



Pad Printing Case Study

On-Demand Marking of Safety Products

Print Flexibility for Small and Very Small Lot Sizes

Hybrid technology dramatically reduces setup times +++ Process integration eliminates operator errors +++ Cliché store becomes superfluous

The Customer

ABB (Asea Brown Boveri)

Asea Brown Boveri, or ABB for short, is a global leader in energy and automation technology. The stock corporation, which is headquartered in Zurich, employs around 140,000 people in over 100 countries. These generate an annual turnover of approximately 40 billion US dollars.

TAMPOPRINT had already been working successfully for ABB's German subsidiary for many years. Contact to Switzerland followed, where ABB produces high-quality switches and protective devices for the global market at its Schaffhausen site.



Incorrect labeling of safety-relevant parts could have fatal consequences. That's why TAMPOPRINT process design covers the entire procedure: The process rules out error-prone operator intervention. The system recognizes the component, compiles the relevant markings for the target market, including all required labels, and then consistently and accurately prints the resulting generated images – and on both sides, too.



The Problem

Small and Very Small Series with a Variety of Print Images

ABB produces high-quality circuit-breakers for the global market at its Schaffhausen site. In case of doubt, the life of the user may depend on the correct use of such safety-relevant components. Reliable marking must therefore include the precise product designation, pin assignments, and additional characteristics – as well, of course, as a wide variety of certification marks. If you multiply the number of product variations with the over 100 destination countries, you get a huge number of print images. What's more, these print images often have to be modified. Firstly, because the products undergo constant further development, and secondly because they need to be adjusted to varying regulations in destination markets.

Marco Kampmann, production engineer at ABB, sums it up like this: “For us, a typical lot size lies between 500 and 5,000 pieces. But we also cater to less common or special equipment requirements. Then it's often a case of small series – 50 or even as few as 5 pieces. That means we're looking at almost one-off production. Consequently, we handle over 5,000 orders per year. And each one of them ought to be completed within a single day, where possible. As we are not able to laser our Duroplast material, marking by means of pad printing is our only alternative.”

Marco Kampmann: “We needed a system which made us quicker, more flexible and more efficient, while at the same time minimizing operator errors.”



For this reason, ABB kept a huge cliché store of several thousand printing plates. This was not without its problems:

⊗ Searching for clichés and adjusting machines by hand was time-consuming and until then made small series expensive and uneconomical.

⊗ The choice of the right cliché – in particular with Chinese, Japanese, Arabic and other similar ‘foreign’ characters – was difficult for the operator and a source of error. And therefore also a considerable economic risk, with regard to questions of liability.

Printing Small Lot Sizes on Demand

It works, it lasts and it pays off.

Thanks to TAMPOPRINT.





The Solution

Operator-Independent Cliché Production IN the Machine – Hybrid Technology

“Can you make us quicker, more flexible and more efficient?”



That was the question ABB put to TAMPOPRINT at the Fakuma trade show. The Swabian engineers posed a surprising question in return: “And what if we were to eliminate confusion of clichés as a source of error at the same time?”

Board member Oliver Nitschke, himself an engineer, explains modestly, “The idea was actually quite simple. We thought about the typewriter. It too can be used spontaneously for writing all sorts of things, without constantly changing the printing tools.

Step 1: Cliché Production IN the Machine

The newly developed TAMPOPRINT HYBRID no longer requires classic printing plates. For each print job, it produces its own cliché in a matter of minutes. And does so using an inexpensive cliché band.

This means cutting out the time usually required at each change of print image for:

- Searching the store or even producing a new cliché where required
- Cleaning the printing machine
- Setting up the machine with the new cliché
- Putting the removed cliché into store

Step 2: Full Interconnection of the System

“The second step,” TAMPOPRINT’s Head of Development, Stephan Berger, adds, “was ultimately a logical consequence of the first.” We simply thought it through to the end: We already have a system that is digitally controlled, so it must be possible to connect it to the customer’s order system.”

Hence, the second half of the project was devoted to developing software. This software development process was ultimately aimed at fully integrating production and marking of the circuit-breakers into the order process.

The printing system is directly connected to the SAP system. The order papers are assigned a barcode which is read by the machine control system and used to retrieve the marking to be printed from the central ERP system. And, what’s more, this includes all product- and country-specific elements and characters.

Marco Kampmann from ABB: “Errors due to insertion of incorrect clichés were a real problem with so many variants.” TAMPOPRINT has now eliminated this problem. Board member Oliver Nitschke: **“Where an operator no longer intervenes in a process, he can’t make any errors.”**

Meanwhile, the final stage of expansion of the overall mechanronic system has gone even further. Fixed print images are no longer stored in the ERP system. Instead, there are only elements which are compiled to make the correct print image required at a given time, depending on the order. A priceless advantage and another contribution to the elimination of potential errors. All that changes now, for example, is the certification mark. That means there is no need to create potentially hundreds of new print images. By contrast, the updated certification mark is simply stored in the system and can be retrieved for each just-in-time print image composition. This rules out anything being forgotten when updating print image elements, and the old certification marks can no longer pop up anywhere by mistake.

The Benefits

Advantages for the Customer – Efficiency and Security

“Of course, projects like this are fun when the solution is so elegant,” Nitschke concludes. “Admittedly, the customer is more interested in the third part of our slogan. ‘It works, it lasts and ... it pays off.’”

And it's a fact: The benefits for the customer are obvious:

☑ **Increased efficiency:**

Space saving, personnel saving, higher throughput

A single networked printing system now replaces five conventional machines. A single machine operator now achieves more than three or four previously.

☑ **Maximum product safety:**

Elimination of operator errors

The scrap rate due to incorrect labeling was reduced to almost 0 %. A priceless advantage in the case of safety-relevant components and the resulting liability risks.

☑ **Outstanding speed:**

Optimization of setup and maintenance times

The networked hybrid system is so fast and flexible that it no longer processes more orders per day, but can also switch to and handle new ones quicker.

Why can only TAMPOPRINT do this?

The key here is TAMPOPRINT's unique HYBRID™ technology. Clichés are no longer “printing plates”: Instead, the machine uses a cliché band to produce its own cliché for the order in question in a matter of minutes. This enables networking and complete digitization of the entire production chain.

What is Pad Printing?

Pad printing is an indirect rotogravure printing method. Ink is applied to a plate that is engraved with the print image (the cliché). The excess ink is “scraped off” with a doctor blade or ring. As a result, the ink remains only in the engraved cavities that correspond to the image to be printed. Finally, this ink is picked up by a silicone rubber pad and transferred during printing. Since the pad is flexible, it is also possible to get great printing results on complex surfaces. The method was invented and perfected by TAMPOPRINT. Consequently, high-precision product printing at high speeds is now possible. In addition to inks, other substances can also be used for printing, if required.

L'essentiel en un seul coup d'œil :

- ☒ Hybrid printing system automatically produces its own cliché for each print job in a matter of minutes.
→ No need for separate cliché production; no setup time between orders.
- ☒ Complete networking makes operator intervention superfluous.
→ Operator errors are eliminated.
- ☒ Inexpensive clichés come as needed per order from the cliché band.
→ Cliché store becomes superfluous.
- ☒ Automation and integration cut time for repeated setup processes.
→ A single operator replaces the three or four required previously.

Conclusion

The system is ideally suited to **efficiently processing a large number of orders**, particularly those involving **small lot sizes**. The **extremely short setup times** mean that the system runs almost continuously, prevents the operator from making errors, and it pays off.

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