Medium-Intensity Type B/C

ICAO MI Type B/C 2000cd
NVG Compliant Infrared 850nm Light

OBELUX AVIATION LIGHTS

Optical Characteristics:

- 2 000 cd fixed or flashing
- Configurable to 200 cd
- Colour aviation RED
- NVG compliant infrared (850nm)
- Horizontal beam 360°
- Vertical beam > 3°

Specifications met

ICAO International Standards and Recommended Practices: Aerodromes Annex 14 Volume 1, 8th Edition, July 2018, Chapter 6: Medium-intensity Type B/C.

Fulfills the recommendations section in Table 6-3:

- 1 125 cd Maximum Intensity @ vertical elevation angle -1°
- 75 cd Maximum Intensity @ vertical elevation angle -10°

(see page 3 for more information)

CAP 764: CAA Policy and Guidelines on Wind Turbines, Sixth Edition February 2016 (UK)

CAP 393: Air Navigation Order, 2016 (UK)

Medium-Intensity Red Obstruction Light

LED Aviation Obstruction Lights

Obelux medium-intensity stand-alone red 2 000 cd model is used for marking tall structures, such as wind turbines, transmission masts, chimneys, broadcast masts, bridges, etc. It is designed for demanding offshore conditions, for instance for use in offshore wind turbines. The product offers unique features such as integrated fault monitoring, photocell, GPS synchronization and cold climate version. It supports both stand-alone and RS-485 Modbus operation as a part of Obelux aviation light system network.

Key Features

- Based on LED technology
- 2 000 cd RED fixed or flashing (configurable to 200 cd)
- Supports both stand-alone and Modbus operations
- Suitable for Offshore environment
- Incorporated GPS, photocell, and fault monitoring
- Built-in temperature controlled smart heater (CCV)
- Adjustable luminous output levels 10%, 30%, and 100%
- Hot start feature for radar controlled systems
- Embedded Web Server
- Design lifetime more than 20 years
- 5-year warranty (option for 10 years, longest in the industry)

Electrical Characteristics

- Operating voltage (AC):
  Nominal 100-240 V_{AC} ± 10%, 50Hz / 60Hz ± 6%
  Range 90-265 V_{AC}
- Operating voltage (DC): 10-30 V_{DC} and 20-60 V_{DC}
- Flash rates: 20/30/40/60 fpm
- Meets standards
  EMC (Emissions): EN 61000-6-4
  EMC (Immunity): EN 61000-6-2
- Overvoltage protection Type 2 (varistors between L – PE, N – PE and L – N)
- Alarm relay output NO/NC dry contact
  Switch voltage / max current: 50 V_{DC} / 1 A, 250 V_{AC} / 6A
- Modbus RS-485 isolated

Power Consumptions

- AC/DC models 2000 cd (excluding heater consumption):
  - 5,5W @ Night (RED, 40 fpm)
  - 7,5W @ Night (RED+IR, 40 fpm)
  - 30W @ Night (RED, fixed)
  - 32,5W@ Night (RED+IR, fixed)

(Flashing power consumptions are for 200ms flash pulse length)

- AC/DC models 200 cd (excluding heater consumption):
  - 3,5W @ Night (RED, fixed)
  - 7W @ Night (RED+IR, fixed)
- E1 versions consumptions: + 8%

Recommended Cables:

- Power (ACW): 3G1,5 mm² or 3G2,5 mm²
- Data: 3x0,5 mm² - 3x1,5 mm² shielded
- Alarm: 3x0,5 mm² - 3x1,5 mm²
- Power + Alarm: 6G1,5 mm², 6G2,5 mm² or hybrid cable
- Power + Data: Hybrid cable (e.g., Servo cable)

Mechanical Characteristics

- Anodized marine grade aluminium body and bottom / upper parts
- AISI 316 acid-proof steel screws
- Glass dome
- Degree of protection IP66
- Operating / storage temperature -40...+55 °C
- Height 350 mm, width 180 mm, depth 160 mm
- Weight 4,3 kg (without mounting set)
- Cable glands:
  2 x M25 for Ø11-17 mm cables (Ø6-13 rubber incl.)
  2 x M20 for Ø6-12 mm cables
- Easy to chain via power and data cables (no need for junction box)

