

Reflector unit type Ellwangen

with Shutter and Shutter driver Dimensions and adjustment

1. Housing dimensions





Legend:

- EA Electrode distance uv lamp (recommendation: EA = curing width plus 30-100 mm, depending from lamp height
- 1 UV lamp
- 2 Easy to renew reflector sheets
- 3 2 Covers, to be removed when lamp have to be changed
- 4 Tube connection piece Ø 100mm (dimension C; other dimensions on request).

With long uv lamps and depending from needed air volume 2 or 3 connection pieces symmetrical over total length

5 Driver with pneumatic cylinder (55 mm) or electric actuator (106 mm)

All dimensions in mm; Dimensions A, B, C, D and EA see separate list.



2. Dimensions of reflector units type Ellwangen - Overview

The below dimensions are given for some standard length. For other length in between the given ones, dimensions could roughly be interpolated.

Arc length	UV lamp- type UVH	Total length of unit			Lenght Air connection piece		nection ce	
		Lamp total length	Reflector unit pneumatic actuator	Reflector unit electric actuator	Reflector	Number	Ø	
EA			A pneum.	A electric	В		С	
mm		mm	mm	mm	mm	1)	mm	
85	822	175	333	383	77	1	100	
110	1022	230	388	439	132	1	100	
150	1522	275	432	483	176	1	100	
205	2022	330	487	538	231	1	100	
247	2522	380	537	588	281	1	100	
305	3022	430	587	638	331	1	100	
360	3522	480	637	688	381	1	100	
425	4122	550	706	757	450	1	100	
505	5022	630	786	837	530	1	100	
585	5822	710	866	917	610	1	100	
680	6722	800	955	1006	699	1	100	
740	7322	860	1015	1066	759	1	125	
830	8322	940	1095	1146	839	1	125	
1010	10022	1130	1284	1335	1028	2	100	
1055	10522	1180	1334	1385	1078	2	100	
1105	11022	1230	1384	1435	1128	2	125	
1265	12522	1390	1551	1602	1287	2	125	
1305	13022	1430	1583	1634	1327	2	125	
1455	14522	1580	1732	1783	1476	2	125	
1655	16522	1780	not available					
1900	19022	2030						
2000	20022	2130						

1) Number and diameter is designed only for using 120 W/cm. For higher lamp power on request.



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3. Reflector adjustment

Reflector characteristics of the Ellwangen unit easily could be adjusted from more or less parallel to concentrated radiation by changing the angle between the two parts of the reflectors when it is open. This angle depends from distance to the substrate(distance D). 180° is "parallel", < 180° is "focussed". It is more easy measured by the opening of the reflector sheets (dimension C). Distance D is measured from lower edge of the unit to substrate surface. Typical values for "C" are:

for "parallel" radiation: for concentrating in about 165mm distance for concentrating in about 115mm distance for concentrating in about 65mm distance for concentrating in about 15mm distance

- C = 109mm (see Fig. 2)
- C = approx. 105 mm (see Fig. 3)
- C = approx. 100 mm (see Fig. 3)
- C = approx. 95 mm (see Fig. 3)
- C = approx. 85 mm (see Fig. 3)

Do not exceed 110mm as a maximum due to gap for cooling air.



3.2 Adjustment

Fig. 4





Fig. 5

Adjust max. opening of reflector by the stop screws to concentrate radiation (in case use longer screws). Use stainless steel screws M4.



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4. General

Reflector units are used as holder of uv-lamps and reflect on the utilizable area a large portion of power, which otherwise will be radiated unused in the space.

In connection with the right amount of cooling air, they also facilitate a cooling, geared to the necessities of the lamp.

By tipping forward both parts of reflector before the lamp, UV and IR radiation could be stopped (shutter) to protect goods when transport stops.

The uv reflector units are produced of corrosion-resistant materials, all important parts are made of aluminum or high-grade steel.

4.1 Precautionary Measures

UV-radiation emitted by uv-lamps in operation is dangerous for skin and eyes and has kept off the operating personal during operation by shielding.

Never look directly with unprotected eyes in an uv-lamp and in reflected radiation! During operation, the quartz tube of the lamp attains a temperature of approx. 700 to 900 °C, therefore the lamp have to be cooled off before working on it or the reflector unit in case of e.g. service. Despite sufficient cooling, the reflector unit itself can reach temperatures clearly more than 50 °C at some places.

Because of the high temperature of the lamp, the use in explosion proof zones is not possible! If, for example, in combination dryers solvent-containing colors, lacquers etc. and uv-curing materials are used alternately, ensure BEFORE switching on the uv-lamp, that the solvent containing air in the dryer is sufficiently rarefied / eliminated!

