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 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
- Can be used with both PT100 and any 4-20 mA sensor input

Cabinet solutions

- Ready to install cabinets available with additional benefits:
- Power distribution to sensors and actuators in cabinets
- 24V transformer inside cabinet for transmitter readings
- Minimum external wiring
- Standalone control system for valve control
- Available with 1, 2 or 3 controllers per cabinet.

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.

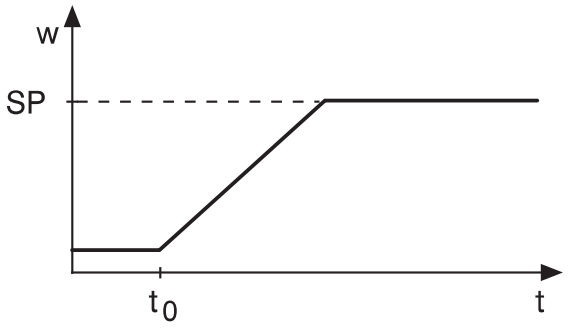
Here, the reaction of the control path to the specific variable changes is evaluated and the controller parameters proportional band, reset time, derivative time, cycle time, and filter time constant are calculated.

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 t0.

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 froma 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.

Setup

For easy setup, please see the ELCO-100 Quick Guide

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Technical data · ELCO-100 Controller

Part number 58-8958 (Without cabinet)

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:	Continous 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
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
Electrical connection:	On the back via spring-cage terminals (Push-in technology)
Conductor cross section	
Wire or stranded wire: (without ferrule)	Min. 0.2 mm^2, max 1.5 mm^2
Stranded wire with ferrule:	Without plastic collar: Min. 0.2 mm^2, max 1.5 mm^2 With plastic collar: Min. 0.2 mm^2, max 0.75 mm^2
Stripping length:	8 mm

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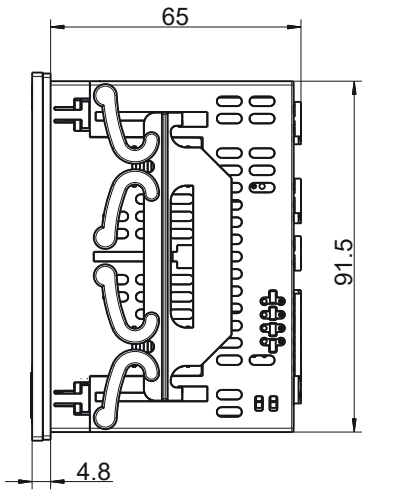
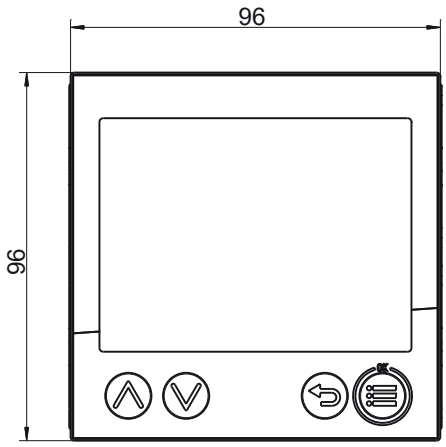
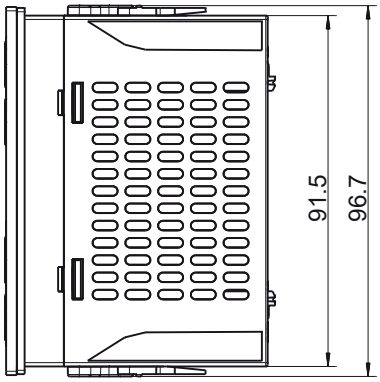
Dimensions

