

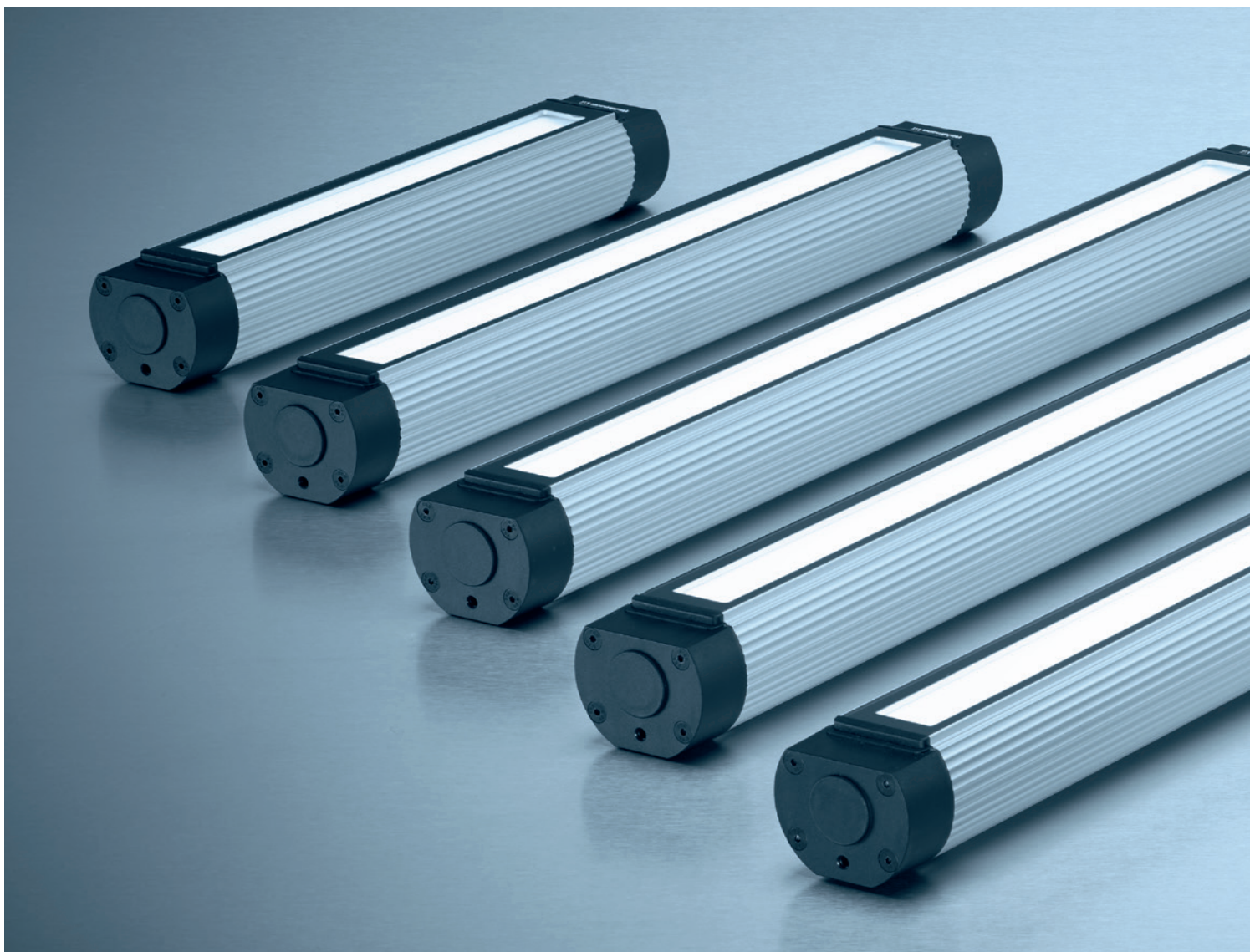
ENG

MACH LED PLUS | SURFACE-MOUNTED LUMINAIRE

•••••  
LED







## MACH LED PLUS FOR THE ADDED PLUS OF POSSIBILITIES.



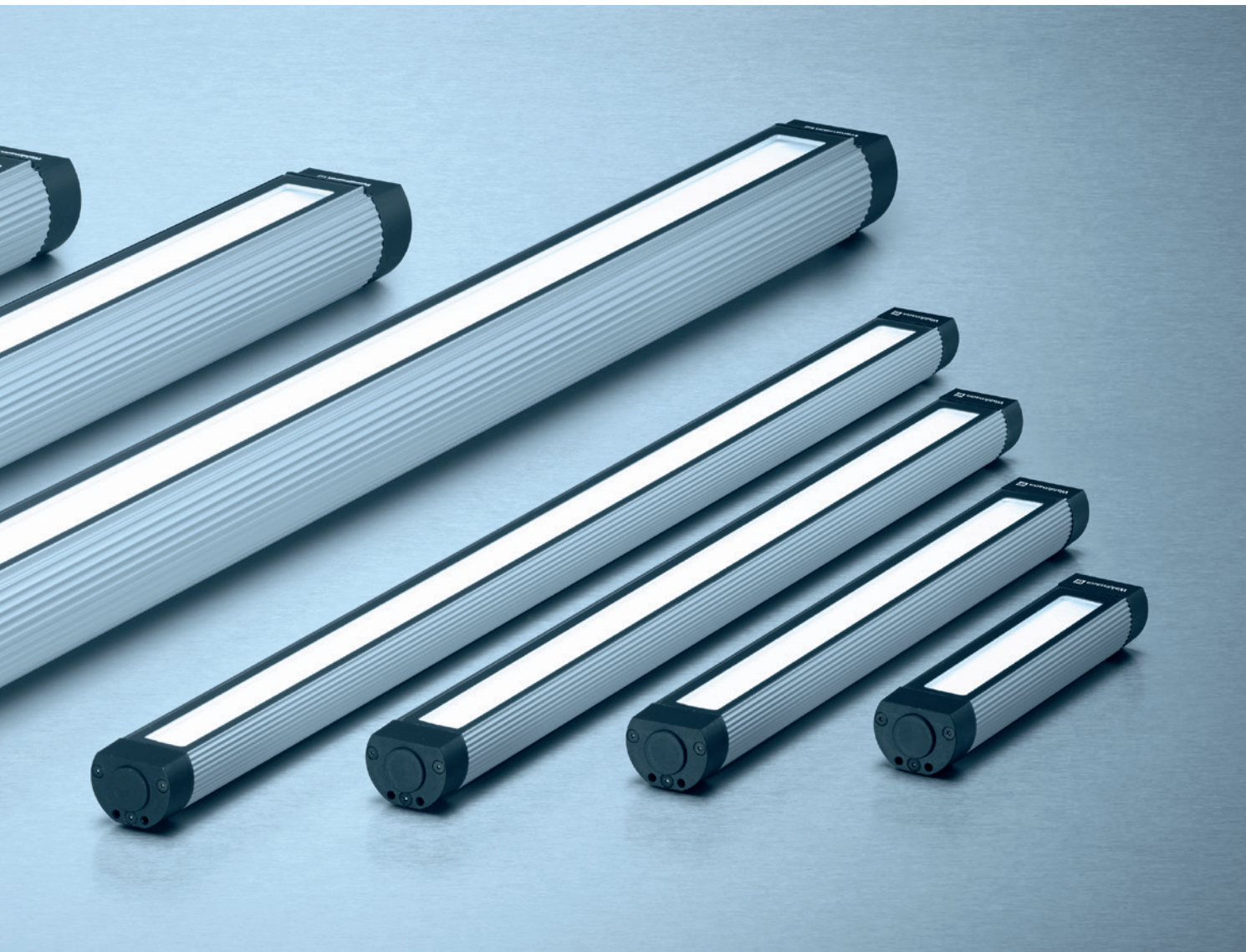
Every day, hundreds of thousands of Waldmann luminaires are used for tough applications all over the world. They have provided the input for the technically sophisticated and robust MACH LED PLUS.

The highly efficient and maintenance-free LED technology, clever lighting technology and extremely robust housing in the attractive design make MACH LED PLUS the first choice for lighting engineering of machines and systems.

Different lengths and output levels enable standard-compliant lighting conditions for any lighting and room situation. Moreover, flexible adaptation options, M12 connector and through-wiring (versions for electrical daisy chaining of several luminaires) ensure a fast and easy integration.

If required, all important components can be replaced. This makes MACH LED PLUS one of the most sustainable machine luminaires on the market.

