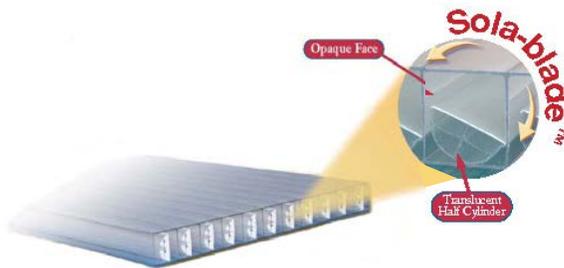




InteltaSun™ Daylighting System Description

The InteltaSun™ Daylighting System consists of arrays of Sola-blades inserted into specially designed polycarbonate panels.



The Sola-blades are mechanically driven within the panel and can be rotated between the fully open (defined as $\pm 90^\circ$) to the fully closed (0°) positions. The full control range may be expanded to $\pm 150^\circ$.

Operation of the panels is most commonly through an InteltaSun™ Wall Controller (although there are other methods), and can be set to operate in either a *Manual* or *Automatic* mode. In the Automatic mode the user defines desired room lighting (level). Once set in the Automatic mode, the InteltaSun™ logic keeps the settings based on the Sun and Room Sensors. In the Manual mode the user directly sets the Sola-blade angles and daylight level.

Glazing Panels can be coupled together to form Zones or Branches. In a Zone the Sola-blades in all panels rotate the same, that is, if the Sola-blades in one panel rotate clockwise to the 30° position, all the other Sola-blades in the Zone rotate clockwise to the 30° position. In a Branch the rotation of any given panel can be different from that of another Branch, that is, if the rotation in one Branch is clockwise to the 30° position, the rotation in another Branch can be counter-clockwise to the -30° position. Regardless of whether it is a Zone or a Branch the relative offset angle of the Sola-blades in any given panel is referenced to the main panel that defines the angles.

Up to 4 Zones and 4 Branches can be controlled by a single controller.

InteltaSun™ Operational Components

The InteltaSun™ Daylighting System consists of a number of mechanical and electronic components through which its operation is effected.

Glazing Panels

There are two types of Glazing Panels: Master (motorized panel) and Slave (driven by the Master panel). The Glazing Panels are self-contained with the gear-assembly and control cards. The Master Glazing panel is driven by an electric brushless gear motor (BLDC), 24Vdc, 0.5A, that rotates the elements of each panel. Each Master panel can be connected to several Slave panels. The number of Master/Slave combinations depends on job-specific design requirement.

The InteltaSun™ Intelligent Daylighting System consists of banks of cylindrical light shading elements (Sola-blades) that can be rotated between the fully open to the fully closed position. By angling the sunlight the InteltaSun™ Intelligent Daylighting System makes use of the physical fact that light hitting at an angle of 30° delivers only half as much energy per square foot as light hitting at a right angle. It can be set to deliver direct or diffused sun rays. The Sola-blade design is such as to require only small rotational steps to control a wide range of light and shading levels.

The length of InteltaSun™ Glazing Panels ranges from one foot up to 40 feet and thus can accommodate small-scale use, such as unit skylights, sun shades or windows, as well as large-scale use, such as commercial skylights (slopes, ridges or pyramids), vertical wall lights, curtain walls, and the like.

Electronic Driver Card

A built-in Electronic Driver Card, called Panel-Card, controls the Sola-blades' angle by means of the step motor and a position absolute-encoder. The position-encoder is attached to the rotation axis of one of the Sola-blade elements to provide the actual angle position of the Sola-blades. The control is accomplished via CAN Bus communication (type 5/RJ-45). The unit is powered by 28Vdc internal line.

Sun Sensor

The Sun Sensor measures sun light intensity and estimates the sun position relative to the Glazing Panel array. The sensor is mounted on the outdoors side of a Glazing Panel array. It is communicated with and powered by a CAN Bus over a cat 5, RJ-45 cable from any of the panel cards. In any automatic sun tracking system only one Sun Sensor need be installed on any of the Glazing Panels.

Room Sensor

The Room Sensor measures daylight intensity transferred by a Glazing Panel to the room. It is mounted on the indoor side of the panel and facing it. It is communicated with and powered by the CAN Bus over a cat 5, RJ-45 cable from any of the panel cards in the Zone. In any automatic system, only one Room Sensor per Zone need be installed on any of the Glazing Panels.

Zone/Branch Modules

These optional modules are used for multi-Zone and/or multi-Branch topologies. They transfer controls from the Wall Controller to the panels. Two card types are used for multi-Zone or multi-Branch topologies:

- Zone Card – The Zone card bridges between the Wall Controller and a Zone/Branch panels. It also provides occupancy for E-Light (either Relay or Dimmer) outputs, Occupancy Sensor input and optional Analog Louver control input.
- Branch Card – The Branch card bridges between the Wall Controller and Branch-in-Zone panels only.

Each type of card is powered directly by a 28Vdc power supply or via a cat 5, RJ-45 cable from their panel cards supply.

