C2i

Entranet SC

Gateway

C2i Entranet™
Model No: Entranet
Serial No:
Frequency: 868 / 915MHz
Environmental: IP65
Voltage Rating: 5 - 24VDC
Current Rating: 800mA max
Hazardous voltages may be present inside this equipment.
Isolate or disconnect the equipment from HAZARDOUS LIVE voltages before removing covers.
Refer to instructions before use.
Utilivista
C2i
Made in the UK

Data and Instruction Manual

Utilivista

BSRIA Member

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1. Introduction

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1.2 - Symbols

☞ **Indicates something to be noted by the user**

⚠ **Indicates important information**

⚡ **Indicates high voltage**

1.3 - Conventions for Cautions and Warnings

CAUTION

⚠

Cautions advise the user to proceed with care.
They alert users to situations wherein there is potential that they might perform an action which could result in an unexpected outcome or the loss of data which could be permanent.
Cautions contain an explanation of why the action is potentially problematic.

WARNING!

⚠

Warnings advise the user to proceed with *extreme* care.
They alert users to situations wherein there is potential that they might perform an action which could result in personal injury or damage to equipment.
Warnings contain an explanation of why the action is potentially dangerous.

1.4 – Important Safety Information

☞ **Be sure to heed the following warnings to prevent personal injury or damage to equipment.**

WARNING!

⚠

The circuit powering the Entranet is 5/24vdc depending on the power module being used. Disconnect power before installation or servicing to prevent electrical shock or damage to equipment. Make all connections in accordance with national and local electrical codes. Use copper conductors only. To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.

The Entranet is only intended for use as a monitoring and communications device. To prevent loss of data or damage to equipment, DO NOT USE IT FOR ANY OTHER PURPOSE.

☞ **Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within an Entranet device are sensitive to static discharge.**

Follow these precautions when installing, servicing, or operating the system:

- **Work in a static-free area.**
- **Discharge any static electricity you may have accumulated.**
- **Discharge static electricity by touching a known, securely grounded object.**
- **Do not handle the printed circuit board (PCB) without proper protection against static discharge.**
- **Use a wrist strap when handling PCBs. The wrist strap clamp must be secured to earth ground.**

WARNING!

⚠

All electrical installation work must be undertaken by a suitably qualified and competent person and must be carried out in full accordance with all relevant Statutory Requirements and Regulations.

1.5 - Before Commencing Repair Work

WARNING!

⚡

1. Disconnect/Isolate the power supply, if connected.

2. Ensure that all safety and operational measures have been implemented.

1.6 – Risk Avoidance

To avoid the risk of personal injury and damage to equipment the **Entranet** must be operated in accordance with the guidelines and specifications detailed in this manual, as well as all statutory requirements and regulations. Take special heed to all Cautions and Warnings.

2. Introduction to the Entranet

2.1 – Device Overview

The Entranet SC gateway seamlessly connects any digital, serial, or Ethernet-enabled device to any system or server you choose via TCP/IP or 3G. The Entranet SC is designed for use with SiteConnect, our remote monitoring tool. This document refers to both variants of the Entranet SC. The TCP/IP variant connects via Ethernet only while the 3G variant can also connect to the internet via 3G/GPRS.

2.2 – Features Overview

- Connect to any software, system or server.
- Powered by 24vdc PSU or 5v USB mains adapter.
- Simple setup and clear configuration, either locally or remotely via the device/data management hub installed onboard.
- Data can be reviewed on the local dashboards
- Firmware can be upgraded over-the-air.
- Modbus TCP/IP Slave and Master via Serial connection (option)
- Sampling and reporting fully customizable.
- Powerful system diagnostic tools.
- IP67 rated

2.3 – Monitoring Capabilities

- **Digital Status and Logger** – Two (optional) digital inputs provide utility and/or maintenance data. Each can be configured to count pulses, regularly sample the status, or log the exact time of each change of status.
- **Modbus Slaves** - *(optional)*. If the device is set up as a Modbus RTU Master and/or a Modbus TCP/IP Master, data will be received for any coils or registers on Modbus slaves, based on user configuration.

