



Description

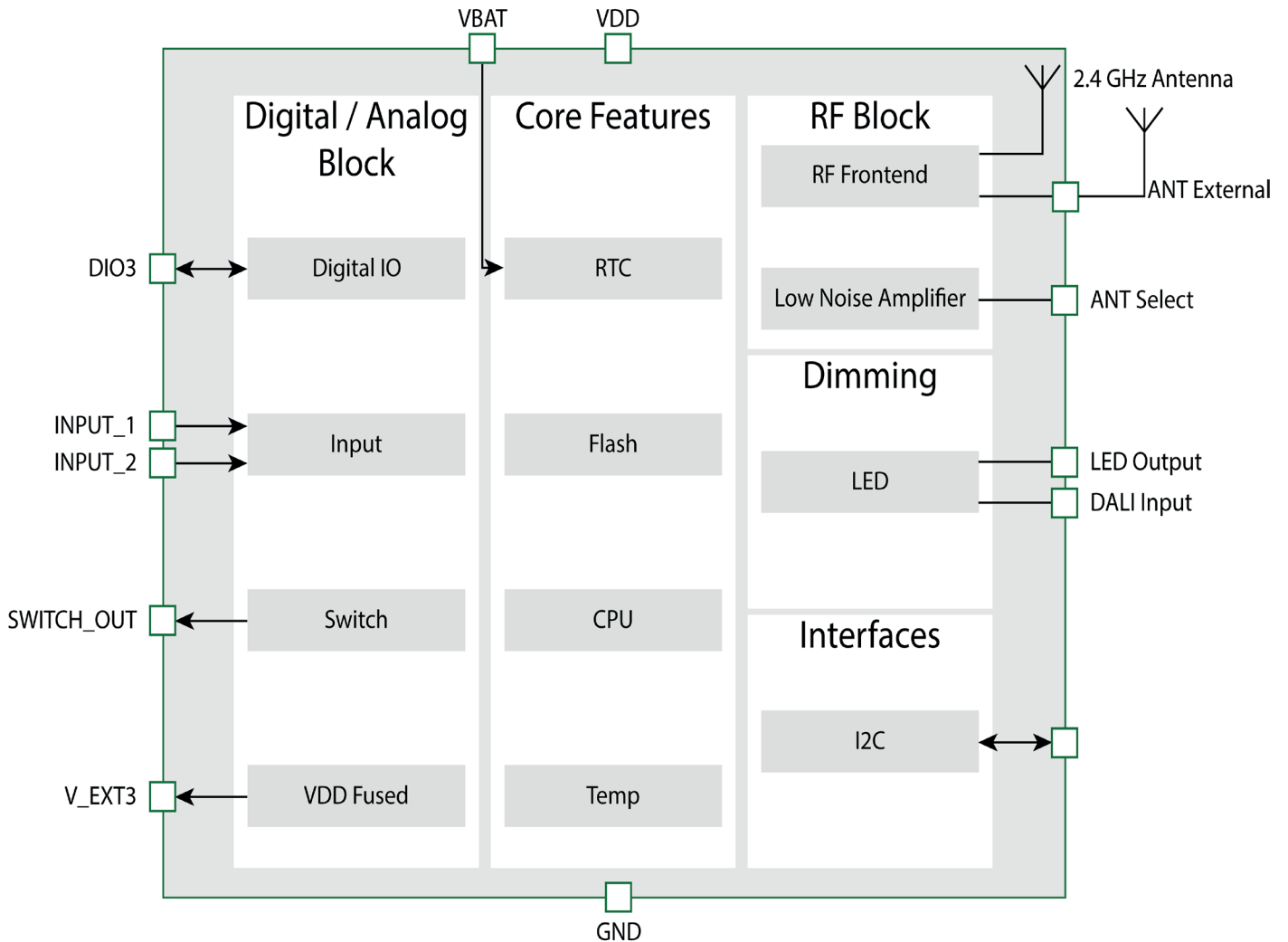
The SLC-Core103 and its integrated antenna make your luminaire or sensor intelligent within a very short development time. It can be easily assembled on your PCB and can be expanded and combined as required with your hardware.

