

LUNA

Indoor Environment Control Equipment
Digital control system for waterborne climate systems



LUNA Indoor Environment Control System

- ▶ For sequential control of cooling and/or heating.
- ▶ Complete system that is easily adapted to changing needs.
- ▶ Flexible controller that can be reconfigured according to needs.
- ▶ Extended unit life cycle
- ▶ Up to 8 actuator pairs can be connected to a single controller.

Application

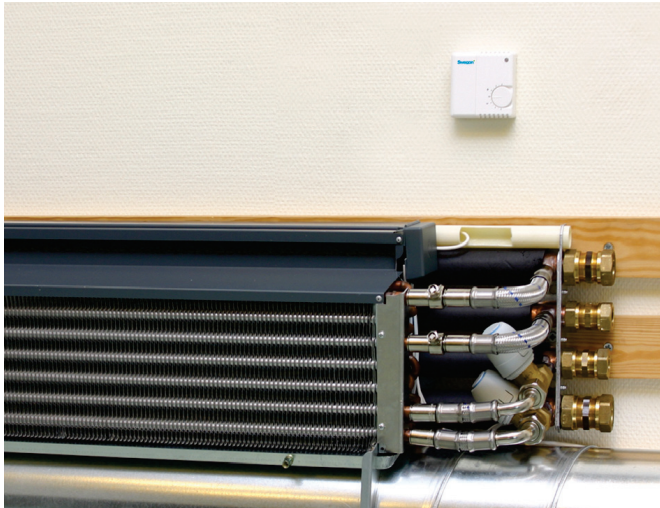
For indoor climate systems with water-based cooling and heating (or electric heating) in new construction and refurbishment projects.

LUNA for flexible indoor environment control

LUNA includes: Digital controller, thermoelectric actuators, valves, prefabricated cables, connection card, transformer and accessories.

Controller function: PI (adjustable via remote configuration unit)

Supply voltage: 24 V AC/DC



LUNA Advantages

- Sequential control of cooling and heating with PI function. Jumpers to set controller outputs – can be switched between PWM (Pulse Wave Modulation) and 0-10 V function.
- Regularly exercising the valves prevents the valve spindles from jamming which is likely to occur if cooling or heating is not required during a longer period.
- The controller's digital processor is easily reconfigured with a remote configuration unit. This provides great flexibility for changing functions and parameters during or at any time after installation.
- With new technology, heat generated in the controller is kept to a minimum, which provides more accurate control and an extended component life cycle.
- Condensation sensor connects directly to the controller without the need for an external junction box.
- A number of condensation sensors can be connected in parallel to the controller, which is advantageous in larger premises with several critical areas at risk from high humidity.
- Up to 8 actuator pairs (8 cooling + 8 heating) can be connected to a single controller.
- The actuators are equipped with a "first open" function that involves allowing the valves to remain open until voltage is supplied.
- The system uses prominent operation indicators. The controller displays the current operating status using LEDs and the operating status of the actuators is shown mechanically via visible cylinder bodies.

Functions

- PI function to ensure an even room temperature
- Regularly exercising the valves prevents them from clogging
- Digital functionality provides reliable operation and long lifetime
- Condensation sensor connection directly into controller
- Input for remote temperature sensor
- Programmable via plug in remote configuration unit

Functionality

Sequential control of cooling and heating. If the room temperature is more than 0.5°C above the set target value, the cooling actuators open the cooling valves. If the room temperature falls more than 0.5°C below the target value, the heating actuators open the heating valves. The controller regulates the environment in accordance with the PI function. The I component senses both the size and duration of the environmental deviations and adjusts the actuator opening times accordingly. This type of regulation is called pulse width modulation (PWM). Compared, for example, with ON/OFF regulation, PWM regulation provides a more stable room temperature with increased comfort as a result.

The controller's standard setting range is 16°C to 28°C, although the remote configuration unit can be used to set the range within the interval 0°C to 31.9°C.

The valves are exercised once a day. On these occasions, all the valves wired to the controller are fully opened for 3 minutes. The actuator is a normally-closed model but is equipped with the so-called "first open" function. This means that the valves are open on delivery, but close 6 minutes after voltage has been supplied. This facilitates pressure testing the water system and purging it of air.

The controller has two inputs, which by default are used for a remote temperature sensor and a condensation sensor respectively. Using the remote configuration unit to connect to the controller, or in some cases by using the jumpers, the inputs (and outputs) can be reconfigured to other functions, such as motion detectors or circuit-breaking window sensors.

LUNA for electric heating

The LUNA can also be used as a room controller if the climate units are equipped with electric heating elements. A cable is then, as in normal cases, wired from the cooling output signal connection on the LUNA to the actuator of the cooling water valve. The controller's heating output signal must be reconfigured for pulse-width modulation and must be wired to a Triac unit, which in turn will control the electric heating elements of the climate unit.

