

APPROACH LIGHTING

FCU, FFL, UEL

Approach and/or RTILS Capacitor Discharge Flashing System



Compliance with Standards

- ICAO:** Annex 14, Vol. I, para. 5.3 (current edition)
- FAA:** L-849 A/C/E as per AC-150/5345-51 E-2159, E-2325, E-2628, E-2689 for photometry only.
- NATO:** STANAG 3316

Uses

Basically Aviation Ground Lighting flashing lights are landing aids for poor weather conditions. They are switched on when the effective range of steady burning approach lights at full intensity becomes insufficient to ensure adequate guidance. Since it may also be desirable to operate such systems under good visibility conditions, for instance to facilitate the location of the runway in urban areas, the use of a 3-level system avoids dazzling. Flashing lights may be used as:

- Sequenced flashing lights (SFL) in (non-) precision approaches,
- Runway threshold identification light systems (RTILS),
- The combination of the above SFL and RTIL systems
- To add a runway alignment segment to a medium-intensity approach lighting (system MALSR),
- Lead-in (LDIN) approach lights (on request).

General Description

The ADB Safegate low-voltage capacitor discharge flash light system consists of up to 32 flashing lights with individual control units. The fixtures are available as elevated and inset unidirectional applications.

All Flasher Control Units are electrically identical. They can be supplied as pole-mounted cabinets for each individual flashing head or – recommended – as 3-in-1 units to control three flashing lights from one cabinet only. In the latter case, the cabinets are mounted on a pedestal, offering the advantage of a most easy access for installation or servicing even as a complete mechanical protection of the in- and outgoing cables.

Thanks to the built-in compensation for the cable length, the FCU-3 cabinets can be placed outside the obstacle limitation area.

Features

- 400 V flashtube for improved overall security compared to 2 kV.
- Low mass elevated flash head incorporates triggering electronics for fault-free firing of flashtube.
- The Flashing Control Unit (FCU) exists in a FCU-1 and a FCU-3 version. The FCU-3 version houses three single FCUs in one common enclosure. User benefits:
 - Lower acquisition and installation costs
 - Perfect balancing of loads over the three phases
 - Easier to service
 - Improved safety due to fully protected cable runs
- New high-power-factor power supply yields lower power consumption, and eliminates peak inrush currents during capacitor charging phase. Smaller cross-section cables for input power are required.
- The FCU flasher electronics adjusts itself automatically to any input voltage from 180 to 260 VAC, 50 or 60 Hz. Available for 230 VAC single-phase (1P) for FCU-1, or 230V/400V three-phase (3P+N) for FCU-3 power supply.
- Wiring between FCU and flash head uses standard, 4-core plus earth, low-voltage cable.
- Remote control and monitoring via single or dual field bus, 24 or 48 V multi-wire or a combination of both.
- Distance between FCU and flash head: 120 m and over without light output loss or misfiring. Required energy to reach specified light output is always guaranteed into the flashtube.
- Microprocessor-controlled design allows user-adjustable parameter setting and configuration, detailed individual status monitoring, software update via Flash EEPROM upload, (all optional) and condensation prevention.
- Lightning surge protection 6,5 kA 8/20 μ s included as standard. Extended protection up to 80 kA recommended for lightning-sensitive areas available as an option.

Combines the best of two worlds: direct line coupled and capacitor discharge flashing systems.

Electrical Equipment Description

The flashing control units are designed for the supply of 400 V DC flash tubes. The flash energy required for each of the 3 individually adjustable levels is stored in a capacitor.

The trigger electronics are located in the flashing light.

Any cabinet in the system can be designated as the Local Master Controller (LMC) by adding a Master PCB. The LMC assures the synchronization between the cabinets, incorporates the master for the local bus, and serves as interface between the flashing system and the control system. Via a standard PC and a dedicated "dongle"* (optional), most of the parameters as well as the system configuration can be optimized to the on-site conditions.

The electrical connections between the substation and the FCUs and between each light fixture and its control cabinet use standard low voltage cabling. The latter connection can be up to 120 m without loss of light output.

Remote control is realized via multiwire, single or double field bus or any combination thereof. All cabinets are equipped with microprocessor controlled anti-condensation heating.

