

ELCO-100

Electric Local Controller

Application

The ELCO-100 controller is designed for marine installations and other industrial applications - such as lubricating oil and cooling water installations, flow temperature control etc.

The universal analog input is user programmable, for either RTD temperature probes, thermocouples, or current/voltage signals.

The setpoint value, the actual value, and other parameters are displayed on the LED displays.

The device can be connected to a central control system using the RS485 serial interface (Modbus).

This enables remote control and reading of the setpoint value and process value as well as transmission of alarms to a central control and alarm system.

Instead of operating the device from the front, the user can also programme the controller using the setup program and USB interface; this requires no additional voltage supply for the controller.



Benefits

- Self-optimisation (autotuning) for exact PID control
- Large and clear display with all relevant information

Ordering

- Part number ELCO-100: **58-8958**

Features

- 96 × 96 mm format
- Continuous modulating and 2/3 point control
- Sensor monitoring
- Up to 5 outputs
- Manual/automatic mode
- Configurable limit value monitoring (alarms)
- Setpoint changeover
- Level inhibit and key lock
- RS485 interface (Modbus RTU)
- Ramp and timer function
- Push-in controller insert
- Setup interface (USB Mini-B)
- Marine type approval

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Functional description

Self-optimisation (autotuning)

Standard features include the tried and tested self-optimization (oscillation method), which makes it possible for the controller to be matched to the control loop by a user who is not a control technology expert.

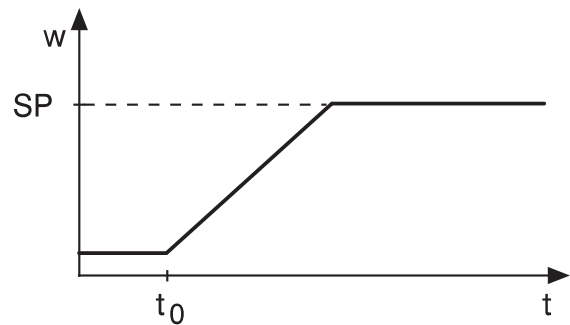
Here, the reaction of the control path to the specific variable changes is evaluated and the controller parameters proportional band, reset time, derivative time, cycle time, and filter time constant are calculated.

Ramp function

The ramp function is used for a constant change of setpoint value w up to the ramp limit value SP (entered setpoint value).

A rising or a falling edge arises depending on the actual value at the time of ramp start t_0 .

The slope is defined by a gradient which is entered during the controller configuration.



Limit value monitoring

The controller is equipped with two limit value monitoring functions, each with eight configurable alarm functions. Any analog signals can be selected as actual and setpoint value from a selector. When a limit value is exceeded, a signal can be displayed or an internal controller function initiated. With the limit value monitoring, extensive alarm and limit value functions can be implemented.

Timer

The timer is started manually or automatically (after power on, for example). When the timer expires, the timer output signal changes its state (configurable). The timer can be used to implement functions like time-limited control or setpoint changeover.

Setup program

The setup program provides the user with an easy and comfortable way to configure the controller using a PC.

The PC has to be connected to the controllers USB interface (Mini-B type) with a USB cable.

Thereby the controller is powered over the USB interface. As a result, no mains supply is required during the configuration.

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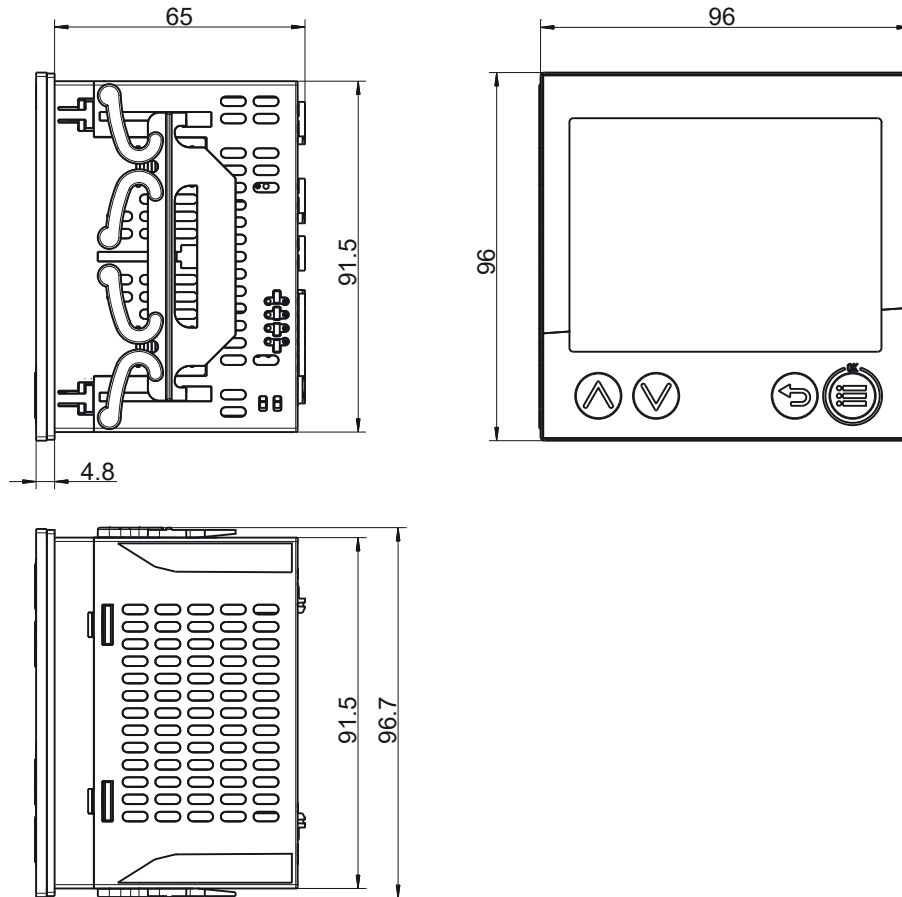
Technical data · ELCO-100 Controller

