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- 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**
- P14: Visualize Equipment Status in Unmanned Areas
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**Tests and inspections**
- P16: Monitor issues remotely and in real-time
- P17: Visualize Inspection Process Anomalies
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**Painting**
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**Body assembly**
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- P24: Takt Time for Manual Assembly Process
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**Boxing and shipment**
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- P33: Prevent sand overflowing from the hopper
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- P35: Create Uniform Visual Signals Throughout the Worksite
- P36: Visualize remaining amount

**Filling and packing**
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**Energy, Energy Conservation and Environment**
- P40: Make The Water Level Visible and Reduce Checking Time

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- P41: Maintaining Hygiene at Food Processing Site
Scenario 3 Logistics

Arrival of stock
- Simple Request System

Storage of stock
- Air Conditioner Remote Alerts

Sorting

Shipment
- 24-hour Network Camera Monitoring

Management office
- Remotely monitor server issues
- Broadcast Disaster Information to All Operators
- Reduce call wait times and backlogs
- UTM External Attack Monitoring Solution
- Improve Notification of Emergency Information
- Industry or automobile-related manufacturing

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

Notice print output as soon as possible
Confirm print output has been received
Visualize Print Errors on Network Printers
Prevent Picking Errors with Pick-to-Light
Building Integrated Systems for Operation Management and Monitoring

Report equipment errors via email

Wirelessly send operation information

Easily Compile Operation Status of Old Equipment

Reduce Labor

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 the production bottlenecks.

* Separate application software is required.

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 the production bottlenecks.

Create 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.

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Before
- The performance status of each unit can be recorded - No need for daily reports.
- The performance status of each unit can be recorded - No need for daily reports.

After
- Use saved data to improve and increase productivity!
- Use saved data to improve and increase productivity!

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.

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* Separate application software is required.
Automating a Handwritten Factory Daily Report

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.

Visualize Level of Cutting Oil Remaining in Tank

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

After
Visualize the oil level with LA6 Signal Tower!

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

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
Visualize the Stages of Equipment Maintenance

Create a standardized, color-coded system for equipment status

**Normal Operation**

- PLC

**Equipment Malfunction**

- PLC
- BUZZER

**Status Confirmation**

Tap touch button to confirm status and start maintenance

**Work in Progress**

- PLC

**Touching the NE Sends Information to PLC**

Blue light indicates maintenance in progress

- PLC changes the NE light color

**Maintenance Completed**

- Normal Operation / Maintenance Completed

**Maintenance Required**

- Equipment Malfunction-Maintenance Required

**In Progress**

- Maintenance in Progress

---

**Visualize Equipment Status in Unmanned Areas**

- Identify the equipment by segments on the LA6-POE.
- Wiring

**Before**

- By dividing the channels into the NBM, you can identify which machine has a problem. Example: CH1 - Machine 1, CH2 - Machine 2 and so on

**After**

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

---

**NE-M1ATB-M**

Signal Beacons

**Options**

- Upper Bracket NE-0370
- Mid-Bracket NE-0360
- Pole POLE22-N
- Pole (Threaded) POLE22-T

---

**NE-M1ATB-M**

Signal Beacons

**Options**

- Upper Bracket NE-0370
- Mid-Bracket NE-0360
- Pole POLE22-N
- Pole (Threaded) POLE22-T

---

**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.

---

**Interface Converter**

NBM-D88N

**Wiring**

- LAN

**Signal Tower**

LA6-POE Series

**Wiring is easy with PoE**

Freely set up the Luminous Color

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

---

**Flexible control the network status monitoring**

- Stationary Type with Clear Switch
- Stationary Type with Mute Switch
- Direct Mount

---

**Software (sold separately)**

- Optional function expansion
- for Windows

---

**LAN**

- Ethernet

**Relay**

- Digital output

**HTTP**

- 8 digital input contacts and 8 digital output contacts
- Easy setup, various commands
- Ping for alive monitoring
- All terminal blocks are screw-free design
- Set up conditions for detecting digital input
- Set log output in USB memory

---

**Accessories**

- AC Adaptor

**Other Uses**

- Automobile Manufacturing
- Food and Pharmaceutical
- Logistics
- Others
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.

