



NMO

2998

III(2)

Pursuant to section 12 of the Weights and Measures Act 1985

Certificate No 2998 Revision 3

Issued by:

NMO

In accordance with the provisions of section 12 of the Weights and Measures Act 1985, the Secretary of State for Business, Innovation & Skills has issued this UK national type-approval certificate to:

Tabology

1 Broad Gate

The Headrow

Leeds

LS1 8EQ

and hereby certifies as suitable for use for trade the following pattern of an intoxicating liquor instrument, in respect of: a beer measuring system dispensing fixed quantities of one third pint, half pint or pint. The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.

Note: This certificate relates to the suitability of the equipment for use for trade only in respect of its metrological characteristics. It does not constitute or imply any guarantee as to the safety of the equipment in use for trade or otherwise.

This revision replaces previous versions of the certificate.

Issue Date: 24 May 2018
Valid Until: 26 August 2024

Grégory Glas

Lead Technical Manager

For and on behalf of the Head of Technical Services

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CERTIFICATION NO 2998

Descriptive Annex

1 INTRODUCTION

This liquid measuring instrument is for use in dispensing measured nominal quantities of $\frac{1}{3}$ pint, $\frac{1}{2}$ pint and 1 pint of beer, cider or stout by specifying the required volume using a Liquid Crystal Display(LCD) touch panel interface, typically referred to as a “Customer iPad”. A pre-programmed Radio-frequency identification (RFID) card is used to authorise use of a dispense. A dispense is initiated by pulling a tap lever forward.

The manufacturer’s model designation for this instrument is Barflow Controller.

Communication of information is passed between the Barflow Controller to a Local Area Network (LAN) computer server via a RJ45 port and Cat5e cable. The LCD touch panels are connected via local area wireless (Wi-Fi) to a Wireless Access Point (WAP) to the LAN server. A network switch controls information passed between the Barflow Controller systems and the WAP before being routed to the LAN server, see fig 1.

The instrument has a single dispense point, controlled by a dedicated flow meter and an electromechanically operated valve (solenoid valve). Satisfactory dispensing requires that the temperature of the liquid to be within the range of 2 - 6 degrees Celsius at a head pressure of 1.6 - 1.8 Bar.

For more detailed information about the system, refer to the Robot Pub Group installation guides and user manuals.

This approval certificate does not cover this instrument for use as a continuous flow monitoring system or any other type of “free flow” measurement mode.

The instrument may be used to dispense non-prescribed beverages.

2 CONSTRUCTION

2.1 General

2.1.1 A typical self-serving dispensing system consists of the Customer iPad, an RFID card reader and the dispense font. A second LCD touch panel is required for management of the system and is located behind the bar, typically referred to as a “Controller iPad”.

2.1.2 All product and gas lines use $\frac{3}{8}$ ” pipes. Except the outlet from the solenoid valve to the font tap lever outlet which is reduced to a $\frac{3}{16}$ ” pipe.

2.2 Mechanical

2.2.1 Each product is connected to a Froth on Beer (FOB) detector and if required a pneumatic pump. These are located as close to the keg as possible. The flow meter and solenoid valve are located as close to the manually operated lever pull tap as possible. A check valve may also be fitted after the solenoid valve, see figure 3. An adjustable flow restrictor may also be fitted after the solenoid valve, refer to figure 3.

2.2.2 The gas supply cylinder will be connected to a pressure indicator/regulator. (Fig. 3)

2.2.3 After the beer/cider or stout exits the FOB detector it is passed through a commercially available cooling system (Fig 3). All product pipes after the cooling system will be thermally insulated.

2.3 Electrical

2.3.1 The Barflow Controller (Mk2), is supplied by a 12V DC power supply unit (PSU) connected to a nominal 230V mains supply. The Barflow Controller supplies power to the RFID readers, flow meter and solenoid valve. The USB type-A socket can provide power to the Customer iPad if required.

2.3.2 The Customer and Controller iPads are supplied by dedicated 5V DC PSU's connected to a nominal 230V mains supply.

2.3.3 The LAN server is supplied by a 19V DC PSU connected to a nominal 230V mains supply.

2.3.4 The Wireless Access Point (WAP) is supplied by a 48V DC PSU supply connected to a nominal 230V mains supply.

2.3.5 The LAN router is supplied by a 12V DC supply connected to a nominal 230V mains supply.

2.3.6 The network switch is supplied by a 12V DC supply connected to a nominal 230V mains supply.

2.4 Electronics

2.4.1 The Barflow Controller (Mk2) box contains custom designed circuitry and acts as a signal control hub for two flow meters, two solenoid valves and two RFID card readers.

