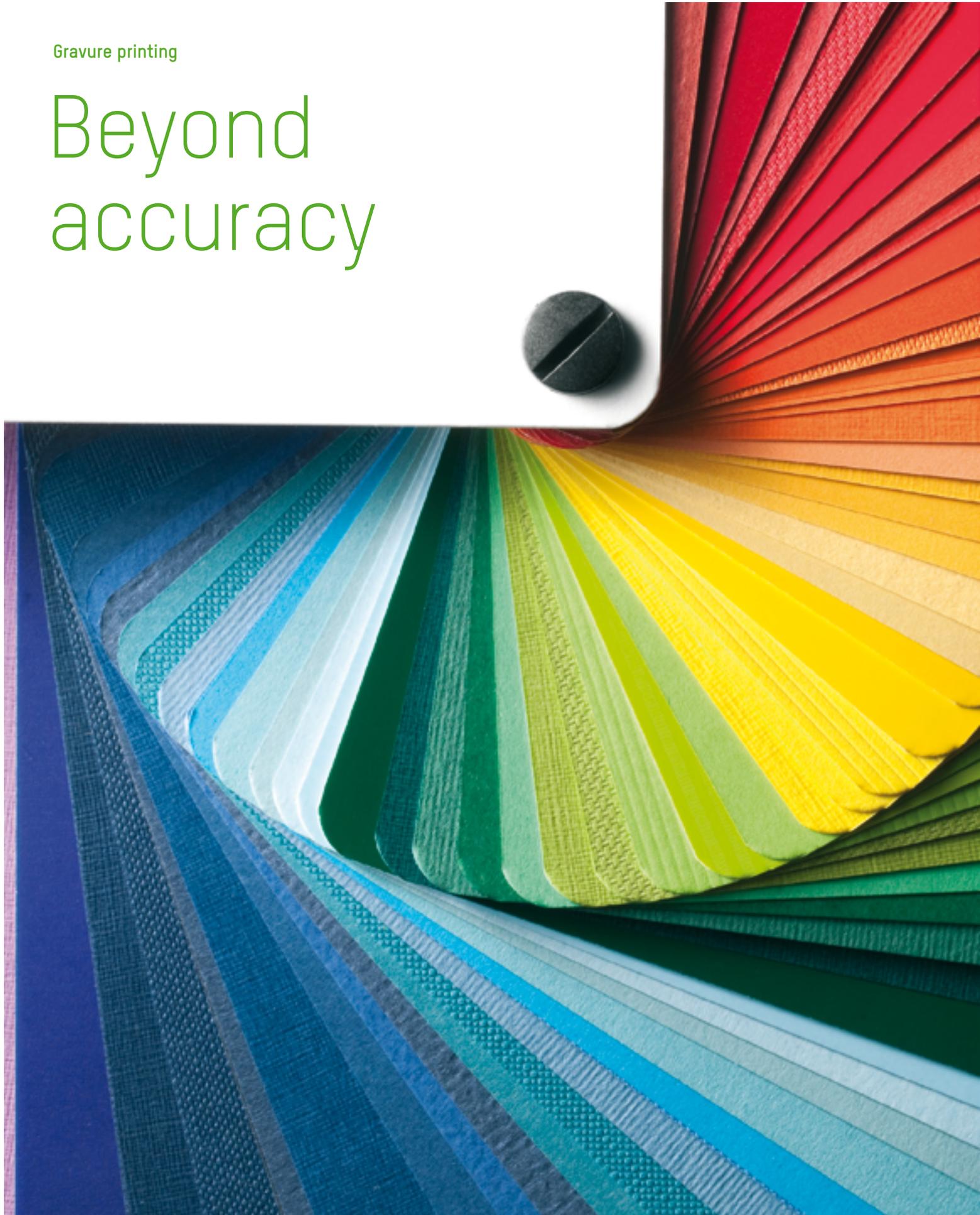


Gravure printing

Beyond accuracy





Shaanxi Beiren is one of China's largest manufacturers of gravure presses for flexible packaging, decorative paper, tobacco products and printing. To ensure that its control technology is equally advanced, Shaanxi Beiren has cooperated with B&R since 2003 to develop integrated register control and shaftless drive technology.



