DAPPRA Automation

Technical Datasheet

DPR-2020-NPN-NC

Safety Light Curtain Area Sensor — 20 Beams · 20 mm Pitch · 380 mm Protection Height

DAPPRA DPR-2020-NPN-NC Safety Light Curtain Area Sensor

Version: 1.0 | Date: September 2023 | SKU: SH61

DAPPRA Automation — Industrial Sensor Manufacturer

DPR-2020-NPN-NC

Safety Light Curtain Area Sensor — 20 Beams · 20 mm Pitch · 380 mm Protection Height

Product Overview

DPR-2020-NPN-NC is a DAPPRA DPR Series safety light curtain area sensor designed for industrial machine protection, hazardous area detection, and automation equipment access monitoring applications.

The sensor uses through-beam infrared detection technology with an emitter and receiver structure to create a protected sensing field.

With 20 infrared beams, 20mm optical axis pitch, 380mm protection height, and NPN NC output configuration, DPR-2020-NPN-NC provides a flexible industrial sensing solution for equipment requiring accurate beam interruption detection and reliable signal communication.

Key Product Specifications

Parameter	Specification
Model	DPR-2020-NPN-NC
SKU	SH61
Product Type	Safety Light Curtain Area Sensor
Detection Method	Through-beam Infrared Detection
Beam Quantity	20 Beams
Optical Axis Pitch	20 mm
Protection Height	380 mm
Total Height	459 mm
Resolution	20 mm
Detection Distance	0.1–3 m
Response Time	0.5 ms
Output Type	NPN
Signal Logic	NC
Protection Rating	IP65
Operating Voltage	DC 12–24V
Cable Length	2 m
Product Series	DAPPRA DPR Series

Key Features

Feature	Description
Through Beam Infrared Detection	Separate emitter and receiver structure using infrared beam detection.
Parallel Beam Configuration	Multiple parallel infrared beams create a defined detection area.
20 mm Resolution	Supports detection requirements with 20 mm resolution specification.
NPN NC Output	Normally Closed NPN signal configuration for industrial control systems.
DC24V Operation	Designed for common industrial control voltage systems.
Wire Synchronization	Uses wire synchronization technology between emitter and receiver.
Dual-Circuit Signal Output	Provides self-test technology through dual-circuit signal output design.
IP65 Protection	Suitable for industrial environments requiring protection against dust and water exposure.
Oil Resistant Surface	Uses fluorosilicone surface coating for oil resistance.

SIL 2 CE FCC RoHS IP65

Technical Specifications

General Specifications

Parameter	Specification
Brand	DAPPRA
Product Series	DPR Series
Product Type	Safety Light Curtain Area Sensor
Detection Type	Through Beam Infrared Detection
Light Source	Infrared LED

Optical Specifications

Parameter	Specification
Optical Beam Quantity	20 Beams
Optical Axis Pitch	20 mm
Protection Height	380 mm
Total Height	459 mm
Resolution	20 mm
Detection Distance	0.1–3 m

Electrical Specifications

Parameter	Specification
Operating Voltage	DC 12–24V
Output Type	NPN
Signal Logic	NC (Normally Closed)
Output Current	≤200 mA
Power Consumption	<5 W
Response Speed	0.5 ms

Mechanical Specifications

Parameter	Specification
Housing Size	29 × 30 mm
Total Height	459 mm
Protection Height	380 mm
Emitter Connector	M12 3-Pin
Receiver Connector	M12 4-Pin
Cable Length	2 m

