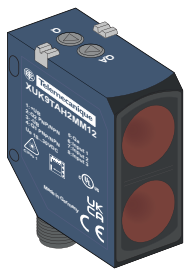


Anti Collision (1) and Tandem Sensor (2) for Over-head Cranes

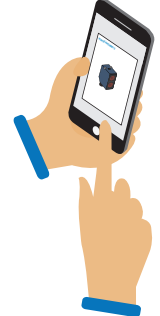


CE

UKCA

ECOLAB

cULus

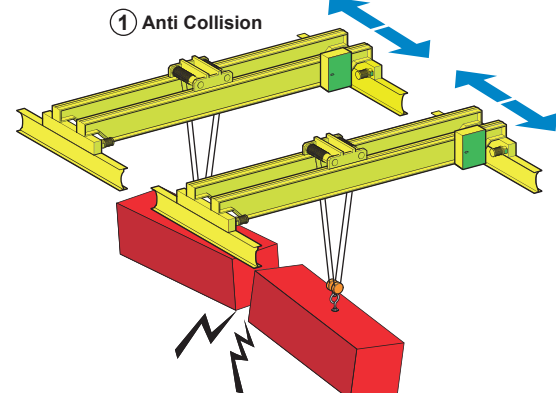


https://tesensors.com/global/en/document/EAV83775

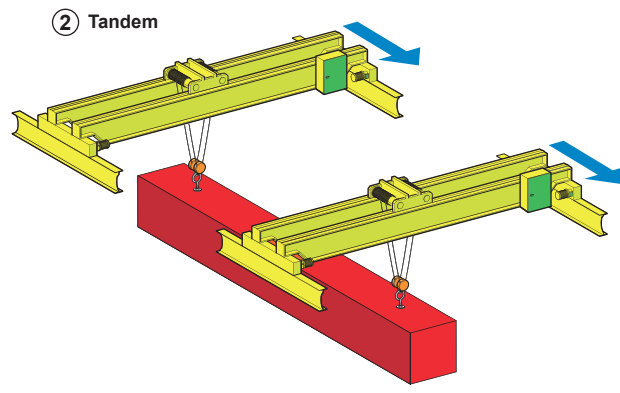
Scan the QR-code to access this Instruction Sheet in different languages or you can download it from our website at: [www.tesensors.com](https://tesensors.com)

We welcome your comments about this document. You can reach us through the customer support page on your local website.

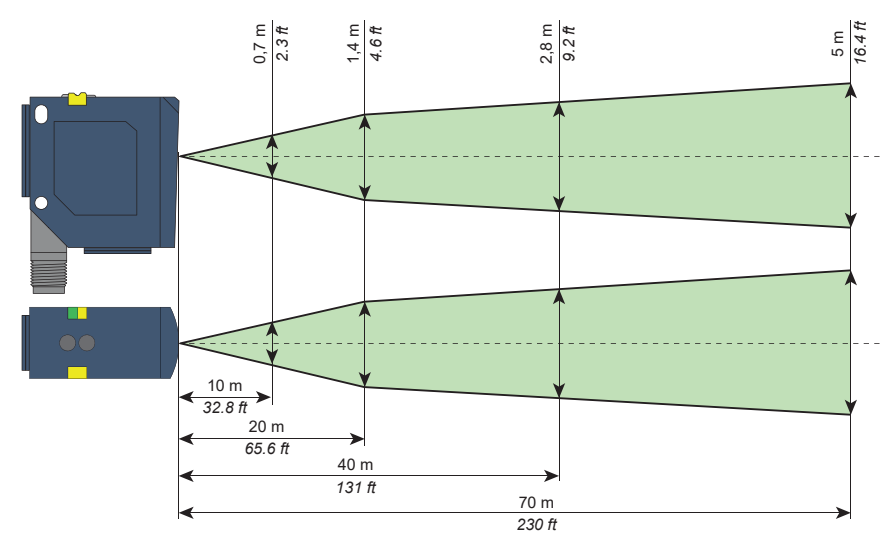
① Anti Collision



② Tandem



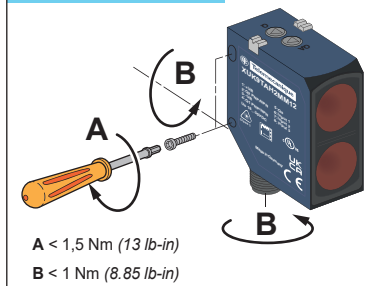
Prevention against other light beams in the colored area



