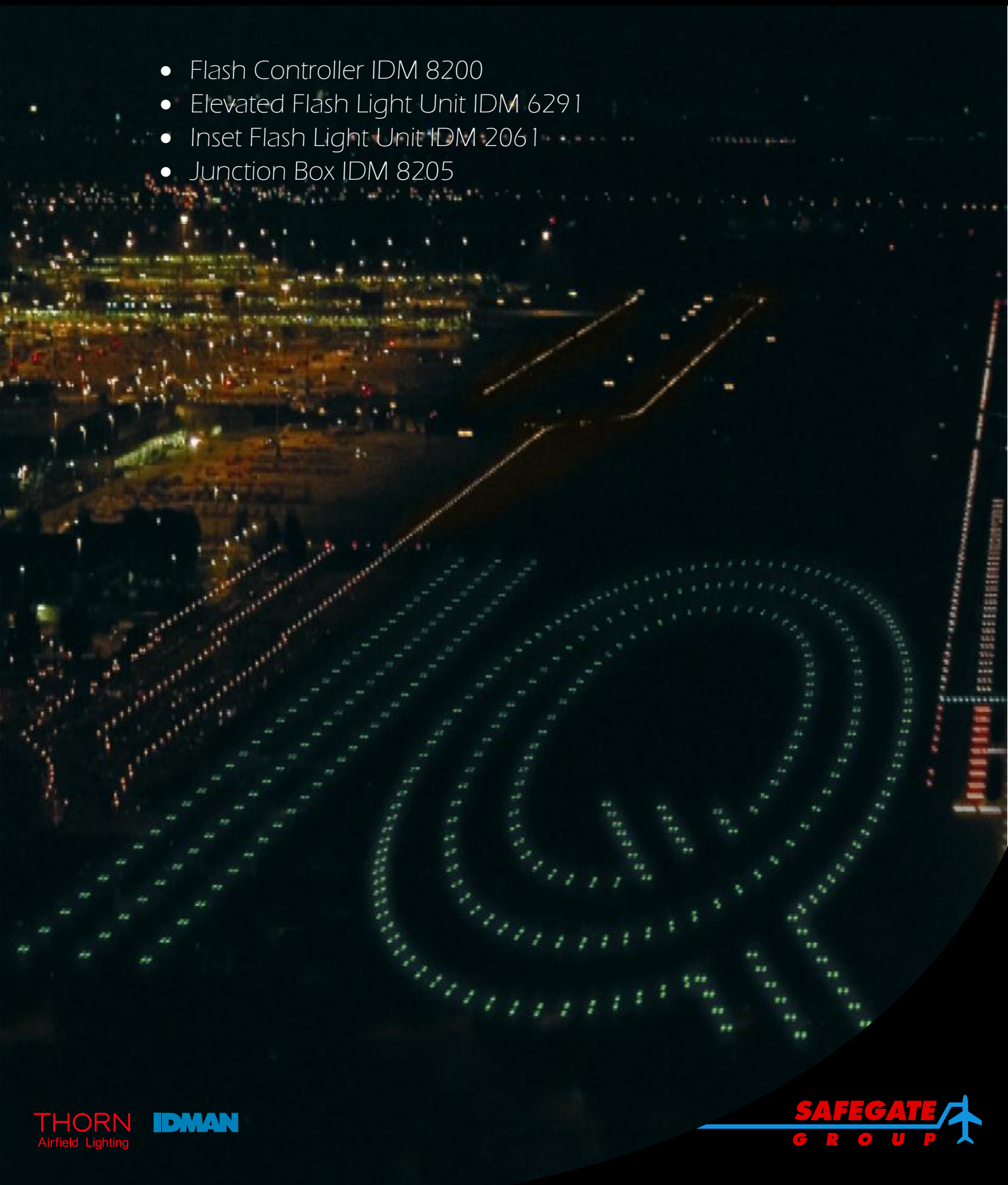
Airfield Lighting

Manual

Sequential Flash Light System

- Flash Controller IDM 8200
- Elevated Flash Light Unit IDM 6291
- Inset Flash Light Unit IDM 2061
- Junction Box IDM 8205



THORN Airfield Lighting IDMAN

SAFEGATE GROUP

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SEQUENTIAL FLASH LIGHT SYSTEM MANUAL CONTENTS

Documentation

This document includes Sequential Flash Light System information with a focus on safety, installation and maintenance procedures.
For more information, see www.safegate.com.

Note: *It is very important to read this document before any work is started.*

Copyright

History

Version	Date	Description
1.0	March 2013	First release
1.1	February 2014	Major updates

Note: *This page is to be updated with every authorised change to the document.*

Abbreviations and Terms

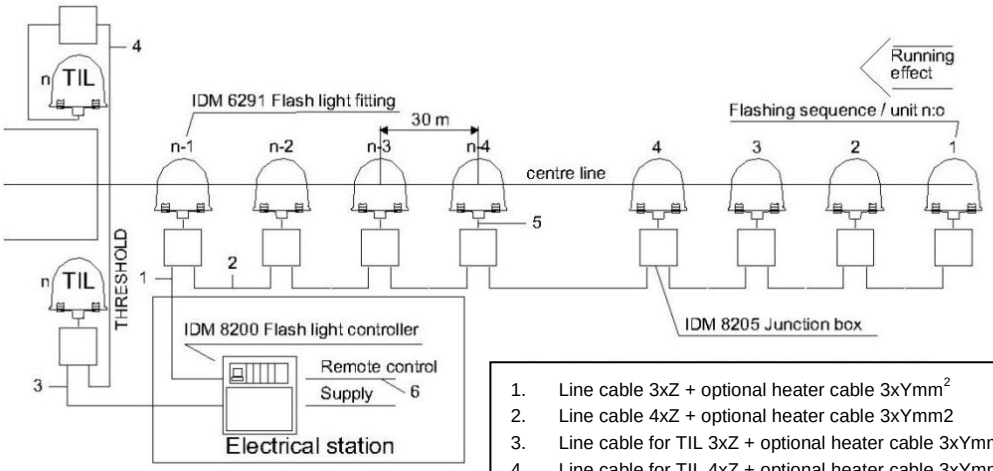
This document may include abbreviations and terms.

Abbreviation	Term
CAA	Civil Aviation Authority
CCR	Constant Current Regulator
CU	Concentrator Unit
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Committee
LED	Light Emitting Diode
LMS	Light Monitor and Switch unit
NATO	North Atlantic Treaty Organization
STAC	Service Technique de l'Aviation Civile (France)
STANAG	Standardization Agreement (NATO)

1. SYSTEM INTRODUCTION

Sequential Flash Light System (SFLS) gives extended information of the centreline of the runway. Flashing light is running from the beginning of the approach system towards the threshold. The system is normally used with barrette type (Alpa-ata) approach systems but can as well be used with distance coded systems.

Sequential Flash Light System is a reliable, mains frequency based direct line coupled system, providing extensive monitoring features and working with a single power cable between the controller and the flash light units. High voltage capacitors are not used in the system.



1. Line cable 3xZ + optional heater cable 3xYmm^2
2. Line cable 4xZ + optional heater cable 3xYmm2
3. Line cable for TIL 3xZ + optional heater cable 3xYmm2
4. Line cable for TIL 4xZ + optional heater cable 3xYmm2
5. Light fitting cable 3xQ (5xQ with heater)
6. Remote control cable

Z to be specified according to the cable length (loop resistance)
Y to be specified according to the cable distance
Q to be specified according to the cable length (loop resistance)

Note: *Numbering of the lights is marked above, numbering of the masts may be different.*

Note: *Cables 1-5 shall be screened.*

Sequential Flash Light System consists of following components:

- Flash Controller IDM 8200
- Elevated Flash Light Unit IDM 6291
- Inset Flash Light Unit IDM 2061
- Junction Box IDM 8205

These components are described more details in this manual in a separate chapters. Apart from these components electrical cables are needed to electrical connect these components together. Requirements for these cables are described later in this manual.

1.1 TERMINOLOGY

Flash gap	Increment in output pulses between two flash units. A gap of 0 means that there are no idle pulses between two consecutive flashes. Defines actually how fast the SFL-effect is.
IDM 8200	Microprocessor based SFLS controller, which supplies, synchronizes and monitors the SFLS.
Flash unit	IDM 6291, IDM 2061 or other IDM 8200 compatible flash light unit with xenon tube and electronic trigger card.
Flash connection cable	Connects the flash unit to junction box
Junction box	Connection boxes installed close to each flash unit and which connect heavier SFLS-cables with smaller connection cables.
Local control	IDM 8200 controlled locally with local control switches and menus.
Mimic	Graphical presentation of a system to illustrate its function.
Operation code	Defines when a flash unit operates in the SFL-sequence. Used in the flash unit to operate it and in the IDM 8200 to monitor the operation. Is actually the number of the feeding pulse since last reset.
Remote control	Means to control and monitor IDM 8200 (and SFLS) from a remote location e.g. ATC tower or a maintenance centre.
Sequential flash line (SFL)	Flash units operate sequentially from the beginning of the approach towards the threshold. Operation is repeated according to the SFL-rate.
SFL- rate	Defines how often the SFL-effect is performed nominal values: 2/s, 1/s and 3/2s.
SFL-cable	Supply cable that connects the IDM 8200 with the junction boxes.
Sync	Synchronization of the SFL provides correct SFL-effect and is realized with reset signal
Sync code	Defined by the SFL-rate and the network frequency. Set automatically by IDM 8200.
TIL	Threshold identification lights: two flash units installed at threshold which operate simultaneously as last in the SFL-effect and require TIL-protection.
TIL-protection	If one of the TIL-units fails the other TIL must also be shut down in predefined time to avoid giving misleading information.
Unit location	Location of the flash unit in the system. Locations 1-32 are used for the SFL. When the TILs are used they always occupy the last locations.

WARNING! PRIOR TO THE COMMENCEMENT OF WORK ALL ELECTRICAL SERVICES MUST BE ISOLATED FROM THE SUPPLY AND CONNECTED TO EARTH. FULL DETAILS OF THE WORK INVOLVED MUST BE GIVEN TO THE AUTHORISED PERSON RESPONSIBLE FOR THE ELECTRICAL ENGINEERING SERVICES AT THE AIRPORT WITH REGARD TO THE DURATION OF THE WORK AND SO ON. IT IS RECOMMENDED THAT PRIOR TO STARTING ANY CUTTING WORK, THE NATURE AND LOCATION OF SERVICES SUCH AS CABLE DUCTS AND THE LIKE SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL. ALSO, WHEN WORKING ON CIRCUITS USING AIRFIELD SMART POWER SYSTEM (ASP) THE SCM MUST BE TUNED OFF.

1.2 SYSTEM DESIGN GUIDELINES

1.2.1 SFLS Cabling and Cable Selection

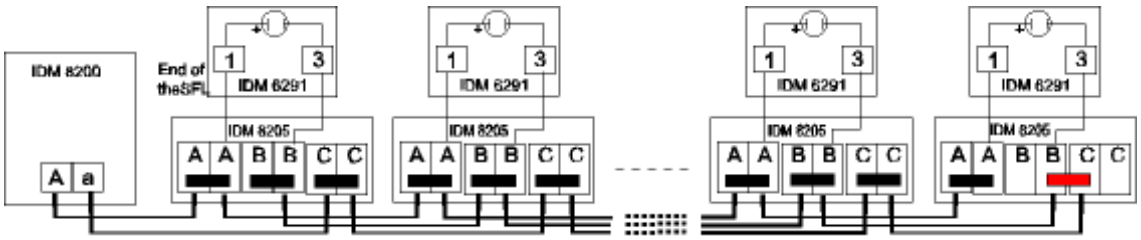
Standard underground 500V copper 4-conductor power cable (3 phases and PE) can be used. To the junction box closest to the IDM 8200, a screened 3-conductor cable is enough, but if a 4-conductor cable is used, the spare conductor can be used to reduce the loop resistance. In case when IDM 6291 internal heaters will be used, a separate screened 3 conductor cable (L,N,PE) must be installed.

The cable conductor cross section (A) is defined according the loop resistance (Rl).

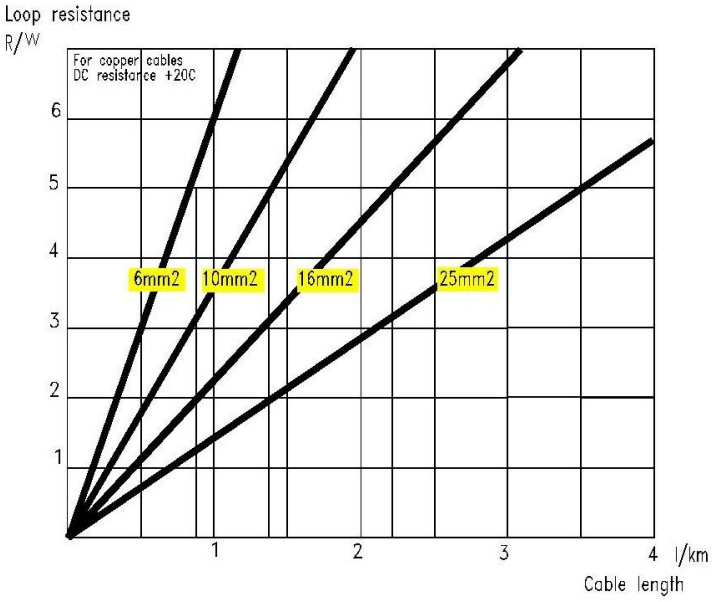
The total loop resistance (SFLS cable + flash connection cable) must be between 3 to 6 ohms.

1.2.2 Flash Controller IDM 8200 Connected at the End of the SFL

SFLS cable is terminated at the opposite end by shorting terminals B-C and loop length (Ll) is 2xcable length (Cl).



When the loop length Ll or cable length Cl is selected the loop resistance can be defined:

LOOP RESISTANCE	
Graph	Formula
	Rl = 20 / A (mm2) * Ll (km)
	Where 20 = constant for copper conductivity A = SFLS-cable copper cable conductor cross section (mm2) Ll = Loop length (km)

Low loop resistance leads to smaller cable power losses, but on the other hand more expensive cabling costs and gives less room for flash unit connection cable length deviations (5% tolerance).

Measurement of the cable resistance is accomplished so that the output of the IDM 8200 (connectors A,a) is disconnected. Terminals A and C in the first junction box (the farthest from the threshold) are connected. The resistance should be between 3 to 6 ohms. After the measurement disconnect A and C and connect the output of the IDM 8200 back. If this is a maintenance check, the cable insulation measurement could be done at the same time

1.2.3 Flash Connection Cable Selection

Also the resistance of the flash unit connection cables must be noted. In some cases it is not equal between the units, in this case different cable sizes (diameters) may be used to compensate for the length deviations between the units. A 5 % deviation in the measured loop resistance between the luminaires is allowed. There should be 3x 2,5mm2 or 4mm2 cable for lights if heater will not be used and 5x cable if heater will be used. Another solution is to use the longest (or within the 5% margin) cable length for all flash units.

10m loop resistance for different flash unit connection cables			
Cable	Loop resistance/ 10m	Max dev @ 3 ohms (m)	Max dev @ 6 ohms (m)
2,5mm2	0,18 ohm	10	20
4mm2	0,1 ohm	15	35

1.2.4 Supply Fuse and Cable Selection

A 40A D-curve circuit breaker is recommended in the supplying low voltage switchboard.

The supply cable should be chosen in line with the supply fuse and installation environment. IDM 8200 has 35mm2 terminals for the supply cable.

1.2.5 Coding Parameters

The coding parameters are used to synchronize the IDM 8200 with flash units for correct flash timing and unit monitoring. Normally the factory set parameters should be used.

The IDM 8200 automatically learns the coding parameters of the connected flash units in a special “detect” sequence.

The flash units are coded with jumper settings on the trigger card.

For understanding the coding principles it is good to know the ideas behind the coding.

CODING PRINCIPLES AND RULES		
Timing	System timing is based on the mains frequency Fm (50 or 60Hz)	
Max SFL-rate	Max SFL-rate (60 FPM=1/s, 90 FPM=1,5/S or 120 FPM=2/s)	
Max code	Max code no is 89 (defined by the IDM 6291 in the flash unit) or result from (2*Fm)/sflrm-6, whichever is smaller (example: 44 if Fm=50Hz and sflrm=2/s)	
Code	The code defines the moment when the flash unit operates in the timeline from 0 to reset code and must be smaller than the max code no	
Code increment	Code increment is the increment of codes between 2 consecutive flash units and is used in automatic detection. It can be calculated with the formula: i=int (max code/ no of flash units)-1.	
Reset code	The reset code is calculated by the IDM 8200 and is defined by the selected SFL-rate (sflrs) and mains frequency (Fm) following way: (2*Fm)/sflrs	
TIL-codes	TIL units have to be set with consecutive codes following the highest flash unit code + 1 (or more) but anyway has to be smaller than the max code no.	
Equal codes	The flash unit and its corresponding code (according its location) in the IDM 8200 should be matching in order to provide correct lamp operation monitoring	
Extensions	To reserve codes for future extensions it is recommended to use the standard locations in the SFL (1 to 30=threshold, 30m intervals in 900m approach line and 31,32 for TIL) for coding	
Coding example: 30 units in locations 1 to 30, flash gap=0, Fm=50Hz		
Unit to be programmed:	Formula:	example:
Trigger card IDM6291 of the light unit	Pa	1,2...30
Coding example: 8 units +TIL in locations 1 to 8, flash gap =2, Fm=50Hz		
Unit to be programmed:	formula:	example:
Trigger card IDM6291 of the light unit	Line TIL Right TIL Left	1,4,7…21 24 25

2. SYSTEM INSTALLATION

NOTE: *All safety matters must be taken into account when making electrical and mechanical installations. All electrical installations should be done by qualified electricians only.*

First unpack the equipment and check for possible damages that may have occurred during the transportation of goods.

