

LIGHTING

TEF 9980 STATUS LIGHT, MAIN LIGHT & REPEATER LIGHT

ZONE 1, ZONE 2 & SAFE AREA

USER MANUAL

Subject to change without prior notice TUM5721 REV. A 17.07.2017

SAFETY INSTRUCTIONS



The TEF 9980 status light may be installed in Zone 1, 2 or safe area. The Equipment shall not be installed in Zone 0!

HANDLE WITH CARE! The TEF 9980 is an Ex d op is signal light, with a glass dome. Whereas glass is chosen for its lifelong transparency and chemical stability, it has its limitations when it comes to impact strength.

High intensity light output.
Do not look directly into the light.
This may cause discomfort or serious permanent damage to your eyes.



Note that changes made to the product and/or installation of components which do not conform to the manufacturer's specification, may be a safety violation. The manufacturer will in no circumstance be held responsible for such activity.

For your health and safety, always use safety gear suited for the task. Be certain to follow codes, regulations and/or specific procedures that are related to the installation.



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DISCLAIMER

Tranberg AS endeavors to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

IMPORTANT

Read this instruction carefully before installing the product

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TABLE OF CONTENTS

CONTENTS

1. SPECIFIC CONDITIONS OF USE	4
2. AREA OF USE	4
3 NUMBERS AND LOCATION OF LIGHT UNITS	5
4 TOOLS REQUIRED FOR INSTALLATION	6
5 MECHANICAL INSTALLATION	6
6 ELECTRICAL INSTALLATION	7
7 FAILURE MODES	11
8 MAINTENANCE	12
9 PUTTING INTO SERVICE	12
10 COMMISSIONING AND TESTING	12
11 STORAGE PRESERVATION	13
12 DISPOSAL	13
13 PART NO.	14
14 TECHNICAL DATA	16

1. SPECIFIC CONDITIONS OF USE

The flameproof joints are not intended to be repaired.



DO NOT OPEN OR REPAIR!

The TEF 9980 is sealed for life, and shall not be opened for repair or inspections. Should a fault occur, contact the manufacturer. Do not try to open the equipment for repair or modifications. This could impair the type of protection and the safety of the product. Regular visual inspections for corrosion and water ingress are recommended.



The TEF 9980 has one threaded cable entry, M25x1.5 (6H) which is used for the permanent connection of the cable. This cable is installed in the factory, and shall not be replaced. Temperature at entry point may reach 85°C with an ambient temperature of +55°C. The TEF 9980 is delivered with a flying lead connection cable. If installed in a hazardous area (Zone 1 or 2) the free end of the cable shall be protected by a type of protection listed in clause 1 of IEC/EN 60079-0:2012 suitable for the mentioned Zone and required EPL. The screen of the cable is also the grounding of the lamp and shall be connected to earth in the junction box. Do not apply excessive pulling or twisting force to the cable. This may impair the type of protection Ex d, and the ingress protection. This may possibly lead to water ingress or reduce the equipment's ability to not transmit an internal explosion.

2. AREA OF USE

The TEF9980 signal light and its control system is made for direct connection to the Fire and Gas alarm system with fully automated functionality. A "manual ON" and "DIM" options are available from the control system. The system includes a "self-test" in order to check for faults without having to test the lights manually.

The TEF9980 is designed to comply with requirements for status light as described in CAA UK CAP437, NORMAM-27/DPC and 2009 MODU Code.

