

## IG316

### User manual



## 1 Introduction

On the following pages you will learn how to install and operate the device in an appropriate way. We attach great importance to the safe, appropriate and effective handling of this device. It is therefore important to read this manual thoroughly before using the device.

In the manual you will find important instructions helping you to avoid danger and to prolong the reliability and durability of the device and the accessories.

For further information refer to [www.swarco.com/sts](http://www.swarco.com/sts)  
Subject to technical modifications.



For your own safety you should read the safety instructions. Follow the instructions closely in order to avoid danger for yourself and others or damage to the device.

If you have any questions about the IG316, which are not answered in this manual, or if you have problems understanding the descriptions, please contact:

**SWARCO TRAFFIC SYSTEMS GMBH**  
Niederkircher Straße 16,  
54294 Trier, Germany  
[detection@swarco.de](mailto:detection@swarco.de)

© 2018 All rights reserved

## 1.1 Usage according to regulations

The IG316 is solely suited for the detection of vehicles. Any further usage is not appropriate. Do not use the IG316 for any other purpose.

## 1.2 Label

The IG316 is provided with a quality label / serial number. You will need these 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.

## 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.

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 backfitting or as accessories. Any violations will lead to the termination of conformity and the manufacturer's warranty. The user will subsequently bear the risk.

## 2 Product description

### 2.1 Features

The induction impulse transmitters IG316 evaluate 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 front 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 induction impulse transmitter IG316 is a 1-channel unit, which means that this device can connect to and evaluate one induction loop.

### 2.2 Switching outputs

The switching outputs are coupled with the LED display (DET) on the front panel. There are two switching outputs available. Relay A is switched as static signal or impulse for the mode "loop occupied". The Relay B emits an additional impulse or can be activated as switching output for the fault report (ERR) via the operating units on the front. All channels (switching outputs) are equipped with electro-mechanical relays.

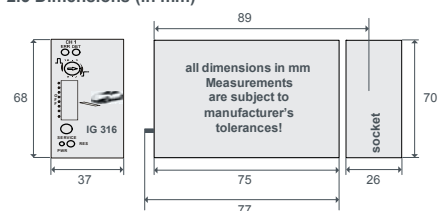
### 2.3 Switching outputs special version ST (Fault report)

The special model ST has a third switching output for fault report. The fault report is an electronic semiconductor relay.

## 2.4 Technical data

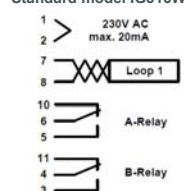
<b>Supply voltage</b>	230 V AC: (-10 - +6) % < 4.5 VA 115 V AC: (-10 - +6) % < 4.5 VA 24 V AC: +/-10 % < 3.0 VA 24 V DC: +/-10 % < 3.0 W
<b>Operating temperature</b>	-25°C to +70°C
<b>Storage temperature</b>	-40°C to +80°C
<b>Protection class</b>	IP30 (version with service interface and without service interface cover: IP 20)
<b>Enclosure (plastic)</b>	L = 75 mm, W = 37 mm, H = 68 mm
<b>Connection</b>	via 11-pin connector (type 78-S 11); dimension of socket manufacturer-dependent
<b>Weight</b>	160 g - 260 g
<b>Inductivity range</b>	20 µH to 2000 µH recommended range: 100 µH to 300 µH
<b>Loop resistance</b>	max. 30 Ω
<b>Measurement time per channel</b>	min. 5 ms – max. 2.5 ms
<b>Cycle time</b>	Measurement time channel 1
<b>Frequency range</b>	2 levels (LOW or HIGH)
<b>Work frequency</b>	20 kHz – 70 kHz
<b>Alignment</b>	automatically after switch-on of power supply, after pushing reset switch or parameter changes
<b>Switching output</b>	floating relay contacts: 230 V AC $U_{max} = 250 V$ $I_{max} = 5 A$ 24 V AC/DC $U_{max} = 42 V$ $I_{max} = 5 A$
<b>Displays</b>	LED red (ERR) = loop failure LED green (DET) = detection LED yellow (PWD) = power
<b>Safety circuit loop input</b>	galvanic separation by transmitter, glow lamp

## 2.5 Dimensions (in mm)



## 2.6 Pin connection

Standard model IG316W



Contact position:  
Detector on, loop not occupied  
DIP-switch (G) S7= OFF active

For special models, please pay attention to the pin connections on the side label

The pins 1 & 2 are used in both versions (230 V AC and 24 V DC / 24 V AC) for connecting the power supply. The 24 V DC version has a reverse polarity protection.

Because of the above-mentioned pin compatibility make sure that under no circumstances the 24 V version is plugged on a socket with 230 V AC power supply and vice versa!

In variants with 230 V AC power supply the relays may only be connected to voltages outside of the SELV voltage range and must not exceed 250 V AC! Only loops with the following additional insulation may be connected:

a) Insulation  $\geq 0.4$  mm b) dielectric strength  $\geq 1.5$  kV

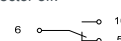
## 2.7 Switching outputs

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<sub>eff</sub>!

