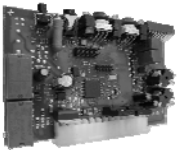


PLD32

User manual



Subject to technical changes.
www.swarco.com/sts



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1 About this manual

On the following pages you will learn how to take the device to your use of properly operating and able to serve. We value the fact that you operate the equipment safely, properly and economically. For this it is necessary that you read this manual thoroughly before using the machine.

It contains important information that will help you to avoid danger, and to increase the reliability and lifetime of the device and the accessories.

Read the Safety section for your own safety. Follow all instructions carefully to not endanger yourself and others or damage to the equipment.

If you have questions about PLD32 that are not answered in this manual, or not understanding the descriptions, please contact before using this device:

SWARCO TRAFFIC SYSTEMS GMBH
Business Unit Detection
Niederkircher Straße 16, D-54294 Trier
detection@swarco.de

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1.1 Intended use

The PLD32 is solely suited for the detection of vehicles. Any further usage is not appropriate. Do not use the PLD32 for any other purpose.

1.2 Label

The PLD32 is provided with a quality label and serial number. You will need the indications when talking with the customer service, e. g. ordering accessories or spare parts.

Note here the serial number and name of the device in order to have them available when needed:

Serial number:

Voltage version:

CE-label:

1.3 Further documentation

Loop installation Manual

1.4 Symbols

In several places throughout this manual you will find the following symbols stating important safety instructions:



ATTENTION! This symbol indicates dangers which might cause damage to people or property.



NOTE This symbol indicates information for installation and function of the device.

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1.5 Safety instructions

Read the following safety instructions thoroughly and observe them carefully. They are stated to ensure your own safety and the safety of others and to avoid damage to the device or accessories.



ATTENTION!

Danger of electricity! Make sure that no liquid may get inside the device. If this happens, interrupt the power supply to the device at once. If you notice any damage, e.g. broken or crushed cables, damaged plugs, enclosures etc., turn off the device at once, interrupt the power supply and make sure that the device cannot accidentally be turned on again.

The device may only be installed, brought into service and repaired by an electro-technical expert. Inappropriate operation, improper maintenance or not observing the instructions in this manual can lead to danger.

Any malfunction of the device which may limit the safety of its users or others must be removed immediately. All warning and safety labels on the device must be observed and kept complete and legible. The appropriate usage must be observed by all means. For damage resulting from inappropriate usage the manufacturer will not undertake any liability.

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The device must not be used as a safety component in the sense of the European Directive 2006/42/EC ("Machinery Directive"). In systems with high risk additional safety measures are necessary.

The operator of the device must ensure that the chosen means of operation will not cause damage to material or danger to people and that all security and safety installations are present and functioning. Before installation and first operation please observe the instructions in the manual.

The manual must be available at the site of usage at any time.

It must be read thoroughly and applied appropriately by the person responsible for the operation, maintenance and service of the device.



NOTE

Our products are in a constant process of improvement and advancement. Because of this, read the current manual thoroughly before installation and first operation.

Without prior consent of the manufacturer, no modifications, neither mechanical nor electrical, may be done. Only parts that have the consent of the manufacturer may be used for back fitting or as accessories. Any violations will lead to the termination of conformity and the manufacturer's warranty. The user will subsequently bear the risk.

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2 Product description

2.1 Features

The induction impulse transmitter PLD32 evaluates the loops in the ground. Those depict the inductivity of a high-frequency oscillator circuit. If a vehicle crosses the loop, its metal components cause a change of frequency in the oscillator circuit. These are analyzed by the loop detector, transmitted as switching signals via potential free relay contacts and displayed on the LEDs. The analysis of the loop frequency is done via a micro-processor system which aligns automatically to the according loop and compensates changes of the loop inductivity caused by temperature, humidity or aging of components. The 2-channel induction impulse transmitter PLD32 analyses two loops in multiplex process. Since only one loop at a time is active, interference is avoided even when loops are interlaced. Due to its design as a plug-in card, the PLD32 is particularly suitable for use in electronic complete control systems.

2.2 Switching outputs

The switching outputs are coupled with the LED display (E + G) at the front. For each channel there is one switching output available, for which the status "loop occupied" can be switched.

All channels (switching outputs) are equipped with electro-mechanical relays (channel 1, channel 2).