For particulars on how to reconfigure the heating output signal to enable it to control the power controller, see the Wiring Directions.

Installation

Installation by means of prefabricated cables with connector and connection card is a simple task (Figure 1). Some installations require long cable runs where prefabricated cables are not long enough. In such cases, the installer can of course use cables of his own (Figure 2). In the installation between the LUNA and a climate unit with electric heating, the control cable used between the LUNA and the power controller for the heating elements is 2 metres long (Figure 3).

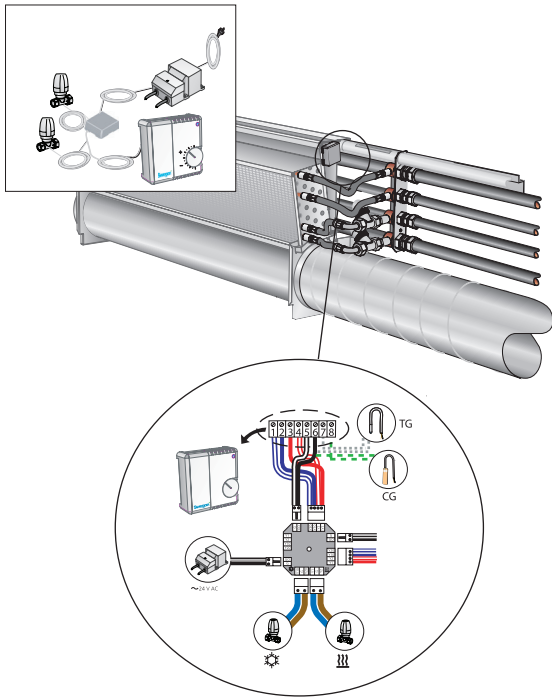


Figure 1. Serial assembly with connection card and prefabricated cables.

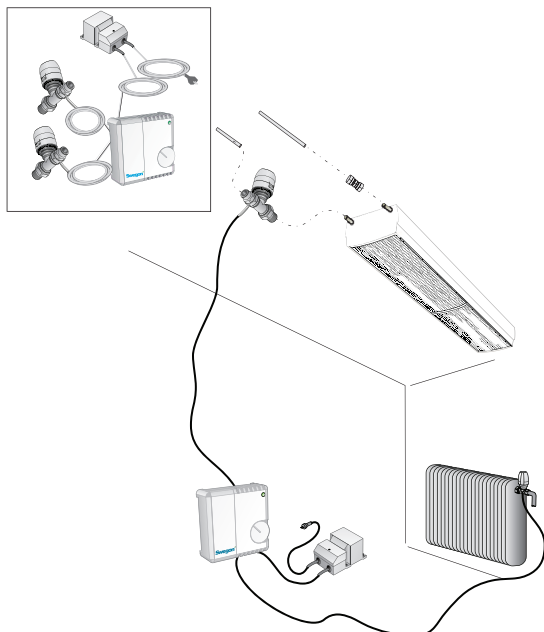


Figure 2. Connection to screw terminal block in the controller.

