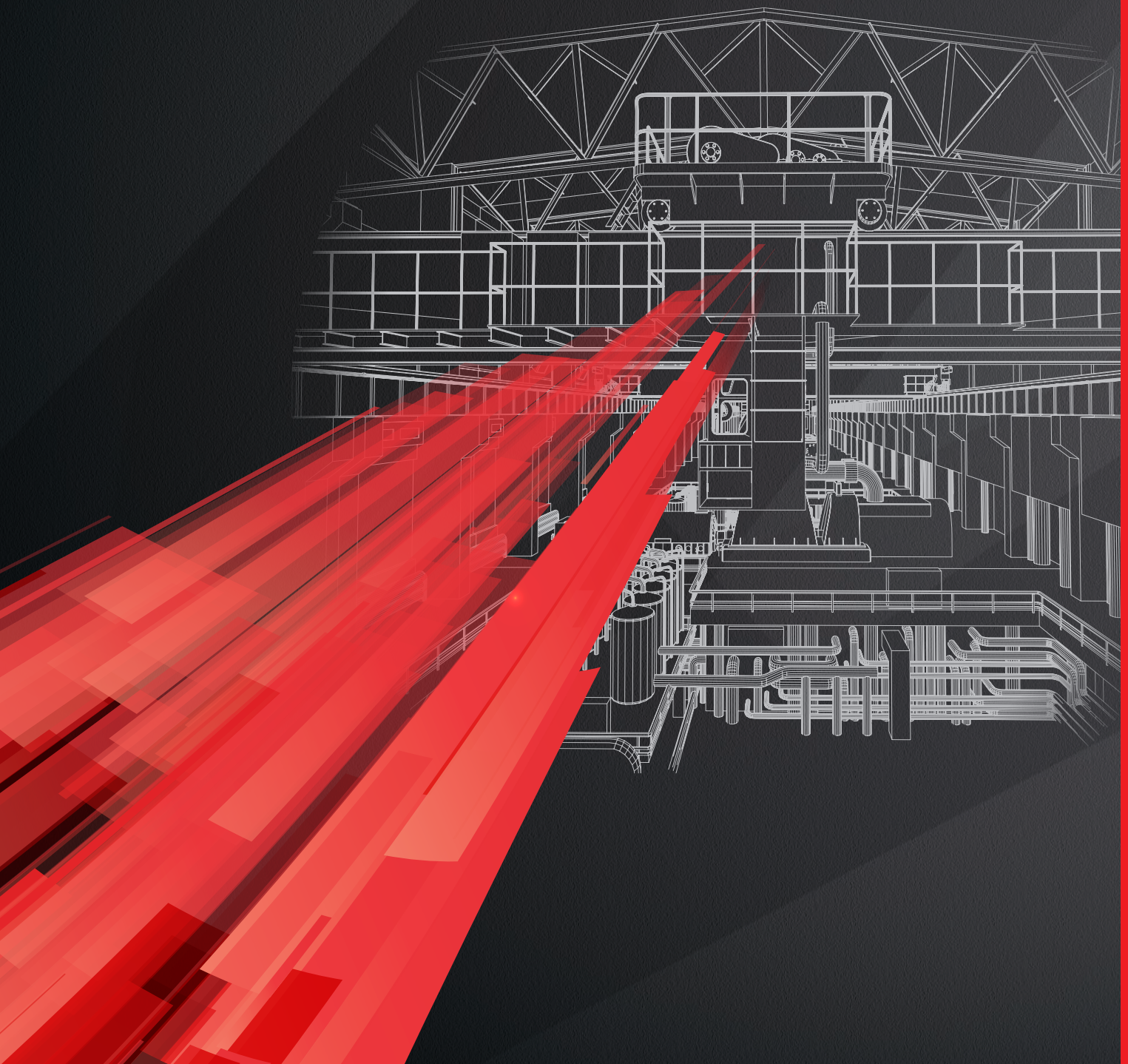


**PATLITE®**

# The KAIZEN Handbook

*~Solutions for Factory Improvement~*





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## Pressing

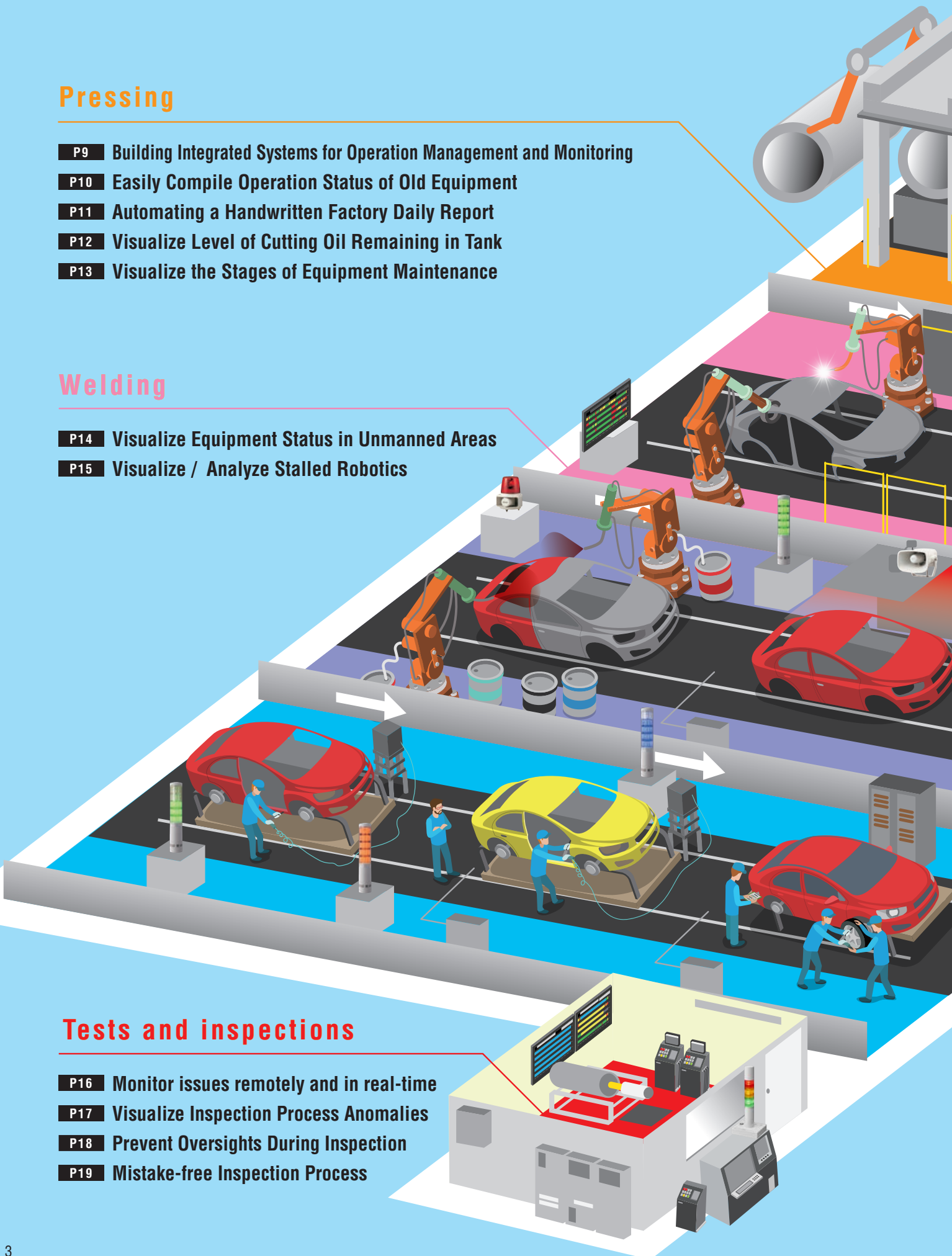
- P9** Building Integrated Systems for Operation Management and Monitoring
- P10** Easily Compile Operation Status of Old Equipment
- P11** Automating a Handwritten Factory Daily Report
- P12** Visualize Level of Cutting Oil Remaining in Tank
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## Welding

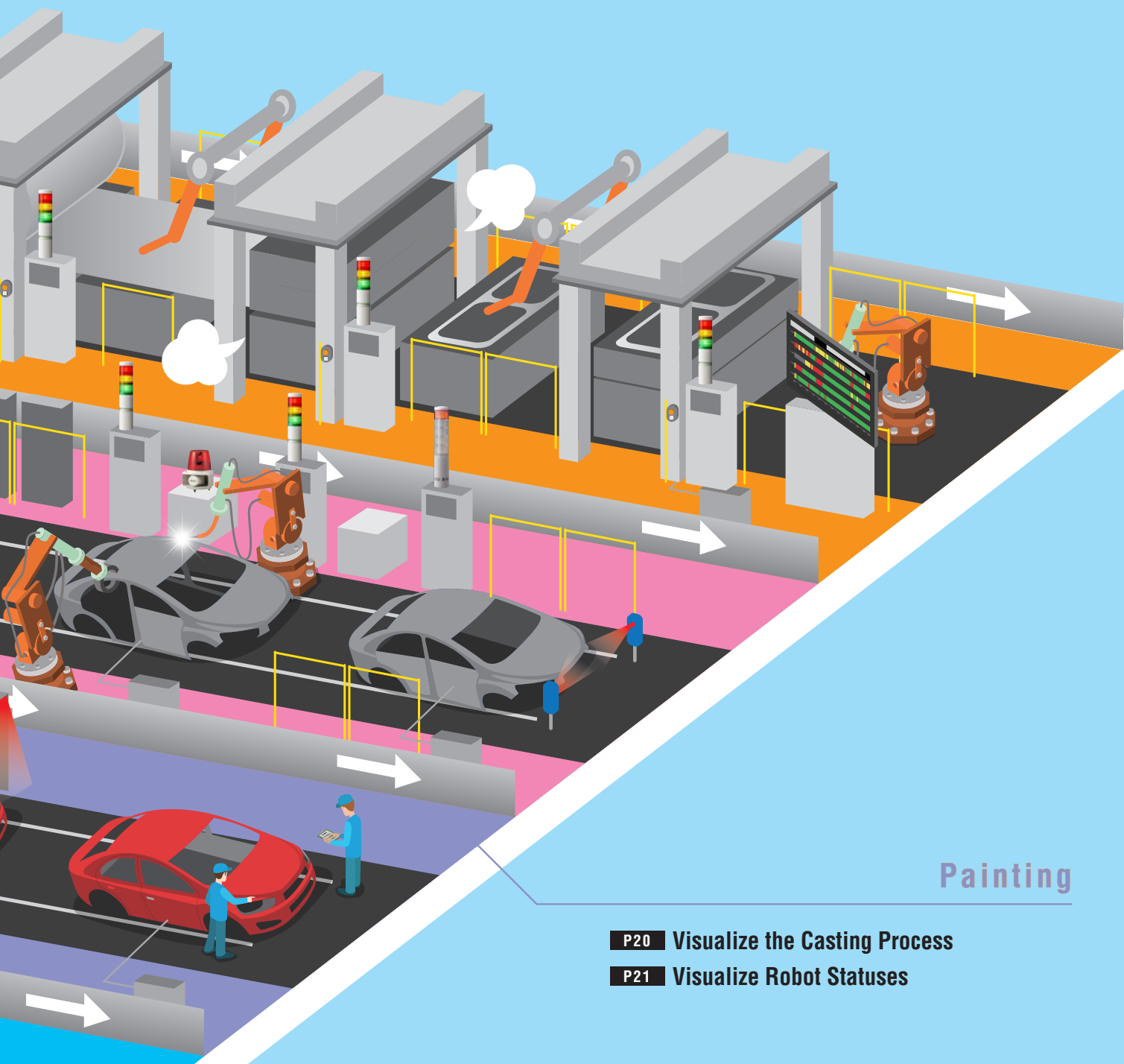
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**P31** Visualize Operation Panel Information

**P32** Improve Predictive Maintenance

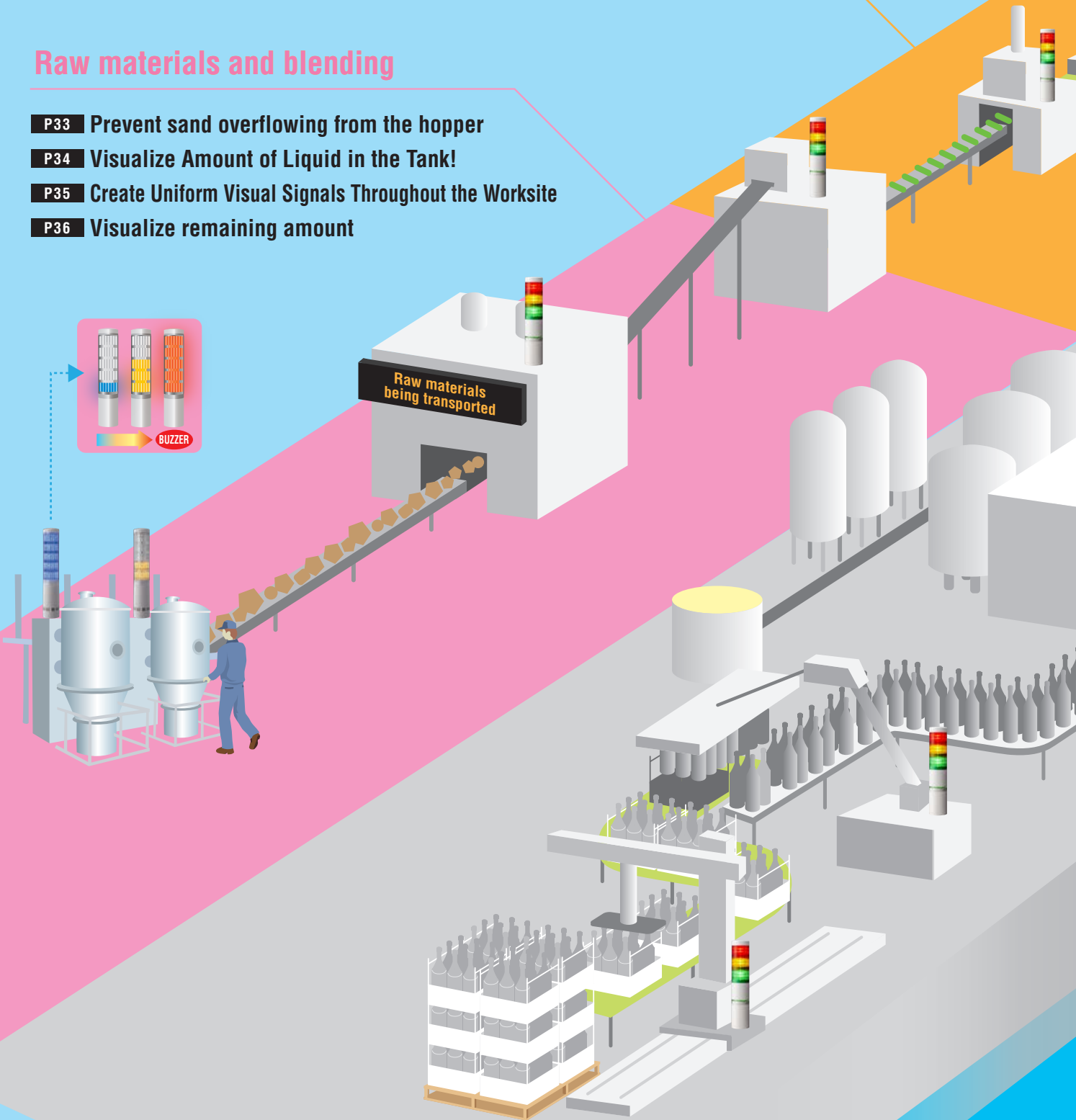
## Raw materials and blending

**P33** Prevent sand overflowing from the hopper

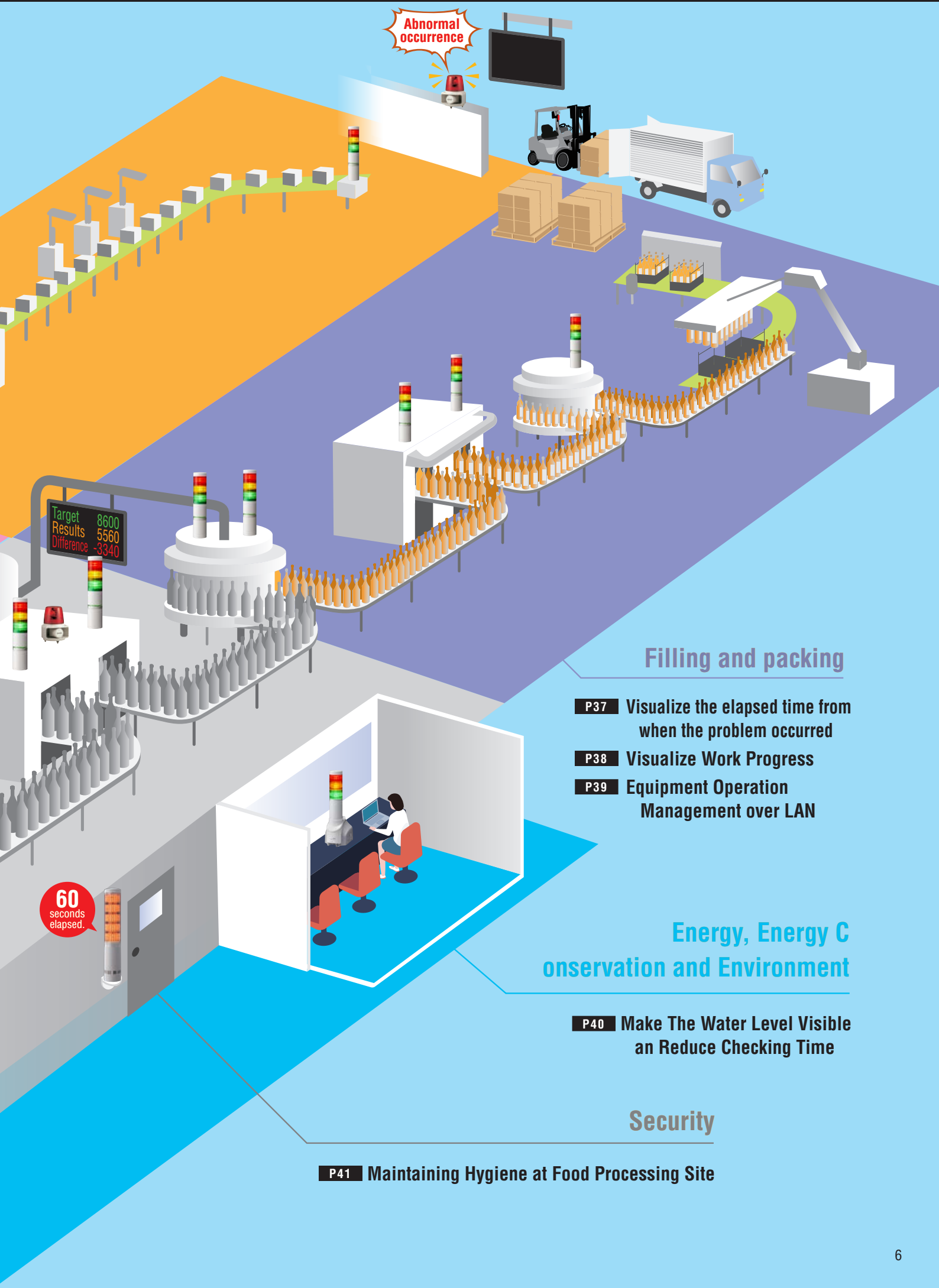
**P34** Visualize Amount of Liquid in the Tank!

**P35** Create Uniform Visual Signals Throughout the Worksite

**P36** Visualize remaining amount







Abnormal occurrence

Target 8600  
Results 5560  
Difference -3340

60 seconds elapsed.

### Filling and packing

- P37** Visualize the elapsed time from when the problem occurred
- P38** Visualize Work Progress
- P39** Equipment Operation Management over LAN

### Energy, Energy Conservation and Environment

- P40** Make The Water Level Visible an Reduce Checking Time

### Security

- P41** Maintaining Hygiene at Food Processing Site

# Scenario 3 Logistics

## Arrival of stock

P42 Simple Request System



## Storage of stock

P43 Air Conditioner Remote Alerts



## Sorting

## Shipment

P44 24-hour Network Camera Monitoring



## Management office

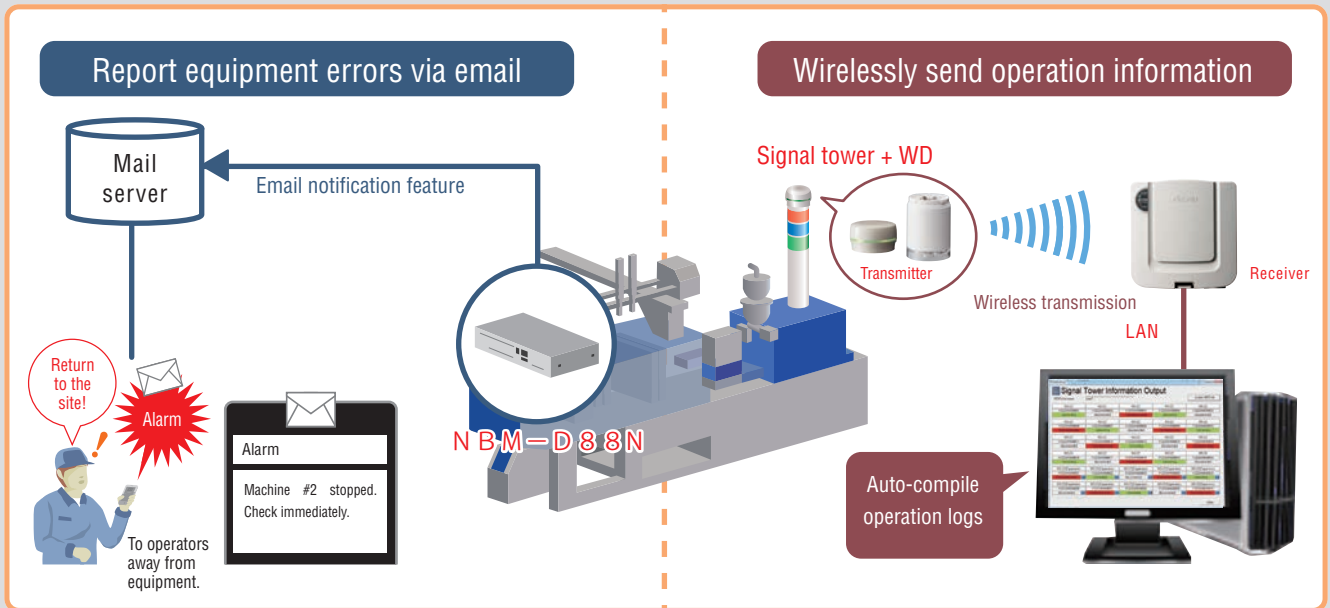
- P45** Remotely monitor server issues
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- P48** UTM External Attack Monitoring Solution
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## Picking

- P51** Notice print output as soon as possible  
Confirm print output has been received
- P52** Visualize Print Errors on Network Printers
- P53** Prevent Picking Errors with Pick-to-Light



# Building Integrated Systems for Operation Management and Monitoring



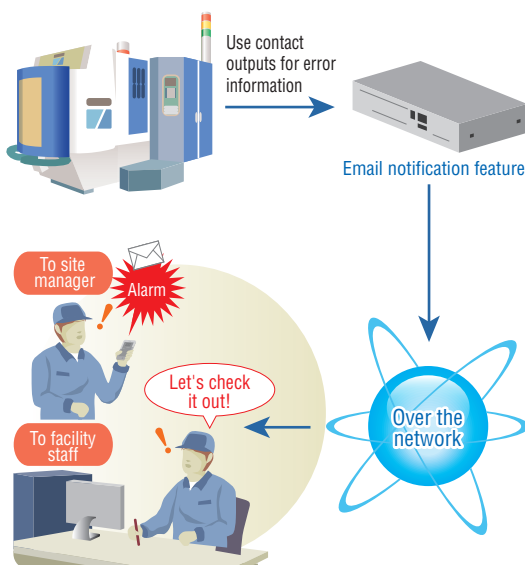
## Before

- With older equipment, it is difficult to build an integrated operation management and monitoring system.
- It would require remodeling the equipment so that it is compatible with the monitoring system, which is both costly and time-consuming.

