

product family	FLDM 170	FLDM 170	FLDK 110	FLDK 110
				
	<i>SCATEC-15</i>	<i>SCATEC-10</i>	<i>SCATEC-2</i>	<i>SCATEC-2</i>
measuring distance Sd	0 ... 120 mm	0 ... 90 mm	0 ... 60 mm 0 ... 120 mm	0 ... 60 mm 0 ... 120 mm
optimum operating distance	100 mm	70 mm	40 mm 100 mm	40 mm 100 mm
counting rate	< 3000000 copies/h	< 3000000 copies/h	< 600000 copies/h	< 600000 copies/h
output pulse length	0,3 ... 100 ms selectable	0,3 ... 100 ms selectable	5 / 10 / 15 / 20 ms selectable	5 / 10 ms selectable
sensitivity	single sheet/edge thickness 0,15 mm	single sheet/edge thickness 0,1 mm	single sheet/edge thickness 0,2 mm single sheet/edge thickness 0,25 mm	single sheet/edge thickness 0,25 mm single sheet/edge thickness 0,2 mm
false pulse suppression	4 program options	4 program options	on/off switchable	on/off switchable
sensitivity adjustment	4 preset levels or level set by customer	4 preset levels or level set by customer	high/low switchable	
direct gap detection	yes	yes		
interface	serial for ScaDiag software	serial for ScaDiag software		
light source	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode	pulsed red laser diode
output circuit	opto isolated push-pull	opto isolated push-pull	opto isolated push-pull	push-pull
page	594	596	598	602

FLDK 110



SCATEC-J

0 ... 55 mm

40 mm

< 280000 copies/h

10 ms

single sheet/edge thickness
1,5 mm

no

pulsed red laser diode

push-pull

604



General information



The sensors in the *SCATEC* range were developed specifically for non-contact counting of overlapped paper sheets and newspapers. Other flat objects conveyed in a lap stream or individually can also be counted. If such an object moves through the laser beam, the sensor replies with an electrical impulse with a fixed time period. The patented optical principle permits objects to be detected regardless of their color and surface; matte black objects are counted just as accurately as white glossy ones.

Characteristics and advantages

- **Counts regardless of the motion of product direction**
The copies are counted when an edge facing the laser beam moves through the beam, whether the direction of product motion is forwards or backwards
- **Visible laser beam**
The red laser line is easily visible on the object and permits simple alignment.
- **Color insensitivity**
The integrated laser controller makes the *SCATEC* extremely insensitive to different surfaces of the object.
- **No blind region**
Large counted objects can even touch the sensor without causing counting errors.
- **Sensitivity adjustment**
Depending on the model, the sensitivity can be adjusted with a DIP switch, on the control panel or via the interface.
- **Edge indicator**
Yellow LED: light is on as long as an edge is in the laser beam.



Characteristics and advantages

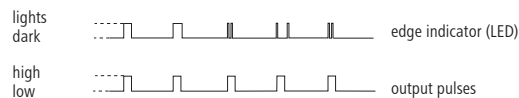
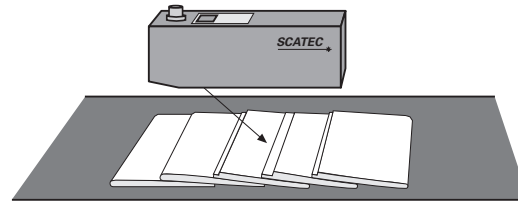
Multiple pulse suppression

Particularly with thick copies (newspapers, folded cardboard boxes etc.) or with a small prefold, multiple pulses which can occur at the edge can be suppressed by this function. Error pulse suppression operates by preventing further pulses from being emitted when an output pulse is active or during an idle time. The following programs guarantee optimum adjustment to all counting problems:

Fixed idle time: adjustable in milliseconds

Dynamic dead time: the microcontroller constantly monitors the pulse sequence and eliminates multiple pulses even if the conveying speed varies by dynamically adjusting the dead time to the pulse sequence.

