

# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: IECEx BAS 14.0107X Issue No: 0 Certificate history:  
Status: Current Page 1 of 3 Issue No. 0 (2014-11-26)  
Date of Issue: 2014-11-26  
Applicant: Compac Industries Limited  
52 Walls Road  
Penrose  
Auckland 1061  
New Zealand  
Electrical Apparatus: C4000 Control Unit Mk II  
*Optional accessory:*  
Type of Protection: Intrinsic Safety  
Marking: Ex ib IIA T4 Gb (-40°C ≤ Ta ≤ +80°C)

Approved for issue on behalf of the IECEx  
Certification Body:

R S Sinclair

Position:

General Manager

Signature:  
(for printed version)

Date:

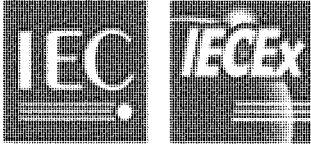
27-11-14

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2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

SGS Baseefa Limited  
Rockhead Business Park  
Staden Lane  
Buxton  
Derbyshire  
SK17 9RZ  
United Kingdom





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Manufacturer: **Compac Industries Limited**  
52 Walls Road  
Penrose  
Auckland 1061  
New Zealand

Additional Manufacturing  
location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEX Quality system requirements. This certificate is granted subject to the conditions as set out in IECEX Scheme Rules, IECEX 02 and Operational Documents as amended.

#### STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Explosive atmospheres - Part 0: General requirements  
Edition:6.0

IEC 60079-11 : 2011 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0

*This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

#### TEST & ASSESSMENT REPORTS:

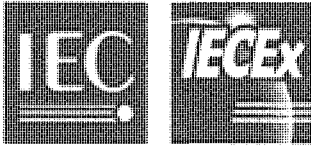
*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

#### Test Report:

GB/BAS/ExTR14.0210/00

#### Quality Assessment Report:

AU/TSA/QAR08.0008/03



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## Schedule

### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

The C4000 Control Unit Mk II is designed to be mounted in a hazardous area within an enclosure and provides the measurement and correction functions required for a number of different fuels including Compressed Natural Gas, Liquid Petroleum Gas, Diesel, Aviation Fuel, Petrol, Adblue and Ethanol, etc. The quantity of fuel measured is shown on a display. Various optical or magnetic encoders detect the output from a positive displacement metering unit or a KG Coriolis metering unit gives an output proportional to the mass flow of fuel. Parameters such as the temperature and pressure of the fuel are monitored and these parameters are passed to a microprocessor unit for correction before the quantity is displayed. The lower ambient limit for the C4000 Control Unit Mk II may be marked as -25°C when mounted local to other temperature limited equipment, but the C4000 Control Unit Mk II remains identical to that marked as suitable for -40°C.

This C4000 Control Unit Mk II is designed to be supplied from a C4000 Power Supply Unit Mk II printed circuit board CI138 & CI139 Certificate Number Baseefa14ATEX0074X or IECEx BAS 14.0039X which provides the essential voltage and current levels and power limitation necessary for the safe operation of the meter.

The C4000 Control Unit Mk II comprises an overall assembly of equipment housed within a number of separate inner enclosures but all mounted within the same dispenser. The Microprocessor Unit CI140 is central to the Control Unit, may be mounted within either an SW052-14 enclosure or AP238-06 enclosure, and various optional separate printed circuit boards in their own separate enclosures are added to the Control Unit depending upon the functions required.

The C4000 Control Unit Mk II assembly may be connected to a maximum of six encoders (containing CI180, CI163 or CI111), or two KG Meters CI176 & CI177, or two V50 Meters CI225 & CI226. It may employ a maximum of four CI170 Generic Displays or four CI236 & CI237 LCD Displays, either of which may also connect to a maximum of four CI178 Preset Displays with CI192 Preset Interface Keypads. The display assembly may include a maximum of two AP324 Card Readers and a maximum of two CI218 PIN Pads with display. The CNG Temperature and Pressure Board CI214 may connect to a maximum of four pressure sensors. With the exception of the simple apparatus, switches, RTDs and thermistors, the remaining equipment is used individually.

See Annex.