System installation can be done according to the following steps:

1. Install the SFLS-cable from substation to the last junction box (=closest to the threshold) and between the junction boxes.
2. Install the flash connection cables.
3. Check that cable resistances are within 5% tolerance.
4. Install the junction boxes.
5. Connect the shorting piece to the B and C inside the first junction box (= the farthest from the threshold) terminals to balance the SFLS-cable loop resistance.
6. Install the flash units.
7. Check aligning and coding according to the unit location, see §7.2.7 Aligning the Unit for more information.
8. Install the IDM 8200 controller in the substation.
9. Measure the SFLS-cable loop resistance, as advice on §1.2.2 Flash Controller IDM 8200 Connected at the End of the SFL.

In order to simplify and ease the SFLS-cabling connections, the following standard terminal codes are used in different system components:

SFL-cabling terminal codes				
Code	Description	Used	SFL id	Flash id
A	SFLS-line (+) to flash unit	IDM 8200, IDM 8205, IDM 6291, IDM 2061		
B	SFLS-line (-) to flash line	IDM 8200, IDM 8205, IDM 6291, IDM 2061		
C	SFLS-line (-) to balancing line	IDM 8205		
PE	Protective earth	IDM 8200, IDM 8205, IDM 6291, IDM 2061		

2.1 SFLS-CABLE

Refer to the cable technical data for max pulling strength and bending radius etc.

Mark the outgoing (to next unit) and incoming cable (from previous) unit to ease possible cabling troubleshooting which may be necessary. Record the conductor identifier (ID, colour or number) to the SFLS-cabling terminal codes table.

2.2 FLASH UNIT CONNECTION CABLES

Refer to the cable technical data for installation details. Record the conductor identifier (ID, colour or number) to the SFLS-cabling terminal codes table.

2.3 JUNCTION BOXES IDM 8205 AND SFLS-CABLE TERMINATING

All junction boxes that are same type are identical with each other, i.e. any unit can be installed to any location. It should be anyway noted that there is different junction box type for Inset Flash Light Unit (-I) and that is NOT interchangeable with elevated type boxes. For loop resistance terminating a shorting piece must be installed in one of the units.

2.4 FLASH LIGHT UNITS

The flash light units are installed in the centreline of each barrette of approach lights, not more than 60cm from the extended centreline of the runway. In the case of TIL light units are installed symmetrically on threshold extension.

The elevated units are normally installed on frangible masts, connected with single flash unit connection cables and need to be aligned both horizontally and vertically. inset light units are installed on standard 12” shallow base. More detailed description for light unit installation is presented later on this manual.

THE FLASH UNIT TRIGGER CARDS ARE CODED AT THE FACTORY AND ARE SUPPLIED WITH UNIT LOCATION NUMBER IDENTIFICATIONS. CHECK THAT THE UNITS ARE INSTALLED IN THE CORRECT ORDER ACCORDING TO THE LOCATION NUMBERS.

2.5 FLASH CONTROLLER IDM 8200

Flash controller IDM 8200 is installed inside electrical sub-station. More detailed description for light unit installation is presented later on in this manual.

3. SYSTEM COMMISSIONING

Commissioning of Sequential Flash Light System according following steps:

INITIAL STEPS			
CT no	Task	Manual ref	Ok
1	Record the project and IDM 8200 information.		
2	Record the circuit information.		
3	Check the line resistance (SFLS loop resistance). Measurement of the cable resistance is accomplished so that the output of the IDM8200 (connectors A and a) is disconnected. Terminals A and C in the first junction box (the farthest from the threshold) are connected. The resistance should be between 3 to 6 ohms. After the measurement disconnect A and C and connect the output of the IDM 8200 back.		
4	Measure the insulation of all output cables with isolation resistance tester using 500V range.		
5	Record the safety information.		
6	Record/check the system HW settings. Record/check the remote control system HW settings.	5.2.4.5 5.2.1.4	
7	Turn IDM 8200 on and check the green led in the PWR module. Adjust the LCD contrast if necessary.	 5.2.4.5	
8	Record/check the system and remote control SW settings	5.2.4.5	
9	Record the lamp addresses if they are set different from the factory set. Run the detect function.	5.2.4.5	

FIRST SFLS RUN			
CT no	Task	Manual ref	Ok
10	Check and record the local control functions.	5.2.3.1	
11	Check and record necessary calibrations at least U_{IN} and lamp fault.	5.2.4.3	
12	Record the lamp fault set values and test the function by making lamp faults to SFL.	5.2.4.5	
13	Check and test (if desired) the remote control function according to remote control signal list.	5.2.3.1	
14	Fill up the commissioning test report and sign both sheets.	10.6	

4. SYSTEM TROUBLESHOOTING

NOTE: *All maintenance and repairs of the electrical installations/devices should be done by qualified electricians only using adequate tools and measuring instruments.*

4.1 INDIVIDUAL FLASH LIGHT UNIT FAILURE

Check that power is available for the unit, the code setting is correct, and the condition of the lamp.

4.2 TOTAL SYSTEM FAILURE

If the complete SFLS does not work, all flash units are off.

TOTAL SYSTEM FAILURE TROUBLESHOOTING STEPS			
Step / name		Check	Repair
1	Initial check IDM 8200	Check that fuses are ON. Check that the green OK led is on in the PWR unit. Check that contactors operate.	Set fuses on. Replace the PWR unit. Replace contactor.
2	SFLS-power out check IDM 8200	Check with a multimeter that DC pulses are given to SFLS (terminals A, a). The multimeter should show 100-200V in DC range. If you have an oscilloscope, it should show rectified, controlled sine wave (mains voltage between phases).	Replace the thyristor controller. Replace MCU.
3	SFLS-Reset check IDM 8200	Check with an oscilloscope that there is 6 pulses pause in intervals defined by the flash rate.	Replace the thyristor bridge
4	SFLS-power check Flash unit	Check that DC-power is available to all flash units by measuring the terminals A-B from the flash units. The voltage should be according to step 2.	Check/correct cabling. Check junction box fuses.
5	The luminaires are flashing coincidentally	Check the thyristors and the thyristor controller.	Change both thyristors also if the other is faulty. Change the thyristor controller
6	There is outshort message in the fault window	There is a short circuit somewhere in the field cable or junction boxes.	Repair the cable or connection.
7	There is Iout>99A message in the fault window	SFLS cable resistance is too low (less than 3 ohm). The current transducer T1 is faulty.	Install right SFLS cable. Replace T1.

5. FLASH CONTROLLER IDM 8200

5.1 INTRODUCTION

Flash Controller IDM 8200 is an electrical device that controls and feeds power to Sequential Flash Light System.

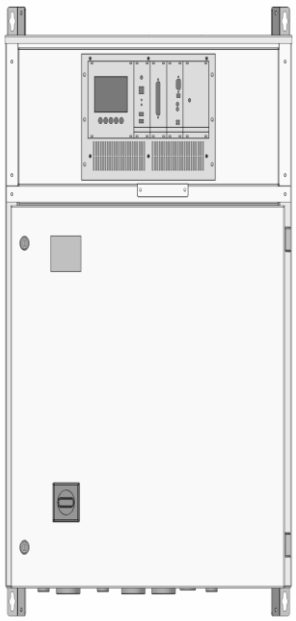


FIGURE 1 – FLASH CONTROLLER

5.1.1 Safety Instructions

Make sure you read this section and are familiar with safety precautions before any work is started.

5.1.1.1 Product Safety

Airfield lighting fixtures in a constant current circuits are connected in a circuit via isolating transformers with currents between 2.0 – 6.6A in the primary circuits.. The primary voltages, depending on the circuitry, are usually several kilovolts and therefore lethal. Although the open circuit voltages of the isolating transformers are much lower, the peak voltage while opening the secondary circuit under current is also hazardous. So it is vitally important to follow all the safety regulations with adequate circumspection.

In the design of this equipment all the practical safety aspects have been taken into account. It is also important to strictly follow existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions.

5.1.1.2 Electrical Maintenance

Valid safety regulations must always be followed. Never carry out any maintenance or maintenance measures before the current is confirmed as safely disconnected. Use extreme caution when disconnecting or connecting high voltage primary connectors.

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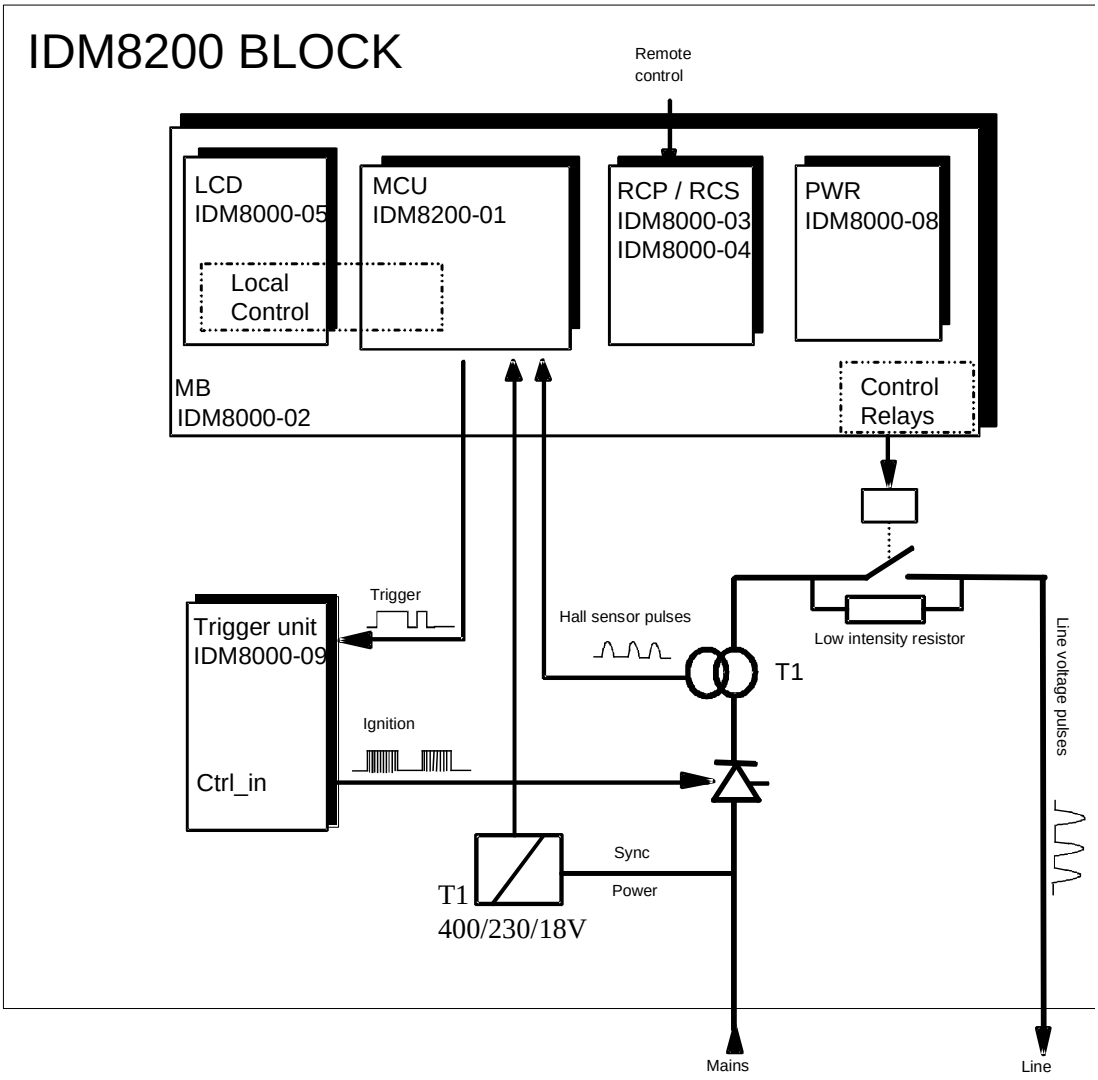
5.1.1.3 Mechanical Maintenance

When maintaining mechanical components, it is important to follow the instructions for electrical maintenance.

5.2 DESCRIPTION OF THE UNIT

IDM 8200 consists of two main functional blocks: electronic control rack and power circuit.



5.2.1 Electronic Control Rack Components

5.2.1.1 Microprocessor Control Unit (MCU)

The control unit is E1 size custom designed electronic card containing a powerful 16-bit microprocessor with application program and peripheral circuits.

- Control function adjusts the thyristor control output according to the actual energy value (E2) provided by the energy calculator (feedback) and target value defined by the user.
- The energy calculator defines the actual output values by sampling the output waveforms and calculating effective lamp energy value from the sample data.

All set-parameters are stored in non-volatile EEPROM memory. Also RAM memory is backed up by a battery for optimal performance in all operational situations.

5.2.1.2 Power Unit

The plug-in E1 size power unit provides desired DC-voltages for the control electronics. The switch mode unit guarantees wide operating voltage range and good efficiency.

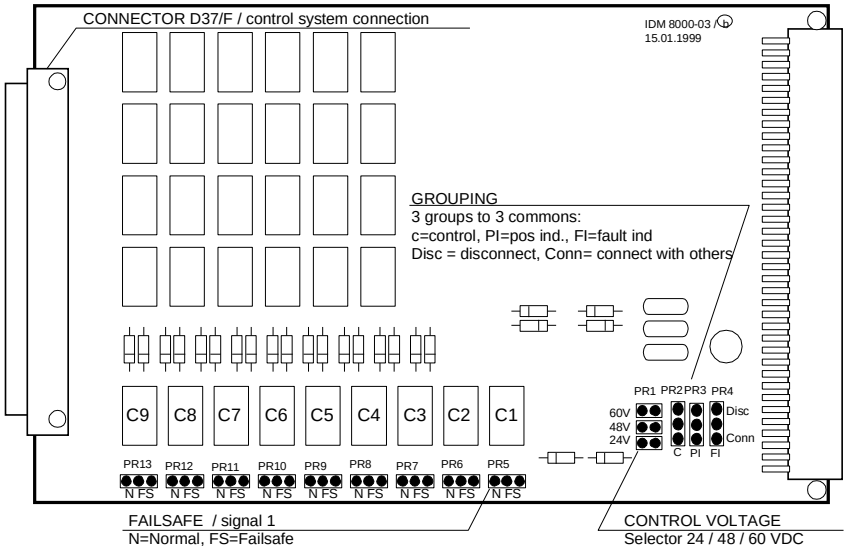
5.2.1.3 Display Unit (LCD)

The LCD unit with 5 soft menu buttons operates as a user interface. The LCD has a backlight that turns off after one minute if no user operation is made via the keyboard.

5.2.1.4 Parallel Control Interface

A parallel control interface is used with traditional “multi-wire” control systems. The interface is designed to match most control system types and allows configuring. This interface is standard for all 8200 range flash systems (normal / threshold identification).

Parallel interface unit is custom designed E1 size plug in card with a D37 / F communication connector installed on the face of the card. The card is located in the RM-slot next to the power unit of the control rack.



PARALLEL CONTROL UNIT IDM 8000-03 LAYOUT

PARALLEL CONTROL UNIT IDM 8000-03 HARDWARE SETTINGS		
Interface	Type	Data
Input / controls	Relay coil	Ucont = 0.8 – 1.6xUdcnom / R=3840 ohm
Output / indications	Relay contact	0.5A / signal max 1.0A common

PARALLEL REMOTE CONTROL HARDWARE SETTINGS			
Setting	Description	Factory setting	Allowed range
Control voltage	Control DC-voltage selection	24V	24 / 48 / 60V DC
Failsafe step	In case of control DC voltage or cable fault failsafe control status is used. The contacts of the control relays are inverted with jumpers. Inverted control signal must be given by the control system.	Off	Any step
Indication group	Enables galvanic isolation between control, positive indications and fault indication groups		
Remote control	Dip switch SW1 settings on mother board See § 5.2.1.5 Mother Board for details.		

