APPLICATION NOTE

SynJet® Variable Level Cooling Control

Features/Benefits

- *Lower overall power consumption for the life of the product*
- *Allows for multiple settings or lock in on one single setting.*
- *Dynamically match cooling to actual environment requirements*

Overview

SynJet Variable Level Cooling Control is available with multiple programmable performance levels for maximum cooling and power flexibility. The designer has the option to apply an external control input signal to vary the cooling level and dynamically match cooling to actual environment requirements. Alternatively, a single level can be hard-wired and fixed for the life of the luminaire.

Specifications

1. **SynJet Variable Level Cooling Control - Standard Performance Level**
   Optimized for maximum LED cooling with minimum acoustics in luminaire design environments with normal airflow and where low acoustics are important. The external control signal can select this level when standard cooling is required.

2. **SynJet Variable Level Cooling Control - High Performance Level**
   Optimized for maximum LED cooling and/or in a restricted air flow environment such as a ceiling can or enclosed box with little venting. This level provides greater cooling in areas that are not as sensitive to the nominal increases in acoustics that the additional flow creates. The external control signal can select this level when greater cooling is required.

3. **SynJet Variable Level Cooling Control - Silent Performance Level**
   Optimized for LED cooling designs where silent acoustics are required in a compact package. The Silent setting is perfect for slightly lower power requirements, but still maintaining small designs. The external control signal can select this level when minimal acoustics are critical.

4. **SynJet Variable Level Cooling Control - “off” Level**
   Air flow is halted. SynJet power consumption is minimal, but the cooler electronics continue to sense the control input. This allows the cooling level to be modified to environmental conditions.

Refer to the SynJet Cooler Product Specification for Thermal Resistance (theta) and Sound Power Level (dBA) details for each cooling performance level for each product.

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Variable Control Level Process

The performance level of the SynJet is selected via an external control signal. This signal (two digital logic levels) is received from the luminaire control system or other control hardware based on the luminaire design. For example, the die temperature may be measured with a thermistor and its output is compared to programmed parameters and the cooling level is sent to the SynJet. This sensor and the measurement hardware are part of the luminaire, not part of the SynJet.

The tables below define the external signal matrix to select the required cooling performance level. CMOS logic levels are shown. For quick temporary comparisons during prototype evaluations in the lab, performance levels may be easily changed. Refer to the "Examples" column in the table below. Simply touch/hold the stripped ends of the wires together or use an alligator clip lead for the temporary connection. After a few seconds the SynJet will change to the newly selected performance level.

Wire	Signal
Blue	I/O 1
Purple	I/O 2
Black	GND
Red	+5Vdc

	I/O 1 (Blue)	I/O 2 (Purple)	Examples:
Standard Performance *	1	1	No connection to the Blue Wire or to the Purple Wire
High Performance	0	1	Connect the Blue Wire to the Black Wire
Silent Performance	1	0	Connect the Purple Wire to the Black Wire
Off	0	0	Connect the Blue Wire and the Purple Wire to the Black Wire

* Default Setting Level if control not used
Inputs are standard CMOS logic levels.
1 = OPEN OR HIGH
0 = GND or LOW

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