



Robot to Press Synchronization

Industrial IT Software



Enhanced functionality for robots

Press Synchronization is the new software function whereby the robot's Tool Centre Point (TCP) will automatically move synchronized with the press. The robot will follow the press sensor speed so that the robot will reach programmed positions when the sensor reaches its programmed external position at the press. Therefore synchronization with the previous press during the unloading movement allows the robot to arrive inside the press precisely when it is opened enough.

This new software functionality added to the interpress transfer robots brings important improvements to throughput, operational simplicity, maintenance and safety in your press line. These benefits are achieved by means of an easy upgrade of the software and the hardware. The required components are: new software functionality in the robot control, a link to an external encoder and an encoder mounted on the press mechanics.

Sensor Synchronization is corrective and predictive: It predicts sensor position in the next calculation step and corrects the programmed robot speed according to this prediction.

Over the last two years ABB Press Automation has installed dozens of Press Synchronization systems and some of them have been working to the forecasted targets for more than one year. In a short period of time, the return of your investment is surely guaranteed.

One of the main benefits achieved from including the Sensor Synchronization operation in interpress robots is the increased productivity of the stamping line. The robot will arrive just in time to unload the previous press, reducing the time needed to perform its sequence of movements. If the line bottleneck is in one of the interpress robots, the improvement in the cycle time will be directly reflected by the cycle time of the whole line and therefore its productivity.

Synchronism makes the line self-adaptable as it automatically restores the rate when it recovers from possible disturbances in its operation. The line productivity optimisation procedure has also been able to be enormously simplified, to the extent where it can be carried out by not highly expert personnel with highly satisfactory results.

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In the Robot Teach Pendant, the necessary functions have been added to operate with the synchronisation operation. In this way, an operator not expert in robot programming can activate or deactivate the synchronisation and even optimise the line without this meaning that production has to stop.

The maintainability of the line is also improved by the robot-press synchronisation. Fewer corrective actions are needed as the robot has to stop fewer times in front of the press before unloading it, so there is less mechanical and electrical wear. Obviously, this also gives energy savings as the number of starts and stops the robot performs during its working cycle is reduced.

The improvements in productivity, operativeness and maintainability of the press line achieved thanks to this function does not penalise at all its safety. As a direct robot-press link is established, the safety conditions and the robustness of the stamping line are increased. Safety functions have been developed on the level of hardware (immediate detection of unexpected stops of the press during the stamping cycle) and software (online supervision of the position of the robot with respect to the press). This significantly contributes to guaranteeing the integrity of the line devices against all possible situations that might arise in a press line.

Other features

Visibility. Being the sensor in the press an additional mechanical robot unit, is now possible to continuously track the most important variables in play: speed, position...

Accuracy. As some presses can change speed during a single stroke, a continuous supervision of the press position is required. The robot has to arrive at the same time as (or later than) the press arrives to unload in under 30 msec. If the robot cannot arrive in this time, it will move at full programmed speed. In this case, the robot has to go through the position with no time penalty.

Quick Line Restart. If any of the safety functions have to be executed, the robot is capable of resetting its working cycle without any need for special actions to be taken by the operator. The line is thus immunised against all situations that might arise, but without penalising productivity.

Reversibility. On press lines where production can run in both directions, Robot to Press Synchronization could also be installed due to the fact that it is possible to connect two encoders to a single robot.