- Ultra low-glare, homogenous light with soft transitions
- Aluminium housing and 4 mm thick safety glass
- Side parts designed with a maximum capacity and protected Viton® gasket for a high system of protection
- Resistant to many coolants and lubricants, high temperatures, shocks and vibrations
- Encapsulated M12 connectors
- Electrical daisy chaining



For use in most diverse areas, the MACH LED PLUS is available in two basic versions with a number of variants:

In its extremely compact form, MACH LED PLUS.forty combines the latest LED technology with the latest innovations from the area of housing technology. It can be integrated easily even if there is little space in the working area.

- Outer diameter 40 mm for integration in case of restricted space
- Four lengths and output levels
- Versions with narrow and wider angles of illumination (40° and 90°)
- Connection to machine voltage of 24 V

MACH LED PLUS.seventy is compatible with classic tube luminaires in form, dimensions and connection options. This makes it the perfect solution for replacement of older luminaires. But it is also suitable for a wide-area illumination for initially equipping machines.

- Outer diameter 70 mm for the easy mechanical and electrical replacement of classic tube luminaires
- Six lengths and output levels
- Powerful Eco or extra-strong power versions (double number of LEDs)
- Connection to 24 V machine voltage or to 100/120/220–240 V mains voltage (wide range)



## MACH LED PLUS.forty



Thanks to many different kinds of lighting characteristics, MACH LED PLUS.forty supports a variety of visual tasks, even if sometimes space is limited.

### Maximum light for minimum space

With an outer diameter of 40 mm and a minimum length of 190 mm MACH LED PLUS.forty enables high illuminance even in the most restricted space. It's output density is very impressive:

just a single luminaire of the shortest version enables standard-compliant illumination of smaller working spaces.

### Two angles of illumination for a single purpose

Large-scale monitoring or focused observation, to enable optimum lighting for many visual tasks, the MACH LED PLUS.forty is available with either 40° or 90° angle of illumination.

### Modern light for modern machines

The MACH LED PLUS.forty reflects the state-of-the-art technology: the latest LED technology, specially developed optics system and the most modern housing concept by the Engineer of Light. MACH LED PLUS.forty: high-tech light for high-tech machines.



1 MACH LED PLUS.forty  
with angle of illumination 40°



2 MACH LED PLUS.forty  
with angle of illumination 90°

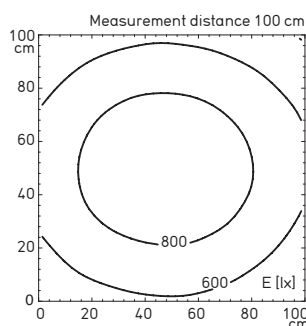


MACH LED PLUS.forty with through-wiring

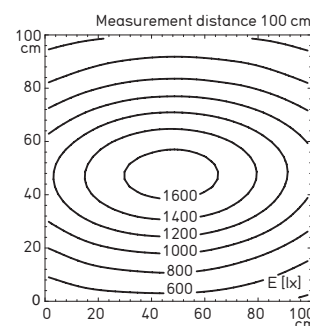
## TECHNICAL DATA

### Features:

- 12, 27, 42 or 57 x LED
- Colour temperature neutral white 5000 K
- Colour rendering  $R_a > 80$
- Angle of illumination  $40^\circ$  (optics) or  $90^\circ$  (reflector)
- Colourless anodised aluminium housing, black side parts made of high-performance plastic 4 mm thick safety glass
- Integration through various brackets from the accessories
- Maximum permissible ambient temperature  $T_{a_{max}} 50^\circ\text{C}$
- LED service life (L 70)  $> 60\,000$  h
- Vibration resistant from 10 up to 55 Hz (amplitude 0.35 mm)  
Shock resistant up to 50 g
- System of protection IP67; protection class III
- Connection via M12 connector, A-coded