Power consumption:	Max. 6.6 W
Voltage Supply:	AC 110 to 240V, +10/-15 %, 48 to 63Hz
Measuring accuracy:	≤ 0.1 % of measuring range
Ambient temperature:	-10 °C to 55°C
Storage temperature:	-30°C to 70°C
Weight:	220 g
Protection class:	Acc. to DIN EN 60529, Front IP65/Rear IP20
Dimensions:	See drawing next page
Operating position:	Any position
Analog Input:	Thermocouple L,J,U,T,K,E,N,S,R,B,C,D,A1,L,K RTD Pt100/Pt1000/KTY Resistance / Potentiometer (0 to 4000Ω) 0(2) to 10V (500kΩ input resistance) 0(4) to 20mA (< 2.5V burden voltage)
Digital Input:	Potential-free contact
Analog Output:	0(2) to 10V (>500Ω load) 0(4) to 20 mA (<450Ω load)
Digital Outputs:	Relays (N/O contacts) [Max 3A at AC230V or DC30V, resistive load] Logic output 0/14V (Max output current 20mA)
RS485 interface:	Modbus RTU (Galvanic isolated)
Controller type:	Continuous modulating controller 2/3 point controller
Display:	Two 18-segment LCD display + Pixel matrix LCD for text Upper display: 25mm Color: White / Lower display: 12mm Color: Green
Electrical connection:	On the back via spring-cage terminals
Approval:	c UL us (UL 61010-1 (3. Ed.), CAN/CSA-22.2 No. 61010-1 (3. Ed.)) DNV GL (DNVGL-CG-0339)
Alarm:	Limit value in relation to setpoint value Fixed limit value



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Dimensions



Display and control elements

- 18-segment LCD display (e.g. actual value), 4-digit
- 18-segment LCD display (e.g. setpoint value), parameters, values and text); display "OK" when exiting editing mode (with change)
- Activity display for ramp function/program, timer, manual mode
- For type ELCO-100: pixel matrix LCD display for displaying menu items, parameters and values as well as customer-specific text
- Switching of the digital outputs (yellow = active)
- Up (in the menu: increase value, select previous menu item or parameter; in basic status: increase setpoint value)
- Down (in menu: reduce value, select next menu item or parameter; in basic status: reduce setpoint value)
- Back (in menu: back to previous menu level, exit editing mode without change; in basic status: configurable function)
- Menu/OK (call up main menu, switch to submenu/level, switch to editing mode, exit editing mode with **change**)



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Technical data

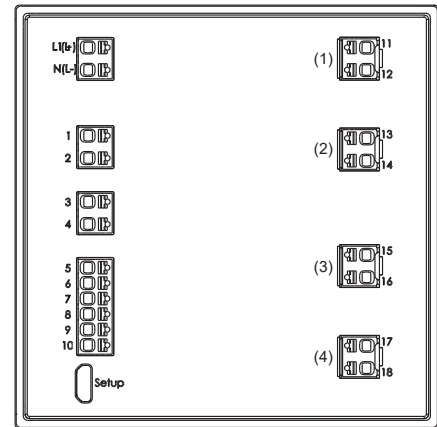
Connection diagram

The connection diagram in this Technote provides preliminary information about the connection possibilities.

For the electrical connection use the operating manual delivered with the product.

The knowledge and the correct technical execution of the safety information/ instructions contained in these documents are mandatory for installation, electrical connection, and startup as well as for safety during operation.

The terminal strips on the device rear are equipped with screw terminals. Please refer to the technical data for specifications concerning the conductor cross section.