## After

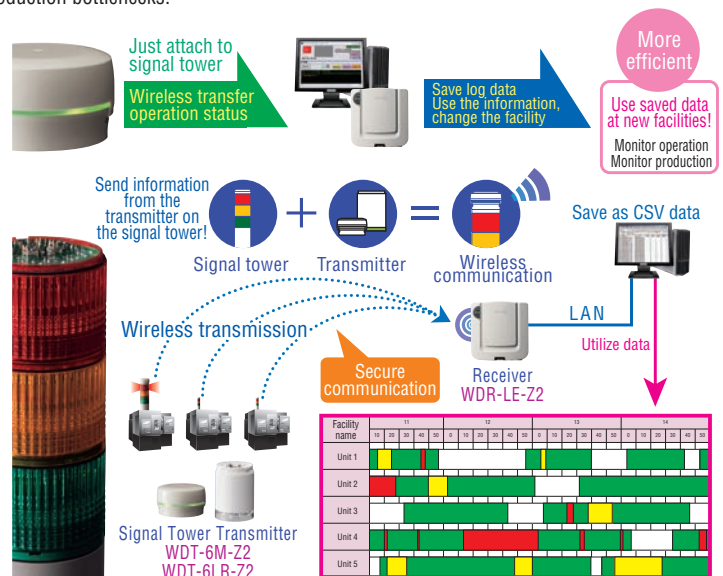
### Email alarms

With the WD installed in workstations, supervisors away from the site receive email alerts when maintenance is required.



### Operation Management

Automatically calculate and summarize operation logs based on the signal tower's color information (Red, Yellow, Green) using the WD-Z2 on the wireless network. Visualize overburden (Muri), waste (Muda), and inconsistency (Mura) in the manufacturing site. Practical and economical solution for data acquisition and analysis, as well as identifying production bottlenecks.



\* Separate application software is required.



# Easily Compile Operation Status of Old Equipment

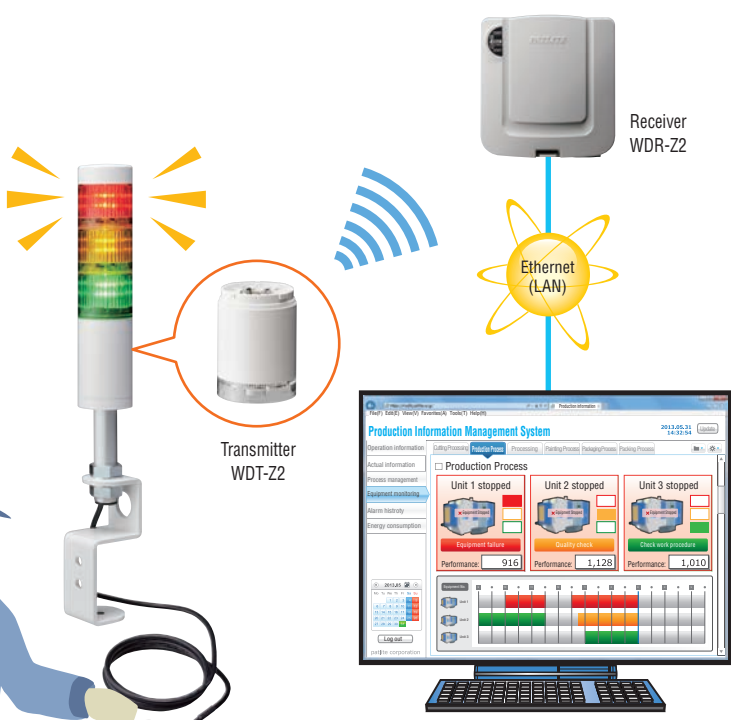
Reduce Labor

Stop (problem) → ● button  
 Change step → ● button  
 Return to normal ● button  
 The performance status of each unit can be recorded - No need for daily reports.

Unit 1 stopped  
 (equipment failure)

Too old to support IoT...

Red switch ON



Normal Setup Alarm  
 Total the Trigger Time and Accumulated Time of each

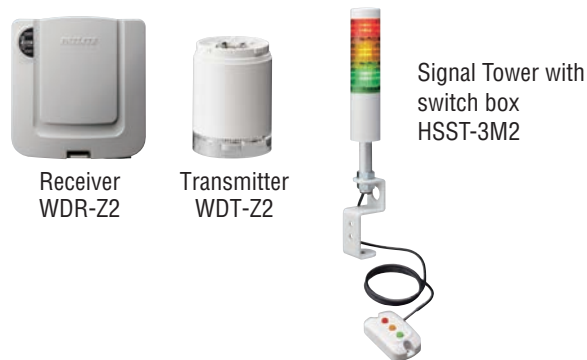
Find things to improve and increase productivity!  
 \* Separate application software is required.

## Before

Creating handwritten daily production reports can be cumbersome, time-consuming, and inaccurate. Furthermore, our machinery is old and does not support modern protocols and devices to send this data over the network.

## After

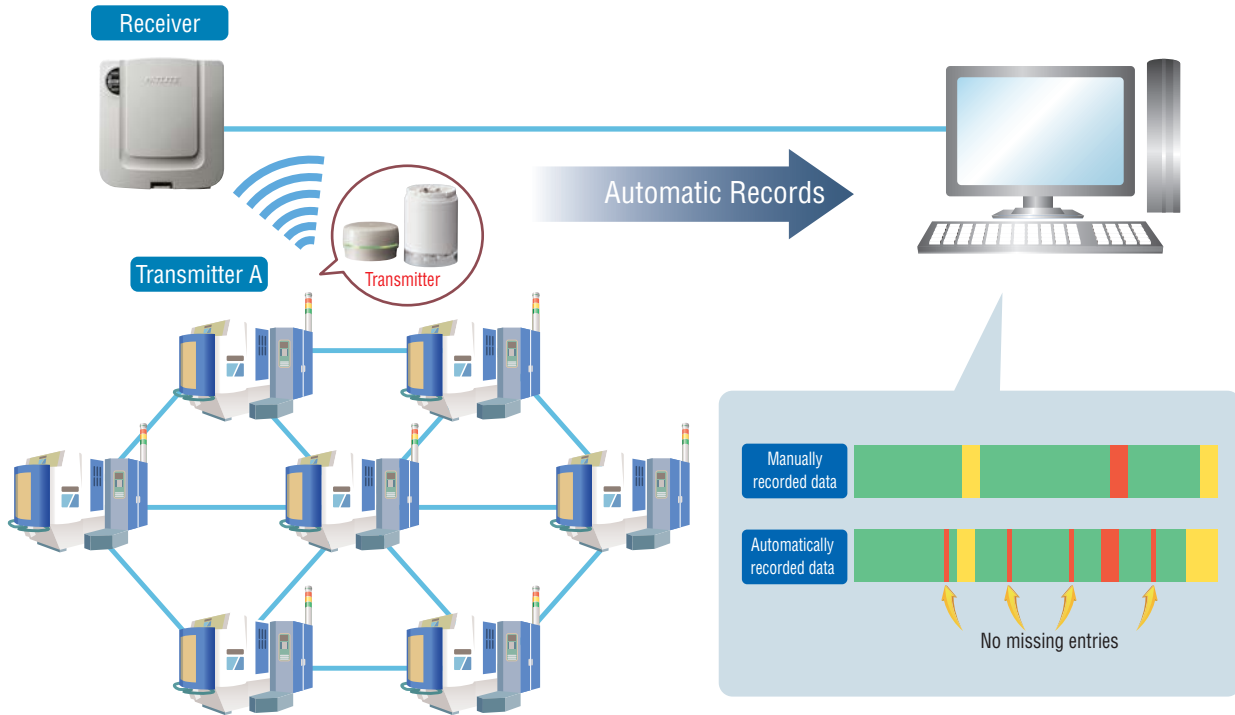
The WD System allows users to wirelessly acquire machine data remotely and in real-time, completely eliminating handwritten reports. The collected data is accurate and can be used to determine issue severity for more effective predictive maintenance. The WD and HSST can also be added to any machine, regardless of brand or age without having to invest in major machine refurbishment.



Data analysis software is required separately

# Automating a Handwritten Factory Daily Report

Network your machinery regardless of brand or age



## Before

Operation reports are often handwritten and taken at the end of the business day. Overnight, machines can stall which will not be reflected in the reports and then takes significant time to identify the lot of defective products, resulting in revenue loss.

## After

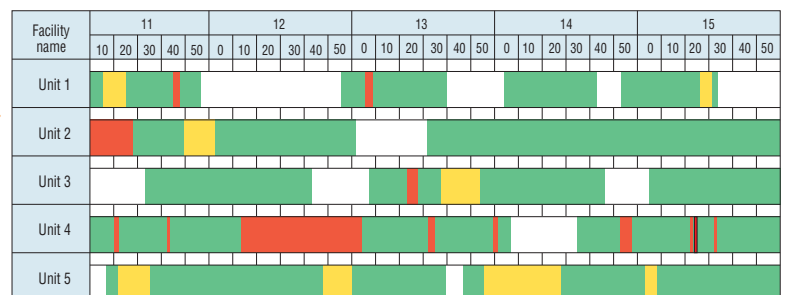
The WD System automatically records equipment operation information 24/7 allowing users to identify trends and pinpoint machine downtime for more efficient predictive maintenance.

## Wireless Data Communication System, WD-Z2



## Chronological order of equipment operations in a Gantt chart

Red: Abnormal stop Yellow: Call the operator Green: Normal operation White: Main power supply ON

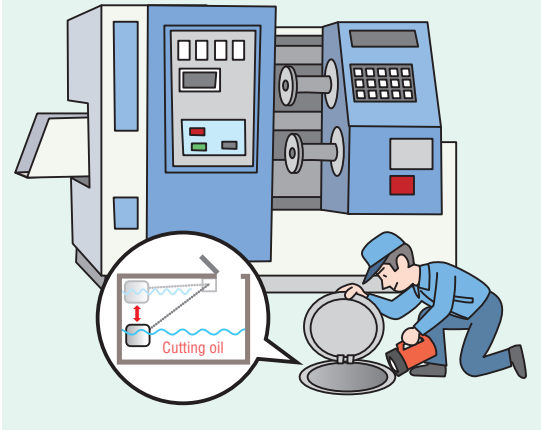


The screen is an example. Data analysis software is required separately.

# Visualize Level of Cutting Oil Remaining in Tank

## Before

Checking the amount of oil in the underground tank is a burden...



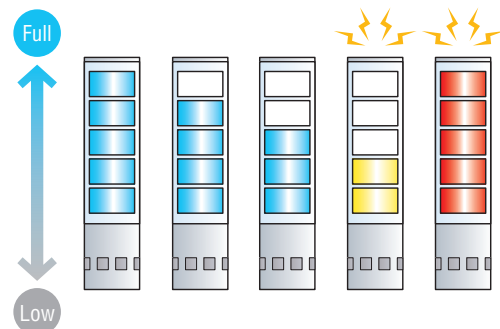
### ISSUE

Checking the oil level requires physically opening and checking the underground tank, which takes effort and time.

## After

Visualize the oil level with LA6 Signal Tower!

Oil Level Meter



### IMPROVEMENT

- Meter display of the level of the cutting oil
- As the oil level is visible from a distance by the number of segments, you can manage multiple units at once

## Improvement Using LA6 Signal Tower

### SOLUTION

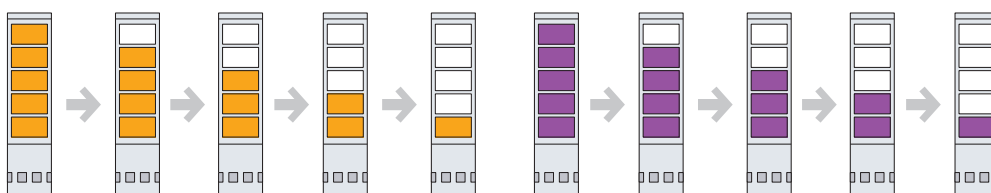
- Use the LA6 Smart Mode (Pulse Trigger Type).
  - ① Detect the oil level with a water-level sensor and show the oil level with segments on the LA6
  - ② You can see the status of multiple units
  - ③ By visualizing the remaining oil levels per unit, you can prioritize maintenance

### Extension

- Connect a temperature sensor to make abnormal temperature conditions more visible.

### Display Pattern Example

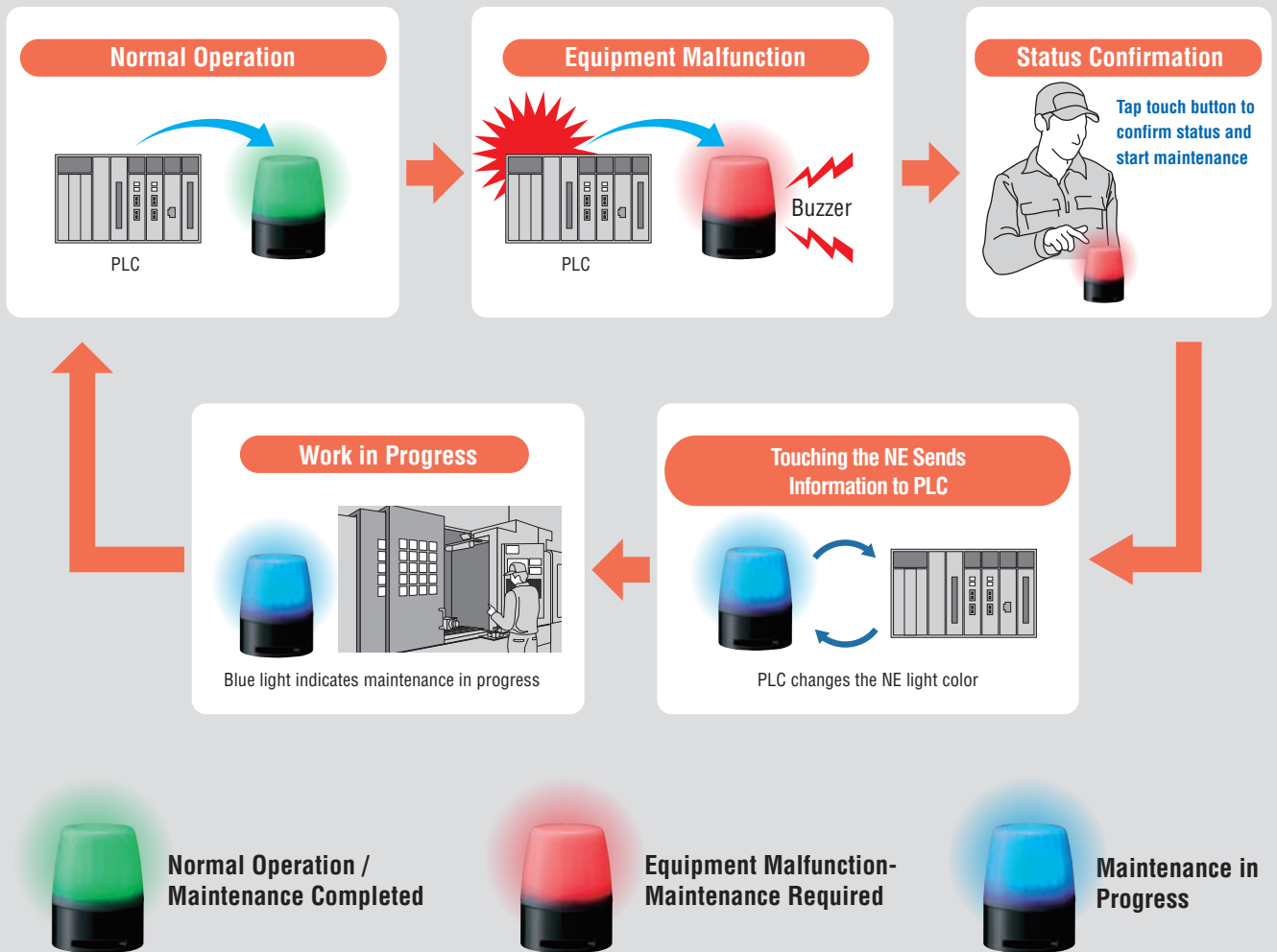
Example



Signal Tower LA6

# Visualize the Stages of Equipment Maintenance

Create a standardized, color-coded system for equipment status



## Before

Even when there are signal towers to alert operators when equipment is down or needs maintenance, there are no indicators that tell operators whether the issue is being addressed. As a result, equipment issues are sometimes left unresolved.

## After

With the NE Signal Beacons, stages of equipment maintenance is color-coded. Equipment status can be recognized instantly by everyone at the work site, helping to mitigate bottlenecks.



**NE-M1ATB-M**  
Signal Beacons

### Options



**Upper Bracket**  
NE-001D



**Wall Mount Bracket**  
NE-002D



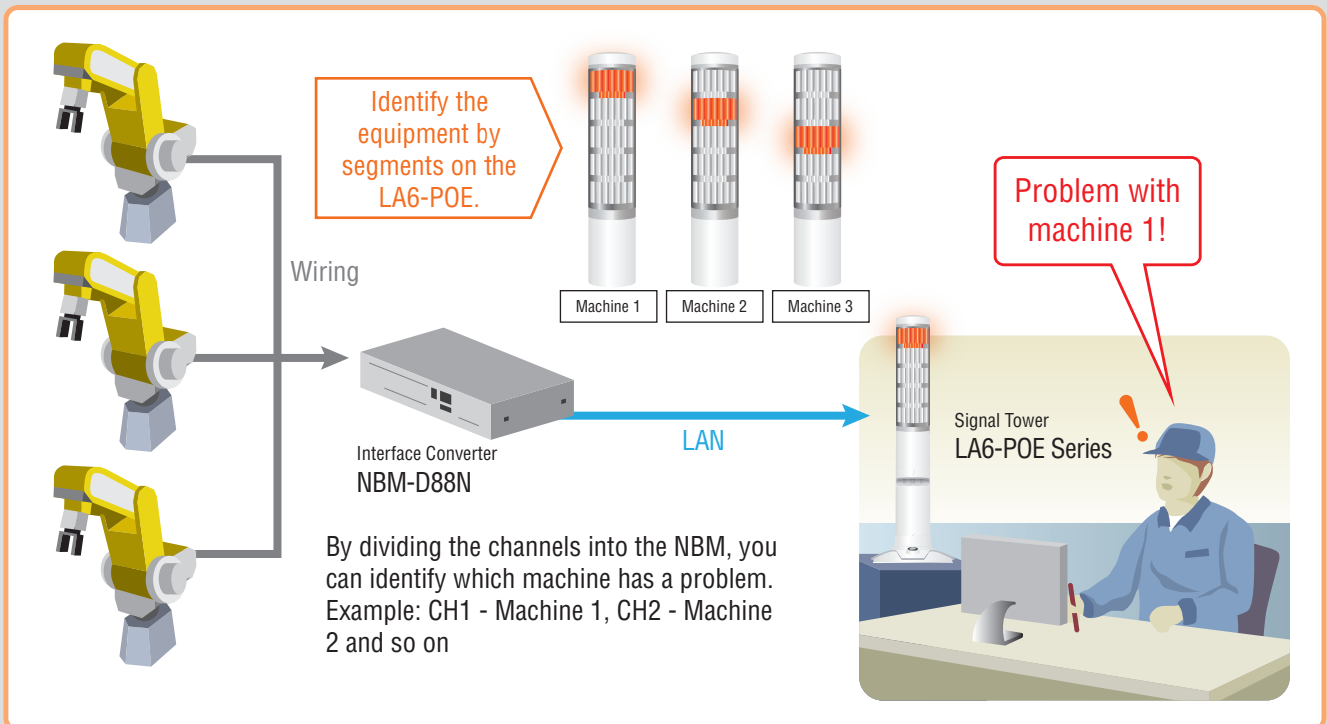
**Pole**  
POLE22-N



**Pole (threaded)**  
POLE22-T



# Visualize Equipment Status in Unmanned Areas



## Before

When workers leave the production site, they are not notified when equipment issues occur.

## After

The NBM is able to convert I/O signals from robots to network commands, triggering the appropriate light segment on the LA6-POE!

### Interface Converter NBM-D88N



Interface Converter



#### Flexibly control the network status monitoring



Accessory: AC Adaptor

\* Use for exporting logs and settings (cannot control with USB connection)

- 8 digital input contacts and 8 digital output contacts
- Supports various commands
- Ping for alive monitoring
- All terminal blocks use screw-less design
- Set up conditions for detecting digital input
- Get log output in USB memory

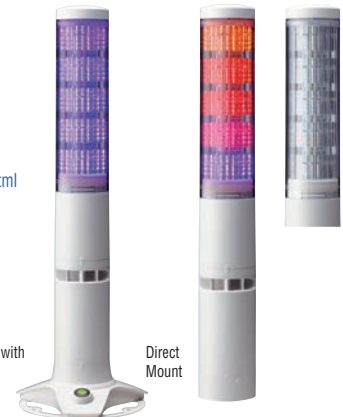
### Signal Tower LA6-POE

LA6-5DSNWB-POE (Stationary)  
LA6-5DTNWB-POE (Direct Mount)

Wiring is easy with PoE  
Freely set up the Luminous Color

<https://www.patlite.com/product/detail0000000651.html>

When light is on When light is off



Stationary Type with Clear Switch

Direct Mount



NH-WST2 Wall Mount Bracket



SZK-003W Wall Mount Bracket



SZW-060W Stationary Bracket

# Visualize / Analyze Stalled Robotics

## Example system



LAN

1	2	3	4	5
02:42:52	01:28:49	00:00:12	03:10:28	02:52:08
03:16:20	00:40:39	02:08:20	01:15:20	02:10:50
01:29:52	02:42:52	02:42:52	02:42:52	02:42:52
01:15:28	00:02:46	00:39:27	00:42:52	00:42:52

\* Separate application software is required.

### Gantt Chart System



Also, operation analysis of robotics using accumulated data

Email notifications sent for robotics stalls and stops  
Use a tablet to check the same andon as the facility.



## Before

In automated robotic processes, robots will stall without anyone noticing for an extended period. The goal is to eliminate manual checks to determine which robots have stalled in the process.

## After

By using the existing PATLITE signal towers on the control panels with the WD system, it is easy to make a cost-effective wireless data acquisition system to improve your robotics operation management.

