

# P12 LEARN-LINE INSTALLATION MANUAL

## PACK CONTENT

- (1) INPROX Operating Manual
- IN82 knob regulation accessory for the models with sensitivity adjustment

## GENERAL DESCRIPTION

- P12 Learn Line Photoelectric Switch series with large scanning ranges
- Small dimensions: M12mm metal housing
- PNP or NPN output
- NO/NC selectable output
- Trimmer adjustment/teach in
- IP67 Protection
- Approvals
- Through-beam 4 m range
- Photoelectric with polarizing 2 m range
- Diffuse energetic scanner 300 mm scanning distance

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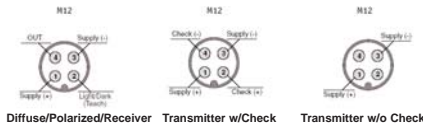
**INPROX SENSORS**

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**Declaration of conformity  
INPROX CORPORATION**  
Declare under our sole responsibility that these products are in conformity with the following EEC directive: 89/336 and 73/23 and amendment.

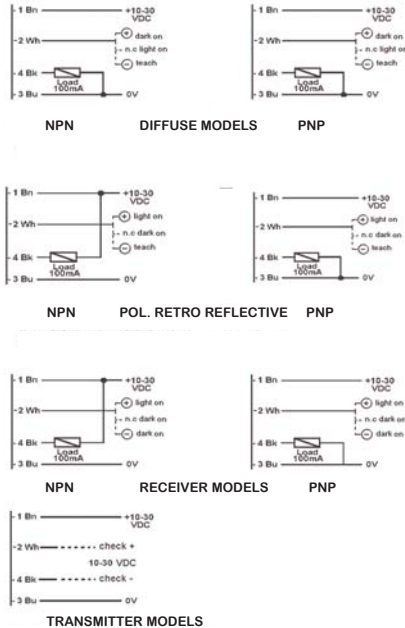
**P DX 100 1 B P 6 K1**

Photoelectric Sensor Series	Cable/Connector
photoelectric	M1 M1 cable
Sensing Mode	K1 E1 M8 connector
diffuse proximity	DX/DZ
polarized retro reflective	PX/PZ
transmitter	TX/TZ
transmitter2	TC/TJ
transmitter	RE
Maximum Range (mm/m)	
100mm	100
200mm	200
300mm	300
2m	002
4m	004
X = teach in sensor Z = fixed unit no adjustment C = with check J = fixed with check	
Logic	6 LO/DO light-dark
Output	N NPN P PNP
Housing Material	B NBT
Body Style	1 12mm body diameter



## TECHNICAL SPECIFICATIONS

Model	DX1	DZ1	DX2	DZ2	DX3	DX3	PX	PZ	RE	TC	TX	TZ	TJ
Type	diffuse proximity				pot. retro		through beam						
Nominal Sensing Distance	100mm	200mm	300mm	2m	4m								
Tolerance	±15/5%												
Repeat Accuracy	5%												
Operating Voltage	10-30VDC												
Ripple	<10%												
No Load Supply	<20mA												
Load Current	100mA												
Leakage Current	<10µA (VDC max)												
Output Voltage Drop	2V max IL=100mA												
Output Type	NPN or PNP NO-NC selectable												
Switching Frequency	400Hz						250Hz						
Time Delay	150 ms												
Supply Protections	Polarity reversal, transient protection												
Output Protections	Short circuit (autoreset)												
Temperature Drift	10%/Sr												
Lux	10000 Lux												
Protection Degree	IP67												
Sensitivity Adjustment	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO	Teach NO
Check Input	NO Decoupled 10-30VDC												



Two types of digital sensitivity adjustment are possible on the diffuse proximity and polarized retro sensors: standard adjustment and fine adjustment. Fine adjustment for the detection of small and semi-transparent objects; if the target objects are opaque or of larger dimensions, or if the background does not guarantee that the system can operate in harsh environments. On the through beam sensors sensitivity adjustment is available by means of a trimmer.

## DIFFUSE PROXIMITY

Install the unit and select the output state. Position the target object at the sensing distance required, checking that the optical axis is perpendicular to the surface of the object. Assuming the worst possible conditions (object statistically smaller and the object darker than the background), position the object at the furthest point possible from the sensor. Press the teach button or connect pin 2 (white cable) to earth for 2-5 seconds, until the yellow signal LED switches back on consistently. The threshold is set at 50% of the detected signal, thus giving the device a standard sensitivity adjustment. Remove the object and check that the yellow LED has switched off. If the yellow LED remains switched on, the sensitivity adjustment is required.

To carry out the fine adjustment connect pin 2 (white cable) to earth or press the Teach in button for T > 8 secs. until the yellow signal LED starts flashing. The threshold is set below the detected signal of the hysteresis amplitude. Remove the object and check that the yellow LED has switched off.