Thanks to its integrated antennas and the antenna amplifier, no additional antenna is required.

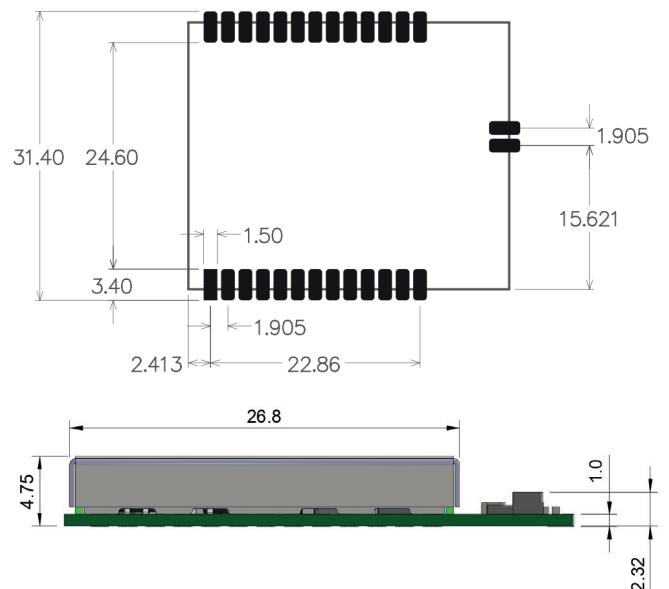
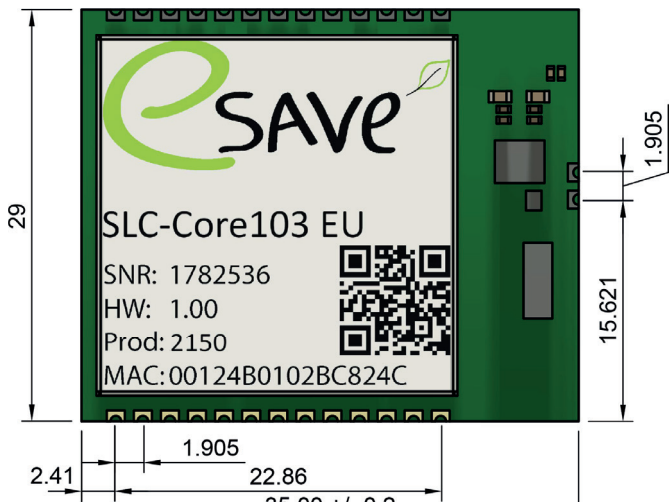
Features

- Fully configurable dim profiles by time, week-days and/or sensor inputs
- Automatically organizing wireless mesh network
- AES encrypted wireless communication
- Wirelessly configurable and updateable
- Automatic adjustment of daylight and standard saving time
- Synchronization (date/time master)
- Automatic wireless distribution of date/time
- Support for most used industry standard dimming interface types (Analog 0-10V; PWM; DALI and DALI-2)
- Optional support for motion sensors, radar, twilight sensor and LED temperature
- Integrated temperature sensor
- Energy usage determination
- Configurable distribution of twilight sensor value and motion detection value
- Support for active monitoring and protection of LED temperature
- Configurable LED luminous flux compensation over lifetime (LFC)
- Custom sensors and extensions possible
- Easy to use software for on-site configuration and controlling
- Optional integration into a web based management and control application with on-site gateway devices

