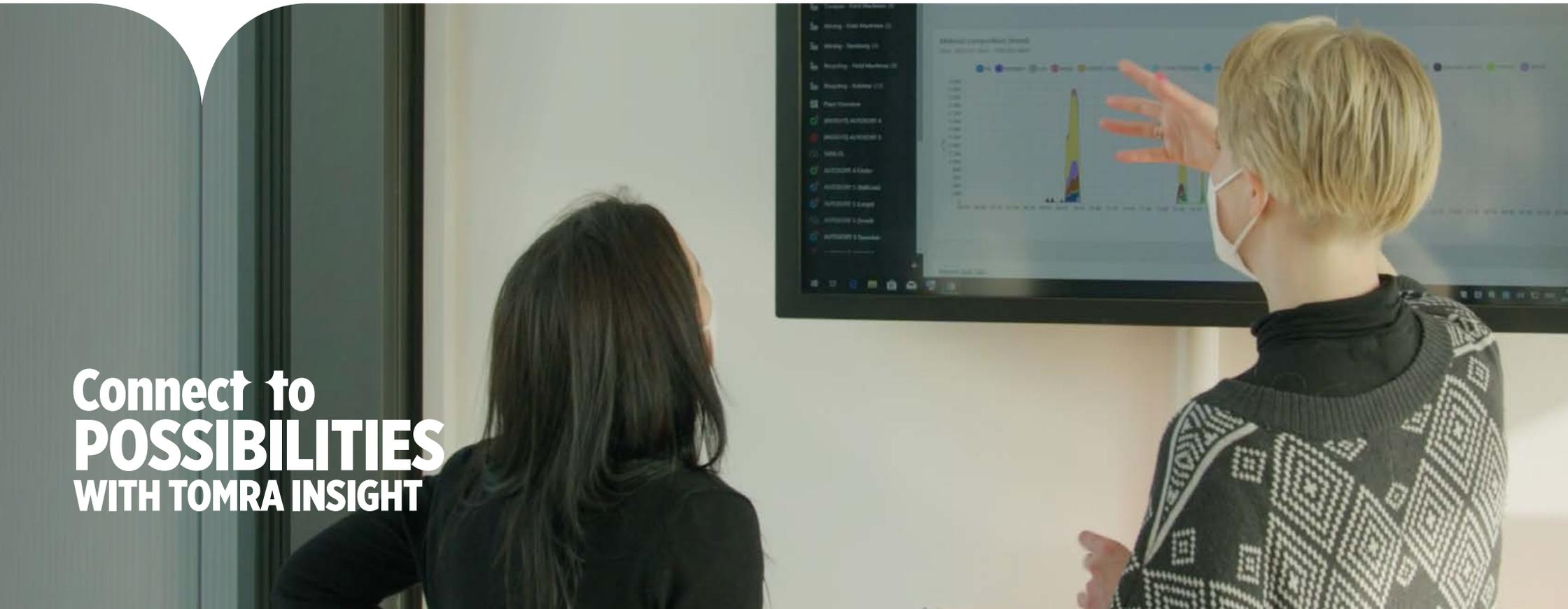


eBook



WHEN SORTERS BECOME DATA GENERATING MACHINES



Connect to
POSSIBILITIES
WITH TOMRA INSIGHT

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eBook

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THE TIME BEFORE DATA



Do you remember the time when a phone was just for making calls? Or when you unfolded maps from the glove compartment of your car to plan a trip? Routine tasks took some time and effort. But you didn't mind, because the job got done and that was just the way things were. Possibilities were limited because data wasn't everywhere. Today it is.



Smart technology tells you which route to take as you remain behind the wheel. It can even help you avoid traffic jams or tell you where to stop for gas or coffee. It shows you where to park and which train or bus to take and continue your commute into the city.

Modern kitchen appliances can almost do the cooking for you. Smart thermostats optimize your indoor climate and your energy consumption based on your routine. Streaming services bring you the music you like even if you haven't heard it before. And dating services – should you be looking – will propose you the perfect match, all based on crisp, clear data.

So, considering all these new possibilities, why should sorting stay behind? Across continents and industries, sorting technology is more than ready to take a big leap forward thanks to the use of digital platforms.

And we all stand to gain. Because a better use of data means better sorting. And better sorting means more efficiency. Higher yields. Less waste. Improved recyclability. The possibilities are almost endless for those willing and able to connect.

Connect to POSSIBILITIES

Today, **digital sorting data solutions are in full development**. No matter what type of produce or materials you are sorting, they enable you to **connect to new possibilities**. These possibilities will help you get the best results out of what your sorters can do. And that ... is more than meets the eye.