3 NUMBERS AND LOCATION OF LIGHT UNITS

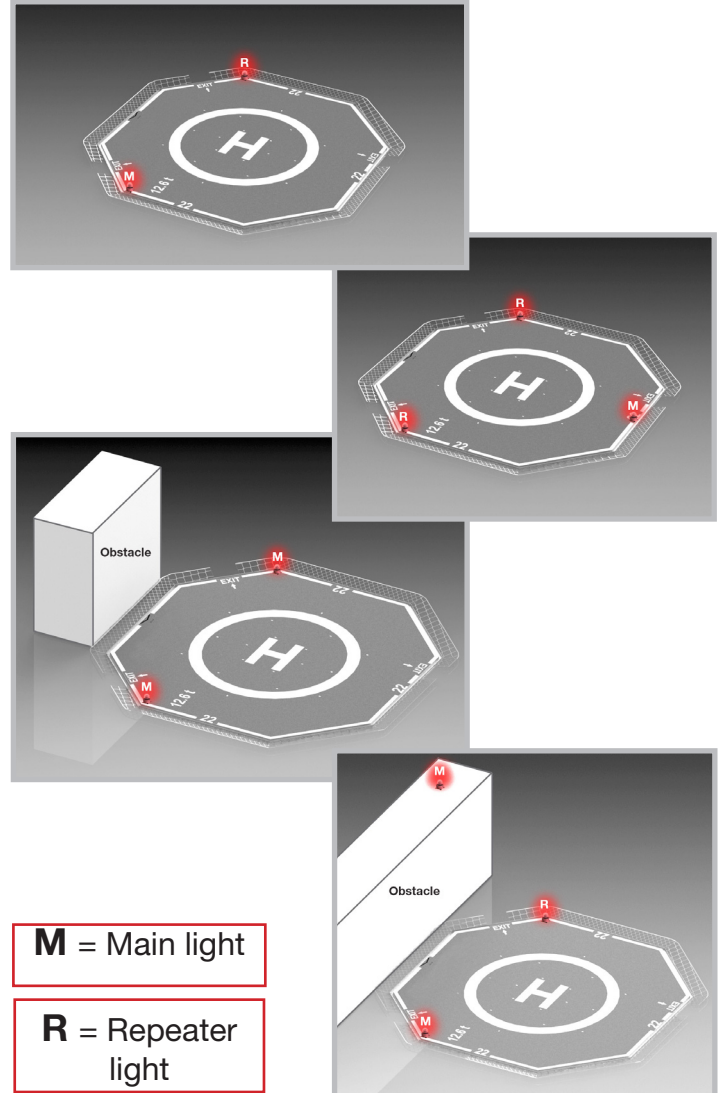
The number and location of light units should be considered in cooperation with the helideck operator. Ref. CAA Paper 2008/01, section 4.8 and 6.2 for further guidance.

- The helideck status light signalling system shall be installed either on or adjacent to the helideck.
- The status light shall be visible from all approach angles, i.e. 360° in azimuth. In case of obstacles blocking visibility, additional lights may be added at other locations.
- While the helicopter is landed on the helideck, intensity shall be dimmed to maximum 60cd. At least one light shall be visible to the pilot when the helicopter is on the helideck, regardless of its orientation to the deck. Note: Output light characteristics are the same for repeater light and main light when in "dim" mode.

Note:

The light units when in combination with Tranberg control system are automatically monitored. Of this reason, according to CAA Paper 2008/01, redundancy light units and components can be omitted.

Proposed location of light units:



4 TOOLS REQUIRED FOR INSTALLATION

The TEF9980 is ready for use, delivered with a flying lead. We recommend you to install the TEF9980 with 4 pcs. M10 stainless steel bolts. We therefore recommend a 17mm wrench or socket wrench for installation.

Refer to user manual for junction box for tools required for fixing and electrical connection.

5 MECHANICAL INSTALLATION

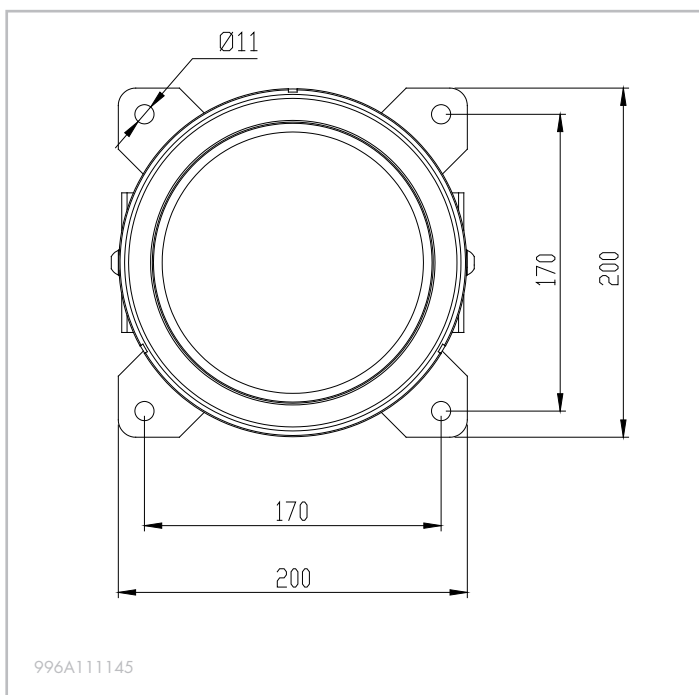
Light unit

The TEF9980 shall be installed on a stable, horizontal surface using 4 stainless steel bolts (A4-70) of minimum size M6. We recommend you to install the TEF9980 with 4 pcs. M10 stainless steel bolts. The flying lead cable shall be protected against excessive twisting and turning.