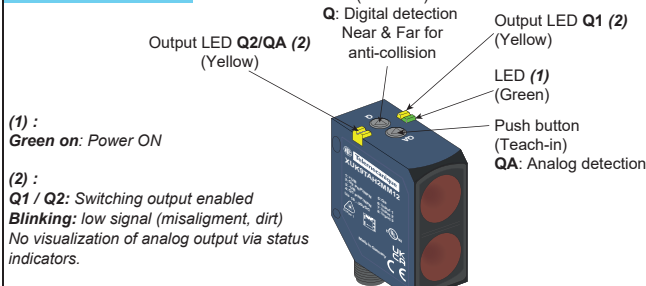
Characteristics

Certification	CE - UKCA - cULus - Ecolab
Sensing distance (Reference material)	0.3...70 m / 0.98...230 ft
Setting	Teach button or remote teach-in
Color of detection light beam	Laser class 1
Spot size of the light beam	see "Light beam size" curve
Wavelength	$\lambda = 660 \text{ nm}$
Puls duration	$t \leq 7 \text{ ns}$
Frequency	$f = 66,7 \text{ kHz}$
Limit of radiant power pulse	$P_p < 8,3 \text{ mW}$
Switching output	PNP or NPN
Analog output (Teachable only via button on the device)	4...20 mA
Current consumption	$\leq 60 \text{ mA}$
Switching capacity	$\leq 100 \text{ mA}$
Switching frequency	$\leq 25 \text{ Hz}$
First-up delay	300 ms max.
Response time	20 ms max.
Recovery time	20 ms max.
Ambient Temperature	Operating : - 30...+50 °C (-22...+122 °F) Storage : - 30...+60 °C (-22...+140 °F)
Power Voltage	Rated operational voltage: 24 Vdc Ripple p-p 10% maximum Operating range: 18...30 Vdc (including ripple)
Product Protection	Power supply : Reverse polarity protection Output: Short circuit protection
Protection class	
Degree of protection	IP67 conforming to EN/IEC 60529 IP69K conforming to DIN 40050
Vibration resistance	Frequency range: 10 Hz to 55 Hz Acceleration: 7 gn
Shock resistance	Peak acceleration: 10 gn Duration of the pulse: 11 ms
Material	Housing: ABS/PC, Lens: PMMA

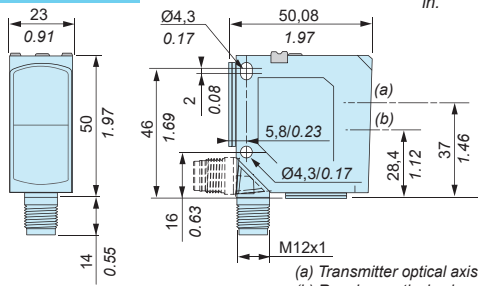
Tightening torques



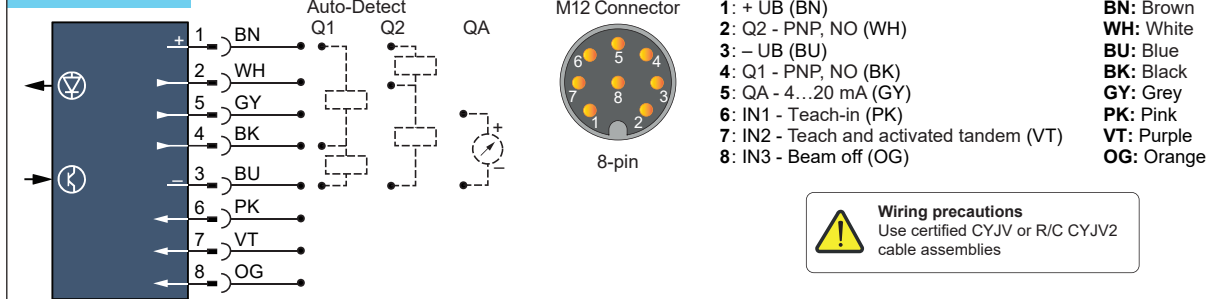
LEDs and Setting



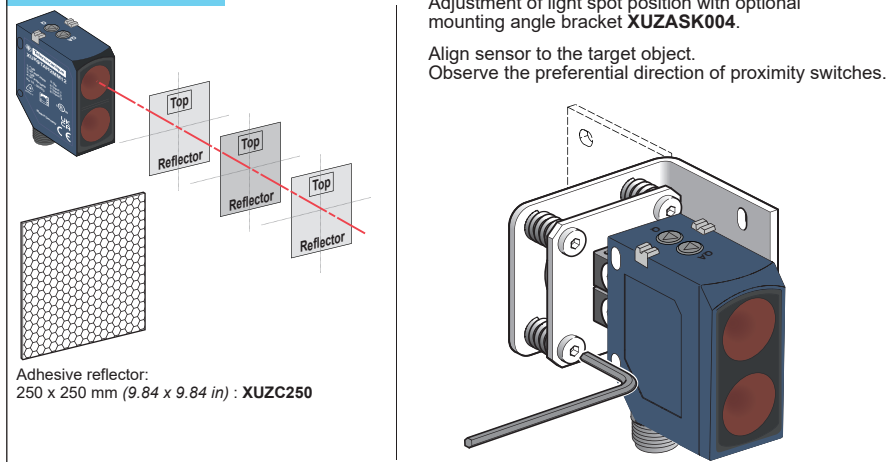
Dimensions



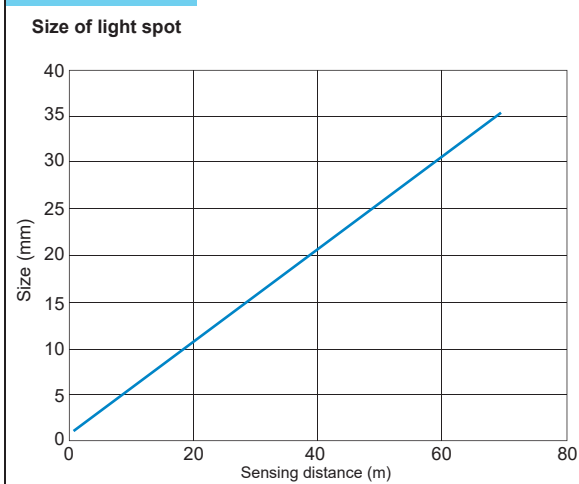
Wiring diagrams



Reflector alignment



Detection curves



WARNING

UNINTENDED EQUIPMENT OPERATION

- Comply with the wiring and configuration instructions.
- Clean the lens regularly, taking care not to scratch it.
- Check the connections and fixings during maintenance operations.