Illuminance taking MLAL 57 S with  $90^\circ$  reflector as an example



Illuminance taking MLAL 57 S with  $40^\circ$  optics as an example

20–28 VDC

OUTPUT	OPERATING DEVICE	DIMENSIONS	SPECIAL FEATURE	$E_m/E_{max}^*$	MODEL	ORDER NO.
5.0 W	–	A = 190 mm x 40 mm	$90^\circ$ reflector	156/216 lx <sup>1</sup>	MLAL 12 S	113 161 000 - 006 625 75
5.0 W	–	A = 190 mm x 40 mm	$40^\circ$ optics	223/393 lx <sup>1</sup>	MLAL 12 S	113 161 000 - 006 600 33
5.0 W	–	A = 190 mm x 40 mm	$90^\circ$ reflector, through-wiring	156/216 lx <sup>1</sup>	MLAL 12 SD	113 161 000 - 006 626 00
10.5 W	–	A = 365 mm x 40 mm	$90^\circ$ reflector	348/477 lx <sup>1</sup>	MLAL 27 S	113 162 000 - 006 626 85
10.5 W	–	A = 365 mm x 40 mm	$40^\circ$ optics	487/846 lx <sup>1</sup>	MLAL 27 S	113 162 000 - 006 606 81
10.5 W	–	A = 365 mm x 40 mm	$90^\circ$ reflector, through-wiring	348/477 lx <sup>1</sup>	MLAL 27 SD	113 162 000 - 006 627 06
16.0 W	–	A = 540 mm x 40 mm	$90^\circ$ reflector	541/732 lx <sup>1</sup>	MLAL 42 S	113 163 000 - 006 627 17
16.0 W	–	A = 540 mm x 40 mm	$40^\circ$ optics	746/1270 lx <sup>1</sup>	MLAL 42 S	113 163 000 - 006 606 84
16.0 W	–	A = 540 mm x 40 mm	$90^\circ$ reflector, through-wiring	541/732 lx <sup>1</sup>	MLAL 42 SD	113 163 000 - 006 627 35
21.5 W	–	A = 715 mm x 40 mm	$90^\circ$ reflector	718/957 lx <sup>1</sup>	MLAL 57 S	113 164 000 - 006 628 06
21.5 W	–	A = 715 mm x 40 mm	$40^\circ$ optics	1001/1692 lx <sup>1</sup>	MLAL 57 S	113 164 000 - 006 606 87
21.5 W	–	A = 715 mm x 40 mm	$90^\circ$ reflector, through-wiring	718/957 lx <sup>1</sup>	MLAL 57 SD	113 164 000 - 006 628 33

\*  $E_m$  = medium illuminance;  $E_{max}$  = maximum illuminance; <sup>1</sup> Measuring field 100 cm x 100 cm/Measuring distance 100 cm

# MACH LED PLUS.seventy

The MACH LED PLUS.seventy ensures a wide-area illumination both as a replacement for classic tube luminaires or for initial equipping of machines.

## High-tech for an effective changeover

With an outer diameter of 70 mm, the long versions ranging from 370 mm to 1070 mm and the connection option to 24V or 100/120/220–240V, the MACH LED PLUS.seventy is the optimum solution to convert machines and

systems from classic tube luminaires to modern LED lighting technology. The versions with Eco-fitting are often adequate to ensure comparable illumination.

## A power pack for demanding lighting requirement

Thanks to the long versions and power fitting with a double number of LEDs, the MACH LED PLUS.seventy is also particularly suitable for initial equipping,

especially for larger machines that have a higher lighting requirement.

## Universal use all over the world

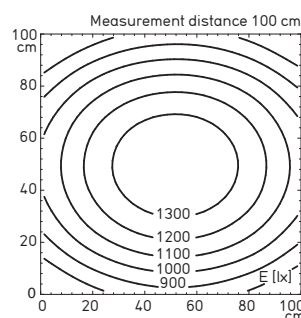
Overall, the large equipment package, enormous variance and especially the connection option to different voltage sources ensure a wide variety of applications worldwide.



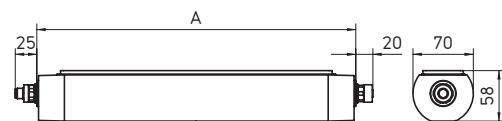
## TECHNICAL DATA

### Features:

- 12, 18, 24, 30, 36, 42, 48, 60 or 84 x LED
- Colour temperature neutral white 5000 K
- Colour rendering Ra > 80
- Glare-free with Light Forming Technology
- Colourless anodised aluminium housing, black side parts made of high-performance plastic 4 mm thick safety glass
- Integration through various brackets from the accessories
- Maximum permissible ambient temperature  $T_{a,max}$   
Eco: 50 °C (24 V) or 45 °C (100/120/220–240 V)  
Power: 45 °C (24 V) or 40 °C (100/120/220–240 V)
- LED service life (L 70) > 60000 h
- Vibration resistant from 10 up to 55 Hz (amplitude 0.35 mm)  
Shock resistant up to 50 g
- System of protection IP67  
Protection class I (100/120/220–240 V) or III (24 V)
- Connection via M12 connector  
S-coded (100/120/220–240 V) or A-coded (24 V)



