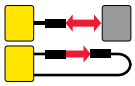
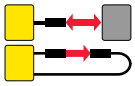
D12
Plastic and Glass Fiber Optic Sensors

The D12 features an LED bargraph that indicates signal strength, sensing contrast, programming status and diagnostic warnings.

- Includes marginal gain indicator with alarm output
- Available in high-speed and high-power models
- Features easy push-button TEACH-mode setup on D12E *Expert*™ models
- Easily mounts to standard 35 mm DIN-rail mounting
- Cordsets and brackets see page 268

D12 *Expert*™, 10-30 V DC

Visible Red LED

Sensing Mode	Maximum Range	Switching Threshold Setting	Connection	Models NPN	Models PNP
 GLASS FIBER	Range varies by sensing mode and fiber optics used. See datasheet for maximum range specifications.	Just above the “dark” condition	2 m	D12EN6FV	D12EP6FV
		Midway between “dark” and “light” conditions	2 m	D12E2N6FV	D12E2P6FV
 PLASTIC FIBER		Just above the “dark” condition	2 m	D12EN6FP	D12EP6FP
		Midway between “dark” and “light” conditions	2 m	D12E2N6FP	D12E2P6FP

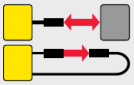
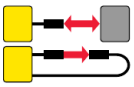
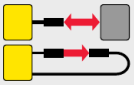
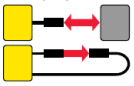
For more specifications see page 268.

Connection options: A model with a QD requires a mating cordset (see page 268).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **D12EN6FV W/30**).

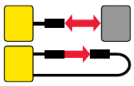
D12 and D12 High-Speed, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Response	Models NPN	Models PNP
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Pico Pigtail QD	500 µs	D12SN6FV D12SN6FVQ	D12SP6FV D12SP6FVQ
HIGH-SPEED  GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Pico Pigtail QD 2 m 4-Pin Pico Pigtail QD	Selectable 50 µs or 500 µs*	D12SN6FVY D12SN6FVYQ D12SN6FVY1† D12SN6FVY1Q†	D12SP6FVY D12SP6FVYQ D12SP6FVY1† D12SP6FVY1Q†
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Pico Pigtail QD	500 µs	D12SN6FP D12SN6FPQ	D12SP6FP D12SP6FPQ
HIGH-SPEED  PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Pico Pigtail QD 2 m 4-Pin Pico Pigtail QD	Selectable 50 µs or 500 µs*	D12SN6FPY D12SN6FPYQ D12SN6FPY1† D12SN6FPY1Q†	D12SP6FPY D12SP6FPYQ D12SP6FPY1† D12SP6FPY1Q†

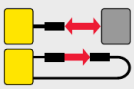
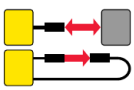
D12 High-Power, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Response	Models NPN	Models PNP
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m 4-Pin Pico Pigtail QD	500 µs	D12SN6FPH D12SN6FPHQ	D12SP6FPH D12SP6FPHQ

D12 AC-Coupled, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Output Type	Output Response	Models
 GLASS FIBER	Range varies by Power Level/ Speed Selection used and with fiber optics used. See datasheet for range information.	2 m 4-Pin Pico Pigtail QD	Bipolar NPN/PNP	50 µs	D12DAB6FV D12DAB6FVQ
 PLASTIC FIBER	Range varies by Power Level/ Speed Selection used and with fiber optics used. See datasheet for range information.	2 m 4-Pin Pico Pigtail QD	Bipolar NPN/PNP	50 µs	D12DAB6FP D12DAB6FPQ

For more specifications see page 268-270.

Connection options: A model with a QD requires a mating cordset (see page 268).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **D12SN6FV W/30**).

† Y1 models have 20 milliseconds output pulse stretcher.

* When 50 microseconds is selected, bargraph is disabled.

Cordsets

Pico QD (for ..Q models)

See page 904

Length	Snap-on 4-Pin	
	Straight	Right-Angle
2.00 m	PKG4-2	PKW4Z-2

Additional cordset information available. See page 902.

Brackets

D12

See page 860	See page 860	See page 861
DIN-35...	SMBR55F01	SMBR55FRA



Additional brackets and more information available. See page 852.

D12 *Expert*™ Specifications

Supply Voltage and Current	10 to 30 V dc at 45 mA max. (exclusive of load); 10% max. ripple
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	NPN open collector (both outputs) or PNP open collector (both outputs), depending on model **Load output:** Normally open and programmable Light or Dark Operate; **Alarm output:** Normally open
Output Rating	150 mA max. each output **OFF-state leakage current:** less than 10 µA at 30 V dc **ON-state saturation voltage:** less than 1 volt at 10 mA dc; less than 1.5 volts at 150 mA dc The total load may not exceed 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and short circuit of outputs (trips at 175 mA)
Output Response Time	200 microseconds ON/OFF (40 milliseconds OFF when OFF-delay selected) NOTE: False pulse protection circuit causes a 0.1 second delay on power-up
Output Operation Mode	**Light or Dark Operate:** selected by push button
Output Timing Functions	ON/OFF (no delay) or fixed 40 millisecond OFF-delay; selected by push button
Repeatability	66 microseconds
Adjustments	Push-button TEACH-mode sensitivity setting; Remote teaching input is provided
Indicators	**Green:** power ON and flashes when ready for TEACH mode **Yellow:** output conducting **7-segment moving dot red LED** See datasheet for detailed information
Mounting Bracket	D12 Sensors mount directly to a standard DIN rail, or may be through-hole mounted using the supplied mounting bracket and M3 x 0.5 hardware
Construction	Black ABS housing with acrylic cover, stainless steel M3 x 0.5 hardware for use with thermoplastic polyester mounting bracket (supplied); the plastic fiber clamping element is acetal
Environmental Rating	IEC IP11; NEMA 2
Connections	PVC-jacketed 2 m or 9 m cables, or 150 mm pigtail with 4-pin Pico-style quick-disconnect (QD) are available. QD cordsets are ordered separately. See page 268.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	CE c UL us

D12 Standard, High-Speed and High-Power Specifications

Supply Voltage and Current	10 to 30 V dc at 45 mA max. (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Outputs are NPN (sinking) or PNP (sourcing), depending on model **Complementary:** one normally open (NO) and the other normally closed (NC); NC output may be wired as diagnostic alarm output by reversing power supply connections except high speed "Y" and "Y1" suffix models (see hookups)
Output Rating	150 mA max. each output **OFF-state leakage current:** less than 10 µA at 30 V dc **ON-state saturation voltage:** less than 1 V at 10 mA dc; less than 1.5 V at 150 mA dc The total load may not exceed 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and short circuit of outputs
Output Response Time	**Standard and High-Power Models:** 500 microseconds ON/OFF **High-Speed Models:** selectable 50 or 500 microseconds ON/OFF NOTE: False pulse protection circuit causes a 0.1 second delay on power-up
Output Timing Functions	"Y1" models have fixed 20 milliseconds pulse stretcher (OFF-delay) when 50 microseconds mode is used
Repeatability	130 microseconds; "Y" and "Y1" models have selectable 50 microseconds/500 microseconds response; repeatability in 50 microseconds mode is 15 microseconds
Adjustments	15-turn adjustment sensitivity; "Y" and "Y1" (high-speed models) also have a response mode selector switch
Indicators	**Two top-mounted LED indicators**: one yellow and one green, and one 7-segment red LED moving dot bargraph; Note that the 7-segment bargraph and marginal excess gain indication (bargraph segment #7) are inoperative in the 50 µs response mode of "Y" and "Y1" models **Green:** LED lights for DC Power ON **Yellow:** LED lights for normally open output conducting On all models in 500 microseconds response mode, the 7-segment moving dot red LED bargraph lights to indicate relative received light signal strength; On all models in 50 and 500 microseconds response mode, segment #1 flashes to indicate OUTPUT OVERLOAD; On all models in the 500 microseconds response mode, segment #7 flashes to indicate MARGINAL EXCESS GAIN; On standard and high-power models, a flashing LED corresponds to the "ON" state of the alarm output; (Alarm output not available on Y & Y1 models)
Mounting Bracket	D12 Sensors mount directly to a standard DIN rail, or may be through-hole mounted using the supplied mounting bracket and M3 x 0.5 hardware
Construction	Black ABS housing with acrylic cover, stainless steel M3 x 0.5 hardware for use with thermoplastic polyester mounting bracket (supplied); the plastic fiber clamping element is acetal
Environmental Rating	IEC IP11; NEMA 2
Connections	PVC-jacketed 2 m or 9 m cables, or 150 mm pigtail with 4-pin Pico-style quick-disconnect (QD) are available. QD cordsets are ordered separately. See page 268.
Operating Conditions	**Temperature:** -20° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	

Plastic Fiber Models
Suffix FP and FPY

D12 AC-Coupled Specifications

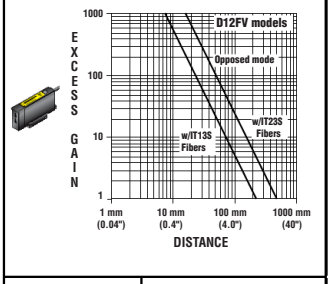
Supply Voltage and Current	10 to 30 V dc at 60 mA max. (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	**Bipolar:** one NPN (current sinking) and one PNP (current sourcing) open-collector transistor
Output Rating	150 mA max. each output **OFF-state leakage current:** less than 10 µA at 30 V dc **ON-state saturation voltage:** less than 1 volt at 10 mA dc; less than 1.5 volts at 150 mA dc The total load may not exceed 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and short circuit of outputs
Output Response Time	50 microseconds ON/OFF NOTE: False pulse protection circuit causes a 0.1 second delay on power-up
Output Operation Mode	**Light Operate or Dark operate**: selected by switch
Output Timing Functions	Pulse output; adjustable from 1 to 70 milliseconds
Repeatability	15 microseconds ON
Adjustments	**Three top-panel controls:** SENSITIVITY control (15-turn slotted brass screw, clutched at both ends of adjustment), a Light- or Dark-Operate select switch, and an OUTPUT PULSE adjustment (3/4-turn potentiometer)
Indicators	**Three top-mounted LED indicators:** **Green LED:** Lights to indicate dc Power ON **Yellow LED:** Lights for Output Conducting **Red LED:** Lights whenever AGC system is locked onto the signal
Mounting Bracket	D12 Sensors mount directly to a standard DIN rail, or may be through-hole mounted using the supplied mounting bracket and M3 x 0.5 hardware
Construction	Black ABS housing with acrylic cover, stainless steel M3 x 0.5 hardware for use with thermoplastic polyester mounting bracket (supplied); the plastic fiber clamping element is acetal
Environmental Rating	IEC IP11; NEMA 2
Connections	PVC-jacketed 2 m or 9 m cables, or 150 mm pigtail with 4-pin Pico-style quick-disconnect (QD) are available. QD cordsets are ordered separately. See page 268.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Application Note	D12 AC-coupled sensors should not be used in areas of known electrical “noise” or RF fields.
Certifications	CE c UL US

Excess Gain Curves

(Diffuse-mode performance based on 90% reflectance white test card)

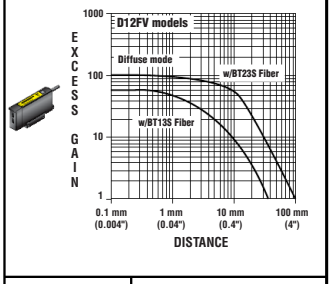
● = Visible Red LED

Opposed Mode—Glass Fiber D12 Standard



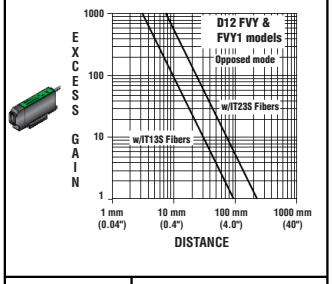
Range: Varies | **LED:** ●

Diffuse Mode—Glass Fiber D12 Standard



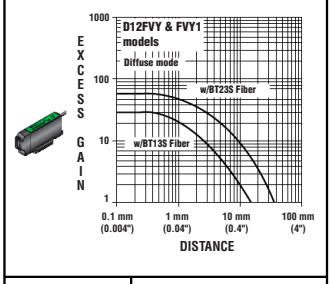
Range: Varies | **LED:** ●

Opposed Mode—Glass Fiber D12 High Speed



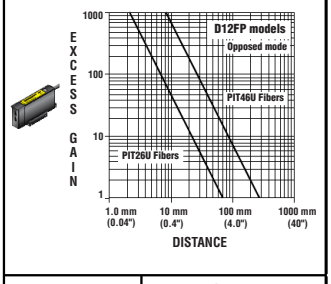
Range: Varies | **LED:** ●

Diffuse Mode—Glass Fiber D12 High Speed



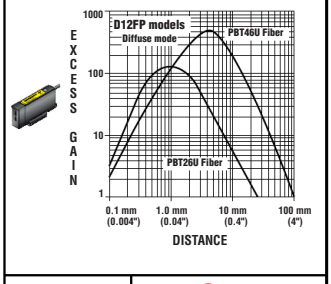
Range: Varies | **LED:** ●

Opposed Mode—Plastic Fiber D12 Standard



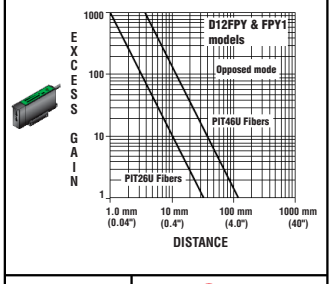
Range: Varies | **LED:** ●

Diffuse Mode—Plastic Fiber D12 Standard



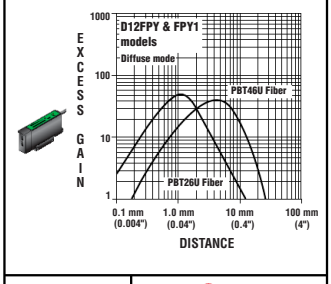
Range: Varies | **LED:** ●

Opposed Mode—Plastic Fiber D12 High Speed



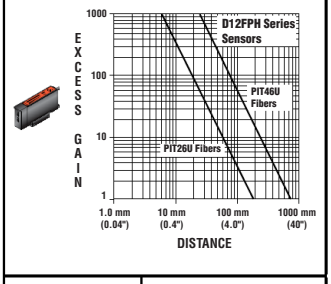
Range: Varies | **LED:** ●

Diffuse Mode—Plastic Fiber D12 High Speed



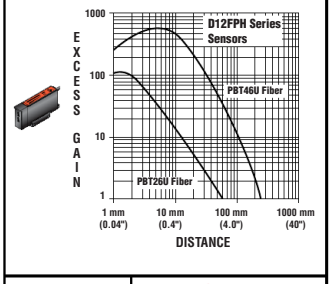
Range: Varies | **LED:** ●

Opposed Mode—Plastic Fiber D12 High Power



Range: Varies | **LED:** ●

Diffuse Mode—Plastic Fiber D12 High Power



Range: Varies | **LED:** ●