2.4 – Input Connections

☞ **Input wiring must be installed in accordance with national and local regulations/requirements. All wiring types must be selected appropriately, according to their function and operating constraints.**

Inputs require glands or conduit entries in the gland plate at the bottom of the Entranet. Care needs to be taken to ensure the IP rating remains intact. Each input can take a wide range of readily available sensor types. All inputs and outputs are protected against electrostatic discharge (ESD).

2.4.1 - Connection Details

The connections to the Entranet are via cable entry holes in the bottom of the case, where cables pass through glands and terminate into the spring loaded plug-in terminals mounted on the edge of the printed circuit board. The case has a detachable plate that is screwed, complete with seal. This plate can be replaced with a blank or with 4 or 8 holes. The cover over the terminal compartment is screwed complete with seal.

3. Deploying the **Entranet**

3.1 - Before Deploying an **Entranet**

☞ **Read this guide before installing. If the Entranet is installed incorrectly, Utilivista's warranty obligations will no longer apply. If in doubt, contact us.**

The **Entranet** must be mounted in a suitable environment in a position that allows safe access and good clearance for wiring, servicing, removal, and connection of all the I/O.

☞ Environmental Considerations

- **Do not operate outside the ambient temperature range (-20°C to +60°C).**
- **Do not cover. Allow air circulation.**
- **Protect from direct contact with steam or any other harmful substances.**
- **Where possible, protect from direct sunlight.**

☞ Where possible keep away from the following:

- **Steel poles, pipes, RSJ's, cladding and other large metal surfaces.**
- **Electric motors or high frequency drives.**
- **Other strong wireless signalling systems, dishes or antenna's.**
- **High voltage electric cables or transmission lines.**
- **Any equipment that transmits high levels of interference (high EMC / RF).**
- **Areas where there is the potential for mechanical damage or obvious obstruction to normal operational behaviour.**

☞ To maximise signal strength (3G variant only):

- **Mount the Entranet in its upright position (though it can be mounted in any orientation).**
- **Fix the Entranet as high as practically possible.**

3.2 - Fixing the **Entranet**

The **Entranet** should be fixed to a wall or other permanent structure by attaching a screw or bolt to the building or equipment framework, and hanging the node via the keyhole fixing on the back of the unit. Allow 300mm between the **Entranet** and any other fixed equipment or services that may cause mechanical / electrical damage or interference.

☞ **Take care not to drill materials that may be harmful. Also ensure that there are no hidden services etc. in or near the path of the drill.**

To avoid any danger in fixing as described above, alternative fixings could be used such as a cable strap, Velcro, "No-Nails" or similar.

3.3 – Connecting Cables

☞ **All cables and wiring must comply with national and local regulations and standards.**

It may be more convenient to make all the connections before mounting the device, especially if it needs to be positioned at a higher level to gain good reception. In this case ensure long enough tails are provided to enable tidy clipping/fastening to the building fabric/cable tray.

Remove the front access cover and route the cables through the gland plate and connect to the appropriate terminals.

The installer must ensure that the cable glands or entry system is sealed to IP67 standard to maintain the IP protection category. If these necessary steps are not taken and an **Entranet** is damaged because of ingress of water or other particulates and corrosive vapours, Utilivista will not be obliged to replace the unit within the warranty period.

☞ **Ensure all cable entries are used or plugged with the appropriate gland/plug.**

4. Configuring the Entranet

4.1 – Accessing the Device

Connect the Entranet to power via the 24v PSU or the USB adaptor.

☞ **The settings for IP networking can be changed, but the Entranet must first be accessed using its default IP address: 192.168.1.130.**

To add to a LAN which allows a new device with static IP address 192.168.1.130:

- Connect the RJ45 Ethernet cable into a switch or router.
- You may need to wait for about 2 minutes for the device to be fully booted up and available via Ethernet cable. See the next section (4.3) for a guide to the LED indicator showing the Ethernet port status.