Illuminance taking MQAL 84 S as an example



MACH LED PLUS.seventy with through-wiring

18–30 VDC						
OUTPUT	OPERATING DEVICE	DIMENSIONS	SPECIAL FEATURE	$E_m/E_{max}^*$	MODEL	ORDER NO.
7 W	–	A= 370 mm x 70 mm	Eco	184/241 lx <sup>1</sup>	MQAL 12 S	113 045 000 - 005 807 02
7 W	–	A= 370 mm x 70 mm	Eco, through-wired	184/241 lx <sup>1</sup>	MQAL 12 SD	113 046 000 - 005 806 96
12 W	–	A= 370 mm x 70 mm	Power	340/443 lx <sup>1</sup>	MQAL 24 S	113 047 000 - 005 806 93
12 W	–	A= 370 mm x 70 mm	Power, through-wired	340/443 lx <sup>1</sup>	MQAL 24 SD	113 048 000 - 005 805 73
10 W	–	A= 510 mm x 70 mm	Eco	273/354 lx <sup>1</sup>	MQAL 18 S	113 053 000 - 005 805 88
10 W	–	A= 510 mm x 70 mm	Eco, through-wired	273/354 lx <sup>1</sup>	MQAL 18 SD	113 054 000 - 005 805 91
18 W	–	A= 510 mm x 70 mm	Power	506/662 lx <sup>1</sup>	MQAL 36 S	113 055 000 - 005 805 94
18 W	–	A= 510 mm x 70 mm	Power, through-wired	506/662 lx <sup>1</sup>	MQAL 36 SD	113 056 000 - 005 805 97
10 W	–	A= 565 mm x 70 mm	Eco	273/354 lx <sup>1</sup>	MQAL 18 S	113 061 000 - 005 806 12
10 W	–	A= 565 mm x 70 mm	Eco, through-wired	273/354 lx <sup>1</sup>	MQAL 18 SD	113 062 000 - 005 806 15
18 W	–	A= 565 mm x 70 mm	Power	506/662 lx <sup>1</sup>	MQAL 36 S	113 063 000 - 005 806 18
18 W	–	A= 565 mm x 70 mm	Power, through-wired	506/662 lx <sup>1</sup>	MQAL 36 SD	113 064 000 - 005 806 21
13 W	–	A= 650 mm x 70 mm	Eco	364/477 lx <sup>1</sup>	MQAL 24 S	113 069 000 - 005 806 39
13 W	–	A= 650 mm x 70 mm	Eco, through-wired	364/477 lx <sup>1</sup>	MQAL 24 SD	113 070 000 - 005 806 42
24 W	–	A= 650 mm x 70 mm	Power	657/856 lx <sup>1</sup>	MQAL 48 S	113 071 000 - 005 806 45
24 W	–	A= 650 mm x 70 mm	Power, through-wired	657/856 lx <sup>1</sup>	MQAL 48 SD	113 072 000 - 005 806 48
16 W	–	A= 790 mm x 70 mm	Eco	444/573 lx <sup>1</sup>	MQAL 30 S	113 077 000 - 005 806 63
16 W	–	A= 790 mm x 70 mm	Eco, through-wired	444/573 lx <sup>1</sup>	MQAL 30 SD	113 078 000 - 005 806 66
30 W	–	A= 790 mm x 70 mm	Power	814/1056 lx <sup>1</sup>	MQAL 60 S	113 124 000 - 006 118 55
30 W	–	A= 790 mm x 70 mm	Power, through-wired	814/1056 lx <sup>1</sup>	MQAL 60 SD	113 125 000 - 006 128 44
22 W	–	A= 1070 mm x 70 mm	Eco	597/756 lx <sup>1</sup>	MQAL 42 S	113 081 000 - 005 806 75
22 W	–	A= 1070 mm x 70 mm	Eco, through-wired	597/756 lx <sup>1</sup>	MQAL 42 SD	113 082 000 - 005 806 81
42 W	–	A= 1070 mm x 70 mm	Power	1089/1391 lx <sup>1</sup>	MQAL 84 S	113 126 000 - 006 129 73
42 W	–	A= 1070 mm x 70 mm	Power, through-wired	1089/1391 lx <sup>1</sup>	MQAL 84 SD	113 122 000 - 006 098 07
100/120/220–240 V, 50/60 HZ						
OUTPUT	OPERATING DEVICE	DIMENSIONS	SPECIAL FEATURE	$E_m/E_{max}^*$	MODEL	ORDER NO.
