#### **TECHNICAL INFORMATION**

# The MLG-2 as a replacement product for the MLG-1 and XLG

Quick finder guide for new light grids





#### **Described product**

MLG-2

#### Manufacturer

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# 1 How to find a new MLG-2 light grid as a replacement for your MLG-1 or XLG

#### 1.1 Finding the right MLG-2 via the type code



Figure 1: Comparison of the MLG-1 and MLG-2 type codes

#### **Beam separation**

Table 1: Beam separation

MLG-1	MLG-2		
Beam separation Example: MLG1-xxxxxxx	Beam separation Example: MLG10x-xxxxxxxx		
1: 10 mm	10: 10 mm		
2: 20 mm	20: 20 mm		
3: 30 mm	30: 30 mm		
4: 40 mm	40: 40 mm		
5: 50 mm	50: 50 mm		
7: 25 mm	25: 25 mm		

#### **Detection height**

Table 2: Detection height

MLG-1	MLG-2
Detection height	Detection height
Example: MLGX-0100xxxx	
0100: 100 mm	0100: 100 mm
to	to
3140: 3,140 mm	3140: 3,140 mm

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#### Interface, connection type $\rightarrow$ version and data interface

If the interface and connection type of your MLG-1 are not listed in the table below, please contact your SICK AG sales office.

#### 

Additional accessories may be required if you want to use your existing connecting cables with the MLG-2 (see "Overview of accessories required", page 19).

#### Table 3: Interface and connection type

MLG-1		MLG-2			
Interface and connection type	Description	Data interface	Result Type code		
MLGx-xxxx <b>A8</b> xx	2 x AO, 1 x PNP-Out, 1 x PNP-In M12, 8-pin	B: 2 x analog + 2 x I/O	MLGxx <b>A</b> -xxxx <b>B</b> xxxxx		
MLGx-xxxx <b>C8</b> xx	CANopen M12, 8-pin	C: CANopen	MLGxx <b>N</b> -xxxx <b>C</b> xxxxx		
MLGx-xxxx <b>E2</b> xx	6 x NPN-Out, 2 x NPN-In Terminal compartment	U: Prepared for terminal box <sup>1</sup> )	MLGxxN-xxxxUxxxxx <sup>1)</sup>		
MLGx-xxxxE5xx	1 x NPN-Out M12, 5-pin	R: 2 x Q + 2 x I/O	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx		
MLGx-xxxx <b>E8</b> xx	3 x NPN-Out, 1 x NPN-In M12, 8-pin	R: 2 x Q + 2 x I/O	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx		
MLGx-xxxx <b>F2</b> xx	6 x PNP-Out, 2 x PNP-In Terminal compartment	U: Prepared for terminal box <sup>1</sup> )	MLGxxN-xxxxUxxxxx <sup>1)</sup>		
MLGx-xxxx <b>F5</b> xx 1 x PNP-Out M12, 5-pin		R: 2 x Q + 2 x I/O	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx		
MLGx-xxxx <b>F8</b> xx	3 x PNP-Out, 1 x PNP-In M12, 8-pin	R: 2 x Q + 2 x I/O	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx		
MLGx-xxxx12xx	1 x RS-485, 4 x PNP-Out, 2 x PNP-In Terminal compartment	U: Prepared for terminal box	MLGxxN-xxxxUxxxxx <sup>1)</sup>		
MLGx-xxxx <b>I8</b> xx	1 x RS-485, 1 x PNP-Out, 1 x PNP-In M12, 8-pin	I: RS-485 + 2 x I/0	MLGxx <b>A</b> -xxxxIxxxxx		
MLGx-xxxx <b>N8</b> xx	2 x AO, 1 x NPN-Out, 1 x NPN-In M12, 8-pin	B: 2 x analog + 2 x I/O	MLGxx <b>A</b> -xxxx <b>B</b> xxxxx		
MLGx-xxxx <b>P8</b> xx	PROFIBUS M12, 8-pin	P: Prepared for PROFIBUS replacement module <sup>2)</sup>	MLGxxN-xxxxPxxx02		
MLGx-xxxx <b>T2</b> xx	1 x RS-485, 4 x NPN-Out, 2 x NPN-In Terminal compartment	U: Prepared for terminal box	MLGxxN-xxxxUxxxxx 1)		
MLGx-xxxx <b>T8</b> xx	1 x RS-485, 1 x NPN-Out, 1 x NPN-In M12, 8-pin	I: RS-485 + 2 x I/0	MLGxx <b>A</b> -xxxxIxxxxx		

1) If you want to replace an MLG-1 that has a terminal compartment, you must order an additional item: the DOS-1205-G M12 female connector for the sender (part number: 6009719).

Table 4: Operating range

MLG-1	MLG-2
Operating range Example: MLGx-xxxxx1x	Operating range Example: MLGxxx-xxxxx05xx
1: 5 m, ± 3.6°	05: 5 m, ± 3.6°
2: 8.5 m, ± 3.6°	08: 8.5 m, ± 3.6°
4:5 m, ± 5°	05: 5 m, ± 3.6°
5: 8.5 m, ± 5°	08: 8.5 m, ± 3.6°

#### Configuration mode $\rightarrow$ "Software Default"

The choice of variant for "Software Default" depends on the following:

- MLG-1 configuration mode
- The version required, which is determined by the interface and connection type of the MLG1 (siehe Tabelle 3, Seite 5)

le 5:	Conf	iguration	mode -	"Software	Default"
	le 5:	le 5: Conf	le 5: Configuration	le 5: Configuration mode –	le 5: Configuration mode – "Software

MLG-1		MLG-2			
Configuration mode Example: MLGx- xxxxxxx1	Connection type Example: MLGx- xxxxx5xx	Version Example: MLGxxA- xxxxxxxxx	Software Default Example: MLGxxx- xxxxxxx01		
1: Standard	5: M12, 5-pin	A: Pro	97		
	5: M12, 5-pin	N: ProNet	01		
	8: M12, 5-pin	A: Pro	99		
2: Configuration inter- face	8: M12, 5-pin	A: Pro	99		
3: Triple cross beam	5: M12, 5-pin	A: Pro	96		
	8: M12, 5-pin	A: Pro	98		
L: Triple cross beam, output Q inverted	5: M12, 8-pin	A: Pro	95		

#### Special devices, customer-specific settings or no results at all

In the following cases, please contact your SICK AG sales office:

- Your MLG-1 is a special device: MLGx-xxxxxxSxx (example: MLGx2-1180F822S01)
- Your MLG-1 has customer-specific settings: MLGx-xxxxxxKxx (example: MLGx2-0580F812K01)
- Despite following the procedure described in this chapter, you are unable to find an appropriate MLG-2 variant to replace your MLG-1 variant.

