LCC Series

Laser Copy Counters

LCC Series laser copy counters primarily are designed for detecting and counting magazines or single sheets in imbricated arrangement. In the optimal operating range they detect sheet edges of a thickness of typ. 50 µm.

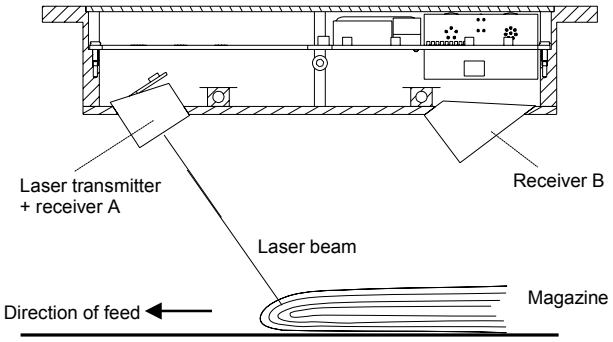
The sensors of LCC Series are characterised by their reliable function, their ease of operation, and their sturdy mechanical construction.

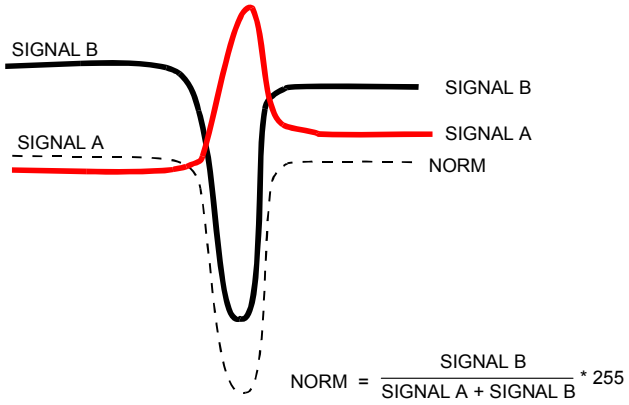
Further characterising features of this sensor series are their high scanning frequency and their ability to adjust themselves to differently bright and dark, or slow and fast moving parts.

Characteristics

Functional principle of the sensor

The LCC-... laser copy counter comprises a laser transmitter (laser diode, λ=670 nm) and two receivers. The laser beam is focussed at an angle onto the magazine or sheet opposite to the direction of feed. When an edge arrives, it blocks the beam path to receiver 2, whereas the signal at receiver 1 slightly increases due to the more favourable angle of impingement! The standardised (NORM) value of SIGNALS A and B is used as the starting signal for all the further algorithms of the laser copy counter!

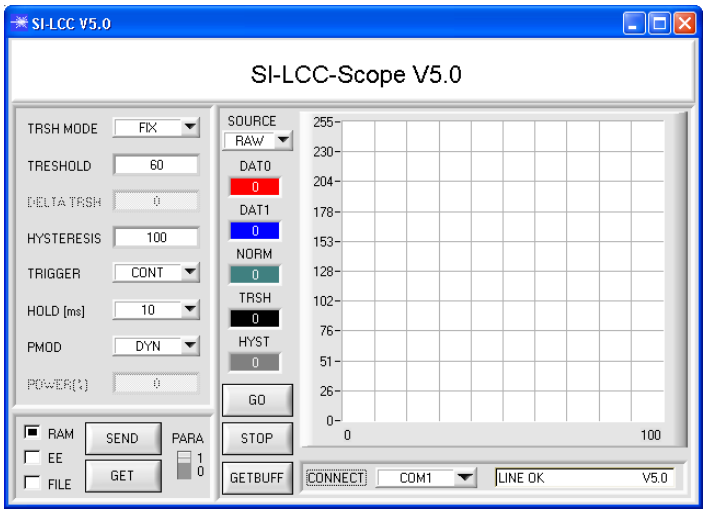




$$NORM = \frac{SIGNAL\ B}{SIGNAL\ A + SIGNAL\ B} * 255$$

Parameterisation under Windows® with software SI-LCC-Scope respectively SI-LCC-MA-Scope

The sensors can easily be set with the help of a Windows® user interface in which the sensor signals are displayed in numerical and graphical form; the user interface also provides various software algorithms and setting parameters.
With software version SI-LCC-MA-Scope, some parameters can also be set with DIP and HEX switches.