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.

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

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.
**Visualize Inspection Process Anomalies**

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

![Threshold problem. Please check. Error occurred during inspection process!](image)

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

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.

**Prevent Oversights During Inspection**

**Are you rushing visual inspections?**

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**

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.

**Use “Time-Trigger” to manage the inspection time**

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.

**Pros/Cons**

**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.

**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.

**PROBLEM**

- Inspections are carried out on the production line before distribution.
- To quickly reach their daily targets, workers may rush inspections.
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**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.

**Efficiency**

You can customize the display pattern with the editing software.

**LAN**

Threshold problem. Please check.

Error occurred during inspection process!

**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.

**NH-FV Series**

- 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.

**Audio and Visual notification**

- 88 dB Sound resonates
- Voice message notification
- With audio notifications, you can communicate information with messages that tell you "What and how that’s a problem," and combine with visual conditions.
Mistake-free Inspection Process

Example system

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

USB-controlled signal tower LR6-USB
Works with USB bus power
*USB Cable sold separately

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.

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.

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

www.patlite.com/la6/app.html

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

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

Increase EFFICIENCY !

Example system

Industry / Equipment Overview

Industry • Manufacturing
Process • Inspection Process

Device configuration
USB-controlled signal tower LR6-USB x 1 unit

USB connection

Simple connection to the PC with a single USB cable. Achieve reduced wiring.

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

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

Example system

Industry / Equipment Overview

Industry • Manufacturing
Process • Inspection Process

Device configuration
USB-controlled signal tower LR6-USB x 1 unit

USB connection

Simple connection to the PC with a single USB cable. Achieve reduced wiring.
Visualize Robot Statuses

Before

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.

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

Visualize the time required at each work step

WIP Inventory

Sensor

Contact output

Do detect with a sensor, and show the elapsed time since completion of previous process.

Using the mirroring function to display the status in the office.

Signal Tower

Display Pattern Example

5 min elapsed
15 min elapsed
35 min elapsed
5 min elapsed

Signal Tower

LA6-POE
LA6-G578WB-POE (Stationary)
LA6-G578WB-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

When light is on
When light is off

Problem at the factory!

Command communication

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

Automobile Manufacturing
Food and Pharmaceutical
Logistics
Others

Example

Flashing lights and audible alarm

This cycle is taking longer than normal.

Manufacturing site A
Office

Maximum 8 locations

Mirroring at the office

Example

Sensor

Detect with a sensor, and show the elapsed time since completion of previous process.

Use mirroring function to display the status in the office.

1 min 2 min 3 min 4 min 5 min 5+ min

Flashing lights

This cycle is taking longer than normal.

Problem at the factory!

Command communication

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

Automobile Manufacturing
Food and Pharmaceutical
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Food and Pharmaceutical
Logistics
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Example

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Detect with a sensor, and show the elapsed time since completion of previous process.

Use mirroring function to display the status in the office.

1 min 2 min 3 min 4 min 5 min 5+ min

Flashing lights

This cycle is taking longer than normal.
Remote monitoring reduces loss from stoppages

Callout Notification System

Line A  
Network Monitoring Signal Tower - NH Series
- Get contact inputs → Control network monitoring signal tower over Ethernet  
- With email notification feature, you can report to supervisors in charge, even at night

Line B

Line C

Line C Red Light is on. Immediate action required.

Network

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

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

Interface Converter NBM-D88N
- Get contact inputs → Control network monitoring signal tower over Ethernet  
- With email notification feature, you can report to supervisors in charge, even at night

Takt Time for Manual Assembly Process

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.

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

Before

After

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

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

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.

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.

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

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

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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.
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.

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

Set a Fixed Pace with the LA6 Signal Tower

Manage progress of the 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.

Sub Line

Exceeded Takt time

Awareness

Reduce lost time caused by AGV stops.

