HT3C S — Diffuse reflection sensor with background suppression

S

1 kHz

5 … 200 mm
100 mm with black-white error < 10 %

10 - 30 V DC

HF A²LS

ASIC

- Diffuse reflection sensor with visible red light and adjustable background suppression
- Small, homogeneous light spot for detecting small parts
- Excellent black/white behavior and reliable switching, even on glossy objects and objects with colored structure
- High switching frequency for detection of fast events
- Small and compact construction with robust plastic housing, degrees of protection IP 67 and IP 69K, tested in accordance with Ecolab for industrial application
- ***NEW***: Housing variant with two integrated M3 metal threaded sleeves
- ***NEW***: Housing variant with integrated slotted-hole mounting sleeve made of metal

CE

cULus LISTED

ECOLAB

IEC 60947...

IEC 60947...

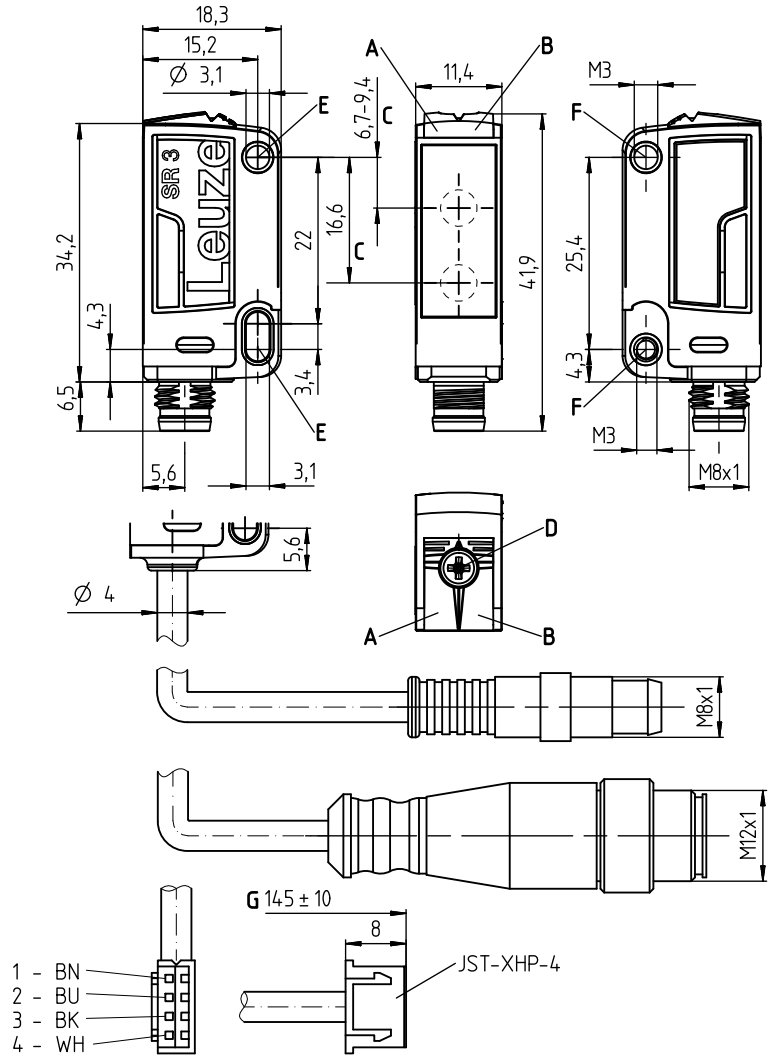
IP 69K IP 67

Accessories:

(available separately)

- Mounting systems (BT …)
- Cable with M8 or M12 connector (KD …)

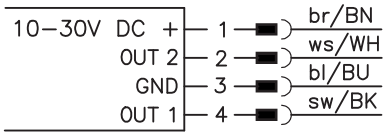
Dimensioned drawing



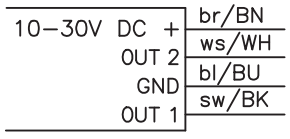
A Green indicator diode
B Yellow indicator diode
C Optical axis
D 8-turn potentiometer for scanning range adjustment
E Mounting sleeve (standard)
F Threaded sleeve (HT3C….**B**…)
G Dimension, incl. device

Electrical connection

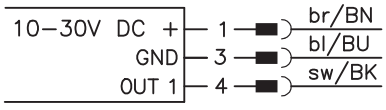
Connector, 4-pin



Cable, 4-wire



Connector, 3-pin



en 02-2017/02 50130055-01

We reserve the right to make changes • PAL_HT3C_S_en_50130055_01.fm

Technical data

Optical data

Typ. scanning range limit [1]	5 … 200mm
Scanning range [2]	see tables
Adjustment range [1]	15 … 200mm
Black/white error < 10% up to	100mm
Light spot	approx. Ø 4mm at 100mm
Light source [3]	LED (modulated light)
Wavelength	633nm (visible red light)

Timing

Switching frequency	1,000Hz
Response time	0.5?ms [4]
Response jitter	166µs
Readiness delay	≤ 300ms (acc. to. IEC 60947-5-2)

Electrical data

Operating voltage U_B [5]	10 … 30VDC (incl. residual ripple)
Residual ripple	≤ 15% of U_B
Open-circuit current	≤ 15mA
Switching output	see part number code on page 3
Function	light/dark switching, see part number code on page 3
Signal voltage high/low	≥ (U_B-2V)/≤ 2V
Output current	max. 100mA [6]
Scanning range	adjustable via 8-turn potentiometer

Indicators

Green LED	ready
Yellow LED	object detected - reflection

Mechanical data

Housing	plastic (high-strength PC-ABS); 2x diecast zinc mounting sleeves or 2x M3 brass threaded sleeves
Optics cover	plastic (PMMA)
Weight	with connector: 10g with 200mm cable and connector: 20g with 2m cable: 50g
Connection type	cable 2m (cross section 4x0.20mm²), connector M8, metal, cable 0.2m with connector M8 or M12

Environmental data

Ambient temp. (operation/storage)	-40°C … +60°C/-40°C … +70°C
Protective circuit [7]	2, 3
VDE safety class	III
Degree of protection	IP 67 IP 69K
Light source	exempt group (in acc. with EN 62471)
Standards applied	IEC 60947-5-2
Certifications	UL 508, CSA C22.2 no.14-13 [5] [8]

1) Typ. scan. range limit/adjustment range: max. achievable scanning range/adjustment range for light objects (white 90%)
2) Scanning range: recommended scanning range for objects with different diffuse reflection
3) Average life expectancy 100,000h at an ambient temperature of 25°C
4) For short decay times, an ohmic load of approx. 5kOhm is recommended
5) Observe the safety regulations and installation instructions regarding power supply and wiring; for UL applications: only for use in "Class 2" circuits acc. to NEC
6) Sum of the output currents for both outputs, 50mA for ambient temperatures > 40°C
7) 2=polarity reversal protection, 3=short circuit protection for all transistor outputs
8) These proximity switches shall be used with UL Listed Cable assemblies rated 30V, 0.5A min, in the field installation, or equivalent (categories: CYJV/CYJV7 or PVVA/PVVA7)

Tables

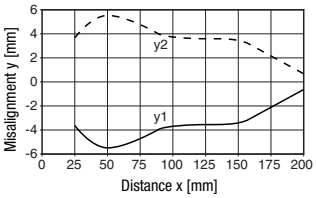
1	5	200
2	10	150
3	15	120

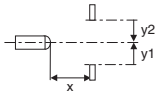
1	white 90%
2	gray 18%
3	black 6%

Scanning range [mm]

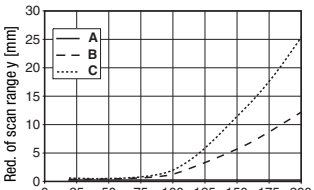
Diagrams

Typ. response behavior (white 90%)

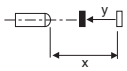




Typ. black/white behavior



A white 90%
B gray 18%
C black 6%



Notes

Observe intended use!

- This product is not a safety sensor and is not intended as personnel protection.
- The product may only be put into operation by competent persons.
- Only use the product in accordance with its intended use.

HT3C S — Diffuse reflection sensor with background suppression

Part number code

H	T	3	C				-	X	X	X	X	.			/	4	P	-	2	0	0	-	S	1	2

Operating principle

HT	Diffuse reflection sensor with background suppression

Construction/version

3C	SR3C series

Light type

N/A	Red light
I	Infrared light

Radiation source

N/A	LED

Pre-set scanning range (optional)

XXXX	Pre-set scanning range [mm]

Equipment

N/A	Standard
B	Housing model with two M3 threaded sleeves (brass)
S	Small light spot
L	Long light spot
XL	Extra long light spot
V	V-optics
F	Permanently set scanning range

Scanning range adjustment

N/A	Scanning range adjustable via 8-turn potentiometer
1	270° potentiometer

Switching output/function OUT 1/IN: Pin 4 or black conductor

2	NPN transistor output, light switching
N	NPN transistor output, dark switching
4	PNP transistor output, light switching
P	PNP transistor output, dark switching
6	Push-pull switching output, PNP light switching, NPN dark switching
X	Not connected (n. c.)

Switching output/function OUT 2/IN: Pin 2 or white conductor

2	NPN transistor output, light switching
N	NPN transistor output, dark switching
4	PNP transistor output, light switching
P	PNP transistor output, dark switching
6	Push-pull switching output, PNP dark switching, NPN light switching
X	Not connected (n. c.)

Electrical connection

N/A	Cable, PVC, standard length 2000 mm, 4-wire
M8	M8 connector, 4-pin (plug)
M8.3	M8 connector, 3-pin (plug)
200-M8	Cable, PVC, length 200 mm with M8 connector, 4-pin, axial (plug)
200-M8.3	Cable, PVC, length 200 mm with M8 connector, 3-pin, axial (plug)
200-M12	Cable, PVC, length 200 mm with M12 connector, 4-pin, axial (plug)
100Y1	Cable, PVC, length 100 mm with JST-XHP-4 connector, 4-pin

Order guide

The sensors listed here are preferred types; current information at *www.leuze.com*

Sensors with through-holes

Order code	Part no.
HT3C.S/4P-M8	50129379
HT3C.S/4-M8.3	50133589
HT3C.S/4P	50129380
HT3C.S/4P-200-M12	50129381
HT3C.S/4P-200-M8	50129382
HT3C.S/66-100Y1 [2]	50136347

Sensors with threaded sleeves

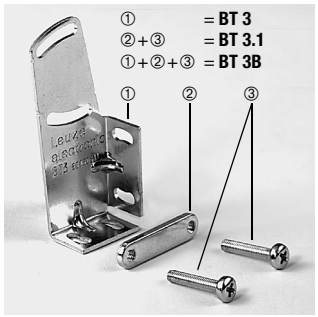
Order code	Part no.
HT3C.BS/4P-M8	50133602
HT3C.BS/4P	50133603
HT3C.BS/4P-200-M12	50133604
HT3C.BS/4P-200-M8	50133605

Accessories mounting systems

Order code	Part no.
For sensors with through-holes:	
BT 3	50060511
BT 3.1 [1]	50105585
BT 3B	50105546
For sensors with threaded sleeves:	
BT 200M.5	50118542
BT 205M [1]	50124651
BTU 200M-D10	50117256
BTU 200M-D12	50117255
BTU 200M.5-D12	50120426
BTU 200M-D14	50117254

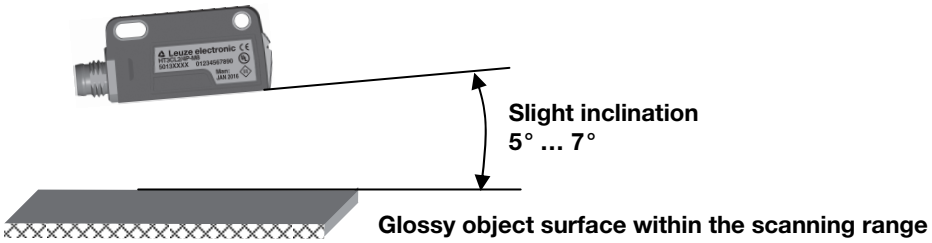
1) Packaging unit: PU = 10 pcs.
2) Special version with JST-XHP-4 connector: dimensions including device 145 mm ± 10 mm

Mounting systems



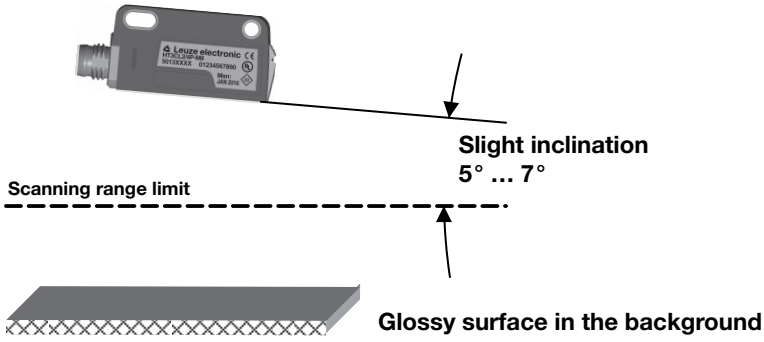
Application notes

- **<u>Detection of glossy surfaces</u> within the scanning range**:
  When detecting glossy surfaces (e.g. metals), the light beam should not hit the object surface at a right angle. A slight inclination is enough to detect the object reliably. The following applies: the smaller the scanning range, the greater the angle of inclination (approx. 5° to 7°).



- **<u>Avoiding interference from glossy surfaces</u> in the background**:
  If a glossy surface is in the background (distance larger than scanning range limit), reflections may cause interfering signals. They may be avoided by mounting the device at a slight inclination (see figure below).

Attention!
It is imperative to note the task and the associated inclination of the sensor of approx. 5° … 7°.



- Objects should only be moved in laterally from the right or left. Moving in objects from the connector side or operating side is to be avoided.
- Outside of the scanning range, the sensor operates as an energetic diffuse reflection sensor. Light objects can still be reliably detected up to the scanning range limit.
- The sensors are equipped with effective measures for the maximum avoidance of mutual interference should they be mounted opposite one another. Opposite mounting of multiple sensors of the same type should, however, absolutely be avoided.