Smart Heater (CCV)

- 15W, thermostat controlled
- Prolongs the life of the obstruction light
- Input voltage monitoring to detect battery/charger operation (DC models only)
  - Turns heater off during battery use
  - Settable input voltage threshold in which the heater will be disabled
  - Enables lower power consumption
  - Heater power consumption can be ignored in UPS autonomy calculations

Options

- Add-on cards (see order code section):
  - 4 Input 4 Output (IO) interface
  - Ethernet interface (1 x RJ-45)
  - 4-port switch (2 x RJ-45, 2 x Fiber)
- 10-year warranty (see order code section)
- Mounting sets (see appendix A)
- Pre-attached cables (see appendixes B and C)
- Optional controllers:
  - CP-series (Ethernet TCP/IP, RS-485 Modbus)
  - CP-M1-series (RS-485 Modbus)

Order code:	Output:	ICAO:	Operating voltage:	Nominal voltage:	GPS:	Infrared:	CCV:	Photocell and Fault monitoring:	RS-485 Modbus:
MI-ICAO-AC-2KR-IR-x-y	2 000 cd	Type B/C	90-265 V_{AC}	100-240 V_{AC}	Yes	Yes	Yes	Yes	Yes
MI-ICAO-AC-2KR-IR-B-x-y	2 000 cd	Type B/C	90-265 V_{AC}	100-240 V_{AC}	No	Yes	Yes	Yes	No
MI-ICAO-AC-2KR-IR-E1-x-y	2 000 cd	Type B/C*	90-265 V_{AC}	100-240 V_{AC}	Yes	Yes	Yes	Yes	Yes
MI-ICAO-AC-2KR-IR-E1-B-x-y	2 000 cd	Type B/C*	90-265 V_{AC}	100-240 V_{AC}	No	Yes	Yes	Yes	No
MI-ICAO-DC1224-2KR-IR-x-y	2 000 cd	Type B/C	10-30 V_{DC}	12/24 V_{DC}	Yes	Yes	Yes	Yes	Yes
MI-ICAO-DC1224-2KR-IR-B-x-y	2 000 cd	Type B/C	10-30 V_{DC}	12/24 V_{DC}	No	Yes	Yes	Yes	No
MI-ICAO-DC1224-2KR-IR-E1-x-y	2 000 cd	Type B/C*	10-30 V_{DC}	12/24 V_{DC}	Yes	Yes	Yes	Yes	Yes
MI-ICAO-DC1224-2KR-IR-E1-B-x-y	2 000 cd	Type B/C*	10-30 V_{DC}	12/24 V_{DC}	No	Yes	Yes	Yes	No
MI-ICAO-DC2448-2KR-IR-x-y	2 000 cd	Type B/C	20-60 V_{DC}	48 V_{DC}	Yes	Yes	Yes	Yes	Yes
MI-ICAO-DC2448-2KR-IR-B-x-y	2 000 cd	Type B/C	20-60 V_{DC}	48 V_{DC}	No	Yes	Yes	Yes	No
MI-ICAO-DC2448-2KR-IR-E1-x-y	2 000 cd	Type B/C*	20-60 V_{DC}	48 V_{DC}	Yes	Yes	Yes	Yes	Yes
MI-ICAO-DC2448-2KR-IR-E1-B-x-y	2 000 cd	Type B/C*	20-60 V_{DC}	48 V_{DC}	No	Yes	Yes	Yes	No

***** *E1 variants fulfil also the -1° and -10° vertical elevation angles maximum intensities as stated in the ICAO Table 6-3 recommendations section (see next page).*

B: = Basic model (no GPS or Modbus)

