

CHI, CHIE

Multistage Centrifugal Pumps
60 Hz



Contents

General data

Performance range, CHI, CHIE	page	4
Applications	page	5
Pumped liquids	page	5
Operating conditions	page	5
Maximum operating pressure and liquid temperature	page	5
Type keys	page	6
Codes	page	6
E-Pumps	page	7
Curve conditions	page	8

Technical data

CHI	page	9
Pump, CHI	page	9
Motor, CHI	page	9
Materials, CHI	page	9
Sectional drawing, CHI	page	9
CHI 2	page	10
CHI 4	page	12
CHI 8	page	14
CHI 12	page	16
CHIE	page	18
Pump, CHIE	page	18
Motor, CHIE	page	18
Materials, CHIE	page	18
Sectional drawing, CHIE	page	18
Dimensional Sketch, CHIE	page	19
CHIE Plus	page	20
Dimensional Sketch, CHIE-Plus	page	20
Dimensional Sketch, CHIE-Plus, Canada Version	page	21
Performance curves, CHIE	page	22
CHIE 2	page	23
CHIE 4	page	24
CHIE 8, CHIE 12	page	25

CHIE Functions

Overview of functions	page	26
Control modes	page	27
Control panel	page	28
Setting by means of R100	page	29
Menu OPERATION	page	30
Menu STATUS	page	30
Menu INSTALLATION	page	31
External forced-control signals	page	33
External setpoint signal	page	34
Indicator lights and signal relay	page	35

Installation

page 36

Electrical data

page 38

Submittal data sheet

page 39

Quotation text

page 41

Mission

- to successfully develop, produce, and sell high quality pumps and pumping systems worldwide, contributing to a better quality of life and healthier environment



GBJ - Bjerringbro, Denmark



GMU - Fresno, California



GPU - Olathe, Kansas



GMX - Monterrey, Mexico



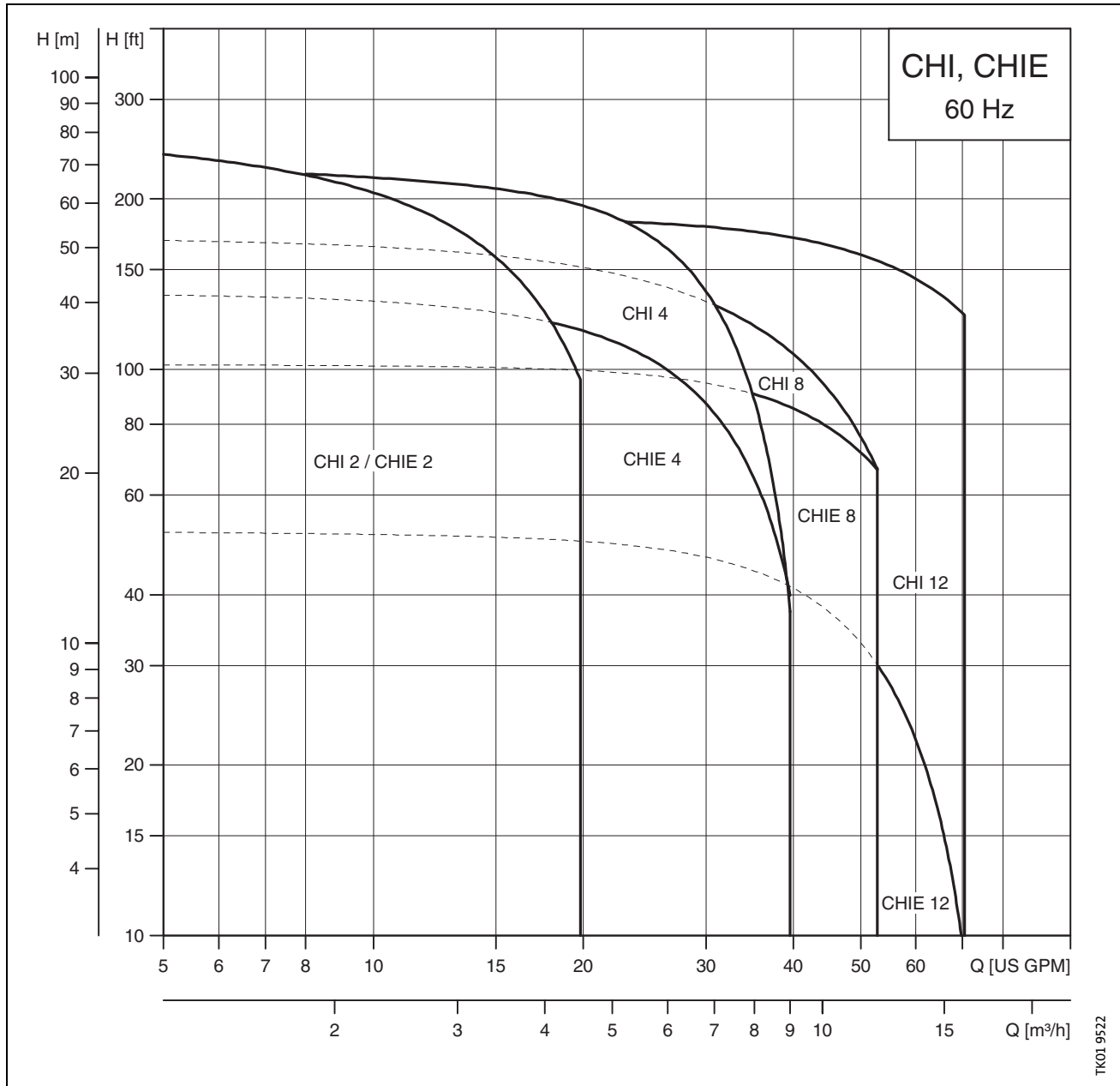
GPA - Allentown, Pennsylvania



GCA - Oakville, Ontario

- One of the 3 largest pump companies in the world
- World headquarters in Denmark
- North American headquarters in Kansas City - Manufacturing in Fresno, California
- 60 companies in 40 countries
- More than 10 million pumps produced annually worldwide
- North American companies operating in USA, Canada and Mexico
- Continuous reinvestment in growth and development enables the company to
BE responsible, **THINK** ahead, and **INNOVATE**

Performance range, CHI, CHIE



Applications

The CHI and CHIE pumps are primarily designed for industrial applications:

Typical applications	CHI	CHIE
Water treatment	●	○
Industrial washing and dish-washing machines	●	○
Pressure boosting of process water	●	○
Heating and cooling in industrial processes	●	○
Air-conditioning	●	
Airwashing, moisturization, humidification (softened water)	●	○
Water supply and pressure boosting (potable water, also slightly chlorinated).	●	○
Fertilizer/dosing systems	●	
Aquafarming	●	

In addition, the CHI, CHIE pump is suitable for many specialized applications.

- Recommended
- Applicable

Pumped liquids

Thin, clean, non-aggressive and non-explosive liquids without solid particles or fibers.

The pumps are able to pump liquids such as demineralised water, softened water, cleaning solutions, light oils and other light chemicals.

When pumping liquids with a density and/or viscosity higher than that of water, motors with correspondingly higher outputs 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 chloride content, pH value, temperature and content of solvents, oils, etc.

Operating conditions*


Liquid temperature:	+5°F to +230°F (-15°C to +110°C)
Maximum ambient temperature:	+104°F (+40°C)
Maximum operating pressure:	145 psi (10 bar)
Sound pressure level:	<70 dB(A)

Minimum inlet pressure according to the NPSHR curve + a safety margin of two feet of head.

Maximum inlet pressure is limited by maximum operating pressure.

* CHIE-Plus:

- Maximum liquid temperature: +176°F (80°C)
- Maximum operating pressure: 125 psi (8.6 bar)

Models:
 Maximum liquid temperature: 248°F (120°C)

Maximum operating pressure and liquid temperature

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

Shaft seal

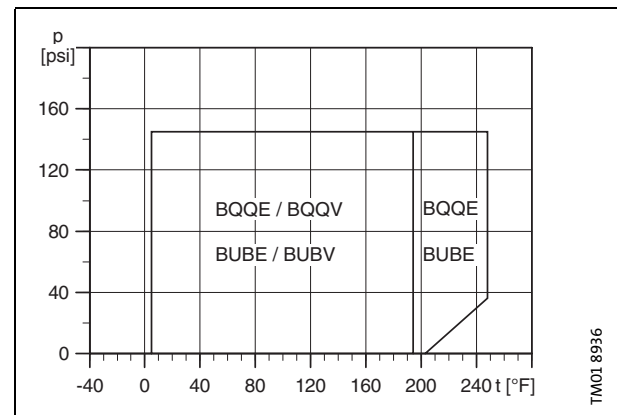
The shaft seal is to be selected on the basis of liquid temperature and type of liquid.

For other liquids than water, the chemical resistance of the materials - incl. seal face, seat and rubber components of the shaft seal - must be taken into account.





The following table shows available shaft seal types.

Pump type	Shaft seal type	Material	Rubber parts
CHI/CHIE	BQQE BQQV	Silicon carbide (Q)/ Silicon carbide (Q)	EPDM (E) FKM (V)
	BUBE BUBV	Tungsten carbide (U)/ Carbon (B)	

The following curves apply to clean water and water-containing antifreeze additives.



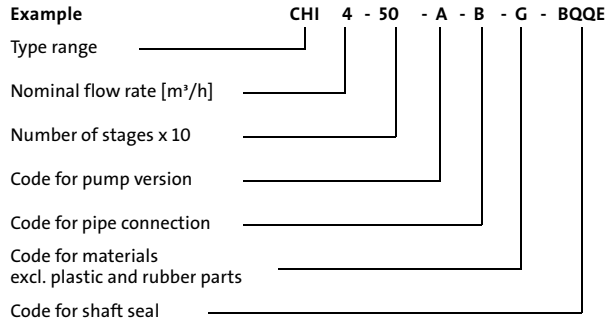
Approvals

 	on	1 x 115/230 V (CHI) 1 x 208 - 230 V (CHIE) 3 x 208 - 230/460 V (CHI)
	on	3 x 208 - 230/460 V (CHI 12-20) 1 x 208 - 230/2800 rpm (CHIE 4-60)
	on	3 x 575 V (CHI)

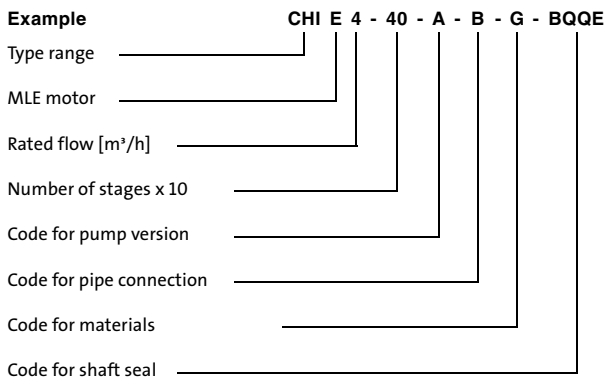
Official UL approval has been given for CHI pumps mounted indoors and pumping water only.

Type keys

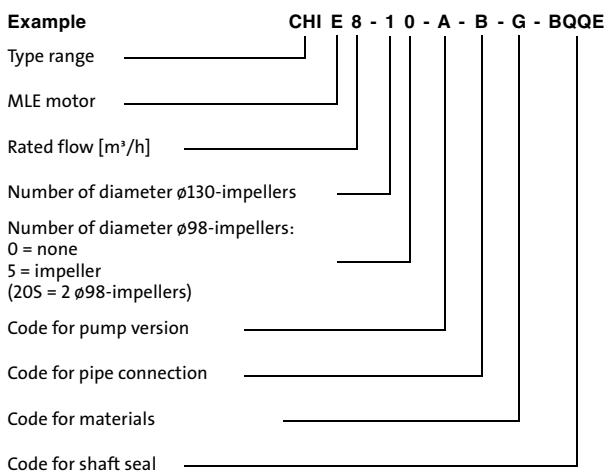
CHI



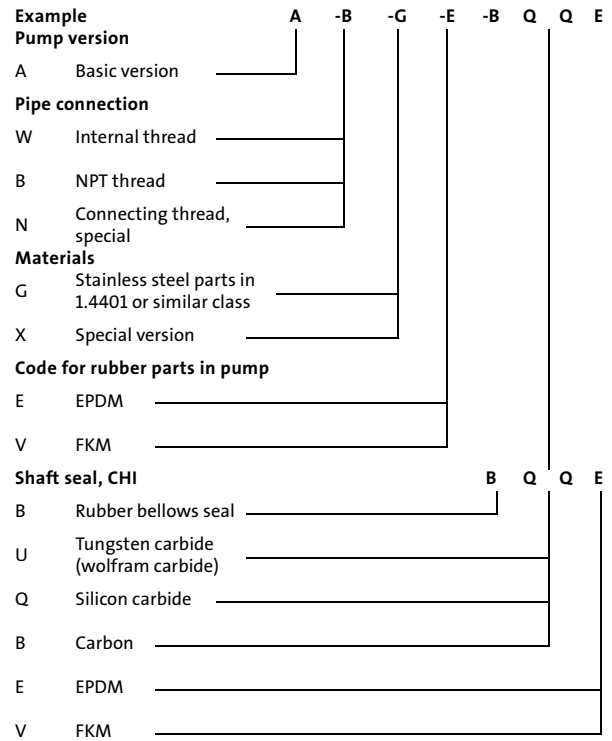
CHIE 2 and CHIE 4



CHIE 8 and CHIE 12



Codes



E-pumps

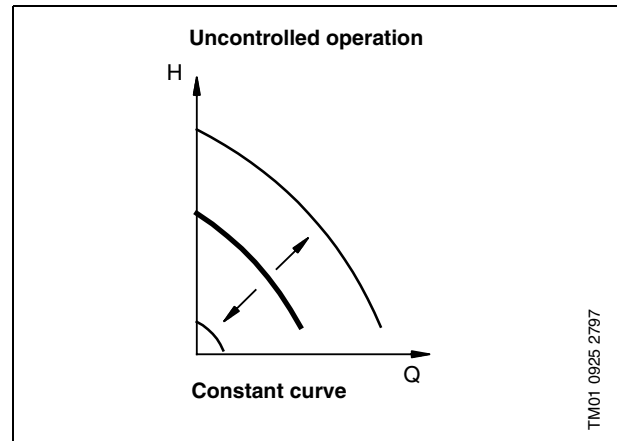
Grundfos pumps equipped with Grundfos MLE motors are called E-pumps. CHIE pumps belong to the E-pumps family.

The pumps are fitted with the single-phase Grundfos MLE motor with built-in PI-controller enabling connection to external control signals.

The MLE motor offers the following features:

- Built-in PI-controller,
- optional connection to external control signals,
- setpoint setting on the unit itself, and
- communication with the Grundfos remote control R100.

Through frequency control the MLE motor enables continuously variable control of the motor speed. Thus the pump can operate in any duty point in the range between pump min. and max. performance curves.

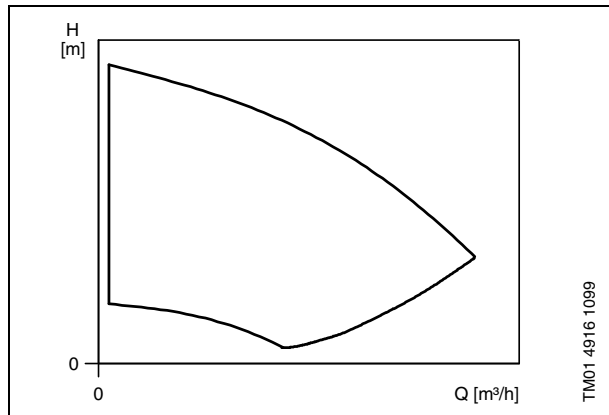


The fitting of a sensor at a later stage opens the possibility of control on the basis of pressure, differential pressure, temperature, differential temperature or flow.

The CHIE pumps are the ideal solution in a number of applications characterized by a need for variable flow at constant pressure. Depending on the nature of the application, the pumps offer energy savings, increased comfort or improved processing.

CHIE-Plus—a compact one-pump booster

With CHIE-Plus, a pressure sensor and a small diaphragm tank are added to build a complete, compact pressure booster supplying constant pressure.



CHIE Pumps

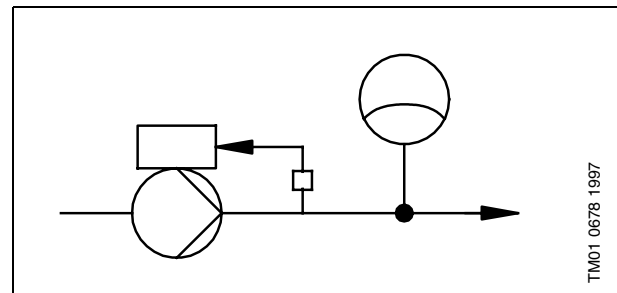
CHIE is a unique product combining stainless steel materials in all parts in contact with the pumped liquid with a compact design and an MLE motor.

This makes CHIE very suitable for industrial applications requiring a stainless steel product combined with the variable pump performance feature.

CHIE can operate in uncontrolled operating mode enabling pump performance control by an external signal.

