

# D P N DESIGN PRODUCT NEWS

Covering the total design engineering function in Canada



May 2010



## Safety controller monitor

The PSR-TRISAFE is a safety controller from Phoenix Contact. The 67.5 mm safety controller can monitor up to 20 safety input signals such as up to 10 dual contact emergency stops.

[www.phoenixcontact.ca/trisafet](http://www.phoenixcontact.ca/trisafet)



## Toothed belt axis

The ELGR toothed belt axis from Festo is available in 3 sizes with strokes of up to 1.5 m, a speed of 3 m/s and a repetition accuracy of  $\pm 0.1$  mm. Units have a service life of 5000 km and deliver feed forces up to 350 N.

[www.festo.ca](http://www.festo.ca)

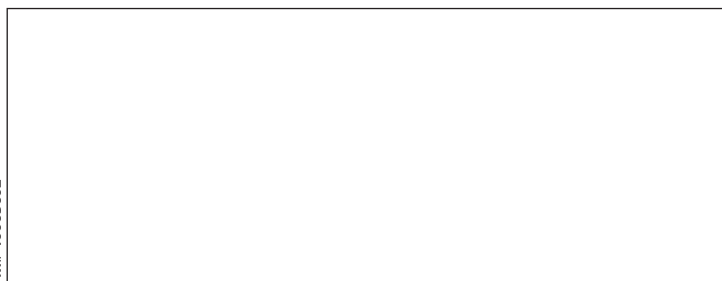


## Hot swap connectors

WAGO Corp. has introduced 770 series WINSTA MIDI and 890 series MINI Plugable Connectors that are UL-recognized 600 V devices for disconnection under load. The MINI is rated at 5 A/600 V; the MIDI is rated up to 10 A/600 V.

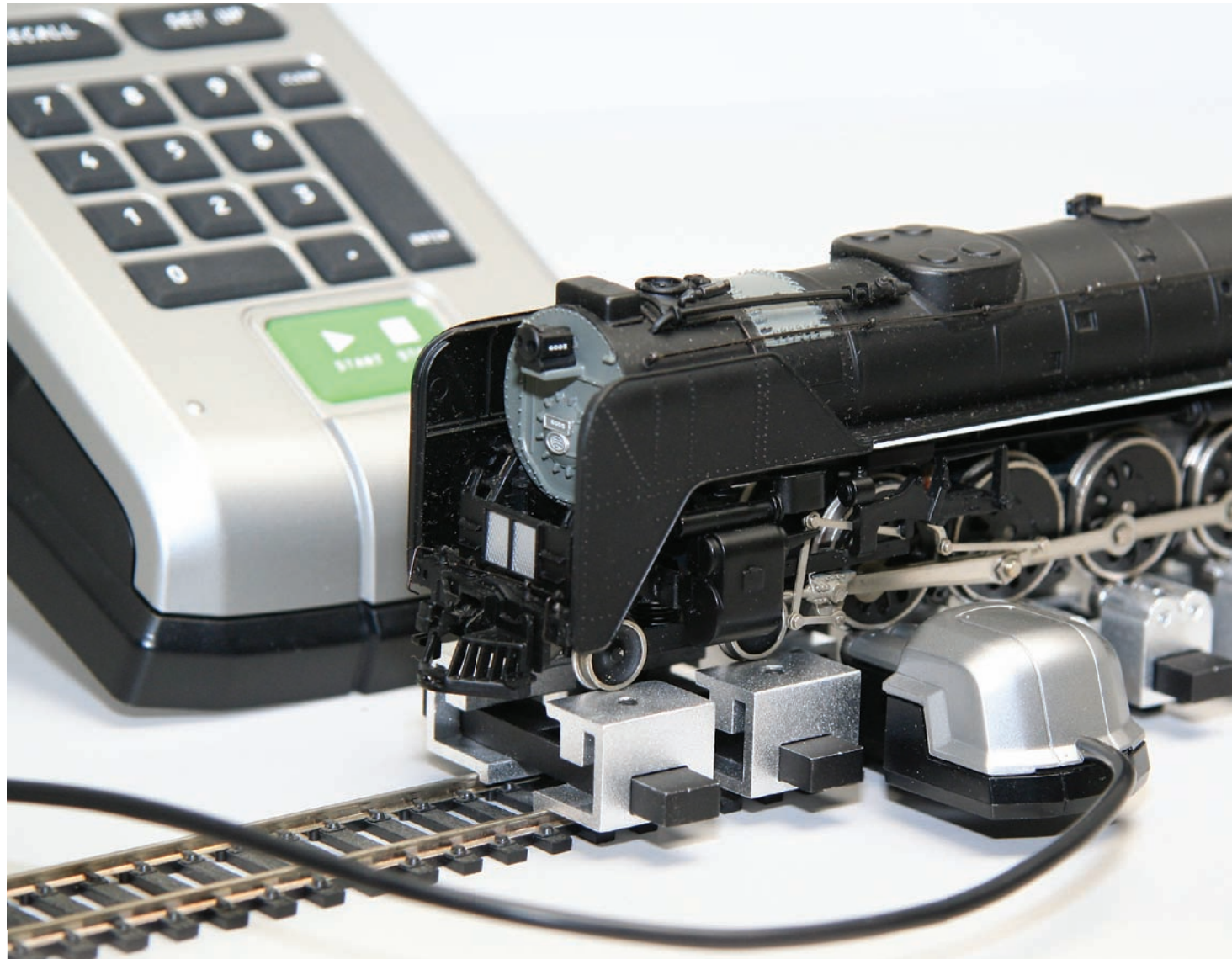
[www.wago.us](http://www.wago.us)