Synchronization to the machine cycle: the *SCATEC* can be synchronized to the machine cycle (e.g. by an encoder) via a synchronization input. The dead time then corresponds to a defined distance which is absolutely independent of the conveying speed.



- No counting errors when the lap stream is interrupted

The *SCATEC* detects only the leading edge of an object. It does not detect trailing edges which become visible when the lap stream is interrupted. Projecting trailing edges can be suppressed by direct gap detection or by delaying the output pulse (*SCATEC-10* or *SCATEC-15*). An integrated retro-reflective sensor allows accurate detection of gaps in the lap stream. This can additionally increase the counting accuracy.

- Programming and diagnostic software

With the programming software *ScaDiag*, all functions and parameters can be simply adjusted on a PC. Furthermore, measurement sequences can be recorded and stored for diagnosis and troubleshooting.



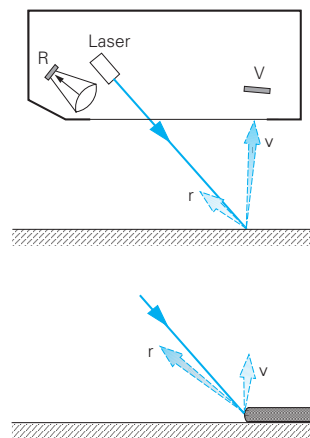
Technology and operation

Stated simply, the **SCATEC** consists of a laser light source and two photodetectors. The beam is aimed diagonally at the objects to be detected.

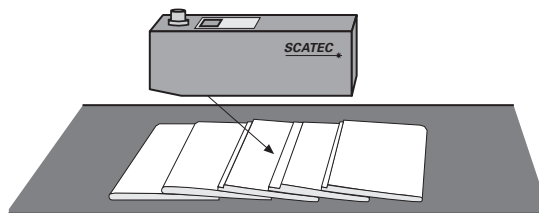
The photodetector **R** is located close to the laser light source and photodetector **V** is a little further away. The sensor determines the ratio between signal **v** (light diffused forwards) and signal **r** (light diffused backwards).

The ratio v/r differs widely depending on whether the beam strikes a flat surface or an edge. If an edge moves into the laser beam, the direct view from detector **V** to the laser strike point is obstructed, reducing signal **v**, and also the edge increases the backwards diffusion, which causes signal **r** to rise. Both effects make the ratio v/r much smaller at an edge than on a flat surface. If the ratio v/r falls below a specific threshold, this is interpreted by the sensor as an edge.

Due to the well-focused laser beam, the **SCATEC** detects even the smallest edges. There is no blind region directly beneath the sensor. Large counted objects may even touch the sensor without causing counting errors.

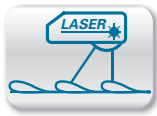


Mounting and adjustment



- The objects to be counted must have an edge facing the beam.
- The sensor must be installed parallel above the working plane.
- The laser beam should be blocked by a beam stop mounted parallel and just below the bearing surface. We recommend a light, matte object for this purpose (white paper, light and matte metal surface).





Sd = 0 ... 120 mm

- up to 3 million copies/hour
- Sensitivity $\geq 0,15$ mm
- display and integrated counter

general data

measuring distance Sd	0 ... 120 mm
optimum operating distance	100 mm
counting rate	< 3000000 copies/h
object speed	< 5 m/sec
object cycle distance	> 1 mm
sensitivity	single sheet/edge thickness 0,15 mm
sync. input	yes
measuring point	visible red laser line 8 mm
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	4 program options
direct gap detection	yes
sensitivity adjustment	4 preset levels or level set by customer

electrical data

voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	230 mA
output pulse length	0,3 ... 100 ms selectable
short circuit protection	yes
reverse polarity protection	yes
interface	serial for ScaDiag software

mechanical data

width / diameter	30 mm
type	rectangular
housing material	die-cast zinc
connector base (main connector)	DIN 45322, 6 pin
connector base (interface)	DIN 45326, 8 pin
front (optics)	glass

