

**INSTRUCTION MANUAL**

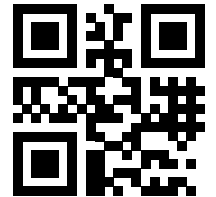
P2002548 Rev E



Single Phase Pump



Three Phase Pump



**ecocirc<sup>®</sup> XL**



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# 1 Introduction and Safety



## 1.1 Introduction

### Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



#### CAUTION:

Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

#### NOTICE:

Save this manual for future reference, and keep it readily available at the location of the unit.

## 1.2 Safety terminology and symbols

### Hazard levels

Hazard level	Indication
<b>DANGER:</b>	A hazardous situation which, if not avoided, will result in death or serious injury
<b>WARNING:</b>	A hazardous situation which, if not avoided, could result in death or serious injury
<b>CAUTION:</b>	A hazardous situation which, if not avoided, could result in minor or moderate injury
<b>NOTICE:</b>	<ul style="list-style-type: none"> <li>• A potential situation which, if not avoided, could result in undesirable conditions</li> <li>• A practice not related to personal injury</li> </ul>

### Hazard categories

Hazard categories can either fall under hazard levels or let specific symbols replace the ordinary hazard level symbols.

Electrical hazards are indicated by the following specific symbol:



#### Electrical Hazard:

### Hot surface hazard

Hot surface hazards are indicated by a specific symbol that replaces the typical hazard level symbols:



#### CAUTION:

### Qualified personnel



#### WARNING:

This product is intended to be operated by qualified personnel only.

## 1.3 Protecting the environment

### Emissions and waste disposal

Observe the local regulations and codes regarding:

- Reporting of emissions to the appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills

### Exceptional sites



#### CAUTION: Radiation Hazard

Do NOT send the product to Xylem if it has been exposed to nuclear radiation, unless Xylem has been informed and appropriate actions have been agreed upon.

### Recycling guidelines

Always follow local laws and regulations regarding recycling.

## 1.4 Spare parts



#### WARNING:

Only use original spare parts to replace any worn or faulty components. The use of imitation spare parts may cause malfunctions, damage, and injuries as well as void the warranty and the UL listing.

# 2 Transportation and Storage



## 2.1 Inspect the delivery

1. Inspect the package for damage or missing items upon delivery.
2. If applicable, unfasten the product by removing any screws, bolts, or straps. For your personal safety, be careful when you handle nails and straps.
3. Remove packing material from the product.
4. Dispose of all packing material in accordance with local regulations.
5. Inspect the product to determine if any parts have been damaged or are missing.

Contact your local B&G representative if there are any issues.

## 2.2 Transportation guidelines

### Positioning and fastening

The unit should be transported in an upright position as indicated on the package. Make sure that the unit is securely fastened during transportation and cannot roll or fall over. The product can be safely transported at ambient temperature from -40°F to +158°F (-40°C to +70°C) with humidity <95% (non-condensing) and protected against dirt, heat source, and mechanical damage.

### Precautions



#### WARNING:

- Observe accident prevention regulations in force.
- Crush hazard. The unit and the components can be heavy. Use proper lifting methods and wear steel-toed shoes at all times.

Check the gross weight that is indicated on the package in order to select proper lifting equipment.

## 2.3 Storage guidelines

### Storage location

#### NOTICE:

- Protect the product against humidity, dirt, heat sources, and mechanical damage.
- The product must be stored at an ambient temperature from -13°F to +131°F (-25°C to +55°C) and humidity < 95% (non-condensing).

## 3 Product Description



### 3.1 Pump design

- The ecocirc XL is a large wet rotor pump with energy efficient, electronically commutated permanent magnet motor.
- The pump is designed for systems with variable flow rates to optimize pump operation thus reducing energy consumption. The pump can be set to any one of the multiple operating modes available, with each designed for a specific application to achieve high performance and maximum energy savings.
- Pumps are offered in cast iron and stainless steel options to handle HVAC and potable water applications respectively. However, a single stainless steel body pump can handle heating, cooling and plumbing applications if so desired. The pumps are also suitable for a 50/50 percent water/glycol circulating fluid. The built-in electrical overload and dry run protection provide safety and protection from damage.

#### Intended use



#### WARNING:

This product can expose you to chemicals including lead, which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

The pump is suitable for:

- Potable water with stainless steel body models
- Hot water heating systems
- Cooling and cold water systems

The pump can also be used for:

- Solar systems
- Geothermal applications

#### Improper use



#### DANGER:

Do not use this pump to handle flammable and/or explosive liquids.



#### WARNING:

Unintended use of the pump may create dangerous conditions and cause personal injury and damage to property.



#### WARNING:

Do NOT install this pump in swimming pools or marine areas. Failure to follow these instructions could result in serious personal injury, death and/or property damage.

**THIS IS A NON-SUBMERSIBLE PUMP**



#### WARNING:

Do NOT exceed the maximum working pressure of the pump. This information is listed on the nameplate of the pump.



#### WARNING:

The pump user interface values are to be used for reference purposes only. Do not use the values given by the pump for system balancing. If a level of flow and accuracy is required, gauges that match the expected accuracy level must be installed independent of the pump.

#### NOTICE:

Do not use this pump to handle liquids containing abrasive, solid or fibrous substances, toxic or corrosive liquids, potable liquids other than water or liquids not compatible with the pump construction material. Water pH must be maintained between 7-9 and water hardness must not exceed 14 grains/ gallon, with suspended solids less than 100 PPM.

An improper use of the product leads to the loss of the warranty.

### 3.2 Product nomenclature

Example: ecocirc XL N 15-75	
ecocirc XL	high efficiency pump series
N	Pump type: Blank = Cast iron N = Stainless Steel pump body for potable water pumping
-15	Maximum pump head (FT)
-75	Maximum pump flow rate (GPM)

### 3.3 Technical data

Feature	Description
Motor model	Electronically commutated motor with permanent magnet rotor
Series	ecocirc XL
Rated voltage	1 x 115 V ±10% 1 x 208-230 V ±10% 3 x 208-230/400-460 V ± 10% 3 x 400-460 V ± 10%
Frequency	50/60 Hz
Power consumption	The maximum power consumption is indicated on the pump nameplate.
IP protection	IP 44
Insulation class	Class 155 (F)
Maximum working pressure	The maximum pressure is indicated on pump nameplate 175 PSI (12 bars)
Liquid temperature range	14°F (-10°C) to 230°F (110°C) Up to 149°F (+65°C) is recommended for domestic hot water pumps
Ambient temperature range	32°F (0°C) to 104°F (40°C)
Ambient humidity	≤ 95% non-condensing
Pumping media	Water and water/glycol mixtures <sup>1</sup> up to 50%.
Sound pressure	See <a href="#">Sound pressure levels</a> on page 5.
EMC (electromagnetic compatibility)	EN 55014-1:2006 + A1:2009 + A2:2011, EN 55014-2:1997 + A1:2001 + A2:2008, EN 61000-3-2:2006 + A1:2009 + A2:2009, EN 61000-3-3:2008, 61800-3:2004+A1:2012.
Leakage current	< 3.5 mA
I/O auxiliary +15 VDC power supply	I <sub>max</sub> < 40 mA
Fault signal relay	1 PH: • V <sub>max</sub> < 250 VAC • I <sub>max</sub> < 2 A  3 PH units have two relays: • Status signal relay • Fault signal relay V <sub>max</sub> < 250 VAC I <sub>max</sub> < 2 A
Run signal relay	3 PH pumps only

<sup>1</sup> The pump can be used with water/propylene glycol mixtures up to 50% with a maximum viscosity of 50cST at 14°F (-10°C). The pump has built-in overload and thermal protection to protect the pump from overload due to increased fluid viscosity. Pump performance is based on 77°F (25°C). Therefore pumping of glycol mixtures will affect max performance, depending on mixture concentration and temperature.

