

# Smart production in a sales order-driven production process



**KOMEXO**  
ERP BUSINESS SOFTWARE



## Smart production in a sales order-driven production process

Developments in the Dutch manufacturing industry require a change from manufacturing companies. Instead of mass production, the production of unique items becomes increasingly important. That is why HP Valves, manufacturer of high-pressure valves, decided to completely change its production process and start manufacturing SMART when building its new factory. All processes have therefore been redesigned with the help of Komexo. We also took care of the development and implementation of all software at HP Valves and its subsidiary Key Valve Technology in South Korea.

### Construction of a new factory

From October 2015 till September 2016, HP Valves had a completely new production facility built at Thales' High Tech Systems park in Hengelo. From early 2016, Komexo was involved in the transformation of the company's logistics processes. We also thought about adjusting the product structure and taking care of system integration of the Isah ERP and other systems, such as:

- Unmanned fork lift trucks (AGVs)
- Rail system (Caldan suspension system)
- Industrial laser printer (laser marking metal plates)
- Pin stampers (applying 2D bar code to product)
- Multiple spray booths
- Pick to Light assembly tables

In addition, various web applications have been developed that are linked to the ERP system. Through these applications, HP Valves receives specific data about what is happening on the work floor and this data can be fed back to the ERP.

# HP Valves systems



From a form of mass production, HP Valves switched to a more paperless and 'one-piece-flow' system. In the new process, every valve produced is unique. Each separate item can be fully tracked: from oven via assembly and spray painting to expedition, until it is finally in its crate for transport. In this whitepaper we describe the steps that a semi-finished product goes through in the HP Valves factory and the role of applications in this process.

## Applying 2D codes with pin stampers

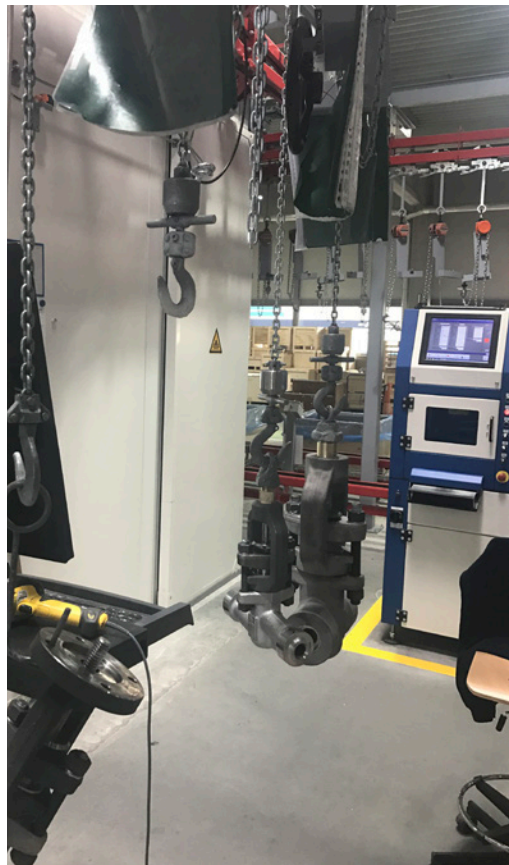
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To enable reading the half-finished products, a unique 2D code is applied to each product entering the process. This is done at the machining centres, where a robot arm offers the product to a pin stamper. From the ERP, this pin stamper extracts the unique serial number to be assigned. Then the 2D code is stamped into the material. A camera reads the 2D code. If this is correct, a signal goes to the ERP system.

You can read out the code at various processing locations with (mobile) scanners. This makes every product traceable throughout the production process.

### Application

Get serial number from ERP and link 2D code.



## Caldan overhead conveyor system

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HP Valves uses a Caldan overhead conveyor system in the production process. After heat treatment in the oven, each half-finished product comes into contact with the Caldan system for the first time. This system knows which hook is available to pick up a product. By scanning the 2D code of the semi-finished product, a link is created between the rail system and the product. This makes it possible for each product to follow its own route through the factory.



