pumps are fitted with a high-speed Grundfos MLE motor with integrated frequency converter.

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 (three phase only).

Pump Energy Index

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.

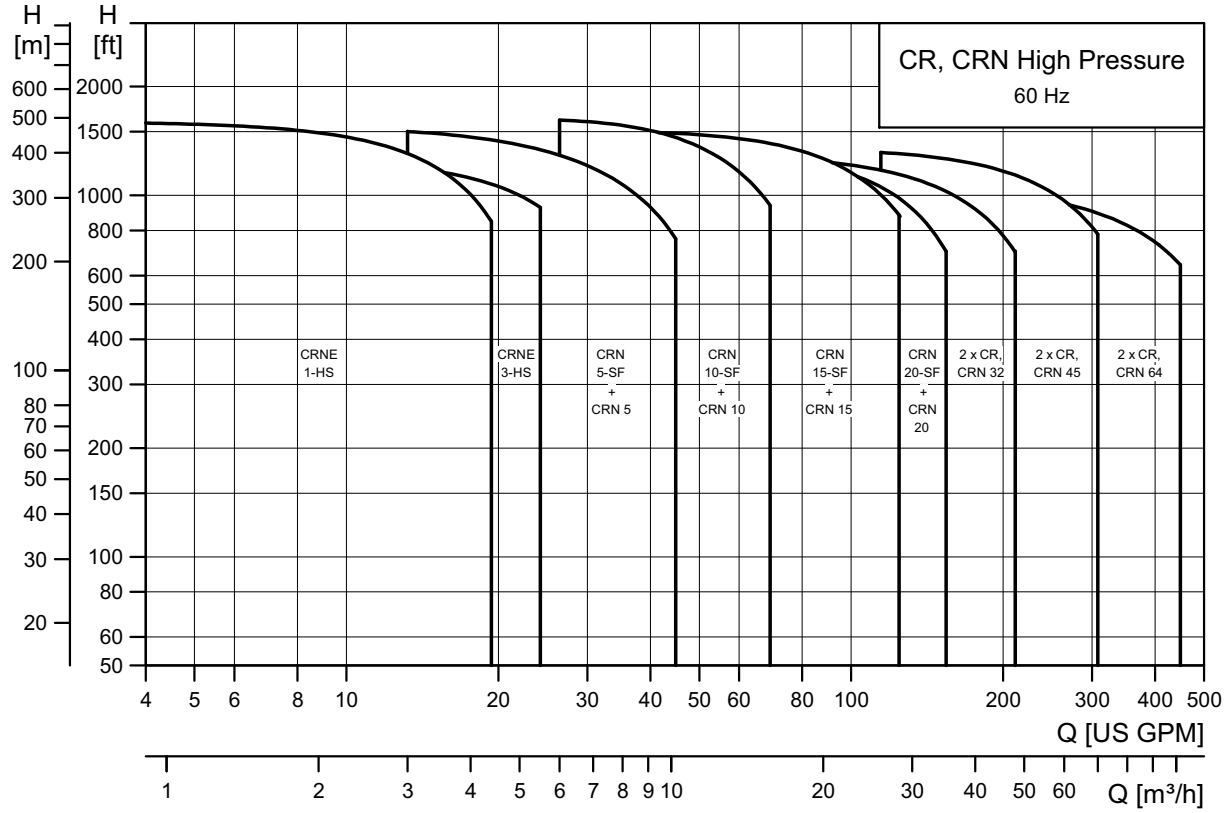
PEI is a generalized efficiency value. PEI cannot be used to determine the efficiency of a pump in a specific application.

Product type	Pole	PEI_{CL} bare-shaft pump	PEI_{CL} pump with motor	PEI_{VL} pump with motor plus controller*	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	0.91	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	

* Grundfos CUE continuous controls.

2. Product overview

Performance range



Product range

CRNE 1 and 3 HS, and CRN 5 to 64 SF

Range	CRNE 1 HS	CRNE 3 HS	CRN 5 SF	CRN 10 SF	CRN 15 SF	CRN 20 SF	CRN 32 SF	CRN 45 SF	CRN 64 SF
Nominal flow rate [US gpm]	13	16	30	55	95	110	140	220	340
Flow range [US gpm]	1.3 - 19.3	1.6 - 24	3-45	5.5 - 70	9.5 - 125	11-155	14-210	22-310	34-450
Max. working pressure [psi]	725	725	725	725	725	725	725	725	725
Motor power [HP]	6.2 - 10	6.2 - 10	1.5 - 7.5	3-15	5-25	5-25	15-40	15-60	15-50
Temperature range [°F]	-4 to +248			-4 to +248			-22 to +248		
Version									
CR: Ductile iron and stainless steel AISI 304	-	-	-	-	-	-	-	-	-
CRN, CRNE: Stainless steel AISI 316	•	•	•	•	•	•	•	•	•
CR pipe connection									
ANSI flange size	-	-	-	-	-	-	-	-	-
ANSI flange class	-	-	-	-	-	-	-	-	-
CRN, CRNE pipe connection									
PJE (Victaulic)	1 1/4"	1 1/4"	1 1/4"	2"	2"	2"	3"	4"	4"
PJE (Victaulic) - on request	-	-	-	-	-	-	-	-	-
ANSI flange size	-	-	-	-	-	-	-	-	-
ANSI flange class	-	-	-	-	-	-	-	-	-
System									
One pump with TEFC/ODP motor	-	-	-	-	-	-	-	-	-
One pump with high-speed motor	•	•	-	-	-	-	-	-	-
Two pumps in series	-	-	•	•	•	•	•	•	•

• Available
- Not available

Product range for CR, CRN 32-64

Range	CR 32 CRN 32	CR 45 CRN 45	CR 64 CRN 64
Nominal flow rate [US gpm]	140	220	340
Flow range [US gpm]	14-210	22-310	34-450
Max. working pressure [psi]	580	580	580
Motor power [HP]	50-60	15-60	25-60
Temperature range [°F]		-22 to +248	
Version			
CR: Ductile iron and stainless steel AISI 304	•	•	•
CRN, CRNE: Stainless steel AISI 316	•	•	•
CR pipe connection			
ANSI flange size	2 1/2"	3"	4"
ANSI flange class	300 lb.	150/300 lb.	150/300 lb.
CRN, CRNE pipe connection			
PJE (Victaulic)	-	-	-
PJE (Victaulic) - on request	3"	4"	4"
ANSI flange size	2 1/2"	3"	4"
ANSI flange class	300 lb.	150/300 lb.	150/300 lb.
System			
One pump with TEFC/ODP motor	•	-	-
One pump with high-speed motor	-	-	-
Two pumps in series	-	•	•

• Available
- Not available

Applications

The CR, CRN high-pressure series is a multi-purpose pump range suitable for a large variety of applications demanding reliable and cost-efficient supply.

The CR, CRN pumps handle a variety of liquids from potable water to industrial liquids within a very wide temperature range, flow rate and pressure scale. The lists below show some general examples of applications requiring a high pressure:

Industry

Pressure boosting

- Process water systems
- washing and cleaning systems
- high-pressure washdown systems
- boiler feed and condensate systems.

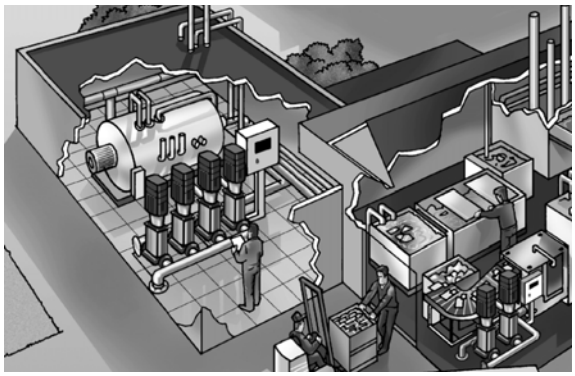


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Fig. 1 Industrial application

Water treatment

- Ultra-filtration systems
- reverse osmosis systems.

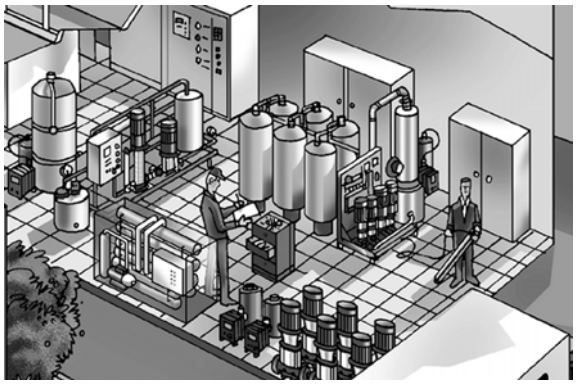

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Fig. 2 Process water treatment

CRNE 1 and 3 HS

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Fig. 3 CRNE 3 HS pump

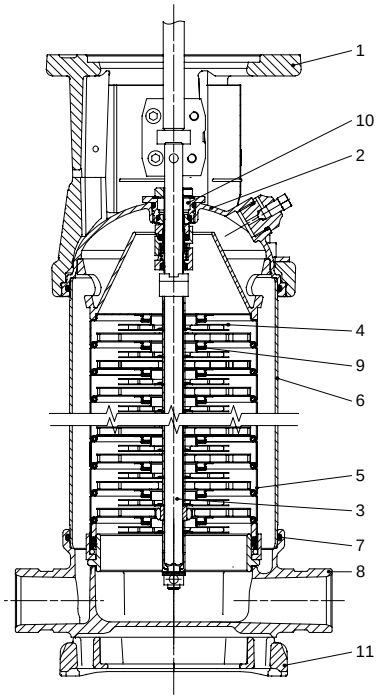

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Fig. 4 Sectional drawing of CRNE 1 and 3 HS

Pump

CRNE-HS is a single pump solution capable of generating up to 692 psi.

The CRNE-HS pump is a non-self-priming, vertical multistage centrifugal pump fitted with a high-speed Grundfos motor with integrated frequency converter, type MLE.

The direction of rotation is the opposite of that of standard pumps, and the chamber stack is turned upside down, resulting in the pumped liquid flowing in the opposite direction.

This special design ensures that the shaft seal is not affected by the pump outlet pressure.

The base, the pump head cover as well as vital pump components are made of stainless steel. The base has in-line inlet and outlet ports.

The pump has a maintenance-free mechanical cartridge shaft seal.

Operating conditions

Liquid temperature:	-4 to +248 °F
Maximum ambient temperature:	104 °F
Minimum inlet pressure:	29 psi
Maximum inlet pressure:	362 psi
Maximum operating pressure:	725 psi

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	Cast iron	ASTM 25 B
2	Pump head cover	Stainless steel	CF8M[1)]
3	Shaft	Stainless steel	AISI 316 AISI 329
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Sleeve	Stainless steel	AISI 316
7	O-ring for sleeve	EPDM or FKM	
8	Base	Stainless steel	CF8M[1)]
9	Neck ring	PTFE	
10	Shaft seal	Cartridge type	
11	Base plate	Cast iron[2)]	ASTM 25B
	Other rubber parts	EPDM, FKM, FXM and FFKM	

1) CF8M is cast equivalent of AISI 316 stainless steel.
2) Stainless steel is available on request.

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 use in UL 778 and C22.2 No 108-14 pump applications. See the installation and operating Instructions for further details.

CRN 5, 10, 15 and 20 SF

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Fig. 5 CRN 15 SF

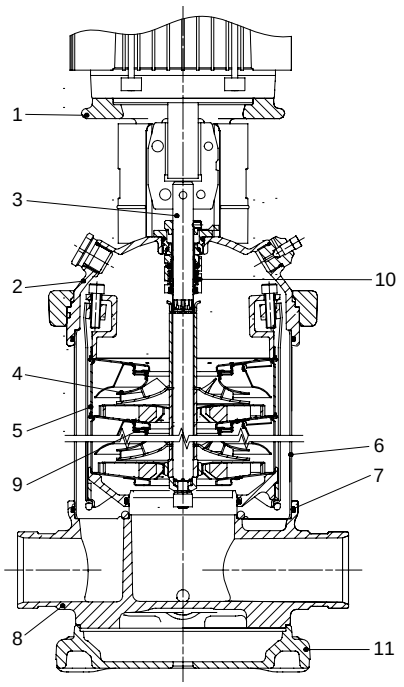

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Fig. 6 Sectional drawing of CRN 5, 10, 15, 20 SF

Pump

CRN-SF is a double-pump system capable of generating up to 696 psi.

The system consists of two pumps connected in series. The first pump is a standard pump for feeding. The second pump is a high-pressure pump such as CRN-SF, especially designed for high pressures. This data booklet covers technical information about the high-pressure pump.

The CRN-SF pump is a non-self-priming, vertical multistage centrifugal pump fitted with a Grundfos specified TEFC-motor.

The pump consists of a base and a pump head. The pump and the sleeve are secured between the base and the pump head by means of staybolts.

The direction of rotation is the opposite of that of standard pumps, and the chamber stack is turned upside down, resulting in the pumped liquid flowing in the opposite direction.

The base, the pump head cover as well as vital pump components are made of stainless steel. The base has in-line inlet and outlet ports.

The pump has a maintenance-free mechanical cartridge shaft seal.

Operating conditions

Liquid temperature:	-4 to +248 °F
Maximum ambient temperature:	104 °F
Minimum inlet pressure:	29 psi
Maximum inlet pressure:	362 psi
Maximum operating pressure:	725 psi

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	Cast iron	
2	Pump head cover	Stainless steel	CF8M[1)]
3	Shaft	Stainless steel	AISI 329
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Sleeve	Stainless steel	AISI 316
7	O-ring for sleeve	EPDM, FKM, FXM and FFKM	
8	Base	Stainless steel	CF8M[1)]
9	Neck ring	PTFE	
10	Shaft seal	Cartridge type	
11	Base plate	Cast iron[2)]	ASTM 25 B
	Other rubber parts	EPDM, FKM, FXM and FFKM	

1) CF8M is cast equivalent of AISI 316 stainless steel.

2) Stainless steel is available on request.

CRN 32, 45, and 64 SF

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Fig. 7 CRN 45 and CRN 45 SF pump system

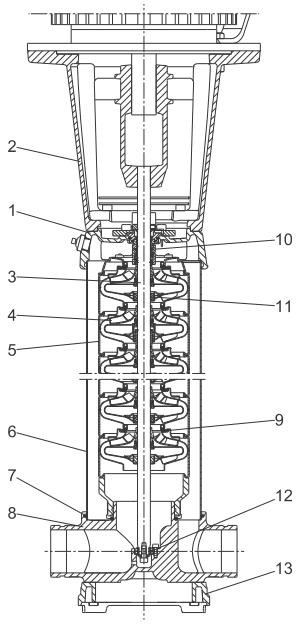

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Fig. 8 Sectional drawing of CRN 32, 45, 64 SF

Pump

CRN-SF is a double-pump system capable of generating up to 696 psi.

The system consists of two pumps connected in series. The first pump is a standard pump for feeding. The second pump is a high-pressure pump such as CRN-SF, especially designed for high pressures. This data booklet covers technical information about the high-pressure pump.

The CRN-SF pump is a non-self-priming, vertical multistage centrifugal pump fitted with a Grundfos specified TEFC-motor.

The pump consists of a base and a pump head. The pump and the sleeve are secured between the base and the pump head by means of staybolts.

The direction of rotation is the opposite of that of standard pumps, and the chamber stack is turned upside down, resulting in the pumped liquid flowing in the opposite direction.

The base, the pump head cover as well as vital pump components are made of stainless steel. The base has in-line inlet and outlet ports.

The pump has a maintenance-free mechanical cartridge shaft seal.

Operating conditions

Liquid temperature:	-22 to 248 °F
Minimum inlet pressure:	29 psi
Maximum inlet pressure:	362 psi
Maximum operating pressure:	725 psi

Materials

Pos.	Designation	Material	AISI/ASTM
1	Pump head	Cast iron	
2	Pump head cover	Stainless steel	CF8M (equal to AISI 316)
3	Shaft	Stainless steel	AISI 329
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Sleeve	Stainless steel	AISI 316
7	O-ring for sleeve	EPDM FKM, FFKM FXM	
8	Base	Stainless steel	CF8M[1)]
9	Neck ring	PTFE	
10	Shaft seal	HQQE, HQQV, HQQF, HQQK	
11	Base plate	Cast iron[1)]	ASTM 25B
	Other rubber parts	EPDM FKM, FFKM, FXM	

1) CF8M is cast equivalent of AISI 316 stainless steel.
2) Stainless steel is available on request.