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

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

SOLUTION: New LA6 Signal Tower

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.

SOLUTION

• 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.

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

• 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!

Visualize Takt Time

Visualize Takt Time

Automobile Manufacturing
Food and Pharmaceutical
Logistics
Others
Regulating the Cell Assembly Line

Collect Working Time and Visualize the Bottlenecks

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

Visualize Workflow in Chronological Order

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

Hands free by using foot switch

Automatic collection with proximity sensor

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

Collect Working Time and Visualize the Bottlenecks

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

Visualize Lost Time in Cell Production

Takt time 35 seconds

Bottleneck Reduce takt time to 25 seconds

Seconds

50
45
40
35
30
25
20
15
10
5
0
Step 1 Step 2 Step 3 Step 4 Step 5 Step 6 Step 7 Step 8 Step 9 Step 10

Example chart of CSV log file collected by WD

Additional equipment

Wireless Data Communication System WDR Receiver x 1 unit

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

Example system

Issue: Cannot see accumulation of lost time

Mechanisms for Visualizing Lost Time

Non-working time ratio ↓

15.6% to 8.3%

7.3% reduction!

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.

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

• Manufacturing
• Process
• Cell Assembly Line

Before

After

PatLITE Sanda Factory Example

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

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

Example chart of CSV log file collected by WD

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.

Before

After

Hands free by using foot switch

Automatic collection with proximity sensor

Replace the HIST pushbutton with a foot switch or sensor to reduce or eliminate the worker’s load.
IoT Screw Driver Measures
Tightness of Screws

System example

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)

Signal From Cells Using an Andon Monitor

Example system

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
• Cell stall

Process

Device configuration
Wireless Data Acquisition System WDR Receiver x 1 unit
Wireless Data Acquisition System WDT-LR-Z2 Transmitter x 20 units
LR Series Body Unit x 5
5 Electric screwdrivers

Caution
• WD can collect the start, increase torque, and reverse signals only.
  (WD cannot collect the stop signals from the electric screwdrivers.)
• An electric screwdriver signal cannot turn on an LED lamp of the LR series.
Visualize Operation Panel
Information

Regular, manual operation panel checks are inefficient

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

Equipment can be checked for abnormalities at a glance from a distance, without needing to approach the machine. Increases efficiency!

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

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

Usage

System example

Processing equipment with cycle time of 60 seconds
- Exceeds cycle time by 10 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.

Improve Predictive Maintenance

Visualize lost productivity from reduction in speed

System example

Processing equipment with cycle time of 60 seconds
- Exceeds cycle time by 10 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.

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.

Device configuration

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

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

Out of material!
Abnormal stop
Exceeded cycle time

Line 1
Line 2
Line 3

Emergency Situation

LA6 Signal Tower x 1 unit per equipment
Prevent sand overflowing from the hopper

Make the amount of sand in the hopper visible!

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

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

Visualize Amount of Liquid in the Tank!

- Visualize tank status with minimal configuration
- Improve efficiency
- No PLC
- Overflow is imminent...

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.

*Electrodes, electrode holder, and floatless switches are not supplied.
Create Uniform Visual Signals Throughout the Worksite

Before

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

Factory B support staff

After

Consistent

Factory A Critical error
Factory B Critical error

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

Increase EFFICIENCY!

Visualize amount of remaining fluid

Before

Casting Site

Tank with Liquid Aluminum

Bottlenecks occur when liquid aluminum is completely depleted.

After

Visualize Using LA6 Signal Tower

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

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

IMPROVEMENT
• 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

PROBLEM
• 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.

Extension
• Connect a temperature sensor to make abnormal temperature conditions more visible.
**Visualize the elapsed time from when the problem occurred**

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

**SOLUTION**

- 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**

![Image of LA6 Signal Tower with visual representation of elapsed time]

**Make maintenance time visible**

**Before**
- Alarm
  - Only 1 red light

**After**
- LA6 to visualize each process
  - Visualize the elapsed time from when the problem occurred.
  - Maintenance on equipment that takes a long time to restore can improve production efficiency.