Feature	Description
CSA certification	NSF/ANSI-372 compliant (stainless steel body parts)
UL/cUL Listed	UL 778 - Motor operated water pump UL1004 - Motors UL listing UL 60730 - Inverters UL listing
BTL Certification	BacNet Smart Actuator (B-SA)

### 3.4 Sound pressure levels

Nominal pump HP	Sound pressure level (approximate values)
1/6	≤ 43 dB (A)
1/2	≤ 48 dB (A)
1	≤ 55 dB (A)
2	≤ 60 dB (A)
3	≤ 65 dB (A)

### 3.5 Scope of delivery

Inside the package you will find:

- Pump unit
- Insulating shells for pump body – for heating applications
- O-ring to be used as replacement between motor housing and pump body
- Two (2) gaskets for flanged connection
- 20 mm x 1/2" NPT electrical fitting
- IOM and Quick Start guide
- Two (2) M16 x 1.5 connection cable fitting
- Two (2) Absolute Pressure Sensors PN 16, rated for 175 PSI (12 bar) (with 3-phase pumps only)

### 3.6 Accessories

- Companion flanges
- Fastener Packs consisting of 4 bolts and 4 nuts (for 2-bolt models)
- Fastener Packs consisting of 8 bolts and 8 nuts (for 4-bolt models)
- Pressure sensor (for details see [External sensors](#) on page 11)
- Temperature sensor (for details see [External sensors](#) on page 11)
- Wireless module
- RS-485 module

## 4 Installation



#### Precautions



**WARNING:**

- Observe accident prevention regulations in force.
- Use suitable equipment and protection.
- Always refer to the local and/or national regulations, legislation, and codes in force regarding the selection of the installation site, plumbing, and power connections.

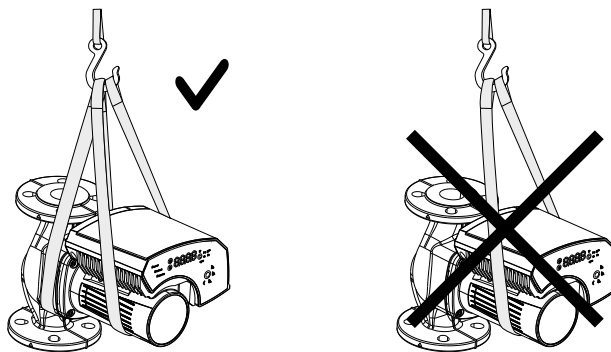
#### 4.1 Pump handling



**WARNING:**

Observe local codes and regulations setting the limits for manual lifting or handling.

Always lift the pump by the motor housing or pump body. If the pump weight exceeds the manual handling limits, use lifting equipment with lifting straps.



A0022\_a\_sc

### 4.2 Tools required for pump installation

- T-Handle with allen screw
- Control screw driver - with 2 mm flat blade size



Nominal HP	Allen wrench size (mm)	T-handle length (in)
1/12	5	8
1/6	5	8
1/2	6	10
1	8	12
2	8	12
3	8	12

### 4.3 Facility requirements

#### 4.3.1 Pump location



**DANGER:**

Do not use this unit in environments that may contain flammable/explosive or chemically aggressive gases or powders.

**Guidelines**

Observe these guidelines regarding the location of the product:

- Make sure that the installation area is protected from any fluid leaks, or flooding.
- If possible, place the pump slightly higher than the floor level.
- Provide shut-off valves on the suction and discharge sides of the pump.
- The relative humidity of the ambient air must be less than 95% non-condensing.
- This pump is suitable for indoor use only.



**CAUTION:**

CAUTION: PROPERTY DAMAGE HAZARD. It is not advisable to install circulators in an attic or upper floor over finished living space. If the circulator must be installed over head, or over expensive equipment, provide adequate drainage in the event of leakage. Failure to follow these instructions could result in property damage.

#### 4.3.2 Minimum inlet pressure at the suction port

The values in the table below are the inlet pressures above the atmospheric pressure.

Nominal Suction Diameter	Fluid temperature 77°F (25°C)	Fluid temperature 203°F (95°C)	Fluid temperature 230°F (110°C)
1 1/2"	4.5 PSI	16 PSI	25 PSI
2"	4.5 PSI	16 PSI	25 PSI
3"	7.5 PSI	19 PSI	28 PSI

**NOTICE:**

- Ensure that the suction pressure is never below the values specified above, as this could cause cavitation and damage the pump.
- The inlet pressure plus the pump pressure against a closed valve must be lower than maximum admissible system pressure.

**4.3.3 De-rating table**

The following table indicates percent decrease in input power draw, with the increase in temperature of circulating water and the ambient.

Ambient temperature	Fluid Temperature (°C)			
	-10	60	95	110
32°F-77°F (0°C-25°C)	100%	100%	100%	100%
86°F (30°C)	100%	100%	80%	70%
104°F (40°C)	100%	100%	70%	55%

**4.4 Piping requirements**

**Precautions**



**CAUTION:**

- Use pipes suited to the maximum working pressure of the pump. Failure to do so can cause the system to rupture, with the risk of injury.
- Make sure that all connections are performed by qualified installation technicians and in compliance with the regulations in force.
- Do not use a shut-off valve on the discharge side in the closed position for more than a few seconds. If the pump must operate with the discharge side closed for more than a few seconds, a bypass circuit must be installed to prevent overheating of the water inside the pump.

**Piping checklist**

- Pipes and valves must be correctly sized.
- Pipe work must not transmit any load or torque to pump flanges.
- Be sure to minimize any pipe-strain on the pump:
  - Support suction and discharge piping by the use of pipe hangers near the pump.
  - Line up the vertical and horizontal piping so that the bolt-holes in the pump flanges match the bolt-holes in the pipe flanges.
  - Do not attempt to spring the suction or discharge lines in position. This may result in unwanted stress in the pump body, flange connections and piping.
  - The code for pressure piping (ANSI B31.1) lists many types of supports available for various applications.

**4.5 Electrical requirements**

- The NEC, CEC and local codes must be followed at all times. If a branch circuit is fitted with ground fault circuit breaker, ensure that the circuit breaker is suitable for use with inverter-driven appliances.

**Electrical connection checklist**

Check that the following requirements are met:

- The electrical wires are protected from high temperature and vibration.
- The current type and power supply voltage connection must correspond to the specifications on the name plate on the pump.
- Use wires at least 14 AWG to supply power to the pump. Follow all local and NEC wiring codes and practices.
- High voltage conduit must connect to one 20mm to 1/2" npt adapter (factory supplied and installed).
- Low voltage conduit can be connected using 16mm to 1/2" npt fittings (field supplied).

**The electrical control panel checklist**

**NOTICE:**

The electrical supply must match the electrical rating of the pump. Improper combination could fail to guarantee protection of the unit.

Check that the following requirements are met:

- The control panel circuit breaker is sized properly to protect the pump against short-circuit.
- Both single and 3-phase pumps have built in overload and thermal protection, no additional overload protection is required.

