

OPTICAL PROXIMITY SWITCH ONS



Dear Customer,

Congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase. You can reach us directly at the mentioned addresses in the last chapter of these instructions.

Kindest Regards,

Your SCHUNK GmbH & Co. KG
Precision Workholding Systems
Bahnhofstr. 106 - 134
D-74348 Lauffen/ Neckar

Tel. +49-7133-103-2503
Fax +49-7133-103-2189
automation@de.schunk.com
www.schunk.com

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1 Quick commissioning

1.1 Installation of the ONS 01-LWL



Note!

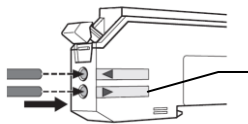
Also observe the safety instructions on page 5. Detailed information can be found in Chapter 7.1, page 8.

- Fasten gripper.
- Apply some glue to the sensor bracket.
- Open gripper all the way.
- Clip the ONS 01-LWL into the sensor bracket.
(Distance from front of sensor to monitor lug is exactly 0.9 mm)

1.2 Installation of the ONS 01 in the control cabinet

- The analysis unit is hooked onto a top-hat rail in the control cabinet.

1.3 Connection of ONS01 and ONS 01-LWL



Marking for
insertion depth

Insert ONS 01-LWL up to the **stop!**
(see also Chapter 7.3 page 9)

1.4 Electrical connection of the ONS 01

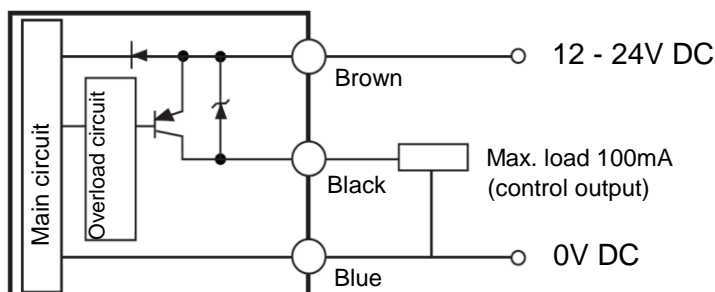


Figure 1: Circuit ONS 01

1.5 Function settings

1.5.1 Two-point calibration

- Open the gripper.
- Press the SET button.
- Close the gripper.
- Press the SET button.

(Further information can be found in Chapter 8.1, page 10.

1.5.2 Programming the switching point

- Press the SET button briefly.
- Move the gripper fingers to switching position.
- Press the SET button for **three seconds**.

(Further information can be found in Chapter 8.2, page 11.

1.5.3 Fine adjustment of the switching point

- Press the rocker button of the ONS 01 in order to adjust the switching value.

(Further information can be found in Chapter 8.3, page 11.

2 Safety

2.1 Explanation of symbols



This symbol is displayed wherever there is a possibility of **danger to life and limb**.



This symbol is displayed wherever the possibility of **damage to the product** exists.



This symbol denotes **important information** about the product and its handling.

2.2 Intended use

The unit may be used only within the range of its technical data. Intended use also includes compliance with the manufacturer's commissioning, installation, operating, environmental and maintenance conditions. Any other use is deemed improper and unintended use. The manufacturer will not be liable for any damages resulting from improper use. The ONS 01 is used for determining the positions of the jaws/fingers of grippers.

2.3 Safety information



Warning!

Incorrect use of the sensor can result in danger to life and limb!

- The sensor is **not** a component in safety circuits for personal protection.



Danger!

Danger of explosion due to **non explosion protected** sensor!

- Avoid use of the sensor in environments with flammable gases, fluids or dust.

3 Warranty

The warranty period is 24 months ←from the date of delivery when utilized as intended in single-shift operations and in compliance with the specified maintenance and lubrication intervals. Parts that come into contact with the workpiece and wearing parts are not covered by the warranty. See also our General Terms and Conditions in this regard. Our terms and conditions are available at www.de.schunk.com under "Service".