115/230 V AC Power supply (IG316W230, IG316S230, IG316ST230) (IG316W115, IG316S115, IG316ST115)		24 V AC/DC Power supply (IG316W24, IG316S24, IG316ST24) (IG316W24S, IG316ST24S)	
Relay A Relay B	electr. relay Fault report (only IG316ST230) (only IG316ST115)	Relay A Relay B	electr. relay Fault report (only IG316ST24)
$U_{max} =$ $U_{eff} = 250 V AC$ $I_{max} = I_{eff} = 5 A$	$U_{max} =$ $U_{eff} = 250 V AC$ $I_{max} = I_{eff} = 100 mA$	$U_{max} =$ $U_{eff} = 42 V AC/DC$ $I_{max} = I_{eff} = 5 A$	$U_{max} =$ $U_{eff} = 42 V AC/DC$ $I_{max} = I_{eff} = 200 mA$
$P_T = 250 mW$	$P_T = 250 mW$	$P_T = 250 mW$	$P_T = 250 mW$
$R_{On} = < 30 \Omega$	$R_{On} = < 30 \Omega$	$R_{On} = < 5.0 \Omega$	$R_{On} = < 5.0 \Omega$
potential free	potential free	potential free	potential free

## Switching mode (e.g. Relay A, standard model IG316W)

Detector off:

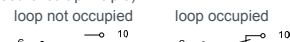


The switching modes for the special version IG316ST only apply to the contacts 5 and 6

DIP-switch 7 (DIP) S7 = OFF  
(open-circuit-principle):



DIP-switch 7 (DIP) S7 = ON  
(closed-circuit-principle):



## 3 Installation of the IG316

Before switching on the power supply, the device must be plugged onto the socket. For the use of the device in a surrounding with higher protection requirements, SWARCO TRAFFIC SYSTEMS offers special enclosures (type GHIG301).

### 3.1 Special notes on 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 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](http://www.swarco.com/sts)).

3.2 Instructions for installation

The device has a power consumption of approximately 3 VA. Because of the enclosure (IP30) creates a self-heating. This is normal, but please note the following instructions.

When you're installing a peripheral space of about 1 cm please ensure that a adequate air circulation is given.

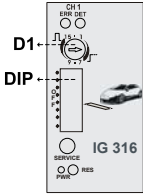
When it is installed in an enclosure or cabinet please ensure a adequate heat dissipation. The ambient temperature surrounding the unit and the temperature inside this enclosure or cabinet must not exceed the maximum allowable operating temperature of 70 °C.

4 Device adjustment and display

Via DIP-switches (DIP) and rotary switch (D1 for channel 1) all parameters can be easily adjusted.

After every device adjustment a new alignment will occur automatically. The reset button (RES) must only be pressed after changing the frequency (DIP-switch 1 off/on).

The service interface (SERVICE) is available in the special version. Please see chapter 6.1 service interface.



4.1 Display of switching and failure status

The switching state "loop occupied" is indicated by the glowing green channel LED (DET), fault is indicated by the red channel LED (ERR). Detector fault, e.g. "loop short circuited", is indicated by cyclic flashing of the green channel LED (DET). For each error, a defined number of blinkings is given, which is repeated every 5 seconds.

Blinking code Channel LED (DET)	Channel faults
1	Loop short circuited
2	Loop interrupted
3	Frequency not adjustable
4	Disturbance
6	Error of other channel of directional logic
7	Maximum period for loop alignment exceeded

4.2 Adjustment via rotary switch (D1)

Symbol	Function
	<b>Pulse:</b> With this setting the channel relay only switches a pulse, regardless of the detection time of the vehicle. The standard pulse length is 75 ms (tolerance +/-20 ms). The pulse lengths can be adjusted (tolerance for pulse length ≥ 200 ms: +20 ms / -50 ms) via service interface (see chapter 6.1).
	<b>Static:</b> The channel relay is switched on permanent („static“), i.e. as long as the vehicle is detected in the detection range

Position	Function
0	<b>Off/Software (Switch off / Service interface active)</b> This switch position turns off the channel function. If the device offers a service interface, software adjustments can be activated by turning off the channel (rotary switch "D1" in position "0"). For more information see also software manual.
8	<b>Relay test mode</b> This switch position allows it to check the devices/ controller connected to the detector: As long as the switch (D1) is set on this switch position, the two relay contacts are alternately turned on and off by pushing the reset button (RES). Start position: A-relay and B-relay not active => keystroke (RES): only A-relay active => keystroke (RES): only B-relay active => keystroke (RES): both relays active => keystroke (RES): => Start position

4.3 Adjustment of sensitivity and hold time

Type: IG316W230 IG316W115 IG316W24  
IG316ST230 IG316ST115 IG316ST24

Position	Function
Static hold time	1 Sensitivity minimal 0.3°
	2 Sensitivity 0.17°
	3 Sensitivity 0.1°
	4 Sensitivity 0.035° <b>Default setting</b>
	5 Sensitivity 0.02°
Pulse mode	6 Sensitivity 0.012°
	7 Sensitivity maximal 0.007°
	9 Sensitivity minimal 0.3°
	10 Sensitivity 0.17°
	11 Sensitivity 0.1°
	12 Sensitivity 0.035°
	13 Sensitivity 0.02°
	14 Sensitivity 0.012°
	15 Sensitivity maximal 0.007°