### CONDITIONS OF CERTIFICATION: YES as shown below:

1. The Micro Processor Board CI140 must be supplied from C4000 Power Supply Unit Mk II, CI138 & CI139 Certificate Number Baseefa14ATEX0074X or IECEx BAS 14.0039X Coded Ex d [Ia IIA Ga] IIA T4 (-40°C ≤ Ta ≤ +55°C).
2. The V50 Meter (CI225 & CI226) must always be mounted within an overall dispenser housing and must be protected from the possibility of rubbing if the meter housing is per MAD0048A (non-metallic). Such meters will have marked on the label "WARNING – Potential electrostatic charging hazard"

### Annex:

IECEx BAS 14.0107X Annex.pdf

The C4000 Control Unit Mk II comprises an overall assembly of equipment housed within a number of separate inner enclosures but all mounted within the same dispenser. The Microprocessor Unit CI140 is central to the Control Unit, may be mounted within either an SW052-14 enclosure or AP238-06 enclosure, and various optional separate printed circuit boards in their own separate enclosures are added to the Control Unit depending upon the functions required.

The C4000 Control Unit Mk II assembly may be connected to a maximum of six encoders (containing CI180, CI163 or CI111), or two KG Meters CI176 & CI177, or two V50 Meters CI225 & CI226. It may employ a maximum of four CI170 Generic Displays or four CI236 & CI237 LCD Displays, either of which may also connect to a maximum of four CI178 Preset Displays with CI192 Preset Interface Keypads. The display assembly may include a maximum of two AP324 Card Readers and a maximum of two CI218 PIN Pads with display. The CNG Temperature and Pressure Board CI214 may connect to a maximum of four pressure sensors. With the exception of the simple apparatus, switches, RTDs and thermistors, the remaining equipment is used individually.

The equipment which may be considered within the C4000 Control Unit Mk II Certificate:-

1. Microprocessor Unit CI140
2. CNG Temperature and Pressure Board CI214
- 3.1 A KG Meter CI176 & CI177
- 3.2 A V50 Meter, MPU CI225, DSP CI226 with either LPG CI227 or LPG CI231.  
Four encoders:- 3.3 COM50 Smart+Encoder CI180, 3.4 COM125+Encoder CI163, 3.5 COM250+Encoder CI163 and 3.6 Optical Encoder CI111.
- 3.7 Encoder Multiplexer CI185 may be used to increase number of Encoders to six.
- 3.8 Triscan Splitter CI196 used with the Encoders and Nozzle Switch.
- 3.9 LPG Splitter CI232
4. CWIT Board CI101 Connected to the CWIT Aerial (May be referred to as CWID.)
- 5.1 Generic Display CI170 Connected to the 5.2 Preset Display CI178 and 5.3 Preset Interface Keypad CI192
- 5.4 CI236 & CI237 LCD Displays Connected to the 5.2 Preset Display CI178 and 5.3 Preset Interface Keypad CI192
- 5.5 PIN Pad with display CI218 Connected either directly to Microprocessor Unit CI140 or via LPG Splitter CI232.
6. AP324 Magtek P Series Card Reader
7. Peripheral equipment:-
  - 7.1 Totaliser ENM P2G729A and
  - 7.2 Piezo Buzzer Hi-Q 54-35C2 54-35
8. Simple Apparatus:-  
Nozzle Switches, Hi / Lo Switch and Parameter On / Off Switch  
Air Detector / Sump Switch Herga 6863 (Common with another C4000 Control Unit within the same appliance)  
Thermistors or RTD and Pressure Sensor.

#### **1. The Microprocessor Unit CI140**

The Microprocessor Unit comprises a single printed circuit board which has a mixture of surface mounted and discrete components, two printed circuit board connectors for the PSU J2A and J2B and a number of other connectors are mounted on the p.c.b. for connection to other peripheral equipment. The printed circuit board is mounted on insulating pillars within a sheet metal outer enclosure mounted within either an SW052-14 or AP238-06 enclosure which provides a degree of protection of at least IP20.