#### 1.2 Finding a replacement for your XLG

Table 6	Replacement for XLG-1
---------	-----------------------

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XLG-1	MLG-2		
Туре	Part number	Description	Result Type code
XLG1-05901812	1065368	Beam separation: 10 mm, sensing range: 5 m, ± 1.8° 1 x RS-485, 1 x PNP-Out, 1 x PNP-In, M12, 8-pin, configuration inter- face	MLG10 <b>A</b> -0590I10801

XLG-1		MLG-2	
Туре	Part number	Description	Result Type code
XLG2-1180I212	1048203	Beam separation 20 mm, sensing range: 5 m, ± 1.8° 1 x RS-485, 4 x PNP-Out, 2 x PNP-In, with terminal compartment, con- figuration interface	MLG20N-1180U10801
XLG3-1020F812	1046353	Beam separation: 30 mm, sensing range: 5 m, ± 1.8° 3 x PNP-Out, 1 x PNP-In, M12, 8-pin, configuration inter- face	MLG30A-1020R10801
XLG3-1470F812	1047926	Beam separation: 30 mm, sensing range: 5 m, ± 1.8° 3 x PNP-Out, 1 x PNP-In, M12, 8-pin, configuration inter- face	MLG30A-1470R10801
XLG5-1150T81	1064836	Beam separation: 50 mm, sensing range: 5 m, ± 1.8° 1 x RS-485, 1 x PNP-Out, 1 x PNP-In, M12, 8-pin, configuration inter- face	MLG50A-1150I10801
XLG5-1900 212	1048351	Beam separation: 50 mm, sensing range: 5 m, , ± 1.8° 1 x RS-485, 4 x PNP-Out, 2 x PNP-In, with terminal compartment, con- figuration interface	MLG50N-1900U10801

#### Special devices, customer-specific settings or no results at all

In the following cases, please contact your SICK AG sales office:

- Your XLG-1 is a special device: XLGx-xxxxxxSxx (example: XLG2-1020F412S04)
- Your XLG-1 has customer-specific settings: XLGx-xxxxxxxKxxx (example: XLG5-1900l212K001)
- Despite following the procedure described in this chapter, you are unable to find an appropriate MLG-2 variant to replace your XLG variant.

#### **1.3** Type code and ordering information

For a detailed illustration of the type code and for further ordering information, please refer to the relevant product information.

- MLG-1 and XLG product information: 8014655
- MLG-2 product information: 8017053

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### 2 Advantages of the MLG-2 compared to the MLG-1

The MLG-2 offers the following advantages over the MLG-1:

- Able to detect smaller objects (high-resolution mode)
- Improved detection of transparent objects thanks to "Transparent mode"
- Improved ambient light immunity due to the smaller aperture angle
- Better able to adapt to the environment and the application thanks to a variety of operating modes
- Shorter response times and minimum presence time
- Smaller minimum distances when mounting multiple light grids
- Flexible mounting of removable fieldbus module (no blind zone)
- Removable fieldbus modules that can be ordered separately
- Control panel for easy commissioning without a PC
- IO-Link interface V.1.1
- Easy configuration with the SOPAS configuration software via an Ethernet interface
- Configuration options for multiple applications (measuring tasks)

For additional information, see the relevant operating instructions.

#### 3 Response times

Response time in ms

As the MLG-2 offers shorter response times, you may have to adjust the PLC configuration. Alternatively, you can also set a digital output delay for the MLG-2. See the relevant MLG-2 operating instructions.



Figure 2: Comparison of response times for MLG-1 / XLG and MLG-2 with parallel-beam function, MLG-2 without high-speed scan

The response time depends on the beam function and on which basic function is selected.

In the case of the cross-beam function, multiply the response time in the diagram by 2.

#### 4 Minimum detectable object (MDO) - Cross-beam function



Area A

(2) Area B

#### Operating range 5 m

Table 7: Cross-beam function, operating range 5 m – Minimum detectable object (stationary object) with standard measurement accuracy

	MLG-1			MLG-2			
	± 3.6°	± 5°	MDO		± 3.6°	MDO	
Beam separa- tion	Minimum dista	nce	In area A	In area B	Minimum dis- tance	In area A	In area B
10 mm	350 mm	180 mm	15 mm	> 10 mm	220 mm	14 mm	9 mm
20 mm	650 mm	320 mm	25 mm	> 15 mm	440 mm	24 mm	14 mm
25 mm	-	400 mm	30 mm	> 18 mm	550 mm	29 mm	16.5 mm
30 mm	900 mm	470 mm	35 mm	> 20 mm	660 mm	34 mm	19 mm
50 mm	1,500 mm	750 mm	55 mm	> 30 mm	1,110 mm	54 mm	29 mm

#### Operating range 8.5 m

Table 8: Cross-beam function, operating range 8.5 m – Minimum detectable object (stationary object) with standard measurement accuracy

	MLG-1			MLG-2			
	± 3.6°	± 5°	MDO		± 3.6°	MDO	
Beam separa- tion	Minimum dista	nce	In area A	In area B	Minimum dis- tance	In area A	In area B
10 mm	350 mm	180 mm	20 mm	> 15 mm	240 mm	14 mm	9 mm
20 mm	650 mm	320 mm	30 mm	> 20 mm	480 mm	24 mm	14 mm
30 mm	900 mm	470 mm	40 mm	> 25 mm	720 mm	34 mm	19 mm
50 mm	1,500 mm	750 mm	60 mm	> 35 mm	1,200 mm	54 mm	29 mm

#### 5 Mounting

#### 5.1 Distance between lower edge of housing and first beam

The distance between the lower edge of the housing and the first beam is not the same on the MLG-2 as on the MLG-1.

There are three different applications, which are illustrated in chapters "Application 1", "Application 2", and "Application 3". The choice of application depends on which MLG-1 is being replaced and on the new MLG-2. The following table lists suitable MLG-2 variants as replacements for certain MLG-1 variants. For additional information, siehe Tabelle 3, Seite 5.

