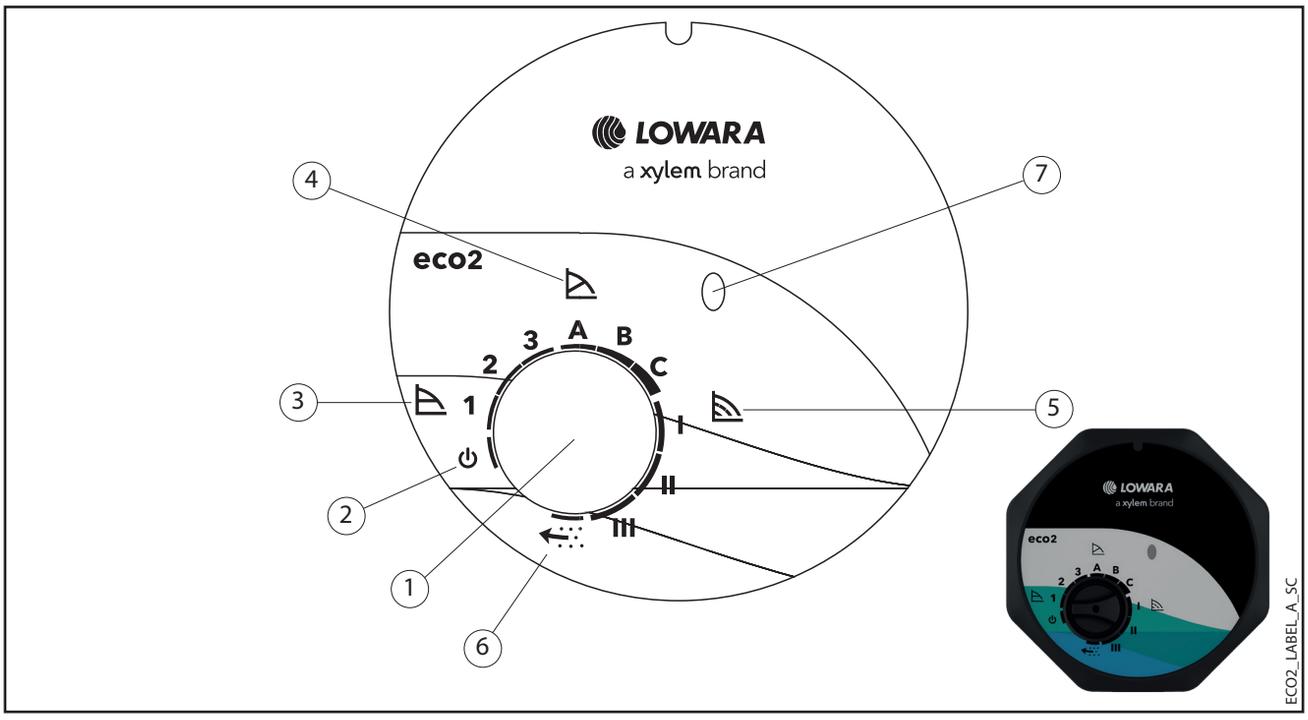
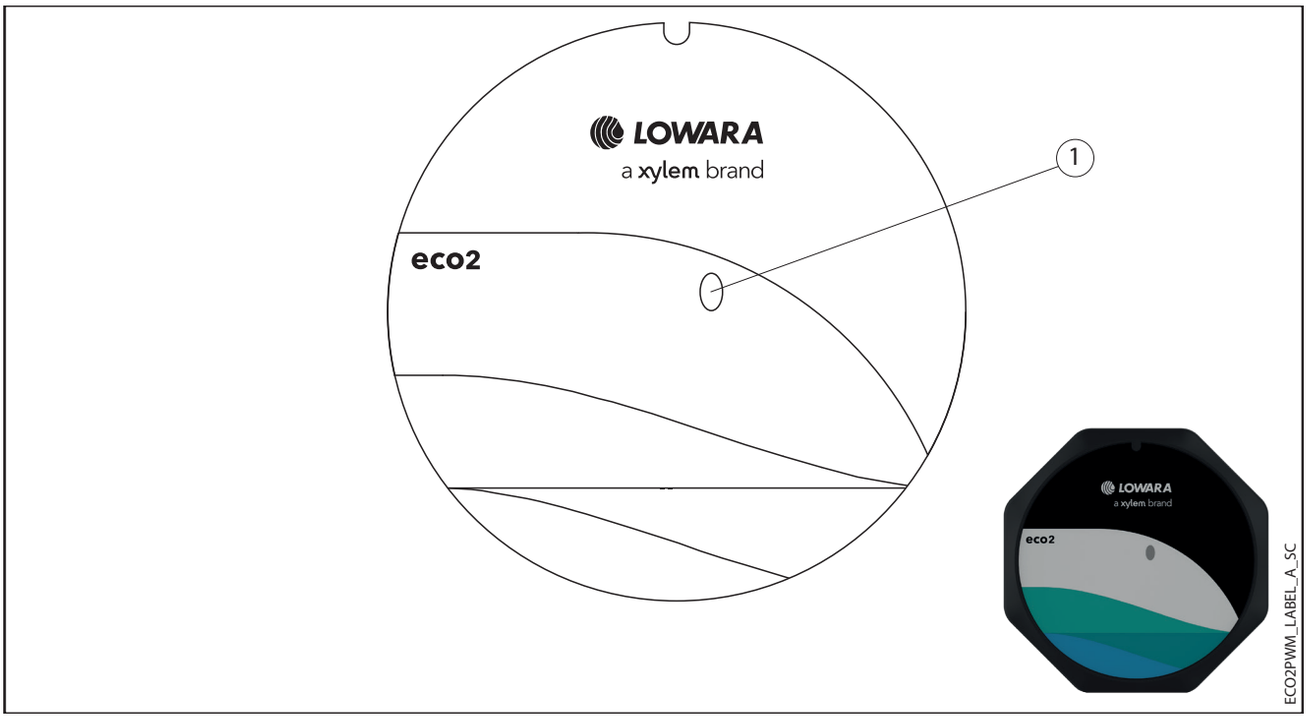
eco2
HUMAN MACHINE INTERFACE