## Industry / Equipment Overview

- Industry** • Manufacturing
- Process** • Robotic Cell Production

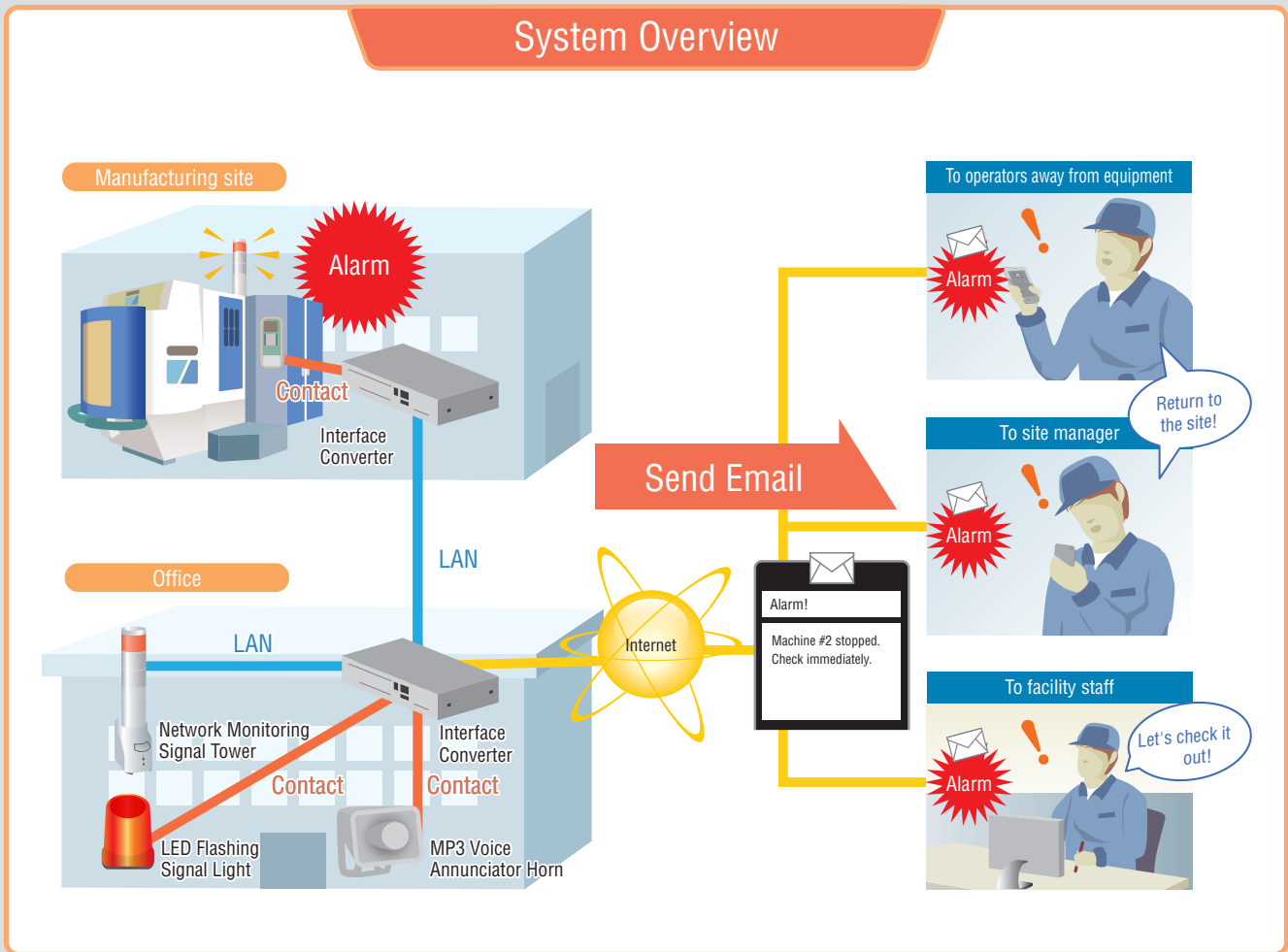
### Device configuration

Wireless Data Acquisition System WDR Receiver x 1 unit  
Wireless Data Acquisition System WDT-LR-Z2 Transmitter x 20 units  
Administration software x 1  
20 Robots

# Monitor issues remotely and in real-time

Factory

## System Overview



### Before

Workers away from the site may not notice when an issue arises with their equipment, which delays corrective action, resulting in revenue loss.

### After

The NBM is able to take signals from standard I/O and network devices and send emails to remote staff, alerting them of issues at the office and manufacturing site in real-time.

### Device configuration

Equipment with Non-Voltage Contact Output  
 PATLITE  
 NBM-D88N NH Series LFH EHV

### Usage

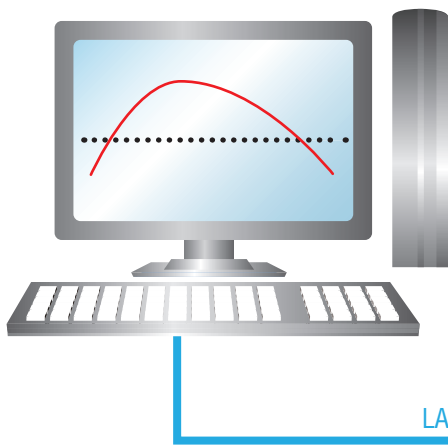
Interfaces discrete input/output signals between indication and control devices over Ethernet. Add a variety of PATLITE signaling devices to a network for real-time remote monitoring and/or data acquisition.



Interface Converter NBM-D88N

# Visualize Inspection Process Anomalies

**Missed the anomaly threshold value in the inspection process?  
NH-FV Series make threshold values for anomaly visible!**



When a threshold value is exceeded, the screen program issues a command and activates the signal tower.



MP3 Playback Network Monitoring Signal Tower  
NH-FV Series

## Before

Workers tend to miss alerts on their monitors due to their busy workload or being away from their terminal.

## After

The NH-FV is able to accept commands from the terminal and provides visual and audible alerts to ensure the operator is aware of the threshold anomalies.

## Visual and audible notification

MP3 Playback Network Monitoring Signal Tower  
NH-FV Series



### 88<sub>dB</sub> Sound resonates

With its compact housing, the unique horn structure achieves sound pressure of 88 dB or more (at 1 meter).

### Play Sound Voice message notification

With audio notification, you can communicate information with messages that tell you, "What and how that's a problem," and combine with input conditions.

### Actively get the equipment status

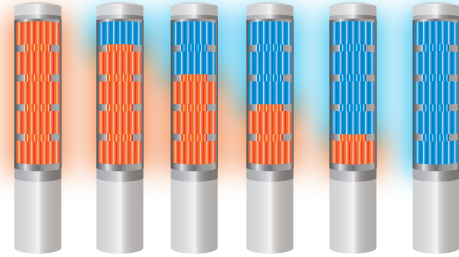
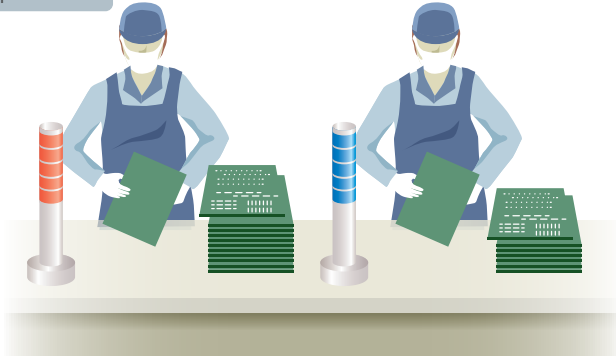
In addition to PING monitoring, the NH Signal Towers are equipped with an SNMP monitoring function. It actively obtains MIB information from supported SNMP network devices and is able to notify personnel with visual, audible and/or email notifications when changes occur.



# Prevent Oversights During Inspection

## Are you rushing visual inspections?

Inspection line



Start Count at 0.6 second intervals Done  
Inspection period = 3 seconds

**For consistent inspections, use the signal tower as a timer. When inspections start, output a signal to LA6. The signal tower is activated, and the worker will inspect the product until all segments are blue.**

## Goal: Deliver defect-free products

### PROBLEM

Inspections are carried out on the production line before distribution. To quickly reach their daily targets, workers may rush inspections. Rushed inspections result in oversights and lead to the distribution of defective products.



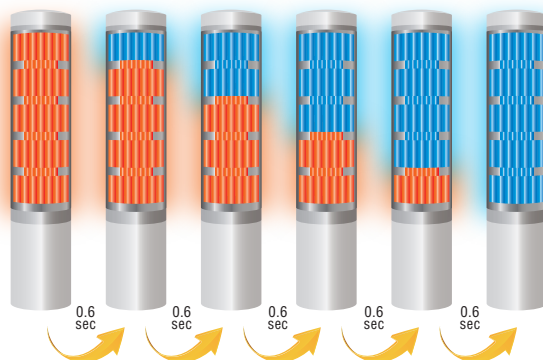
Improve

## Use "Time-Trigger" to manage the inspection time

### SOLUTION

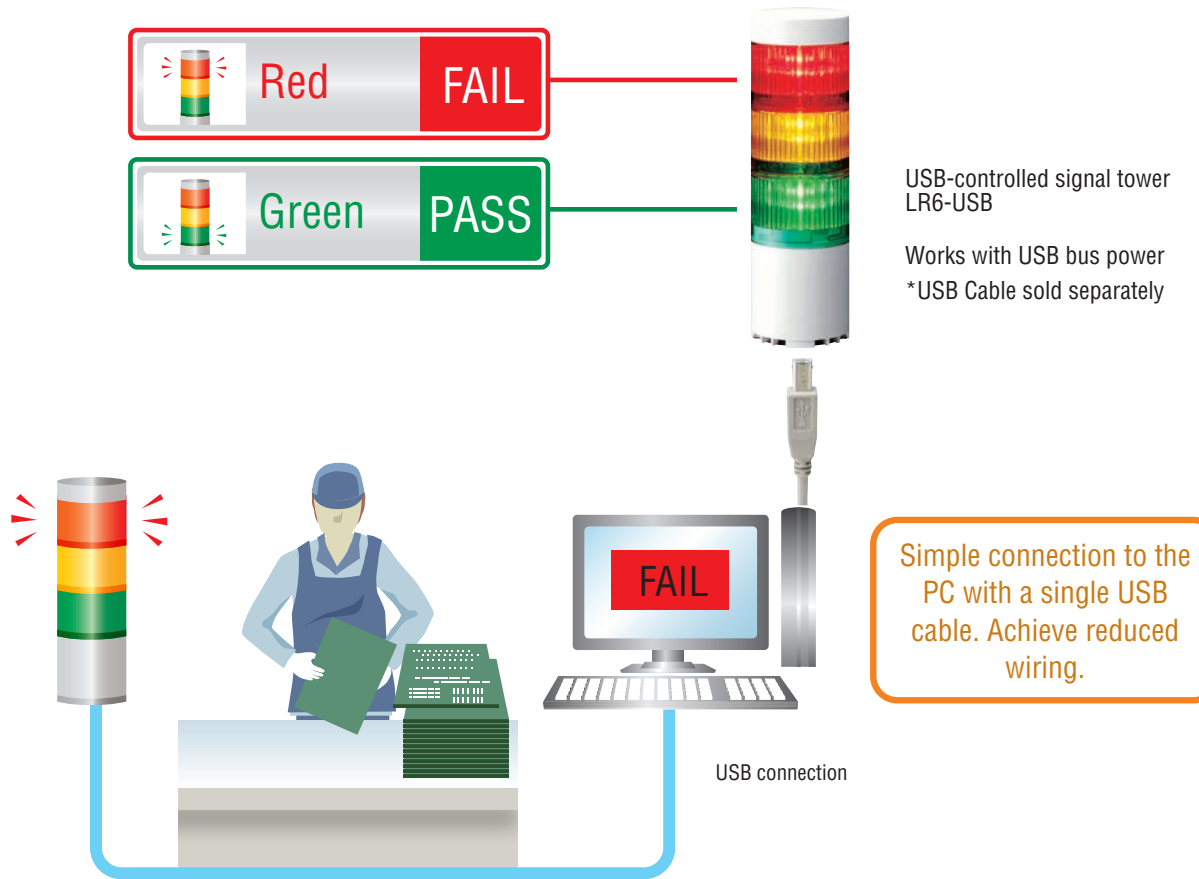
You can use the signal tower as a timer by using "Time Trigger" in the Smart Mode setting of the editing software. Inspect one product per display cycle. Once all the segments are blue, the worker can end the inspection. Then proceed to the next product.

You can customize the display pattern with the editing software.



# Mistake-free Inspection Process

## Example system



### Before

During the inspection process, Pass and Fail notifications on the screen are sometimes overlooked, resulting in error.

### After

By adding the LR6-USB, the visual and audible alerts indicate Pass or Fail, adding another notification layer to further prevent oversight and errors.

### Industry / Equipment Overview

- Industry • Manufacturing
- Process • Inspection Process

### Device configuration

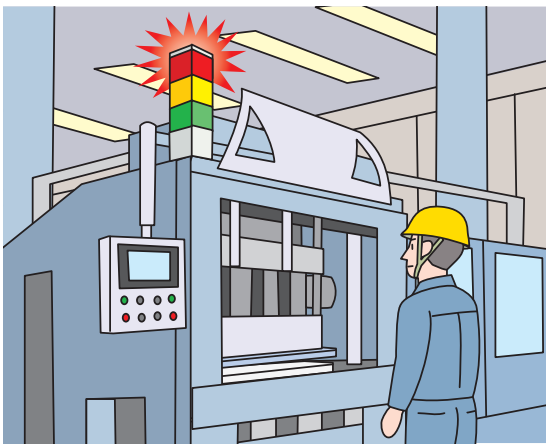
USB-controlled signal tower LR6-USB x 1 unit

# Visualize the Casting Process

## Before

Cast manufacturing equipment

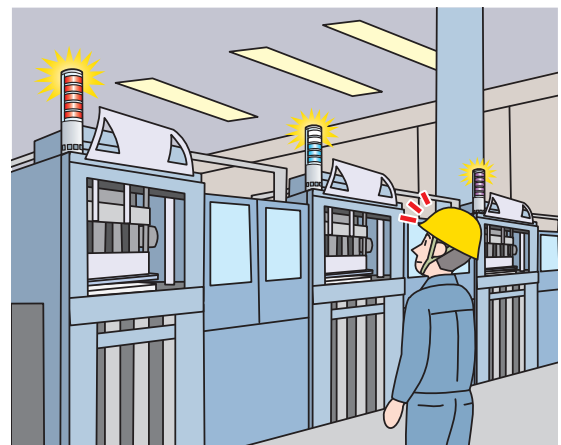
Signal Tower indicates completion.



## After

### Signal Tower LA6 Solution

As time elapses, the tower displays different patterns according to its progress. When casting is complete, the tower will flash blue.



## Reduce the workload for staff on site

### PROBLEM

- Must continually go back to machine to check its status.
- Unwanted downtime if machine is unattended when work is complete.

### New feature!

Using the LA6 Signal Tower, make the elapsed time visible until complete

### SOLUTION

- With the application software EDITOR For Signal Tower, customize the display pattern and time of each work process. Easy to see the process of equipment even from a distance.

Download the editing software here:

[www.patlite.com/la6/app.html](http://www.patlite.com/la6/app.html)

#### Extension

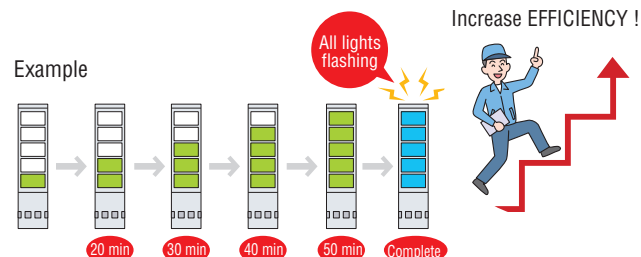
- Use tower to display information from the operation panel.
- Integrate with sensors to display tank fluid levels.

### Benefits

Visualize elapsed time until casting is complete. Understand the situation even from a distance.

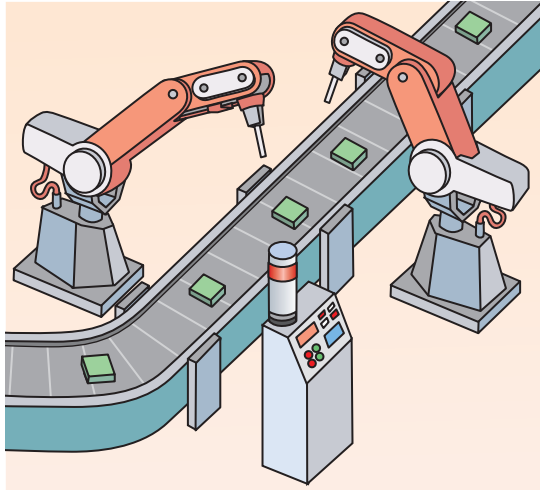


### Example



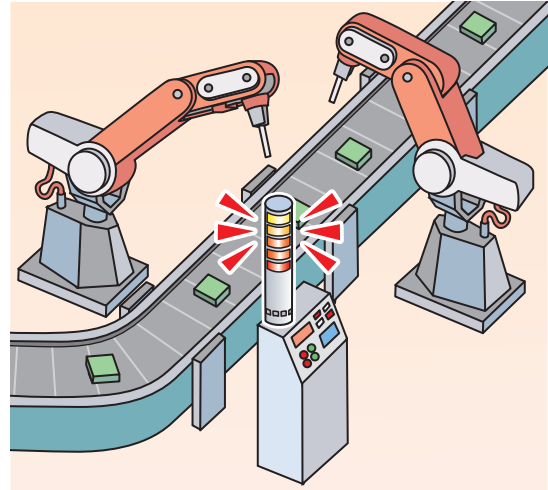
# Visualize Robot Statuses

Before



In the robot motion display, the signal light or pilot light was the only indication that the power was on.

After



Visibility is greatly improved by programming all five light segments of the LA6 a single color. Understanding the status of the device can be done from a distance without having to approach the control monitor.

## Remote monitoring of robot operation status and safety improvements

- With fewer workers on site, the need for clearer visual information as well as safety lighting increases.

### New feature! Improvements Using LA6 Signal Tower

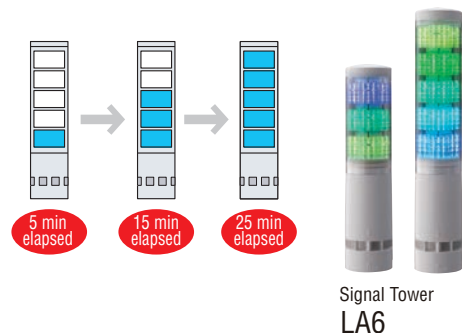
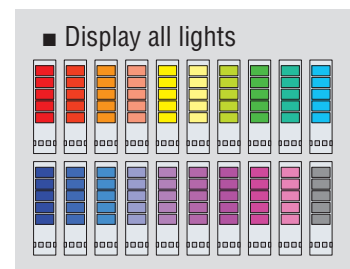
#### Rich expressions, high visibility

21 color display using multi-color LED. Display various status conditions in a variety of colors. [Orange: Servo power ON, White: Teaching, Green: Automatic run] By emitting the same color on all five light segments, visibility is increased.

**Count up from when problem occurred to show the elapsed time**  
Using the LA6 timer function, count up every 5 minutes from when the problem occurred. → You can use this to reinforce the level of priority.

#### Count down to show the process completion time

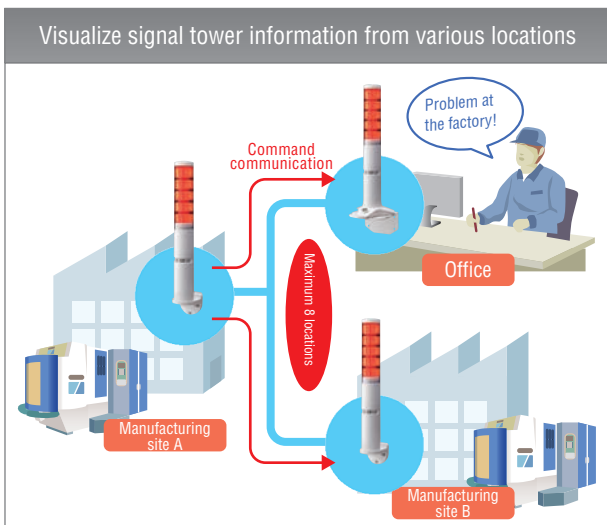
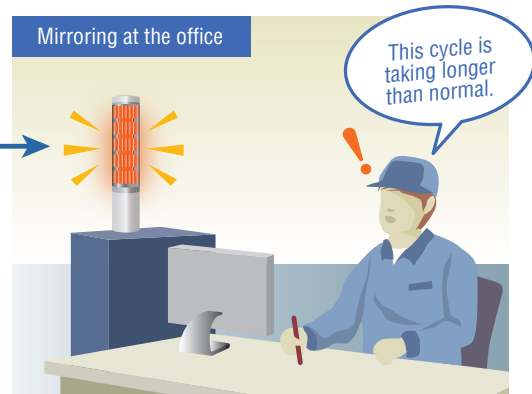
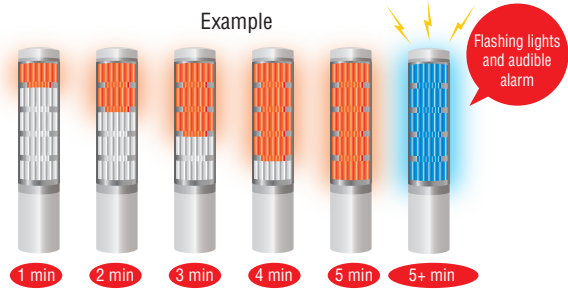
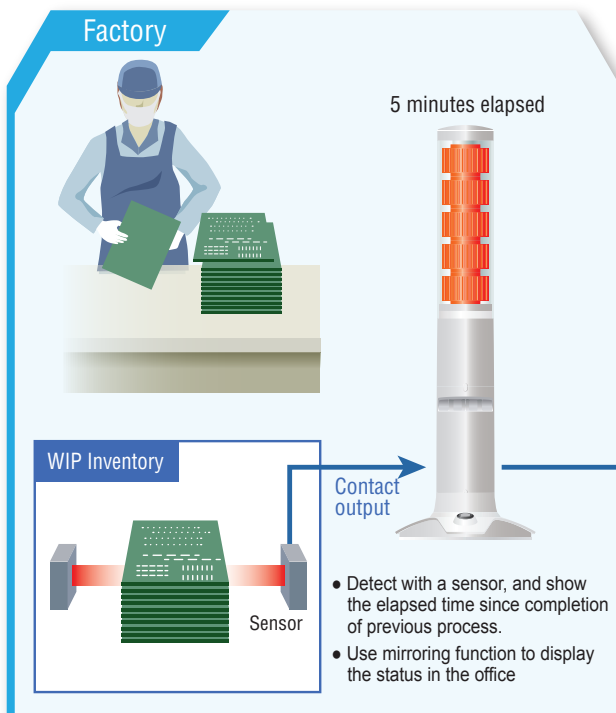
Previously, a green light from a signal tower only expressed that it was in operation. Now you can visually identify the remaining time until completion, thus improve productivity.





# Visualize the time required at each work step

Do increases in work-in-process inventory create bottlenecks?  
Use LA6-POE to make elapsed time visible and to notify managers.



You can use the mirroring function to send the equipment operation status to multiple locations.

## Signal Tower LA6-POE

LA6-5DSNWB-POE (Stationary)  
LA6-5DTNWB-POE (Direct Mount)

Easy wiring with PoE  
Freely set up the Luminous Color

<https://www.patlite.com/product/detail0000000651.html>



NH-WST2  
Wall Mount Bracket



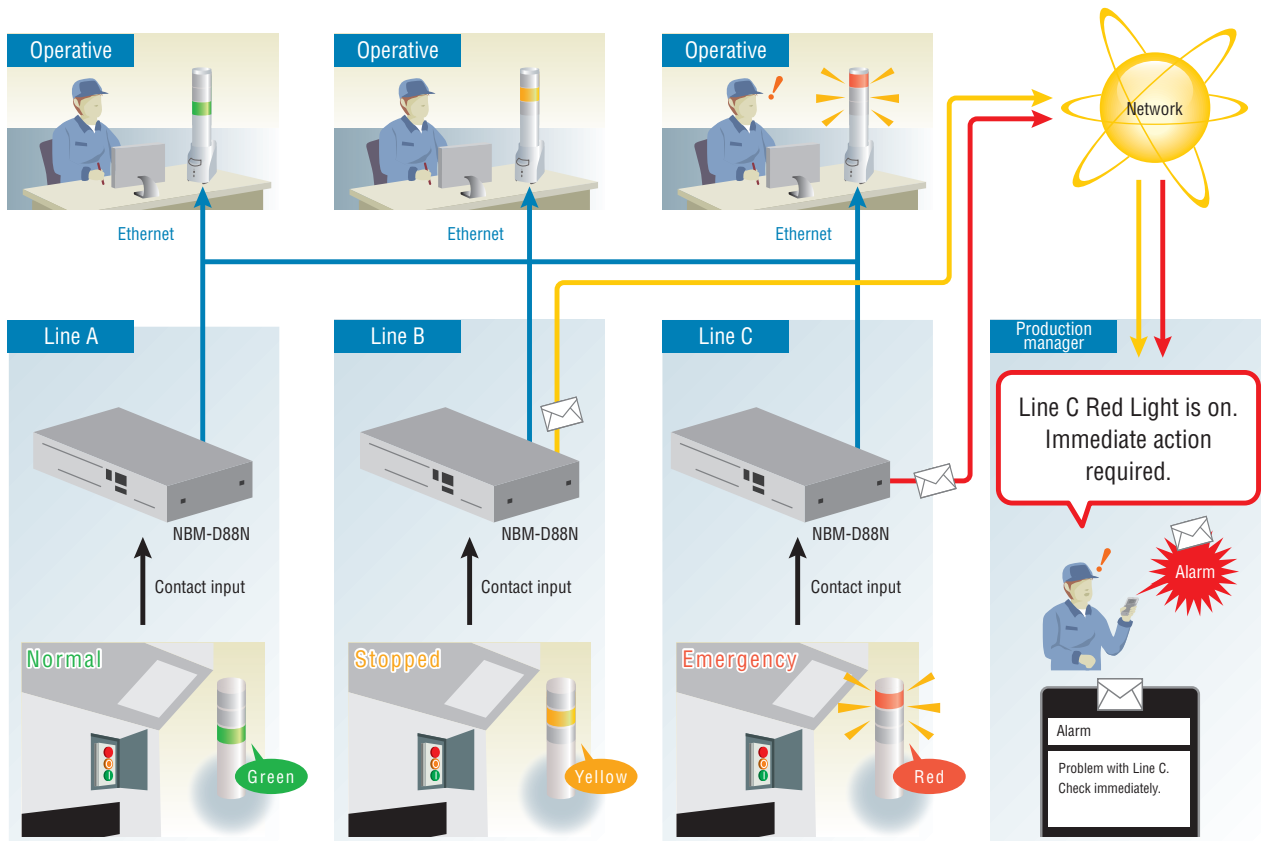
SZK-003W  
Wall Mount Bracket



SZW-060W  
Stationary Bracket

# Remote monitoring reduces loss from stoppages

## Callout Notification System



Retrofit existing equipment easily. Remotely monitor contact information over the network.