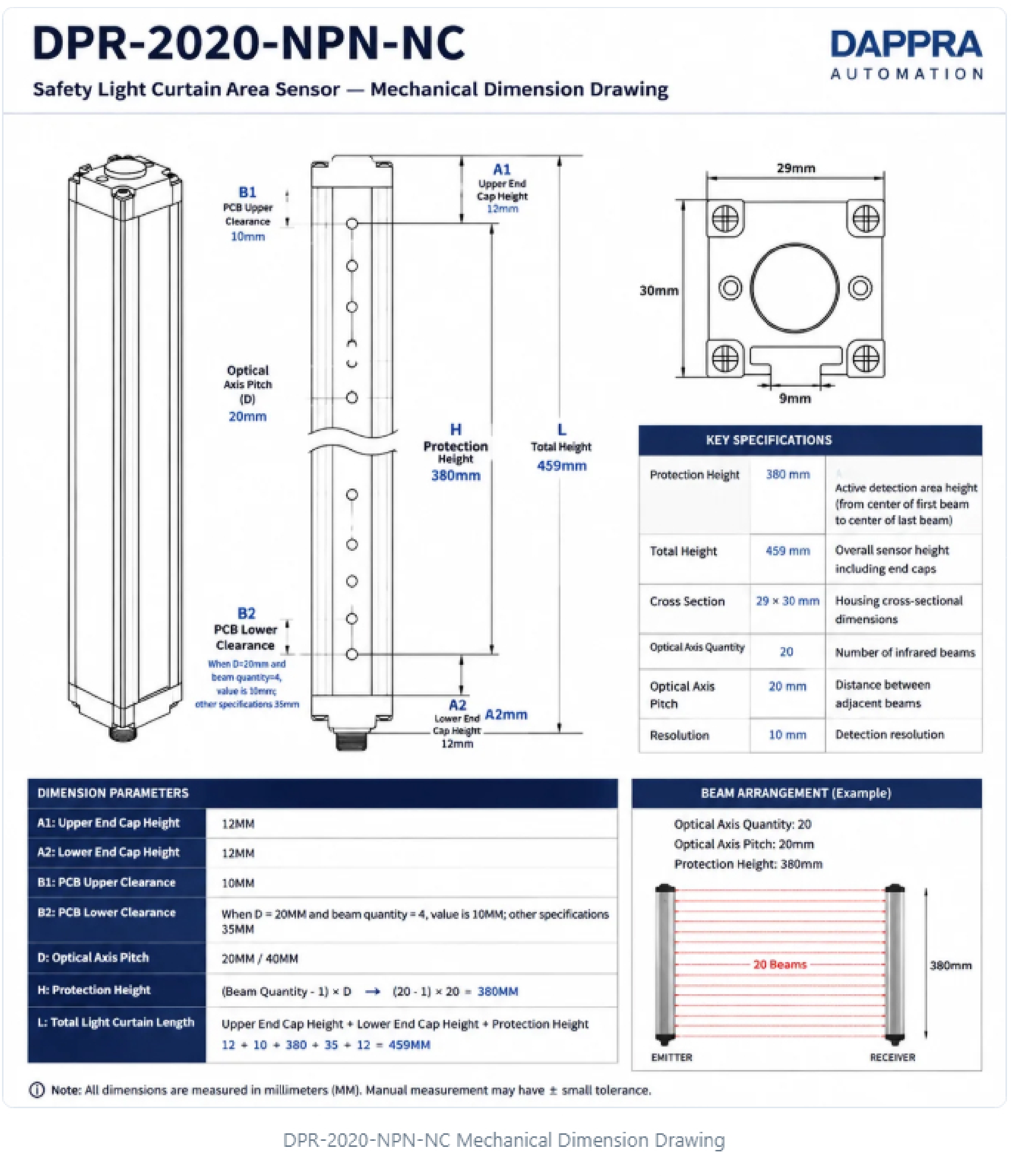
Environmental Specifications

Parameter	Specification
Protection Rating	IP65
Operating Temperature	−10 to 55°C
Relative Humidity	<85% RH at 20°C
Anti-Light Interference	10,000 Lux, incidence angle >5°
Dielectric Strength	AC1500V, 60s, no breakdown or flashover
Insulation Resistance	≥100 MΩ

Safety & Compliance

Parameter	Specification
Safety Standard	IEC 61508
Safety Integrity Level	SIL 2
Certifications	SIL 2, CE, FCC, RoHS

Dimension & Optical Structure


DPR-2020-NPN-NC
Safety Light Curtain Area Sensor — Mechanical Dimension Drawing
DAPPRA AUTOMATION
B1 PCB Upper Clearance 10mm
Optical Axis Pitch (D) 20mm
B2 PCB Lower Clearance
When D=20mm and beam quantity=4, value is 10mm; other specifications 35mm
A1 Upper End Cap Height 12mm
H Protection Height 380mm
L Total Height 459mm
A2 Lower End Cap Height 12mm
A2mm
29mm
30mm
9mm
BEAM ARRANGEMENT (Example)
Optical Axis Quantity: 20
Optical Axis Pitch: 20mm
Protection Height: 380mm
20 Beams
380mm
EMITTER
RECEIVER