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 54

Accessories

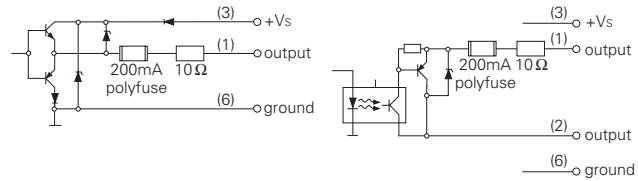
10157472	Mounting panel for sensors SCATEC
----------	-----------------------------------

for details: see accessories section

order reference	output circuit
FLDM 170C1030/S42	opto isolated
FLDM 170G1030/S42	push-pull



connection diagrams



accessories

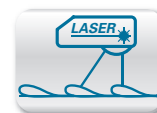
ScaDiag kit diagnostic program includes interface converter and manual	10156491
mounting plate for mounting on round rod	10157472

for details, see accessories section

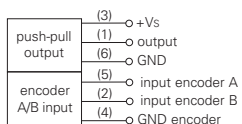
laser warning

LASER RADIATION
DO NOT STARE INTO BEAM
Wavelength: 640...670nm
IEC 60825-1, Ed. 3, 2014
CLASS 2 LASER PRODUCT

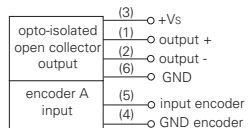
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



pin assignments

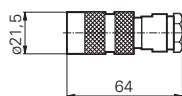


main connector push-pull

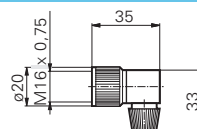


main connector open collector

connectors



10104236	6 pin	(included)
10153202	8 pin	(optional)



10153094	6 pin	(optional)
10153095	8 pin	(optional)

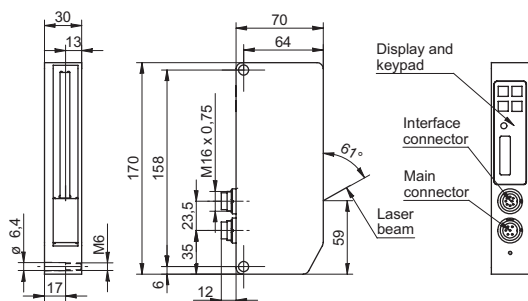
connector

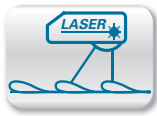
ESG 16DP1000G main cable, length = 10 m, shielded, 6 pin

reflectors

FTDF 025F025	tape 25 x 25 mm
(included)	

dimension drawing





Sd = 0 ... 90 mm

- up to 3 million copies/hour
- Sensitivity $\geq 0,1$ mm
- display and integrated counter

general data

measuring distance Sd	0 ... 90 mm
optimum operating distance	70 mm
counting rate	< 3000000 copies/h
object speed	< 5 m/sec
object cycle distance	> 1 mm
sensitivity	single sheet/edge thickness 0,1 mm
sync. input	yes
measuring point	visible red laser line 6 mm
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	4 program options
direct gap detection	yes
sensitivity adjustment	4 preset levels or level set by customer

electrical data

voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	230 mA
output pulse length	0,3 ... 100 ms selectable
short circuit protection	yes
reverse polarity protection	yes
interface	serial for ScaDiag software

mechanical data

width / diameter	30 mm
type	rectangular
housing material	die-cast zinc
connector base (main connector)	DIN 45322, 6 pin
connector base (interface)	DIN 45326, 8 pin
front (optics)	glass

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 54

Accessories

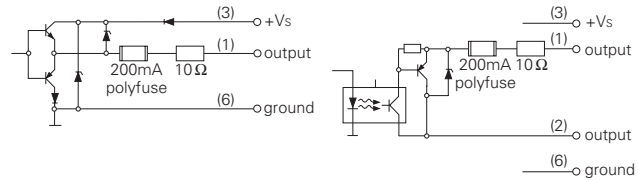
10157472	Mounting panel for sensors SCATEC
----------	-----------------------------------

for details: see accessories section

order reference	output circuit
FLDM 170C1011/S42	opto isolated
FLDM 170G1011/S42	push-pull