9 W	Integrated transformer	A= 370 mm x 70 mm	Eco	184/241 lx <sup>1</sup>	MQAL 12 N	113 049 000 - 005 805 76
9 W	Integrated transformer	A= 370 mm x 70 mm	Eco, through-wired	184/241 lx <sup>1</sup>	MQAL 12 ND	113 050 000 - 005 805 79
15 W	Integrated transformer	A= 370 mm x 70 mm	Power	340/443 lx <sup>1</sup>	MQAL 24 N	113 051 000 - 005 805 82
15 W	Integrated transformer	A= 370 mm x 70 mm	Power, through-wired	340/443 lx <sup>1</sup>	MQAL 24 ND	113 052 000 - 005 805 85
12 W	Integrated transformer	A= 510 mm x 70 mm	Eco	273/354 lx <sup>1</sup>	MQAL 18 N	113 057 000 - 005 806 00
12 W	Integrated transformer	A= 510 mm x 70 mm	Eco, through-wired	273/354 lx <sup>1</sup>	MQAL 18 ND	113 058 000 - 005 806 03
21 W	Integrated transformer	A= 510 mm x 70 mm	Power	506/662 lx <sup>1</sup>	MQAL 36 N	113 059 000 - 005 806 06
21 W	Integrated transformer	A= 510 mm x 70 mm	Power, through-wired	506/662 lx <sup>1</sup>	MQAL 36 ND	113 060 000 - 005 806 09
12 W	Integrated transformer	A= 565 mm x 70 mm	Eco	273/354 lx <sup>1</sup>	MQAL 18 N	113 065 000 - 005 806 24
12 W	Integrated transformer	A= 565 mm x 70 mm	Eco, through-wired	273/354 lx <sup>1</sup>	MQAL 18 ND	113 066 000 - 005 806 30
21 W	Integrated transformer	A= 565 mm x 70 mm	Power	506/662 lx <sup>1</sup>	MQAL 36 N	113 067 000 - 005 806 33
21 W	Integrated transformer	A= 565 mm x 70 mm	Power, through-wired	506/662 lx <sup>1</sup>	MQAL 36 ND	113 068 000 - 005 806 36
15 W	Integrated transformer	A= 650 mm x 70 mm	Eco	364/477 lx <sup>1</sup>	MQAL 24 N	113 073 000 - 005 806 51
15 W	Integrated transformer	A= 650 mm x 70 mm	Eco, through-wired	364/477 lx <sup>1</sup>	MQAL 24 ND	113 074 000 - 005 806 54
27 W	Integrated transformer	A= 650 mm x 70 mm	Power	657/856 lx <sup>1</sup>	MQAL 48 N	113 075 000 - 005 806 57
27 W	Integrated transformer	A= 650 mm x 70 mm	Power, through-wired	657/856 lx <sup>1</sup>	MQAL 48 ND	113 076 000 - 005 806 60
20 W	Integrated transformer	A= 790 mm x 70 mm	Eco	444/573 lx <sup>1</sup>	MQAL 30 N	113 079 000 - 005 806 69
20 W	Integrated transformer	A= 790 mm x 70 mm	Eco, through-wired	444/573 lx <sup>1</sup>	MQAL 30 ND	113 080 000 - 005 806 72
26 W	Integrated transformer	A= 1070 mm x 70 mm	Eco	597/756 lx <sup>1</sup>	MQAL 42 N	113 083 000 - 005 806 84
26 W	Integrated transformer	A= 1070 mm x 70 mm	Eco, through-wired	597/756 lx <sup>1</sup>	MQAL 42 ND	113 084 000 - 005 806 90

\*  $E_m$  = medium illuminance;  $E_{max}$  = maximum illuminance; <sup>1</sup> Measuring field 100 cm x 100 cm/Measuring distance 100 cm



## MACH LED PLUS SIMPLY INTEGRATED MACHINE LUMINAIRES.

A machine luminaire is only convincing if it satisfies the user from the installation through to the actual application.