Alternatively, the pump can operate in controlled operating mode enabling e.g. a constant pressure to be established by means of the built-in PI-controller and a connected sensor.

Other sensor types such as flow, temperature, differential temperature or differential pressure can also be connected.



CHIE incorporates a stop function ensuring that the pump automatically stops if the water demand drops to a very low level or disappears altogether. The method gives good total operating economy irrespective of the water demand, and the pump is not subjected to overheating and the subsequent risk of damage to the shaft seal.

E-pumps in industrial applications

Today many pumps are used in industrial applications, and in many of them speed control is an advantage. Within industrial cleaning and the like the advantage of a constant supply pressure is also gained.

Water treatment systems

Water treatment is an obvious area for speed-controlled CHIE pumps. Combining stainless steel materials and speed control makes it possible to meet material requirements as well as the need for optimum operating conditions, minimum energy consumption etc.

Due to the small dimensions of the CHIE pump it is suited for the pumping of clean water in compact water treatment systems.

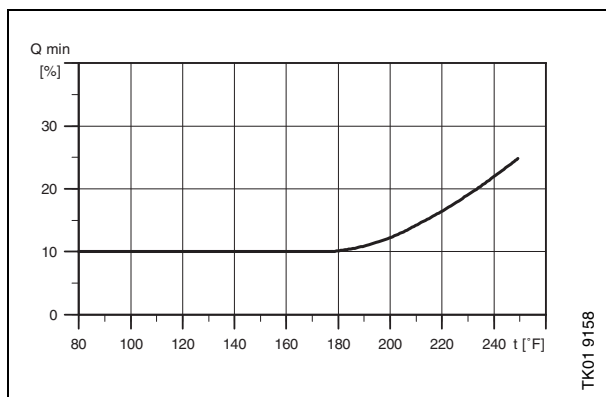
The pump can supply the processed water at a constant pressure to the consumer.

Curve conditions

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

1. The motors used for the measurements are standard Grundfos MG and MLE motors.
2. Measurements were made with airless water at a temperature of +68°F (+20°C).
3. The curves apply to a kinematic viscosity of $\nu=1\text{cSt (mm}^2/\text{s)}$
4. The bold curves indicate the full performance range. The thin curves are only a guide.
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.



Pump, CHI

The CHI pump is a non self-priming, compact horizontal multistage centrifugal pump fitted with a Grundfos motor including an extended motor/pump shaft. All parts in contact with the pumped liquid are made of 316 stainless steel. The pump bearings are self lubricated by the pumped liquid.

The pump has a maintenance-free mechanical shaft seal. The seal is a 16mm, unbalanced shaft seal with material options; BQQE, BQQV, BUBE, and BUBV .

The compact pump unit has small physical dimensions and an end suction type axial suction port and radial discharge port. The pump sleeve is drawn of 316 stainless steel sheet and has a threaded hole (G 3/8) with priming plug at the top and a threaded hole (G 3/8) with drain plug at the bottom.

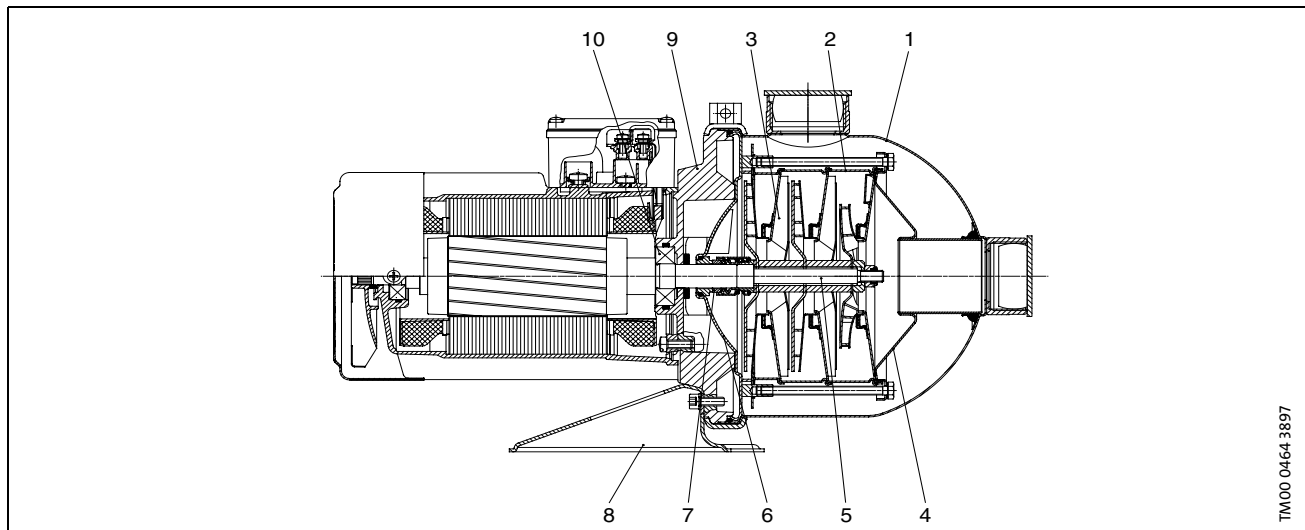
Connections	CHI 2	CHI 4	CHI 8	CHI 12
Axial suction port	1" NPT	1 1/4" NPT	1 1/2" NPT	1 1/2" NPT
Radial discharge port	1" NPT	1 1/4" NPT	1 1/2" NPT	1 1/2" NPT

Motor, CHI

The pump is coupled with a totally enclosed, fan-cooled Grundfos squirrel-cage motor.

Enclosure class: TEFC
 Insulation class: F
 Standard voltages: 1 x 115/230 V, 60 Hz
 3 x 208-230/460 V, 60 Hz
 3 x 575 V, 60 Hz
 Sound-pressure level: ≤ 64 dB(A)

Sectional drawing, CHI



Single-phase motors do not have built-in thermal overload protection and therefore require external motor protection.

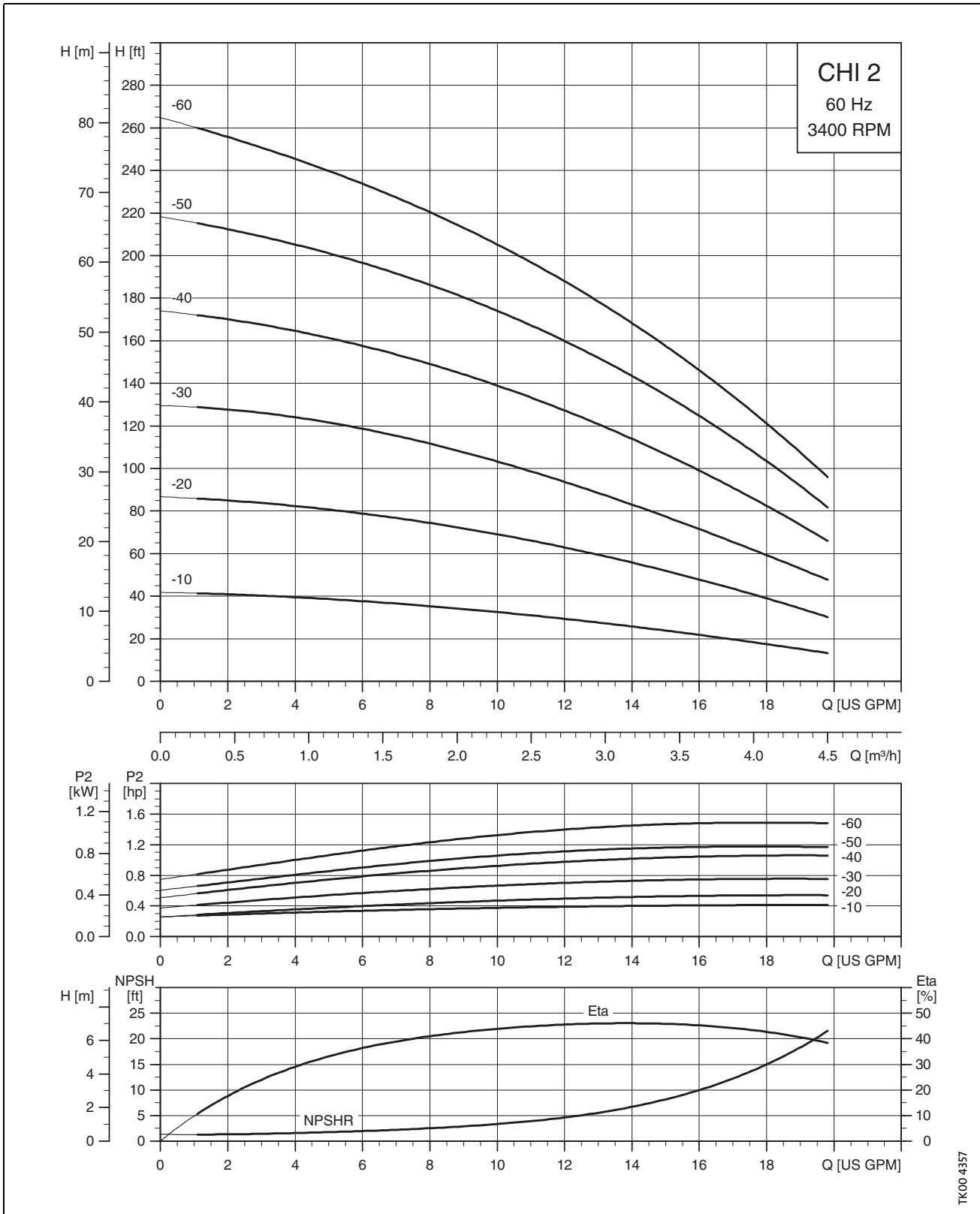
Three-phase motors must be connected to a motor starter in accordance with local regulations.

CHI single-phase are also available with variable speed motors, type MLE. See CHIE section.

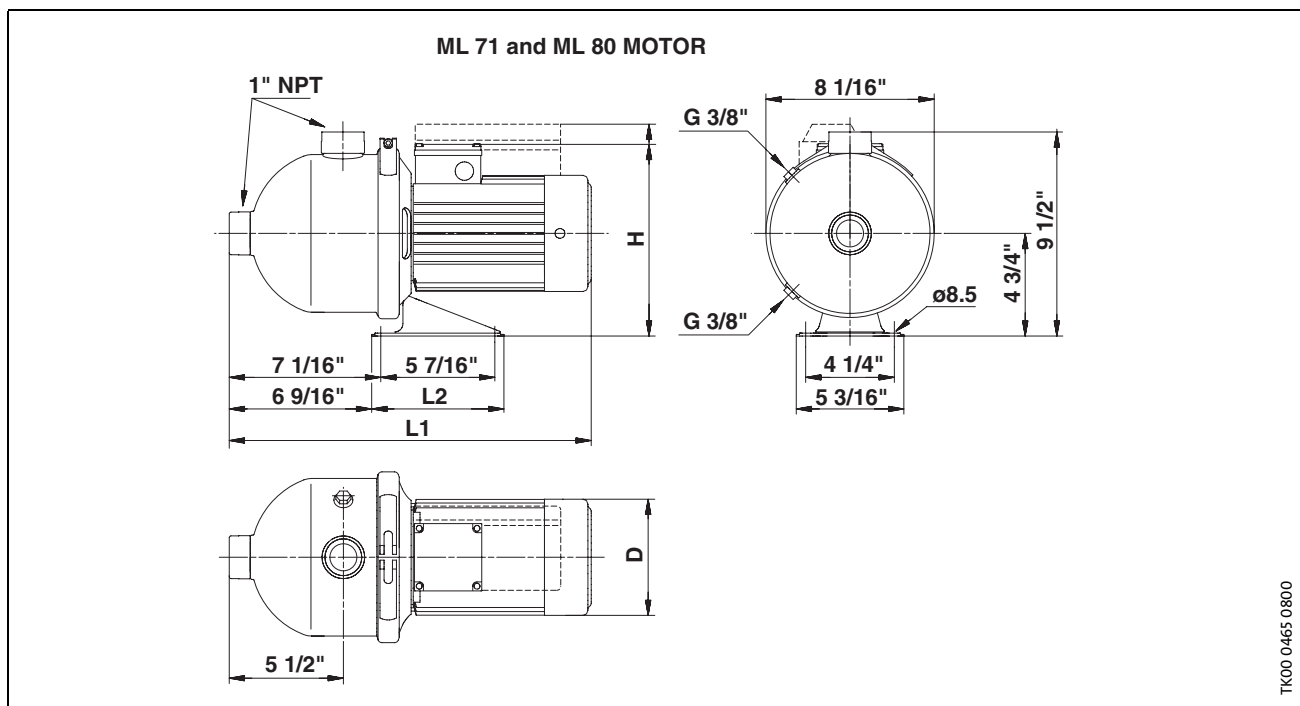
Materials, CHI

Pos.	Description	Materials	AISI, ASTM
1	Pump sleeve	Stainless steel	316
2	Intermediate chamber/ guide vanes	Stainless steel	316
3	Impeller	Stainless steel	316
4	Suction interconnector	Stainless steel	316
5	Spline shaft	Stainless steel	316
6	Cover plate	Stainless steel	316
7	Shaft seal faces	BQQE, BQQV, BUBE, and BUBV	
8	Base plate	Painted steel plate	
9	Motor flange	Cast iron Silumin	
10	Ball bearing		
	O-rings	EPDM or FKM	D1418

TM00 0464 3897

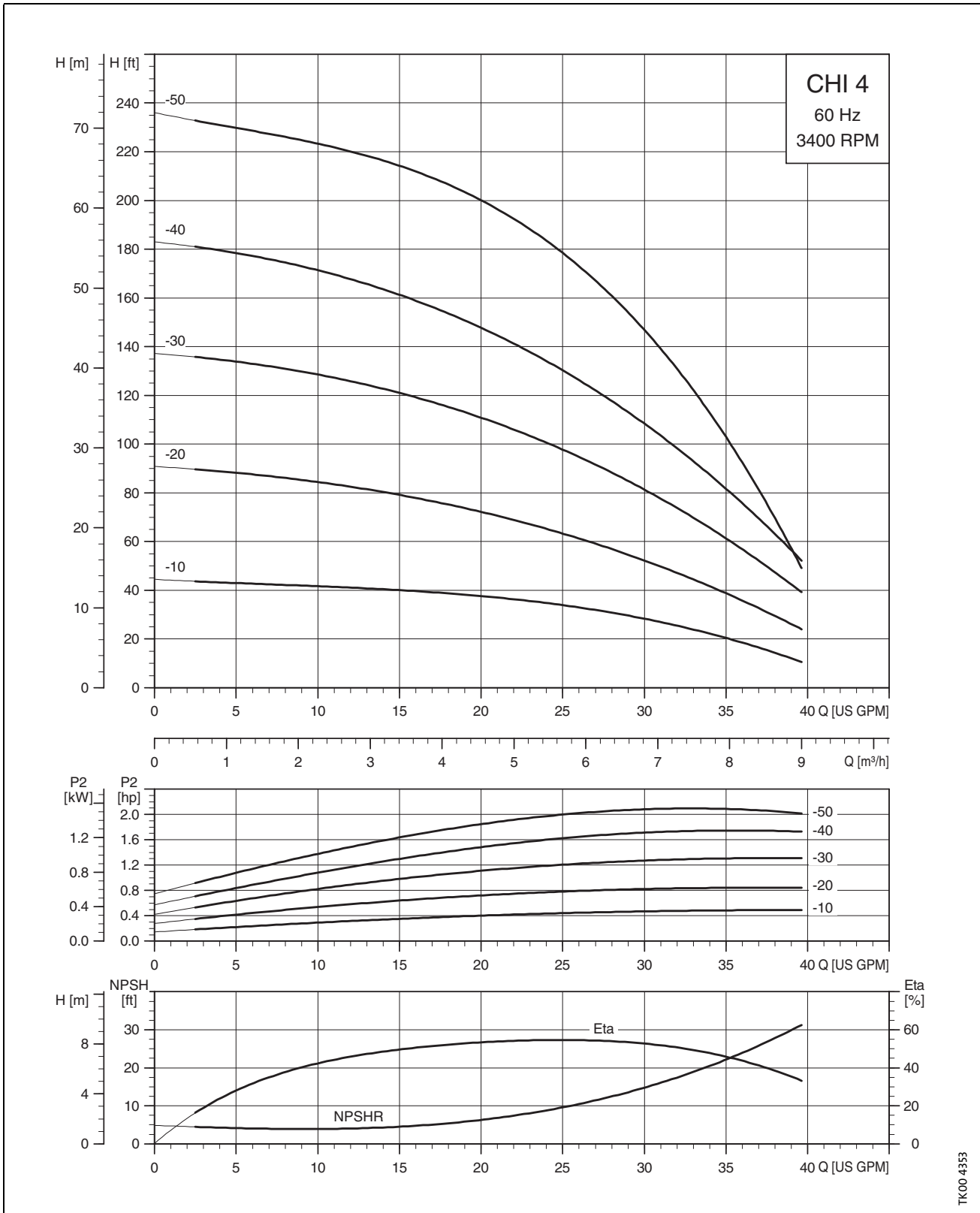


Dimensional sketch



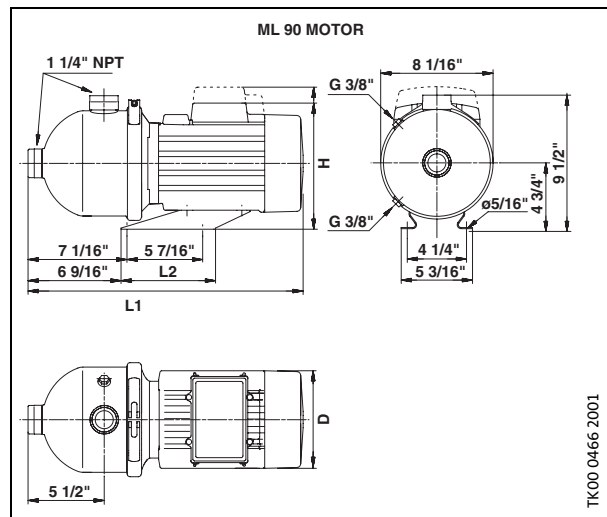
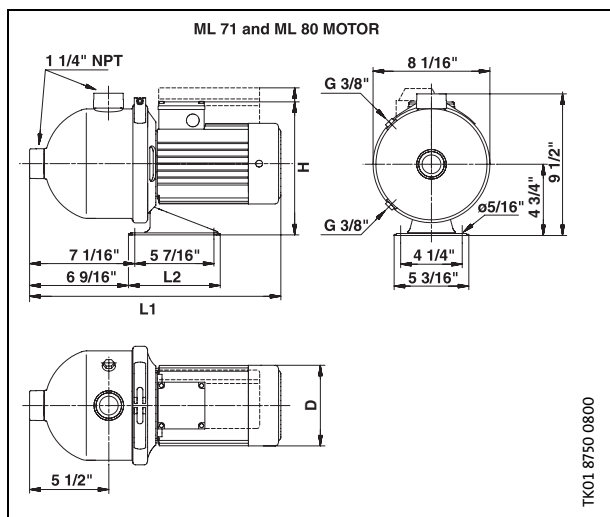
Dimensions/weights/electrical data