To reduce corrosion, consider the risk of electrochemical corrosion when different metals are electrically and mechanically in contact. The TEF9980 status light shall not be installed in a way that may cause it to work as an anode for a larger structure. To ensure this, it might be necessary to isolate the lamp from the structure (except from the bonding conductor and the cable screen, which in no case shall be omitted/disconnected).

Junction box

The light unit is delivered with flying lead cable (standard length 3 meters), and must be terminated in an Ex approved junction box. Refer user manual for junction box for installation.

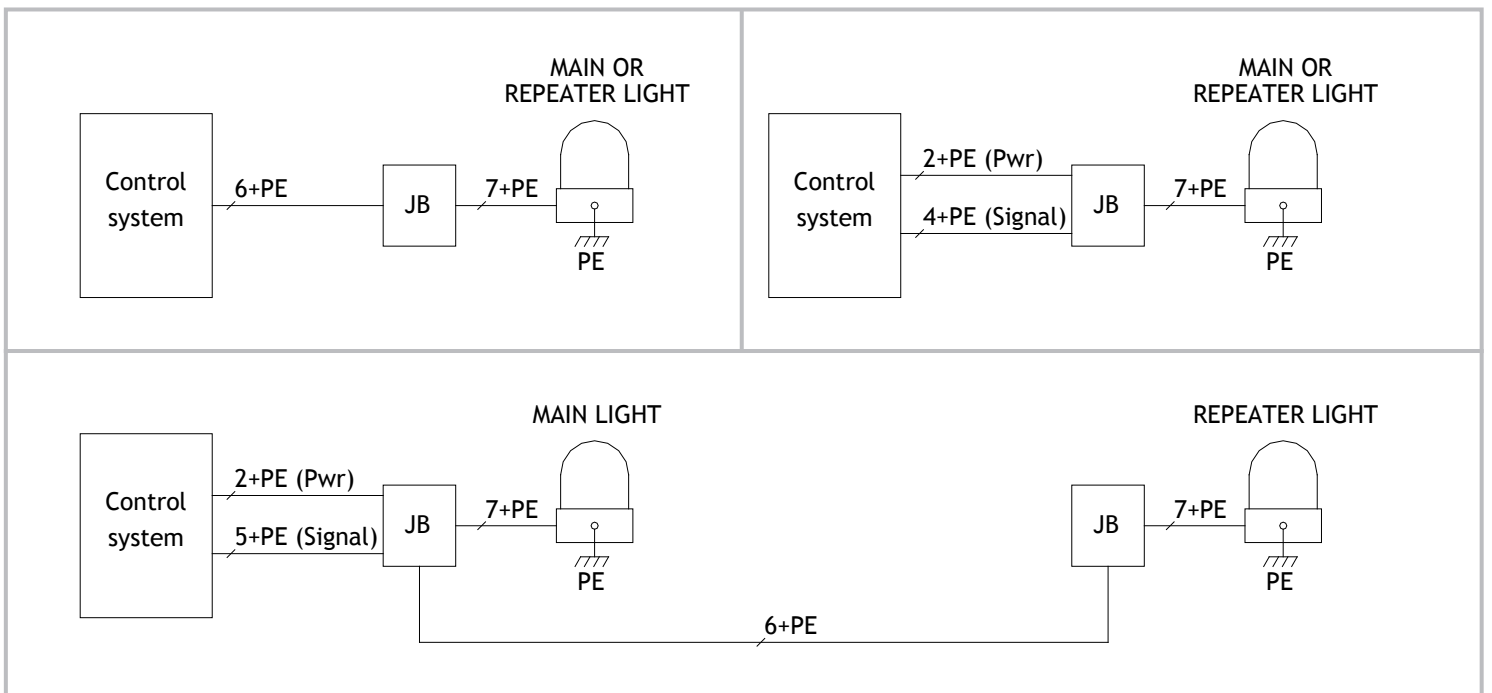


6 ELECTRICAL INSTALLATION

The light units are supplied with flying lead cable, standard length 3 meters. The cable shall be terminated in an Ex approved junction box. Cables must be effectively clamped to prevent pulling or twisting.

- The control cabinet is delivered with connections for up to two main lights and two repeater lights as standard.
- One main light, plus one or two repeater lights can be connected to same output. This can in many cases save cabling.
- Power and signals can be wired in a single multi cable or split up in two cables, one for power and one for signals. Allows for using large cross section for power wires and smaller cross section for signals.
- The Status Light System should be fed from an uninterrupted power supply (UPS) system.