To connect directly to a computer (e.g. to change the IP address to suit your LAN):

- Ensure your computer is not connected to any other LAN, either wirelessly or through an Ethernet cable.
- Connect the RJ45 Ethernet cable into your computer's Ethernet port. You may need wait for about 2 minutes for the device to be fully booted up and available via Ethernet cable. See the next section (4.3) for a guide to the LED indicator showing the Ethernet port status.
- In the TCP / IP settings of the LAN connection for your computer, set the IP address manually within the range **192.168.1.1 – 192.168.1.254**, (but DO NOT use 192.168.1.130), and the subnet mask to **255.255.255.0**.
- Open Internet Explorer or another browser on a computer on the network, and type into the address bar: http://192.168.1.130.

4.2 – Logging In

☞ **You will need to log in with a username and password.**

The username must be 'admin', 'manager' or 'user':

- Logging in as 'admin' allows you to change any settings.
  - The default password for admin is: C2iAdmin
- Logging in as 'manager' allows you to change configuration settings but not general settings.
  - The default password for manager is: C2iManager
- Logging in as 'user' means that no changes can be made.
  - The default password for user is: C2iUser

Passwords can be changed in the *Administration* settings. Each login type allows all settings to be viewed.

CAUTION

⚠ **It is strongly advised to create a unique password at the earliest opportunity. This document, and thus the default passwords, are publicly available.**

4.3 – Using the LED Indicator

When powered, the LED on your **Entranet** will indicate the status of the device with a series of flashes followed by a five second gap. The number of these flashes between each pause indicate the following:

	Device is Functioning	Ethernet Networking is Functioning	3G is Functioning
No Flashes	X	X	X
1 Flash*	🟩	X	X
2 Flashes	🟩	🟩	X
3 Flashes**	🟩	X	🟩
4 Flashes**	🟩	🟩	🟩

** When networking needs to be initiated (e.g. on inserting an Ethernet cable) this may continue for about 2mins.*

*** Only applicable to the 3G variant of the* **Entranet**

4.4 – Settings and Tools

4.4.1 – Administration

To access these settings, open the *Settings* folder in the menu and then click *Administration*. You will see options for the following:

- *Label and Description for Device*: You can set values for these, for display purposes.

- *Location Info*: These settings describe the site on which the device is installed. If applicable, they synchronise with the online SiteConnect interface, with the following rule: The latest edit, whether on the device or online, takes precedence and overwrites previous values in both places, except for the customer name setting, which is always retrieved, if possible, from SiteConnect.

- *Update password:* This is the only field which can be edited by the non-admin usernames, and gives the opportunity to change the password for the username you are logged in as. If logged in as admin you can also set any of the usernames to revert back to their default password.

- *Internet Activity and Time Synchronisation*: The time will be kept accurate by regular synchronisation over the internet or with a local timeserver which you can specify here. If you need to be able to set the time manually then set *Only use NTP to set time* to **No**. This will not disable synchronisation but will allow you to click an icon on the front page next to the time and change it manually. To access the front page at any time, (where the current time is displayed) click the *Front Page* icon at the top right of the screen.

- *Internet Activity and Remote Access / Updates*: If the device is to be continuously online (which is not necessary for all functionality), you can choose to automatically apply updates (*Check for Updates*), and to allow remote access through SiteConnect (must be purchased).

- *User-Initiated Updates*: If you have an update from C2i that needs to be manually uploaded, e.g. because the device is not connected to the internet, you can use the *Drop upg file or click to upload* section of the page. You will see a message that the file is uploaded, and the update will then be applied.

- *System Boots*: This shows the latest boot timestamp, which will be based on the time settings at the time of booting up. There is a link to *Reboot now* which will perform a reboot; the device will be off for up to one minute, and network connectivity may take more than a minute to be restored.
    - *For 3G devices*: There is also a link to *Restart modules* which power cycles all peripheral modules including the modem.

- *Configuration Backup Files:* A configuration file contains all settings relating to the pages in the menu under 'Configuration', though no data history. Configuration files can be downloaded or uploaded and applied on the Administration page. All firmware versions to date use the same format for these files (version 1).

4.4.2 – System Info

To access these settings, open the *Settings* folder in the menu and then click *System Info*. As well as seeing version information and technical information for the device, you will see options for the following:

- *Locale Settings*: Time zone can set, with all the geographic options from any continent, or the option of always using Greenwich Mean Time. There are also settings for date format and the choice between temperature in °C or °F.

