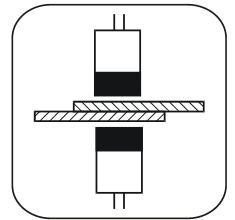


### Double Sheet Detector I100 R100 Series

for double sided sensors



- ▶ Double sided sensors (transmitter / receiver), inductive
- ▶ Non-contact double sheet control of  
FE material 0.05 - 4 mm (single sheet)  
NF material 0.05 - 12 mm (single sheet)
- ▶ Suitable for fluttering sheets
- ▶ Easy setup by key operation or via control input
- ▶ LCD display for visualization of nominal / current values,  
operational / error messages, key allocation
- ▶ Compact enclosure
  - control unit for DIN-rail mounting, protection class IP00
  - control unit for screw-on mounting, pluggable connections, protection class IP54
  - control unit for screw-on mounting, in protective enclosure, protection class IP65



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Otto-Maurer-Str. 17  
DE 75210 Kelttern

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Double Sheet Detector R100 I100  
for pairs of sensors

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# Manual

## Double Sheet Detector R100 I100 for pairs of sensors

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# Manual

## Double Sheet Detector R100 I100 for pairs of sensors

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Safety advices

### Declaration of conformity according to EC directives

Manufacturer: Roland Electronic GmbH  
Otto-Maurer-Str. 17  
DE 75210 Keltern

Product name: **I100**

Product type: **R100 Double Sheet Detector**

Roland Electronic GmbH declare that the product listed above complies with the requirements of the EMC directives listed below.

#### Applied Directives:

2004/108/EG: EMC Directive  
EN61000-6-2: 2005-08 EN61000-6-4: 2007-01

Date of mark's apposition: **13.02.2013**

Keltern, **13.02.2013**

Managing Director

*Place, Date*

*Signature*

*Function of the signer*

The declaration confirms the compliance with the cited directives. However, it is not any implied warranty of fitness for a particular purpose especially as it may relate to product liability.

The safety instructions and warnings must be observed.



DIN EN ISO 9001  
Reg.-no. 5152





## Manual

# Double Sheet Detector R100 I100 for pairs of sensors

Safety advices

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## 1 Safety advices

### 1.1 General

This document was created with utmost care. Anyhow, faults and cases of misunderstanding cannot be totally excluded. Please contact us in case of differences or weak understanding. We will be pleased to assist you.

We reserve the right to improve this document at any time without announcement. No exchange of delivered documents.

### 1.2 Safety instructions and warnings for user

This handbook contains all information required for the correct operation of the Roland equipment. It has been written for technically qualified personnel.

Unauthorized tampering with the unit, especially ignoring the warnings in this handbook, can cause malfunction and damage to the unit. Only authorized personnel should be allowed to make changes to the unit and perform cable connections especially the power supply.

Should it be necessary, e.g. in case of service or repair, to make measurements within the unit, then all customary accidents prevention procedures should be observed. Only professional electrical tools should be used.



**Note** The factory pre-settings – especially the upper / lower limit values – have been chosen such that an optimal machine protection is ensured.  
Diverging settings can impair the machine protection.



#### **Safety advice for persons with cardiac pacemakers!**

Persons with cardiac pacemakers are to stay away from the sensors!

The strong magnetic / electromagnetic fields of the sensors can cause malfunction of cardiac pacemakers and other such apparatus!



## Manual

# Double Sheet Detector R100 I100 for pairs of sensors

Safety advices

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# Double Sheet Detector R100 I100 for pairs of sensors

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Technical data

## 2 Technical data

### 2.1 Control unit I100

Supply voltage	24 V DC / 110 mA
Power consumption	approx. 2 VA
Fuse	375 mA slow-blow size 1206 (SMD)
Power / switching indication	5 LEDs
Display	LCD display, 2 lines, 16 chars. each
Ambient temperature	0° - 50°C (32° - 122°F) during operation
Switching outputs 0-1-2 - Sheet	Opto coupler outputs, output sourcing (PNP)
Temperature depending drift of switching point	± 0,02 % / °C
Switching capacity	max. 50V, max. 10mA
Measurement period	The min. dwell time of the sheet between the sensors roughly equals the sensor diameter in milliseconds, e.g. for S28 = 30 ms..
Enclosure	for DIN-rail mounting (EN50022, BS5584)
Class of protection I100 / I100-S / I100-IP65	IP00 / IP54 / IP65
Weight	approx. 0,2 kg (0.44 lbs)
Connections	Terminal block (I100 / I100-IP65) / Plug connection (I100-S)
Dimensions	125,4 x 103 x 38 mm (H x W x D)

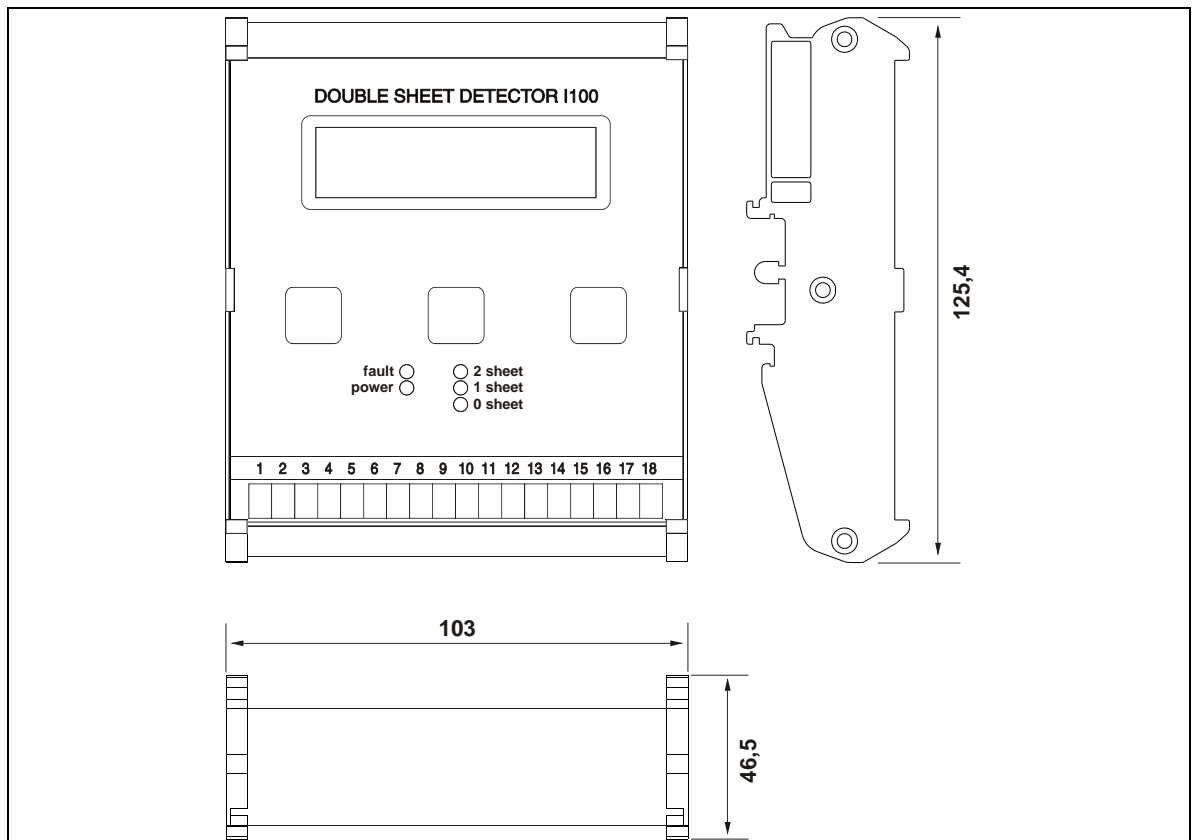


Fig. 1: Dimensions of I100 (for mounting on DIN-rail)