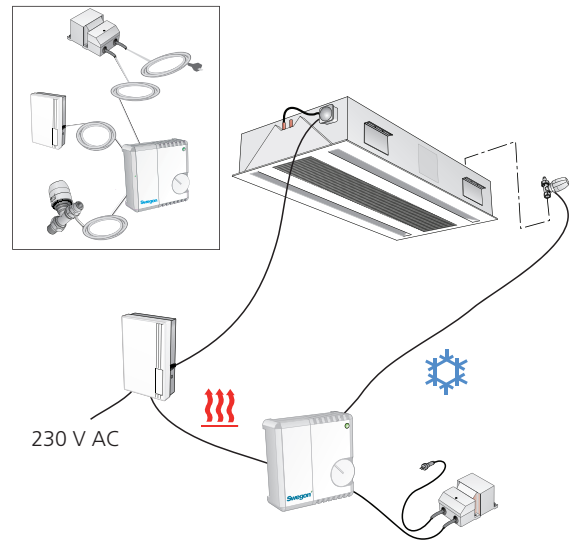


Figure 3. Connection to the screw terminal for electric heating

LUNA RE Room controller

Designation:	LUNA RE-1: Model with fitted cable for connection to LUNA KK connection card. LUNA RE-S: Model with screw terminal blocks.
Temperature:	Ambient temperature for storage: 0°C to +70°C Operating temperature: +5°C to +40°C
Markings:	Swegon logo on casing. Particulars of the part number, name of the part and a simple wiring diagram are provided under the detachable cover. Item number on card.
Encapsulation:	White Polylac – ABS plastic.
Dimensions:	77 x 77 x 27 mm
Protection class:	IP 20
Supply voltage:	24 V AC/DC \pm 10%.
Controller outputs:	24 V (cooling and heating). Max.2A
Output signal function:	Cooling: NC Heating: NC (can be set to NO with function button)
	IMPORTANT! A maximum of 8 actuators may be energized at the same time, that is: in applications where normally open actuators are used, only a total of 8 actuators are permitted to be wired (for example 4 in the heating circuit + 4 in the cooling circuit)
Inputs:	Remote temperature sensor and condensation sensor.
Connection block:	All outputs use screw terminal blocks. RE-1 with factory-fitted cable.
Cables:	Prefabricated. If other cables are used, 0.5 mm ² , stranded cable is recommended.
Power rating:	1 VA
Controller function:	PI (can be switched between PWM and 0-10 V)
P-band, cooling steps:	1 K
P-band, heating steps:	1,5 K
Neutral zone:	1 K
I time:	20 minutes
Valve exercising:	Once per 24-hour period (fully open for 3 minutes) Important! For electric heating: Shut off the exercising function for the heating output.
Temperature sensor:	Thermistor NTC 10K / 25°C.
Setting range:	16 - 28°C. Temperature setting midpoint 22°C
Operating status:	Light-emitting diode Cooling: lit, blue indication Neutral: diode not lit Heating: lit, red indication Condensation alarm: flashing blue indication (if cooling is required)
Mounting:	On wall or standard 70 mm electrical bracket. Not in direct sunlight.
Trunking:	Trunking must have a minimum diameter of 12 mm in order to run connecting cables to the controller.

The product is CE labelled and S labelled and meets the EU provisions for electromagnetic compatibility (EMC).

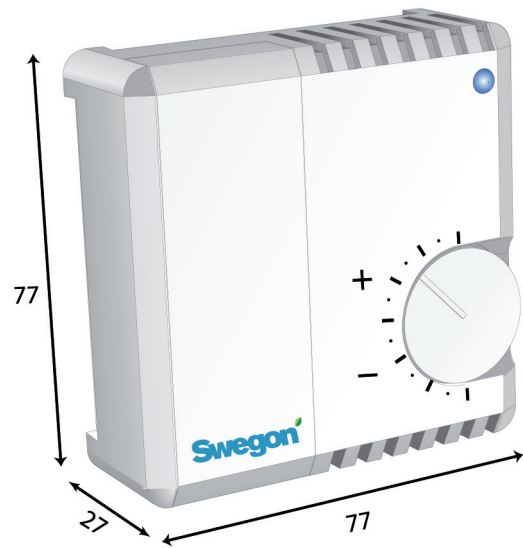


Figure 4. LUNA RE-1/ LUNA RE-S room controller



Figure 5. LUNA T-CU remote configuration unit

With the LUNA T-CU remote configuration unit you can easily reconfigure the controller's default factory settings. The adjustable parameters include:

- Target range
- Setting range
- Neutral zone
- Controller function
- P-band (cooling and heating)
- Output signal function

The functionality of the inputs can also be altered. By default, these are used for a remote temperature sensor and a condensation sensor. More particulars of the input functions are available in a separate manual available at www.swegon.com.

When a remote temperature sensor is connected to the controller, it automatically overrides the built-in temperature sensor. Using the remote configuration unit to carry out simple reprogramming, you can instruct the controller to regulate according to the average of the internal and remote temperature sensor readings. This can be especially advantageous in a larger room where temperature differences can arise.

For more information about configuration, contact Swegon.

LUNA AT Valve actuator

Designation:	LUNA AT-1 (including connector) LUNA AT-2 (pins on cable ends)
Temperature:	Ambient temperature for storage: -25 to +60°C Operating temperature, air temperature: 0 to 60°C Operating temperature, energy carrier: 10 to 100°C
Markings:	Swegon logo on casing
Casing:	Polyamide – grey plastic
Supply voltage:	24 V AC/DC, +10%, 0-60 Hz
Functionality:	NC, two-point, thermoelectric
Cable:	Fixed two-wire cable, L= 1.0 m, 0.75 mm ²
Power rating, start-up:	6 VA for a maximum of 2 minutes
Power rating, operation:	1.8 VA
Opening/Closing time:	About 3 minutes
Protection class:	IP 54
Actuator power:	100 N +5%
Stroke:	4 mm
Weight:	100 g
Connection:	As standard, a VA-80 adapter is included which fits thread size M30 x 1.5 mm.
Mounting:	Horizontal or vertical

This product CE-marked and fulfils EU requirements on EMC.