The flexible packaging, printing and tobacco industries have a strong need for high-quality gravure printing. As a pioneer in this field, Shaanxi Beiren knows that its customers' expectations are rising – and their requirements are growing more dynamic. Staying at the technological forefront is essential to winning customers' trust, so lean production, efficiency and quality are a constant pursuit.

Direct drive as the foundation for accuracy

At the end of 2003, Shaanxi Beiren began development of the new SY400 machine, with the goal of achieving higher efficiency and quality with a speed of 400 meters per minute. The mechanical transmission, electric drive and control presented a great challenge. When the Shaanxi Beiren technical team began conceptual design for the project, it was immediately clear that a direct drive solution would be the best choice.

Since direct drive motors provide low speed and high torque, it is possible to control rollers without a deceleration mechanism. Having fewer mechanical components not only simplifies machine design but also reduces the risk of downtime. The direct drive solution reduces the footprint of the machine as well as its price tag.

Often, the trouble with direct drive motors is that the low speeds result in what's known as the slot effect. When the rotor passes the slot it produces jitter that can reduce transmission accuracy. B&R's ACOPOS servo drives, however, easily eliminate this

problem with integrated compensation technology that lowers jitter and improves accuracy.

Together with an EnDat encoder, this gives the machine the accuracy it needs for high-quality printing. Testing of the completed machines in 2014 proved the effectiveness of this technology – with good transmission even at speeds of 400 to 450 meters per minute.



The modular drives in B&R's ACOPOS multi family offer maximum flexibility and return on investment.

Dedicated module for dedicated application

High-precision drive technology is a solid basis for printing quality, but it is not enough. The truly decisive factor in printing accuracy is register control. For many years, Shaanxi Beiren has cooperated with B&R on an integrated register control system that has proven highly competitive on the market. Shaanxi Beiren's engineers also wanted to improve the ability to capture



weak color marks in order to meet its customers' most demanding requirements.

This is where B&R's new X67 module comes into play. It was developed specifically for color processing in the printing industry. Its sampling time of 5 microseconds supports printing speeds of 600 meters per minute, and it can achieve 1 microsecond interpolation calculations to collect offset signals more accurately. High-precision register control with microsecond cycle times is achieved by synchronizing the POWERLINK network, drive system and master control system, all on a single platform.

With their excellent sampling, the new X67 module allows detection and analysis of weak colors such as light yellow, white and silver for high-quality printing across the full range of colors.

With its IP67 rating, the module can also be mounted directly on the machine. M8 or M12 connections with a high degree of protection simplify wiring and save cabinet space. A POWERLINK interface ensures efficient synchronization.

