



Q45XDN

"Intelligent" Photoelectric Sensors for use on DeviceNet™ Bus Networks



DeviceNet™

Features

- Easy "smart sensor" interfacing to DeviceNet bus networks
- Integral Euro-style (M12) quick-disconnect connector for DeviceNet compatible cable
- Impressive optical performance in opposed, diffuse, retroreflective, convergent or fiber optic sensing modes
- Highly visible Power and Received Signal Strength indicator LEDs
- Tough mechanical design

Description

Q45XDN Series sensors are designed specifically for use on DeviceNet-bus networks. These are "smart" sensors which can be wired to a DeviceNet bus using a "dumb" tee.

Q45XDN1 models support the *Bit Strobe Connection*, which responds to a master's request. Q45XDN2 models support the *Change of State Connection*, which responds to a slave's change of state. All models support the *Explicit Message Connection*, which is required to *Set* and *Get* sensor *Attributes*.

Q45XDN Series sensors feature two highly-visible sensor status indicator LEDs for power and received signal strength. The Signal indicator incorporates Banner's patented[†] Alignment Indicating Device (AID™) circuitry which pulses the indicator at a rate which is proportional to the received light signal strength. A slow flash rate alerts personnel to a marginal signal due to sensor misalignment or dirt on the lenses.

Q45XDN Series photoelectric sensors have impressive optical performance (see excess gain curves on pp. 2 - 4). All models boast o-ring sealing which exceeds the NEMA 6P (IP67) rating. They are extremely rugged, with PBT polyester housings and molded acrylic lenses. They are equipped with a 12 mm Euro-style quick-disconnect connector which accepts DeviceNet-compatible cable (see Hookup Information).

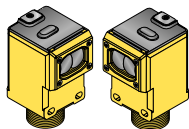
[†]U.S. Patent #4356393



WARNING . . . Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death.

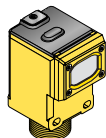
This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.



Infrared, 880 nm

Opposed-Mode Emitter (E) and Receiver (R) Models

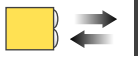
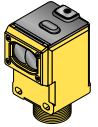
Models	Focus	Cable	Supply Voltage	I/O Support	Excess Gain	Beam Pattern Effective Beam: 13 mm
Q45XDN1EQ6	60 m (200')	5-pin Euro QD	11-25V dc	Emitter Only		
Q45XDN1RQ6				Bit Strobe		
Q45XDN2RQ6				Change of State		



Visible Red, 680 nm

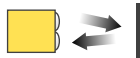
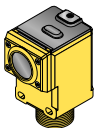
Retroreflective Mode Models

Models	Focus	Cable	Supply Voltage	I/O Support	Excess Gain	Beam Pattern
Non-Polarized						
Q45XDN1LVQ6	80 mm to 9 m (3" to 30')	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2LVQ6				Change of State		
Polarized						
Q45XDN1LPQ6	150 mm to 6 m (6" to 20')	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2LPQ6				Change of State		



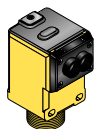
Infrared, 880 nm

Diffuse Mode Models						
Models	Focus	Cable	Supply Voltage	I/O Support	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
Short-Range Diffuse						
Q45XDN1DQ6	450 mm (18")	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2DQ6				Change of State		
Long-Range Diffuse						
Q45XDN1DLQ6	1.8 m (6')	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2DLQ6				Change of State		



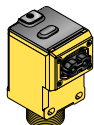
Visible Red, 680 nm

Convergent Mode Models						
Models	Focus	Cable	Supply Voltage	I/O Message	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
Q45XDN1CVQ6	38 mm (1.5 in)	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2CVQ6				Change of State		
Q45XDN1CV4Q6	100 mm (4 in)	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2CV4Q6				Change of State		



Infrared, 880 nm

Glass Fiber Optic Models						
Models	Focus	Cable	Supply Voltage	I/O Message	Excess Gain	Beam Pattern
					Diffuse mode performance based on 90% reflectance white test card	
Q45XDN1FQ6	Range varies by sensing mode and fiber optics used	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2FQ6				Change of State		