Part number 58-8958

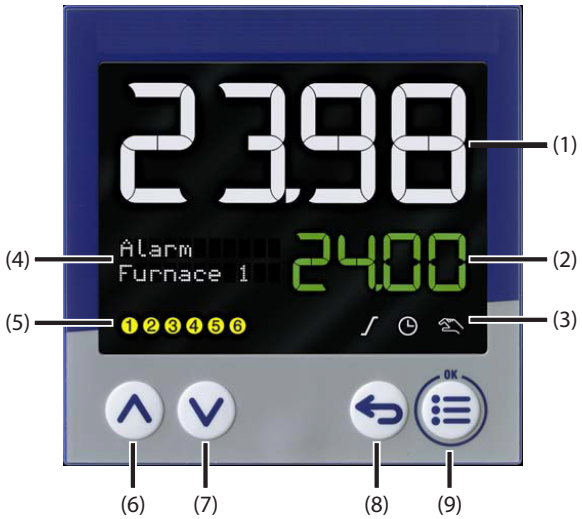






Display and control elements

1. 18-segment LCD display (e.g. actual value), 4-digit
2. 18-segment LCD display (e.g. setpoint value), parameters, values and text); display "OK" when exiting editing mode (with change)
3. Activity display for ramp function/program, timer, manual mode
4. For type ELCO-100: pixel matrix LCD display for displaying menu items, parameters and values as well as customer-specific text
5. Switching of the digital outputs (yellow = active)
6. Up (in the menu: increase value, select previous menu item or parameter; in basic status: increase setpoint value)
7. Down (in menu: reduce value, select next menu item or parameter; in basic status: reduce setpoint value)
8. Back (in menu: back to previous menu level, exit editing mode without change; in basic status: configurable function)
9. Menu/OK (call up main menu, switch to submenu/level, switch to editing mode, exit editing mode with **change)**



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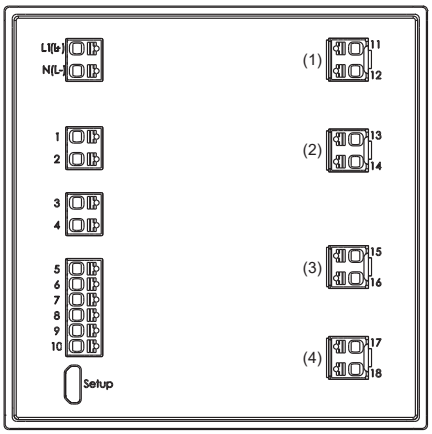
Technical data



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
Analog input		
Thermocouple	+ –	6 7
RTD temperature probe, 2-wire	ϑ	5 7
RTD temperature probe, 3-wire	ϑ	5 6 7
Voltage DC 0(2) to 10 V (usable alternatively to binary input)	+ U_X -	8 7
Current DC 0(4) to 20 mA	+ I_X -	6 7
Binary input for potential-free contact (usable alternatively to analog input DC 0 to10 V)		9 10
	Output:	1 2 3 4 5
Analog output DC 0 (2) to 10 V, DC 0(4) to 20 mA	+ U_X, I_X -	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)	+ U_X -	9 10
RS485 interface	+ RxD/TxD -	11 12
Voltage supply	AC	L1 (L+) N (L-)
Setup interface	USB socket, type Mini-B 5-pole	

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ELCO-100 Controller Cabinets

The cabinets are premounted with Frese ELCO-100 controllers for smooth installation on site.

Power supply (100-240 VAC) needs to connected to the cabinet where from power supply is distributed to valve actuator and sensors, enabling one cabinet to take care of the whole valve and sensor control loop as a standalone unit. The unit can still communite with external systems via Modbus.

A build-in 24V transformer enables power supply for 4-20 mA sensor input and has the required terminals for sensor input and valve control signal and feedback signal.

The standalone configuration reduced the amount of cabling from central control systems and enables a local valve control station, where only external power supply is required for a fully functional valve control.