4.4.3 - Network Settings

To access these settings, open the *Settings* folder in the menu and then click *Network*.

- *IP Network*: Use these settings if you need to assign an IP address, subnet mask or default gateway (if using a gateway to the internet or to another network), as well as (excl. 3G devices) the DNS server (the Domain Name Server for internet use, often the same as the default gateway). Alternatively, you can specify that DHCP addressing should be used by your router to allocate the **Entranet** ‘s IP address, in which case you will need to find out the IP address from your router to be able to access the **Entranet**.

- *Mobile Network (For 3G devices):* For setting the APN, username and password specific to the Sim Card inserted for mobile internet. This information can be provided by the mobile internet company. This section also shows connection status, remote IP address, boot-time signal strength, and mobile network.

4.4.4 - TCP / UDP Ports

To use this page, open the *Settings* folder in the menu and then click *TCP / UDP Port Numbers*. It shows port numbers for all incoming and outgoing connections, with options to turn off activity on specific ports.

4.4.5 - Settings for Digital Inputs (applicable only to devices with digital inputs installed.)

These settings are located by opening the *Configuration* folder and then the *Onboard Inputs* folder in the menu.

There is a page called *Generic Settings* which allows you to set the sampling interval for both digital inputs. (The interval between any two consecutive data values, between 10 seconds and 4 hours.)

The page called *Status / Pulse* allows you to activate and set the mode for the digital inputs. The options for mode are: *Take regular snapshots* or *Keep pulse count*.

4.5 – Diagnostics

The 5 sections below refer to pages that can be found by opening the Diagnostics folder from the menu and clicking on the relevant section.

4.5.1 - Error Log

- *Reports*: You will be able to see details of any problems with email or FTP operations, which may be due to an intermittent internet connection, incorrect server details, etc.
- *Modbus*: You will be able to see details of any problems with Modbus requests, which may be due to registers not being valid on a particular device, or failure to connect to the device. The presence of an error message indicates that a read request was attempted.

4.5.2 - Upgrade Log

This shows all upgrade activity for this gateway. A table shows the date and time, upgrade filename and status of all upgrades, most recent first.

To manually initiate upgrade, if you have a file for this, see Section 4.4.1, P9. Please note that it may take up to 2 minutes for an uploaded upgrade file to show in the Upgrade Log.

4.5.3 - Boot Log / GSM Log

This shows all instances of the device shutting down or booting up, and for 3G devices, all instances of the GSM connection status changing.

4.5.4 - System Power Log

This gives information about changes to powering mode (Mains or UPS), and hourly values for processor voltage and UPS battery voltage.

4.5.5 - Ping Tool

To access the *Ping Tool* open the *Diagnostics* folder from the menu and click on *Ping Tool*.
This allows you to ping IP addresses or domain names on the local area network or the internet and see responses.

5. Viewing and Exporting Data

5.1 – Summary of Interfaces for Viewing/Exporting Data

5.1.1 –Tables and Graphs on Web Pages

Use your web browser to see tables and graphs for latest and historical data.

5.1.2 - CSV Files and Reporting Schedules

Comma Separated Variable (CSV) files can be requested for any combination of device and input type. These can be downloaded on request or scheduled for email and / or FTP upload at user definable regular intervals.

5.1.3 - Modbus Slave Functionality

Applicable only to devices with Modbus additional functionality.

If the device is set up as a Modbus TCP/IP Slave, any input for which data is being received can be assigned a register number so that the latest value can be read via Modbus at any time.

5.2 – Graphs and Tables

5.2.1 – For All Inputs

To see a table of the latest data from any inputs of your device, open the *Diagnostics* folder from menu, then click *Data*.

Use the check boxes for device and input type and use the filter checkboxes to select which combination of devices and input types you are interested in, then click **Refresh Data**, for a static table or **Auto Refresh**, for a table which will be refreshed automatically every 30 seconds.

There will be a row in the table for every active input that matches your filter options. Each row shows the Device ID, Input ID, Input Name, the latest value and when it was captured.

For Modbus inputs, the Input ID means the absolute register address.

For digital inputs, the input ID is D1 for digital input 1 or D2 for digital input 2.

