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# TEST REPORT

## IP65 TESTS ON BA405C SETPOINT AND IP66 TESTS ON BA390 LED LAMP

### Prepared for:

**BEKA associates Ltd  
Old Charlton Road  
Hitchin  
Hertfordshire SG5 2DA  
UNITED KINGDOM**

**Project ID: 3026080  
Class: 3810 - FMU  
Date: May 23 2006**

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**IP65 TESTS ON BA405C SETPOINT  
AND  
IP66 TESTS ON BA390 LED LAMP**

from

**BEKA associates Ltd  
Old Charlton Road  
Hitchin  
Hertfordshire SG5 2DA  
UNITED KINGDOM**

**I INTRODUCTION**

- 1.1 BEKA Associates Ltd. (manufacturer) requested confirmation of the IP65 rating on their 48 x 96 DIN Panel Mounted case typically intended to be used for the BA405C Setpoint Display, BA307C 3.5 Digit Indicator and BA327C 4.5 Digit Indicator and also of the IP66 rating for the BA390 LED panel mounted lamps. This report does not convey FM Approval of these ratings.
- 1.2 This Report may be freely reproduced only in its entirety and without modification.
- 1.3 **Standards**

Title	Standard Number	Date
Degrees of protection provided by enclosures (IP Code)	IEC 60529	1989
	Inc amendment 1	1999

**II DESCRIPTION**

- 2.1 The enclosure is intended for use with panel mounted displays similar to but not limited to the BA405C, BA307C and BA327C.
- 2.2 Installation and mounting requirements for the 48 x 96 DIN case are described on BEKA associates drawing number CI100-04 revision 1.
- 2.3 Installation and mounting requirements for the BA390 lamps are described on BEKA associates drawing number CI100-05 revision 1.

**III EXAMINATIONS AND TESTS**

- 3.1 **Environmental protection** - The following testing verified the IP65 rating for the front panel of the 48 x 96 DIN case and the IP66 rating of the LED lamp. Representative samples of the display and LED Lamp were mounted in a test enclosure intended to simulate an installation in

accordance with the manufacturer's instructions. Testing was conducted under project ID 3022662 and 3026080. The BA405C was chosen for this test because of the control knob fitted to the front panel.

- 3.1.1 **Protection from the Entry of Water - LED lamp (IPX6)** – A hosedown test was conducted to verify the IPX6 rating requested by the manufacturer. The sample was subjected to a stream of water from a hose with a 12.5 mm diameter nozzle and delivering at least 100 litres/minute. The water was directed at the enclosure's front panel from a distance of 2.5 to 3.0 metres for at least three minutes. The tests results were satisfactory in that the enclosure excluded the entry of water.
- 3.1.2 **Protection from the Entry of Water - Setpoint Display (IPX5)** – A hosedown test was conducted to verify the IPX5 rating requested by the manufacturer. The sample was subjected to a stream of water from a hose with a 6.3 mm diameter nozzle and delivering at least 12.5 litres/minute. The water was directed at the enclosure's front panel from a distance of 2.5 to 3.0 metres for at least three minutes. The tests results were satisfactory in that the enclosure excluded the entry of water.
- 3.1.3 **Protection from the Entry of Dust - Setpoint Display and LED lamp (IP6X)** – A dust exclusion test was conducted to verify the IP6X rating requested by the manufacturer. The sample enclosure was suspended in a circulating dust atmosphere while connected to a vacuum pump adjusted to draw a vacuum of at least 20 mBar on the sample. The extraction rate was negligible. The test duration was 8 hours. At the conclusion of the test, excess dust was removed from the enclosure exterior surface and the sample opened. The test results were satisfactory in that the enclosure had excluded the entry of dust.

## VIII DOCUMENTATION

The following drawings describe the mounting arrangement.

Drawing No.	Issue	Description
CI100-04	1	Enclosure Drawing for IP65 Panel Mounting Products in 48 x 96 DIN case
CI100-05	1	Enclosure Drawing for IP66 Panel Mounting BA390 Lamps

## IX CONCLUSION

The BA405C Setpoint Display and the BA390 LED lamp tested in this report complies with the requirements of IEC 60529:1989 including amendment #1, Degree of protection provided by enclosures.

**EXAMINATION AND TESTING BY:** N. Ludlam, C. Burch.

**ATTACHMENTS:** Mounting arrangement CI100-04 Issue 1  
Mounting arrangement CI100-05 Issue 1

FM APPROVALS  
PROJECT ID: 3026080

**PROJECT DATA RECORDS:**      **3022662 and 3026081**

**REPORT BY:**



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**Nicholas P. Ludlam**  
**Senior Engineering Specialist**  
**Hazardous Locations**