Double Sheet Detector R100 I100  
for pairs of sensors

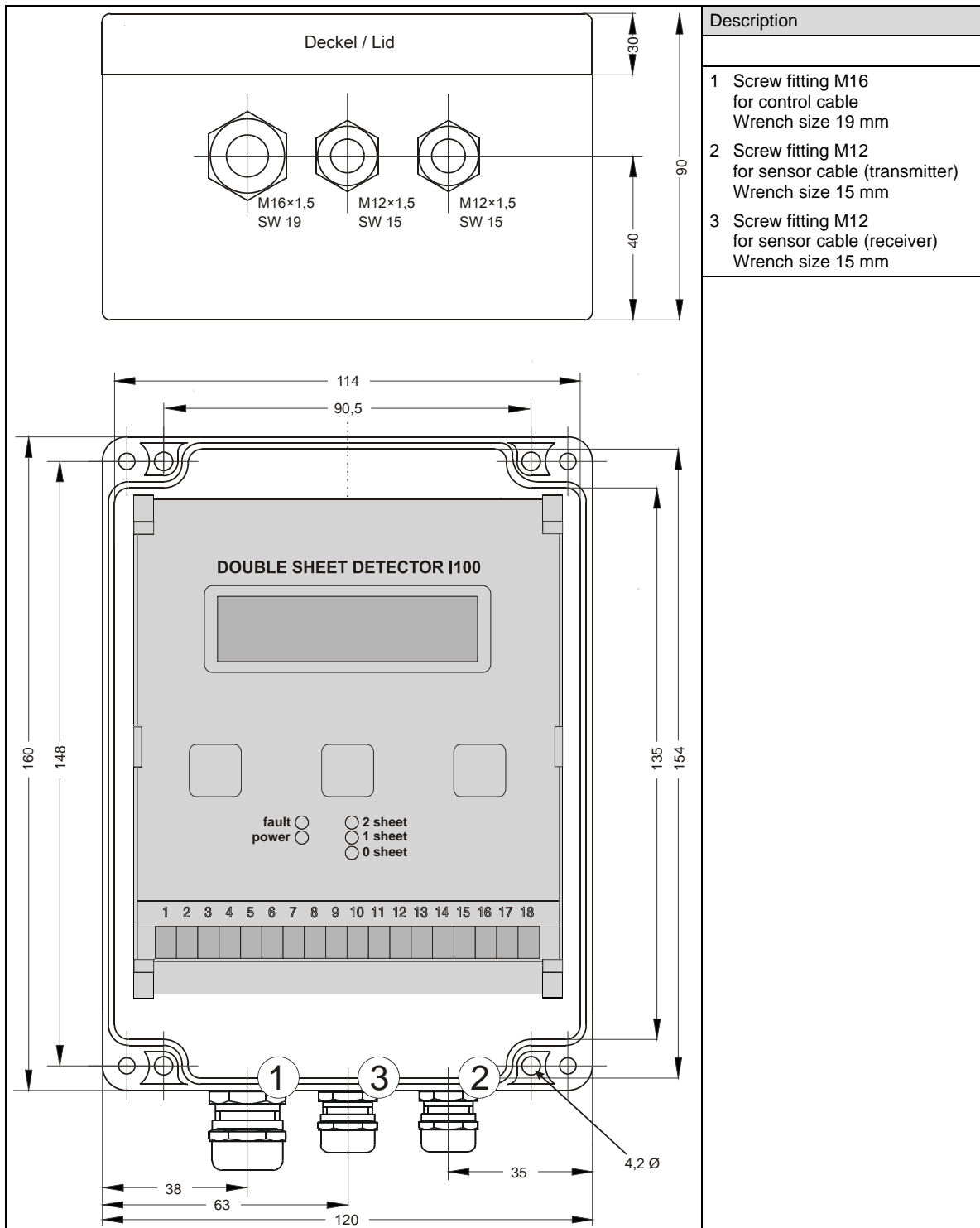


Fig. 2: Dimensions of I100-IP65 (in protective enclosure IP65)

Double Sheet Detector R100 I100  
for pairs of sensors

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13.02.2013

Technical data

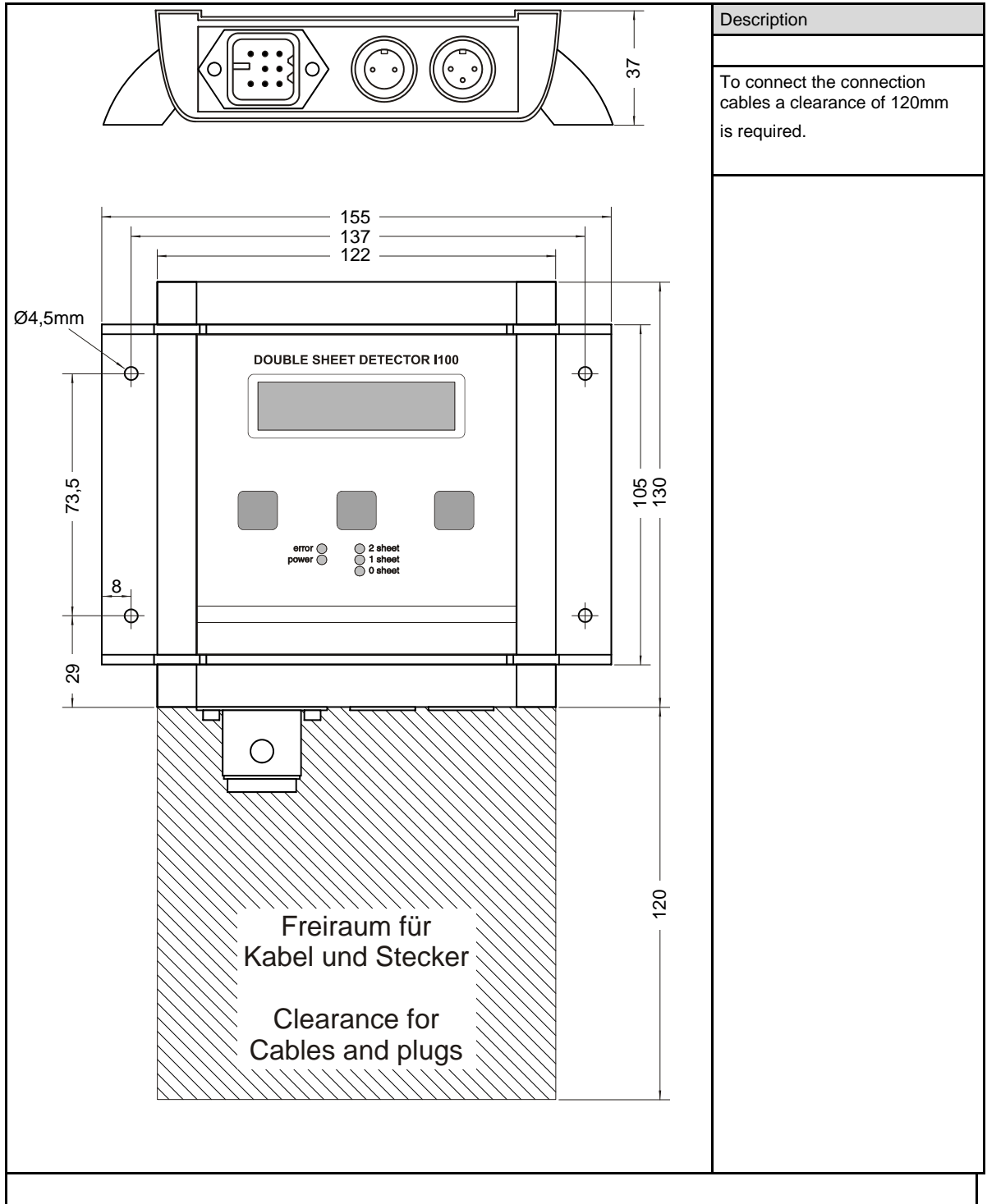


Fig. 3: Dimensions of I100-S



Double Sheet Detector R100 I100  
for pairs of sensors

## 2.2 S/E sensors

The sensors are available either with fixed cable or plug connector.  
The pluggable version has the addition **S** (e.g. S/E28 -> S/E28**S**)

**For all sensors:** Class of protection: IP65  
Length: transmitter 65 mm, receiver 45 mm  
Ambient temperature: 0 – 50 °C during operation)  
Single sheet thickness: see sensor diagrams

### 2.2.1 Sensor S/E 28

Technical data	
Responding time:	30 ms
Diameter:	28 mm (1.1 inch)
Weight:	0,28 kg (0.62 lbs)

### 2.2.2 Sensor S/E 34

Technical data	
Responding time:	35 ms
Diameter:	34 mm (1.34 inch)
Weight:	0,40 kg (0.89 lbs)

### 2.2.3 Sensor S/E 34V\_16kHz

Technical data	
Responding time:	35 ms
Diameter:	34 mm (1.34 inch)
Weight:	0,40 kg (0.89 lbs)

### 2.2.4 Sensor S/E 54

Technical data	
Responding time:	55 ms
Diameter:	54 mm (2.13 inch)
Weight:	0,90 kg (1.99 lbs)

### 2.2.5 Sensor S/E 75

Technical data	
Responding time:	75 ms
Diameter:	75 mm (2.96 inch)
Weight:	1,80 kg (3.97 lbs)

### 2.2.6 Sensor MSI18S/E

Technical data	
Responding time:	30 ms
Diameter:	18 mm (0.71 inch)
Weight:	0,18 kg (0.40lbs)

Double Sheet Detector R100 I100  
for pairs of sensors

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13.02.2013

Technical data

2.3 Technical drawing S/E sensors

Description	
	<p>The sensors <b>S/E28, S/E34, S/E54, S/E75</b> are equipped with a firmly connected cable for terminal connection. Standard cable length is 2 meters, lengths up to 20 meters upon order.</p>
	<p>The sensors <b>S/E28S, S/E34S, S/E54S, S/E75S</b> are without cable, but with build-in plug at the sensor.</p>
	<p>The sensors <b>MSI18S</b> and <b>MSI18E</b> are without cable, but with build-in plug at the sensor.</p>

Fig. 4: Dimensions of S/E sensors and MSI18S/E sensors

### 2.3.1 Sensor diagrams

The marked areas represent the working ranges of the sensors. For all combinations of sheet thickness and sensor distance  $A_x$  within the range a double sheet condition will be securely detected, if the switching thresholds are set "tight". So it might be required to restrict the 1-sheet detection range by changing the (factory-set) thresholds of 85% / 115% to approx. 95% / 105%.