Technical data

Standard:	EN61439-2
Rated operational voltages [Ue]:	110 - 240 VAC
Rated frequency [fn]:	50...60 Hz
Rated current [Ina]:	1A
Short circuit withstand strength [Ikmax]:	50kA at 220...240 VAC
Short circuit protective device: (SCPD)	Fuse before panel max. 6 A charactisic B or max. 2 A charactisic C
Degree of protection:	IP65
Protection against indirect contact in the switchboard:	Before the switchboard
Protection against indirect contact external:	Automaticlly switch of the supply (With SCPD)
Service conditions:	-10...+55 ºC
System earth:	IT

Controller Cabinets Compliance

The panel comply with the following directives and harmonized standards:

EC-directives:

Machinery directive:	2006/42/ef
Low voltage directive:	2014/35/eu
EMC directive:	2014/30/eu

Harmonized standards :

Low voltage switch gear and control gear part 1. General rules:	DS/EN IEC 61439-1:2021
Low voltage switch gear and control gear part 1 : power switch gear and control assemblies:	DS/EN IEC 61439-2:2021
Safety of machinery – electrical equipment of machines part 1. General requirements:	DS/EN 60204-1:2018

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Controller Cabinet Use

- The product is intended to cooperate in machinery or complete with others machine parts for insert into machines covered by machine directive.

Therefore is stated prohibition of use before the plant, where the product must be incorporated, has been declared in accordance with all relevant provisions as a whole.

Controller Cabinets Electric Connections

	58-8972	**58-8974**		**58-8976**		
	Controller 1	Controller 1	Controller 2	Controller 1	Controller 2	Controller 3
L1	10F1-2	10F1-2		10F1-2		
L2/N	10F1-4	10F1-4		10F1-4		
Earth	PE BAR	PE BAR		PE BAR		
Valve Supply (+)	100X2 - 1	100X2 - 1	110X2 - 1	100X2 - 1	110X2 - 1	120X2 - 1
Valve Supply (-)	100X2 - 2	100X2 - 2	110X2 - 2	100X2 - 2	110X2 - 2	120X2 -2
Valve Direction 1	100X2 - 3	100X2 - 3	110X2 - 3	100X2 - 3	110X2 - 3	120X2 - 3
Valve Direction 2	100X2 - 4	100X2 - 4	110X2 - 4	100X2 - 4	110X2 - 4	120X2 - 4
Valve Analog Out (+)	100X3 - 1	100X3 - 1	110X3 - 1	100X3 - 1	110X3 - 1	120X3 - 1
Valve Analog Out (-)	100X3 - 2	100X3 - 2	110X3 - 2	100X3 - 2	110X3 - 2	120X3 - 2
24VDC (FUSED MAX 0.5A)	100X5 - 1	100X5 - 1	110X5 - 1	100X5 - 1	110X5 - 1	120X5 - 1
RTD100	100X5 - 2	100X5 - 2	110X5 - 2	100X5 - 2	110X5 - 2	120X5 - 2
Input	100X5 - 3	100X5 - 3	110X5 - 3	100X5 - 3	110X5 - 3	120X5 - 3
Ref	100X5 - 4	100X5 - 4	110X5 - 4	100X5 - 4	110X5 - 4	120X5 - 4
0VDC	100X5 - 5	100X5 - 5	110X5 - 5	100X5 - 5	110X5 - 5	120X5 - 5
DI +	100X6 - 1	100X6 - 1	110X6 - 1	100X6 - 1	110X6 - 1	120X6 - 1
DE2	100X6 - 2	100X6 - 2	110X6 - 2	100X6 - 2	110X6 - 2	120X6 - 2
Modbus RTU (A+)	30X1 - 1	30X1 - 1		30X1 - 1		
Modbus RTU (B-)	30X1 - 2	30X1 - 2		30X1 - 2		

