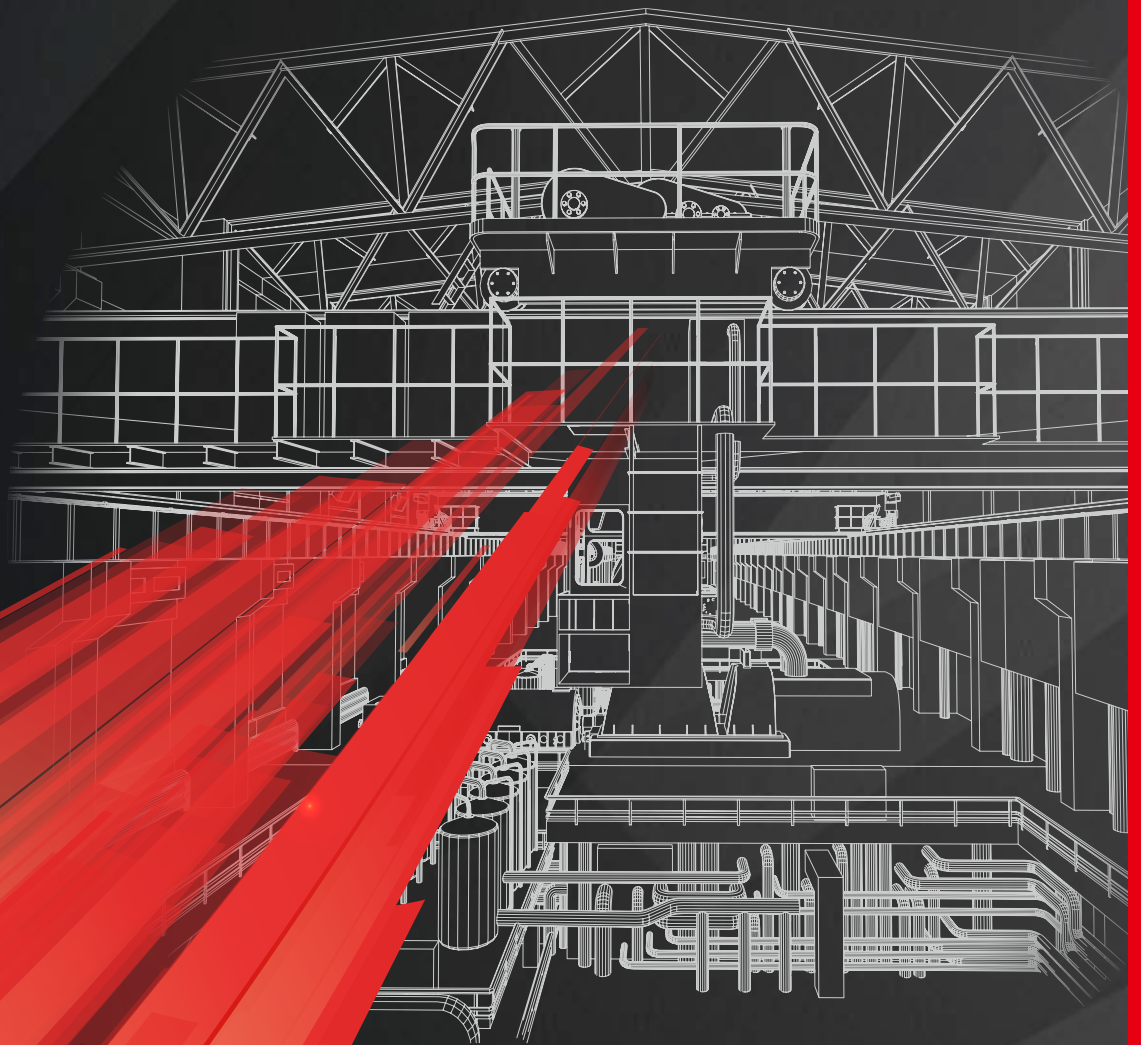


PATLITE®

The KAIZEN Handbook

~Solutions for Factory Improvement~



CONTENTS

Scenario 1 Automobile Manufacturing	3
Scenario 2 Food and Pharmaceutical	5
Scenario 3 Logistics	7

Automobile Manufacturing

Building integrated systems for operation management and monitoring	9
Easily compile operation status of old equipment!	10
Automating a Handwritten Factory Daily Report	11
Visualize Level of Cutting Oil	12
Visualize the Stages of Equipment Maintenance <small>Create a standardized, color-coded system for equipment status</small>	13
Visualize Equipment in Unmanned Areas	14
Visualize / Analyze Stalled Robotics	15
Monitor issues remotely and in real-time	16
Visualize Inspection Process Anomalies	17
Prevent Oversights During Inspection	18
Mistake-free Inspection Process	19
Visualize the Casting Process	20
LA6 Improves Display of Robot Status and Safety Guidelines	21
Visualize the time required at each work step	22
Remote monitoring reduces loss from stoppages	23
Takt Time for Manual Assembly Process	24
Visualize Takt Time with LA6 on AGV	25
Visualize Takt Time	26
Regulating the Cell Assembly Line	27
Visualize Lost Time in Cell Production	28
IoT Screw Driver Measures Tightness of Screws	29
Signal From Cells Using an Andon Monitor	30

Food and Pharmaceutical

Visualize Operation Panel Information	31
Improve Predictive Maintenance <small>Visualize lost productivity from reduction in speed</small>	32

Prevent sand overflowing from the hopper	33
Visualize Amount of Liquid in the Tank!	34
Create Uniform Visual Signals Throughout the Worksite	35
Visualize remaining amount	36
Visualize the elapsed time from when the problem occurred	37
Visualize Work Progress	38
Equipment Operation Management over LAN	39
Make The Water Level Visible and Reduce Checking Time	40
Maintaining Hygiene at Food Processing Site	41

Logistics

Simple Request System	42
Air Conditioner Remote Alerts	43
24-hour Network Camera Monitoring <small>Automatic Camera Restart</small>	44
Remotely monitor server issues	45
Broadcast disaster information to everyone!	46
Reduce call waiting and call backlogs!	47
UTM External Attack Monitoring Solution	48
Improve Notification of Emergency Information <small>For Factory Security, Railway Command, Disaster Prevention and Emergency Services</small>	49
Industry or automobile-related manufacturing	50
Notice print output as soon as possible Confirm print output has been received	51
Visualize Print Errors on Network Printers	52
Prevent Picking Errors with Pick-to-Light <small>Implement NE Touch Sensor Beacons to simplify and enhance workflow</small>	53

Others

Smarter, More Efficient Scheduling. <small>Visualize Meeting Room Schedules</small>	54
Reduce Stress and Avoid Work Interruptions <small>Indicate the busyness of current work</small>	55
Clear Indication, Simple Installation. <small>Indicate meeting room status</small>	56

List of Vocabulary	58
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Scenario 1 Automobile Manufacturing

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
- P13 Visualize the Stages of Equipment Maintenance

Welding

- P14 Visualize Equipment in Unmanned Areas
- P15 Visualize / Analyze Stalled Robotics

Painting

- P20 Visualize the Casting Process
- P21 LA6 Improves Display of Robot Status and Safety Guidelines

Body assembly

- P22 Visualize the time required at each work step
- P23 Remote monitoring reduces loss from stoppages
- P24 Takt Time for Manual Assembly Process
- P25 Visualize Takt Time with LA6 on AGV
- P26 Visualize Takt Time
- P27 Regulating the Cell Assembly Line
- P28 Visualize Lost Time in Cell Production
- P29 IoT Screw Driver Measures Tightness of Screws
- P30 Signal From Cells Using an Andon Monitor

Tests and inspections

- P16 Monitor issues remotely and in real-time
- P17 Visualize Inspection Process Anomalies
- P18 Prevent Oversights During Inspection
- P19 Mistake-free Inspection Process

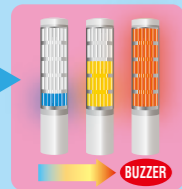
Scenario 2 Food and Pharmaceutical

Boxing and shipment

- 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



Raw materials being transported

60 seconds elapsed.

Abnormal occurrence

Target 8600
Results 5560
Difference -3040

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 and Reduce Checking Time

Security

- P41 Maintaining Hygiene at Food Processing Site

Management office

Arrival of stock

P42 Simple Request System

- P45 Remotely monitor server issues
- P46 Broadcast disaster information to everyone!
- P47 Reduce call waiting and call backlogs!
- P48 UTM External Attack Monitoring Solution
- P49 Improve Notification of Emergency Information
- P50 Industry or automobile-related manufacturing

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

Storage of stock

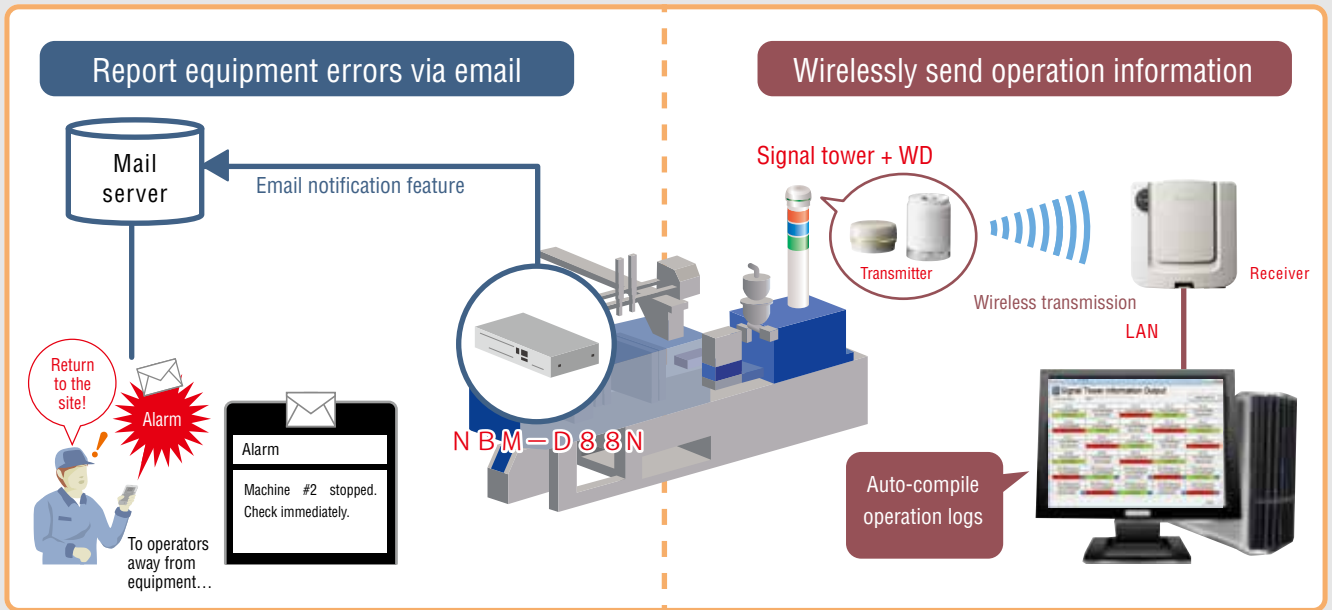
P43 Air Conditioner Remote Alerts

Sorting

Shipment

P44 24-hour Network Camera Monitoring

Building integrated systems for operation management and monitoring



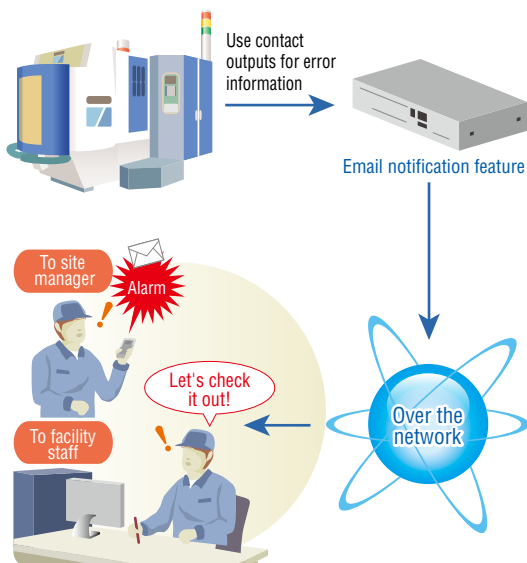
Before

- 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

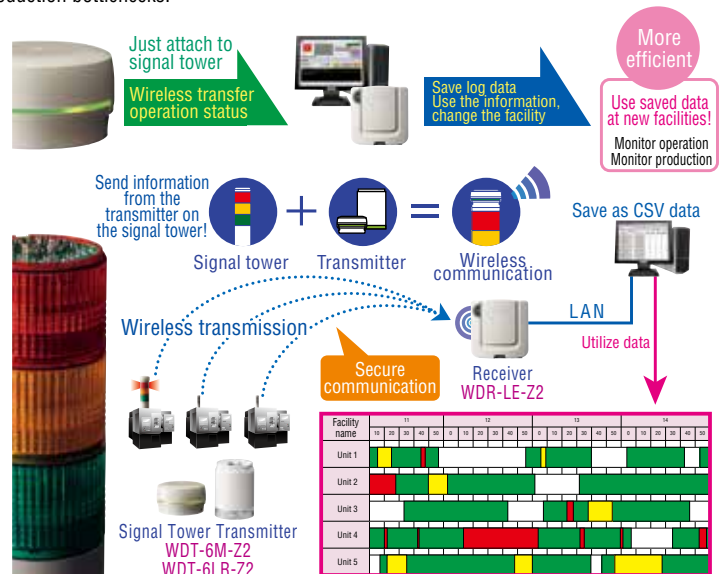
Email alarms

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



Operation Management

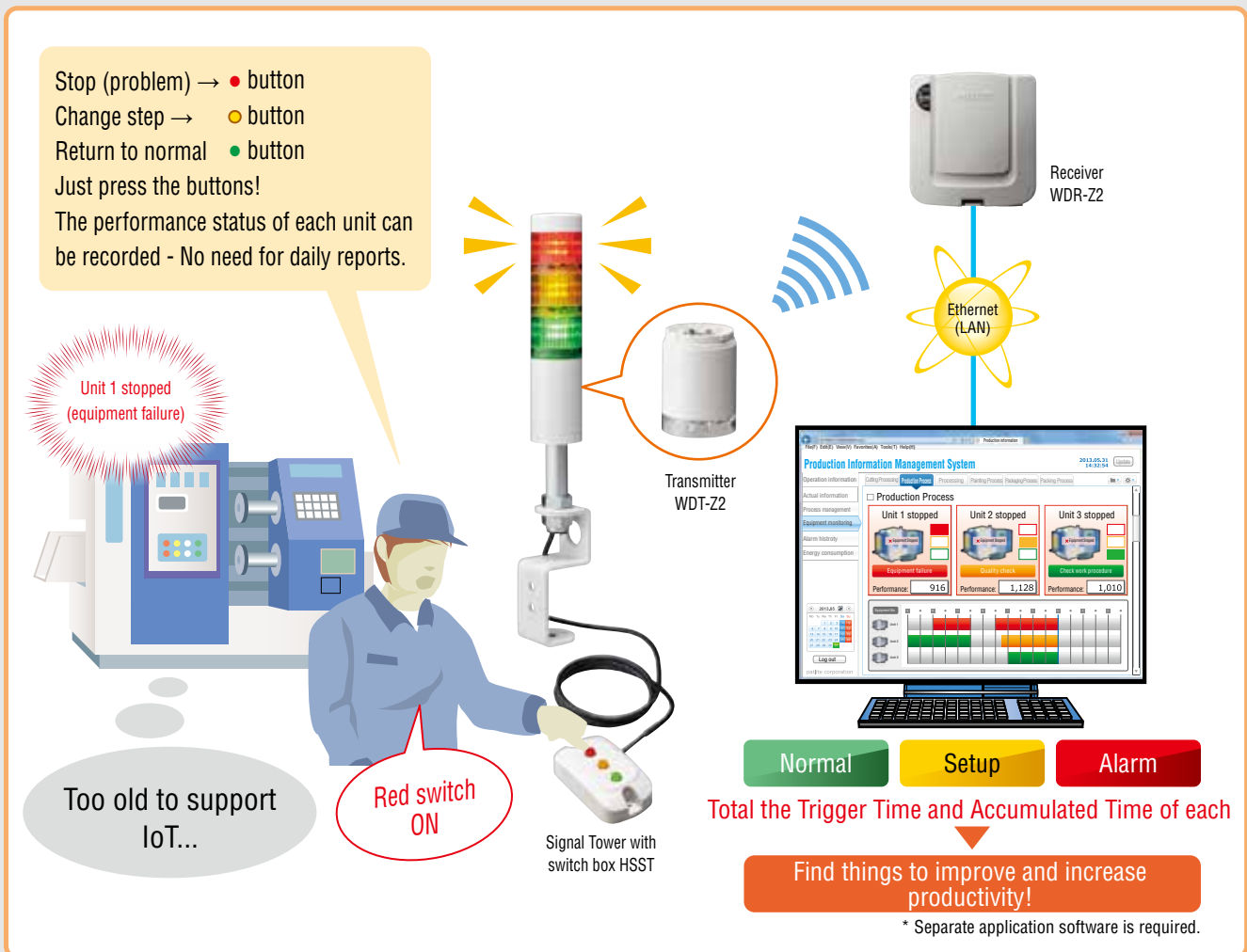
Automatically calculate and summarize operation logs based on the signal tower's color information (Red, Yellow, Green) using the WD-Z2 on the wireless network. Visualize overburden (Muri), waste (Muda), and inconsistency (Mura) in the manufacturing site. Practical and economical solution for data acquisition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



* Separate application software is required.

Easily compile operation status of old equipment!