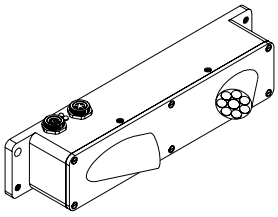
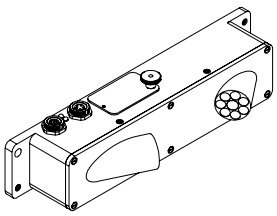


Parameters such as e.g.
- Threshold (sensitivity)
- Hysteresis
- Laser power mode (static or dynamic)
- Output pulse lengthening
- Dead time (static or dynamic)

can be set with the software, or with types LCC-...-MA by means of HEX and DIP switches.

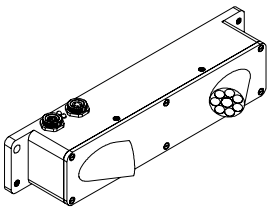
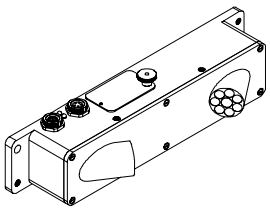
Product Overview

Laser copy counters with reference distance 30 mm:

Product name	LCC-30	LCC-30-MA (Manual Adjustment)
		
Laser	Semiconductor laser, 670 nm, AC operation, 1mW max. opt. power, laser class 2 acc. to DIN EN 60825	
Optical filter	Interference filter + red light filter	Interference filter + red light filter
Digital outputs (OUT1, OUT2)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)
Voltage supply	+12VDC ... +30VDC	+12VDC ... +30VDC
Sensitivity setting	adjustable under Windows®	adjustable via HEX coding switch (16 steps)
Laser power correction	adjustable under Windows®	adjustable under Windows®
Current consumption	typ. 150 mA	typ. 150 mA
Dead time	adjustable under Windows®	adjustable via DIP switch (16 steps)
Dead time mode	static or dynamic, adjustable under Windows®	static or dynamic, adjustable via DIP-switch
Scanning frequency	typ. 15 kHz (without averaging)	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED	Visualization by means of a yellow LED
Dyn. output (pulse lengthening)	adjustable under Windows®	adjustable via DIP switch (8 steps)
Modulation frequency	typ. 100 kHz	typ. 100 kHz
Max. product stream	typ. 500 000 copies/h	typ. 500 000 copies/h
Min. height of object	typ. 0.05 mm	typ. 0.05 mm
Working range	typ. 26 mm ... 34 mm	typ. 26 mm ... 34 mm
Working range with TB-30	typ. 29 mm ... 31 mm	typ. 29 mm ... 31 mm
Enclosure rating	IP54	IP54
Operating temperature range	-20°C ... +50°C	-20°C ... +50°C
Housing material	Aluminium, anodized in blue	Aluminium, anodized in blue
Housing dimensions	approx. 205 mm x 40 mm x 40 mm	approx. 205 mm x 40 mm x 40 mm
Interface	RS232, parameterisable under Windows®	RS232, parameterisable under Windows®
Type of connector	8-pole circular connector Binder 712 5-pole circular connector Binder 712	8-pole circular connector Binder 712 5-pole circular connector Binder 712
Connecting cables	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)
Max. switching current	100 mA, short-circuit-proof	100 mA, short-circuit-proof
EMC test acc. to	DIN EN 60947-5-2 CE	DIN EN 60947-5-2 CE

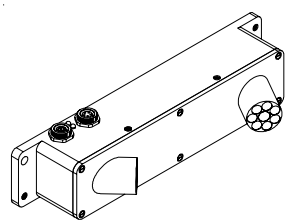
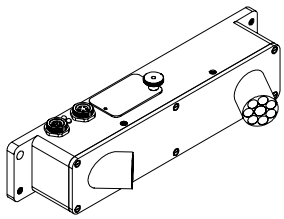
Product Overview

Laser copy counters with reference distance 40 mm:

Product name	LCC-40	LCC-40-MA (Manual Adjustment)
		
