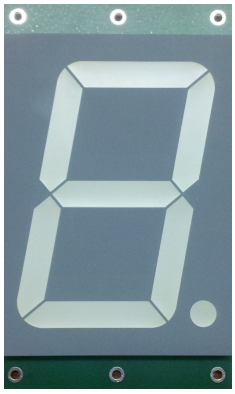
IQ41X

100mm 4” Extra Large intelligent 7-Segment Display (PCB, 4 / 5 or 6 Digit)

Manual – English 1.01



Introduction

The extra large intelligent 7-Segment display with its high light output 100mm 4” digits provide excellent visibility and viewing distance even from 50m away. The extra large display is available as individual Master/Slave PCB digits or as a completed unit mounted in a rugged IP65 powder coated steel enclosure.

Both RS232 and RS485 serial communication interfaces are provided as standard with status LEDS indicating communication activity. The IQ41X has many built-in serial communication software protocols but specific customer serial communication protocols can also be written on request. The IQ41X can also act as a Modbus slave display.

A simple menu system allows for easy configuration of display and serial communication settings.

Applications include remote display for process inputs (temperature, pressure, level, etc), remote display for weighing applications, score board displays etc.

1 Features

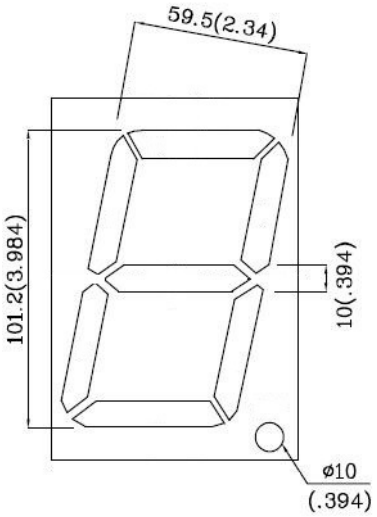
- **100mm 4” Extra Large 7-segment intelligent display**
- **Excellent visibility even at 50m viewing distance**
- **Available as individual Master/Slave PCB digits or as a completed unit mounted in a rugged IP65 powder coated steel enclosure (4/5/6 digit display)**
- **Both RS232 and RS485 serial interfaces are provided as standard**
- **Many built-in serial communication software protocols**
- **The large display can act as a Modbus slave display (Modbus RTU and Modbus ASCII supported)**
- **Customer specific serial communication protocols can be written on request**
- **Over / under range and communication timeout error messages**
- **Standard 12Vdc input with built-in voltage reversal and over voltage protection**
- **Status LEDS for RS232 and RS485 communication activity**
- **Universal Mains Power supply (90-265Vac) option available (Complete display unit)**
- **Radio modem option available (Complete display unit)**
- **Field upgradable firmware via the RS232 port**