Pump Type	Electrical Data						Dimensions [in.]				Motor type	Ship Wt. [lbs.]	Ship Vol. [ft ³]
	Hp	Ph	Voltage	Service Factor	Rated Current [A]	Maximum Current [A]	L1	L2	H	D			
CHI 2-10	1/2	1	115/230	1.6	4.8/2.5	9.0/4.5	15 5/8	6 3/8	10	5 5/8	ML 71	26	1.4
	1/3	3	208-230/460	1.5	1.0/0.5	1.55/0.75	15 5/8	6 3/8	9 1/16	5 5/8			
	1/3	3	575	1.7	0.4	0.68	15 5/8	6 3/8	9 1/16	5 5/8			
CHI 2-20	1/2	1	115/230	1.6	5.8/3.0	9.0/4.5	15 5/8	6 3/8	10	5 5/8	ML 71	27	1.4
	1/2	3	208-230/460	1.7	1.8/0.9	2.9/1.45	15 5/8	6 3/8	9 1/16	5 5/8			
	1/2	3	575	1.7	0.72	1.22	15 5/8	6 3/8	9 1/16	5 5/8			
CHI 2-30	1/2	1	115/230	1.5	7.0/3.6	9.0/4.5	15 5/8	6 3/8	10	5 5/8	ML 71	28	1.4
	1/2	3	208-230/460	1.7	2.3/1.2	2.9/1.45	15 5/8	6 3/8	9 1/16	5 5/8			
	1/2	3	575	1.7	0.96	1.63	15 5/8	6 3/8	9 1/16	5 5/8			
CHI 2-40	3/4	1	115/230	1.5	9.4/4.7	11.5/5.7	17 1/4	6 3/8	10	5 5/8	ML 80	31	1.4
	3/4	3	208-230/460	1.7	3.1/1.5	4.0/2.1	15 5/8	6 3/8	9 1/16	5 5/8			
	3/4	3	575	1.7	1.5	2.04	15 5/8	6 3/8	9 1/16	5 5/8			
CHI 2-50	3/4	1	115/230	1.5	10.8/5.4	11.5/5.7	17 1/4	6 3/8	10	5 5/8	ML 80	32	1.4
	3/4	3	208-230/460	1.7	3.6/1.8	4.0/2.1	15 5/8	6 3/8	9 1/16	5 5/8			
	3/4	3	575	1.7	1.44	2.45	15 5/8	6 3/8	9 1/16	5 5/8			
CHI 2-60	1	1	115/230	1.5	13.0/6.5	15.0/7.5	17 1/4	6 3/8	10	5 5/8	ML 80	36	1.4
	1	3	208-230/460	1.6	4.5/2.3	5.2/2.6	17 1/4	6 3/8	9 1/16	5 5/8			
	1	3	575	1.6	1.84	2.94	17 1/4	6 3/8	9 1/16	5 5/8			



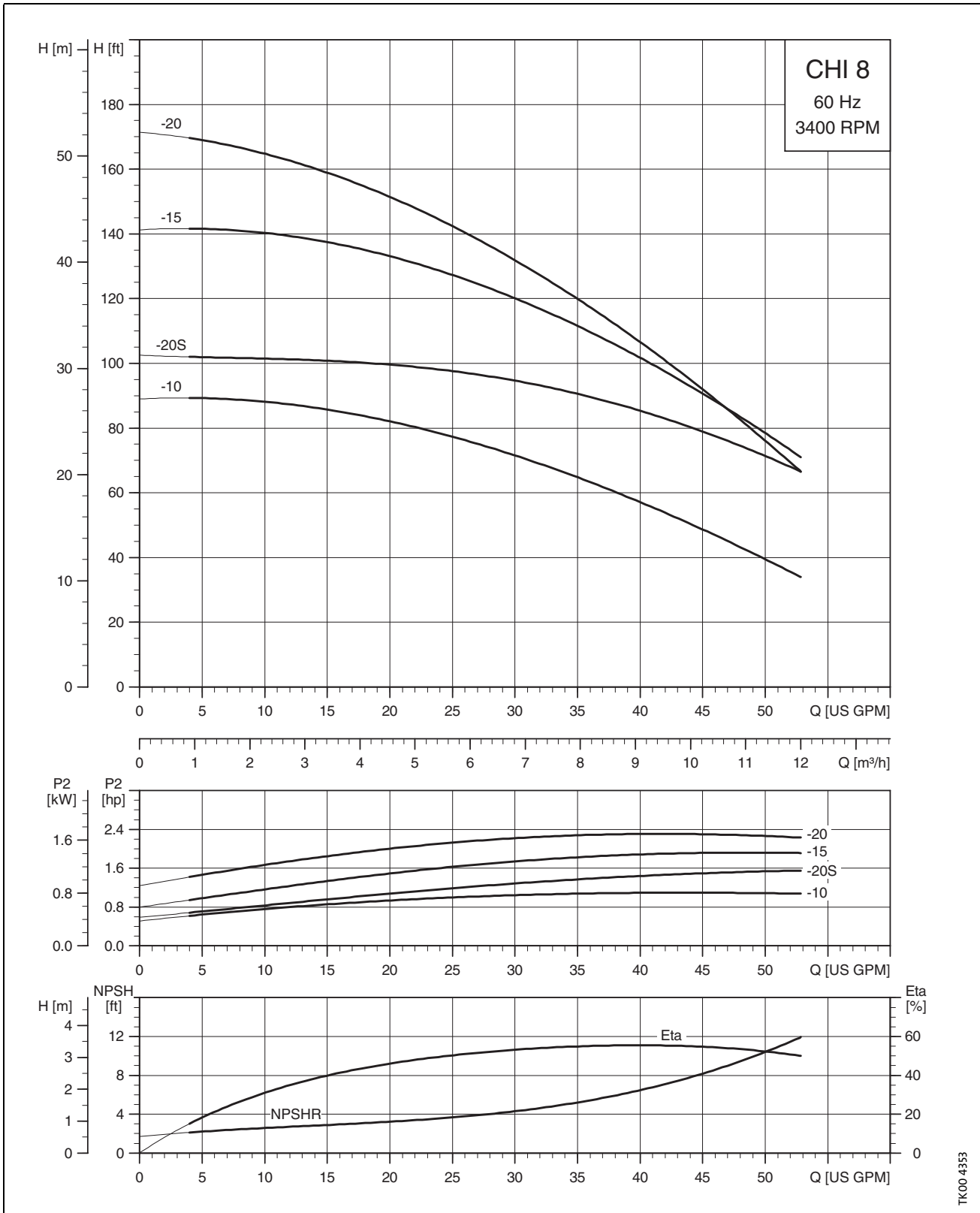
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Dimensional sketches



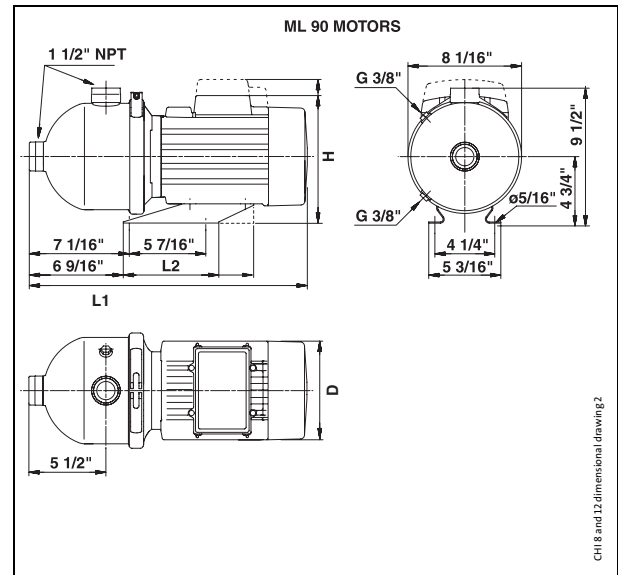
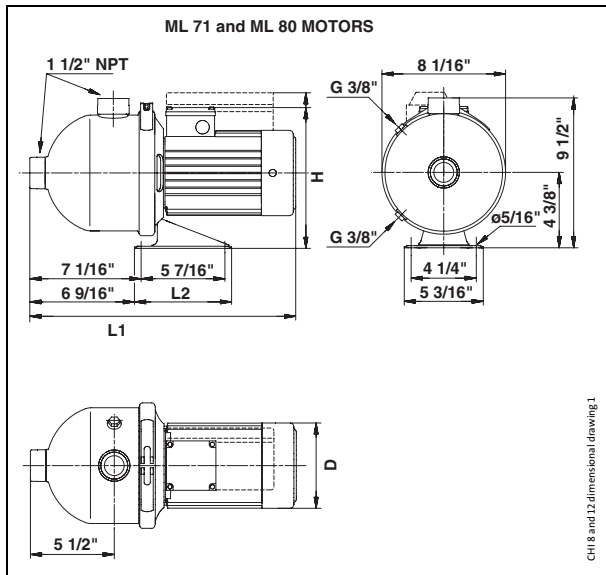
Dimension/weights/electrical data

Pump Type	Electrical Data						Dimensions [in.]				Motor type	Ship Wt. [lbs.]	Ship Vol. [ft ³]
	Hp	Ph	Voltage	Service Factor	Rated Current [A]	Maximum Current [A]	L1	L2	H	D			
CHI 4-10	1/2	1	115/230	1.6	6.0/3.0	9.0/4.5	15 5/8	6 3/8	10	5 5/8	ML 71	26	1.4
	1/3	3	208-230/460	1.5	1.55/0.75	1.55/0.75	15 5/8	6 3/8	9 1/16	5 5/8	ML 71		
	1/3	3	575	1.7	0.6	1.02	15 5/8	6 3/8	9 1/16	5 5/8	ML 71		
CHI 4-20	1/2	1	115/230	1.6	9.0/4.5	9.0/4.5	15 5/8	6 3/8	10	5 5/8	ML 71	27	1.4
	1/2	3	208-230/460	1.7	2.9/1.45	2.9/1.45	15 5/8	6 3/8	9 1/16	5 5/8	ML 71		
	1/2	3	575	1.7	1.16	1.97	15 5/8	6 3/8	9 1/16	5 5/8	ML 71		
CHI 4-30	3/4	1	115/230	1.5	11.5/5.7	11.5/5.7	17 1/4	6 3/8	10	5 5/8	ML 80	31	1.4
	3/4	3	208-230/460	1.7	4.0/2.1	4.0/2.1	15 5/8	6 3/8	9 1/16	5 5/8	ML 71		
	3/4	3	575	1.7	1.68	2.86	15 5/8	6 3/8	9 1/16	5 5/8	ML 71		
CHI 4-40	1	1	115/230	1.5	15.0/7.5	15.0/7.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	34	1.4
	1	3	208-230/460	1.6	5.2/2.6	5.2/2.6	17 1/4	6 3/8	9 1/16	5 5/8	ML 80		
	1	3	575	1.6	2.08	3.33	17 1/4	6 3/8	9 1/16	5 5/8	ML 80		
CHI 4-50	1 1/2	1	115/230	1.4	19.3/9.7	21.5/10.7	19 11/16	6 13/16	10 1/4	7	ML 90	59	1.4
	1 1/2	3	208-230/460	1.5	6.2/3.1	6.9/3.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80		
	1 1/2	3	575	1.5	2.48	3.65	17 1/4	6 3/8	9 1/16	5 5/8	ML 80		



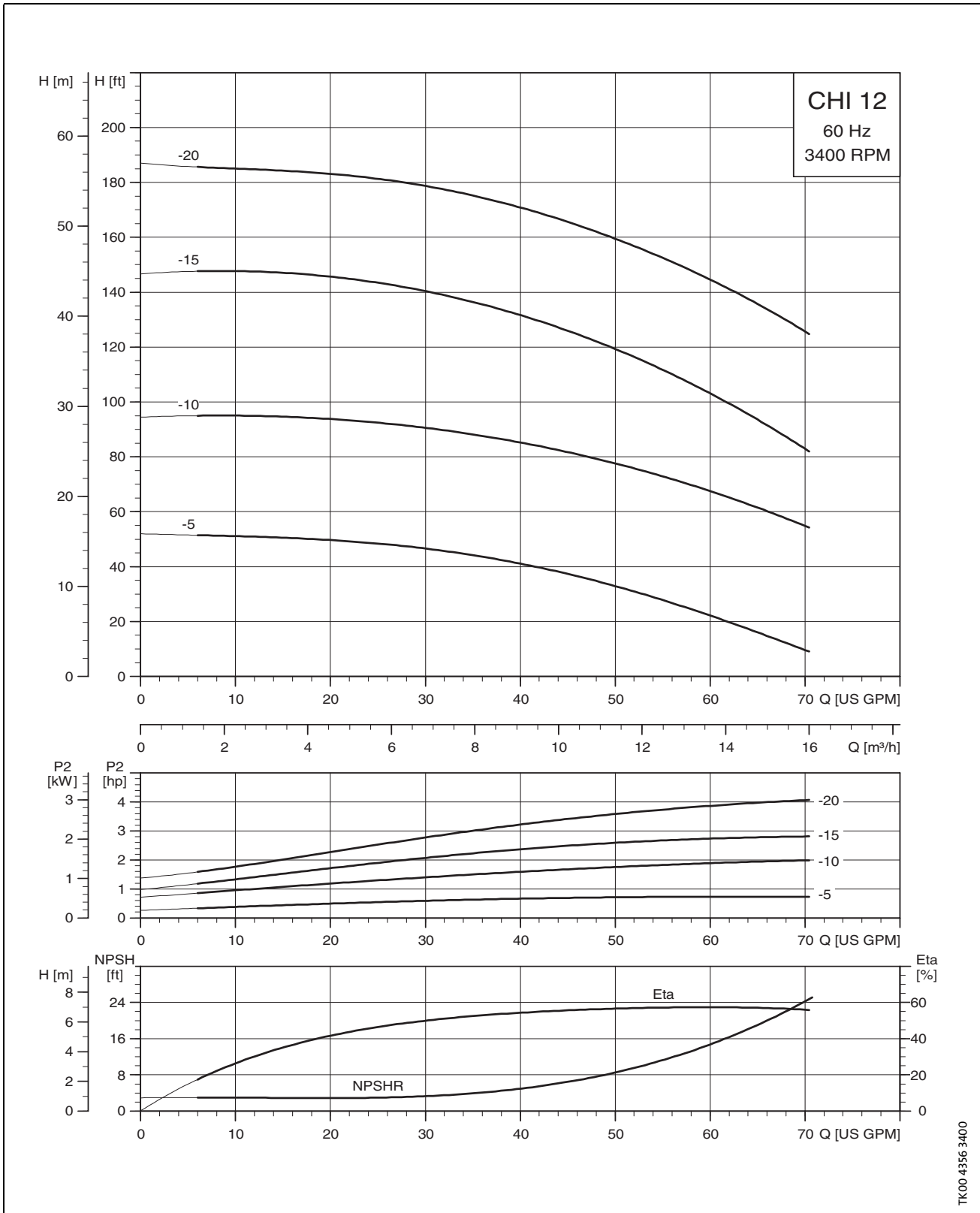
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Dimensional sketches