The working ranges of the sensors depend very much on the material properties, they can deviate from the sensor diagrams shown below.

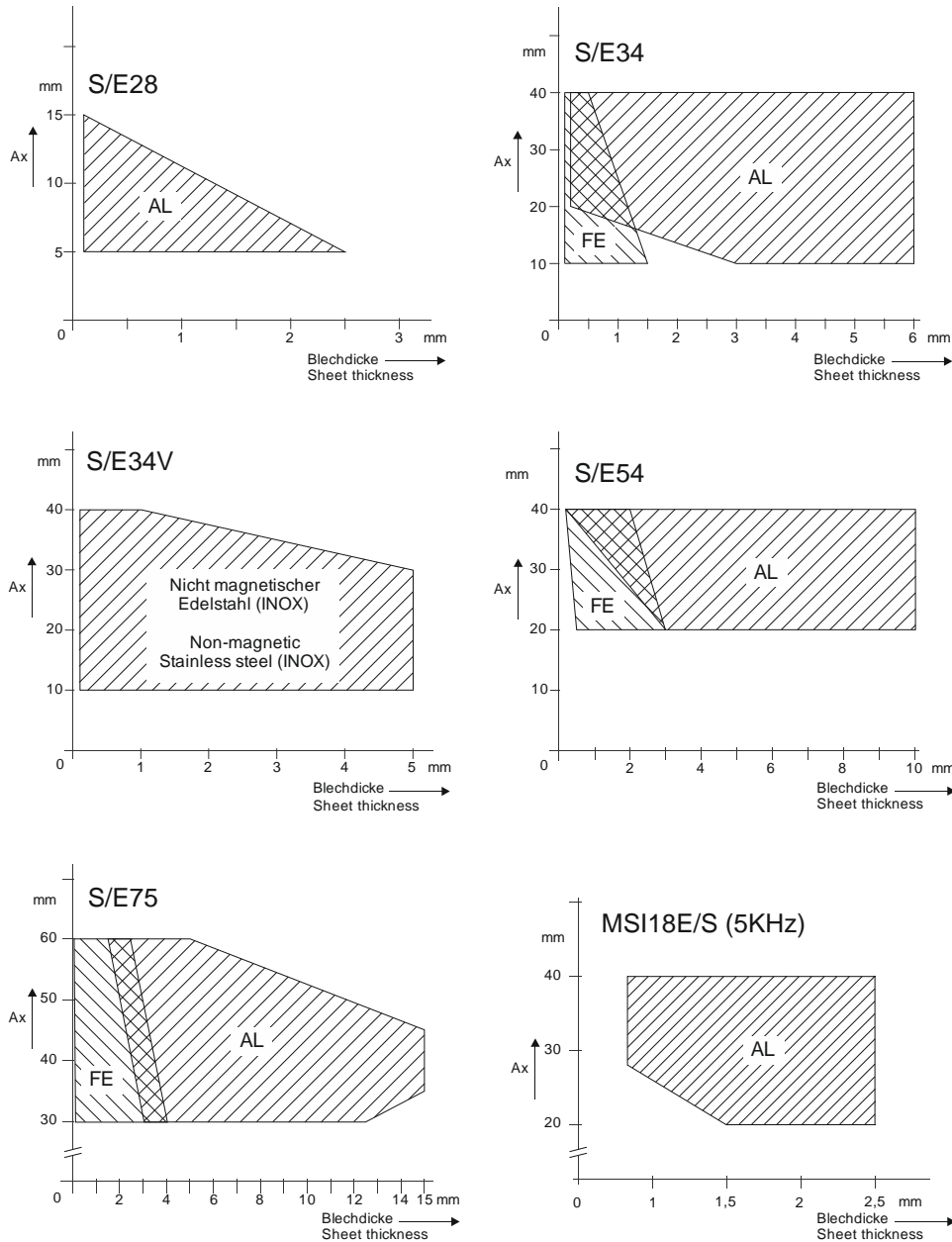


Fig. 5: Sensor diagrams for S/E sensors and MSI18S/E sensors

# Double Sheet Detector R100 I100 for pairs of sensors

## 2.3.2 Cable allocation of S/E-sensors and sensor cables KISS and KISE

For sensors and cables before February 2008

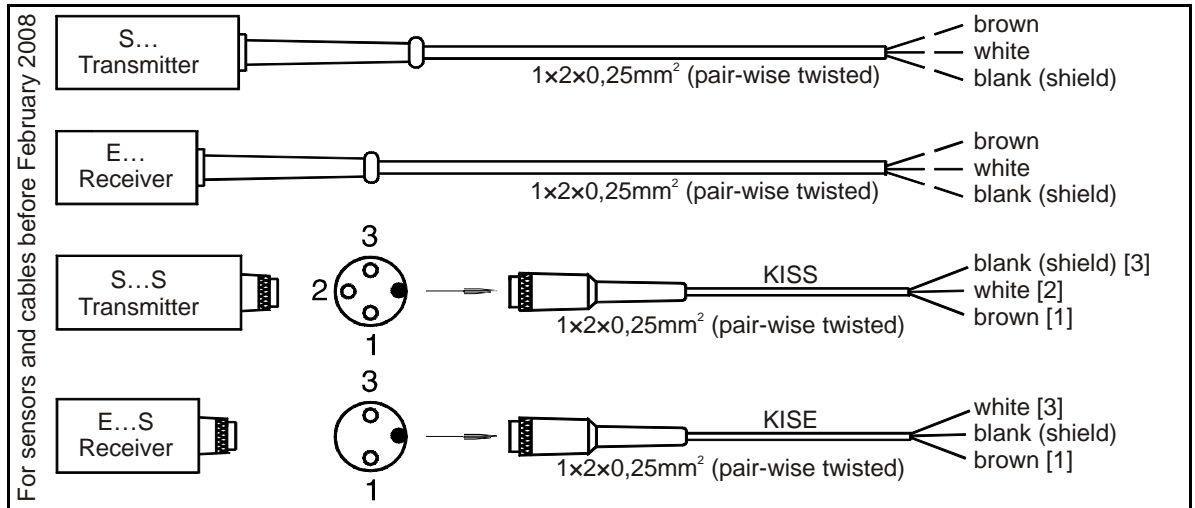


Fig. 6: Cable allocation of S/E sensors and sensor cables before february 2008



**Note:** S/E sensors with black cables should no longer be used.

For sensors and cables after February 2008

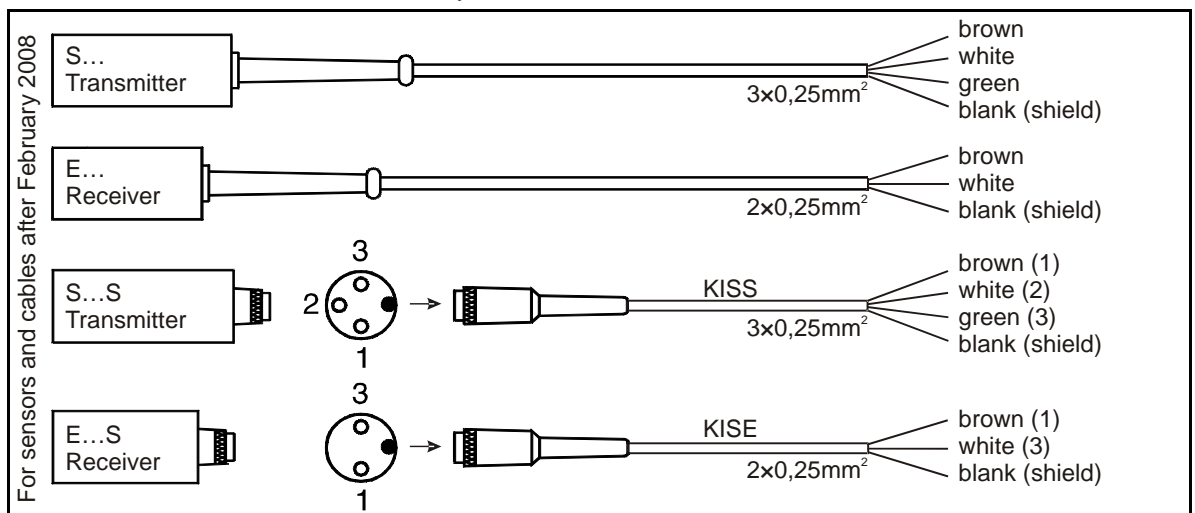
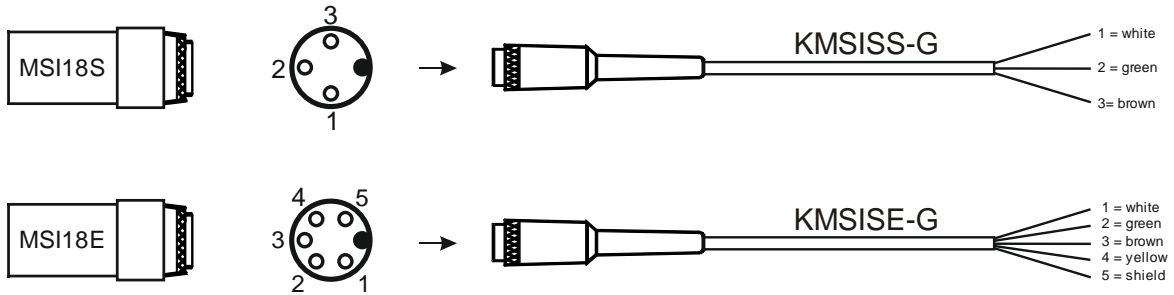
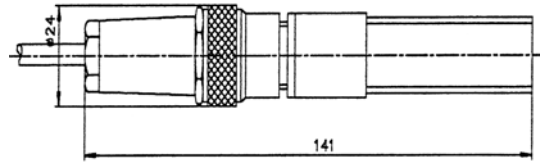