- Remember to take account of the difference between the lower edge of the housing and the first beam during planning and mounting.
- Application 1: see "Application 1", page 12
- Application 2: see "Application 2", page 13
- Application 3: see "Application 3 (PROFIBUS or CANopen)", page 14

Table 9: Applications – Replacement involving MLG-1 and MLG-2

MLG-1	MLG-2	MLG-1 and MLG-2
Type code Interface and connection type	Type code Version and data interface	Application – Comparison of first beam in relation to lower edge of housing
MLGx-xxxx <b>A8</b> xx	MLGxx <b>A</b> -xxxx <b>B</b> xxxxx	Application 1
MLGx-xxxx <b>C8</b> xx	MLGxxN-xxxxCxxxxx	Application 3
MLGx-xxxx <b>E2</b> xx	MLGxxN-xxxxUxxxxx 1)	Application 2
MLGx-xxxx <b>E5</b> xx	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx	Application 1
MLGx-xxxx <b>E8</b> xx	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx	Application 1
MLGx-xxxx <b>F2</b> xx	MLGxxN-xxxxUxxxxx 1)	Application 2
MLGx-xxxx <b>F5</b> xx	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx	Application 1
MLGx-xxxx <b>F8</b> xx	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx	Application 1
MLGx-xxxxI2xx	MLGxxN-xxxxUxxxxx 1)	Application 2
MLGx-xxxxI8xx	MLGxx <b>A</b> -xxxxIxxxxx	Application 3
MLGx-xxxx <b>N8</b> xx	MLGxx <b>A</b> -xxxx <b>B</b> xxxxx	Application 1
MLGx-xxxx <b>P8</b> xx	MLGxxN-xxxxPxxx02	Application 3
MLGx-xxxx <b>T2</b> xx	MLGxxN-xxxxUxxxxx	Application 2
MLGx-xxxx <b>T8</b> xx	MLGxxA-xxxxIxxxxx	Application 1

 Remember to order the following additional item: the DOS-1205-G M12 female connector for the sender (part number: 6009719).



Figure 4: Application 1 – Comparison of distance between first beam and lower edge of housing on MLG-1 and MLG-2

- ① Detection height
- 2 Beam separation
- 3 Receiver
- ④ Sender
- A Distance between lower edge of housing and first beam (see table 10, page 15)

#### 5.1.2 Application 2



Figure 5: Application 2 – Comparison of distance between first beam and lower edge of housing on MLG-1 and MLG-2

- ① Detection height
- 2 Beam separation
- 3 Receiver
- (4) "Flat" installation example
- (5) "Slim" installation example
- 6 "Compact" installation example
- (7) "AFB" terminal box (for additional information, see "Connecting the "AFB" terminal box", page 20).
- A Distance between lower edge of housing and first beam (see table 10, page 15)



#### 5.1.3 Application 3 (PROFIBUS or CANopen)

Figure 6: Application 3 – Comparison of distance between first beam and lower edge of housing on MLG-1 and MLG-2

- ① Detection height
- Beam separation
- 3 Receiver
- ④ Sender
- (5) Fieldbus module; the fieldbus module can be mounted separately
- 6 CANopen adapter ADAPT-CAN-GE-MLG or PROFIBUS adapter ADAPT-PB-GE-MLG
- A Distance between lower edge of housing and first beam (see table 11, page 15)

#### 5.1.4 Distance between lower edge of housing and first beam for all applications

#### Applications 1 and 3

Table 10: Applications 1 and 3 – Distance between first beam and lower edge of housing

Beam separation	Dimension A <sub>MLG-1</sub>	Dimension A <sub>MLG-2</sub>
10 mm	40 mm	68.3 mm
20 mm	49 mm <sup>1)</sup>	68.3 mm
	59 mm <sup>2)</sup>	78.3 mm
25 mm	64 mm	83.3 mm
30 mm	69 mm	88.3 mm
50 mm	89 mm	108.3 mm

1) With an even number of beams

2) With an uneven number of beams

#### Application 2

Table 11: Application 2 – Distance between first beam and lower edge of housing

Beam separation	Dimension A <sub>MLG-1</sub>	Dimension A <sub>MLG-2</sub>
10 mm	160 mm	68.3 mm
20 mm	170 mm <sup>1)</sup>	68.3 mm
	180 mm <sup>2)</sup>	78.3 mm
25 mm	175 mm	83.3 mm
30 mm	180 mm	88.3 mm
50 mm	200 mm	108.3 mm

1) With an even number of beams

2) With an uneven number of beams

#### 5.2 Overview of brackets

Various brackets were available for mounting the MLG-1 light grid. In the case of the brackets below, you can use the same mounting positions for the MLG-2 as for the MLG-1 by relying on the BEF-1SHABP004 mounting kit.

Please note that the MLG-1 and MLG-2 differ in terms of where the first beam is located in relation to the lower edge of the housing (see "Distance between lower edge of housing and first beam", page 11).

MLG-1		MLG-2			
Designation	Part number	Description	Designation	Part number	
Swivel mount bracket BEF-2SMKEAKU4	2019649		Mounting kit BEF-1SHABP004	2071021	
Side bracket BEF-NUT-MLG	2023696		•		

Table 12: Replaceable MLG-1 and XLG-1 brackets

Alternatively, you can mount the MLG-2 using the following brackets:

- FlexFix bracket BEF-1SHABPKU4 (part number: 2066614)
- QuickFix bracket BEF-3SHABPKU2 (part number: 2066048)

In order to use this bracket, you must adapt the mounting position accordingly.

#### 5.2.1 Mounting the MLG-2 with the BEF-1SHABP004 mounting kit



Figure 7: Mounting kit (part number: 2071021) – Dimensions, layout, and scope of delivery

- ① Method C
- 2 Method A or B
- 3 Screw (8x)
- ④ Washer (8x)
- 5 FlexFix bracket (4x)
- 6 Mounting plate (4x)
- ⑦ Sliding nut (8x)



Figure 8: Mounting the MLG-2 with mounting kit BEF-1FSHABP004 – Methods A and B, replacement for side bracket BEF-NUT-MLG



Figure 9: Mounting the MLG-2 with mounting kit BEF-1FSHABP004 – Method C, replacement for swivel mount bracket BEF-2SMKEAKU4

# 6 Electrical connection

#### 6.1 Overview of accessories required

SICK offers some accessories in case you want to use your MLG-1 connecting cables for the MLG-2.