*Details on application

Electrical Supply

The system is powered either from a three-phase (3 or 4 wire) or a singlephase power system, providing a voltage between phases of 190 to 260 V 50/60 Hz.

In case FCU-3 control cabinets are used, the load balancing over the three phases is almost automatic.

As soon as power is applied, the wiring arrangement allows the anticondensation heater(s) to operate, even while the Flashing Light system is switched off.

Options

- Additional surge protection:
The standard control electronics are protected by MOV's against over voltages up to 6.5 kA 8/20 μ s. An optional protection for surges up to 80 kA 8/20 μ s is recommended for any lightning sensitive area.
- 230 V Mains socket outlet:
FCU boxes can be supplied with built-in socket outlet to ease servicing activities in the field and at night.

Configuration and Parameters

Each flashing unit can be configured in hardware mode by means of dip switches, indicating the position of the control unit in the system, and in the software mode.

The software configuration overrules the hardware configurations and allows adapting the system irrespective of the hardware address given to the FCU (dongle required).

Depending on the chosen remote control system, both the configuration and a vast number of available command parameters and status signals may be monitored and in case the one disposes over a "dongle" adapted to the customers' needs or wishes.

The flashing system may be used in any approach lighting configuration using up to 32 unidirectional flashing lights:

- to supplement steady burning, CAT. I, II or III ICAO approach systems
- to complete reduced steady burning patterns in FAA ASFL, SSALR or MALSR systems
- as runway threshold identification (RTILS or REILS) lights all or not in combination with sequenced flashing lights

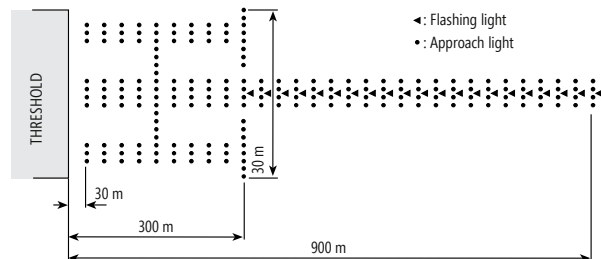


Figure 1. CAT. II/III

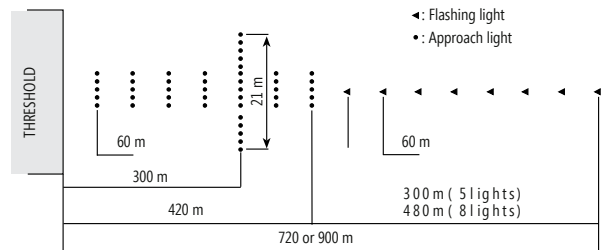


Figure 2. SSALR (FAA)

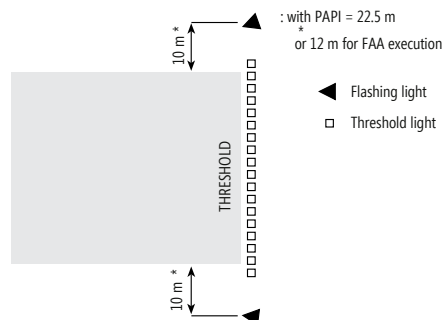


Figure 3. RTILS (ICAO) or REILS (FAA)