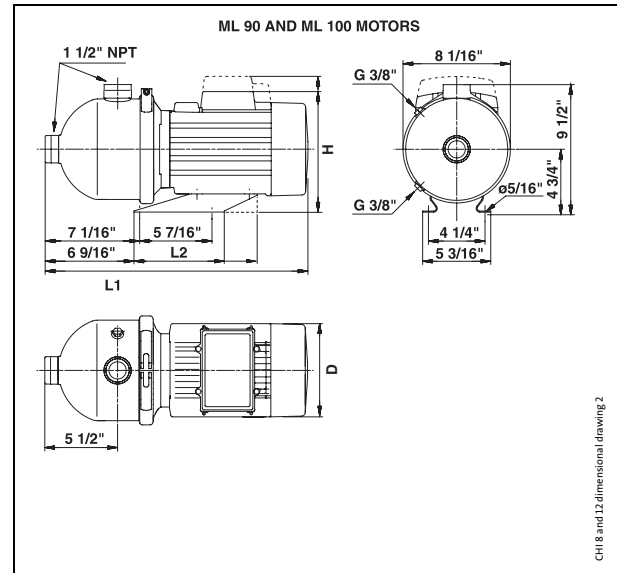
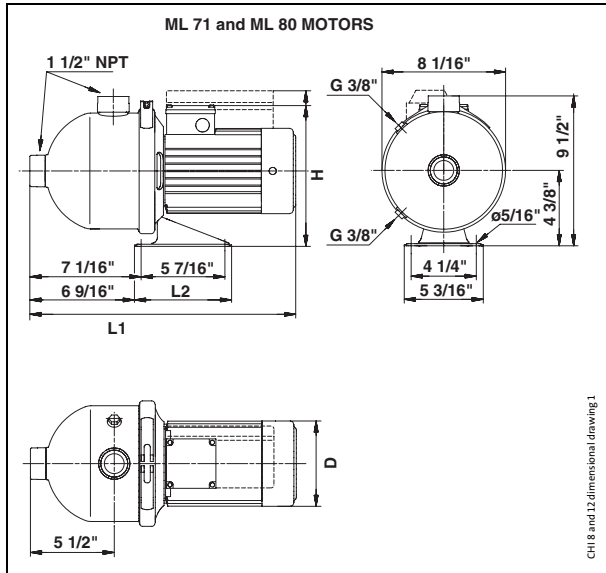


Dimensions/weights/electrical data

Pump Type	Electrical Data						Dimensions [in.]				Motor type	Ship Wt. [lbs.]	Ship Vol. [ft ³]
	Hp	Ph	Voltage	Service Factor	Rated Current [A]	Maximum Current [A]	L1	L2	H	D			
CHI 8-10	3/4	1	115/230	1.5	10.6/5.3	11.5/5.7	17 1/4	6 3/8	10	5 5/8	ML 80	33	1.4
	3/4	3	208-230/460	1.7	3.6/1.8	4.0/2.1	15 5/8	6 3/8	9 1/16	5 5/8	ML 71	29	
	3/4	3	575	1.7	1.44	2.45	15 5/8	6 3/8	9 1/16	5 5/8	ML 71	29	
CHI 8-20S	1	1	115/230	1.5	14.6/7.3	15.0/7.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	37	1.4
	1	3	208-230/460	1.6	5.0/2.5	5.2/2.6	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	31	
	1	3	575	1.6	2	3.2	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	31	
CHI 8-15	1 1/2	1	115/230	1.4	18.2/9.3	21.5/10.7	19 11/16	6 13/16	10 1/4	7	ML 90	61	1.4
	1 1/2	3	208-230/460	1.5	5.8/2.9	6.9/3.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	35	
	1 1/2	3	575	1.5	2.32	3.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	35	
CHI 8-20	1 1/2	1	115/230	1.4	21.5/10.7	21.5/10.7	19 11/16	6 13/16	10 1/4	7	ML 90	62	1.4
	1 1/2	3	208-230/460	1.5	6.9/3.5	6.9/3.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	36	
	1 1/2	3	575	1.5	2.8	4.12	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	36	



Dimensional sketches



Dimensions/weights/electrical data

Pump Type	Electrical Data						Dimensions [in.]				Motor type	Ship Wt. [lbs.]	Ship Vol. [ft ³]
	Hp	Ph	Voltage	Service Factor	Rated Current [A]	Maximum Current [A]	L1	L2	H	D			
CHI 12-05	1/2	1	115/230	1.5	7.7/4.0	9.0/4.5	15 5/8	6 3/8	10	5 5/8	ML 71	32	1.4
	1/2	3	208-230/460	1.7	2.5/1.3	2.9/1.45	15 5/8	6 3/8	9 1/16	5 5/8	ML 71	28	
	1/2	3	575	1.7	1.04	1.77	15 5/8	6 3/8	9 1/16	5 5/8	ML 71	28	
CHI 12-10	1 1/2	1	115/230	1.4	19.3/9.7	21.5/10.7	19 11/16	6 13/16	10 1/4	7	ML 90	57	1.4
	1 1/2	3	208-230/460	1.5	6.2/3.1	6.9/3.5	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	35	
	1 1/2	3	575	1.5	2.48	3.65	17 1/4	6 3/8	9 1/16	5 5/8	ML 80	35	
CHI 12-15	2	3	208-230/460	1.5	8.6/4.3	9.1/4.75	19 11/16	6 13/16	9 1/16	7	ML 90	52	1.4
	2	3	575	1.5	3.8	5.7	19 11/16	6 13/16	9 1/16	7	ML 90	52	
CHI 12-20	3	3	208-230/460	1.4	12.7/7.3	12.7/7.3	21 5/16	9 15/16	9 1/16	7	ML 100	60	1.4

Pump, CHIE

The CHIE pump is a non self-priming, compact horizontal multistage centrifugal pump fitted with a variable speed Grundfos MLE motor including an extended motor/pump shaft. All parts in contact with the pumped liquid are made of 316 stainless steel. The pump bearings are self lubricated by the pumped liquid.

The pump has a maintenance-free mechanical shaft seal. The seal is a 16mm, unbalanced shaft seal with material options; BQQE, BQQV, BUBE, and BUBV.

The compact pump unit has small physical dimensions and an end suction type axial suction port and radial discharge port. The pump sleeve is drawn of 316 stainless steel sheet and has a threaded hole (G 3/8) with priming plug at the top and a threaded hole (G 3/8) with drain plug at the bottom.

Connections	CHI E 2	CHI E 4	CHIE 8	CHIE 12
Axial suction port	1" NPT	1 1/4" NPT	1 1/2" NPT	1 1/2" NPT
Radial discharge port	1" NPT	1 1/4" NPT	1 1/2" NPT	1 1/2" NPT

Motor, CHIE

The pump is coupled with a totally enclosed, fan-cooled Grundfos MLE squirrel-cage motor with a built-in micro frequency converter.

Enclosure class:TEFC

Insulation class:F

Standard voltage:1 x 208-230

Sound pressure level: ≤ = 67 dB(A)

MLE single-phase motors have built in protection against overcurrent, over/under temperature, and over/under voltage.

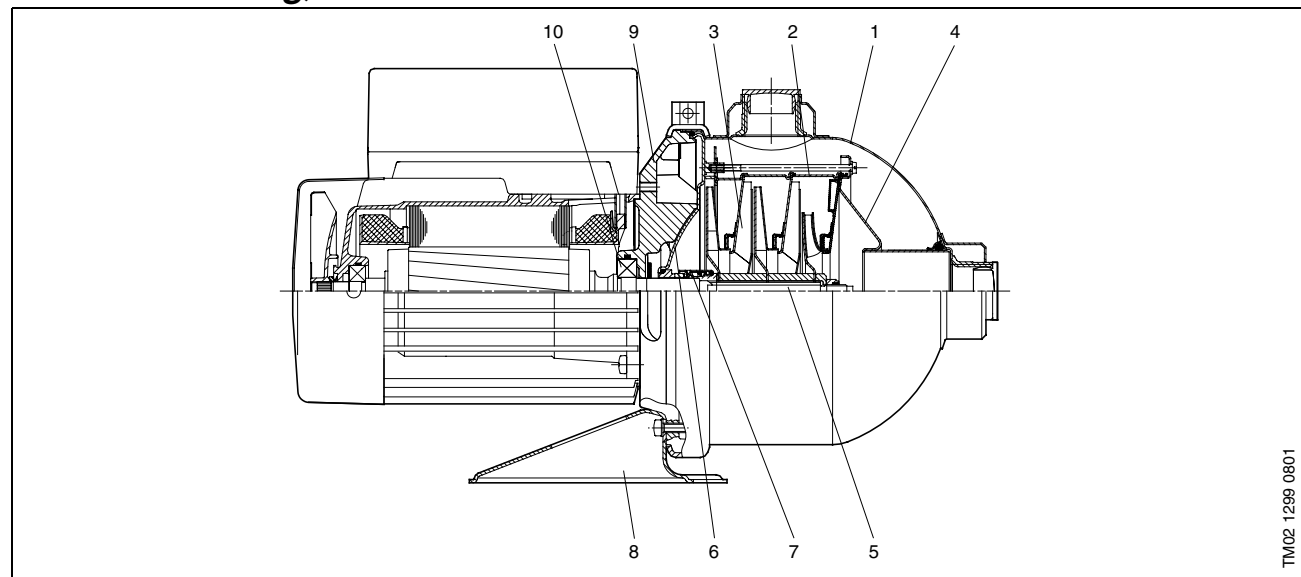
CHIE-Plus—a compact one-pump booster

CHIE pumps are also available as a compact, one-pump booster, including pressure transducer, diaphragm tank, and 4-way cross fitting.

Materials, CHIE

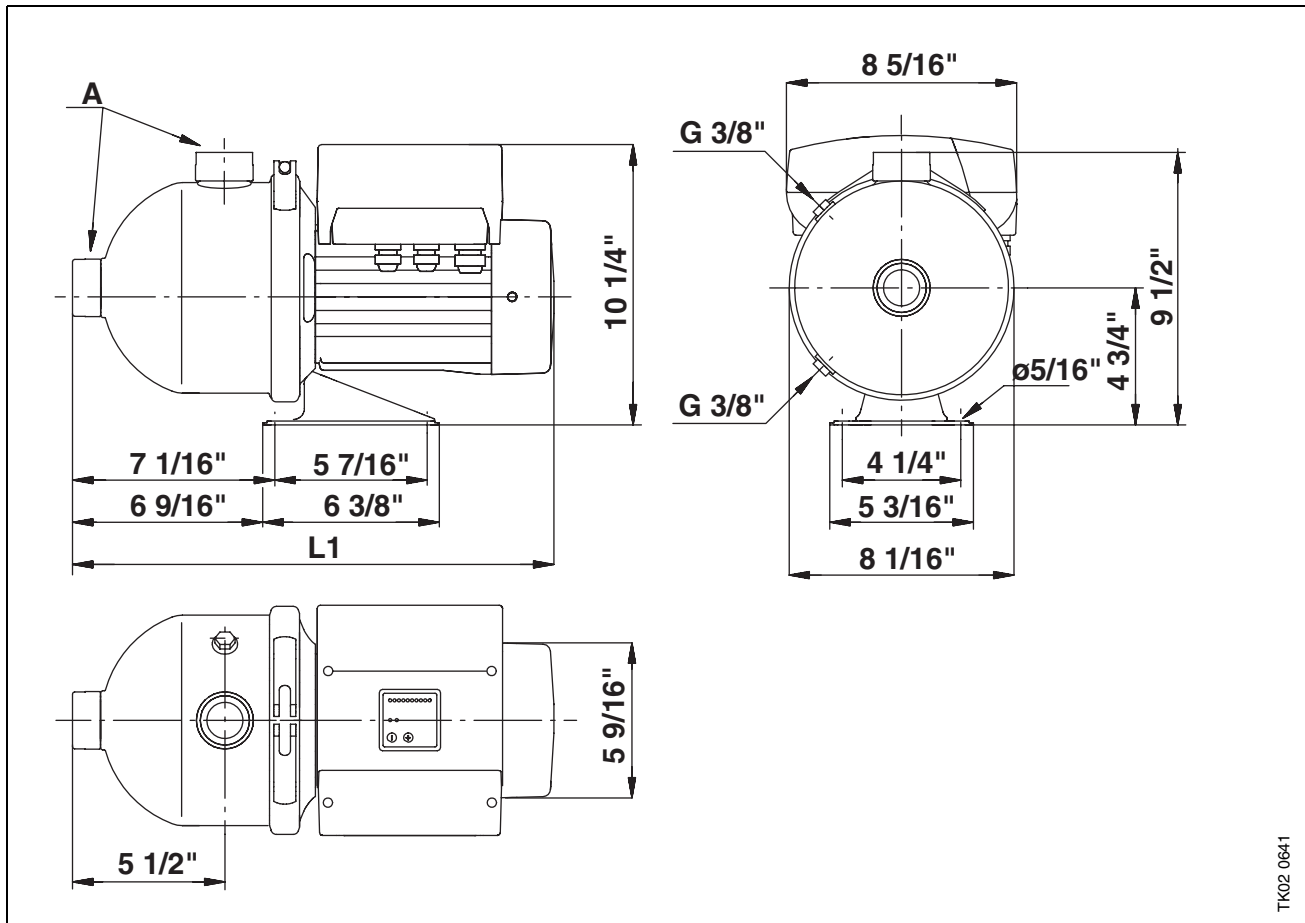
Pos.	Pump components	Materials	AISI, ASTM
1	Pump sleeve	Stainless steel	316
2	Intermediate chamber/ guide vanes	Stainless steel	316
3	Impeller	Stainless steel	316
4	Suction interconnector	Stainless steel	316
5	Spline shaft	Stainless steel	316
6	Cover plate	Stainless steel	316
7	Shaft seal faces	BUBE, BUBV, BQQE and BQQV	
8	Base plate	Painted steel plate	
9	Motor flange	Cast iron	
10	Ball bearing		
	O-rings	EPDM or FKM	D1418

Sectional drawing, CHIE



TM/02 1299 0801

Dimensional Sketch, CHIE

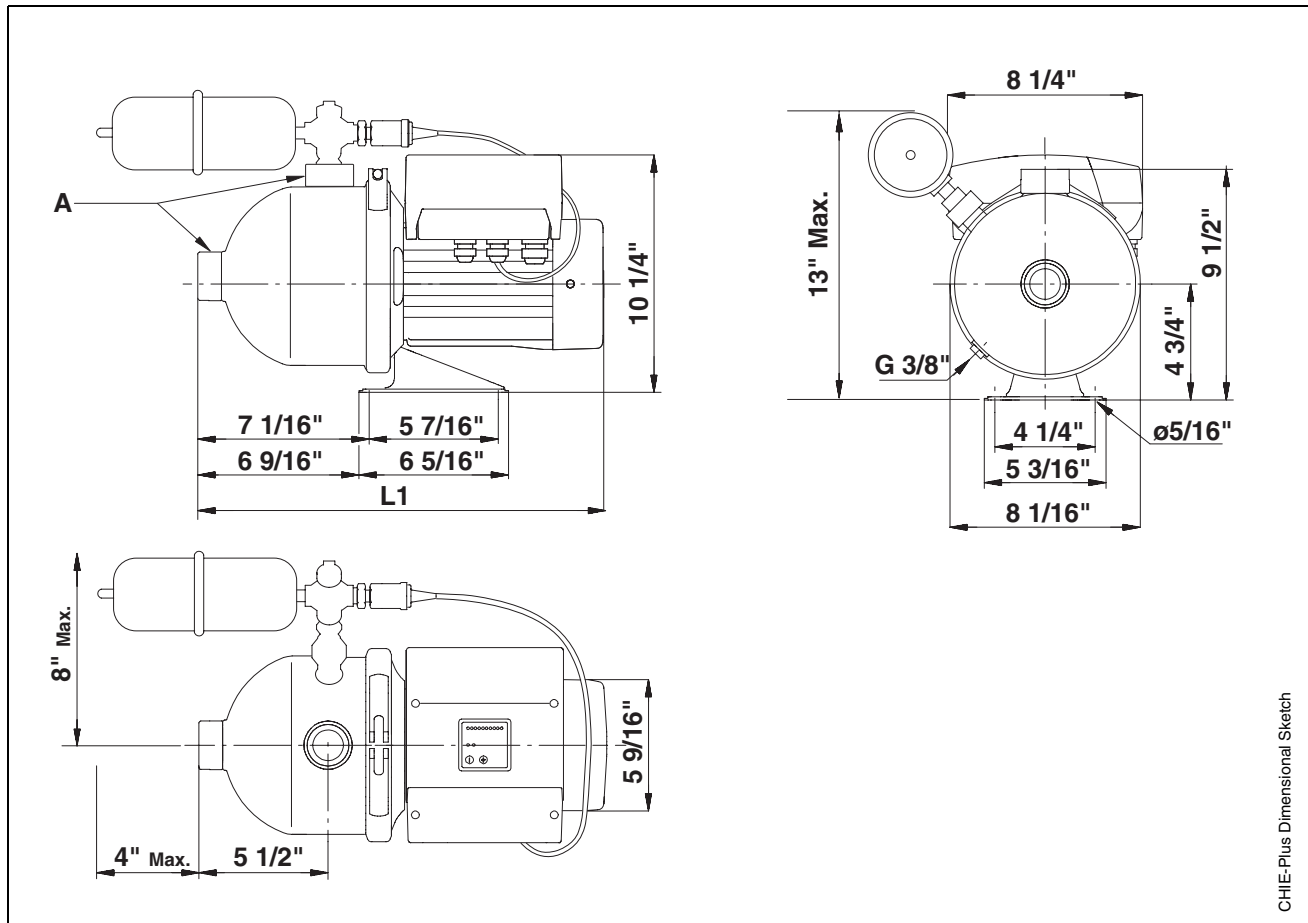


Dimensions/weights/electrical data, CHIE

Pump type	Motor type	Ph	Voltage	hp	Dimensions [in]		Weight [lb]	Ship. vol. [ft ³]
					L1	A		
CHIE 2-30	MLE	1	208-230	3/4	15 5/8	1" NPT	34	1.9
CHIE 2-40	MLE	1	208-230	1	17 1/4	1" NPT	36	1.9
CHIE 2-60	MLE	1	208-230	1 1/2	17 1/4	1" NPT	43	1.9
CHIE 4-10	MLE	1	208-230	1/2	15 5/8	1 1/2" NPT	32	1.9
CHIE 4-20	MLE	1	208-230	1	17 1/4	1 1/2" NPT	36	1.9
CHIE 4-60*	MLE	1	208-230	1 1/2	17 1/4	1 1/2" NPT	40	1.9
CHIE 8-20S	MLE	1	208-230	1 1/2	17 1/4	1 1/2" NPT	41	1.9
CHIE 12-05	MLE	1	208-230	3/4	15 5/8	1 1/2" NPT	34	1.9

