ROLAND
sensor technology

DOUBLE SHEET DETECTION

I21 DOUBLE SHEET

DUAL HEAD SYSTEM, NON-CONTACTING

- Suitable for magnetic feeder systems
- Calibration by Teach-In procedure
- 5" capacitive touch display
- Simple and clearly structured menu
- Monitoring of over-gauge and under-gauge limits
- Monitoring of operating voltage & sensor distance
- Integrated fieldbus interface or IO interface
- Available as wall mounting enclosure or as front panel mounting

I21 DOUBLE SHEET

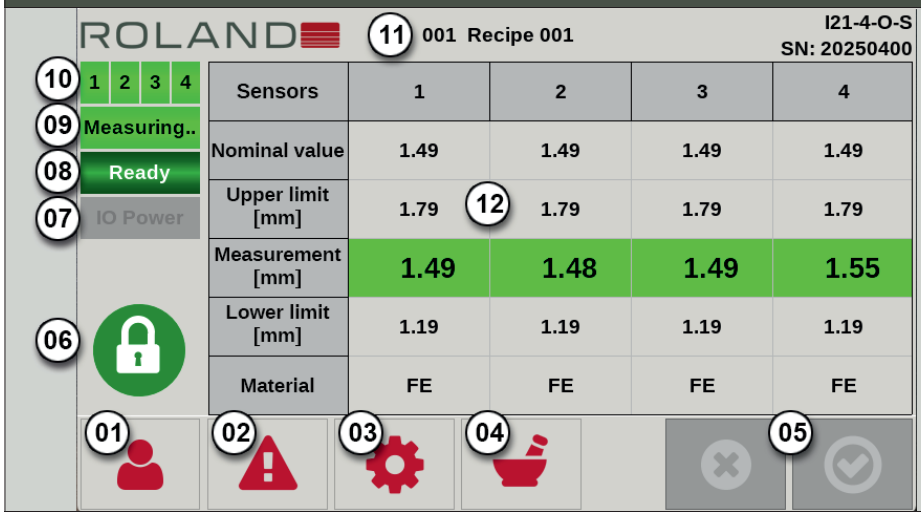
Description

Flexible Manufacturing Systems in the sheet processing industry require reliable Double Sheet Control systems in order to protect presses and other sheet processing machines against damage caused by feeding multiple sheets.
The Double Sheet Detector I21 was specifically developed for this technical environment. Depending on the application (type of material, thickness, sensor gap) the I21 can be used with up to four pairs of sensors. The reliable function of the Double Sheet Detector highly depends therefore most importantly on the selection of the correct sensors and the mounting of the sensors.
The I21 consists in the standard version of three components:
- control unit
- one pair of sensors (transmitter and receiver)
- sensor cables

Function

The function of the sensor system is based on the measurement of eddy currents. The sensor system consists of a transmitter and a receiver. The transmitter generates an electro magnetic field, which generates eddy currents in the target.
The eddy current loss in the sheet dampens the electro magnetic field. These losses are measured in the receiver and provide a measure of the sheet thickness.

Frontal view of the I21



01: User selection
02: Error list
03: Settings
04: Recipe editing
05: Menu navigation
06: Current user mode
07: Interface status
08: System status
09: Current device action
10: Active sensors of the current recipe / action
11: Current recipe number/name
12: Measured value display

Control unit I21 with opto coupler interface

I21-2-O-S-FP
A B C D E

A	Type of unit	I21	
B	No. of sensors	2 4	Up to 2 sensor pairs Up to 4 sensor pairs
C	Outputs	O	Opto coupler
D	Connections	S	Cables pluggable
E	Enclosure version	FP	Front panel mount

Control unit I21 with fieldbus interface

I21-2-XX-S-FP
A B C D E

A	Type of unit	I21	
B	No. of sensors	2 4	Up to 2 sensor pairs Up to 4 sensor pairs
C	Fieldbus version	XX	Bus code
D	Connections	S	Cables pluggable
E	Enclosure version	FP	Front panel mount

XX bus code
PR = Profibus-DP
DNT = DeviceNet
PN = ProfiNet IO
CC = CC-Link
EN = Ethernet/IP
ET = EtherCAT