Based on the workpiece list in the ERP system, a translation is made to the route to be followed for each product type. The information contained therein (identified by its 2D code) determines the route. Thanks to the link, the Caldan system knows at each crossing or processing location whether the product must be halted, or needs to follow a different route.

### Application

Making a link between rail system and half finished product for the route to be followed.

## Choosing the right assembly table

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There are several assembly lanes in the factory. Depending on the diameter, a product automatically goes to the correct assembly line. Once arrived, the ERP system receives a signal, after which a routine is activated that automatically presents an xml-file to the editing table. This file contains information about the bill of materials, which items have to be

### Application

ERP system provides xml-file on assembly at the assembly table.

mounted where, and which is the 'tightening torque' for the automatic torque wrench.

## Integration with the Pick to Light system

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The assembly table where the product ends up is divided into four logical assembly zones. Thanks to the Pick to Light system it is relatively easy to assemble the valve correctly without a drawing.



### Application

Activating routine Pick to Light assembly table for correct assembly.

This is how it works: trays with materials are in a rack with a light at each tray. Based on the xml-file from the ERP, the lights will light up at the trays with the material needed for this product. This starts with zone 1, and continues to move to the next zone after completing a part. At the end of the assembly table, a pneumatic torque wrench is placed on the product and the whole is automatically fastened with the correct tightening torque from the xml-file.

## Test bench

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After assembly, the product is tested on a test bench. The test data is obtained from the ERP. After completion, the test results are written back to the ERP. The product is then reconnected to the rail system by scanning the 2D code, after which it is back on its way in the production process.

### Application

Feedback test results to ERP.

## Final check

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Depending on the type of valve (manual, pneumatic or electrically operated), the product continues its journey towards final inspection. Once there, a signal is sent to an industrial laser printer. This printer is equipped with cassettes holding 12 different types of type plates. Thanks to a link with the ERP system, the printer can automatically offer the right cassette to the laser based on the article in the bill of materials. The information is then laser marked directly from the ERP onto the type plate.

With most products, the printer produces multiple type plates in different sizes. The 2D code is also printed on a new type plate as the previously marked code is hard to read after spray painting.

### Application

Select correct cassette based on 2D code and related information in ERP.



## Spray Painting

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The laser marked plates arrive on the conveyor system in a tray and continue to the paint shop with the product. After the processes of 'degreasing' and 'masking off', the product automatically leaves to the right buffer for one of the 3 spray booths.

### Application

Communicating paint scheme and spray booth per product.

In the ERP the paint scheme is linked to the paint present in the spray booth. Using an application, the active paint in the spray booth can be communicated with the ERP system. Adjustment is possible until the last moment.

After spraying and drying, the plates are mounted on the product. During final inspection, the product is thoroughly checked based on data from the ERP system in the client-specific application of HP Valves.

## Gatekeeper

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During the process, the shipping department can assign each product to its own "gate" in a web application developed for them, called Gatekeeper. The gates are 28 endpoints linked to the sales order. By assigning the gates to sales rules in the ERP system, products automatically reach the right end station.

A lot number is assigned to the crate where the products arrive, which is also linked to the ERP system. Once they have arrived in the crate, the products are scanned one last time.

As a result, they are linked. In the ERP system the logistics department can automatically see that the products are ready for shipment.

### Application

Assignment of sales rules with which products automatically arrive at the correct end station.

## Link between ERP system and AGVs

In the renewed production process, Komexo created a link between the ERP system and the AGVs (Automatic Guided Vehicles). This link ensures that every movement of goods from and to the high-bay warehouse is offered to the 'MASS software'. This software communicates with the lift trucks. After processing an order, this is fed back to the ERP system. This makes administrative logistic handling well-organised and simpler.

### Control everything on site

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Assignments to the AGVs are initiated, among other things, by purchase receipt, production receipt, material issue or stock posting. Depending on the parameters in the ERP, goods are put in the right place in the high-bay warehouse. This takes into account dimensions, weight, turnover speed and other factors. Employees on the floor have PDAs with which they can control everything on site.

### Would you like to know more?

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Would you like to know more about the implementation of ERP software at HP Valves? Please contact **Edwin van Wezep**.



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