Also on each row is an expand link which allows you to see more historical data and graphs for that input (see Section 5.2.2 below). There is also a checkbox which you can select and then use the **Delete** button at the bottom of the table, if you wish to delete all stored data for that input.

5.2.2 - Historical Data

See above section(s) for how to access graphs and tables of historical data for a specific input. These pages have the following options for changing which data is shown:

- Date: The default setting is today’s date, or latest date for which there is data.

- Data Range: The default setting is **24 hours** which shows 24 hours of data ending with the last known value for that date. The other options for this are:

    - 2 weeks ending on this date
    - 7 days ending on this date
    - 24 hours
    - 4 hours (beginning either at 0:00, 04:00, 08:00, 12:00. 16:00 or 20:00).

  For the first two of these options, because of the larger amount of data, just a graph is shown with no accompanying table.

- The graphs and tables show all the known data in the specified range; the frequency of data is determined by the settings for the input in question.

5.3 - CSV Files and Reporting Schedules

5.3.1 - Description of the CSV files

The **Entranet** provides data files in the Comma Separated Variable (CSV) file format. These can be opened in a variety of applications, including spreadsheet programs such as Excel, and also imported into many monitoring software offerings.

An example of the first 3 lines of text from a CSV file for 2 different inputs is shown below:

```
Timestamp,Mod-meter 40001 K-counter,Node A211410-0136 V1 Ref-voltage,
27/03/2015 00:00:00,237001,242.4,
27/03/2015 00:05:00,237008,241.9,
```

The column names for an input (text on the top line, after the first column of 'Timestamp', are composed of the following information, appended together:

- If a digital input:
  1. The label of the device, or the serial number if there is no label (see Section 4.4.1, P8).
  2. A code for the input (e.g. D1 for digital input 1).
  3. The label of this input, if it has been labelled.

- If a Modbus input *(applicable only to devices with Modbus additional functionality)*:
  1. The label of the Modbus device.
  2. The register address, e.g. 40001
  3. The label for this register address, if it has been labelled.

The first column of all rows of data is a timestamp, showing the date (in your chosen date format) and the time (HH:MM:SS).

Data in the columns after this is written as numbers (without any characters separating thousands), with the number of decimal places used being dependent on 1) the type of field this is measuring, if a digital input, or 2) the specified number of decimal places for that register, if a Modbus input.

There will be one row in the CSV file for each timestamp for which data was sampled for any of the inputs that the CSV file is for. The CSV file will only apply to a specific range e.g. the latest 24 hours.

5.3.2 - Downloading a one-off CSV file

To download a CSV file:

1. Open the *Diagnostics* folder from the menu then click *Data*.
2. Use the check boxes for device and input type to select which combination of devices and input types you are interested in.
3. Click the **CSV Download** link below the checkboxes.
4. Select a start date and (inclusive) end date.
5. Use either the **Download CSV File** link or the **No Timeout Download** link. The first of these will take no longer than a few minutes but if you have requested lots of data (e.g. 100,000 values in total) the file may be incomplete. (In this case the filename will indicate that it is incomplete). The second of these can take an unlimited length of time and will always give a complete file with all the data you are requesting.

If your browser shows a security bar asking you to confirm download of the file, click to **Confirm**. You may then have to do the previous step again.

5.3.3 - Description of scheduled CSV reports

A report can be scheduled so that data relating to a user defined combination of devices and input types is emailed and / or uploaded via FTP, at a defined frequency.

The input types you can select from are:

- *C2i Inputs*: **Status / Pulse**

- *Modbus Inputs* (can be combined in the same report): **Discrete Coils, Discrete Inputs, Holding Registers, Input Registers**

The frequencies you can select are:

5, 10, 15, or 30 minutes
1, 6, 12 or 24 hours
Weekly (with options for when the week starts), or monthly.

The scheduler will perform the following actions:

1. Wait until it is time for another report. (e.g. for 15 minute reports, wait until a little before 0, 15, 30, or 45 minutes past the hour. The report may be ready a little before these times, e.g. if the sampling interval for this data was 1 min, the report for 12:00-12:15 would contain data for times up to 12:14, because the data for 12:15 would be included in the next report.)
2. Check that all the data for this report has been received from any Modbus devices.
3. Build the CSV file, naming it as defined by the user, with a suffix in the filename to show the times it relates to, and check that it can be emailed to the specified address(es) and / or uploaded to the specified FTP server. If it can then do so. If it cannot due to problems with the internet connection, keep checking until the internet connection is OK.