2 x CR 32, 45 and 64
2 x CRN 32, 45 and 64

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Fig. 9 2 x CR, CRN double pump system

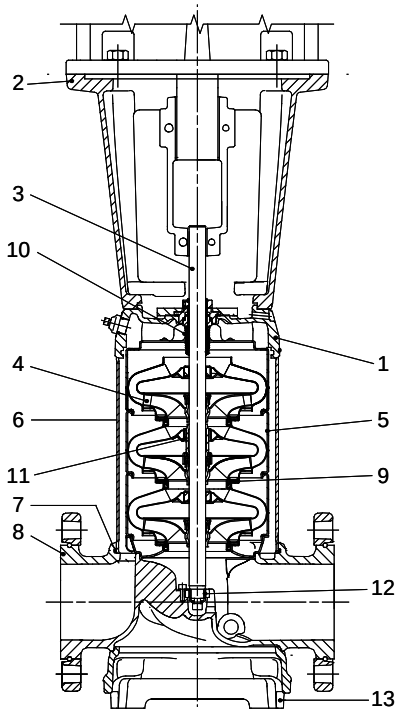

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Fig. 10 Sectional drawing of a CR(N) 45, 64 pump

Pump

2 x CR, CRN is a double-pump system capable of generating up to 580 psi. The system consists of two pumps connected in series. The first pump is a standard pump for feeding. The second pump is a high-pressure pump and can be a specially designed pump for high pressures. This data booklet covers technical information about the high-pressure pump.

The CR, CRN high-pressure pump is a non-self-priming, vertical multistage centrifugal pump fitted with a Grundfos specified motor and a specially developed high-pressure shaft seal. When necessary, it includes a special pump sleeve and a bearing flange which make the pump capable of handling higher pressures.

CRN

The base, the pump head cover and all components in contact with the pumped liquid are made of stainless steel.

CR

The base and the pump head are made of ductile cast iron.

Operating conditions

Liquid temperature:	-22 to +248 °F
Minimum inlet pressure:	29 psi
Maximum ambient temperature:	104 °F
Maximum inlet pressure:	362 psi
Maximum operating pressure:	580 psi

Materials

Pos.	Description	Materials	AISI/ASTM
1	Pump head	CR: Ductile iron EN-GJS-500-7	ASTM 80-55-06
		CRN: Stainless steel	CF8M[1)]
2	Motor stool	Cast iron	ASTM 25B
3	Shaft	Stainless steel	AISI 431[3)] SAF 2205[4)]
4	Impeller	Stainless steel	AISI 316
5	Chamber	Stainless steel	AISI 316
6	Sleeve	Stainless steel	AISI 316
7	O-ring for sleeve	EPDM or FKM	
8	Base	CR: Ductile iron	ASTM 80-55-06
		CRN: Stainless steel	CF8M[1)]
9	Neck ring	Carbon-graphite filled PTFE	
10	Shaft seal	Cartridge type	
11	Bearing ring	Bronze/carbon-graphite filled PTFE	
12	Bottom bearing ring	TC/TC	
13	Base plate	Ductile iron[2)]	ASTM80-55-06
	Other rubber parts	EPDM or FKM	

1) CF8M is cast equivalent of AISI 316 stainless steel.
2) Stainless steel is available on request.
3) CR 45, 64.
4) CRN 45, 64.

Type key

Example	CR	E	32	s	-4	-2	-A	-G	-A	-E	-HQQE	O	C	B
Type range: CR, CRI, CRN, CRT														
Pump with integrated frequency converter														
Flow rate [m^3/h]														
Undersize impeller (all impellers) CR 1s, CRI 1s, CRN 1s														
Number of impellers														
Number of reduced-diameter impellers CR, CRE, CRN, CRNE 32, 45, 64														
Code for pump version														
Code for pipe connection														
Code for materials														
Code for rubber parts														
Code for shaft seal														
Code for motors [HP (kW)]														
Code for phase and voltage [V]														
Code for speed variant [pm]														

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
B	Tungsten carbide / Tungsten carbide
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
X	Special version

Code	Description
Rubber parts in pump	
E	EPDM
F	FXM (Fluoraz®)
K	FFKM (Kalrez®)
N	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*
X	Special version*
Seal face material	
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®)
Motors [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)
Phase and voltage (V)	
A	1x200-240 V
B	3x200-240 V
C	3x440-480 V
D	3x380-500 V
X	Not defined
Speed variant (rpm)	
A	1450-2000
B	2900-4000
C	4000-5900
2	2-pole
4	4-pole

* Option. See the CR "Custom-built pumps" data booklet available in Grundfos Product Center. See QR code or link below.

http://net.grundfos.com/qr/i/96486346

Shaft seal

Example	-H	-Q	-Q	-E
Shaft seal type designation				
Material of rotating seal face				
Material of stationary seal face				
Material of secondary seal (rubber parts)				

Shaft seal operating range

The actual operating range of the shaft seal for the high-pressure pump depends on operating pressure, type of shaft seal and liquid temperature.

The following temperature ranges apply to clean water.

Operating conditions of the shaft seal for the CR high-pressure pump

Shaft seal	Description	Max. temp. range [°F]
HQQE	O-ring (cartridge) (balanced seal), SiC/SiC, EPDM	-22 to +248
HQQV	O-ring (cartridge) (balanced seal), SiC/SiC, FKM	-4 to +194
HUBE	O-ring (cartridge) (balanced seal), TC/carbon, EPDM	+32 to +248
HUBV	O-ring (cartridge) (balanced seal), TC/carbon, FKM	+32 to +194

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, oversized motors must be used, 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 and oils.

Please note that aggressive liquids, such as sea water and some acids, may attack or dissolve the protective oxide film of the stainless steel and thus cause corrosion.

Performance curves

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

- Tolerances to ANSI or ISO standards, if indicated on the curve chart.
- The motors used for the measurements are standard TEFC or MLE motors.
- Measurements are made with airless water at a temperature of 68 °F.
- 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 curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature.

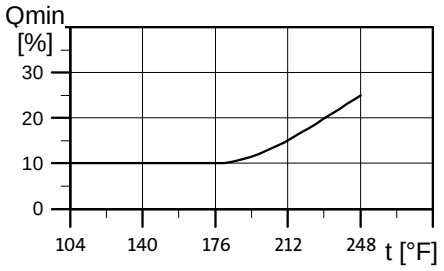


Fig. 11 Minimum flow rate

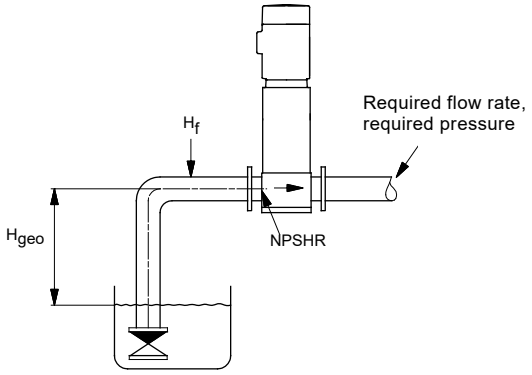
3. Selection and sizing

Selection of CR, CRN high-pressure pumps

Pump size

Base the selection of pump size on these parameters:

- Required flow rate and pressure at the draw-off point. Pressure loss as a result of height differences (H_{geo}).
- Friction loss in the pipes (H_f).
  It may be necessary to account for pressure loss in connection with long pipes, bends or valves and similar.
- Best efficiency at the estimated duty point.



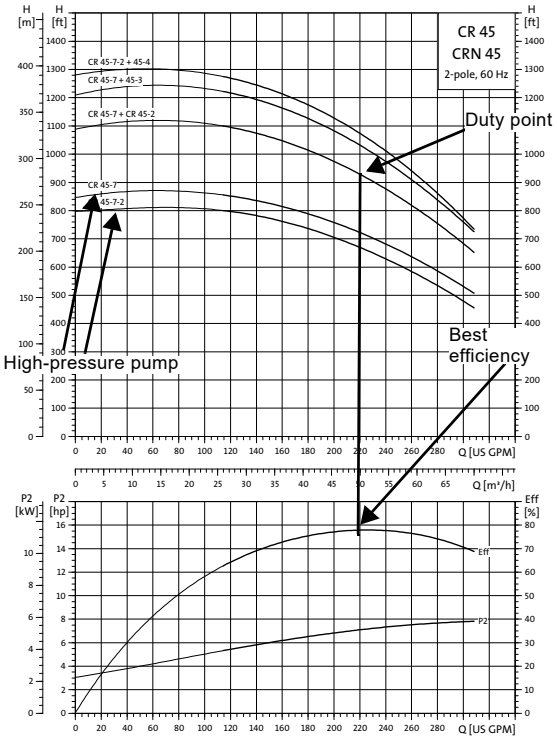
TM02 6711 1403

Fig. 12 Sizing data

Pump efficiency

If the pump is expected to always operate at the same duty point, select a pump which is operating at a duty point corresponding with the best efficiency of the pump.

In case of varying consumption, select a pump which best efficiency falls within the duty range representing the highest power consumption, that is, typically the duty range covering the greater part of the duty time.



TM02 8316 2406

Fig. 13 Example of a duty point

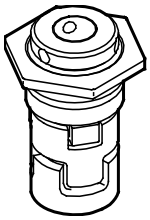
Shaft seal

As standard, the CR, CRN high-pressure range is fitted with a high-pressure cartridge shaft seal suitable for the most common high-pressure applications.

The following key parameters must be taken into account when selecting the shaft seal:

- type of pumped liquid
- liquid temperature.

Grundfos offers a wide range of shaft seal variants to meet specific demands.



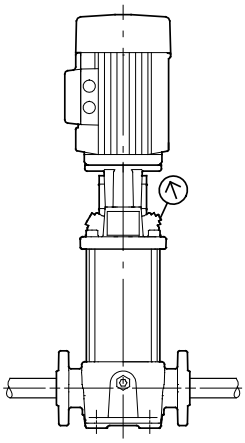
TM02 0538 4800

Fig. 14 Shaft seal (Cartridge type)

Inlet pressure and operating pressure

The limit values stated on pages 7-11 must not be exceeded as regards these pressures:

- minimum inlet pressure
- maximum inlet pressure
- maximum operating pressure.



TM02 1204 0601

Fig. 15 CR pump

Examples of operating and inlet pressures

The values for the operating pressures and inlet pressures must not be considered individually but must always be compared. See the following examples:

Example 1:

The following pumps in series are selected.

First stage pump: CRN 5-24.

Second stage pump: CRN 5-24SF.

	CRN 5-24 [psi]	CRN 5-24SF [psi]
Maximum operating pressure	362	725
Maximum inlet operating pressure	218	362
Outlet pressure against a closed valve	338	

The pump outlet pressure against a closed valve for a CRN 5-24 is 338 psi.

The first stage pump is not allowed to operate at an inlet pressure of 218 psi. The maximum inlet pressure of the first stage pump is 362 - 338 = 24 psi.

Example 2:

The following pumps in series are selected.

First stage pump: CRN 32-3

Second stage pump: CRN 32-10.

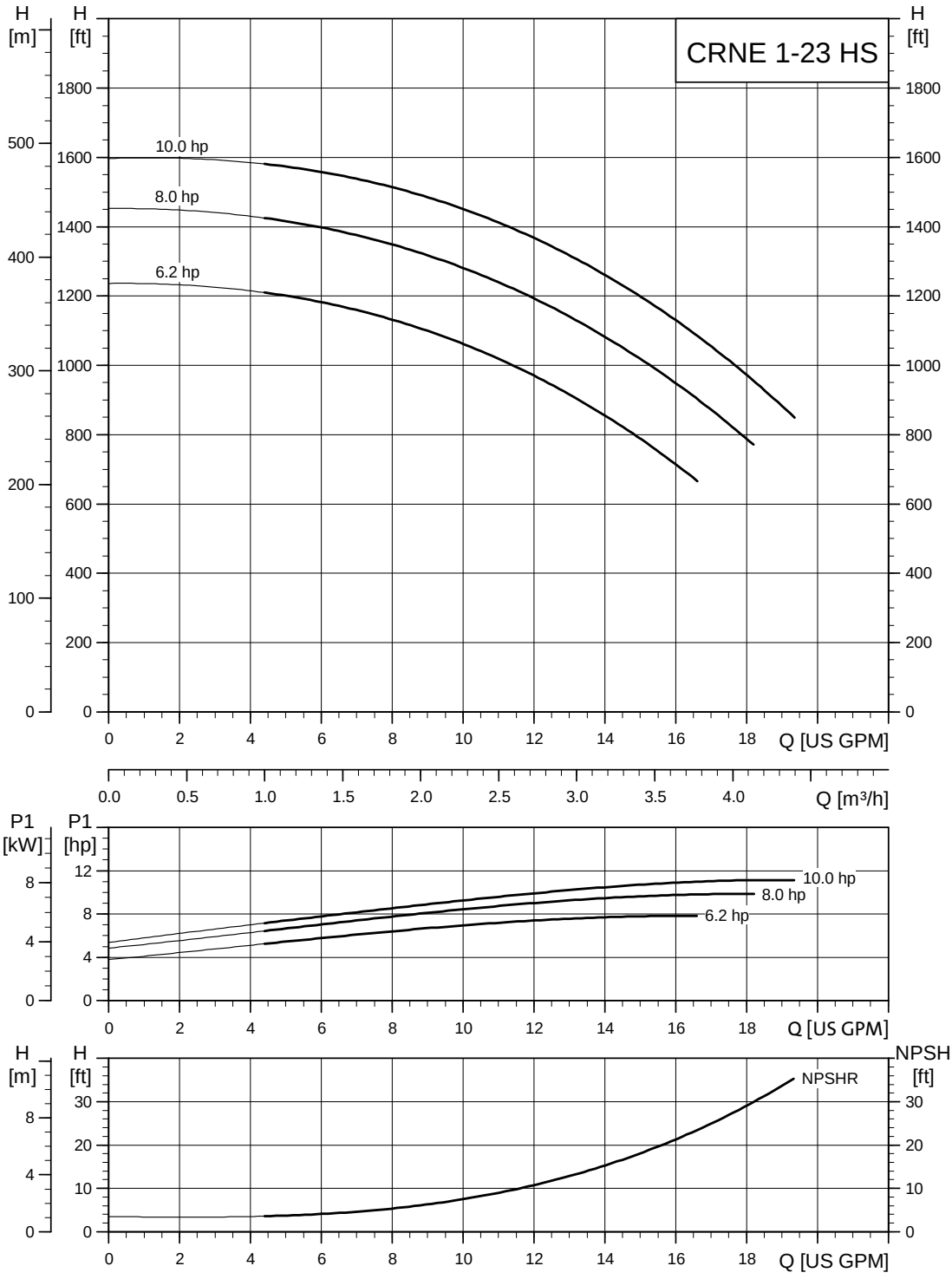
	CRN 32-3 [psi]	CRN 32-10 [psi]
Maximum operating pressure	232	580
Maximum inlet operating pressure	145	218
Outlet pressure against a closed valve	519	

The pump outlet pressure against a closed valve for the two pumps in series is 519 psi.

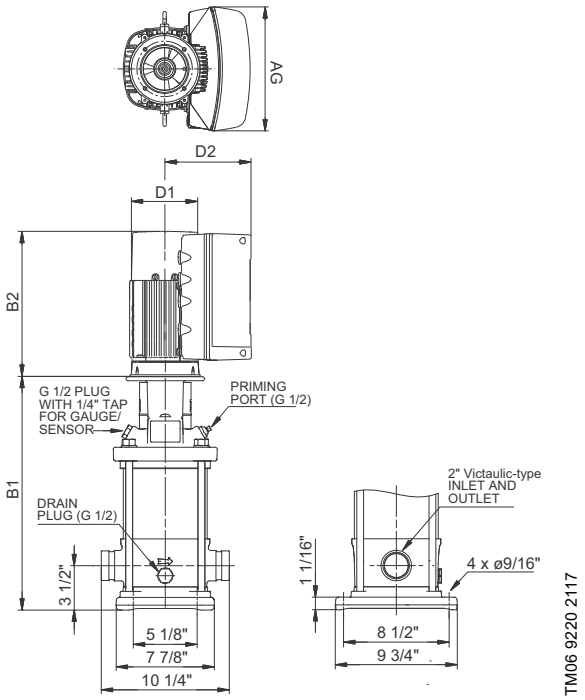
The first stage pump is not allowed to operate at an inlet pressure of 145 psi. The maximum inlet pressure of the first stage pump is 580 - 519 = 61 psi.