connection diagrams



accessories

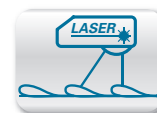
ScaDiag kit diagnostic program includes interface converter and manual	10156490
mounting plate for mounting on round rod	10157472

for details, see accessories section

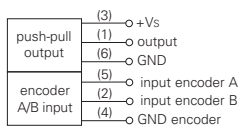
laser warning

LASER RADIATION
DO NOT STARE INTO BEAM
Wavelength: 640...670nm
IEC 60825-1, Ed. 3, 2014
CLASS 2 LASER PRODUCT

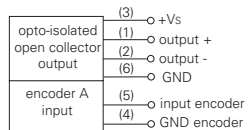
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



pin assignments

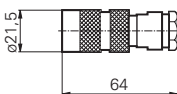


main connector push-pull

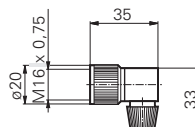


main connector open collector

connectors



10104236 6 pin (included)



10153094 6 pin (optional)

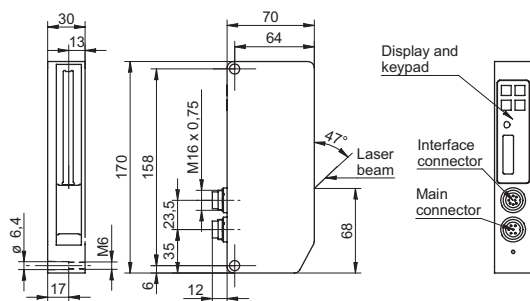
connector

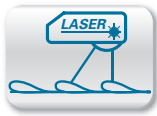
ESG 16DP1000G main cable, length = 10 m, shielded, 6 pin

reflectors

FTDF 025F025 tape 25 x 25 mm
(included)

dimension drawing





Sd = 0 ... 120 mm

- Smallest laser copy counter on the market
- counting of up to 600'000 copies/hour
- Sensitivity ≥ 0,2 mm



general data

counting rate	< 600000 copies/h
object speed	< 5 m/sec
object cycle distance	> 1 mm
sync. input	no
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	on/off switchable

electrical data

voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	180 mA
output pulse length	5 / 10 / 15 / 20 ms selectable
short circuit protection	yes
reverse polarity protection	yes

mechanical data

width / diameter	30 mm
type	rectangular
housing material	PA 6
front (optics)	glass

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 54

connectors and mating connectors

ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m

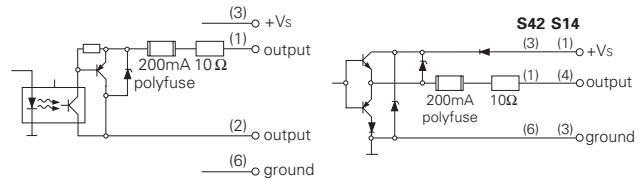
additional cable connectors and field wireable connectors: see accessories

Accessories

10157472	Mounting panel for sensors SCATEC
----------	-----------------------------------

for details: see accessories section

connection diagrams



accessories

ScaDiag kit (S14) diagnostic program includes interface converter and manual	10156479
ScaDiag kit (S42) diagnostic program includes interface converter and manual	10156489
mounting plate for mounting on round rod	10157472

for details, see accessories section

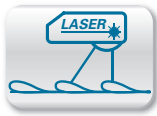
laser warning

LASER RADIATION
DO NOT STARE INTO BEAM
Wavelength: 640...670nm
IEC 60825-1, Ed. 3, 2014
CLASS 2 LASER PRODUCT

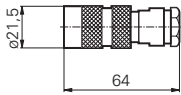
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007