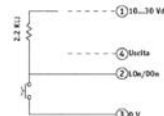
## POLARIZED

Install the retro reflector so that its surface is perpendicular to the sensor's optical axis. Make sure that the distance between the sensor and the reflector is not greater than that specified for the reflector in use. Provisionally secure the sensor in a stable position and select the output state. To achieve the best alignment, use the following procedure. Press the Teach in button, or connect pin 2 (white cable) to earth for t. 8 secs., until the yellow signal LED starts flashing. The threshold is set below the detected signal of the hysteresis amplitude. Adjust the sensor by moving it vertically and horizontally until the LED switches on constantly, or at least the frequency of the flashes decreases. Repeat the operation until it is no longer possible to vary the frequency at which the yellow LED flashes. Secure the sensor in a stable position and check that the LED switches off when the beam is interrupted by the target object. In this way a correct centering on the reflector in use and a fine adjustment of device sensitivity have been carried out. This adjustment is ideal for the accurate detection of semi-transparent objects. For applications in which th target objects are not transparent, the standard adjustment is recommended (after having carried out the operations described above). This gives the highest margin of immunity to the dust or dirt which can deposit on the optical elements. To carry out standard adjustment press the Teach button or connect pin 2 (white cable) to earth for 2-5 secs. until the yellow signal LED switches back on constantly. The threshold is set at 50% of the detected signal. Check that the LED switches off when the beam is interrupted by the target object. If the yellow LED remains switched on, fine sensitivity adjustment is required.

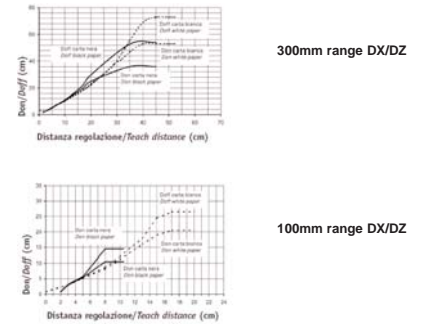
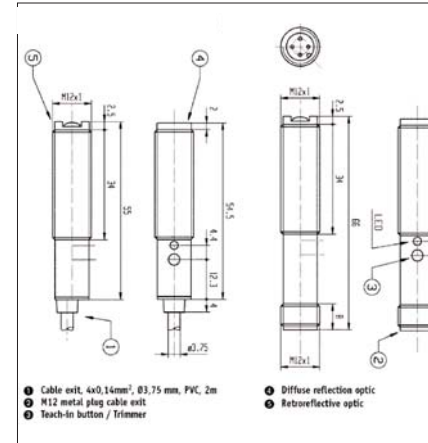
## DIGITAL ADJUSTMENT NOTES

Beyond the nominal distance of the sensor, the fine adjustment has no effect on the operating distance. As shown from the curves, the hysteresis increases with a correspondent increase in the teach distance. If a fine adjustment is required, the sensor must be used within the nominal sensing distance. To check if the sensor is capable of adjusting the sensitivity correctly, it is always advisable to carry out a fine adjustment and to make certain that the LED is flashing at the end of the procedure. If the LED remains constant, either the sensor operates at too high distance in relation to the target object or the sensor is not correctly aligned. If it is sufficient only to detect the presence of objects and this is not affected by backgrounds or other objects behind those to be detected, the sensor can be used until the distance indicated in the curves is reached. If necessary repeat the setting by carrying out a brief teach in. The curves represent the relationship between the position in which the sensor is placed to carry out the sensitivity adjustment and the position in which the sensor is activated with a margin >=2.

Teach in with Dark ON configuration  
Should it be necessary to use the teach in input with a DARK ON configuration 2.2K- resistor must be added to avoid short circuits in the power supply when the teach mode is activated.



## MECHANICAL DRAWINGS



## THROUGH BEAM

Using the recommended brackets, provisionally install the transmitter and receiver within the sensing distance. Position the components so that they coincide with the optical axis as much as possible. Check that the sensitivity adjustment trimmer is turned to the furthest clockwise position. Adjust the transmitter by moving it vertically and horizontally until the yellow LED on the receiver switches on. Adjust the receiver by moving it vertically and horizontally until the yellow LED switches on constantly. Secure the system properly and proceed with the sensitivity adjustment. Check that, when no object is present, the yellow LED on the receiver is constantly switched on. Turn the sensitivity adjustment trimmer in a counter-clockwise direction until the LED switches off. Turn the trimmer in a clockwise direction until the signal LED switches back on constantly. This is the position in which the system can operate in the optimum conditions for detecting both solid parts and spaces with equal precision and with good safety margins. If the target object does not create problems, the trimmer can be turned clockwise to the furthest position to achieve higher working limits. Check that the yellow LED on the receiver switches off when the optical beam is interrupted.

**WARNING** These products are NOT safety sensors and are NOT suitable for use in personal safety