☞ **Sometimes the scheduler waits until a report can be sent. If enough time elapses such that more reports of this definition would be ready to send, then it groups all the necessary reports as one longer one, rather than sending them as multiple reports.**

5.3.4 - Scheduling CSV file reports

To schedule a report, open the *Configuration* folder and then the *CSV Reports* folder, then click **New**.
Use the check boxes for device and input type to select which combination of devices and input types you are interested in. Then enter values for the following fields:

☞ **You can run an instant test of the settings once they are saved.**

- *Report ID*: An ID to use to refer to these particular settings for automatic reporting.
- *Frequency*: See section above.
- Filename: Maximum 28 characters. It will be appended with the date and .csv file extension. As well as alphanumeric characters, you can use the underscore and dash characters.

Email Settings (If email is to be used):

- *Email to*: An email address, or more than one, separated with commas.
- *Email From*: An email address to appear as the sender address. To reduce risk of emails being put in a spam folder the domain name of this address should be that of your SMTP server (see below).
- *Email Subject*: Enter a subject if you want emails to be sent with a subject line different from the csv filename.
- *SMTP Server*: Server name for SMPT (Simple Mail Transport Protocol). The device does not function as a mail sending server so you must use an external one which this device must be able to access.
- *SMTP Port*: This is usually 25.
- *SMTP Username and Password*: Enter these if your server requires authentication.
- *SSL Security Required*: Select yes if your SMTP server requires SSL (Secure Sockets Layer) security.

FTP / SFTP Settings (If FTP uploads are to be used):

- *Connection Type*: 'FTP in active mode' is the default. 'FTP in passive mode' means that all connections to the server are initiated by the client. Often the reason for using this mode is to prevent a firewall blocking the connections. 'SFTP' can also be selected which is a different protocol with added security, using Secure Shell (SSH)
- *Server*: IP address or server name e.g. ftp.example.com.
- *Port*: TCP Port for this server. Usually this is 21 for FTP or 22 for SFTP.
- *Username and Password*: For FTP authentication.
- *Folder*: A folder found in the root folder of the FTP server, e.g. reports, or the path to a subfolder, e.g. reports/workshop. The folder entered here must exist on the server. Leave blank if just uploading to root folder.

Once you have entered the necessary settings click **Save**.

5.3.5 - Altering, Duplicating or deleting an existing scheduled report

To see the settings for an existing scheduled report, open the *Configuration* folder and then the *CSV Reports* folder, then click the appropriate report ID. Any settings can be altered and the report saved again. If the Report ID is altered, this will duplicate these settings and create a new report. Use the delete icon to remove this scheduled report.

5.4 - Modbus Slave Functionality

Applicable only to devices with Modbus additional functionality.

If the device is set up as a Modbus TCP/IP Slave, any input for which data is being received can be assigned a register number so that the latest value can be read via Modbus at any time.

To access the page for the Modbus Server, open the *Configuration* folder and then the *Modbus Server Settings* folder, then click *Modbus Server Settings*.

The top section of this page gives options for the status of the Modbus Server (On/Off), and the TCP Port used for requests, which **cannot** be any of the following reserved ports:

20, 21, 25, 80, 102, 123, 5001, 32123, 34962, 34963, 32964

Once the status has been set to **On**, and the page saved for the first time, you are able to assign specific inputs to specific Modbus addresses. You can choose which addressing mode for registers, as follows: **Register Addresses (Absolute),** in which the first input coil is displayed as 10001 and the first input register is displayed as 30001, or **Input Numbers Within Type**, in which the first input coil is displayed as 0 and the first input register is also displayed as 0.

To assign specific inputs to specific Modbus addresses, use the filter checkboxes to select the devices and input types you are interested in (see Section 5.3.1 - Description of the CSV Files, P12, for a list of input types), then click **Apply Filters**.