\*(Frequency change in %)

4.4 DIP-switch (DIP)

<b>Switch 1</b> Frequency	<b>Adjustment of frequency</b> 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
<b>Switch 2 ON</b> BOOST - Sensitivity boost	<b>Boost – Sensitivity boost ON</b> 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.
<b>Switch 3 ON</b> Switch on delay	<b>Switch on delay ON</b> The switching signal is emitted when the loop is attenuated for more than one second.
<b>Switch 4 ON</b> Switch off delay	<b>Switch off delay ON</b> The switching signal is switched-off with a delay of 2 seconds after the loop is vacant (not in pulse mode).
<b>Switch 5 ON</b> Pulse on exit	<b>Pulse on exit ON</b> This setting influences the B-relay only. The detector switches the B-relay after the loop is vacant. The channel adjusted to pulse mode and the additional switch-off delay have no influence on the length of the "pulse on exit". In static mode the pulse is only emitted after the A-relay is released.
<b>Switch 6 ON</b> Detection by fault	<b>Detection by fault ON</b> A loop fault is indicated on the LEDs (ERR), additionally the according channel relay (A-relay) is switched on.

<b>Switch 7</b> Relay mode	<b>Relay Mode</b> OFF = open-circuit-principle ON = closed-circuit-principle
<b>Switch 8 ON</b> B-relay as fault report	<b>B-relay as fault report</b> B-relay switches when detector faults. The function B-relay as pulse relay is invalid. The "pulse output" or "pulse on exit" can be emitted on the A-relay.

4.5 Reset button (RES)

The reset-button (RES) 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

5 Alignment

When switching on the power supply, when there are voltage interruptions or when the reset switch (RES) 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 (PWR) 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.

6 Detection and correction of errors

Description	Possible cause	Correction
Detector does not align, yellow LED (PWR) off	There is no power supply for detector	Check connection to power supply
Red LED (ERR) on, green LED (DET) blinking cyclically 2x long	Detector detects "loop interrupted"	Check loop and loop connection
Red LED (ERR) on, green LED (DET) blinking 1x long	Detector detects "loop short-circuited"	Check loop and loop connection
Green LED (DET) permanently on	„Test mode relay“ relay tightened is active, switch (D1)-8	Deactivate „Test mode relay“ (see "Adjustment of sensitivity and hold time")
Yellow LED (PWR) blinking at 5 Hz after alignment / reset	Vehicle motion on the loop	During alignment phase there mustn't be any vehicles on the loop
	Loop is moved mechanically	Control laying of loop, observe documentation Loop installation Manual
Detector does not switch in spite of alignment	„Channel off“ switch (D1)-0 or "Test mode relay" switch (D1)-8	Activate channel (see "Adjustment of sensitivity and hold time")
	Selected sensitivity is too low	Progressively increase sensitivity until vehicles are detected correctly

6.1 Service interface (Option for all 24 V AC/DC devices)

Type: IG316W24S  
IG316W24S

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 switch (D1) is on position 0, the parameterizing is solely done via service interface.  
The settings of the rotary switch (D1) & the DIP-switch (DIP) on the front panel are disabled.

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.

EG-Konformitätserklärung  
EC-Declaration of Conformity

Hersteller / manufacturer: Swarco Traffic Systems GmbH  
Adresse / address: Niederrhein-Str. 16  
54294 Trier

erklärt, dass das Produkt / declares that the product:  
Typ / type: Induktiver Schleifen-detektor / inductive loop transmitter  
Modell / model: IG316W24, IG316W24S, IG316W230, IG316W220  
Verwendungszweck / intended use: Fahrzeug-Zugangskontrolle / vehicle access control

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

1 Sicherheit / Gesundheit (Artikel 3.1.a der RÄTTE-Richtlinie)  
safety / health (Article 3.1.a of the RÄTTE Directive)  
Angewandte Norm(en) / IEC 60950-1  
Applied standard(s): EN 60950-1 2005 (2nd Edition)/A1 2009  
2 Elektromagnetische Verträglichkeit (Artikel 3.1.b der RÄTTE-Richtlinie)  
electromagnetic compatibility (Article 3.1.b of the RÄTTE Directive)  
Angewandte Norm(en) / ETSI EN 301 489-1  
Applied standard(s): ETSI EN 301 489-1 V1.6.1  
3 Effiziente Nutzung des Funkfrequenzspektrums (Artikel 3.2 der RÄTTE-Richtlinie)  
efficient use of the radio frequency spectrum (Article 3.2 of the RÄTTE Directive)  
Angewandte Norm(en) / ETSI EN 300 330-1  
Applied standard(s): ETSI EN 300 330-2 V1.7.1  
V1.6.1

Träger: D.A.G. 2012  
Date of issue: 2012-01-01  
Place and date of the declaration of conformity

Unterzeichnet: [Signature]  
Representative: [Signature]  
Date: 2012-01-01  
Date of issue: 2012-01-01

EG-Konformitätserklärung  
EC-Declaration of Conformity