The Microprocessor Unit CI140 connects to the C4000 Power Supply Unit Mk II p.c.b. CI139 Certificate Number Baseefa14ATEX0074X or IECEx BAS 14.0039X within the same Dispenser

CI140:J2A connects to CI139:J5, CI139:J6 and CI139:J7  
CI140:J2B connects to CI139:J5 and CI139:J8  
CI140:J13 connects to CI139:J8 or CI101:CON1 or CI232:J1

CI140:J2A Pins 3&4 VP PERIPH - (for connection to CI139 J7 Pins 7 & 8 or Cable J2A Pins 3&4)

$U_i = 17.5V$

$I_i = 1.675A$  –Supplied from a linear output with an internal impedance of 10.45 Ohm.

$P_i = 7.33W$

$C_i = 1\mu F$

$L_i = 0$

CI140:J2A Pins 21&22 VL MICRO - (for connection to CI139 J7 Pins 3 & 4 or Cable J2A Pins 21&22)

$U_i = 17.5V$

$I_i = 1.25A$  Transient - Supplied from a linear output with an internal impedance of 14 Ohm.

$I_i = 0.185A$  Long Term

$P_i = 3.24W$

$C_i = 5.3\mu F$

$L_i = 0$

The combination of POK, TI0 – TI9, RXD1, TXD1, TXE1, RXD2, TXD2, TXE2 and VIS.

CI140:J2A Pins 7-17, CI140:J2B Pins 1-7, CI140:J13 Pins 5&9 and CI196:CON3 Pins 1-8.

(for connection to CI139:J5, J6, J8 and CI184:CON1) All combined as the same intrinsically safe circuit:-

$U_i = 5.2V$

$I_i = 11mA$

$P_i = 4.1mW$

$C_i = 950\mu F$  This value includes the worst case capacitance of CI140 and the other circuits which may be connected.

$L_i = 0$

$U_o = 5.38V$

$I_o = 1.3A$  Transient -Linear output.

$I_o = 0.2A$  Long Term

$P_o = 1W$

$C_o = 10\mu F$

$L_o = 10\mu H$

The Microprocessor Unit CI140 Connects to other equipment 15.2 to 15.8 within the same Dispenser.

CI140:J3 or CI140:J4 may connect to:-

CI111, CI163:CON1, CI177:J2, CI180:J1, CI185:CON7, CI196:CON2, CI196:CON5 or CI225:J1

CI140:J5 or CI140:J6 may connect to:- CI111, CI163:CON1 or CI180:J1

CI140:J7 may connect to:- CI170:CON2 or CI237:CON2

CI140:J8 connects to CI214:CON5

CI140:J9 may connect to:-

CI214:CON8, CI218:J1 & CI218:CON2, CI177:J1 or CI232:J4 or CI170:CON12 or CI237:CON12

CI140:J10 may connect to:- CI170:CON1 or CI237:CON1

CI140:J11 may connect to:- CI170:CON12 or CI237:CON12

CI140:J12 may connect to:- CI170:CON1, CI237:CON1 or CI196:CON4

CI140:J15 and CI140:J16 connects to Card Reader

CI140:J17 may connect to:- CI170:CON12, CI178:CON4, CI178:CON6 or CI237:CON12

## **2. CNG Temperature and Pressure Board CI214**

CI214:CON5 to CI140:J8 and CI214 CON8 to CI140:J9  
CI214:CON10 or CI214:CON11 to CI177:J1  
CI214:CON1, 2, 4, 6, 7, 9 connect to Simple Apparatus.

The CNG Temperature and Pressure Board CI214 comprises external thermistors or RTDs (CI214:CON6 and CI214:CON7) and external pressure sensors with a maximum capacitance of 16 $\mu$ F (CI214:CON1, 2, 4 & 9), associated resistors, capacitors, an inductor, integrated circuits, diodes and zener diodes. Each of the thermistors, RTDs and pressure sensors takes its supply from Vcc derived from the microprocessor board and the temperature and the pressure signals are monitored and conditioned by the circuit components.

The Temperature and Pressure Board CI214 is housed within a plastic enclosure which provides a degree of protection of at least IP20, provides 500V isolation from earth. The thermistors & pressure sensors have integral leads, are provided with a degree of protection of at least IP20 and provide 500V isolation from earth.