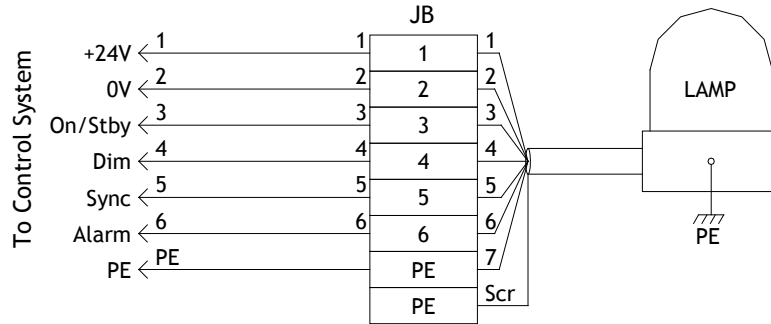
EXAMPLES - WIRING



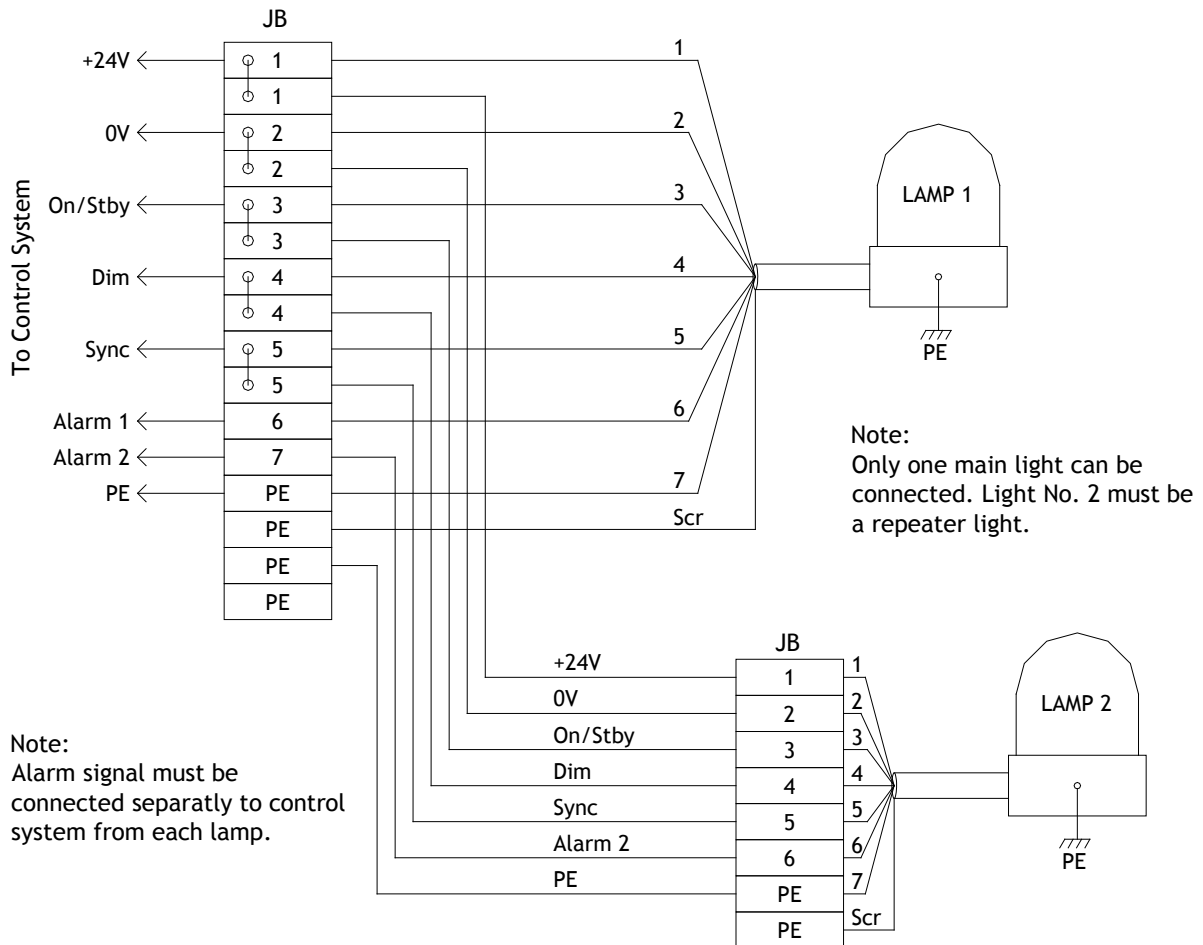
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WIRING

One light connected to one control system output.



Two lights connected to one control system output.



