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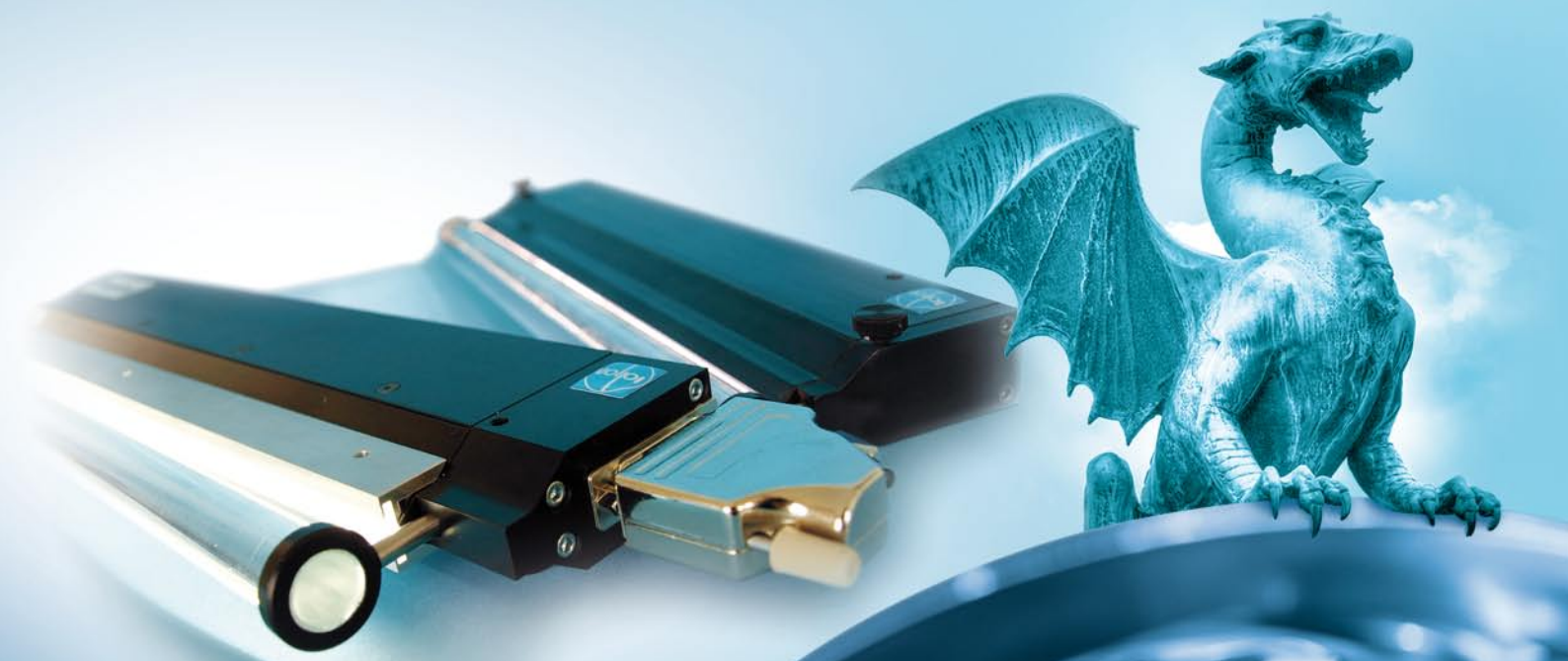

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Retrofit Design Dragon Style

Easy Conversion to Modern LED Line Lights

Up to now a combination of a DC-stabilized halogen light source and a fiber-optic line converter has been the optimum lighting installation for numerous line scan camera applications. Despite its good performance characteristics, demands for uncomplicated and cost-effective LED lighting are being heard more often for various reasons. Swiss lighting specialist Volpi has now responded to these demands with the new Dragonline LED line light.