Interface Converter NBM-D88N

LAN ⇌ Relay

- Get contact inputs → Control network monitoring signal tower over Ethernet
- With email notification feature, you can report to supervisors in charge, even at night

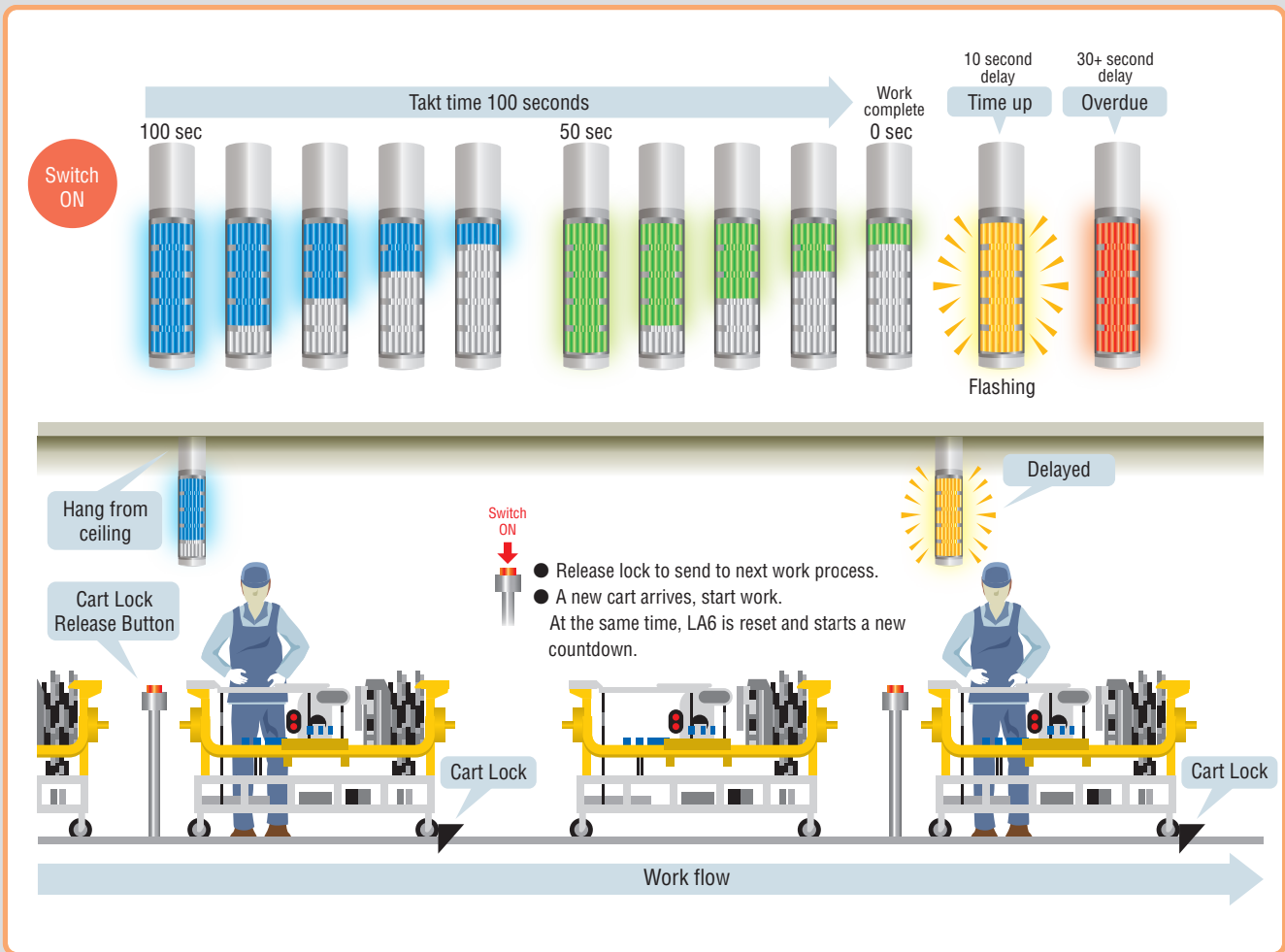


Network Monitoring Signal Tower - NH Series

Signal Tower ⇌ LAN

- Compatible with a wide range of protocols such as SMTP, SNMP, RSH
- Notify receipt of TRAP and commands from NBM with visual and audible alerts

# Takt Time for Manual Assembly Process



## Before

Assembly line at a major car manufacturer

As assembly work is done by hand, work speed may fluctuate. At times, a worker may not be able to keep up with the main assembly line and other workers may not be fully aware of the situation or the assembly pacing.

## After

Install a signal tower showing the work progress. By making delays clearer, awareness at the work site is improved, and supply delays are reduced.

The cart travels on rails, and requires a button to send it to the next process. As the button is pressed, the signal tower is automatically reset.



Signal Tower LA6

- 21 different colors
- Flashing mode
- Easy set up from a PC
- Easy to change Takt time by changing input signal

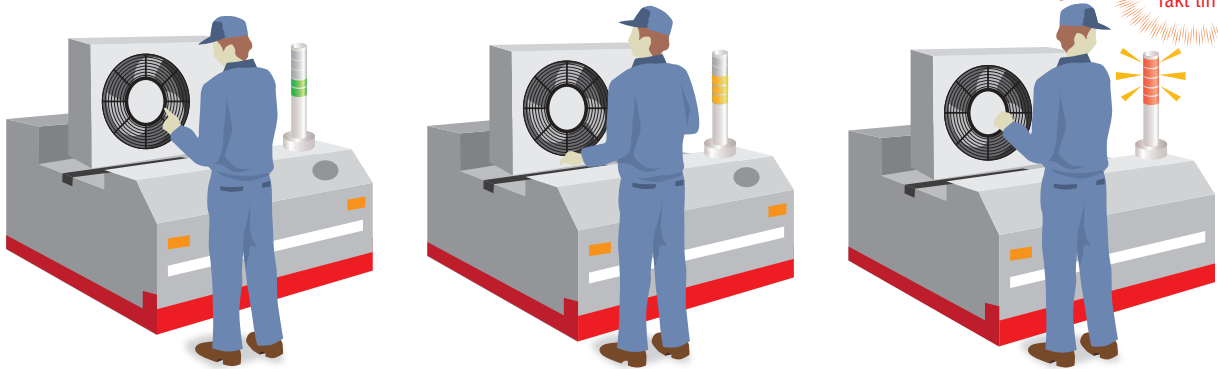


# Visualize Takt Time with LA6 on AGV

## LA6 visualizes Takt time

A production line utilizing AGV (automated guided vehicles).  
The LA6 mounted on the AGV displays the work time for each assembly process.

Assembly line for outdoor equipment



Make workers aware of the Takt time, to keep pace with assembly speed.  
Reduce lost time caused by AGV stops.

Awareness

Keep pace

Reduce lost time

SOLUTION

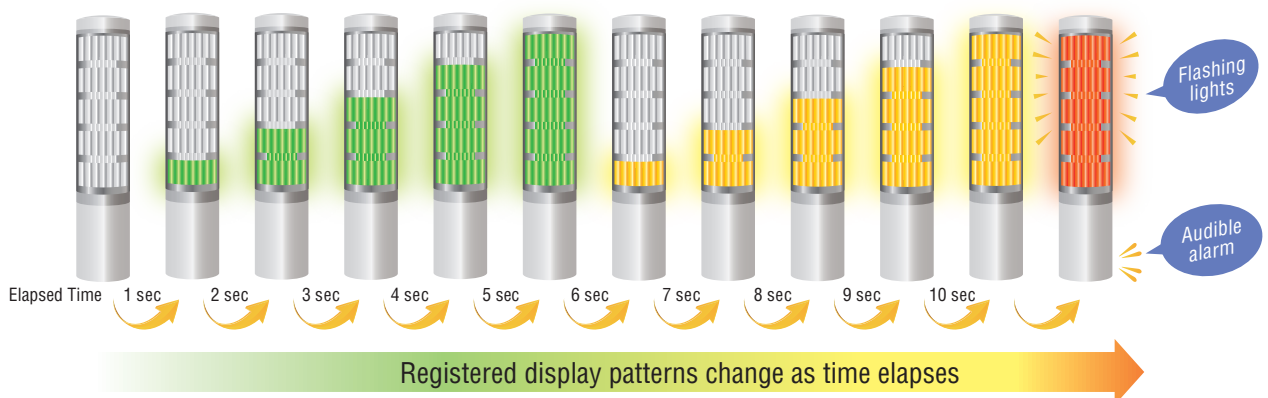
## Smart Mode - Time Trigger Type

- Register 15 types of takt time patterns
- Pulse input at the start of production starts the takt count
- Pulse input at the end of production resets the count

### Display Pattern Example

Example: Production takt time = 10 seconds

After input at start of production, the display changes to show the passing of time → When takt time exceeds a certain threshold, lights flash and audible alarm sounds





# Visualize Takt Time

## Set a Fixed Pace with the LA6 Signal Tower

Manage progress of the sub line

**Sub Line**

Adjust work pace with takt time colors

With the signal tower's takt time function, the color changes indicate the elapsed work time.

Yellow light is on!  
Better hurry!

Signal Tower

- Warning
- Red light!
- Alert
- Yellow light!
- Start work
- Green light!

Picking and assembling parts on the sub line to the main line

**Main Line**

Supply parts from the sub line just in time for assembly on the main line, reducing time loss

## Improve quality and productivity by pacing the work.

**PROBLEM**

- Currently, our main line and sub line are running separately, although the main line is dependent on the sub line for parts. When the sub line is not keeping up with the main line, it can cause errors and/or delays in the production while also affecting subsequent processes.



### SOLUTION: New LA6 Signal Tower

**SOLUTION**

- Set up a takt time display with colors indicating elapsed time so that both the sub line and main line are aware of the work progress of each line.



Using visual presentations, information that was hidden is now visible.

Signal Tower LA6

- Install a program on the signal tower to set the display patterns and colors.
- Set or change the Takt time even without a control program device (personal computer required)
- IP65 protection rating with integrated globe
- Display as much information as a production analysis board.

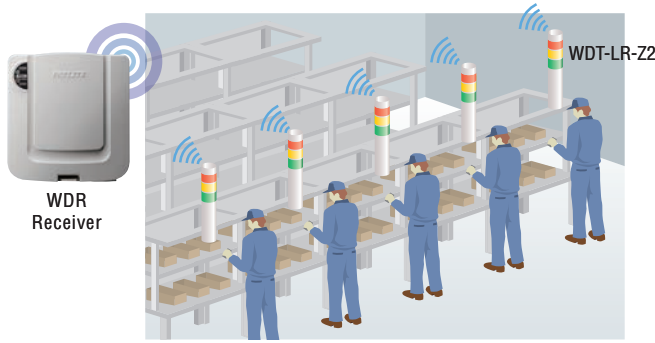


Increase EFFICIENCY !



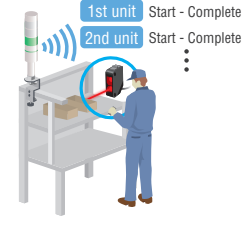
# Regulating the Cell Assembly Line

## Collect Working Time and Visualize the Bottlenecks



Hands free by using foot switch

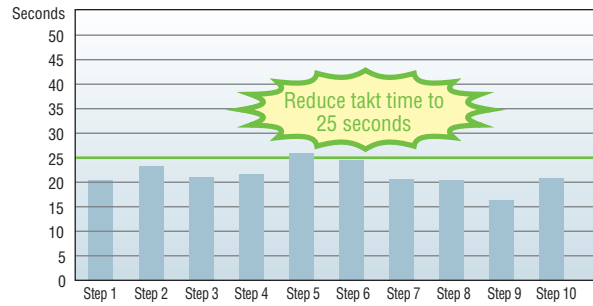
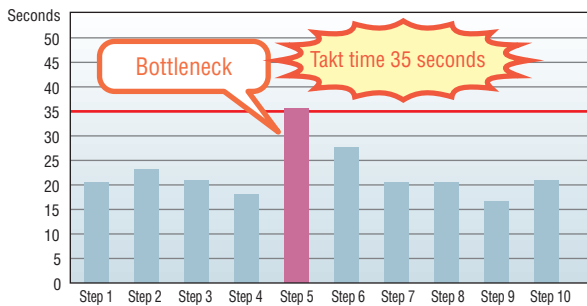
Automatic collection with proximity sensor



Replace the HSST pushbutton with a foot switch or sensor to reduce or eliminate the worker's load.

Before

After



Example chart of CSV log file collected by WD

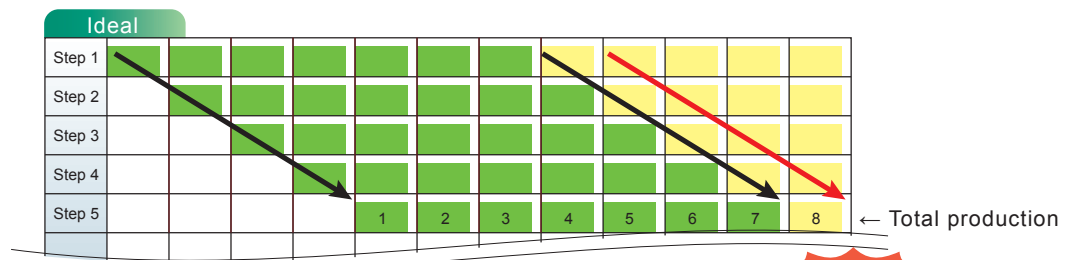
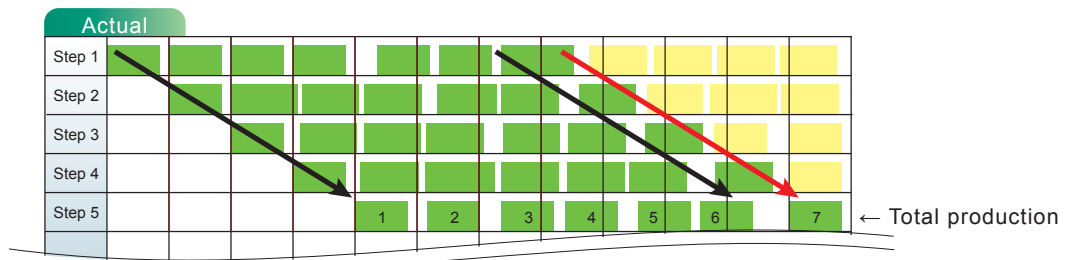
By collecting the work time for all the processes, you can visualize the bottleneck and clarify where balancing is required.

### Additional equipment

- Wireless Data Communication System WDR Receiver x 1 unit
- Wireless Data Communication System WDT Transmitter x 1 unit

With WD-LR transmitters, you can have 1 receiver and up to 30 transmitters in a single cell.

## Visualize Workflow in Chronological Order



By visualizing the work time of all processes, you can increase overall efficiency by evenly distributing workload.

Lost time adds up and reduces productivity by 12.5%

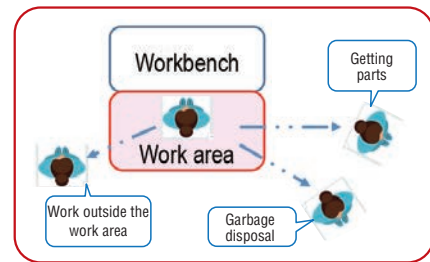
# Visualize Lost Time in Cell Production

## Example system

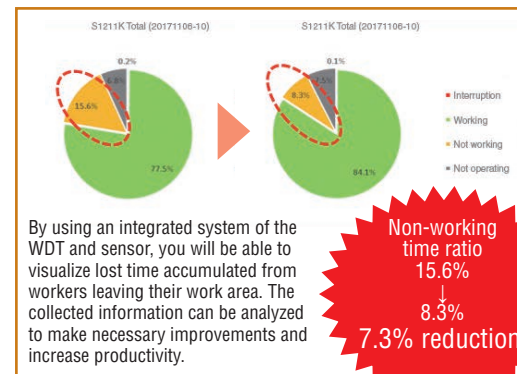
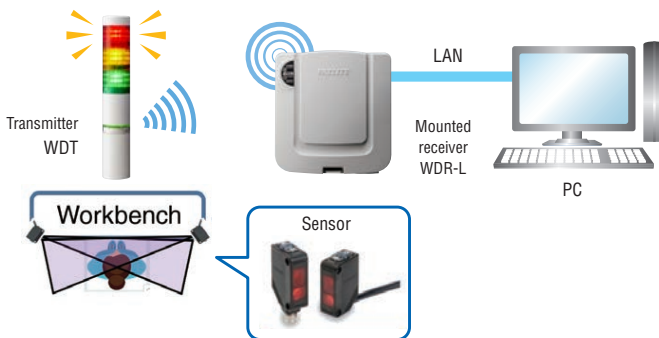


PATLITE Sanda Factory Example

Issue: Cannot see accumulation of lost time



## Mechanisms for Visualizing Lost Time



## Before

The main focus at the factory is the assembly of many types of small quantity parts in cell stalls. Managers are unable to see time loss resulting from workers leaving their work area to pick parts or perform other duties.

## After

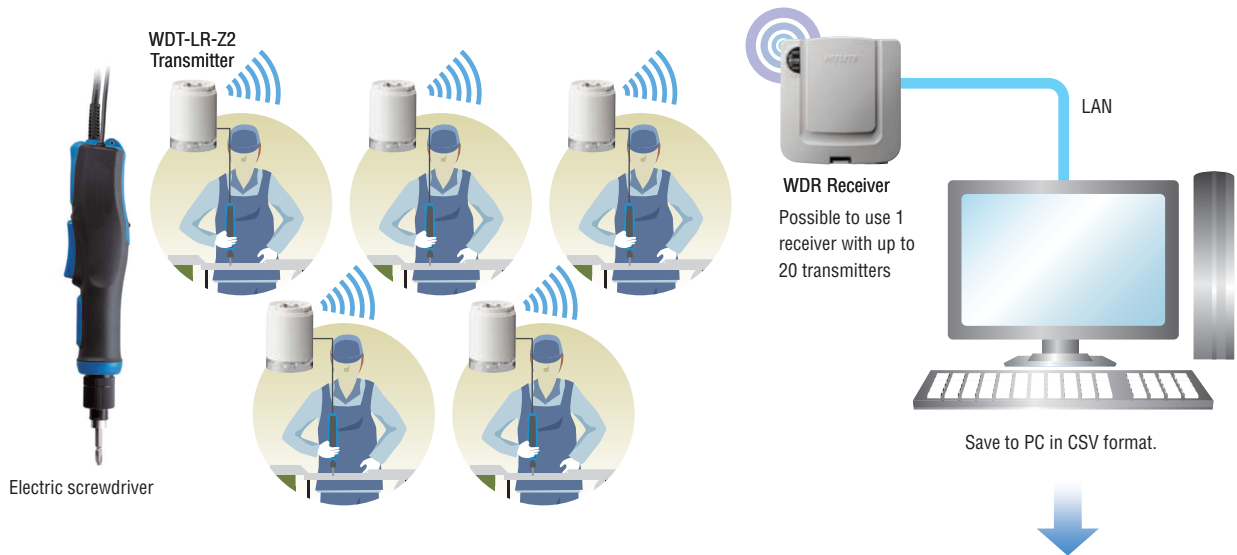
By installing a sensor at the workbench of the cell stall to collect the simple data of when the worker is in the stall (working) and when the worker is away (not working), we were able to make improvements in just 1 month without adding a burden for collecting this data.

## Industry / Process Overview

- Industry** • Manufacturing
- Process** • Cell Assembly Line

# IoT Screw Driver Measures Tightness of Screws

## System example



### • Example CSV data

		Electric screwdriver label	Start	Increase Torque	Reverse	Not used	
3	Date/Time	MAC Address	User name	Red information	Amber information	Green information	Blue information
4	2017/7/20 15:00:47	58C232FFFE2CFFC3	Cell_1	0	0	0	0
5	2017/7/20 15:00:51	58C232FFFE2CFFC3	Cell_1	1	0	0	0
6	2017/7/20 15:00:52	58C232FFFE2CFFC3	Cell_1	1	1	0	0
7	2017/7/20 15:00:52	58C232FFFE2CFFC3	Cell_1	1	0	0	0
8	2017/7/20 15:00:52	58C232FFFE2CFFC3	Cell_1	0	0	0	0

Easily process data in Excel.

0: OFF, 1: ON

### Caution

- WD can collect the start, increase torque, and reverse signals only. (WD cannot collect the stop signals from the electric screwdriver.)
- An electric screwdriver signal cannot turn on an LED lamp of the LR series.

## Before

I want to keep a record of the work performed for tightening screws and prevent output of defective products. Additionally, improvements cannot happen without understanding the current situation with the variations in assembly work.

## After

Connect the signal output of each electric screwdriver to the WD to quickly and easily build a system that is inexpensive.

1. Automatically record the screw tightening value (with the increase torque signal)
2. At each cell, automatically record the number of operations and the order for multiple screwdrivers (Electric screwdrivers are identified by registering their names with the WD transmitter's MAC address)
3. Automatically record loosen screw operations (with the reverse and start signals)
4. Compile all the electric screwdriver operations at the facility (with the WD unit's csv log file)

## Industry / Equipment Overview

**Industry** • Manufacturing

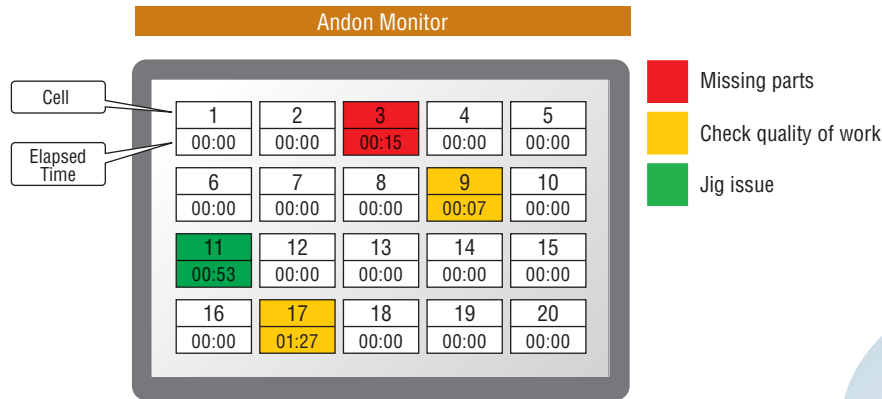
**Process** • Cell stall

### Device configuration

Wireless Data Acquisition System WDR Receiver x 1 unit  
 Wireless Data Acquisition System WDT-LR-Z2 Transmitter x 5 units  
 LR Series Body Unit x 5  
 5 Electric screwdrivers

# Signal From Cells Using an Andon Monitor

## Example system



\* Separate application software is required.