**REPORT REVIEWED BY:**

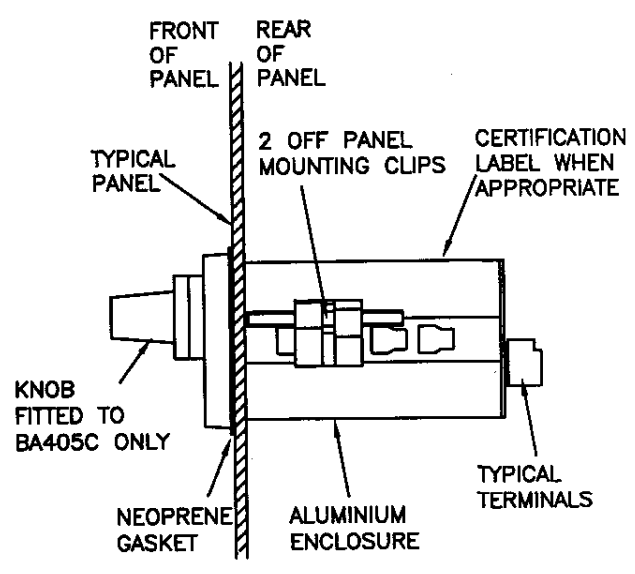
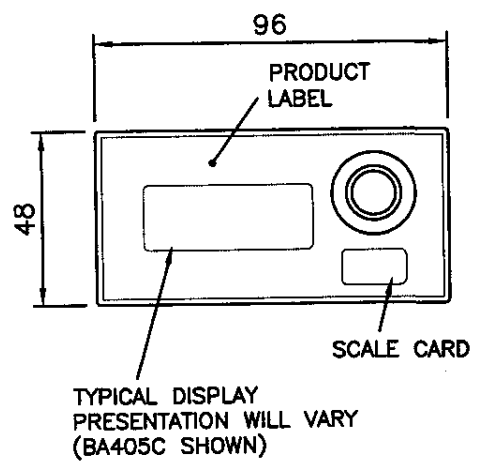


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**William G. Lawrence, P.E.**  
**Senior Engineering Specialist**  
**Hazardous Locations**

Iss.	Date	Modification	Ckd.	Appd.
1	02.05 2006			
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Iss.	Date	Modification	Ckd.	Appd.

THIRD ANGLE PROJECTION
DIMENSIONS IN mm
DO NOT SCALE



When mounting the unit to maintain the IP65 front panel rating:

- Two panel mounting clips should be used
- Minimum panel thickness should be
  - 2mm (0.08inches) Steel
  - 3mm (0.12inches) Aluminium
- Outside panel finish should be smooth, free from particle inclusions, runs or build-up around cut-out.
- Panel cut-out should be
  - 43.5 x 90.0mm -0.0 +0.5
  - (1.71 x 3.54 inches -0.00 +0.02)
- Edges of panel cut-out should be deburred and clean
- Each panel mounting clip should be tightened to between:
  - 20 and 22cNm (1.77 to 1.95 inLb)
- Enclosure provides IP65 protection to front of panel only.
- Operating Temperature -20 to +60°C
- This enclosure is used to house a variety of BEKA Products including:
  - BA307C 3.5 Digit IS Indicator
  - BA327C 4.5 Digit IS Indicator
  - BA405C Setpoint Station

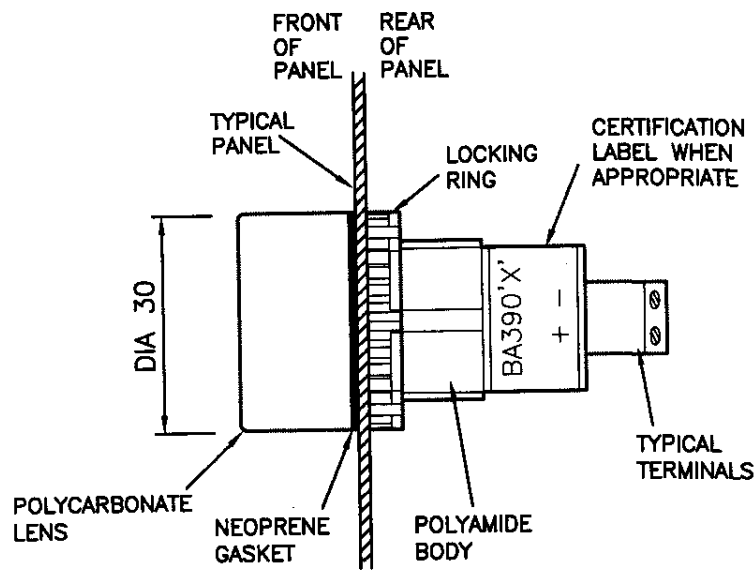
Title  
**ENCLOSURE DRAWING for  
 IP65 PANEL MOUNTING PRODUCTS  
 IN 48 X 96 DIN CASE**

Drawn RC	Checked 	Scale 1:2
Drawing No. Sheet 1 of 1		CI100-04

Iss.	Modification			Ckd.	Appd.
Iss.	Date	Modification	Ckd.	Appd.	
1	02.05 2006				

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THIRD ANGLE PROJECTION      DIMENSIONS IN mm      DO NOT SCALE



When mounting the unit to maintain the IP66 front panel rating:

Minimum panel thickness should be      2mm (0.08inches) Steel  
    3mm (0.12inches) Aluminium

Outside panel finish should be smooth, free from particle inclusions,  
 runs or build-up around cut-out.

Panel cut-out should be      22.5 mm DIA. ±0.2  
    (0.88 inches ±0.008)

Edges of panel cut-out should be deburred and clean

The Locking Ring should be tightened to between:  
    20 and 22cNm (1.77 to 1.95 inLb)

Enclosure provides IP66 protection to front of panel only.  
 Operating Temperature -20 to +60°C

This enclosure is used to house a variety of BEKA Products including:

BA390	IS Lamps
BA590	Non-IS Lamps
:	:
:	:

Iss.	Date	Title	Drawn	Checked	Scale
	02.05 2006		ENCLOSURE DRAWING for IP66 PANEL MOUNTING BA390 LAMPS	RC	[Signature]
1			Drawing No. C1100-05 Sheet 1 of 1		