PARALLEL REMOTE CONTROL HARDWARE SETTING STEPS		
Step	Task	
1	Turn IDM 8200 main switch off	
2	Remove RCP unit	
3	Set jumper switches to desired positions	
4	Insert RCP and turn the main switch on	

RELATED SOFTWARE SETTINGS		
Setting	Menu	Description
Type	System	Control/indication signals' purpose depends on the Type selection. See HW-settings and parallel connection signal list.
Sysfail	Remote control	Defines if all fault signals are summed to Sysfault indication (All) or it contains only Uin, Freq and Temp alarms (Sysfault trip).

5.2.1.5 Mother Board

The mother board provides connections between the MCU and its peripherals such as remote control unit, display unit and measuring channels. System hardware settings are made through dipswitch SW1 settings on the motherboard.

5.2.1.6 Thyristor Trigger Unit IDM8000-09

This unit gives ignition pulses to the thyristor full bridge.

5.2.1.7 Current Sensor

The Hall effect-based current sensor converts the current pulses taken by the flash units to DC-voltage pulses to be sampled by the MCU.

5.2.2 Power Circuit Components

5.2.2.1 Main Switch and Fuse

The main switch breaks the electrical supply to the controller (and therefore to the system) and can be used as safety switch. The main fuse protects the controller and the system from over current in case of e.g. thyristor or regulation fault.

5.2.2.2 Surge Arresters (optional)

Optional surge arresters are used to suppress possible voltage surges in mains SFLS-line.

5.2.2.3 Thyristor Bridge

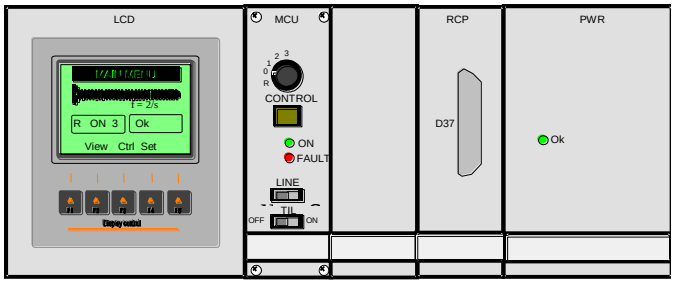
The thyristor full bridge generates controlled DC-pulses from the 2-phase mains voltage. The thyristor is triggered on with an ignition pulse given to the gate electrode, and closed when forward current through it goes to zero.

5.2.2.4 Low Intensity Resistor

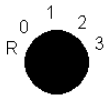
A low intensity resistor is used with intensity level at 3% to add resistance in the circuit to ensure sufficient voltage for the flash tube. A contactor is used for switching.

5.2.3 User Interface

5.2.3.1 Control Functions



CONTROL RACK WITH DISPLAY UNIT AND CONTROL SWITCHES
AND PARALLEL REMOTE CONTROL

Main switch: located on the cabinet door, disconnects the system from mains			
Control switch on the MCU			
	Position	Control mode	Function
	R	Remote	Unit in remote mode
	O	Local	Unit off
	1 2 3	Local	3% on 10% on 100% on
Toggle switches on the MCU			
	Position		
	LINE	ON/OFF	
	TIL	ON/OFF	

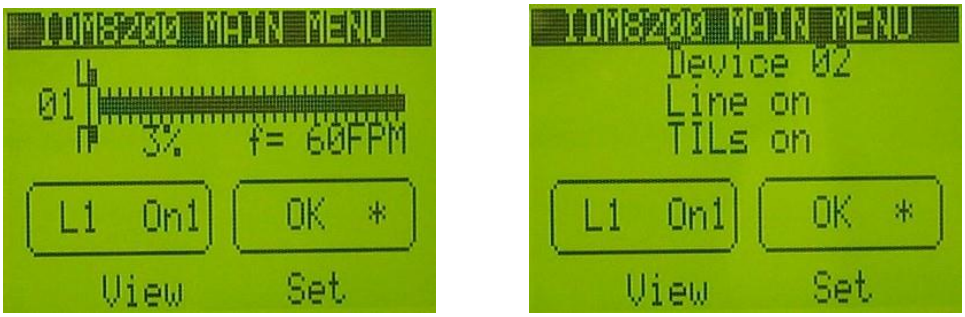
5.2.3.2 Status Indications

On and fault indication LEDs on the MCU		
	ON (green LED)	
	Status	Description
	Off	Controller and system off
	On	Controller and system on
	FAULT (red LED)	
	Status	Description
	Off	FLASH controller is ok
	On	CPU stopped / FLASH controller system fault, change the MCU
	Blink	Fault: Monitoring / protection operated
OK-led (green) on the PWR unit: On if DC power is ok		

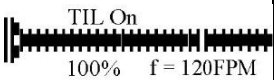
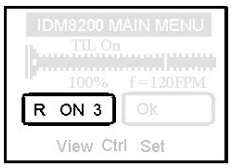
5.2.4 Display Unit and Functions

Display unit consists of a graphical LCD display and 5 soft menu buttons.

Each display window consists of a header, function dependent data fields and/or permanent status fields and 5 function dependent soft menu texts.



DISPLAY UNIT IN 2 DIFFERENT USER SELECTABLE MAIN MENU STAGES

Display component	Description	Remarks
Header	Describes the function of current display	
Flash mimic 	Indicates the status of flash lights in 32 possible locations in the flash line. Shows if units are detected, on, ok/fault and also brilliancy, SFL-rate and TIL control status	= No flash configured to location | = lamp has parameters, ■ = lamp is on and working Only in main menu.
Data field 1 (left)	Data according to the selected function	Alternative to Flash mimic
Data field 2 (right)	Data according to the selected function	Alternative to Flash mimic
Status field 1 (left) 	FLASH control status Control type (R / L) Intensity step (On 1 - 3)	Remote mode indication (parallel) Local mode
Status field 2 (right)	FLASH fault status indication * = unacknowledged faults in event log	
Soft menu texts	Describes the function of the soft menu button located below the text.	
Soft menu button	Pressing the button will activate the function described by above menu text.	Press again to activate the following function

Following status texts are used in Status field 2 and also in the event log:

Fault status	Description
Ok	Ok / no faults or warnings
Freq A-	Low frequency trip
Freq B-	Low frequency warning
Freq A+	High frequency trip
Freq B+	High frequency warning
Uin A-	Low supply voltage trip
Uin B-	Low supply voltage warning
Uin A+	High supply voltage trip
Uin B+	High supply voltage warning
Temp A	High temperature trip
Temp B	High temperature warning
L fault A	Lamp fault alarm
L fault B	Lamp fault warning
SYSfail	System error
ERR	Incorrect user input or function
TIL error	One or both TILs are not functional
Iout>99A	Over current
OUTSHORT	Output short circuit

5.2.4.1 Display interface main menu structure

The main menu has two selections:

- **View** Viewing the values without affecting any settings
- **Set** Settings and calibration of the FLASH.

The set menu is divided in three submenus

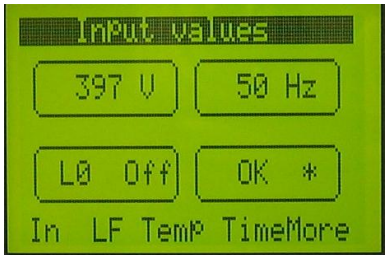
- **Cal** Calibration functions
- **Set** Setting functions; other monitoring and system configuration functions.
- **Prot** Protective functions: monitoring functions which are able to trip the Flash controller

Commonly used symbols in all display menus:

- **More** Brings more equal level displays
- **Up** Brings you back to the upper level display
- **Next** Brings you, for example, to next error in the error log

5.2.4.2 View Functions

Select **View** from the main menu to access the view-level displays:



VIEW DISPLAY, INPUT VOLTAGE AND FREQUENCY SHOWN

MAIN LEVEL VIEW DISPLAYS			
Header / function	Data 1	Data 2	Remarks
In Input values	Supply voltage Resolution 1 V	Supply frequency, resolution 1 Hz	
LF Lamp faults	Fault L: (=line) Fault T: (=TIL)	number x number x	x=number of faulty light
	No more	faults	
Temp thyr.temp	Temperature	Temperature of the thyristor module heat sink Resolution = 1°C	
Time Time and date	Time hh.mm.ss	Date dd.mm.yy	
More			Access to scroll info displays.

SCROLL INFO DISPLAYS			
Header / function	Data 1	Data 2	Remarks
Log Event log	A = acknowledged1-10 Fault number 1-10 1 = oldest fault	Fault description	Next=Next fault in log Prev=Previous fault in log Ackn=Acknowledge the fault and go to next fault Time=Fault occurrence time and date
Hour Operating hours	Elapsed hours Elapsed hours	Total Step 1-3	Prev=previous counter Next=next counter Res=Clear the operating hours
Sys System information	Ver Type Dev no Dir Lst serv DC +5V DC +12V DC –12V DIP POS	Vx.x SFL / SFT XX XX dd.mm.yy X.xx V XX.xx V XX.xx V ABCD	SW version IDM 8200 type Device number in AFL system Direction name Last service date +5V internal supply +12V internal supply -12V internal supply DIP switches, see HW settings for details
Rcs Remote control info	Parallel interface Sysfail	 Trip/AH	 Common fault content
….Up			Return to main menu

5.2.4.3 Calibration Functions

- Select **Set** / **Cal** to access the calibration functions:

CALIBRATION DISPLAY

- Calibration instructions are given in tables
- **Calibration displays** which describe the contents of the displays
- **Calibration steps** which describe the setting process in step-by-step form.

Input Voltage Uin Calibration

Input voltage measurement is used for input voltage protection. Accuracy of the input voltage protection depends on the correct calibration.

UIN CALIBRATION DISPLAYS			
Header / function	Data 1	Data 2	Remarks
Uin Calibration	Uin / V	Uin cal	**+** - adjust, **Set** to accept

Light Units Automatic Detection

The controller detects installed flash light units automatically

AUTOMATIC DETECTION STEPS		
Step	Task	Buttons
1	Find how many luminaires are installed in the system	
2	Select detection function from the display menu	**Set** - **Cal** - **Detect**
3	Enter the number of the luminaires installed, press Next	**+** / - , **Next**
4	Enter flash gap (0 / 01 / 02). The gap is set different from zero, if the locations of the lights are different from 30 m. See paragraph 5.4 in this manual.	**+** / **-**
5	Set controller to the 1st intensity step. Enter Detect	Detect
6	If there is indication of 1 or more lights missing, press Help	Help
7	Fix lights, repeat detect. If no more missing lights, press End	End

Uin CALIBRATION STEPS		
Step	Task	Buttons
1	Connect external calibrated True RMS Voltage meter (Appropriate scale, Accuracy better than 1%) to the FLASH mains input terminals (at main switch). Warning ! Line voltage circuit – use appropriate test probes!	
2	Select Uin calibration	**Set** - **Cal** - **In**
3	Adjust the Uin reading on data field 1 to equal with the external meter reading	**+** / **-**
4	Make sure that the readings are equal and then press	**Set**
5	Check that both external meter reading and View-menu info are equal	**Up** - **View** - **In**
6	If necessary, repeat steps 2-5	

5.2.4.4 Protection Functions

- Select **Set** / **Prot** for protections settings:

PROTECTION DISPLAY

GENERAL DEFINITIONS USED IN PROTECTION SETTING DISPLAYS	
Level A, B	Threshold level, fault count rising to the level causes operation of the protective function. Level A (alarm) normally causes shutdown of the Flash controller output, hereafter called tripping and level B warning indication.
Delay	Delay time after which the protection operates.
Nom	Nominal value used for input voltage and frequency protections. Nominal values are normally set with the dip switch on the mother board and are critical for correct operation and lifespan of the IDM 8200. A threshold level, which trips the controller, is automatically calculated from these values and cannot be set directly. Note! Nominal values must correspond with the values of the mains input. Incorrect nominal value or calibration may cause incorrect operation of the protection.

RESET MODE: Defines how the actual protection function can be reset i.e. IDM 8200 can be restarted:	
L	Local reset: Protection resets only when the user switches OFF the local operation switch of the flash controller. Only after that it can be restarted. If there is an earth fault in any line, the user must reset the protection module by turning the switch lever of the protection module to the normal position inside the cabinet.
A	Automatic reset: Protection resets automatically when the actual value returns within the acceptable limits (normally level A + hysteresis). This reset function cannot be used with active Uin, Freq and Temp protections.
R	Remote reset: setting the controller step to 0 with the remote controller resets the fault.

Input Voltage Protection

- **Protection displays** describe the contents of the displays
- **Protection steps** describe the setting process in step-by-step form.
- **Protection test** describes the testing of the protection in step-by-step form.

Input voltage protection function protects the system from long-term over/under voltages. If the input voltage is outside acceptable limits (see Table below) for a predefined time, IDM 8200 will trip. The system restarts automatically when input voltage has returned to acceptable level.

FIXED VALUES FOR THE INPUT VOLTAGE PROTECTION LIMIT A: These values are derived from the nominal value. (Values for 400V AC input voltage).				
Function	Limit type	Value	Trip level	Return level
Uin protection	Limit A + Limit A –	+15% - 20%	460 Vac 320 Vac	440 Vac 340 Vac

Note! *IDM 8200 can only start-up within ±15% of Uin nominal voltage. After start-up it will operate between A- and A+ (see Table above). When CCR is off, the input voltage alarm A is given below -15% level.*

B-levels are used as warning indications and they can be set by the user.

Reset mode is always A (automatic).

PROTECTION DISPLAYS FOR THE Uin				
Header / function	Data 1	Data 2	Factory setting	Allowed range
Uin protection	Nominal value * Threshold level B + Threshold level B – Delay time	Nom L b, + L b, - Delay	380V / 400V / 420V 1.00s	 0.10 – 9.90s in 0.1s steps

Uin PROTECTION SETTING STEPS		
Step	Task	Buttons
1	Select input voltage protection by	**Set** **Prot** **Uin**
2	Nominal value is displayed, if adjustment is needed, use	**+** / **-** .
3	To accept the value, select	**Set**
4	To adjust warning levels, press	**Next**
5	If necessary, adjust levels Lb+ and Lb- with	**+** / **-** .
6	To accept the levels, select	**Set**
7	To adjust level Lb- or delay, select	**Next**
8	Repeat steps 5-7 if necessary.	

Uin PROTECTION TEST
Change the Uin calibration in order to go beyond threshold limits (La+ and La-) and see that the required function operates within due time.

Input Frequency Protection

This function protects the system from long-term over/under frequency.

If the input frequency is outside acceptable limits (see Table below) for a predefined delay time IDM 8200 will trip. Restart is automatic after the input voltage returns to the acceptable value.

FIXED VALUES FOR THE INPUT FREQUENCY PROTECTION LIMIT A These values are derived from the nominal value.				
Function	Limit type	Fnom	Trip level	Return level
Freq protection	Threshold level A + Threshold level A –	50 / 60Hz 50 / 60Hz	Fnom + 10 % (55/66Hz) Fnom - 10 % (45/54Hz)	Fnom+ 7.5% (54/65Hz) Fnom – 7.5% (46/55Hz)

B-limits are used as warning indications. The B-limit values can be set by the user.

Reset mode is always A (automatic).

FREQUENCY PROTECTION DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
Frequency protection	Nominal value Threshold limit B+ Threshold limit B- Delay time	Nom F b, + F b, - F delay	50 Hz 52 Hz 48 Hz 1.0 s	32 Hz – 65 Hz 32 Hz - 65Hz in 1Hz steps 32 Hz - 65Hz in 1Hz steps 0.1 - 9.9s in 0.1s steps

FREQUENCY PROTECTION SETTING STEPS		
Step	Task	Buttons
1	Select frequency protection by	**Set** / **Prot** / **Freq**
2	Nominal value is displayed, if adjustment is needed, use	**+** / **-**
3	To accept the value, select	**Set**
4	To adjust warning levels, press	**Next**
5	If necessary, adjust levels Lb+ and Lb- with	**+** / **-**
6	To accept the levels, select	**Set**
7	To adjust level Lb- or delay, select	**Next**
8	Repeat steps 5-7 if necessary.	

Temperature Protection

Temperature protection is used to protect the thyristor modules from overheating. If the temperature reaches the limit A (100 °C), the controller will trip.

Reset mode is always automatic and the operation is restored when the temperature has reached the acceptable value.

The IDM 8200 has a cooling fan mounted on the bottom of the heat sink. The fan is always on when the output step 1 is selected. The control system turns it on also when the temperature of the heat sink rises above +50° C. The fan is switched off when the temperature drops below +45° C.

TEMPERATURE PROTECTION DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
Temperature protection	T B T Delay	Temperature Delay time	+ 80° C 10s	0-100 C in 1° C steps 0-30s in 1s steps

TEMPERATURE PROTECTION SETTING STEPS		
Step	Task	Buttons
1	Select Temperature protection by	**Set** / **Prot** / **Temp**
2	T B warning value is displayed, if adjustment is needed, use	**+** / **-**
3	To accept the value, select	**Set**
4	To adjust delay, press	**Next**
5	If necessary, adjust mode with	**+** / **-**
6	To accept, select	**Set**

PROTECTION TEST FOR AN OVER TEMPERATURE
Adjust the temperature alarm level below the ambient temperature and see that the alarm is given within the due time.