Reduce Labor

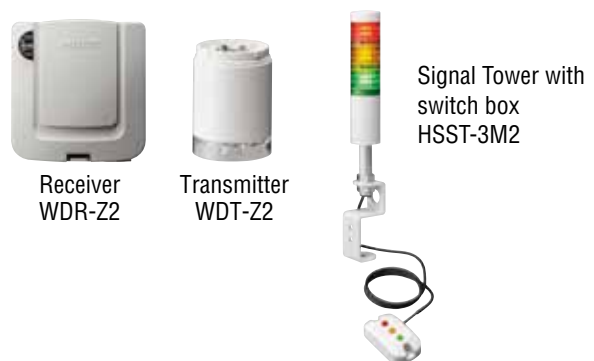


Before

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

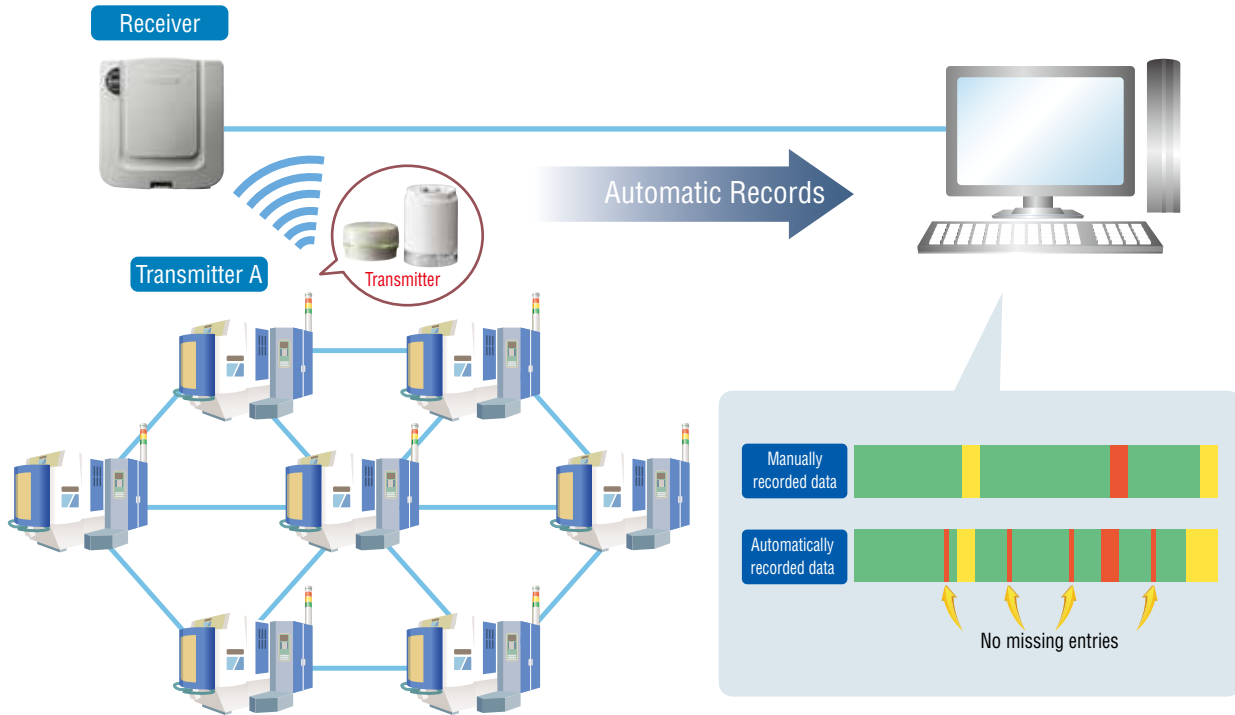
The WD System allows users to wirelessly acquire machine data remotely and in real-time, completely eliminating handwritten reports. The collected data is accurate and can be used to determine issue severity for more effective predictive maintenance. The WD and HSST can also be added to any machine, 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

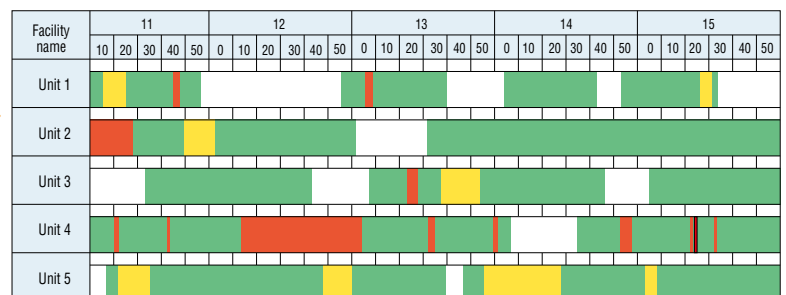
The WD System automatically records equipment operation information 24/7 allowing users to identify trends and pin point machine downtime for more efficient predictive maintenance.

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

Before

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



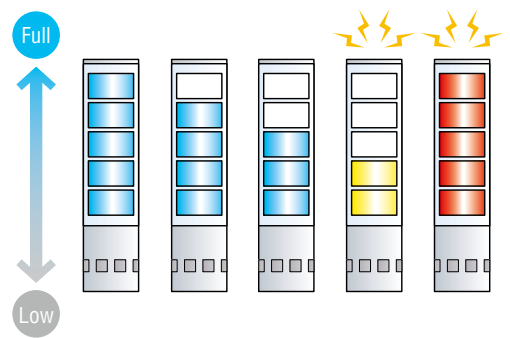
ISSUE

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

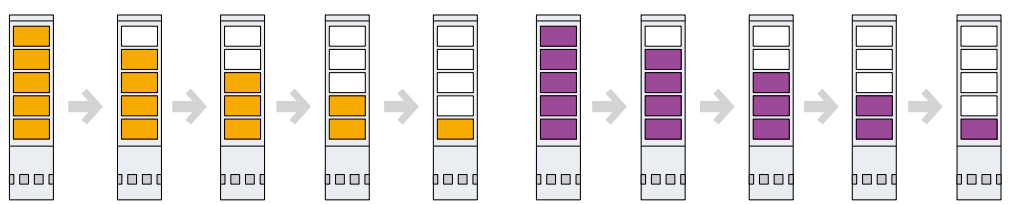
- Use the LA6 Smart Mode (Pulse Trigger Type).
 - ① Detect the oil level with a water-level sensor and show the oil level with segments on the LA6
 - ② You can see the status of multiple units
 - ③ By visualizing the remaining oil levels per unit, you can prioritize maintenance

Extension

- Link with a temperature sensor to make abnormal temperature conditions more visible.

Display Pattern Example

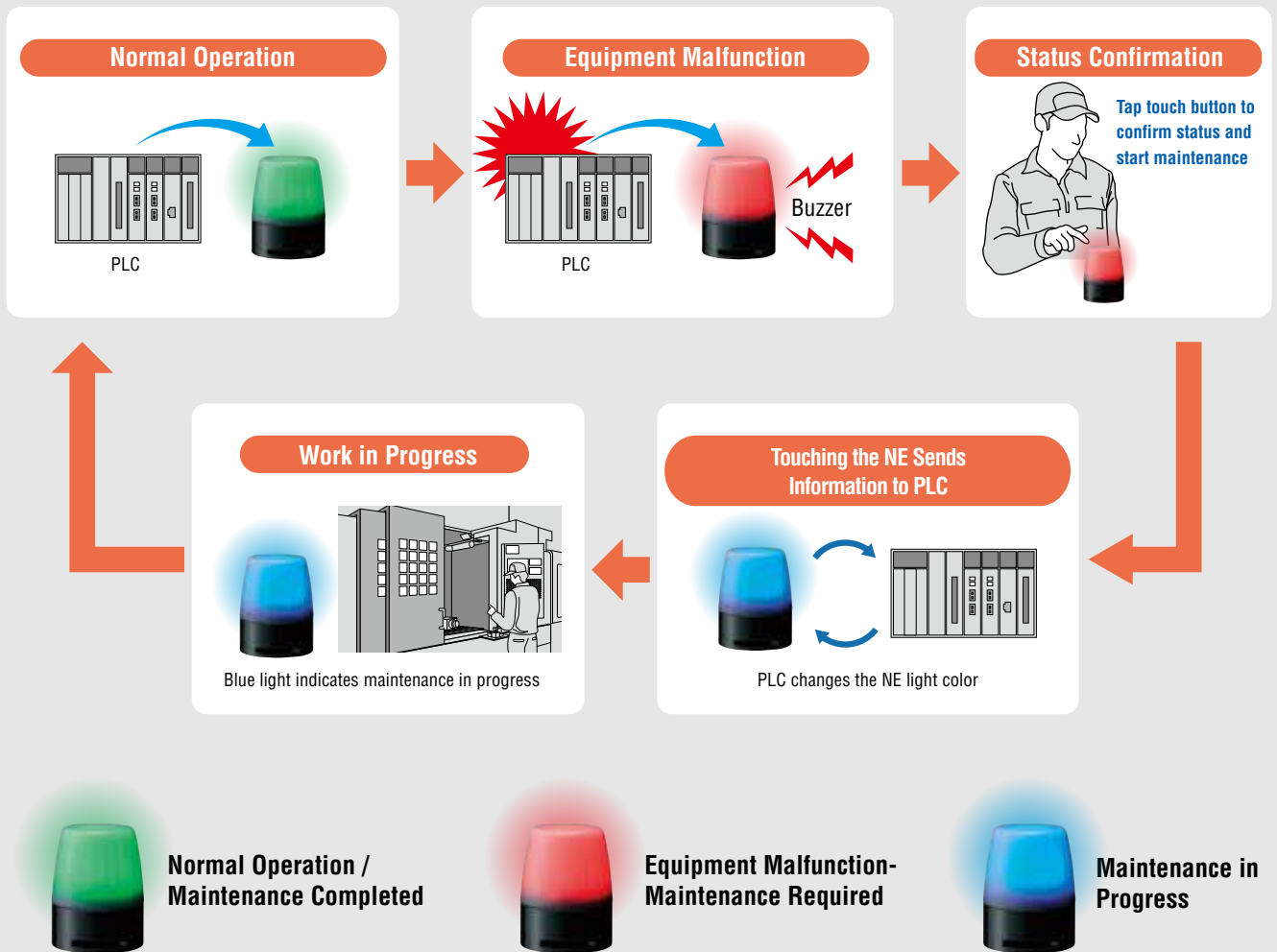
Example



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

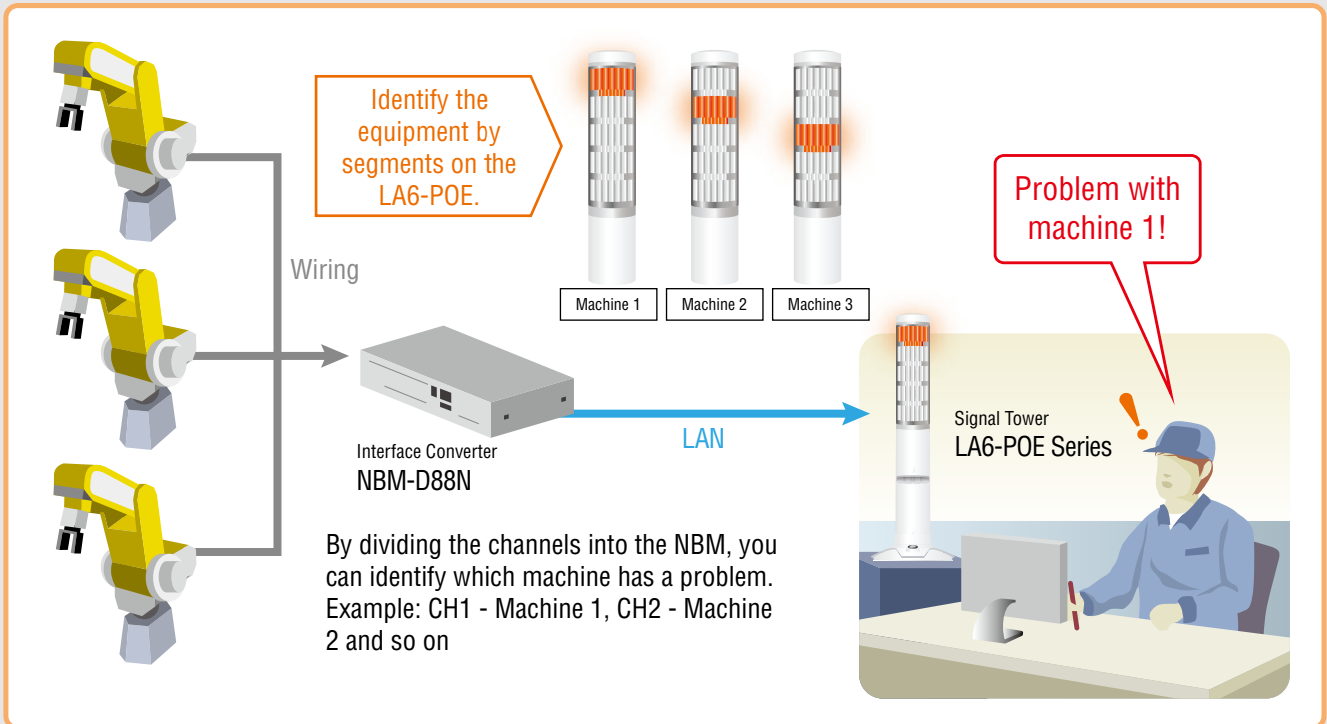


Pole
POLE22-N



Pole (threaded)
POLE22-T

Visualize Equipment 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

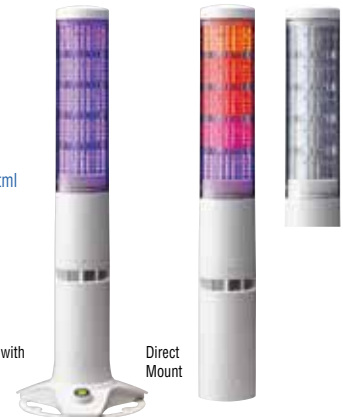
Signal Tower
LA6-POE

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/detail/0000000651.html>

When light is on When light is off



NH-WST2
Wallmount Bracket



SZK-003W
Wallmount Bracket



SZW-060W
Stationary Bracket

Visualize / Analyze Stalled Robotics

Example system



LAN

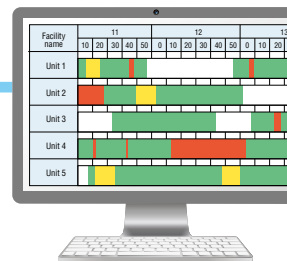
Robot Operation Andon

1 02:42:52	2 01:28:49	3 00:00:12	4 03:10:28	5 02:52:08
6 03:16:20	7 00:40:39	8 02:08:20	9 01:15:20	10 02:10:50
11 01:29:52	12 02:42:52	13 02:42:52	14 02:42:52	15 02:42:52
16 01:15:28	17 00:02:46	18 00:39:27	19 00:42:52	20 00:42:52

Robot #
Elapsed Time

* 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

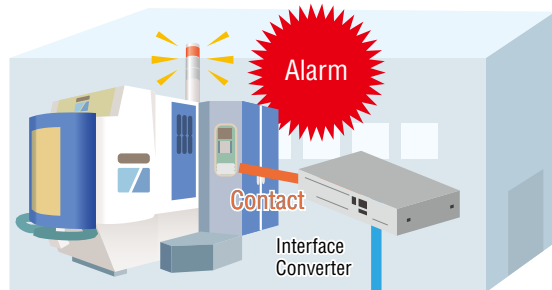
Wireless Data Acquisition System WDR Receiver x 1 unit
Wireless Data Acquisition System WDT-LR-Z2 Transmitter x 20 units
Administration software x 1
20 Robots

Monitor issues remotely and in real-time

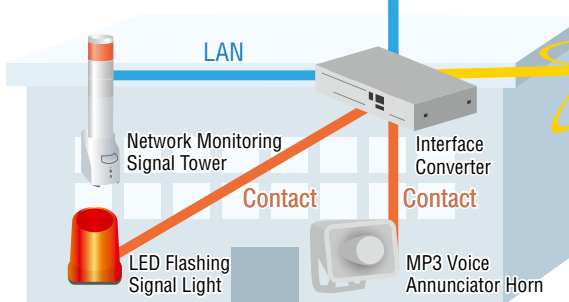
Factory

System Overview

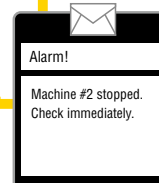
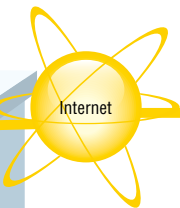
Manufacturing site



Office



Send Email



To operators away from equipment



To site manager



To facility staff



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

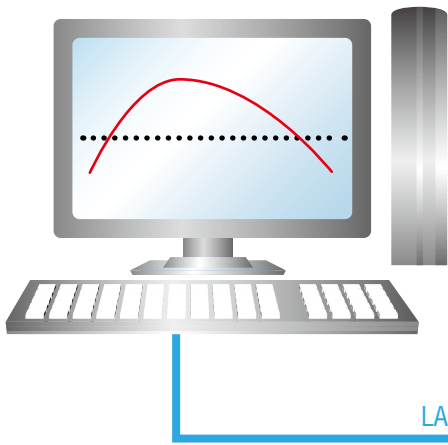
Interfaces discrete input/output signals between indication and control devices over Ethernet. Add a variety of PATLITE signaling devices to a network for real-time remote monitoring and/or data acquisition.



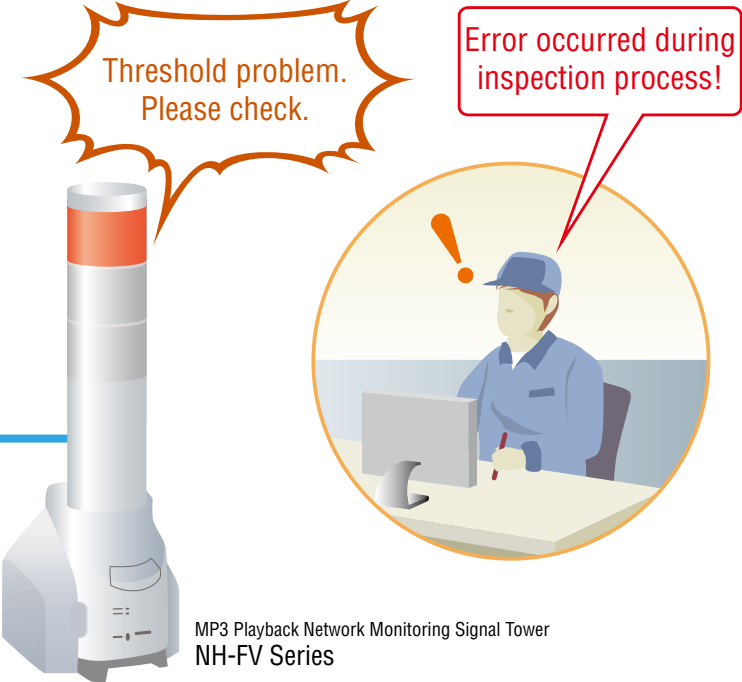
Interface Converter NBM-D88N

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 Serie



88_{dB} 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.

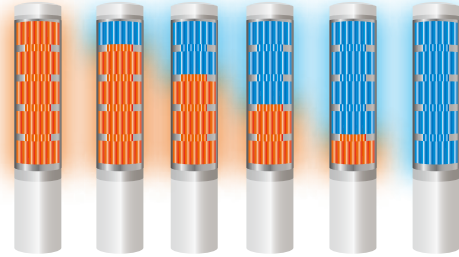
Actively get the equipment status

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.