4. Performance curves and technical data

CRNE 1-HS



Dimensional sketch

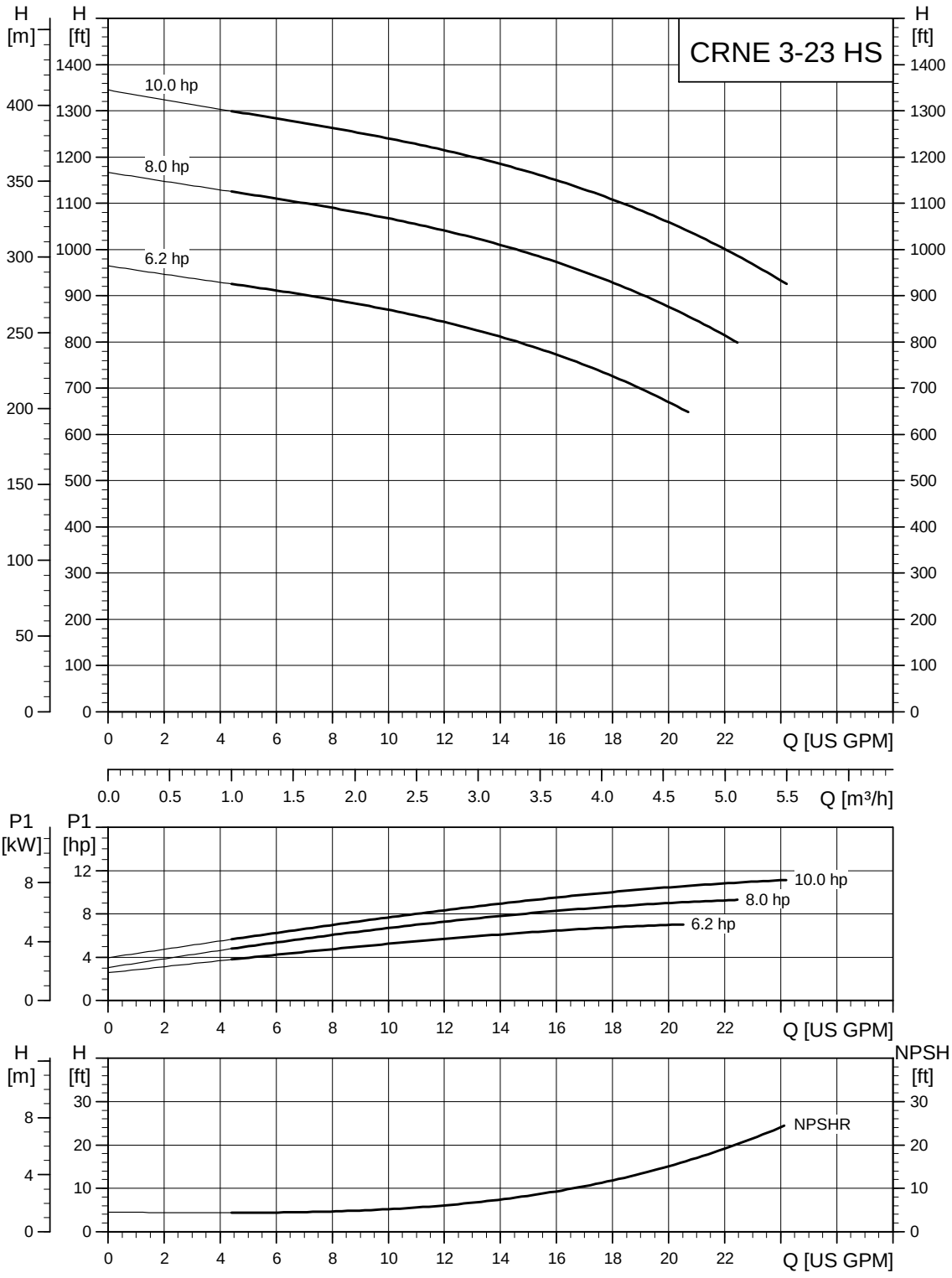


Dimensions and weights

Pump type	HP	Ph	Voltage [V]	Frame size	Dimensions [in]					PJE ship wt.[1)] [lbs]
					PJE B1	TEFC D1	TEFC D2	AG	PJE TEFC B1+B2	
CRNE 1-23 HS	6.2	3	440-480 460	112C	26.77	7.53	7.91	11.46	39.92	111
CRNE 1-23 HS	8.0	3	440-480 460	132E	26.77	7.53	7.91	11.46	41.14	132
CRNE 1-23 HS	10.0	3	440-480 460	132F	26.77	10.04	9.33	13.62	42.08	137

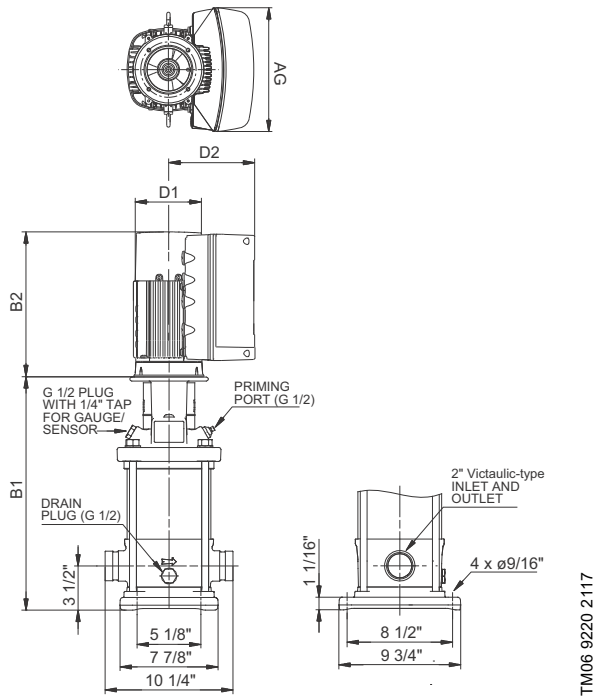
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).
All dimensions in inches unless otherwise noted

CRNE 3-HS



TM02 8309 2806

Dimensional sketch

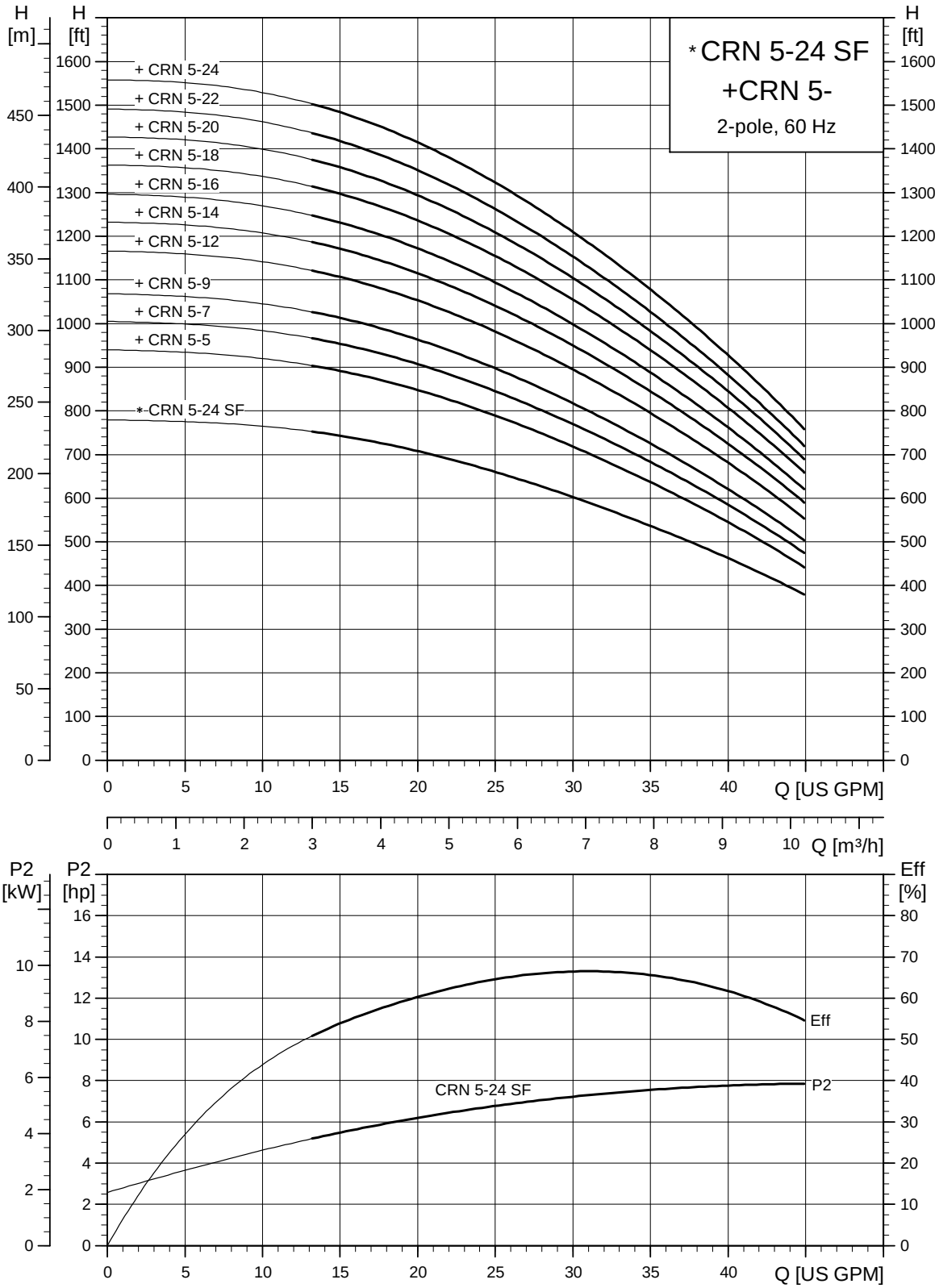


Dimensions and weights

Pump type	HP	Ph	Voltage [V]	Frame size	Dimensions [in]					PJE ship wt.[1] [lbs]
					PJE B1	TEFC D1	TEFC D2	AG	PJE TEFC B1+B2	
CRNE 3-23 HS	6.2	3	440-480 460	112C	26.77	7.53	7.91	11.46	39.92	111
CRNE 3-23 HS	8.0	3	440-480 460	132E	26.77	7.53	7.91	11.46	41.14	132
CRNE 3-23 HS	10.0	3	440-480 460	132F	26.77	10.04	9.33	13.62	42.08	137

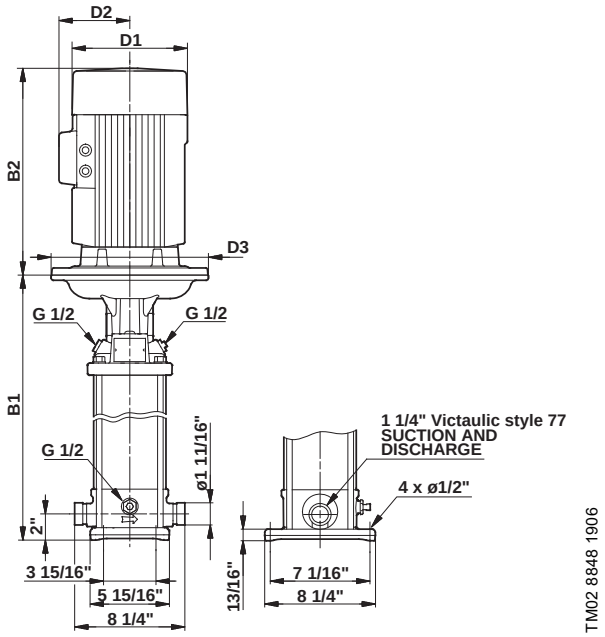
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).

CRN 5-SF

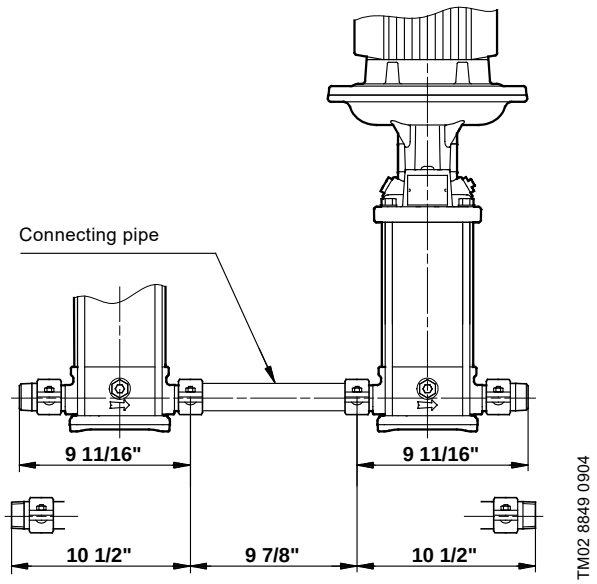


TM02 8310 2806

Dimensional sketches



CRN feed pump/CRN SF high-pressure pump



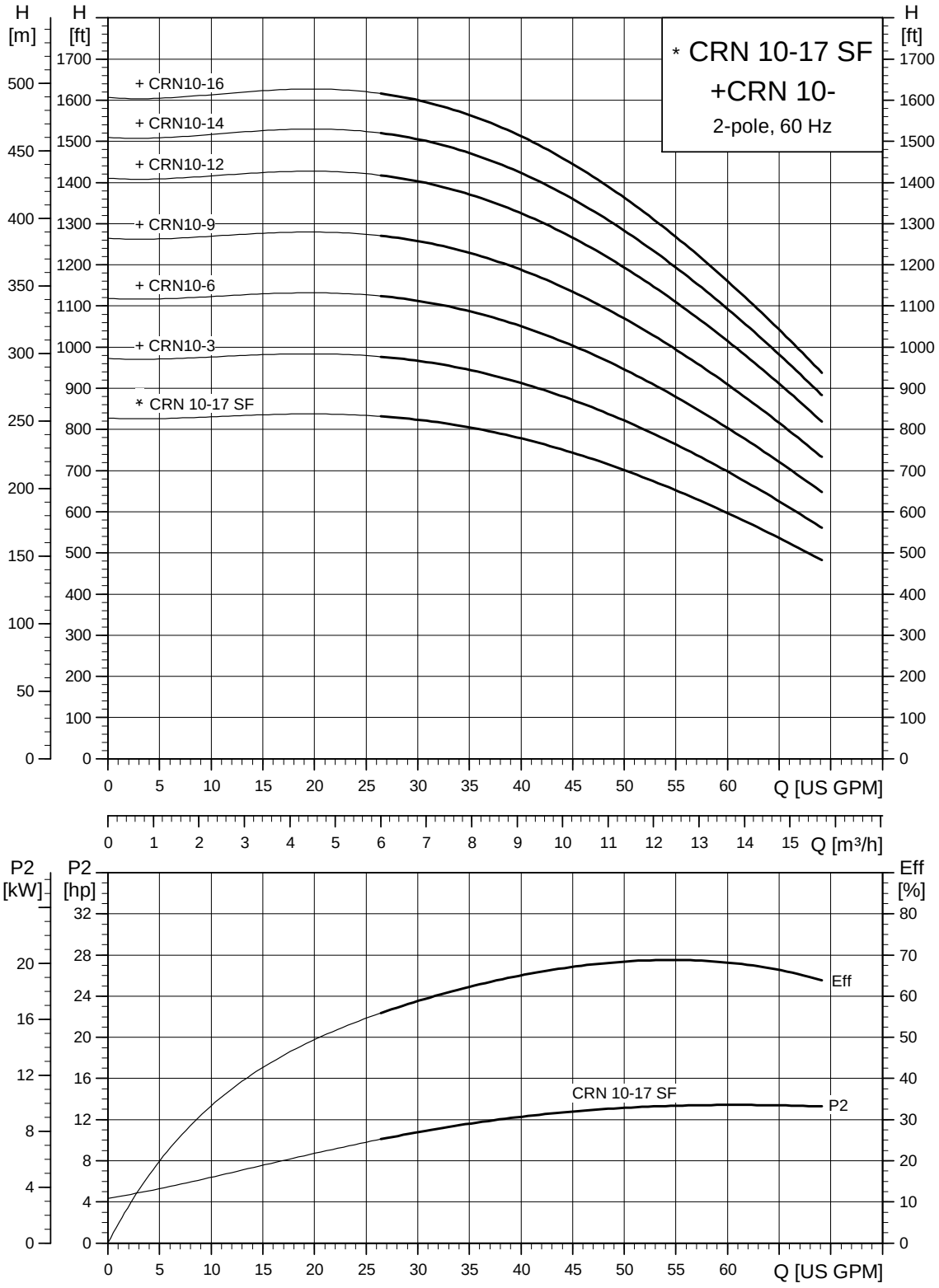
CRN feed pump, connecting pipe and CRN SF high-pressure pump