X: **Add-on card**

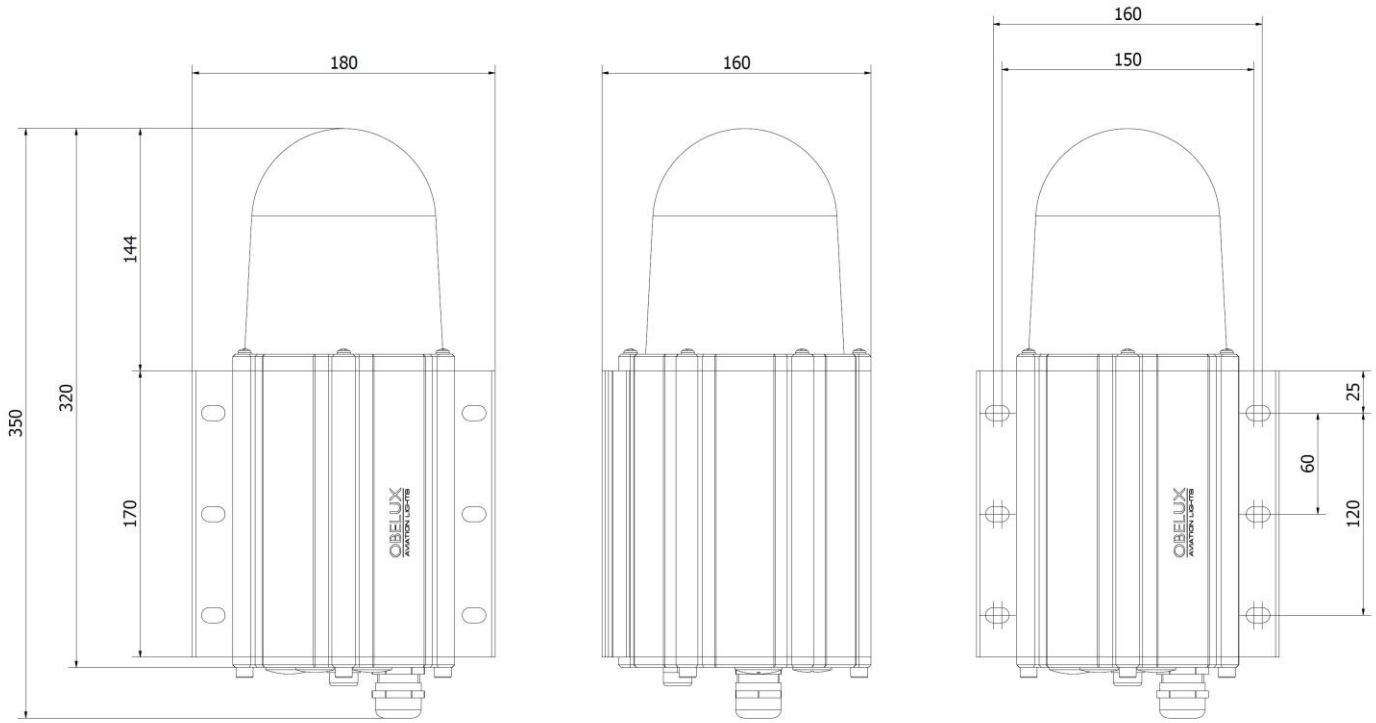
	=	no add-on card
IO	=	4 Input 4 Output (IO) interface
E	=	Ethernet interface (1 x RJ45 connector)
EF	=	4-port switch (2 x RJ-45 connectors + 2 x Fiber SC Multimode female connectors)

Example: MI.ICAO-AC-2KR-IR-IO (AC model with IO add-on card)

Y: **Warranty option**

	=	Regular warranty
10	=	10-year warranty

Example: MI-ICAO-AC-2KR-IR-E1-10 (AC model with E1 and 10-year warranty)



Addressing the vertical downwards light impact

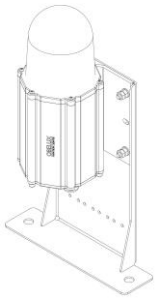
By implementing the recommendation below we attenuate the vertical downwards light to a level causing only negligible visual impact. This is the reason why the recommendation was made.

ICAO International Standards and Recommended Practices: Aerodromes Annex 14 Volume 1, 8th Edition, July 2018, Chapter 6: Table 6-3. Light distribution for medium- and high-intensity obstacle lights according to benchmark intensities of Table 6-1

MI-ICAO-xx-2KR-IR-**E1**-xx product variants fulfil also the -1° and -10° vertical elevation angles maximum intensity expressed in candela as marked in red in the table below. For flashing lights, the intensity is read into effective intensity, as determined in accordance with the Aerodrome Design Manual (Doc 9157), Part 4.