Table 13: Accessories require
-------------------------------

MLG-1	MLG-2	Accessories required for the MLG-2			
Type code Interface and connection type	Type code Version and data interface	Sender	Receiver		
MLGx-xxxx <b>A8</b> xx	MLGxx <b>A</b> -xxxx <b>B</b> xxxxx	Adapter cable Part number: 6057015	Adapter cable Part number: 6057014		
MLGx-xxxx <b>C8</b> xx	MLGxx <b>N</b> -xxxx <b>C</b> xxxxx	No accessories required	No accessories required		
MLGx-xxxx <b>E2</b> xx (with terminal compartment)	MLGxxN-xxxxUxxxxx	M12 female connector, 5-pin, A-coded DOS-1205-G Part number: 6009719	"AFB" terminal box Part number: 2082790 Included with delivery		
MLGx-xxxx <b>E5</b> xx	MLGxxA-xxxx <b>R</b> xxxxx	No accessories required	Adapter cable Part number: 6057013		
MLGx-xxxx <b>E8</b> xx	MLGxxA-xxxx <b>R</b> xxxxx	Adapter cable Part number: 6057015	Adapter cable Part number: 6057014		
MLGx-xxxx <b>F2</b> xx (with terminal compartment)	MLGxx <b>N</b> -xxxxUxxxxx	M12 female connector, 5-pin, A-coded DOS-1205-G Part number: 6009719	"AFB" terminal box Part number: 2082790 Included with delivery		
MLGx-xxxx <b>F5</b> xx	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx	No accessories required	Adapter cable Part number: 6057013		
MLGx-xxxx <b>F8</b> xx	MLGxx <b>A</b> -xxxx <b>R</b> xxxxx	Adapter cable Part number: 6057015	Adapter cable Part number: 6057014		
MLGx-xxxx <b>l2</b> xx (with terminal compartment)	MLGxxN-xxxxUxxxxx	M12 female connector, 5-pin, A-coded DOS-1205-G Part number: 6009719	"AFB" terminal box Part number: 2082790 Included with delivery		
MLGx-xxxx <b>I8</b> xx	MLGxx <b>A</b> -xxxxIxxxxx	Adapter cable Part number: 6057015	Adapter cable Part number: 6057014		
MLGx-xxxx <b>N8</b> xx	MLGxx <b>A</b> -xxxx <b>B</b> xxxxx	Adapter cable Part number: 6057015	Adapter cable Part number: 6057014		
MLGx-xxxx <b>P8</b> xx (PROFIBUS)	MLGxxN-xxxxPxxx02	No accessories required	PROFIBUS replacement mod- ule FBM-P22 Part number: 2092618 Included with delivery		
MLGx-xxxx <b>T2</b> xx	MLGxxN-xxxxUxxxxx	M12 female connector, 5-pin, A-coded DOS-1205-G Part number: 6009719	"AFB" terminal box Part number: 2082790 Included with delivery		
MLGx-xxxx <b>T8</b> xx	MLGxx <b>A</b> -xxxxIxxxxx	Adapter cable Part number: 6057015	Adapter cable Part number: 6057014		

Please note that the accessories are always required with the following variants:

- MLG-1 variants with a terminal compartment: accessory required = "AFB" terminal box
- MLG-1 featuring PROFIBUS: accessory required = PROFIBUS replacement module FBM-P22

#### 6.2 Adapter cables

Various adapter cables are available to facilitate the replacement of certain MLG variants (see "Overview of accessories required", page 19).

To carry out the replacement process, proceed as follows:

- 1. Connect the adapter cable between the connecting cable of the MLG-1 sender and the MLG-2 sender.
- 2. Connect the adapter cable between the connecting cable of the MLG-1 receiver and the MLG-2 receiver.



#### 6.3 Connecting the "AFB" terminal box

In order to replace the receiver for MLG variants that have a terminal compartment, you must connect the "AFB" terminal box (part number 2082790) to the MLG-2 receiver (see "Overview of accessories required", page 19 and see "Application 2", page 13).

To carry out the replacement process, proceed as follows:

- 1. Unplug the connecting cable from the MLG-1 receiver. Remember to make a note of the wire colors and terminal numbers of the MLG-1.
- 2. Plug the connecting cable into the "AFB" terminal box as shown below (see figure 12, page 21).
  - Please note that the wiring is dependent on the MLG variant.
  - To make the wiring process easier, you can remove the terminal strips.
- 3. Connect the "AFB" terminal box to the 12-pin connecting cable (M12 male connector) of the MLG-2.
- 4. To configure the MLG-2, you will need a PC that has SOPAS ET installed. Connect this PC to the RJ45 female connector on the terminal box via an Ethernet cable (part number 6026084).



Figure 12: MLG-1, replacing a receiver that has a terminal compartment

- ① Terminal compartment on MLG-1 receiver
- 2 Connecting cable for MLG-1 receiver
- 3 Connection to the "AFB" terminal box for variants MLGx-xxxxE2 and MLGx-xxxxF2
- (4) Connection to the "AFB" terminal box for variants MLGx-xxxxl2 and MLGx-xxxxT2

### 6 ELECTRICAL CONNECTION



Figure 13: Dimensions of the "AFB" terminal box (part number 2082790)

The terminal box has 17 terminals.

Table 14: Terminals in the terminal box

1	SyncA
2	SyncB
3	L+
4	Μ
5	Q1
6	Q2
7	Q3
8	Q4
9	Q5
10	Q6
11	Reserved (Q7 for special applications)
12	IN1
13	IN2
14	RS485_A
15	RS485_B
16	Reserved (CAN_H for special applications)
17	Reserved (CAN_L for special applications)

#### 6.4 Connecting the M12 female connector

In the case of MLG variants that feature a terminal compartment, a 5-pin, M12 female connector is available to enable replacement of the sender (see "Overview of accessories required", page 19).