Dimensions and weights

Pump type	HP	Ph	Voltage [V]	Frame size	Dimensions [in (mm)]				PJE net. wt.[1)] [lbs]
					PJE B1	TEFC D1	TEFC D2	PJE TEFC B1+B2	
CRN 5-5	2	1	115/208-230	56C	14.29 (363)	7.64 (194)	5.88 (149)	27.15 (690)	64.37 (29)
		3	208-230/460	56C	14.29 (363)	7.64 (194)	5.88 (149)	26.75 (680)	69.89 (32)
CRN 5-7	3	1	115/208-230	182TC	17.52 (445)	9.45 (240)	8.06 (205)	33.99 (863)	101.1 (46)
		3	208-230/460	182TC	17.52 (445)	9.45 (240)	6.69 (170)	31.24 (793)	102.0 (46)
CRN 5-9	3	1	115/208-230	182TC	19.65 (499)	9.45 (240)	8.06 (205)	36.12 (917)	103.8 (47)
		3	208-230/460	182TC	19.65 (499)	9.45 (240)	6.69 (170)	33.36 (847)	104.7 (48)
CRN 5-12	5	1	208-230	182TC	22.83 (580)	10.96 (279)	8.41 (214)	42.15 (1071)	153.8 (70)
		3	208-230/460	182TC	22.83 (580)	9.45 (240)	6.69 (170)	38.13 (968)	127.6 (58)
CRN 5-14	5	1	208-230	182TC	24.96 (634)	10.96 (279)	8.41 (214)	44.27 (1125)	156.5 (71)
		3	208-230/460	182TC	24.96 (634)	9.45 (240)	6.69 (170)	40.25 (1022)	130.2 (59)
CRN 5-16	5	1	208-230*	182TC	27.09 (688)	10.96 (279)	8.41 (214)	46.40 (1179)	158.7 (72)
		3	208-230/460	182TC	27.09 (688)	9.45 (240)	6.69 (170)	42.38 (1076)	132.5 (60)
CRN 5-18	7 1/2	1	208-230	213TC	29.72 (755)	10.96 (279)	8.41 (214)	49.04 (1246)	183.8 (83)
		3	208-230/460	213TC	29.72 (755)	10.96 (279)	7.97 (202)	46.67 (1186)	186.2 (85)
CRN 5-20	7 1/2	1	208-230	213TC	31.85 (809)	10.96 (279)	8.41 (214)	51.16 (1300)	186.5 (85)
		3	208-230/460	213TC	31.85 (809)	10.96 (279)	7.97 (202)	48.80 (1240)	188.9 (86)
CRN 5-22	7 1/2	1	208-230	213TC	33.98 (863)	10.96 (279)	8.41 (214)	53.29 (1354)	188.9 (86)
		3	208-230/460	213TC	33.98 (863)	10.96 (279)	7.97 (202)	50.93 (1294)	191.3 (87)
CRN 5-24	7 1/2	1	208-230	213TC	36.10 (917)	10.96 (279)	8.41 (214)	55.41 (1408)	191.5 (87)
		3	208-230/460	213TC	36.10 (917)	10.96 (279)	7.97 (202)	53.05 (1348)	194.0 (88)
CRN 5-24 SF	10	3	460	132SB	35.59 (904)	10.24 (260)	6.26 (159)	50.51 (1283)	285 (129)

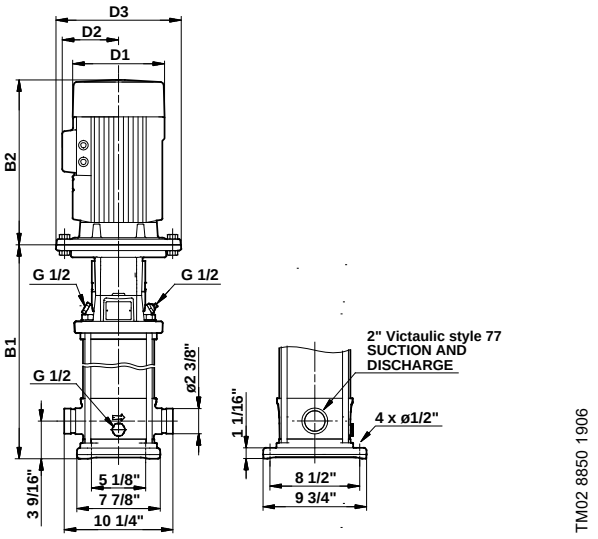
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).

CRN 10-SF

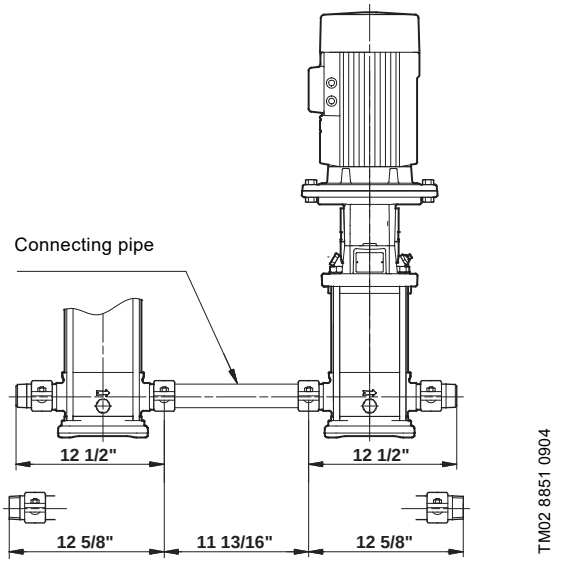


TM02 8311 2806

Dimensional sketches



CRN feed pump/CRN SF high-pressure pump



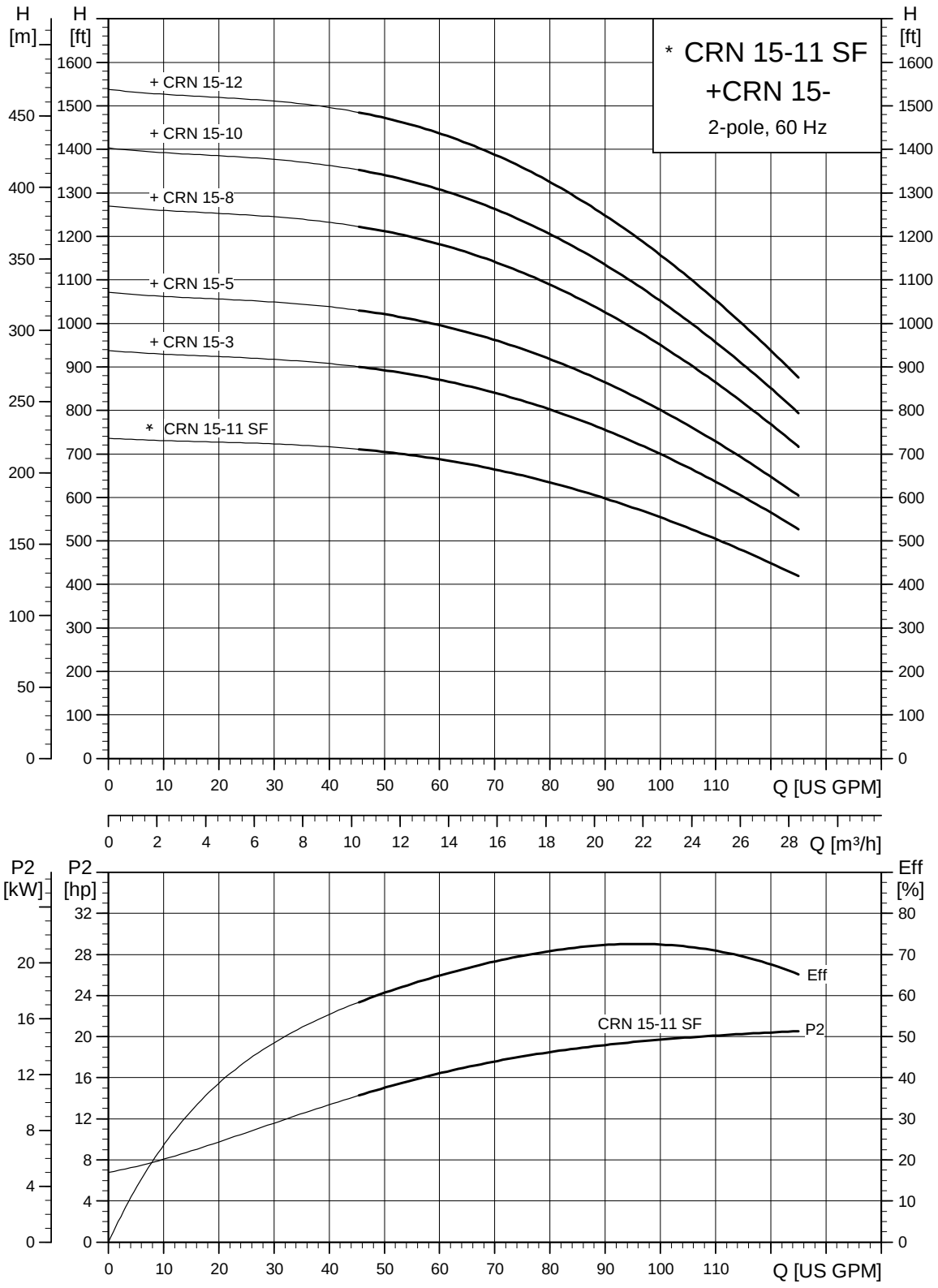
CRN feed pump, connecting pipe and CRN SF high-pressure pump

Dimensions and weights

Pump type	HP	Ph	Voltage [V]	Frame size	Dimensions [in (mm)]				PJE net. wt.[1)] [lbs]
					PJE B1	TEFC D1	TEFC D2	PJE TEFC B1+B2	
CRN 10-3	3	1	115/208-230	182TC	17.13 (435)	9.45 (240)	8.06 (205)	33.60 (853)	135.5 (62)
		3	208-230/460		17.13 (435)	7.64 (194)	5.88 (149)	30.77 (782)	117.5 (53)
CRN 10-6	5	1	208-230	182TC	20.67 (525)	10.96 (279)	8.41 (214)	39.98 (1016)	189.8 (86)
		3	208-230/460		20.67 (525)	9.45 (240)	6.69 (170)	35.96 (913)	163.5 (74)
CRN 10-9	7 1/2	1	208-230	213TC	24.53 (623)	10.96 (279)	8.41 (214)	43.84 (1114)	218.9 (99)
		3	208-230/460		24.53 (623)	10.96 (279)	7.97 (202)	41.48 (1054)	221.3 (100)
CRN 10-12	10	1	230	213TC	28.07 (713)	10.96 (279)	8.41 (214)	47.38 (1204)	232.8 (106)
		3	208-230/460		28.07 (713)	10.96 (279)	7.97 (202)	46.90 (1191)	264.3 (120)
CRN 10-14	15	3	208-230/460	254TC	32.95 (837)	13.18 (335)	9.45 (240)	51.76 (1315)	341.9 (155)
CRN 10-16	15	3	208-230/460	254TC	35.31 (897)	13.18 (335)	9.45 (240)	54.12 (1375)	346.3 (157)
CRN 10-17 SF	15	3	460	160MB	38.07 (967)	12.52 (318)	8.03 (204)	57.05 (1449)	350.7 (159)

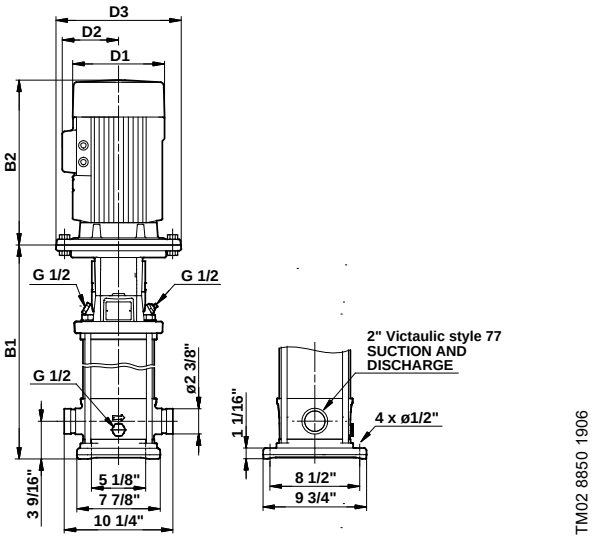
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).

CRN 15-SF

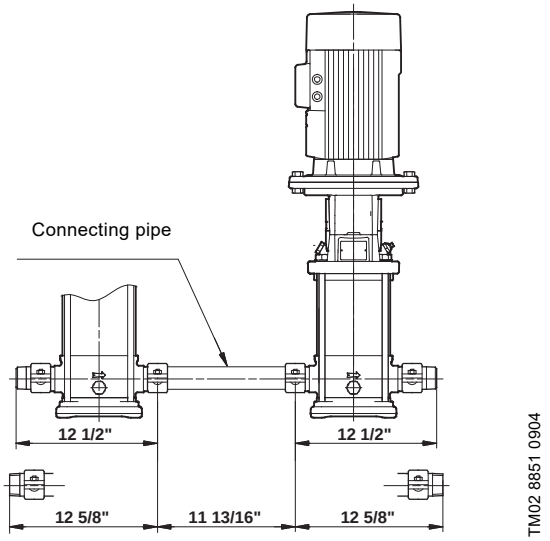


TM02 8312 2806

Dimensional sketches



CRN feed pump/CRN SF high-pressure pump



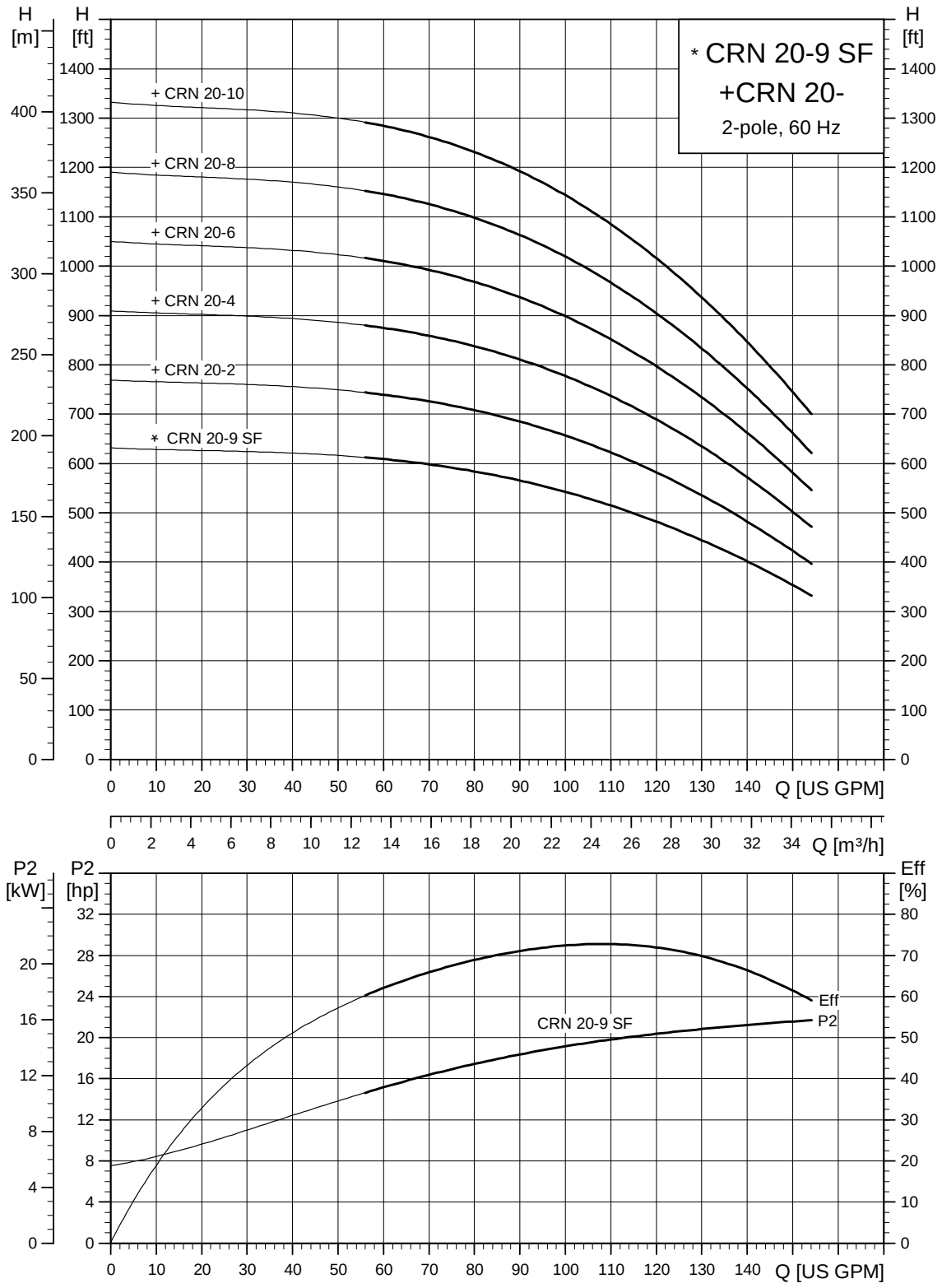
CRN feed pump, connecting pipe and CRN SF high-pressure pump

Dimensions and weights

Pump type	HP	Ph	Voltage [V]	Frame size	Dimensions [in (mm)]				PJE net. wt.[1)] [lbs]
					PJE B1	TEFC D1	TEFC D2	PJE TEFC B1+B2	
CRN 15-3	7 1/2	1	208-230	213TC	19.21 (488)	10.96 (279)	8.41 (214)	38.52 (979)	205.6 (93)
		3	208-230/460		19.21 (488)	10.96 (279)	7.97 (202)	36.16 (919)	208.1 (94)
CRN 15-5	10	1	230	213TC	22.76 (578)	10.96 (279)	8.41 (214)	42.07 (1069)	219.5 (100)
		3	208-230/460		22.76 (578)	10.96 (279)	7.97 (202)	41.58 (1056)	251.1 (114)
CRN 15-8	15	3	208-230/460	254TC	30.59 (777)	13.18 (335)	9.45 (240)	49.40 (1255)	335.3 (152)
CRN 15-10	20	3	230/460	254TC	34.13 (867)	13.18 (335)	9.45 (240)	53.73 (1365)	368.6 (167)
CRN 15-12	25	3	230/460	284TSC	37.05 (941)	14.17 (360)	11.08 (282)	60.62 (1540)	505.3 (229)
CRN 15-11 SF	20	3	460	160MD	38.46 (977)	12.52 (318)	8.03 (204)	57.28 (1455)	435 (197)

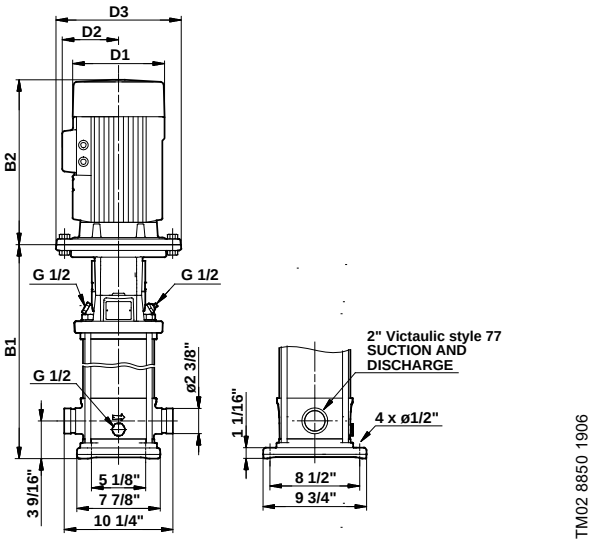
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).