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# Styling keeps model trains appeal on track

Edited by Mike Edwards

Hobbyists have been collecting model trains from the age of steam engines and streamliners right up to today's diesel-electrics, always with a respect for mechanical functionality.

Bachrus Inc. ([www.bachrus.com](http://www.bachrus.com)) makes rolling stands, a standalone unit of bearings allows model train wheels to move in motion while stationary. These are called saddles, and the saddles sit directly underneath each axle of the train engine to allow the low voltage current from the track to pass through into the train. The system is great for people that do not have the room for track layouts.

When Bachrus wanted to create an accessory to its rolling stand it came to the St. Catharines, ON-based industrial design firm IDWS Inc. ([www.idws.ca](http://www.idws.ca)) to create a system to read the rotation of the bearings and translate that into a scale speedometer speed – in a unit that would appeal to hobbyists.

Should the design begin from the inside out or from the outside in?

"We were designing our enclosure to suit trains and the people who like to collect them, and so we chose to design from the outside in," according to IDWS president David Duncan.

"Considering the customer demographics, we began looking at the style and ergonomics that might be required first and then the functional process of engineering the parts to follow."

Certainly some of Duncan's concerns were how he was going to get the data from the wheels and into an enclosure. "But for us the bigger issue was marketing, could we create a visual aspect for the sale-ability of the product?"

"And so we really wanted to re-create who this customer was and what might help motivate them to purchase such a product. So we started to create image maps of different trains and train eras, looking back to steam locomotives and a streamlined locomotives that find favor in collectors eyes."

IDWS focused in on the heyday styling from the 1930s of the streamlined era, the smooth lines and curves of an aerodynamic shape that

Continued on page 9

# Cover Story

## Industrial design appeals to hobbyists

### From Front Page

really gave way to the industrial styling trends that found its way into so many products like cars and toasters. “Using this style we started sketching various contour shapes with keypads and screen displays we found one that seemed promising,” added Duncan.

From the direction of the sketches IDWS created foam core mockup models. “This allowed us to create a tangible mass to help visualize the scale of keys and display required. These first models let us pick the right display angle and spacing for the keys, but also confirmed the overall size versus the visual value for the end product.

“And so we were able to modify the shapes quickly and create a product direction that Bachrus could envision – as well as a product that an older demographic could use because small keys and display read out could really hinder sales.”

After the first cardboard mock-ups, IDWS built a 3D model using Rhinoceros ([www.rhino3d.com](http://www.rhino3d.com)), a combination of surface design with solid modeling to get the right draft angles, wall thickness, and structural ribbing for injection molding the housing correct. “We blocked in the approximate screen size, keypads and circuit board and from there we would have to add the power source and the input slots for the reader,” explained Duncan.