## **3. Quantity Measurement Sensors**

### **3.1 Up to two KG Meter CI177 & CI176**

CI177:J1 Connected to CI140:J9 or CI1214:CON10 or CI1214:CON11 and  
CI177:J2 Connected to CI140:J3 or CI140:J4 or CI196:CON1 or CI196:CON6

The metering of fuel by mass is achieved by either one or two Coriolis KG Meters. Each KG Meter comprises two printed circuit boards CI177 and CI176 connected to the Micro Processor Board.

Within the KG Meter, printed circuit board CI177 is connected to three Coriolis sensing coils. Three cores move into or out of these coils, proportional to the mass flow of fuel through two loops of process pipe work. Printed circuit board CI177 is the Power Supply printed circuit board and is connected to Micro Processor Board and is diode blocked at the input to prevent interaction between the two units.

The two printed circuit boards contain a mixture of discrete and surface mounted components and the units have an integral cable. The units are capable of meeting the 500V test to earth or frame and meet the requirements for IP20 with a metallic outer enclosure.

### **3.2 Up to two V50 (or KG S3) Meters, MPU CI225, DSP CI226 & either LPG CI227 or LPG CI231.**

CI225:J1 connected to CI140:J3 or CI140:J4 if one or two V50 Meters are used without PIN Pad CI218.  
CI225:J1 connected to CI232:J2 or CI232:J3 if two V50 Meters are used with PIN Pad CI218.

The metering of LPG, Adblue, Ethanol, etc. by mass is achieved by either one or two coriolis V50 Meters. Each V50 Meter comprises three printed circuit boards. MPU CI225 connected to the Micro Processor Board CI140 via the LPG Splitter CI232. DSP CI226 connected to MPU CI225 and a further interconnecting board either LPG CI227 or LPG CI231 which connect to the three coriolis drive and sense coils. Three cores move into or out of these coils, proportional to the mass flow of fuel through two loops of process pipe work.

The two printed circuit boards MPU CI225 and DSP CI226 contain a mixture of discrete and surface mounted components and the unit has an integral cable. The units are capable of meeting the 500V test to earth or frame and meet the requirements for IP20 with either a metallic or non-metallic outer enclosure. (See Specific Conditions of Use No. 2)

Up to Four (or Six via Encoder Multiplexer CI185) encoders:-

- 3.3 COM50 Smart with Encoder CI180 –
- 3.4 COM125 with Encoder CI163 –
- 3.5 COM250 with Encoder CI163 –

Connected to CI140:J3 to CI140:J6, or CI185:CON1 - CI185:CON6 or CI196:CON1 or CI196:CON6

Each of the Encoders CI163 & CI180 comprises a mechanical assembly of differing diameters containing a magnetic pole piece on a rotor attached to a positive displacement measuring system, and has an integral cable. In a separate chamber three Hall Effect sensors mounted on a printed circuit board pick up measurement data from the magnetic pole piece. This data is conditioned and is passed to the microprocessor board. Each printed circuit board contains surface mounted capacitors, a zener diode, resistors a transistor and the three Hall Effect sensors and derives the circuit power from Vcc within the microprocessor board. Each encoder is capable of meeting the 500V test to earth or frame and meets the requirements for IP20.

### 3.6 Optical Encoder CI111

Connected to CI140:J3 to CI140:J6, or CI185:CON1 to CI185:CON6 or CI196:CON1 and CI196:CON6

The Optical Encoder CI111 comprises a mechanical assembly containing a segmented disc on a rotor attached to a positive displacement measuring system and has an integral cable. The vanes pass between three LED / photo transistor pickups which pass measurement data to the microprocessor board. Each printed circuit board contains discrete capacitors, three LED / photo transistor pickups and resistors and derives the circuit power from Vcc within the microprocessor board. The encoder is capable of meeting the 500V test to earth or frame and meets the requirements for IP20.