Fig. 7: Cable allocation of S/E sensors and sensor cables after February 2008

**2.3.3 Cable allocation of MSI18S/E-sensors and cables KMSISS and KMSISE**



optional with straight receptacle or



right angle receptacle

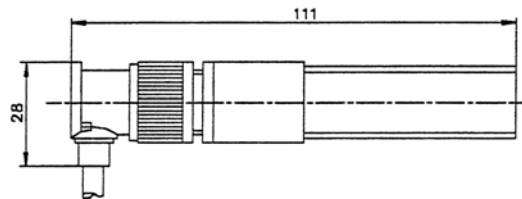


Fig. 8: Cable allocation of MSI18S/E-sensors and sensor cables





## 3 System description

### 3.1 Introduction

When automatically feeding sheets from a stack to a processing machine, it can unintentionally happen that more than one sheet is picked up and transported. This can result in disturbances of the machine run, damage of tools, expensive repair measures and loss of production. The A100 double sheet detectors can reliably prevent from such incidents by measuring the thickness of every sheet from both sides with a pair of sensors.

### 3.2 Structure and measuring principle

A system mainly consists of the control unit, the sensor and the sensor cable.

For performing the measurement, the transporting facility of the machine must move the sheet between the sensors. During the measurement the sensors do not contact the sheet.

The transmitter emits an alternating electrical field, the receiver on the other side of the sheet electronically detects the signal attenuated by the sheet. The receiver signal is processed in the control unit and made available to the machine control as switching signals.

The main influencing factors for the measurement are the material properties of sheets, the sensor bracket (holder), the sensor distance and the neighbouring metal parts.



**Caution! The system is not suited for applications of personal protection!**

## Double Sheet Detector R100 I100 for pairs of sensors

### 3.3 Functional sequence

The transport facility places the sheet between the sensors. The receiving sensor will process the transmitted sensor signal. According to the preset limits, the respective signal output (0-sheet, 1-sheet, 2-sheet) will be set activated.

If the output signal for 2-sheet is active, the PLC stops the material transport for removal of the double sheet.

**Note!**

“Active“means, that the signalling output will switch. In case that the supply voltage fails, all signalling outputs (0-, 1-, 2-sheet) will become inactive.

Then the PLC must stop the material transport.

**Caution!**

Usually, the signalling outputs of the control unit will be used for stopping the material transport facilities and / or machines in case of double sheet.

As soon as the double sheet is removed from the sensor(s), the signalling outputs instantly switch back to normal condition (0-sheet / 1-sheet).

Suitable control measures must ensure that the previously stopped material transport facilities and / or machines cannot automatically restart and thus create hazardous situations.

# Double Sheet Detector R100 I100 for pairs of sensors

## 4 Mounting

### 4.1 Mounting of the control unit

The system is available in 3 different enclosures:

- for machine mounting, cables pluggable, in metal enclosure, protection class IP54.
- for DIN-rail mounting (EN50022, BS5584), protection class IP00.
- for machine mounting, in plastic enclosure with transparent lid, protection class IP65.

The system should be mounted in such a way that the indicators and operating keys in the front of the unit are always well visible. The place should be safely accessible and free from obstruction.

The system must not be exposed to extreme temperature, irradiation or mechanical load.

### 4.2 Mounting of the sensors



**Caution!** The sensors must be kept away from magnet sensitive media (cheque cards, hard disks, diskettes...) and systems (cardiac pacemakers, solenoid switches).

Sensors with different sizes are available. The size has substantial influence on the thickness measuring range.

#### **Mounting:**

The place of mounting depends on the transporting equipment. In principle a distance of more than 0.5m must be kept from magnetic/electromagnetic interference sources like e.g. valve coils, transportation magnets, inductive proximity switches or the like.

The sensors can be mounted in any direction, transmitter and receiver must be aligned face-to-face. The possible distance ( $A_x$ ) of the sensors can be read from the sensor diagrams.

- It is recommended to mount the sensors in "stick-out" position in brackets made of plastic or stainless steel.
- Flush mounting is also possible, then however only in brackets made of plastic material.
- Recessed installation is very unfavourable, particles and splinters can accumulate in the recess.
- Sensor brackets made of electrically well conductive NF metals (aluminum, copper, brass) should not be used, since otherwise the sensor distances must be reduced (see sensor diagrams).

Length and width of the sheet to be controlled should be at least 3 x the sensor diameter. Then safe double sheet control is ensured.

The minimum retention time of the sheet between the sensors (full surface coverage) up to switching the appropriate exit depends on the sensor diameter. The minimum retention time (in milliseconds) corresponds roughly to the sensor diameter. Something similar applies to the minimum measuring break between 2 sheet metals up to switching the appropriate exit.

### 4.2.1 Mounting the MSI18S/E-sensors

Preferably the sensors should be mounted either in sturdy plastic or nonmagnetic stainless steel brackets.

The transmitter and receiver should be mounted aligned to each other with a sensor gap specified in the documentation. Sensors should not be mounted flush in the bracket and recessed mounting should also be avoided in order to prevent accumulation of metallic chips and dirt.

Protruded sensor mounting according to examples "A" or "B" is recommended. Brackets made of aluminum or other nonferrous metal with high electrical conductivity should be avoided in order to prevent performance degradation and reduction in sensor gap  $A_x$ .

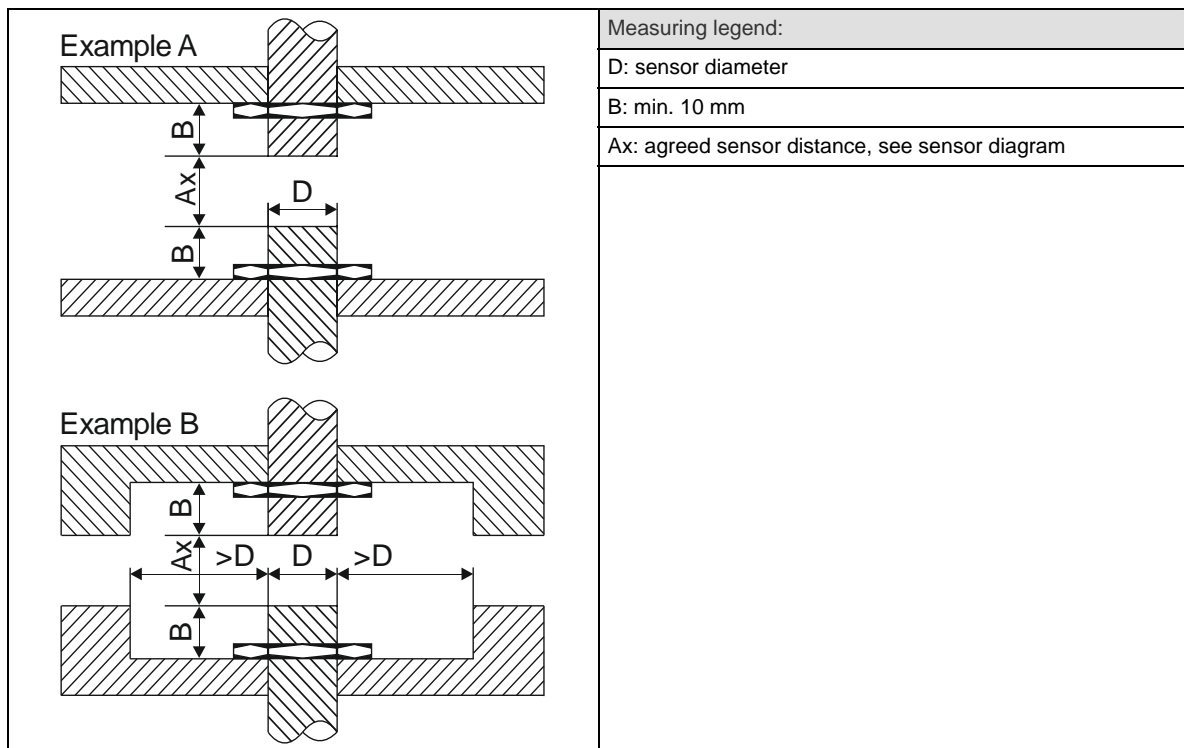


Fig. 9: Mounting the MSI18S/E-sensors

## Double Sheet Detector R100 I100 for pairs of sensors

### 4.2.2 Measurement target

The sensor coverage (measurement target) must be at least the three times sensor diameter. The dimension  $x$  should ideally correspond to the sensor diameter  $D$  (see picture below).