**Display Pattern Example**

<table>
<thead>
<tr>
<th>Process</th>
<th>Wash</th>
<th>Rinse</th>
<th>Spin</th>
<th>Dry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elapsed Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Visualize Work Progress**

**Before**
- Current status is unknown...
  - 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.

**After**
- LA6 to visualize each process
  - Color code processes
  - Flashing light/audible when there is an error

**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.

**Example**

- Download free from our home page → https://www.patlite.com/la6/app.html

**Display Pattern Example**

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Error Elapsed Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 min</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ISSUE**
- 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.
Equipment Operation Management over LAN

System example

Power over Ethernet

PoE HUB

Signal Tower LA6-POE

Signal Tower LA6-POE

Signal Tower LA6-POE

Signal Tower LA6-POE

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
- Electronic components, modules, inspection equipment

Device configuration
LA6-50T/NWB-POE

Make The Water Level Visible and Reduce Checking Time

Before

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

Wastewater Overflow
Wastewater Overflow
Wastewater Overflow

Wastewater Overflow
30 minutes elapsed

Highlight with flashing + audible

Light all the colors in accordance with the location

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.

Turn on all segments + audible

Increase EFFICIENCY!
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
- 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 enter the work area.

Improvements Using LA6 Signal Tower
- 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.

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

Example system
Warehouse A
Network Monitoring Signal Tower
NH-FV Series
Warehouse A requests supply of parts from Warehouse B.
Warehouse B notifies Warehouse A when the parts will be supplied.
Warehouse A notifies Warehouse B when the parts will be supplied.

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

Electronic component warehouse temperature and humidity management

- Temperature Range: 60-80°F (15.6-29.4°C)
- Humidity Range: 30 - 75%

Alerts when temperature or humidity is beyond normal levels
- Temperature / humidity sensor with alarm output function
- 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

365 day operation

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.

Before

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.

Visual and audible notification

MP3 Playback Network Monitoring Signal Tower
NH-FV Series

88dB

Sound resonates

Voice message notification

With audible alerts, you can play messages that tell you “what and how that’s a problem”.

Automatically 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.

24-hour Network Camera Monitoring

Automatic Camera Restart

Notified by email alert

Alerts when temperature or humidity is beyond normal levels

- Temperature / humidity sensor with alarm output function
- Email sent to notify the manager.

NH-FV Series

PoE HUB

Send Command

Camera restarted

Ping monitoring of network camera

LAN

remote monitoring ports on PoE HUB

Monitor Power Supply Controller

LAN

Contact

Electronic component warehouse temperature and humidity management

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Industry Overview

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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.

Broadcast Disaster Information to All Operators

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.
Reduce call wait times and backlogs

Display the status of the call center

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

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
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.

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.

After

● 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

Network Monitoring Signal Tower NH-FV Series

Industry or automobile-related manufacturing

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

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

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.

Device configuration

Signal Tower LA6-5DTNW-POE x 2 units

System example

Just use PATLITE signal towers to make equipment problems visible!

PC and software not required!*  
* Personal computer required for setup.

System example

Remote notification of core equipment operation cycle time

Mirror status of LA6-POE master over LAN connection

Machine 1 operation is almost done.
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.

Visualize Print Errors on Network Printers

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. e.g. light indication when printing.

Visual and audible notifications when there is a printing error.

Immediately emits visual and audible alerts.

Device configuration

Network Monitoring Signal Tower
NH-FV Series

Industry Overview

Industry • Manufacturing

Device configuration

NH-FV Series x 1 units

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

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.

**Signal Beacons**

NE-M1ATB-M

**Options**

- Upper Bracket NE-001D
- Wall Mount Bracket NE-002D
- Mounting Bracket TB8130016-F1
- Mounting Screw TB8100030-F1

**Smarter, More Efficient Scheduling.**

Visualize Meeting Room Schedules

The meeting room status can be confirmed from outside the room.