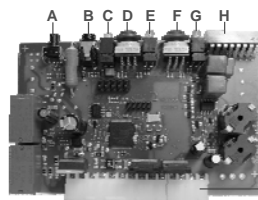
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2.3 Technical Data

Supply voltage	24 V AC/DC: +/-10 % <3.0 V A
Operating temperature	-25°C to +70°C
Storage temperature	-40°C to +80°C
Dimension	L = 100 mm, W = 70 mm, H = 22 mm
Connection PLD32	via 14-pole Molex connector (type 2145/3215 KK 3.96 mm)
Weight	70 g
Inductivity range	20 µH to 2000 µH recommended range: 100µH up to 300µH
Loop resistance	max. 30 Ω
Measurement time per channel	min. 5ms – max. 25ms
Cycle time	Measurement time channel 1 + measurement time channel 2
Frequency range	2 levels (LOW or HIGH)
Work frequency	20 kHz – 70 kHz
Alignment	automatically after switch-on of power supply, after pushing reset switch, after parameter changes or by external reset
Switching output	floating relay contacts: 24 V AC/DC → U _{max} = 42 V I _{max} = 5 A
Displays	LED red (ERR) = loop failure LED green (DET) = detection LED yellow (PWD)= power
Safety circuit loop input	galvanic separation by transmitter, glow lamp

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2.4 Pin connection



A - Reset
B - Service
C - Power LED orange
D - Rotary switch CH 1
E - Green + red LED CH 1
F - Rotary switch CH 2
G - Green + red LED CH 2
H - Dip switch S1-8
I - Molex connector

AC-Version DC-Version

3 > U_N 3 +
4 - (GND) 4 - (GND)

5 7 6 Relay channel 1

8 10 2 Relay channel 2

11 12 Loop 1

13 14 Loop 2

1 N.C.

9 ext. Reset (low active)*

Contact position:

Detector on, Loop not occupied

N.C. = not occupied

DIP-Switch (DIP) S7=OFF active

* ext. reset only possible with 24 V DC

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2.5 Switching outputs



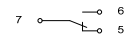
With the 24 V detector versions, the relays may only be connected to voltages within the range of maximally 60 V peak voltage and maximally 42 V_{eff}!

24 V AC/DC power supply
Relay Channel 1 Relay Channel 2
U _{max} = U _{eff} = 42V AC/DC
I _{max} = I _{eff} = 5 A
floating

Switching states

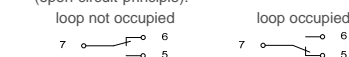
(Example Relay channel 1, standard version PLD32)

Dead-voltage state:



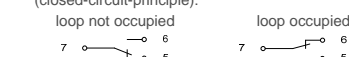
DIP-Switch (H) S7 = OFF

(open-circuit-principle):



DIP-Switch (H) S7 = ON

(closed-circuit-principle):



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3 Installation of the PLD32

Before switching on the power supply, the device must be plugged into the socket e.g. a compact control board. The compact controller must be installed in an additional enclosure with IP54 insulation.

3.1 Specific instructions for the loop

The safe functioning of the device depends essentially on the technically proper installation and laying of the loops, since the loops are the sensors of the device. The loop must not be mechanically stressed or moved. The loop feed cable must be drilled approx. 20 - 50 times per meter and must be laid in distance from live wires. For further information see Loop installation Manual (available at www.swarco.com/sts).

3.2 Display of switching and failure status

The switching state "loop occupied" is signaled by the glowing green channel LED (E or G) and a fault by the red channel LED (E or G). A detector fault, e.g. "loop short circuited", is signaled by a cyclically flashing green channel LED. For each error, a defined number of flashes is given, which appears repeatedly every 5 seconds:

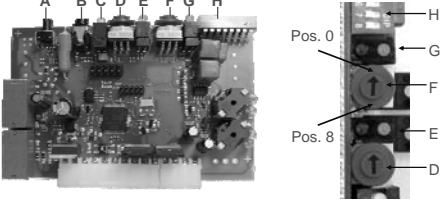
3.3 Notes for installation

The device has a power consumption of approximately 3.0 VA. Please note, in particular when installing a larger number of PLD32 or presence of other heat-generating devices, the following instructions. When installed in an enclosure or cabinet, sufficient heat dissipation must be ensured. The ambient temperature surrounding the device and thus the temperature inside this enclosure or cabinet must not exceed the maximum allowable operating temperature of 70°C.