To carry out the replacement process, proceed as follows:

- 1. Unplug the connecting cable from the MLG-1 sender. Remember to make a note of the wire colors and terminal numbers of the MLG-1.
- 2. Connect the connecting cable to the 5-pin M12 female connector as follows:
  - Terminal 1 wire of MLG-1  $\rightarrow$  pin 1 of M12 female connector
  - Terminal 2 wire of MLG-1  $\rightarrow$  pin 3 of M12 female connector
  - Terminal 3 wire of MLG-1  $\rightarrow$  pin 2 of M12 female connector
  - Terminal 4 wire of MLG-1  $\rightarrow$  pin 5 of M12 female connector
  - Terminal 5 wire of MLG-1  $\rightarrow$  pin 4 of M12 female connector
- 3. Using the connecting cable, connect the M12 female connector to the M12 male connector of the MLG-2.



Figure 14: MLG-1, replacing a sender that has a terminal compartment

- ① Terminal compartment on MLG-1 sender
- 2 Connecting cable for MLG-1 sender
- 3 M12 female connector, 5-pin, A-coded, e.g., DOS-1205-G (part number 6009719); to be ordered separately
- ④ M12 male connector, 5-pin, A-coded on MLG-2 sender

## 7 Configuration

This chapter is only relevant if you are replacing MLG-1 devices that have been configured using the MLG-1 configuration program called "MLGsetup".

#### 7.1 Transferring the parameter settings from the MLG-1 to the MLG-2

To transfer the MLG-1 settings to the MLG-2, you must complete the following steps:

- 1. Save the MLG-1 settings in the "MLGsetup" configuration program as an "MLG System Information" file (see "Setting the parameters for the MLG-2 in SOPAS ET", page 24).
- 2. Take the parameters from the "MLG System Information" file and set them manually for the MLG-2 in the SOPAS ET configuration program (see "Saving the MLG-1 parameter settings", page 24).

#### 7.2 Saving the MLG-1 parameter settings

The MLG-1 Programmable and XLG Programmable were configured via the "MLGsetup" configuration program.

To configure the MLG-2, you need to use SOPAS ET instead.

#### Saving the parameter settings

- 1. Start MLGsetup.
- 2. Download the parameter settings from the MLG-1. You have the following options:
  - Select the "Download" menu. Menu path: MLG > Download
  - Select the "Load configuration data from MLG" button.



- 3. Print the parameter settings (MLG System Information).
  - Select the printer. Menu path: File > Page layout
  - Print the settings. Menu path: File > Print
  - The "MLG System Information" file contains the settings from the "Configuration parameter" window (menu path: Handle > Parameters) as well as additional information. The information in the "MLG System Information" file does not appear in the same order as the tabs of the "Configuration parameter" window.

Configuration parameter	-
Light beams Outputs Inputs Installation Properties outputs Application notes	

- 4. Quit MLGsetup.
- The relevant data for the MLG-1 is now contained in the "MLG System Information" file.

#### 7.3 Setting the parameters for the MLG-2 in SOPAS ET

To make the settings for the MLG-2 in SOPAS ET, proceed as follows:

- 1. Take the printout of the "MLG System Information" file.
- 2. Make the settings step by step in SOPAS ET by referring to the "MLG System Information" file.

#### How the "MLG System Information" is structured

The "MLG System Information" file is divided into the following sections:

- Application notes
- Hardware
- Installation: see ""Installation" section", page 26.
- Configuration > Outputs: see ""Configuration Outputs" section", page 27
- Configuration > Light beams: see ""Configuration Light beams" section", page 32
- Configuration > Inputs: see ""Configuration Inputs" section", page 33
- Configuration > Data interface: see ""Configuration Data interface" section", page 35

The "Application notes" and "Hardware" sections are not relevant for the purpose of configuring the MLG-2.

#### 7.3.1 MLGsetup and SOPAS ET user interfaces



**SOPAS ET** 



Figure 15: MLGsetup and SOPAS ET user interfaces

- ① Configuration window, marked in green
- 2 Light beam window, marked in blue
- 3 Status window, marked in red

#### 7.3.2 "Installation" section

The "Installation" section of the "MLG System Information" file corresponds to the "Installation" tab in MLGsetup (see figure 17, page 27).

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# MLG System information

Installation	
(1) Offset (distance lowest/first light beam to object support)	100 mm
2 Operating range of MLG (in the field)	1000 mm
3 Plug/cable entry orientation	Below

Figure 16: MLG-1 "MLG System Information" file, "Installation" section (example)

- 1 Offset does not need to be set in SOPAS
- 2 Operating range does not need to be set in SOPAS
- (3) Orientation: This should be set via the SOPAS ET installation wizard when setting up the MLG-2. Alternatively, it can be set directly in SOPAS ET by selecting the "System" menu followed by the "Beam numbering" area.

MLGsetup	
Configuration parameter	
Light beams Outputs Inputs Installation Properties outputs Application notes	SOPA
Offset (distance lowest/list light beam to object support)	Welcome Installation wizard MLG-2
Operating range of MLG (in the field)	Welcome to the Installation assistant of the MLG-2. This assistant will guide you through the most important steps in setting up the ML
Plug/cable entry orientation	spectraciary retex at ey • Alignment of the light grid • Total • Configuration of your own measurement task
QKCancel	



Figure 17: "Installation" in MLGsetup and SOPAS ET

1Configuring the position of the light grid

#### 7.3.3 "Configuration - Outputs" section

.

The "Outputs" section in the "MLG System Information" file corresponds to the following tabs in MLGsetup:

- "Outputs" tab: see figure 19, page 29 .
  - "Analog outputs" tab: see figure 21, page 31
- "Properties outputs" tab: see figure 22, page 32 .
- "Light beams" tab: see figure 24, page 33

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# MLG System information

Configuration	
oomgulation	( <b>9</b> )
Outputs	+
<ol> <li>Output Q1</li> </ol>	/ LBB >= 1
Output Q2	LBB >= 1 AND LBB <=30
(3) Output Q3	Contamination output (Alarm)
Output Q4	Inactive
④ Output QA1	FBB = 4-20 mA
(5) Output QA2	LBB = 4-20 mA
6 Off delay	0 ms
⑦ Hysteresis	0 Beams
<ul><li>(8) Contamination output (Alarm)</li></ul>	3 Beams (Q3)

Figure 18: MLG-1 – "MLG System Information" file, "Outputs" section (example)