Failure to follow these instructions can result in death, serious injury or equipment damage.

CAUTION

HAZARD OF LASER RADIATION EXPOSURE

- Do not stare into the beam.
- Do not operate below - 30°C (- 22°F)
- Follow all operating instructions.

Failure to follow these instructions can result in injury or equipment damage.

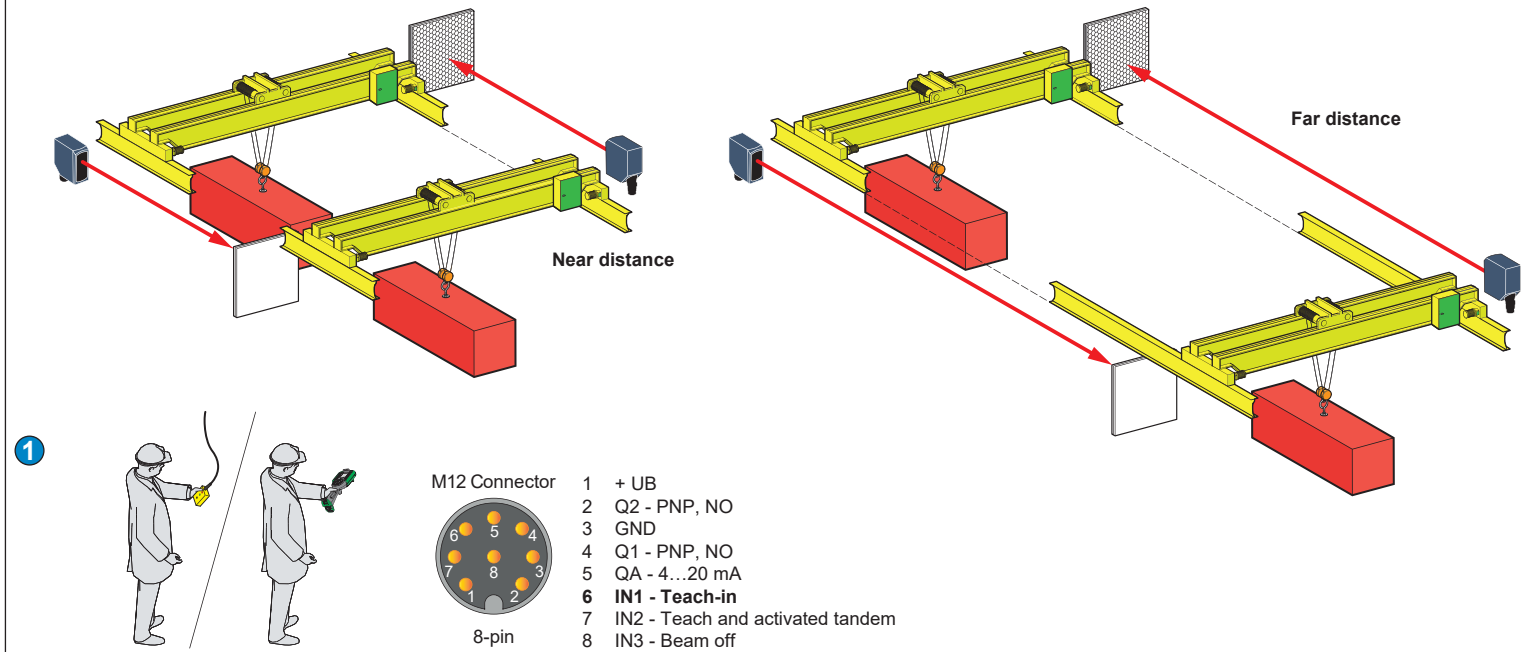


CLASS 1 LASER PRODUCT (IEC 60825-1: 2014)
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56 dated May, 2019

Manufacturer :
TMSS France
Tour Egho - 2 avenue Gambetta
92400 Courbevoie
France

UK Representative :
Yageo TMSS UK Limited
2 North Park Road
Harrogate, HG1 5PA
United Kingdom

Setting for Anti-collision mode



Teach-in Anti-Collision Mode through external wire

1.Step: First position
IN 1 = High > 3 sec and deactivation
2.Step: Second position
IN 1 = High > 32 ms and deactivation
The nearest of the two positions is taken as NEAR, the other is taken as FAR.
Set points NEAR and FAR are stored permanently even if you return from "Tandem Mode" in "Anti-Collision Mode".
Teach-in of the distance is done at the falling edge of the signal.
To set new distances for NEAR and FAR, a new complete teach-in needs to be done.
During teach, Q1 and Q2 are in slow mode condition (Q1=1, Q2=0)
If NEAR and FAR are too close together: previous setting is kept.
Time out to go back to operation mode between 1st step and 2nd step is 30 minutes.