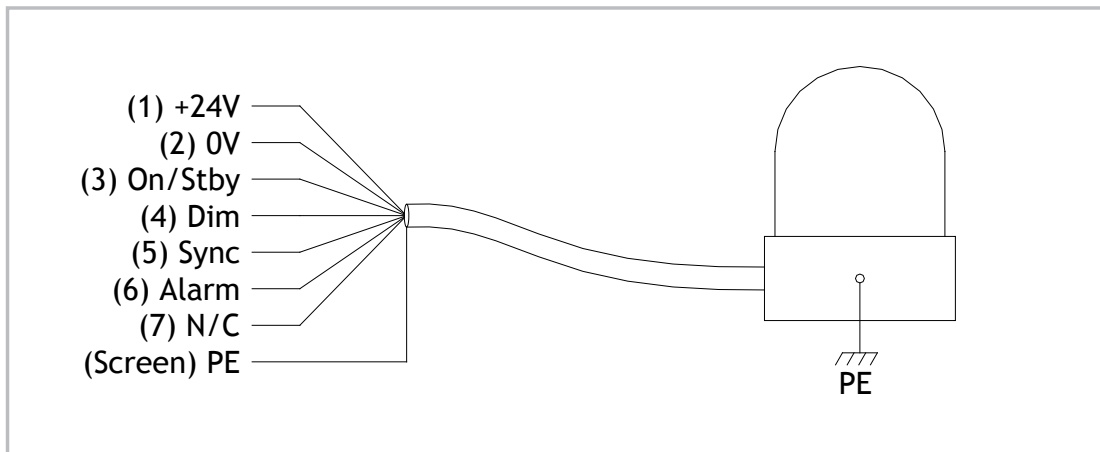
TEF 9980 STATUS LIGHT - INSTALLATION AND USER MANUAL

- For best EMI performance, bond lamp to earth via a PE wire. Connect wire to M5 earth screw at lamp base. Keep wire as short as possible, maximum 80cm. See section below.
- Cut cable to desired length.
- Terminate wires in junction box as described below. Cables must be effectively clamped to prevent pulling or twisting.
- Unused conductors (wire No. 7) shall be earthed or suitably protected. Grounding is recommended.
- Connect screen to PE.
- Power and digital in signals can be connected in parallel. Alarm signal (digital out) must be connected to control system separately for each lamp.
- Maximum one main light can be connected to each power output at the control system. If two lamps are connected to one power output, lamp No. 2 must be a repeater light.

Earthing

The screen of the cable shall be earthed in the junction box in order to fulfill the EMC requirements. Connection facility for a bonding conductor is found adjacent to the cable entry in the lamp housing. Connection is done with a stainless steel M5 screw, two stainless steel washers, a spring washer and the cable lug. The cable lug shall be placed between the two stainless steel washers. Use a min. 4mm² conductor, with a maximum length of 80cm to ensure conformity to the EMC standards. Use a stainless steel washer to isolate the cable lug from the aluminum housing to prevent excessive corrosion.

Lamp connections



Wire no.	Signal	Description	Comment
1	+24V	Power	
2	0V	Power (common)	
3	On/Stby	Digital input.	`0` = Standby `1` = On
4	Dim	Digital input. Dimming light intensity and reduce flash rate.	`0` = Normal mode `1` = Dim mode
5	Sync	Digital input. Flash synchronization. (>2 sec: test mode)	(Test mode: see section 10)
6	Lamp failure	Digital output. Failure signal to control system.	`1` = Lamp OK. See section "failure modes" for detailed description.
7	Not connected		Terminate to PE or N/C terminal
Screen	PE	Protective earth	Terminate to PE
Lamp housing	PE	Protective earth	Terminate to PE

Note: For repeater light, 'Dim' signal is used to reduce flash rate only.

TEF 9980 STATUS LIGHT - INSTALLATION AND USER MANUAL

Cable dimensions

Voltage drop in cables should be calculated to ensure that voltage at lamp is minimum 16V. Use a current consumption of 6.15A for main lamp and 0.41A for repeater light to calculate voltage drop.

Note:

- *The control cabinet incorporates a regulated power supply, and voltage out from cabinet can be considered to be 24VDC.*
- *Voltage drop in power supply cable will be compensated in regulator.*
- *If necessary the voltage at control cabinet can be adjusted up to 28.5V.*

Recommendation

One Main Light, Power Lines Wire 1 and 2 (Voltage at control cabinet = 24V)

Cable Length	Dimension
<60 meter	2,5mm ²
<100 meter	4mm ²
<140 meter	6mm ²
<230 meter	10mm ²

Repeater light and signal lines: Recommendation: Min. 1.5mm² regardless of cable length (<300m).

7 FAILURE MODES

The TEF9980 constantly monitors the condition of the light by measuring temperature, voltage and current. Failure is reported to control system as described below. See also section “Lamp connections”.