* 2800 rpm version

Dimensional Sketch, CHIE-Plus



Dimensions/weights/electrical data, CHIE-Plus

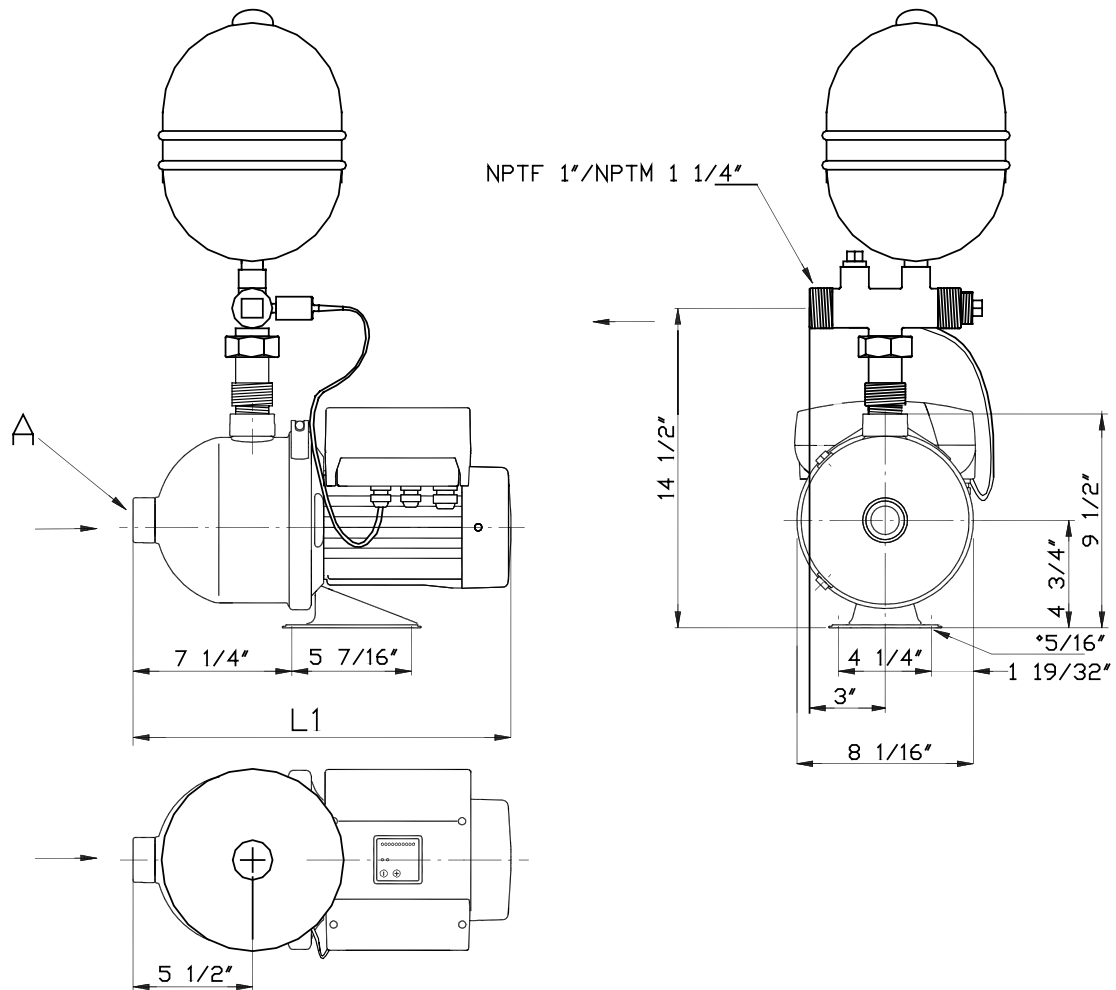
Pump type	Motor type	Ph	Voltage	hp	Dimensions [in]		Weight [lb]	Ship. vol. [f ³]
					L1	A		
CHIE 2-30	MLE	1	208-230	3/4	15 5/8	1" NPT	34	1.9
CHIE 2-40	MLE	1	208-230	1	17 1/4	1" NPT	36	1.9
CHIE 2-60	MLE	1	208-230	1 1/2	17 1/4	1" NPT	43	1.9
CHIE 4-10	MLE	1	208-230	1/2	15 5/8	1 1/4" NPT	32	1.9
CHIE 4-20	MLE	1	208-230	1	17 1/4	1 1/4" NPT	36	1.9
CHIE 4-60*	MLE	1	208-230	1 1/2	17 1/4	1 1/4" NPT	40	1.9
CHIE 8-20S	MLE	1	208-230	1 1/2	17 1/4	1 1/2" NPT	41	1.9
CHIE 12-0S	MLE	1	208-230	3/4	15 5/8	1 1/2" NPT	34	1.9

* 2800 rpm version

CHIE-Plus additional materials

Pump component	Description	Material
Pressure transducer	4-20mA signal	316 SS
Hardware	4-way 1/2" NPT cross-fitting	316 SS
	1/4" tap for pressure gauge	316 SS
Diaphragm tank		304 SS/ butyl rubber

Dimensional Sketch, Canadian Version, CHIE Plus



Dimensions/weights/electrical data, CHIE-Plus

Pump type	Motor Type	Ph	Voltage	hp	Dimensions		Weight (lb)	Ship.vol. (ft³)
					L1	A		
CHIE 2-10	MLE	1	208-230	1/2	15-5/8	1" NPT	38	5.75
CHIE 2-30	MLE	1	208-230	3/4	15-5/8	1" NPT	40	5.75
CHIE 2-40	MLE	1	208-230	1	17-1/4	1" NPT	42	5.75
CHIE 2-60	MLE	1	208-230	1 1/2	17-1/4	1" NPT	44	5.75
CHIE 4-10	MLE	1	208-230	1/2	15-5/8	1 1/4" NPT	38	5.75
CHIE 4-20	MLE	1	208-230	1	17-1/4	1 1/4" NPT	42	5.75
CHIE 4-60	MLE	1	208-230	1 1/2	17-1/4	1 1/4" NPT	46	5.75
CHIE 8-20S	MLE	1	208-230	1 1/2	17-1/4	1 1/2" NPT	47	5.75
CHIE 12-05	MLE	1	208-230	3/4	15-5/8	1 1/2" NPT	40	5.75

CHIE-PLUS additional materials

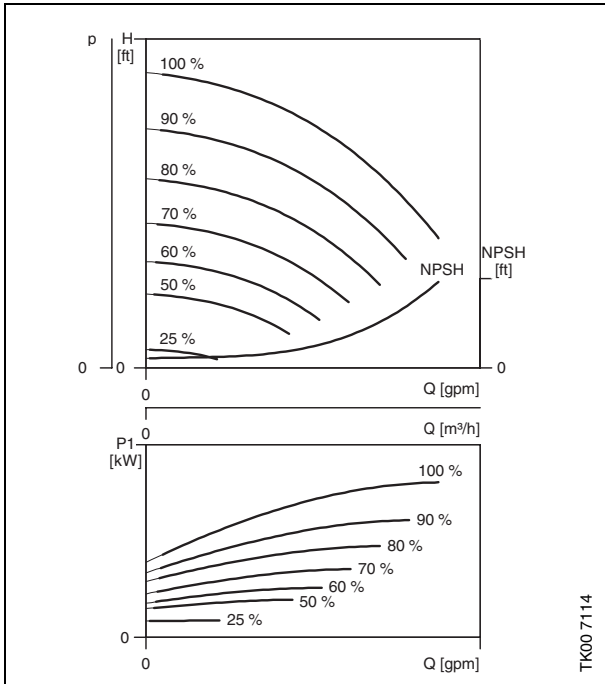
Pump component	Description	Material
Pressure transducer	4-20mA signal	316 SS
Discharge Manifold		304 SS
Diaphragm tank		304 SS/ Butyl rubber

Performance curves of CHIE and CHIE-Plus

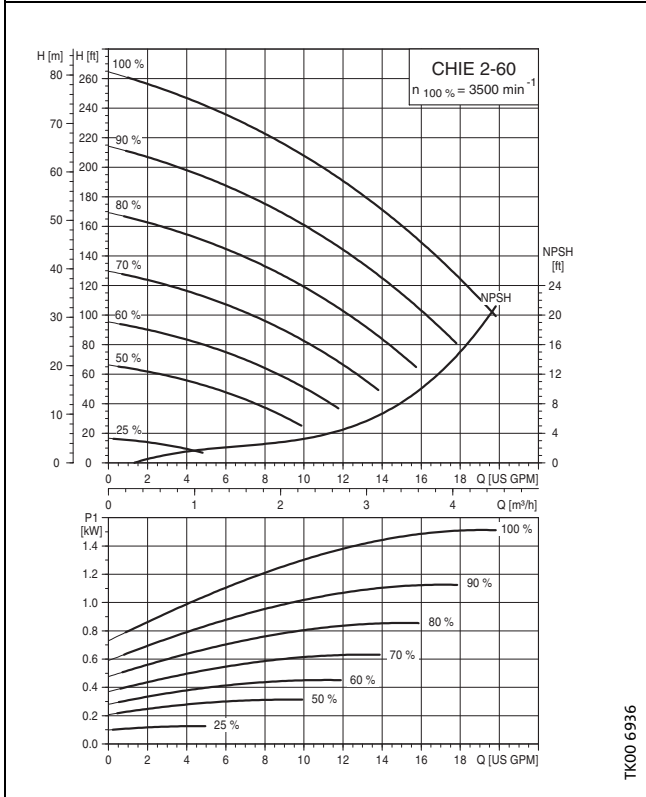
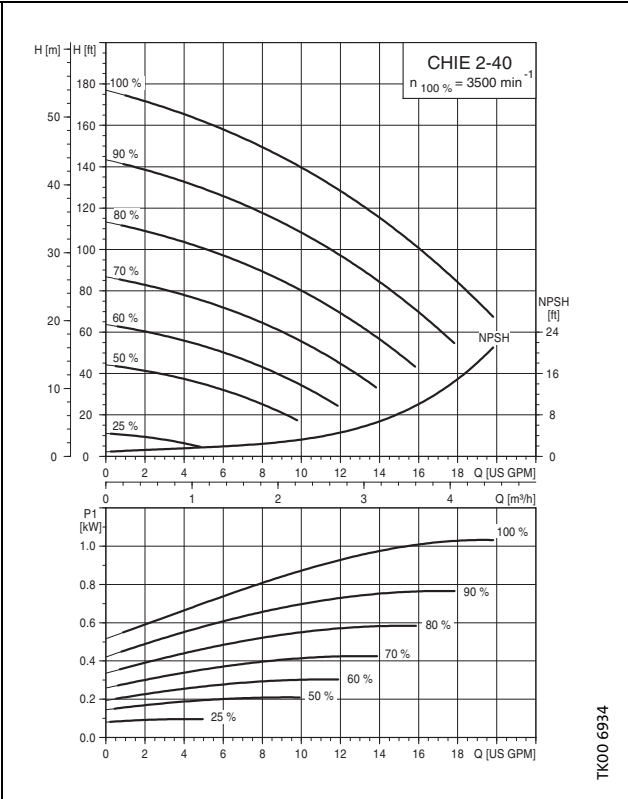
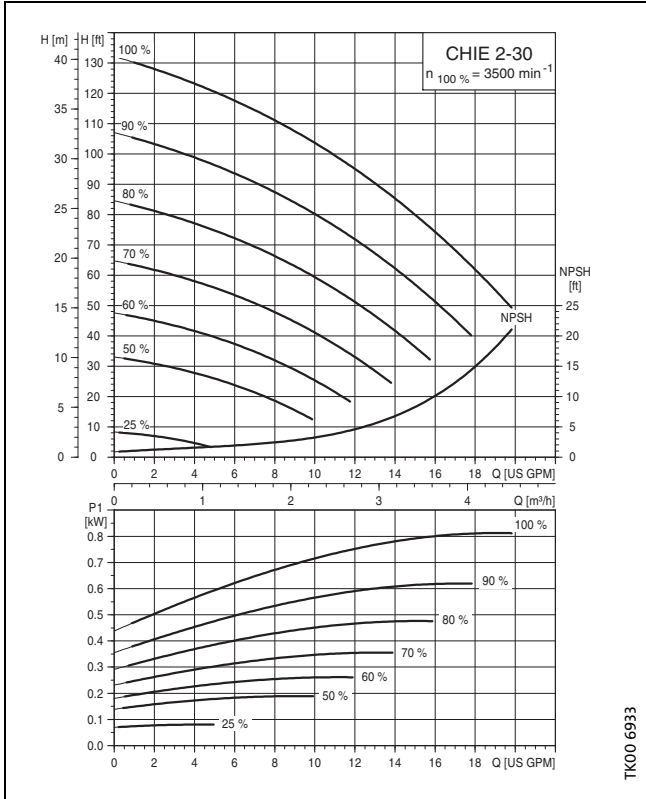
The curve charts on the following pages show QH-curves and QP_1 -curves for 100%, 90%, 80%, 70%, 60%, 50% and 25% speed.

In the QH-chart the 100%-curve corresponds to the curve for a pump fitted with a standard fixed speed motor. In principle pumps with MLE motors have an infinite number of performance curves each representing a specific speed.