FCU, FFL, UEL

Construction

Control cabinets FCU-3 and FCU-1

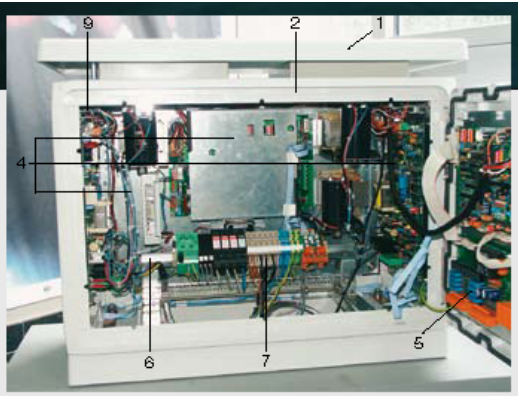


Figure 4. FCU-3

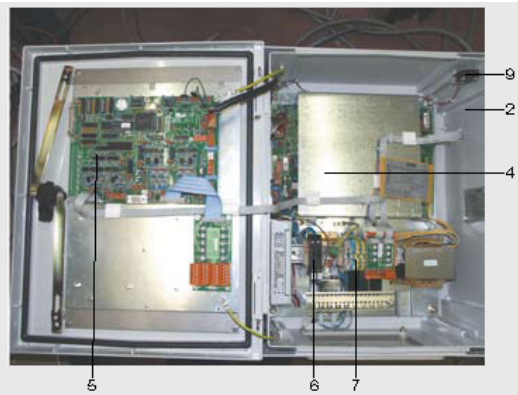


Figure 5. FCU-1

1. Sun protection
2. Cabinet
3. Pedestal for FCU-3 (not shown)
4. Flashing electronics (EMC only shown once)
5. Master PCB
6. Space for additional surge protection (optional)
7. Terminal block
8. Heater resistance(s) (not shown)
9. Micro switch
10. Mains fuses (not shown)

Elevated lights

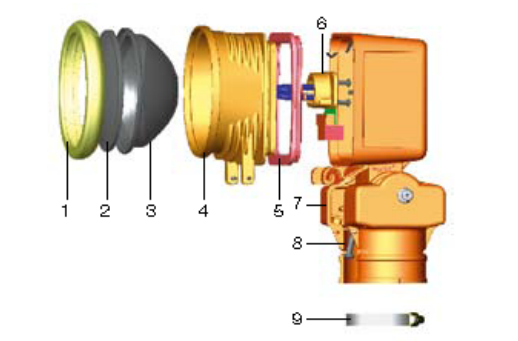


Figure 6. Exploded View: UEL

1. Lens/reflector seal
2. Lens
3. Reflector
4. Removable front housing, containing all optical components
5. Gasket
6. Low-voltage flash lamp with trigger transformer
7. Main housing with slip fitter, UV resistant plastic, containing trigger control circuit
8. Elevation adjustment screws
9. Bracing clamp with screw

Inset flashing lights

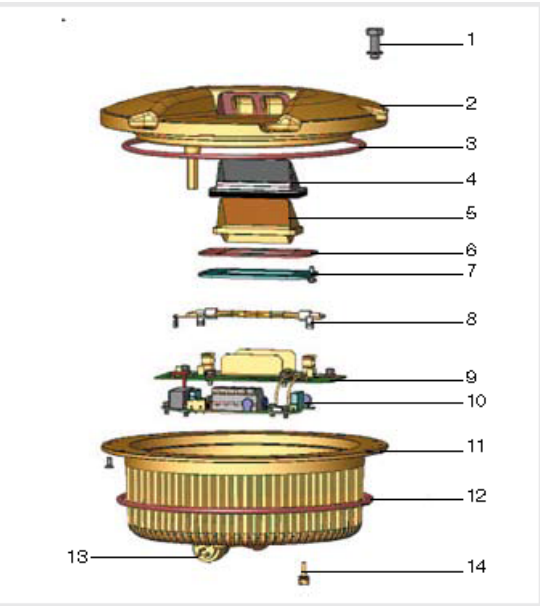


Figure 7. Exploded View: FFL

1. High tensile screws
2. Aluminum alloy cover
3. O-ring gasket between cover and inner cover
4. Prism gasket
5. Prism
6. Flat seal
7. Prism clamp
8. Flashing lamp
9. Lamp holder
10. Trigger PCB
11. Aluminum alloy inner cover
12. O-ring gasket between light fitting and base
13. Cable assembly with molded 5-pole plug
14. Pressure release screw

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Installation

Flashing control units

Preferably the control units are installed outside the safety area. If installed inside, the installation needs to be frangible. In order to limit the effect of the jet blast, it is recommended to install the cabinets with their largest vertical surface parallel to the approach axis.

Flashing lights

The inset light can be mounted on an ADB SAFEGATE 12" shallow base with 100 mm Ø central hole, on a FAA L868-B deep base, by means of a 12" to 16" adaptor ring on a deep FAA LB-4 base. Bases need to be ordered separately. When installing the control units outside the safety area, the elevated flashing lights can be installed like any other steady burning approach light.

In case of pole-mounted, 1-in-1 control cabinet in the approach, the elevated light can be installed on top of the pole supporting the individual control cabinet. In the latter case, all exposed cables need to be suitably protected.