Benchmark intensity	Minimum requirements					Recommendations				
	Vertical elevation angle (b)			Vertical beam spread (c)		Vertical elevation angle (b)			Vertical beam spread (c)	
	0°		-1°			0°	-1°	-10°		
	Minimum average intensity (a)	Minimum intensity (a)	Minimum intensity (a)	Minimum beam spread	Intensity (a)	Maximum intensity (a)	Maximum intensity (a)	Maximum intensity (a)	Maximum beam spread	Intensity (a)
2 000	2 000	1 500	750	3°	750	2 500	1 125	75	N/A	N/A

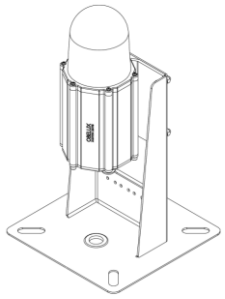
Appendix A: Available mounting sets



Obelux MS-MI-H01/02:
- ► Mounting set for horizontal plane mounting.
- ► Mounting set includes bracket and fasteners.
- ► Mounting bracket AISI 304 stainless steel or AISI 316 acid-proof steel, other parts AISI 316 acid-proof steel.

More detailed mechanical data: see MS-MI-H01/02 datasheet.

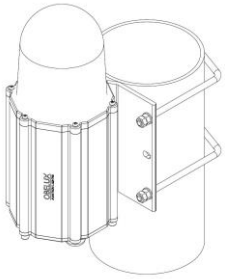
- ► **Order Code: MS-MI-H01** (AISI 304 stainless steel bracket)
- ► **Order Code: MS-MI-H02** (AISI 316 acid-proof steel bracket)



Obelux MS-MI-H03:
- ► Mounting set for horizontal plane mounting.
- ► Mounting set includes bracket and fasteners.
- ► All parts AISI 316 acid-proof steel.

More detailed mechanical data: see MS-MI-H03 datasheet.

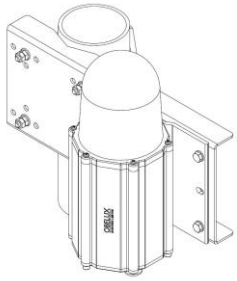
- ► **Order Code: MS-MI-H03**



Obelux MS-MI-V01:
- ► Mounting set for vertical pipe mounting.
- ► Mounting set includes U-bolts and fasteners.
- ► All parts AISI 316 acid-proof steel.

More detailed mechanical data: see MS-MI-V01 datasheet.

- ► **Order Code: MS-MI-V01**



Obelux MS-MI-V02:
- ► Mounting set for vertical pipe mounting.
- ► Mounting set includes bracket, U-bolts, and fasteners.
- ► Mounting bracket AISI 304 stainless steel, other parts AISI 316 acid-proof steel.

More detailed mechanical data: see MS-MI-V02 datasheet.

- ► **Order Code: MS-MI-V02**

Appendix B: Pre-attached cable (HAN6)

Cable specification:

SERVO cable FACAB EFK SERVO-CP acc. to Siemens Standard 6FX8008+

faber kabel

Specification/standard:	UL/CSA
conductor material:	bare copper
conductor construction:	fine stranded class 6
insulation:	polypropylen
screen:	Cu-braid, tinned
screen coverage:	85 %
sheathing material:	polyurethan
colour of outer sheath:	orange RAL 2003 (DESINA)
flame retardant:	VDE 0482-332-1-2/IEC 60332-1
halogen free:	DIN EN 50267/IEC 60754
oil resistant:	EN 60811-2-1
max. operating temperature, fixed:	-50 - +80 °C
temperature, moved/during installation:	-40 - +80 °C
bending radius, fixed installation:	5 x DA
bending radius, moved application:	7,5 x DA
Bending cycles, max.:	5 Mio.
Moving distance, max.:	100 m
nominal voltage Uo:	600 V
nominal voltage U:	1 kV
test voltage:	4 kV
core identification:	acc. to Siemens specification

Application: Low capacity connection cable between servo controller and frequency driven motor. For application in machine tools and drag chains with medium mechanical stress. Please pay attention to our instructions for the use of drag-chain cables.