Signal Tower with switch box HSST

Check on a tablet!

All button operations are recorded – such as ON: Attention, OFF: resume work – so they can be the basis for improvement data such as frequency of occurrence and response time.

### Before

Currently, there is not a way to call for parts from a cell stall. It is also difficult to determine order of priority, resulting in lost time due to waiting for managers to address an issue.

### After

The manually-controlled HSST allows assembly workers to send requests to the Andon monitor so managers can determine priority and reduce lost time.

### Industry / Equipment Overview

- Industry** • Manufacturing
- Process** • Cell stall

#### Device configuration

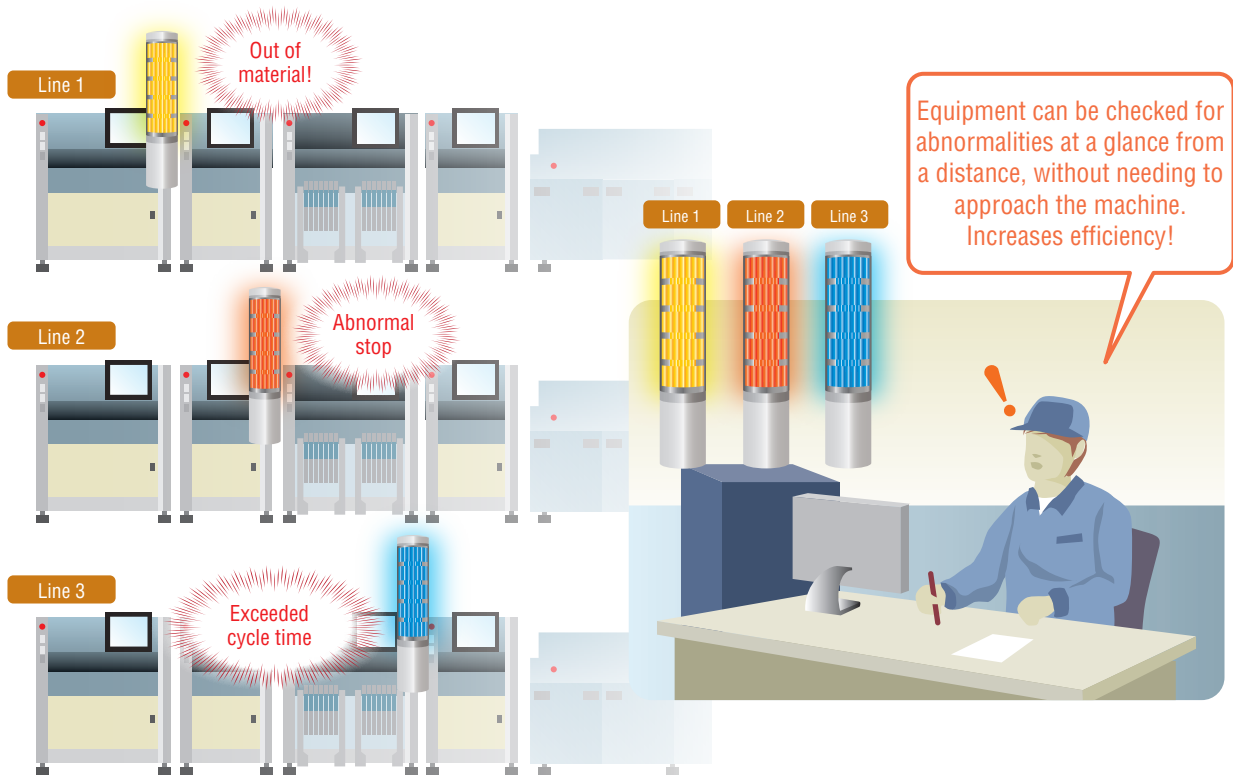
Wireless Data Acquisition System WDR Receiver x 1 unit  
 Signal Tower with switch box HSST-3M2 x 20 units  
 Wireless Data Acquisition System WDT-LR-Z2 Transmitter x 20 units  
 Administration software x 1  
 For 20 Cell Stalls

# Visualize Operation Panel Information

Reduce Labor

Regular, manual operation panel checks are inefficient

With the LA6 Signal Tower, visualize panel information from a distance



## Before

Multiple staff needed to manage various equipment. Some staff may need to travel long distances just to check the status of an equipment.

## After

With the equipment status visible from a distance, the LA6 signal tower minimizes the need to continually check the operation panel. Audible notification can also be added for additional indication.

## Device configuration



Signal Tower  
LA6

## Usage

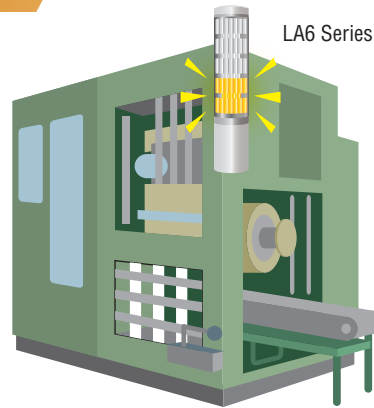
- 1 LA6 Smart Mode lets you set up your own light patterns with 21 different colors to choose from.
- 2 Create a display pattern for each operating state.



# Improve Predictive Maintenance

## Visualize lost productivity from reduction in speed

### System example

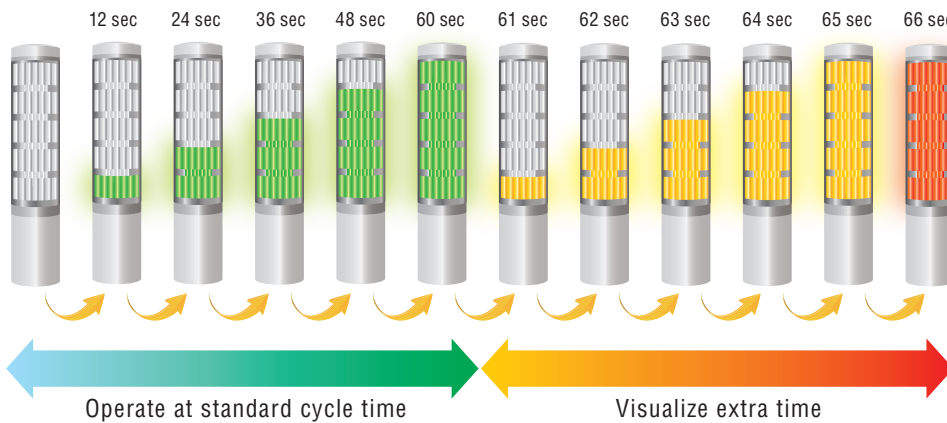


Processing equipment with cycle time of 60 seconds

Exceeds cycle time by 5 seconds  
Productivity down approximately 8%

Exceeds cycle time by 10 seconds  
Productivity down approximately 16%

By visualizing the extra time that has elapsed, you will not miss any required maintenance.



Visualize the timing of maintenance: Cycle time for processing equipment is 60 seconds. A yellow light is lit for every second over the standard cycle time. When the standard cycle time is exceeded by 6 seconds or more, all the lights on the signal tower change to red.

### Before

When running automatic processing equipment, cycle time becomes increasingly longer. It then becomes more difficult to predict maintenance, resulting in delays and thus reducing productivity.

### After

The LA6 allows you to visualize the processing time and when it exceeds the standard cycle time, it enables operators to plan required maintenance more effectively.

### Industry / Equipment Overview

- Industry**
  - Machinery, Metal Products, Electrical Equipment, Transportation Equipment, Manufacturing, and others
- Equipment**
  - Forge, polishing machine, other automatic processing machine
- Scale**
  - Number of target equipment

### Device configuration

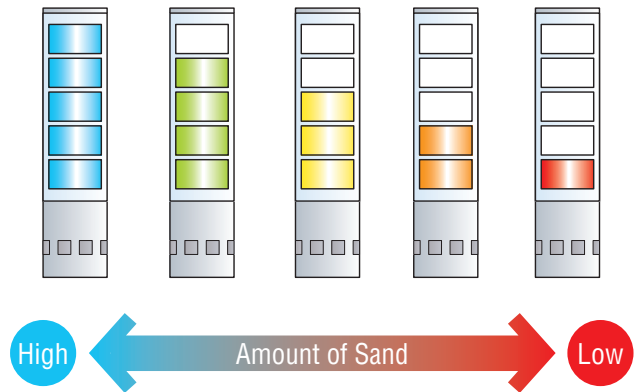
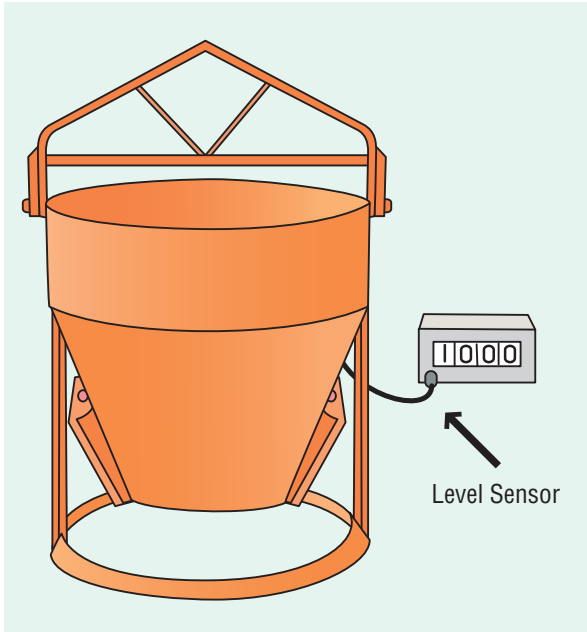
Signal Tower LA6 Series x 1 unit per equipment

Signal Tower LA6



# Prevent sand overflowing from the hopper

Make the amount of sand in the hopper visible!



LA6 displays the remaining amount of sand in the hopper.

## Make visible the level of sand in the hopper

### PROBLEM

- When the level of sand in the hopper is not monitored, it could cause overflowing.

With new Signal Tower functions, create an intuitive display

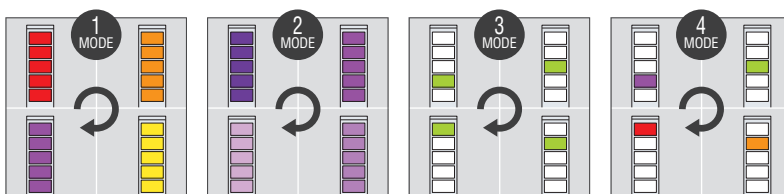
### SOLUTION

- When used with a sensor, the signal tower can indicate different statuses based on user-specified display patterns using colors, number of segments, and flashing lights.
- You can customize the display pattern with configuration software.

Download the application here (free): [www.patlite.com/la6/app.html](http://www.patlite.com/la6/app.html)



Improve



Signal Tower  
LA6



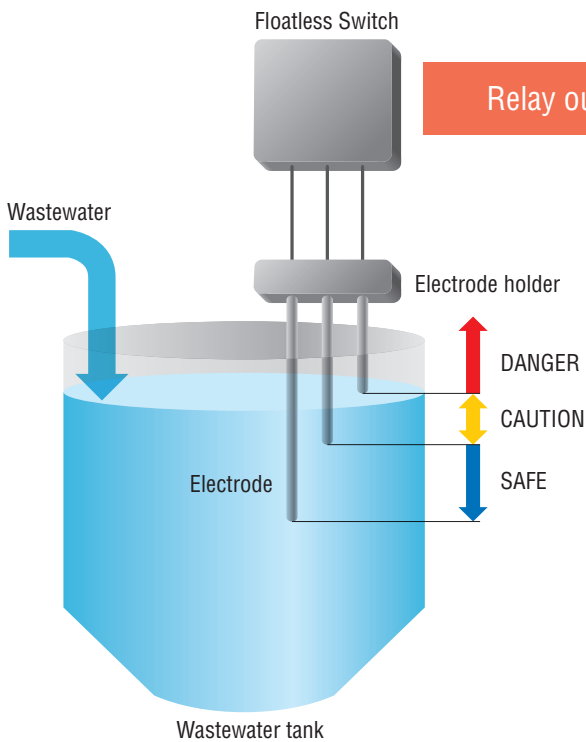
Increase EFFICIENCY !



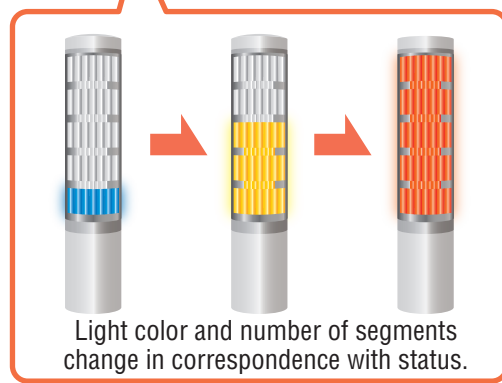
# Visualize Amount of Liquid in the Tank!

Visualize tank status with minimal configuration

No PLC



Overflow is imminent...



\*Electrodes, electrode holder, and floatless switches are not supplied.

## Product Configuration

1. With minimal equipment configuration, the LA6 clearly displays the fluid levels. No need to utilize complicated PLC controls.
2. Tower-type display for clear visibility even from a distance.
3. The signal tower can be set up for both water supply and drainage. Easy set up from a computer.



# Create Uniform Visual Signals Throughout the Worksite

**Before**

Factory A

Factory B

Factory B support staff

Factory A displays are different!  
Is it safe to approach?

**Consistent**

**After**

Factory A

Factory B

Set the display pattern after purchase.

## Make consistent status displays on all Signal Towers in the worksite

**PROBLEM**

- The signal tower's color codes for errors are inconsistent between factory locations.

### SOLUTION: Signal Tower LA6 with new functions

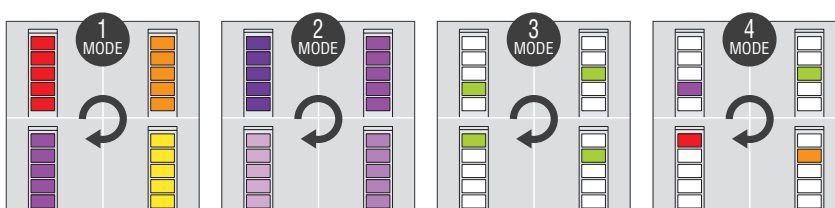
**SOLUTION**

- With the application software EDITOR For Signal Tower, set up various displays for errors.
- Even after installation, you can change signal colors using the application.

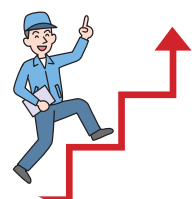
Download the application here (free): [www.patlite.com/la6/app.html](http://www.patlite.com/la6/app.html)



Signal Tower LA6



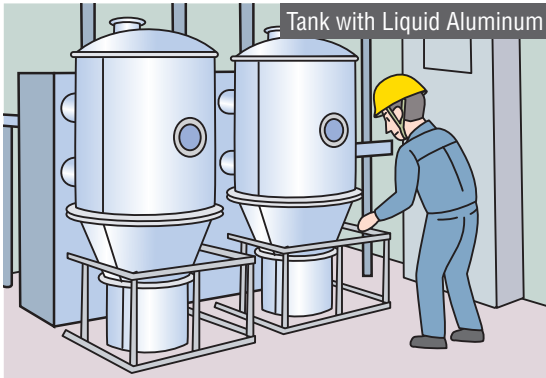
Increase EFFICIENCY !



# Visualize amount of remaining fluid

## Before

### Casting Site



Bottlenecks occur when liquid aluminum is completely depleted.

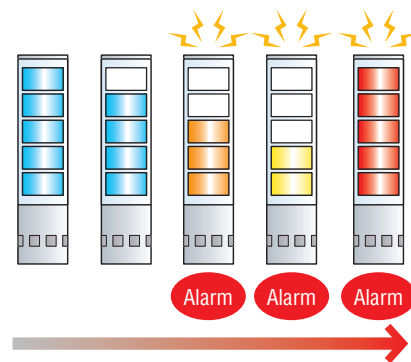
### ISSUE

- I want to reduce downtime caused by the depletion of liquid aluminum.
- Furthermore, checking every machine manually is time-consuming.

## After

### Visualize Using LA6 Signal Tower

Detect the level of liquid aluminum in the tank with sensors. Use LA6 to display the level.



### Benefits

- By making the remaining amount of liquid visible from a distance with the LA6 signal tower, we were able to reduce non-operating time and increase work efficiency.

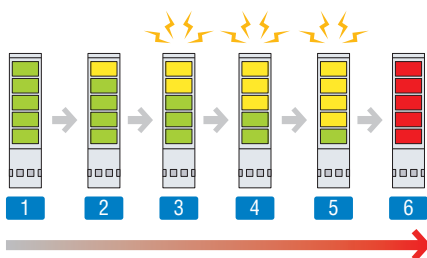
## Improvements Using LA6 Signal Tower

### SOLUTION

- Use the LA6 Smart Mode.  
Receive pulse signal from sensors, remaining fluid level is displayed by segments on signal tower
- Pulse Trigger Type: Register display patterns for different operating status  
Change the display based on pulse outputs from sensors

### Display Pattern Example

In the level meter display, show the remaining amount of material.



Gradually change display pattern

Notifications via audible alarm

### Extension

- Connect a temperature sensor to make abnormal temperature conditions more visible.



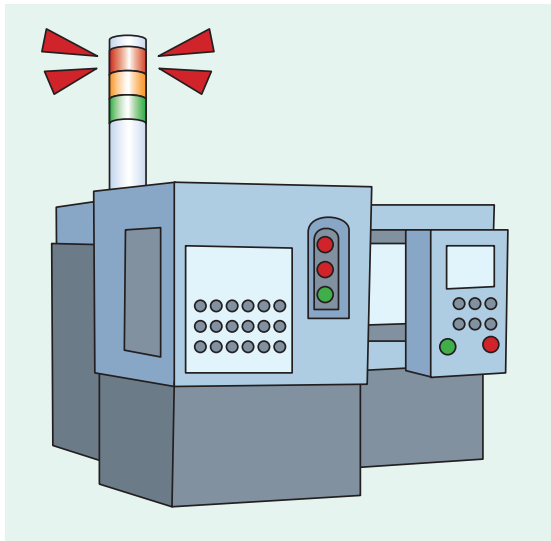
Signal Tower LA6

# Visualize the elapsed time from when the problem occurred

## Before

### Alarm

Only 1 red light



## After

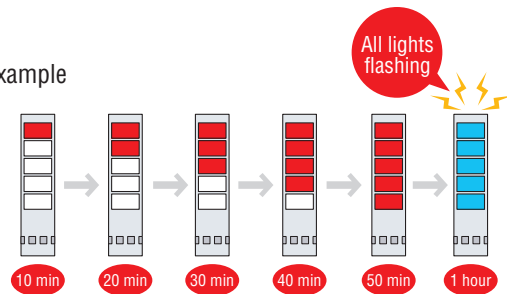
- The LA6 Signal Tower displays different light patterns and audible alarms. Additionally, one segment lights up every 10 minutes, until the alarm is restored.
- If 1 hour elapses, all the lights flash in sky blue.

### Benefits

- Visualize the elapsed time from when the problem occurred
- Maintenance on equipment that takes a long time to restore can improve production efficiency



### Example



## Make maintenance time visible

### PROBLEM

- Long equipment maintenance time lowers operation rate
- Difficult to manually record the time elapsed after alarm goes off

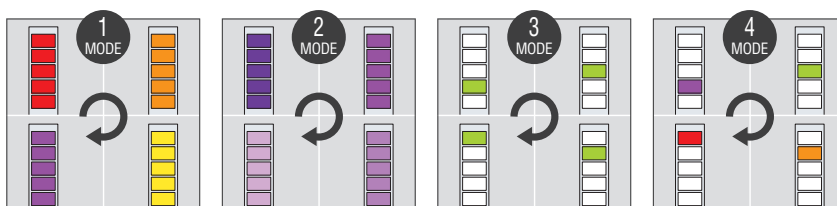
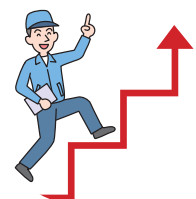
### SOLUTION: LA6 Signal Tower

### SOLUTION

- After an alarm goes off, signal tower increases one tier every 10 minutes until the problem is resolved.
- Easy installation; no programming required to activate timer display.
- Use editing software to change display time, display, color (21) and pattern (15).
- Download free from our home page → <https://www.patlite.com/la6/app.html>



Increase EFFICIENCY !

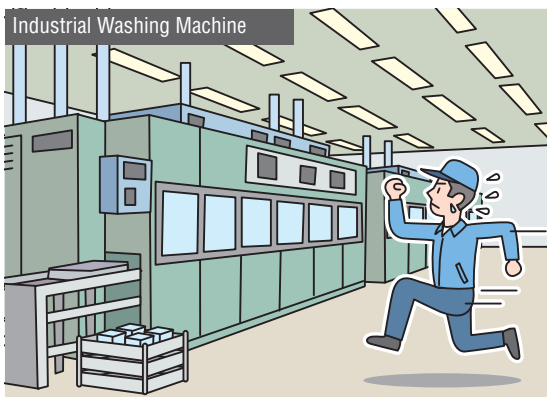




# Visualize Work Progress

## Before

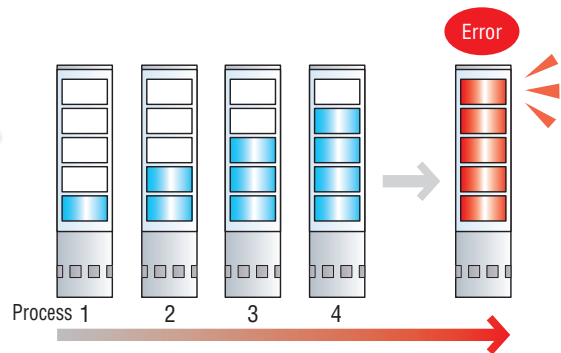
Current status is unknown...