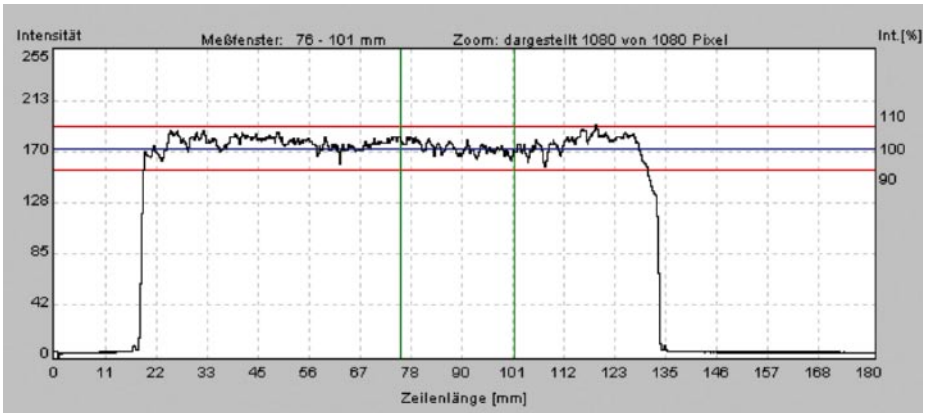
Volpi offers complete conversion from conventional glass-fiber lighting to LED lighting with high performance and cost efficiency, in addition to replacement of halogen light sources with high-power LED light sources. The company, based in Schlieren near Zurich, would like to make this conversion as easy as possible for its customers.

Modernized

Thanks to their retrofit design, the new LED Dragonlines have identical housing geometries to those of the well-known Volpi fiber optic light lines. This compatibility allows existing fiber optic lines to be taken out of the system and the new LED line lights to be integrated at the same position using the same mounting material. The new lighting is ready for use immediately after connection to the power supply and the user quickly has sustainable, high-power and energy-saving line lighting. According to Michael K. Friedrich, Machine Vision Business Unit Manager at Volpi, the advantages of the Dragonline lie in its adaptation to highly sophisticated applications: "Innovative demanding line camera applications require a high-quality lighting system characterized by extremely good homogeneity and outstanding intensity. The Dragonline offers these characteristics and much more, for example excellent long-term stability, low power consumption, application-optimized thermal management and a virtually unbelievable light transmitter service life. Lens attachments adapted to the application and optimized micro-lens diffusers with low light loss allow for application-optimized use in bright field and dark field."

Individualized

The flexibility in length selection is nearly limitless. Due to cascading LED PCBs, the Dragonline can be built modularly in 75 mm steps. A further 35 mm for side housing parts for each length and a D-SUB Mixed 7W2 port integrated on the side are given. The standard light output width is 1.1 mm. The light color can be optimized according to the application. There are currently ten different power



Dragonline shows very good light uniformity values of +/– 10 % over the whole line length. A cos4-effect falloff at the edges will be corrected by light distribution.

LEDs available. Apart from three shades of white ('cold white', 'white' and 'warm white'), the colors red (625 nm), amber (617 nm), yellow (590 nm), green (528 nm), blue (470 nm) and NIR (850 nm and 940 nm) are available for the Dragonline. A cylindrical 18 mm focusing lens is available for every length.