Laser	Semiconductor laser, 670 nm, AC operation, 1mW max. opt. power, laser class 2 acc. to DIN EN 60825	
Optical filter	Interference filter + red light filter	Interference filter + red light filter
Digital outputs (OUT1, OUT2)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)
Voltage supply	+12VDC ... +30VDC	+12VDC ... +30VDC
Sensitivity setting	adjustable under Windows®	adjustable via HEX coding switch (16 steps)
Laser power correction	adjustable under Windows®	adjustable under Windows®
Current consumption	typ. 150 mA	typ. 150 mA
Dead time	adjustable under Windows®	adjustable via DIP switch (16 steps)
Dead time mode	static or dynamic, adjustable under Windows®	static or dynamic, adjustable via DIP-switch
Scanning frequency	typ. 15 kHz (without averaging)	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED	Visualization by means of a yellow LED
Dyn. output (pulse lengthening)	adjustable under Windows®	adjustable via DIP switch (8 steps)
Modulation frequency	typ. 100 kHz	typ. 100 kHz
Max. product stream	typ. 500 000 copies/h	typ. 500 000 copies/h
Min. height of object	typ. 0.05 mm	typ. 0.05 mm
Working range	typ. 45 mm ... 55 mm	typ. 45 mm ... 55 mm
Enclosure rating	IP54	IP54
Operating temperature range	-20°C ... +50°C	-20°C ... +50°C
Housing material	Aluminium, anodized in blue	Aluminium, anodized in blue
Housing dimensions	approx. 205 mm x 40 mm x 40 mm	approx. 205 mm x 40 mm x 40 mm
Interface	RS232, parameterisable under Windows®	RS232, parameterisable under Windows®
Type of connector	8-pole circular connector Binder 712 5-pole circular connector Binder 712	8-pole circular connector Binder 712 5-pole circular connector Binder 712
Connecting cables	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)
Max. switching current	100 mA, short-circuit-proof	100 mA, short-circuit-proof
EMC test acc. to	DIN EN 60947-5-2 CE	DIN EN 60947-5-2 CE

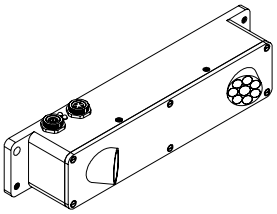
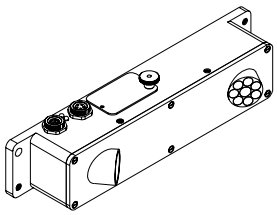
Product Overview

Laser copy counters with reference distance 80 mm:

Product name	LCC-80	LCC-80-MA (Manual Adjustment)
		
Laser	Semiconductor laser, 670 nm, AC operation, 1mW max. opt. power, laser class 2 acc. to DIN EN 60825	
Optical filter	Interference filter + red light filter	Interference filter + red light filter
Digital outputs (OUT1, OUT2)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)
Voltage supply	+12VDC ... +30VDC	+12VDC ... +30VDC
Sensitivity setting	adjustable under Windows®	adjustable via HEX coding switch (16 steps)
Laser power correction	adjustable under Windows®	adjustable under Windows®
Current consumption	typ. 150 mA	typ. 150 mA
Dead time	adjustable under Windows®	adjustable via DIP switch (16 steps)
Dead time mode	static or dynamic, adjustable under Windows®	static or dynamic, adjustable via DIP-switch
Scanning frequency	typ. 15 kHz (without averaging)	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED	Visualization by means of a yellow LED
Dyn. output (pulse lengthening)	adjustable under Windows®	adjustable via DIP switch (8 steps)
Modulation frequency	typ. 100 kHz	typ. 100 kHz
Max. product stream	typ. 500 000 copies/h	typ. 500 000 copies/h
Min. height of object	typ. 0.1 mm	typ. 0.1 mm
Working range	typ. 60 mm ... 100 mm	typ. 60 mm ... 100 mm
Enclosure rating	IP54	IP54
Operating temperature range	-20°C ... +50°C	-20°C ... +50°C
Housing material	Aluminium, anodized in blue	Aluminium, anodized in blue
Housing dimensions	approx. 205 mm x 40 mm x 40 mm	approx. 205 mm x 40 mm x 40 mm
Interface	RS232, parameterisable under Windows®	RS232, parameterisable under Windows®
Type of connector	8-pole circular connector Binder 712 5-pole circular connector Binder 712	8-pole circular connector Binder 712 5-pole circular connector Binder 712
Connecting cables	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)
Max. switching current	100 mA, short-circuit-proof	100 mA, short-circuit-proof
EMC test acc. to	DIN EN 60947-5-2 CE	DIN EN 60947-5-2 CE

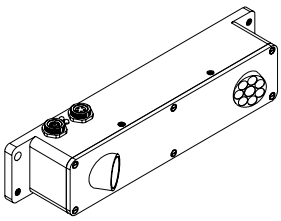
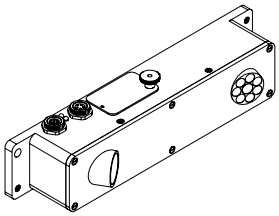
Product Overview