## After

LA6 to visualize each process

- Color code processes
- Flashing light/audible when there is an error



### ISSUE

To check the progress of the current process, the operator must get close to the equipment  
 With a small number of people, productivity is affected by delays in checking

### IMPROVEMENT

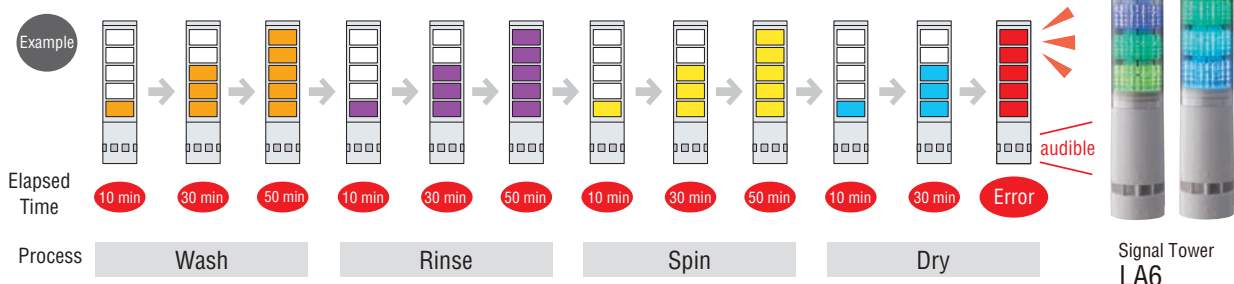
Each process is assigned a color, and the segments indicates the progress, with flashing lights and audible alarms when an error occurs, makes it possible to check even from a distance to enable a fast response

## Improvements Using LA6 Signal Tower

### SOLUTION

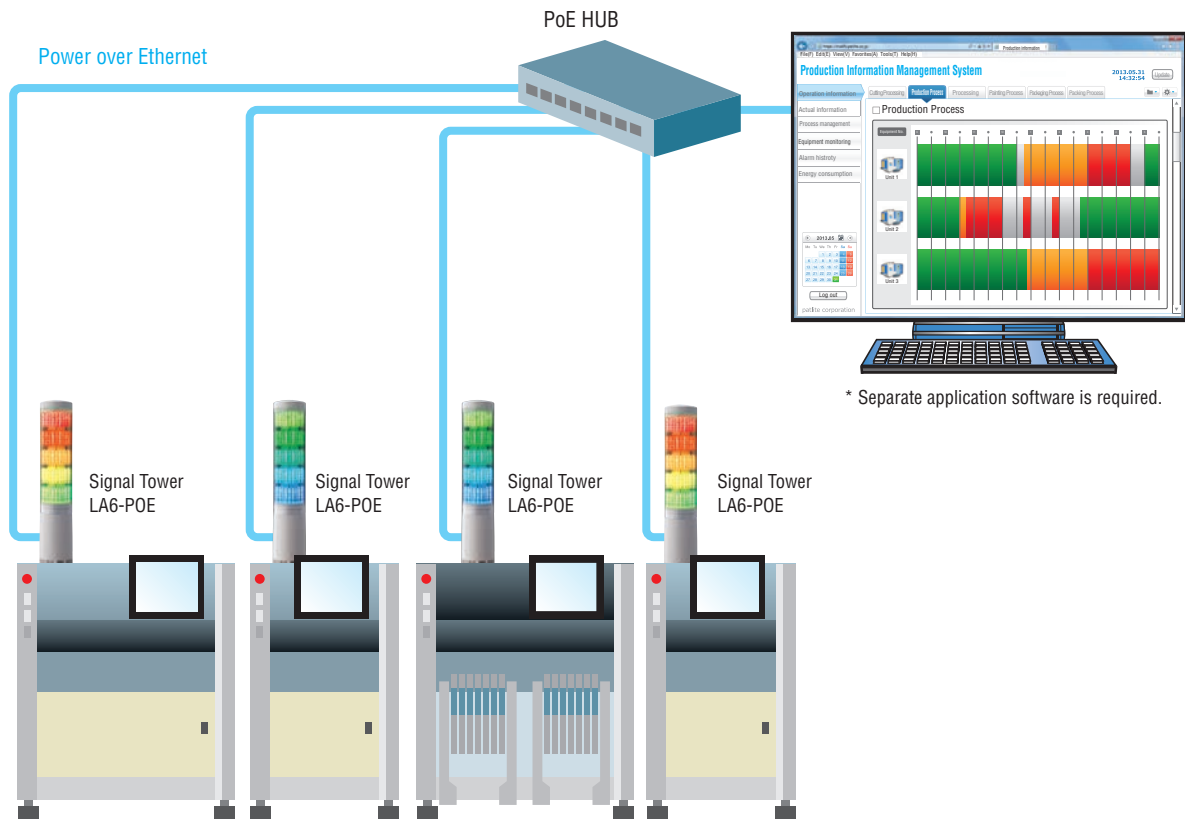
- Solved with LA6 Smart Mode (Time Trigger Type).
  - ① Assign a color for each process. Know the working process right away
  - ② When work is started, the progress is made visible by the number of segments
  - ③ When an error occurs, alert with flashing light + audible alarms

### Display Pattern Example



# Equipment Operation Management over LAN

## System example



### Before

Typically, older equipment is not networkable and we are not able to easily collect performance data for analysis.

### After

By switching signal towers to LA6-POE, you are able to collect operation data over the LAN infrastructure. Because the LA6 supports PoE, it does not require a power supply.

### Industry / Equipment Overview

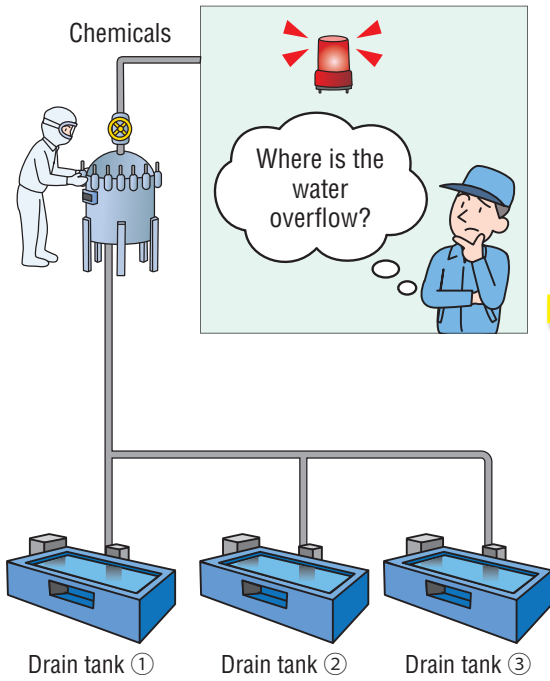
- Industry**
  - Electronic equipment manufacturing
- Equipment**
  - Electronic components, modules, inspection equipment

### Device configuration

LA6-5DTNWB-POE

# Make The Water Level Visible and Reduce Checking Time

## Before



## After

### Visualize water level with the LA6 Signal Tower.

Water level is visible!

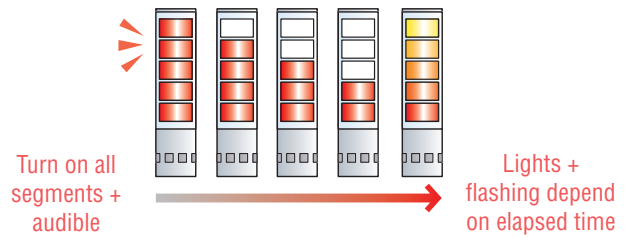
Simple set up of display patterns (color, elapsed time) for input signals

#### Use Case

Drain tank reaches irregular level → all segments of tower light up and audible alarm sounds. Additionally, the timer display shows the elapsed time from when the alarm was triggered.

#### Benefits

- ① It is clear which drain tank is overflowing.
- ② By visualizing elapsed time you can prioritize your response to urgent issues.



## Make levels of wastewater treatment visible

### PROBLEM

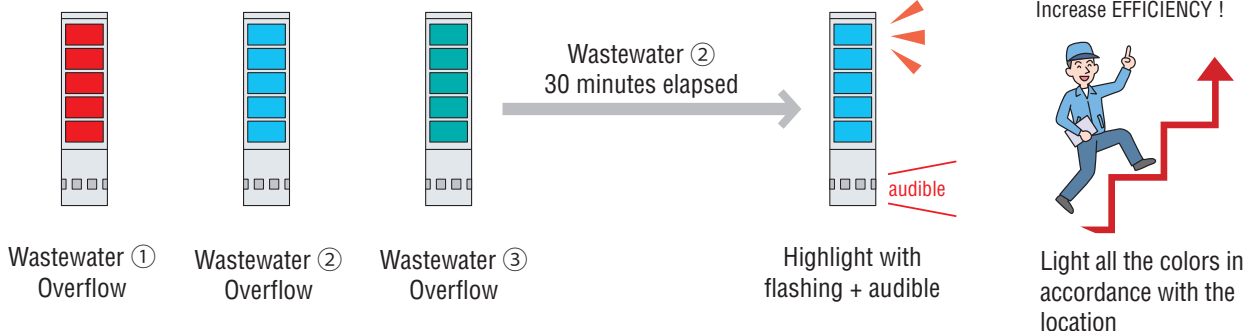
- ① Using a single-segment warning light to alert when liquid volumes reach a certain level as well as indicate which tank is overflowing.
- ② Hard to determine urgency, as elapsed time from overflow is unclear.

### SOLUTION

- ① With the LA6, it is clear which tank is overflowing.
- ② By visualizing the elapsed time, your can prioritize urgent issues.



### Display Pattern Example



# Maintaining Hygiene at Food Processing Site

## Before

The opening and closing of doors allow for intrusion of contaminants such as dust and insects.

Because contamination could be fatal in a food processing center, we want to ensure that we are not letting exterior contaminants inside.

However, the door may accidentally be left open when carrying items in or when multiple people pass through.



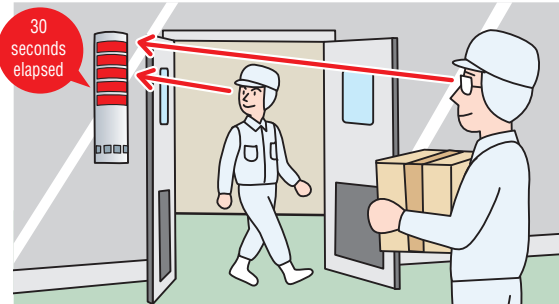
## After

### LA6 Signal Tower Solution

LA6 displays the amount of time doors are left open. Flashing when the doors are opening, and for the amount of time they remain open, there is a change in the colors and number of segments.

#### Benefits

By making people more conscious of opening and closing the door, we can avoid contamination threats that occur from leaving the door open.



## Make visible the amount of time the door is open

### PROBLEM

- Workers need to be more cautious about the amount of time the door is left open.
- Without any criteria, it is hard to make a set of rules and have them followed.
- Fatal risks if bacteria or other substances enters work area.

### Improvements Using LA6 Signal Tower

### SOLUTION

- Use the LA6 to visualize the amount of time the door is left open.
- Easy time-keeping so workers can concentrate on their daily tasks.
- The LA6 notifies workers right away when there are hazards such as the door not fully closed or if something is caught in the door.



Signal Tower LA6

### Extension

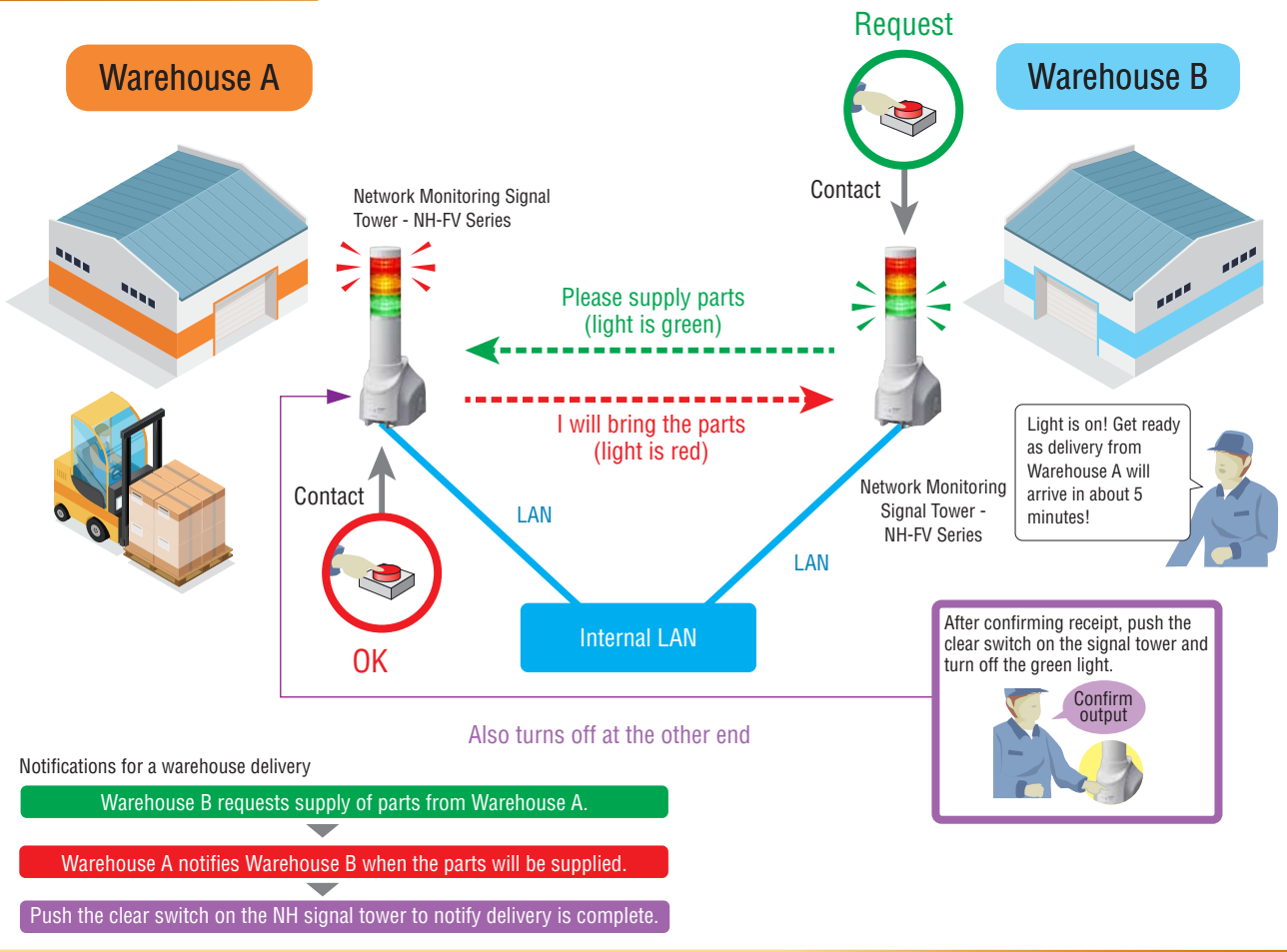
- Connect a temperature sensor to make abnormal temperature conditions more visible.

### Display Pattern Example



# Simple Request System

## Example system



## Before

With a lack of personnel, parts are not supplied in a timely manner, which results in decreased productivity.

## After

The NH-FV gives visual indication of when and what supplies are being requested. Wait time for parts is reduced, and productivity increases.

## Industry Overview

Industry • Manufacturing

### Device configuration

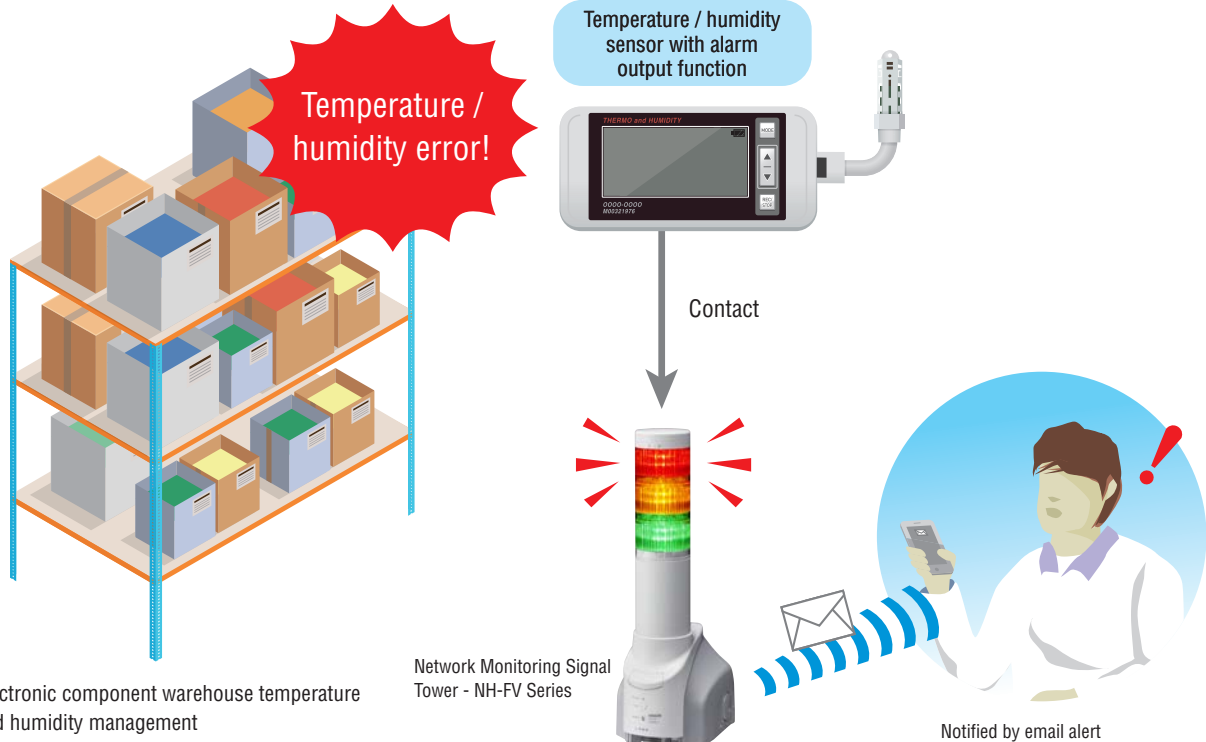
NH-FV Series x 2 units

Network Monitoring Signal Tower  
NH-FV Series



# Air Conditioner Remote Alerts

## Example system



Electronic component warehouse temperature and humidity management

Temperature Range	60-85°F (15.6-29.4°C)
Humidity Range	30 - 75%

Network Monitoring Signal Tower - NH-FV Series

Alerts when temperature or humidity is beyond normal levels

Flashing Red

Notified by email alert

Email sent to notify the manager.

### Before

To maintain the quality of parts, temperature and humidity control is essential. However, periodic work site checks are time-consuming.

### After

The NH-FV Network Monitoring Signal Tower alerts site managers via visual, audible and email alerts when there are irregularities in temperature or humidity.

### Industry Overview

#### Industry

- Semiconductor and electronic components

#### Device configuration

NH-FV Series x 1 unit

Network Monitoring Signal Tower NH-FV Series

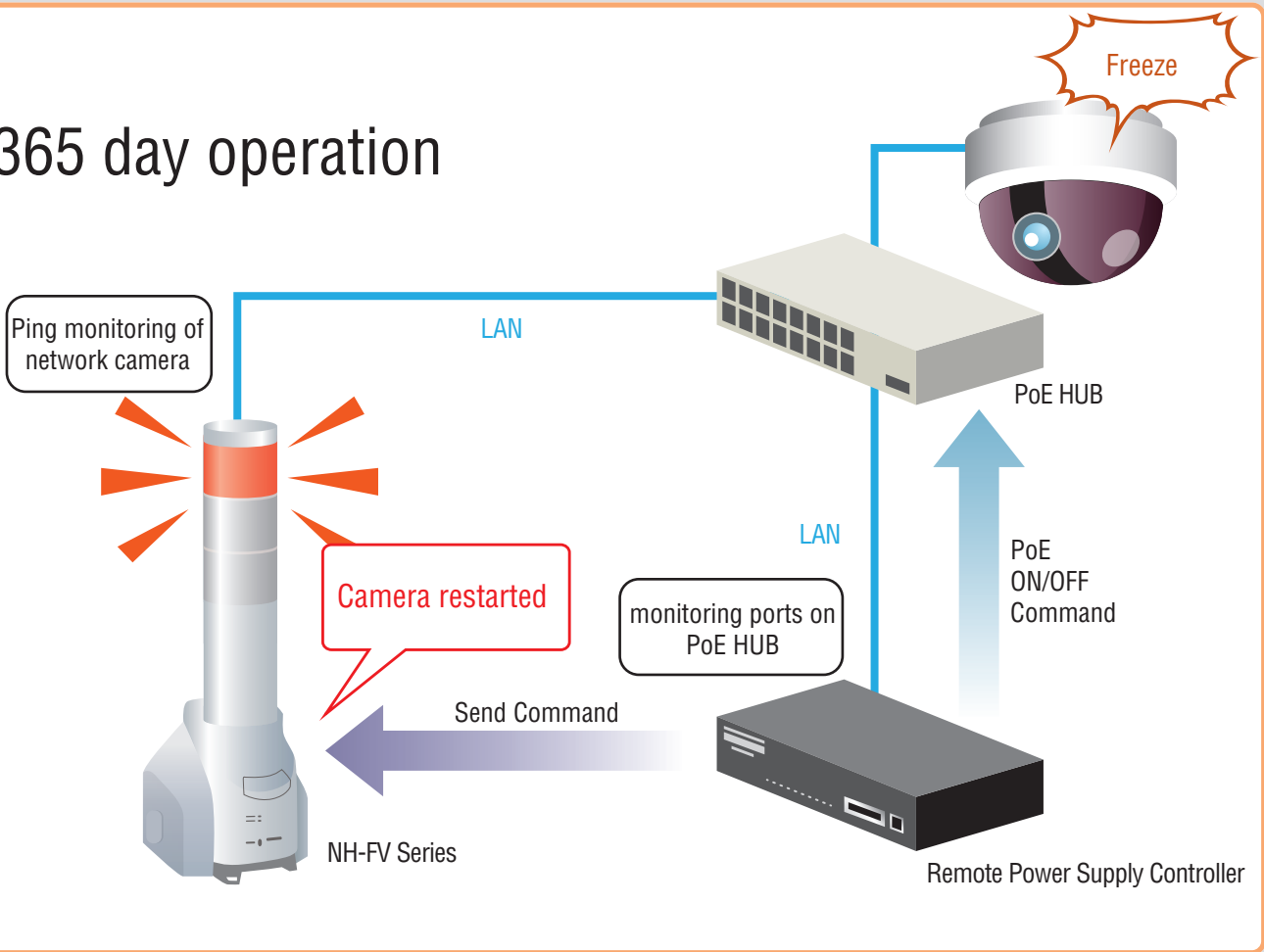




# 24-hour Network Camera Monitoring

## Automatic Camera Restart

### 365 day operation



### Before

The camera freezes and stops recording, but there are no operators at the site to realize and address the issue. Additionally, it is inefficient to send an operator to the site every time the camera needs to be reset.

### After

When the network camera freezes, the remote power controller used to monitor the port automatically restarts the camera. The PATLITE NH-FV series uses ping monitoring and in the event the camera cannot recover automatically, the NH-FV alerts via visual, audible, and email notifications. With this sort of configuration you can use network cameras with confidence.

### MP3 Playback Network Monitoring Signal Tower

NH-FV Series



88 dB

Sound resonates

Play Sound

Voice message notification

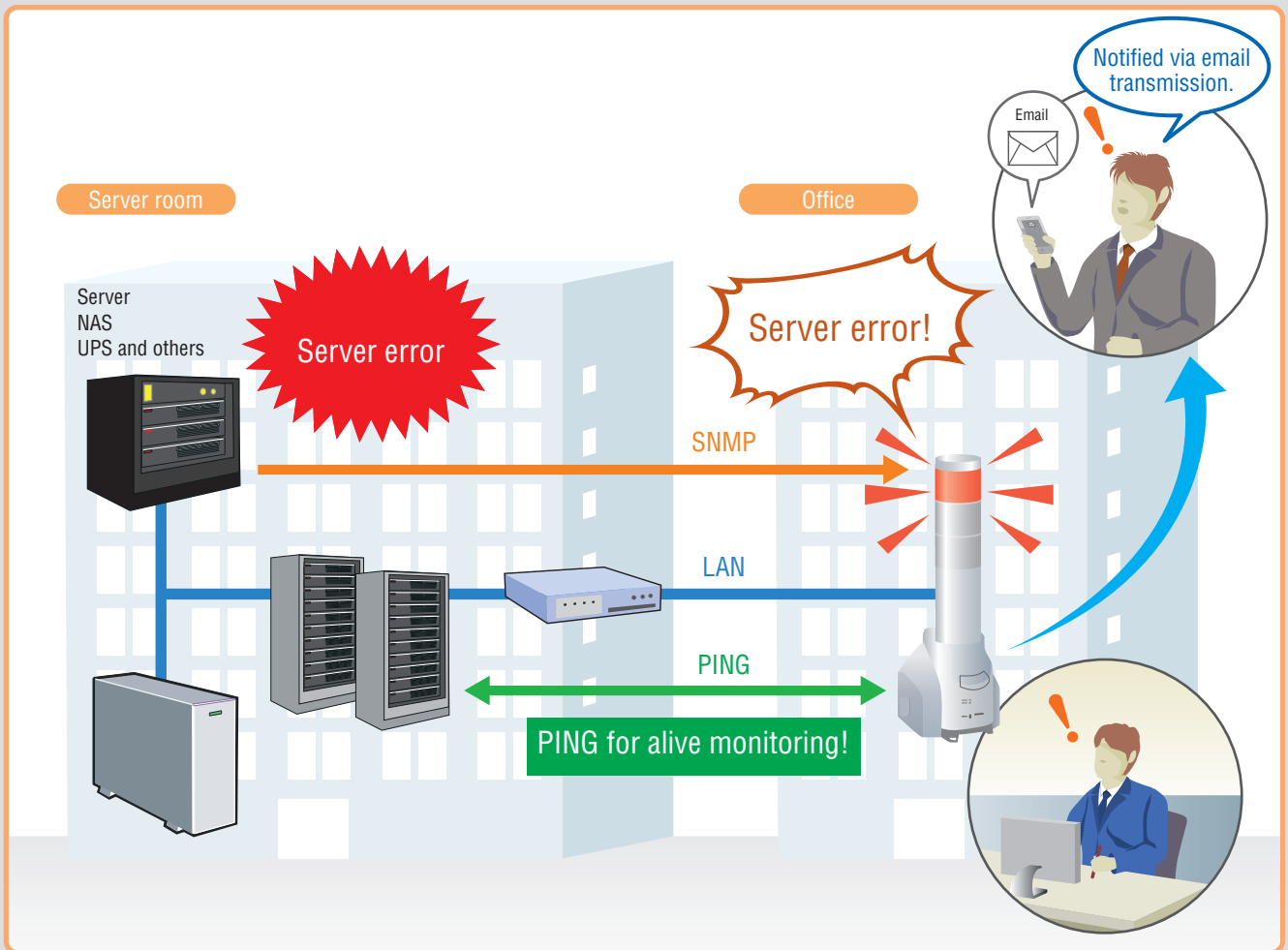
With its compact housing, the unique horn structure achieves sound pressure of 88 dB or more (at 1 meter).