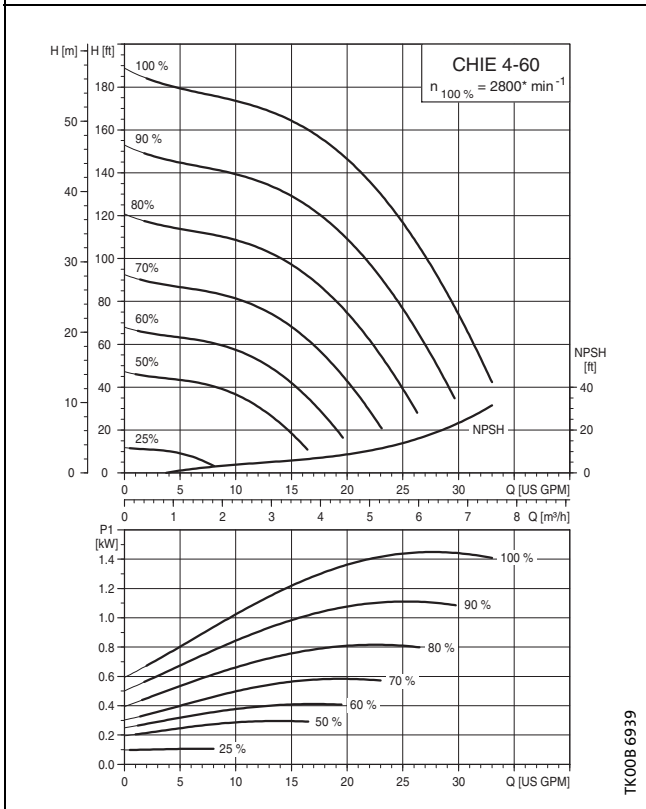
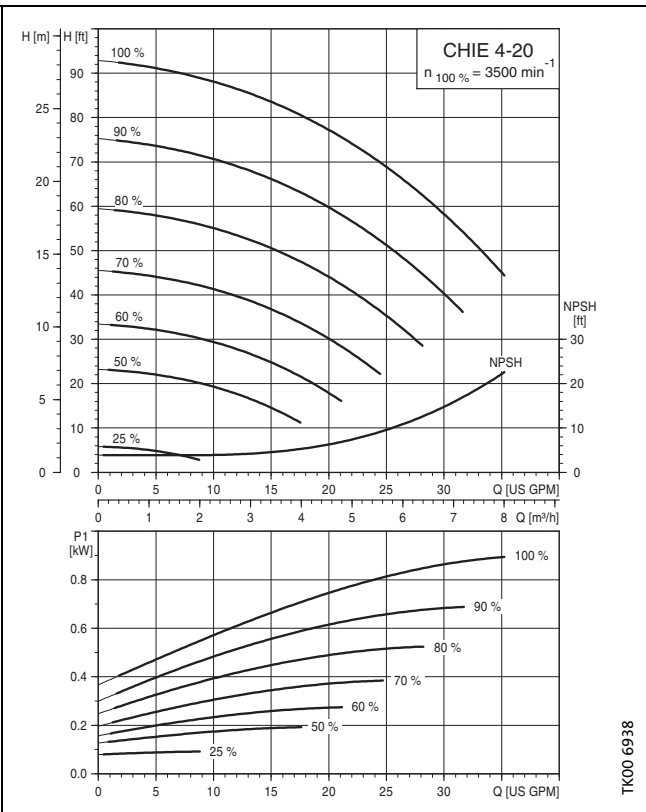
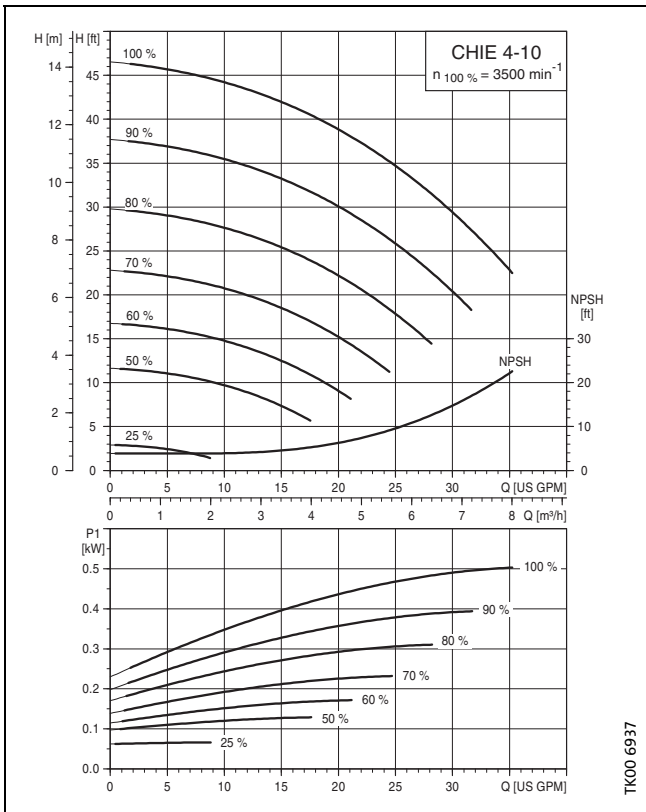
The P_1 chart states pump input power depending on the flow and the chosen speed.



CHIE 2

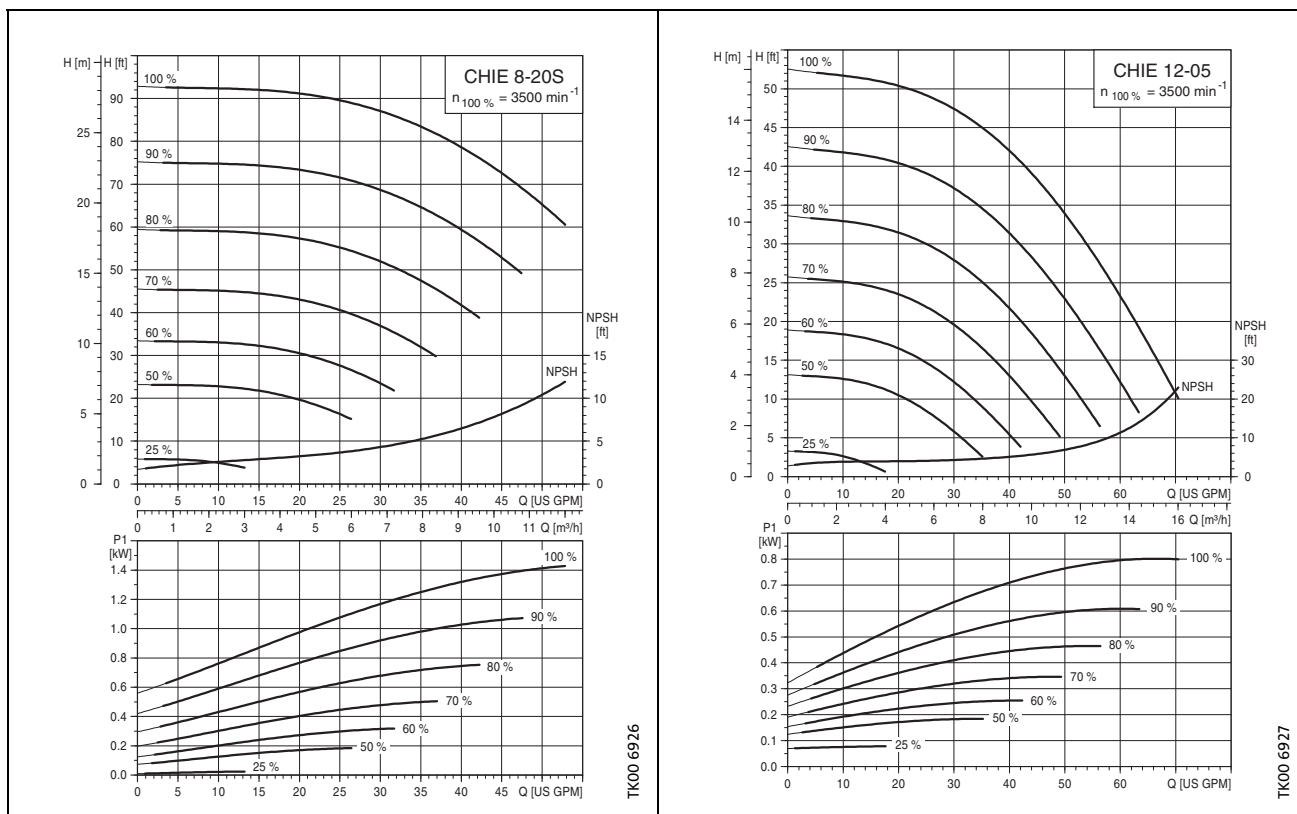


CHIE 4

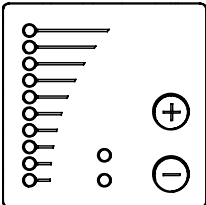
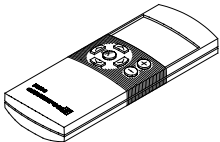
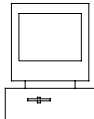
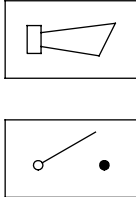


***Note: The motor on the CHIE 4-60 is a UL Recognized Component but the CHIE 4-60 pump is not UL Listed. The CHIE 4-60 pump curve is based on the maximum speed of 2800 rpm; this is the maximum speed that the pump will run. The pump speed is limited by the software in the MLE motor and will keep the motor from overloading.**

CHIE 8, CHIE 12



Overview of functions

E-pumps/functions		CHIE
	Setting via control panel: Setpoint Start/stop Max. curve Min. curve	• • • •
	TM00 7600 1596 Reading via control panel: Setpoint Operating indication Fault indication	• • •
	Setting via R100: Setpoint Start/stop Max. curve Min. curve Controlled/uncontrolled PI-controller Signal relay Operating range Stop function	• • • • • • • • •
	TM00 4498 3494 Reading via R100: Setpoint Operating indication Pump status	• • •
	TM01 0929 2797 Connection to building management system	The pumps have inputs for BUS communication via GENibus, Grundfos BUS Protocol, RS485. For connection to other BUS types, contact Grundfos.
	External signals. Inputs: Setpoint Start/stop Sensor Digital signals: Max. curve Min. curve External fault Flow switch	• • • • • • • •
	TM00 4533 3593 Outputs: Signal	•

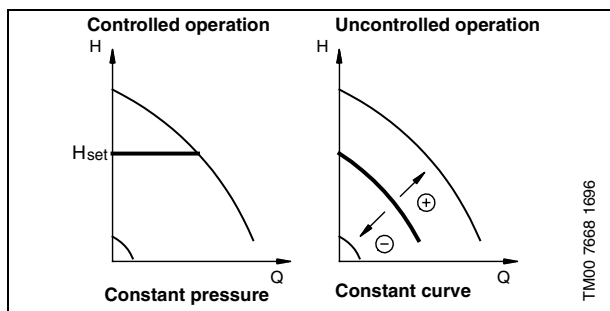
Control modes

CHIE pumps can be connected to an external sensor enabling control of e.g. pressure, differential pressure, temperature, differential temperature or flow in the system in which the pumps are installed.

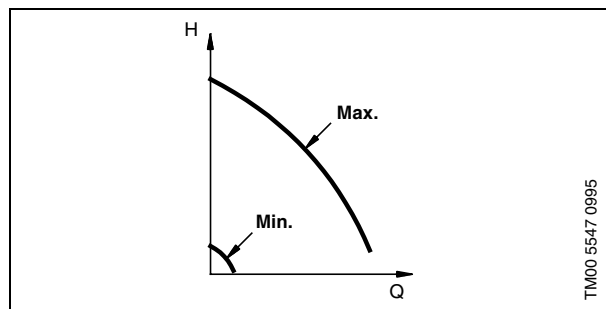
CHIE pumps can be set to two control modes, i.e. controlled or uncontrolled operation.

In **controlled** operating mode the pump sets itself to the desired setpoint of the control parameter. The illustration below shows a pump with flow control as an example of controlled operation.

In **uncontrolled** operating mode the pump operates according to the constant curve set.



Besides normal duty (constant pressure and constant curve) the operating modes **Stop**, **Min.** or **Max.** are available.



The max. curve can for instance be used in connection with the venting procedure during installation.

The min. curve can be used in periods in which a minimum flow is required.

The operating modes (Stop, Normal, Min., Max.) can all be set on the control panel on the pump terminal box.

If the electricity supply to the pump is disconnected, the pump setting will be stored.

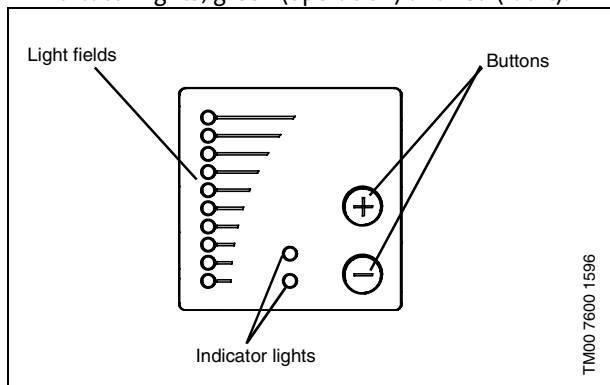
The remote control R100 offers additional possibilities of setting and status displays.

The pumps are set to uncontrolled operation from factory. The setpoint value corresponds to 100% of max. pump performance.

Control panel

The control panel on the pump terminal box incorporates the following:

- Buttons, "+" and "-", for setpoint setting.
- Light fields, yellow, for setpoint indication.
- Indicator lights, green (operation) and red (fault).



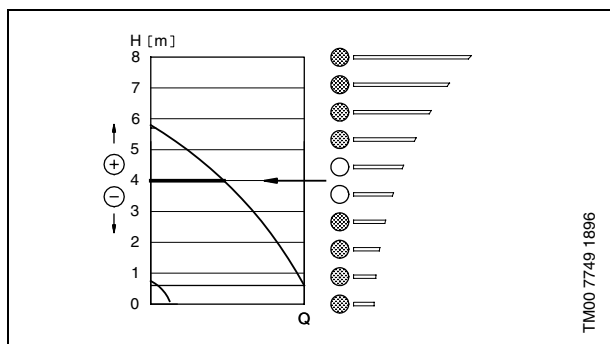
Setpoint setting

The pump setpoint is set by pressing the "+" or "-" buttons.

The light fields on the control panel will indicate the setpoint set. See the following two examples.

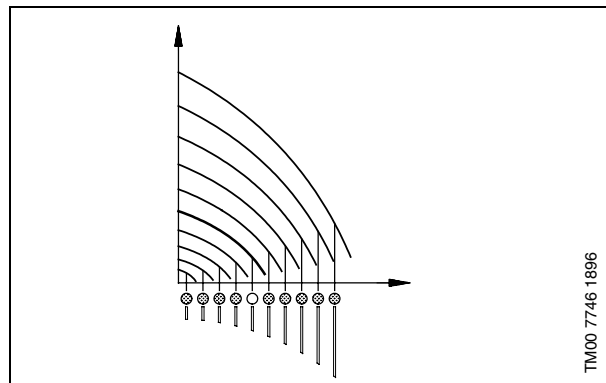
Example: Pump in controlled operating mode (differential pressure control):

The illustration below shows that the light fields 5 and 6 are activated, indicating a desired setpoint of 4 m with a sensor measuring range from 0 to 8 m. The setting range is equal to the sensor measuring range (see sensor nameplate).



Example: Pump in uncontrolled operating mode:

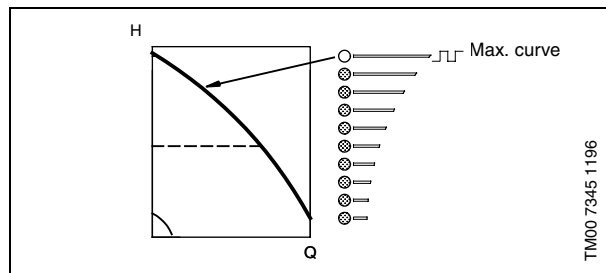
In uncontrolled operating mode, the pump performance is set within the range from min. to max. curves.



Setting to max. curve duty

Press "+" continuously to change over to the max. curve of the pump (top light field flashes).

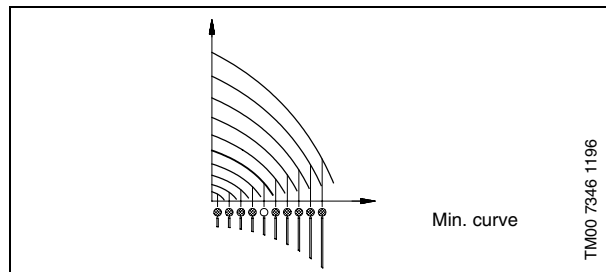
To change back, press "-" continuously until the desired setpoint is indicated.



Setting to min. curve duty

Press "-" continuously to change over to the min. curve of the pump (bottom light field flashes).

To change back, press "+" continuously until the desired setpoint is indicated.



Start/stop of pump

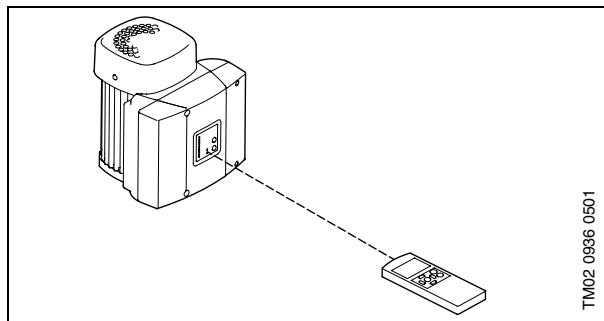
Stop the pump by continuously pressing "-" until none of the light fields are activated and the green indicator light flashes.

Start the pump by continuously pressing "+" until the desired head is indicated.