- ① Output Q1 (see figure 19, page 29)
- 2 Output Q2
- ③ Output Q3, configured via "Contamination output (Alarm)" function (see figure 19, page 29)
- (4) Analog output QA1 (see figure 21, page 31)
- (5) Analog output QA2 (see figure 21, page 31)
- 6 Off delay (see figure 22, page 32)
- ⑦ Hysteresis cannot be set in SOPAS ET
- (8) The number of beams as of which the contamination signaling alarm is active (see figure 24, page 33)
- (9) "/" is used to identify an inverted output

#### Configuring the outputs

iht be Switcl	ams O hing out	lutputs	nputs   In:	stallation	Properti	es output	s Applic	ation notes				
No.	Function NBB	on to activ	ate transis	tor output	•		•	•	inverted	0	1	
2	LBB	▼ >=	•	1 AN	D 💌	LBB	▼ <=	▼ 30	•	0		
3	Alarm	•	-		Ŧ		-	-	Γ	0	2	
4		•	•		•		•	•	Γ	0		
5		•	•		•		•	•	Γ	0		
6		•	•		•		-	•	Г	0		

#### SOPAS ET Digital output 1 ٢ Applications leight classification (LBB/FBB) leight measurement of free space (LBM/FBM) ---ce detection of objects (NBB/NCBB ence detection of holes (NBM/NCBM) Outer dim ension/Inner dimens ion (ODI/IDI) Position classification of object (CBB/BNB) osition classification of hole (CBM/BNM) Zone Selection All Rays V Manual setup ✓ 0 \$ beams Object is equal to Evaluate only connected blocked beams General Output Settings Invert Output Minimum pulse width 0 ms Digital output 3 2 Presence detection of objects (NBB/NCBB) Presence detection of holes (NBM/NCBM) Outer dimension/Inner dimension (ODI/IDI) Position classification of object (CBB/BNB) sition classification of hole (CBM/BNM) 2 Diagno ~ Diagnoses settings Activate Qn in case of following alarm message Contamination Short circuit Teach-Error Hardware-Error Synchronisation-Error Activate Qn if "Teach-in Quality" falls under ...% 100% Activate Qn if "Process Quality" falls under ... % 100%

Figure 19: Outputs in MLGsetup and SOPAS ET

- ① Configuring the output function (in this case: the "NBB" function)
- 2 Configuring the output for the contamination alarm

#### Configuring output Q1 (example)

On the MLG-1, output Q1 may (for example) be configured with function "LBB  $\geq 1$ ". To configure this function in SOPAS ET, proceed as follows:

- 1. In SOPAS ET, go to the right-hand window and select (for example) the "Digital output 1" menu.
- 2. Configure function "LBB >= 1" as follows:
  - In the "Applications" area, select the "Height classification (LBB/FBB)" application.
  - In the "Manual setup" area, select the "Measure height starting from first beam (LBB)" option.
  - In the "Object is" area, select the "bigger or equal than" option and the number "1".
- 3. In the "General Output Settings" area, activate the "Invert Output" option. In the "MLG System Information" file, an inverted output is identified by the symbol "/".

#### Configuring output Q2 (example)

On the MLG-1, output Q2 may (for example) be configured with function "LBB >= 1 AND LBB <= 30". To configure this function in SOPAS ET, proceed as follows:

- 1. In SOPAS ET, go to the right-hand window and select (for example) the "Digital output 2" menu.
- 2. Configure function "LBB >= 1 AND LBB <= 30" as follows:
  - In SOPAS ET, go to the middle window and select the "Function programming" tab.
  - Select the "Expert" user level.
  - In the "Beam function variables" area, select beam function variables BFVar1 and BFVar2.
  - Go to the "Logic functions" area for the LogVar1 logic function variable and logically link the BFVar1 and BFVar2 beam function variables.
  - In the "Digital outputs/Virtual outputs" area, assign the LogVar1 logic function variable to output Q2. Please note that if you use the "Function programming" tab to configure a user-defined application, you will not be able to make any further settings in the "Output" menu.

)eviceseled	ction										userie
MLGO	)5A-0145R105	01								EXPERT	
Simulation B	Beam Energy M	Ionito	or Functio	n pro	gram	ning					
Beam func	tion variat	oles									
Name	Beam Funct	ion	Operation		Value		Resu	ilt			
BFVar1	LBB	~	≥	¥			1	0			
BFVar2	LBB	×	≤	~		3	30	0			
Combinatio	on of logica	al va	ariables		PEVa	frant	Dec	1.	_		
Combinatio	on of logica	al va	ariables								
Combinatio	BFVar/Input	al va	Operation		BFVar	/Input	Resu	lt			
<b>Combinatio</b> Name LogVar1	BFVar/Input BFVar1	al va	Operation AND	*	BFVar BF	/Input Var2	Resu Y	ilt			
Combination	BFVar/Input BFVar1	al va	Operation AND	•	BFVar BF	/Input Var2	Resu •	ilt			
Combination Name LogVar1 Digital out	BFVar/Input BFVar/Input BFVar1	al va t v	Operation AND	*	BFVar BF	/Input Var2	Resu v	ilt			
Combination Name LogVar1 Digital out	BFVar/Input BFVar1 BFVar1	al va t v al o	Operation AND AND Outputs ection	~	BFVar BF	/Input Var2 Variable	Resu Y	ilt			
Combinatik Name LogVar1 Digital out Name Q1	BFVar/Input BFVar1	al va v	Operation AND Outputs ection !=	*	BFVar BF	/Input Var2 Variable	Resu Y BFVar5	ilt	•		
Combinatix Name LogVar1 Digital out Name Q1 Q2 (vir	BFVar/Input BFVar/Input BFVar1 puts/virtu	al va t v al o	Operation AND Outputs ection != =	~	BFVar BF	Var2 Variable	Resu P BFVar5 OT1		•		
Combinatix Name LogVar1 Digital out Name Q1 Q2 (vir Q3	BFVar/Input BFVar1 BFVar1	al va t v al o	Operation AND AND ection != = =	~	BFVar BF	/Input Var2 Variable I	Resu BFVar5 OT1 .ogVar1		* *		

Figure 20: SOPAS ET – Function programming; used here (for example) to configure output Q2 with function "LBB  $\geq 1$  AND LBB  $\leq 30$ "

#### Configuring output Q3 – Contamination output (Alarm) (example)

- 1. In SOPAS ET, go to the right-hand window and select (for example) the "Digital output 3" menu.
- 2. In the "Applications" area, select the "Diagnostics" application.
- 3. In the "Configuration" area, activate the "Contamination" option.