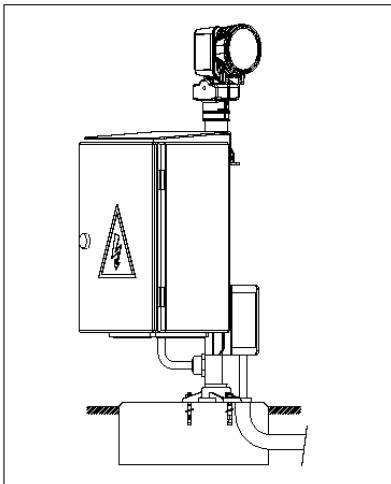


Figure 8. Typical installation of FCU-1 cabinet

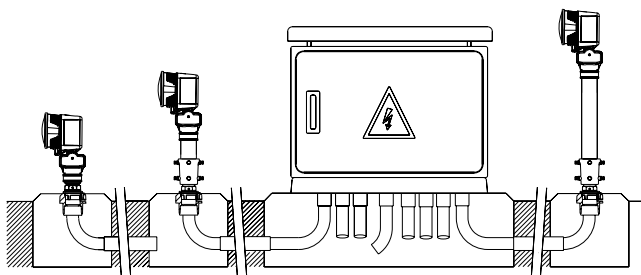


Figure 9. Typical installation of the FCU-3 with three flashing lights

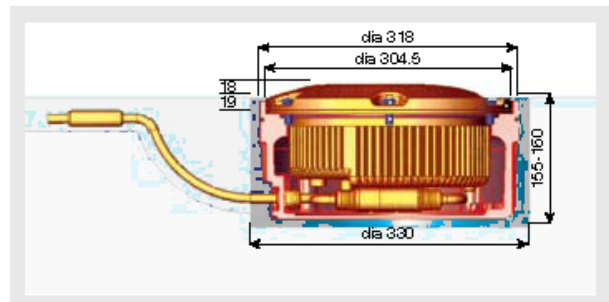


Figure 10. FFL Dimensions in mm

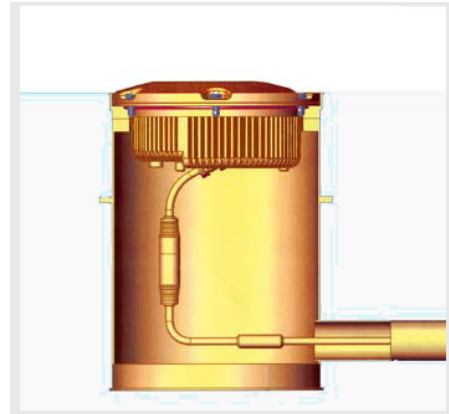


Figure 11. FFL mounted on L-868B

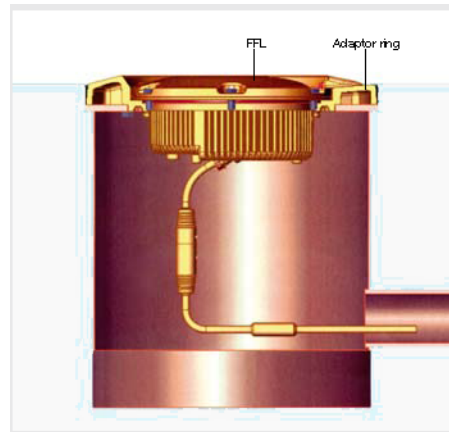


Figure 12. FFL mounted on a LB4

Adjustment

For an easy aiming of the UEL approach flashing lights, the same device as developed for the steady burning approach lights can be used. The device, available as an electronic and as a simple mechanical unit, can be used for lights installed on frangible approach masts as well as for ground mounted or conduit mounted lights.

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Technical Data

Lamp specification

Xenon discharge lamp 60 J – 400 V – 3,600,000 flashes min.