CRN 20-SF

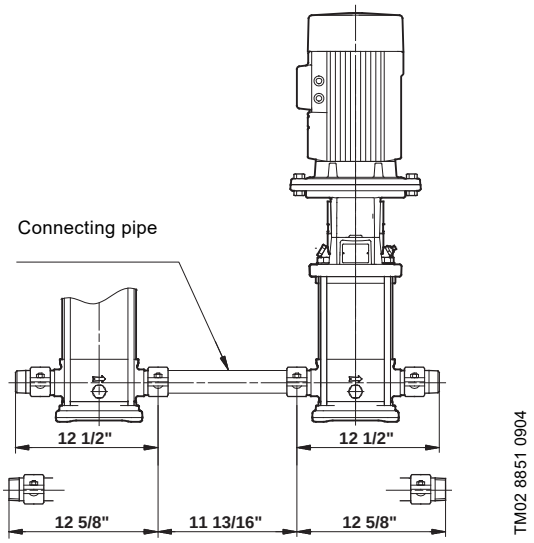


TM02 8313 2806

Dimensional sketches



CRN feed pump/CRN SF high-pressure pump



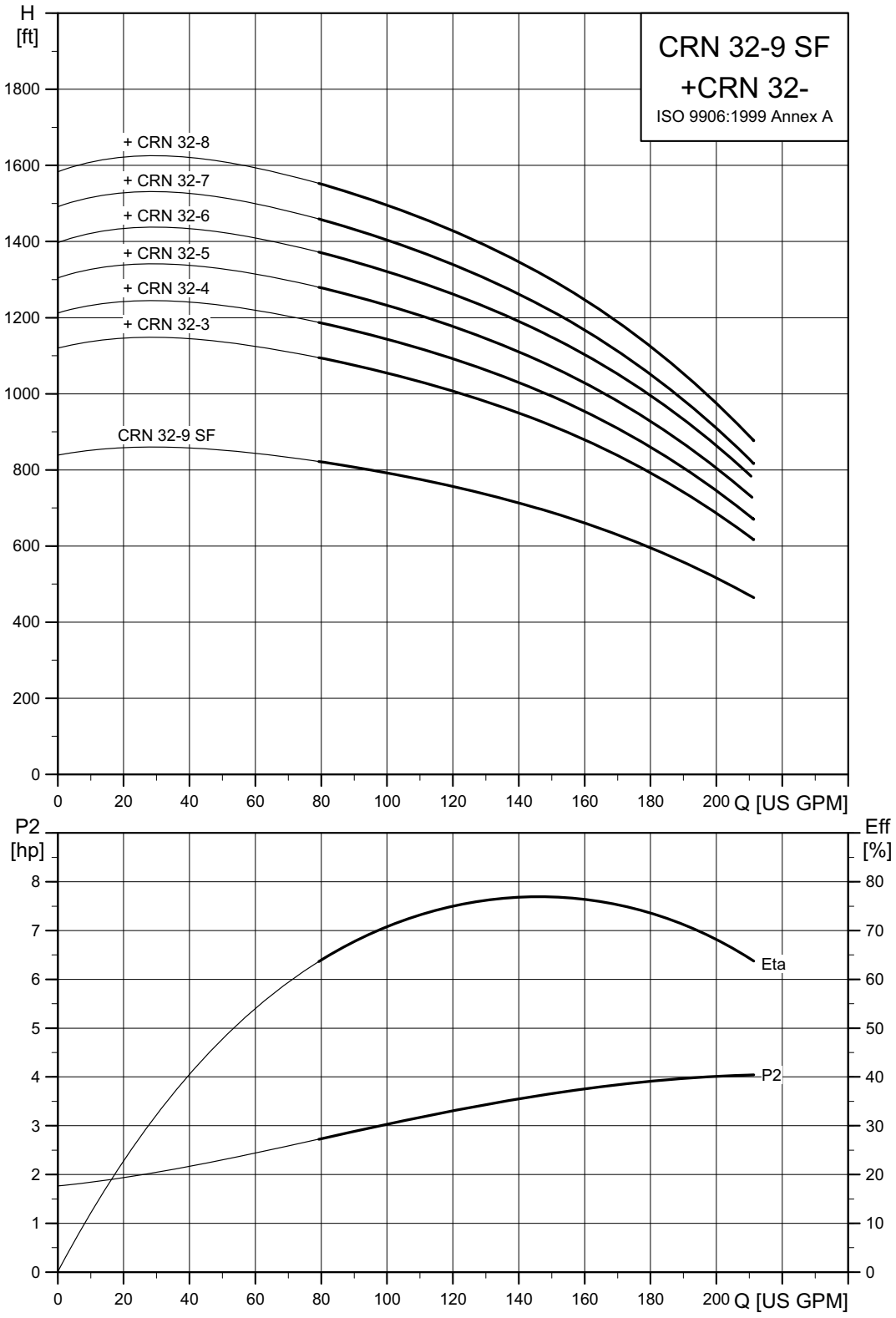
CRN feed pump, connecting pipe and CRN SF high-pressure pump

Dimensions and weights

Pump type	HP	Ph	Voltage [V]	Frame size	Dimensions [in (mm)]				PJE net. wt.[1)] [lbs]
					PJE B1	TEFC D1	TEFC D2	PJE TEFC B1+B2	
CRN 20-2	5	1	208-230	182TC	17.13 (435)	10.96 (279)	8.41 (214)	36.44 (926)	183.2 (83)
		3	208-230/460		17.13 (435)	9.45 (240)	6.69 (170)	32.42 (823)	156.9 (71)
CRN 20-4	10	1	230	213TC	20.98 (533)	10.96 (279)	8.41 (214)	40.30 (1024)	217.3 (99)
		3	208-230/460		20.98 (533)	10.96 (279)	7.97 (202)	39.81 (1011)	248.9 (113)
CRN 20-6	15	3	208-230/460	254TC	27.05 (687)	13.18 (335)	9.45 (240)	45.86 (1165)	328.7 (149)
CRN 20-8	20	3	230/460	254TC	30.59 (777)	13.18 (335)	9.45 (240)	50.19 (1275)	362.0 (164)
CRN 20-10	25	3	230/460	284TSC	33.50 (851)	14.17 (360)	11.08 (282)	57.08 (1450)	498.6 (226)
CRN 20-9 SF	25	3	460	160LB	34.92 (887)	12.48 (317)	8.03 (204)	55.63 (1413)	486 (220)

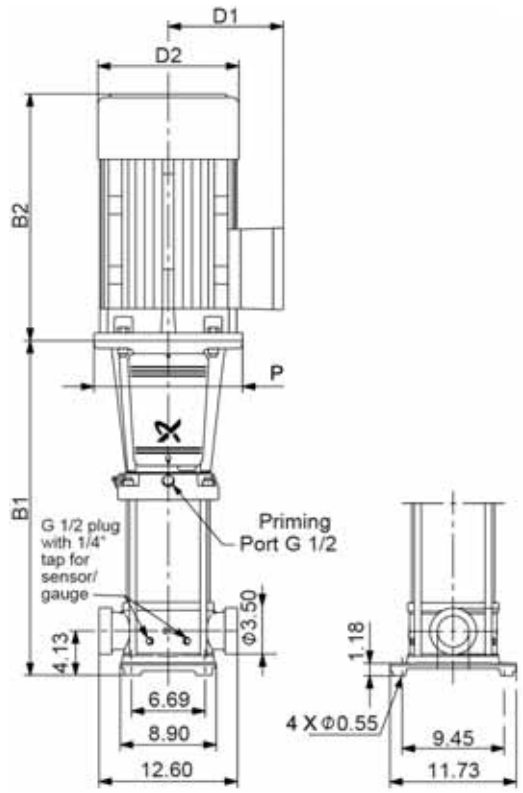
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).

CRN 32 SF, 60 Hz

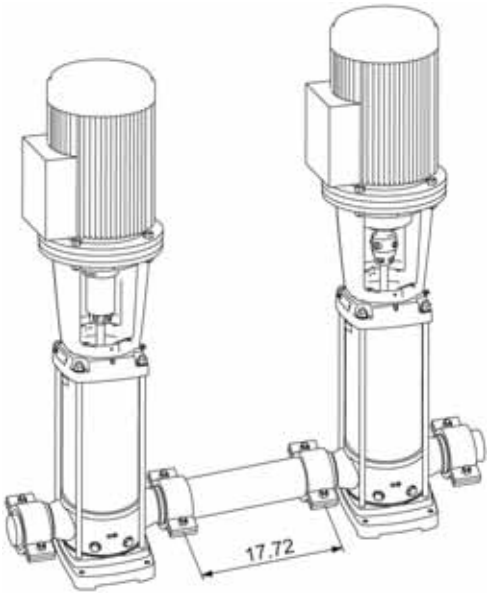


TM05 9549 1013

Dimensional sketches



CRN feed pump/CRN high-pressure pump



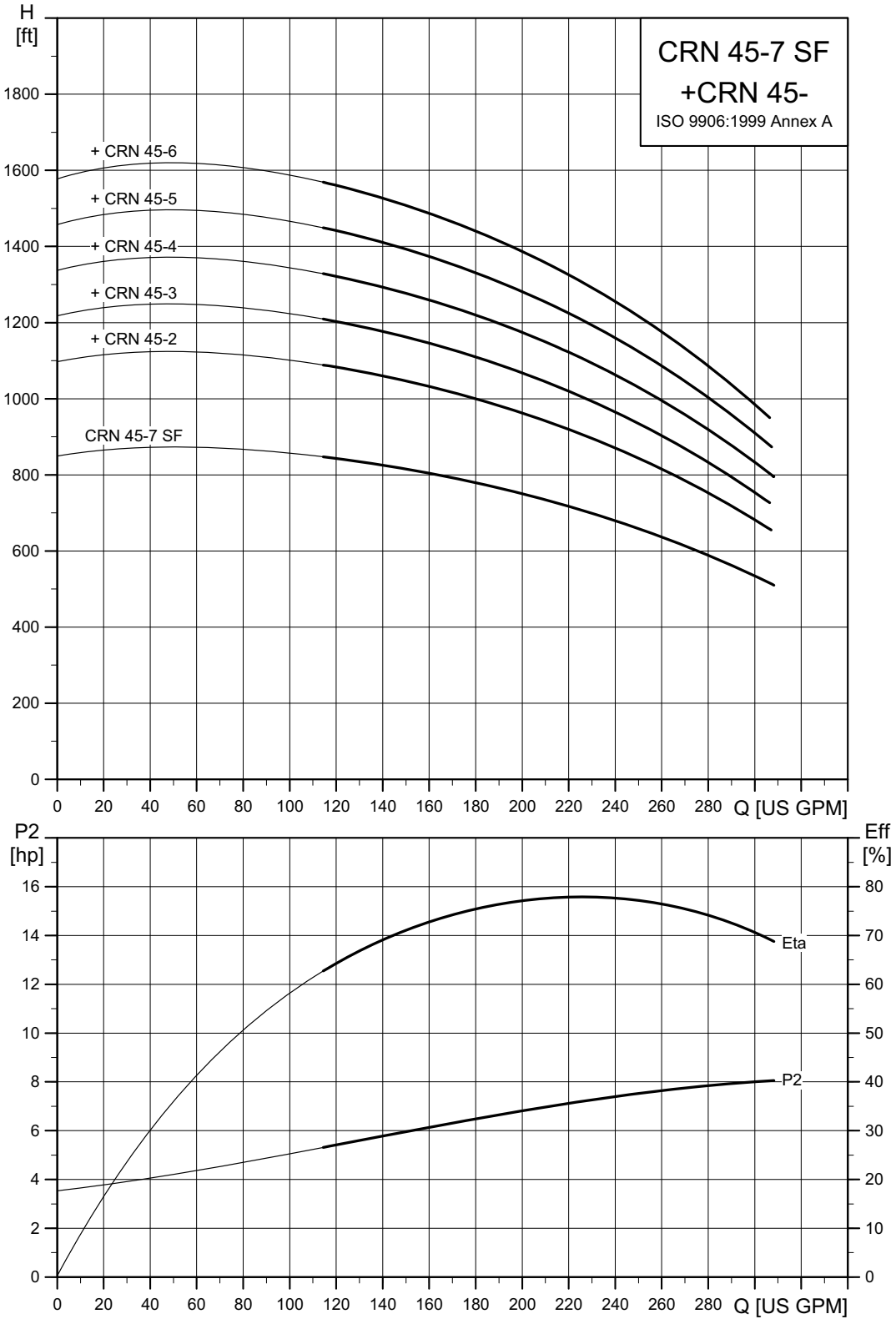
TM05 9426 0913 - TM05 9427 0913

Dimensions and weights

Pump type	P2 [HP]	Ph	ANSI Dimensions [in (mm)]				
			TEFC				
			B1	D1	D2	B1+B2	Net. wt.[1)] [lbs]
CRN 32-3	15	3	29.72 (755)	13.18 (335)	9.45 (240)	48.53 (1233)	378.9 (172)
CRN 32-4	20	3	32.48 (825)	13.18 (335)	9.45 (240)	52.08 (1323)	410.2 (186)
CRN, CRNE 32-5	20	3	35.24 (895)	13.18 (335)	9.45 (240)	54.83 (1393)	416.8 (189)
CRN, CRNE 32-6	25	3	37.99 (965)	14.17 (360)	11.08 (282)	61.57 (1564)	553.5 (251)
CRN, CRNE 32-7	30	3	40.75 (1035)	14.17 (360)	11.08 (282)	64.32 (1634)	561.0 (255)
CRN 32-8	40	3	43.50 (1105)	15.83 (402)	12.58 (320)	69.61 (1768)	742.3 (337)
CRN 32-9	40	3	46.26 (1175)	15.83 (402)	12.58 (320)	72.37 (1838)	750.0 (340)
CRN 32-9 SF*	40	3	49.02 (1245)	15.59 (396)	12.40 (315)	73.03 (1855)	825.0 (374)

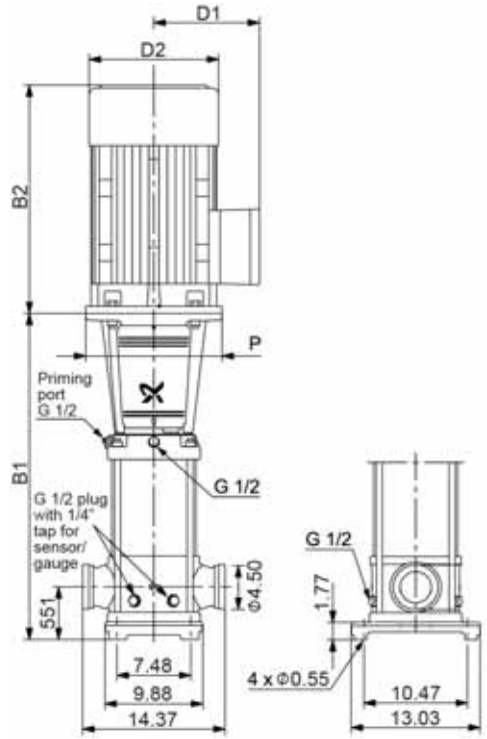
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).
* High-pressure pump