DIMENSION PARAMETERS	
A1: Upper End Cap Height	12MM
A2: Lower End Cap Height	12MM
B1: PCB Upper Clearance	10MM
B2: PCB Lower Clearance	When D = 20MM and beam quantity = 4, value is 10MM; other specifications 35MM
D: Optical Axis Pitch	20MM / 40MM
H: Protection Height	(Beam Quantity - 1) × D → (20 - 1) × 20 = 380MM
L: Total Light Curtain Length	Upper End Cap Height + Lower End Cap Height + Protection Height 12 + 10 + 380 + 35 + 12 = 459MM

KEY SPECIFICATIONS		
Protection Height	380 mm	Active detection area height (from center of first beam to center of last beam)
Total Height	459 mm	Overall sensor height including end caps
Cross Section	29 × 30 mm	Housing cross-sectional dimensions
Optical Axis Quantity	20	Number of infrared beams
Optical Axis Pitch	20 mm	Distance between adjacent beams
Resolution	10 mm	Detection resolution

ⓘ Note: All dimensions are measured in millimeters (MM). Manual measurement may have ± small tolerance.

DPR-2020-NPN-NC Mechanical Dimension Drawing

Dimension Parameter	Value (mm)
Protection Height	380
Total Height	459
Cross Section	29 × 30
Optical Axis Quantity	20
Optical Axis Pitch	20

Model Number Description

```
DPR − 20 − 20 − NPN − NC
```

- **DPR** — DAPPRA DPR Series
- **20** — 20 Optical Beams
- **20** — 20 mm Optical Axis Pitch
- **NPN** — NPN Output Type
- **NC** — Normally Closed Signal Logic

Protection Height Calculation

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Protection Height = (Beam Quantity − 1) × Optical Axis Pitch
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For DPR-2020-NPN-NC:

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(20 − 1) × 20 mm = 380 mm
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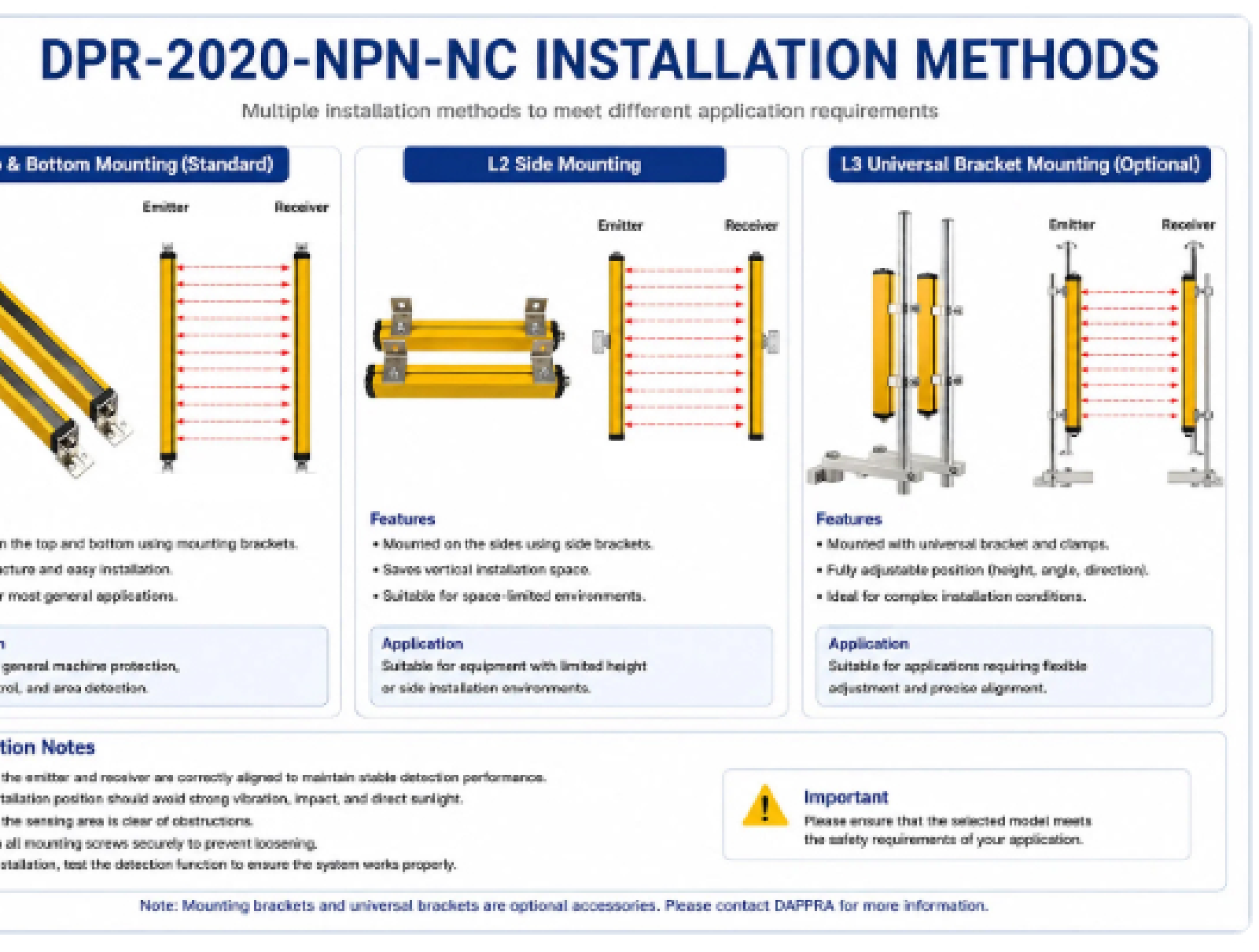
Installation Methods