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4 Device adjustment and display















All detector settings can easily be done by rotary switches (D for channel 1, channel 2 for F) and DIP switch (H). After every device adjustment a new alignment will occur automatically. The reset button (A) must only be pressed after changing the frequency (DIP-switch (H) S1 → off/on). For the service interface (B) see chapter 6.



Blinking code Channel LED (DET)	Channel faults
1	Loop short circuited
2	Loop open, loop broken
3	Reserved
4	Disturbance
6	Error of other channel of directional logic
7	Maximum period for loop alignment exceeded

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4.1 Adjustment via rotary switch (D + F)

Symbol	Function								
	Static 1-7 (Static hold time): In this setting, the channel relay is switched on permanent („static“), i.e. as long as the vehicle is detected in the detection range								
	Pulse 9-15 (pulse mode): In this setting, the channel relay is switched on only a pulse, regardless of the acquisition time of the vehicle. Pulse length 100ms (optional up to 1s)								
Positions	<table><tr><td>0</td><td>8</td><td>1 - 7</td><td>9 - 15</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	0	8	1 - 7	9 - 15				
0	8	1 - 7	9 - 15						
									

Example channel 2 rotary switch F

Position	Function: Software (interface active)
H A 0	This switch turns off the channel function. If the device offers a service interface, software adjustments can be activated by turning off both channels (switches „D“ and „F“ on position „0“). For more information see also software manual.
Position	Function: Test mode Relay (Relay Test mode)
H A 8	This switch position allows it to check the devices/ controller connected to the detector. As long as both switches (D + F) are set on this switch position, the two relay contacts are alternately turned on and off by pushing the reset button (A). Start position: relay channel 1 and relay channel 2 not active => keystroke (RES): only relay 1 active => keystroke (RES): only relay 2 active => keystroke (RES): both relays active => keystroke (RES): => Start position

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4.2 Adjustment of sensitivity and holding time

Example channel 2 rotary switch F

Position	Function: Static hold time
H A 1	Sensitivity minimum 0.3*
2	Sensitivity 0.17*
3	Sensitivity 0.1*
4	Sensitivity 0.035* default setting
5	Sensitivity 0.02*
6	Sensitivity 0.012*
7	Sensitivity maximum 0.007*
Position	Function: Pulse mode
H A 9	Sensitivity minimum 0.3*
10	Sensitivity 0.17*
11	Sensitivity 0.1*
12	Sensitivity 0.035*
13	Sensitivity 0.02*
14	Sensitivity 0.012*
15	Sensitivity maximum 0.007*

* (Frequency change in %)

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4.3 Adjustment via DIP switch (H)

Switch 1 Frequency	Adjustment of frequency This setting is used to avoid signal interference from other loops. Two or more detectors may not operate on the same frequency: => OFF = Freq. HIGH => ON = Freq. LOW
Switch 2 ON BOOST - Sensitivity boost	Boost – Sensitivity boost ON The "Boost" function causes an automatic increase of sensitivity limited to the maximum sensitivity. Thus, e.g. poles of trailers can be reliably detected. After the vehicle has left the loop, the sensitivity returns to the value originally set. In pulse mode, this function is disabled.
Switch 3 ON Switch on delay	Switch on delay ON The switching signal is emitted when the loop is attenuated for more than one second.
Switch 4 ON Switch off delay	Switch off delay ON The switching signal is switched-off with a delay of 2 seconds after the loop is vacant (not in pulse mode).
Switch 5 ON Pulse on exit	Pulse on exit ON The detector switches the channel relay only after the loop is vacant. The setting is only active if additionally the channel adjustments are set to pulse mode (switches D1, D2).
Switch 6 ON Detection by fault	Detection by fault ON A loop fault is indicated on the LEDs (ERR), additionally the according channel relay is switched.
Switch 7 Relay mode	Relay Mode => OFF = open-circuit-principle => ON = closed-circuit-principle

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Switch 8 ON Directional logic	Directional logic The attenuation of the first loop is registered in the detector but no relay is switched yet. Only if the second loop is attenuated at the same time, the relay of the channel which was attenuated the last is switched and stays switched until the second loop is clear again. This function is valid for both directions. Switch on delay is not allowed while using directional logic
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4.4 Reset button (A)

The reset-button (A) has two functions. The two functions can be activated over the period of the keystroke:
=> **Alignment:** short keystroke (< 2 sec), all active loop-channels are initialized
=> **Reset:** long keystroke (> 2 sec), Detector reset, afterwards initialization of all channels

4.5 Alignment

When switching on the power supply, when there are voltage interruptions or when the reset switch (A) is pushed, the loop detector automatically aligns itself to the connected loops and switches the relays to switching position "loop not attenuated". During the alignment period the yellow power-LED (C) is blinking with a frequency of 5 Hz and glows permanently after the alignment is finished. This alignment period usually takes < 2 seconds.