4 Scope of delivery

The optical wave guide ONS 01-LWL is needed for use of the ONS sensor. It is not included in the scope of delivery of the ONS and must be ordered separately.

The scope of delivery includes:

- Optical proximity switch analysis unit ONS 01 (quantity as ordered)
- Operating manual

5 Product description

5.1 Components of the ONS 01



Important information!

The ONS sensor from SCHUNK is based on the product FS-V31P from Keyence. In order to keep the sales price reasonable and to increase user friendliness for use with Schunk grippers, the hardware and software has been streamlined - the ONS sensor features considerably fewer functions and capabilities than the basic product from Keyence.

If you require additional functions, then we recommend that you purchase the FS-V31P.

The ONS sensor features the following functions:

- Two-point calibration (see page 10)
- Direct programming of the switching point (see page 11)
- Fine adjustment of the switching point (see page 11)

Description of the components

Lever for clamping
the optical wave guide

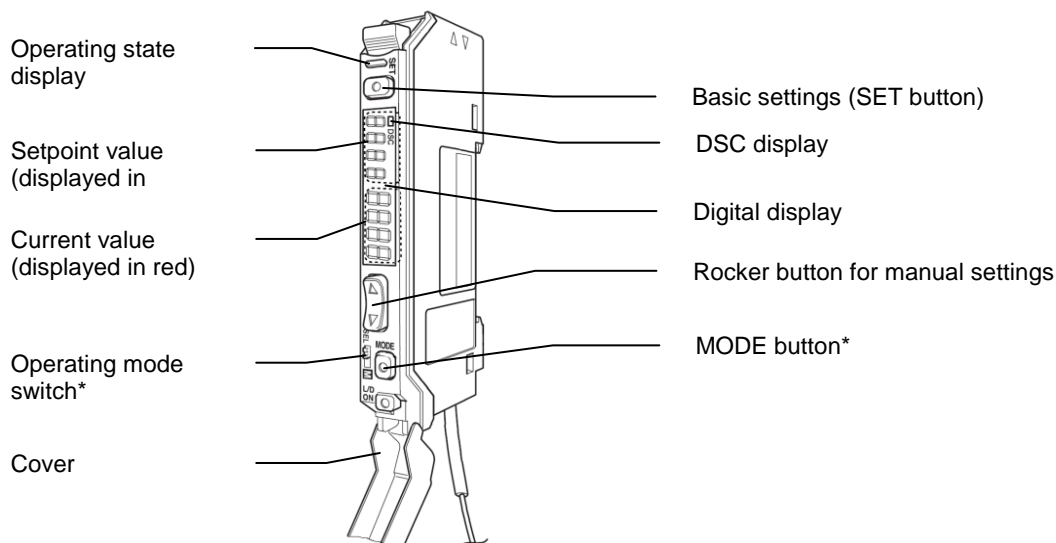


Figure 2: Design of the ONS 01

*These components have no function in the ONS 01.

5.2 Information on the original product Keyence FS-V31P

The original product (FS-V31P from Keyence) features additional interesting functions, which can also be used with our optical wave guide (ONS 01-LWL) and our grippers. You only have to replace the analysis unit ONS 01 with the electronic unit FS-V31P.

Examples of additional functions:

- **Range detection.**
It is possible to define a range for the light intensity. Within this range, the output is in state ON. Outside of this range (above or below) the output is in state OFF! This can be used for component detection.
- **Programming with external inputs.**
This enables programming via digital inputs.
This function can be useful if components are changed frequently.
- **Analog output.** (special FS-V31 versions)
Units with an analog output deliver a value that changes analogous to the light intensity. Therefore, by programming the PLC accordingly it is possible to use the sensor to monitor the state of the gripper (e.g. gripper OPEN, gripped and gripper CLOSED).

- **Switching from Dark ON to Light ON.**
 In "Light on" mode the output is switched if the current light value (red display) is greater than the switching threshold (green display).
 In "Dark on" mode the output is switched if the current light value (red display) is smaller than the switching threshold (green display).
 This function is comparable to the switching from Opener to Closer.