Connection	Symbol	ELCO-100
Analogue input		
Thermocouple		6 7
RTD temperature probe, 2-wire		5 7
RTD temperature probe, 3-wire		5 6 7
Voltage DC 0(2) to 10 V (usable alternatively to binary input)		8 7
Current DC 0(4) to 20 mA		6 7
Binary input for potential-free contact (usable alternatively to analogue input DC 0 to 10 V)		9 10
	Output:	1 2 3 4 5
Analogue output DC 0 (2) to 10 V, DC 0(4) to 20 mA		13 14
Relay output (N/O contact) (max. 3 A at AC 230 V, resistive load)		1 3 2 4
Logic output (DC 0/14 V)		9 10
RS485 interface		11 12
Voltage supply		L1 (L+) N (L-)
Setup interface	USB socket, type Mini-B 5-pole	

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Application temperature sensor

Screw-in RTD temperature probe for marine applications.

Temperature Range from -50 to +400 °C

The RTD temperature probes for standard and marine applications is commonly used for measuring temperatures in liquids and gases in pipes and tanks.

Application areas:

- Ballast water management
- Water treatment systems
- Generators, motors, and compressors
- Heating and air-conditioning industry
- For nearly all applications on ships



Benefits

- Quick response times – a reduced probe tip allows response times of $t_{0.9} = 14$ s to be reached in water
- Increased safety – thanks to successful testing by Bureau Veritas
- Flexible and time-saving startup – due to availability of different standardized process connections

Features

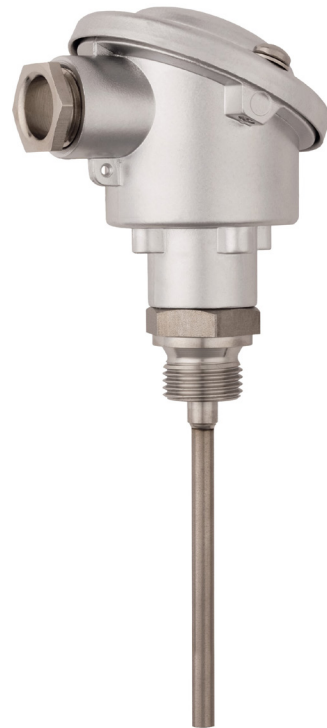
- The connection head is suitable for ambient temperatures up to 100 °C.
- Normally fitted with a Pt100 temperature sensor according to DIN EN 60751, Class B in 4-wire circuit connections.
- The intelligent design of the RTD temperature probe with a fixed measuring insert allows temperatures to be measured under standard conditions.
- Versions of class A or AA are also possible.
- Versions with a reduced probe tip are available for quicker response times.
- A transmitter can be integrated into the terminal head as an option.
- The RTD temperature probes are certified according to Bureau Veritas.

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Technical data · RTD temperature sensor

Terminal head	Form B DIN EN 50446, die-cast aluminum, M20 × 1.5
Seal	IP65
Measuring insert	Pt100 temperature sensor DIN EN 60751, cl. B, 4-wire circuit, permanently installed
Response times	$t_{0.5} = 5$ s, $t_{0.9} = 14$ s in water 0.4 m/s; $\varnothing 6$ mm
Transmitter Accessories	Programmable transmitter, output 4 to 20 mA or 20 to 4 mA
Operating temperature	-50°C to +400°C
Measuring insert	Protection pocket,
Tolerance class	Class B (Standard) Class A & AA (Optional)
Protection tube	Stainless steel 1.4571 (316Ti) in $\varnothing 6$ mm
Process connection	Screw connection G 1/2 B
Environmental influences	Admissible temperature at connection head -40°C to +100°C -40°C to +85°C (with transmitter)
Permissible torque moment:	130 Nm
Permissible flow velocities:	Air: 25 m/s Hot steam: 25 m/s Water: 3 m/s
Reaction times at liquid velocity = 0.4 m/sec:	$t_{1/2}$: 5 s $t_{9/10}$: 14 s (t = total temperature step)
Max. pressure:	165 bar
Max. temperature:	400 °C
Weight:	280 g



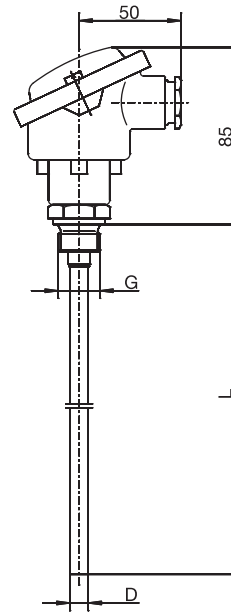
Approvals/approval marks

Approval mark	Testing agency	Certificate/certification number	Inspection basis	Valid for
BUREAU VERITAS	BUREAU VERITAS	47622/A0 BV	Rules for the Classification of Steel Ships Environmental Category, EC Code: 41	Basic type

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Dimensions

Fitting length L: See table below
Diameter probe D: ø6 mm
Connection thread G: G 1/2 B



Types and Operation Data

Type	Sensor type	Sensor length L [mm]
58-8961	PT100	50
58-8962		100
58-8963		150
58-8964		200
58-8965	4-20 mA	50
58-8966		100
58-8967		150
58-8968		200

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