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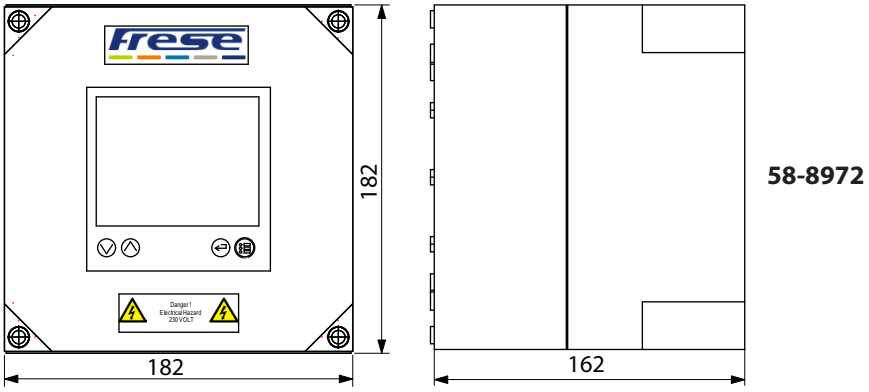
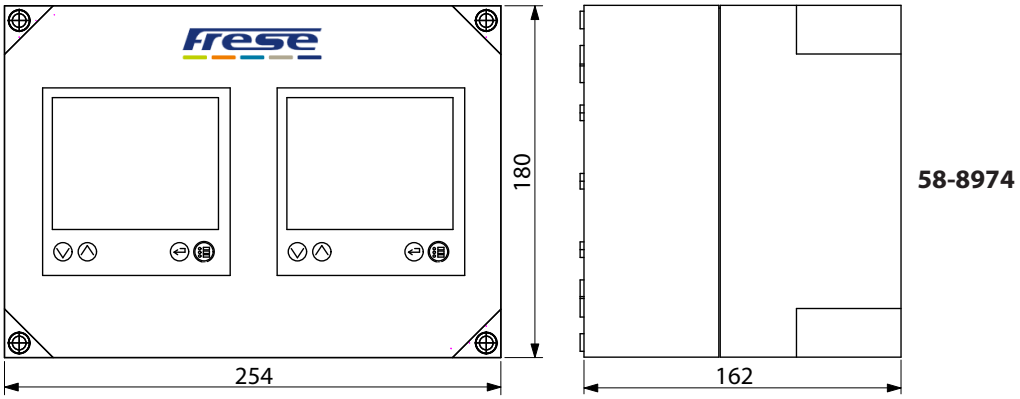
Product Programme Controller Cabinets

Frese no.	Number of ELCO controllers
58-8958	1 (Without cabinet)
58-8972	1
58-8974	2
58-8976	3

Dimensions



58-8972



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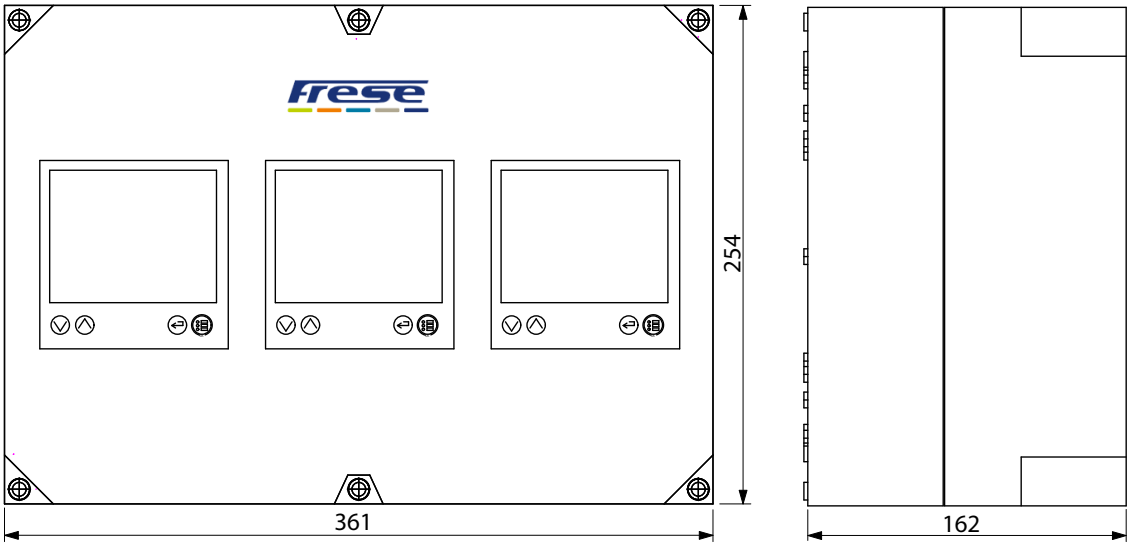

58-8976

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