If the coverage is smaller, then the sheets should be transferred with reduced speed through the sensor gap or measured statically. Precondition is however a constant distance to the sheet edge.

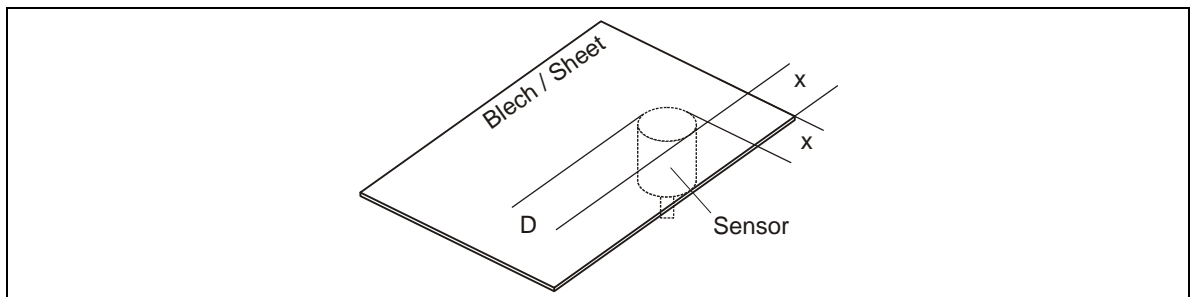


Fig. 10: Measurement target

## Double Sheet Detector R100 I100 for pairs of sensors

### 4.3 Cables

All cables must be professionally installed. Bending radii (see data sheets of manufacturer) must be adhered. The cables must be protected from chafing and buckling by suitable installation.

Damaged cables must not be used and need to be replaced immediately.

If the recommended cables cannot be used (e.g. due to missing UL/CSA approval), substitutes should be cleared with Roland Electronic.

**Note!**

Keep the sensor cables as well as the power supply / control cable away from unshielded cables with strong electro magnetical interference potential (e.g. servo motor and power cables).

#### 4.3.1 Sensor cables

The sensors are available either with plug connector or with fixed cable. For connecting, only the supplied shielded sensor cables may be used. In the standard version those cables are suitable for drag-chain operation but not for robot operation.

The cable shield is connected at both sides.

#### 4.3.2 Power supply / Control cables

Suitable power supply / control cables:

- Type H05VV5-F (Lapp Ölflex® 140) with leads 0.5 mm<sup>2</sup>
- Type H05VVC4V5-K (Lapp Ölflex® 140CY), shielded, with leads 0.5 mm<sup>2</sup>.

A shielded cable must be used if the environment has high electromagnetical interference signals. This cable shield must be grounded at the machine side, not at the control unit side.

## Double Sheet Detector R100 I100 for pairs of sensors

### 5 Electrical installation

The system should be installed only by professional electricians. The cables must correspond with the specifications stated in section „Cables“.

**Note!**

For connecting the cables to the control unit, insulated wire-end ferrules must be used.



The required supply voltage is 24 V DC and should be supplied from the associated machine controls.





# Double Sheet Detector R100 I100 for pairs of sensors

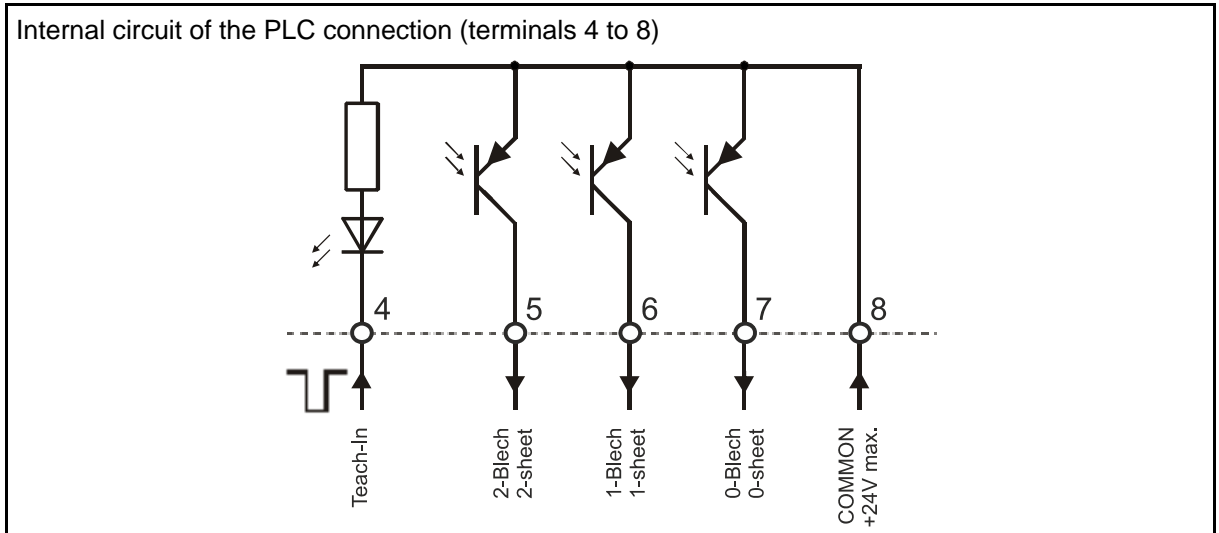


Fig. 11: Connecting diagram for I100 and I100-IP65

## 5.2 Connecting diagram for MSI18S/E-sensors

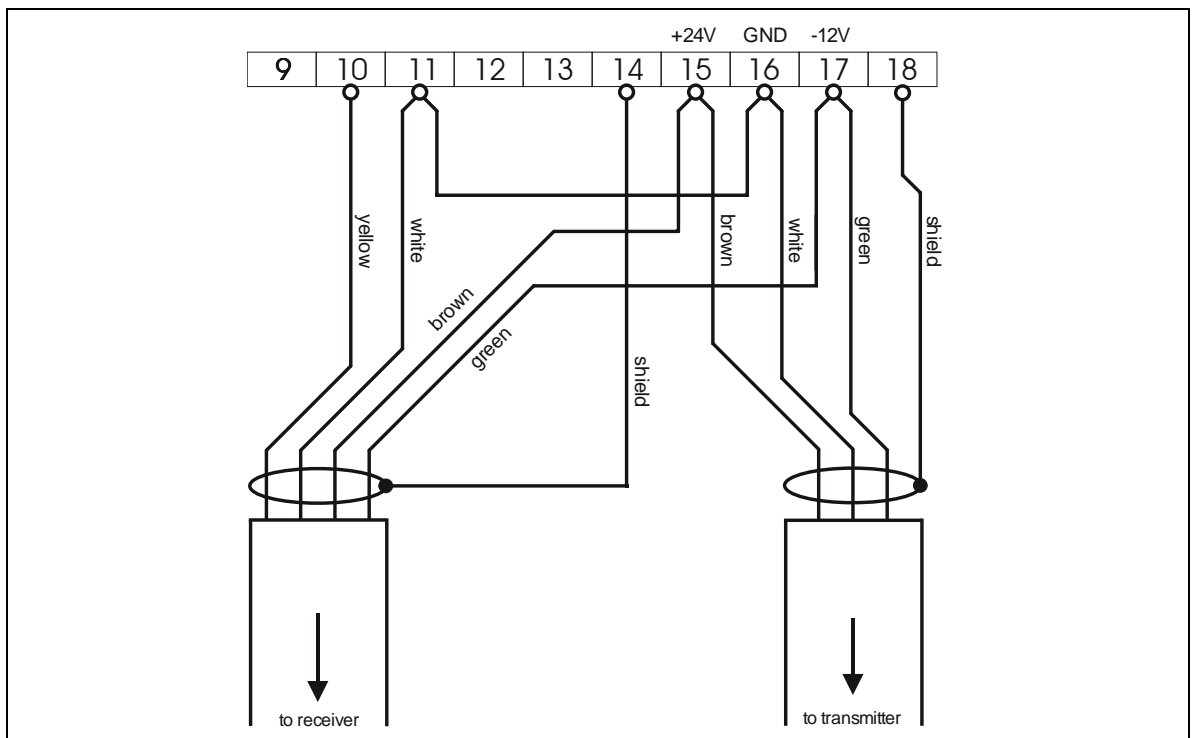


Fig. 12: Connecting diagram for MSI18S/E-sensors

## Double Sheet Detector R100 I100 for pairs of sensors

### 5.3 Connections at I100-S

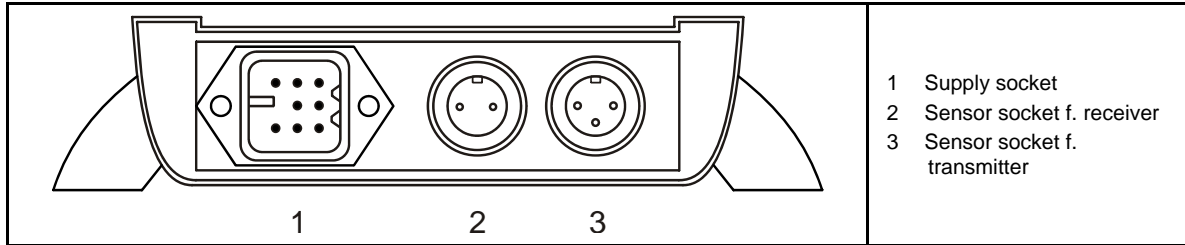
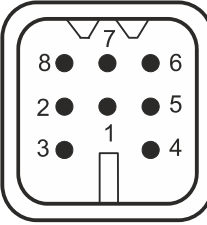