“First open” function

On delivery, the actuator is equipped with a “first open” function. This means that the valves are open on delivery, but close 6 minutes after voltage has been supplied. This facilitates pressure testing the water system and purging it of air. The actuator's “first open” function is automatically deactivated 6 minutes after it has been energized. You will hear a clicking sound, after which the actuator will be switched over to the normally-closed position and the normal control function will begin.



Figure 6. LUNA AT

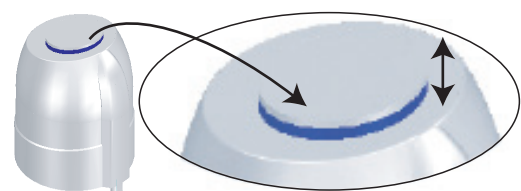


Figure 7. LUNA AT position indicator

The actuator's cylindrical position indicator clearly shows the current operating mode – see Figure 6. When the indicator is recessed and level with the casing, the actuator is in the closed position. When the indicator is raised above the casing, the actuator is in the open position.

SYST VD CLC Valve

The SYST VD CLC (straight) valves fit the system's LUNA AT actuator together with the LUNA VA-80 adapter.

- Dimensions: See table 1
- K_v values: See table 2
- Max. working pressure: 1000 kPa
- Max. pressure drop over open valve: 20 kPa
- Max. pressure drop over closed valve: 150 kPa
- Maximum flow line temperature: 110 °C
- Maximum glycol concentration in water system: 40%

Table 1. VD CLC valve dimensions

	DN	A	B	C	D	E	F
VD115	1/2"	61	33	46.5	24.5	35	M30 x 1,5
VD120	3/4"	65	40	46.5	24.5	35	M30 x 1,5

Tabulka 2. Hodnoty k_v pro ventil VD CLC

DN (inches)	Type	k_v -value preset	k_v -value (m ³ /h) Adjustable range
Straight 2-way valves (VD)			
1/2"	VD115CLC	1.90	0.25..1.90
3/4"	VD120CLC	2.60	0.25..2.60

Table 3. Presetting VD CLC valve k_v values

Setting:	1	2	3	4	5	6	7	0
VD115CLC	0.25	0.65	0.88	1.12	1.30	1.46	1.57	1.90
VD120CLC	0.25	0.60	0.91	1.18	1.43	1.64	1.85	2.60
Flow tol. ±2	60	30	20	10	10	10	10	10
Settings < 5 are not recommended due to increased tolerances								

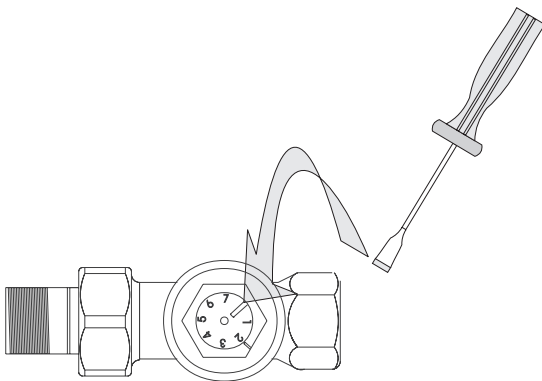


Figure 8. Presetting the k_v value.

1. Turn the screw clockwise until it is well seated.
2. Turn the screw anticlockwise to 0.
3. Turn the screw anticlockwise to the desired preset figure.

Preset values, see table 3.

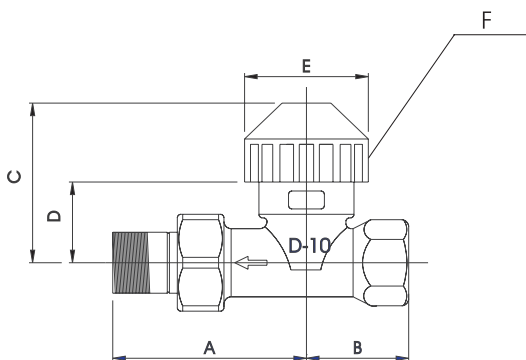


Figure 9. SYST VD CLC valve

LUNA KK Connection card

Connection card for connecting actuators, transformer and slave units to the LUNA RE-1 controller. All connections made with quick connectors and prefabricated cables.

Designation: LUNA KK

Dimensions: See Figure 10

Protection class: IP 20

Markings: The casing shows actuator (heating and cooling), voltage and control signal connections.

The connection card is fitted with two actuator outputs. One for cooling and one for heating. The voltage from the transformer can be connected to any two-wire port marked "power". Slave cables for supplying voltages to additional units are connected to any available two-wire port marked "power". The control signal from the controller can be connected to any available four-wire port marked "signal". Slave cables for control signals to additional units are connected to any available four-wire port marked "signal". The connection card has pin connectors. Prefabricated cables are connected to the connection card with female connectors.