**The motor checklist**

Electrical supply and grounding wires must be suitable for at least 194°F (90°C).

**4.6 Pump installation**

1. Install the pump according to the liquid flow direction.
  - The arrow on the pump housing shows the flow direction through the pump body.
  - The pump must be installed with the motor in a horizontal position. For more information about allowed positions, refer to the following image:

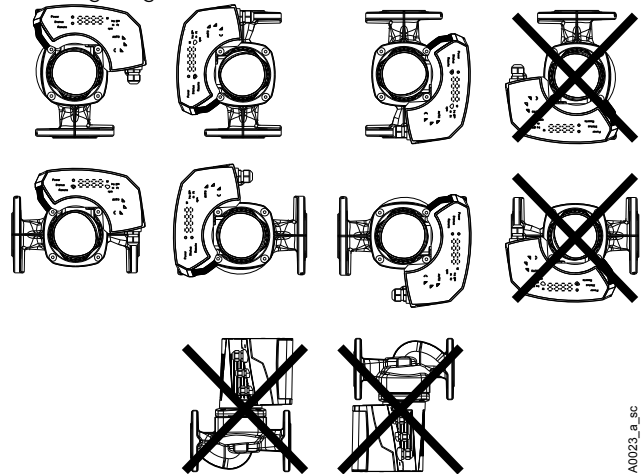


Figure 1: Allowed pump installation

2. If necessary, rotate the position of the motor for better visibility of the user interface.
 

Section 4.7 below describes the procedure of changing of motor orientation.
3. If applicable, install the thermal insulation shells.
  - Only use the pump thermal shells that are included in the delivery. Do not insulate the motor housing, the electronics can overheat and cause the pump to thermally overload.
  - The thermal shells that are included with the pump must only be used in hot water circulation applications with fluid temperature above 68°F (20°C). The thermal shells are permeable to water vapor.
  - If the customer installs vapor barrier insulation for cold water application, then the pump housing must not be insulated above the motor flange. The drain opening must be kept unobstructed in order that the accumulated condensation can run out.

**NOTICE:**

Improper installations shown above can cause the pump to fail prematurely and create an electrical hazard and/or damage caused by water leakage.



## 4.7 Change the position of the motor housing



### WARNING:

- Drain the system if possible or close the service valves on both sides of the pump before disassembling the pump. The pumped fluid can be pressurized and may be scalding hot.
- There is the risk of escaping vapor when the motor is separated from the pump housing.



### Electrical Hazard:

Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized.



### CAUTION:

Burn hazard. During operation various surfaces on the unit will become hot. To avoid burn injury, use heat protective gloves.



### WARNING:

- A strong magnetic field is created when the rotor is removed from or inserted into the motor housing. This magnetic field can be harmful to pacemaker wearers and others with medical implants. In addition, the magnetic field may attract metal parts to the rotor which can cause injuries and/or damage the bearing of the pump.

1. Loosen the four hex-head screws (2) that fix the motor to the pump housing (4) using the T-handle allen wrench described.
2. Rotate the motor (1) in 90° steps to the desired position.
3. In case of separation of the motor housing from the pump body (4):
  - a) avoid removing the rotating assembly from the motor housing;
  - b) note the magnetic hazard listed above.

A defective O-ring must be replaced. A spare O-ring is already available inside the package.

4. Properly align and tighten the four hex-head screws (2) that affix the motor to the pump body (4) according to the torque table given below in a criss cross pattern.

Nominal HP	Screw size	Torque
1/12 & 1/6	M6	90 in-lb
1/2	M8	170 in-lb
1 & 2	M10	340 in-lb
3	M10	340 in-lb



### CAUTION:

Check for the presence of leaks after reassembling the pump.

## 4.8 Electrical installation

### Precautions



### WARNING:

- Make sure that all connections are performed by a qualified electrician in accordance with all applicable codes, ordinances and good practices. Failure to follow these instructions could result in serious injury, death and/or property damage.
- Before starting work on the unit, make sure that the unit and the control panel are isolated from the power supply and cannot be energized.

### Grounding (earthing)



### WARNING:

Reduced risk of electric shock during operation of this pump requires the provision of acceptable grounding.

Be sure the following are adhered to. Failure to follow these instructions could result in serious personal injury, death, and/or property damage.

- If means of connection to the supply connection box (wiring compartment) is other than grounded metal conduit, ground the pump back to service using a copper conductor at least the size of the circuit conductors supplying the pump.
- Connect the ground wire to the grounding terminal in the wiring compartment.

The number of ON/OFF power cycles for the pump must be less than 3 times per hour and less than 20/24 hours. If more frequent start/stop cycles are required, the use of a dedicated start/stop input is recommended. See [External start/stop](#) on page 10.

### 4.8.1 Power supply connection



### WARNING:

Do not make any connection in the pump control box unless the power supply has been switched off for at least 2 minutes.

For models with standard terminal block connection:

1. Open the terminal box cover removing the screws (5).
2. Thread the ½" NPT electrical fitting into the conduit connection of the pump.
3. Connect the cable according to the wiring diagram.
  - a. Connect the ground wire, if used.
  - b. Connect the power wiring.
4. Close the terminal box cover.