Fig. 13: Connections I100-S

Supply socket (pos. 1)				
 view onto contacts	Socket at unit		Supplier / types / remarks	
	Enclosure HAN 3A, EMI-type, metrical 7-pin insert with PE, Pin contacts at control unit			Harting and others
	Pin 1	+24V DC	Internal Pin 2	
	Pin 2	common / GND	Internal Pin 3	
	Pin 3	Teach-In	Internal Pin 4	
	Pin 4	2-sheet	Internal Pin 5	
	Pin 5	1-sheet	Internal Pin 6	
	Pin 6	0-sheet	Internal Pin 7	
	Pin 7	+24V DC f. I/O	Internal Pin 8	
	Pin 8	PE	Internal Pin 1	
The associated cable plug (contacts) is not within the scope of delivery, it must be ordered separately under S0003515. See also chapter "Order data".				


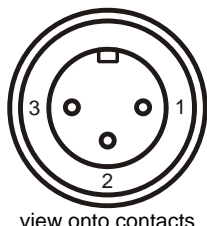
Sensor socket f. receiver (pos. 2)				
 view onto contacts	Socket at unit		Supplier / types / remarks	
	M12, 2-pin, B-coded, female connector at control unit			Binder Type 713 and others
	Pin 1	+V <sub>in</sub>	Internal Pin 10	Wire colour: brown
	Pin 2	-V <sub>in</sub>	Internal Pin 11	Wire colour: white
Enclosure	Shield	Internal Pin 14	transparent / green-yellow	
Sensor socket f. transmitter (pos. 3)				
 view onto contacts	Socket at unit		Supplier / types / remarks	
	M12, 3-pin, B-coded, female connector at control unit			Binder Type 713 and others
	Pin 1	+12V	Internal Pin 15	Wire colour: brown
	Pin 2	-12V	Internal Pin 17	Wire colour: white
	Pin 3	common / GND	Internal Pin 16	Wire colour: green
	Shield	Internal Pin 18	transparent / green-yellow	

Fig. 14: sockets I100-S

# Double Sheet Detector R100 I100 for pairs of sensors

### Sensors and cables

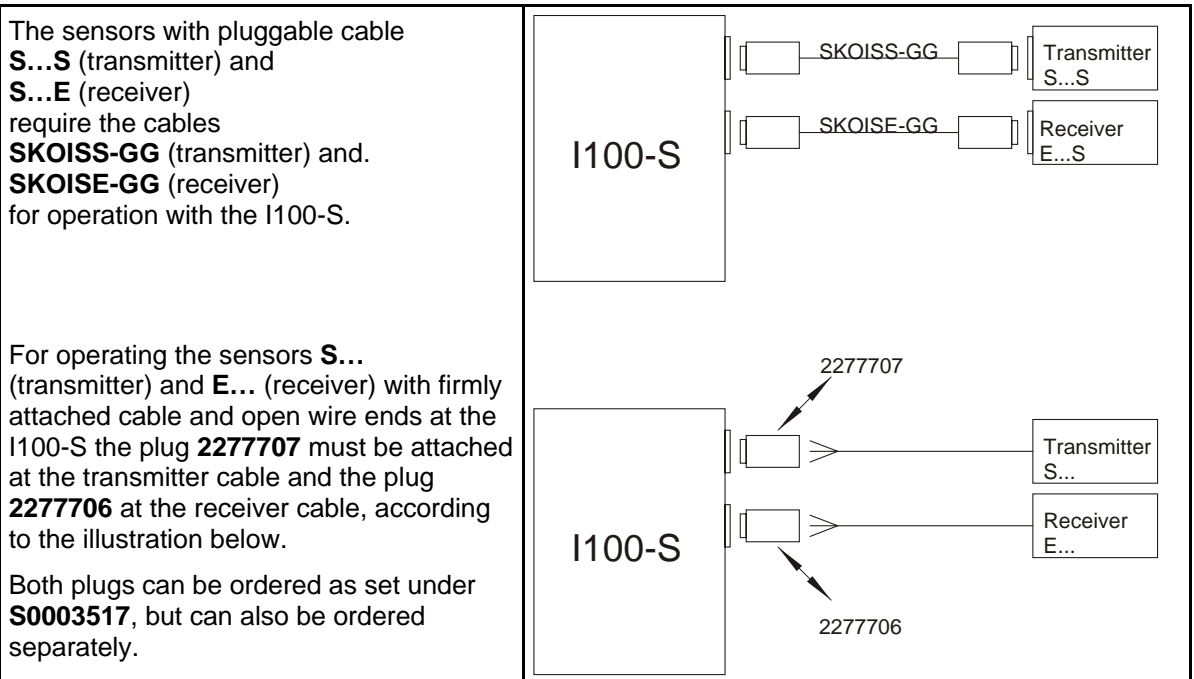


Fig. 15: Sensors and cables for I100-S

Sensor plug for receiver (2277706)			
<p>view onto soldering side</p>	Pin 1	+V <sub>in</sub>	wire colour: brown
	Pin 3	-V <sub>in</sub>	wire colour: white
	enclosure	shield	transparent / green-yellow
Sensor plug for transmitter (2277707)			
<p>view onto soldering side</p>	Pin 1	+12V	wire colour: brown
	Pin 2	-12V	wire colour: white
	Pin 3	common / GND	wire colour: green
	enclosure	shield	transparent / green-yellow

Fig. 16: Allocation of sensor plugs for I100-S



Manual  
Double Sheet Detector R100 I100  
for pairs of sensors

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## 6 Start-up

### 6.1 Keys and indicators

The control unit has three operating keys, which provide for easy adjustment. Adjustment is required upon commissioning and change of material.

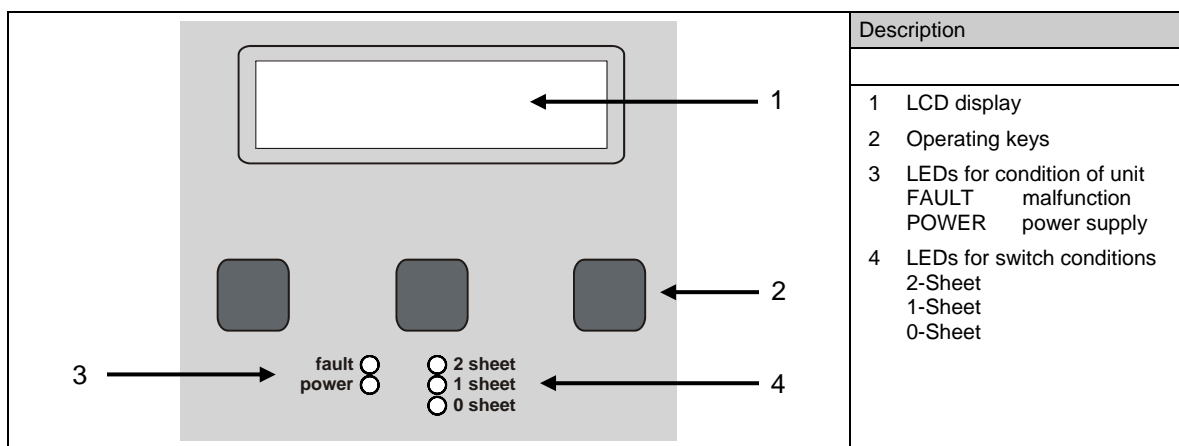
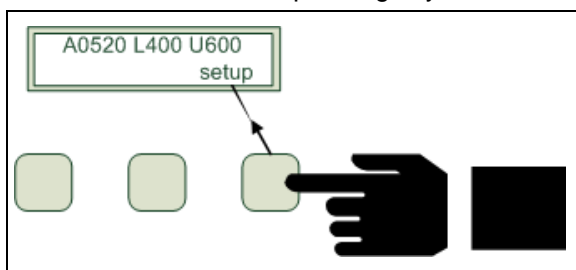


Fig. 17: Controls and indications

### 6.2 Allocation and function of keys

The functions of the 3 operating keys are variable, as will be shown in the lower line of the display.