Additional information: Siemens part numbers (6FX...) are registered trade marks of Siemens AG and used only as reference.

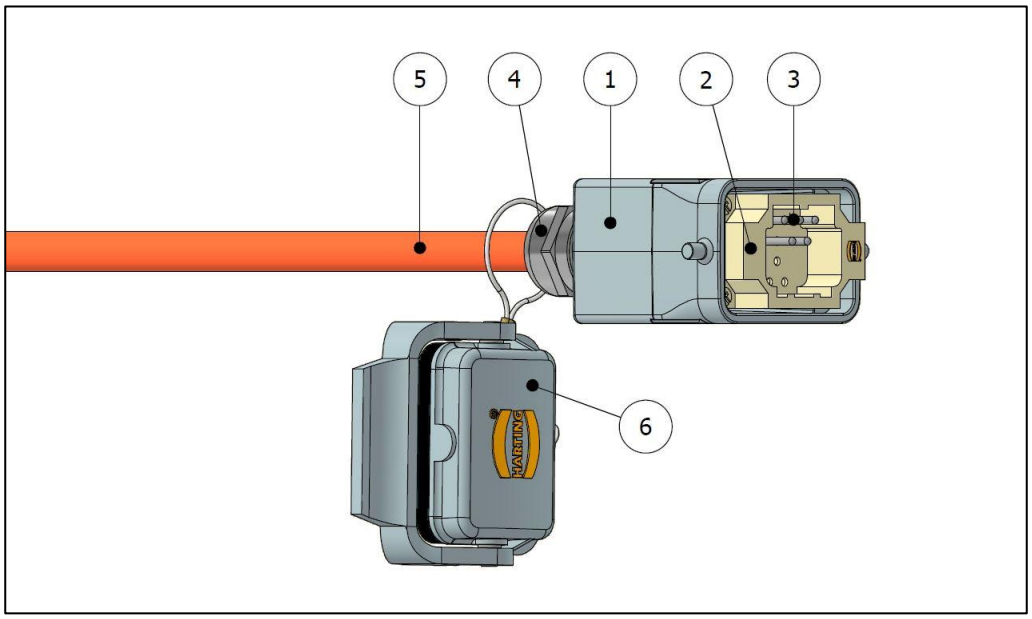
The products and information presented here are for technical calculation only. They are subject to technical progress and in no way represent the ability of shipment. Outer diameters are approximately.

p/n	part name	D_A [mm]	G [kg]	Cu [kg/km]
035291	[4G25] 0,6/1 kV OR cUL - 6FX8008-1BB25	25,4	1523	1100
035292	[4G35] 0,6/1 kV OR cUL - 6FX8008-1BB35	28,6	2080	1510
035293	[4G50] 0,6/1 kV OR cUL - 6FX8008-1BB50	33,4	2710	2130
035294	[4G70] 0,6/1 kV OR cUL - 6FX8008-1BB70	42,5	4123	3025
035295	[4G1,5+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA116FX8008-1BA1	11,6	244	163,5
035296	[4G2,5+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA21 6FX8008-1BA21	13,4	310	189
035297	[4G4+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA316FX8008-1BA3	14,8	408	260,5

p/n	part name	D_A [mm]	G [kg]	Cu [kg/km]
035298	[4G6+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA41	16,8	540	365
035299	[4G10+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA516FX8008-1BA5	19,9	782	560
035300	[4G16+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA616FX8008-1BA6	22,5	1101	816
035301	[4G25+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA256FX8008-1BA2	26,2	1490	1172
035302	[4G35+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA356FX8008-1BA3	29,8	2015	1595
035303	[4G50+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA50	34	2754	2214

DA	outer diameter
G	weight
Cu	copper

Connector parts:



1.	Housing:	HAN HC2 Pegs Top Entry M25	19 30 006 0446
2.	Insert:	HAN EE 10pos Male Crimp	09 32 010 3001
3.	Crimp:	Contact HAN E Male Ag 1,5mm^2	09 33 000 6104
4.	Gland:	M25x1.5 EMC	
5.	Cable:	Servo 4G1,5+(2x1,5)	
6.	Cover:	HAN B Cover for Hood PG	09 30 006 5423

Connector pinouts:

Alarm Relay		**Modbus**	
Pin number:	Designation:	Pin number:	Designation:
1	L	1	L
2	N	2	N
3	NO	3	D+
4	COM	4	D-
5	NC	5	SH
6	-	6	-
7	-	7	-
8	-	8	-
9	-	9	-
10	-	10	-
PE	PE	PE	PE

Order code:

Syntax for order code: **[Light unit name]-[Cable length]-[Connector type]**
For “Alarm Relay” pinout: Add “A” at the end of product code
For “Modbus” pinout: Use default product code

Example: MI-ICAO-AC-2KR-IR-2.70M-HAN6A (Alarm Relay, 2,7m cable with HAN6 connector)
Example: MI-ICAO-AC-2KR-IR-2.70M-HAN6 (Modbus, 2,7m cable with HAN6 connector)

Important note! Above order code syntax for pre-attached cable only available for the following models:

MI-ICAO-AC-2KR-IR
MI-ICAO-AC-2KR-IR-E1

For other models please contact Obelux for further information.

Appendix C: Pre-attached cable (open ended)

Cable specification:

SERVO cable FACAB EFK SERVO-CP acc. to Siemens Standard 6FX8008+

faber kabel

Specification/standard:	UL/CSA
conductor material:	bare copper
conductor construction:	fine stranded class 6
insulation:	polypropylen
screen:	Cu-braid, tinned
screen coverage:	85 %
sheathing material:	polyurethan
colour of outer sheath:	orange RAL 2003 (DESINA)
flame retardant:	VDE 0482-332-1-2/IEC 60332-1
halogen free:	DIN EN 50267/IEC 60754
oil resistant:	EN 60811-2-1
max. operating temperature, fixed:	-50 - +80 °C
temperature, moved/during installation:	-40 - +80 °C
bending radius, fixed installation:	5 x DA
bending radius, moved application:	7,5 x DA
Bending cycles, max.:	5 Mio.
Moving distance, max.:	100 m
nominal voltage Uo:	600 V
nominal voltage U:	1 kV
test voltage:	4 kV
core identification:	acc. to Siemens specification

Application: Low capacity connection cable between servo controller and frequency driven motor. For application in machine tools and drag chains with medium mechanical stress. Please pay attention to our instructions for the use of drag-chain cables.

Additional information: Siemens part numbers (6FX...) are registered trade marks of Siemens AG and used only as reference.