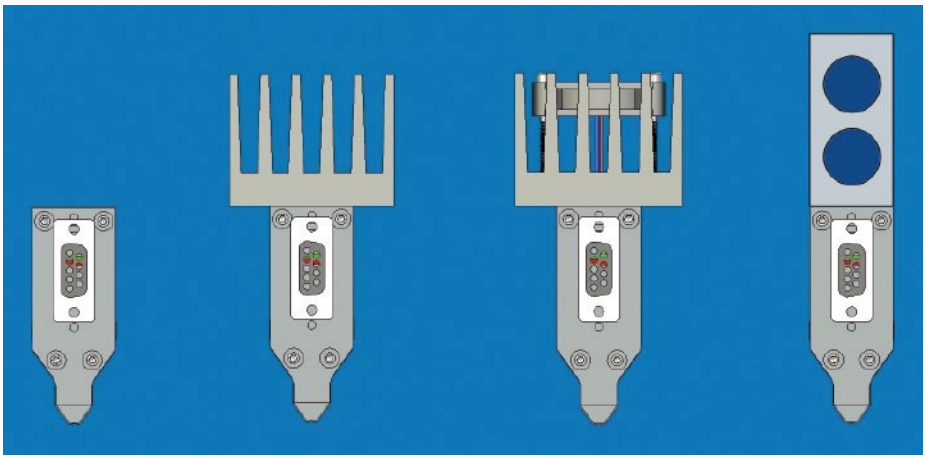
Performance-oriented

Depending on the required luminous intensity, the Dragonline can be configured with any of four different intensity levels. At the first level in this thermal management design, the Dragonline is cooled solely passively via the housing and the lighting can be operated at 25 % of maximum overall intensity. This level corresponds to an illuminance of 110 klux in a dark field application with a working distance of 20 mm. The other three intensity levels – extended passive cooling with additionally mounted cooling element, fan cooling and closed circuit water cooling – allow the intensity to be increased in 25 % steps up to the maximum level. Apart from the enormous luminous intensity and the high degree of individualization, the very good homogeneity values of +/– 3 % over 20 mm length are immediately convincing. With an external voltage dimmer, the lighting can be dimmed in the range of 10–100 %. The Dragonline can also be operated with external flash control via the integrated TTL input.

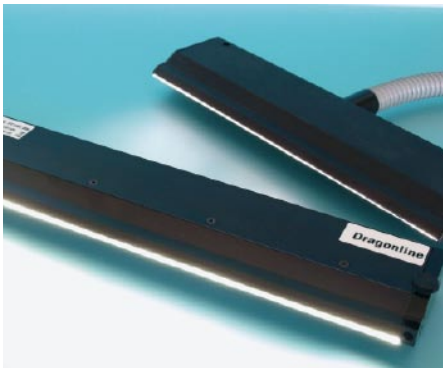
Cost-optimized

In comparison with a DC-stabilized halogen light source, the innovative LED line light offers enormous savings potential. A 300 mm Dragonline with high-power white LEDs consumes just 24 watts at the first intensity level. The halogen light source consumes 200 watts on average – more than eight times as much. In the water-cooled version, in which the Dragonline can be operated at 100 % intensity, the savings are still slightly above 50 %.

The service life of the Dragonline can reach more than 50,000 hours, depending on the LED light color. This means that the LEDs are expected to only have around 50 % of their original illumination intensities after this operating time. Because of the extremely long running time of modern LED components, regular lamp replacement (as is necessary, for example, every 200–2,000 hours with a halogen light source) is eliminated. The failure frequency of a halogen lamp depends on the lamp type and selected intensity at which the light source is operated. Frequent on/off switching also has a detrimental effect on the service life of a halogen lamp. Costs arise for purchase of the numerous replacement lamps as well as for maintenance and machine downtime as usually the entire process must be temporarily stopped during lamp replacement. The overall profitability of the new LED line lights is many times higher than that of conventional line lights.



From left to right: Dragonline without forced cooling, with optional heat sink element, forced cooling with fans and liquid cooling: Intensity increases in steps of 25 %



The new LED-Dragonline (front) in comparison with a Volpi fiber optic lightline in the background

Application-oriented

According to Michael K. Friedrich, Volpi is especially targeting applications requiring particularly high luminous intensities with their new line light: 'The compact cascading mechanical properties meet the tough industrial demands for high-speed systems in the area of steel-aluminum-paper web products and for mail sorting applications and banknote inspection systems. Moreover, the Dragonlines are excellently suited for print inspection applications and as lighting for surface inspection applications.'

Swiss Precision

Volpi provides fiber-optic and LED lighting components for use in machine vision, microscopy, forensics and medical diagnostics. Development of fiber-optic sensors for customized applications comprises another business area. With locations in Switzerland and North America, Volpi sells their products worldwide through a dense network of regional sales partners.

Conclusion

Especially in economically difficult times every company carefully scrutinizes their current cost situation. Conventional halogen lights all too frequently reveal themselves to be inefficient power devourers on closer inspection. In most cases investment in modern powerful LED lights pays off directly after commissioning. With Dragonline, Swiss lighting specialist Volpi has introduced innovative LED line lights with outstanding optical characteristics providing a further possibility to lower operating costs to the market.

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