With audible alerts, you can play messages that tell you "what and how that's a problem"

#### ■ Actively get the equipment status

In addition to PING monitoring, the NH Signal Towers are equipped with an SNMP monitoring function. It actively obtains MIB information from supported SNMP network devices and is able to notify personnel with visual, audible and/or email alerts when changes occur.

# Remotely monitor server issues



## Before

There are servers and network systems in place, but no operators that can constantly monitor the operation status of the equipment. Therefore, there is a delay in noticing and addressing equipment issues.

## After

When a server issue occurs, you can immediately notify the operator with visual, audible and/or email alerts. Even without an operator responsible for constantly monitoring the systems, this notification method ensures a quick response for any problems.

## Device configuration

SERVER • NAS • UPS • PATLITE NH-FV Series

## Usage

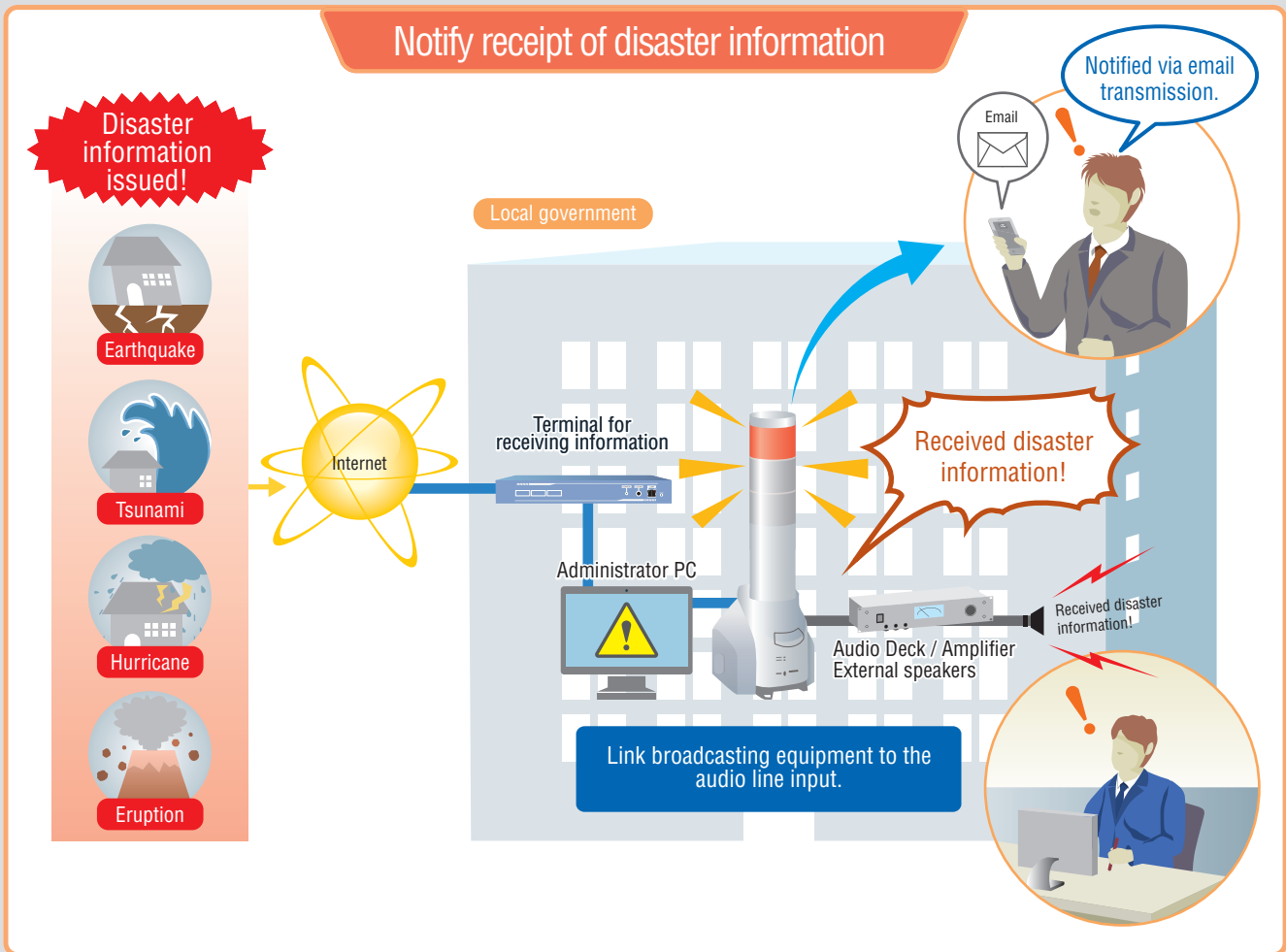
The Network Monitoring Signal Tower uses the ping monitoring function or SNMP for servers, NAS, and UPS to notify the status of network equipment via visual, audible and/or email alerts.

Network Monitoring Signal Tower  
NH-FV Series



# Broadcast Disaster Information to All Operators

Emergency Situation



## Before

Need to respond immediately to disaster alerts such as early earthquake warnings, however this information cannot be transmitted right away from administration computers.

## After

When a natural disaster alert is received, the NH-FV notifies administrators immediately with visual and audible alerts to ensure prompt response to emergency situations.

## Device configuration

Terminal for receiving information, Administrator PC, PATLITE - NH-FV Series, Amplifier / Speakers

## Usage

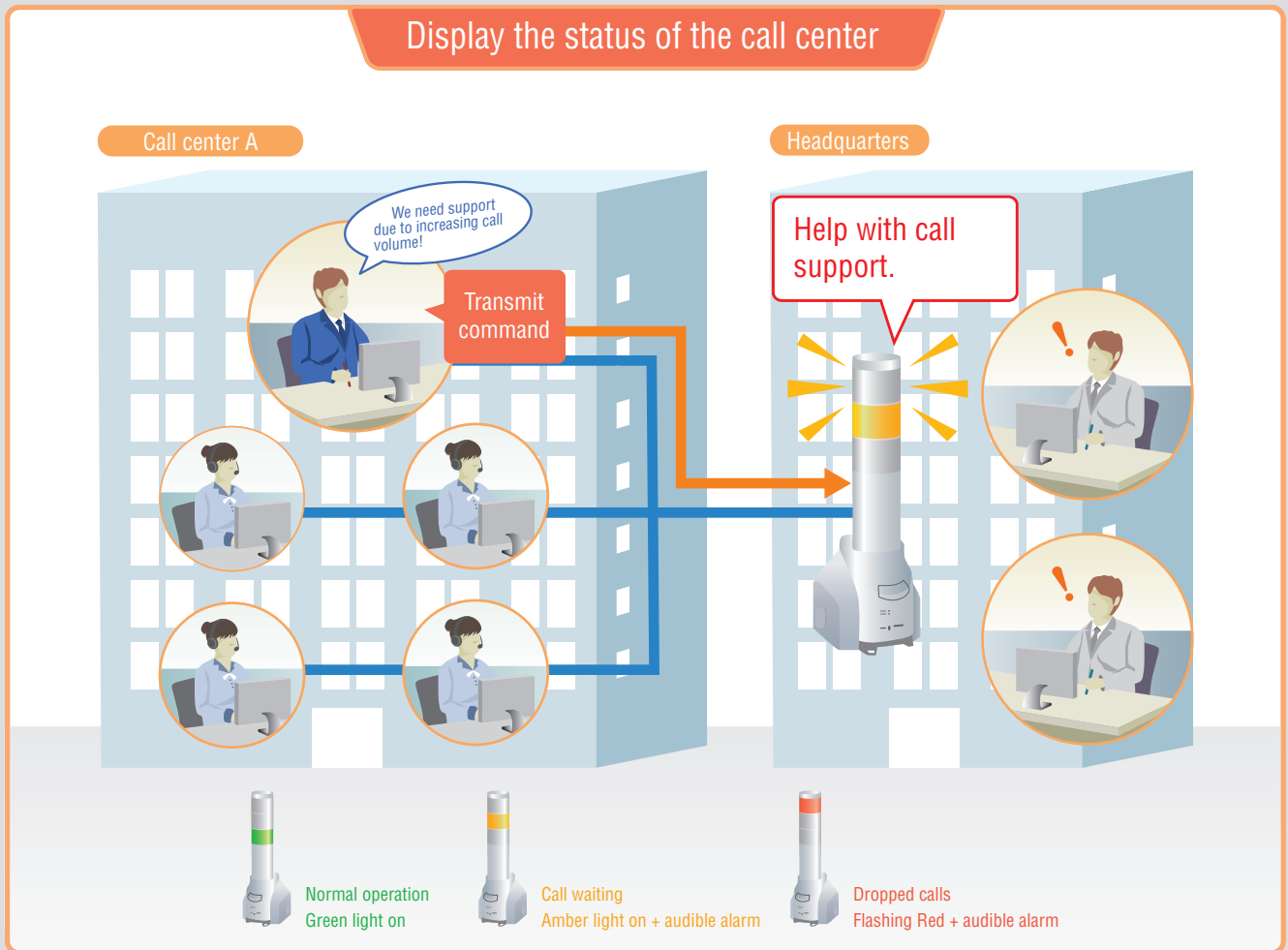
By connecting the disaster information delivery system with either socket communication or SNMP, status can be indicated via visual, audible and email notification.

Network Monitoring Signal Tower  
NH-FV Series



# Reduce call wait times and backlogs

Call center



## Before

There are periods where callers experience unusually long call wait times due to call volume spikes, unusually long calls or insufficient operator resources at the call centers.

## After

By indicating operator's call status with the NH-FV, administrators are able to monitor the situation remotely and in real-time, allowing them to route calls to another call center, mitigating long wait times for multiple call center locations.

## Device configuration

Call center system

PATLITE  
NH-FV Series

## Usage

By connecting the call center system with either socket communication or SNMP, status can be indicated via visual, audible and email notification.

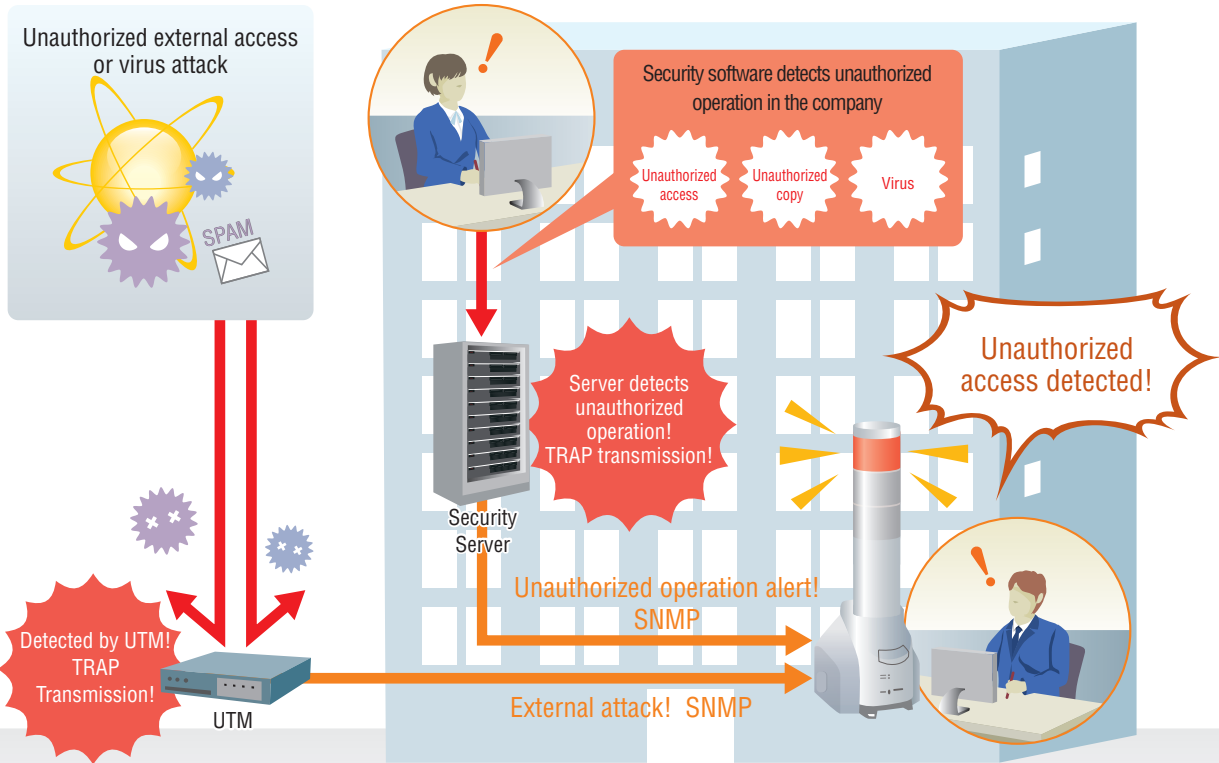


Network Monitoring Signal Tower  
NH-FV Series

# UTM External Attack Monitoring Solution

Office

Alert for unauthorized operation or an external attack



## Before

Unified Threat Management (UTM) has been implemented to prevent unauthorized access, filter emails, and counter Web threats, but we are unaware of any immediate threats.

## After

Detect an external attack with UTM, and use the NH-FV series to notify administrators immediately. By noticing as early as possible, you can take measures to improve the safety of servers that handle personal information.

## Device configuration

UTM • Security Server

PATLITE  
NH-FV Series

## Usage

By connecting the UTM or security server with either socket communication or SNMP, status can be indicated via visual, audible and email notification.

Network Monitoring Signal Tower  
NH-FV Series



# Improve Notification of Emergency Information

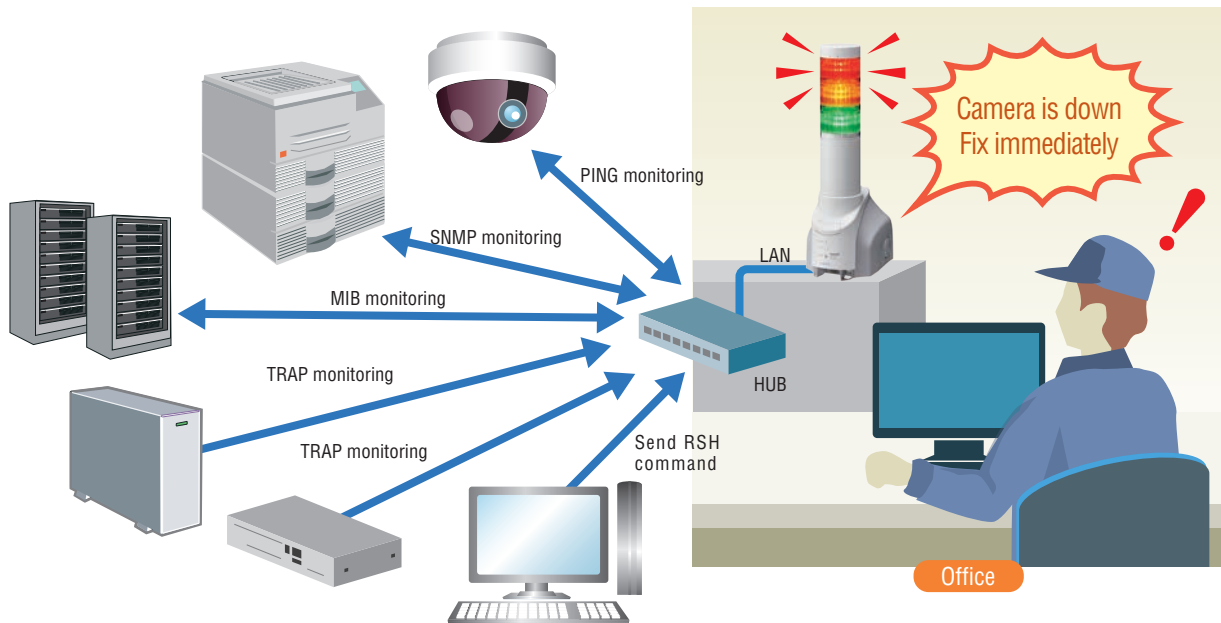
For Factory Security, Railway Command,  
Disaster Prevention and Emergency Services

## System example

PC and software  
not required!\*

Just use PATLITE signal towers to make  
equipment problems visible!

\* Personal computer required for setup.



## Before

It is critical that IT staff is able to monitor the increasing number of devices on the network and be notified immediately when and where an issue is occurring.

## After

In addition to visual alert functions, the NH-FV can also play user-specified voice message alerts to specify where the issue is coming from instead of coding multiple locations with lights or sounds.

- Monitoring network equipment for signs of life (PING monitoring of 24 nodes)
- Get status of all the network equipment (You can register 20 MIB for SNMP compatible equipment)
- Receive and distinguish TRAP (64) messages

## Device configuration

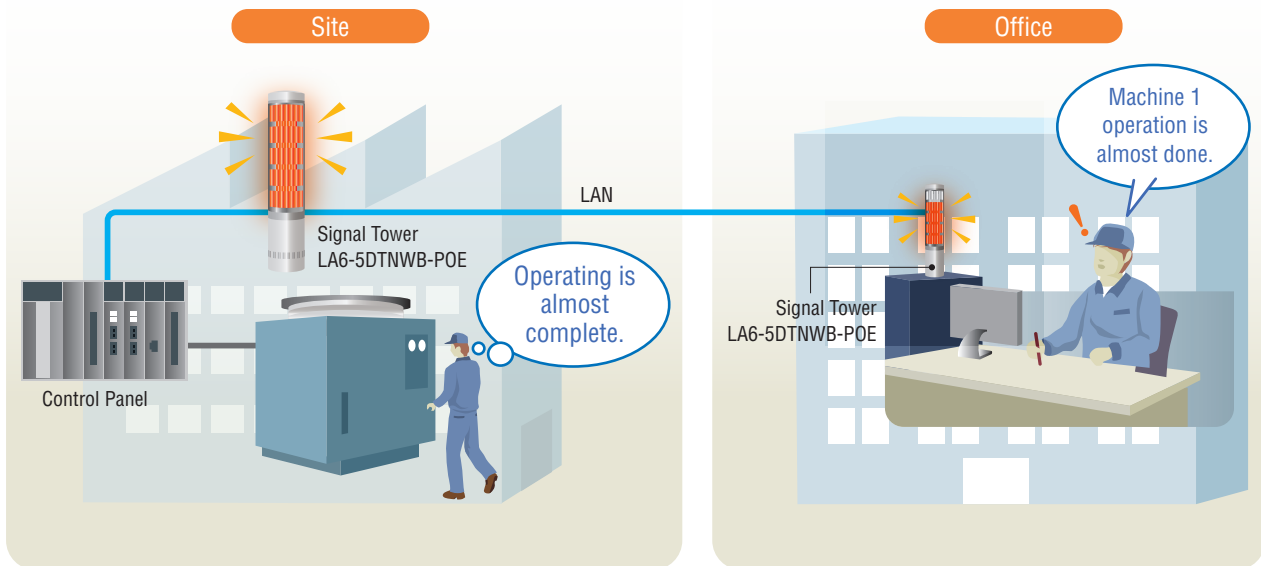


MP3 Network Monitoring Signal Tower  
NH-FV Series



# Industry or automobile-related manufacturing

## System example



Mirror status of LA6-POE master over LAN connection

Remote notification of core equipment operation cycle time

### Before

Make visible the operation cycle and changeover time. Build a centralized monitoring display center and make that site responsible for multiple remote facilities.

### After

The LA6 conveniently integrates into your facilities' existing LAN infrastructure. Operators are able to mirror status from the LA6-POE master over the network to the LA6-POE slave in the office. Leveraging the existing LAN connection minimizes time and wiring costs.

- ① Synchronize Signal Tower LA6 LA6 master control via PLC I/O contacts
- ② Connect LA6 slaves via LAN lines Synchronize display with mirroring

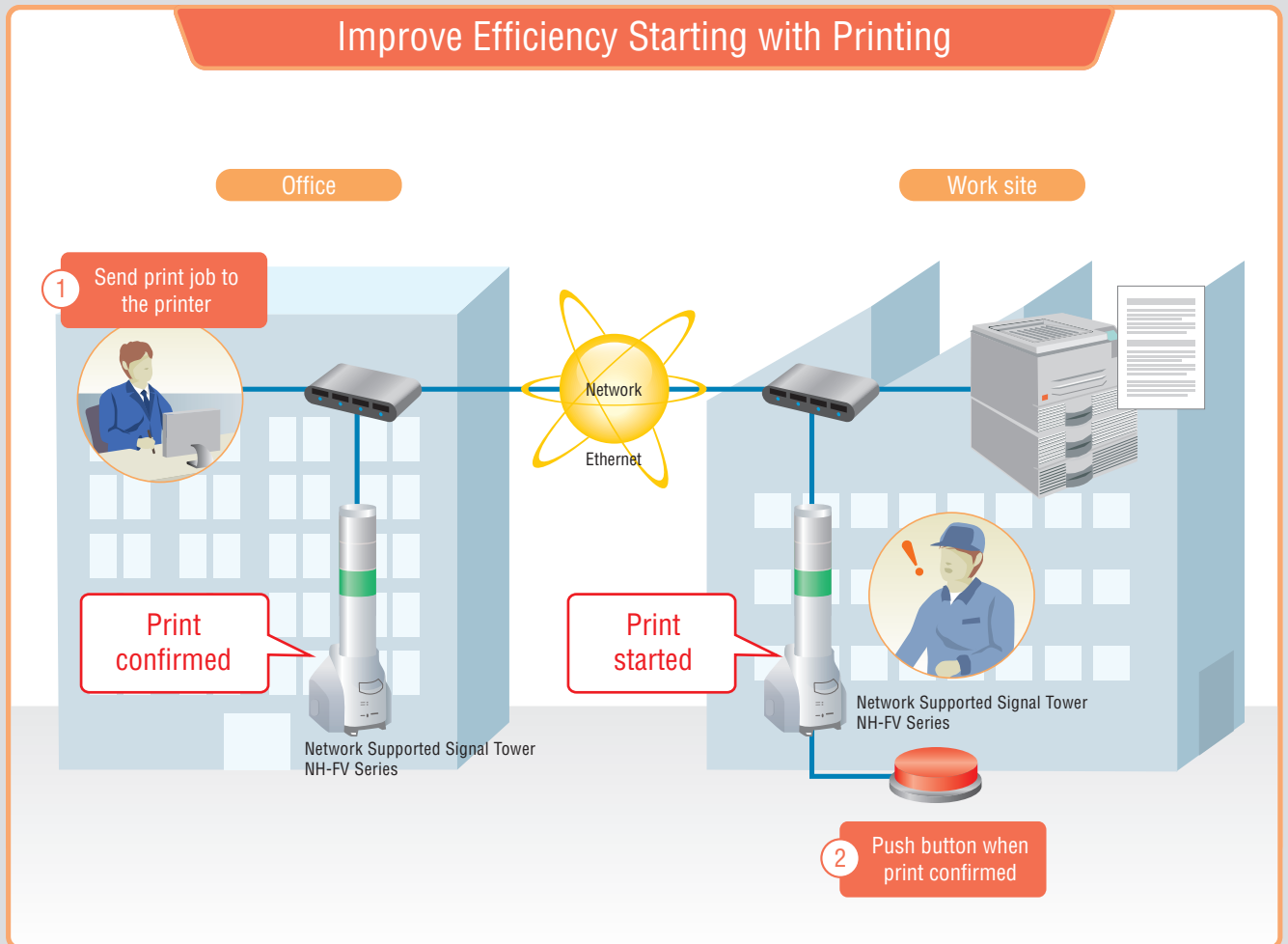
### Device configuration



Signal Tower LA6-5DTNWB-POE x 2 units

# Notice print output as soon as possible

## Confirm print output has been received



### Before

I do not notice when my colleague sends me a print job to my printer from his remote office. My colleague has no way to tell if and when I have received his printed documents.