Electrical data

Supply voltages (1 ph or 3 ph)	230V AC, 50/60 Hz (1 Phase)
	230V/400V AC, 50 Hz (3 Phase)
Power consumption per FCU	300 VA max
Over-voltage / Lightning protection by means of	MOV 6.5 kA 8/20 µs (or optionally: 80 kA 8/20 µs surge arrestors)

Mechanical data

Degree of Protection	
Light fixture UEL, elevated	IP 45
Inset light type FFL	IP 67
3-in-1 cabinet	IP 44
1-in-1 cabinet	IP 44

Packaging data

Type	Weight (kg)		Individual packing Dimensions (mm)
	Net	Gross	
FCU-3	47	66	905 x 410 x 820
FCU-1	18.5	37.5	905 x 410 x 820 (packed per 2)
UEL with lamp	1.8	2.05	290 x 160 x 190
FFL	7.5	7.8	305 x 305 x 125

Dimensions

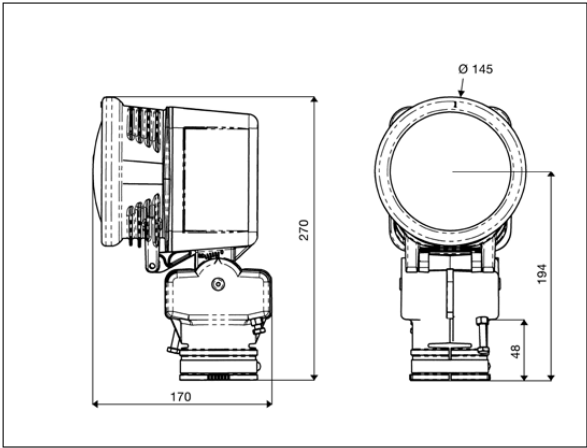


Figure 13. Dimensions UEL in mm

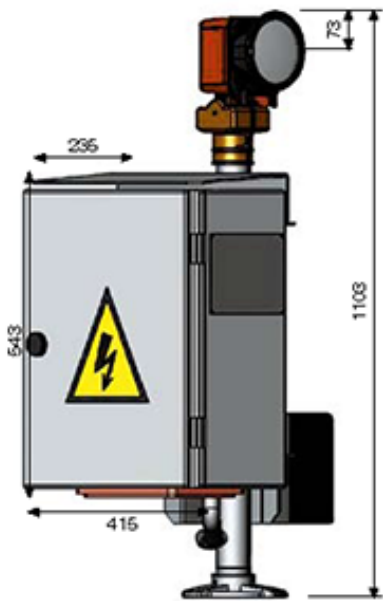


Figure 14. FCU-1 Dimensions in mm

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Photometric Performance

Fitting type	Fig	Intensity level	Min. effective intensity (cd)	Beam spread	
				Horizon	Vert.
UEL (elevated)	15	Low Medium High	150 800 8000	+/-15°	10°
FFL (inset)	16	Low Medium High	150 500 5000	+/-15°	+2 to 12°