Further information is available on the Keyence website.

6 Technical data

Additional technical data can be found in our catalog. The most recent version applies (according to General Terms and Conditions, Chapter 2.3).

General characteristics	
Designation	ONS 01 (Analysis unit with connecting cable)
Type	PNP output
Power supply	12-24 V DC
Allowances with cover (length x height x width)	71.8mm x 30.3mm x 9.8mm
Weight	ca. 80g
Control output (PNP, open collector)	Input voltage - 1.5V 100mA
Light source	red 4-part LED
Material of analysis unit	Polycarbonate
Impact resistance	50g X-, Y- und Z-axis
Operating conditions	
Ambient lighting	with light bulbs, max. 10,000 Lx; with sunlight, max. 20,000 Lx;
Ambient temperature	-10°C to 55°C (condensation-free, frost-free)
Relative humidity	35% to 85% (condensation-free)

On / Off circuit

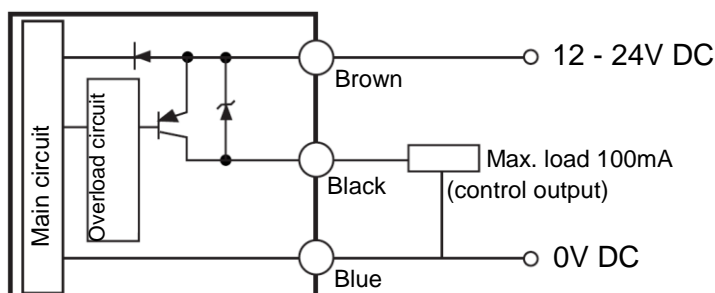


Figure 3: Circuit ONS 01

7 Assembly and installation

7.1 Installation of the ONS 01-LWL on the gripper

Installation of the ONS-LWL is described in the operating manual for the gripper on which the unit is to be mounted.



Important!

Incorrect installation can cause malfunctions of the optical wave guide!

- When gluing the optical wave guide, make sure that no adhesive is applied to or remains on the front side.
- Do not bend or squeeze the optical wave guide.

7.2 Installation of the analysis unit ONS 01 in the control cabinet

- Hook the analysis unit in direction of arrow on a top-hat rail in the control cabinet. (see Figure 4 Number ①)
- Now clip on the analysis unit in direction of arrow. (see Figure 4 Number ②)

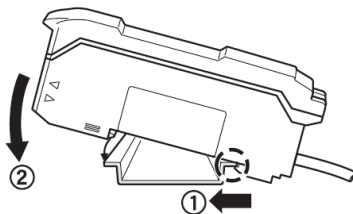
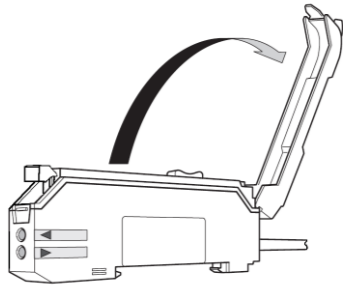
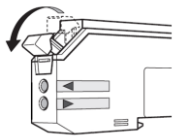


Figure 4: Installation of ONS 01

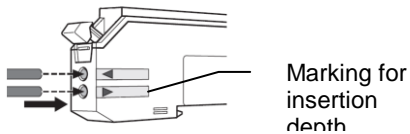
7.3 Connection of ONS 01-LWL to ONS 01



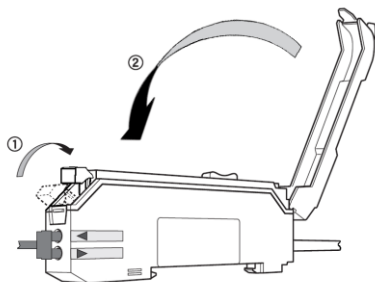
Step 1
Open cover of the ONS 01.



Step 2
Press locking lever downward.



