



1 **EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres**  
3 **Directive 94/9/EC**

4 EC - Type Examination Certificate Number: **Baseefa09ATEX0019**

5 Equipment or Protective System: **PFC200 Position Feedback Converter**

6 Manufacturer: **Orange Instruments Ltd**

7 Address: **Northampton, NN6 6XF**

8 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

9 Baseefa, Notified Body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. **08(C)0125**

10 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN 60079-0:2006 EN 60079-11:2007**

except in respect of those requirements listed at item 18 of the Schedule.

11 If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

12 This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

13 The marking of the equipment or protective system shall include the following :

**⊕ II (I) G [Ex ia] IIC (-20°C ≤ Ta ≤ +60°C)**

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. **1575**

Project File No. **08/0125**

This certificate is granted subject to the general terms and conditions of Baseefa. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

**R S SINCLAIR**  
**DIRECTOR**  
On behalf of  
Baseefa

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## Schedule

14

Certificate Number Baseefa09ATEX0019

### 15 Description of Equipment or Protective System

The PFC200 Position Feedback Converter is designed to be powered from a nominally 24V supply, measure signals from a transducer and switches in the hazardous area, and feed back information to other safe area equipment.

The circuit utilises an isolating DC-DC converter and opto-isolators to ensure that the connections to the hazardous area are isolated from earth. An analogue to digital converter in the isolated circuits processes the signals from the transducer and switches in the hazardous area and sends the data back to the safe area using an isolating SPI interface.

The plastic DIN rail mounted enclosure contains two PCBs, one contains unspecified circuitry and the other contains the safety components and other components required for safety. The user connections to the hazardous area and to the safe area are made using rows of screw terminals along opposite edges on top of the PFC200.

#### TERMINAL AND LOAD PARAMETERS

##### Safe Area Terminals 9 to 16

$$U_m = 253V_{rms}$$

The circuit connected to the safe area terminals 9 to 16 is designed to operate from a d.c. supply voltage of nominally 24V DC. The signal lines are logic level signals designed to interface with 5V circuits.

The input terminals are galvanically isolated from the connections to the hazardous area.

##### Transducer Terminals 1 to 4

$$\begin{aligned} U_o &= 7.0V \\ I_o(\text{peak}) &= 282mA \\ I_o(\text{continuous}) &= 85mA \\ P_o &= 500mW \\ C_i &= 22nF \\ L_i &= 0 \end{aligned}$$

The capacitance and either the inductance or inductance to resistance ratio ( $L/R$ ) of the load connected to hazardous area terminals 1 to 4 must not exceed the following values:

GROUP	CAPACITANCE ( $\mu F$ )	INDUCTANCE (mH)	OR	L/R RATIO ( $\mu H/ohm$ )
IIC	15.6 $\mu F$	0.44		20.6
IIB	299 $\mu F$	1.79		82.4
IHA	1000 $\mu F$	3.57		164

The above load parameters apply where:

1. The external circuit contains no combined lumped inductance  $L_i$  and capacitance  $C_i$  greater than 1% of the above values,
- or 2. The inductance and capacitance are distributed as in a cable,
- or 3. The external circuit contains either only lumped inductance or lumped capacitance in combination with a cable.

In all other situations e.g. the external circuit contains combined lumped inductance and lumped capacitance, up to 50% of each of the L and C values is allowed.



Switch Terminals 5 to 8

$U_o = 14.7V$   
 $I_o = 34mA$   
 $P_o = 49mW$   
 $C_i = 0$   
 $L_i = 0$

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the load connected to hazardous area terminals TB1 are calculated based on the worst case of using a 6 core cable to supply the 3 switches and must not exceed the following values:

GROUP	CAPACITANCE ( $\mu F$ )	INDUCTANCE (mH)	OR	L/R RATIO ( $\mu H/ohm$ )
IIC	0.62	30		100
IIB	3.86	120		400
IIA	14.9	240		800

The above load parameters apply where:

1. The external circuit contains no combined lumped inductance  $L_i$  and capacitance  $C_i$  greater than 1% of the above values,
- or 2. The inductance and capacitance are distributed as in a cable,
- or 3. The external circuit contains either only lumped inductance or lumped capacitance in combination with a cable.

In all other situations e.g. the external circuit contains combined lumped inductance and lumped capacitance, up to 50% of each of the L and C values is allowed.

**16 Report Number**

08(C)0125

**17 Special Conditions for Safe Use**

None

**18 Essential Health and Safety Requirements**

All relevant Essential Health and Safety Requirements are covered by the standards listed at item 9.

**19 Drawings and Documents**

Number	Sheet	Issue	Date	Description
3687-0001	-	G	02/04/09	PFC200 Position Feedback Converter
3687-0006	-	B	02/04/09	PFC200 Parts List Board P522 General Sale
3687-0008	-	C	02/04/09	PFC200 Position Feedback Converter GA of Enclosure
3687-0017	-	C	02/04/09	PFC200 Position Feedback Converter Printed circuit Board P522 (3687-004) Detail