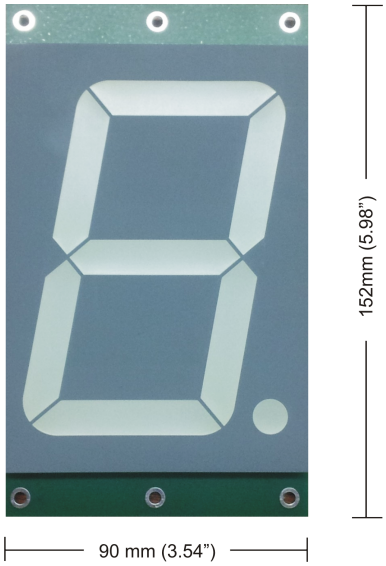
2 Specifications

General:	
Display	101mm (4”) high light output 7-segment display
Non-volatile memory storage	100000 write cycles
Connector (Master PCB)	6-Way plug in connector
Power Requirements:	
Power Supply (PCB)	12Vdc with built in over voltage and reverse voltage protection. 12W (All segments on, based on a 4-digit display) add 2.8W per additional 7-segment digit
Power Supply (Completed unit)	Universal mains power supply (90-265Vac)
Communications:	
RS232 Communications	Baud rate: 1200,2400,4800,9600,19200,38400,57600,115200 Data bits: 7 or 8 bits Parity: Odd, Even or none Stop bits: 1 or 2 stop bits non-isolated
RS485 Communications	Baud rate: 1200,2400,4800,9600,19200,38400,57600,115200 Data bits: 7 or 8 bits Parity: Odd, Even or none Stop bits: 1 or 2 stop bits Jumper selectable 120 Ohm termination resistor on Master Digit PCB (position J1) non isolated
Status LEDS	RS232 data transmit and receive RS485 data transmit and receive
Serial Protocols	Modbus RTU Modbus ASCII Infiniteq Protocol Various built-in serial communication protocols (Please consult the factory for a complete listing of supported serial protocols)
Dimensions:	
PCB Digit	152mmx90mm (5.98”x3.54”)
4 Digit Complete Display	500mmx200mmx120mm (19.69”x7.87”x4.72”)
Environmental Conditions:	
Operating temperature	-10°C to 60°C (14°F to 140°F)
Storage temperature	-40°C to 80°C (-40°F to 176°F)
Operating and storage humidity	<85%, RH (non-condensing)