Step 3
Insert ONS 01-LWL until stop; insertion to the seal is not far enough!



Step 4
① Press locking lever upward and
② close cover of the ONS 01.

7.4 Electrical installation of the ONS 01

Wire	Designation	Function
Brown	U_b	Operating voltage, 12 - 24 VDC, max. residual ripple 10%, Class 2
Blue	GND	Mass
Black	Signal	Max. signal output 100mA

8 Function and handling

8.1 Two-point calibration



Note

You can additionally optimize the switching point by observing fine adjustment function. (see page 11)

This function is used to set the switching point exactly at the arithmetic mean between two taught display values.

Procedure:

- Open the gripper.
- Press the SET' button briefly.
("Set" appears on the display - see Figure 5)
- Close the gripper.
- Press the SET button briefly again.
- The calibration is completed and the switching point is shown on the display (green).
(see Figure 5)

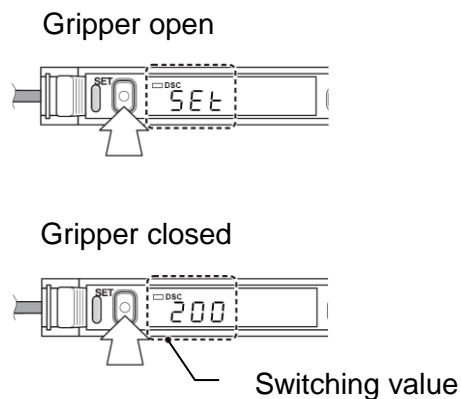


Figure 5: Two-point calibration



Note

The LED next to the SET' button lights up red when the current value (red) is greater than the switching value (green). The digital output switches through at the same time.

8.2 Direct programming of the switching point



Note

Due to tolerances, the real switching point will always deviate somewhat from the taught point! For precise position detection you should use a calibrated measuring system.

This function is used to directly teach the exact switching point.
The unit only needs the position to be taught.

Procedure

- Press the SET button briefly.
- Move the gripper fingers exactly to the position at which you wish to switch.
(Make sure that this position is not exactly at the end points of the jaw movement. Since the light intensity always deviates somewhat, there may otherwise be incorrect switching.)
- Press the SET button for **three seconds**. Watch the display during this time. The green display blinks when the programming is completed.

8.3 Fine adjustment of the switching point

This function is used to manually change or fine adjust the switching point of the digital output. You can increase or decrease the switching point by activating the rocker button (see Figure 2, page 6).

Tip


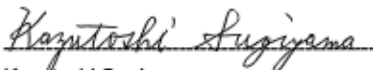
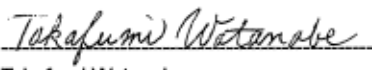
If you move the gripper, the red display shows how high the current light intensity is at this position of the gripper. The current switching point of the digital switching point is indicated by the green value on the display. The current value is indicated by the red display.



9 Troubleshooting

Display does not light up	- Check power supply, see Ch. Electrical Connection, page 9
The current display value (red) always remains below 20	- Check whether the optical wave guide (ONS 01-LWL) is inserted.
The current display value (red) changes only minimally	- Check whether the optical wave guide (ONS 01-LWL) was pushed in all the way. - Check whether the the minimum distance between the optical wave guide (ONS 01-LWL) and the switching control pin is exactly 0.9 mm. - Check whether the front of the LWL emits red light. - Check whether the front of the LWL is dirty.
The current display value (red) does not change.	- Check whether the the minimum distance between the optical wave guide and the switching control pin is exactly 0.9 mm. - Check whether the front of the LWL emits red light. - Check whether the optical wave guide is pointing in the direction of the control pin. Does the distance between the control pin and the front of the optical wave guide change when you move the gripper jaws?
The current display value (red) changes slightly although the gripper jaws are not moved.	- Depending on the environment, deviations up to a difference of 50 can be expected.
The current display value (red) changes although the gripper jaws move.	- Check whether the optical wave guide is deformed by other movements (e.g. robot). - Check whether the optical wave guide is being pulled, therefore changing the position of the metal sleeve relative to the control pin.