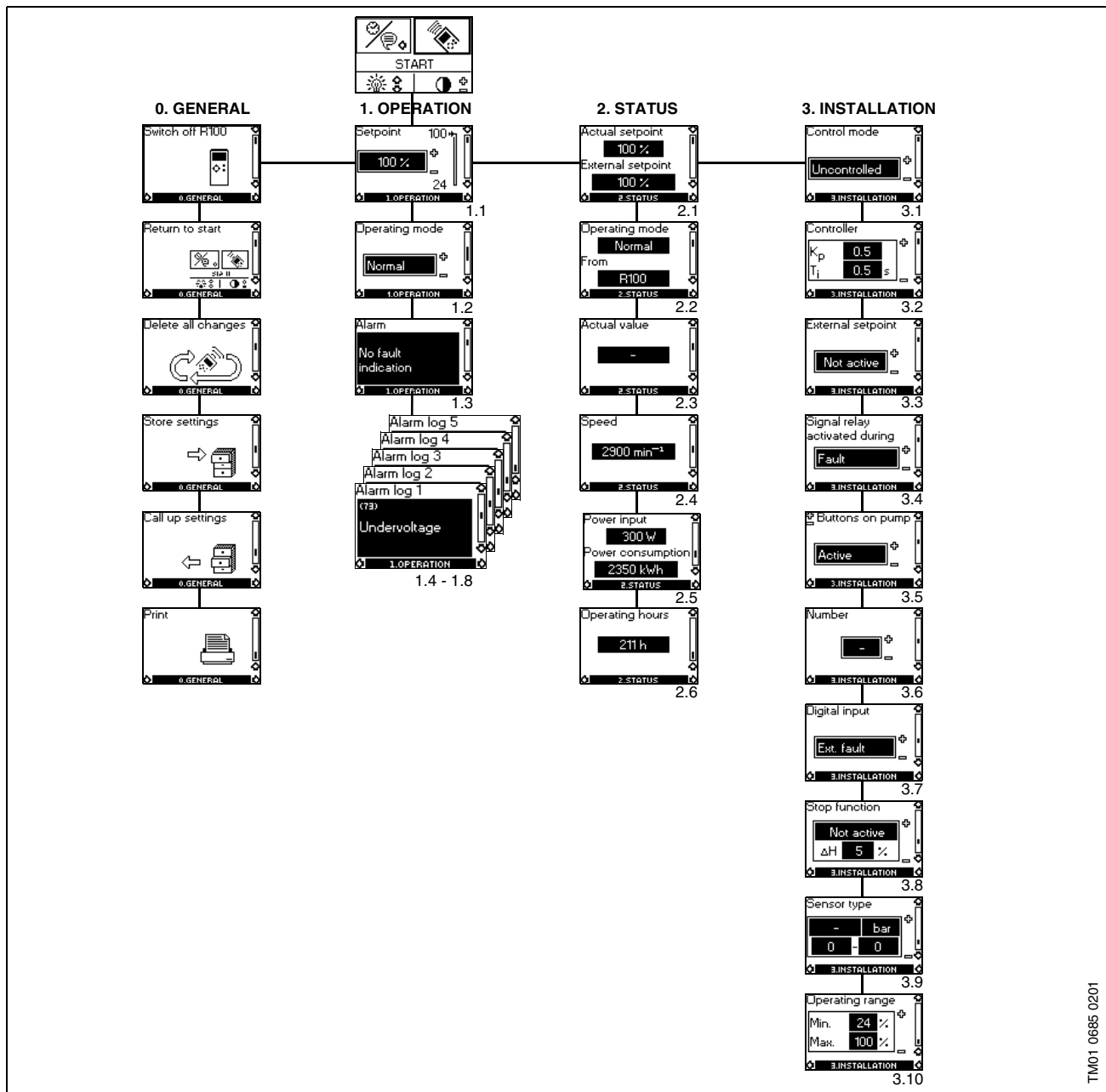
Setting by means of R100

The pump is designed for wireless communication with the Grundfos remote control R100. The communication is effected by means of infra-red light. The pump transmitter and receiver unit is placed in the control panel. R100 offers additional possibilities of pump settings and status readings. The displays are divided into four parallel menus:

- 0. GENERAL
- 1. OPERATION
- 2. STATUS
- 3. INSTALLATION



TM02 0936 0501

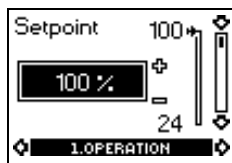


TM01 0685 0201

Menu OPERATION

Using the R100 remote control it is possible to make the following operating mode settings.

1.1 Setpoint setting

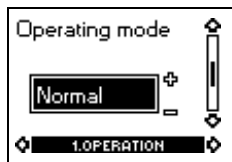


In this display, the desired setpoint can be set.

In **controlled** operating mode the setting range is equal to the sensor measuring range e.g. 0 to 25 m.

In **uncontrolled** operating mode the setpoint is set in % of max. performance. The setting range lies between the min. and max. curves.

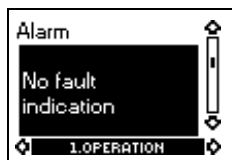
1.2 Setting of operating mode



Select one of the following operating modes:

- Stop
- Min.
- Normal (**duty**)
- Max.

1.3 Fault indications



If the pump is faulty, the cause will appear in the display.

- Too high motor temperature
- Undervoltage
- Overvoltage
- Too many restarts (after faults)
- Overload
- Sensor signal outside signal range
- Setpoint signal outside signal range (only 4-20 mA)
- External fault
- Dry running
- Other fault.

A fault indication can be reset in this display if the cause of the fault has disappeared.

1.4-1.8 Alarm log



If faults have been indicated, the last five fault indications will appear in the alarm log. "Alarm log 1" shows the newest/latest fault.

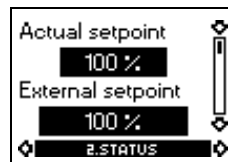
The example shows the fault indication "Undervoltage", the fault code and the number of minutes the pump has been connected to the electricity supply after the fault occurred.

Menu STATUS

The displays appearing in this menu are status displays only. It is not possible to change or set values.

The tolerances are stated as a guide in % of the maximum values of the parameters.

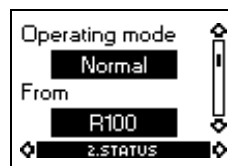
2.1 Display of actual setpoint



Tolerance: $\pm 2\%$

This display shows the actual setpoint and the external setpoint in % of the range from the minimum value to the setpoint set. See "External setpoint signal" page 34.

2.2 Display of operating mode

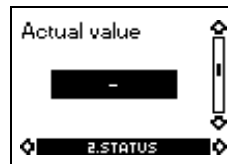


This display shows the actual operating mode:

- Stop
- Min.
- Normal (**duty**),
- Max.

It also shows where this operating mode was selected (R100, BUS or External).

2.3 Display of actual value



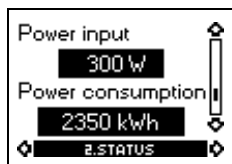
Tolerance: $\pm 3\%$

2.4 Display of actual speed



Tolerance: $\pm 5\%$

2.5 Display of actual power



Tolerance: $\pm 10\%$

The power consumption value is accumulated from the beginning of pump operation, and it cannot be reset.

2.6 Display of operating hours



Tolerance: $\pm 2\%$

The value of operating hours is an accumulated value and cannot be reset.

Menu INSTALLATION

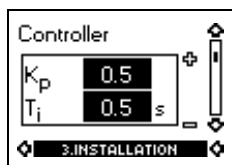
3.1 Selection of control mode



Select one of the following control modes:

- Controlled
- **Uncontrolled.**

3.2 Setting of controller



- The gain (K_p) is set within the range from 0.1 to 20.
- The integral-action time (T_i) is set within the range from 0.1 to 3600 s. If 3600 s is selected, the controller will function as a P-controller

The gain (K_p) and intergral-action time (T_i) of the built-in PI-controller can be changed, should factory settings be inadequate.

Furthermore, it is possible to set the controller to inverse control (if the setpoint is increased, the speed will be reduced). In the case of inverse control, the gain (K_p) must be set within the range from -0.1 to -20 .

3.3 Selection of external setpoint signal



Select one of the following types:

- 0-10 V
- 0-20 mA
- 4-20 mA
- **Not active**

If "Not active" is selected, the setpoint set by means of the R100 or the control panel will apply.

3.4 Selection of fault, operating or ready signal relay



The signal relay can be set to activation by:

- Fault (fault indication),
- Operation (operating indication),
- Ready (ready indication).

3.5 Locking of the buttons on the pump



The buttons "+" and "-" on the pump can be set to:

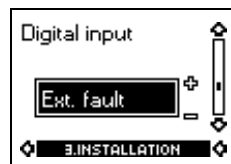
- Active
- **Not active.**

3.6 Allocation of pump number



A number between 1 and 64 can be allocated to the pump. In the case of BUS communication, a number must be allocated to each pump.

3.7 Selection of function for digital input



Select one of the following functions:

- Min. (min. curve),
- Max. (max. curve),
- **Ext. fault** (external fault),
- Flow switch.

The selected function is activated by closing the contact between the following terminals:

- 1 and 9 of single-phase pumps
- 1 and 3 of three-phase pumps

See "Other connections" page 36.

- **Min.:** When the input is activated, the pump is operating according to the min. curve.

- **Max.:** When the input is activated, the pump is operating according to the max. curve.
- **Ext. fault:** When the input is activated, a timer is started. If the input is activated for more than 5 secs., the pump is stopped and a fault is indicated. If the connection is disconnected for more than 5 secs., the fault condition will cease and the pump can be restarted manually by resetting the fault indication. The typical application will be detection of missing inlet pressure or water shortage by means of a pressure switch installed on the suction side of a pump.
- **Flow switch:** When this function is active, the pump will be stopped when a connected flow switch detects a low flow. It is only possible to use this function if the pump is connected to a pressure sensor. When the input is activated for more than 5 secs., the stop function incorporated in the pump will take over, see "Setting of stop function" page 32.

3.8 Setting of stop function



The stop function can be set to:

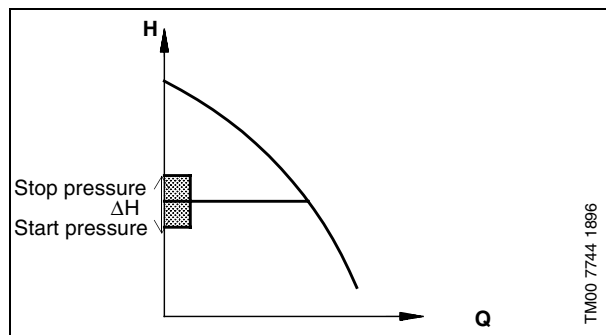
- Active
- Not active.

When the stop function is active, the pump will be stopped at very low flows to avoid unnecessary power consumption. It is only possible to use this function if the pump is connected to a pressure sensor.

There are two possibilities of low-flow detection:

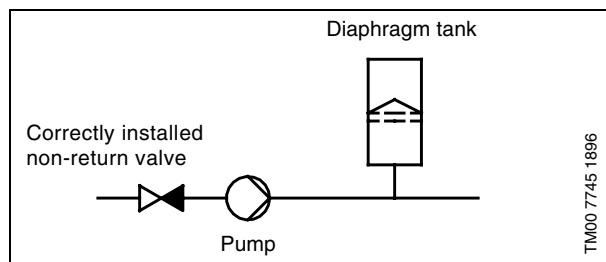
1. By means of the built-in "low-flow detector" which automatically starts functioning if no flow switch is chosen/connected to the digital input. The pump will check the flow regularly by reducing the speed for a short time, thus checking the change in pressure. If there is no or a small change in pressure, the pump will detect a low flow.
2. By means of a flow switch connected to the digital input. When the input is activated for more than 5 secs., the stop function of the pump takes over. Unlike the built-in low-flow detector, the flow switch measures the minimum flow at which the pump must stop. The pump will not check the flow regularly by reducing the speed.

When the pump detects a low flow, the speed will be increased until the stop pressure (actual setpoint + 0.5 x ΔH) is reached and the pump stops. When the pressure has fallen to the start pressure (actual setpoint - 0.5 x ΔH), the pump will restart. ΔH indicates the difference between start and stop pressures.



ΔH is factory-set to **10% of actual setpoint**. ΔH can be set within the range from 5% to 30% of actual setpoint.

Note: The non-return valve must be fitted immediately before the pump. If the non-return valve is fitted between pump and diaphragm tank, the pressure sensor must be fitted after the non-return valve.



The stop function requires a diaphragm tank of a certain minimum size. The tank must be installed immediately after the pump and the precharge pressure must be 0.7 x actual setpoint.

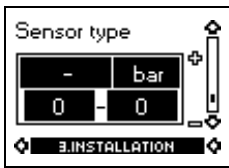
Recommended diaphragm tank size when no flow switch is connected.

Nominal flow of pump [gpm]	Diaphragm tank size [gal.]
0-30	2
31-100	5

If a diaphragm tank of the above size is installed in the system, the factory setting of ΔH is the correct setting. If the tank installed is too small, the pump will start and stop too often. This can be remedied by increasing ΔH .

The CHIE-Plus is fitted with a very small diaphragm tank; therefore, frequent starts/stops will occur in systems with long periods of very low (<0.5 gpm) flow or leaks in the piping.

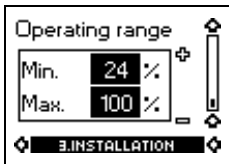
3.9 Setting of sensor



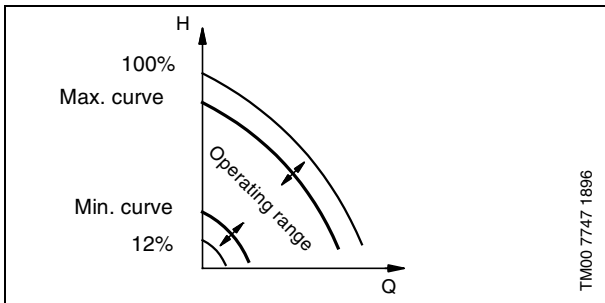
- Select the following:
- Sensor output signal (0-10 V, 0-20 mA or 4-20 mA),
 - sensor measuring unit (bar, mbar, m, kPa, psi, ft, m³/h, m³/s, l/s, gpm, °C, °F or %)
 - and
 - sensor measuring range.

The setting of the sensor is only to be made in the case of controlled operation.

3.10 Setting of min. and max. curves



Set the min. and max. curves in % of maximum performance if the operating range must be reduced.



- The max. curve can be adjusted within the range from maximum performance (100%) to min. curve.
- The min. curve can be adjusted within the range from max. curve to 12% of maximum performance. The pump has been factory-set to 24% of maximum performance.
- The operating range lies between the min. and max. curves.

External forced-control signals

The pump has inputs for external signals for the forced-control functions:

- Start/stop of pump.
- Digital function.

Functional diagram: Start/stop input:

Start/stop (terminals 2 and 3)		
		Normal duty
		Stop

By means of the R100, one of the following functions can be selected for the digital input:

- Min. curve.
- Max. curve.
- External fault.
- Flow switch.

Functional diagram: Input for digital function:

Digital function (terminals 1 and 9)		
		Normal duty
		Min. curve
		Max. curve
		External fault
		Flow switch

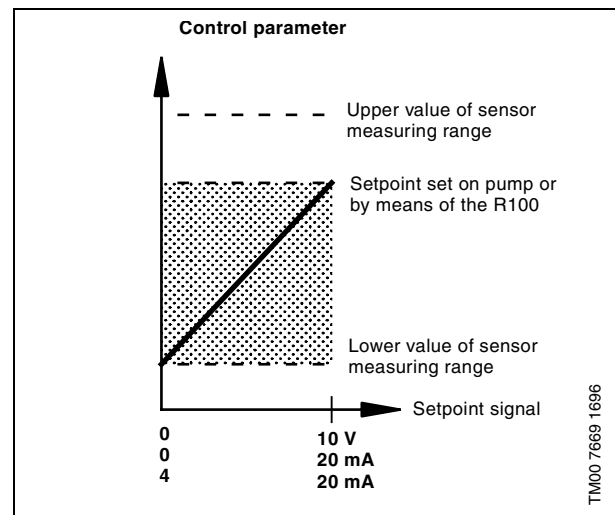
External setpoint signal

By connecting an analog signal transmitter to the input for the setpoint signal (terminal 4 and 6), it is possible to remote-set the setpoint.

The actual external signal (0-10 V, 0-20 mA, 4-20 mA) must be selected via the R100.

If uncontrolled operation is selected by means of the R100, the pump can be controlled by any controller.

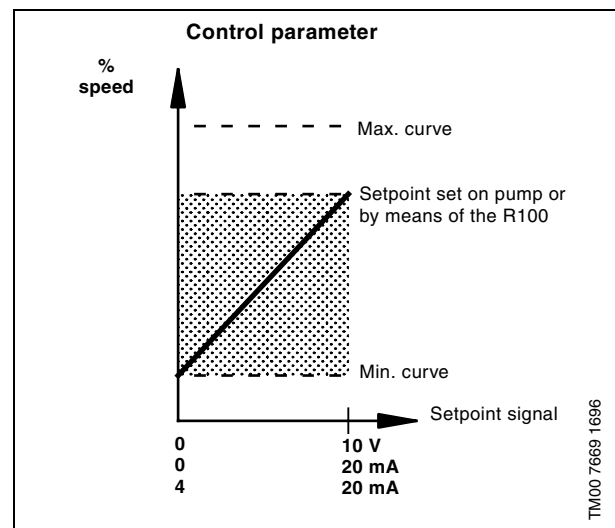
In **controlled** operating mode, the setpoint can be set externally within the range from the lower value of the sensor measuring range to the setpoint set on the pump or by means of the R100.



Example: At a lower pressure-sensor value of 0 bar, a setpoint set of 20 bar and an external setpoint of 80%, the actual setpoint will be as follows:

$$\begin{aligned}
 H_{\text{actual}} &= (H_{\text{set}} - H_{\text{lower}}) \times \%_{\text{external setpoint}} + H_{\text{lower}} \\
 &= (20 - 0) \times 80\% + 0 \\
 &= 16 \text{ bar}
 \end{aligned}$$

In **uncontrolled** operating mode, the setpoint can be set externally within the range from the min. curve to the setpoint set on the pump or by means of the R100.