Because, whether you manage one sorter or multiple machines or lines, **every sensor in your sorters is a great source of information**. Think of it this way: the sensors in your sorters act as all-seeing eyes that inspect your products or materials, and then steer the appropriate action to be taken, with accept or reject as the most obvious example.

But in fact, the sensors do a lot more. They **collect and store** every piece of information about what they see. And this information can tell you a lot about how your machine is performing, about the products that pass through it, and about your process.

Am I using my sorter's **uptime capacity** as efficiently as possible? What is the **condition** of the parts? Did the machine encounter any issues and, if so, what was the cause? But also: what is the **size, purity, or quality** of the product that I am sorting? Is it evenly distributed on the sorter? Are there any anomalies that I should address?

Imagine the answers to all these questions, for any given time or machine, automatically flowing out of one easily accessible system. A system that processes the raw data and visualizes them into **ready-to-use information** that you can use to **monitor and optimize** your operations.

Curious? Continue reading!

Before data

You and your team periodically check the metrics on each sorter or in the process control system and record the information manually. This gives you valuable information but does not provide a full overview.

After data

The metrics for all your sorters come together into one comprehensive digital dashboard and can be consumed directly by other systems of yours. You can monitor and compare different lines, batches, or time slots.

PROCESS CONTROL SYSTEM

VS

A DIGITAL SORTING DASHBOARD

SCADA® System controls the process and visualizes related alarms, performances, and control parameters

PROCESS CONTROL SYSTEM



Sorting dashboard enables advanced analytics based on much larger data sets and time series

BUSINESS CONTROLS

TURNING SORTERS INTO CONNECTED DEVICES



Before we dive into the actual data your sorters can generate, let's quickly look at what you need to collect, store, and use this data.

The good news is you can benefit from digital sorting data with a minimal impact on your company's IT resources. Because some of the leading solutions on the market are fully cloud and web-based, there are no applications to install and no servers to maintain. All you need is wiring and a stable Internet connection.

A central connector cabinet brings your sorters online. This connector cabinet is a piece of hardware that is installed locally and connected to your sorting equipment via ethernet cables. It collects data from your sorter(s) and connects them to the sorting dashboard through a tightly secured gateway.

Here, the data solution's software stores and processes the data coming from your sorters. All data is visualized in a monitoring and reporting system.

Network layout



Web-based cloud access on any desktop or mobile device

The data portal itself can in most cases be accessed through a simple web browser. This means that it is available on any device connected to the Internet, so you and your team can enjoy the comfort of working with your sorting data anywhere and anytime, on a desktop computer or a mobile device. Almost endless possibilities are right at your fingertips in an easy-to-use and intuitive interface.

Before data

Following up and reporting on sorting operations was done based on metrics tied to the machine, on-site observations, and manual recordings.

After data

Smooth, company-wide communication and collaboration is facilitated by automatically recorded, remotely accessible, and objective data sets.

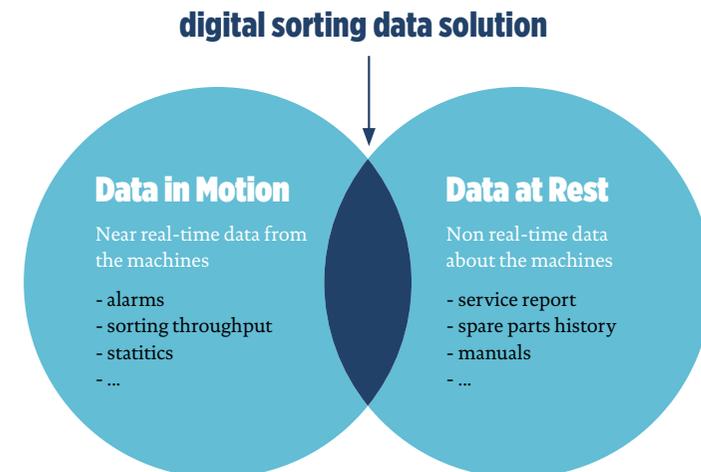
THE TWO TYPES OF DATA YOUR SORTER CAN GENERATE

To uphold their promise of enabling one comprehensive overview of all information, metrics and statistics relating to your sorting operations, digital data solutions combine, process, and visualize data sets from different sources.



To fully understand what this data can do and where it comes from, we can distinguish two main types of data:

- 1 Data linked to the machine itself: we call this '**Data at Rest**' because it contains information that remains relatively stable and does not require near real-time updates and follow-up.
- 2 Data linked to the machine's operation: we call this '**Data in Motion**' because it contains a continuous flow of dynamic data originating from your actual sorting activity.