5.2.4.5 Settings Functions

- Select **Set** and then again **Set** to access Set-level functions:

SETTING DISPLAY

- Setting instructions are given in the Tables.
- **Set displays** which describe the contents of the displays.
- **Setting steps** which describe the setting process in step-by-step form.
- Test which describe the testing of the function in step-by-step form

System Settings

These general settings may be adjusted only when the controller is in Local-Off state.

TERMINOLOGY	
Term	Description
Direction	Control direction or runway number.
Lampline	Controls 2 different types of main menu (yes/no)
Dev no	Identification number. Together with the type and direction name, identifies the controller.
Lst serv	Used to memorize date of last service/calibration

SYSTEM SETTING DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
System settings	Direction Lampline Dev no Servdate	00 … 36 Yes/no 00 … 99 Date	00 01 Fact.cal.date	00-36 00-99 Date

SYSTEM SETTING STEPS		
Step	Task	Buttons
1	Set the control switch in Local-Off-position.	
2	Select system settings by	**Set** / **Set** / **More** / **Rcs** .
3	Select the desired parameter with	**Next .**
4	Adjust the parameter with	**+** / **-** .
5	Accept setting with	**Set**

Lamp Fault Indication Settings

These settings define the operation of LF A and LF B indications. Two adjustable levels A=alarm and B=warning are provided with an adjustable delay.

TIL lamp faults are handled so that when either of them is regarded faulty, they both will be turned off within fixed delay of 15s. This delay cannot be adjusted according to the standard

LF SETTING DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
Lamp fault set	LF A LF B Delay	Lamps Lamps Delay time	2 L 1 L 10 s	1 – 30 L 1 – 30 L 1 – 99 s

Lamp fault terminology	
LF A/B	Define how many lamp faults are needed to generate the indication.

LF SETTING STEPS		
Step	Task	Buttons
1	Select lamp fault monitor settings by	**Set** - **Set** - **LF**
2	Adjust setting if necessary with	**+** **-**
3	Accept setting with	**Set**
4	For next setting select	**Next** .
5	Repeat steps 2 to 4 until all settings are made.	

LFL-ALARM TEST	
Make actual lamp faults to the line to get alarms LF B, LF A.	

Time and date setting

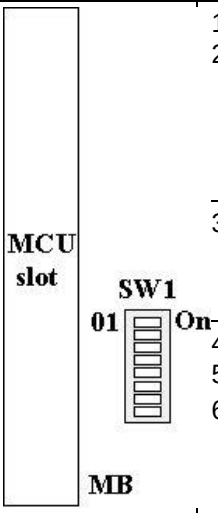
Time and date settings are used as time labels in the fault log and also on the time and date display of the view menu. Years are presented with 2 last digits i.e. 2000 = 00.

TIME AND DATE SETTING DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
Time&date set	hh.mm.ss dd.mm.yy	Time Date	Finnish time	0-23 / 0-59 / 0-59 1-31 / 1-12 / 0-99

TIME AND DATE SETTING STEPS		
Step	Task	Buttons
1	Select time and date setting by	**Set** - **Set** - **More** - **Time**
2	If necessary adjust Time with arrows below each time component	**^** / **^** / **^** .
3	To accept the Time press	**Set**
4	If necessary adjust the Date as in steps 2 and 3	
5	To return, press	**Up** .

Hardware System Settings

The most basic IDM 8200 settings are made on hardware basis with dipswitch SW1.

HW SETTINGS	Sw	Setting	DIP-switch positions / description		
	1 2	UIN Nominal value	Sw1	Sw2	Setting
			0	0	400V
			1	0	380V
			0	1	420V
			1	1	400V
	3	F1 Nominal value	Sw3		Setting
			0		50Hz
			1		60Hz
	4 5 6	Type	Sw 4	Sw 5	Sw 6 / Setting
			1	0	0 SFL
			0	1	0 TIL
			1	1	0 SFT (SFL+TIL)
	7 8	Remote control	Sw7	Sw8	Setting
			0	0	Parallel
			0	1	Parallel, enable separate line and TIL control
			1	0	Spare
			1	1	Spare

The settings are made with dipswitch SW1 located on the motherboard (MB) on the right side of the MCU unit. Switch no 1 is on the top of dipswitch block. The left switch positions = OFF (0) and right positions = ON (1)

SET SYSTEM HW SETTING		
Step	Task	Remarks
1	Turn IDM 8200 main switch off	
2	Remove the MCU unit	
3	Set the SW1 dipswitches to the desired positions	
4	Insert the MCU and turn the main switch on	

The settings can be viewed for checking from the display:

VIEW SYSTEM HW SETTING		
Step	Task	Buttons
1	To view the system select:	**View** / **More** / **Sys**
2	Scroll displays until “DIP POS” is on Data field 2	**Next**

Remote Control Settings

IDM 8200 automatically detects the parallel card or if nothing is connected. The following setting is available:

ComF-m	Defines if all fault signals are summed to Com-fault indication (SumF), or if it contains only Uin, Freq and Temp alarms (SysF).

REMOTE CONTROL SETTING DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
Parallel or no card detected	Com fault content	ComF-m	SysF	SysF / SumF

REMOTE CONTROL SETTING STEPS		
Step	Task	Buttons
1	Select remote control settings by	**Set** / **Set** / **More** / **Rcs** .
2	Select the desired parameter with	**Next** .
3	Adjust the parameter with	**+** / **-** .
4	Accept the setting with	**Set** .

LCD Contrast Settings

This setting defines the contrast of the LC-display, which may need to be adjusted according to the desired viewing angle and the prevailing room temperature.

LCD CONTRAST SETTING DISPLAYS				
Header / function	Data 1	Data 2	Factory setting	Allowed range
LCD contrast set	Contrast value	LCDSET	12	0-25 contrast range, 0=max

LCD CONTRAST SETTING STEPS		
Step	Task	Buttons
1	Select LCD contrast setting by	**Set** - **Set** - **More** - **Lcd**
2	Adjust the parameter with	**+** / **-**
3	Accept the setting with	**Set**

Contrast enhancement with built in trimmer resistor

Sometimes the adjustment range in the software is not enough to make the

LCD display contrast clearly visible. In this case there is a way to adjust the contrast manually in the LCD panel.

Step	Task
1.	First switch the IDM 8200 controller knob to Local-Off (0) position.
2.	Adjust the display contrast with the user interface to a value 12.
3.	Remove the four screws holding the LCD panel in its place.
4.	Carefully take the LCD panel out, holding it by one hand. Note that the module is connected to the motherboard with a flat cable. See Fig 10.
5.	To adjust the contrast, use the trimmer resistor on the printed circuit board marked with 'Ccal'. To increase the contrast (more black) turn the trimmer clockwise, to decrease (less visible) turn it counter clockwise.
6.	When the contrast is good, switch the controller off from the main switch before reinstalling the LCD panel.
7.	Place the LCD panel to its place and fasten the four holding screws.
8.	Turn the controller back on and check the contrast.

Hold the LCD panel this way to make the adjustment. Do not disconnect the flat cable. The picture is taken of the IDM8000, which uses the same display.

5.3 MAINTENANCE

NOTE: *All maintenance of the electrical installations/devices should be done by qualified electricians only.*

Every time the cabinet is opened, check the surge protectors (SAxx). The colour in the small window of the surge protector should be green. If it is red, the module should be changed. Do it by pulling the module out; it is not necessary to disconnect any wiring.

Every year:

Note: *Switch the feeding power off from the LV-board.*

- Check the total loop resistance.
- Check that the ventilation of the unit is not blocked.
- Clean away dust if necessary.
- Tighten screws of the power terminals.
- Check visually for any damaged, for example overheated, components.
- Check the earth resistance of the output cables with isolation resistance tester using 500V voltage.

Note: *The following tests are performed while the input voltage is on.*

- Check the calibration of the input voltage. Refer to § 5.2.4.3 Calibration Functions.
- Check and clear the fault log.
- Check the fan operation by turning the intensity step 1 on. If the fan is exceptionally noisy, replace it. Mark the date of change with a sticker on the side of the fan.

6. INSET FLASH LIGHT UNIT IDM 2061

6.1 INTRODUCTION

IDM 2061 is an inset unidirectional flash light fitting designed to work with the IDM 8200 digital sequential flash light controller and IDM 8200-T TIL-controller. Only one light unit for each installation position is required.

The light unit is equipped with a built-in addressable trigger unit.

FIGURE 2 – JUNCTION BOX

6.1.1 Safety Instructions

6.1.1.1 General safety

Make sure you read this section and are familiar with safety precautions before any work is started. Keep away from live circuits. It is vital to switch off the current securely before any installation or maintenance procedures are carried out. It is also strongly recommended to disconnect the circuit from IDM 8200 flash controller before these activities.

NOTE: *IDM 2061 Light unit has to be always equipped with external over-current and residual current protectors.*

6.1.1.2 Product safety

IDM 8200 is directly coupled to 400VAC supply system. The voltage is therefore lethal. So it is vitally important to follow all the safety regulations with adequate circumspection.

In the design of this equipment all the practical safety aspects have been taken into account. It is important to strictly follow existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions.

6.1.1.3 Electrical maintenance

Valid safety regulations must always be followed. Never carry out any maintenance or maintenance measures before the current is confirmed as safely disconnected. Use extreme caution when disconnecting or connecting high voltage primary connectors.

WARNING! *PRIOR TO THE COMMENCEMENT OF WORK ALL ELECTRICAL SERVICES MUST BE ISOLATED FROM THE SUPPLY AND CONNECTED TO EARTH. FULL DETAILS OF THE WORK INVOLVED MUST BE GIVEN TO THE AUTHORISED PERSON RESPONSIBLE FOR THE ELECTRICAL ENGINEERING SERVICES AT THE AIRPORT WITH REGARD TO THE DURATION OF THE WORK AND SO ON. IT IS RECOMMENDED THAT PRIOR TO STARTING ANY CUTTING WORK THE NATURE AND LOCATION OF SERVICES SUCH AS CABLE DUCTS AND SO ON SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL.*

6.1.1.4 Mechanical maintenance

When maintaining mechanical components, it is important to follow the instructions for electrical maintenance.

WARNING! *IT IS STRONGLY RECOMMENDED TO DEPRESSURIZE THE LIGHT BEFORE OPENING FOR MAINTENANCE. IT IS IMPORTANT TO UNDERSTAND THAT OPENING A PRESSURIZED LIGHT CAUSES THE LIGHT HALVES TO SEPARATE AT HIGH SPEED, AND MAY CAUSE PERSONAL INJURY AND DAMAGE THE LIGHT.*

THE LIGHTS ARE DESIGNED TO WITHSTAND INTERNAL PRESSURE OF 1.5 BAR. IT IS NOT ALLOWED TO EXCEED 1.5 BAR OF PRESSURE IN ANY CIRCUMSTANCES. FOR THIS REASON, IT IS NOT ALLOWED TO OPEN THE INNER COVER USING COMPRESSED AIR, AS THIS MAY CAUSE PERSONAL INJURY AND DAMAGE THE LIGHT.

6.1.2 Description of the Fitting

The lights are designed according to airfield placement and functionality.

Light	Colours	Power	Description
IDM 2061	White	80W	Flash light unit

6.1.3 Delivery of the Fitting

Each unit is supplied completely assembled, tested, programmed and sealed, ready for installation. The electrical connection is made via one cable assembly that is equipped with a 3 pole-plug.

Each unit is individually packed in a durable cardboard box, labelled with its reference name and code.

For more information, see www.safegate.com.

6.2 INSTALLATION

In this section you can find a description of the different steps for successful installation of the fitting. Before you start, make sure you have read and understand §6.1.1 Safety Instructions.

When removing the fitting from its packaging box, check that nothing is broken.

The screw tapping of the frangible support can be either 2 in. NPS (American standard - 11.5 threads per inch) or 2 in. BPS (British standard - 11 threads per inch). Check support and base tapings fit.

Inset lights are installed in base receptacles that are stationary installed on the field.

There are many different installation practices which can be adopted for bases and detailed instructions how to carry out the installation can be found on base manuals.

For correct light location, it is recommended to read and comply with the following:

- ICAO: Annex 14 Volume I 5th edition 2009
- All drawings and design plans, for the particular project, to guarantee correct location for each fixture.

The following tools and accessories are required for installation and removal of the unit:

Standard tools and accessories:

- Lifting hooks
- Torque wrench with socket 17mm

The base option for 12” fittings has following dimensions: outer diameter is 330 mm and height is 150 mm.

FIGURE 3 - BASE FOR 12” – 150 FOR INSET LIGHTS

The installation steps refer to:

1. Installing the shallow base
2. Installing the fitting in the base
3. Installing external safety components
4. Setting the operation code

6.2.1 Installing the Shallow Base

In order to install the shallow base, see Base 12" –150 Manual.

6.2.2 Installing the Fitting in the Base

(a) Check and clean the contact surface of the base receptacle, especially the groove for O-ring gasket.
(b) Place the O-ring gasket to its groove in the base and connect the secondary connectors.
(c) Using lifting hooks, place the light to the base making sure that O-ring gasket and cable settle well into the base. Take care not to pinch secondary cable.
(d) Align light channels parallel to aiming grooves in the base receptacle.
(e) Screw the fastening bolts M10x25 first by hand. Note that due to locking element in base receptacle thread it is possible to drive the bolts only halfway by hand. The locking element is intentional and prevents the bolt from becoming loose by vibrations.
(f) Tighten the bolts gradually crosswise to the final torque of 40 Nm using torque wrench. Do not use too high speed in case a tool is used for tightening, recommended speed is 60-80 1/min! It is recommended also to use suitable lubricant (nickel or graphite grease, but NO copper based grease) when fastening the bolts.

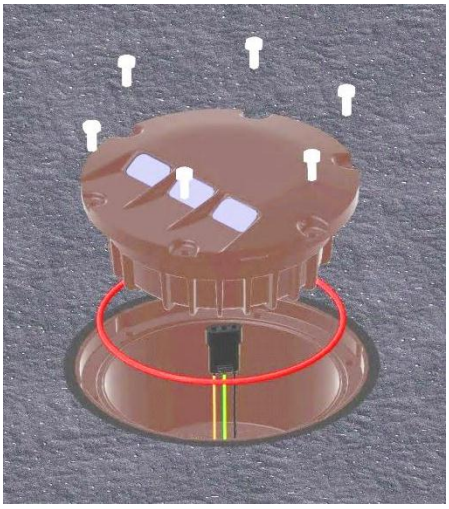


FIGURE 4 – LIGHT INSTALLATION

6.2.3 Installing External Safety Components

IDM 2061 does not have internal electrical screening devices and that's why

IDM 2061 light unit power supply has to be always equipped with 25A over current protectors (2 pcs) and 30 mA residual current device!

These components are part of IDM 8205 –I (-S) junction box that is special junction box model designed for IDM 2061 Inset Flash Light Unit. If lights are installed without junction box, installer of the system has to take care that these devices are properly installed and working. In picture below there is wiring diagram for IDM 8205 –I where correct installation of over current and residual current protectors can be seen.

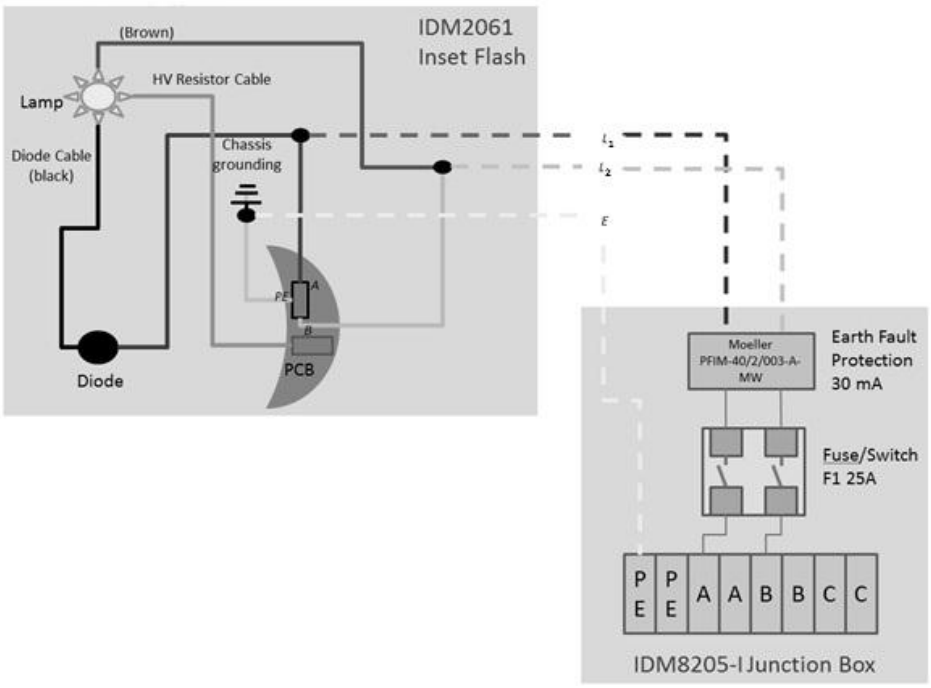
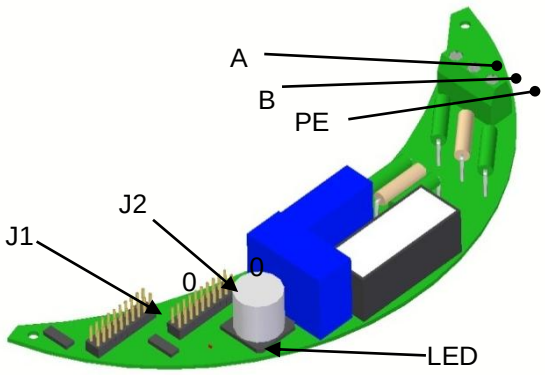


FIGURE 5. WIRING DIAGRAM OF FLASH LIGHT UNIT AND JUNCTION BOX

6.2.4 Setting the Operation Code

The operation code (address) of the unit has been set at the factory and should be correct if the unit is in its correct location

Description	Image example
The code is set with two jumpers, J1 and J2. J2 defines tens (0x, 1x, 2x, etc.) and J1ones (y0, y1, y2, etc.) ***Note:*** *There is a red indicator LED on board that is illuminated when light unit is powered. When opening light unit always check that LED is NOT illuminated before any further actions.*	

6.3 MAINTENANCE

In this section you can find a description of the different steps for the maintenance of the fitting.