Then for each input that shows in the table you can set the following information:

- *Input Register Type*: The options are, **Input Register, 16 bit integer**, **Input Register, 32 bit float**, (these options are not available when assigning for a coil input being read from another Modbus RTU or Modbus TCP slave), or **Coil, Single bit 1/0**, (this option is available when assigning for a C2i digital input or a coil input being read from another Modbus RTU or Modbus TCP slave.)

☞ **If registers are assigned as 32 bit float input register, the byte order (strictly speaking, the word order or register order) is High -> Low.**

- *Modbus Address*: This can be entered individually for each input, or if you wish to assign consecutive addresses to inputs in the table, enter the address for the first row in the table, and any others that will not simply take the next register address after the input above it in the table, then click on **Auto-Fill Empty Addresses**.

After saving any changes on this page, please allow a minute for these changes to take effect.

6. Specifications

6.1 - General Specifications

Ambient Limits	-20°C to +60°C.
Electrical Supply	24vdc PSU or 5vdc USB Mains Adapter
Connectivity	TCP/IP or 3G/GPRS (depending on variant)

CASING

Material	Acrylonitrile Butadiene Styrene (ABS)
Dimensions (H,W,D)	235.00 x 154.06 x 73.22 mm
Volume	$3.5x10^{16}$ Ωcm
Weight	1.1kg approx.
Colour	Black
IP Rating	67
Impact Strength	240J/m
Ultimate Tensile Strength @ 20°C	40Mpa
Elongation at Break @ 20°C	50%
Instantaneous Flexural Modulus @20°C	2200Mpa
Compressive Strength @ 20°C	42Mpa
Specific Gravity	$1.05x10^{3}$ kg/m^{3}
Poisson's Ratio	0.35
Surface Resistance	< 10^{9} Ω
Vicat Softening Point	95
Coefficient of Thermal Expansion	$10.1x10^{-5}$ m/m°C
Maximum Operating Temperature	60°C
Temperature Range	-20°C to +60°C
Thermal Conductivity	0.2W/m°C
Specific Heat	1.47kJ/kg°C
Thermal Ignition Resistance	HB @ 1.5mm

DIGITAL INPUTS (depending on variant)

Voltage Rating	5V DC
Input Logic Low Voltage (typical)	<0.7V
Input Logic High Voltage (typical)	>2.25V
Input Type	Logic level
Operating Logic	Open circuit = 1, Closed circuit = 0
Pulsed Input	Fast Counter
Max	220ms

6.2 - Special Conditions

No testing has been carried out in any of the following environments:

- High altitudes.
- Pressurised cabins or containers.
- Explosive atmospheres.

6.3 - Approvals

IP67 protection, where 6 means total protection against dust and 7 means protection against immersion between 15cm and 1m of water for 30 minutes.

☞ **C2i only recommends and sells approved sensors. It is the responsibility of the customer to ensure that all sensors used with the Entranet have the appropriate approvals.**

6.4 – Safety Features

6.4.1 - Cage Clamp Terminals

Cage clamp type terminals ensure the wires are secure and held reliably, thus the connections have an increased durability and stability.
Power terminals conductor size is equal to 0.75mm^2 and low voltage terminals conductor size is equal to 0.5mm^2. Recommend using 0.5mm^2 pin ferrule crimps for easier termination.

6.4.2 - ABS Casing Material

The casing material used for the **Entranet** is acrylonitrile butadiene styrene (ABS) a compound which has been formulated to meet the static dissipative requirements of the ATEX Directive, thus meeting specific safety requirements. The Casing has high impact strength and ductility, good chemical resistance and abrasion resistance. The material is nontoxic, thus handling of the node has no inherent safety risks. The casing material has high strain tolerance and good resistance to ultraviolet light.

6.4.3 – Electrical Static Discharge (ESD)

All inputs and outputs are protected against ESD.

6.5 – Flammability Ratings

The ratings are as follows:

- 5VA: burning stops within 60 seconds on a vertical specimen with no drips; specimens do not develop a hole.
- 5VB: burning stops within 60 seconds on a vertical specimen with no drips; specimens may develop a hole.
- V-0: burning stops within 10 seconds on a vertical specimen; non-inflamed particles may drip.
- V-1: burning stops within 30 seconds on a vertical specimen; non-inflamed particles may drip.
- V-2: burning stops within 30 seconds on a vertical specimen; flaming particles may drip.