Feedback of teach-in and wire brake check

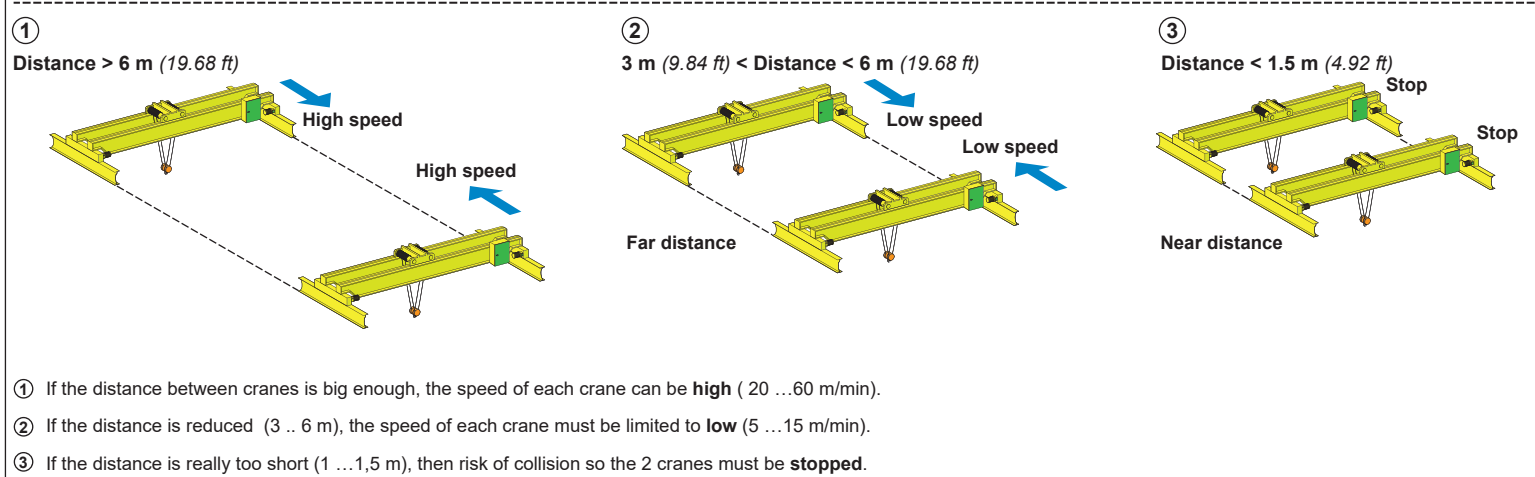
If low signal function is activated
Response to check wires not cut and teach is completed via external wire:
Q1 = Q2 = 3 pulses 100 ms high / 100 ms low (600 ms)



Feedback NEAR and FAR are too close:
Q1 = Q2 = 6 pulses 100 ms high / 100 ms low.