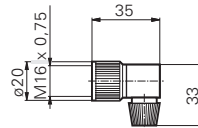
order reference	measuring distance Sd	sensitivity	output circuit	optimum operating distance	connector base (main connector)	measuring point	sensitivity adjustment
FLDK 110C1003/S42	0 ... 60 mm	single sheet/edge thickness 0,2 mm	opto isolated	40 mm	DIN 45322, 6 pin	visible red laser line 2 mm	high/low switchable
FLDK 110C1005/S42	0 ... 120 mm	single sheet/edge thickness 0,25 mm	opto isolated	100 mm	DIN 45322, 6 pin	visible red laser line 3 mm	high/low switchable
FLDK 110G1003/S14	0 ... 60 mm	single sheet/edge thickness 0,2 mm	push-pull	40 mm	M12 x 1, 5 pin	visible red laser line 2 mm	high/low switchable
FLDK 110G1003/S42	0 ... 60 mm	single sheet/edge thickness 0,2 mm	push-pull	40 mm	DIN 45322, 6 pin	visible red laser line 2 mm	high/low switchable
FLDK 110G1005/S14	0 ... 120 mm	single sheet/edge thickness 0,25 mm	push-pull	100 mm	M12 x 1, 5 pin	visible red laser line 3 mm	-



connectors



10104236 6 pin DIN 45322
(included)



10153094 6 pin DIN 45322
(optional)

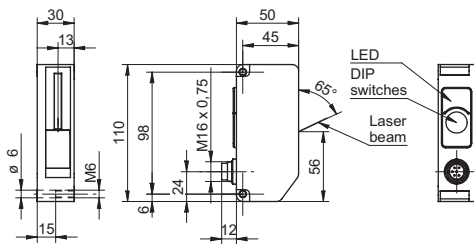
connectors M12 x 1

ESG 34AH0200	4 pin	2 m, straight
ESG 34AH0500	4 pin	5 m, straight
ESG 34AH1000	4 pin	10 m, straight

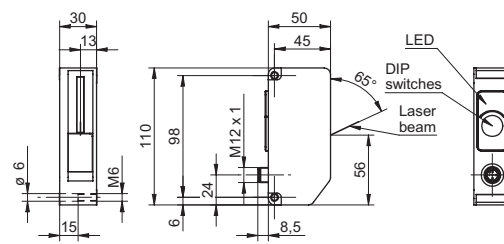
connectors M12 x 1

ESW 33AH0200	4 pin	2 m, angular
ESW 33AH0500	4 pin	5 m, angular
ESW 33AH1000	4 pin	10 m, angular

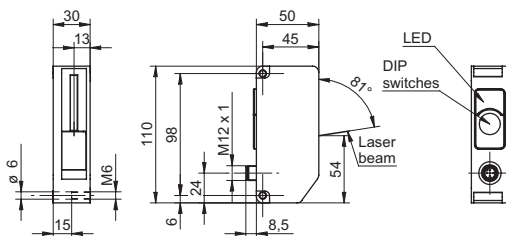
dimension drawings



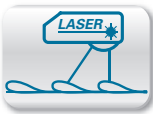
FLDK 110x1003/S42



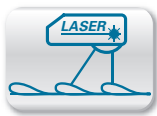
FLDK 110x1003/S14



FLDK 110G1005/S14



Laser copy counter SCATEC-2 FLDK 110 Sd = 0 ... 120 mm



Sd = 0 ... 120 mm

- Laser copy counter / edge detector
- Individual package detection with seamless product detection



general data

counting rate	< 600000 copies/h
object speed	< 5 m/sec
sync. input	no
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
false pulse suppression	on/off switchable

electrical data

voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	180 mA
output circuit	push-pull
output pulse length	5 / 10 ms selectable
short circuit protection	yes
reverse polarity protection	yes

mechanical data

width / diameter	30 mm
type	rectangular
housing material	PA 6
connector base (main connector)	M12 x 1, 5 pin
front (optics)	glass

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 54

connectors and mating connectors

ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m

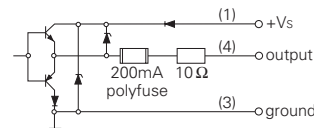
additional cable connectors and field wireable connectors: see accessories

Accessories

10157472	Mounting panel for sensors SCATEC
----------	-----------------------------------

for details: see accessories section

connection diagram



accessories

mounting plate for mounting on round rod	10157472
ScaDiag kit diagnostic program includes interface converter and manual	10156479