### After

The NH-FV uses visual and audible notification to alert me when a print job is being sent. I can then confirm receipt of the printed documents by simply pushing a button, which triggers visual and audible notification to the NH-FV Signal Tower at the sender's work site.

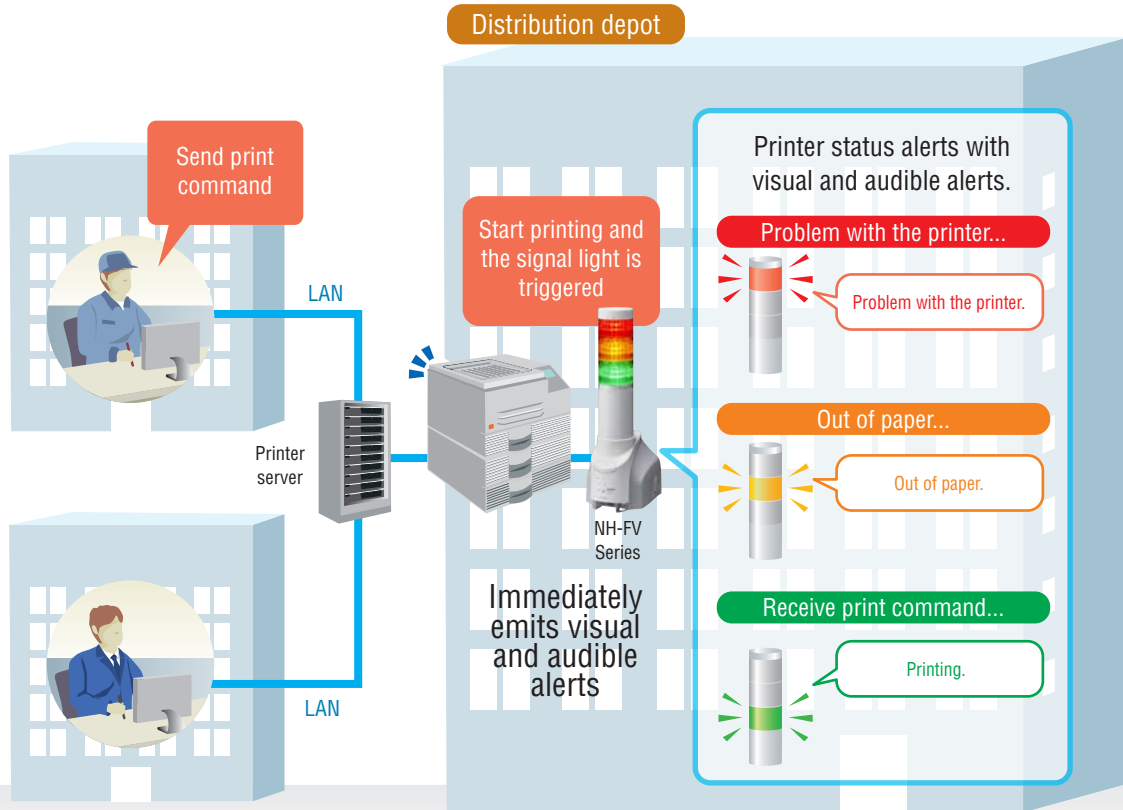
By using the NH-FV Series print monitoring and audible notification features, you can remotely notify printing instructions.

Network Monitoring Signal Tower NH-FV Series



# Visualize Print Errors on Network Printers

## Example system



\*For NH-FV setup, either check with the printer manufacturer or contact us.

## Before

At sites where work is initiated by instructions output by a printer, sometimes no one notices when the printer is out of paper, there is a paper jam, or other printer issues that could delay work.

## After

- Constantly monitor the printer status.  
ex: light indication when printing.
- Visual and audible notifications when there is a printing error.

## Industry Overview

Industry • Manufacturing

### Device configuration

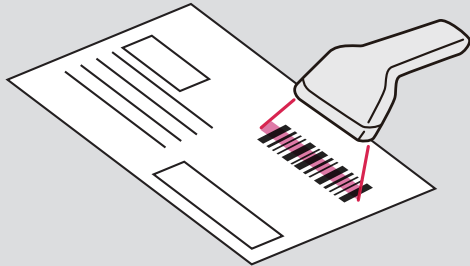
NH-FV Series x 1 unit

Network Monitoring Signal Tower  
NH-FV Series

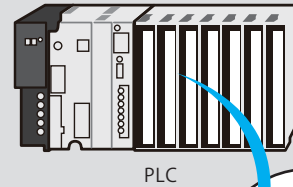


# Prevent Picking Errors with Pick-to-Light

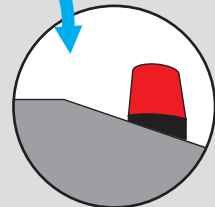
## Implement NE Touch Sensor Beacons to simplify and enhance workflow



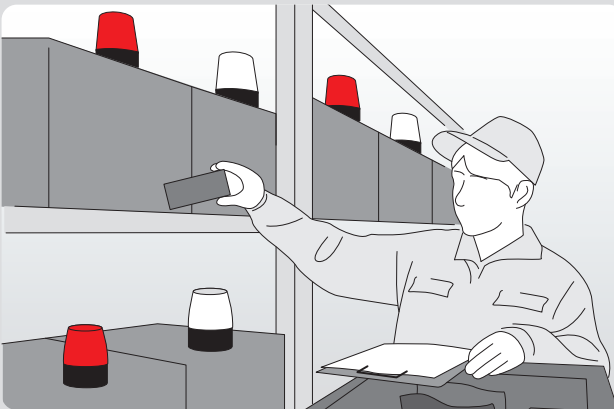
A barcode that contains parts and shipping instructions is scanned with a barcode reader.



PLC



The PLC processes the scanned information and illuminates the NE signal beacons corresponding to the bins the operator needs to select parts from.



As parts are picked from bins, operators simply touch the sensor located on the top of the NE to turn off the light, allowing operators to accurately keep track of the parts and reduce picking errors.

### Before

When there is no system in place to ensure the accuracy of picking processes, human error can cause mistakes during picking. Additional time and resources are spent re-picking, reducing work efficiency.

### After

Implementing a pick-to-light system with NE signal beacons simplifies the part picking process and prevents human error. Furthermore, the NE features a compact size for installation in tight spaces.



**NE-M1ATB-M**  
Signal Beacons

Options



**Upper Bracket**  
NE-001D



**Wall Mount Bracket**  
NE-002D



**Mounting Bracket**  
T85130016-F1



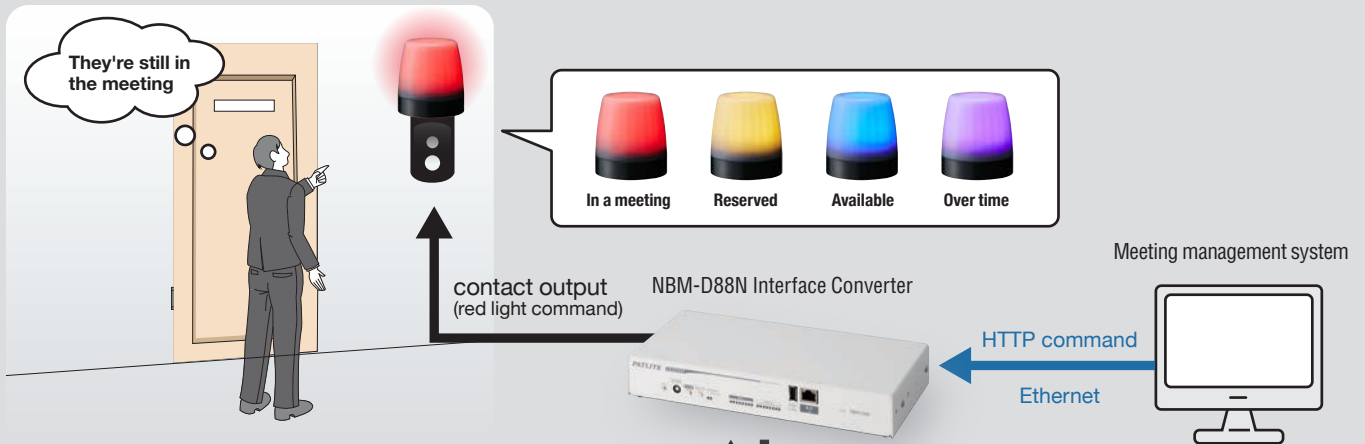
**Mounting Screw**  
T81800030-F1

Mounting example

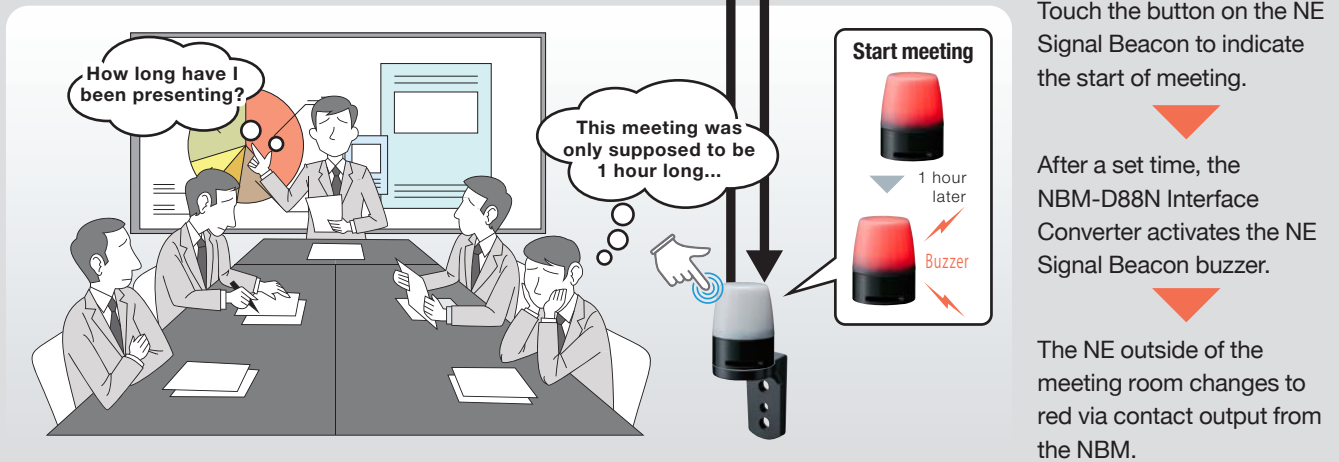


# Smarter, More Efficient Scheduling.

## Visualize Meeting Room Schedules



The meeting room status can be confirmed from outside the room



### Before

Without a visual meeting room system, meetings tended to run longer than allotted for, causing schedule delays and reducing productivity.

### After

By implementing a visual meeting room indicator system, meetings became more efficient and reduced delays in the meeting room schedule which improved productivity.



**Interface Converter**  
NBM-D88N



**Signal Beacon (with buzzer)**  
NE-M1ATB-M



**Signal Beacon**  
NE-M1ANN-M

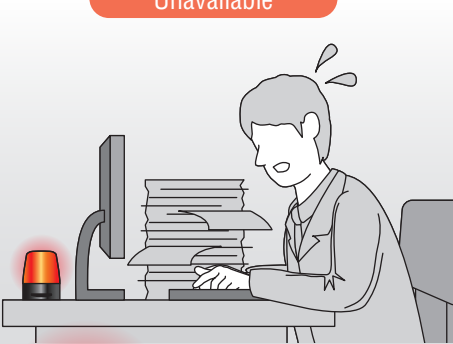



**Wall Mount Bracket**  
NE-002D

# Reduce Stress and Avoid Work Interruptions

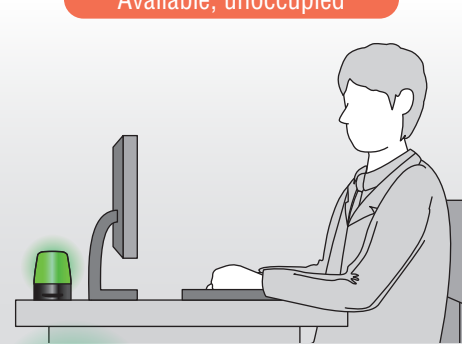

Indicate the busyness of current work

Unavailable





▶ Busy;  
Do Not Disturb

Available; unoccupied

▶ The hand is free  
It can correspond



Touch to switch color

## Options



**Upper Bracket**  
NE-001D



**Wall Mount Bracket**  
NE-002D

N type



**Pole**  
POLE22-N

T type



**Pole (threaded)**  
POLE22-T

Nut included

## Mounting Examples



## Before

In a time-sensitive work environment such as call centers and broadcasting stations, it can be difficult to respond to a coworker's request when working on another task. Interruptions in employee's busy work flow causes delays, errors, and further stress.

## After

The NE Signal Beacons is installed on the employee's desk, allowing them to toggle indication between red for "busy" and green for "available" with a single touch button. This avoids time-sensitive work from being interrupted, and coworkers can clearly see when it is an appropriate time to have a discussion.



**NE-M1ATB-M**  
Signal Beacons

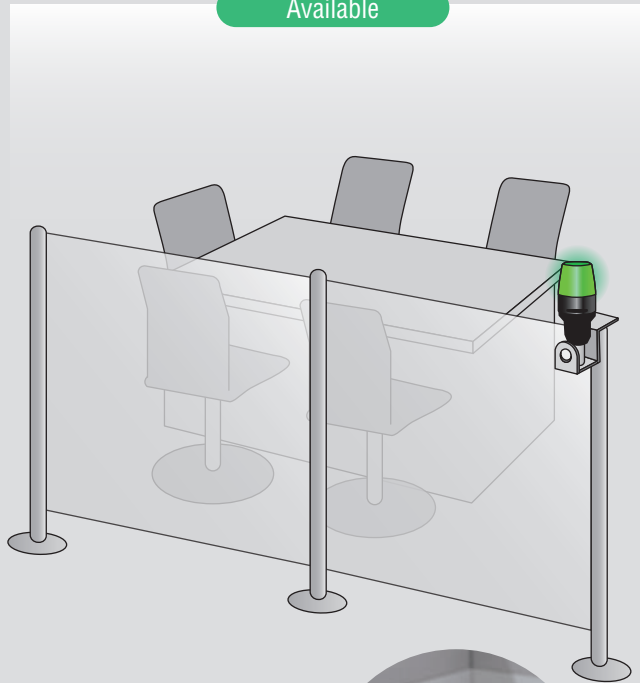
# Clear Indication, Simple Installation.

Indicate meeting room status

In use



Available



In use

Available

Touch to switch color



Mounting example

## Before

In a large facility with multiple meeting rooms, it is unclear which rooms are in use and which ones are vacant. It was an inefficient process to have to check each room to confirm its vacancy, and important meetings were often disrupted by this.

## After

The NE Signal Beacons are implemented in a color-coded system with red signaling "in use" and green signaling "available," enabling quick and clear indications, even from a distance. Furthermore, it can be connected using a single M12 cable, making installation quick and easy.



**NE-M1ATB-M**  
Signal Beacons



**Upper Bracket**  
NE-001D



**Pole (threaded)**  
POLE22-T  
100mm



**Mounting Bracket**  
T85130016-F1



**Mounting Screw**  
T81800030-F1

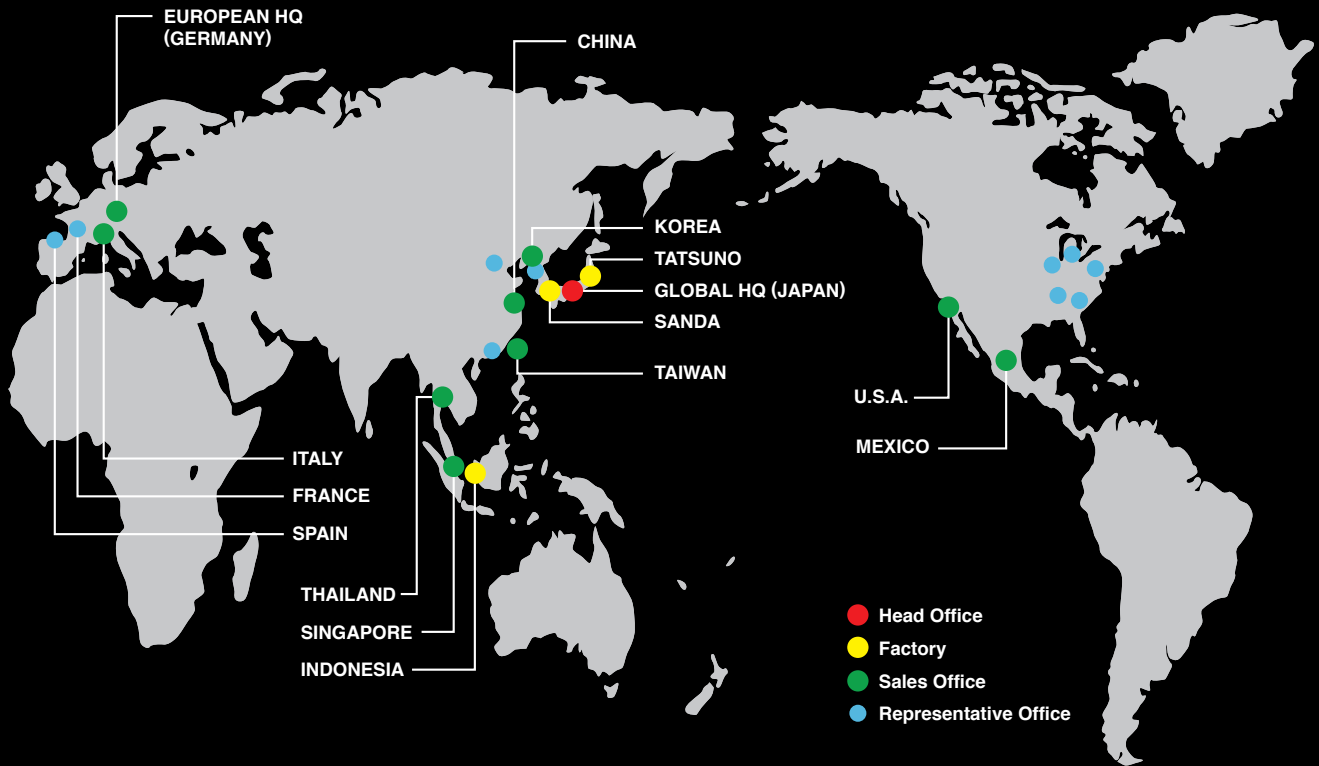


# Vocabulary

Vocabulary	Explanation
<b>IoT</b>	Stands for "Internet of Things", an industry term describing the interrelationship of devices connected to the internet, which collect and share data.
<b>M2M</b>	Stands for "Machine-to-Machine" and refers to technology that enables the exchange of data between networked machines, without requiring human assistance.
<b>ECRS</b>	Stands for Eliminate, Combine, Rearrange, and Simplify. They are a set of processes that aim to carry out a procedure in a disciplined and effective way. Eliminate: Identify processes that can be eliminated. Combine: if work cannot be eliminated, try to combine them. Rearrange: Rearrange resources to optimize work efficiency. Simplify: Simplify processes and make continued efforts for long-term improvement.
<b>PoE</b>	Stands for "Power of Ethernet" and describes a system where both data and power are supplied to a machine using a single Ethernet cable.
<b>TPM</b>	Stands for Total Productive Maintenance, which refers to a strategy for equipment maintenance in efforts to optimize production efficiency.
<b>The 7 Wastes of Lean Manufacturing</b>	Seven wastes (or Muda) that hinder production productivity. Overproduction, Excess inventory, Excess motion, Defects, Over-processing, Waiting, and Transporting.
<b>Logistics 4.0</b>	Refers to the digitalization and automation of logistic processes, as well as the interaction of people, machines, and products within the digitally-networked system. Examples include: AGVs, Drones, parts picking robots.
<b>Supply Chain</b>	Refers to the management of a company and its suppliers, from the raw components and services all the way to delivery to the consumer.
<b>Bottleneck</b>	Refers to inefficiencies that occur in a production system. The term is derived from the appearance of a bottle: wide at the base, but narrow towards the top.
<b>Andon</b>	A status-display system in a production area that alerts managers of machine or process errors in real-time, so that the issue can be addressed right away. It originated from Toyota's production system.

Vocabulary	Explanation
<b>Takt Time</b>	<p>The rate at which one unit of a product must be produced in order to meet the customer's demand.</p> <p>Takt time is the quantity of products requested by a customer, in relation to the total time it takes to produce those items.</p> <p>Takt time = Total Time Available for Production / Average Daily Customer Demand</p>
<b>Cycle Time (C/T)</b>	<p>Refers to the average time required to complete production of one unit.</p> <p>When cycle time &gt; takt time, it creates a shortage</p> <p>When cycle time &lt; takt time, it creates a surplus</p>
<b>Traceability</b>	<p>Refers to the ability to trace all processes of the production of an item, from the procurement of raw materials, production, consumption, all the way until disposal.</p>
<b>Pandemic</b>	<p>Refers to the worldwide spread of a new disease.</p> <p>Pandemic countermeasures are actions taken by the country or an organization to eliminate the pandemic disease.</p>
<b>Utilization Rate</b>	<p>Refers to the percentage of time that is actually used to perform productive work, in relation to the total available time.</p> <p>It can be used to measure operational efficiency, as well as how well capital investment is being managed.</p>
<b>Operational Availability</b>	<p>Refers to the percentage of total time that an equipment is properly functioning during the time it is required for production.</p> <p>Of course, an operational availability rate of 100% is ideal. However, events such as maintenance, cleaning, and resolving machine errors can reduce the operational availability rate.</p>
<b>Predictive Maintenance</b>	<p>Refers to the percentage of total time that an equipment is properly functioning when it is required for production.</p> <p>Of course, an operational availability rate of 100% is ideal. However, events such as maintenance, cleaning, and resolving machine errors can lower the operational availability rate.</p>
<b>Small Lot Production</b>	<p>Refers to techniques using machine-monitoring devices that track the machine's status while in operation, to detect and address signs of error before they result in failure.</p> <p>Unlike conventional methods of equipment maintenance that address equipment issues after they occur, predictive maintenance aims to realize signs of potential issues, and resolve them before they occur.</p>
<b>Production Leveling</b>	<p>Refers to a production technique where the rate of production remains constant, regardless of the fluctuation in demand over time.</p>
<b>Labor and Manpower Reduction</b>	<p>Labor reduction can be achieved by improving operational procedures and implementing equipment that can replace human labor.</p> <p>Manpower reduction can be achieved by optimizing work efficiency and reducing any unnecessary or redundant work.</p>

# PATLITE Global Network



## **PATLITE MEXICO S.A. de C.V.**

E-mail: [info@patlite.com.mx](mailto:info@patlite.com.mx); TEL: +52-442-688-3496  
[www.patlite.com.mx](http://www.patlite.com.mx)

## **PATLITE (U.S.A.) Corporation**

[www.patlite.com](http://www.patlite.com)

## **PATLITE KOREA CO., LTD.**

[www.patlite.co.kr](http://www.patlite.co.kr)

## **PATLITE (SINGAPORE) PTE LTD**

[www.patlite-ap.com](http://www.patlite-ap.com)

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[www.patlite.co.th](http://www.patlite.co.th)

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[www.patlite.eu](http://www.patlite.eu)

## **PATLITE Corporation**

[www.patlite.co.jp](http://www.patlite.co.jp)