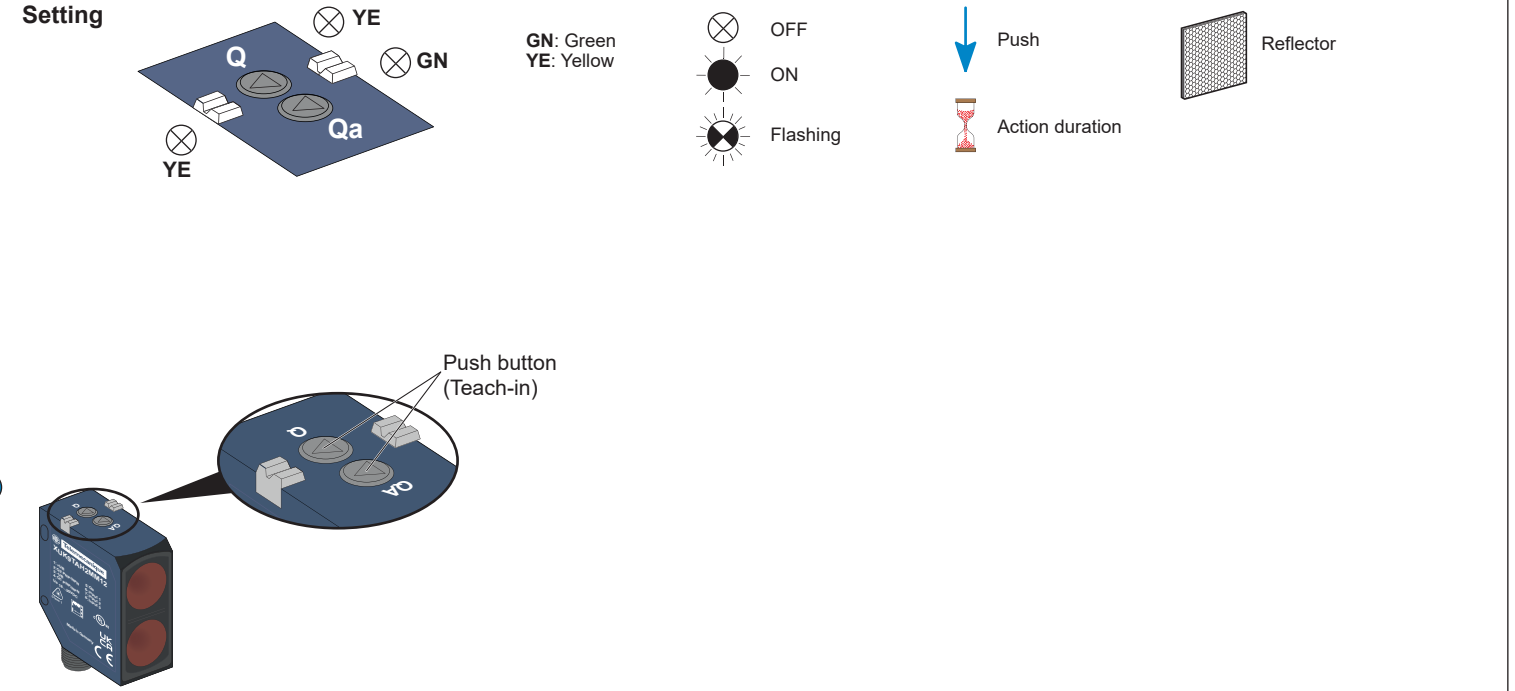


If low signal function is disabled
No feed back on Q1 and Q2.



- ① If the distance between cranes is big enough, the speed of each crane can be **high** (20 ...60 m/min).
- ② If the distance is reduced (3 .. 6 m), the speed of each crane must be limited to **low** (5 ... 15 m/min).
- ③ If the distance is really too short (1 ... 1,5 m), then risk of collision so the 2 cranes must be **stopped**.

Setting



Teach-in Anti-Collision Mode by Push button

1.Step: First position
Press button Q for > 3 sec and release.
Feedback of status indicators.
2.Step: Second position
Press button Q and release
Feedback of status indicators
The nearest of the two positions is taken as NEAR, the other is taken as FAR.
Set points NEAR and FAR are stored permanently even if you return from "Tandem Mode" in "Anti-Collision Mode".
Teach-in of the distance is done when releasing the teach-in button.
During teach, Q1 and Q2 are in slow mode condition (Q1=1, Q2=0).
Time out to go back to operation mode between 1st step and 2nd step is 30 minutes.
If NEAR and FAR are too close together: previous setting is kept.
No feedback via wire.

Feedback of teach-in via button

Teach Feedback:
● Feedback teach success: Synchronous blinking of LEDs for 3 s.
● Feedback NEAR and FAR are too close together: Fast asynchronous blinking of LEDs for 3 s.

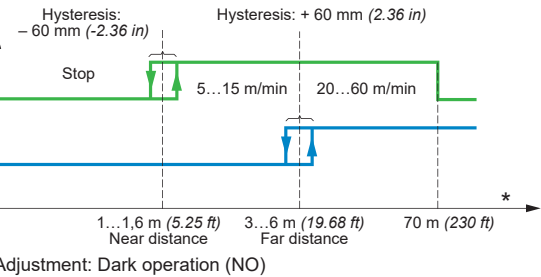
Output during anti-collision mode

Q1 = High / Q2 = High → High speed
Q1 = High / Q2 = Low → Slow
Q1 = Low / Q2 = Low → Stop
If low signal function is activated
Q1 = Low / Q2 = High → to less signal, reflector outside range or no reflector signal (*).
If low signal function is disabled
Q1 = high / Q2 = High → to less signal, reflector outside range or no reflector signal.

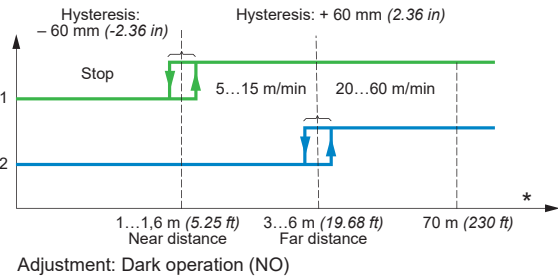
(*) See **B** (page 3).