For example, the operator can change from the measuring mode into the setup mode with the key "setup".

Fig. 18: Indication of key allocation



**Note!**

If a function causes a fault, a fault number is indicated and the yellow LED "FAULT" lights.

The error condition can be confirmed with the right "ENTER" key. Otherwise the system changes to the measuring mode after approx 5 seconds. The "FAULT" LED will, however, go off only if upon a new attempt the requested function is fault free.

If a function consists of several steps, which are not completely executed, the system automatically changes back to the original measuring mode after approx. 5 seconds.

## Double Sheet Detector R100 I100 for pairs of sensors

### 6.3 Switching on and Powering up

Applying the supply voltage (24 V DC) to the unit will switch the unit on, as soon as power is supplied the POWER LED lights.

When the operation system is loaded, the manufacturer and system information will be shown for a short period.:

<b>Roland</b> <b>Electronic GmbH</b>
---

and then

<b>A100</b> (I100 for system I100) <b>Sw.1.0 21.05.2007</b> <sup>1</sup>
---

Fig. 19: Indication of manufacturer and system information

The unit changes automatically to the measuring mode and will work with the last taught values.

### 6.4 Operational conditions

#### 6.4.1 Undisturbed operation

As long as no fault is detected in the measuring mode, no operator actions are required.

The unit measures continuously and sets the signal output according to the measurement result.

#### 6.4.2 Detection of 0-sheet, 1-sheet or 2-sheet

As long as the measured value is within the range of 85% to 115% of the nominal value, the system will detect 1-sheet.

If the measured value is outside the range, the system will then detect 0-sheet (no sheet) or 2-sheet (double sheet).

- The associated LED (0-SHEET, 1-SHEET, 2-SHEET) will light up accordingly.
- The associated signal output will be set to low resistance (active).
- The signal outputs 0-SHEET, 1-SHEET, 2-SHEET will deliver a switch voltage only if an external positive voltage (max. +24V, max. 50mA) is applied to the COMMON input (terminal 8).

<sup>1</sup> Depending on software version



## Double Sheet Detector R100 I100 for pairs of sensors

### 6.4.3 Operational disturbances

If situations arise during operation, which the system recognizes as "operational faults", the system reacts with the "FAULT" LED lighting and issues the assigned fault message (if any).

- If the fault condition was caused by the machine PLC, the signal outputs for 1-sheet **and** 2-sheet are set at the same time. The illogical constellation of 1-sheet **and** 2-sheet will indicate the fault condition to the machine PLC. Depending upon the PLC programming an appropriate reaction can then be initiated. Recognizable faults are to be eliminated and the function should be performed again.
- If the fault condition was caused by the operator or by the system, the operator must react according to the measures explained in the fault table.
- If the fault cannot be assigned, restarting the system by recycling power may eliminate the fault.

### 6.4.4 Functional check

If the system does not detect double sheet conditions though a Teach-In was freshly performed, the sensorics might (according to material properties) work at the detecting limit.

First, the mechanical sensor settings should be checked, as well as the working range (according to sensor data).

If the mechanical circumstances are correct and the sensor is operated within the permissible range, the upper limit might be improved by changing the upper threshold. For doing so, refer to section "changing the thresholds".

## 6.5 Measurement mode

After having applied power, the following will be displayed on the LCD display:

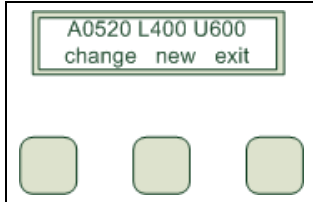


Fig. 20: Indication in the measurement mode

In the measurement mode the current measurement value and the switching thresholds will be shown.

Axxx	The input signal of the sensor is represented as digital value between 0000 and 1024 this value is equivalent to the relative thickness of the material. A possible result may look like this: 0.5 mm steel A=0300; 1.0 steel A=0590
Lxxx	Lower absolute threshold (0-999)
Uxxx	Upper absolute threshold (0-999)

The relation between material thickness and digital value depends on the sensor selected and is not exactly linear. The nonlinearity is influenced by the type of material. During “teach-in” the input amplifier can adopt its amplification factor and this results in a different digital value. Example for this influence: Material A with thickness 1 mm may show 0400 after “teach-in”. Material B with thickness 1.5 mm may show 0300 as digital value after “teach-in”.

Since the display shows the actual measurement value as well as the set switching thresholds, it can easily be checked whether the thresholds are correctly set.

### 2-sheet threshold:

The threshold for 2-sheet should be selected such that it is located slightly **above** the normal variation range for 1-sheet, but will be significantly exceeded in case of 2-sheet so that 2-sheet will be securely detected.

### 0-sheet threshold:

The threshold for 0-sheet should be selected such that it is located slightly **below** the normal variation range for 1-sheet, but will be significantly exceeded in case of 0-sheet so that 0-sheet will be securely detected.



## 6.6 Teach-In

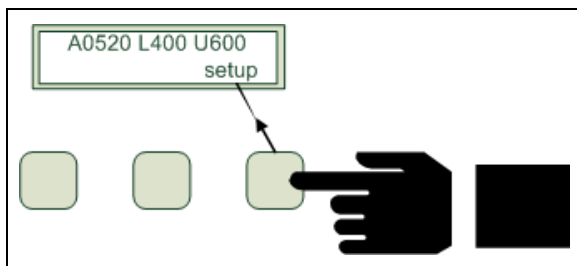
This function is useful in case of changing material or upon initial commissioning. The system is in the measurement mode.



**Attention!** The function must not be used, if threshold values other than the standard values (85% / 115%) are used. This function deletes the modified values and uses the standard values instead.

**Preparation:** A100: Place the sensor on the sheet.  
I100: Place the sheet between the sensors.

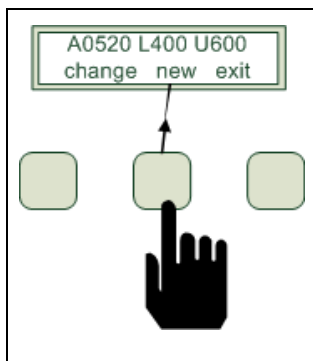
### Step 1



Push the key "setup".

Fig. 21: Calling up the setup mode

### Step 2



Push the key "new".

The current measurement value will now be stored as reference value. From this value the absolute thresholds L (lower limit) and U (upper limit) will be calculated with the factors 85% und 115% and then be stored also.

If the function is performed, the system automatically changes back to measuring mode and shows the new switching thresholds.

If the function could not be performed, a fault message will be shown in the LCD display.

Fig. 22: Storing the current measurement value as reference value



**Note!** If the Teach-In fails, the previous thresholds stay active. The yellow "FAULT" LED lights until the next Teach-In is successfully performed.

### Step 3 Final inspection, it must be performed after every Teach-In !

- Apply a double sheet repeatedly and check if the double sheet will be detected in any case.
- If the double sheet will not be safely detected, restrict the switching thresholds (see section „Changing the switching thresholds“).

## 6.7 Changing the switching thresholds

This function should only be performed, if the factory-set values for the thresholds (85% and 115%) cannot be used.

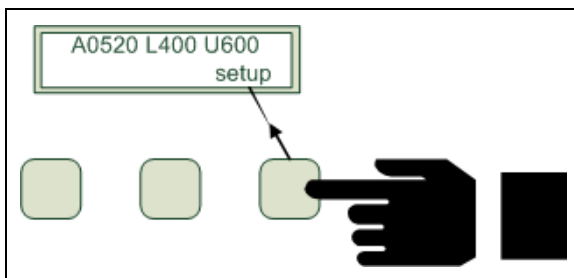


**Note!**

If this function is executed, the external Teach-In will also work with the changed values.

**Preparation:** A100: Place the sensor on the sheet.  
I100: Place the sheet between the sensors.

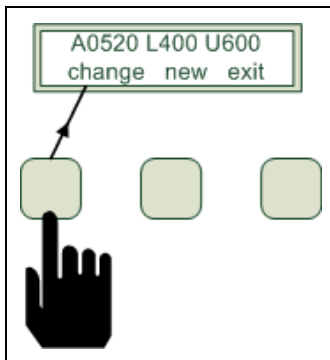
### Step 1



Press the key "setup".

Fig. 23: Calling up the setup mode

### Step 2

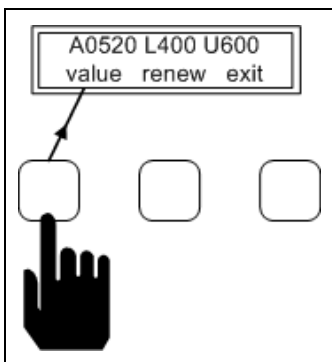


Press the key "change".