10 EC Declaration of Conformity

	
Declaration of Conformity	
Manufacturer	KEYENCE CORPORATION 1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku, Osaka, 533-8555, JAPAN
Type of product	Mega Power Dual Display Digital Fibreoptic Sensors
Model Designation	FS-V, followed by "31", "32", "33" or "34", may be followed by "C", may be followed by "P", and may be followed by "M".
These products comply with the requirements of the following EU Directive:	
89/336/EEC	Electromagnetic Compatibility Directive (amended by 92/31/EEC, 93/68/EEC and 98/13/EC)
The following harmonized standard is applied to these products in order to confirm the compliance.	
EN60947-5-2: 1998+A2:2004	
Year of first marking:	2005
We declare that the above-identified products comply with all essential requirements of the above European Directive.	
Date:	December 8, 2005
 Kazutoshi Sugiyama FA-IN Division, R&D Dept. Manager	 Takafumi Watanabe FA-IN Division, General Manager

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12 Contact



GERMANY – HEAD OFFICE

SCHUNK GmbH & Co. KG
Spann- und Greiftechnik
Bahnhofstrasse 106 – 134
D-Lauffen/Neckar
Tel. +49-7133-103-0
Fax +49-7133-103-2399
info@de.schunk.com
www.schunk.com



CANADA

SCHUNK Intec Corp.
190 Britannia Road East,
Units 23-24
Mississauga, ON L4Z 1W6
Tel. +1-905-712-2200
Fax +1-905-712-2210
info@ca.schunk.com
www.ca.schunk.com



DENMARK

SCHUNK Intec A/S
Storhaven 7
7100 Vejle
Tel. +45-43601339
Fax +45-43601492
info@dk.schunk.com
www.dk.schunk.com



HUNGARY

SCHUNK Intec Kft.
Széchenyi út. 70.
3530 Miskolc
Tel. +36-46-50900-7
Fax +36-46-50900-6
info@hu.schunk.com
www.hu.schunk.com



AUSTRIA

SCHUNK Intec GmbH
Holzbauernstr. 20
4050 Traun
Tel. +43-7229-65770-0
Fax +43-7229-65770-14
info@at.schunk.com
www.at.schunk.com



CHINA

SCHUNK Intec Precision
Machinery Trading
(Shanghai)
Co., Ltd.
Xin Zhuang Industrial Park
479 Chundong Road
Minhang District
Shanghai 201108
Tel. +86-21-51760266
Fax +86-21-51760267
info@cn.schunk.com
www.cn.schunk.com



FRANCE

SCHUNK Intec SARL
Parc d'Activités des Trois
Noyers 15, Avenue James de
Rothschild
Ferrières-en-Brie
77614 Marne-la-Vallée
Cedex 3
Tel. +33-1-64 66 38 24
Fax +33-1-64 66 38 23
info@fr.schunk.com
www.fr.schunk.com



INDIA

SCHUNK Intec India Private
Ltd. # 80 B, Yeswanthpur
Industrial Suburbs,
Bangalore 560 022
Tel. +91-80-40538999
Fax +91-80-41277363
info@in.schunk.com
www.in.schunk.com



BELGIUM, LUXEMBOURG

SCHUNK Intec N.V./S.A.
Bedrijvententrum Regio Aalst
Industrielaan 4, Zuid III
9320 Aalst-Erembodegem
Tel. +32-53-853504
Fax +32-53-836022
info@be.schunk.com
www.be.schunk.com



CZECH REPUBLIC

SCHUNK Intec s.r.o.
Drážni 7
627 00 Brno
Tel. +420-545 229 095
Fax +420-545 220 508
info@cz.schunk.com
www.cz.schunk.com