Anti-Collision Diagram

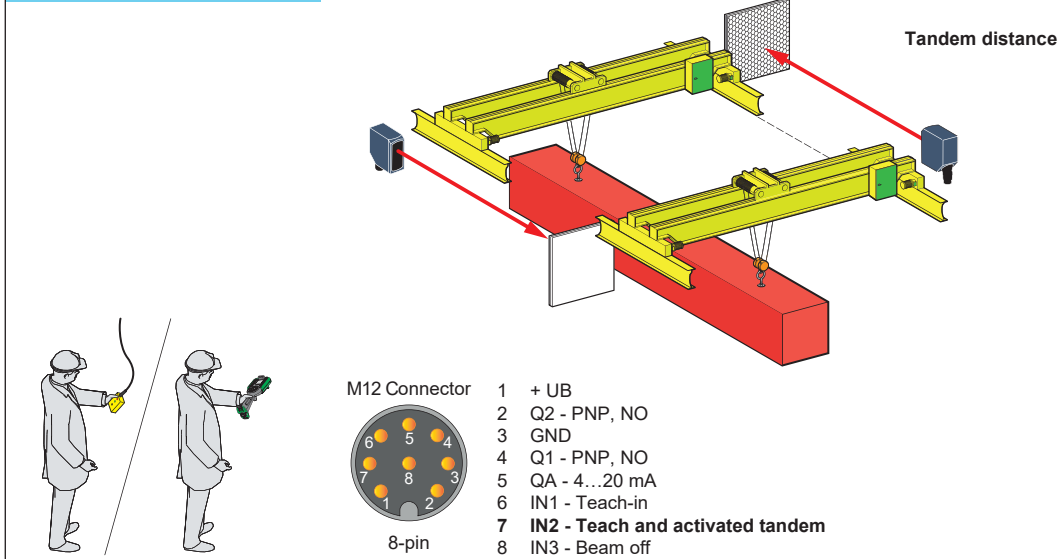
If low signal function is activated



If low signal function is disabled



Setting for Tandem mode



Teach-in and activation of tandem mode through external wire

IN 2 = High
The sensor teaches the distance of the tandem when activating IN 2 for at least 32 ms.
The sensor puts a window around the taught-in distance.
After deactivating IN 2 for at least 32 ms, the sensor goes back to anti-collision mode.
The distance of the tandem mode is not stored permanently.

Feedback of teach-in and wire brake check

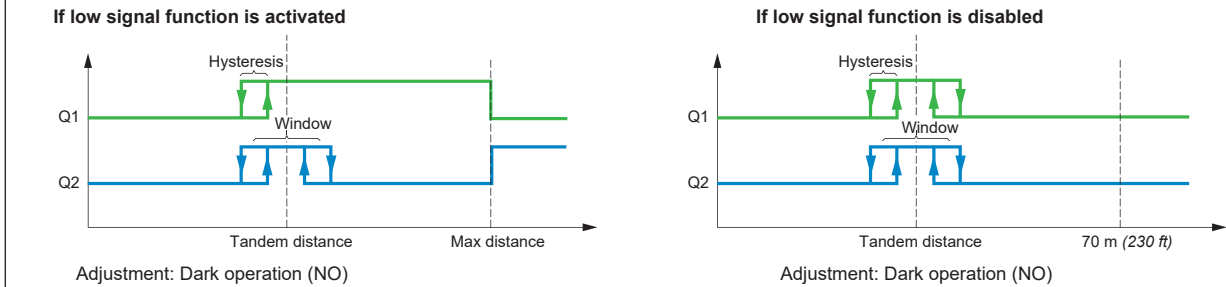
If low signal function activated
Response that tandem mode is activated and to check that wires are not cut:
● If tandem teach is **successful**
Q1 = Q2 = 3 pulses 100 ms high / 100 ms low (600 ms)
● If tandem teach is **not successful** (e.g no reflector present)
Q1 = Q2 = permanent pulses 100 ms high / 100 ms low (1200 ms)

If low signal function is disabled
No feed back on Q1 and Q2 for successful teach and not successful teach.

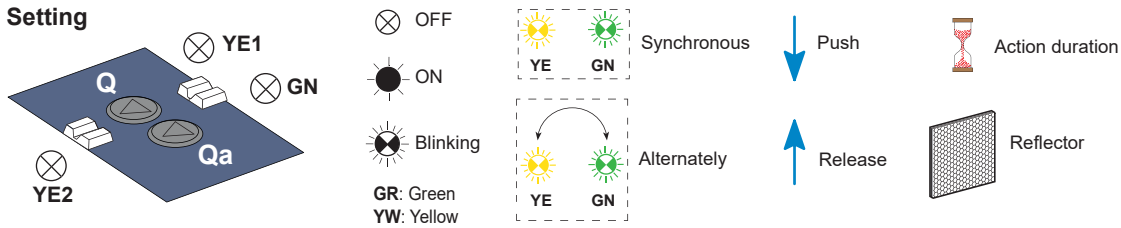
Tandem Mode
Q1 = Low / Q2 = Low → Outside window and closer than window closest position of the window.
Q1 = High / Q2 = High → Inside the window
Q1 = High / Q2 = Low → outside the window and farer than the farrest position of the window.
If low signal function (*) is activated
Q1 = Low / Q2 = High → outside range → to less signal, reflector outside range.
If low signal function (*) is disabled
Q1 = Low / Q2 = Low → outside range → to less signal, reflector outside range.