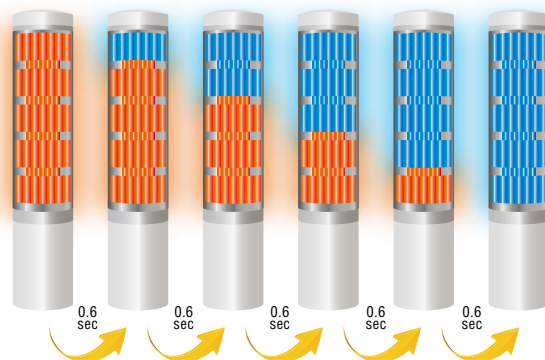
Improve

Use "Time-Trigger" to manage the inspection time

SOLUTION

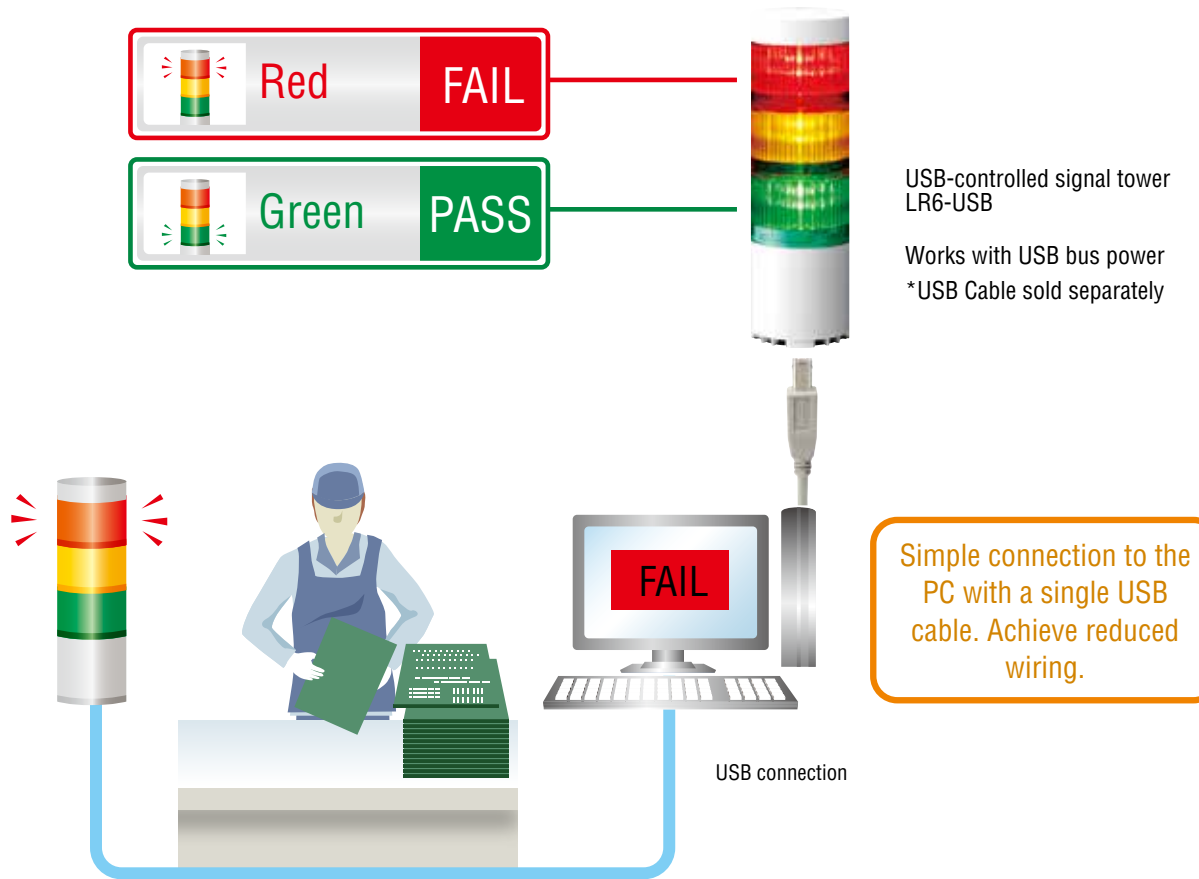
You can use the signal tower as a timer by using "Time Trigger" in the Smart Mode setting of the editing software. Inspect one product per display cycle. Once all the segments are blue, the worker can end the inspection. Then proceed to the next product.

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

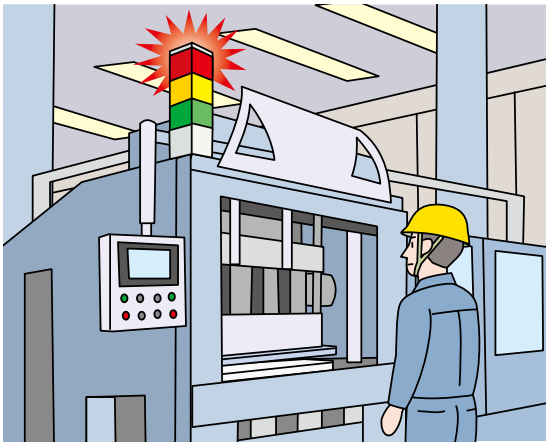
USB-controlled signal tower LR6-USB x 1 unit

Visualize the Casting Process

Before

Cast manufacturing equipment

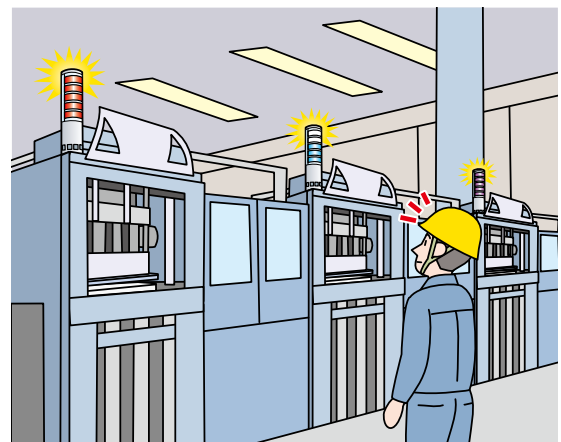
Signal Tower indicates completion.



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

Extension

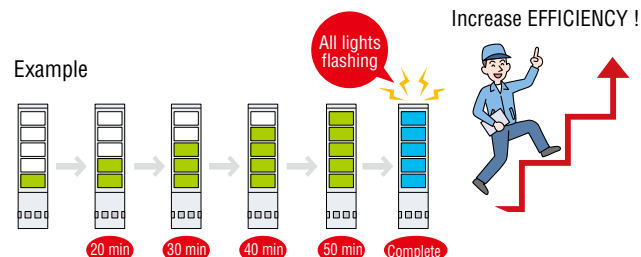
- Use tower to display information from the operation panel.
- Integrate with sensors to display tank fluid levels.

Benefits

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

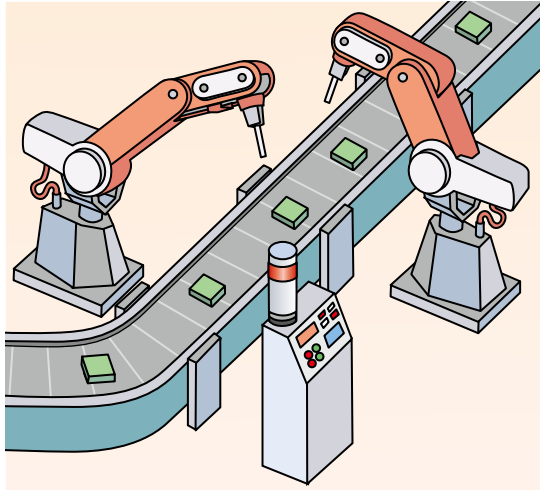


Example



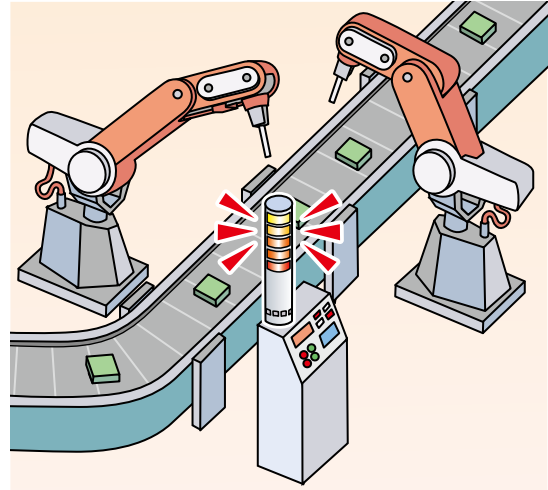
LA6 Improves Display of Robot Status and Safety Guidelines

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

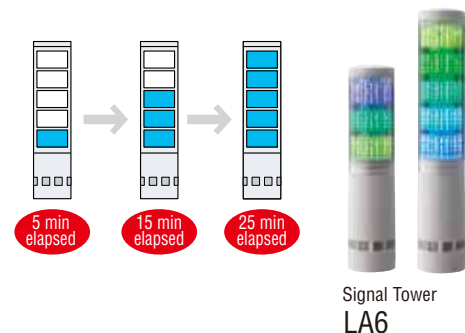
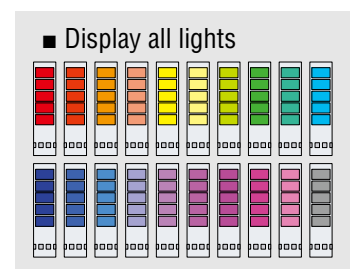
Rich expressions, high visibility

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.

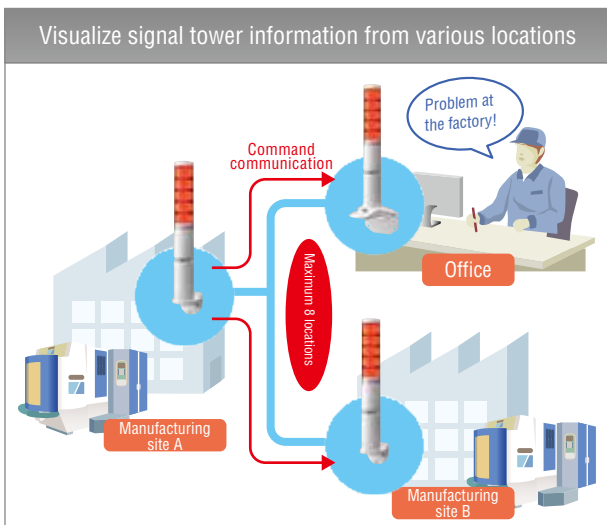
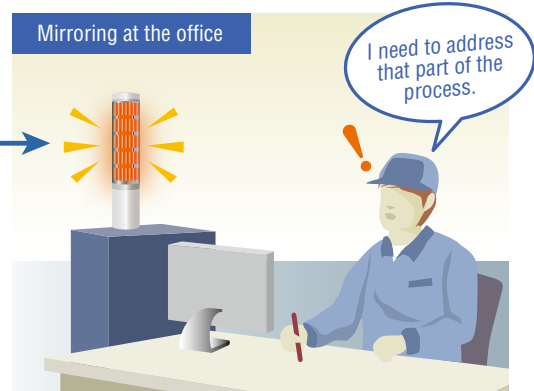
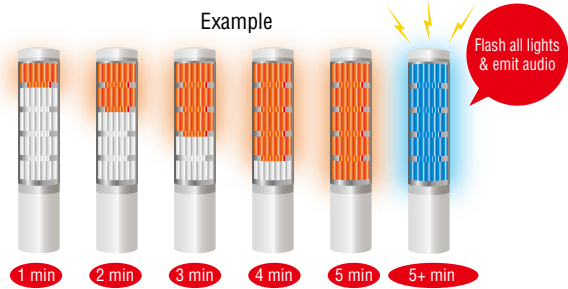
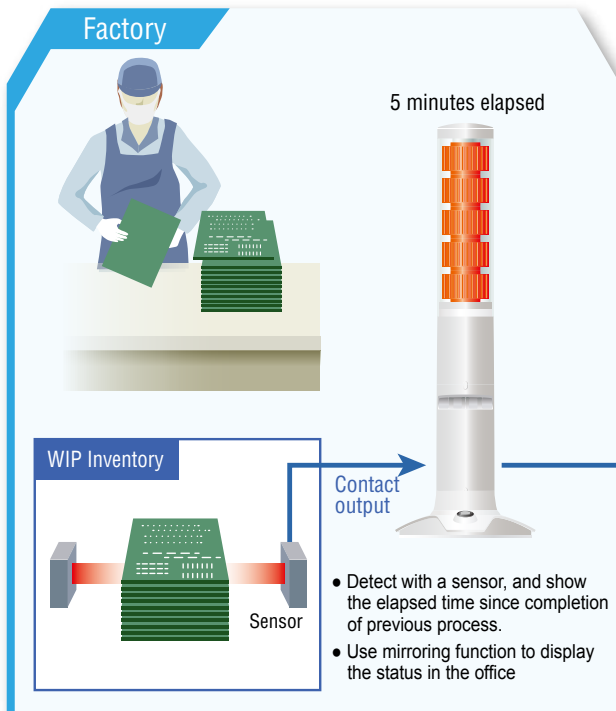
Count down to show the process completion time