Before you start, make sure you have read and understand §6.1.1 Safety Instructions.

Find out the location of the light unit that needs maintenance. If the purpose is to replace an existing light unit with new one, make sure that corresponding unit is available.

WARNING! *WHEN A FITTING HAS BEEN REMOVED FROM ITS BASE, THE BASE MUST BE EITHER FITTED WITH A COVER OR A RESERVE FITTING PUT IN ITS PLACE.*

IT IS RECOMMENDED THAT ONLY AUTORIZED PERSONNEL DISASSEMBLE FITTINGS WITH PRIOR AGREEMENT FROM SAFEGATE.

6.3.1 Basic Maintenance Programme

There are recommended maintenance tasks to ensure that the equipment is in correct operating condition.

Maintenance tasks	
Weekly	• Visual inspection of the fitting. • Removal of dust from external surfaces of the fitting.
Monthly	• Check of the optical window, check for mechanical damage. • Check for proper fixing of the fitting in its base.
Yearly	• Detailed inspection of the fitting. • Check of the body resistance, check for mechanical damage (for example cracks around prism windows). • Clean of the optical windows.

A daily function check is referred to in the document:
ICAO, Airport Services Manual Part 9, Airport Maintenance Practice and FAA AC 150/5340-26A, Maintenance of airport visual aids facilities.

The light is designed for outdoor operation, however storing the light outside without using it is a risk for damage to light components. For a longer storage time (more than a week), it is recommended to store the light indoors in a dry and dust free environment and at room temperature. Proper storage ensures trouble free replacement procedures. It is strongly recommended not to store any electrical equipment outside.

Note*: Only the most common maintenance procedures are instructed in following paragraphs. Construction of the luminaire allows that it can be fully disassembled and all the parts can be replaced if needed*.

6.3.1.1 Depressurizing the Fitting

The light is provided with a valve component according to standard automotive tubeless valve design for common pressure gauges. The valve has to be loosened to release pressure during maintenance and tightened after assembly for testing, before use in the field.

It is important to depressurize the light using the valve in the inner cover immediately before maintenance as following scenarios can occur:

- If the light has been on for a long period of time prior to maintenance, it may contain pressure due to high internal temperature.
- If the light cover is hot, there is probably pressure inside and the light.
- If the latch mechanism feels abnormally tight, there is a risk for pressure inside the light.

6.3.1.2 Testing the Seal Integrity

The luminaire can be easily tested for seal integrity as completely assembled with secondary cable through the metal valve installed to the inner cover.

The valve is standard automotive tubeless valve and commonly available pressure gauges with pressure release function for automotive tyres can be used for testing.

Before testing make sure that the inner cover is properly closed. This mean that the flange of the inner cover meets the top cover and the holes for base receptacle fastening bolts are completely aligned with respect to each other (so that M10x25 bolt can run through).

As an additional safety measure before pressurising the luminaire for test, it is advised to install three (3) pieces of M10x25 bolts, 120 degrees apart from each other, through the luminaire fastening holes and install suitable nuts for the bolts. The nuts should be tightened with a hand tightening torque. The purpose is to minimise the safety hazard against pressured air equipment faults or unintentional misuse of pressured air equipment.

WARNING! *NEVER EXCEED TESTING PRESSURE OF 1.5 BAR. THE LIGHT IS NOT DESIGNED TO WITHSTAND PRESSURES HIGHER THAN 1.5 BAR.*

Fit the pressure gauge to the valve and put the luminaire into water container so that the whole luminaire is covered by water. Gradually increase the pressure to the maximum testing pressure of 1,5 bar (150 kPa). Keep the luminaire in water for couple of minutes and inspect for air leaks. If leaks exist, it is necessary either to reassemble the luminaire, tighten the cable gland or change the gasket or O-ring gasket, depending on the leak position.

6.3.1.3 Cleaning the Fitting

It is important to handle with care and clean to maximize the light and component lifetime and minimize maintenance.

- Do not touch the glass bulb or the reflecting surface of the lamp with bare hands as this can shorten the expected lifetime of the lamp.
- Use a soft, clean and dry rag when cleaning, handling or maintaining the optical parts of the light.
- When any maintenance procedures are carried out, remove all possible dust and moisture from the inside of the base, inner cover and top cover.
- All sealing mating surfaces must be thoroughly cleaned before reassembling.

6.3.2 Workshop Maintenance

Before you start, make sure you have read and understand §6.1.1 Safety Instructions.

The workshop maintenance refers to following:

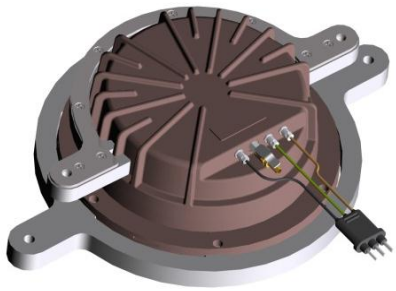
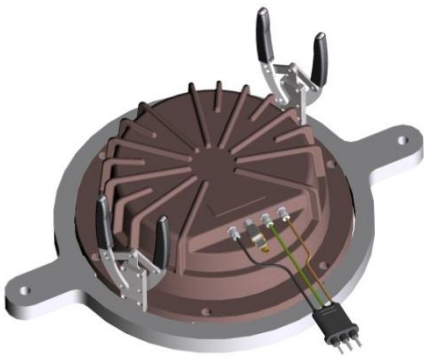
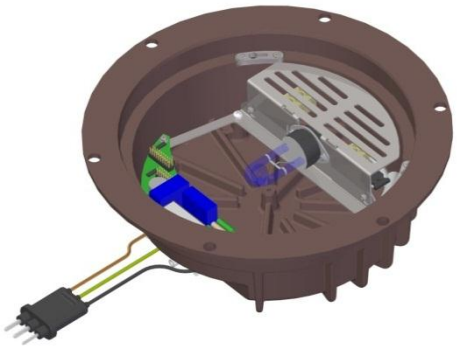
1. Disassembling/ assembling the fitting
2. Replacing the fitting
3. Replacing the lamp
4. Replacing the prism and the prism gasket
5. Replacing the O-ring gasket

6.3.2.1 Disassembling/ Assembling the Fitting

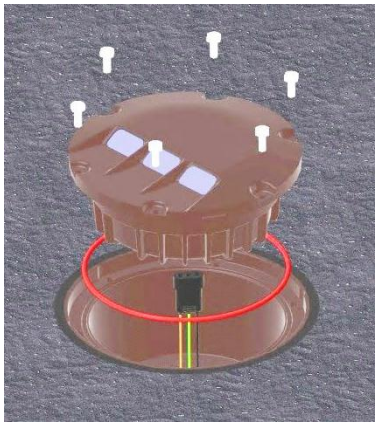
It is important to always make sure that the light is depressurized before disassembly for maintenance work.

***Note**: Make sure you have read and understa*nd *§6.1.1 Safety Instructions.*

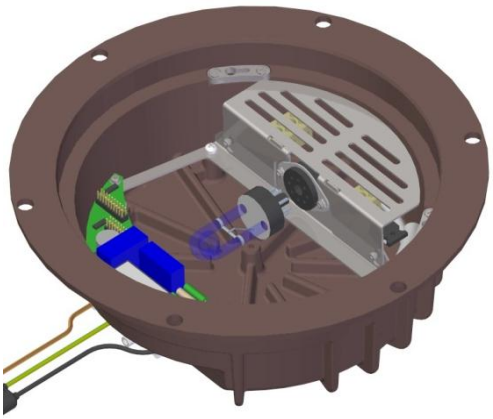
Only the most common maintenance procedures are instructed in the following paragraphs. Construction of the luminaire allows that it can be fully disassembled and all the parts can be replaced if needed.

Disassemble	
(a) Fasten the stationary tool (bigger) to a bench plastic side upwards. (b) Place the luminaire upside down on the tool, which prevents the top cover from rotating. (c) Attach the c-shaped tool to inner cover plastic side against it. (d) Turn the inner cover counter-clockwise with respect to the top cover until the holes for fastening bolts in the top cover cannot be seen through the holes in the inner cover. (e) Lock the seal integrity testing valve open with a bleeding nozzle.	 FIGURE 6 – OPENING THE INNER COVER
(f) Place the removal pliers to slots in top cover and press to separate the inner cover from top cover. If covers are not separated completely at once, move the pliers to flat surface beside the slot and press again. (g) Lift the inner cover straight up.	 FIGURE 7 – REMOVING THE INNER COVER
Assemble	
(a) Always replace the O-ring gasket of the inner cover when a light is opened for maintenance. (b) Before replacing the inner cover, apply lubricant to the O-ring and/or top cover sealing mating surface, for example high temperature resistant (minimum 200^0C) grease. This eases replacement considerably and extends the lifetime of the O-ring. ***Note:*** *Do not use copper based grease as it strongly stimulates corrosion.* (c) Place the inner cover on top of the top cover so that the studs pass through the openings in the fastening plates. (d) Fit the bleeding nozzle to the seal integrity testing valve to keep the needle open and press the inner cover downwards until the flange meets the top cover. (e) Turn the inner cover clockwise with respect to the top cover until the holes for fastening bolts in top and inner covers are fully aligned. *(f)* Remove the bleeding nozzle.	 FIGURE 8 – ASSEMBLING THE INNER COVER

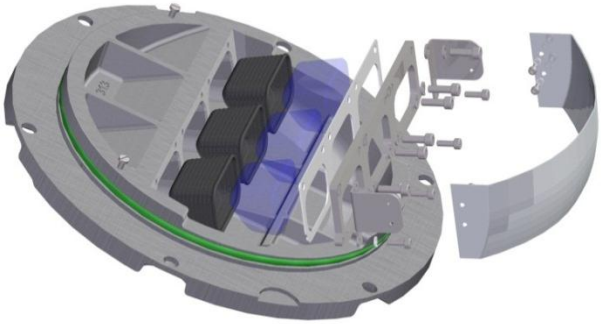
6.3.2.2 Replacing the Fitting

Remove	
(a) Clean the outer surface of the top cover. (b) Unfasten the six bolts securing the base. (c) Use the lifting hooks to lift the light from the base receptacle. (d) Disconnect the secondary cable.	 FIGURE 9 – LIFTING HOOK
Replace	
(a) Check and clean the contact surface of the base receptacle, especially the groove for O-ring gasket. (b) Place the O-ring gasket to the groove in the base receptacle and connect the secondary connectors. (c) Using lifting hooks, place the luminaire to the base receptacle. Make sure that the O-ring gasket and cable settle well into the base. (d) Align light channels parallel to aiming grooves in base receptacle. (e) Fasten the bolts M10x25 by hand. By using a torque wrench fasten the bolts gradually crosswise in a sequence to a torque of **40 Nm.**	 FIGURE 10 – LIGHT INSTALLATION

6.3.2.3 Replacing the Lamp

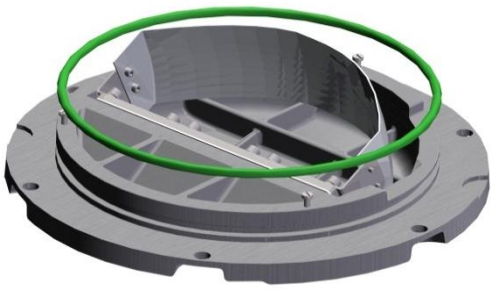
Remove	
(a) Disassemble the light. (b) Remove the lamp from its socket, slowly and patiently if the socket grip seems too tight. In that case preferably use a flat screwdriver. (c) Be careful not damaging the circuit board at the opposite side of the lamp.	 FIGURE 11 – REMOVING A LAMP
Replace	
(a) Replace old lamp with a new one and avoid touching the bulb glass with bare hands. Use gloves to be sure. (b) Check that the lamp has settled properly to the holder.	

6.3.2.4 Replacing the Prism and the Prism Gasket

Remove	
(a) Disassemble the light. (b) Unfasten the screws securing the prism fastening plates and the reflector holders. (c) Remove the fastening plate and prism protection plate. ***Note:*** *All the prisms are fastened with the same fastening plate, so unfastening the plate releases all three prisms. However, a single prism can be replaced without removing the other two prisms as long as the two prisms seem to stay in their original positions.* (d) Remove the prism and gasket from the top cover by pressing those inwards to the light.	 FIGURE 12 – PRISMS AND GASKET REPLACEMENT
Replace	
(a) Clean the gasket mating surfaces in the top cover and replace the gasket. (b) Apply some silicone grease to the gasket surfaces. (c) Insert the prism about halfway through to the gasket and apply some grease on top of the gasket. (d) Install the gasket with prism to the top cover so that the O-ring shaped edge of the gasket settles well to the chamfer around the prism opening in the top cover. (e) Press the prism to the top cover with thumbs as much as possible. (f) Install the prism protection plate, fastening plate and the reflector holders and tighten the screws alternately until the protection plate meets with the surface of the top cover. (g) Using a thin sharp knife cut the surplus gasket around the prism opening from the outside of the light. (h) Clean the visible surfaces of the prism from any possible grease or fingerprints using soft damp cloth (mild soap water or glass cleaner can be used provided that no residues will remain). (i) Reassemble the inner cover.	

6.3.2.5 Replacing the O-ring Gasket

It is recommended to change the O-ring gasket simultaneously with the lamp replacement. Perform a seal integrity test for the assembled luminaire.

Remove	
(a) Disassemble the light. (b) Remove the old O-ring gasket, but be careful not to damage the surfaces in top cover. (c) Clean properly the sealing surfaces in the inner and top cover.	 FIGURE 13 – O-RING REPLACEMENT
Replace	
(a) Install the new O-ring gasket to the groove. (b) Apply high temperature resistant grease to the O-ring vertical mating surface in the inner cover to ease the operation. (c) Close the inner cover.	

Note: *This page is blank for convenient double-sided printing.*

7. ELEVATED FLASH LIGHT UNIT IDM 6291

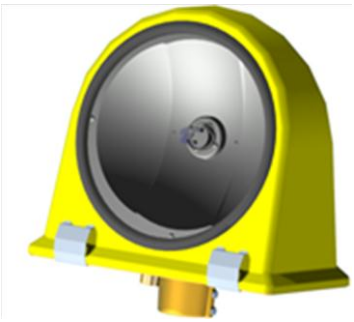


FIGURE 14 - FLASH LIGHT

7.1 INTRODUCTION

IDM 6291 Flash Light Unit is a unidirectional flash light fitting designed to work with the IDM 8200 digital flash light controller.

The fitting is equipped with a safety switch, automatic overload protection, built-in addressable trigger unit and an aligning device. A heater element is in-built.

7.1.1 Safety Instructions

7.1.1.1 General safety

Make sure you read this section and are familiar with safety precautions before any work is started. Keep away from live circuits. It is vital to switch off the current securely before any installation or maintenance procedures are carried out. It is also strongly recommended to disconnect the circuit from IDM 8200 Flash controller before these activities.

7.1.1.2 Product safety

IDM 8200 is directly coupled to 400VAC supply system. The voltage is therefore lethal. So it is vitally important to follow all the safety regulations with adequate circumspection.

In the design of this equipment all the practical safety aspects have been taken into account. It is important to strictly follow existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions.

7.1.1.3 Electrical maintenance

Valid safety regulations must always be followed. Never carry out any maintenance or maintenance measures before the current is confirmed as safely disconnected. Use extreme caution when disconnecting or connecting system components.