Enclosure Material (UL-94 1.5mm)	**V-0**
Enclosure Material (UL-94 2.0mm)	5VB
Enclosure Material (UL-94 3.0mm)	5VA
Resin (UL-94 6.0mm)	V-0

Appendix A – Additional Information

A.1 - Data Intervals and Storage

A.1.1 - Sampling Intervals

The data logs will acquire new values at regular intervals, according to which sampling rate is set. The options are:

10, 20, or 30 seconds
1, 2, 3, 5, 6, 10, 15, or 30 minutes
1,2, 3 or 4 hours

A.1.2 - Storage and Capacity

The device is able to store data until its buffer of 32 million values is full, at which point new values will overwrite the oldest values. Here are some examples of how long this might take:

Total Number of Inputs/Registers	Sampling Interval (mins)	Duration that data is kept on Entranet
500	5	7 months +
1000	3	2 months
1500	1	2 weeks

A.2 - Required TCP or UDP Ports

☞ **They may need to be unblocked by a firewall.**

The following TCP or UDP ports will be required, if the specified functionality is used. Port numbers shown with an asterisk can be changed in the settings for that functionality.

Functionality	TCP Ports	UDP Ports
WAN, Inbound		
FTP of CSV files (unless passive mode)	20	
WAN, Outbound		
Internet Time (NTP)		123
Email of CSV files	25*	
FTP of CSV files	21	
Automatic Firmware Upgrades	80, 443	
Remote Access	80, 443, 22	

LAN, Inbound		
All configuration pages	80	
Modbus TCP, gateway as Slave	1502*	
LAN, Outbound		
Local Time Server (NTP)		123
Modbus TCP, gateway as Master	502*	

A.3 – Resin Fill Information

A large part of the circuitry is resin potted. This provides structural and thermal stability to the internal workings of the node. The components are protected from any physical and most chemical risks. The resin also provides UV absorption.

Robnor Resins EL171H:
A semi-rigid, room-temperature-curing, flame-retardant polyurethane resin system.

DESCRIPTION

Basic	Two-component polyurethane system
Resin	RL171H
Hardener	HL171H

Application	Key Properties
Encapsulation of Transformers	Non-toxic
Cable Joints	UL94-V0 @ 6mm
Wide range of substrates	Excellent adhesion
Low to medium voltage electrical and electronic applications	High thermal conductivity
	Economical

PHYSICAL DATA (APPROX. VALUES)

Description	Resin	Hardener	Mixed
Colour	Black	Amber	Black
Colour	Beige	Amber	Beige
Specific Gravity	1.72	1.24	1.65
Viscosity (mPas) @ 25°C	19000	200	6000

CURE SCHEDULE (150ML SAMPLE)

Temperature	Working Life (minutes)	Gel Time (minutes)	Light Handling (hours)	Full Cure (hours)
RT (20-25°C)	20	40	24	48
60°C	-	-	2	4
80°C	-	-	1	2

TYPICAL PROPERTIES

Test	Result	Unit
Operating Temperature	-40 - +125	°C (application & geometry dependant)
Flammability	6mm	UL94-V0
Peak Exotherm (250g @ 20°C)	40	°C
Shrinkage	0.5	%
Volume Resistivity	12^{10}	Ohm.cm
Surface Resistivity	$12 – 14^{10}$	Ohm.cm
Dielectric Strength	16	kV/mm
Permittivity (ϵ)	4.6	50Hz
Loss Tangent (Tanδ)	0.04	50Hz
Hardness	90	Shore A
Heat Deflection Temperature	Flexible	
Water Absorption (30 days @ 25°C)	0.54	%
Thermal Conductivity	0.75	W/mK
Coefficient of Linear Expansion	60 – 80	Ppm/°C
Elongation at Break	~30	%
Comparative Tracking Index	>600	v

APPROVALS

RoHS Compliant	Yes
UL94-V0	6mm
REACH (SVHC Concentration)	0%