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
Wallmount Bracket

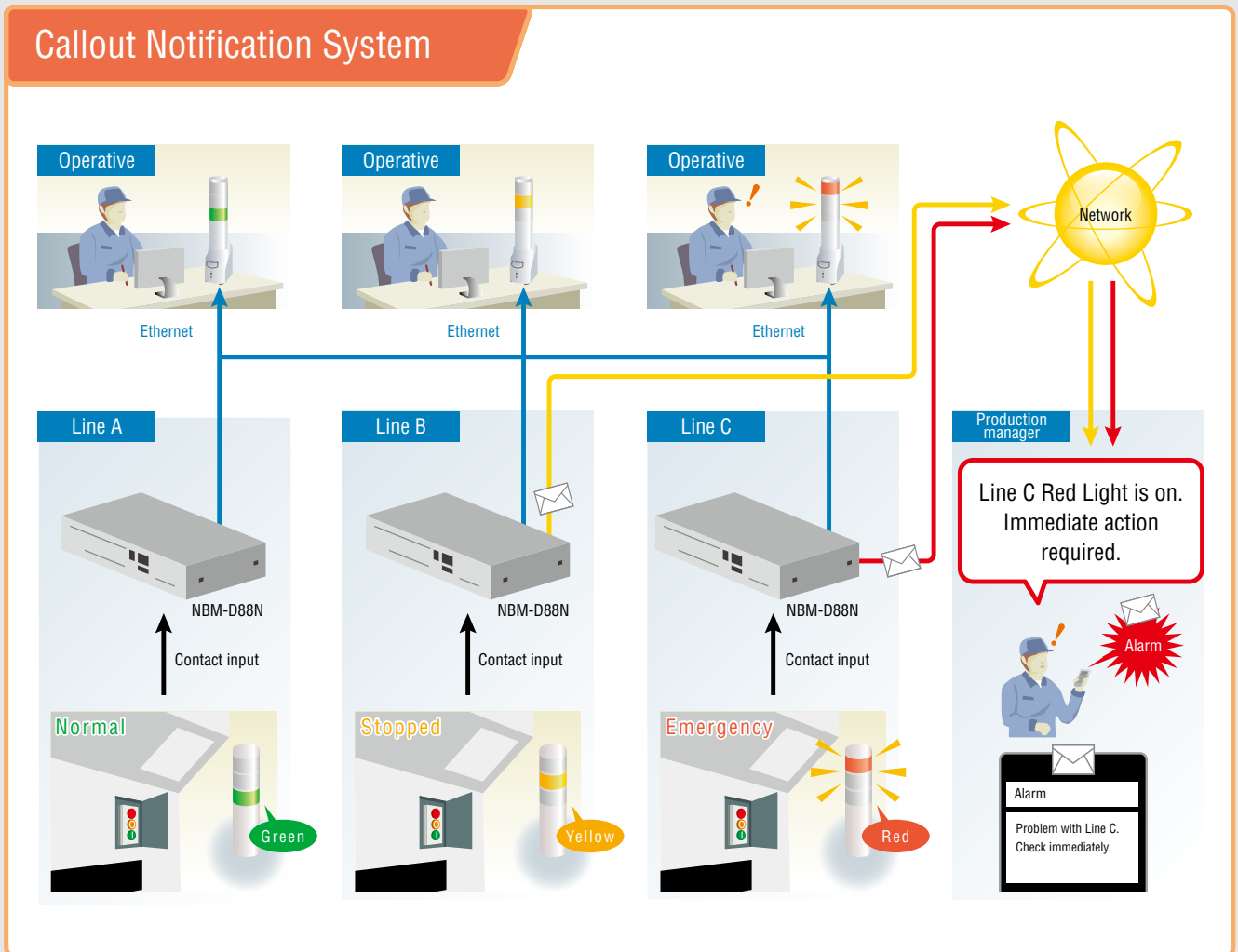


SZK-003W
Wallmount Bracket



SZW-060W
Stationary Bracket

Remote monitoring reduces loss from stoppages



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

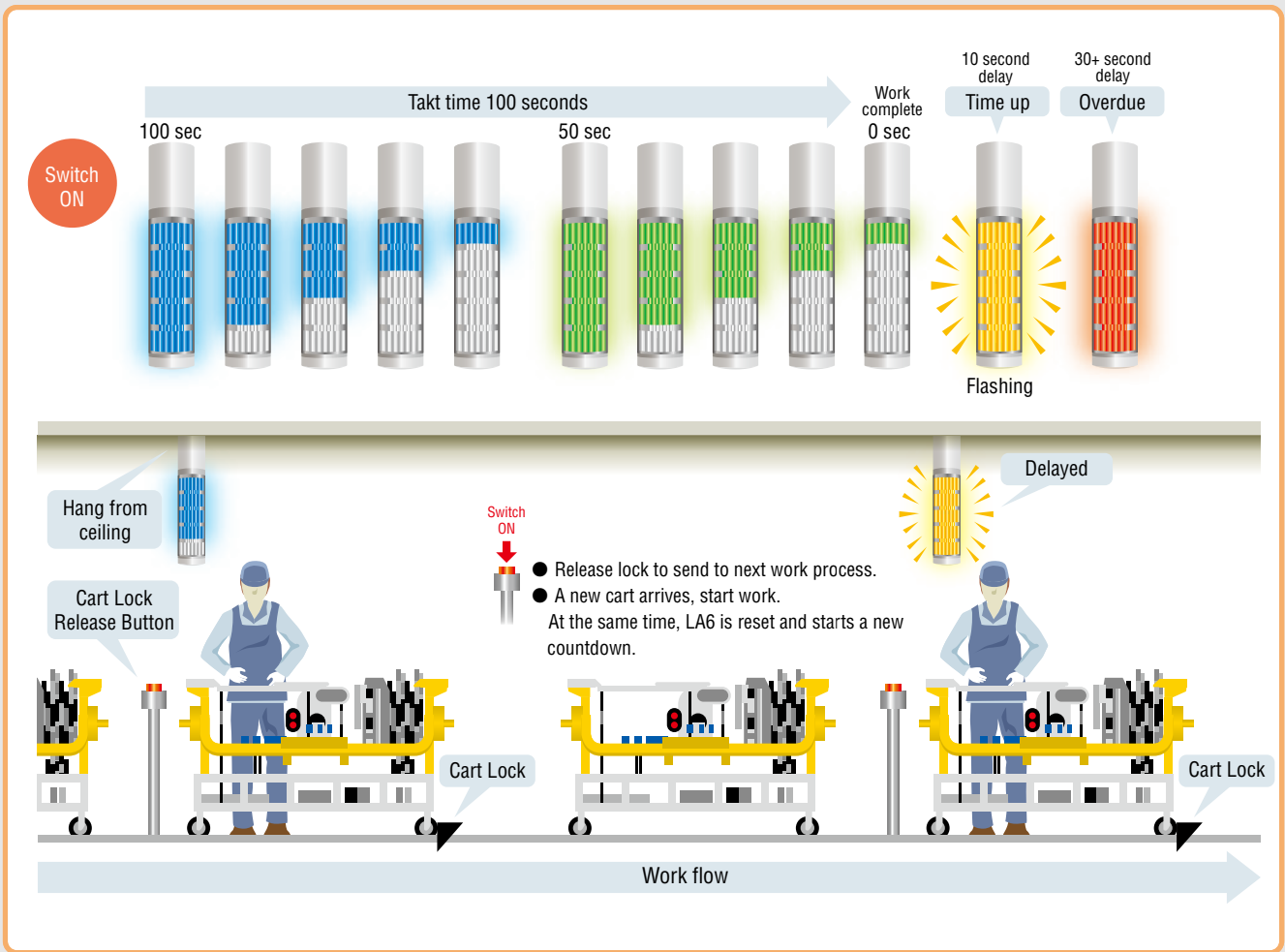


Network Monitoring Signal Tower - NH Series

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

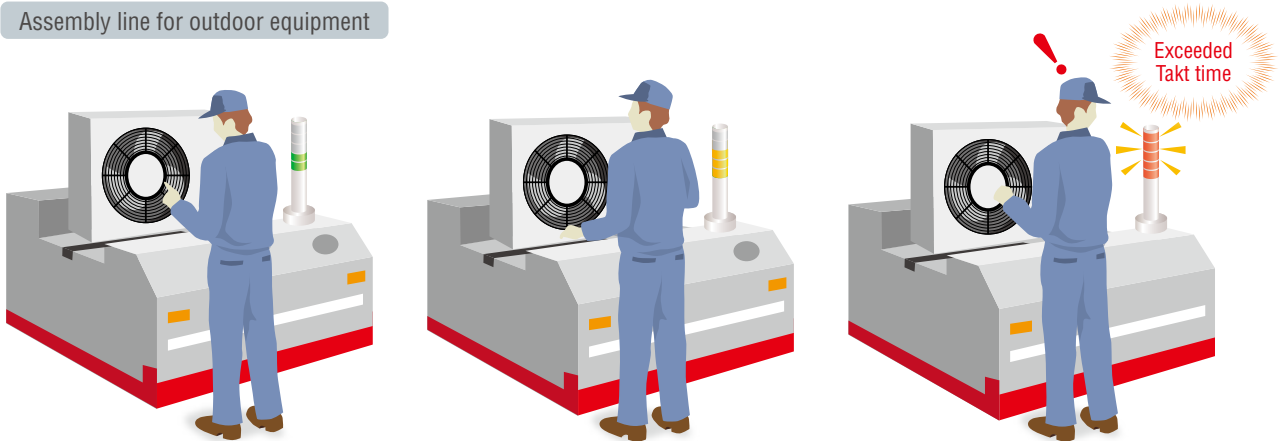


Visualize Takt Time with LA6 on AGV

LA6 visualizes Takt time

A production line utilizing AGV (automated guided vehicles).
Mount the LA6, and display 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

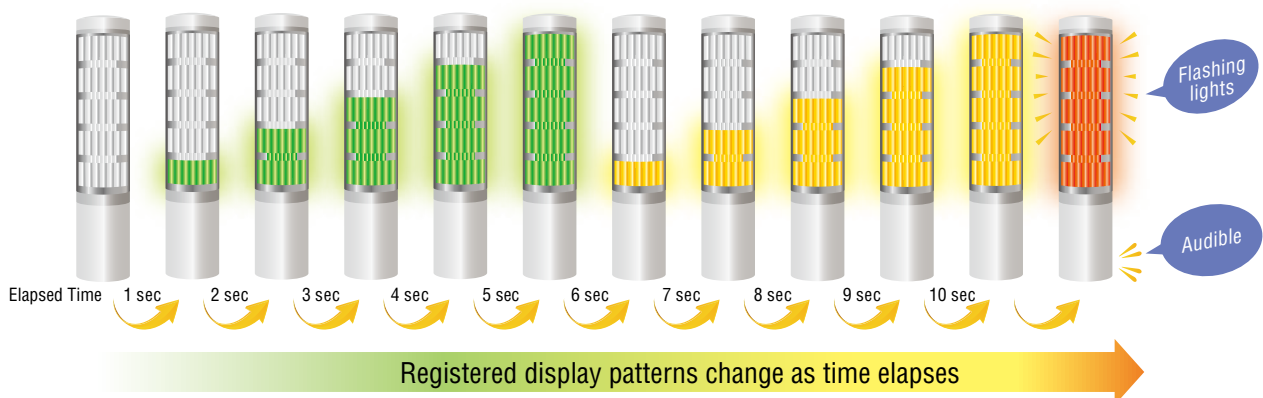
Smart Mode - Time Trigger Type

- 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 The Pace with 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!

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

Signal Tower

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.

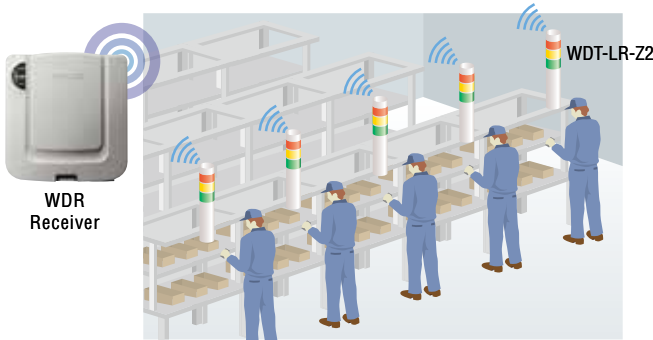


Increase EFFICIENCY !



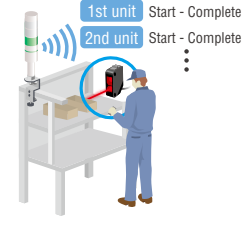
Regulating the Cell Assembly Line

Collect Working Time and Visualize the Bottlenecks



Hands free by using foot switch

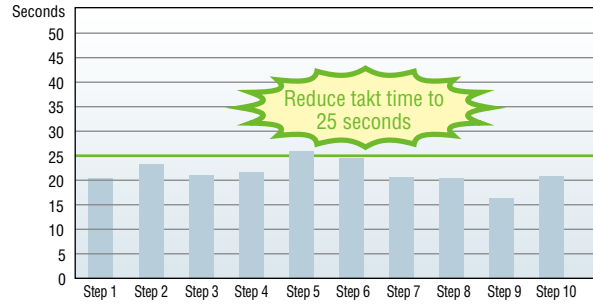
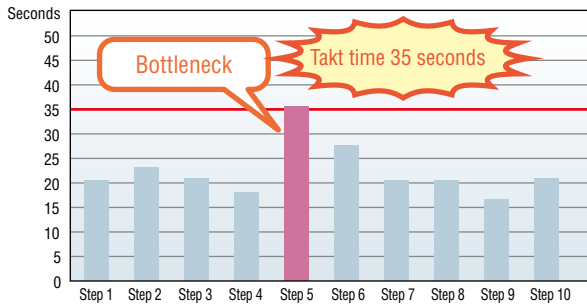
Automatic collection with proximity sensor



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

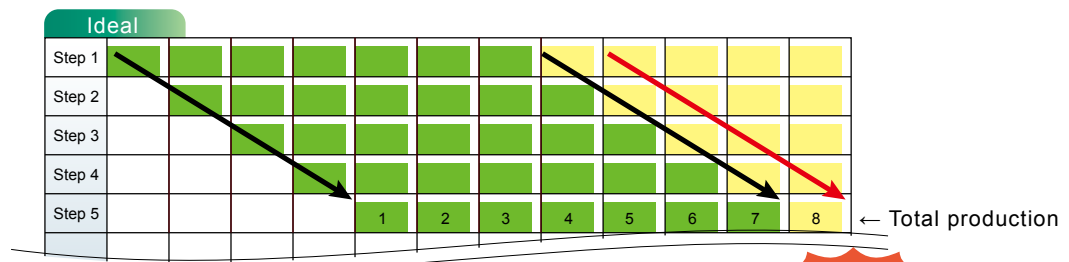
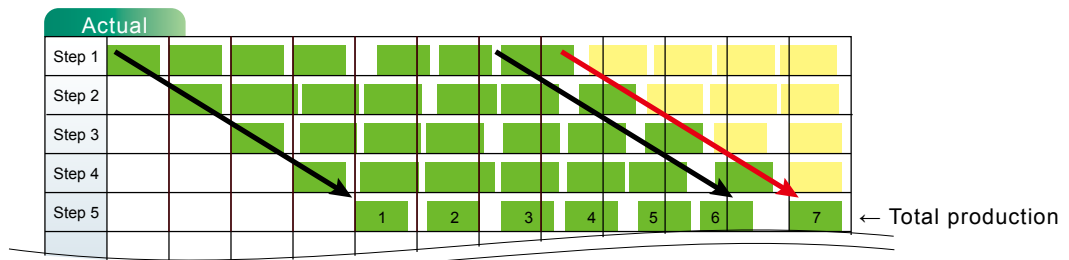
By collecting the work time for all the processes, you can visualize the bottleneck and clarify where balancing is required.

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%

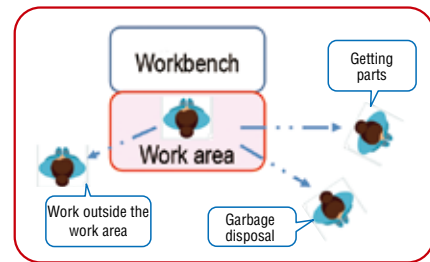
Visualize Lost Time in Cell Production

Example system

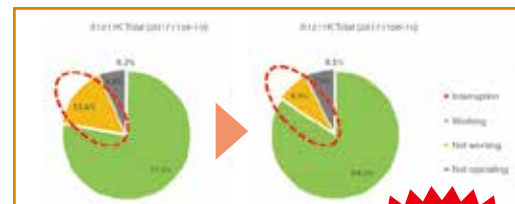
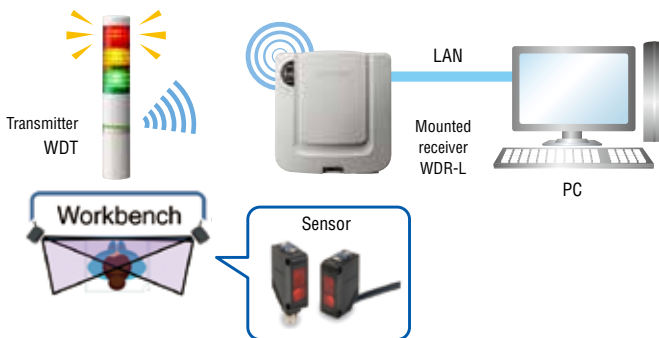


PATLITE Sanda Factory Example

Issue: Cannot see accumulation of lost time



Mechanisms for Visualizing Lost Time



By using an integrated system of the WDT and sensor, you will be able to visualize lost time accumulated from workers leaving their work area. The collected information can be analyzed to make necessary improvements and increase productivity.

Non-working time ratio 15.6%
↓ 8.3%
7.3% reduction!

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

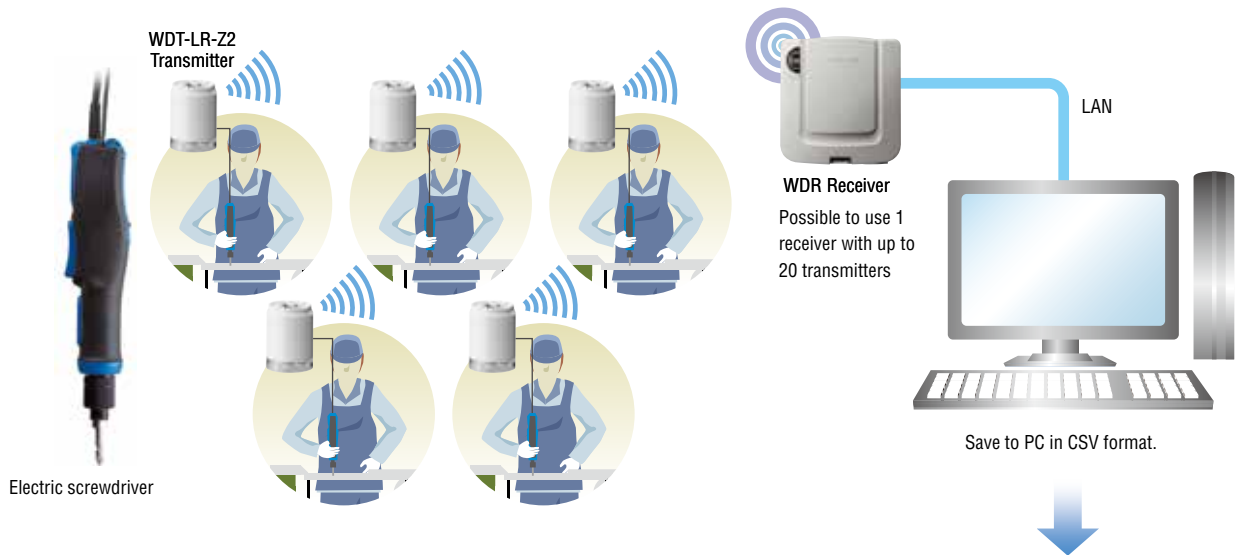
By installing a sensor at the workbench of the cell stall to collect the simple data of when the worker is in the stall (working) and when the worker is away (not working), we were able to make improvements in just 1 month without adding a burden for collecting this data.

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	58C232FFFE20FFC3	Cell_1	0	0	0	0
5	2017/7/20 15:00:51	58C232FFFE20FFC3	Cell_1	1	0	0	0
6	2017/7/20 15:00:52	58C232FFFE20FFC3	Cell_1	1	1	0	0
7	2017/7/20 15:00:52	58C232FFFE20FFC3	Cell_1	1	0	0	0
8	2017/7/20 15:00:52	58C232FFFE20FFC3	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 use the stop signal from an 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.

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

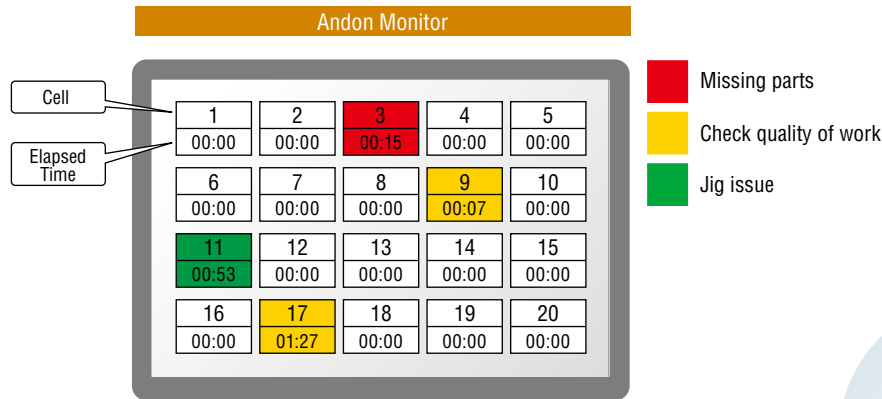
After

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)

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

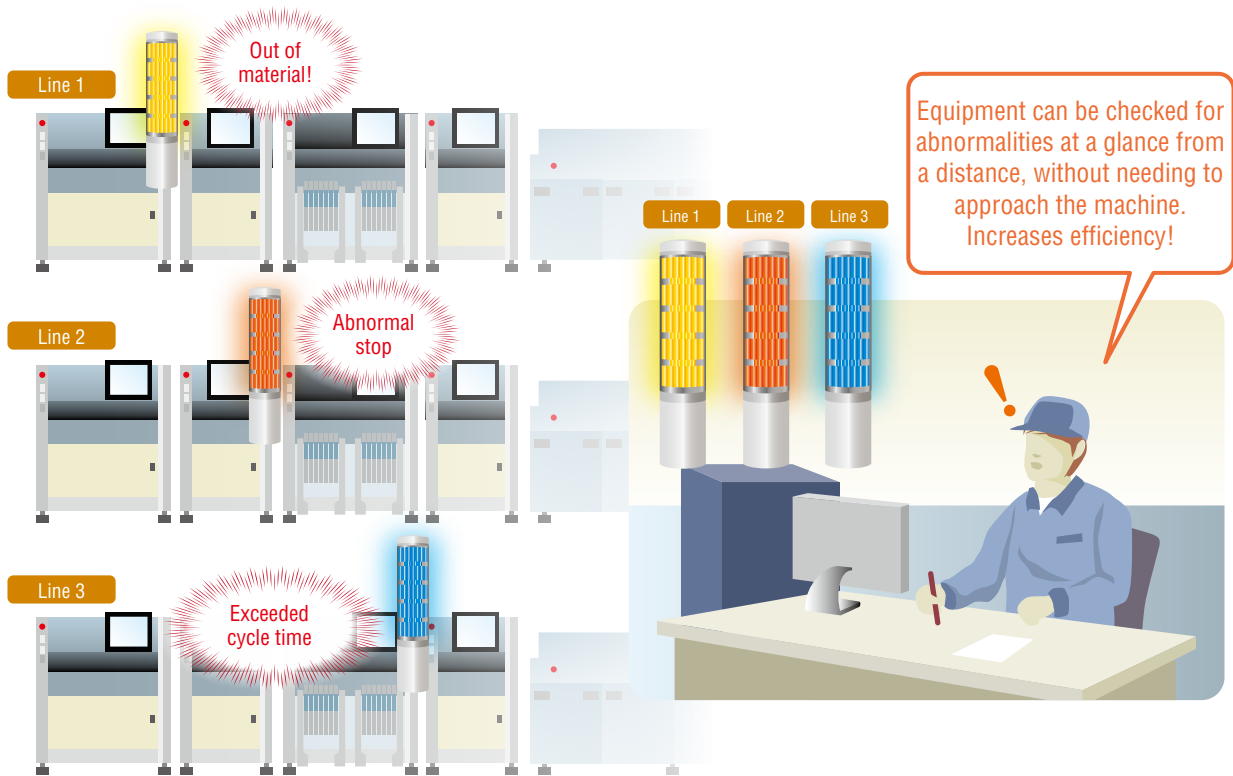
Wireless Data Acquisition System WDR Receiver x 1 unit
 Signal Tower with switch box HSST-3M2 x 20 units
 Wireless Data Acquisition System WDT-LR-Z2 Transmitter x 20 units
 Administration software x 1
 For 20 Cell Stalls