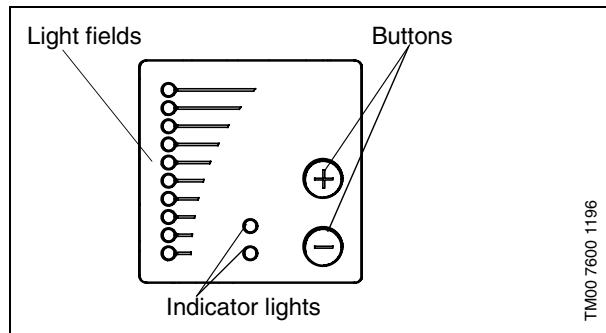


Indicator lights and signal relay

The operating condition of the pump is indicated by the green and red indicator lights on the pump control panel. The pump incorporates an output for a potential-free signal via an internal relay.

The signal relay of CHIE can be set to fault indication, operating indication or ready indication by means of R100.

This setting cannot be changed. The functions of the two indicator lights on the terminal box and the signal relay are as shown in the following table:



Indicator lights		Signal relay activated during:			Description
Fault (red)	Operation (green)	Fault	Operation	Ready	
Off	Off				The electricity supply has been switched off.
Off	Permanently on				The pump is operating.
Off	Flashing				The pump has been set to stop.
Permanently on	Off				The pump has stopped because of a fault. Restarting will be attempted (it may be necessary to restart the pump by resetting the fault indication). In case of the fault causes "dry running" and "external fault", the pump must be restarted manually by resetting the fault indication.
Permanently on	Permanently on				The pump is operating, but it has been stopped because of a fault. If the cause is "sensor signal outside signal range", the pump will continue operating according to the max. curve and the fault indication cannot be reset until the signal is inside the signal range. If the cause is "setpoint signal outside signal range", the pump will continue operating according to the min. curve and the fault indication cannot be reset until the signal is inside the signal range.
Permanently on	Flashing				The pump has been set to stop, but it has been stopped because of a fault.

A fault indication can be reset in one of the following ways:

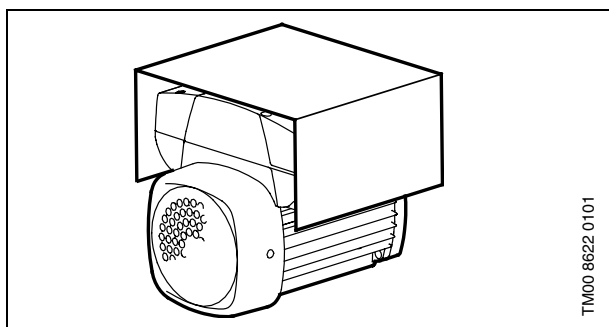
- By briefly pressing the buttons "+" or "-" on the pump. This will not change the setting of the pump. A fault indication cannot be reset by means of "+" or "-" if the buttons have been locked.
- By briefly switching off the electricity supply to the pump.
- By means of the R100. When the R100 communicates with the pump, the red indicator light will flash rapidly.

General

To ensure cooling of motor and electronics, the following must be observed:

- Place the pump in such a way that sufficient cooling is ensured.
- The temperature of the cooling air must not exceed 104°F (40°C).
- Motor cooling fins, holes in fan cover and fan blades must be kept clean.

When installed outdoors, the motor must be provided with a suitable cover to avoid condensation on the electronic components.



Electrical connection

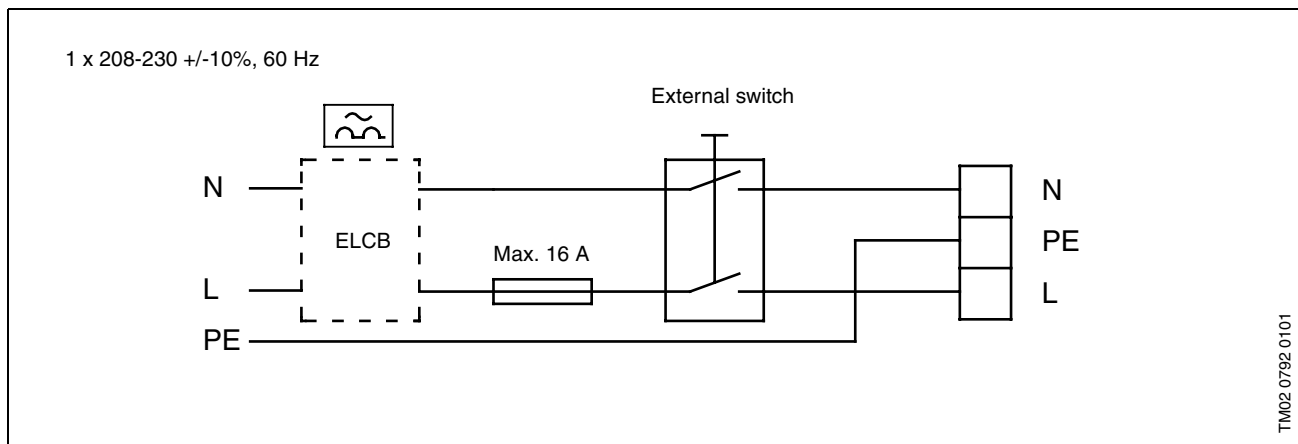
The electrical connection and protection should be carried out in accordance with local regulations.

- The pump must be connected to an external main power switch.
- The E-pump must always be correctly grounded.
- The pump requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking (IEC 34-11: TP 211).
- When the pump is switched on via the main power, the pump will start after approx. 5 secs.

Note: The number of starts and stops via the main power voltage must not exceed 4 times per hour.

The pump main power connection must be made as shown in the diagram below.

Wiring diagram



Additional protection

If the pump is connected to an electric installation where a ground fault circuit interrupter (GFCI Class B, 10 mA minimum rated leakage current trip level, UL 943) is used as an additional protection the earth leakage circuit breakers must be marked with the following symbol.

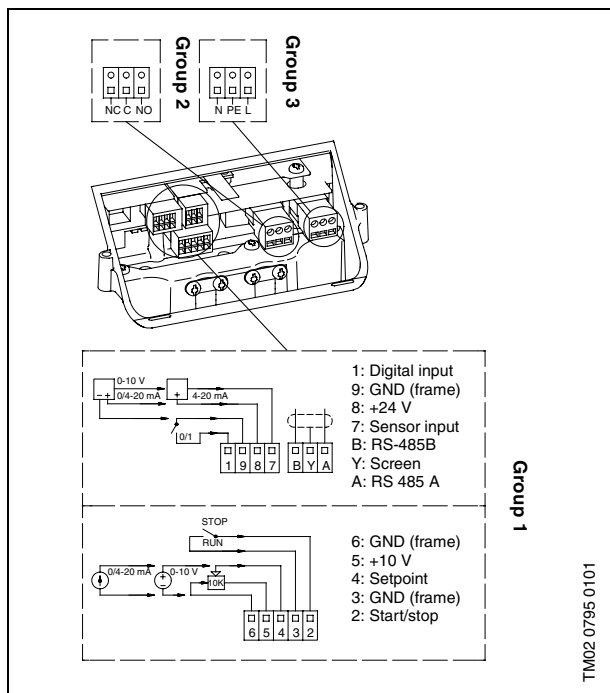


The earth leakage circuit breakers must trip out when earth fault currents with DC content (pulsating DC) occur.

Other connections

The connection of external potential-free contacts for start/stop and digital function, external setpoint signal and fault signal is shown in the wiring diagram.

Wiring diagram



The wires can be connected to the following connection groups:

Group 1: Inputs (external start/stop, digital function, setpoint and sensor signals, terminals 1-9 and bus connection, A, Y, B).

All inputs are separated from the mains-conducting parts by reinforced insulation.

Group 2: Output (fault signal relay).

The output, terminals C, NO and NC, is electrically separated from other circuits. Therefore, the supply voltage or a safety extra-low voltage can be connected to the output as desired.

Group 3: Main power supply.

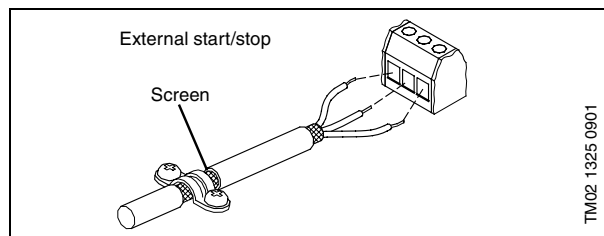
Note:

- As a precaution, the wires must be separated from each other by reinforced insulation in their entire lengths.
- Maintain the connection across terminals 2 and 3, if no external on/off switch is connected.

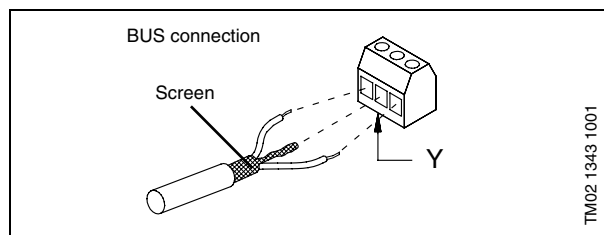
Cables

Use screened cables (min. 0.5 mm²) for external on/off switch, digital input, sensor and and setpoint signals. The screens of the cables should be connected to frame at both ends.

The screen of the cable must have good frame connection and it must be as close as possible to the terminals.



For the BUS connection a screened 2-core cable must be used. Connect the screen to terminal Y at both ends.



External force control

Functional diagram: Start/stop input:

Start/stop (terminals 2 and 3)		
		Normal duty
		Stop

Functional diagram: Input for digital function:

Digital function terminals 1 and 9		
		Normal duty
		Min. curve
		Max. curve

The function for digital input is selected using the R100. CHIE is supplied with external fault as factory setting.

Electrical data

Electricity supply to pump	1 x 208-230 V -10%/+10%, 60 Hz, PE.
External start/stop input	External potential-free contact. Maximum contact load: Voltage 5 VDC, current < 5 mA. Screened cable*.
Digital input	External potential-free contact. Maximum contact load: Voltage 5 VDC, current < 5 mA. Screened cable*.
Setpoint signals	Potentiometer 0-10 VDC, 10 kΩ (via internal voltage supply). Screened cable*. Maximum cable length: 330 ft. (100 m.) Voltage signal 0-10 VDC, $R_i > 50 \text{ k}\Omega$. Tolerance: +0%/-3% at maximum voltage signal. Screened cable*. Maximum cable length: 1640 ft. (500 m.) Current signal DC 0-20 mA/4-20 mA, $R_i = 175 \Omega$. Tolerance: +0%/-3% at maximum current signal. Screened cable*. Maximum cable length: 1640 ft. (500 m.)
Electricity supply to sensors	The sensors are supplied with electricity via the motor terminal box. 24 VDC $\pm 10\%$ Maximum load: 40 mA.
Sensor signals	Voltage signal 0-10 VDC, $R_i > 50 \text{ k}\Omega$ Tolerance: +0%/-3% at maximum voltage signal. Screened cable*. Maximum cable length: 1640 ft. (500 m.) Current signal DC 0-20 mA/4-20 mA, $R_i = 175 \Omega$. Tolerance: +0%/-3% at maximum current signal. Screened cable*. Maximum cable length: 1640 ft. (500 m.)
Signal output	Potential-free changeover contact. Maximum contact load: 250 VAC, 2 A. Minimum contact load: 5 VDC, 1 mA. Screened cable: 0.5-2.5 mm ² . Maximum cable length: 1640 ft. (500 m.)
Bus input	Grundfos BUS protocol, GENibus protocol, RS-485. 0.5-1.5 mm ² screened 2-core cable. Maximum cable length: 1640 ft. (500 m.)
EMC	EN 61800 Residential areas - unlimited distribution, corresponding to CISPR 11, class B, group 1.
Enclosure class	Standard: TEFC (IP 55)
Insulation class	F (IEC 85).
Ambient temperature	During operation: -4°F to +104°F (-20°C to +40°C). During storage/transport: -40°F to +104°F (-40°C to +60°C).
Relative air humidity	Maximum 95%.

*Cross section min. 0.5 mm² and max. 1.5 mm².

Submittal Data Sheet

CHI, CHIE, CHIE-Plus

Horizontal Multistage Centrifugal Pumps

Company name: _____
 Prepared by: _____
 Phone number: () - _____
 Fax number: () - _____
 Date: _____ Page 1 of: _____
 Quote number: _____

Client Information	
Project title: _____	Client name: _____
Reference number: _____	Client number: _____
Client contact: _____	Client phone no: () - _____

Location Information			
For: _____	Unit: _____		
Site: _____	Service: _____		
Address: _____	City: _____	State: _____	Zip Code: _____

Application Information			
Operating Conditions			Pumped Fluid
	max.	norm.	min.
Capacity (gpm)			
Suction Pressure (psig)			
Discharge Pressure (psig)			
Differential Head (ft)			
Hydraulic Power (hp)			
at designated capacity			
NPSH Available (ft)			
Service			
Continuous: _____	Intermittent (starts/day): _____		
Fluid type: _____			
			rated max. norm.
Fluid Temperature (°F)			
at designated temperature			
Specific Gravity			
Vapor Pressure (psia)			
Viscosity (cp)			
Fluid ph: _____		Chlorides (ppm): _____	
Hazardous: _____		Flammable: _____	
Other: _____			
Corrosion/Errrosion caused by: _____			
% Solids: _____		Max. particle size (in): _____	

Pump Information	
Model Information from Type Key and Codes: _____	
Quantity Required: _____	Example: CHI 4-30 A-B-G-BQQE
Minimum required flow: _____	NPSH required at duty point: _____
Product Guide additional information pages	
Materials page number: _____	Performance curve page number: _____
Technical data page number: _____	Motor data page number: _____

Motor Information			
HP: _____	Phase: _____	Voltage: _____	Enclosure: TEFC

Custom-built pump information (optional): _____

Additional Information			

Quotation Text

CHI, CHIE

Horizontal, multistage, non self-priming, centrifugal pump with axial suction port and radial discharge port.

The compact unit has maintenance-free mechanical shaft seal and an extended motor/pump shaft.

Pump and motor are mounted on a common baseplate and all pump components in contact with the pumped liquid are made of 316 stainless steel.

The motor is a _____-phase motor.

Technical:

Rated flow: _____ GPM

Rated head: _____ Feet

Minimum liquid temperature: _____ °F

Maximum liquid temperature: _____ °F

Type of shaft seal: _____

Materials:

Material, pump housing: 316 AISI Stainless Steel

Material, impeller: 316 AISI Stainless Steel

Material, shaft: 316 AISI Stainless Steel

Material, seal metal: 316 AISI Stainless Steel

- seal face: _____

- seal face: _____

- seal elastomer: _____

Installation:

Minimum ambient temperature: _____ °F

Maximum ambient temperature: _____ °F

Maximum operating pressure: _____ PSI

Max. pressure at stated temp.: _____ PSI/°F

Size, pipe connection: _____" NPT

Electrical data:

Rated power (P2): _____ HP

Frequency: _____ Hz

Rated voltage: _____ V

Rated current: _____ A

Service factor:

Rated speed: _____ RPM

Enclosure class: TEFC

Insulation class: F

Additional:

Gross weight: _____ Lbs.

Shipping volume: _____ ft³

CHIE and CHIE-Plus Only

The pump is fitted with a single-phase MLE motor with frequency converter and PI-controller integrated in the motor terminal box. No additional motor protection is required as both motor and electronics are protected by integrated overload and temperature protection.

External sensor can be connected if controlled pump operation based on for example flow, differential pressure or temperature is required.

A small control panel is incorporated into the terminal box for setpoint adjustment and turning the pump on and off.

As an alternative to the control panel, the setpoint can be set via an external analog signal.

Two indicator lights on the terminal box indicate the operational state of the pump.

The terminal box holds terminals for the connection of:

- Pump start/stop (potential-free contact),
- external remote setpoint setting via analog signal, 0 - 5 V, 0 - 10 V, 4 - 20 mA,
- 5 V voltage supply for setpoint potentiometer, I_{max} = 5 mA,
- sensor, 0 - 5 V, 0 - 10 V, 0(4) - 20 mA,
- 24 V voltage supply for sensor, I_{max} = 25 mA
- potential-free fault signal relay with changeover contact

L-CHI-PG-01 1/06 (US)
Subject to alterations

GRUNDFOS Pumps Corporation
17100 West 118th Terrace
Olathe, Kansas 66061
Phone: 913 227 3400
Fax: 913 227 3500

www.grundfos.com

GRUNDFOS Canada Inc.
2941 Brighton Road
Oakville, Ontario L6H 6C9 Canada
Phone: 905 829 9533
Telefax: 905 829 9512

Bombas GRUNDFOS de Mexico S.A. de C.V.
Boulevard TLC No. 15
Parque Industrial Stiva Aeropuerto
Apodaca, N.L. Mexico 66600
Phone: 52-81-8144 4000
Telefax: 52-81-8144 4010