

**tSL-P4R1 tSL-PA4R1**  
Single Stack Light Monitoring Module

## Features

- Able to detect the status of each color segment: ON, OFF, or Flashing
- 4-channel DC/AC digital input and 1-channel alarm relay output
- Status monitoring for user-defined combinations of multiple color segments
- Reports the duration of the previous status
- Supports Modbus RTU, Modbus TCP and MQTT protocols
- Includes RS-485/Ethernet communication interfaces
- Includes redundant power inputs: PoE (IEEE 802.3af, Class 1) and DC input
- Web-based configuration interface and firmware update via Ethernet
- Relay output for alarm devices
- Wide operating temperature range: -25 to +75°C



## Introduction

The main purpose of managing machine status is to reduce the amount of downtime and to reduce production costs. The easiest way to achieve this is by installing a tSL-P4R1/tSL-PA4R1 intelligent module from ICPDAS, which monitors the output of the machine's indicators without affecting the operation of the equipment, thereby enabling the current operation stage of the machine to be mastered and ensuring timely command of the logistics system support in order to achieve production goals.

The tSL-P4R1/tSL-PA4R1 is a stack light monitoring module which includes 4-channel DC/AC digital input and 1-channel relay output that can be used to monitor the status of the stack light of the MES (Manufacturing Execution System) machine. The module can be used to detect the status of each color segment of the stack light as being either OFF, ON, or flashing. In addition to detecting the status of each individual color segment, the status of the combination of multiple color segments can also be defined, including the ability to report the duration of the previous status. By integrating the tSL-P4R1/tSL-PA4R1 module into your system, it is easy to implement stack light status monitoring on an MES via SCADA software to improve machine utilization and throughput.

## Applications

- Factory Automation
- Machine Automation
- Remote Maintenance
- Remote Diagnosis
- Testing Equipment

## System Specifications

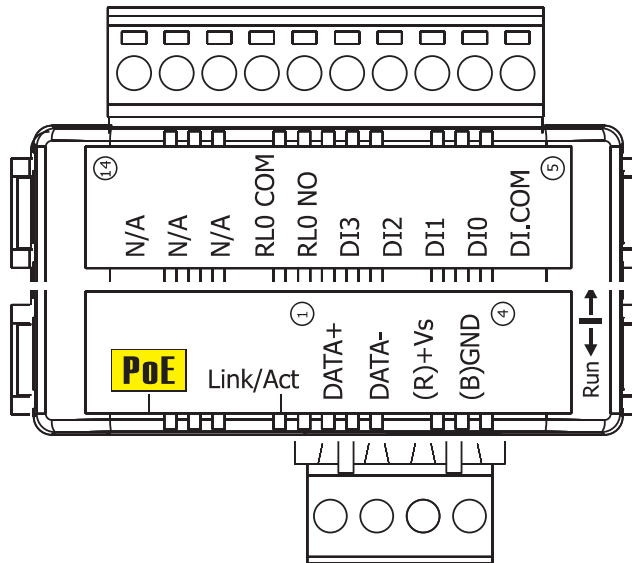
Model	tSL-P4R1	tSL-PA4R1
<b>Software</b>		
Built-in Web Server	Yes	
<b>Communication</b>		
RS-485 Port	Baud Rate = 1200 ~ 115200 bps	
Ethernet Port	10/100 Base-TX, 8-Pin RJ-45 x1 (Auto-negotiating, Auto-MDI/MDIX, LED indicators)	
Security	IP filter (whitelist) and Password (web)	
Protocol	Modbus/RTU, Modbus TCP and MQTT	
Dual Watchdog	Yes, Module (2.3 seconds), Communication (Programmable)	
<b>LED Indicators</b>		
S1	System indicator	
E1	PoE indicator (Green)	
	Link/Act,(Yellow)	
<b>Isolation</b>		
Intra-module Isolation, Field-to-Logic	3750 V <sub>DC</sub>	
<b>EMS Protection</b>		
ESD (IEC 61000-4-2)	±4 kV Contact for Each Terminal	
	±8 kV Air for Random Point	
EFT (IEC 61000-4-4)	±2 kV for Power	
<b>Power Requirements</b>		
Reverse Polarity Protection	Yes	
Power Input	Terminal Block: +10 ~ +48 VDC	
	PoE: IEEE 802.3af, Class 1	
Consumption	PoE	1 W Max.
	Non-PoE	0.9 W Max.
<b>Mechanical</b>		
Dimensions (W x L x H)	52 mm x 98 mm x 27 mm	
Installation	DIN-Rail Mounting	
<b>Environment</b>		
Operating Temperature	-25 to +75°C	
Storage Temperature	-30 to +80°C	
Humidity	10 to 95% RH, Non-condensing	