Ref.	Function	Description
1	**Knob**	Operating modes change by turning the knob
2	⏻	Stand-by mode
3		Constant pressure control at 1, 2 or 3 performance curve
4		Proportional pressure control at A, B or C performance curve
5		Constant speed control at I, II or III performance curve
6		Automatic Air Purge function
7	**Control mode LED**	Multicolor LED showing circulator status
	GREEN (Fixed)	Circulator is working properly
	GREEN (Blinking)	Automatic Air-Purge function is running
	YELLOW (Blinking)	Stand-by
	RED (Fixed)	Pump failure
	RED (Blinking)	Dry run

En-RevA

eco2 PWM
HUMAN MACHINE INTERFACE



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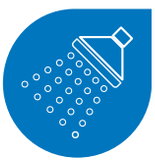
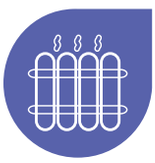
APPLICATIONS


Heat and cooling systems


Residential building


Domestic hot water systems


Systems with thermostatic radiators valves


Underfloor heating systems


Thermal solar systems

GAS AND OIL-FIRED BOILERS

Boilers are water heaters fueled by gas or oil: fuel is burned and the hot gases produced pass through a heat exchanger where much of their heat is transferred to water, thus raising the water's temperature. One of the hot gases produced in the combustion process is water vapour (steam), which arises from burning the hydrogen content of the fuel.

More and more of these heaters are condensing boilers: they achieve high efficiency (typically greater than 90% on the higher heating value) by using waste heat in flue gases to pre-heat cold water entering the boiler.

Water vapour produced during combustion is condensed into liquid form, which leaves the system via a drain. Boilers can be for heating only or for both heating systems and domestic hot water production. Heaters are mostly controlled by a weather-compensating system controller with different time programs, which means the central heating water temperature is often lower than the domestic hot water temperature.

In systems with domestic hot water supply either as combination heaters with integrated DHW supply or with external DHW tank or heat exchanger there is a need to increase the medium temperature temporarily above DHW temperature level.