### 3.7 Encoder Multiplexer CI185

CI185:CON7 connects to CI140:J3, CI140:J4, CI140:J5 and CI140:J6  
CI185:CON1 to CI185:CON6 connects to up to six encoders CI111, CI163 or CI180

The Encoder Multiplexer CI185 comprises a printed circuit board containing capacitors and integrated circuits and derives the circuit power from Vcc within the microprocessor board. The Encoder Multiplexer is capable of meeting the 500V test to earth or frame and meets the requirements for IP20

### 3.8 Triscan Splitter CI196

CI196:CON4 connects to CI140:J12, CI196:CON2 connects to CI140:J3, CI196:CON5 connects to CI140:J4,  
CI196:CON3 connects to CI184:CON1 on Mk II Power Supply Baseefa14ATEX0074X.  
CI196:CON1 and CI196:CON6 connect to encoders CI111, CI163, CI180 or CI177:J2,  
CI196:CON7 and CI196:CON8 connects to nozzle switches.

The Triscan Splitter CI196 printed circuit board does not contain any components but provides the interconnection facility between the Microprocessor CI140 and up to four encoders CI111, CI163 or CI180 and up to two nozzle switches.

### 3.9 LPG Splitter CI232

CI232:J4 connected to CI140:J9, CI232:J1 connected to CI140:J13, CI232:J2 or CI232:J3 connected to CI225:J1,  
CI232:J5 or CI232:J6 connected to CI218:J1 and CI218:CON2

The LPG Splitter CI232 printed circuit board does not contain any components but provides the interconnection facility between the Microprocessor CI140 and up to two PIN Pad Displays CI218 and up to two V50 Meters CI225 & CI226.

#### **4. Wireless Interface CWIT (or CWID) Board CI101**

CI101:CON5 Connected to CI140:J13,  
CI101:CON2 / CI101:CON9 for the CWIT Aerial

The C4000 CWIT pcb CI101 is designed to be mounted in a hazardous area and its associated CWIT Aerial provides a wireless data interface for the C4000 Control Unit.

The C4000 CWIT pcb CI101 comprises a single printed circuit board which has a mixture of surface mounted and discrete components, six pcb connectors, CI101:CON5 for the Microprocessor Unit C140-J13 and CI101:CON2 / CI101:CON9 for the CWIT Aerial connection. The other connectors CI101:CON1, CI101:CON3, CI101:CON4 and CI101:CON6 are not to be used for hazardous area applications. The printed circuit board is mounted within an outer plastic enclosure which provides a degree of protection of at least IP20.

CWIT (or CWID) Aerial

Either CI101:CON2 or CI101:CON9 may be connected to the CWIT Aerial which is a single coil antenna wound on a nylon former. It is provided with a degree of protection of at least IP20 and can withstand a 500V test to earth.

#### **5. Displays**

##### **5.1 Retail Display CI170**

CI170:CON1 to CI140:J10, CI140:J12.  
CI170:CON2 to CI140:J7  
CI170:CON9 to Buzzer, CI170:CON12 to CI140:J11 and CI140:J17  
CI170:CON3, 4 & 5 may be connected to Totalisers.  
CI170:CON6 may be connected to Nozzle Switches.  
A second display may be connected to:-  
CI170:CON7 to CI170:CON7 or CI178:CON1 or CI178:CON5 and  
CI170:CON10 to CI170:CON10 or CI178:CON4 or CI178:CON6

The Retail Display CI170 is designed to be mounted in a hazardous area and comprises a number of LCD displays, the LCD driver integrated circuits, capacitors, resistors, LEDs and semiconductors. The LCD displays are back lit with LEDs and fibre optic mats. The display derives the circuit power from VDSP within the microprocessor board.

##### **5.2 Preset Display CI178**

CI178:CON1 or CI178:CON5 connects to CI170:CON7 or CI237:CON7 and  
CI178:CON4 or CI178:CON6 connects to CI140:J17 or CI170:CON10 or CI237:CON10  
CI178:CON2 connected to CI192:J1  
A second display may be connected to:-  
CI178:CON1 and  
CI178:CON4



The Optional Preset Display CI178 forms part of the display circuit and is supplied from the CI140 Microprocessor printed circuit board via the Generic Display. The circuit comprises surface mount capacitors and resistors, integrated circuits and semiconductor components mounted on a printed circuit board. The Preset Display CI178 may be mounted within the same enclosure as the Generic Display which will provide a degree of protection of IP20.

### 5.3 Preset Interface Keypad CI192

CI192:J1 connects to CI178:CON2

CI192:J3, CI192:J3A and CI192:J4 connect to a membrane keypad which only contains simple switches.