(*) This state can be disabled by pressing Q button for > 16 s See **D**

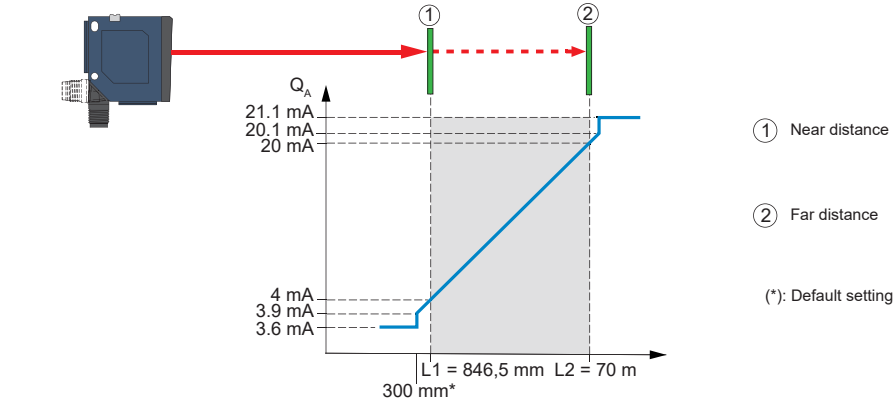
Tandem Diagram



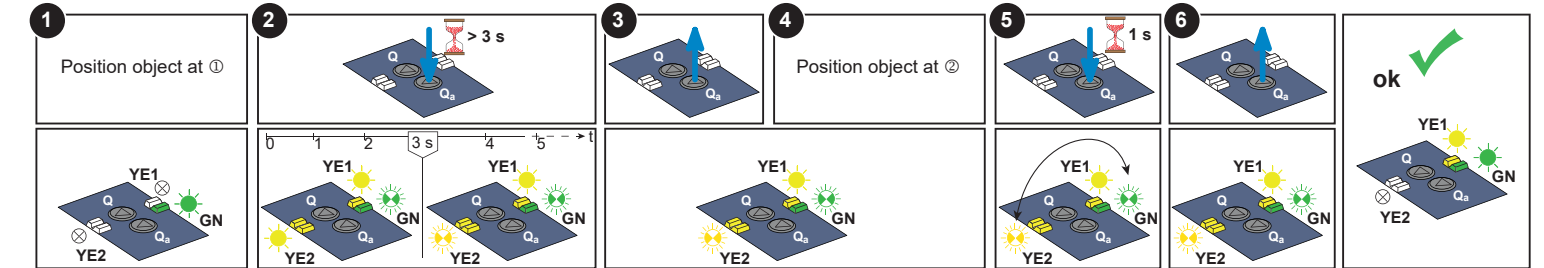
Setting



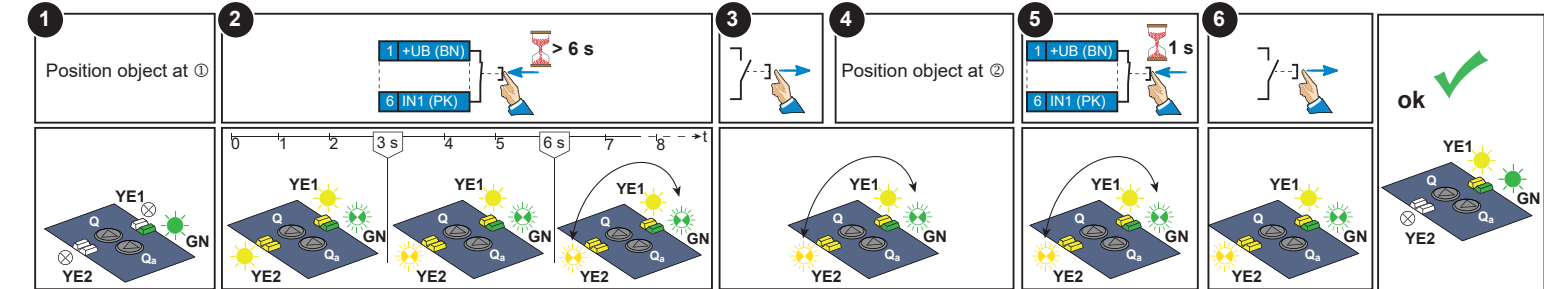
A Analog Output



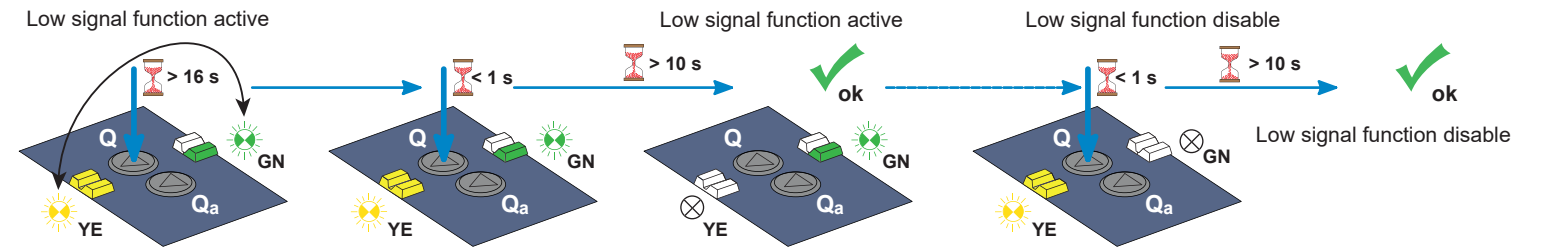
A1 Only via button QA



A2 Only via remote input IN1



B Low signal disable in case of contactors use (otherwise the use is PLC)



- Press Q >16 s until green and yellow LED flash flash alternately.
 - As long as the yellow and green LEDs are flashing, press the teach button for 1 s; the low signal function is active. The green LED shows the output status (PNP).
 - When OK, do not push the button for 10 s. Setting is saved. Sensor is ready to operate.
 - Press the teach button for 1 s; the low signal function is inactive. The yellow LED shows the output status (NPN).
- Every consecutive push/release will toggle the function, indicated by green or yellow LED.

To summarize:
If the low signal is disabled:
● no feed back on Q1, Q2 after anticollision external teach or tandem teach.
● Q1 and Q2 are modified, see "anticollision diagram" and "tandem diagram".

