

Safety in COLORMAN

Using SOLID-2E Safety Light Curtains with automatic printing plate changes in manroland printing machines

The premium solution in newspaper offset printing has a name: COLORMAN. And not just because this printing machine scores so well in newspaper production with the highest print runs and amount of pages with flexible ink assignment and dynamic production changes. But also because the new “Automatic Plate Loading (APL)” system with reliable guarding is also provided for this extra-class category setup (pict. 1).



Pict. 1: Safety Light Curtains as access guarding with a fully automated system for loading printing plates

To better understand APL, it helps to know something about the usual methods used to load printing cylinders with printing plates. Manual loading, whereby the operator feeds the plates in by hand, is the most common process. The printing cylinders are reliably stopped here for safety reasons. The plate is slowly drawn on to the roll by activating the feeder. It generally takes almost 10 minutes for the plate

change (calculated for 12 plates for each cylinder). The machine cannot produce in this state. Manufacturers have therefore long been trying to automate plate changes.

Various automation levels

The next expansion stage with the standard printing unit drive technology is described pretty well by the abbreviation PPL: “Power Plate Loading” is a semi-automatic plate feeding system. This system, which is indicative of the state of technology used to date in this area, automates the plate loading and removal. With reduced setup time and efficiency increases with newspaper printing machines with end-to-end plate mounting channel, the semi-automatic PPL enables time savings of approx. 50 percent – provided the technology is robust and extremely fail-safe, as it is at manroland. The plates can then be changed in just three minutes.

APL – the most efficient option

Beat the existing APL solutions – that was the goal the manroland engineers set themselves. manroland is the world’s second biggest manufacturer of printing machines and the global market leader in the web-fed rotary offset area. Specialists currently work at the Augsburg site with letterpress on a fully automated system for printing plate changes. APL (“Automatic Plate Loading”) helps the team in Augsburg live up to its claim of being the innovation drivers of the entire printing industry. Proof is provided by the company’s numerous inventions, established all over the world – from the first German illustration rotary printing machine and Europe’s

biggest high-performance rotary printing machine, right through to the ground-breaking machine concepts (LITHOMAN) and electronics projects in control station technology (PECOM).

manroland’s APL module was presented to the public for the first time at DRUPA 2008 and implemented and tested first of all with a COLORMAN user in Saarbrücken, Germany.

APL is the Augsburg-based company’s double redundancy solution, because if a fault occurs during fully automatic operation, a change can be made to PPL (semi-automatic) any time, and manual operation is also possible if required. manroland therefore provides the operator with freedom of choice when loading printing plates. This ensures that the cylinders can be loaded with plates in every operating and fault status and the print process can start, even if PPL automation is stopped.



Pict. 2: Mechanically stable Automatic Plate Loading (APL) system handling printing plates

Reliably guarding APL processes

The APL system is a spaciouly dimensioned robot system (pict. 2) for fully automatic printing plate loading in printing cylinders (pict. 3). Because of this dimensioning and

the high volumes in combination with the high speed with the printing plate change, the engineers planned for a danger zone guarding, which was implemented with Leuze electronic Safety Light Curtains.

Extremely long-life and versatile sensors are used with the self-testing type 2 SOLID-2E Safety Light Curtains in accordance with IEC/EN 61496 and SIL 2 in accordance with IEC/EN 61508. This reliable technology is the prerequisite for high system availability and achieving production targets in newspaper printing. At the same time the increasing cost pressure of global competition also requires an economical safety system. Meeting these key requirements was critical for manroland in selecting the self-testing SOLID-2E Safety Light Curtains.

SOLID-2E Safety Light Curtains boast a robust housing design and high interference immunity. Even the ink mist that frequently appears in the printing cylinder area has no effect on the reliability of this safety solution.



Pict. 3: Winding the printing plates with the APL system

Various resolutions and functionalities enable cost-optimized solutions with the most diverse applications with SOLID-2E. These Safety Light Curtains are predestined for hand and arm protection and detecting the presence of people (danger zone guarding). The slender and robust aluminum housing with



Pict. 4: Manual loading the printing plates before starting the APL system

only 30 x 34 mm cross-section allows the Light Curtain to be ideally integrated into the printing machine's casing.

The APL safety system based on SOLID-2E has already been approved by health and safety at work authorities. The SOLID-2E signal analysis on the safety switching outputs (pnp transistor outputs) is two-channel. The restart interlock is performed by the machine's PLC, but this function can also be performed at any time by the SOLID-2E Safety Light Curtain itself. The SOLID-2E Safety Light Curtain is enclosed to protect it from damage by mechanical effects that can occur during changeover work. When changing the printing plates they must still be placed into the loading area by hand and the already used plates must be removed.

In a normal application with a typical user the operator changes the plates about three times per shift on average – a very important reason for full automation, as a lot of time

can be saved here. Newspaper printing in particular stands to gain from the advantage that automation provides of being able to take out and replace individual plates automatically, i.e. very quickly. This provides great flexibility with production and also means more up-to-date reporting.

Plate changes at the touch of a button

After the operator has loaded the new plates and removed the old plates (pict. 4), they leave the printing cylinder area and confirm the status on the operating console, which is located at the front of machine. After this release a check and the signal controls are made on the control panel, and the fully automated PPL plate change can start. The swivel arm developed together with KUKA (KUKA supplies the drives and control unit; the mechanical/kinematic components come from manroland) moves to the plate supply container and picks up the pre-programmed number of plates with its suction cups (pict. 5).



Pict. 5: Removing the printing plates

It then swings directly back to the cylinder (pict. 6) and places the plates, similar to how an operator would do it with the PPL process – but much quicker. The cylinders already begin to turn while the swivel arm is returning to its rest position, and the print process starts.

Good prospects for success

manroland competitors do not have any comparable concept to speak of. Most cylinder offset printing machine manufacturers offer a “cartridge” solution at the moment. Such solutions do not, however, provide the high level of flexibility achieved with the APL solution. The APL module can also be easily removed when upgrading existing systems – completely in line with manroland’s policy of setting up printing systems in modules and designing them to achieve the highest level of efficiency. Leuze electronic Safety Light Curtains on the printing plate



Pict. 6: Loading the printing plates into the cylinder (left) with the APL system

changer are a deciding element in the implementation of this strategic concept.