Failures are grouped in two main modes; “alarm” and “warning”. Warnings are considered to be corrected when environmental conditions change. Alarms are considered to be permanent.

When light is OK, failure signal is “high”. If a failure occurs, failure signal will go “low” and approx. every 5 seconds send out a pulse sequence to indicate type of failure. Pulse width is 10ms and duty cycle is 0.5.

No. of pulses	Failure description	Action
0	Alarm: No power supply.	Lamp off.
1	Alarm: Internal comm. error, top LED circuit.	Lamp will not start up.
2	Alarm: Internal comm. error, middle LED circuit.	Lamp will not start up.
3	Alarm: Internal comm. error, bottom LED circuit.	Lamp will not start up.
4	Alarm: Top LED's not blinking.	Lamp attempts continue working.
5	Alarm: Middle LED's not blinking.	Lamp attempts continue working.
6	Alarm: Bottom LED's not blinking.	Lamp attempts continue working.
7	Alarm: >10% of LED's top not working.	Lamp attempts continue working.
8	Alarm: >10% of LED's middle not working.	Lamp attempts continue working.
9	Alarm: >10% of LED's bottom not working.	Lamp attempts continue working.
10	Alarm: Light intensity, top, out of bounds.	Lamp attempts continue working.
11	Alarm: Light intensity, middle, out of bounds.	Lamp attempts continue working.
12	Alarm: Light intensity, bottom, out of bounds.	Lamp attempts continue working.
13	Alarm: Light intensity, top, out of bounds or no light.	Lamp attempts continue working.
14	Alarm: Light intensity, middle, out of bounds or no light.	Lamp attempts continue working.
15	Alarm: Light intensity, bottom, out of bounds or no light.	Lamp attempts continue working.
16	Warning: Over-temperature LED's top, level 1.	Half flash frequency. Resets automatically when temperature drops below threshold.
17	Warning: Over-temperature LED's middle, level 1.	Half flash frequency. Resets automatically when temperature drops below threshold.
18	Warning: Over-temperature LED's bottom, level 1.	Half flash frequency. Resets automatically when temperature drops below threshold.
19	Warning: Over-temperature driver, level 1.	Half flash frequency. Resets automatically when temperature drops below threshold.
20	Warning: Over-temperature LED's top, level 2.	Goes to “dim mode”. Resets to level 1 when temperature drops below threshold.
21	Warning: Over-temperature LED's middle, level 2.	Goes to “dim mode”. Resets to level 1 when temperature drops below threshold.
22	Warning: Over-temperature LED's bottom, level 2.	Goes to “dim mode”. Resets to level 1 when temperature drops below threshold.
23	Warning: Over-temperature driver, level 2.	Goes to “dim mode”. Resets to level 1 when temperature drops below threshold.
24	Alarm: Over-temperature LED's top, level 3.	Lamp off. Resets to level 2 when temperature drops below threshold.
25	Alarm: Over-temperature LED's middle, level 3.	Lamp off. Resets to level 2 when temperature drops below threshold.
26	Alarm: Over-temperature LED's bottom, level 3.	Lamp off. Resets to level 2 when temperature drops below threshold.
27	Alarm: Over-temperature driver, level 3.	Lamp off. Resets to level 2 when temperature drops below threshold.

8 MAINTENANCE

The TEF9980 is designed for a minimum of maintenance. Cleaning with a damp cloth is recommended. Visual check for water ingress and corrosion is recommended.



Do not look directly into the light.
This may cause discomfort or serious permanent damage to your eyes.

9 PUTTING INTO SERVICE

The lamp is designed to receive a defined set of inputs from a specialized control system and return a set of values in terms of faults and alarms. We therefore strongly recommend installation of the TEF9980 only together with Tranberg control systems. The safety of the product is not based on the control system. Testing of the light and control system after installation is recommended.

Before putting into service:

1. Make sure that the device is not damaged.
2. Make sure that the device is installed correctly.
3. Remove any foreign objects from the device.
4. Check the tightening torques.

10 COMMISSIONING AND TESTING

Commissioning

Please see manual for control system for proposed commissioning procedure.

Testing

While the lamp is monitored also in standby mode, the lamp must be switched on to test all parameters. The lamp should be tested at suitable intervals. This can either be done by manually switch on the lamp or using the test function described below. This test function is designed to be used for automatic testing and light intensity during this test sequence will not become a hazard for helicopter pilot or other personnel.