CRN 45 SF, 60 Hz

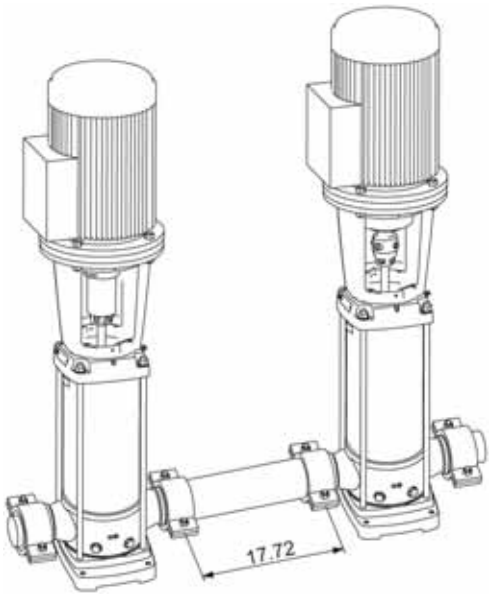


TM05 9550 1013

Dimensional sketches



CRN feed pump/CRN high-pressure pump



CRN feed pump, connecting pipe and CRN high-pressure pump

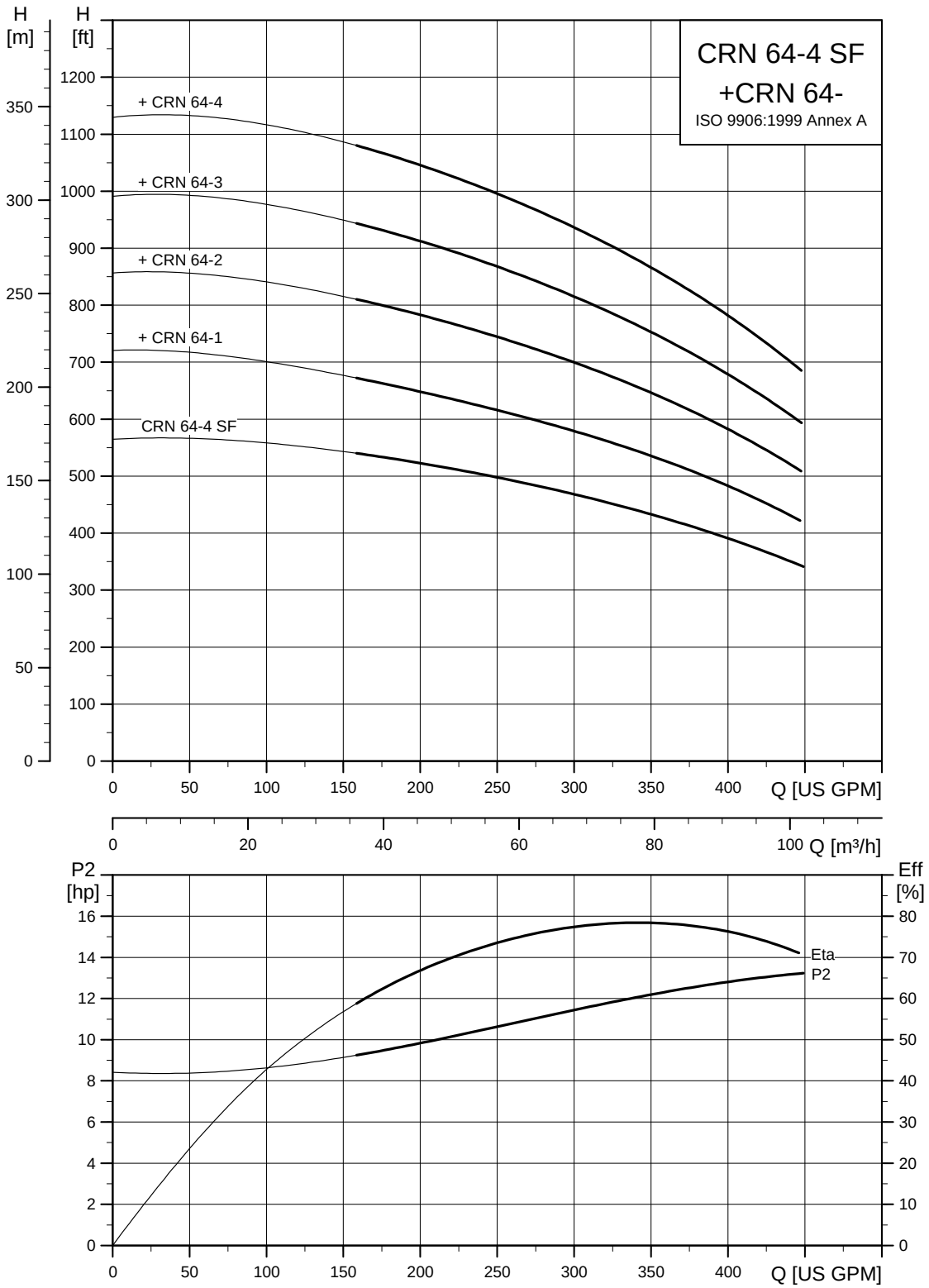
TM05 9461 0913 - TM05 9462 0913

Dimensions and weights

Pump type	P2 [HP]	Ph	ANSI Dimensions [in (mm)]				Net. wt.[1)] [lbs]
			TEFC				
			B1	D1	D2	B1+B2	
CRN 45-2	15	3	29.49 (749)	13.18 (335)	9.45 (240)	48.30 (1227)	389.5 (177)
CRNE 45-2	15	3	29.49 (749)	10.22 (260)	8.67 (220)	46.07 (1171)	376 (171)
CRN, CRNE 45-3	25	3	32.64 (829)	14.17 (360)	11.08 (282)	56.21 (1428)	552.2 (251)
CRN, CRNE 45-4	30	3	35.79 (909)	14.17 (360)	11.08 (282)	59.36 (1508)	564.6 (256)
CRN 45-5	40	3	38.94 (989)	15.83 (402)	12.58 (320)	65.04 (1652)	741.1 (336)
CRN 45-6	50	3	42.09 (1069)	15.83 (402)	12.58 (320)	68.19 (1732)	793.6 (360)
CRN 45-7 SF*	60	3	48.38 (1229)	17.28 (439)	13.31 (338)	76.30 (1938)	1185 (538)

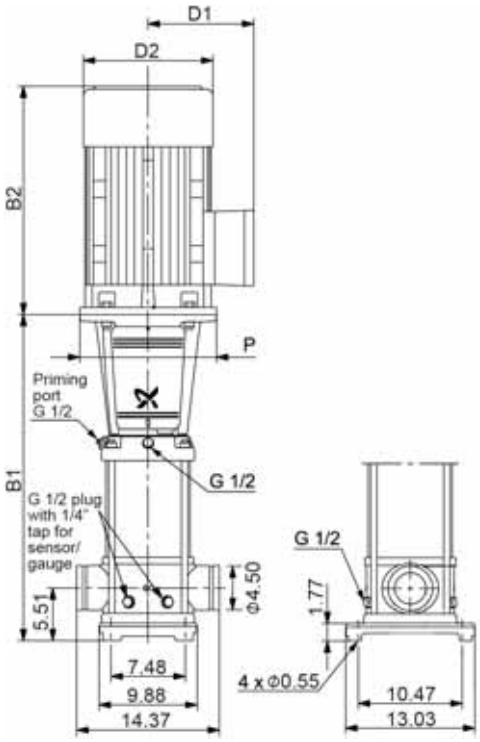
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).
* High-pressure pump

CRN 64 SF, 60 Hz

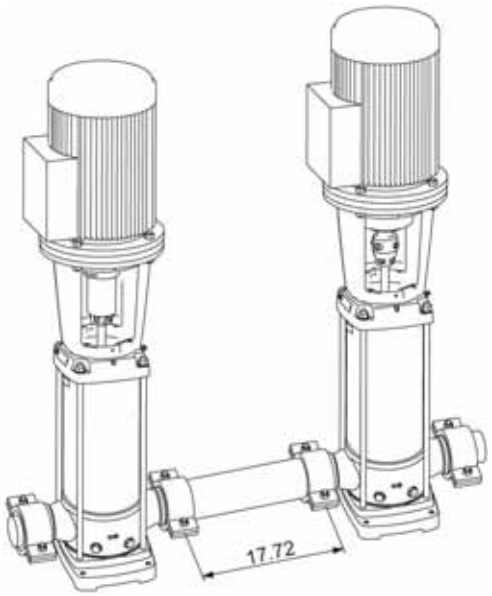


TM05 9551 1013

Dimensional sketches



CRN feed pump/CRN high-pressure pump



CRN feed pump, connecting pipe and CRN high-pressure pump

TM05 9464 0913 - TM05 9465 0913

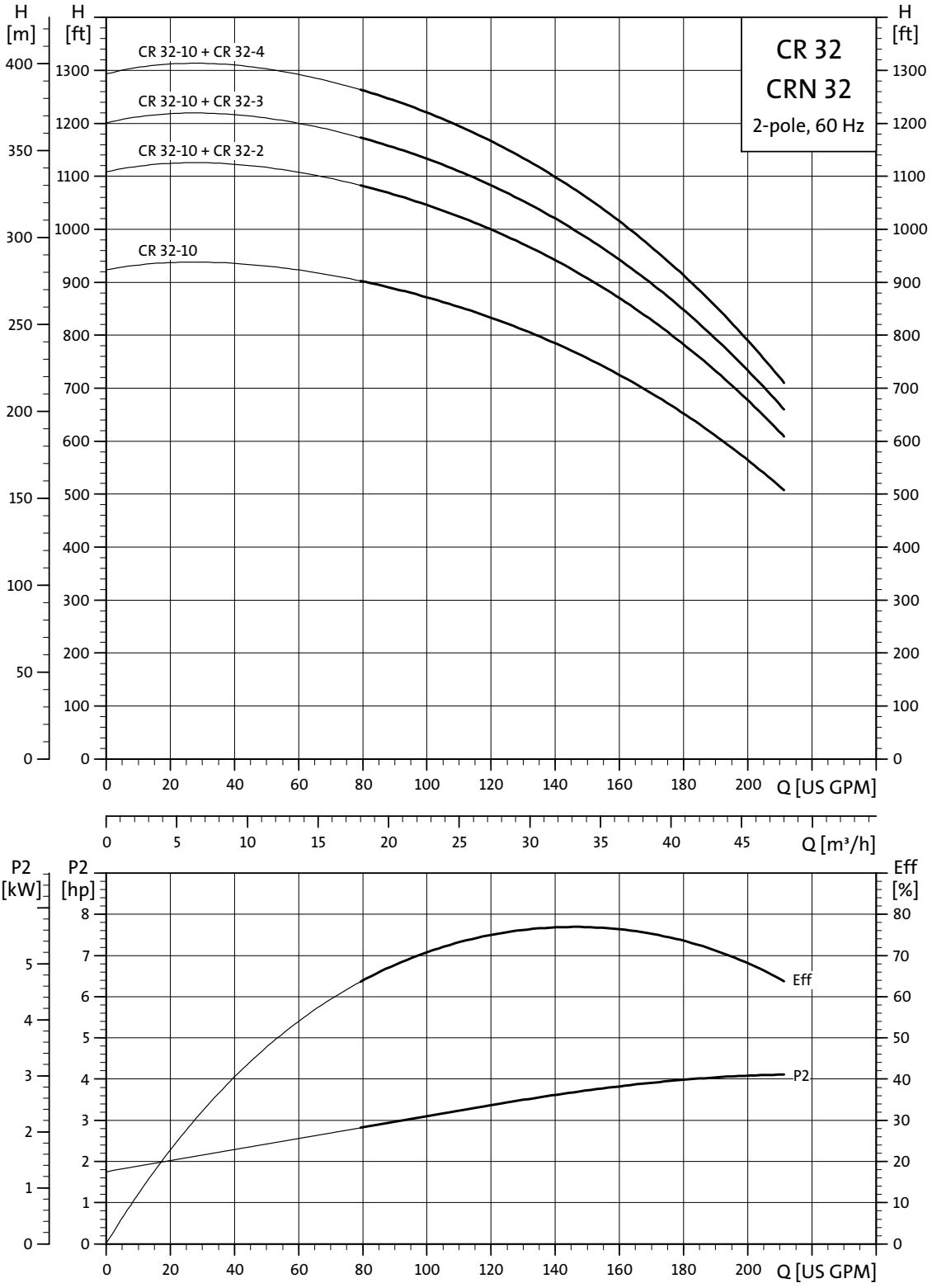
Dimensions and weights

Pump type	P2 [HP]	Ph	ANSI Dimensions [in (mm)]				Net. wt.[1)] [lbs]
			TEFC				
			B1	D1	D2	B1+B2	
CRN 64-1	15	3	26.42 (671)	13.18 (335)	9.45 (240)	45.23 (1149)	391.5 (178)
CRNE 64-1	15	3	26.42 (671)	10.22 (260)	8.67 (220)	43.00 (1092)	378 (172)
CRN, CRNE 64-2	25	3	29.69 (754)	14.17 (360)	11.08 (282)	53.26 (1353)	555.5 (252)
CRN, CRNE 64-3	40	3	32.91 (836)	15.83 (402)	12.58 (320)	59.02 (1499)	734.3 (333)
CRN 64-4	50	3	36.18 (919)	15.83 (402)	12.58 (320)	62.29 (1582)	794.7 (361)
CRN 64-4 SF*	60	3	45.90 (1166)	17.28 (439)	13.31 (338)	67.32 (1710)	1056 (480)

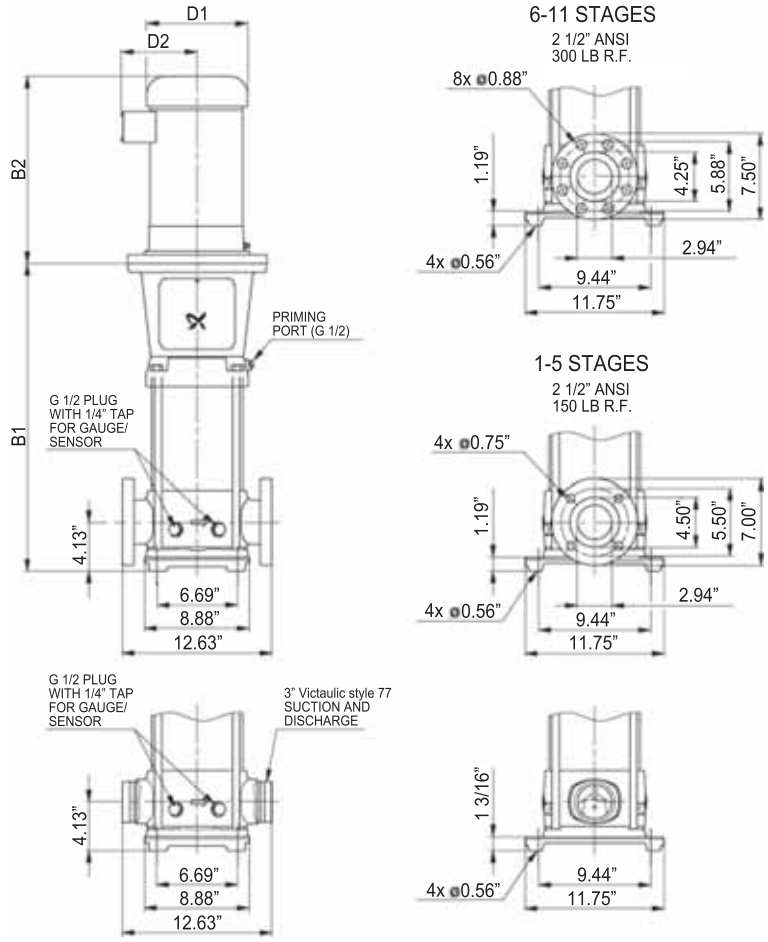
1) Weights are based on a pump with a TEFC motor (see the price list for individual weights).
* High-pressure pump