### Flexible bracket for easy mounting

Special brackets (accessories) have been developed for mounting of luminaires, they allow for flexible adjustment of the luminaires. In addition, existing tube luminaire brackets can be used to mount the MACH LED PLUS.seventy luminaires.

### Solid standard for quick connection

Standardised and robust M12 connector ensures an easy connection. In addition, electrical daisy chaining of luminaires facilitates through-wiring, since it is not necessary to start each luminaire individually.

### Sophisticated accessories for all instances

Both pre-assembled connection cables with M12 connector socket in various lengths and custom M12 connector sockets and plugs are available for particularly simple integration.





# ACCESSORIES

## LUMINAIRE BRACKET-SET



SPECIAL FEATURE	USE	ORDER NO.
Adjustment range +/- 90°	MACH LED PLUS.forty	408 001 403 - 006 716 26

## LUMINAIRE BRACKET



SPECIAL FEATURE	USE	ORDER NO.
Adjustment range +/- 20°	MACH LED PLUS.forty	408 001 402 - 006 716 23
Each luminaire requires at least two brackets		

## LUMINAIRE BRACKET-SET



SPECIAL FEATURE	USE	ORDER NO.
Adjustment range +/- 65°	MACH LED PLUS.seventy	408 001 876 - 005 820 65

## LUMINAIRE BRACKET



SPECIAL FEATURE	USE	ORDER NO.
Adjustment range +/- 30°	MACH LED PLUS.seventy	408 001 878 - 005 855 35
Each luminaire requires at least two brackets		

## M12 CONNECTOR SOCKET



SOCKET	USE	ORDER NO.
5-pin A-coded Wire diam. up to 0.75 mm <sup>2</sup> Cable diam. 4–8 mm	24 V without through-wiring	336 615 019 - 005 220 18
4-pin A-coded Wire diam. up to 1.5 mm <sup>2</sup> Cable diam. 6–8 mm	24 V with through-wiring	336 883 010 - 005 975 30
4-pin S-coded Wire diam. up to 1.5 mm <sup>2</sup> Cable diam. 6–8 mm	100/120/220–240 V	336 885 010 - 005 975 38
4-pin S-coded Wire diam. up to 1.5 mm <sup>2</sup> Cable diam. 8–10 mm	100/120/220–240 V	336 885 020 - 006 346 14

## M12 CONNECTOR PLUG



PLUG	USE	ORDER NO.
4-pin A-coded Wire diam. up to 1.5 mm <sup>2</sup> Cable diam. 6–8 mm	24 V with through-wiring	336 884 010 - 005 975 20
4-pin S-coded Wire diam. up to 1.5 mm <sup>2</sup> Cable diam. 6–8 mm	100/120/220–240 V with through-wiring	336 886 010 - 005 975 35
4-pin S-coded Wire diam. up to 1.5 mm <sup>2</sup> Cable diam. 8–10 mm	100/120/220–240 V with through-wiring	336 886 020 - 006 345 96

## M12 CONNECTOR CABLE



SOCKET	CABLE	USE	ORDER NO.
5-pin A-coded	3 m; 5 x 0.5 mm <sup>2</sup> Cable diam. 5.4 mm	24 V without through-wiring	336 703 010 - 005 821 09
5-pin A-coded	7 m; 5 x 0.5 mm <sup>2</sup> Cable diam. 5.4 mm	24 V without through-wiring	336 703 020 - 005 433 41
4-pin A-coded	3 m; 3 x 1.5 mm <sup>2</sup> Cable diam. 6.8 mm	24 V with through-wiring	336 889 010 - 005 979 07
4-pin A-coded	7 m; 3 x 1.5 mm <sup>2</sup> Cable diam. 6.8 mm	24 V with through-wiring	336 889 020 - 005 979 35
4-pin S-coded	3 m; 3 x 1.5 mm <sup>2</sup> Cable diam. 6.8 mm	100/120/220–240 V	336 891 010 - 005 979 43
4-pin S-coded	7 m; 3 x 1.5 mm <sup>2</sup> Cable diam. 6.8 mm	100/120/220–240 V	336 891 020 - 005 979 48

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