C Beam off Function



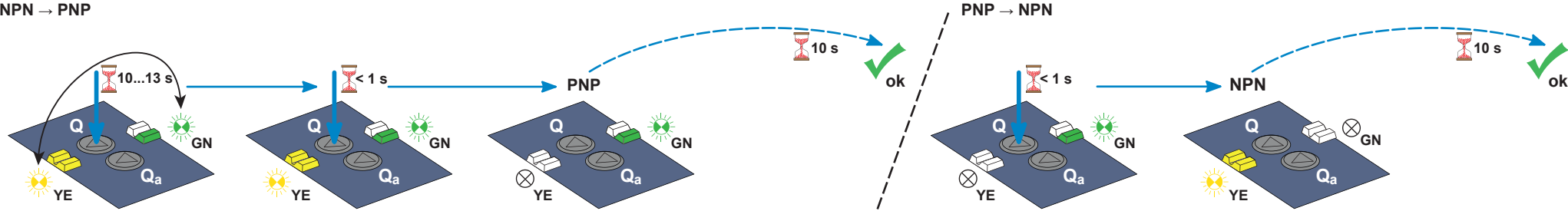
8-pin

M12 Connector

1	+ UB
2	Q2 - PNP, NO
3	GND
4	Q1 - PNP, NO
5	QA - 4...20 mA
6	IN1 - Teach-in
7	IN2 - Teach and activated tandem
8	IN3 - Beam off

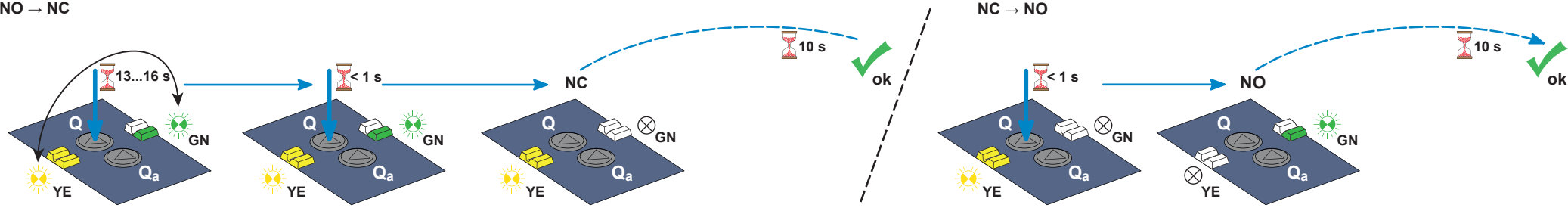
Activation:
IN 3 = Low →Run (tandem or anti-collision)
IN 3 = High → Diagnostic function, Laser off
Response, if IN3 switches to high:(*)
● If Q1 is high → low (or low → high)
● If Q2 is high → low (or low → high)
● QA must keep its values.
Before beam-off, the cranes should be in Stop Condition!
(*): The response time between activation (IN3) and response (Q1 or Q2) is less than 500 ms.

D Switching NPN / PNP



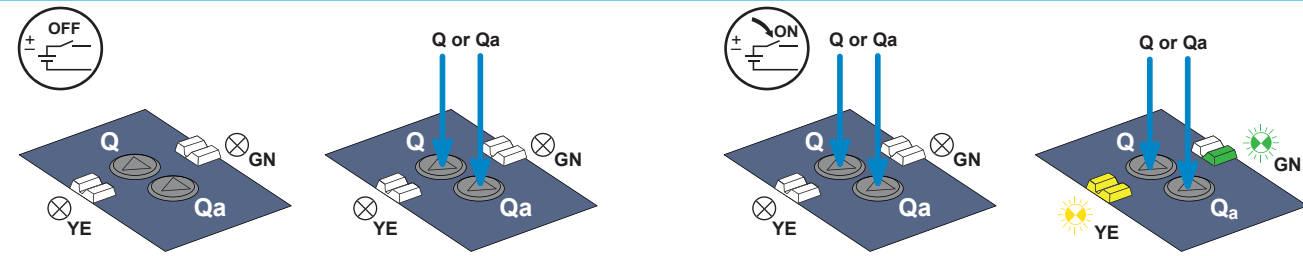
- Press Q 10 s...13 s until green and yellow LED flash alternatively.
- As long as the yellow and green LEDs are flashing, press the teach button for 1 s to invert the output. The green LED shows the output status (PNP).
- When OK, do not push the button for 10 s. Setting is saved. Sensor is ready to operate.
- Press the teach button for 1 s to invert the output. The yellow LED shows the output status (NPN).Every consecutive push/release will toggle the function, indicated by green or yellow LED.

E Switching NO/NC



- Press Q 13 s...16 s until green and yellow LED flash at the same time.
- As long as the yellow and green LEDs are flashing, press the teach button for 1 s to invert the output. The yellow LED shows the output status (NO).
- When OK, do not push the button for 10 s. Setting is saved. Sensor is ready to operate.
- Press the teach button for 1 s to invert the output. The green LED shows the output status (NC). Every consecutive push/release will toggle the function, indicated by green or yellow LED.

F Default Setting



The sensor can be set back to the default setting.
The sensor must not be in tandem mode.
• Power supply OFF
• Press button Q or Qa and hold
• Power supply ON
• Keep button pressed for 10 s until LEDs blink three times synchronously.