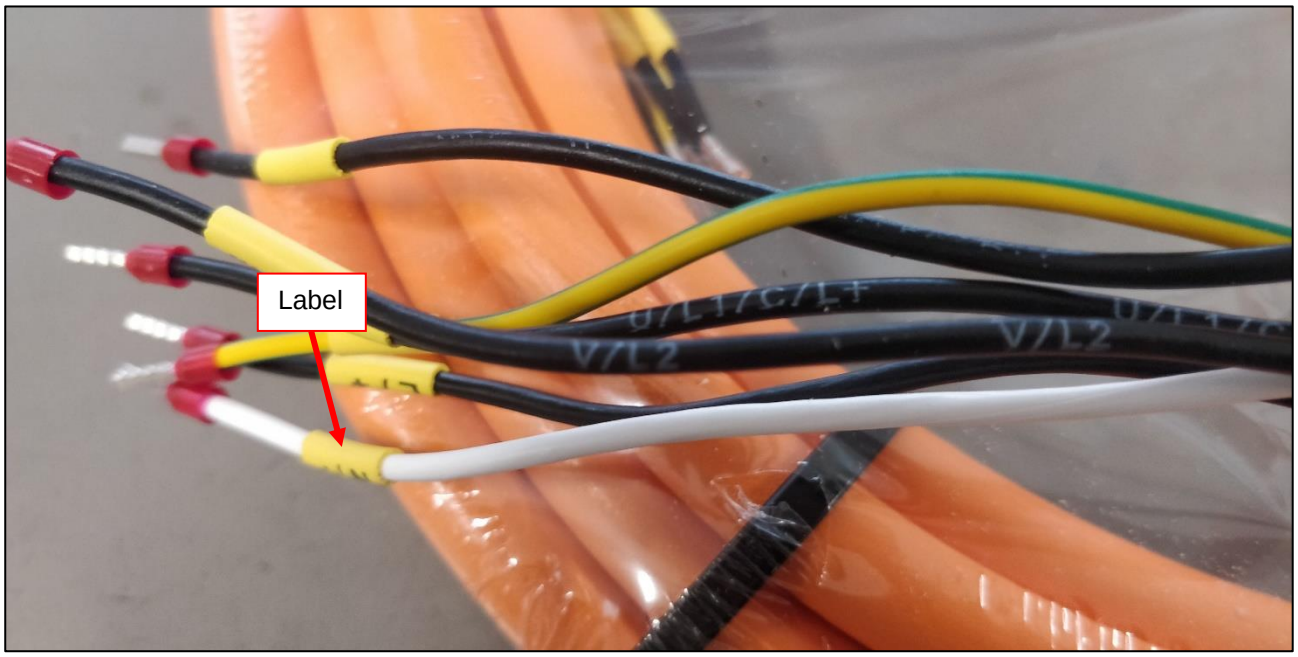
The products and information presented here are for technical calculation only. They are subject to technical progress and in no way represent the ability of shipment. Outer diameters are approximately.

p/n	part name	D_A [mm]	G [kg]	Cu [kg/km]
035291	[4G25] 0,6/1 kV OR cUL - 6FX8008-1BB25	25,4	1523	1100
035292	[4G35] 0,6/1 kV OR cUL - 6FX8008-1BB35	28,6	2080	1510
035293	[4G50] 0,6/1 kV OR cUL - 6FX8008-1BB50	33,4	2710	2130
035294	[4G70] 0,6/1 kV OR cUL - 6FX8008-1BB70	42,5	4123	3025
035295	[4G1,5+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA116FX8008-1BA1	11,6	244	163,5
035296	[4G2,5+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA21 6FX8008-1BA21	13,4	310	189
035297	[4G4+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA316FX8008-1BA3	14,8	408	260,5

p/n	part name	D_A [mm]	G [kg]	Cu [kg/km]
035298	[4G6+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA41	16,8	540	365
035299	[4G10+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA516FX8008-1BA5	19,9	782	560
035300	[4G16+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA616FX8008-1BA6	22,5	1101	816
035301	[4G25+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA256FX8008-1BA2	26,2	1490	1172
035302	[4G35+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA356FX8008-1BA3	29,8	2015	1595
035303	[4G50+(2X1,5)] 0,6/1 kV OR cUL - 6FX8008-1BA50	34	2754	2214

DA	outer diameter
G	weight
Cu	copper

Wire designations:



Alarm Relay		Modbus	
Label:	Designation:	Label:	Designation:
L / +	L (+ with DC)	L / +	L (+ with DC)
N / -	N (- with DC)	N / -	N (- with DC)
PE	PE	PE	PE
NO	NO	D+	D+
COM	COM	D-	D-
NC	NC	SH	SH

Order code:

Syntax for order code: **[Light unit name]-[Cable length]**
For “Alarm Relay” pinout: Add “A” at the end of product code
For “Modbus” pinout: Use default product code

Example: MI-ICAO-AC-2KR-IR-5.0MA (Alarm Relay, 5,0m cable)
Example: MI-ICAO-AC-2KR-IR-5.0M (Modbus, 5,0m cable)

Important note! Above order code syntax for pre-attached cable only available for the following models:

MI-ICAO-AC-2KR-IR
MI-ICAO-AC-2KR-IR-E1
MI-ICAO-DC1224-2KR-IR
MI-ICAO-DC1224-2KR-IR-E1
MI-ICAO-DC2448-2KR-IR
MI-ICAO-DC2448-2KR-IR-E1

For other models please contact Obelux for further information.