Once blocked into CAD software, IDWS started to put the sourced components in place to confirm that enough space had been allocated. “From there we had to meet with the electrical engineers for the console and reader circuit boards, to give them an idea we had to develop what we wanted. “So we started sketching out the layout for the display finding out how many characters would be required in both static fields and variable fields that would be on display at any given time, as the line segment numbering would drive the amount of screen pins that would affect the circuit board design.”

With that completed, the screen needed input from the user, and so the second area of focus was on the keypad and the order of hierarchy that would be required to operate the display. The most important number was to display the speed in either km/h or mph, with some other features like a timer and count down. From a technical point of view on the circuit board, how many carbon pills would there be under each button to complete the circuits when activated by the user? “But from an end user point of view we added known symbols and colors like red for the power button and green for the start/stop button,” said Duncan.

Once the display and keypad were created, IDWS had a better sense of the power needs that would be required. As well, knowing this unit was for North America and Europe, a mobile system of using batteries became the logical choice, as this improved design efficiencies and eliminated power adapters for different countries.

“We had to find suppliers who were using RoHS and EU compliant parts for production too, and in all of this the housing was going to be assembled with machine screws with for ABS plastic,” Duncan explained. “The choice was to use a PT Thread-Forming Fastener from Fabory, which helped us design specific techniques in the bosses to avoid stress cracking and

sink marks on the finished parts opposite of each boss.”

“In the end we wanted a mechanical, but stylish looking product that would appeal to train enthusiasts. With the efforts put into the design, the serious hobbyist can now measure accurately the scale speed, wheel/axle rpm and distance traveled during use,” concluded Duncan.

“Exactly the kind of product that Bachrus wanted to present to its consumers, adding a new feature to its product line, helping to increase market share and competitiveness building their brand identity and the bottom line.”

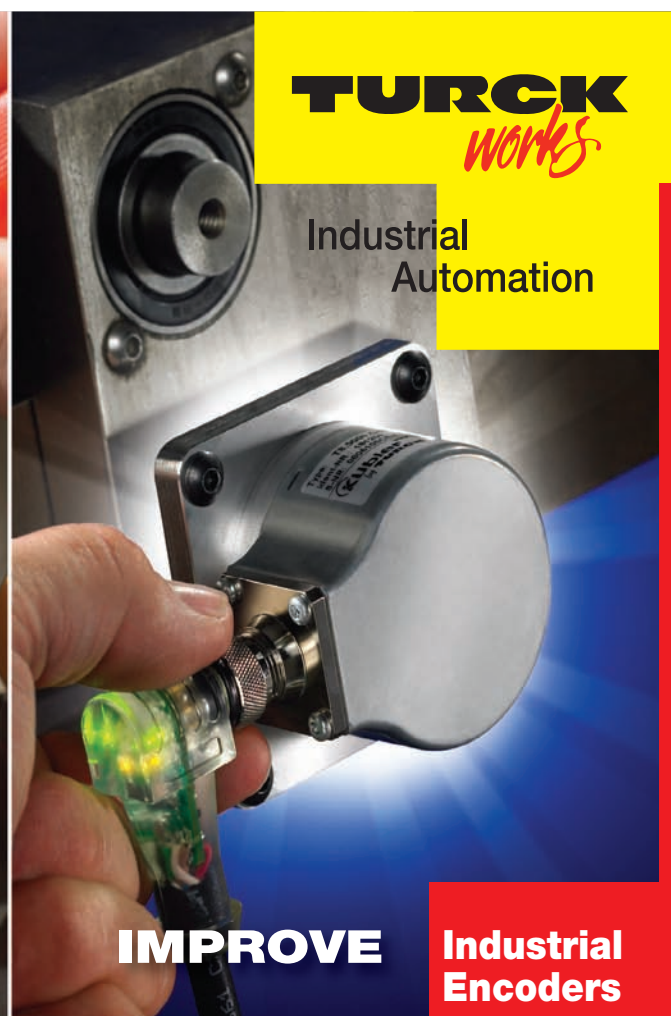
*This story was edited from an article contributed by IDWS.*



Rolling stand accessory reads the rotation of bearings and translates into a scale speedometer speed display.



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