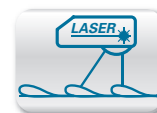
for details, see accessories section

laser warning

LASER RADIATION
DO NOT STARE INTO BEAM
Wavelength: 640...670nm
IEC 60825-1, Ed. 3, 2014
CLASS 2 LASER PRODUCT

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50, dated June 24, 2007

order reference	measuring distance Sd	sensitivity	optimum operating distance	measuring point
FLDK 110G1006/S14	0 ... 120 mm	single sheet/edge thickness 0,25 mm	100 mm	visible red laser line 3 mm
FLDK 110G1303/S14	0 ... 60 mm	single sheet/edge thickness 0,2 mm	40 mm	visible red laser line 2 mm



connectors

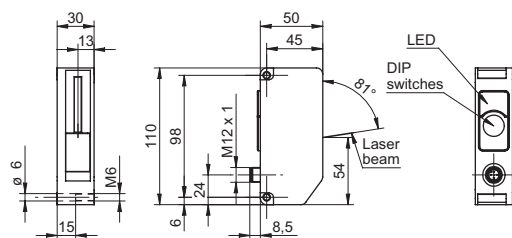
connectors M12 x 1

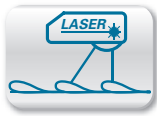
ESG 34AH0200	4 pin	2 m, straight
ESG 34AH0500	4 pin	5 m, straight
ESG 34AH1000	4 pin	10 m, straight

connectors M12 x 1

ESW 33AH0200	4 pin	2 m, angular
ESW 33AH0500	4 pin	5 m, angular
ESW 33AH1000	4 pin	10 m, angular

dimension drawing





Sd = 0 ... 55 mm

- Smallest laser copy counter on the market
- counting of up to 280'000 copies/hour
- Sensitivity $\geq 1,5$ mm

**general data**

measuring distance Sd	0 ... 55 mm
optimum operating distance	40 mm
counting rate	< 280000 copies/h
object speed	< 2 m/sec
object cycle distance	> 13 mm
sensitivity	single sheet/edge thickness 1,5 mm
sync. input	no
measuring point	visible red point
light source	pulsed red laser diode
wave length	670 nm
laser class	2
edge indicator	LED yellow
power on indication	LED green
sensitivity adjustment	no

electrical data

voltage supply range +Vs	10 ... 30 VDC
current consumption max. (no load)	180 mA
output circuit	push-pull
output pulse length	10 ms
short circuit protection	yes
reverse polarity protection	yes

mechanical data

width / diameter	30 mm
type	rectangular
housing material	PA 6
connector base (main connector)	M12 x 1, 5 pin
front (optics)	glass

ambient conditions

operating temperature	0 ... +50 °C
protection class	IP 54

connectors and mating connectors

ESG 34AH0200	Connector M12, 4 pin, straight, 2 m
ESW 33AH0200	Connector M12, 4 pin, angular, 2 m

additional cable connectors and field wireable connectors: see accessories

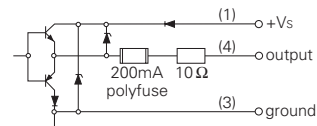
Accessories

10157472	Mounting panel for sensors SCATEC
----------	-----------------------------------

for details: see accessories section

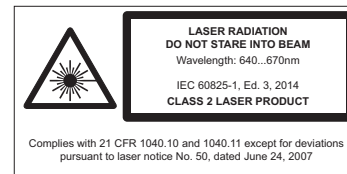
order reference

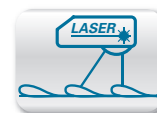
FLDK 110G1010/S14

connection diagram**accessories**

mounting plate for mounting on round rod	10157472
ScaDiag kit diagnostic program includes interface converter and manual	11051709

for details, see accessories section

laser warning



connectors

connectors M12 x 1

ESG 34AH0200	4 pin	2 m, straight
ESG 34AH0500	4 pin	5 m, straight
ESG 34AH1000	4 pin	10 m, straight

connectors M12 x 1

ESW 33AH0200	4 pin	2 m, angular
ESW 33AH0500	4 pin	5 m, angular
ESW 33AH1000	4 pin	10 m, angular

dimension drawing