DPR-2020-NPN-NC INSTALLATION METHODS

Multiple installation methods to meet different application requirements

L1 Top & Bottom Mounting (Standard)

Features
- Mounted on the top and bottom using mounting brackets.
- Simple structure and easy installation.
- Suitable for most general applications.

Application
Suitable for general machine protection, access control, and area detection.

L2 Side Mounting

Features
- Mounted on the sides using side brackets.
- Saves vertical installation space.
- Suitable for space-limited environments.

Application
Suitable for equipment with limited height or side installation environments.

L3 Universal Bracket Mounting (Optional)

Features
- Mounted with universal bracket and clamps.
- Fully adjustable position (height, angle, direction).
- Ideal for complex installation conditions.

Application
Suitable for applications requiring flexible adjustment and precise alignment.

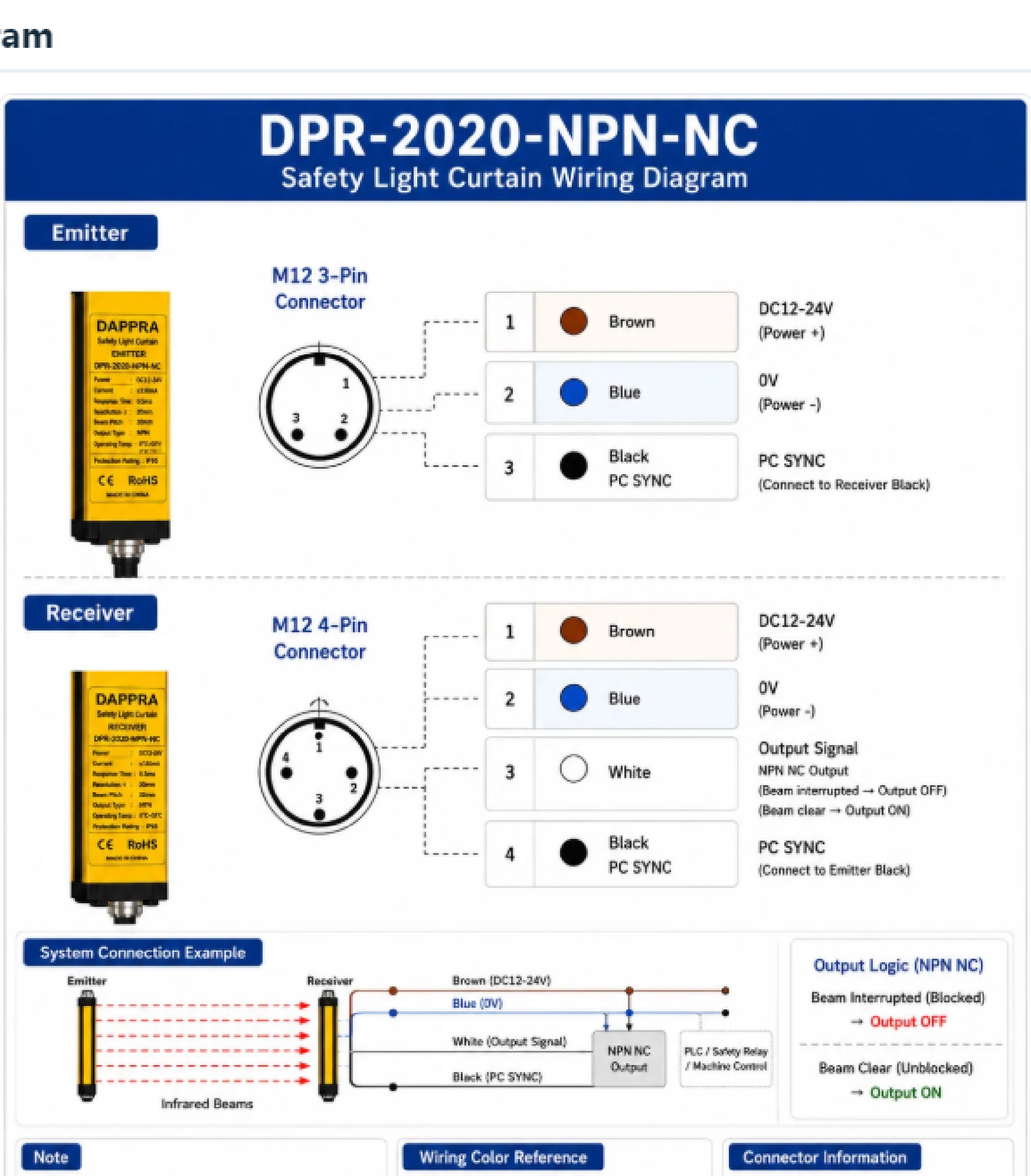
Installation Notes
1. Ensure the emitter and receiver are correctly aligned to maintain stable detection performance.
2. The installation position should avoid strong vibration, impact, and direct sunlight.
3. Ensure the sensing area is clear of obstructions.
4. Tighten all mounting screws securely to prevent loosening.
5. After installation, test the detection function to ensure the system works properly.