See the figure under CONNECTION INSTRUCTIONS.

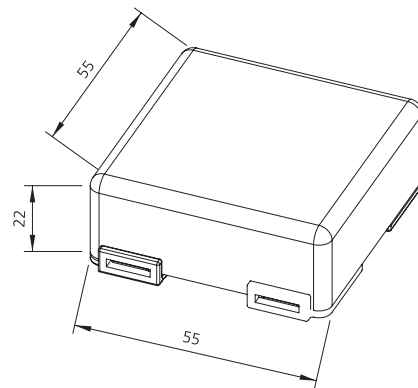


Figure 10. LUNA KK connection card

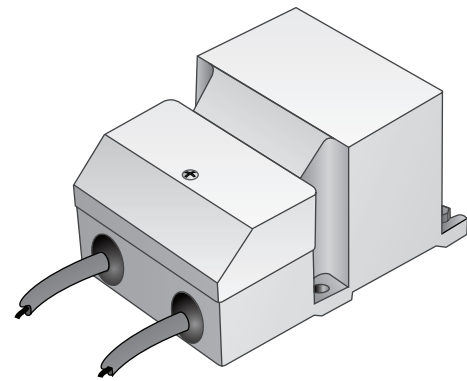


Figure 11. LUNA TS transformer

LUNA TS TRANSFORMER

Double-insulated protective transformer

Designation: LUNA TS

Encapsulation: Fully moulded. Plastic casing.

Protection class: IP 44

Primary side: 230 V AC, 50-60 Hz. Connection via wall plug (SE).

Secondary side: 24 V AC. T1,6 A, secondary fuse. Connecting cable, length = 1 m, with 2 branches, quick connector 2L for connecting to connection card.

Mounting: Mounting holes on outside of casing or fitted with bracket to wall rack in perimeter wall system.

This product CE-marked and fulfils EU requirements on EMC and LVD.

LUNA KL Cables

LUNA KL-A operating voltage cable

Prefabricated 2-wire cable $\text{Ø}0.35 \text{ mm}^2$ with quick connectors for connecting operating voltage between connection cards. This cable comes in three standard lengths: 1900, 3200 and 4200 mm.

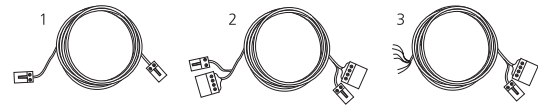


Figure 12. LUNA KL cables

1=LUNA KL-A
2=LUNA KL-B
3=LUNA KL-C

LUNA KL-B slave control cable

Prefabricated 6-wire cable $\text{Ø}0.35 \text{ mm}^2$ with quick connectors for slave control. This cable carries both the control signal and the operating voltage between cards. This cable comes in standard lengths: 1900, 3200 and 4200 mm.

LUNA KL-C controller cable

Prefabricated 6-wire cable $\text{Ø}0.35 \text{ mm}^2$ with pins on cable ends for connecting to the controller's screw terminal block and quick connectors for connecting to connection cards. This cable comes in standard lengths: 1500 and 3000 mm.

Cable length for Primo perimeter wall system

Calculate the required cable length between two units by measuring from end to end between the units and adding 600 mm. Select the closest longer standard length. See Figure 13.

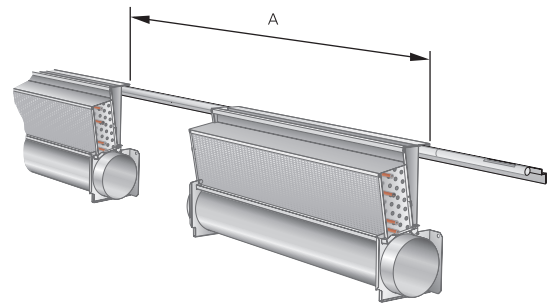


Figure 13. Cable length for perimeter wall system
A=Length (end to end)

Selection – maximum cable length

By using prefabricated cables up to 8 actuator pairs can be connected to a single regulator. The entire assembly can then be driven by a SYST TS transformer. The transformer can be connected to any terminal card in the circuit. If cables other than the prefabricated type are used, the cable rating must comply with the relevant regulations for low-voltage installations.

Accessories

LUNA T-TG remote temperature sensor

External temperature sensor, length 2500 mm.

Designation: LUNA T-TG-2

Temperature: Ambient temperature 0 to 50°C

Sensor element: Thermistor

Resistance: 10 kW at 25°C

Cable: 2 x 0.25 mm² length: 2500 mm

SYST CG condensation sensor

Condensation sensor, cable length 1500 mm.