## I/O Specifications

Model	tSL-P4R1	tSL-PA4R1
<b>Digital Input</b>		
Input Channels	4	
Type	Wet Contact (Sink, Source)	
ON Voltage Level	+10 VDC ~ 50 VDC	80 VAC ~240 VAC
OFF Voltage Level	+4 V Max.	30 VAC Max.
Input Impedance	10 KΩ, 0.5 W	150 KΩ, 2 W
Programmable Digital Filter	0 ~ 6500 ms	
Max. Stack Light Flashing Speed	3 kHz	60 Hz
Able to detect the status of each color segment: ON, OFF, or Flashing	Yes	
Status monitoring for user-defined combinations of multiple color segments	Max. 81 combinations	
Report duration of previous status	Yes, 10 ~ 65500 s	
Overvoltage Protection	70 VDC	300 VAC
Isolation	3750 VDC	
<b>Digital Output</b>		
Output Channels	1	
Type	Power Relay, Form A (SPST N.O.)	
Operating Voltage Range	250 VAC or 30 VDC	
Max. Load Current	5 A	
Operate Time	6 ms	
Release Time	3 ms	
Electrical Life (Resistive load)	VDE	5 A @ 250 VAC 30,000 ops (10 ops/minute) at 75°C
		5 A @ 30 VDC 70,000 ops (10 ops/minute) at 75°C
	UL	5 A @ 250 VAC/30 VDC 6,000 ops 3 A @ 250 VAC/30 VDC 100,000 ops
Mechanical Life	20,000,000 ops at no load (300 ops/minute)	
Power-on Value	Yes, Programmable	
Safe Value	Yes, Programmable	

Pin Assignments

tSL-P4R1/tSL-PA4R1



Applications

# Stack Light Monitoring Solution

Easy to implement stack light status monitoring on an MES to improve machine utilization and throughput.

**Status**

Machine Utilization = RUN Time / ON Time  
 KPI = (RUN + LOST + TEST) Time / ON Time

**ON Time**

Production status time chart

#1 RUN #2 STOP

iKAN series

Ethernet

NS-205

Control Room

Ethernet/RS-485

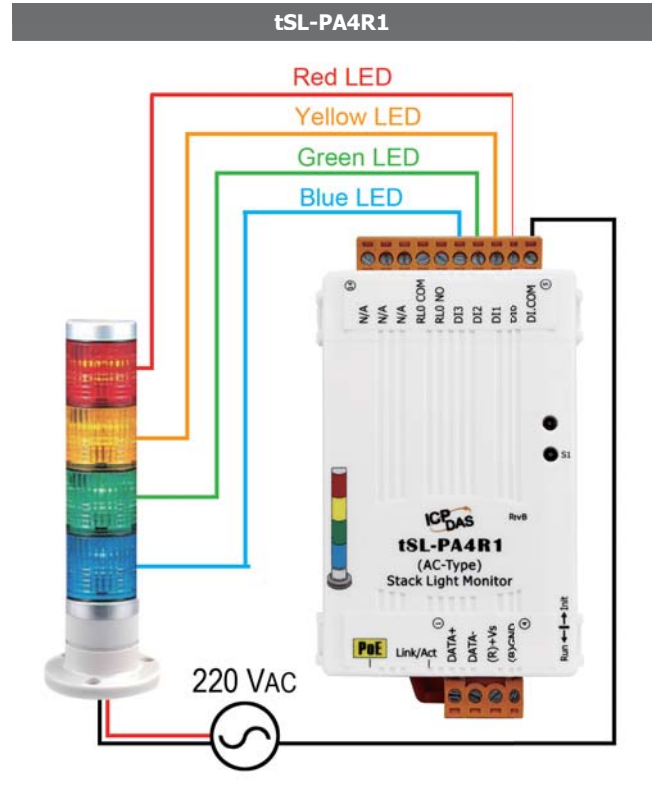
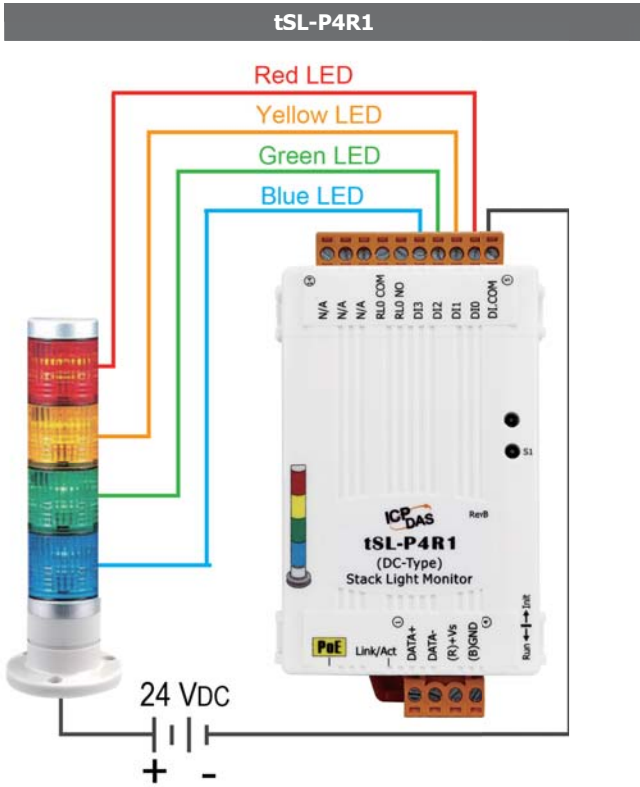
tSL-PA4R1

