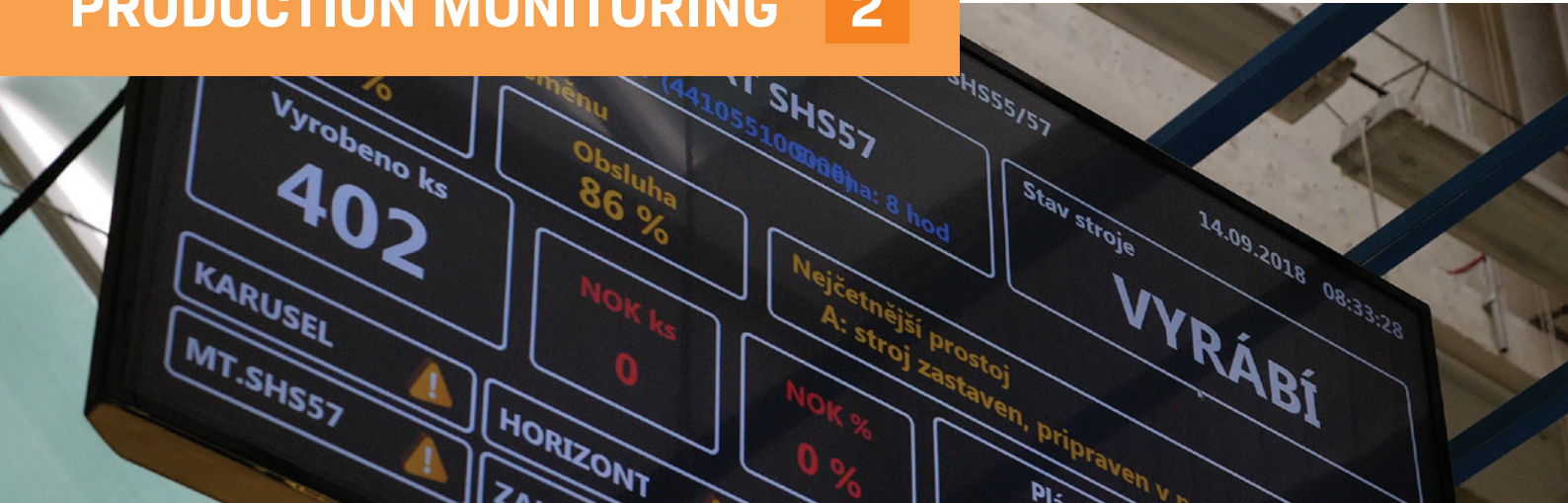


# PRODUCTION MONITORING 2



## Production visualization

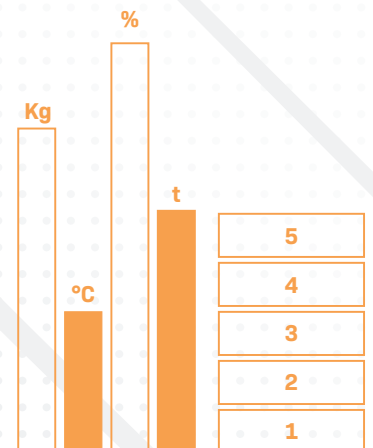
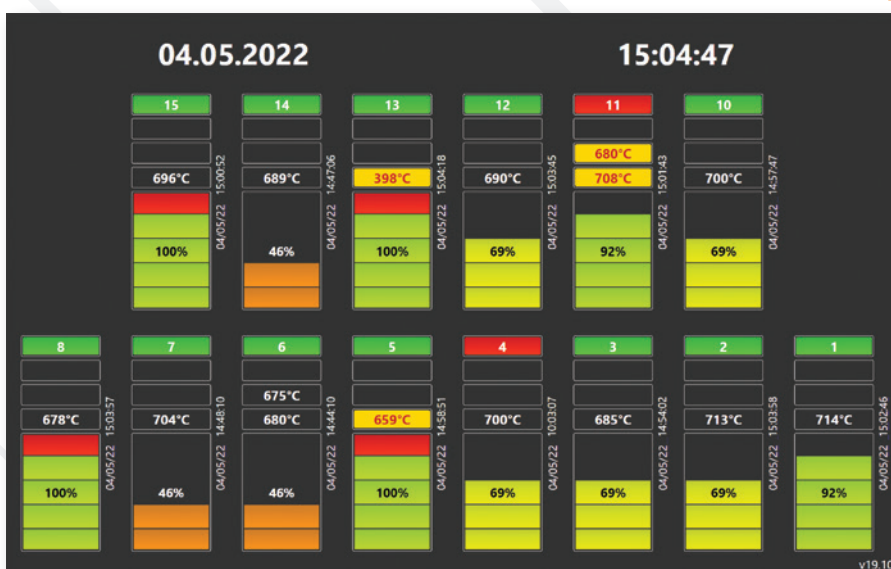
Display options of production information:

- » Large ANDON visualization screens (located above the production line) which contain selected information about the progress and status of production, the state of technology or individual machines
- » visualization terminals at each workplace
- » beacons
- » information in the plant intranet system

Further possibly displayed information:

- » Currently planned and actual number of produced pieces
- » Current difference in the quantity of produced and planned pieces
- » Required production rate
- » Type of currently produced piece
- » TPM time reporting for operational maintenance, breaks, OEE values, production line failures, downtime, supply shortages, etc.

In general, it is possible to visualize any necessary production-related information according to the management's wishes.



## Production genealogy

### Mass production

Addresses the manufacturer's obligation to record the values of key production parameters on a long-term basis and keep them for the purpose of monitoring compliance. Such a need arises during a customer audit or in the case of forward or backward traceability when analysing a manufacturing error to determine measures to prevent its recurrence. It includes a robust network infrastructure for long-term reliable operation with large data flows (typically hundreds of GB/month), as a failure in data collection will cause production to stop in this case. It uses information from the production technology, recorded in the "Process Parameter Monitoring". The main objective is to ensure lossless data transfer to the central storage and therefore a three-layer system architecture is used:

In the case of adding external sensors to the machines, the lowest layer consists of data concentrators that collect data directly from topologically close PLC/PCs. The data concentrator adapts the format of the acquired data to the universal data interface for the "Production Line Server" connector. Advanced machine control systems are usually equipped with an interface that can be directly connected to the "Production Line Server" connector.

The production line servers are connected to the highest layer, the central cloud servers, which are usually managed by the customer's IT department. Each layer is capable of autonomous operation in the event of a communication failure. When the connection is restored the data is automatically transferred without loss. The operation of the system is therefore not directly dependent on the continuous functionality of the computer network in the production plant.

### Small series production

For small series and piece production (e.g. cable cars, elevators), MES PATRIOT offers the "Product Datasheet" module. This module records information from the initial customer requirements at the time of demand (order parameters) through critical production parameters, output tests, acceptance and handover. It is also possible to record operational data, owner data, warranty and service interventions, repair and reconditioning data.

The screenshot displays the MES PATRIOT software interface, which is divided into several sections. At the top, it shows the current production status: "Probíhá výroba" (Production in progress) for order number "270.2506.351". Key details include the machine "Mischer 170", the product "TacoSol Circ ZR 1.5-6 l/min TacoFlow3 GenS+KFE3Weg", and the operator "P. Kalivoda F. Vomáčka". The interface also displays a table of production orders and a summary of production metrics.

Priorita	Č. zakázky	Č. operace	Č. výrobku	Výrobek	Datum dokončení	Vyrobeno	Zbývá ks.	Celkem ks.
1	MRO119795	100	270.2506.351	TacoSol Circ ZR 1.5-6 l/min TacoFlow3 GenS+KFE3Weg	18.04.2023	0	75	75
P	MRO119842	100	223.5203.000	logMetr Rectars 1/2" 0.6-2.4/min O-R. 18.7x1.78	31.08.2023	0	10	10

Summary metrics shown in the interface:

- Okamžitý plán: 0
- Výkon: --- %
- Vyrobeno OK: 0
- OEE: --- %
- Aktuální stav zakázky: 0 % (0 / 75 ks)
- Směnový plán: 0 % (0 / 85 ks)

Buttons at the bottom include: Prostoje, Plán výroby, Přehled výroby, Odepať výrobu, Odhlásit pracownika, and Odhlásit všechny.