Designation: SYST CG

Sensor element: Copper element

Dimensions: 30 x 15 x 0.4 mm (sensor element)

Fastening: Adhesive tape and cable ties.

Recommended location: On the chilled water supply flow pipe where it is in contact with the room air.

Cable: 2 x 0.25 mm² length: 1500 mm

LUNA T-VA adapters for valves from other manufacturers

The LUNA T-VA-80 adapter is supplied as standard with every LUNA AT actuator. This adapter fits SYST VD CLC valve types as well as other manufacturers.

Material: Plastic

Designation: LUNA T-VA-32 / Tour & Andersson

LUNA T-VA-39 / Oventrop

LUNA T-VA-50 / Honeywell, Reich, MNG, Böhnisch (H), Cazzaniga

LUNA T-VA-54 / MMA

LUNA T-VA-59 / Danfoss RAV/L

LUNA T-VA-72 / Danfoss RAV

LUNA T-VA-78 / Danfoss RA

LUNA T-VA-80 / Siemens and others

TR Triac unit

Triac unit for controlling electric heating.

Material: Plastic

Control input: 24 V ss.

Control output: 230 V AC, max 16 A

Degree of protection: IP 20

Dimensions: 150 x 94 x 41 mm

Cable: 2-wire cable for connection to LUNA controller, L = 2 m

LUNA T-KT connector

If needed, extra connectors are available.

Designation: LUNA T-KT-2L-1 / for power cable

LUNA T-KT-2L-2 / for actuator

LUNA T.KT-4-L / for slave cable

Motion detector

If reconfigured the controller can work with motion detectors. KSO type motion detectors are perfect for this purpose. See separate documentation.

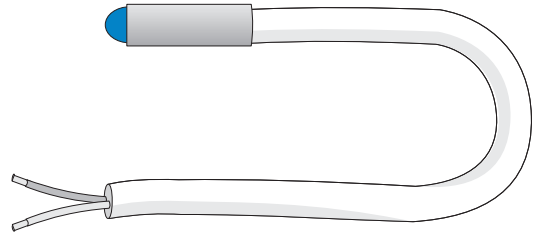


Figure 14. LUNA-T-TG

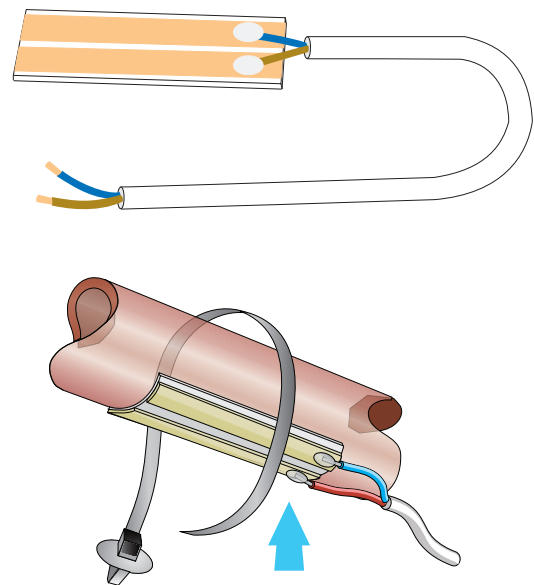


Figure 15. SYST CG



Figure 16. TR Triac unit

Connection instructions

LUNA is a complete control system for waterborne cooling and heating. The complete packaged system is ideal for perimeter wall units, installations with ceiling units, individual components should be selected in order to achieve the correct cable lengths to suit the installation. Figure 18 shows a wiring diagram wherein the entire LUNA system is used. In this case, the LUNA RE-1 controller is normally used and is provided fitted with a cable with quick connectors for connecting to the LUNA KK connection card. In cases where prefabricated cables are not used, the LUNA RE-S controller is available and other cables can be directly connected to the terminal blocks (Figure 17).

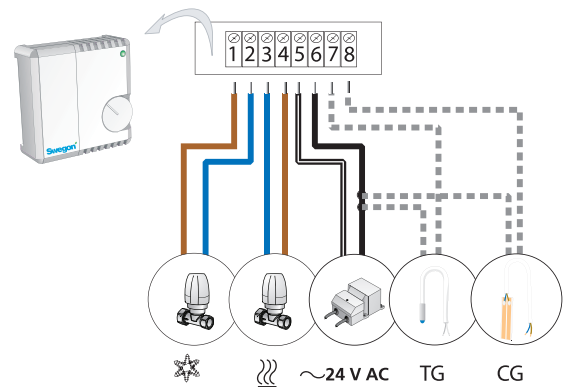


Figure 17. Connection to screw terminal block in LUNA RE-S controller

Table 4. Inputs/Outputs

Controller terminal block	Connection card	Function	Cable colour
1	Y20	Output signal, cooling actuator	Brown
2	G	System potential	Blue
3	G	System potential	Blue
4	Y2	Output signal, heating actuator	Brown
5	G	System potential input	Black/White
6	G0	System ground	Black
7	Y1	Input remote temp. sensor	*
8	Y10	Input condensation sensor	*

*= the LUNA TG and LUNA CG are fitted with one brown and one white cable. In terms of functionality, it does not matter which is connected to the system ground and function input respectively.