Important
Please ensure that the selected model meets the safety requirements of your application.

Note: Mounting brackets and universal brackets are optional accessories. Please contact DAPPRA for more information.

DPR-2020-NPN-NC Three Installation Methods

Wiring Diagram



DPR-2020-NPN-NC
Safety Light Curtain Wiring Diagram

Emitter — M12 3-Pin Connector

1	● Brown	DC12-24V (Power +)
2	● Blue	0V (Power -)
3	● Black PC SYNC	PC SYNC (Connect to Receiver Black)

Receiver — M12 4-Pin Connector

1	● Brown	DC12-24V (Power +)
2	● Blue	0V (Power -)
3	○ White	Output Signal NPN NC Output (Beam interrupted → Output OFF) (Beam clear → Output ON)
4	● Black PC SYNC	PC SYNC (Connect to Emitter Black)

System Connection Example

Output Logic (NPN NC)
Beam Interrupted (Blocked) → Output OFF
Beam Clear (Unblocked) → Output ON

Note
1. PC (SYNC) wiring (black) between emitter and receiver must be short-circuited.
2. Ensure DC12-24V power supply capacity is sufficient and correctly wired.

Wiring Color Reference
● Brown : DC12-24V (Power +)
● Blue : 0V (Power -)
○ White : Output Signal (NPN NC)
● Black : PC SYNC

Connector Information
Emitter : M12 3-Pin Connector
Receiver : M12 4-Pin Connector

⚠ Important: Please ensure that the selected model meets the safety requirements of your application.

DPR-2020-NPN-NC Wiring Diagram