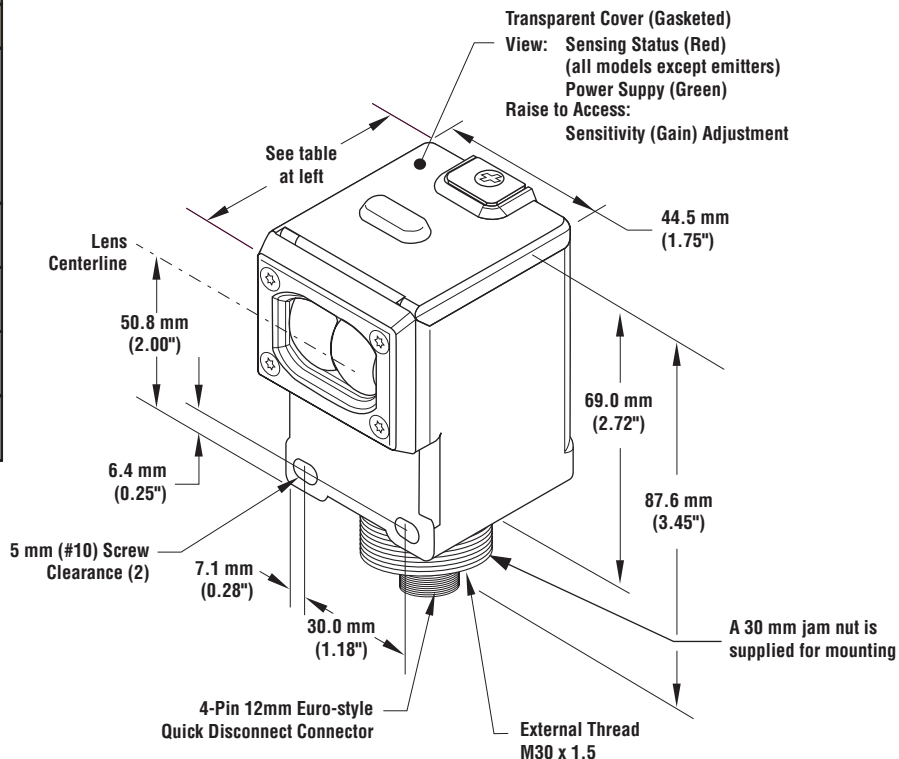
Visible Red, 660 nm

Plastic Fiber Optic Models						
Models	Focus	Cable	Supply Voltage	I/O Message	Excess Gain	Beam Pattern
					Diffuse mode performance based on 90% reflectance white test card	
Q45XDN1FPQ6	Range varies by sensing mode and fiber optics used	5-pin Euro QD	11-25V dc	Bit Strobe		
Q45XDN2FPQ6				Change of State		

Specifications																								
Supply Voltage and Current	The sensor is powered by the bus network (11 to 25V dc @60 mA)																							
Supply Protection Circuitry	Protected against reverse polarity, transient voltages, and loss of ground. (none of these conditions will harm the sensor or interrupt communication on the network)																							
Response Time	2 milliseconds; Total response time will also include the response time of the network																							
Adjustments	Multi-turn SENSITIVITY control on top of the sensor (beneath a transparent o-ring sealed cover) allows precise sensitivity setting (turn clockwise to increase gain); Internal switch must be in Light Operate (L/O) position, which is the factory setting																							
Indicators	<p>On the sensor: Green and Red; visible through the transparent sensor top cover</p> <p>Green LED lights for dc power ON</p> <p>Red LED is Banner's patented Alignment Indicating Device (AID[™], U.S. patent #4356393) which lights whenever the sensor "sees" a light condition and superimposes a pulse rate which is proportional to the strength of the received light signal (the stronger the signal, the faster the pulse rate)</p> <p>On the 45DN Bus Card: Green and Red; visible through the transparent sensor top cover</p> <p>A bi-color LED indicates the status of the network.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Green</td> <td style="width: 30%;">Steady</td> <td>Sensor on line, connected to master</td> </tr> <tr> <td></td> <td>Flashing</td> <td>Sensor on line, address + baud rate are ok</td> </tr> <tr> <td>Red</td> <td>Steady</td> <td>Critical network fault or duplicate node address detected; wrong baud rate</td> </tr> <tr> <td></td> <td>Flashing</td> <td>Minor or connection time-out fault</td> </tr> </table>	Green	Steady	Sensor on line, connected to master		Flashing	Sensor on line, address + baud rate are ok	Red	Steady	Critical network fault or duplicate node address detected; wrong baud rate		Flashing	Minor or connection time-out fault											
Green	Steady	Sensor on line, connected to master																						
	Flashing	Sensor on line, address + baud rate are ok																						
Red	Steady	Critical network fault or duplicate node address detected; wrong baud rate																						
	Flashing	Minor or connection time-out fault																						
Sensor Configuration	<p>The following features of the Q45XDN Series Sensors are programmable via the network with a configuration tool*:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Feature</th> <th style="text-align: left;">Range</th> </tr> </thead> <tbody> <tr> <td>Network Address</td> <td>0-63 (default = 63)</td> </tr> <tr> <td>Baud Rate</td> <td>125K, 250K, 500K (default = 125K)</td> </tr> <tr> <td>Operate Mode*</td> <td>Light Operate or Dark Operate (default = Light Operate)</td> </tr> </tbody> </table> <p>All Q45XDN models support:</p> <p>Explicit Message Connection: Required to <i>Set</i> and <i>Get</i> sensor <i>Attributes</i></p> <p>Q45XDN1 supports the following connection type:</p> <p>Bit Strobe Connection: Responds to a master's request.</p> <p>Q45XDN2 supports the following connection type:</p> <p>Change of State Connection (COS): Responds to a slave's change of state.</p> <p>I/O Response is with the following 8-bit word of data:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Bit 0:</td> <td style="width: 15%;">0</td> <td>Output is OFF</td> </tr> <tr> <td></td> <td>1</td> <td>Output is ON</td> </tr> <tr> <td>Bit 1:</td> <td>0</td> <td>Alarm output is OFF</td> </tr> <tr> <td></td> <td>1</td> <td>Alarm output is ON</td> </tr> <tr> <td>Bits 2-7</td> <td colspan="2">Not Used: Always 0</td> </tr> </table> <p>*NOTES: Configuration may be simplified through use of an Electronic Data Sheet (Banner model EDS 40223). The Light/Dark Operate switch in the Q45 sensor must be set to the Light Operate position (the factory setting).</p>	Feature	Range	Network Address	0-63 (default = 63)	Baud Rate	125K, 250K, 500K (default = 125K)	Operate Mode*	Light Operate or Dark Operate (default = Light Operate)	Bit 0:	0	Output is OFF		1	Output is ON	Bit 1:	0	Alarm output is OFF		1	Alarm output is ON	Bits 2-7	Not Used: Always 0	
Feature	Range																							
Network Address	0-63 (default = 63)																							
Baud Rate	125K, 250K, 500K (default = 125K)																							
Operate Mode*	Light Operate or Dark Operate (default = Light Operate)																							
Bit 0:	0	Output is OFF																						
	1	Output is ON																						
Bit 1:	0	Alarm output is OFF																						
	1	Alarm output is ON																						
Bits 2-7	Not Used: Always 0																							
Construction	Molded PBT polyester thermoplastic polyester housing; molded acrylic lenses; stainless steel hardware. O-ring sealed transparent polycarbonate top cover.																							
Environmental Rating	IEC IP67; NEMA 6P																							
Connections	Euro-style DeviceNet [™] -compatible quick-disconnect cables																							
Operating Temperature	-25° to +70°C (-13° to +158°F); Maximum relative humidity 95% (non-condensing)																							

Dimensions

Overall Sensor Depth	
Suffix	Depth
E (emitter), D (short-range diffuse), DL (long-range diffuse), LV (retroreflective), and R (receiver)	54.6 mm (2.15")
CV and CV4 (convergent)	61.5 mm (2.42")
LP (polarized retroreflective)	56.4 mm (2.30")
F (glass fiber optic)	60.5 mm (2.38")
FP (plastic fiber optic)	59.8 mm (2.35")


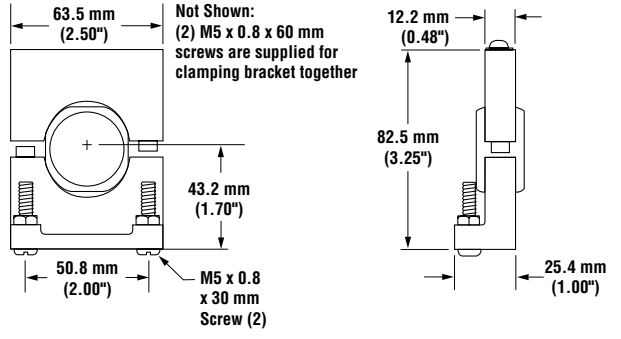

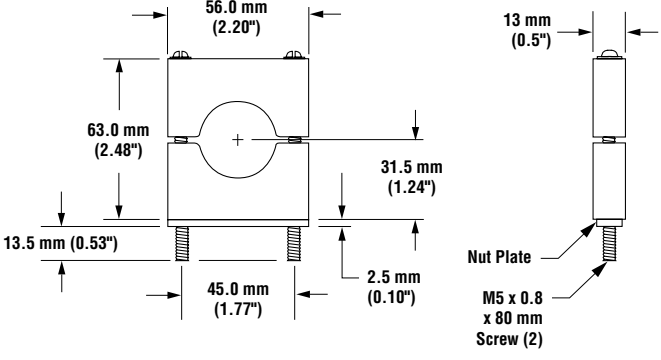


Hookups

Q45X Male Connector	Pin	Wire Color	Function
Male Pinout 	1		Shield
	2	Red	BUS power (+V)
	3	Black	BUS power (-V)
	4	White	Communications +
	5	Blue	Communications -

The Q45XDN sensor requires DeviceNet-compatible quick-disconnect cable which is available from various manufacturers, such as interlinkBT.

Mounting Brackets

<p>SMB30S</p>	<ul style="list-style-type: none"> • 12-gauge, stainless steel, right angle mounting bracket with a curved mounting slot for versatility and orientation • Clearance for M6 (1/4") hardware 	<p>SMB30C</p>	<ul style="list-style-type: none"> • 30 mm split clamp bracket • Black reinforced thermoplastic polyester • Includes stainless steel mounting hardware
 		 	
<p>SMB30MM</p>	<ul style="list-style-type: none"> • 30 mm, 12-gauge, stainless steel bracket with curved mounting slots for versatility and orientation • Clearance for M6 (1/4") hardware 		