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



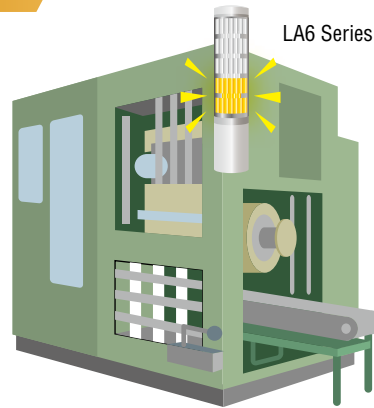
Usage

- 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

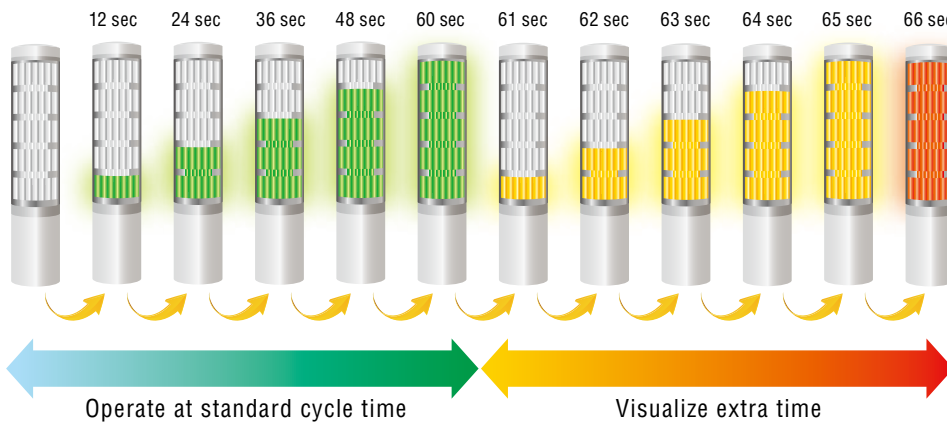


Processing equipment with cycle time of 60 seconds

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

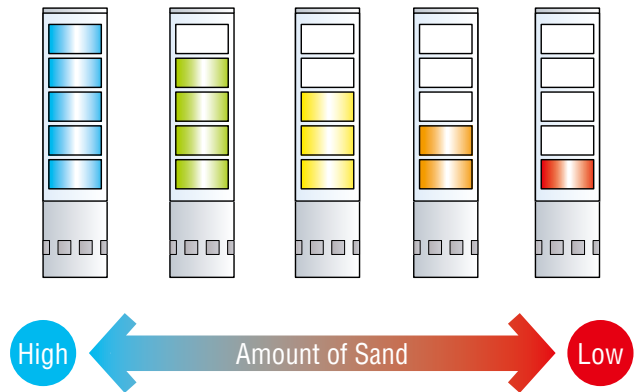
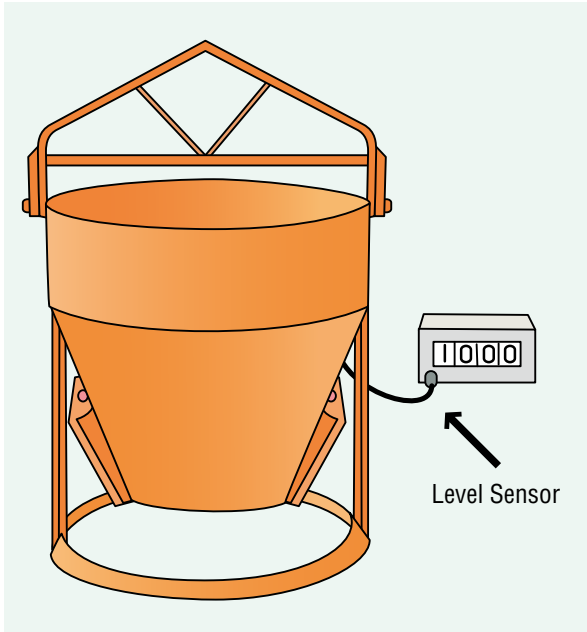
Signal Tower LA6 Series x 1 unit per equipment

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

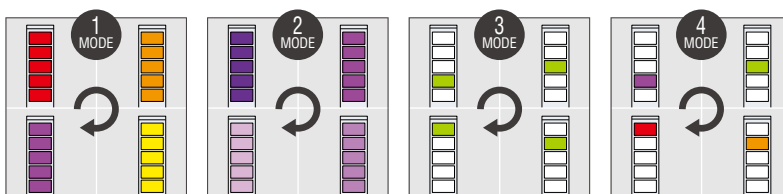
- When the level of sand in the hopper is not monitored, it could cause overflowing.

With new Signal Tower functions, create an intuitive display

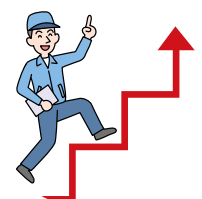
SOLUTION

- 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 from here (free): www.patlite.com/la6/app.html



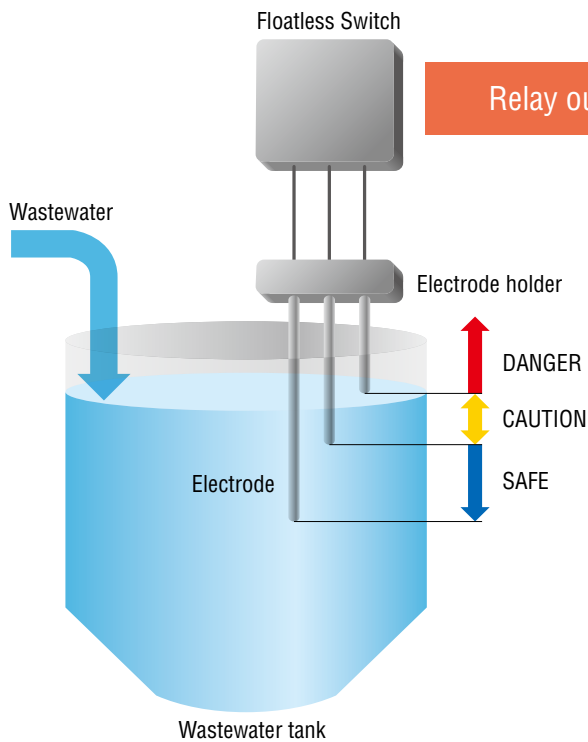
Increase EFFICIENCY !



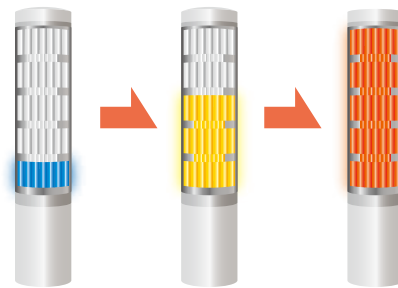
Visualize Amount of Liquid in the Tank!

Visualize tank status with minimal configuration

No PLC



Overflow is imminent...



Light color and number of segments change in correspondence with status.

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

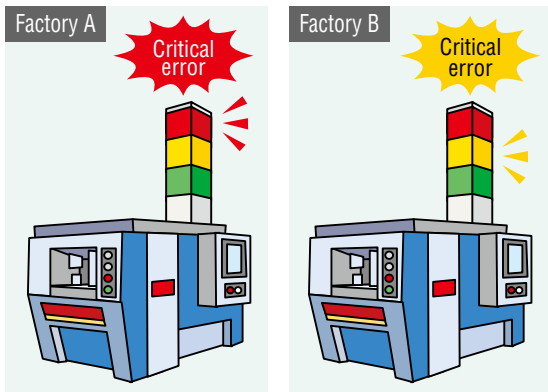
Product Configuration

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

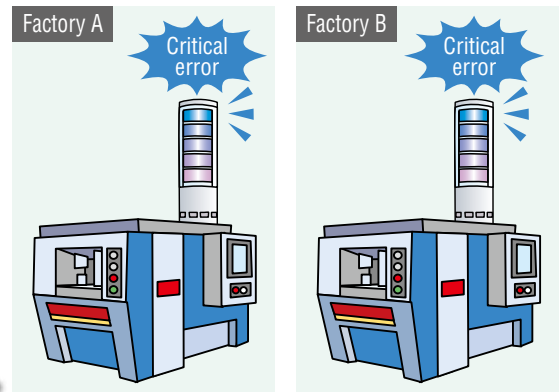
Before



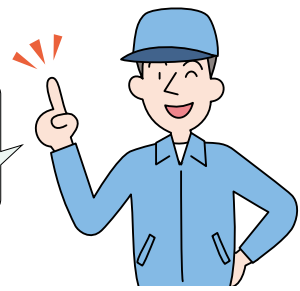
Factory B support staff
Factory A displays are different!
Is it safe to approach?



After



Set the display pattern after purchase.



Consistent

Make consistent status displays on all Signal Towers in the worksite

PROBLEM

- Light color codes for errors are not consistent between factory locations.

SOLUTION: Signal Tower LA6 with new functions

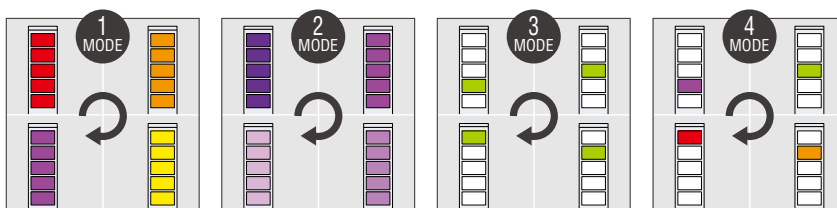
SOLUTION

- 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.

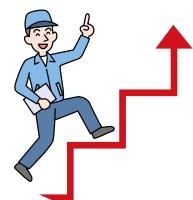
Download the application from here: www.patlite.com/la6/app.html



Signal Tower LA6



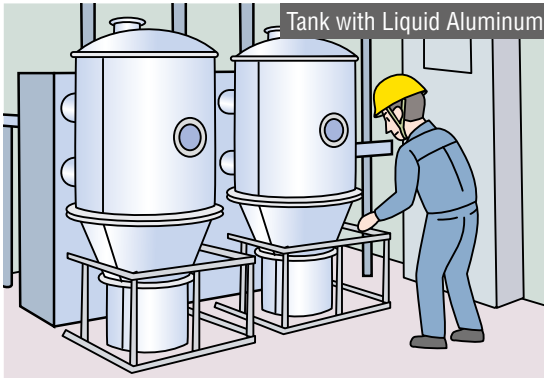
Increase EFFICIENCY !



Visualize remaining amount

Before

Casting Site



Bottlenecks occur when liquid aluminum is completely depleted.

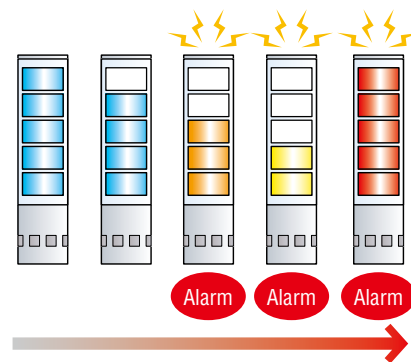
ISSUE

- 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.

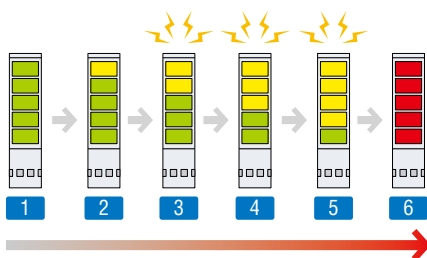
Improvements Using LA6 Signal Tower

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

- Link with a temperature sensor to make abnormal temperature conditions more visible.



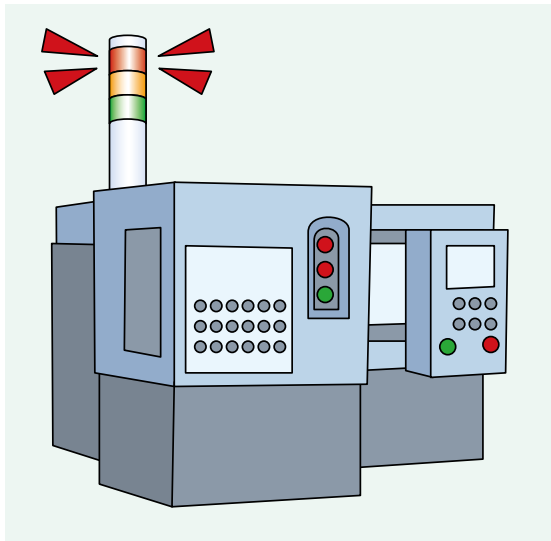
Signal Tower LA6

Visualize the elapsed time from when the problem occurred

Before

Alarm

Only 1 red light



After

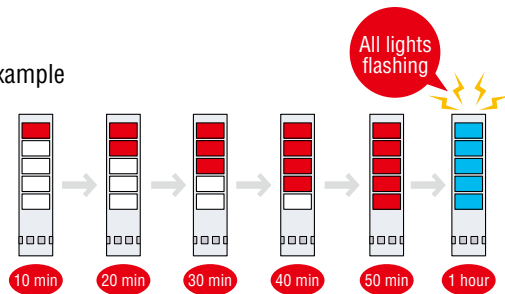
- The LA6 Signal Tower emits different light patterns and audible alarms. Additionally, one segment lights up every 10 minutes, until the alarm is restored.
- If 1 hour elapses, all the lights flash in sky blue.

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

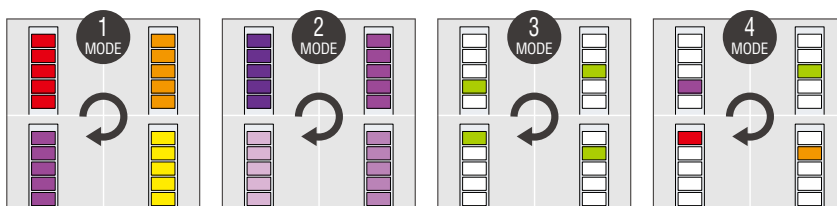
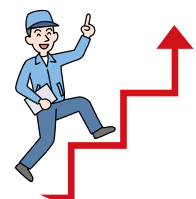
SOLUTION: LA6 Signal Tower

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>



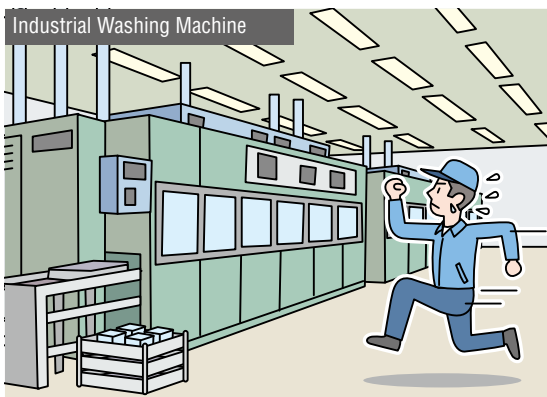
Increase EFFICIENCY !



Visualize Work Progress

Before

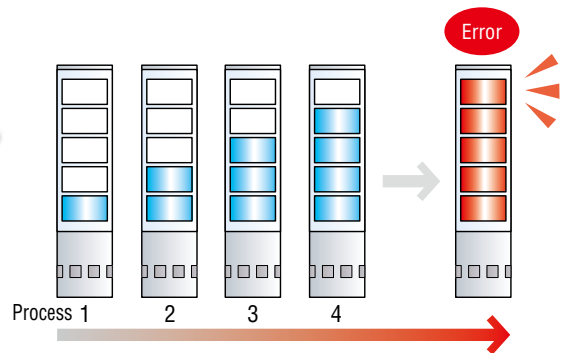
Current status is unknown...



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

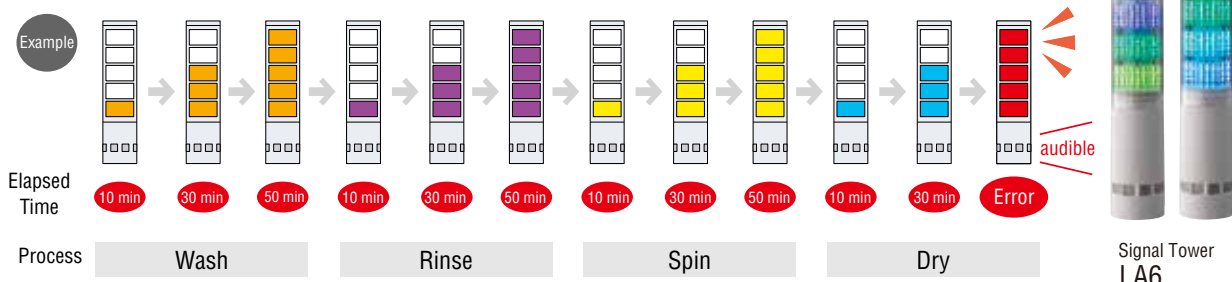
Each process is assigned a color, and the segments indicates the progress, with flashing lights and audible when an error occurs, makes it possible to check even from a distance to enable a fast response

Improvements Using LA6 Signal Tower

SOLUTION

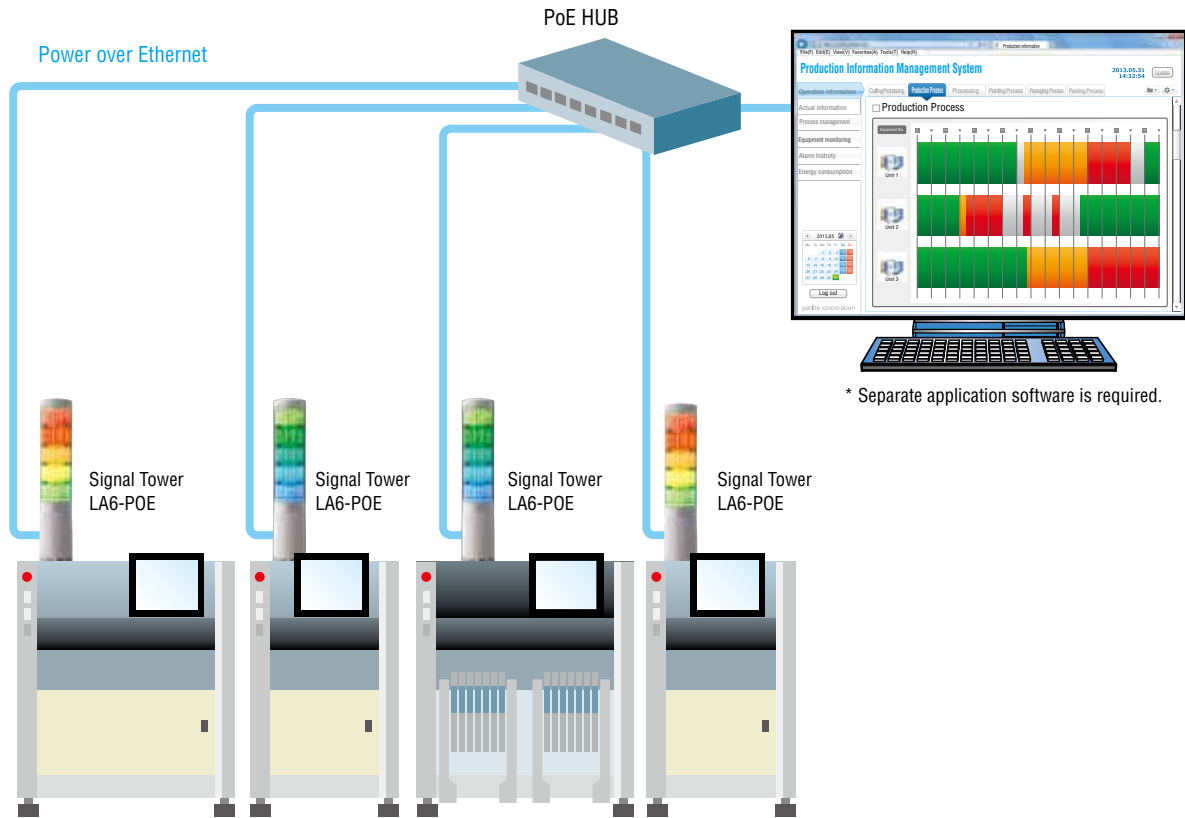
- Solved with LA6 Smart Mode (Time Trigger Type).
 - ① Assign a color for each process. Know the working process right away
 - ② When work is started, the progress is made visible by the number of segments
 - ③ When an error occurs, alert with flashing light + audible

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

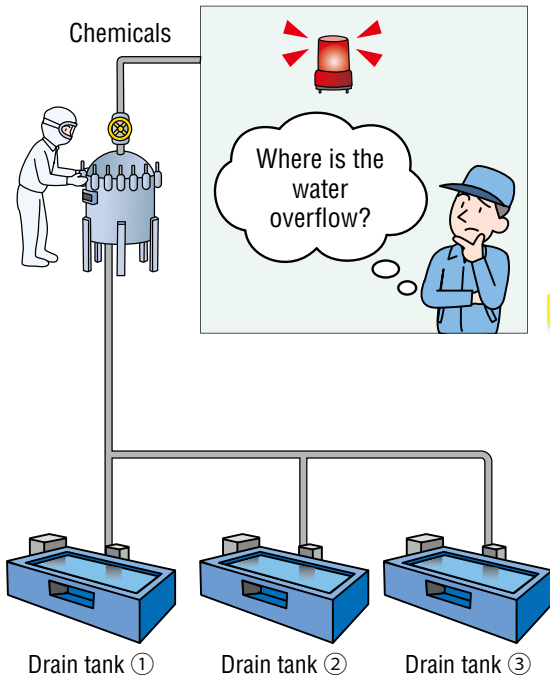
- Industry**
 - Electronic equipment manufacturing
- Equipment**
 - Electronic components, modules, inspection equipment

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!