The Preset Interface Keypad CI192 is designed to be mounted in a hazardous area and comprises integrated circuits, capacitors, resistors, and semiconductor components mounted on a printed circuit board. The Preset Interface Keypad derives the circuit power from Vcc within the microprocessor board and is split into two separate intrinsically safe circuits. Connectors CI192:J3, CI192:J3A and CI192:J4 may be connected to a membrane keypad which only contains simple switches.

### 5.4 CI236 & CI237 LCD Displays

CI237:CON1 to CI140:J10, CI140:J12.

CI237:CON2 to CI140:J7

CI237:CON9 to Buzzer, CI237:CON12 to CI140:J11 and CI140:J17

CI237:CON5 may be connected to a Totaliser.

A second display may be connected to:-

CI237:CON7 to CI237:CON7 or CI178:CON1 and

CI237:CON10 to CI237:CON10 or CI178:CON4

The LCD Display CI236 & CI237 is designed to be mounted in a hazardous area and comprises a number of LCD displays, the LCD driver integrated circuits, capacitors, resistors, LEDs and semiconductors. The LCD displays are back lit with LEDs and a plastic light board. The LCD panel interface printed circuit board CI237:J1 connects directly to CI236:J1 LCD Display printed circuit board. The display derives the circuit power from VDSP within the microprocessor board.

### 5.5 PIN Pad with Display CI218

CI218:J1 connect to CI140:J9 or CI232:J5 or CI232:J6

CI218:CON2 connect to CI140:J9, CI232:J5 or CI232:J6.

CI218:J2 is connected to a membrane keypad which only contains simple switches

The PIN Pad with Display CI218 is designed to be mounted in a hazardous area and comprises two OLED displays, the driver integrated circuit, capacitors, resistors, and semiconductor components mounted on a printed circuit board. The PIN Pad with display derives the circuit power from VP and Vcc within the microprocessor board and is split into two separate intrinsically safe circuits. Connector CI218:J2 is connected to a membrane keypad which only contains simple switches.

## 6. Card Reader - Connected to CI140:J15 & CI140:J16

Either one or two Card Readers may be connected to the Microprocessor CI140. This assembly does not meet the requirements for IP20, therefore must be mounted within a suitable external enclosure which provides this protection to the rear of the unit. The receptacle for inserting a card may be external to this enclosure. The unit must be segregated from other IS and non IS circuits and mounted such that it is capable of meeting a 500V test to earth.

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The Card Reader consists of one or two inductive heads, which read magnetic data from an external card and interpret this data using two integrated circuits. The electronic circuit components are mounted on a printed circuit board.

## **7. Peripheral equipment:-**

7.1 Totaliser ENM P2G729A Connected to CI140:J10 or CI170:CON3, 4 or 5

The Totaliser is an electromechanical device comprising a solenoid coil with an armature which actuates a mechanical counter mechanism. Up to four totalisers may be connected to the Microprocessor Unit CI140 or Display CI170. Each totaliser is contained within a plastic enclosure which provides a degree of protection of at least IP20, provides 500V isolation from earth and is provided with two leads (and screen).

7.2 Buzzer Hi-Q 54-35C2 Connected to CI140:J11 or CI170:CON10 or CI170:CON2

The buzzer is a piezo crystal device with a maximum capacitance of 0.1 $\mu$ F, and is contained within a plastic enclosure which provides a degree of protection of at least IP20, provides 500V isolation from earth and is provided with two leads which are connected to the Microprocessor Unit CI140.

## **8. Simple Apparatus:-**

Connected to Microprocessor Board CI140:J12, CI140:J11, CI196:CON7 or CON 8, CI214:CON1, 2, 4, 6, 7, 9, CI170:CON6

Various switches, temperature sensors and pressure sensors with a maximum capacitance of 16 $\mu$ F, are connected to the Microprocessor Unit CI140 to detect the state of external equipment. These are provided with a degree of protection of at least IP20 and provide 500V isolation from earth, therefore are considered to meet the requirements of Simple Apparatus and are not considered further. This covers the Nozzle Switches, Hi / Lo Switches, Parameter On / Off Switches, Peripheral switch, Air Detector / Sump Switches Herga 6863, temperature sensors and pressure sensors.