2.4.2 The solenoid valve, RFID card readers and flow meter (Titan 300-010 Beverage Meter) are commercially available products connected to the Barflow Controller box (Mk2) using custom 3-pole "snap & lock" connectors. The flowmeter signal cable is less than 1m in length. All other signal cables may vary in length.

2.4.3 The LCD touch panels consist of Apple Inc. iPads with Bluetooth™ @ 2.4 GHz and Wi-Fi 802.11a/b/g/n at 2.4 GHz and 5 GHz.

2.4.3 The LAN server, network switch, LAN router and WAP are commercially available products and are located in a secure remote location. The WAP is located within Wi-Fi range of the Customer iPad and Controller iPad.

2.5 Interlocks

2.5.1 The following interlocks will prevent the system from initiating a dispense:

- FOB detector activated.
- RFID card not seated, or incorrectly seated on reader. No credit on RFID card.
- Table disabled and displaying the message “OFF”.
- Solenoid valve disconnected from the Barflow Controller (Mk2) box. Will failsafe closed.
- Flow meter disconnected from the Barflow Controller (Mk2) box. Table is disabled and displays the message “OFF”.
- LAN cable disconnected. No communication to the LAN server.
- Disconnection of either or both of the RFID card readers.

2.5.2 The following interlocks will prevent further use during a dispense. The tap will be closed and the dispense will be incomplete. This transaction will be voided and will not be charged to the customer.

- Measured flow rate below a specified threshold. Message (or similar): “Low flow rate detected. Tap has been switched off and staff have been alerted.” on Customer iPad.
- FOB detector activated. Message (or similar): “Low flow rate detected. Tap has been switched off and staff have been alerted.” on Customer iPad.

2.5.3 The following interlock will pause the table during a dispense. The dispense can be resumed.

- RFID card removed from reader. Message (or similar): “Flow interrupted. Place card back on reader and complete the in-progress dispense” is displayed on the Customer iPad.

A satisfactory dispense will be completed upon placing the RFID card back on the reader.

2.6 Legends

2.6.1 The following legends are marked, in the form of permanent printing, a fixed metallic plate or a label, or a combination of either method, which shall be destroyed/voided if removed, see figure 9.

- Manufacturer's name : **Robot Pub Group.**
- The certificate number: **2998**
- Specified quantity legend: **1 Pint , ½ Pint, ⅓ Pint**
- Product Serial number :

The specific quantity legend may differ depending on the chosen system configuration.

2.7 Securing and Sealing.

2.7.1 The following items are to be secured or sealed and are described as follows:

- Barflow Controller box (Mk2), see figure 2. The box is mounted in place by screws and is not easily accessible to the user. The removable lid is also secured by screws that are not visible unless the box is removed from its mounting. The box has two parts and at least one security sticker is placed over the screws and joint. The internal electronics cannot be easily modified for fraudulent use.
- The flow meter and solenoid valve are not easily accessible by the user. These devices will be sealed inside a secure box (see fig 16) and shall include a security sticker over at least one screw.
- If an adjustable flow restrictor has been fitted this will have a security sticker placed across the device to ensure no further adjustments are made following verification. See figure 17.
- The Customer iPad and Controller iPad are housed in secure cases whereby all buttons and switches are inaccessible to the user, see figure 5. The secure case may include a key lock.
- The Customer iPad runs an “executable only” application that cannot be modified by the user and there are no user configuration options available. Multitasking gestures are disabled.
- The Controller iPad also runs an “executable only” application that cannot be modified by the user. This application requires passcode activation and there are no metrological parameters available. Multitasking gestures are disabled.

- The LAN server, network switch and LAN router are enclosed in a lockable cabinet. Security stickers are placed across the cabinet door, see figure 7.
- Executable applications can only be accessed or modified using application development software and is controlled by Robot Pub Group employees. Records of all modifications are held by Robot Pub Group.
- Metrological software exists on the LAN server and can only be accessed or modified by a Robot Pub Group employee using developer software. Records of all modifications are held by Robot Pub Group.

2.8 Interactive software.

2.8.1 The Controller iPad with a dedicated RFID card reader contains a variety of functions. The functions available relating to the customer dispense font are listed below:

- Enabling / disabling dispense taps.
- Enabling / disabling RFID card readers.
- Loading credit onto the RFID card.
- Receiving error messages.
- Voiding or refunding incomplete dispenses.