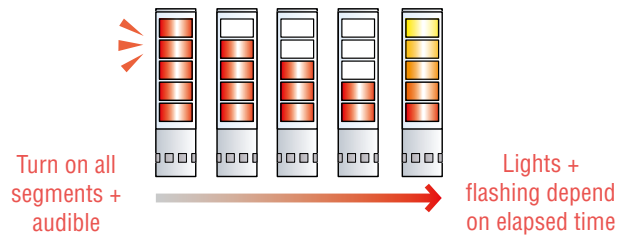
Simple set up of display patterns (color, elapsed time) for input signals

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

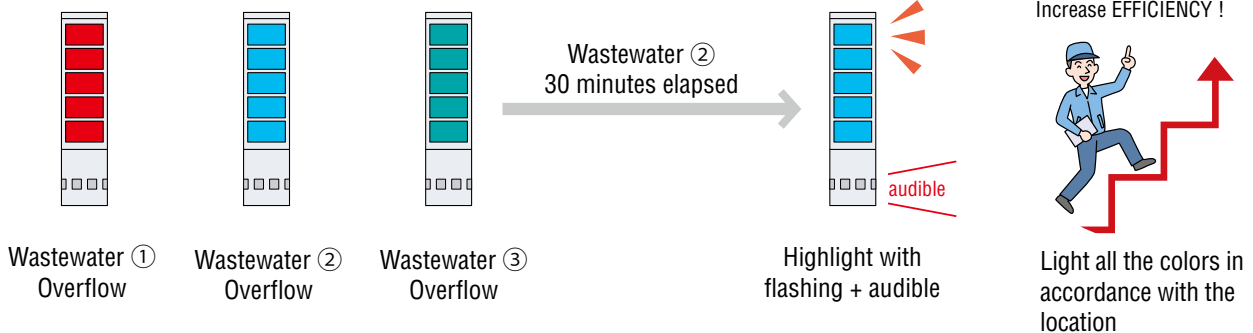
- ① Using a single-segment warning light to alert when liquid volumes reach a certain level as well as indicate which tank is overflowing.
- ② Hard to determine urgency, as elapsed time from overflow is unclear.

SOLUTION

- ① With the LA6, it is clear which tank is overflowing.
- ② By visualizing the elapsed time, you 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.



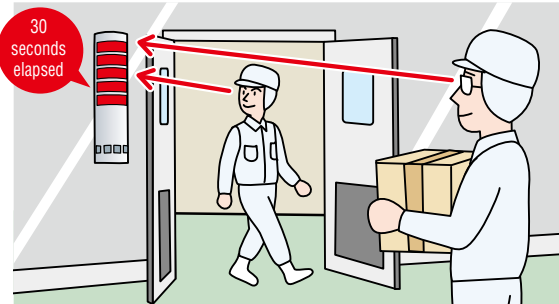
After

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

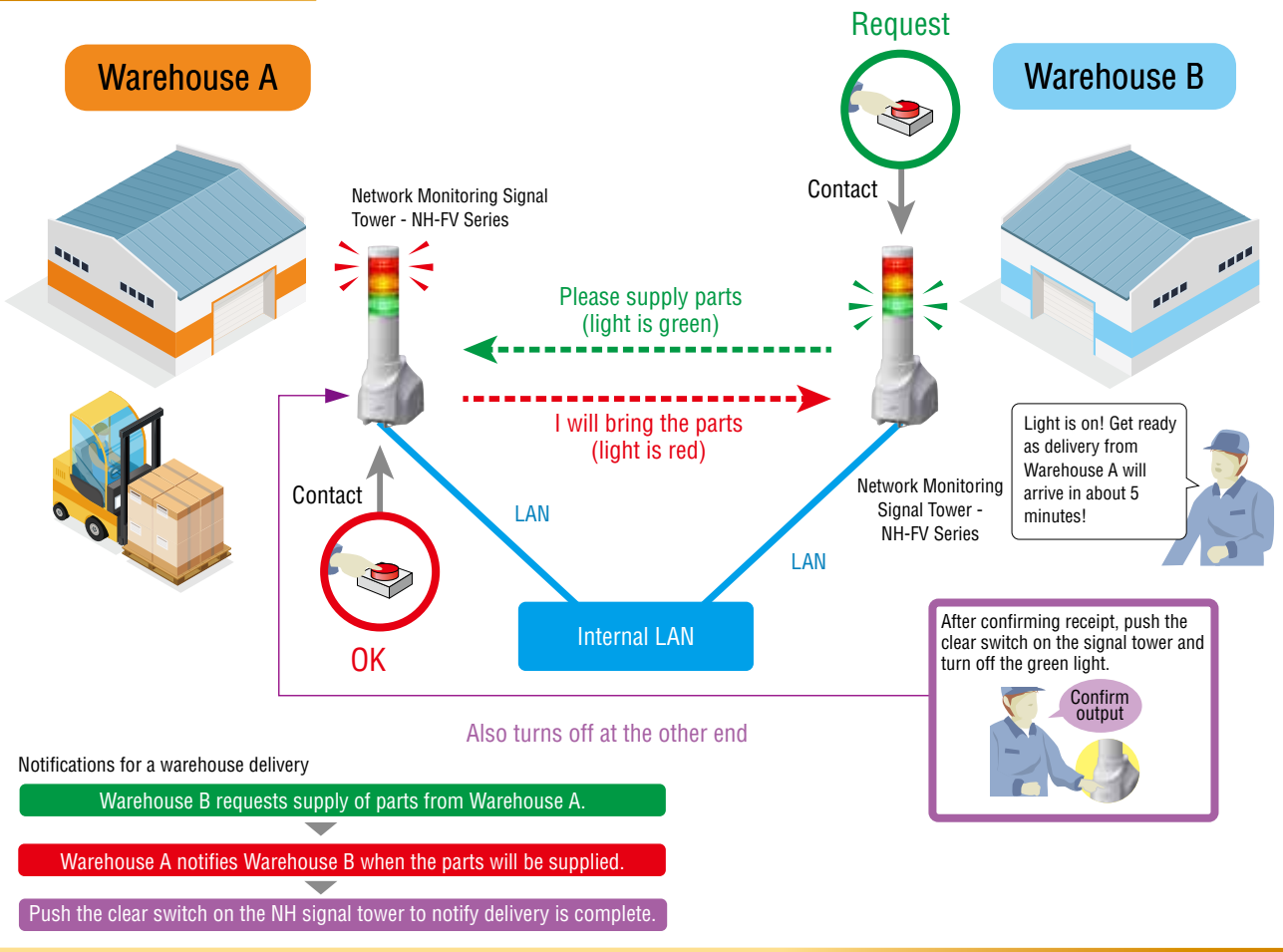
- Link with a temperature sensor to make abnormal temperature conditions more visible.

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

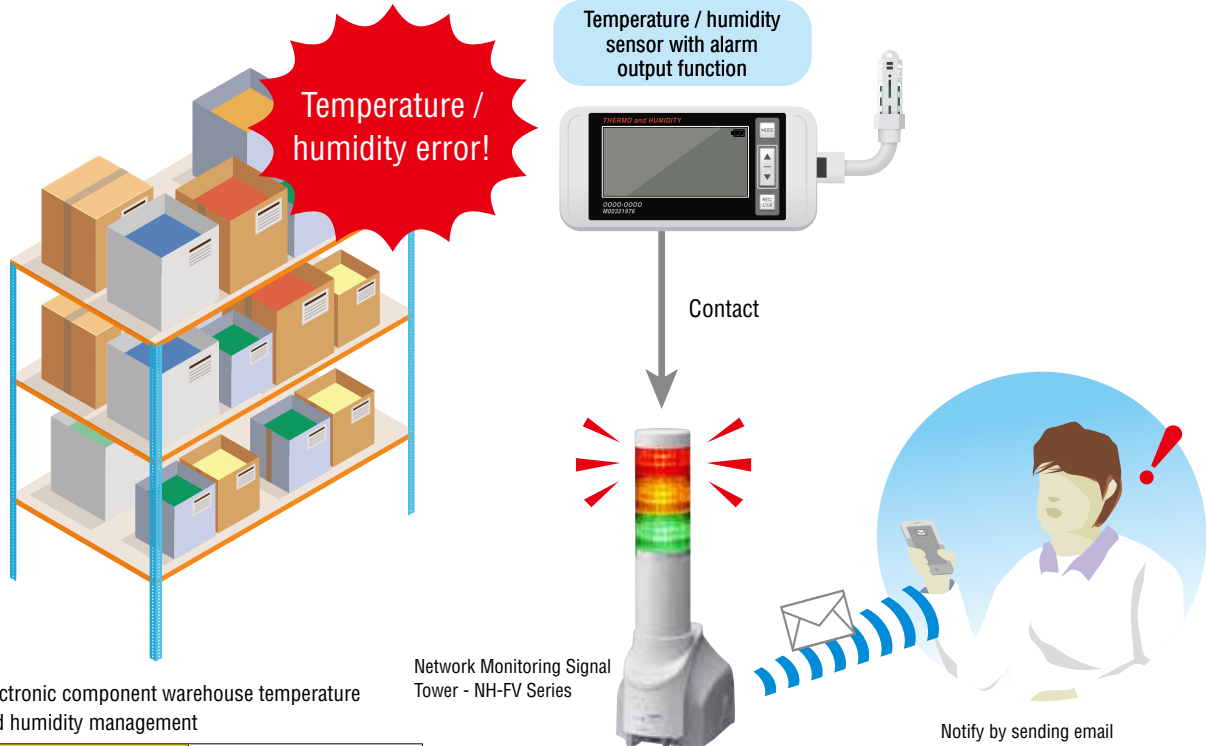
NH-FV Series x 2 units

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

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

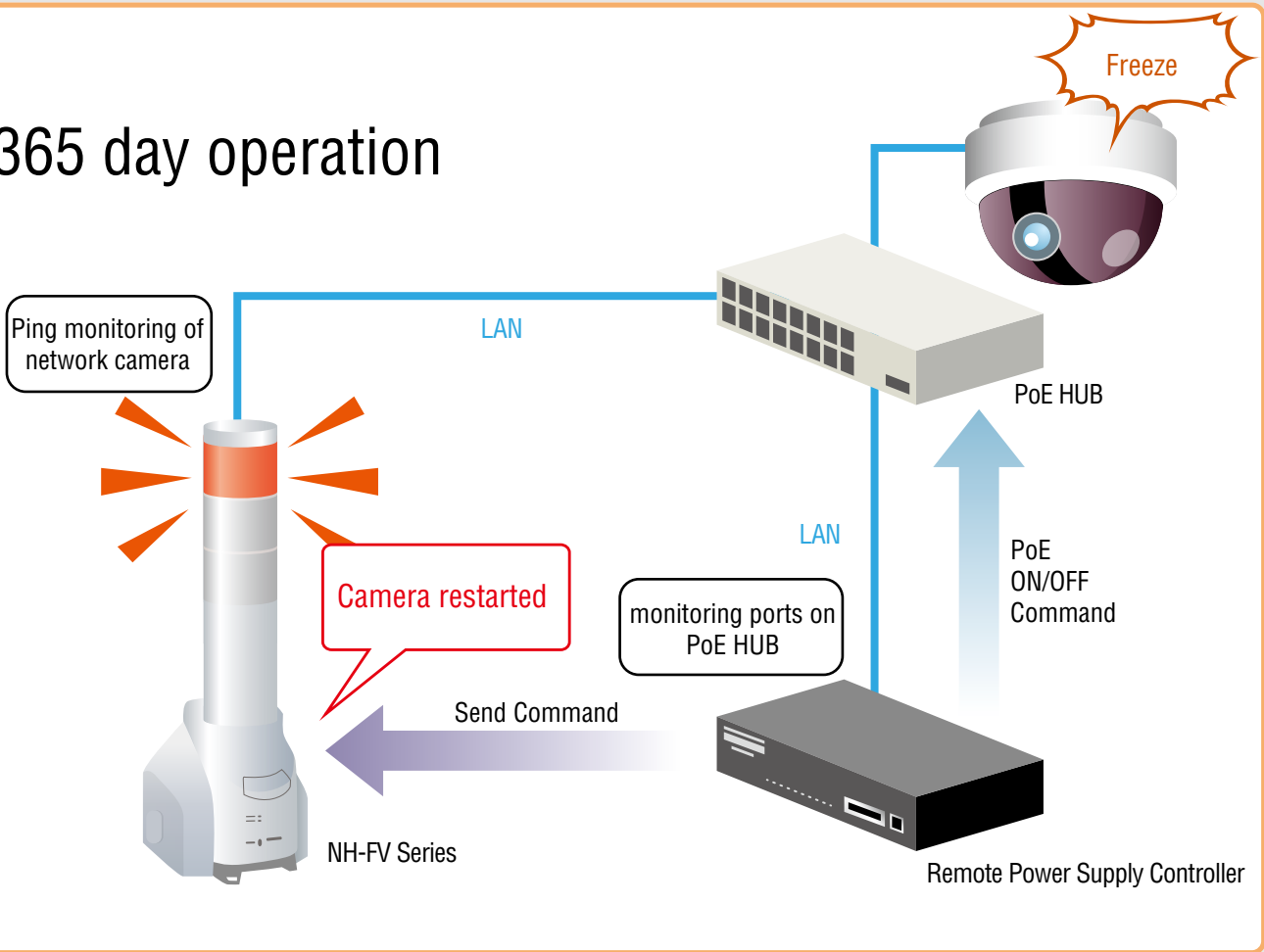
Network Monitoring Signal Tower
NH-FV Series



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

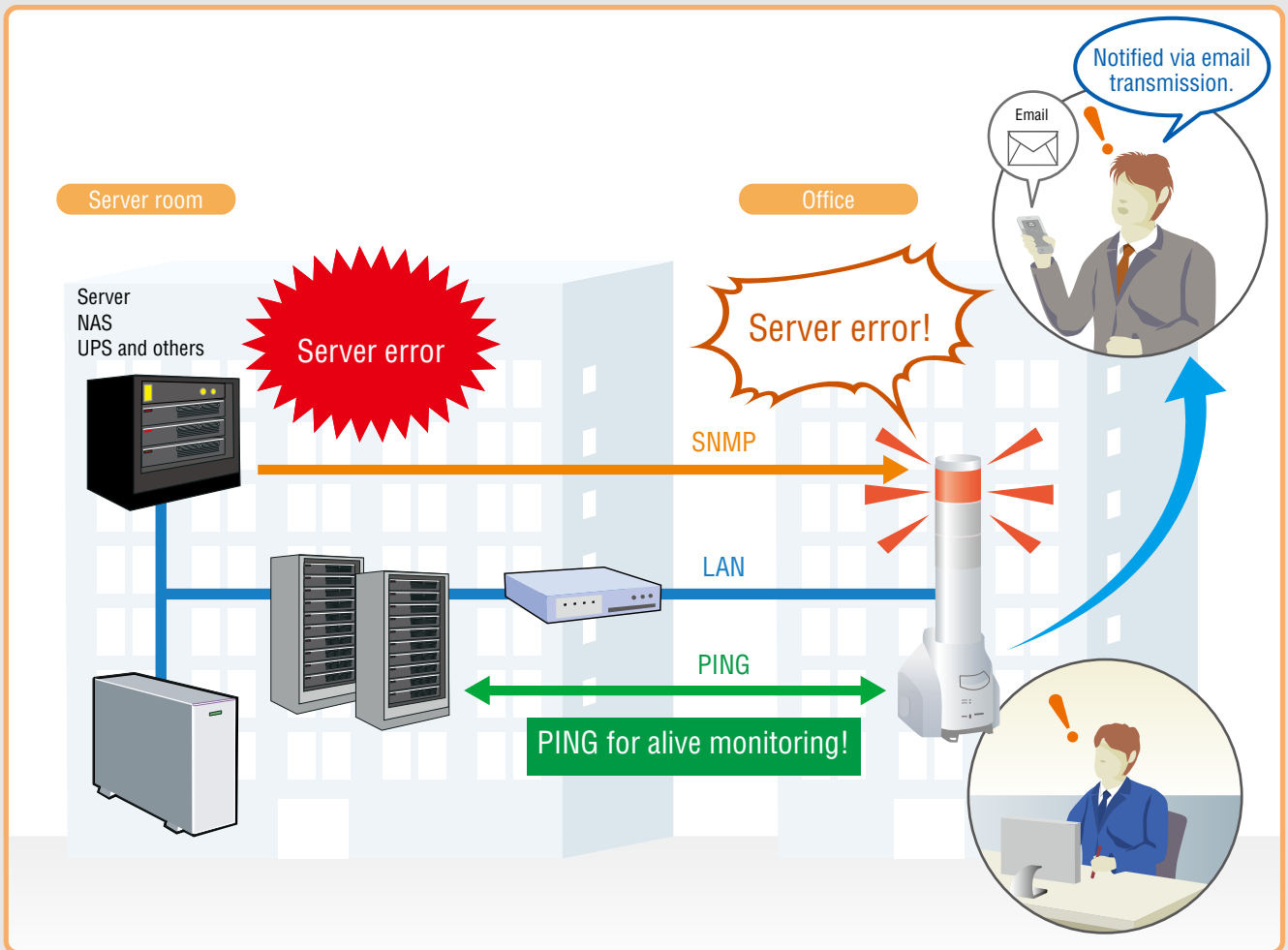
With its compact housing, the unique horn structure achieves sound pressure of 88 dB or more (at 1 meter).