#### Configuring the analog output



Figure 21: Analog outputs in MLGsetup and SOPAS ET

- ① Configuring the analog output function (in this case: the "FBB" function)
- 2 Configuring the analog output function (in this case: the "LBB" function)

#### Configuring analog output QA1 (example)

On the MLG-1, analog output QA1 may (for example) be configured with function "FBB = 4-20 mA". To configure this function in SOPAS ET, proceed as follows:

- 1. In SOPAS ET, go to the right-hand window and select (for example) the "Analog output 1" menu.
- 2. Configure function "FBB = 4-20 mA" as follows:
  - In the "Applications" area, select the "Object height measurement (LBB/ FBB)" application.
  - In the "Analog function" area, select the "Measure height starting from first beam (LBB)" option.
  - In the "General Output Settings" area, select the "4-20 mA" option.

#### Configuring the off delay

					ML	Gsetu	р			
Co	nfigur	ation para	meter							D
	Light b	eams   Ou	itputs   Ing	outs   Installat	ion   Properties	outputs Applica	ation notes A	nalog Output		A
1	Ana	og Output:	\$							
	1	FBB	•	4-20 mA			•			
	2	LBB	•	4-20 mA			•			
										z
										N
_										G
								<u> </u>	Cance	6
										(1

SOPAS ET	
Digital output 1	۲
Applications	^
Height classification (LBB/FBB)	^
Height measurement of free space (LBM/FBM)	
Object recognition (RLC)	
Presence detection of objects (NBB/NCBB)	
Presence detection of holes (NBM/NCBM)	
Outer dimension/Inner dimension (ODI/IDI)	
Position classification of object (CBB/BNB)	
Position classification of hole (CBM/BNM)	~
Zone Selection	
Manual setup	
Object is equal to V 0 S beams	
Evaluate only connected blocked beams	
General Output Settings	
D Minimum pulse width 0 ms	

Figure 22: Output properties in MLGsetup and SOPAS ET

- ① Configuring the off delay/minimum pulse width
  - 1. In SOPAS ET, select the output to which the off delay is to apply, e.g., the "Digital output 1" menu for Q1.
  - 2. In the "General Output Settings" area, specify the off delay for the "Minimum pulse width" parameter.

#### 7.3.4 "Configuration – Light beams" section

The "Light beams" section in the "MLG System Information" file corresponds to the "Light beams" tab in MLGsetup (see figure 24, page 33).

MLG Parametrier Software	Version 2.15	SICK
	MLG System information	
Light beams		
Masking	No beam disabled	
① Multiple scan	3x multiple scan	

Figure 23: MLG-1 – "MLG System Information" file, "Light beams" section (example)

① Cross-beam function activated

mobeams   Uutputs   Inputs   In Masking	stallation   Properties outputs   Applic	ation notes	
disable beams made		disable bear	ms blocked
C no () (	3x multiple scan		
Sensitivity adjustment C High operating reserve	C High sensitivity	<ul> <li>automatic</li> </ul>	8 start
Contamination output (Alarm) active from 3 E	eams		

Performance op	otions	8
Responsetime	3	1
- fast	Cross beam	
	High speed scan inactive	
	Cross beam active	
	Cross beam only valid for presence detection	
- slow		
-high	Standard Best compromise	
T	<ol> <li>Recommended for indoor applications</li> </ol>	
Activate Cros	sbeam Mode	
switching	$\bigcirc$	
measurement		

SOPAS ET

Figure 24: Light beams in MLGsetup and SOPAS ET

① Activating the cross-beam function

#### Activating the cross-beam function

- 1. In SOPAS ET, go to the middle window and select the "Expert" option in the "User level" area.
- 2. In SOPAS ET, go to the right-hand window and select the "Performance options" menu.
- 3. In the "Object size/Detection type" area, select the "Activate cross beam mode" option.

#### 7.3.5 "Configuration – Inputs" section

The "Inputs" section in the "MLG System Information" file corresponds to the "Inputs" tab in MLGsetup (see figure 26, page 34)

SICK

MLG Parametrier Software Version 2.15

# MLG System information

#### Inputs

Input 1 Teach-In
 Input 2 Standby

Figure 25: MLG-1 – "MLG System Information" file, "Inputs" section (example)

① "Teach-in" input function

(2) "Standby" input function

#### Configuring the inputs

MLGsetup	SOPAS ET
Configuration parameter	Teach-in 🛞
Light beams   Outputs Inputs Installation   Properties outputs   Application notes   Input functions Nt. function available 1 Teach-In 2 <u>no input function</u> <u>EnableOutputs</u> StableOutputs StableOutputs BibleOutputs B	Sensitivity adjustment Start Teach-in Use toput No. [input 2 v] Activate automatic Teach-in (at every power up) Teach-in Quality 100%
	Performance options (8) Responsetime
	- rast Standard High speed scan inactive Parallel beam scan Suitable for most processes Suitable for most processes
<u> </u>	Function Reserve  High resolution  - bigh bigh resolution Low function reserve bight resolution bight resolu
SOPAS ET	Activate Crossbeam Mode  switching  consumment
Energy-Options         X           Standby         Image: Constraint of the stand-by mode.	Object size/Detection type Adjust object size to smallest object which needs to be detected in the application.
(This reduces power consumption but in this mode no measurement is possible). Use input No. Input 2 ✓ Energy saving is active on: ③ Oligital input active (24/)	Object Speed 0 m/s Height 50 mm Length 50 mm
<ul> <li>Digital input inactive (0V)</li> <li>Simultaneous Scan</li> <li>Deactivate simultaneous scan to save energy (will increase response time).</li> </ul>	Parallel beam scan with high resolution High resolution settings active Cross beam inactive
OK OK	Object is detected continuously     Energy-Options     v

#### Figure 26: Inputs in MLGsetup and SOPAS ET

- ① Configuring the "Teach-in" input function
- (2) Configuring the "Standby" input function

#### Configuring the "Teach-in" input function

- 1. In SOPAS ET, go to the middle window and select the "Expert" option in the "User level" area.
- 2. In SOPAS ET, go to the right-hand window and select the "Teach-in" menu.
- 3. In the "Sensitivity adjustment" area, activate the "Use digital input to start the teach process" option.
- 4. In the "Use output No." field, assign the input for triggering the teach-in process.