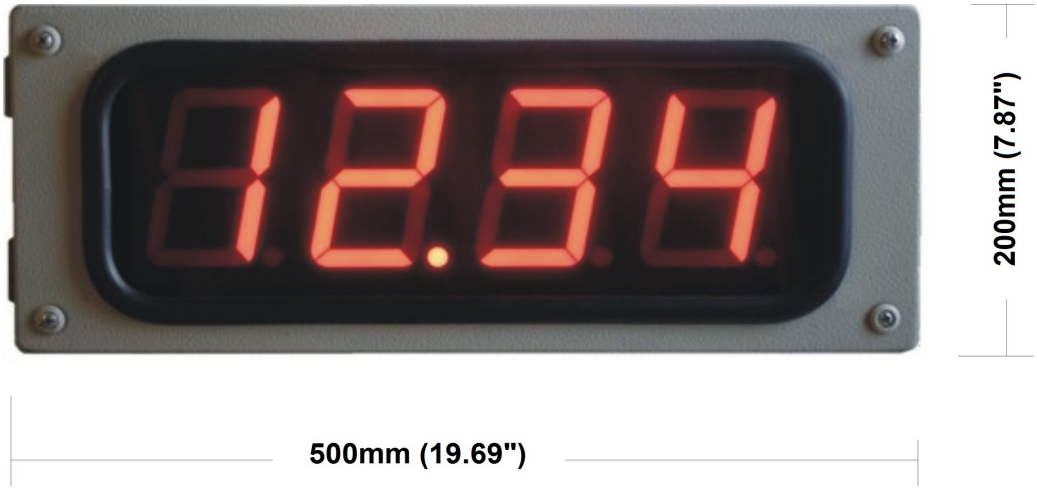
3 Installation

3.1 7-Segment digit size and PCB mounted digit size





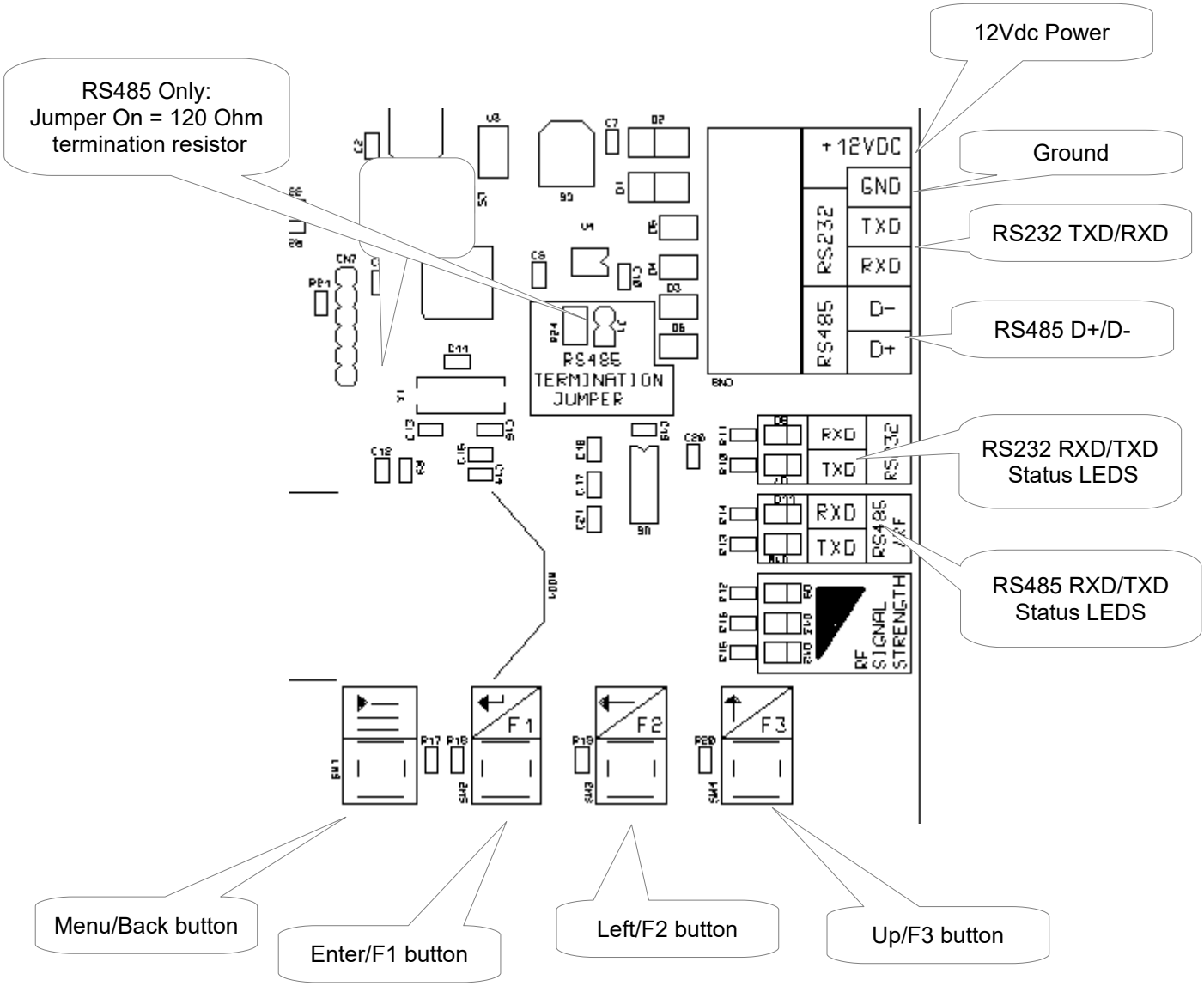
3.2 Enclosure Dimensions (4 digit enclosure shown)



Depth = 120mm (4.72”)

3.3 Connection Diagram

Connect the large display as shown in the diagram below:



3.4 RS485 Communications

The large display includes an on-board termination resistor which can be selected by linking J1 on the master digit PCB inside the large display enclosure. The termination resistor is 120 Ohms.

3.5 RS232/RS485 Transmit and Receive LEDS

The transmit and receive status LEDS will flash to indicate activity on the RS232 and RS485 serial communication lines. This is useful for field debugging and installation.