Data at Rest

Let's start by having a look at what machine-related info can be found in some of the leading sorting data platforms.

In most cases, you can consult data from two different sources for each individual sorter:

1. **Data that belongs to the machines themselves, such as documentation, up-to-date manuals, and service contacts**
2. **Data generated by the manufacturer's ERP system**

Generally speaking, the Data in Motion or machine-related data will most often include:

- **Documentation, service & operator manuals**
- **Service requests and reports**
- **Spare part history and web shops**
- **Best-practice guides**
- **Benchmarks & recommendations**
- **News & updates on available machine upgrades**

Tangible benefits

The main benefit of having all this information digitally in one place, is of course that all **maintenance and service-related activities** can be scheduled, managed, and optimized far **more efficiently**. By collecting and analyzing data such as service intervals and interventions, breakdowns and their root causes maintenance managers can start moving towards **predictive and condition-based maintenance**, which enables them to prevent unscheduled machine shutdowns.

What most companies appreciate, is the ability for staff to solve issues quicker thanks to a **better overview and availability of accurate information**. For instance, operators and technicians no longer need to waste time looking for the right machine documentation, as they have it digitally available on their mobile devices **anywhere, anytime**.

Before data

Sharing information between operations, service, maintenance, and purchasing was an administrative challenge sifting through paper-based filing systems in the office.

After data

Everyone involved has simultaneous access to correct, up-to-date, and shared information in one digital workspace.

Data in Motion

As you noticed on the previous pages, the benefits of machine data at rest are quite self-explanatory. But moving to the actual (near) live Data in Motion, things get really interesting.

You can imagine that, with near live information flowing from your sorters into a digital performance dashboard, a digital sorting data solution becomes a powerful reporting and decision-making tool.

To get a good understanding of what's possible, we will identify 4 categories of process data.

Before data

Quality management was based on on-site observation, laborious manual sampling, and time-consuming reporting & communication. Maintenance and service teams had to rely on their visual inspections and experience.

After data

Near live insights into the products as they are being sorted enables efficiency gain, tighter quality control and production optimization. The maintenance of the equipment can be optimized based on quantitative information.

Category #1: material composition statistics

For starters, material composition statistics visualize what the machine 'sees' after the classification. These graphs allow you for instance to monitor trends of input material composition, indicating purity levels, detected defects, and so on.

You can also:

- Monitor trends in the amount of infeed material
- Analyze significant changes in detection by the machine
- Identify misfunctions and analyze their potential root causes
- Analyze the influence of infeed fluctuance on the sorting performance

Working with these metrics, you get a good view on the nature and quality of the products or materials in your infeed stream.

Category #2: material distribution statistics

Material distribution statistics are a second interesting type of data. They visualize the distribution of material on the machine over time.

This allows us to:

- Monitor the material spread
- Monitor the influence of upstream mechanics on the spread of the material
- Optimize material separation
- Identify peaks in infeed

These metrics are an excellent tool to monitor whether your machines and processes are running optimally.

Category #3: sorting statistics

The actual sorting statistics visualize the calculated sorting fractions.

With this information, we can for instance monitor trends in sorting fractions and compare these to intended or planned benchmarks. We can also monitor changes over time based on different input material.

When used right, these statistics can become a powerful tool for quality management. Elaborating even further, they can help match product characteristics to specific customer requirements, or they can even be used to steer downstream processes such as by-production, washing or packing lines.

Category #4: machine health data

While a sorter is running, it does not only generate data about the product being sorted, but also about its own operational status, availability, and condition. Collected data such as vibration, temperature, and light intensity, combined with machine alarms and warnings, allows to monitor the performance of the machine, and predict failure of parts (e.g., valves, light bulbs, ...) or the machine. In most cases, the ability to anticipate when something starts to go wrong can prevent unnecessary downtime.