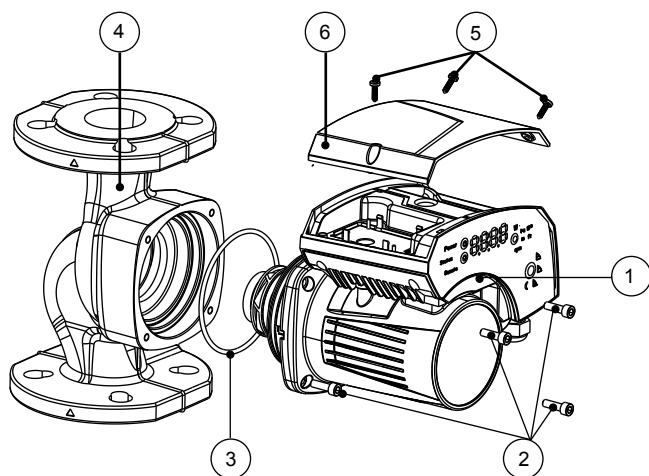


Figure 2: Change the position of the pump head for 1 PH

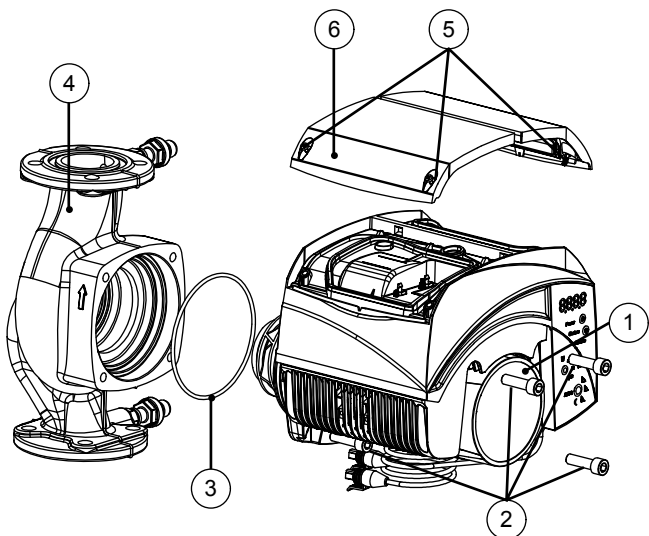


Figure 3: Change the position of the pump head for 3 PH

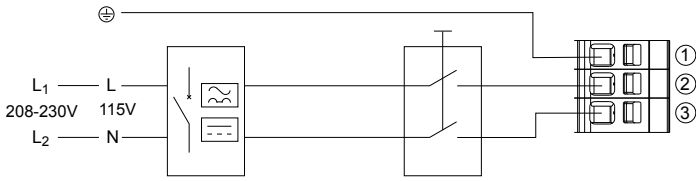


Figure 4: Wiring diagram for single phase models

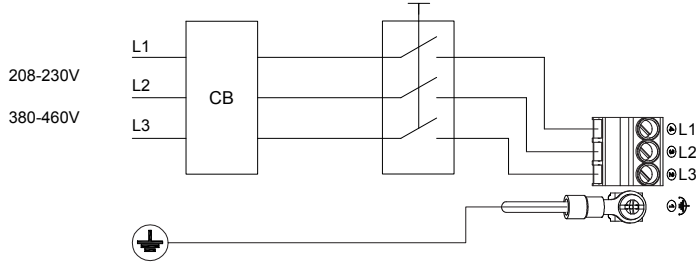


Figure 5: Wiring diagram for three phase models

**CAUTION:**  
 If stranded wire is used to connect power to the pump, make sure that all the individual strands enter the terminal block as the wire is inserted. Peeled back strands can cause a short circuit hazard at the pump terminal block connections.

1-PHASE TERMINAL BLOCK

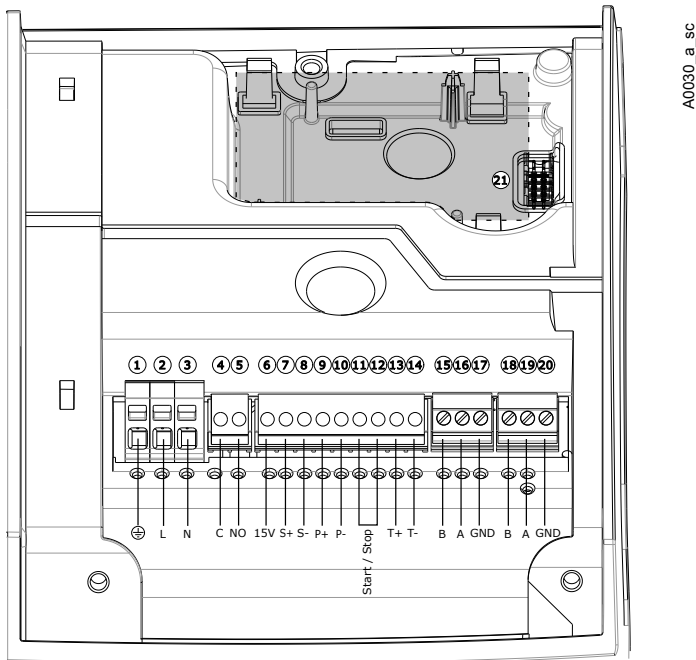


Figure 6: Connection diagram for single phase models

3-PHASE TERMINAL BLOCK

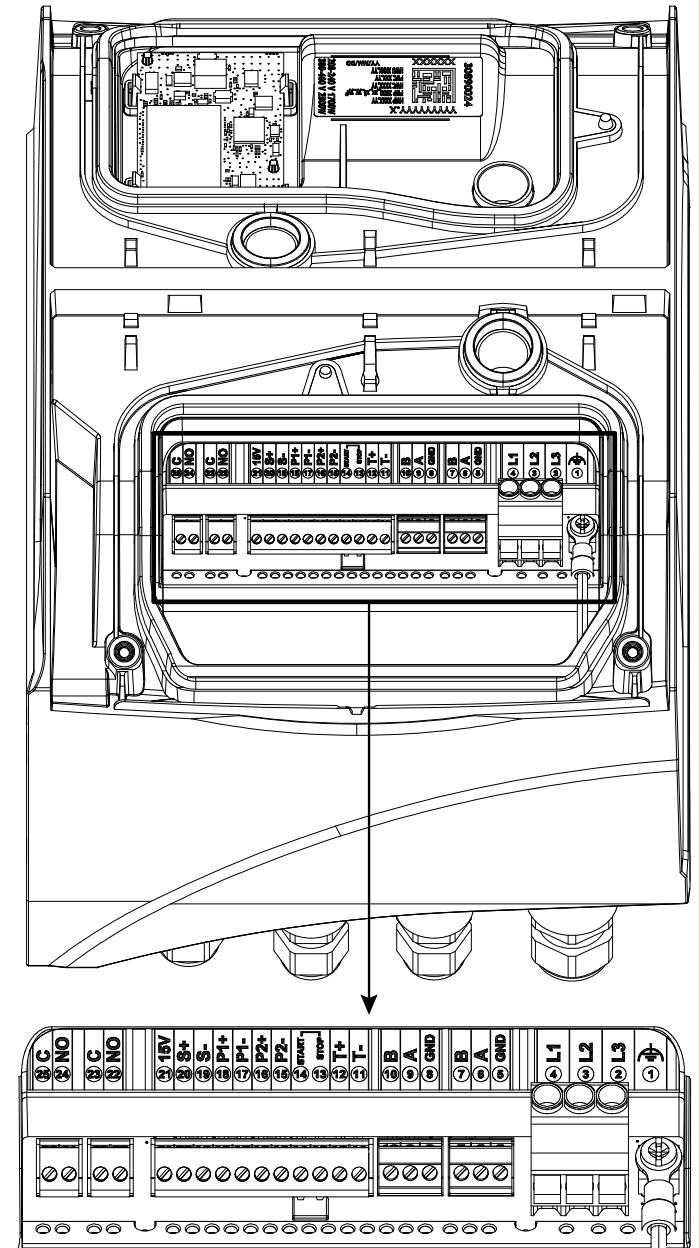


Figure 7: Connection diagram for three phase models

**CAUTION:**  
 Connect the low voltage circuits of the electronic drive only to Safety Extra Low Voltage (SELV) circuits. The circuits provided for use with external communications and control equipment are designed to provide isolation from neighboring hazardous circuits within the drive. The communications and control circuits within the ecocirc XL drive are floating from ground and are classified as SELV. They must be connected only to other SELV circuits in a manner which maintains all the circuits within the SELV limits and prevents ground loops. Physical and electrical separation of the communications and control circuits from non-SELV electrical circuits must be maintained both within the inverter and external to the inverter.

### 4.8.2 I/O connections

1. Open the terminal box cover removing the screws (5). Refer to figures 2 & 3 on page 7. Use control screwdriver described under section 4.2 to access terminal blocks.
2. Connect the appropriate wires according to the terminal block diagram and the requirements of section [Connection assignment](#) on page 9 given below in section 4.7.3.
3. Close the terminal box cover.

### 4.8.3 Connection assignment

- For all electrical connections, use heat resistant wires or cable that is rated for at least 194°F (90°C). Make sure that the wiring does not touch the motor housing, the pump, or the piping.
- Power and control wires must be run in separate channels.
- Metal conduit for power wiring must only be attached to 1/2" NPT conduit fitting.
- For a two pump connection, wire both pumps through a communication cable connecting the 2 RS-485 ports at the pumps to terminals 15, 16 & 17 for single phase pumps and 5-6 & 7 for three phase pumps.
- Low voltage wiring is recommended to be twisted pair and shielded. Sensor wiring is not to exceed 65 feet (19.8 m) in length.