Ethernet/RS-485

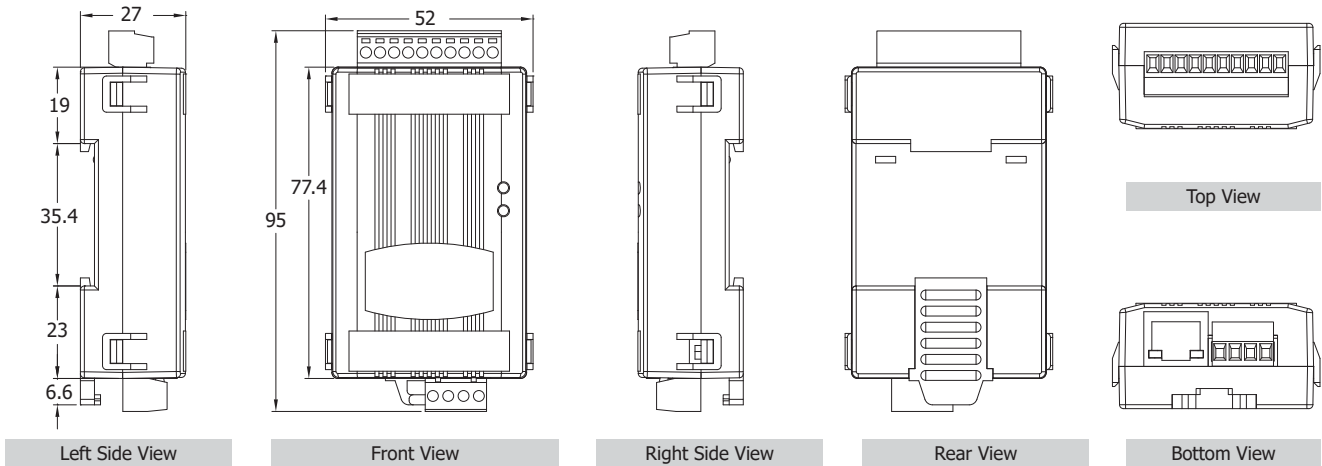
Automation can be easy!

tSL-P4R1/tSL-PA4R1

## Wire Connections



## Dimensions (Units: mm)



## Ordering Information

<b>tSL-P4R1 CR</b>	Single Stack Light Monitoring Module with Ethernet/RS-485 Interface and PoE for DC Stack Lights. (4 DC DI + 1 Relay) (RoHS)
<b>tSL-PA4R1 CR</b>	Single Stack Light Monitoring Module with Ethernet/RS-485 Interface and PoE for AC Stack Lights. (4 AC DI + 1 Relay) (RoHS)

## Related Products

	tM-7520U CR	Isolated RS-232 to RS-485 Converter (RoHS)		I-7514U CR	4-channel RS-485 Hub (RoHS)
	tM-7561 CR	Isolated USB to RS-485 Converter (RoHS)		NS-205PSE CR	Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)

tSL-P4R1/tSL-PA4R1