Reflector units with shutter do not stop all UV radiation, a residual leakage radiation will still be emitted.

This has taken into account, when humans should work in the area of this residual radiation.

4.2 Installation and Shutter Driving of Reflector Unit

Reflector units are designed for mounting in a larger housing provided by the customer (e.g. dryer unit), which guarantees a sufficient protection against touching (hot) and especially against uvradiation.

The fastening of the unit may be done in various ways, e.g. to lie on rails (do NOT cover the gills or the air inlet slits at the long sides between outer wall and reflector), or by holders (screws) at the back side or the face sides of the unit. If fastened by the rear side drill holes in the inside wings of the edge profile but not in the backside coversheet for more stability.

Care have to be taken to the end stops (open and closed) and to the speed of the shutter. The driver have to close/open the shutter smoothly, not hard! Otherwise early damaging of shutter mechanism will occur.



4.3 Cooling

The necessary amount of cooling air depends on the power of the lamp. The air should be sucked off at the backside of the unit. In special cases it could be necessary to blow the air from the backside over the lamp to the front of the unit, but it is more difficult to find the right amount of air in this case, because of jet effects and partial cooling of the lamp.

Guiding value for the amount of exhausted cooling air is shown in the following table. These values have to be multiplied with the power of lamp in kW.

Lamp power	40 to 60	70 to 90	100 to 130	140 to	200 to 240
	W/cm	W/cm	W/cm	180W/cm	W/cm
air volume	kW * 25 m³/h	kW * 35 m³/h	kW * 50 m³/h	kW * 70 m³/h	kW * 9 <mark>5 m³/h</mark>

About 70 to 100% air volume have to be added to the calculated values for the cooling of the surrounding customer provided housing and machinery.

Example: electrical lamp power **6 kW** at **120 W/cm** necessary amount of cooling air for the reflector unit: additional amount of cooling air for the housing: total amount of air

approx. 300 m³/h approx. 270 m³/h about 600 m³/h

General experience has shown, that an exhaust temperature of approx. 60 °C measured near the air outlet at the dryer means a sufficient cooling. A lower temperature of <40°C often indicates a too strong cooling, but must not. A sure indication could be made by the lamp voltage. It have to be near the nominal value according to the lamp data (U_{lamp} should be more than 75-80% of nominal lamp voltage).

In stand-by operation with reduced power, the air volume has to be reduced in order not to cool down the uv-lamp too much. A too strong cooling could be indicated by a sinking lamp voltage lower than about 80% of the nominal lamp voltage. The air reduction is to be established in a test, since it also depends on practical conditions of use. The air may be reduced by means of e.g. a motor-operated throttle valve or by a two-step blower or other.

<u>Take care</u>, that amount of cooling air at stand by power differs clearly between open and closed shutters!

With open shutter air should be calculated by the above formula. With closed shutter this low air volume will be too less for cooling the closed and heated shutter profiles. So a much higher volume is recommended, it may be, that the full power volume is applicable. This has to be tested via lamp voltage (see above) and/or profile temperature, it should not exceed 300°C.

CAUTION: with closed shutters, the lap power must be reduced to 30...50% of full power! The exhausted air has to be drawn away via roof or equivalent because of the ozone content. Through the relatively high temperature of the exhausted air, the ozone decays really fast (some minutes).



4.4. Electrical connection and operation

<u>CAUTION</u>: If shutter is closed, lamp power must been reduced to 30...50% of the maximum power. Otherwise lamp and/or reflectors are overheated (stand by operation).

The operating and ignition voltage and operating current of the uv-lamp have to be taken from the documents provided by the lamp supplier. For lamps operated with ignitor, an ignition peak voltage of about 5kV has to be considered. For lamps operated without ignitor, the open-circuit voltage of the transformer (power supply) is decisive for the isolation.

Electrical connection has to be worked out with suitable cables, the cable cross-section and the insulation have to correspond to the operation current, temperature of cable and ignition voltage. The connection of the cables is effected on terminal blocks and/or ceramic insulators (high-voltage) according to the design of the reflector unit. Since inside the unit the temperature can reach up approx. 120°C, the connected wires have to be chosen accordingly. They have to be protected against uv-radiation and ozone inside the unit for example by protective or insulation tubes made of PTFE or soaked glass fiber.

For the same reason, the screws joint for cables and protective tubes outside the unit have to be made of metal.

The electrical connections for the air exhauster built on the reflector unit (additional equipment on arrangements) are designed for 230V/50Hz. Other voltages / frequency on request.



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