Energy-saving design

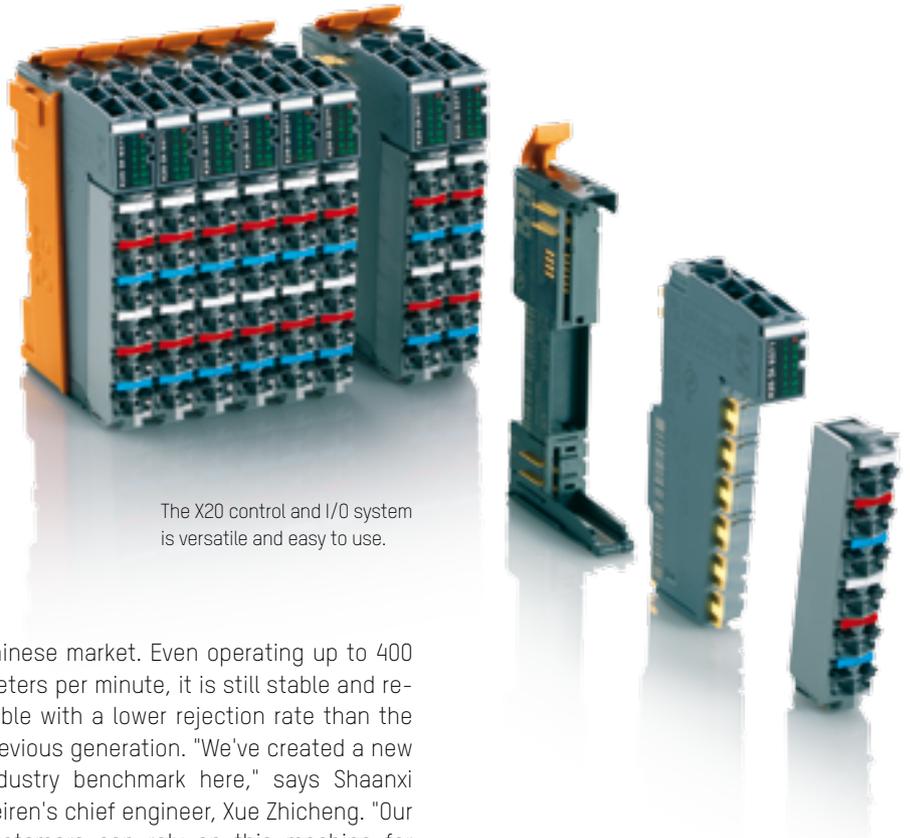
The new press features a variety of energy-saving optimizations. The new drying tunnel is designed for energy savings. The previous solution used hot air drying, which meant that the hot air could be recycled but not effectively utilized. The new machine uses heat exchange, which converts the hot air into hot water for reuse. This system can be intelligently adjusted to accommodate different inks, materials and printing speeds. With B&R's temperature control library, it is easy to achieve precise control with minimal waste.

Easy to use for end users

Complex machines can be quite daunting to use, and the cost of training operators is something that shouldn't be underestimated. Engineers from both Shaanxi Beiren and B&R therefore put a lot of effort into usability.

For operators, recipe management is an important feature. With a flexible interface for recipe management, users they can configure printing process parameters including offset compensation and the phase of each printing plate.

For new orders, this makes it easy to achieve fast proofing and to avoid material waste. At the same time, the machine can also perform auto-zeroing, plate correction and registration error monitoring in real time. A dedicated service report provides informa-



The X20 control and I/O system is versatile and easy to use.

tion for the mechanical service team to indicate necessary service tasks. There is also a vibration monitoring solution that can be directly added in the future to implement predictive maintenance.

Electrical service technicians, on the other hand, are more concerned about features that make it easier to run diagnostics on the I/O and electrical systems. The BSR printing solution comes with built-in web-based diagnostics, which make it very easy to diagnose I/Os, wiring and even the drive system. Additionally a remote maintenance package allows immediate access to distant factories.

Stunning debut

In November 2015, the new printing machine made a stunning debut showing off its new industrial design – a novelty on the

Chinese market. Even operating up to 400 meters per minute, it is still stable and reliable with a lower rejection rate than the previous generation. "We've created a new industry benchmark here," says Shaanxi Beiren's chief engineer, Xue Zhicheng. "Our customers can rely on this machine for high efficiency, high quality and low operating costs."

Yet, even with the success of its new machine, Shaanxi Beiren has no plans to slow its pace of innovation. Together with BSR, they are planning a factory operation management system for a factory-level printing solution based on lean production. "In

line with the principles of Industry 4.0, we want to provide our customers a more personalized, more intelligent production system that helps them meet their market needs," says Li Yanfeng, general manager of Shaanxi Beiren. "BSR's open platform and hardware/software in compliance with international standards will provide us with excellent support in pursuit of these goals." ←