Procedure, test function:

1. When in standby mode and "dim" signal is off, set "sync" signal (digital input) to '1' for minimum 2 seconds.
2. Lamp starts test sequence.
 - Top LED's flashes with reduced light output.
 - Middle LED's flashes with reduced light output.
 - Bottom LED's flashes with reduced light output.
 - Lamp switched off, and test completed
3. If any failure is detected, it will be reported at "failure signal" (digital output).

11 STORAGE PRESERVATION

The product should be stored in the original box, in a dry location and within the operational temperature range.

12 DISPOSAL

The TEF9980 shall be disposed of according to national regulations. The equipment may be returned to the manufacturer for recycling, shipment is the customer's responsibility.

13 PART NO.

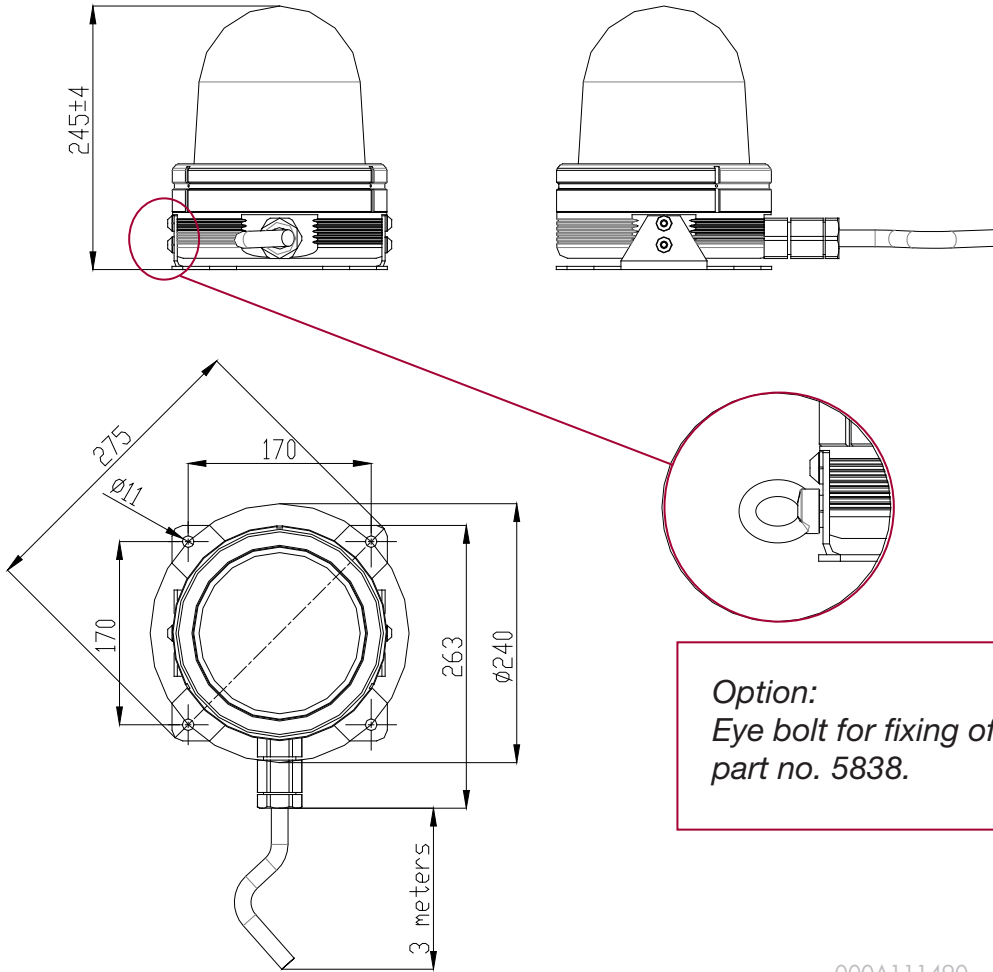
Description	Part No.
TEF9980 Helideck Status Light – Main Light	9980 000
TEF9980 Helideck Status Light – Repeater Light	9980 005
Junction Box for Single Lamp Connection	1058 2089
Junction Box for Single Lamp Connection + Connection to Next Lamp	1058 2589
Eye bolt for fixing of security wire	0000 5838

Note:

Junction boxes supplied with stopping plugs and one cable gland for lamp cable.