CR, CRN 32

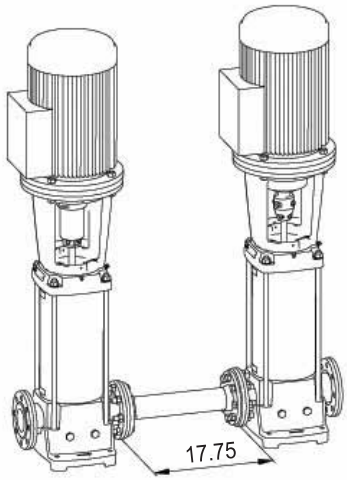
Dimensional sketches



TM02 8314 2406



CR, CRN feed pump/CR, CRN high-pressure pump



CR, CRN feed pump, connecting pipe and CR, CRN high-pressure pump

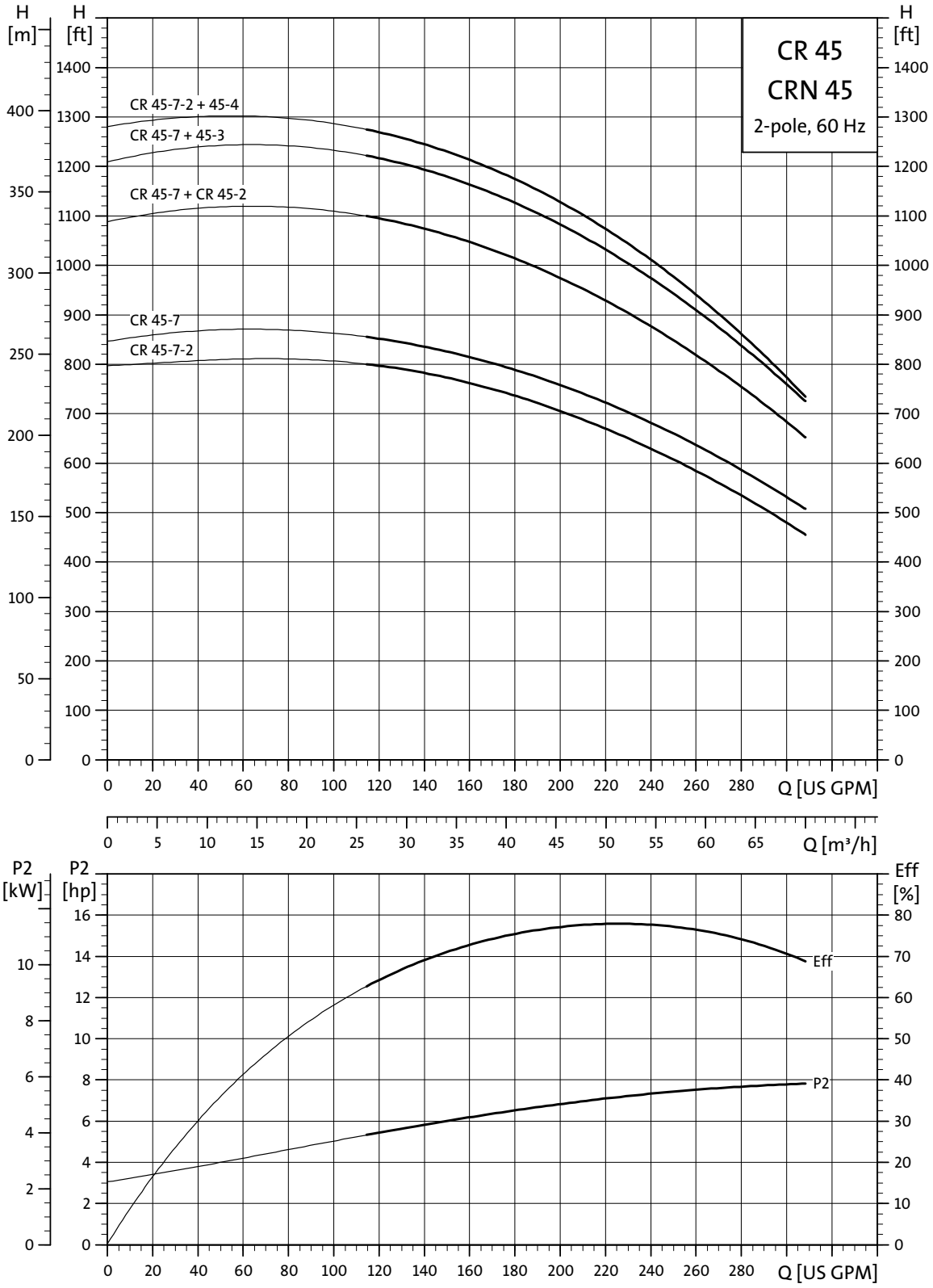
TM05 9717 1013 - TM05 9718 1013

Dimensions and weights

Pump type	P2 [HP]	Dimensions [in (mm)]							Ship weight[1] [lbs]	
		Victaulic B1	ANSI B1	B2	Victaulic B1+B2	ANSI B1+B2	D1	D2	Victaulic	ANSI
CR, CRN 32-2	7 1/2	22.83 (580)	22.83 (580)	19.31 (491)	42.15 (1071)	42.15 (1071)	10.96 (279)	8.41 (214)	256.8 (117)	256.8 (117)
CR, CRN 32-3	15	29.72 (755)	29.72 (755)	18.81 (478)	48.53 (1233)	48.53 (1233)	13.18 (335)	9.45 (240)	378.9 (172)	378.9 (172)
CR, CRN 32-4	15	32.48 (825)	32.48 (825)	19.60 (498)	52.08 (1323)	52.08 (1323)	13.18 (335)	9.45 (240)	410.2 (186)	410.2 (186)
CR, CRN 32-10	40	49.02 (1245)	49.02 (1245)	26.11 (663)	75.12 (1908)	75.12 (1908)	15.83 (402)	12.58 (320)	757.2 (344)	757.2 (344)

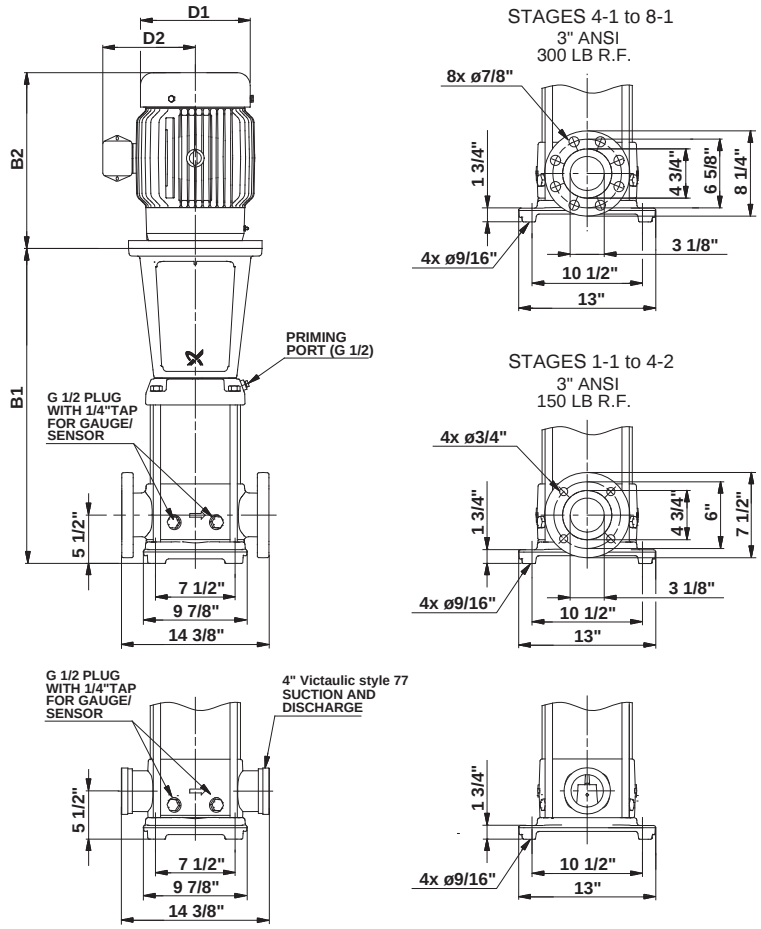
1) Weights are based on pump with TEFC motor (see price list for individual weights).

CR, CRN 45

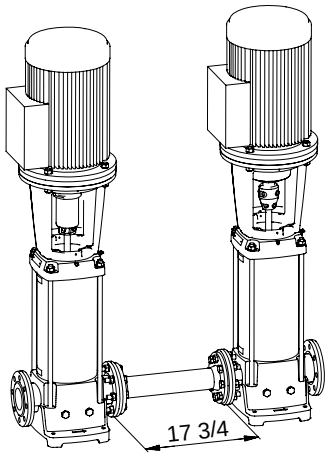


TM02 8316 2406

Dimensional sketches



CR, CRN feed pump / CR, CRN high-pressure pump



CR, CRN feed pump, connecting pipe and CR, CRN high-pressure pump

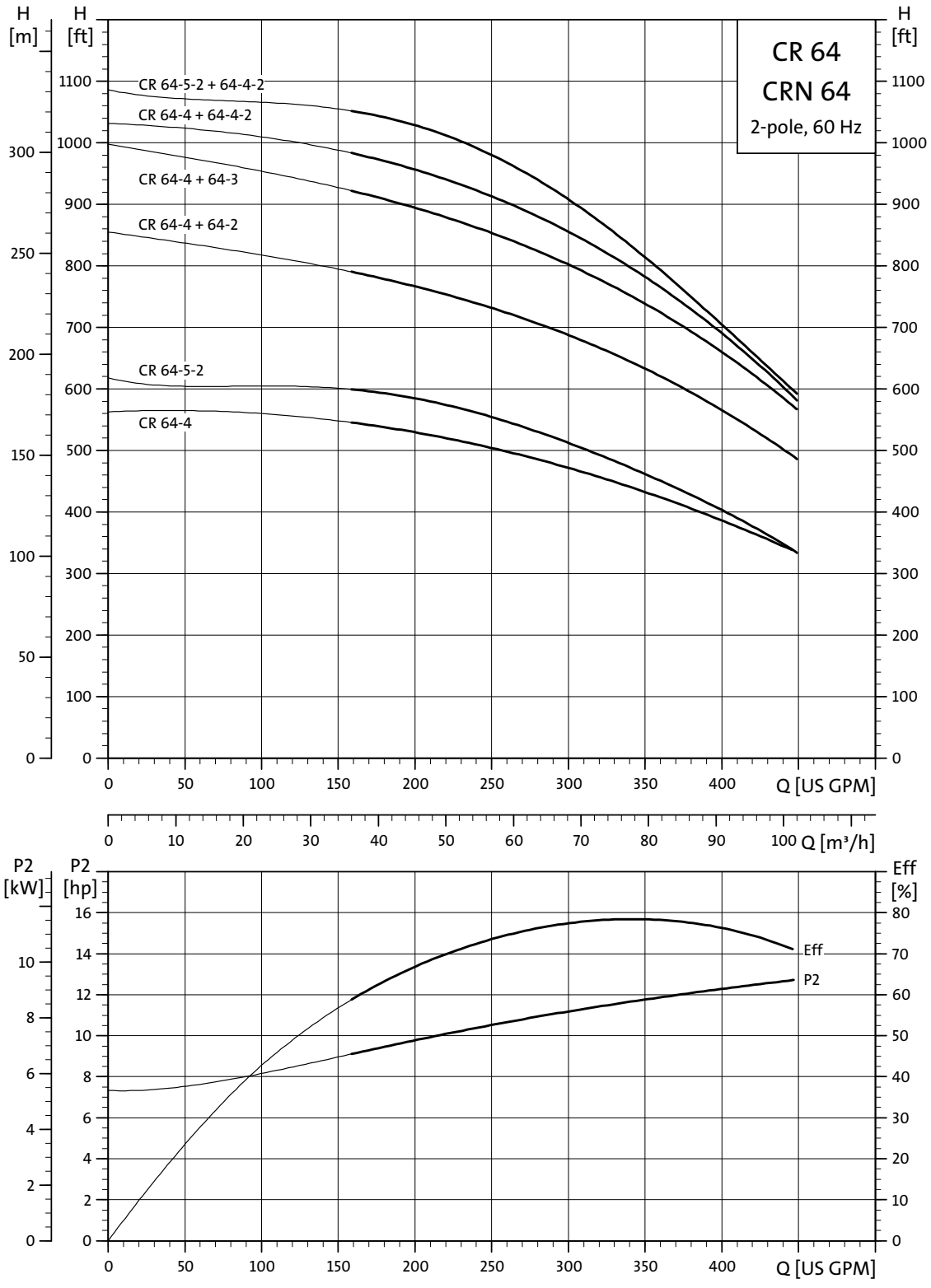
TM03 4285 1906 - TM03 3414 0306

Dimensions and weights

Pump type	HP	Ph	Voltage [V]	NEMA Frame Size	Dimensions [in (mm)]						ANSI net wt.[1] [lbs]
					PJE B1	ANSI B1	TEFC D1	TEFC D2	PJE TEFC B1+B2	ANSI TEFC B1+B2	
CR, CRN 45-2	15	3	208-230/460	254TC	29.49 (749)	29.49 (749)	13.18 (335)	9.45 (240)	48.30 (1227)	48.30 (1227)	285.0 (129)
CR, CRN 45-3	25	3	230/460	284TSC	32.64 (829)	32.64 (829)	14.17 (360)	11.08 (282)	56.21 (1428)	56.21 (1428)	484.5 (220)
CR, CRN 45-4	30	3	230/460	284TSC	35.79 (909)	35.79 (909)	14.17 (360)	11.08 (282)	59.36 (1508)	59.36 (1508)	496.2 (225)
CR, CRN 45-7-2	50	3	230/460	324TSC	45.24 (1149)	45.24 (1149)	15.83 (402)	12.58 (320)	71.34 (1812)	71.34 (1812)	668.4 (303)
CR, CRN 45-7	60	3	230/460	364TSC	45.24 (1149)	45.24 (1149)	17.91 (455)	16.02 (407)	74.06 (1881)	74.06 (1881)	890.0 (404)

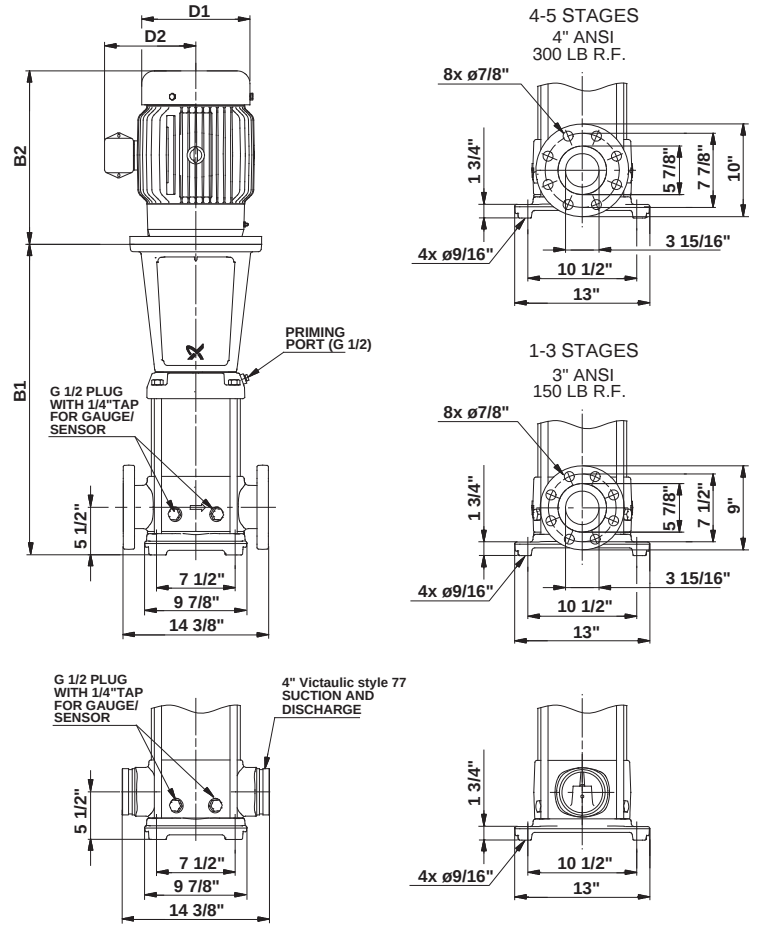
[1] Weights are based on pump with TEFC motor (see price list for individual weights).
All dimensions in inches unless otherwise noted

CR, CRN 64

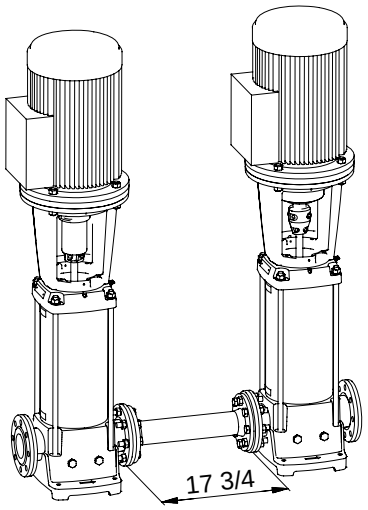


TM02 8318 2406

Dimensional sketches



CR, CRN feed pump / CR, CRN high-pressure pump



CR, CRN feed pump, connecting pipe and CR, CRN high-pressure pump

TM03 4286 1906 - TM03 3414 0306

Dimensions and weights

Pump type	HP	Ph	Voltage [V]	NEMA Frame Size	Dimensions [in (mm)]						ANSI net. wt.[1] [lbs]
					PJE B1	ANSI B1	TEFC D1	TEFC D2	PJE TEFC B1+B2	ANSI TEFC B1+B2	
CR, CRN 64-2	25	3	230/460	284TSC	29.69 (754)	29.69 (754)	14.17 (360)	11.08 (282)	53.26 (1353)	53.26 (1353)	391.5
CR, CRN 64-3	40	3	230/460	286TSC	32.91 (836)	32.91 (836)	15.83 (402)	12.58 (320)	59.02 (1499)	59.02 (1499)	625
CR, CRN 64-4-2	40	3	230/460	286TSC	36.18 (919)	36.18 (919)	15.83 (402)	12.58 (320)	62.29 (1582)	62.29 (1582)	625
CR, CRN 64-4	50	3	230/460	324TSC	36.18 (919)	36.18 (919)	15.83 (402)	12.58 (320)	62.29 (1582)	62.29 (1582)	678
CR, CRN 64-5-2	60	3	230/460	364TSC	39.41 (1001)	39.41 (1001)	17.91 (455)	16.02 (407)	68.23 (1733)	68.23 (1733)	868

1) Weights are based on pump with TEFC motor (see price list for individual weights).