Laser copy counters with reference distance 90 mm:

Product name	LCC-90	LCC-90-MA (Manual Adjustment)
		
Laser	Semiconductor laser, 670 nm, AC operation, 1mW max. opt. power, laser class 2 acc. to DIN EN 60825	
Optical filter	Interference filter + red light filter	Interference filter + red light filter
Digital outputs (OUT1, OUT2)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)
Voltage supply	+12VDC ... +30VDC	+12VDC ... +30VDC
Sensitivity setting	adjustable under Windows®	adjustable via HEX coding switch (16 steps)
Laser power correction	adjustable under Windows®	adjustable under Windows®
Current consumption	typ. 150 mA	typ. 150 mA
Dead time	adjustable under Windows®	adjustable via DIP switch (16 steps)
Dead time mode	static or dynamic, adjustable under Windows®	static or dynamic, adjustable via DIP-switch
Scanning frequency	typ. 15 kHz (without averaging)	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED	Visualization by means of a yellow LED
Dyn. output (pulse lengthening)	adjustable under Windows®	adjustable via DIP switch (8 steps)
Modulation frequency	typ. 100 kHz	typ. 100 kHz
Max. product stream	typ. 500 000 copies/h	typ. 500 000 copies/h
Min. height of object	typ. 0.1 mm	typ. 0.1 mm
Working range	typ. 70 mm ... 130 mm	typ. 70 mm ... 130 mm
Enclosure rating	IP54	IP54
Operating temperature range	-20°C ... +50°C	-20°C ... +50°C
Housing material	Aluminium, anodized in blue	Aluminium, anodized in blue
Housing dimensions	approx. 205 mm x 40 mm x 40 mm	approx. 205 mm x 40 mm x 40 mm
Interface	RS232, parameterisable under Windows®	RS232, parameterisable under Windows®
Type of connector	8-pole circular connector Binder 712 5-pole circular connector Binder 712	8-pole circular connector Binder 712 5-pole circular connector Binder 712
Connecting cables	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)
Max. switching current	100 mA, short-circuit-proof	100 mA, short-circuit-proof
EMC test acc. to	DIN EN 60947-5-2 CE	DIN EN 60947-5-2 CE

Product Overview

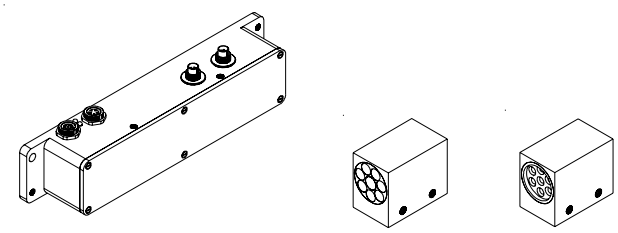
Laser copy counters with reference distance 130 mm:

Product name	LCC-130	LCC-130-MA (Manual Adjustment)
		
Laser	Semiconductor laser, 670 nm, AC operation, 1mW max. opt. power, laser class 2 acc. to DIN EN 60825	
Optical filter	Interference filter + red light filter	Interference filter + red light filter
Digital outputs (OUT1, OUT2)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)
Voltage supply	+12VDC ... +30VDC	+12VDC ... +30VDC
Sensitivity setting	adjustable under Windows®	adjustable via HEX coding switch (16 steps)
Laser power correction	adjustable under Windows®	adjustable under Windows®
Current consumption	typ. 150 mA	typ. 150 mA
Dead time	adjustable under Windows®	adjustable via DIP switch (16 steps)
Dead time mode	static or dynamic, adjustable under Windows®	static or dynamic, adjustable via DIP-switch
Scanning frequency	typ. 15 kHz (without averaging)	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED	Visualization by means of a yellow LED
Dyn. output (pulse lengthening)	adjustable under Windows®	adjustable via DIP switch (8 steps)
Modulation frequency	typ. 100 kHz	typ. 100 kHz
Max. product stream	typ. 500 000 copies/h	typ. 500 000 copies/h
Min. height of object	typ. 0.3 mm	typ. 0.3 mm
Working range	typ. 80 mm ... 160 mm	typ. 80 mm ... 160 mm
Enclosure rating	IP54	IP54
Operating temperature range	-20°C ... +50°C	-20°C ... +50°C
Housing material	Aluminium, anodized in blue	Aluminium, anodized in blue
Housing dimensions	approx. 205 mm x 40 mm x 40 mm	approx. 205 mm x 40 mm x 40 mm
Interface	RS232, parameterisable under Windows®	RS232, parameterisable under Windows®
Type of connector	8-pole circular connector Binder 712 5-pole circular connector Binder 712	8-pole circular connector Binder 712 5-pole circular connector Binder 712
Connecting cables	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)	to PLC: cab-las8/SPS (2m) to PC: cab-las5/PC or cab-las5/USB (2m)
Max. switching current	100 mA, short-circuit-proof	100 mA, short-circuit-proof
EMC test acc. to	DIN EN 60947-5-2 CE	DIN EN 60947-5-2 CE