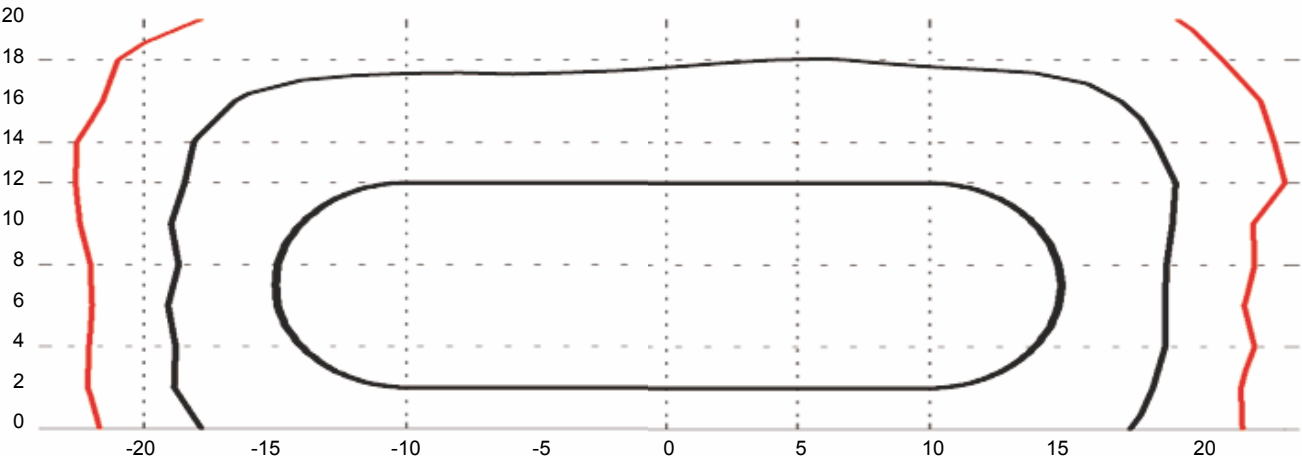


Figure 15. Photometric curve elevated flashing light UEL-1-120

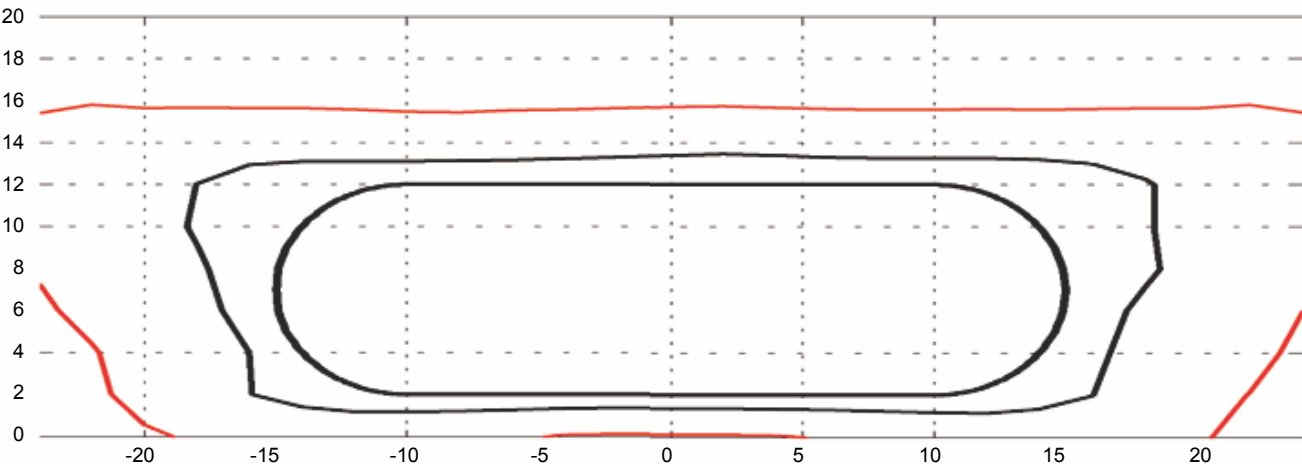


Figure 16. Photometric curve inset flashing light FFL

FCU, FFL, UEL

Ordering Code: FCU

Number of Lights Controlled per Unit

Surge Protection

Mains Socket Outlet

Bottom Plate

FCU

0B000

Number of Lights Controlled per Unit

1 = 1 light unit

3 = 3 light units

Surge Protection

S = Standard protection

E = 80 kA protection

Mains Socket Outlet

0 = Without

1 = With

Bottom Plate

0 = Plain

1 = With cable entries

Ordering Code: LMC

Field bus (J-bus)

Multi-wire

1LMC

000000

Field bus (J-bus)

0 = No

1 = Single J-bus

2 = Dual J-bus

Multi-wire

0 = No

1 = 24 V DC

2 = 48 V DC

Ordering Codes

Elevated light fitting	
Complete light with trigger electronics and low voltage flashing lamp	1UE9C2Y00000
Inset light fitting	
Complete light with trigger electronics and low voltage flashing lamp, without base	FFL9C0000001
Accessories	
12" shallow base for FFL inset flashing light, including M10 fixing screw kit and core cable with factory molded 5-pole receptacle with 100 mm dia bottom hole	MSBB590Y0003
12" shallow base for FFL inset flashing light, including M10 fixing screw kit and core cable with factory molded 5-pole receptacle with side entry via PG3	MSBB5A0Y0003
5-pole receptacle for connection to supply cable	4072.03.960
Dongle for on-site reconfiguration	1444.00.010
Aiming tool for elevated light with clinometer using electronic sensors	1570.05.400
Aiming tool for elevated light with clinometer using spirit level	1570.05.410
Shallow base installation jig	1411.19.260
Sighting telescope for shallow base installation jig	1411.19.251
Mounting accessories for FCU-1 cabinet (mounting pole & flange)	1440.20.200
Bottom plate with prefab cable entries for FCU-1 cabinet	4072.01.530
Junction box for FCU-1 cabinet	1440.20.100