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

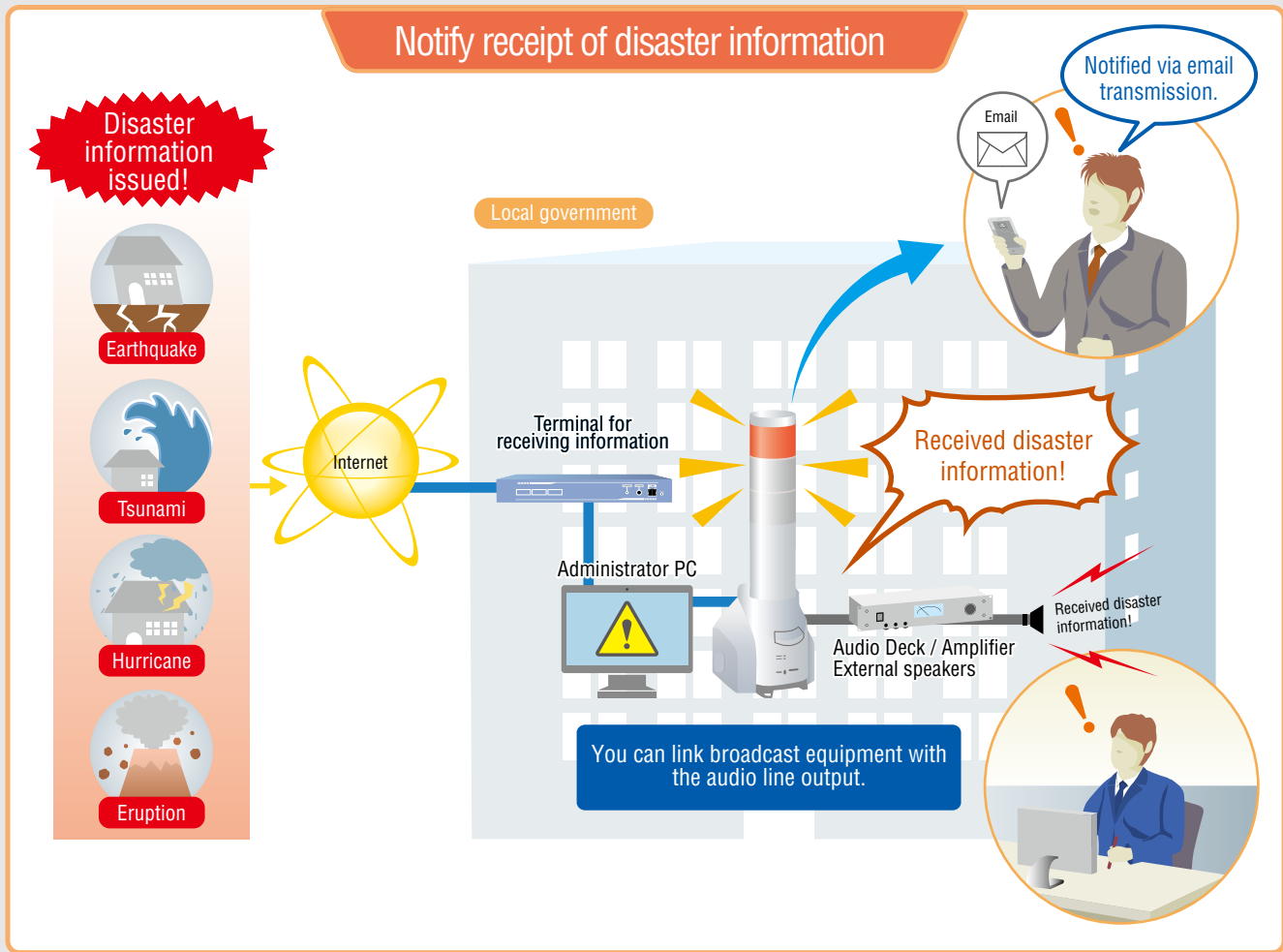
The Network Monitoring Signal Tower uses the ping monitoring function or SNMP for servers, NAS, and UPS to notify the status of network equipment via visual, audible and/or email alerts.

Network Monitoring Signal Tower
NH-FV Series



Broadcast disaster information to everyone!

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

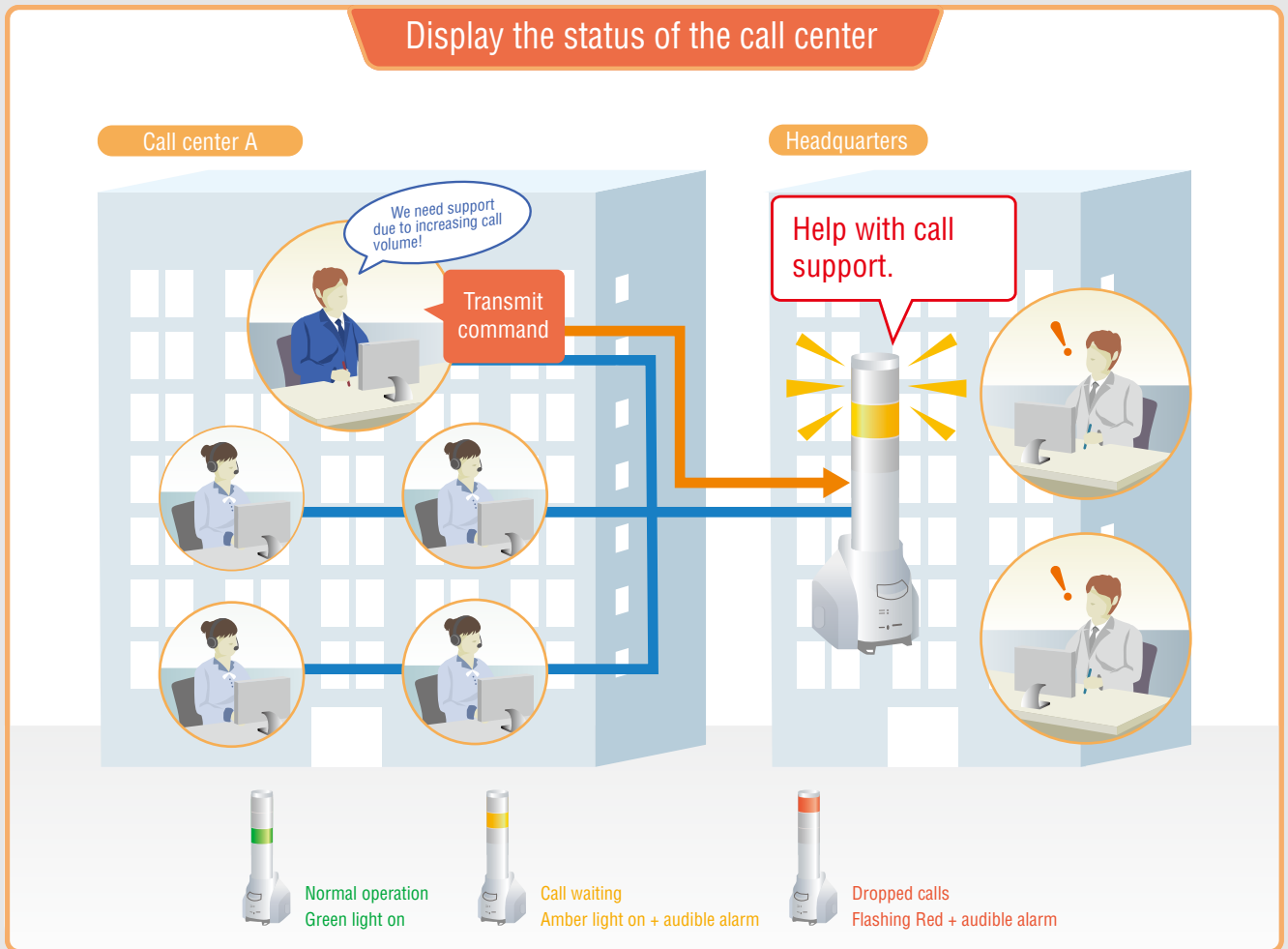
By linking the disaster information delivery system with either socket communication or SNMP, status can be indicated via visual, audible and email notification.

Network Monitoring Signal Tower
NH-FV Series



Reduce call waiting and call backlogs!

Call center



Normal operation
Green light on

Call waiting
Amber light on + audible alarm

Dropped calls
Flashing Red + audible alarm

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

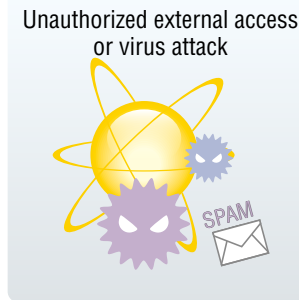


Network Monitoring Signal Tower
NH-FV Series

UTM External Attack Monitoring Solution

Office

Alert for unauthorized operation or an external attack



Security software detects unauthorized operation in the company

- Unauthorized access
- Unauthorized copy
- Virus



Server detects unauthorized operation! TRAP transmission!

Unauthorized access detected!



Detected by UTM! TRAP Transmission!



Unauthorized operation alert! SNMP

External attack! SNMP

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 linking 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

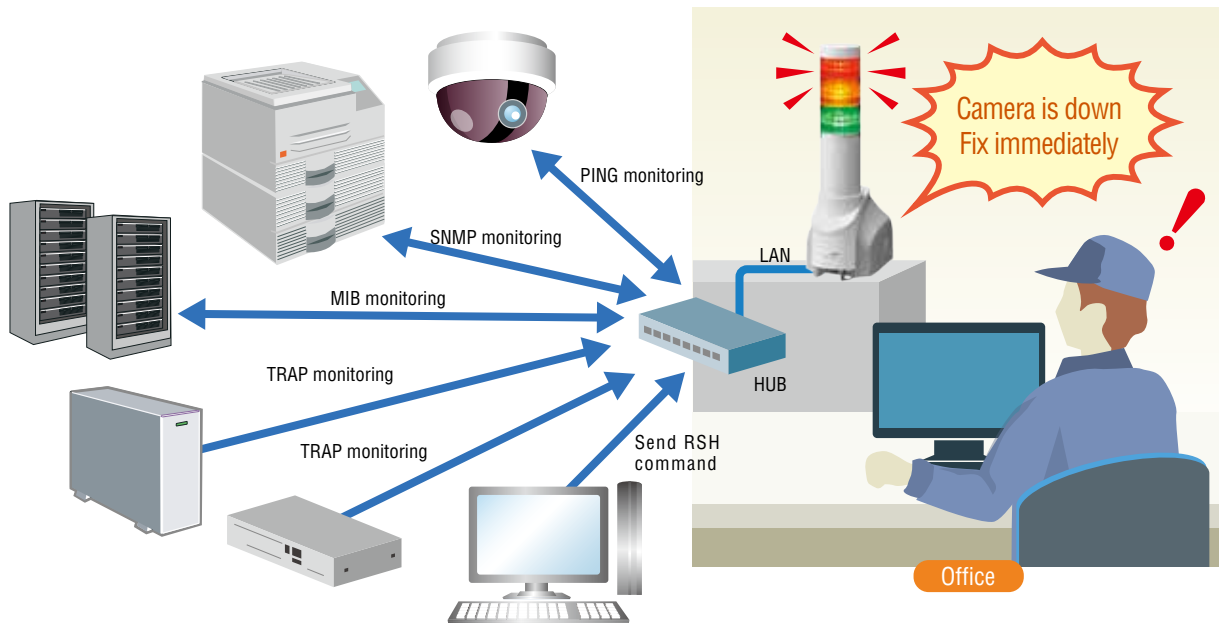
For Factory Security, Railway Command,
Disaster Prevention and Emergency Services

System example

PC and software
not required!*

Just use PATLITE signal towers to make
equipment problems visible!

* Personal computer required for set up.



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

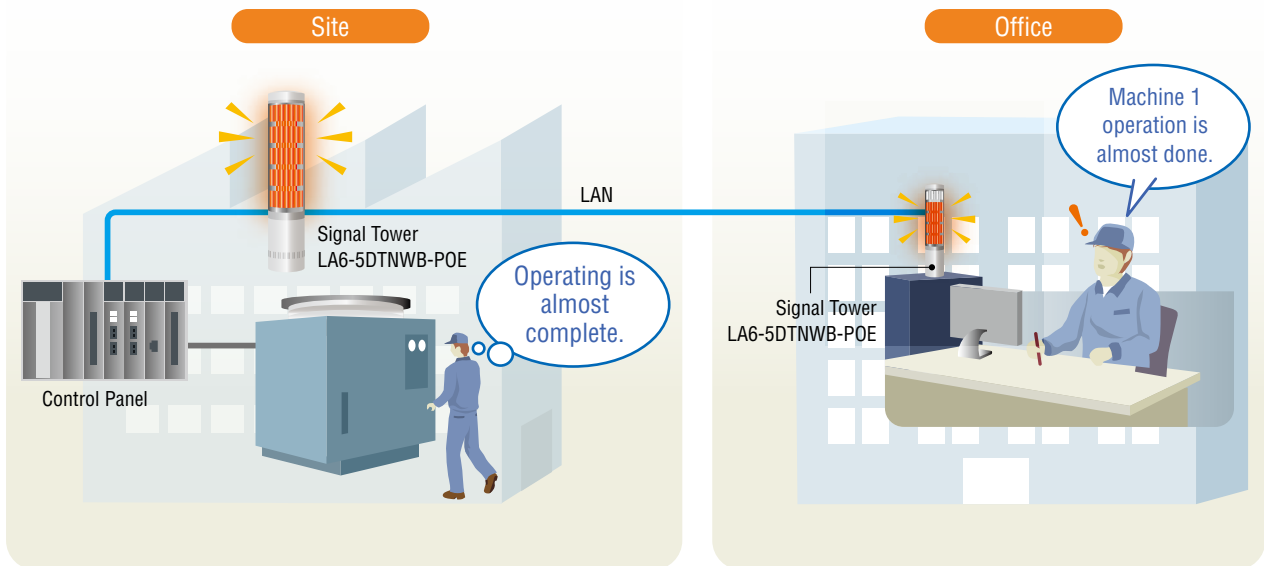
Device configuration



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

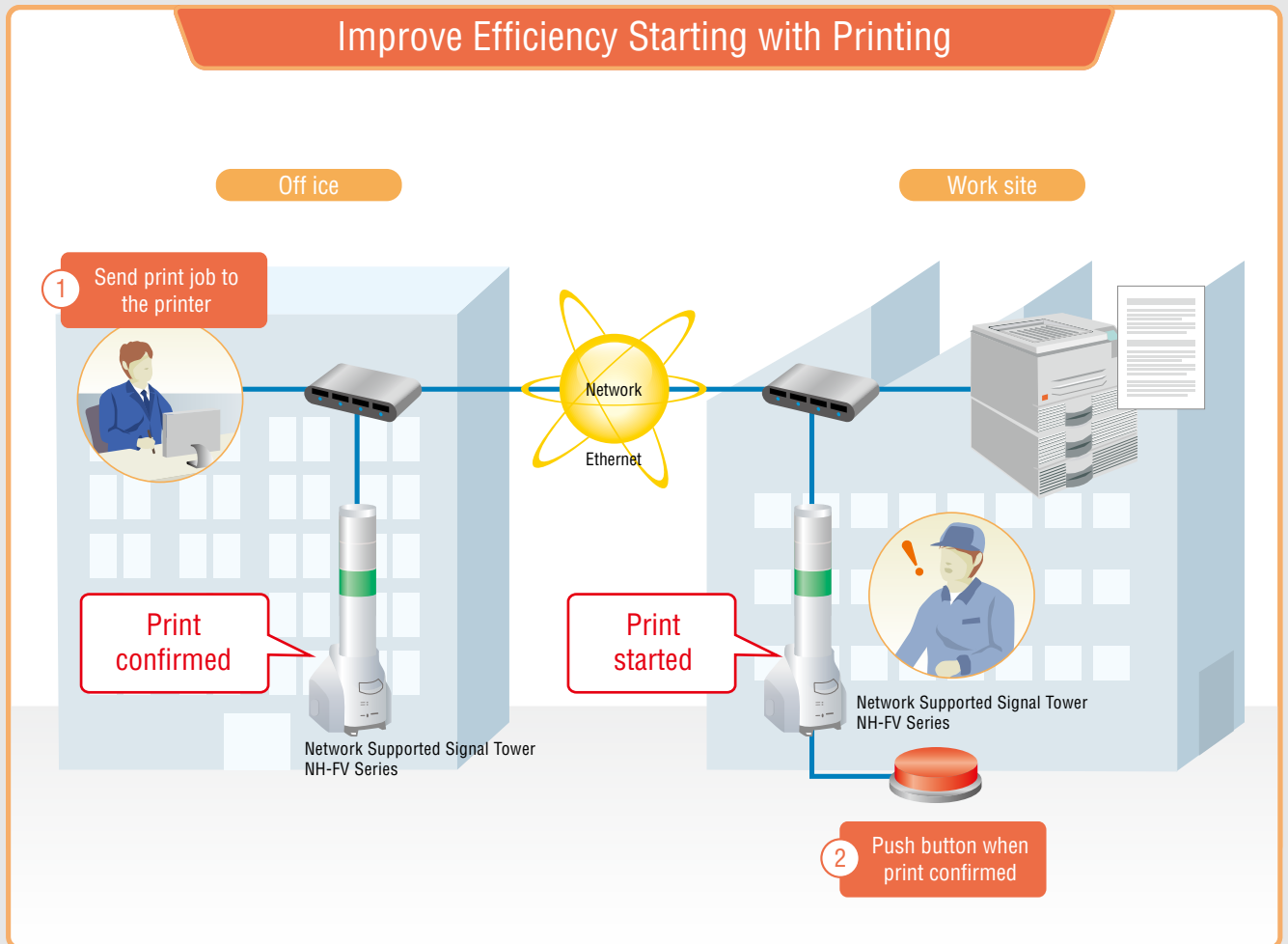
Device configuration



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.