**NOTICE:**

Cable glands are only available for low voltage wiring to protect against cable slippage and vapor ingress into the terminal box.

5. Setting buttons
6. Numeric display
7. Power indicator
8. Status / Fault indicator
9. Remote control indicator



**Hot Surface:**

Burn hazard. During normal operation, the pump surfaces may be so hot that only the buttons should be touched to avoid burns.

### 5.1.1 User interface locking/unlocking

The user interface will automatically lock if no button is pressed for ten minutes, or if the upper setting button (5) and the parameter button (3) are pressed for two seconds. See [User interface](#) on page 9.

If a button is pressed when the user interface is locked, the display (6) shows:



To unlock the user interface, press the upper setting button (5) and the parameter button (3) for two seconds. The display (6) will show:



Now it is possible to change the pump setting as required.

## 5 System Description

### 5.1 User interface

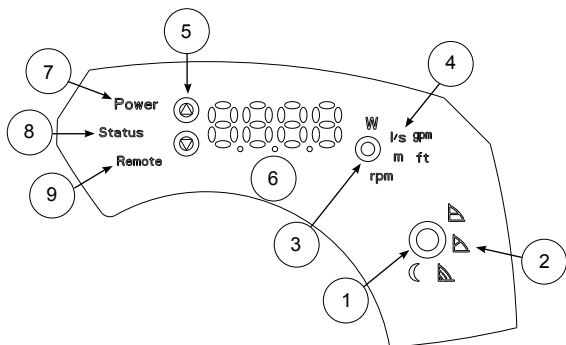


Figure 8: User interface diagram for single phase models

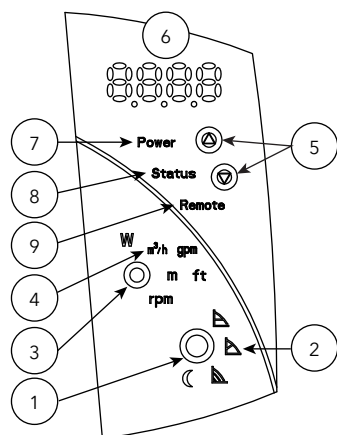


Figure 9: User interface diagram for three phase models

1. Control mode button
2. Control mode indicators
3. Parameter button
4. Parameter indicators

### 5.2 Functions

The main functions of the pump and control modes are selectable through the pump user interface and the embedded I/O. Advanced functions or communication features, can only be accessed and set via communication bus protocol or the optional Wireless module. See the electronic drive manual at [www.bellgossett.com](http://www.bellgossett.com), for details.

#### 5.2.1 Control Modes

Mode	Description
<p>Constant pressure</p>	<p>The pump maintains a constant pressure at any flow demand. The desired head of the pump can be set via user interface. See <a href="#">Change the set point</a> on page 12.</p>
<p>Proportional pressure</p>	<p>The pump pressure is continuously increased/decreased depending on the increased/decreased flow demand. The maximum head of the pump can be set via user interface. See <a href="#">Change the set point</a> on page 12.</p>
<p>Fixed speed control</p>	<p>The pump maintains a fixed speed at any flow demand. The speed of the pump can be set via user interface. See <a href="#">Change the set point</a> on page 12.</p>

All the above control modes can be combined with the night mode function.

## 5.2.2 Temperature dependent control modes

For details refer to the electronic drive manual on [www.bellgossett.com](http://www.bellgossett.com).

### 5.2.2.1 $\Delta p$ -T control

This function adjusts the nominal differential pressure set point according to the temperature of the pumped media.

For details refer to the electronic drive manual on [www.bellgossett.com](http://www.bellgossett.com)

### 5.2.2.2 T-Constant temperature control

This function adjusts the nominal differential pressure set point according to the temperature of the pumped media.

For details refer to the electronic drive manual on [www.bellgossett.com](http://www.bellgossett.com).

### 5.2.2.3 $\Delta T$ constant

This function alters the speed of the pump in order to maintain a constant differential temperature of the pumped media.

For details, refer to the electronic drive manual on [www.bellgossett.com](http://www.bellgossett.com).

## 5.2.3 Night mode

The night mode cannot be used in cooling systems.

Pre-requisites:

- The pump is installed between boiler outlet and system supply.
- The night mode feature is initiated when the pump recognizes a water temperature change that is brought about by the boiler or high-level control system.

The night mode is active only with:

- Proportional pressure
- Constant pressure
- Fixed speed / Constant curve

This function decreases power consumption of the pump to the minimum when heating system is not running. An algorithm detects the water temperature change and automatically adjusts the speed of the pump.

The pump returns to the original setpoint when the system restarts.

## 5.2.4 External start/stop

The pump can be started or stopped via an external dry contact or a relay that is connected to terminals 11 and 12 on single phase pump models. The pump unit is provided by default, with the terminals 11 and 12 jumpered. See [Figure 6: Connection diagram for single phase models](#) on page 8.

Start/stop terminals for three phase models are 13 and 14. See [Figure 7: Connection diagram for three phase models](#) on page 8.

### NOTICE:

- The pump provides 5 VDC through the start / stop terminals.
- No external voltage must be provided to start / stop terminals.
- The cables connected to terminals 11 and 12 on single phase or to terminals 13 and 14 on three phase pumps shall not exceed 65 feet in length

## 5.2.5 Analog Input

The pump integrates a 0-10 V analog input at terminals 7 and 8 for single phase and 19 and 20 for three phase units. See [Figure 6: Connection diagram for single phase models](#) on page 8 and [Figure 7: Connection diagram for three phase models](#) on page 8.

When a voltage input is detected, the pump switches to fixed speed control mode automatically and starts to run according to the following diagram:

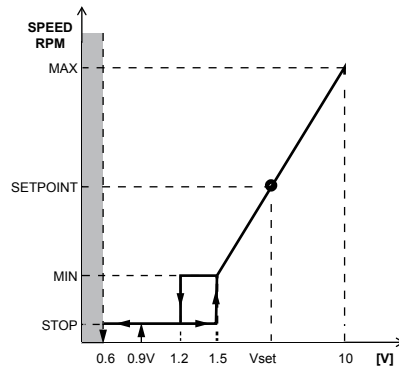


Figure 10: Voltage input detected

0-0.6V	Voltage control – unrecognized	
0.6-0.9V	Control recognized – fixed speed icon begins blinking. Pump off.	
0.9-1.5V	Pump operates at minimum speed	
1.5-10V	Pump accelerates at controlled speed	 

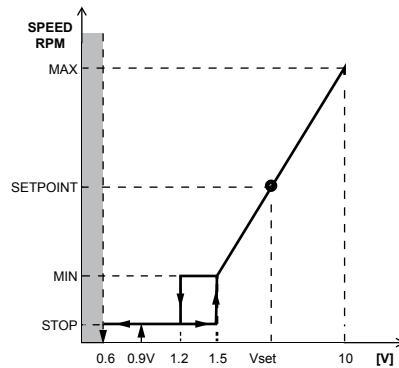


Figure 11: Voltage input detected

10-1.5V	Pump decelerates at controlled speed	 
1.5-1.2V	Pump runs at minimum speed	
1.2-0.6V	Control recognized – fixed speed icon remains blinking. Pump off.	
0.6-0V	Voltage control – unrecognized	

## 5.2.6 Signal relay

Dry relay contacts are available at terminal 4 and 5 for single phase pumps, and at terminals 22, 23 and 24, 25 for three phase pumps.