WARNING! *PRIOR TO THE COMMENCEMENT OF WORK ALL ELECTRICAL SERVICES MUST BE ISOLATED FROM THE SUPPLY AND CONNECTED TO EARTH. FULL DETAILS OF THE WORK INVOLVED MUST BE GIVEN TO THE AUTHORISED PERSON RESPONSIBLE FOR THE ELECTRICAL ENGINEERING SERVICES AT THE AIRPORT WITH REGARD TO THE DURATION OF THE WORK AND SO ON. IT IS RECOMMENDED THAT PRIOR TO STARTING ANY CUTTING WORK THE NATURE AND LOCATION OF SERVICES SUCH AS CABLE DUCTS AND SO ON SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL.*

7.1.1.4 Mechanical maintenance

When maintaining mechanical components, it is important to follow the instructions for electrical maintenance.

7.1.2 Description of the Fitting

The lights are designed according to airfield placement and functionality.

Overview of lights			
Light	Colours	Power	Description
IDM 6291 (-H)	White	80W	Flasher max power (100% intensity; rate 2/S)
IDM 6291-H	White	100W	Heater

7.1.3 Delivery of the Fitting

Each unit is supplied completely assembled, tested and programmed, ready for installation. The electrical connection is made via one cable assembly; the wires are connected to the screw terminals in the Flash Light Unit.

Each unit is individually packed in a durable cardboard box, labelled with its reference name and code.

For more information, see www.safegate.com.

7.2 INSTALLATION

In this section you can find a description of the different steps for successful installation of the unit. Before you start, make sure you have read and understand §7.1.1 Safety Instructions.

Find out the location of the light unit that needs maintenance. If the purpose is to replace an existing light unit with new one, make sure that corresponding unit is available.

The following tools and accessories are required for installation and removal of the unit.

Standard tools and accessories:

- Keys, opening 10, 30 and 36 mm
- Slide tongs
- Screwdriver
- Stripping pincers

The installation steps refer to:

1. Installing the unit on its support
2. Connecting the unit to the junction box
3. Setting the operation code
4. Aligning the unit

7.2.4 Installing the Unit on its Support

(a) Remove the light unit from the transit case.
(b) Check that it is not damaged during transportation and check also that it is the right one for the location.
(c) Open the four latches holding the cover of light unit and move them to upper position (1).
(d) Remove the cover (2).
(e) Open connection box (3) by first rotating the switch (4) to 0-position and then turn and open its cover.
(f) Remove the cable gland (5) and attach it to the flash connection cable about 25 cm down from the end of the cable.
(g) Strip and cut the cable so that the PE (yellow/green) wire is about 5 cm longer than the other wires. Strip about 1 cm of each individual wire.
(h) Attach the cable to cable gland back to its original place in the light unit.
(i) Put the light unit on its mounting base. Align the unit horizontally.
(j) Tighten the two clamping screws (6).
(k) Check that the unit operation code (address) of the trigger unit (7) corresponds with the unit location. If not, set the correct code.
(l) Attach the wires to the main switch block and to the protection earth block (8). Do the connections as follows:
(m) Flash (+) wire (A in IDM 8200, or B if light unit is TIL) to main switch terminal 1.
(n) Flash (-) wire (a in IDM 8200, or b if light is TIL) to main switch terminal 3.
(o) Heater (if available) phase wire (H1 in IDM 8200) to main switch terminal 5.
(p) Heater (if available) neutral wire (h1 in IDM 8200) to main switch terminal 7.
(q) Protection earth wire (yellow/green) to yellow/green protection earth connector.
(r) Close the connection box and turn the switch to 1-position.
(s) Align the unit vertically.
(t) Close the cover with the four clamps.

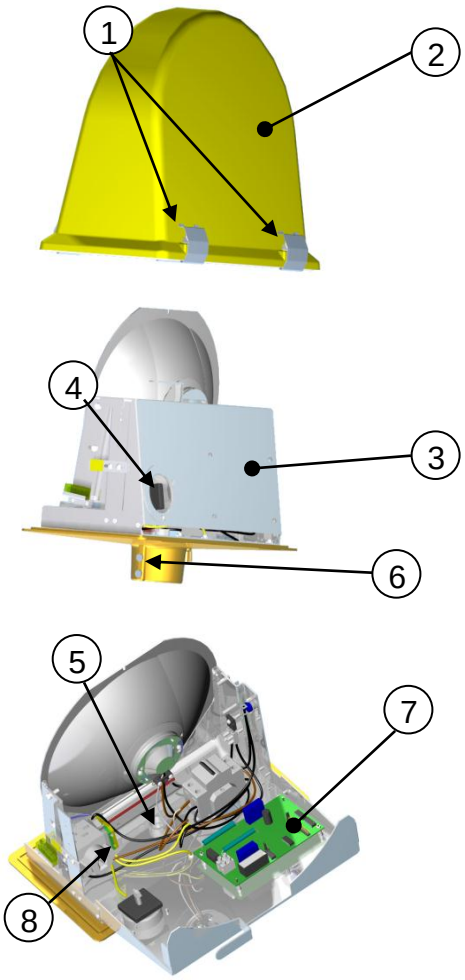


FIGURE 15 – TARGETS FOR THE ASSEMBLY PROCEEDINGS

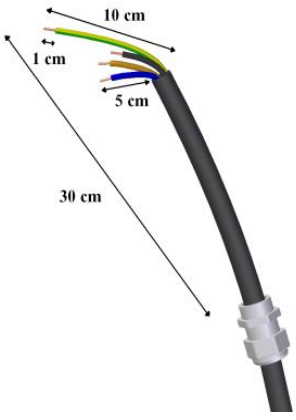
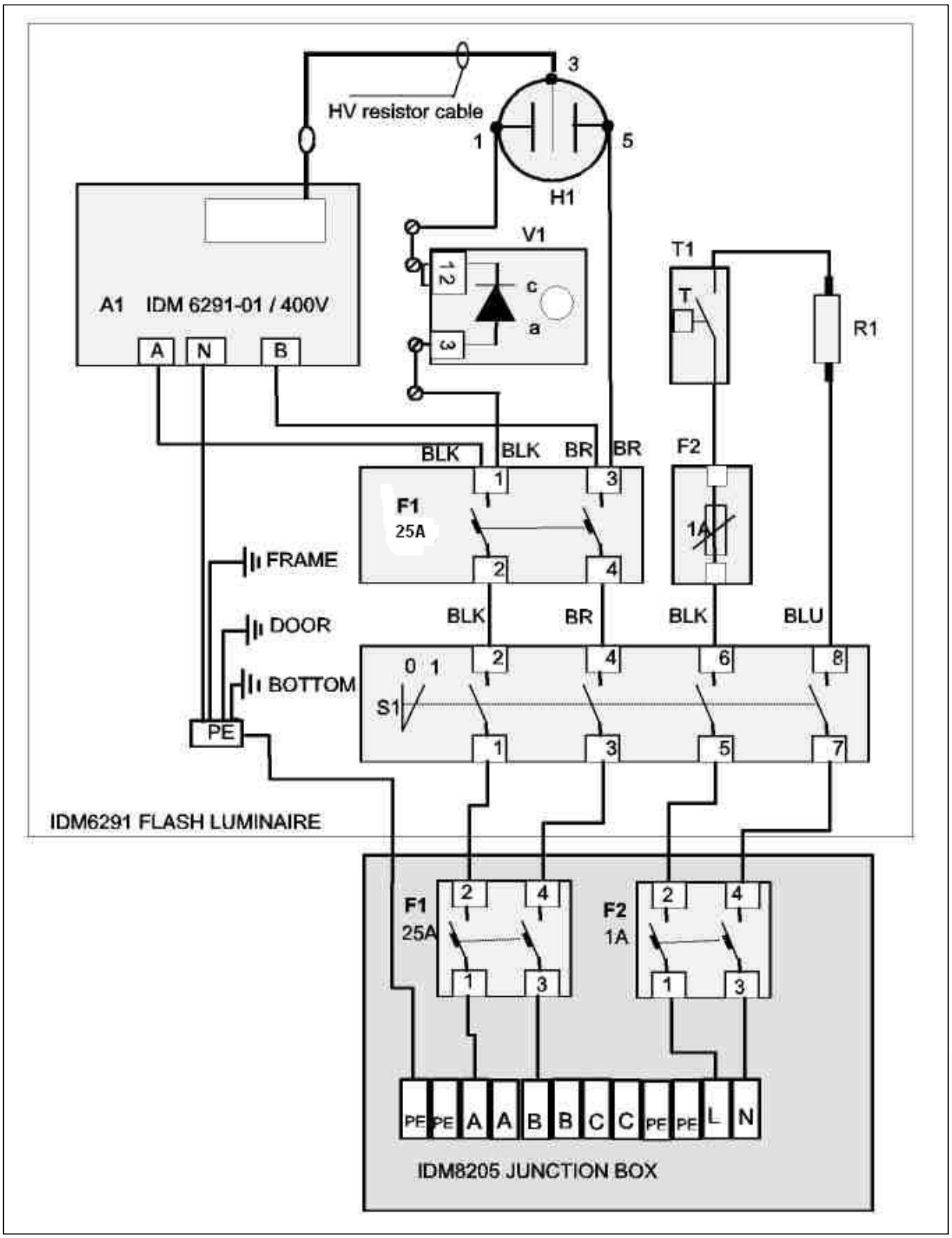


FIGURE 16 – CABLE AND WIRE STRIPPING

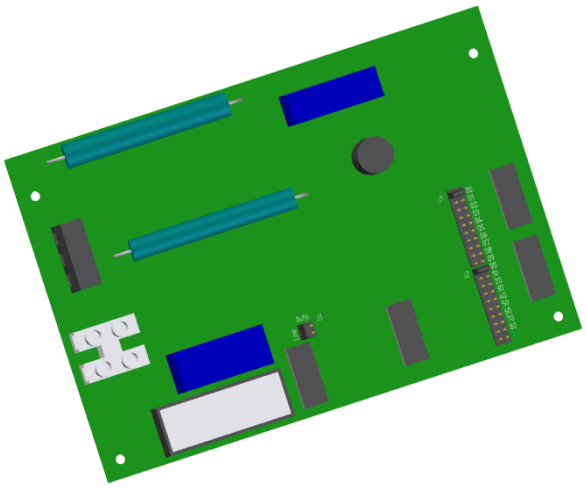
7.2.5 Connecting the Unit to the Junction Box

Wiring diagram of flash light unit and junction box



7.2.6 Setting the Operation Code

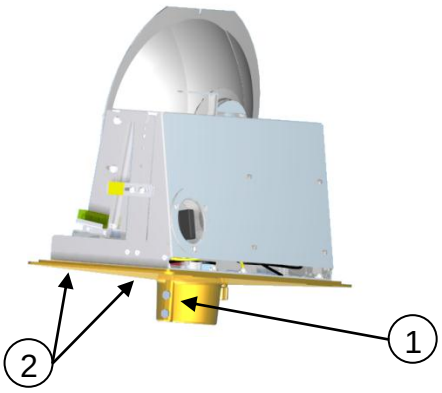
The operation code (i.e. address) of the unit has been set at the factory and should be correct if the unit is in its correct location.

Description	Image example
The code is set with two jumpers, J1 and J2. J2 defines tens (0x, 1x, 2x, etc.) and J1 ones (y0, y1, y2, etc.) Jumper J3 is for line reset and it should be set to “line”.	 FIGURE 17 – POSITIONS OF THE OPPERATION CODE JUMPERS

7.2.7 Aligning the Unit

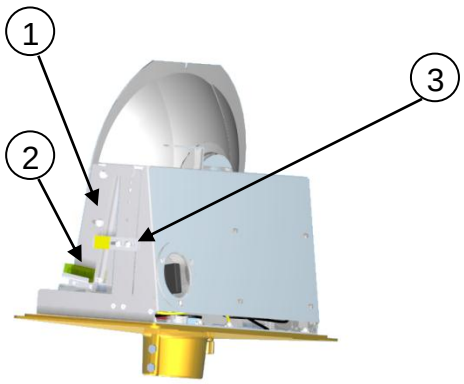
7.2.7.1 Horizontal alignment

Horizontal alignment is necessary to set the flash light units along the centre line of the axis of the approach lighting system.

Horizontal alignment	Image example
(a) Loosen the clamping screws (1). (b) Align the light unit using the bead and the sighting located on the left side of the framing (2). (c) Aim the unit to the left side of the next unit on the SFL-line	 FIGURE 18 – HORIZONTAL ALIGNMENT

7.2.7.2 Vertical alignment

For vertical alignment it is necessary to set the flash light units to the equal vertical angle as the approach light fittings in the approach lighting system. Angles are normally defined by the ICAO and should be found from the installation design documents.

Vertical alignment	Image example
(a) Attach the alignment device to the luminaire. (b) Check the correct vertical aligning angle for the unit location. (c) Open the reflector locking screws on both sides of the reflector (1). (d) Adjust the reflector into position where the spirit level is in the mid position (2). (e) Tighten the reflector locking screws (1). (f) Open the scale locking screws (3) and set the alignment scale to 0 deg to calibrate the scale. Then fasten the scale locking screws again. (g) Loosen the reflector locking screws (1) and set reflector to the desired angle with the help of the alignment scale. (h) Fasten the reflector locking screws (1) to lock the alignment.	 FIGURE 19 – VERTICAL ALIGNMENT

7.3 MAINTENANCE

In this section you can find a description of the different steps for the maintenance of the unit.

Before you start, make sure you have read and understand §7.1.1 Safety Instructions.

Find out the location of the light unit that needs maintenance. If the purpose is to replace an existing light unit with new one, make sure that corresponding unit is available.

WARNING! *IT IS RECOMMENDED THAT ONLY AUTORIZED PERSONNEL DISASSEMBLE FITTINGS WITH PRIOR AGREEMENT FROM SAFEGATE.*

***Note**: Only the most common maintenance procedures are instructed in following paragraphs. Construction of the luminaire allows that it can be fully disassembled and all the parts can be replaced if needed*.

7.3.8 Basic Maintenance Programme

There are recommended maintenance tasks to ensure that the equipment is in correct operating condition.

Maintenance tasks	
Weekly	• Visual inspection of the fitting. • Removal of dust from external surfaces of the fitting.
Monthly	• Check of the optical window, check for mechanical damage. • Check for proper fixing of the fitting in its base.
Yearly	• Detailed inspection of the fitting. • Check of the body resistance, check for mechanical damage (for example cracks around prism windows). • Clean of the optical windows.

A daily function check is referred to in the document:
ICAO, Airport Services Manual Part 9, Airport Maintenance Practice and FAA AC 150/5340-26A, Maintenance of airport visual aids facilities.

The light is designed for outdoor operation, however storing the light outside without using it is a risk for damage to light components. For a longer storage time (more than a week), it is recommended to store the light indoors in a dry and dust free environment and at room temperature. Proper storage ensures trouble free replacement procedures. It is strongly recommended not to store any electrical equipment outside.

7.3.9 Workshop Maintenance

Before you start, make sure you have read and understand §7.1.1 Safety Instructions.

It is important to always turn off the power in the junction box when working with the Flash Light Unit for safety reasons. Do not turn on the Flash Light Unit's safety switch while the cover of the connection box is open.

The workshop maintenance refers to following:

1. Opening the unit
2. Replacing the bulb
3. Replacing the a front glass
4. Replacing the trigger unit

7.3.9.1 Opening the Unit

(a) Open the four latches holding the cover of light unit and move them to upper position (1).
(b) Remove the cover (2).
(c) Open connection box (3) by first rotating the switch (4) to 0-position and then turning and opening its cover.

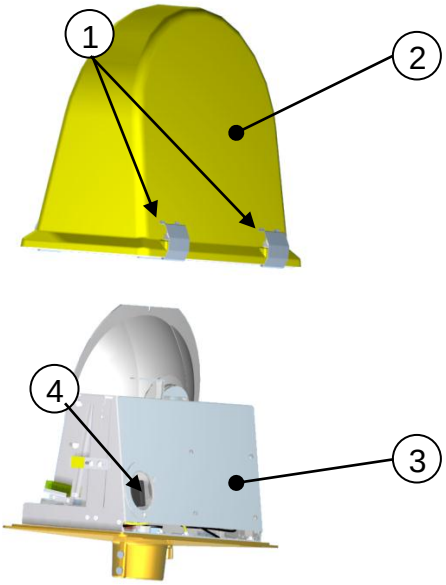


FIGURE 20 – OPENING A COVER

7.3.9.2 Replacing the Bulb

Remove

(a) Open the cover as described in **Error! Reference source not found.**
(b) Loosen the bulb holder attachment screws (1).
(c) Rotate the bulb holder (2) counter clock-wise and pull it out.