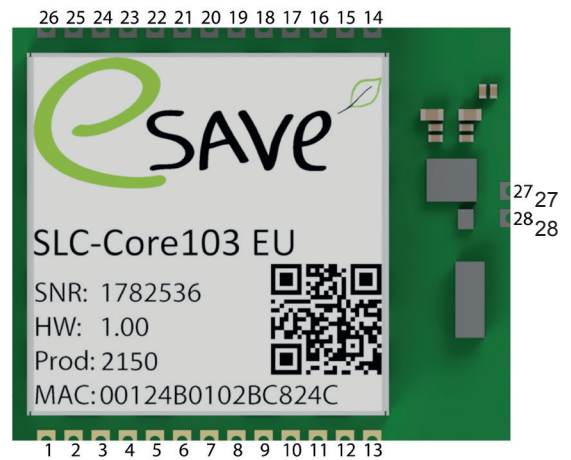
Hardware block diagram



Dimensions



Connection Diagram



Interface Pin	Name	I/O	Description
1	GND		Ground
2	VBAT	I	This is a power-supply pin for RTC Optional connect a large-capacity capacitor or an external battery
3	RESET	O	Reset output for external Modules like GPS
4 & 5			Don't connect this pin
6	DALI_In	I	DALI Input signal
7			Don't connect this pin
8	LED_OUTPUT	O	LED Module Output PWM, Analog (with low-pass filter), DALI (with hardware extension)
9			Don't connect this pin
10	SWITCH_OUT	O	Extension Switch output
11	INPUT_2	I	Input Signal 2
12	V_EXT3	O	Extension power supply (+3.2V)
13	VDD		Power Supply Pin (+3.2V)
14	GND		Ground
15	VDD		Power Supply Pin (3.2V)
16	I2C SDA	I/O	I2C data (SLC-Core103 is I2C master with integrated pull-up resistors)
17	I2C SCL	I/O	I2C clock (SLC-Core103 is I2C master with integrated pull-up resistors)
18 & 19			Reserved (don't connect this pin, or high impedance)
20 & 21			Don't connect this pin
22	INPUT_1	I	Input Signal 1 / Motion sensor signal input
23	DIO3	I/O	Digital Input / Output 3
24			Don't connect this pin
25	ANT_SELECT	I	Antenna Select (Low = using external Antenna / High or NC = using internal Antenna)
26	GND		Ground
27	ANT		Antenna feed for ecterna antenna (line must have 50Ω Impedance)
28	GND		Ground

Sensor and Extension

The SLC-Core103 modules can optionally be equipped with motion, brightness or other sensors. The following pins are used for the different sensors.

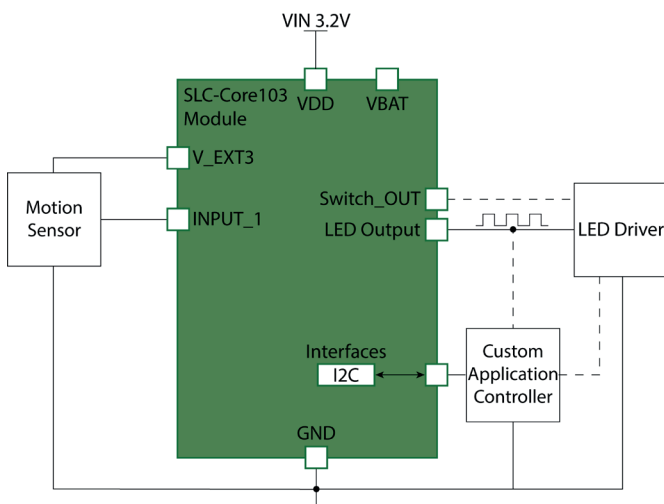
For reliable operation, please use only sensors supplied or approved by esave ag.

Motion Detector

- Pin 22 = Motion detector Signal (INPUT_1)
- Pin 14 = Ground (GND)
- Pin 12 = +3.2V (V_EXT3)

The Pin 22 (INPUT_1 signal) and Pin 7 (BRIGHT signal) are fully protected against ESD up to 20kV and short circuit. It can be connected directly to the sensor.

Typical Application



Extension Switch Output

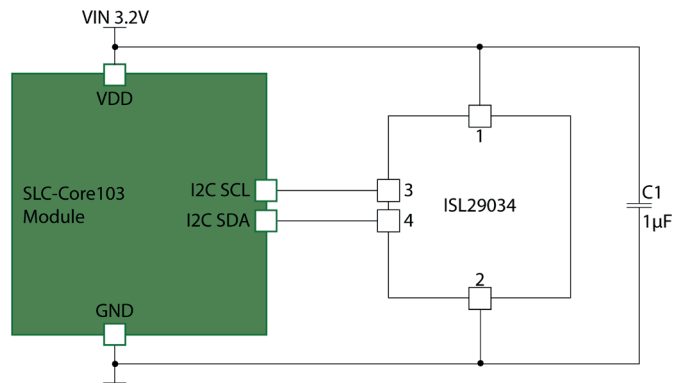
The esave SLC-Core103 offer an optional switch output to drive (electronic) relays or similar. The functionality can be configured in software. A typical application is to completely turn off the LED power supply mains with a relays while the street light is in standby mode (e.g. during the day)

Use to following digital output pin in combination with an external MOSFET or transistor to drive the load:

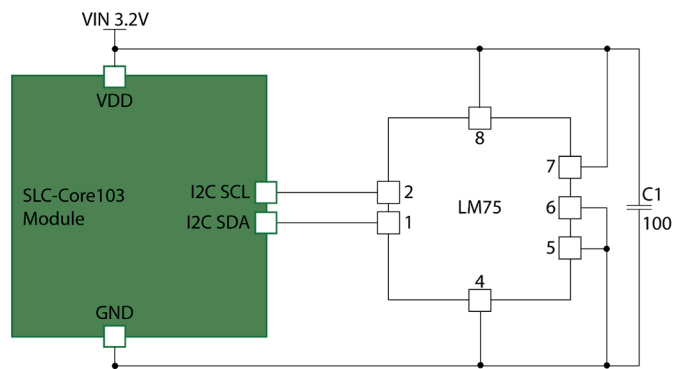
- Pin 10 = External switch output pin (SWITCH_OUT)

Please ensure that the rated output current of pin 10 is not exceeded (max. 2mA)

Ambient Brightness



LED Temperature Sensor



A digital temperature sensor can be connected to the I2C bus. It is important to set the device address to 0x49h. In this case the SLC-Core103 will detect the sensor automatically. The I2C lines are pulled up inside of the SLC-Core103, in this case it is not necessary to do this again.

Maximum ratings

Parameter	Sym	Min	Max	Unit
Supply Voltage	V_{DD}	-0.3	3.9	V
Operating temp.	T_O	-40	+85	°C
Storage temp.	T_S	-40	+125	°C
Motion sensor input voltage (Pin 22)	V_{mot}	-0.2	3.4	V
Brightness (Twilight) sensor input voltage (Pin 7)	V_{bright}	-0.2	3.4	V
3.2V Power supply output current (Pin 12)	I_{ext3}		35	mA
Digital output pins: Source and sink current	I_{DO}		2	mA

Operating characteristics

Parameter	Sym	Min	Typ	Max	Unit
Supply voltage range	V_{DD}	3.0	3.2	3.6	
Power usage			110		mW
LED output voltage *1 $I_{out} = 2 \text{ mA}$ Output mode: $V_{out} = \text{PWM} / \text{Analog}$ Min, Max Values @ $V_{DD} 3.2V$	$V_{out \text{ Low}}$	0.0	0.01	0.1	V
	$V_{out \text{ High}}$	2.9	3.0	3.1	
PCB temperature range	$T_{PCB R}$	-40		+125	°C
PCB temperature accuracy	$T_{PCB A}$		+0.5		°C

Extension / Sensor connector operation characteristics

Parameter	Pin #	Sym	Min	Typ	Max	Unit
Extension power output voltage 3.2V	12	V_{ext3}	2.7	2.9	V_{DD}	V
Motion detector inactive high signal	22	$V_{mot H}$	2.5		V_{DD}	V
Motion detector active low signal	22	$V_{mot L}$	-0.2		0.5	V

Wireless characteristics

Parameter	Sym	Min	Typ	Max	Unit
RF frequency range (center frequency)	f_w	2.420		2.480	GHz
RF nominal output power			+10		dBm
Receiver sensitivity			-97	-92	dBm
Antenna impedance on MCX connector			50		Ohm

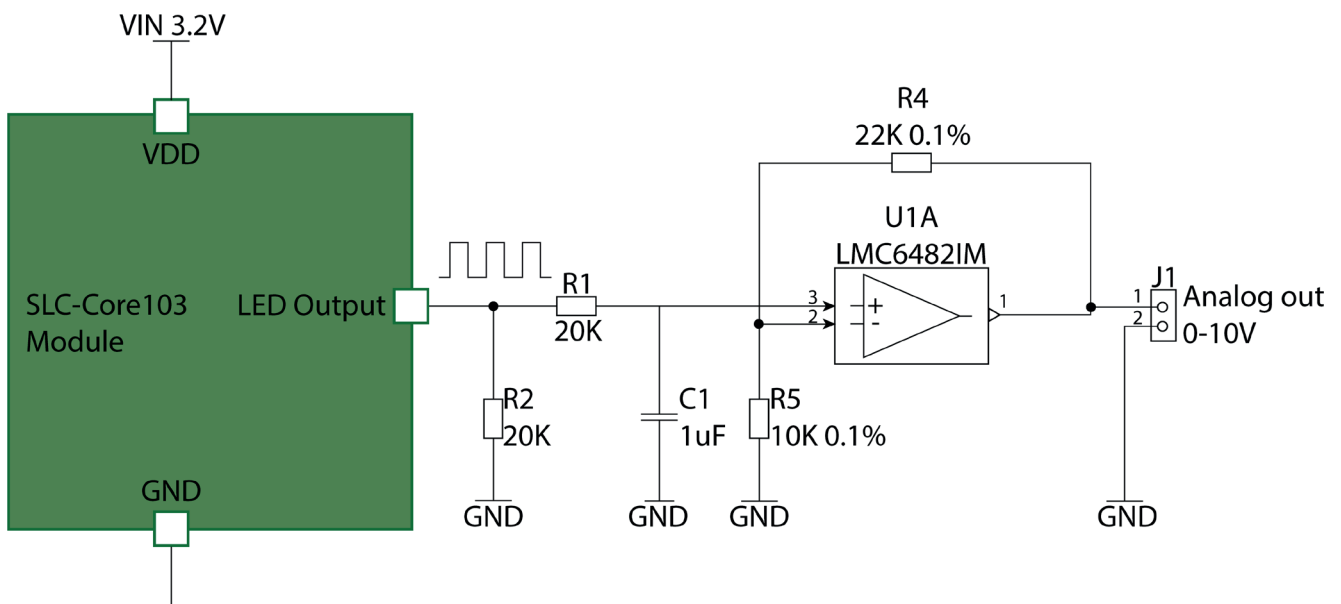
LED Output

The LED Output pin, provide a PWM signal. The PWM frequency and high/low operation can be configured by the SL-Configurator or by the Factory Configurator. The following options are available:

Description	LED on level 100%	PWM Frequency	Output type
PWM for analog signal 0 - 3V	3 V	1300 Hz	Analog
PWM for analog signal 3 - 0V	0 V	1300 Hz	Analog inverted
PWM high active	3 V	500 Hz	PWM inverted
PWM low active	0 V	500 Hz	PWM

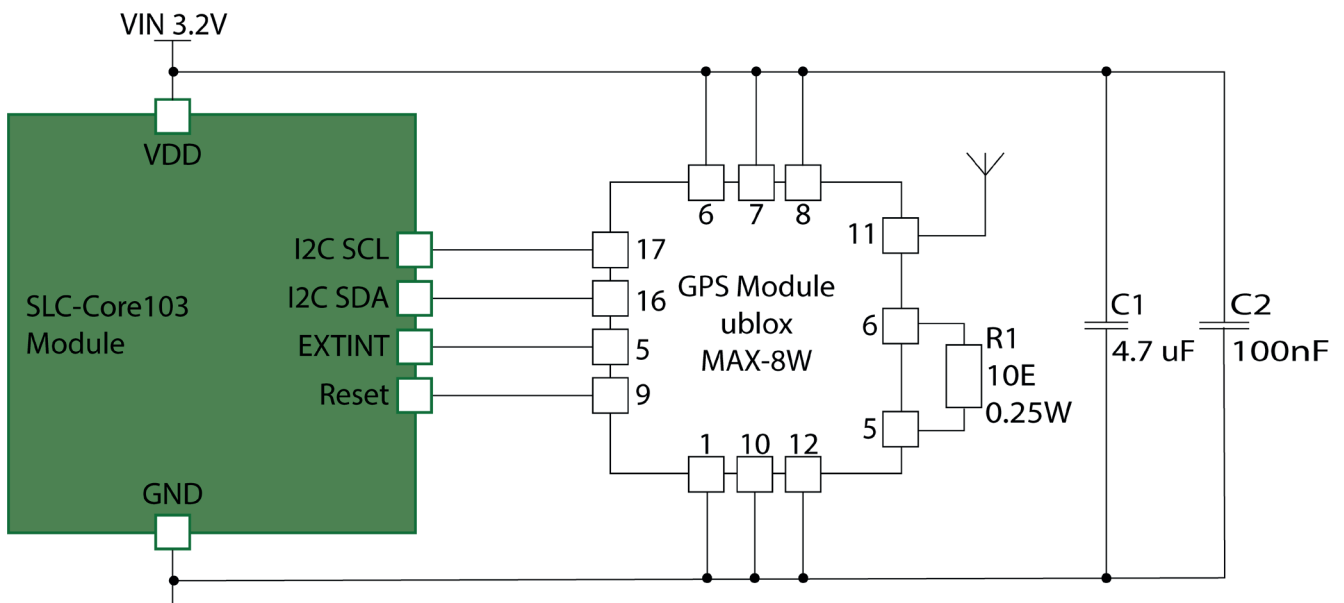
Application Note Analog output mode 0 - 10 V

For a standard analog output 0 - 10 V dim interface, you will need an additional amplifier circuit.



External GPS Module

It is possible to connect a ublox GPS Module MAX-7W or a MAX-M8W directly to the SLC-Core103. The SLC-Core103 will detect the GPS-Module automatically if it is connected like the above application note. If a GPS-Module connected, the SLC-Core103 synchronizes the time and determines the light Module position automatically.

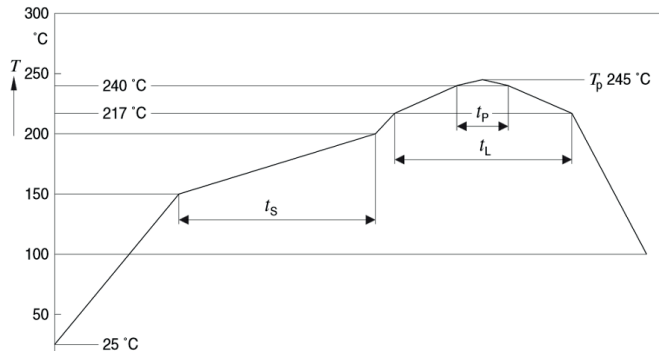


Moisture Sensitivity Levels

The Moisture Sensitive Level (MSL) relates to the packaging and handling precautions required. SLC-Core103 modules are rated at MSL level 5a.

For MSL standard see IPC/JEDEC J-STD-020, which can be downloaded from www.jedec.org.

Reflow Soldering Profil



Profile Feature

Parameter	Sym	Min	Typ	Max	Unit
Ramp-up rate to preheat* 25°C to 150°C			2	3	K/s
Time t_s T_{Smin} to T_{Smax}	t_s	60	100	120	s
Ramp-up rate to peak* T_{Smax} to T_P			2	3	K/s
Liquidus temperature	T_L		217		°C
Time above liquidus temperature	t_L		80	100	s
Peak temperature	T_P		245	260	°C
Time within 5°C of the specified peak temperature $T_P - 5K$	t_P	10	20	30	s
Ramp-down rate* T_P to 100°C			3	6	K/s
Time 25°C to T_P				480	s

All temperatures refer to the center of the Module, measured on the top

*slope calculation DT/Dt : Dt max. 5s, fulfillment for the whole T-range

Approvals

Category	Declaration / Certificates
CE conformity	CE compliant
Electromagnetic compatibility (EMC / ERM)	<ul style="list-style-type: none"> EN 300 328 V2.1.1 : 2016 EN 301 489-1 V1.9.2 : 2011 EN 301 489-17 V2.2.1 : 2012 EN 61000-6-2:2005
Safety	<ul style="list-style-type: none"> EN 60950-1 : 2006

Packaging information

The SLC-Core103 will be delivered in an ESD tray with 24 units or a multiple of 24 units.
A deposit of CHF 1.- or EUR 1.- will be charged. If the ESD trays are sent back, these will be refunded.