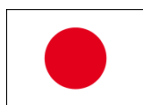
GREAT BRITAIN, IRELAND

SCHUNK Intec Ltd.
Cromwell Business Centre
10 Howard Way,
Interchange Park
Newport Pagnell MK16 9QS
Tel. +44-1908-611127
Fax +44-1908-615525
info@gb.schunk.com
www.gb.schunk.com



ITALY

SCHUNK Intec S.r.l.
Via Barozzo
22075 Lurate Caccivio (CO)
Tel. +39-031-4951311
Fax +39-031-4951301
info@it.schunk.com
www.it.schunk.com



JAPAN

SCHUNK Intec K.K.
45-28 3-Chome Sanno
Ohta-Ku Tokyo 143-0023
Tel. +81-33-7743731
Fax +81-33-7766500
s-takano@tbk-hand.co.jp
www.tbk-hand.co.jp



POLAND

SCHUNK Intec Sp.z o.o.
ul. Stoneczna 116 A
Stara Iwiczna
05-500 Piaseczno
Tel. +48-22-7262500
Fax +48-22-7262525
info@pl.schunk.com
www.pl.schunk.com



SOUTH KOREA

SCHUNK Intec Korea Ltd.
907 Joongang
Induspia 2 Bldg.,
144-5 Sangdaewon-dong
Jungwon-gu, Seongnam-si
Kyunggi-do, 462-722
Tel. +82-31-7376141
Fax +82-31-7376142
info@kr.schunk.com
www.kr.schunk.com



**SWITZERLAND,
LIECHTENSTEIN**

SCHUNK Intec AG
Im Ifang 12
8307 Effretikon
Tel. +41-523543131
Fax +41-523543130
info@ch.schunk.com
www.ch.schunk.com



MEXICO, VENEZUELA

SCHUNK Intec S.A. de C.V.
Calle Pirineos # 513 Nave 6
Zona Industrial Benito Juárez
Santiago de Querétaro,
Qro. 76120
Tel. +52-442-211-7800
Fax +52-442-211-7829
info@mx.schunk.com
www.mx.schunk.com



PORTUGAL

Sales Representative
Victor Marques
Tel. +34-937-556 020
Fax +34-937-908 692
Mobil +351-963-786 445
info@pt.schunk.com
www.pt.schunk.com



SPAIN

SCHUNK Intec S.L.
Foneria, 27
08304 Mataró (Barcelona)
Tel. +34-937 556 020
Fax +34-937 908 692
info@es.schunk.com
www.es.schunk.com



TURKEY

SCHUNK Intec
Bağlama Sistemleri ve
Otomasyon San. ve Tic. Ltd. Şti.
Küçükalyalı İş Merkezi
Girne Mahallesi
Irmak Sodak, A Blok, No: 9
34852 Maltepe, İstanbul
Tel. +90-216-366-2111
Fax +90-216-366-2277
info@tr.schunk.com
www.tr.schunk.com



NETHERLANDS

SCHUNK Intec B.V.
Speldenmakerstraat 3d
5232 BH 's-Hertogenbosch
Tel. +31-73-6441779
Fax +31-73-6448025
info@nl.schunk.com
www.nl.schunk.com



SLOVAKIA

SCHUNK Intec s.r.o.
Mostná 62
949 01 Nitra
Tel. +421-37-3260610
Fax +421-37-6421906
info@sk.schunk.com
www.sk.schunk.com



SWEDEN

SCHUNK Intec AB
Morabergsvägen 28
152 42 Södertälje
Tel. +46-8 554 421 00
Fax +46-8 554 421 01
info@se.schunk.com
www.se.schunk.com



USA

SCHUNK Intec Inc.
211 Kitty Hawk Drive
Morrisville, NC 27560
Tel. +1-919-572-2705
Fax +1-919-572-2818
info@us.schunk.com
www.us.schunk.com



RUSSIA

OOO SCHUNK Intec
ul. Samojlovoj, 5, lit. C
St. Petersburg 192102
Tel. +7-812-326-78-35
Fax +7-812-326-78-38
info@ru.schunk.com
www.ru.schunk.com