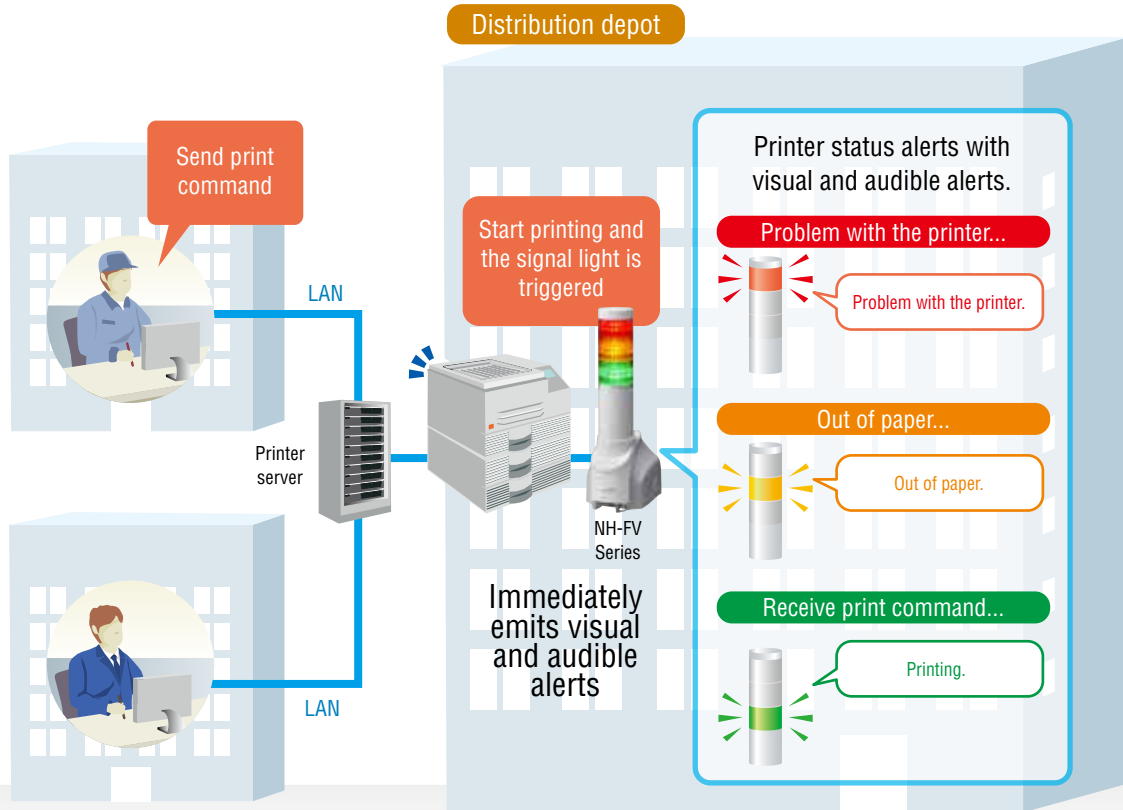
By using the NH-FV Series print monitoring and audible notification features, you can remotely notify printing instructions.

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

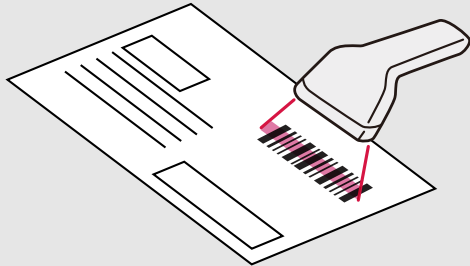
NH-FV Series x 1 unit

Network Monitoring Signal Tower
NH-FV Series

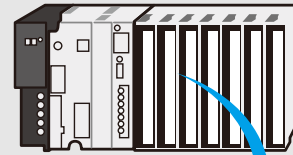
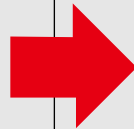


Prevent Picking Errors with Pick-to-Light

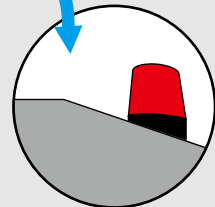
Implement NE Touch Sensor Beacons to simplify and enhance workflow



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



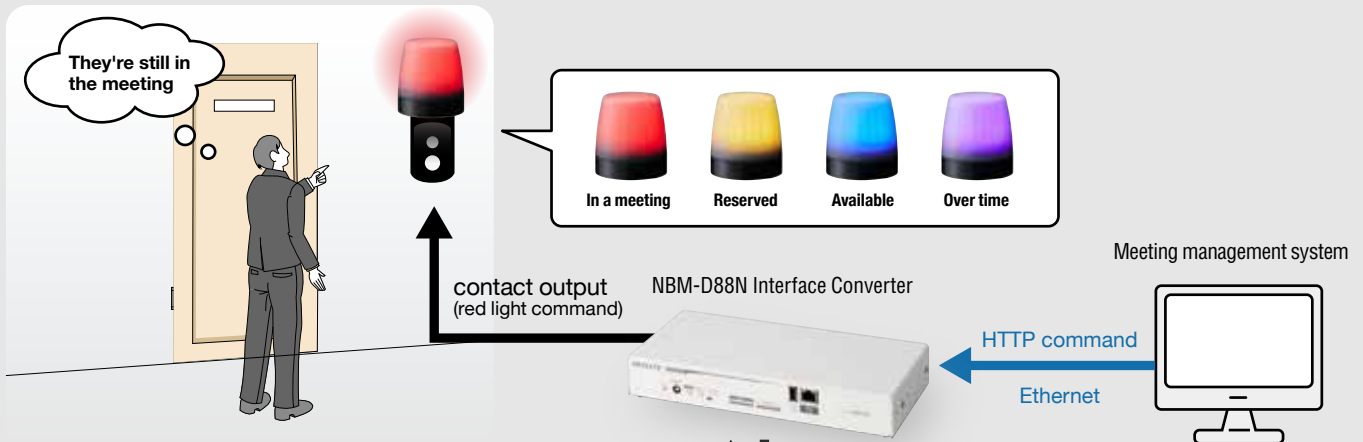
Mounting Screw
T81800030-F1

Mounting example

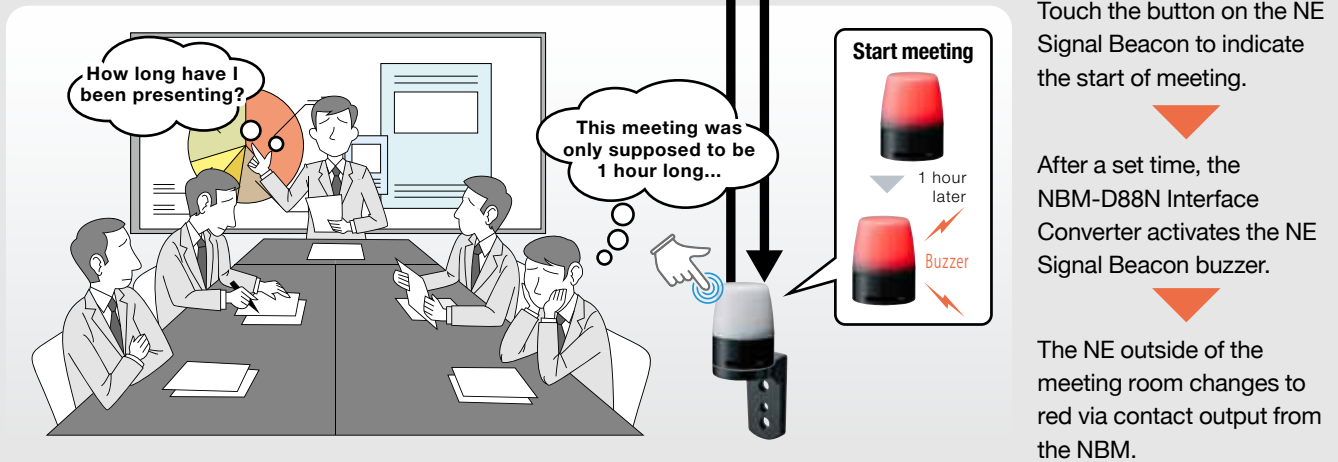


Smarter, More Efficient Scheduling.

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

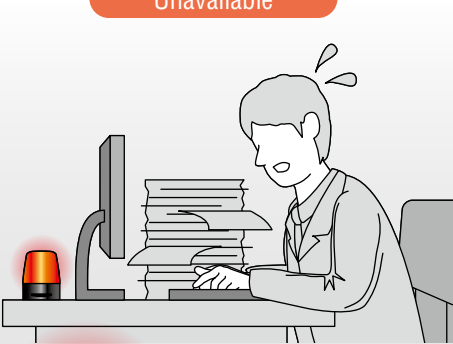



Wall Mount Bracket
NE-002D

Reduce Stress and Avoid Work Interruptions

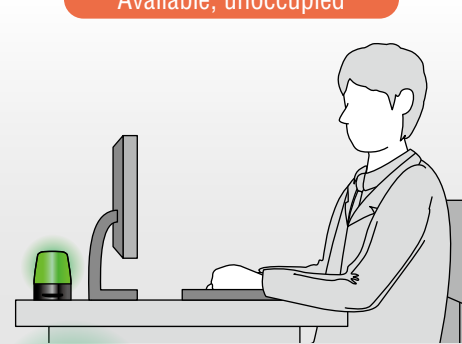

Indicate the busyness of current work

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.

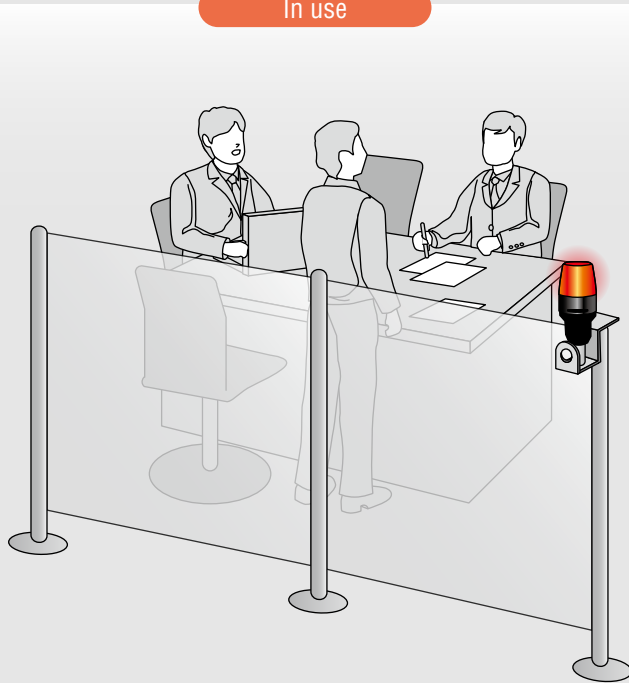


NE-M1ATB-M
Signal Beacons

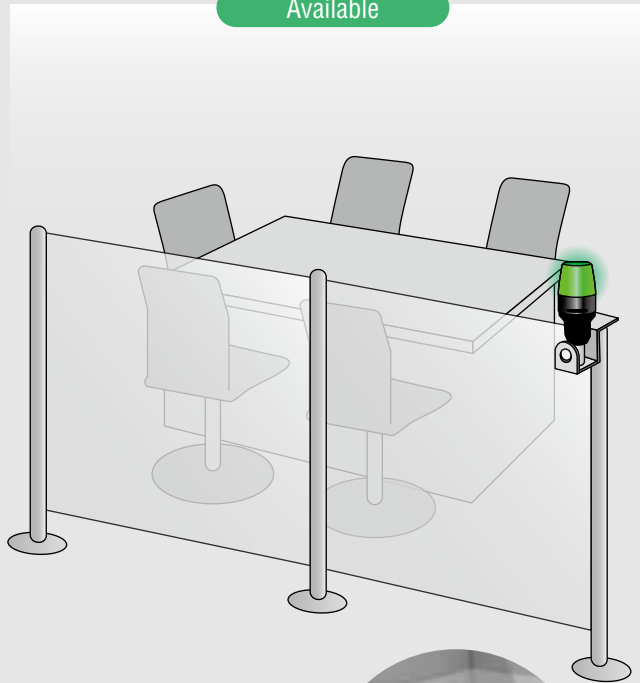
Clear Indication, Simple Installation.

Indicate meeting room status

In use



Available



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



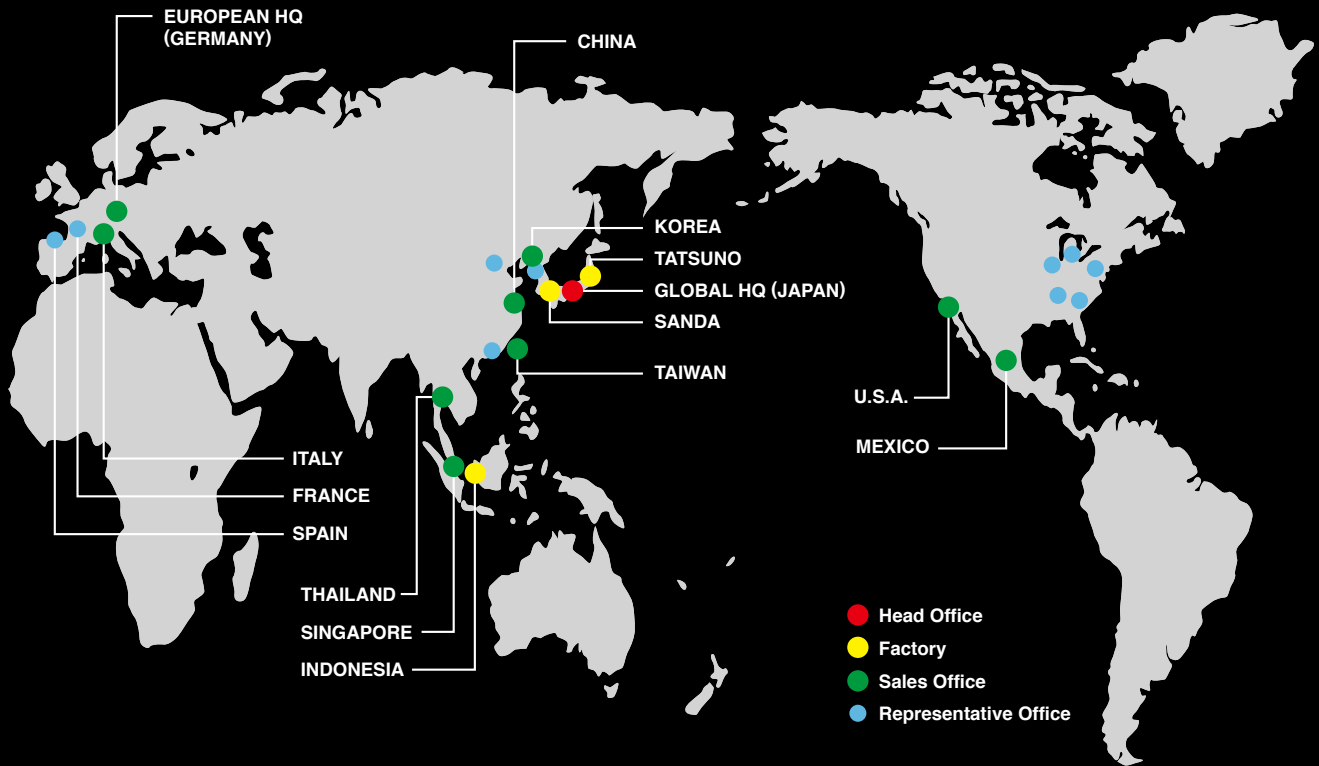
Mounting Screw
T81800030-F1

Vocabulary

Vocabulary	Explanation
IoT	Stands for "Internet of Things", an industry term describing the interrelationship of devices connected to the internet, which collect and share data.
M2M	Stands for "Machine-to-Machine" and refers to technology that enables the exchange of data between networked machines, without requiring human assistance.
ECRS	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.
PoE	Stands for "Power of Ethernet" and describes a system where both data and power are supplied to a machine using a single Ethernet cable.
TPM	Stands for Total Productive Maintenance, which refers to a strategy for equipment maintenance in efforts to optimize production efficiency.
The 7 Wastes of Lean Manufacturing	Seven wastes (or Muda) that hinder production productivity. Overproduction, Excess inventory, Excess motion, Defects, Over-processing, Waiting, and Transporting.
Logistics 4.0	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.
Supply Chain	Refers to the management of a company and its suppliers, from the raw components and services all the way to delivery to the consumer.
Bottleneck	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.
Andon	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
Takt Time	<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>
Cycle Time (C/T)	<p>Refers to the average time required to complete production of one unit.</p> <p>"When cycle time > takt time, it creates a shortage When cycle time < takt time, it creates a surplus"</p>
Traceability	<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>
Pandemic	<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>
Utilization Rate	<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>
Operational Availability	<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 reduce the operational availability rate.</p>
Predictive Maintenance	<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 reduce the operational availability rate.</p>
Small Lot Production	<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>
Production Leveling	<p>Refers to a production technique where the rate of production remains constant, regardless of the fluctuation in demand over time.</p>
Labor and Manpower Reduction	<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>

Please use your products with ease from the time of purchase to after-support through PATLITE's global network.



PATLITE (U.S.A.) Corporation

20130 S. Western Ave. Torrance, CA 90501, U.S.A.
 TEL. +1-310-328-3222 FAX. +1-310-328-2676
 E-mail: sales@patlite.com

PATLITE KOREA CO., LTD.

A2603, Daesung D-POLIS, 606, Seobusaet-gil, Geumcheon-gu, Seoul, 08504, Korea
 TEL. +82-2-523-6636 FAX. +82-2-861-9919
 E-mail: sales@patlite.co.kr

PATLITE (SINGAPORE) PTE LTD

No.2 Leng Kee Road, #05-01 Thye Hong Centre, Singapore 159086
 TEL. +65-6226-1111 FAX. +65-6324-1411
 E-mail: sales@patlite.com.sg

PATLITE TAIWAN CO., LTD.

2F-1, No.215, Sec. 2, Chengde Rd., Datong Dist., Taipei City 10364, Taiwan (R.O.C.)
 TEL. +886-2-2552-9611 FAX. +886-2-2552-9811
 E-mail: info@patlite.tw

PATLITE (CHINA) Corporation

Room 1102-1103, No. 55, Lane 777, Guangzhong Road (West), Jing an District, Shanghai, China 200072
 TEL. +86-21-6630-8969 FAX. +86-21-6630-8938
 E-mail: sales@patlite.cn

PATLITE (THAILAND) CO., LTD.

Olympia Thai Tower, 15th Floor 444 Ratchadapisek Road Samsennok, Huay Kwang Bangkok 10310, Thailand
 TEL. +66-2-541-5431 FAX. +66-2-541-5429
 E-mail: sales_150716@patlite.co.th

PATLITE Europe GmbH

Am Soeldnermoos 8, D-85399 Hallbergmoos, Germany
 TEL. +49-811-9981-9770-0 FAX. +49-811-9981-9770-90
 E-mail: info@patlite.eu

PATLITE Corporation

4-1-3, Kyutaromachi, Chuo-ku, Osaka 541-0056 Japan
 International Sales Division
 TEL. +81-6-7711-8953 FAX. +81-6-7711-8961
 E-mail: overseas@patlite.co.jp