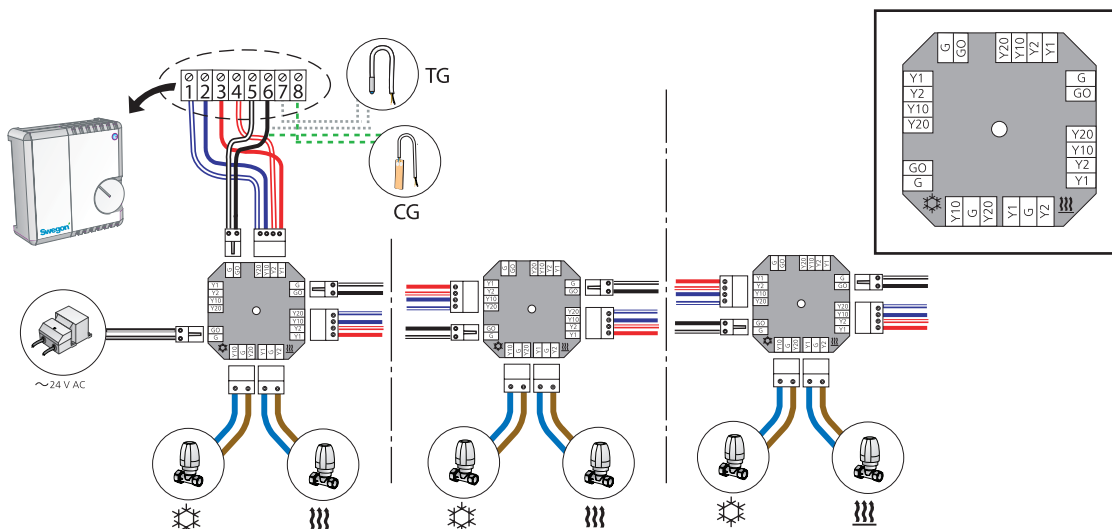


Figure 18. Several LUNA KK cards connected in series with a LUNA RE-1

Sensor limitations

Remote temperature sensor: One per controller

Maximum cable length: 15 m

Condensation sensor: 8 per controller

Maximum cable length: 15 m

To relocate the jumper for electric heating

If climate units with electric heating are to be controlled from the LUNA, wire the leads from the Triac unit to the heating output signal connection on the LUNA as illustrated in Figure 19. The heating output signal must also be reconfigured from 24 V DC to 0-10 V DC. Reconfigure as follows:

1. Disconnect the power supply to the regulator.
2. Fasten an approved earthing bracelet, connected to earthed object, around your wrist.
3. Unscrew the cover of the controller.
4. Move the jumper on the jumper strip as shown in Figure 20.
5. Connect the LUNA T-CU hand-held unit to the controller and proceed to Menu 4 OUTPUT*.
6. Select OUTPUT no. A2 and set the following settings:
Type = 0-10 V
MOT = 0

* For more information about how to use the hand-held unit, see separate manual at our website: www.swegon.com.

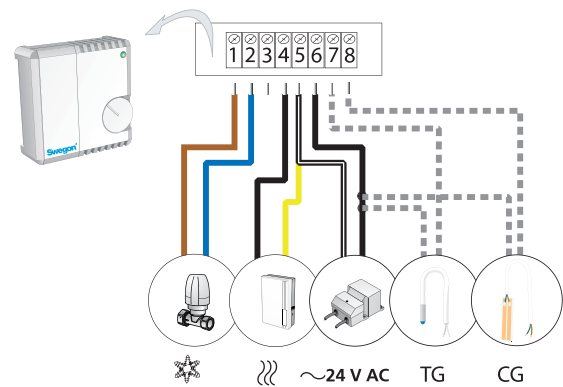


Figure 19. Connection to the screw terminal in the LUNA RE-S controller for electric heating