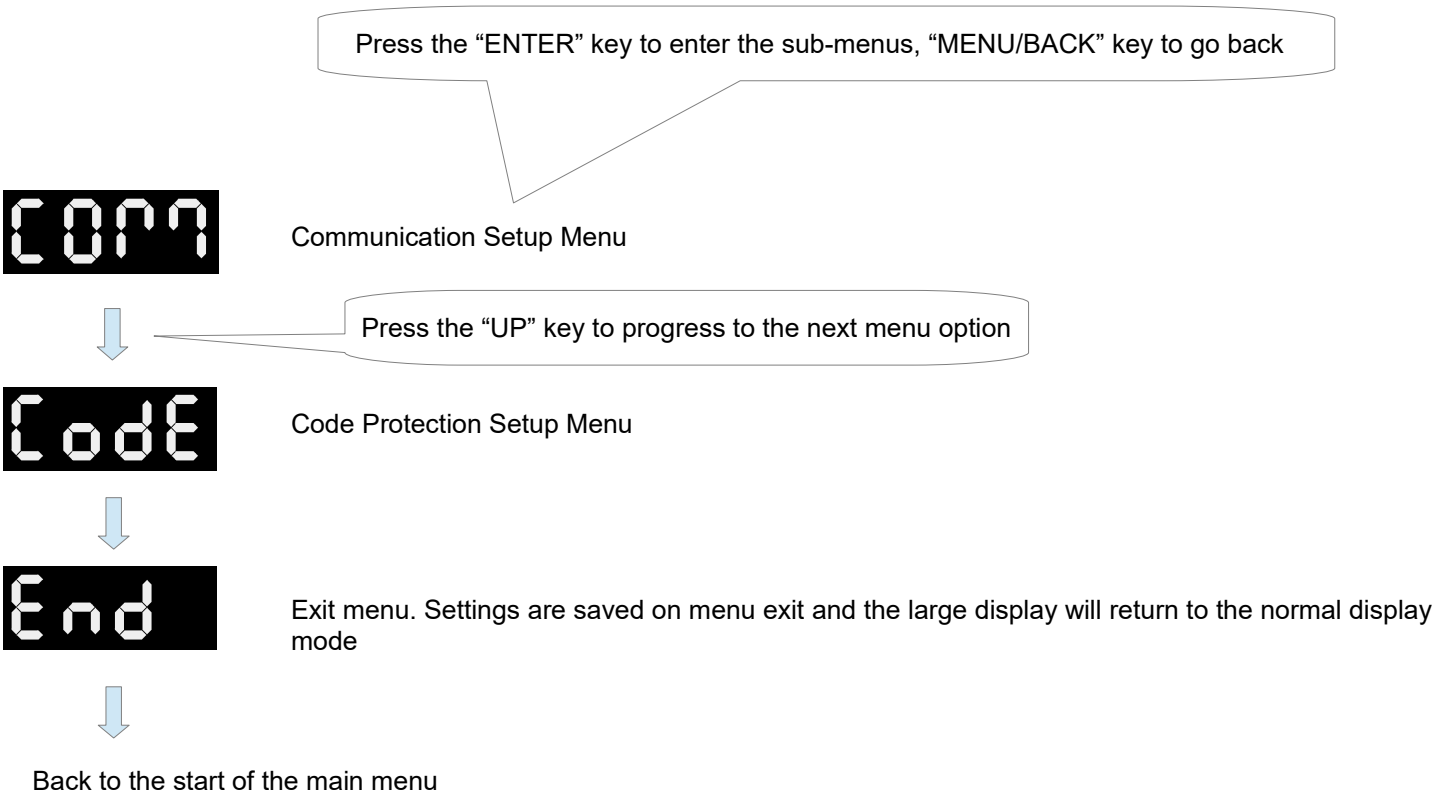
4 Menu System

The menu system can be entered by pressing the menu button. Use the keys to navigate though the menu system. All settings are saved in non-volatile memory when exiting the menu system. The menu system has a 30 second program timeout. If no key has been pressed within this period then the large display will save all settings and return to the normal display mode. Press the menu button to return to the previous menu.

4.1 Editing and Entering Values

The large display will occasionally prompt the user to enter a value by flashing the digit. Use the “LEFT” and”UP” buttons to change the value, “ENTER” to accept or “MENU” to cancel and return to the menu system.

4.2 Main Menu



Note: The menu system has a 30 second program timeout. If no key has been pressed within this period then the large display will save all the settings and return to the normal display mode.

4.3 Communication Setup Menu

All serial communication parameters can be setup here

Select the serial communications protocol of the large display. The large display can also act as a Modbus slave display by selecting “Mb.r” or “Mb.A”. The large display also has many built-in serial protocols (Please consult the factory for a complete listing of supported serial protocols)

Infiniteq protocol

Modbus RTU

Modbus ASCII

This menu option sets the communication timeout period. If no valid communications is received within the timeout period then the large display will flash to indicate an error.

Enter the communication timeout period in seconds. Select zero seconds to disable this feature.

.

Enter the communication address of the large display. If more then one large display is connected via a multidrop network then the address of each large display must be unique. The Modbus address range is 001 to 247.