Fig. 24: Calling up a change

# Double Sheet Detector R100 I100 for pairs of sensors

### Step 3

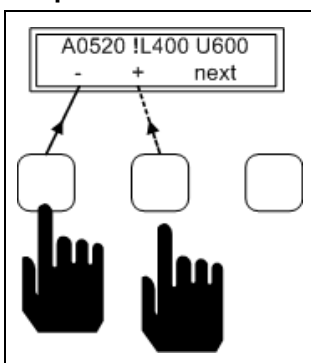


Press the key "value".

Pressing the key "value" enables editing of the thresholds for L and U. Editing is done with the absolute values, based on the current measurement value.

Fig. 25: Enabling editing

### Step 4

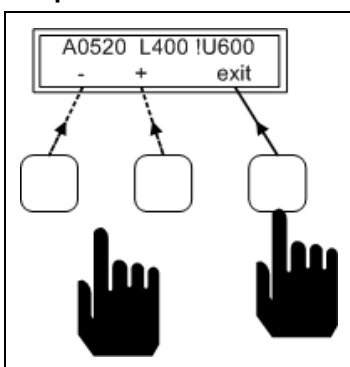


The sign "!" before "L" indicates that the value L can be changed.

The key "-" decreases the L value,  
the key "+" increases the value.

Fig. 26: Changing the lower threshold value L

### Step 5



Select the parameter U with the key "next".  
The sign "!" closes up to the "U".

The key "-" decreases the L value,  
the key "+" increases the value.

Fig. 27: Selecting the upper threshold value U and changing the value

### Step 6

Closing the setting:

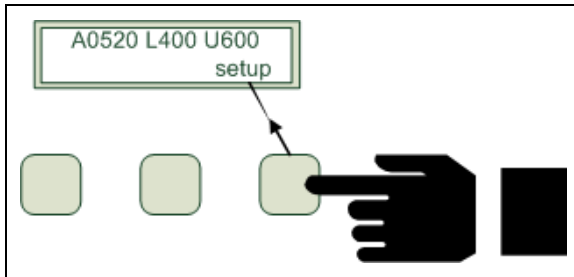
With the key „exit“ the values are stored. The system changes over to the measurement mode. The changed thresholds will be used from now on.

## 6.8 Teach-In with changed threshold values

This function should only be performed if different threshold settings are to be used.

**Preparation:** A100: Place the sensor on the sheet.  
I100: Place the sheet between the sensors.

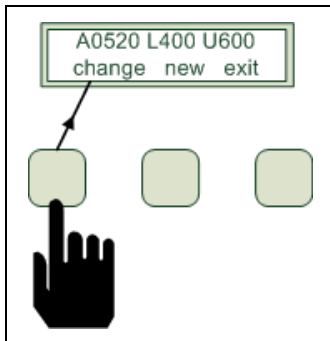
### Step 1



Press the key "setup".

Fig. 28: Calling up the setup mode

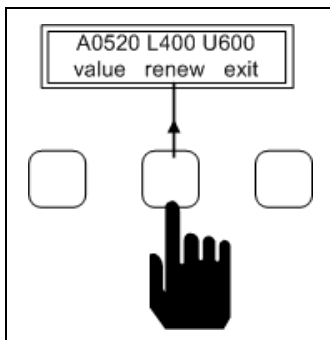
### Step 2



Press the key "change".

Fig. 29: Calling up a change

### Step 3



Press the key "renew".

By pressing the key "renew" the Teach-In will be performed with the modified settings.

The current measurement value is stored as reference value. Based on the reference value the absolute values for the thresholds L and U are calculated with the modified relative factors and be stored also.

Fig. 30: Performing the Teach-In with modified values

Has the function been executed, the system automatically changes to the measurement mode and shows the new thresholds.

If the function could not be executed, a fault message appears in the LCD display.

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### 6.9 External Teach-In

External Teach-In is useful, if the control unit is not mounted at the place of measurement but inside the control cabinet, and the material will be frequently changed.

The external Teach-In can be triggered via the machine PLC or with a simple pushbutton.

**Note!**

Before the external Teach-In can be performed, a Teach-In must once have been performed at the control unit via operating keys.

**Preparation:**

A100: Place the sensor onto the sheet.

I100: place the sheet between the sensors.

**Step 1**

Switch the input "Teach-In" (terminal 4) to GND for a short time (see section "connection diagram"). After that the signal outputs "1-sheet" AND "2-sheet" activated as feedback.

**Step 2**

Again switch the input "Teach-In" (terminal 4) to GND for a short time. The teach-In will then be performed.

If the Teach-In was successful, the system releases the measurement result "1-sheet" and automatically switches over to the measurement mode.

**Note!**

If the second step is not performed, the system reverts back to the measurement mode after approx. 5 seconds without any changes.

If the Teach-In was not successful, the signal outputs "1-sheet" and "2-sheet" will stay active for the present. Furthermore, an error message will be shown on the LCD indication and the yellow "FAULT" LED will be actuated.

The error message will disappear after approx. 5 seconds, and the outputs "1-sheet" and "2-sheet" will be de-activated. The system then automatically reverts back to the measurement mode.

Measurements are performed with the currently existing Teach-In value.

The "FAULT" LED will go off only if a new Teach-In has been successful or if the system is re-started by recycling power.

**Note!**

The external Teach-In will always be performed with the last valid thresholds.



## Manual

# Double Sheet Detector R100 I100 for pairs of sensors

Start-up

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## 7 Fault messages, causes and remedies

Message	Meaning	Cause / Remedy
<b>Error 1</b>	Value for Teach-In is not plausible (measurement value is smaller than 25 or larger than 960)	Sensor has no contact with the sheet Sensor cable is cut off Sensor type is not suitable System might be defective
<b>Error 2</b>	Value for external Teach-In is not plausible (measurement value is smaller than 25 or larger than 960)	Sensor has no contact with the sheet Sensor cable is cut off Sensor type is not suitable System might be defective
<b>Error 3</b>	External Teach-In is not permitted (system is still in factory-set condition)	Factory settings have not been overwritten – perform Teach-In via operating keys once.



## Manual

# Double Sheet Detector R100 I100 for pairs of sensors

Fault messages, causes and remedies

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## 8 Maintenance

During operation, chips and metal particles can accumulate at the sensors. Thus the sensors must be cleaned from time to time.

During operation, the sensors do not touch the sheets, so normally there will be no wearing to the sensors. If, however, the sensors are exposed to mechanical strain for any reason (abrasion, damage of sensor face), they must be replaced if the sensor faces begin to show small punctures.

A pair of sensors and a sensor cable should be kept on stock as spare parts.

When ordering spare parts, always state the serial number, the order information and the part number (if available).



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# Double Sheet Detector R100 I100 for pairs of sensors

Maintenance

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Order data

**9 Order data****Control units, for pairs of sensors (transmitter / receiver)**

Order information	Comment
I100	Control unit, supply voltage is 24 V DC.
I100-S	Control unit, for pluggable sensors supply voltage is 24 V DC, enclosure with protection class IP54.
I100-IP65	Control unit, supply voltage is 24 V DC, mounted in a protective enclosure with protection class IP65.

**Sensors**

Order information	Comment
S/E28	Pairs of sensors, fixed cable with open wire ends for terminal block wiring. Standard cable length is 2 meters, lengths up to 20 meters made to order.  When using those sensors with the system I100-S, mount the plug 2277707 at the transmitter cable and the plug 2277706 at the receiver cable. Please order those plugs separately.
S/E34	
S/E34V_16kHz	
S/E54	
S/E75	
S/E28S	Pairs of sensors, with plug connector for connecting the sensor cable (order cable separately).  When using those sensors with the system I100-S, please use the cables SKOISS and SKOISE.
S/E34S	
S/E34VS_16kHz	
S/E54S	
S/E75S	
MSI18S/E	Pairs of sensors, with plug connector for connecting the sensor cable (order cable separately).  When using those sensors with the system I100 and I100-IP65, please use the cables KMSISS-G and KMSISE-G.



# Manual

## Double Sheet Detector R100 I100 for pairs of sensors

Order data

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### Cables (for connecting pluggable sensors)

Order information	Comment
<b>KISS-G</b>	For connecting the transmitter, only for systems I100 and I100-IP65
<b>KISE-G</b>	For connecting the receiver, only for systems I100 and I100-IP65
<b>KMSISS-G</b>	For connecting the transmitter, only for systems I100 and I100-IP65
<b>KMSISE-G</b>	For connecting the receiver, only for systems I100 and I100-IP65
<b>SKOISS</b>	For connecting the transmitter, only for system I100-S
<b>SKOISE</b>	For connecting the receiver, only for system I100-S
<b>S0003517</b>	Plug set, for sensor cables with open wire ends, consisting of: - 2277707 plug, for transmitter cable - 2277706 plug, for receiver cable The plugs can also be ordered separately.
<b>S0003515</b>	Supply plug set, complete, consisting of: - 2279013 sleeve enclosure - 2276001 socket insert - 2278003 8 pcs. socket contact 0,5mm <sup>2</sup> - 2291011 screw fitting PG11 The parts of the plug can also be ordered separately.

**Standard cable length is 2 meters, lengths up to 20 meters upon order, larger lengths upon request.**

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