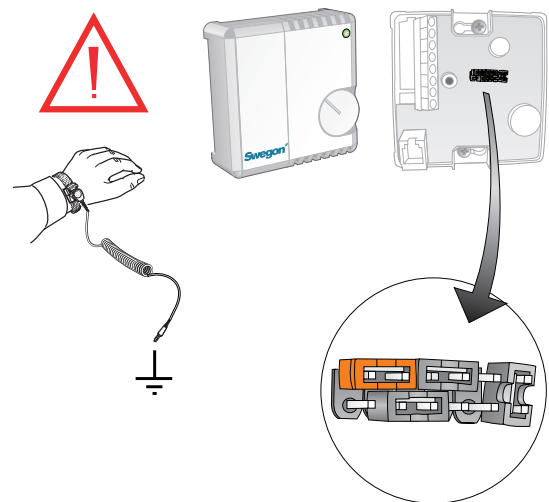


Figure 20. To reconnect the jumper of the controller for electric heating

SPECIFICATION

Product

Controller	LUNA	c	RE-	a
Version:				
Model:				
1 = With factory-fitted controller cable.				
S = Screw terminal block				

Valve actuator	LUNA	a	AT-	a
Version:				
Model:				
1 = With quick connector				
2 = With pins on cable ends				

Valve	SYST	VD	aaa-	CLC
Model:				
VD = straight				
Size:				
115 and 120				

Connection card	LUNA	c	KK
Version:			

Transformer	LUNA c TS - 2	trafo 24V 60VA
with bracket (perimeter wall system)		

Cables			
Operating voltage (2-wire)	LUNA	a	KL-A-aaaa
Version:			
Length:			
1900, 3200 and 4200 mm			
Slave cable (6-wire)	LUNA	a	KL-B-aaaa
Version:			
Length:			
1900, 3200 and 4200 mm			
Controller cable (6-wire)	LUNA	a	KL-C-aaaa
Version:			
Length:			
1500 and 3000 mm			

Accessories

External temperature sensor	LUNA	a	T-	TG-	2
Version:					
Model:					
2 = bare wire cable ends					

Condensation sensor	SYST	CG			
bare wire cable ends					

Remote control	LUNA	b	T-	CU	
Version:					

Connector, 2-wire	LUNA	a	T-	KT-	2L-	a
Version:						
Model:						
1 = for power cable						
2 = for actuator						

Connector, 4-wire	LUNA	a	T-	KT-	4L	
Version:						

Adapter, actuator / valve	LUNA	a	T-	VA-	aa	
Version:						
For valve type:						
32 = Tour & Andersson						
39 = Oventrop						
50 = Honeywell, Reich, MNG, Böhnisch (H), Cazzaniga						
54 = MMA						
59 = Danfoss RAV/L						
72 = Danfoss RAV						
78 = Danfoss RA						
80 = Siemens and others						

Triac unit for electric heating				TR		
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Descriptive texts

Examples of descriptive texts in accordance with Swedish standard VVS AMA.

Swegon digital control equipment for waterborne climate systems, LUNA, with the following functions:

- Adapted to indoor environment control
- Reprogrammable digital controller
- Individual temperature regulation
- Current operating status indication
- Selectable regulation function PWM or 0-10 V.
- Control heating and cooling sequentially
- Automatic valve conditioning
- Electrothermic actuators, dual-mode (on / off) with mode clearly indicated
- "First open" function for simplified top-ups and pressure testing of the water system
- Controller with built-in condensation sensor function
- Input for remote temperature sensor

Delivery:

- Ceiling units, climate beams, radiators and cooling/heating ceiling.
- Valves delivered to RE for mounting in the system.
- Room controller delivered to EE, SE or other contractor to be fitted to the unit connector.
- All electrical wiring installed by EE or SE, who also provide unit connectors, connection terminals and cables.

Perimeter wall units:

- Room controller delivered to EE, SE or other contractor to be fitted to the unit connector.
- All electrical wiring installed by EE or SE or other contractor and fitted to the unit connector.
- EE provides an earthed power outlet for every transformer and a mounted unit connector for every room controller.

Accessories

- Condensation sensor SYST CG, XX qty
- Remote temperature sensor LUNA T-TG-2, XX qty
- Adapter, actuator / valve LUNA T-VA-aa, XX qty
- Remote configuration unit LUNA T-CU, XX qty
- Connector 2-wire LUNA T-KT-2L-a, XX qty
- Connector 4-wire LUNA T-KT-4L, XX qty

Ceiling units, chilled beams, radiators and cooling/heating panels:

- Controller LUNA RE-S, XX qty
- Valve SYST VD aaa-CLC, XX qty
- Valve actuator LUNA AT-2, XX qty
- Transformer LUNAc TS-2 trafo 24V 60VA, XX qty
- Triac unit, TR, XX

Perimeter wall units:

- Controller LUNA RE-1, XX qty
- Transformer LUNAc TS-2 trafo 24V 60VA, XX qty
- Prefabricated cables LUNA KL-a-bbbb, XX qty

Numbers specified separately or provided with reference to plans.