#### Configuring the "Standby" input function

- 1. In SOPAS ET, go to the middle window and select the "Expert" option in the "User level" area.
- In SOPAS ET, go to the right-hand window and select the "Performance options" menu.
- 3. In the "Object size/Detection type" area, click the "Energy-Options" button.
- 4. In the "Energy-Options" window, activate the "Standby mode" option.
- 5. In the "Use output No." field, assign the input for triggering Standby mode.

#### 7.3.6 "Configuration - Data interface" section

The "Data interface" section in the "MLG System Information" file corresponds to the "Data interface" tab in MLGsetup (see figure 28, page 35).

MLG Parametrier Software Ver	sion 2.15 SICK
	MLG System information
Data interface Format of	9600 Baud, hexadecimal-Coding type, no-Parity, Start character: None [00 H],
Reporting mode	Continuous
Basic function transmitted on RS-485	BS

Figure 27: MLG-1 "MLG System Information" file, "Data interface" section (example)

1	1. 1				1	
pht beams   O	utputs   Inputs	Installation U	ata interface   P	roperties outp	uts   Applicatio	n notes
Format of data	interface				_	
Baudrate	9600 Baud	J 🔻	Start character	None	-	
Parity	no	•	Separation cha	ar. None	-	
Coding type	hexadecim	al 💌	Stop character	LF	▼ CR ▼	
Reporting mod	le					
C Inactive						
C Input 1		input 2		7		
continuo	na		a	<u>r</u>		
C interval p	period		20 ms	-		
C if beams	tatus (BS) chan	ges		_		
		RS485				
Basic function	s transmitted on				T 11 NPP,	13 0DI
Basic function	s transmitted on 3.FBB	5.LBB	I 7.NCBB	10 CDM	E 121.00	E 14 IDI
Basic function 1.NBB 2.NBM	s transmitted on 3.FBB 4.FBM	☐ 5.LBB ☐ 6.LBM	■ 7.NCBB	10.CBM	12.LBBr	14.IDI
Basic function 1.NBB 2.NBM	s transmitted on 3.FBB 4.FBM 16.BS	☐ 5.LBB ☐ 6.LBM ☐ 17.SYST	■ 7.NCBB	☐ 3.CBB	12.LBBr	14.IDI
Basic function 1.NBB 2.NBM 15.QS	s transmitted on 3.FBB 4.FBM 16.BS	☐ 5.LBB ☐ 6.LBM ☐ 17.SYST	8.NCBM	10.CBM	12.LBBr	14.IDI
Basic function 1.NBB 2.NBM 15.QS	s transmitted on 3.FBB 4.FBM 16.BS	☐ 5.LBB ☐ 6.LBM ☐ 17.SYST	S.NCBM	10.CBM	12.LBBr	☐ 14.IDI

#### RS485 interface (\$) Format of data interface Baud rate 9600 Bit/s 🗸 Reporting mode Continuous O If beam status changes Process data Available functions 🔺 🕕 Functions + Number beams made (NBM) Number beams made (VIMM) First beam made (FBM) Last beam made (LBM) Number of consecutive beams blocked (NBB) Number of consecutive beams made (NBM) Central beam blocked (CDB) Central beam made (CBM) Beam Schube Selected functions System status ^ Digital outputs Number beams blocked (NBB) Last beam blocked (LBB) First beam blocked (FBB) ~ v Data bytes count: 30 Telegram content STX 02 SYSTEMSTAT ... VIRTUAL\_OU ... NBB 000F 0000 0000 LBB FFFF ETX FBB FFFF ODI IDI 0000 0000 03

Figure 28: Data interface in MLGsetup and SOPAS ET

#### **SOPAS ET**

#### 8 IPG protective pipes

In cases where an MLG-1 is installed in an IPG protective pipe, you must also order a new IPG protective pipe when switching over to the MLG-2. For details of how to mount IPG protective pipes, see the "IPG2 protective pipe for MLG-2 light grid" mounting instructions (part number 8018943). The distance between the lower edge of the IPG protective pipe housing and the first beam is not the same on the MLG-2 as on the MLG-1. Even if the detection height is kept exactly the same, the total length of the IPG protective pipe has to be longer for the MLG-2 than for the MLG-1.

Remember to take account of this difference during planning and mounting.



#### IPG for MLG-1

Figure 29: MLG-1 with IPG protective pipe

L Protective pipe



Figure 30: MLG-2 with IPG2 protective pipe

L Protective pipe length

Table 15: Comparison of	<sup>f</sup> IPG protective pipe	for MLG-1 and IPG2	protective pipe for	<sup>.</sup> MLG-2, aluminum
-------------------------	----------------------------------	--------------------	---------------------	------------------------------

MLG-1		MLG-2	MLG-2 and MLG-1		
Detection height	IPG type (part num- ber)	Detection height	IPG2 type	IPG2 part number	Protective pipe length (L)
100 140 mm	IPG67-02205111	140 145 mm	IPG2-0220A5P167	2083870	220 mm
250 290 mm	IPG67-03705111	250 295 mm	IPG2-0370A5P167	2083871	370 mm
400 440 mm	IPG67-05205111	400 445 mm	IPG2-0520A5P167	2082909	520 mm
550 590 mm	IPG67-06705111	550 595 mm	IPG2-0670A5P167	2083872	670 mm
850 890 mm	IPG67-09705111	850 895 mm	IPG2-0970A5P167	2083873	970 mm
1,000 1,040 mm	IPG67-11205111	1,000 1,045 mm	IPG2-1120A5P167	2083874	1,120 mm
1,300 1,340 mm	IPG67-14205111	1,300 1,345 mm	IPG2-1420A5P167	2083875	1,420 mm
1,450 1,490 mm	IPG67-15705111	1,450 1,495 mm	IPG2-1570A5P167	2083878	1,570 mm
1,600 1,640 mm	IPG67-17205111	1,600 1,645 mm	IPG2-1720A5P167	2083879	1,720 mm
2,200 2,240 mm	IPG67-23205111	2,200 2,245 mm	IPG2-2320A5P167	2082189	2,320 mm

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	ary object) with standard measurement accuracy	10
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	aluminum	37

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