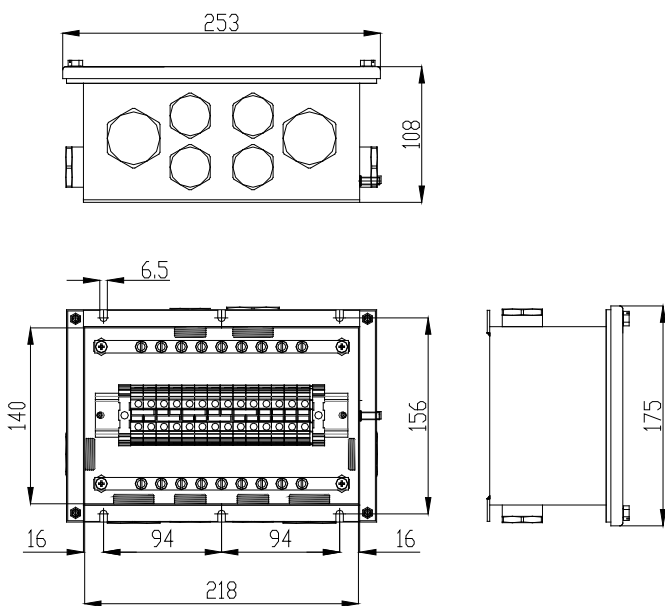
Cable glands for cables which are not supplied by Tranberg not included.

STATUS LIGHT 9980 000/ 9980 005



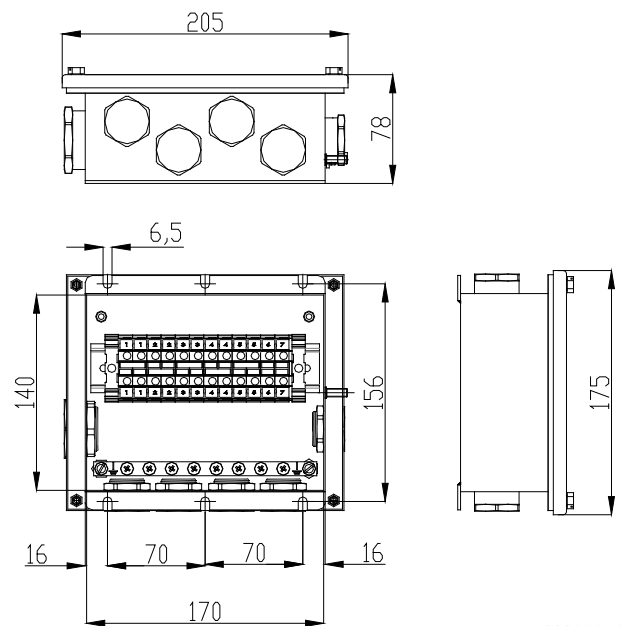
000A111490

JUNCTION BOX 1058 2589



000A111490

JUNCTION BOX 1058 2089



000A111490

TEF 9980 STATUS LIGHT - INSTALLATION AND USER MANUAL

14 TECHNICAL DATA

Ex Protection:	Ex II 2 G Ex db op is IIB+H ₂ T5 Gb
Area of Use:	Hazardous areas Zone 1 or 2, EPL Gb and safe area
Materials:	Powder coated seawater resistant aluminum, tempered glass.
Input Voltage:	16-32V DC
Current consumption:	Main Light: Max. 6.15A @16V Repeater Light: Max. 0.41A @16V
Power, Main Light:	Peak: Max. 98W Average: Max. 30W Standby: Max. 1.8W
Power, Repeater Light :	Peak: Max. 7.3W Average: Max. 2.6W Standby: Max. 1.8W
Digital Inputs :	'0': -3V to +5V '1': +11V to +32V Typical current consumption: 2mA @ 24VDC
Digital output:	Voltage: U _{in} - 1.2V @2.4mA Max. output current: 25mA
Light intensity, Main Light:	Min. 700cd 2°-10° elevation Min. 176cd 0°-90° elevation
Light intensity, Repeater Light and Main Light in Dim Mode:	Min. 16cd 0°-90° elevation Max. 60cd 0°-90° elevation
Color:	Red. According to ICAO Annex 14. NVG compatible IR LED's.
Flash rate:	Standard Mode: 120 flashes pr. min. «Dim» Mode: 60 flashes pr. min.
Flying lead cable:	7 x 1.5mm ² with screen. Flame retardant, halogen-free and mud resistant. Standard length: 3 meters. Ø17mm ±0.8.
Ingress Protection:	IP 66/67
Operating Temperature:	-40°C to +55°C
Overall dimensions (L x W x H):	200x263x245mm (excluding cable)
Weight:	11.5 kg.
Compliance standards:	CAA UK CAP437:2013, NORMAM-27/DPC:2015, 2009 MODU Code:2010, IEC 60079-0 ed. 6, IEC 60079-1 ed. 7, IEC 60079-28 ed. 2, EN 60079-0:2012/A11:2013, EN 60079-1:2014, EN 60079-28:2015, EN 61000-6-2:2005, EN 61000-6-4:2007, EN 61547:2009, EN 50581:2012, IEC 60533:2015