### Relay ratings

1.  $V_{max} < 250$  VAC
2.  $I_{max} < 2$  A

### 5.2.6.1 Signal relay for single phase pumps only

A dry contact relay is provided at terminals 4 and 5. See connection diagrams [Figure 6: Connection diagram for single phase models](#) on page

8 and [Figure 7: Connection diagram for three phase models](#) on page 8 for location. If there is a fault, the relay contact closes to display a red status light and the error code on the user interface display. See [User interface](#) on page 9. The relay contact closure can also be used to energize a remote fault display.

### 5.2.6.2 Signal relay for 3-phase pumps only

Two normally open relay contacts are available at terminals 22, 23 and 24, 25. If an error causes the pump to stop operating, the relay contact closes and terminals 24-25 are closed. Terminals 23-24 indicate pump stop/run status.

**Table 1: Relay status**

	Motor running	Motor stopped
No fault	Relay 1 Open (24-25 open circuit) Relay 2 Closed (22-23 short circuit)	Relay 1 Open (24-25 open circuit) Relay 2 Open (22-23 open circuit)
Fault present	Not possible	Relay 1 Closed (24-25 short circuit) Relay 2 Open (22-23 open circuit)

### 5.2.7 External sensors

Single phase pumps can be equipped with an optional differential pressure sensor and a remote optional temperature sensor. The three phase pumps are equipped with two absolute pressure sensors and an optional external temperature sensor. Refer to the following table for more information.

Sensor description	Type	Terminals	
		1-Phase Pump	3-Phase Pump
Differential pressure sensor 4-20 mA	15 psi 30 psi	9-10	–
Absolute pressure sensors 4-20 mA	–	–	17-18 15-16
Temperature sensor	KTY82	13-14	11-12

#### Differential pressure sensor setup — single phase pumps only

1. Install differential pressure sensor on the pipe
2. Connect wires at terminals 9 and 10. See [Figure 6: Connection diagram for single phase models](#) on page 8.
3. Turn on the pump.
4. Upon startup, the pump detects the sensor and displays the setup menu.
5. Select the right sensor model and confirm the selection by using the parameter button (3). See [User interface](#) on page 9.
6. The pump runs through the startup sequence and automatically starts working in constant pressure mode (factory default). The sensor must be wired to terminals 9 & 10.
7. The setpoint can be changed by using the settings button (5). See [User interface](#) on page 9.

#### Pressure sensor setup — three phase pumps only

Two absolute pressure sensors are factory provided to be installed on the pump flanges pressure ports and wired to terminals 15, 16 and 17, 18. The sensors must be installed to allow for precise pump operation in constant and proportional pressure modes. In case of sensor failure, the pump will display the corresponding alarm code (see par. 8.2) and will continue to operate with limited precision using pressure estimation.

#### External temperature sensor setup

The optional external temperature sensor setup and related control modes are available only through RS-485 or wireless module connection.

For details refer to the electronic drive manual on [www.bellgossett.com](http://www.bellgossett.com)

#### NOTICE:

The differential sensor cables shall not exceed 65 ft.

### 5.2.8 Communication bus

The pumps have two built-in RS-485 communication channels.

**Single phase pumps** – The standard channel is available on terminals (15-16-17), while the second one is enabled only with optional RS-485 or wireless module on terminals (18-19-20). See [Figure 6: Connection diagram for single phase models](#) on page 8.

**Three phase pumps** – The standard channel is available on terminals (5-6-7), while the second one is enabled only with optional RS-485 or wireless module on terminals (8-9-10). See [Figure 7: Connection diagram for three phase models](#) on page 8.

The pump can communicate with external BMS systems via Modbus or BACnet protocol. For a complete description of the protocols, refer to the electronic drive manual, in addition to Modbus and BACnet instruction manuals at [www.bellgossett.com](http://www.bellgossett.com).

#### NOTICE:

When remote control is active, the set points and control modes are managed only through communication channels and cannot be changed via the user interface. The displayed quantity and unit of measurement remain active on the user interface.

### 5.2.9 Wireless module

The wireless module is an optional module, to be coupled with the ecocircXL circulators. When correctly configured, it generates a wireless network accessible by a mobile device, tablet or a personal computer. See wireless module instructions manual for details at [www.bellgossett.com](http://www.bellgossett.com).

### 5.2.10 Automatic two pumps in parallel operation

#### Backup operation (bcup)

Only the lead pump runs. The second pump starts in case of failure of the lead pump.

#### Alternate operation (alte)

Only one pump runs at a time. The working time is switched every 24 hours so that workload is balanced between both pumps. The second pump is started immediately in case of failure of the lead pump.

#### Automatic parallel operation (para)

Both pumps run simultaneously at the same set point. Only when the constant pressure mode is selected (for details see [Control Modes](#) on page 9), the lead pump determines the behavior of the full system and is able to optimize the performance. To guarantee the required performance with the minimum power consumption, the lead pump starts or stops the lag (second) pump to satisfy system requirement of flow and head.

NOTE: The automatic optimization works correctly on most installations. In the case of unstable running, switch the pump operation to “forced parallel operation” (forc).

#### Forced parallel operation (forc)

Both pumps run simultaneously with the same set point. The master pump determines the behavior of the full system.

## 6 System Setup and Operation



#### CAUTION:

Always wear protective gloves when handling the pumps and motor. When pumping hot liquids, the pump and its parts may exceed 40°C (104°F).

#### NOTICE:

The pump must not run dry as this can damage the bearings. Fill the system correctly with liquid and vent the air before first start-up.



**NOTICE:**

- Never operate the pump with discharge valve closed for longer than a few seconds.
  - Do not expose an idle pump to freezing conditions. Drain all liquid that is inside the pump. Failure to do so can cause liquid to freeze and damage the pump.
  - The suction plus shut-off discharge pressure must not exceed the pump pressure rating.
  - Do not use the pump if cavitation occurs. Cavitation can damage the internal components.
- Do not use the pump if cavitation occurs. Cavitation can damage the internal components and cause reduced life of the pump.

## 6.1 Configure the pump settings

Change the pump settings using one of the following methods:

- User interface
- Bus communication
- Wireless communication

### 6.1.1 Change the communication parameters

Change pump communication parameters. See [User interface](#) on page 9.

1. Switch off the pump.  
Wait until the power indicator light turns off.
2. Turn on the pump.
3. When the display shows **COMM**, press the parameter button (3) to access the communication menu.
4. Select one of the four below parameters using the settings button (5).
  - **BAUD** = baud rate setup (available values 4.8 - 9.6 - 14.4 - 19.2 - 38.4 - 56.0 - 57.6 kbps)
  - **PROT** = communication protocol (available protocols "mod" = Modbus; "bac" = BACnet)
  - **ADDR** = address setup (available address 1-247 for Modbus 0-127 for BACnet)
  - **MODU** = optional module setup ("none" = no module; "wifi" = Wireless module; "485" = RS-485 module)
5. Press the parameter button to enter the submenu
6. Edit the values using setting buttons.
7. Press the parameter button to confirm and store the new values.
8. Press mode button to exit the submenu.
9. Repeat above procedure for each of the three parameters.