In small residential buildings, the heating demand for DHW is higher than for space heating. Internal or external circulator pumps for these primary circuits must be controlled by the needs of the heaters to optimize the combustion conditions and the condensation process.
Often this can only be guaranteed by using a variable speed circulator pump with external control signal from the boiler controller.

WOOD HEATERS

Pellet burning stoves hydro are designed to yield all the heat they produce to the water of the heating and domestic water systems.

The entire hydraulic system needed to make them function is already supplied in the stove: an expansion tank, a safety valve, a relief valve, a manometer, a circulator and an anti-condensing valve.

HEAT PUMPS

A heat pump is a device that provides heat energy from a source of heat to a destination called a "heat sink".
Heat pumps are designed to move thermal energy opposite to the direction of spontaneous heat flow by absorbing heat from a cold space and releasing it to a warmer one.
While air conditioners and freezers are familiar examples of heat pumps, the term "heat pump" is more general and applies to many HVAC (heating, ventilating, and air conditioning) devices used for space heating or space cooling.

When a heat pump is used for heating, it employs the same basic refrigeration-type cycle used by an air conditioner or a refrigerator, but in the opposite direction - releasing heat into the conditioned space rather than the surrounding environment.

In this use, heat pumps generally draw heat from the cooler external air or from the ground. In heating mode, heat pumps are three to four times more efficient in their use of electric power than simple electrical resistance heaters.
Heating pumps are, due to their high annual operating hours, among the largest power-consuming appliances in buildings. After the compressor in heat pumps and in other systems of heating applications, the circulation pump is the biggest consumer of electrical power and is therefore the major efficiency factor for the entire application.
Automatic pump performance control helps drastically to reduce power consumption in heating pumps.

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APPLICATIONS

DIRECT HEATING
Direct heat interface units facilitate a direct connection between the primary system and the secondary system. Domestic hot water is provided by a plate heat exchanger.

INDIRECT HEATING
Indirect heat interface units facilitate a separation between the primary and secondary systems, with a plate heat exchanger to transfer energy from fluid in the primary system to fluid in the secondary system. In installations where separation between the primary and secondary systems is required, indirect heat interface units provide this.

DOMESTIC HOT WATER SYSTEM
A typical configuration of a DHW system is a boiler working in tandem with a heat exchanger and hot water tank.
The systems can be fired by natural gas, oil, propane or electricity. The potable water is usually stored in a tank next to the boiler and heated indirectly by primary heating water either by an external plate heat exchanger or by an internal indirect coil. This process continues until the water in the tank reaches the required temperature.

FRESH WATER MODULES
The fresh water modules are stations that instantaneously heat up domestic water, when required, by exploiting the heating water stored in a buffer cylinder. When there is demand for domestic hot water from an user, fresh DHW heats up through the fresh water module, cooling down the heating water in the cylinder. A plate heat exchanger offers very efficient heat transfer and keeps the two flows completely separated. This separation is required to satisfy restrictive regulations in terms of water temperature, health measures and maintenance operations.

CIRCULATING PUMP
The secondary circulator pump is often a self-controlled stand-alone circulator pump, which can be mounted in a heating kit, and responds to the changing flow demand of heat consumers like radiators or underfloor heating circuits. Providing the best operating conditions for all components, hydraulic balancing is important for well-performing hydraulic systems.
Especially in 2-pipe heating systems with thermostatic valves, hydraulic balancing helps to avoid noises, oversupply, undersupply, too high pump performance, and saves energy. If an automatic bypass valve is installed to ensure a minimum flow, you must adjust the differential pressure control of the circulator pump in a way to ensure the function of the automatic bypass valve.

THERMAL SOLAR SYSTEMS
Solar water heating (SWH) is the conversion of sunlight into renewable energy for water heating using a solar thermal collector. Solar water heating systems comprise various technologies that are used worldwide increasingly.
In a “close-coupled” SWH system the storage tank is horizontally mounted immediately above the solar collectors on the roof. No pumping is required as the hot water naturally rises into the tank through thermosiphon flow.
In a “pump-circulated” system the storage tank is ground- or floor-mounted and is below the level of the collectors; a circulating pump moves water or heat transfer fluid between the tank and the collectors. SWH systems are designed to deliver hot water for most of the year.
However, in winter there sometimes may not be sufficient solar heat gain to deliver sufficient hot water.
In this case a gas or electric booster is used to heat the water.