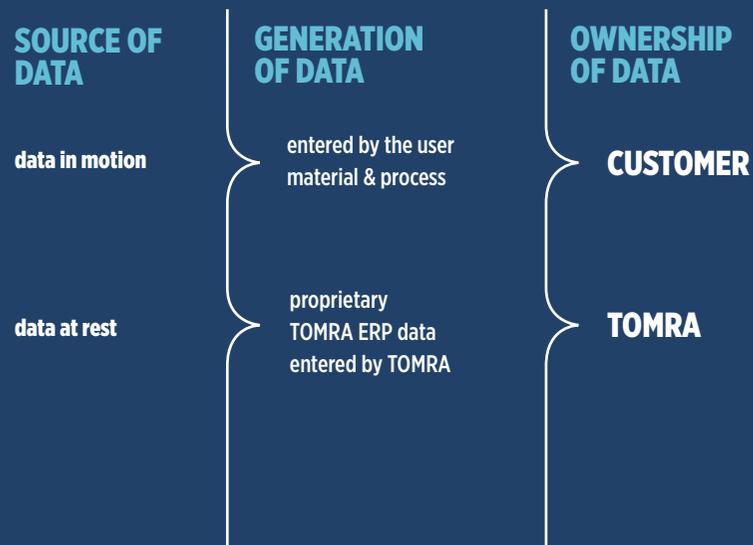
DATA SECURITY AND OWNERSHIP

With all this data flowing from your sorting equipment, you may wonder about the ownership and security of these digital information sets.

We are more than happy to set your mind at ease with clear answers. It goes without saying that – related to this specific topic – we can only speak for our own digital sorting data solution, TOMRA Insight.

Who does the data belong to?

In terms of data ownership, the schedule below should give you a clear insight into how this is set up. In a nutshell, data related to your product and operations remain yours. Data related to the functioning of the sorters remain TOMRA's.



How secure is your digital sorting data?

To go short: you can trust TOMRA's digital sorting solutions just like you trust your online banking application. TOMRA Insight is built and managed with a rigorous focus on data protection, that can be summarized in 4 important steps.

1. Built on an established cloud platform

TOMRA Insight is built on the most certified cloud platform worldwide: Microsoft Azure. This platform meets the broadest set of international compliance standards, such as GDPR, ISO 27001, HIPAA, FedRAMP, SOC 1, and SOC 2, to mention a few.

2. Tested on a regular basis

TOMRA executes regular penetration testing by recognized third parties. These audits ensure independent and up-to-date confirmation of our security measures' effectiveness.

3. State-of-the-art architecture and encryption

In terms of system security, the entire backbone of TOMRA Insight has been built according to a multi-layered architecture. This means that on the off chance that the system is penetrated, a second, third, ... protection level will prevent the intruder from entering any further. All data communication is monitored and runs through state-of-the-art encryption engines and is secured by expertly engineered push and pull concepts. Every customer's data is stored for 2 years minimum.

4. Airtight user management

To prevent the misuse of sorting data by human neglect, mistake or ill intent, the dashboard provides role-based user access management with strong password requirements for every single user within your organization. TOMRA also supports its TOMRA Insight customers with user training to create awareness and install best practices with regards to data security.

APPLICATION

IN THE FOOD, RECYCLING AND MINING INDUSTRIES

Two minutes after the production line starts, the purchasing manager checks the quality report and sees that there is 84% good product and 16% defects being kicked out. Suppose this is not in line with the agreed quality. In that case, the purchasing manager can work together with the grower to identify which defects were found (brown spots, rot, pieces of plastic or metal cans, etc.) and how to improve the quality of the next batches.

The plant manager trusts his night shift team but is reassured each morning when he sees that the night shift report confirms the team did a great job: they produced the agreed quantities at the agreed quality level.

The quality manager checks the charts with the incoming defect flow and ejected defect flows. If they are consistent and stable, he is assured that his packaged product's quality will be within the customer's quality specifications. When the sorting data shows a sudden peak in defect detections, the quality manager can quickly check the accept stream quality. This will reduce the amount of rework, customer quality complaints and call-backs.

The shift manager calls his vendor's service desk because the team needs to set up the sorters for a new type of crop from a new supplier, and his expert operator is at home. In an immediate response, the service engineer sets up a secured connection to the sorter and helps the shift manager set up a new program. Within an hour, the sorter is ready for the new crop.

The process manager discovers in the load report that when he optimizes the sorter's infeed, he can squeeze one more ton of product or material per hour over the sorter without impacting the sorting quality.

The sorter manufacturer's service desk observes an underutilized lane showing up for a certain period leading to a larger amount of product being circulated back to the sorter. Notifying the customer and scheduling a service visit to improve the line feed situation results in an increased throughput and higher sorting efficiency.

Operators report inefficiencies during the sorting process and unwanted material passing through. The process management team investigates the sorting data to detect the underlying issue and the impact it has had. Because the problem is pinpointed quickly and accurately, downtime can be avoided.



Do you want
to **know more**
about **TOMRA**
Insight, TOMRA's
digital sorting
data service?

Please visit tomra.com/insight or contact
your regular TOMRA representative to:

- Receive more information
- Schedule a personal demo session
- Request a risk-free trial installation

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