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

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

**Before**

This meeting was only supposed to be 1 hour long...

How long have I been presenting?

This meeting was only supposed to be 1 hour long...

**After**

Touch the button on the NE Signal Beacon to indicate the start of meeting.

After a set time, the NBM-D88N Interface Converter activates the NE Signal Beacon buzzer.

The NE outside of the meeting room changes to red via contact output from the NBM.
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.

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.

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.

Reduce Stress and Avoid Work Interruptions

Indicate the busyness of current work

Clear Indication, Simple Installation.

Indicate meeting room status
## Vocabulary

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IoT</strong></td>
<td>Stands for “Internet of Things”, an industry term describing the interrelationship of devices connected to the internet, which collect and share data.</td>
</tr>
<tr>
<td><strong>M2M</strong></td>
<td>Stands for ‘Machine-to-Machine’ and refers to technology that enables the exchange of data between networked machines, without requiring human assistance.</td>
</tr>
<tr>
<td><strong>ECRS</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>PoE</strong></td>
<td>Stands for ‘Power of Ethernet’ and describes a system where both data and power are supplied to a machine using a single Ethernet cable.</td>
</tr>
<tr>
<td><strong>TPM</strong></td>
<td>Stands for Total Productive Maintenance, which refers to a strategy for equipment maintenance in efforts to optimize production efficiency.</td>
</tr>
<tr>
<td><strong>The 7 Wastes of Lean Manufacturing</strong></td>
<td>Seven wastes (or Muda) that hinder production productivity. Overproduction, Excess inventory, Excess motion, Defects, Over-processing, Waiting, and Transporting.</td>
</tr>
<tr>
<td><strong>Logistics 4.0</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Supply Chain</strong></td>
<td>Refers to the management of a company and its suppliers, from the raw components and services all the way to delivery to the consumer.</td>
</tr>
<tr>
<td><strong>Bottleneck</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Andon</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>

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<tr>
<td><strong>Takt Time</strong></td>
<td>The rate at which one unit of a product must be produced in order to meet the customer’s demand. Takt time is the quantity of products requested by a customer, in relation to the total time it takes to produce those items. Takt time = Total Time Available for Production / Average Daily Customer Demand</td>
</tr>
<tr>
<td><strong>Cycle Time (C/T)</strong></td>
<td>Refers to the average time required to complete production of one unit. When cycle time &gt; takt time, it creates a shortage When cycle time &lt; takt time, it creates a surplus</td>
</tr>
<tr>
<td><strong>Traceability</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Pandemic</strong></td>
<td>Refers to the worldwide spread of a new disease. Pandemic countermeasures are actions taken by the country or an organization to eliminate the pandemic disease.</td>
</tr>
<tr>
<td><strong>Utilization Rate</strong></td>
<td>Refers to the percentage of time that is actually used to perform productive work, in relation to the total available time. It can be used to measure operational efficiency, as well as how well capital investment is being managed.</td>
</tr>
<tr>
<td><strong>Operational Availability</strong></td>
<td>Refers to the percentage of total time that an equipment is properly functioning during the time it is required for production. 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.</td>
</tr>
<tr>
<td><strong>Predictive Maintenance</strong></td>
<td>Refers to the percentage of total time that an equipment is properly functioning when it is required for production. 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.</td>
</tr>
<tr>
<td><strong>Small Lot Production</strong></td>
<td>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. 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.</td>
</tr>
<tr>
<td><strong>Production Leveling</strong></td>
<td>Refers to a production technique where the rate of production remains constant, regardless of the fluctuation in demand over time.</td>
</tr>
<tr>
<td><strong>Labor and Manpower Reduction</strong></td>
<td>Labor reduction can be achieved by improving operational procedures and implementing equipment that can replace human labor. Manpower reduction can be achieved by optimizing work efficiency and reducing any unnecessary or redundant work.</td>
</tr>
</tbody>
</table>
Please use your products with ease from the time of purchase to after-support through PATLITE’s global network.