Product Overview

Laser copy counters (split version) for individual adjustment of working range:

Product name	**LCC-CON1** (electronic control unit) **LCC-FE-TR** (transmitter-/receiver unit), **LCC-FE-R** (receiver unit)



Laser	Semiconductor laser, 670 nm, AC operation, 1mW max. opt. power, laser class 2 acc. to DIN EN 60825
Optical filter	Interference filter + red light filter
Digital outputs (OUT1, OUT2)	pnp bright-/npn dark-switching or pnp dark-/npn bright-switching (adjustable under Windows®)
Voltage supply	+12VDC ... +30VDC
Sensitivity setting	adjustable under Windows®
Laser power correction	adjustable under Windows®
Current consumption	typ. 150 mA
Dead time	adjustable under Windows®
Dead time mode	static or dynamic, adjustable under Windows®
Scanning frequency	typ. 15 kHz (without averaging)
Switching state indication	Visualization by means of a yellow LED
Dyn. output (pulse lengthening)	adjustable unter Windows®
Modulation frequency	typ. 100 kHz
Max. product stream	typ. 500 000 copies/h
Min. height of object	typ. 0.1 mm
Working range	individually adjustable (max. distance to the object: 200 mm)
Enclosure rating	IP54
Operating temperature range	-20°C ... +50°C
Housing material	Aluminium, anodized in blue
Housing dimensions	Electronic control unit LCC-CON1: approx. 205 mm x 40 mm x 40 mm Transmitter-/receiver unit LCC-FE-TR: approx. 40 mm x 32 mm x 24 mm Receiver unit LCC-FE-R: approx. 40 mm x 32 mm x 24 mm
Interface	RS232, parameterisable under Windows®
Type of connector	8-pole circular connector Binder 712, 5-pin circular female connector Binder 712, 8-pole circular connector Binder 712, 5-pin circular female connector Binder 712
Connecting cables	LCC-CON1 to PLC: cab-las8/SPS (2m), LCC-CON1 to PC: cab-las5/PC or cab-las5/USB (2m) LCC-CON1 to LCC-FE-TR: cab-lcc-8 (2m), LCC-CON1 to LCC-FE-R: cab-lcc-5 (2m)
Max. switching current	100 mA, short-circuit-proof
EMC test acc. to	DIN EN 60947-5-2 CE

Application Examples

Picture 1 Edge detection of laminates (LCC-30, LCC-30-MA)

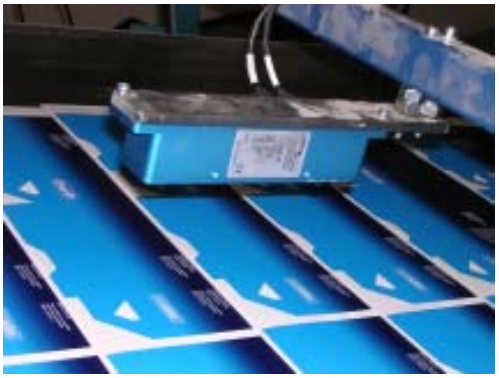
Picture 2 Counting of single sheets (LCC-40, LCC-40-MA)

Picture 3 Copy counting at compensating stackers (LCC-80, LCC-80-MA)

Picture 4 Counting of folded beverage packages (LCC-90, LCC-90-MA)

Picture 5 and 6 Copy counting during overhead conveyance (LCC-90, LCC-90-MA)

Picture 7 Counting of corrugated cardboard boxes (LCC-130, LCC-130-MA)



Picture 8 Counting of number of folds of paper filter elements (LCC-CON1)