If no buttons are pressed for 10 seconds, then the pump exits the current menu and continues start-up procedure. All the parameters that are changed but not confirmed restore back to previous state.

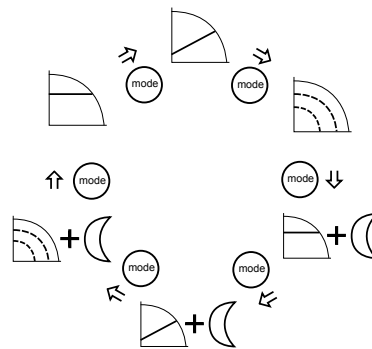
**NOTE:** The communication setup menu is available only on display and not through communication bus.

### 6.1.2 Change the control mode

The pump can be controlled by a BMS (Building management system) or other devices through the RS-485 communication port via Modbus or BACnet protocol.

The following instructions are used when making the change on the user interface. See [User interface](#) on page 9.

- Press the operating mode button (1).
- The operating modes are cyclically changed by the pressed button.



### 6.1.3 Change the set point

See [User interface](#) on page 9.

1. Press one of the arrow setting buttons (5).  
The display starts to blink.
2. Change the value using the buttons (5).
3. Wait 3 seconds to store and activate the new set point.  
The display will stop blinking to confirm the change.

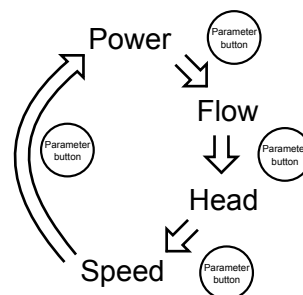
**NOTICE:**

If a check valve is installed in the system, ensure that the pump head is sufficient to allow flow through the system.

### 6.1.4 Change the displayed unit of measurement

Power, Flow, Head and Speed parameters cyclically change by pressing the parameter button (3). In order to change the unit of measurement, follow these steps:

1. Press the button (3) to change the unit of measurement. See [User interface](#) on page 9.



2. When flow and head are displayed, by pressing the button (3) for more than one second at each of these parameters, the unit of measurement automatically changes as below:
  - Flow: m<sup>3</sup>/h ↔ gpm (US)
  - Head: m ↔ ft

## 6.2 Start or stop the pump

**CAUTION:**

- The pump must not run dry as this can result in premature failure of the bearings in a very short time. Fill and vent the system correctly before first start-up. The pump rotor chamber will be vented after the pump is powered on with an automatic air venting procedure. "deg" will be displayed indicating degassing process.

**NOTICE:**

The system cannot be vented through the pump.

- Start the pump in one of the following ways:

- Switch on power to supply the pump.
- Close the start/stop contact by jumpering terminals 11 and 12 on single phase pumps and terminals 13 and 14 for three phase pumps, or through a remote dry contact..
- Send start command through the communication bus.

The pump starts pumping in constant pressure mode with the following default set points:

Default set points	Pump models
7.5 ft	15-XX (Max head 15 ft)
10 ft	20-XX (Max head 20 ft)
13.5 ft	27-XX (Max head 27 ft)
18 ft	36-XX (Max head 36 ft)
20 ft	40-XX (Max head 40 ft)
22.5 ft	45-XX (Max head 45 ft)
27.5 ft	55-XX (Max head 55 ft)
32.5 ft	65-XX (Max head 65 ft)
35 ft	70-XX (Max head 70 ft)
47.5 ft	95-XX (Max head 95 ft)
55 ft	110-XX (Max head 110 ft)

For more information about how to change setting, see [Configure the pump settings](#) on page 12.

- Stop the pump in one of the following ways:
  - Switch off power supply to the pump.
  - Open the start/stop contact.
  - Send stop command through the communication bus.

### 6.2.1 Automatic air venting procedure

At each power-on of the pump unit, an automatic air venting procedure is executed. During this phase, the user interface displays "deg" (degassing) and a count-down begins until the completion of the procedure.

The air venting procedure can be recalled or skipped:

- Manually by pressing simultaneously the two buttons (5). See [User interface](#) on page 9. The feature will remain disabled until power to pump is disconnected.

The procedure can be permanently enabled or disabled by:

- Manually by pressing simultaneously the two buttons (5) for at least 10 seconds. See [User interface](#) on page 9. Or
- Via communication bus. See the electronic drive manual on [www.bellgossett.com](http://www.bellgossett.com).

### 6.2.2 Two pumps in parallel configuration setup

The circulators are configured as single units by factory default. To activate the two pump parallel functions, follow the procedure below only on one of the two pumps. The second pump will be automatically configured. The working modes are described in [Automatic two pumps in parallel operation](#) on page 11.

### 6.2.3 Set automatic operation mode on two pumps in parallel

Once the communication cable is connected, configure only the "lead" pump. The two pump submenu for this configuration is available at each power-on. When the drive is displaying **SING** (which stands for "Single Pump) short press one of the settings button (5) to display two pumps in parallel menu.

The following procedure must be executed during the start-up phase of the pump.

1. Enter the two-pump sub menu when the display is showing **TWMA (two-pump master)** or **TWSL (two-pump slave)**.
2. Select the applicable two-pump operation.
  - **bcup** = backup operation
  - **alte** = alternative operation
  - **para** = automatic parallel operation
  - **forc** = forced parallel operation
3. Push the parameter button (3) to accept the new setting.

The second pump is configured automatically by the lead pump. Refer to Electronic Drive Manual for further details.

## 7 Maintenance



### Precaution



#### Electrical Hazard:

Disconnect and lock out electrical power before installing or servicing the unit.

Wait 2 minutes before opening the conduit box.



#### WARNING:

- Always wear protective gloves when handling the pumps and motor. When pumping hot liquids, the pump and its parts may exceed 40°C (104°F).
- Maintenance and service must be performed by skilled and qualified personnel only.
- Observe accident prevention regulations in force.
- Use suitable equipment and apply personal protection.
- Risk of property damage, serious personal injury or death. You must repair or replace the pump if corrosion or leakage is found.

## 8 Troubleshooting



### 8.1 Introduction

See [User interface](#) on page 9.

- In case of any alarm that allows the pump to continue running, the display shows a blinking alarm code and the last quantity selected, while the status indicator (8) becomes orange.
- In case of a failure that stops the pump, the display shows the error code permanently lit and the status indicator (8) becomes red

### 8.2 Periodic inspection

Bell & Gossett ecocircXL circulators are designed to provide years of trouble-free service. It is recommended that periodic inspections be made to check for potential problems with the pump. If any leakage or evidence of leakage is present, repair or replace the unit.

### 8.3 Display messages

Table 2: Default

Operating LEDs / Display	Cause
Power On	Pump powered
All LEDs and display On	Start-up of the pump
Status Green light	Pump is working properly
Remote On	Remote communication is activated

Table 3: Fault messages

Operating LEDs / Display	Cause	Solution
Power Off	Pump is not connected or is incorrectly connected	Check power connection
	Power failure	Check power supply and circuit breaker
Status light Orange	Alarm for system problem	Check the displayed alarm code and find cause from table 8.4.
Status light Red	Pump failure	Check the displayed error code and find the cause from table 8.3.

Operating LEDs / Display	Cause	Solution
Remote Off	Remote communication is deactivated	If the communication does not work, check the connection and the configuration parameters for communication on the external controller.
Display shows "ALOC"	Rotor unlocking function is in progress	Wait for the result of this procedure (about 30 seconds). If procedure fails, error code E04 will appear. Note: during the execution of this procedure, vibration and noise may occur. Wait for the procedure to complete.

