Light grid

LGS25

- Automation light grid
- Optical resolution 25 mm
- Super-fast object detection, even with 3-way beam crossover
- Software-free adjustment of height monitoring
- Object identification using integrated object recognition
- IO-Link interface for service and process data
- Optional temperature range to -30 °C

Automation light grid with beam spacing of 25 mm, IO-Link interface, push-pull output, fixed cable with M12 plug

Function

The LGS automation light grid series detects objects ranging in size from small to large. The very slender light grids have a modular design and come in different beam spacings and field heights. All signal evaluation takes place inside the unit. The lightweight systems can be integrated in their surroundings in a well-designed configuration, which means that machines and plants in temperature ranges between -30 °C ... +60 °C can be designed more compactly.

Application

- Detection of objects over large areas
- Detecting and counting irregular objects
- Measuring and sorting objects of different heights (height checking)
- Presence and overhang control in material handling systems
- Web sag monitoring
- Position or shape monitoring (object identification)

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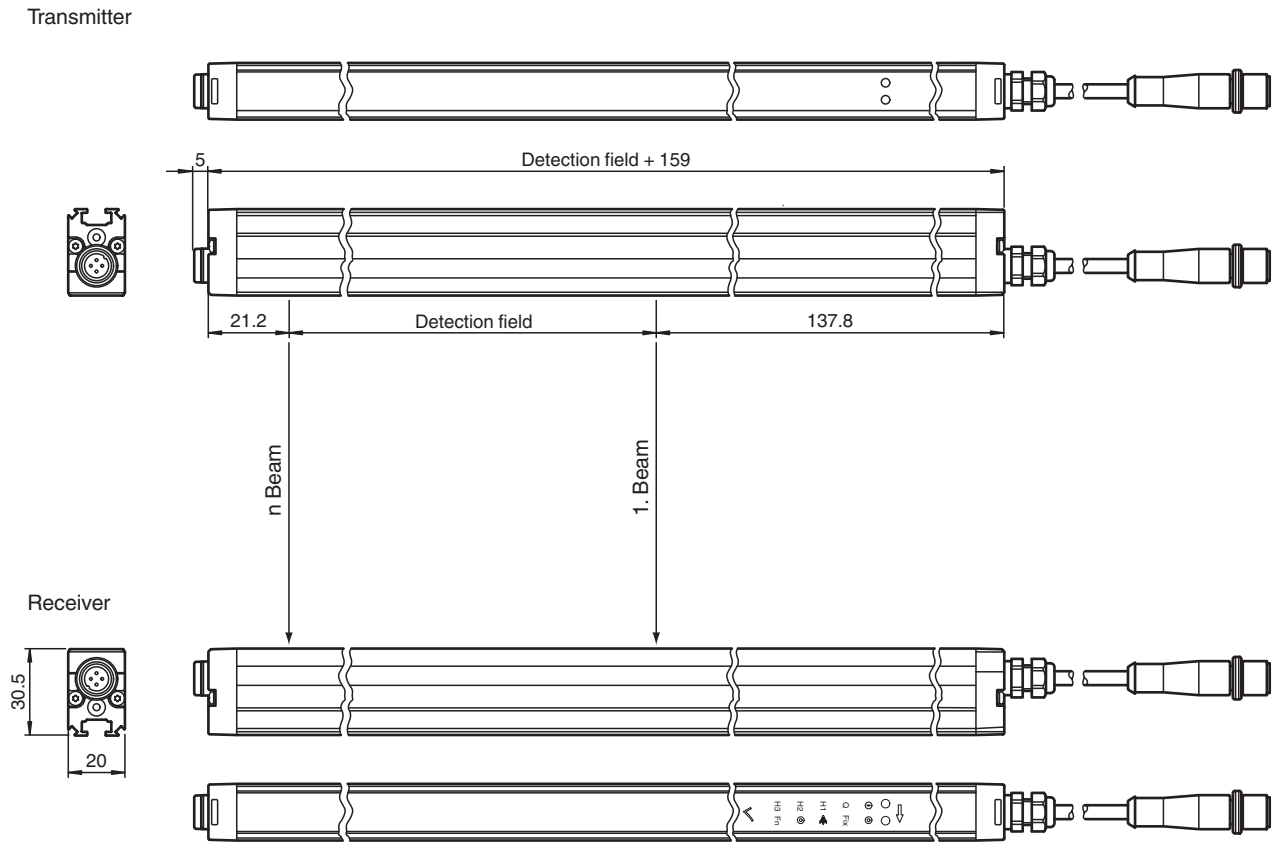
Dimensions



Technical Data

General specifications	
Effective detection range	Standard : 0.3 ... 6 m Option /35: 0.5 ... 8 m
Threshold detection range	Standard : 7.5 m Option /35: 10 m
Light source	IRED
Light type	modulated infrared light , 850 nm
Field height	see Table 1, max. 3200 mm
Beam crossover	Factory setting: three beam crossing, deactivateable
Beam blanking	adjustable max. 2 fixed suppressible beam areas (blanking)
Beam spacing	25 mm
Number of beams	see Table 1, max. 129
Operating mode	Emitter: Emitter power adjustable in two ranges
Optical resolution	without beam crossover: 25 mm with beam crossover: 12.5 mm with in 25% and 75% of the range
Opening angle	10 °
Ambient light limit	> 50000 Lux (if external light source is outside the opening angle)
Functional safety related parameters	
$MTTF_d$	34 a
Mission Time (T_M)	20 a
Diagnostic Coverage (DC)	60 %
Indicators/operating means	
Operation indicator	Power on: LED green, statically lit , Undervoltage indicator: Green LED, pulsing (approx. 0.8 Hz) , short-circuit : LED green flashing (approx. 4 Hz)

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Function indicator		Emitter: Yellow LED, illuminates at high emitting power, off at low emitting power Receiver: Yellow LED: illuminates when an object is detected flashes when falling short of the operating reserve (4 Hz) Error message: Yellow LED flashes (8 Hz) in emitter and receiver
Control elements		Receiver: 2 touch buttons for programming
Parameterization indicator		IO link communication: green LED goes out briefly (1 Hz)
Electrical specifications		
Operating voltage	U_B	18 ... 30 V DC
Ripple		10 %
No-load supply current	I_0	Emitter ≤: 50 mA Receiver: ≤ 150 mA (without outputs)
Time delay before availability	t_v	see Table 1, max. 2.3 s
Interface		
Interface type		IO-Link
Protocol		IO-Link V1.0
Mode		COM2 (38.4 kBit/s)
Input		
Test input		Emitter switch-off with +UB or 0 V at pin 4 (emitter)
Function input		Range input activation from 1.6 m (or 2 m in case of option /35) with +UB or 0 V on pin 2 (emitter) Teach-In input for programming on pin 8 (receiver)
Output		
Stability alarm output		Stability Control (SC) 1 PNP, short-circuit protected, reverse polarity protected on pin 2 (receiver)
Switching type		Factory setting: dark on , Switchable to light-on mode
Signal output		Switching output (detection field C/Q) 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected on pin 4 (receiver), Height monitoring (H1, H2. H3) 3 push-pull (4 in 1) outputs, short-circuit proof, reverse polarity protected on pin 5, pin 6, pin 7 (receiver)
Switching threshold		Factory setting: The signal tracking for the threshold value is deactivated, increasing the optical resolution by a maximum of 4 mm; switchable to active signal tracking
Switching voltage		max. 30 V DC
Switching current		max. 100 mA
Voltage drop	U_d	≤ 2 V DC
Switching frequency	f	see Table 1, max. 135 Hz
Response time		see Table 1, max. 12 ms
Timer function		Off-delay programmable from 0 ... 1.25 s in 5 ms steps (adjustment via IO-Link only)
Conformity		
Communication interface		IEC 61131-9
Product standard		EN 60947-5-2
Approvals and certificates		
Protection class		III (IEC 61140)
UL approval		cULus Listed
CCC approval		CCC approval / marking not required for products rated ≤36 V
Ambient conditions		
Ambient temperature		Standard : -10 ... 60 °C (14 ... 140 °F) Option /146: -30 ... 60 °C (-22 ... 140 °F)
Storage temperature		-30 ... 70 °C (-22 ... 158 °F)
Mechanical specifications		
Conductor cross section		min. 0.25 mm²
Housing width		20 mm
Housing depth		30.5 mm
Housing length L		see Table 1, max. 3360 mm
Degree of protection		IP67
Connection		Emitter: connecting cable with 4-pin, M12 x 1 connector , 330 mm total length Receiver: connecting cable with 8-pin, M12 x 1 connector , 350 mm total length
Material		
Housing		extruded aluminum section , Silver anodized

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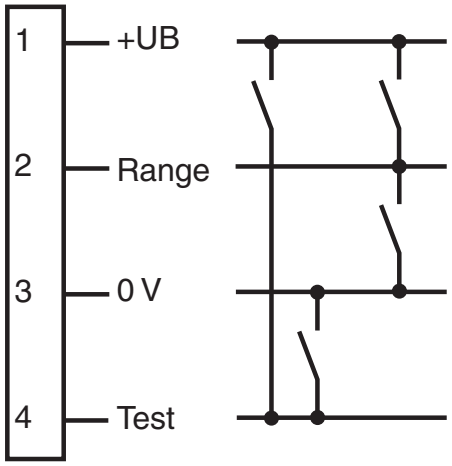
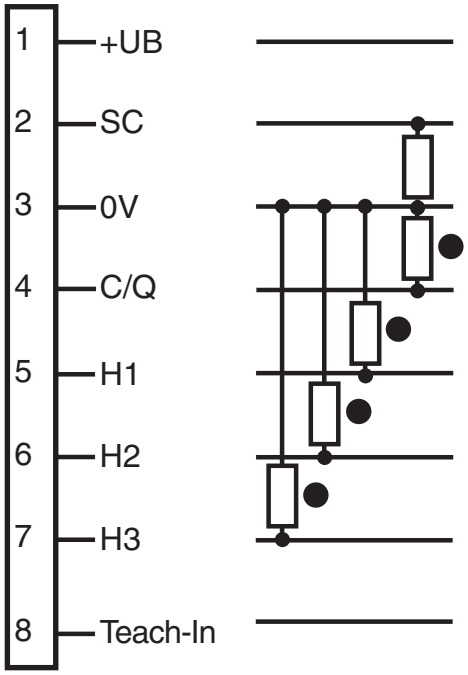
Optical face	Plastic pane , Polycarbonate
Mass	see Table 1, max. 1750 g (per profile)
Cable length	max. 30 m

Connection Assignment

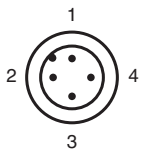
Transmitter

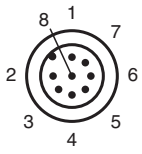


Receiver

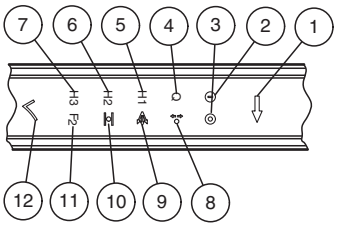


Connection Assignment





Assembly



1	Menu button	yellow	7	Height checking 3	yellow
2	Operating indicator	green	8	Object floating	yellow
3	Status display	yellow	9	Crossing	yellow
4	Q object	yellow	10	Peripheral beam tolerance	yellow
5	Height checking 1	yellow	11	2nd level	yellow
6	Height checking 2	yellow	12	OK button	yellow

2nd level: Beam collimation, inverse mode, light-on/dark-on switching, reset factory setting, signal tracking

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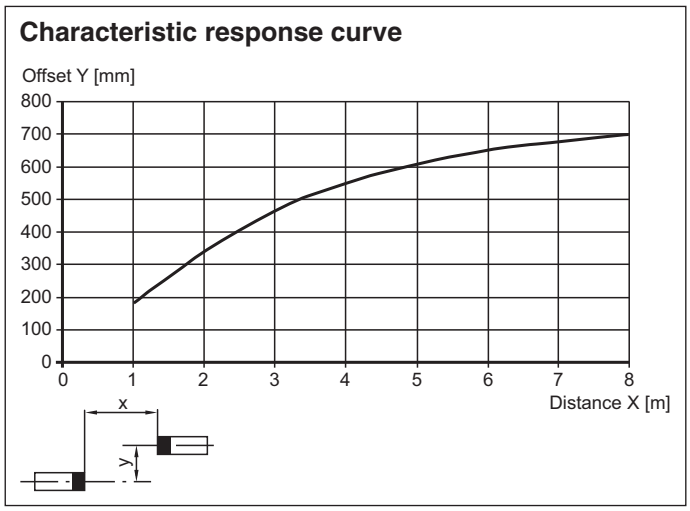
Characteristic Curve



System Description

The light grid consists of a emitter and a receiver, between which is the area to be monitored.

The switching command is initiated by the entry or existence of a body/object in the monitoring field.

The modular system design supports a wide range of distances for the lines of light. Optimum implementation of the light grids for specific application requirements is thus possible.

The system also has 3 switch outputs for height checking.

The system is programmed using the integrated touch field or the IO-Link interface.

Accessories

	**OMH-SLCT-06**	Swivel Bracket
	**V19-G-EMV-BK0,3M-PVC-V19-G**	Double-ended cordset, M12 to M12, with EMC filter, 8-pin, PVC cable
	**OMH-LGS-01**	Attachment aid for light grid series LGS/LGM
	**OMH-SLCT-01**	Quick clamp and adjustment system
	**AA SLCT-01**	Profile alignment aid; simplified alignment of the SLCS and SLCT safety light curtains
	**OMH-SLCT-05**	Mounting bracket including adjustment
	**OMH-SLCT-04**	Mounting bracket including adjustment (with loose bearing)
	**OMH-SLCT-03**	Mounting bracket including adjustment
	**V1-G-BK2M-PUR-U**	Female cordset single-ended M12 straight A-coded, 4-pin, PUR cable black, UL approved, drag chain suitable, torsion resistant
	**V1-G-BK5M-PUR-U**	Female cordset single-ended M12 straight A-coded, 4-pin, PUR cable black, UL approved, drag chain suitable, torsion resistant
	**V1-G-BK10M-PUR-U**	Female cordset single-ended M12 straight A-coded, 4-pin, PUR cable black, UL approved, drag chain suitable, torsion resistant

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Accessories

	**V1-G-BK15M-PUR-U**	Female cordset single-ended M12 straight A-coded, 4-pin, PUR cable black, UL approved, drag chain suitable, torsion resistant
	**V19-G-BK10M-PUR-IEC**	Female cordset, M12, 8-pin, PUR-cable
	**V19-G-BK2M-PUR-IEC**	Female cordset, M12, 8-pin, PUR-cable
	**V19-G-BK5M-PUR-IEC**	Female cordset, M12, 8-pin, PUR-cable
	**V19-G-BK2M-PUR-U-V1-G**	Cordset M12 socket straight A-coded 8-pin to M12 plug straight A-coded 4-pin, PUR cable black, UL approved, drag chain suitable, torsion resistant
	**PACTware 4.1**	FDT Framework
	**V1-G-BK0,6M-PUR-U-V1-G-LGS25T**	Cordset, LGS25 light grids to ICE modules/WIS 2, M12 to M12, PUR cable, 4-pin
	**ICE2-8IOL-G65L-V1D**	EtherNet/IP IO-Link master with 8 inputs/outputs
	**ICE3-8IOL-G65L-V1D**	PROFINET IO IO-Link master with 8 inputs/outputs
	**ICE1-8IOL-G30L-V1D**	Ethernet IO-Link module with 8 inputs/outputs
	**ICE1-8IOL-G60L-V1D**	Ethernet IO-Link module with 8 inputs/outputs
	**ICE2-8IOL-K45P-RJ45**	EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, push-in connectors
	**ICE2-8IOL-K45S-RJ45**	EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, screw terminal
	**ICE3-8IOL-K45P-RJ45**	PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, push-in terminals
	**ICE3-8IOL-K45S-RJ45**	PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, screw terminal
	**IO-Link-Master02-USB**	IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

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Technical Features

Table 1:

Switch-on delay, maximum switching frequency and maximum time delay before availability:

Field height [mm]	Switch-on delay Q [ms] without object parameterization		Switch-on delay Q [ms] with object parameterization, HQn outputs		Max. switching frequency [Hz]	Max. time delay before availability t_V [s]
	typ.	max.	typ.	max.		
100	2	4	5	6	134	0.8
200	3	5	5	7	125	0.9
300	3	5	5	7	118	0.9
400	3	5	5	8	112	0.9
500	3	5	6	8	106	1.0
600	3	5	6	9	101	1.0
700	3	6	6	9	96	1.
800	3	6	6	10	92	1.1
900	3	6	7	10	88	1.2
1000	4	6	7	11	84	1.2
1100	4	7	7	11	81	1.3
1200	4	7	7	12	78	1.3
1300	4	7	8	12	75	1.4
1400	4	7	8	13	72	1.4
1500	4	8	8	13	70	1.5
1600	4	8	8	14	67	1.5
1700	4	8	9	14	65	1.6
1800	5	8	9	15	63	1.6
1900	5	9	9	15	61	1.7
2000	5	9	9	16	60	1.7
2100	5	9	10	16	58	1.8
2200	5	9	10	17	56	1.8
2300	5	10	10	17	55	1.9
2400	5	10	10	18	53	1.9
2500	5	10	11	18	52	1.9
2600	6	10	11	19	51	2.0
2700	6	11	11	19	49	2.0
2800	6	11	11	20	48	2.1
2900	6	11	12	20	47	2.1
3000	6	11	12	21	46	2.2
3100	6	12	12	21	45	2.2
3200	6	12	12	22	44	2.3

Number of beams, housing length and weight:

Field height [mm]	Number of beams	Overall length of the transmitter/receiver unit [mm]	Weight of the transmitter/receiver unit [g]
100	5	260	200
200	9	360	250

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Field height [mm]	Number of beams	Overall length of the transmitter/receiver unit [mm]	Weight of the transmitter/receiver unit [g]
300	13	460	300
400	17	560	350
500	21	660	400
600	25	760	450
700	29	860	500
800	33	960	550
900	37	1060	600
1000	41	1160	650
1100	45	1260	700
1200	49	1360	750
1300	53	1460	800
1400	57	1560	850
1500	61	1660	900
1600	65	1760	950
1700	69	1860	1000
1800	73	1960	1050
1900	77	2060	1100
2000	81	2160	1150
2100	85	2260	1200
2200	89	2360	1250
2300	93	2460	1300
2400	97	2560	1350
2500	101	2660	1400
2600	105	2760	1450
2700	109	2860	1500
2800	113	2960	1550
2900	117	3060	1600
3000	121	3160	1650
3100	125	3260	1700
3200	129	3360	1750

Design and function

Safety information

The device must only be operated with Safety Extra Low Voltage (SELV) with safe electrical disconnection. Intervention and repairs must only be carried out by your suppliers.
The system must be serviced and checked regularly.
A clean, soft cloth can be used for cleaning. Aggressive, abrasive cleaning agents that damage the surface must be avoided. The device must not be subjected to hard knocks or vibration.

Commissioning

Prerequisites

- The transmitter and receiver must be installed and aligned correctly.
- The electrical connection must be established according to the connection diagram.
- The signal output must respond to object detection.
- If at least one light beam is interrupted, the output remains active as long as the object is detected.

Fault location

- Measure operating voltage

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- Check the cabling.
- Check the transmitter and receiver for dirt and clean if necessary.

Function displays

Behind the optics cover on the connection side of the profiles there is a green Power ON operating indicator LED and a yellow status display LED.

Transmitter

Function	Diagnostic description
Green operating indicator LED lights up statically	Power on
Green operating indicator LED is dark and yellow status indicator flashes	Power save mode
Yellow status indicator LED is dark	Transmitter with low transmitting power
Yellow status indicator LED lights up statically	Transmitter with high transmitting power
Yellow status indicator LED flashes quickly (approx. 8 Hz)	Error condition
Yellow status indicator LED light changes for short time	Test input is activated

Receiver

Function	Diagnostic description
Green operating indicator LED lights up statically	Power on
Green operating indicator LED is dark	Power save mode
Green operating indicator LED flashes with brief interruption	IO-Link mode active, parameterisation only possible via IO-Link
Green operating indicator LED flashes (4 Hz)	Error condition: Short circuit at the outputs
Yellow status indicator LED lights up statically	Detection field interrupted
Yellow status indicator LED is dark	Detection field is enabled.
Yellow status indicator LED flashes (approx. 4 Hz)	Insufficient function reserve
Yellow status indicator LED flashes quickly (approx. 8 Hz)	Error condition: Incorrect signal measurement

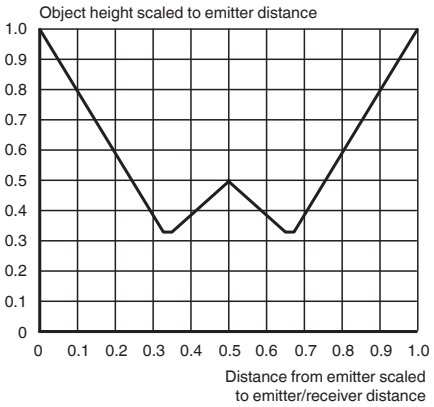
Resolution and beam clearance

The mechanical beam clearance determines the smallest detectable object size. Crossing the light beams increases the resolution of the light grid.

The devices are delivered without programmed height checking. The beam is crossed three times.

Resolution of the crossed beam arrangement

If three-way crossing of the beams is programmed, the resolution increases. For a three-way crossing, this means that the increased resolution is offered after 25 % of the transmitter range or receiver range. It must therefore be ensured that all objects pass transmitters or receivers with this clearance.



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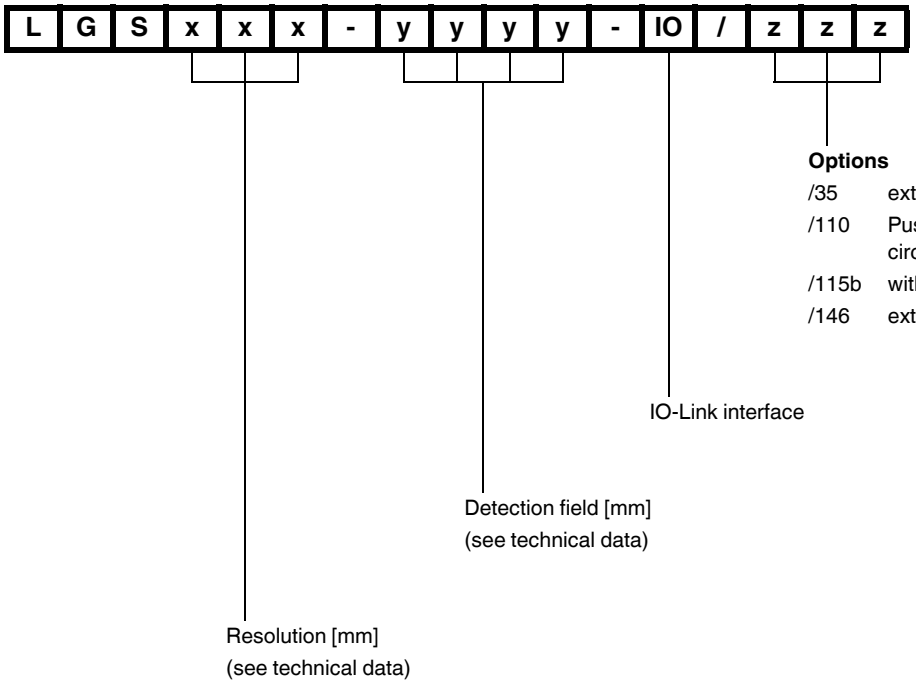

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