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OPERATING CONDITIONS

Feature	Specification
Nominal supply voltage	1 x 230 V ± 10 % 50/60 Hz.
Motor protection	The motor is protected by the electronics in the control box and requires no external motor protection.
Degree of protection (IEC 60529)	IP 44
Insulation thermal class (IEC 60085)	155 (F)
Equipment class (EN 60335-1)	I
Temperature class (EN 60335-2-51)	TF110 (at 55 °C ambient temperature).
Standby power consumption	< 0.8 W

Transport	The unit can be transported only as indicated on the packaging, at an ambient temperature from -40°C to 85°C and must be protected against dirt, heat source and mechanical damage.
Storage temperature	-40 to +85 °C, with humidity maximum 95% at 40°C.
Operating ambient temperature	0 to 55 °C.
Relative air humidity	Maximum 95 %, non-condensing environment.
Maximum altitude of installation	2000 m above sea level.

Pumped liquids	The pump is suitable for liquids • thin (watery), • clean, • free of abrasive, solid or fibrous substances, • chemically and mechanically non-aggressive, • non-flammable, • non-explosive, • non-toxic, • free of mineral oils, • water/glycol mixtures. In addition, the pump is not suitable for liquids • potable other than water, • foodstuffs, • not compatible with the pump construction materials.
General recommendation for water	• Water in heating systems: according to VDI 2035-1 (German standard). • Water containing glycol: water/glycol mixture up to 50 %. • Water hardness: 0 to 21°f .
Liquid temperature	• Minimum: -10 °C. • Maximum: 95 °C (pumps with composite housings). 110 °C (pumps with cast iron or stainless steel housings).
Drinking water approvals (ACS, WRAS, DM 174)	Pumps with stainless steel housing are compliant.

Maximum operating pressure (PN)	1 MPa (10 bar).
Minimum inlet pressure/liquid temperature	0,005 MPa (0,05 bar) / 50 °C. 0,030 MPa (0,3 bar) / 95 °C. 0,100 MPa (1 bar) / 110 °C.
Flow estimation	Information available for PWM version only.
Maximum number of starts	3 starts per hour (in any case < 20 starts in the 24 h).
Anti-lock sequence	Continuously restarting every 5 seconds with increasing torque steps till maximum torque. If the rotor unlocks, the pump goes back to its normal operation. If the locked rotor condition persists, the anti-lock sequence is repeated as long as the pump is powered on. If the standby operating mode is selected during the anti-lock sequence, the sequence is reset and the pump goes to standby mode.
Dry run ability	Dry run operation allowed for 24 h.
Reaction time - power on	< 2,8 second.
Reaction time - standby	< 2,3 second.
Sound pressure level	≤ 43 dB(A)

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INSTALLATION

eco2 is designed for indoor installations.
The pump must be installed with the pump head in a horizontal position, in vertical as well as horizontal pipes. The arrow of the pump housing shows the flow direction through the pump. The pump head can be rotated so the display is in a convenient position. Pipes and valves must be correctly sized.

Do not insulate the motor housing, the electronics can overheat so that the pump automatically switch off.
To ensure adequate cooling of the pump head, position the circulator in such a way that sufficient cooling is ensured. Air temperature must not exceed +55°C.

The local regulations in force overrule specified requirements listed here below.

- The electrical leads are protected from high temperature, vibrations and collisions.
- Use cables according to rules with 3 leads (2 + earth/ground). All cables must be heat-resistant up to +85°C. Cables should be positioned so that they do not touch the motor housing or pipework.
- The current type and voltage of mains connection must correspond to the data plate on the pump.
- Always connect the external protection conductor to ground (earth) terminal before making other electrical connections. All electrical equipment must be ground (earth) connected. This applies to the pump unit and related equipment.
- The power supply line is provided with: a high-sensitivity differential switch (30 mA) (residual current device RCD) suitable for earth fault currents with DC or pulsating DC content (a Type B RCD is suggested).

CONTROL BOX POSITION