Sensor cable SCI20S-xx

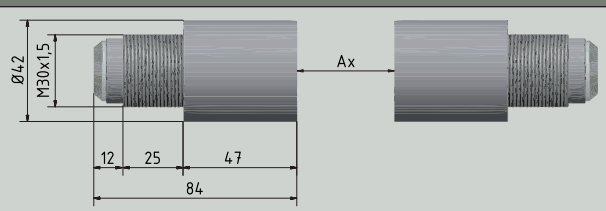
Bending radius depends on cable type.
Min. 50 mm for fixed installation, min. 100 mm for movable installation

Sensors

For performing Double Sheet Detection with I21 the following sensor pairs are required: IS/IE20-30GS, IS/IE42-30GS or ISQ42S / IEQ42S.
To perform part inspection, material inspection, or hardness inspection the sensor pair ISQ160S / IEQ160S has to be used.

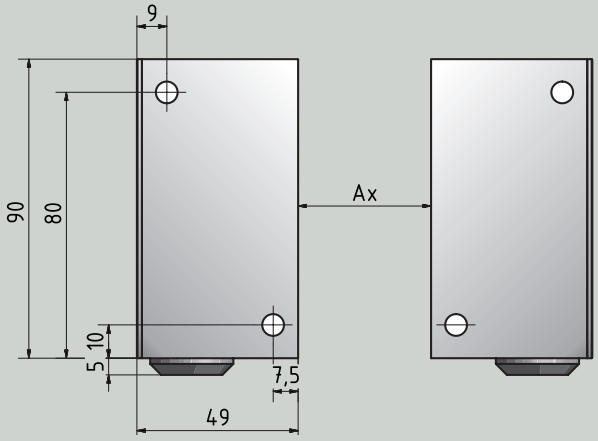
Sensor pair IS42-30GS / IE42-30GS

Application:	Double Sheet Detection
Sheet thickness*:	0.15 - 8 mm for steel 0.1 - 16 mm for aluminum (LW 20 - 30 MS/m) 0.5 - 16 mm for austenitic stainless steel
* at nominal sensor distance Ax (min. / max.) 40 (20 –80) mm	
Sensor distance:	see sensor diagrams in the manual
Measurement principle:	Eddy current
Protection class:	IP54
Weight:	approx. 0.45 kg (1 lbs)
Material of enclosure:	stainless steel / brass, nickel plated
Sensor cable:	Quick disconnect



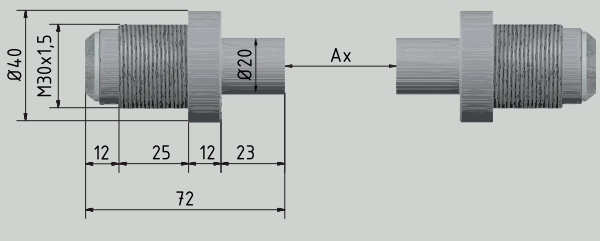
Sensor pair ISQ42S / IEQ42S or Sensor pair ISQ42FS / IEQ42FS

Application:	Double Sheet Detection
Sheet thickness*:	0.15 - 8 mm for steel 0.1 - 16 mm for aluminum (LW 20 -30 MS/m): 0.4 - 16 mm for austenitic stainless steel
* at nominal sensor distance Ax (min. / max.) 40 (20 –80) mm	
Sensor distance:	see sensor diagrams in the manual
Measurement principle:	Eddy current
Protection class:	IP54
Weight:	approx. 0.50 kg (1.1 lbs)
Material of enclosure:	plastic
Sensor cable:	ISQ / IEQ42S: Quick disconnect ISQ / IEQ42FS: 0.2 m permanently connected cable, quick disconnect plug at end



Sensor pair IS20-30GS / IE20-30GS:*

Application:	Double Sheet Detection
Sheet thickness**:	0.05 - 4 mm for steel 0.05 - 5 mm for aluminum (LW 20 - 30 MS/m) 0.2 - 5 mm for austenitic stainless steel
** at nominal sensor distance Ax (min. / max.) 20 (10 –40) mm	
Sensor distance:	see sensor diagrams in the manual
Measurement principle:	Eddy Current
Protection class:	IP54
Weight:	approx. 0.25 kg (0.55 lbs)
Material of enclosure:	stainless steel / brass, nickel plated
Sensor cable:	Quick disconnect