Enter the unit address of the large display. Any packet not addressed to this address will be ignored (serial protocol dependent)

Select the communication baud rate.

1200 baud.

2400 baud.

4800 baud.

9600 baud.

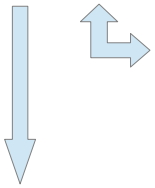
19200 baud.

38400 baud.

57600 baud.

115200 baud.

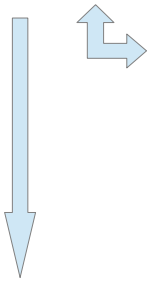
Select the communication data bits



7 data bits.

8 data bits.

Select the communication parity.

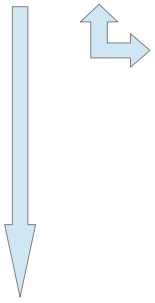


No parity.

Even parity.

Odd parity.

Select the communication stop bits.

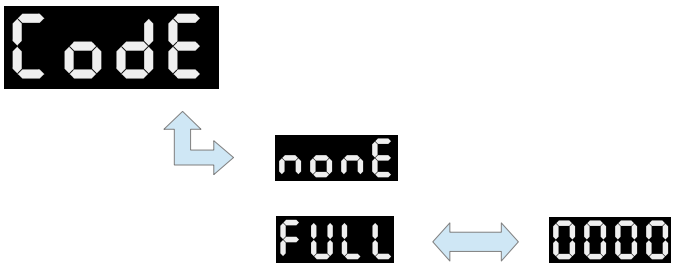


1 Stop bit.

2 Stop bits.

Back to the start of the Communication Setup menu

4.4 Code Protection Setup Menu



Use the push buttons to enter a unique password.

If a password has been set and “FULL” has been selected then the large display will prompt the user to enter the password upon entering the menu system. If the password is correct then it will allow the user into the menu system otherwise it will return to the normal display mode.

5 Serial Protocols

5.1 Infiniteq Protocol (I.TEQ)

Example: *123 12:23:45 01/01/2011 N +123456.78 kg

<*> = Decimal 42
<AAA><SPACE> (Only transmitted if address > 0)
<HH:MM:SS><SPACE><DD/MM/YYYY><SPACE> (Optional field if RTC selected) = Time & Date
<G/N><SPACE> = G=Gross, N=Net
<10 digits right justified, leading zero suppression, including decimal point and polarity>
<SPACE> = Decimal 32
<UNIT>=

None=Unit not transmitted F=Fahrenheit, C=Celsius, K=Kelvin, mA, mV, V, Hz, g, kg, t, oz, lb, T, N, RPM, kg/min, kg/hr, t/hr, lb/min, T/hr

<CR> = Decimal 13
<LF> = Decimal 10

5.2 The Modbus Protocol (mB.r or mB.A)

The IQ41X modbus implementation is based on the following documents:

“MODBUS over Serial Line Specification and Implementation Guide V1.02” from Modbus-IDA.ORG.

And

“MODBUS Application Protocol Specification V1.1b” from Modbus-IDA.ORG.

Details of the Modbus protocol is described in these documents and is available for free download from the following website URLs:

http://modbus-ida.org/docs/Modbus_over_serial_line_V1_02.pdf

http://www.infiniteq.co.za/manuals.aspx

5.2.1 Modbus Commands

The IQ41X supports the following Modbus commands:

FC03 (0x03) – Read Holding Registers

FC05 (0x05) – Write Single Coil

FC06 (0x06) – Write Single Holding Register

Note: Broadcast read commands are ignored by the large display, only broadcast write commands are processed.

Supported Modbus Error Messages:

Error Code	Error Description
0x01	Illegal function code
0x02	Illegal register address
0x03	Illegal data value or data length

5.2.2 Modbus Register Addresses

Read Holding Register (FC03), Write Single Holding Register (FC06):

Referenced to 4XXXX.

Address	Data Type	Operation	Description
400	32 bit signed	R/W	Display Value High Word
401	32 bit signed	R/W	Display Value Low Word
402	8 bit unsigned	R/W	Display decimal point

FC05: Write Single Coil

Referenced to 0XXXX. A value of 0xFF00 for the data will execute the function. An Echo of the original message will be returned.