Power

The InteltaSun™ Daylighting System is driven by 28Vdc power line connected to the Master Glazing Panels. Typically, each power supply has 100VA capability and conforms to UL-1330 Class 2 standards. One 100VA power supply can drive 4 to 6 typical Master Glazing Panels for simultaneous operation of all panels in a Zone. Alternatively, the 100VA power supply can power more Master Glazing Panels and divide the operation into 2 (or more) groups (this will increase the operation response time but decrease the number of power supplies per system). Basically, most 28Vdc power supplies conforming to the SLEV standard can be used.

IntelaSun™ User Control Options

Control of IntelaSun™ operations can be effected through:

- **IntelaSun™ Wall Controller**, which consists of an easy-to-read LCD screen and a panel of control buttons. Several types of Wall Controllers are available: Automatic, Manual, Single Zone and Multi Zone Wall Controllers.

The most commonly wall controller used is the IntelaSun™ **Automatic Wall Controller (AWC)**:



One of advantages of the AWC is that it has both Automatic and Manual modes of operation which provides the user with considerable flexibility in controlling the IntelaSun™ Daylighting System. Another feature of the AWC is its **Quick Dim** button that enables the user to close the Sola-blades temporarily, thereby darkening the room. Pressing the button again restores the Sola-blades to their previous positions.

- **External Analog Louver Positioning**

Analog Louver Positioning (0-10Vdc) is an input used for direct control, by others, of the Sola-blade angles. The inputs (via an RJ-12 line) are provided in Wall Controller and Zone Cards enabling per Zone control. An external 0-10Vdc input signal sets the Sola-blade position angle. The range calibration points are: 0V for -135°; +5V for 0° and +10V for +135°.

When used in a single Zone topology, the signal is processed via the Wall Controller and overrides regular system operation. For the multi-Zone topologies, the analog input is applied in each Zone controller only. The current Sola-blade angle of the controlled Zone can be monitored on the Wall Controller LCD display.

- **External Computer**

An external computer can be connected to the wall controller via standard RS232 COM connector.

The interface program enables the reading and setting of all parameters, sensors, faults and other signals. It is enabled by the external computer and a Computer icon (🖥️) is displayed on the IntelaSun™ Wall Controller LCD.

Communication Control

Communications are initiated and managed by the Wall Controller based on standard CAN Bus (or DeviceNet) protocol and physical layers. The command transmission is transferred directly to the panels via a Cat5, RJ-45 cable or via the Zone Unit. Whenever the controller logic defines a new target angle, either due to manual or automatic control, the controller packs strings and transfers them to the panels. All selected panels receive the data in parallel and only the one matching current priority will respond with angle execution.

IntelaSun™ Daylighting Operational Modes

There are two basic Daylighting modes:

- **Direct Sunlight Mode**
In the Direct Sunlight Mode the Sola-Blades are mostly directed in parallel with sun rays. Thus direct sunlight illumination dominates. It is the optimal mode for winter.
- **Indirect Sunlight Mode**
In the Indirect Sunlight Mode the Sola-Blades are mostly directed perpendicular to the sun rays. Thus indirect room illumination dominates. It is the optimal mode for summer.

IntelaSun™ Optional Devices

The IntelaSun™ Daylighting System can be fitted with the following optional devices:

E-Light Relay

The E-Light (Electric Light) Relay is part of the Zone unit component and delivers a dry contact to close artificial light circuit. This option requires Zone card for single or multi-zone topologies. The relay is enabled if the Daylight level is too low. For operation, the output that enables the contact to close if the Daylight level is too low and/or the Sola-blades are set to 0° is pre-set by the user through the Wall Controller. In systems with an enabled Occupancy sensor, the output is disabled if no person is present in the room.

Occupancy Sensor Input

The Occupancy Sensor Input is an input for an external Person-in-Room Occupancy device (commercially available – not part of the system). It delivers a dry contact whenever a person is detected as present in the room. For single Zone systems it can be connected to the Wall Controller. For multiple Zones systems it can be connected to each Zone unit.

Dimmer Output

The Dimmer Output is an output for an external Dimmer device (commercially available – not part of the system) delivering a control signal range of 0-10V. For a single Zone system, this signal is obtained directly from the Wall Controller. For multiple Zones system, this output is provided by the Zone units. For operation, the output level must be predefined by the user *manually* through the Wall Controller and enabled to handle the light conditions if the Daylight level is too low *and/or* the Sola-blades are set to 0°. In systems with an Occupancy sensor, the output is disabled if no person present in the room.

Internet Communication

Internet connection is an indirect function via the computer interface where the computer can be controlled using WebEx or NetMeeting tools.

Installation

The IntelaSun™ Glazing Panels come from the factory completely preassembled with all control cards, internal system wiring, etc. The building must have 115V/60Hz mains to feed the IntelaSun™ power supplies. The Wall Controller can be wall-mounted (over standard electrical steel box 411/16 square) at the desired location with a distance of up to 1000 ft from the Glazing panels.

Additional Information

Additional information may be obtained from:
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