During the alignment phase there must not be any vehicle on the loop since it will not be detected.

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5 Detection and troubleshooting

Description	Possible cause	Correction
Detector does not align, yellow LED off	There is no power supply for detector	Check connection to power supply
Red LED on, green LED blinking cyclically 2x	Detector detects "loop interrupted"	Check loop and loop connection
Red LED on, green LED blinking cyclically 1x	Detector detects "loop short-circuited"	Check loop and loop connection
Green LED permanently on	Test mode activated, D+F → 8, relay switched	Deactivate „Test mode relay“ (see "Adjustment of sensitivity and hold time")
Yellow LED blinking at 5 Hz after alignment / reset	Vehicle motion on the loop	During alignment phase there mustn't be any vehicles on the loop
Detector does not switch in spite of effected alignment	Channel switched off" e.g. D+F up 0 or test mode D+F → 8	Activate channel (see "Adjustment of sensitivity and hold time")
	Selected sensitivity is too low	Progressively increase sensitivity until vehicles are detected correctly

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6 Service interface

The SWARCO TRAFFIC SYSTEMS service software "LoopMaster" offers the user a convenient interface for the modification and display of all parameters and diagnostic values.

All parameter values and diagnostic values can be set, read out, controlled, saved and printed via the serial interface (SERVICE) at the front of the device.

The interface continues to provide additional setting options which are not available via switch on the front.

If the rotary switches (D, F) are on position 0, the parameterizing is solely done via service interface. The settings of the rotary switches (D, F) & the DIP-switch (H) are disabled.
If only one rotary switch (D or F) is on position 0, this channel is deactivated and the service interface is not active.

When the interface is activated, the parameter values from the non-volatile EEPROM are used. The read-out values from the EEPROM may be different from the switch values.

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EG-Konformitätserklärung
EC-Declaration of Conformity

Hersteller / manufacturer: Swarco Traffic Systems GmbH

Adresse / address: Niederkirchstr. 16
54294 Trier

erklärt, dass das Produkt / declares that the product

Typ / type: Induktiver Schleifen-detektor / inductive loop detector

Modell / model: PLD31 (1-Kanal), PLD32 (2-Kanal)

Verwendungszweck / intended use: Fahrzeug-Zugangskontrolle / vehicle access control

bei bestimmungsgemäßer Verwendung den grundlegenden Anforderungen gemäß Artikel 3 der RAATE-Richtlinie 1999/5/EG entspricht und dass die folgenden Normen angewandt wurden: conforms with the essential requirements of Article 3 of the RAATE 1999/5/EC Directive if used for its intended use and that the following standards have been applied:

1 **Sicherheit / Gesundheit (Artikel 3.1.a der RAATE-Richtlinie)**
Safety / health (Article 3.1.a of the RAATE Directive)
Angewandte Norm(en) / Applied standard(s): IEC 60950-1 EN 60950-1 2003 (2nd Edition)-A1:2009 2006-ATT 2009-A1:2010+AC:2011 +A1:2011

2 **Elektromagnetische Verträglichkeit (Artikel 3.1.b der RAATE-Richtlinie)**
electromagnetic compatibility (Article 3.1.b of the RAATE Directive)
Angewandte Norm(en) / Applied standard(s): ETSI EN 301 489-1 V1.9.2 V1.4.1 ETSI EN 301 489-3

3 **Effiziente Nutzung des Funkfrequenzspektrums (Artikel 3.2 der RAATE-Richtlinie)**
Efficient use of the radio frequency spectrum (Article 3.2 of the RAATE Directive)
Angewandte Norm(en) / Applied standard(s): ETSI EN 300 330-1 V1.7.1 V1.5.1 ETSI EN 300 330-2

Trnr. 26.11.13
(Date and date of the Declaration of conformity)

(Signature)
(Signature: Dr.-Ing. Gerhard Pries)
(Signature: Dr. rer. nat. G. Pries)

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