### 8.4 Fault and error codes (Red LED)

Error code	Cause	Solution
E01	Internal communication lost	Restart the pump <sup>2</sup>
E02	High motor current	Restart the pump <sup>2</sup>
E03	DC Bus overvoltage	Indicates excessive power through the pump. Confirm system setup, verify correct position and operation of check valves.
E04	Motor stall	Restart the pump <sup>2</sup>
E05	Data memory corrupted	Restart the pump <sup>2</sup>
E06	Voltage supply out of operating range	Check the electrical system voltage and wiring connection.
E07	Motor thermal protection trip	Check the presence of foreign material around impeller and rotor that cause overload. Check installation conditions and temperature of the water and ambient air. Wait until the motor is cooled. If the error persists try to restart the pump <sup>2</sup> .
E08	Inverter thermal protection trip	Check installation conditions and ambient air temperature.
E09	Hardware error	Restart the pump.
E10*	Dry run	Check for system leakage or fill the system.
E11**	Loss of phase	Check power supply
E12	Internal communication error	Switch off the pump for 5 minutes and then power on. If problem persists, contact factory.

<sup>2</sup> Switch off the pump for 5 minutes and then power on. If the problem persists, contact service.

### 8.5 Alarm codes (Orange LED)

Alarm code	Cause	Solution
A01	Fluid sensor malfunction	Switch off the pump for 5 minutes and then power on. If the problem persists, contact local B&G representative.
A02	High temperature of the fluid	Check water temperature value
A03	Automatic speed reduction to prevent inverter overheating	Check installation conditions and rectify status of the system
A05	Data memory corrupted	Switch off the pump for 5 minutes and then power on. If the problem persists, contact local B&G representative.
A06	External temperature probe malfunction	Check the probe and the connection to the pump
A07	External pressure sensor malfunction	Check the sensor and the connection to the pump
A08	Cooling fan failure (Only on 2 HP and larger models)	Check for the presence of foreign bodies which could lock the fan rotation. Switch off the pump for 5 minutes and then power on. If the problem persists, contact service.
A12	2-pump communication lost	If both pumps show the A12 alarm, check the connection between the pumps. If one of the pump is switched off or shows another error code, check the section 8.1 and 8.2 to find the problem
A20	Internal alarm	Switch off the pump for 5 minutes and then power on. If the problem persists, contact local B&G representative.
A31**	Sensor P1 failure	Check pressure sensor installation and wiring connections
A32**	Sensor P2 failure	Check pressure sensor installation and wiring connections
A33**	Sensors P1 and P2 failure	Check pressure sensor installation and wiring connections

\* For very low motor RPM, dry run condition cannot be properly detected.

\*\* Applies to 3-Phase pumps only

### 8.6 Faults, causes, and remedies

#### The pump does not start

Cause	Solution
No power.	Check the power supply and ensure that it is properly terminated to the pump power.



Cause	Solution
Tripped circuit breaker or ground-fault protection device or the circuit breaker.	Reset power supply circuit breaker and determine cause for overload.
If display shows "ALOC", the rotor unlocking function is in progress.	The procedure, in the attempt to unlock the rotor can produce noise and vibration. Wait for the procedure to finish (approximately 30 seconds).

#### The pump starts but the thermal protection is triggered after a short time

Cause	Remedy
Incorrect wiring size or circuit breaker rating not suitable for motor current.	Check and replace the components as necessary.
Thermal overload protection due to excessive input.	Check the pump working conditions.
Missing a phase in the power supply.	Verify continuity and ensure proper wiring connections.

#### The pump is noisy

Cause	Remedy
Not thoroughly vented.	Switch off the pump and after 30 seconds switch on again to restart the automatic air-venting procedure.
Cavitation due to insufficient suction pressure.	Increase the system suction pressure within the admissible range.
Foreign objects in pump.	Clean the system.
Worn out bearing	Replace pump.

## 9 Other Relevant Documentation or Manuals

### 9.1 Embedded Software and Driver Software License Agreement

With the purchase of the product, the terms and conditions of the license for the software embedded on the product are considered accepted. For more information see license condition on [www.bellgosssett.com](http://www.bellgosssett.com)

#### FCC Statement — USA only (Federal Communications Commission)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference and
2. this device must accept any interference received, including interference that may cause undesirable operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

## 10 Product warranty

### Commercial warranty

**Warranty.** For goods sold to commercial buyers, Seller warrants the goods sold to Buyer hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be (i) be built in accordance with the specifications referred to in the quotation or sales form, if such specifications are expressly made a part of this Agreement, and (ii) free from defects in material and workmanship for a period of eighteen (18) months from the date of installation or thirty-six (36) months from the date of shipment (which date of shipment shall not be greater than after receipt of notice that the goods are ready to ship), whichever shall occur first, unless a longer period is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render the Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, GUARANTEES, CONDITIONS OR TERMS OF WHATEVER NATURE RELATING TO THE GOODS PROVIDED HEREUNDER, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED. EXCEPT AS OTHERWISE REQUIRED BY LAW, BUYER'S EXCLUSIVE REMEDY AND SELLER'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES ARE LIMITED TO REPAIRING OR REPLACING THE PRODUCT AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE BUYER FOR THE DEFECTIVE PRODUCT. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION.**

### Limited consumer warranty

**Warranty.** For goods sold for personal, family or household purposes, Seller warrants the goods purchased hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other "wear parts" or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be free from defects in material and workmanship for a period of eighteen (18) months from the date of installation or thirty-six (36) months from the product

date code, whichever shall occur first, unless a longer period is provided by law or is specified in the product documentation (the "Warranty").

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer's failure to comply with Seller's repair or replacement directions shall terminate Seller's obligations under this Warranty and render this Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. The Warranty is conditioned on Buyer giving written notice to Seller of any defects in material or workmanship of warranted goods within ten (10) days of the date when any defects are first manifest.

Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller's written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller's instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller's supplier of such products.

**THE FOREGOING WARRANTY IS PROVIDED IN PLACE OF ALL OTHER EXPRESS WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO EIGHTEEN (18) MONTHS FROM THE DATE OF INSTALLATION OR THIRTY-SIX (36) MONTHS FROM THE PRODUCT DATE CODE, WHICHEVER SHALL OCCUR FIRST. EXCEPT AS OTHERWISE REQUIRED BY LAW, BUYER'S EXCLUSIVE REMEDY AND SELLER'S AGGREGATE LIABILITY FOR BREACH OF ANY OF THE FOREGOING WARRANTIES ARE LIMITED TO REPAIRING OR REPLACING THE PRODUCT AND SHALL IN ALL CASES BE LIMITED TO THE AMOUNT PAID BY THE BUYER FOR THE DEFECTIVE PRODUCT. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY OTHER FORM OF DAMAGES, WHETHER DIRECT, INDIRECT, LIQUIDATED, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR SPECIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT, LOSS OF ANTICIPATED SAVINGS OR REVENUE, LOSS OF INCOME, LOSS OF BUSINESS, LOSS OF PRODUCTION, LOSS OF OPPORTUNITY OR LOSS OF REPUTATION.**

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state.

To make a warranty claim, check first with the dealer from whom you purchased the product or visit [www.xylem.com](http://www.xylem.com) for the name and location of the nearest dealer providing warranty service.



# Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

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