5. Motor data

Motors used in the CR pump high pressure range are:

- Grundfos-specified WEG motors
- Grundfos ML, MG and MLE motors
- Grundfos-specified Siemens 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 (three phase only).

Standard motors for CR, CRN high pressure, 60 Hz

Motors for CRN 5, 10, 15, 20 feed pumps and for CR, CRN 32, 45 and 64 feed and high-pressure pumps

HP	Ph	Frame	Service factor	Voltage [V]	Mtr. eff. [%]	Full-load current [A]	Service-factor current [A]	Starting current [A]	Motor type
1 1/2	3	56C	1.15	208-230/4600	84.0	4.7-4.6 / 2.3	5.2-5.1 / 2.55	33.8-36.8 / 18.4	ML
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	ML
3	3	182TC	1.15	208-230/460	86.5	8.5-8.2 / 4.1	9.6-9.2 / 4.6	79.9-79.5 / 39.8	ML
5	3	182TC	1.15	208-230/460	88.5	13.8-13.0 / 6.5	15.6-14.6 / 7.3	124-129 / 64.4	ML
7 1/2	3	213TC	1.15	208-230/460	90.0	20.4-19.4 / 9.7	23-21.5 / 10.8	192-202 / 101	ML
10	3	213TC	1.15	208-230/460	90.2	26.5-25.5 / 12.8	30.5-28.5 / 14.5	239-252 / 127	ML

Grundfos ML motor

GR 7845

HP	Ph	Frame	Service factor	Voltage [V]	Mtr. eff. [%]	Full-load current [A]	Service-factor current [A]	Starting current [A]	Motor type
15	3	254TC	1.15	208-230/460	91.0	37.6-34.0 / 17	37.6-39.1 / 19.6	308-279 / 139	WEG
15	3	254TC	1.15	575	91.0	13.9	16.0	114	WEG
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	WEG
20	3	256TC	1.15	575	91.0	18.2	20.9	120	WEG
25	3	284TSC	1.25	208-230/460	91.7	63-57.0 / 28.5	63-71.3 / 35.6	397-359 / 180	WEG
25	3	284TSC	1.25	575	91.7	23	28.8	145	WEG
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	WEG
30	3	286TSC	1.25	575	91.7	27	33.8	170	WEG
40	3	324TSC	1.25	208-230/460	92.4	101-91.6 / 45.8	101-115 / 57.3	636-577 / 289	WEG
40	3	324TSC	1.25	575	92.4	37	46.3	233	WEG
50	3	326TSC	1.25	208-230/460	93.0	124-112 / 56.1	124-140 / 70.1	769-694 / 348	WEG
50	3	326TSC	1.25	575	93.0	44.9	56.1	278	WEG
60	3	364TSC	1.25	208-230/460	93.6	148-134 / 67	148-168 / 83.8	977-884 / 442	WEG
60	3	364TSC	1.25	575	93.6	53.6	67.0	354	WEG

WEG motor

TM07 7440 3820

All motors are TEFC (Totally Enclosed Fan Cooled, constant speed). Insulation class F.
The motors are recognized under the component recognition program of the Underwriters Laboratories Inc. for the United States and Canada.

Motors for CRN-SF 5, 10, 15, 20, 32, 45 and 64 high-pressure pumps

HP	Ph	Frame	Service factor	Voltage [V]	Full-load current [A]	Motor type
10	3	132SB	1.0	480	12.0	MG
15	3	160MB	1.0	480	17.2	MG
20	3	160MD	1.0	480	22.8	MG
25	3	160LB	1.0	480	28.0	MG
30	3	200L	1.0	480	50.0	Siemens
45	3	225M	1.0	480	74.0	Siemens

GR 7845

All motors are IP55 (similar to TEFC wash-down duty). Insulation class F.

Motors for horizontally mounted CR, CRN 32 pumps

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. [%]	Full-load current [A]	Motor type
50	3	326TSC	1.25	208-230/460	93.0	124-112 / 56.1	WEG
50	3	326TSC	1.25	575	93.0	44.9	WEG
60	3	364TSC	1.25	208-230/460	93.6	148-134 / 67	WEG
60	3	364TSC	1.25	575	93.6	53.6	WEG

TM07 7440 3820

All motors are TEFC (Totally Enclosed Fan Cooled, constant speed). Insulation class F.

MLE motors for CRNE-HS 1 and 3 (Integrated variable frequency drive)

HP	Ph	Frame	Service factor	Voltage [V]	Motor eff. [%]	Full-load current	Power factor	RPM CRNE 1-23	RPM CRNE 3-23	Motor type
6.2	3	112C	1.15	440-480	91.2	6.20 - 5.80	0.90 - 0.88	4800	4100	MLE
8	3	132E	1.15	440-480	90.2	9.40 - 8.60	0.91 - 0.89	5200	4500	MLE
10	3	132F	1.15	440-480	90.7	12.50 - 11.60	0.91 - 0.90	5500	4800	MLE

TM06 9830 0817

Note: Motor eff. is the total efficiency for the motor and variable frequency drive.
All motors are IP55 (similar to TEFC wash-down duty). Insulation class F.
The MLE motors are recognized under the component recognition program of the Underwriters Laboratories Inc. for the United States and Canada.

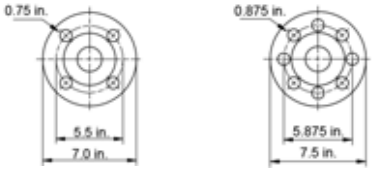
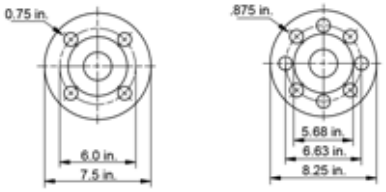
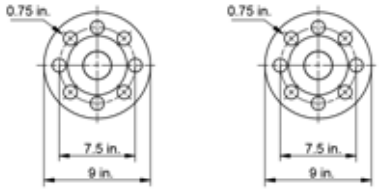
6. Accessories

Pipe connection

Various sets of counterflanges and couplings are available for pipe connection.

Counterflanges for CR and CRN

Counterflanges for CR, CRN pumps are made of stainless steel according to AISI 316.
A set consists of two counterflanges, two gaskets, bolts and nuts.

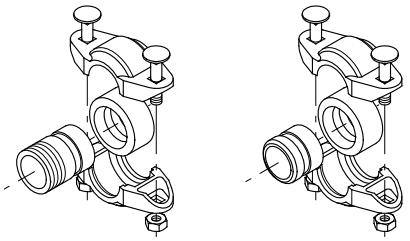
	TM02 5693 3802 TM02 5694 3802	**CR 32 CRN 32**	Threaded	ANSI 150 lb.	2 1/2" NPT	91121951
			Threaded	ANSI 300 lb.	2 1/2" NPT	0ID00138
	TM02 5695 3802 TM02 5696 3802	**CR 45 CRN 45**	Threaded	ANSI 150 lb.	3" NPT	91121953
			Threaded	ANSI 300 lb.	3" NPT	91121954
	TM02 5697 3802 TM02 5698 3802	**CR 64 CRN 64**	Threaded	ANSI 150 lb.	4" NPT	0ID00148
			Threaded	ANSI 300 lb.	4" NPT	91121955

Victaulic® type couplings with pipe stub

Couplings for CRN pumps are made of stainless steel according to AISI 316.

A coupling set consists of a Victaulic type coupling (style 77), rubber bushing, pipe stub, bolts and nuts.

The number of sets needed for a complete pump is stated in the figures below.

Coupling sets	Pump type	Pipe stub	Rated pressure	Pipe connection	Rubber parts	Number of coupling sets needed	Product number
 TM00 3808 1094	CRNE HS 1 CRNE-HS 3 CRN 5 SF	Threaded	1000 psi	1 1/4" NPT	EPDM	1*	4013010
					FKM	1*	0ID00118
		For welding	1000 psi	1 1/4"	EPDM	2	419912
					FKM	2	419904
	CRN 10 SF CRN 15 SF CRN 20 SF	Threaded	1000 psi	2" NPT	EPDM	1*	331301
					FKM	1*	0ID00128
		For welding	1000 psi	2"	EPDM	2	339910
					FKM	2	339917
	CRN 32 SF	For welding	1000 psi	3"	EPDM	2	98144746
					FKM	2	98144749
	CRN 45 SF CRN 64 SF	For welding	1000 psi	4"	EPDM	2	98144746
					FKM	2	98144755

* Includes two sets of Victaulic type couplings and pipe stubs

Fig. 16 Victaulic type couplings (style 77) with pipe stubs for threaded or welded pipe connection

Victaulic® type pipe stub

Pipe stubs for CRN pumps are made of stainless steel according to AISI 316.

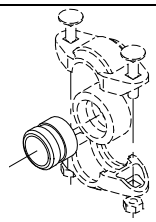
Pipe stub	Pump type	Rated pressure	Pipe connection	Product number
 TM03 4636 2406	CRN 32	1000 psi	3"	00150574
	CRN 45 CRN 64	1000 psi	4"	96416743

Fig. 17 Victaulic type pipe stub for welded pipe connection

Victaulic® type coupling

A set includes one coupling (style 77), rubber bushing, bolts and nuts.

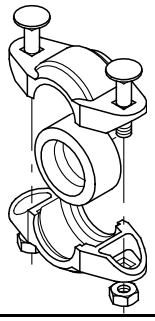
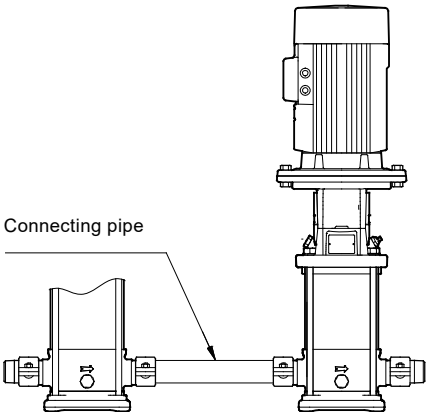
Coupling	Pump type	Rated pressure	Pipe connection	Product number		
				EPDM	FKM	NBR
 TM03 4637 2406	CRNE 1 HS CRNE 3 HS CRN 5 SF	1000 psi	1 1/4"	0ID1781	00ID6742	-
	CRN 10 SF CRN 15 SF CRN 20 SF		2"	00ID2643	00ID6743	-
	CRN 32 SF		3"	ID5530	ID8311	-
	CRN 45 SF CRN 64 SF		4"	96483370	96428783	-
	CRN 32		3"	-	-	00ID7664
	CRN 45 CRN 64		4"	-	-	96415463

Fig. 18 Victaulic type coupling (style 77)

Note: Victaulic® is a registered trademark of Victaulic.

Connecting pipe



TM01 1984 1906

Pump type	Pipe connection	Pipe type	Product number
CRN 5 SF	1 1/4"	Victaulic type (style 77)	400132
CRN 10 SF CRN 15 SF CRN 20 SF	2"		420138
CRN 32 SF	3"		98144757
CRN 45 SF CRN 64 SF	4"		98144759
CR, CRN 32	2 1/2"	ANSI	On request
	3"	Victaulic type (style 77)	On request
CR, CRN 45	3"	ANSI	On request
	4"	Victaulic type (style 77)	On request
CR, CRN 64	4"	ANSI	On request
	4"	Victaulic type (style77)	On request
	5"	ANSI	On request
	4"	Victaulic type (style77)	On request

CRN pumps with AISI 316 stainless steel connecting pipe

Pressure sensor for CRNE-HS

Pump type	Pressure range	Product number
CRNE 1, 3 HS	0-870 psi	91136174

Danfoss pressure sensor kit consists of the following:

- Danfoss pressure transmitter type MBS3000
- 6 ft screened cable
- Connection: 1/4" NPT
- Pressure range 0-870 psi

A priming valve with hollow stem is required when ordering a pressure sensor (product number 96527050).

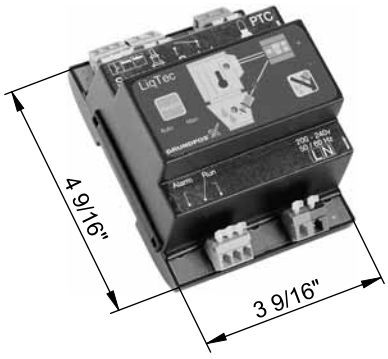
LiqTec™

The LiqTec dry-running protection unit has the following features:

- Protection of the pump against dry running.
- Protection of the pump against too high liquid temperature (+266 °F ± 9 °F (130 °C ± 5 °C)).
- A fail-safe design. If the sensor, sensor cable, electronic unit or power supply fails, the pump stops immediately.

When connected to the PTC sensors in the motor, the LiqTec also protects the motor against overheating. LiqTec is prepared for DIN rail mounting in a control cabinet.

Enclosure class: IPX0.



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Dry-running protection	Pump type	Voltage [V]	LiqTec	Sensor 1/2"	Cable 16.4 ft	Extension cable 49.2 ft	Product number
		200-240	•	•	•	-	96556429
	CR, CRN	80-130	•	•	•	-	96556430
		-	-	-	-	•	96443676

Fig. 19 Dimensions of Liqtec

7. Grundfos Product Center

Online search and sizing tool to help you make the right choice.
http://product-selection.grundfos.com

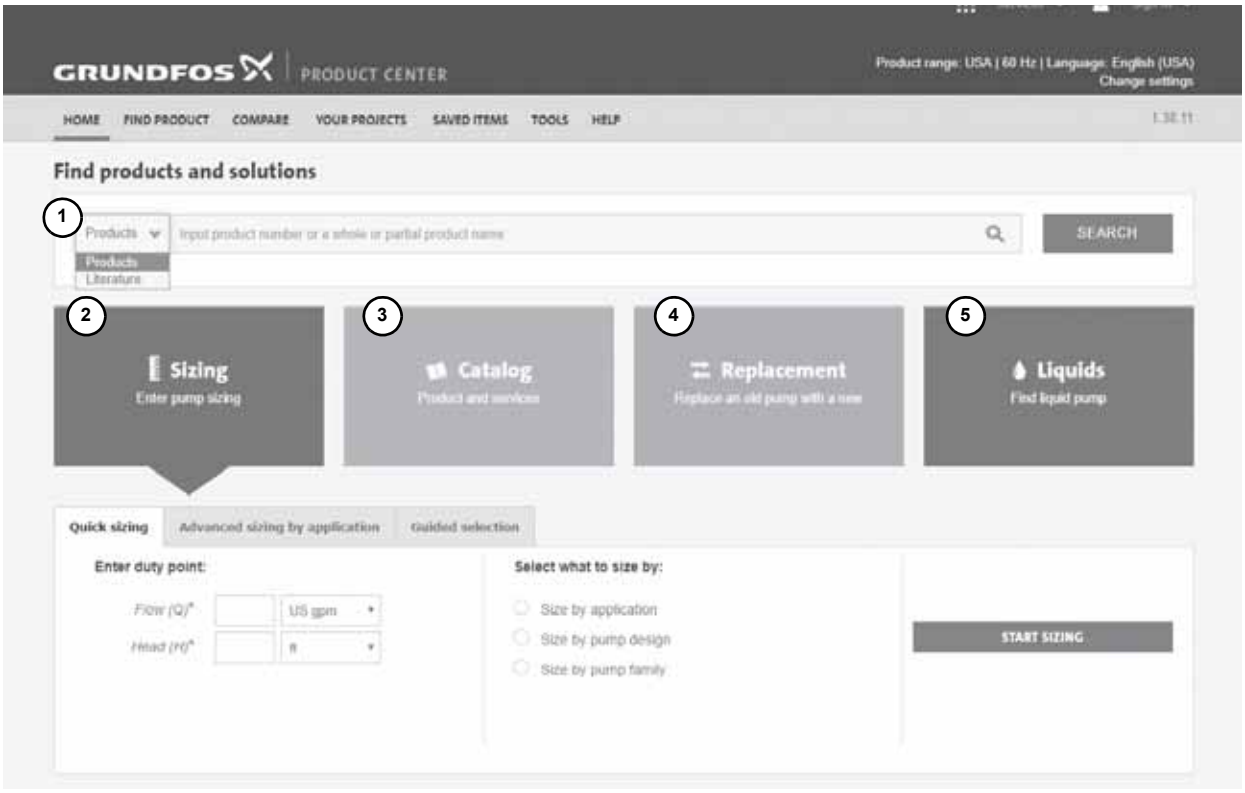
All the information you need in one place

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.

TM07 2384



TM07 2383

Pos.	Description
1	This drop-down menu enables you to set the search function to "Products" or "Literature".
2	**SIZING** enables you to size a pump based on entered data and selection choices.
3	**CATALOGUE** gives you access to the Grundfos product catalogue.
4	**REPLACEMENT** enables you to find a replacement product. Search results will include information on • the lowest purchase price • the lowest energy consumption • the lowest total life cycle cost.
5	**LIQUIDS** enables you to find pumps designed for aggressive, flammable or other special liquids.

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