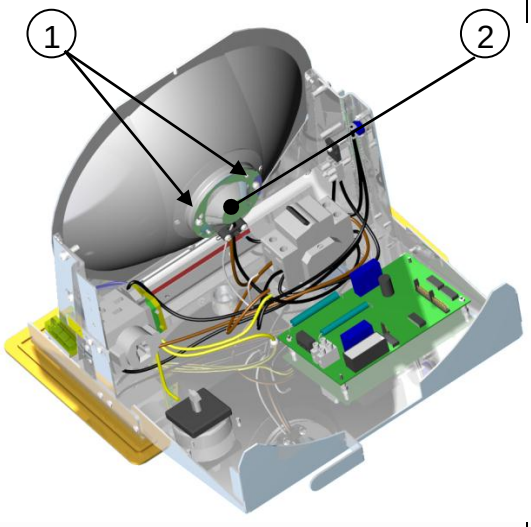
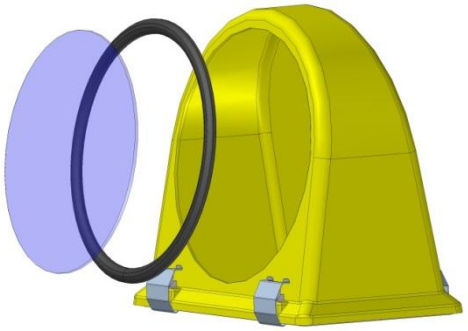


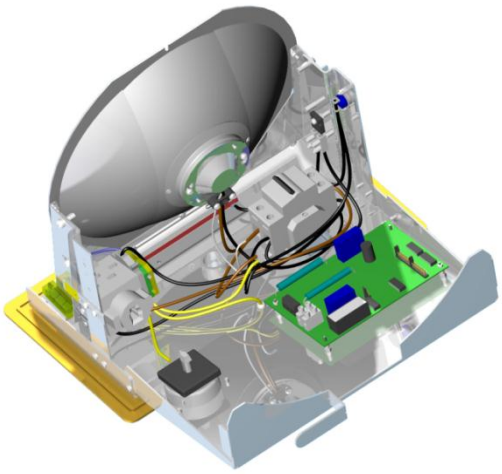
FIGURE 21 – BULB REPLACEMENT

Replace	
(a) Replace the bulb. ***Note:*** *Avoid touching the bulb glass surfaces because this may shorten its lifetime.* (b) Put the bulb holder back to its original place, turn it clock-wise and tighten screws. (c) Close the connection box and turn the switch to 1-position (d) Replace the cover and close the four latches. (e) Turn on the power in the junction box.	

7.3.9.3 Replacing the Front Glass

Remove	
(a) Detach the middle part of the front glass gasket with a help of a small screwdriver.	 FIGURE 22 – FRONT GLASS REPLACEMENT
Replace	
(a) Replace the front glass. (b) Insert the middle part of the front glass gasket. (c) Replace the cover and close the four latches.	

7.3.9.4 Replacing the Trigger Unit

Remove	
(a) Detach the four wires connected to the trigger unit. ***Note:*** *Mark the wires so that you can attach those to the same places in the new trigger unit.* (b) Unfasten the screws and remove the trigger unit.	 FIGURE 23 – TRIGGER UNIT REPLACEMENT
Replace	
(a) Locate the new trigger unit and attach the screws. (b) Attach the wires to the trigger unit. Connect each wire to the same position as it used to be. (c) Close the connection box and turn the switch to 1-position (d) Replace the cover and close the four latches.	

Note: *This page is blank for convenient double-sided printing.*

8. JUNCTION BOX IDM 8205

8.1 INTRODUCTION

Junction Box IDM 8205 includes electrical terminals and safety devices that are needed to branch main SFLS cable to single light unit's flash connection cable.

Junction Box IDM 8205 –I includes 30 mA residual current device which is a must with Inset Flash Light IDM 2061.

FIGURE 24 – JUNCTION BOX

8.1.1 Safety Instructions

8.1.1.1 General safety

Make sure you read this section and are familiar with safety precautions before any work is started. Keep away from live circuits. It is vital to switch off the current securely before any installation or maintenance procedures are carried out. It is also strongly recommended to disconnect the circuit from IDM 8200 flash controller before these activities.

8.1.1.2 Product safety

Sequential Flash Light System is directly coupled to 400VAC supply system. The voltage is therefore lethal. So it is vitally important to follow all the safety regulations with adequate circumspection.

In the design of this equipment all the practical safety aspects have been taken into account. It is important to strictly follow existing international or national regulations, the instructions established by civil aviation authority or airport operator and the following instructions.

8.1.1.3 Electrical maintenance

Valid safety regulations must always be followed. Never carry out any maintenance or maintenance measures before the current is confirmed as safely disconnected.

WARNING! *PRIOR TO THE COMMENCEMENT OF WORK ALL ELECTRICAL SERVICES MUST BE ISOLATED FROM THE SUPPLY AND CONNECTED TO EARTH. FULL DETAILS OF THE WORK INVOLVED MUST BE GIVEN TO THE AUTHORISED PERSON RESPONSIBLE FOR THE ELECTRICAL ENGINEERING SERVICES AT THE AIRPORT WITH REGARD TO THE DURATION OF THE WORK AND SO ON. IT IS RECOMMENDED THAT PRIOR TO STARTING ANY CUTTING WORK THE NATURE AND LOCATION OF SERVICES SUCH AS CABLE DUCTS AND SO ON SHOULD BE IDENTIFIED. ANY INSTALLATION OR MAINTENANCE WORK SHOULD ONLY BE CARRIED OUT BY TRAINED AND EXPERIENCED PERSONNEL.*

8.1.1.4 Mechanical maintenance

When maintaining mechanical components, it is important to follow the instructions for electrical maintenance.

8.1.2 Delivery of the Unit

Each unit is supplied completely assembled, ready for installation. The electrical connection is made via cable assemblies; the wires are connected to the screw terminals in the Junction Box.

For more information, see www.safegate.com.

8.2 INSTALLATION

In this section you can find a description of the different steps for successful installation of the unit. Before you start, make sure you have read and understand §8.1.1 Safety Instructions.

Junction Box IDM 8205 installation is done as follows:

(a) Fix the mounting brackets to the junction box.

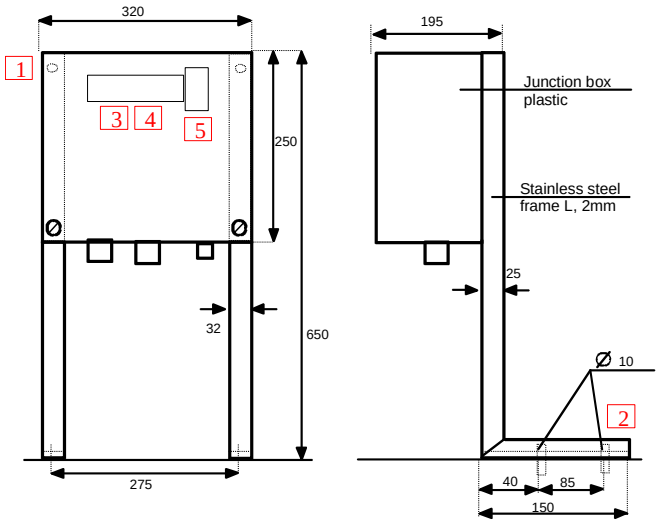
(b) Fix the junction box brackets to concrete base with suitable anchor bolts.

(c) Measure the cable insulation with isolation resistance tester before making any connections. Make sure that both cable ends are lifted from the ground.

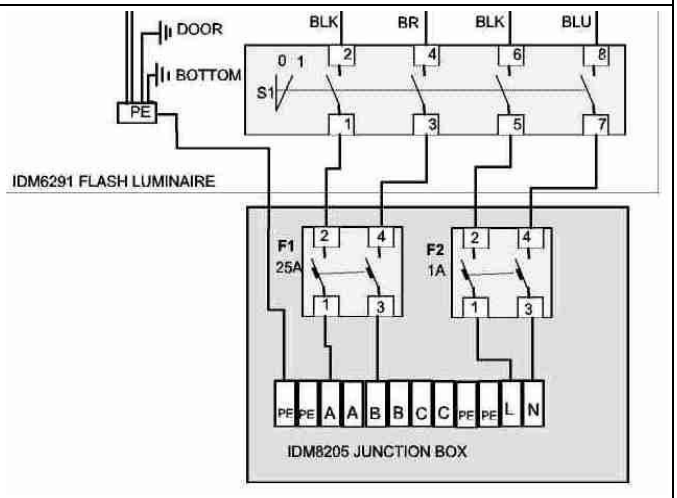
(d) Connect the incoming SFLS-cable to the terminals A, B and C according to picture on Appendix 6.

(e) Connect the outgoing SFLS-cable to the terminals A, B and C.

(f) Connect the flash unit connection cable to fuse F1 (2=A), (4=B) and to the PE terminal.



(g) Connect the optional heating unit wires to the fuse F2 (2=L3, 4=neutral).



8.3 MAINTENANCE

Junction Box IDM 8205 does not require any periodical maintenance. It is anyway recommended to visually check the Junction Box, both outside and inside, at least twice a year.

IDM 8205 –S models includes surge arresters that should be checked every time the Junction Box is opened. The colour in the small window of the surge protector should be green. If it is red, the module should be changed. To change, just pull the module out, it is not necessary to disconnect any wiring

IDM 8205 –I models Junction Boxes includes residual current device that needs to be tested monthly by bushing the test button on device. More detailed instructions for test can be found on sticker inside the Box.

IDM 8205 has fuses for light unit and heater. If light unit is out of order status of the fuses (and residual current device in the case of –I model) should be checked before any further troubleshooting actions are carried out.

9. SUPPORT

Our experienced engineers are available for support and service at all times, 24 hour/7 days a week. They are part of a dynamic organization making sure the entire Safegate Group is committed to minimal disturbance for airport operations.

Safegate Group Support	
Safegate Group knows that our equipment is used in one of the busiest industries in the world, where down-time costs money and creates delays for airlines and their passengers. As one of the world's leading suppliers of airport systems, Safegate Group is committed to ensuring that our customers are able to get the most out of your equipment, regardless of the location or the time of day. For this reason, Safegate Group has established the Safegate Group Support service. Safegate Group Support is a unique service provided by Safegate Group to our customers, free of charge during the warranty period or as a service contract. Any time of day, any day of the year, a Safegate Group engineer is on standby to answer questions and assist with any problems that may arise. Qualified technical assistance is just a phone call or an e-mail away, 24-7 worldwide. ✉ support@safegate.com ☎ +46 40 699 1740	 

9.1 SAFEGATE GROUP WEBSITE

The Safegate Group Website, www.safegate.com, offers information regarding our airport solutions, products, company, news, links, downloads, references, contacts and more.

Note: *There is also a* ***Client/Partner login*** *area for the latest information and updates, if available.*

9.2 RE-CYCLING

9.2.1 Local Authority Re-cycling

The disposal of Safegate Group products is to be made at an applicable collection point for the recycling of electrical and electronic equipment. The correct disposal of equipment prevents any potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling. The recycling of materials helps to conserve natural resources. For more detailed information about recycling of products, contact your local authority city office.

9.2.2 Safegate Group Re-cycling

Safegate Group is fully committed to environmentally-conscious manufacturing with strict monitoring of our own processes as well as supplier components and sub-contractor operations. Safegate Group offers a re-cycling program for our products to all customers worldwide, whether or not the products were sold within the EU.

Safegate Group products and/or specific electrical and electronic component parts which are fully removed/separated from any customer equipment and returned will be accepted for our recycling program.

All items returned must be clearly labelled as follows:

- For ROHS/WEEE Re-cycling
- Sender contact information (Name, Business Address, Phone number).
- Main Unit Serial Number.

Safegate Group will continue to monitor and update according for any future requirements for EU directives as and when EU member states implement new regulations and or amendments. It is our aim to maintain our compliance plan and assist our customers.

Note: *For more information, see www.safegate.com, or contact Safegate Group Support via email at support@safegate.com or phone +46 40 699 1740.*

9.3 SPARE PARTS

Spare parts are available for Airfield Lighting. For more information see the Spare Parts List document.

Note: *Contact Safegate Group for assistance with ordering spare parts.*

10. APPENDIXES

10.1 APPENDIX 1: FLASH CONTROLLER IDM 8200 REMOTE CONTROL PARALLEL CONNECTION SIGNAL LIST

Parallel interface control and indication signals are in the D37 connector in the front panel RCP-unit (example in Appendix 2).

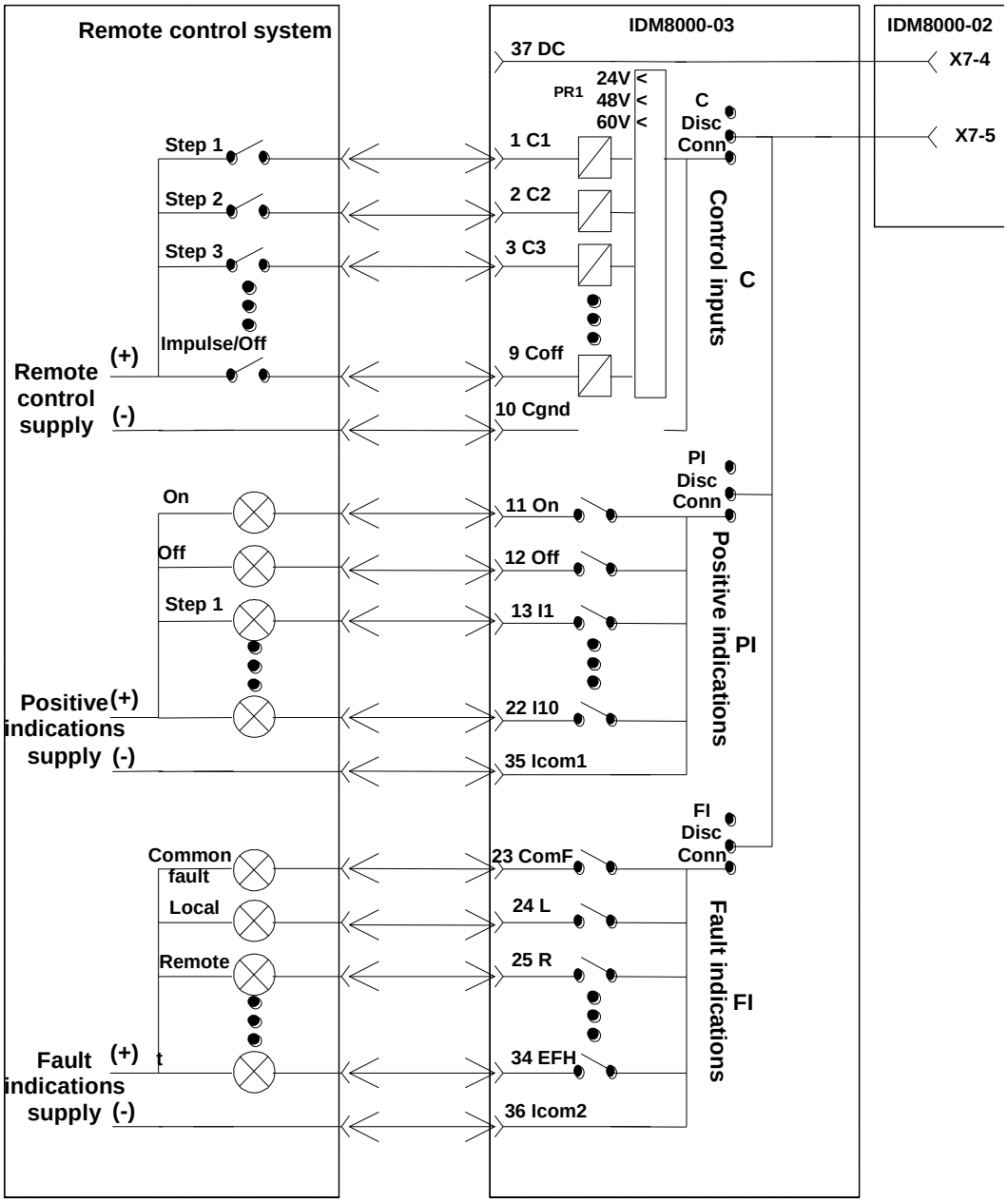
Control signals			
Pin	Group	Abbrev.	Normal / dir FLASH
			Dec
1	C	C1	Control, 3%
2	C	C2	Control, 10%
3	C	C3	Control, 100%
4	C	CL	Control LINE on
5	C	CT	Control TIL on
6	C		Spare
7	C		Spare
8	C		Spare
9	C		Spare
10	CC	Cgnd	Ground

Indicational signals			
Pin	Group	Abbrev.	Normal / dir FLASH
			Dec
11	PI	On	Flash on indication
12	PI	Off	Flash off indication
13	PI	I1	3% on indication
14	PI	I2	10% on indication
15	PI	I3	100% on indication
16	PI	LO	Line ON
17	PI	TO	TIL on
18	PI		Spare
19	PI	TA	Temperature alarm A (trip)
20	PI	TB	Temperature alarm B
21	PI		Spare
22	PI	TILF	TIL fault
23	FI	ComF	Common fault, according the Comfault mode selection: all / power + UIN +f1 + T alarms
24	FI	L	Local control indication.
25	FI	R	Remote control indication
26	FI	IE	Input error
27	FI	OC	Over current (trip)
28	FI	CF	Current fault (output short circuit)
29	FI	LFA	Lamp fault alarm A
30	FI	LFB	Lamp fault warning B
31	FI		Spare