Address	Action Command
0	Large Display Reset
1	Load Default Settings

6 Error Messages

Under Range:

This message is displayed if the serial input message to the large display is less then -1999 (4 digit), -19999 (5 digit) or -199999 (6 digit).

Over Range:

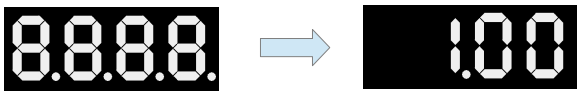
This message is displayed if the serial input message to the large display is greater then 9999 (4 digit), 99999 (5 digit) or 999999 (6 digit).

Communication Error:

The large display will flash if no communications has been received within the timeout period set in the “t.oUt” setup menu. This message is disabled if the timeout parameter is set to zero.

7 Display Test & Firmware Revision number

On startup the large display will do a display test whereby all the segments of the large display is turned on. It will then briefly display the firmware revision number.



8 Loading Factory Default Settings

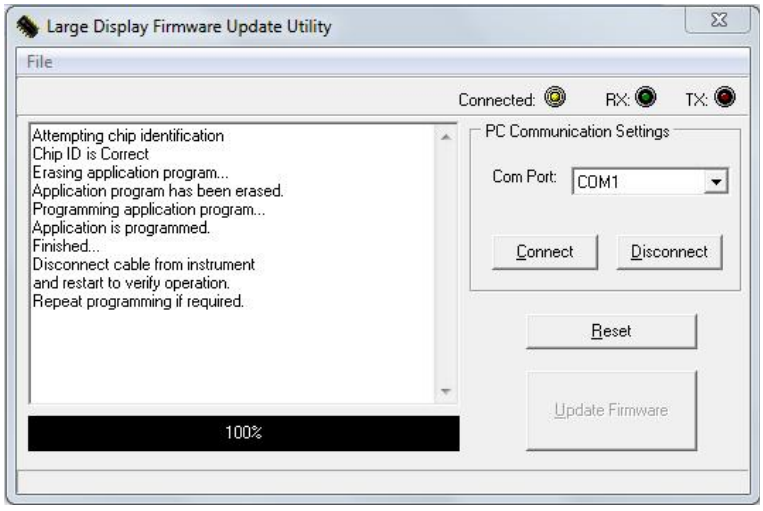
Factory default settings can be loaded by pressing both the “UP” and “LEFT” key simultaneously at power up. The word “D.SET” will briefly appear on the large display. All settings will be set back to the factory defaults.

9 Field Firmware Upgrading

The large display can be upgraded in the field by connecting the RS232 port to a PC and running the firmware update program. **Note that only the RS232 port can be used to upgrade the firmware.**

Steps to follow to upgrade the firmware:

1) Connect the RS232 port on the large display to the PC RS232 port as described in the table below
2) Run the upgrade program on the PC that matches your large display
3) Select the correct Com Port and click the “Connect” button
4) Power up the large display while pressing all 4 push buttons down. The word “BOOT” will appear.
5) The words “Ready to program” will be displayed in the text area and the “Update Firmware” button will be enabled
6) Click the “Update firmware” button and the firmware will begin to be updated
7) The following screen will be displayed if successful



PC connections:

D9 Female Connector	Large Display
Pin 5	GND
Pin 2	RS232 TXD
Pin 3	RS232 RXD

10 Ordering Information

IQ410 – 4 Digit display
IQ412 – 5 Digit display
IQ411 – 6 Digit display

100mm Master digit
100mm Slave digit

11 Notice

Specifications of the products displayed herein are subject to change without notice. Infiniteq cc, or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Infiniteq's terms and conditions of sale for such products, Infiniteq assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Infiniteq products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Infiniteq for any damages resulting from such improper use or sale.

12 Warranty

This product carries a warranty for a period of one year from date of purchase against faulty workmanship or defective materials, provided there is no evidence that the unit has been mishandled or misused. Warranty is limited to the replacement of faulty components and includes the cost of labor. Shipping costs are for the account of the purchaser.

Note: Product warranty excludes damages caused by unprotected, unsuitable or incorrectly wired electrical supplies and or sensors, and damage caused by inductive loads.

DISTRIBUTED BY: