SIEMENS

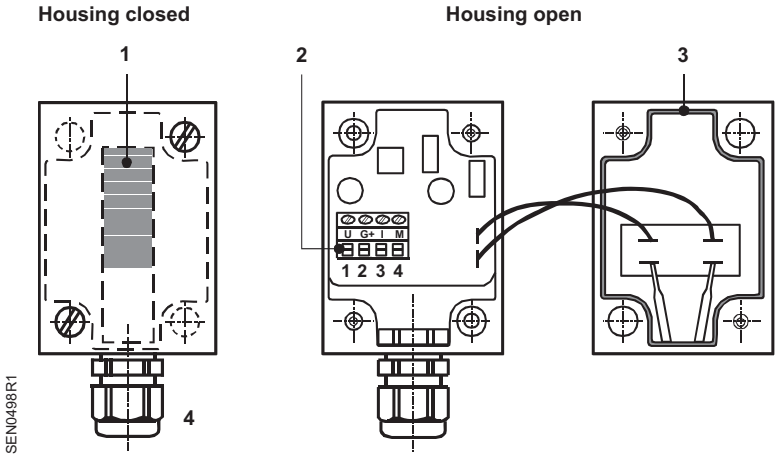
Technical Instructions
Document No. 155-706
April 30, 2010

QLS60

Solar Impact Sensor

Description	• Sensor for acquiring the impact of solar radiation • Output signal 0 to 10 Vdc • Two-wire current output 4 to 20 mA
Use	The solar impact sensor is used as a reference sensor in heating, ventilation and air conditioning facilities where compensation of solar radiation is required. Solar compensation is necessary where buildings or building sections with large window areas are subjected to strong solar radiation, especially in installations where thermostatic radiator valves cannot be used.
Equipment Combinations	This sensor can be used in connection with all types of systems and devices capable of acquiring and handling the sensor's 4 to 20 mA or 0 to 10 Vdc output signal.
Product Number	QLS60
Technical Design	To determine the impact of solar radiation, the sensor uses a solar cell which acquires the level of radiation. That cell generates an electrical current depending on the extent of radiation, which is then evaluated by the sensor. As a result, the sensor delivers an output signal of 4 to 20 mA or 0 to 10 Vdc, which is proportional to the solar radiation range.
Mechanical Design	The solar impact sensor is designed for wall mounting. The cable must be inserted from the bottom. The sensor consists of a plastic housing with a transparent cover, an NPT connector for 3/8" flexible conduit, and a Pg 9 cable entry gland. The solar cell is located in the cover; the sensor electronics with the connection terminals are inside the housing. The cover is secured to the housing with two screws and can be removed. A rubber seal is used between housing and cover to ensure degree of protection IP 65. The measured values from the photocell to the sensor electronics are transmitted via a two-wire connection.

Mechanical Design (Continued)



1 Solar cell
2 Connection terminals
3 Rubber seal
4 Sealing gland

Engineering Notes

The correct mounting location of the sensor is decisive for achieving the desired effect. It must be determined by the planning engineer. The information given in *Mounting and Installation Notes* must be observed.

Power supply line and measuring line must be run together.

The voltage output can be used only if the current output is not required. Mixed operation is not possible. The measuring voltage is calculated as follows:

$$U = E \bullet \frac{10\,V}{1000\,W\,/\,m^2}$$

where: E = solar radiation in W/m2

When using the current output, the voltage output cannot be used. The electronic circuit receives its power from the current supply. For that, the current measuring voltage must lie in the range of 15 to 30 Vdc. The measuring current is calculated as follows:

$$I = 4\,mA + E \bullet \frac{16\,mA}{1000\,W\,/\,m^2}$$

where E = solar radiation in W/m2

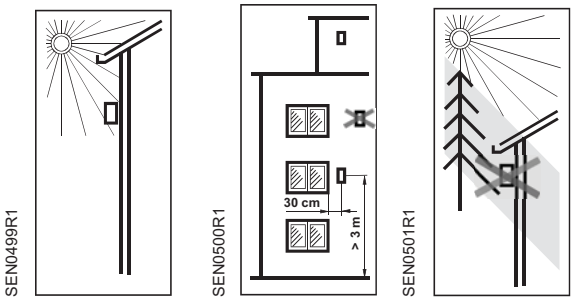
Mounting and Installation Notes

When deciding on the mounting location, it should first be determined for which part of the building (heating zone) the sensor shall acquire the solar radiation. It must be located on the wall having the windows of the rooms that are affected by solar radiation.

This is, in general:

- The wall of the heating zone with the window area which receives the largest part of solar radiation for the longest period of time
- As high as possible, but at least 9.8 feet (3 m) above the ground
- Easily accessible (to facilitate checking), approximately 11.8 inches (30 cm) beside a window.

Mounting and Installation Notes (Continued)



NOTE: Do not mount in the shade of trees, houses, telephone poles, and so on. Do not paint over the sensor.

The solar impact sensor is supplied complete with Installation Instructions.

Commissioning Notes

When commissioning the installation, the wiring must be checked. No settings can be made on the sensor itself.

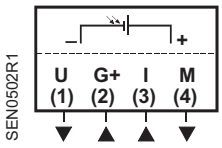
Specifications

Power Supply (G+, M)	Rated voltage range	24 Vac ± 20% SELV) or 24 Vdc (18 to 30V)
	Rated frequency at 24 Vac	50/60Hz
	Rated power consumption	Max. 2.5 VA (1 W)
Range of use	Measuring range	0 to 1000 W/m^2
Functional data	Time constant t_{63}	≤ 2 seconds
Measured value outputs (U, I)	Voltage signal output (U) Current signal output (I) Permissible cable lengths with copper cable: 18 AWG 16 AWG 12 AWG	0 to 10 Vdc ≙ 0 to 1000 W/m^2 4 to 30 mA ≙ 0 to 1000 W/m^2 164 feet (50 m) 492 feet (150 m) 984 feet (300 m)
Electrical connections	Screw terminals for	2 × 16 AWG or 1 × 12 AWG
Protective data	Degree of protection of housing Insulation class	IP 65 to IEC 60 529 III to EN 60 730
Environmental conditions	Operation to Climatic conditions Temperature Humidity (non-condensing) Mechanical conditions Transportation to Climatic conditions Temperature Humidity Mechanical conditions	IEC 60 721-3-3 Class 3K5 -13°F to 131°F (-25°C to 55°C) 5 to 95% rh Class 3M2 IEC 60 721-3-2 Class 2K3 -13°F to 158°F (-25°C to 70°C) <95% rh Class 2M2
Agency standards	Product safety Electromagnetic compatibility Immunity Emissions CE conformity to EMC directive UL Listing cUL Listing	EN 61010-1, EN 61010-031 EN 61 326 Class B to EN 61 326 2004/108/EC UL873 Canadian Standard C22.2 No. 24-93

Materials and colors	Housing	Polycarbonate/RAL 9002 (gray-white)
	Housing cover	Polycarbonate (transparent), solar Panel molded in silicone/RAL 9010
	Packaging	Cardboard
Weight	Without packaging	Approx. 4.37 ounces (0.124 kg)

Wiring Diagrams

Internal diagram

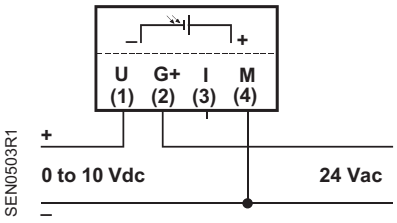


G+ Operating voltage 24 Vac or 24 Vdc (18 to 30 Vdc)
M Measuring neutral (power supply and signal).Solar radiation measuring signal 4 to 20 mA
U Solar radiation measuring signal 0 to 10 Vdc
I Operating voltage 24 Vdc (18 to 30 Vdc)

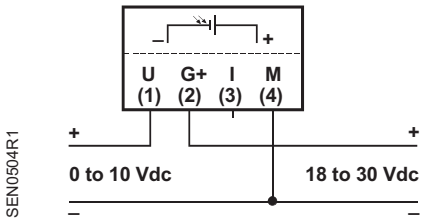
Connection diagrams

Voltage measurement with:

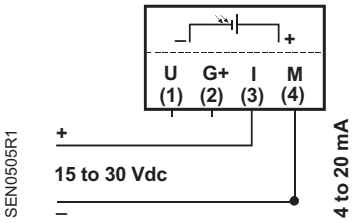
AC Supply



DC Supply



Current measurement:



Dimensions