Indicational signals			
Pin	Group	Abbrev.	Normal / dir FLASH
			Dec
32	FI	EFL	Earth fault, Line
33	FI	EFT	Earth fault, TIL
34	FI	EFH	Earth fault, Heater
35	PI	Icom1	Common for positive indications (PI)
36	FI	Icom2	Common for fault indications (FI)
37		DC	Internal DC out

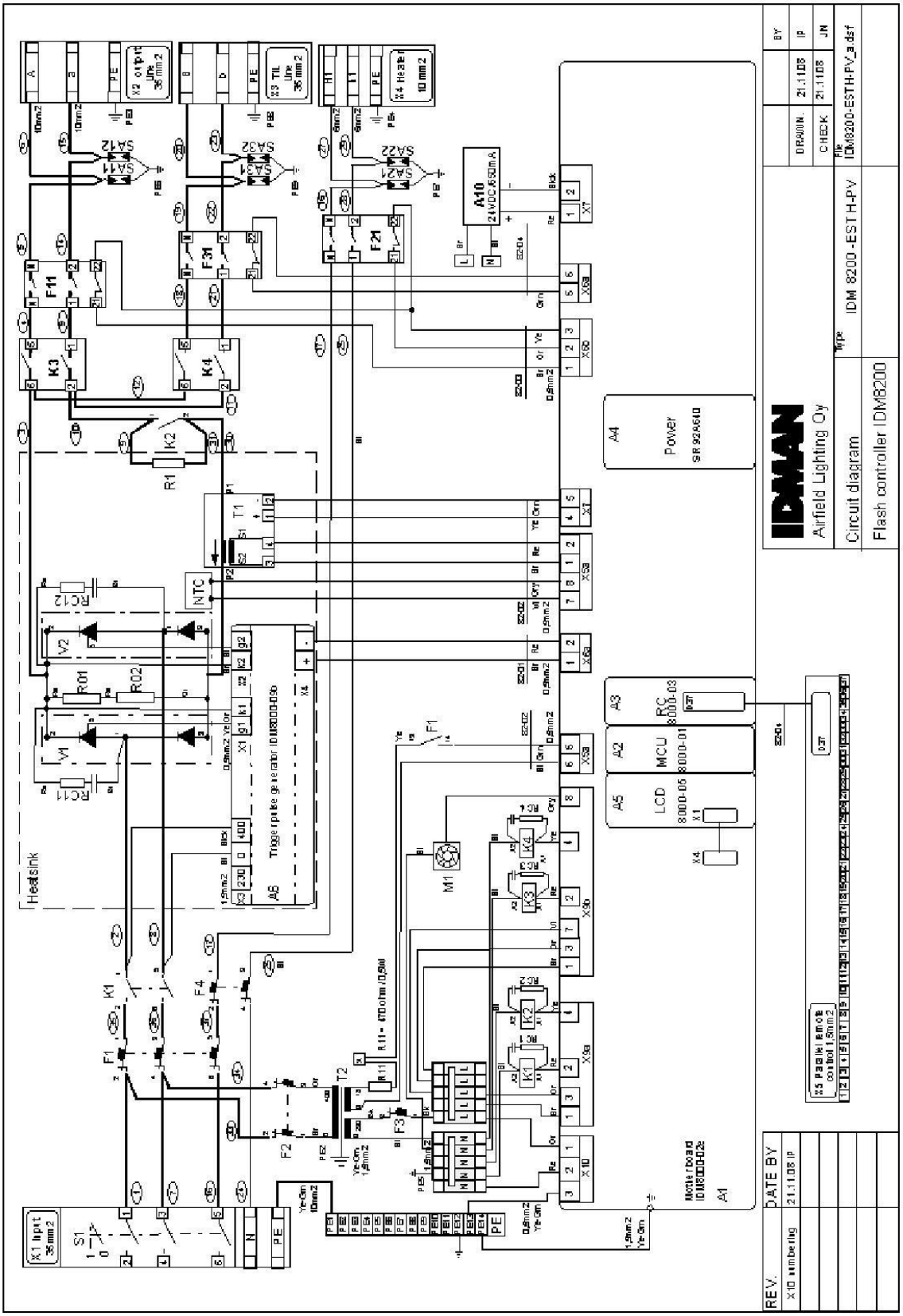
NOTE: *If the flash line and TIL are controlled individually, the motherboard dip switches 7 and 8 must be set to "Enable Separate Line and TIL" control. See paragraph 4.4.11 in this manual.*

10.2 APPENDIX 2: FLASH CONTROLLER IDM 8200 REMOTE CONTROL PARALLEL CONNECTION WIRING EXAMPLE



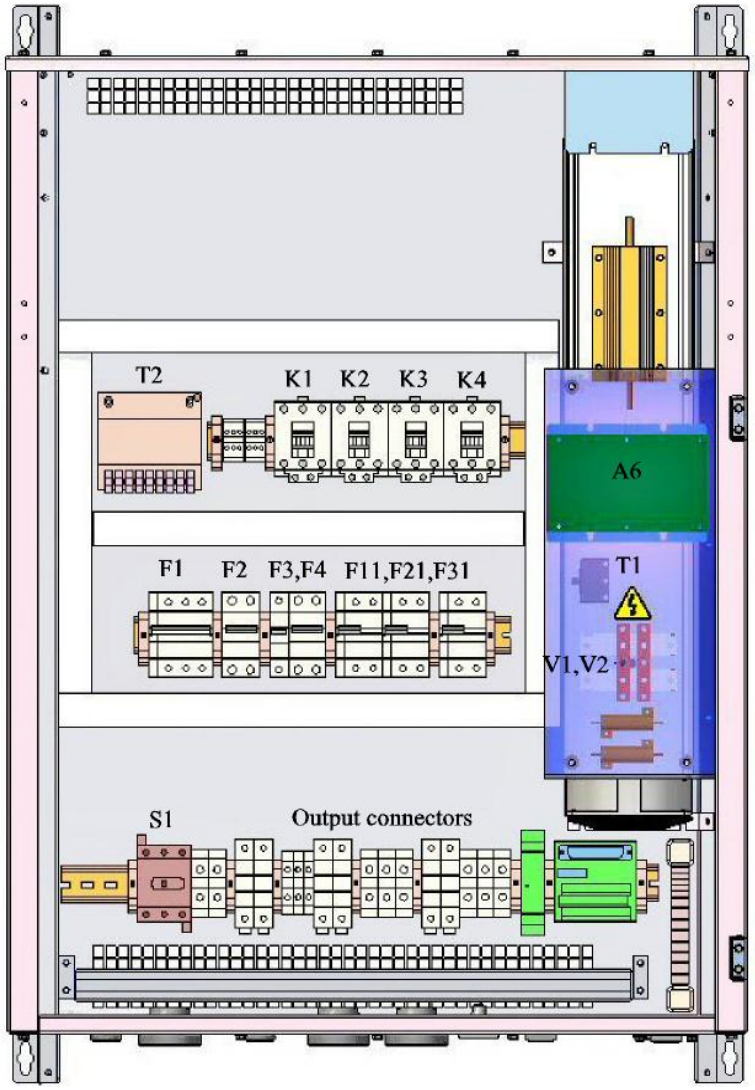
10.3 APPENDIX 3: FLASH CONTROLLER IDM 8200 WIRING DIAGRAM

This drawing contains all possible options. The supplied unit may have been ordered without them.



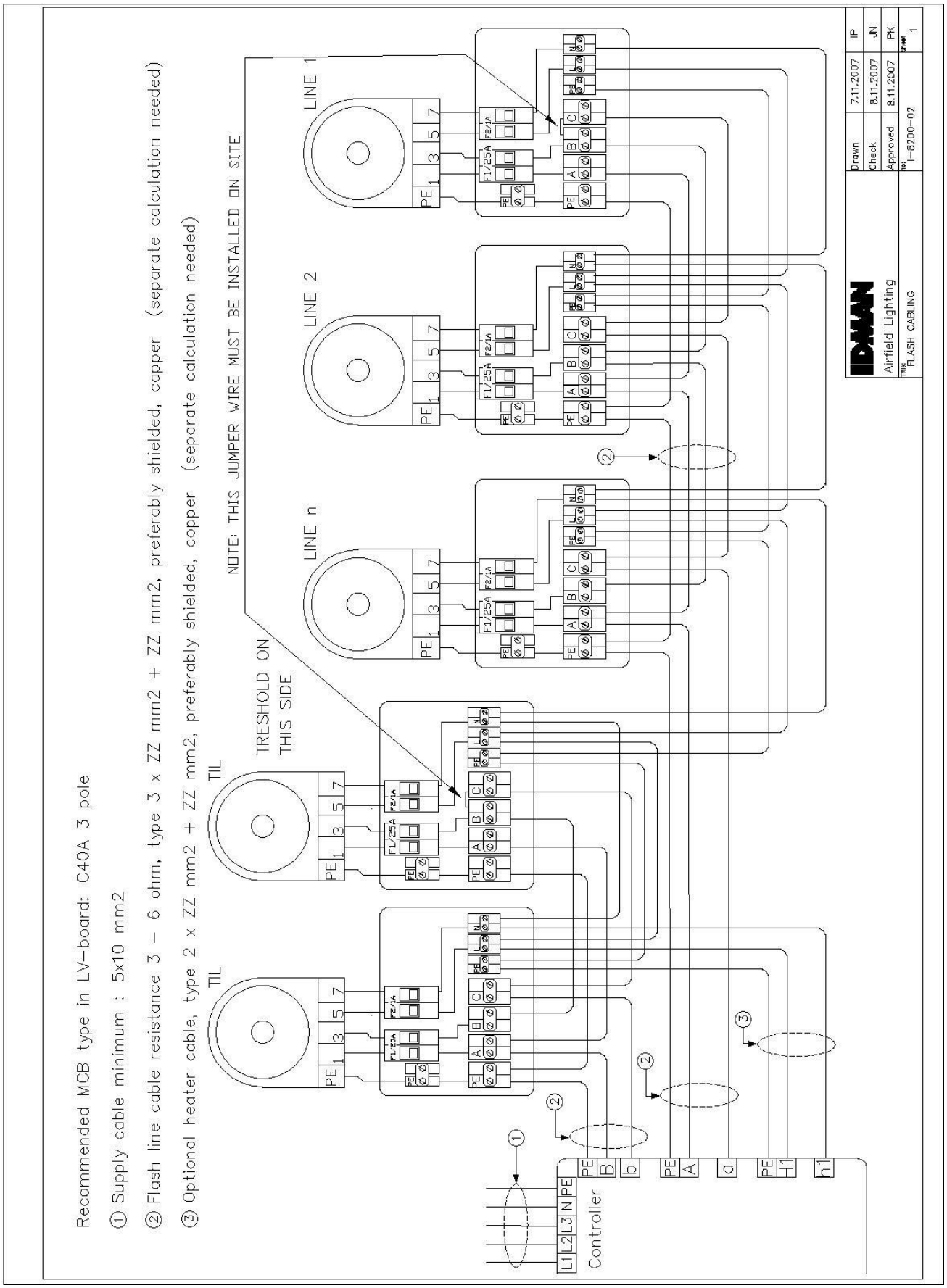
10.4 APPENDIX 4: FLASH CONTROLLER IDM 8200 GENERAL LAYOUT

This picture contains all possible options. Main components are marked.



ID	Component	ID	Component
S1	Main switch	T1	Hall effect current transmitter
F1	Main fuse	A6	Thyristor triggering unit
K1	Main contactor		
V1,V2	Thyristors		
K2	Power adjustment contactor		
K3	Flash line contactor		
K4	TIL contactor		
F2	Fuse of the supply transformer T2		
T2	Supply transformer		
F4	Heater supply fuse		
F11, F21, F31	Output residual current breakers		

10.5 APPENDIX 6: DIAGRAM OF SEQUENTIAL FLASH LIGHT SYSTEM



10.6 APPENDIX 7: SEQUENTIAL FLASH LIGHT SYSTEM COMMISSIONING TEST CHECK LIST

Project / customer			
Type	IDM 8200-	Station name	
SW -version		Device No.	

Circuit Information

Check	Result	Check	Result
1. Circuit name		5. Impedance (ohm) & insulation heater cable (Mohm)	
2. Flash rate		6. Flash line cable length (m)	
3. Impedance (ohm) & insulation line cable (Mohm)		7. Lamp count and type	
4. Impedance (ohm) & insulation TIL cable (Mohm)		8. TIL in use	

Safety

Check cabling	Result	Check supply	Result
1. Supply cable size mm2		4. Supply fuse in LV panel	
2. Earthing conductor size mm2		5. Supply fuse identification / code	
3. Earthing resistance (< 0.5ohm)		6. Supply voltage, measured value	

Settings, hardware

System (motherboard settings)		Dip switch setting								Remote control, parallel	Jumper setting		
1. Uin-nom.	(dip sw 1-2)									7. Control voltage 24V / 48V / 60V DC			
2. Freq–nom.	(dip sw 3)									8. Failsafe step 0 -7 and circuit			
3. IDM 8200 type	(dip sw 4-6)									9. Ind. grouping C, PI, FI C/D			
4. Parallel	(dip sw 7)												
5. (P) start	(dip sw 8)												
		1	2	3	4	5	6	7	8				
6. HW setting dip-switch code 1-8													

Settings, software

System settings		Remote control, Parallel	Settings-Rcs
	View-Hrs		
1. Clear operation time counters			
	Settings-Sys	4. Common fault content SumF / Sysf	
2. Flash type			
	Settings-Time		
3. Set time and date			

Local Controls

Check	Result	Check	Result
1. Main switch		3. TIL- control (optional)	
2. Local steps 1-3		4. Flash rate control	

Calibration

Function	Result	Function	Result
1. Uin input voltage		2. Lamp fault	

Operation

Step		UIN	Flash rate			
1						
2						
3						

Protections

Input/Freq/Temper.	Limit	Delay	Func.	Output	Delay	Reset m.	Func
1. Uin B+				5. Temperature B			
2. Uin B-				6. TIL protection (L)			
3. Freq B+				7. TIL protection (R)			
4. Freq B-							

Monitoring Functions

Lamp fault	Limit	Delay	Func	Lamp fault	Limit	Delay	Func
1. LF A	2	10 s					
2. LF B	1	10 s					

Remote Control

Controls	Func.	Indication	Func.	Indication	Func.	Indication	Func.
Step 1 / a		On 1 / a		MV A		ComF (P)	
2 / b		2 / b		MV B		LV A	
3 / c		3 / c				LV B	
				UIN A (S)		I1 / A (S)	
				UIN B (S)		Uin / V (S)	
		Off (P)		F1 A (S)			
		On		F1 B (S)		Failsafe function	
		Local (P)		T1 A (S)			
		Remote l		T1 B (S)			

Function of the Light Units

N:O	Address	Func.	N:O	Address	Func.	N:O	Address	Func.	N:O	Address	Func.
1			11			21			TIL 1		
2			12			22			TIL 2		
3			13			23					
4			14			24					
5			15			25					
6			16			26					
7			17			27					
8			18			28					
9			19			29					
10			20			30					

Check in to the future

How many aircraft can your airport handle today?
Can this number be increased without adverse effects on the airport's safety level?
It is a known fact that traffic volume will rise in the foreseeable future. More movements will demand monitoring of the entire airport. Requirements will be sharpened and the development of an integrated system controlling not only ground movements but also air traffic close to the airport is of the highest interest.
The International Civil Aviation Organization (ICAO) already describes A-SMGCS, Advanced Surface Movement Guidance and Control System, as the answer to the future modern airport need to control the entire airport space in one superior system.
To a larger extent than today's systems, A-SMGCS will rely on automated processes to give both pilots and traffic controllers exact information about positions and directions. Safegate Group delivers complete A-SMGCS solutions already, as well as all vital parts relating to it.
Safegate Group can check your airport into the future – today!

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THORN Airfield Lighting IDMAN aVibit AIR TRAFFIC SOLUTIONS

SAFEGATE GROUP

Safegate Group offers solutions for increased safety, efficiency and environmental benefits to airports worldwide. The company was founded in 1973 and has its headquarters in Malmö, Sweden. Safegate Group has more than 70 partners around the globe in order to be close to its customers. Earlier members of Safegate Group include Thorn AFL and Idman, who both have over 40 years of experience in airfield lighting solutions for airports and heliports. The latest member of Safegate Group is Avibit, a leading provider of next generation software applications and integration of efficient air traffic control systems. Safegate Group's complete range of products and services, a "one-stop shop", provides solutions to customers and airborne travellers around the globe.

www.safegate.com