* For small , thin sheets. Not suited for magnetic strip.
Note: For magnetic feeder systems we recomend the sensor pairs IS /IE42-30GS, ISQ42S / IEQ42S or ISQ42FS / IEQ42FS

Technical Data

I21	
Operating voltage:	24 V DC +6 V / -2V
Power consumption:	< 12 W
Class of protection:	IP 65 (Wall Mount Enclosure) / IP40 (Front Panel Mounting)
Ambient temperature:	0°C - 50° C during operation
Weight:	approx. 3 kg (6.61 lbs)
Backup / Restore / Update:	USB-Stick
I21 IO:	Signal inputs: 24 VDC with common ground reference Signal outputs: 24 VDC high side switching with common supply, max. 0.5 A
I21 Fieldbus:	Version according to the specification of the respective fieldbus
Operating system:	Linux, Realtime OS

Order information

I21 Fieldbus version	Wall Mount Enclosure	Front Panel Mounting (FP)	
Part no.	Description	Part no.	Description
I21-2-XX-S	2 Sensor pairs	**I21-2-XX-S-FP**	2 Sensor pairs
I21-4-XX-S	4 Sensor pairs	**I21-4-XX-S-FP**	4 Sensor pairs
XX: **PR**=PROFIBUS DP, **DNT**=DeviceNet (A-Coding), **PN**=PROFINET IO, **CC**=CC Link, **EN**=Ethernet/IP, **ET**=EtherCAT			
I21 IO	**Wall Mount Enclosure**	**Front panel mounting (FP)**	
Part no.	Description	Part no.	Description
I21-2-O-S	2 Sensor pairs	**I21-2-O-S-FP**	2 Sensor pairs
I21-4-O-S	4 Sensor pairs	**I21-4-O-S-FP**	4 Sensor pairs

Sensors			
Transmitter		**Receiver**	
Part no.	Description	Part no.	Description
IS42-30GS	Sensor transmitter 42 mm Ø, without cable with sensor plug for sensor cable connection, sensor with thread sleeve M30 x 1.5, 2 flat nuts M30	**IE42-30GS**	Sensor receiver 42 mm Ø, without cable with sensor plug for sensor cable connection, sensor with thread sleeve M30 x 1.5, 2 flat nuts M30
ISQ42S	Sensor transmitter in cubical enclosure with 50mm installation height, mounting M6 screws, without cable, with sensor plug for sensor cable connection	**IEQ42S**	Sensor transmitter in cubical enclosure with 50mm installation height, mounting M6 screws, without cable, with sensor plug for sensor cable connection
ISQ42FS	Same as ISQ42S, but with fixed cable 0,2 m	**IEQ42FS**	Same as IEQ42S, but with fixed cable 0,2 m
IS20-30GS	Sensor transmitter 20/40 mm Ø, without cable with sensor plug for sensor cable connection, sensor with thread sleeve M30 x 1.5, 2 flat nuts M30	**IE20-30GS**	Sensor receiver 20/40 mm Ø, without cable with sensor plug for sensor cable connection, sensor with thread sleeve M30 x 1.5, 2 flat nuts M30
ISQ160S	Sensor transmitter in cubical enclosure with 36 mm installation height, mounting M4 without cable with sensor plug for sensor cable connection	**IEQ160S**	Sensor receiver in cubical enclosure with 36 mm installation height, mounting M4 without cable with sensor plug for sensor cable connection

Cables		
Part no.	Specification	Description
SCI20S-GG	Superflex TRONIC[C]PUR TP 4 x 2 x 0.25 mm²	Cable for connecting the sensors IS / IE20-30GS, IS / IE42-30GS with the I21, both cable ends with quick disconnect, straight cable plug at the unit (GG), resp. angular cable socket (GW) at the sensor side.
SCI20S-GW		
SCI20S-GG-TE		Extension cable for SCI20S-GG and SCI20S-GW, **as well as for sensors ISQ/IEQ42FS**

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