A continuous log of all activities is stored on the LAN server.

Authorised users of the Controller iPad are issued with an RFID card that when placed on the RFID card reader can access pre-determined levels of functions. However, no metrological parameters can be accessed.

Messages, intended for information only, can be sent to other Apple Inc devices paired via Wi-Fi. No functions can be activated, deactivated or changed from any other devices other than the Controller iPad.

2.8.2 Additional apps are available to the customer via the Customer iPad but are not an element of this type approval certificate. They do not effect any metrological calculations or functions when active or inactive. Any dispense related error messages override all apps and render the Customer iPad in-operative or if appropriate will automatically close the tap.

3 OPERATION

3.1 System Setup

3.1.1 The Barflow Controller (Mk2) can control up to 2 individual dispense taps in one font providing that each tap is connected to individual flow meters, solenoid valves and/or check valve. A LAN server co-ordinates communications between the Barflow Controller and the Customer and Controller iPads, and also maintains a database of Barflow Controllers on the network, configures them and monitors status information such as flow count data. The LAN server, Barflow Controllers and iPads are connected together by a suitable WAP.

The system is designed to remain active for extended periods of time. This is to allow for the cooling system to maintain the correct product delivery temperature and to avoid trapped air or gas breakout issues which may cause the FOB detector to activate.

3.1.2 The system will be calibrated prior to use for each product that has been assigned to each tap.

3.1.3 Accuracy of the dispense is achieved through software that monitors the pulse output from the flowmeter. A small number of flow interruptions can be accounted for by software algorithms to ensure the correct quantity is delivered.

3.1.4 Extra pipe lengths may be required during initial set-up which may require a pneumatic pump.

3.1.5 Any retro-fitted equipment, such as a replacement flowmeter or addition/removal of a pump or check valve will require a dispense check and possible re-calibration.

3.1.6 Standard compressed gas bottles are used at mixtures suitable for the intended product.

3.1.7 A standard pressure regulator can be used and should be set as described in Section 1.

3.2 Software

3.2.1 The Barflow Controller contains firmware stored in non-volatile EEPROM memory and can be managed via Linux operating system software contained on the LAN server, the software program name is "Barflow".

- The current firmware version is 1207
- The current software version is 3.1a [0] (**X.yz**)

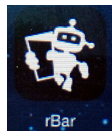
Where **X** represents legally relevant software and **yz** represents changes to the non-legally relevant software. The value [0] represents the software change audit record number. This

number will automatically increment when any changes (legally relevant or non-legally relevant) are made to the software. Any changes are logged on the server records as explained in section 2.7.1.

The version information can be viewed on the Controller iPad status page by selecting the following:

- Admin → Table Manager

3.2.2 The executable application designed for customer interaction is called “rBar” and is stored in solid state flash memory inside the LCD touch panel device. This application should only be installed on the Customer iPad. See icon image below:



- (image may vary)
- The current software version is 1.00 (X.yy). This can be accessed using the “Settings” menu on the LCD touch panel device, via the following sequence:
 - General → Usage → “rBar” icon.

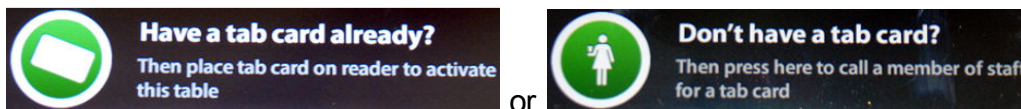
3.2.3 The executable application designed for administration and management is called “rPOS” and is stored in solid state flash memory inside the LCD touch panel. This application should only be installed on the Controller iPad. See icon image below:



- (image may vary)
- The current software version is 1.0 (X.y). This is displayed in the top right hand corner of the LCD.

3.3 Dispensing

3.3.1 When the table is primed and configured as “OPEN”. A message will appear along the lower edge of the Customer iPad similar to the images below, the image may vary:



- The RFID card is placed on the RFID card sensor, see Fig 6. The Customer iPad will display the amount of credit in the centre of the screen.

- Options are then made available for a 1 pint, ½ Pint or ⅓ pint quantity. These are located at the lower left side of the Customer iPad. An example image is shown below, the dispense quantity combinations or GUI may vary:



- The selection is made by touching the relevant area on the screen.
- The solenoid valve will open. At this point a cancel button, or similar message, may become available. The cancel button feature is optional and may not be available at every installation.



- The user may cancel the selected delivery quantity and select a different quantity. However, once the tap lever is moved and a flow count has started, the cancel option is disabled. The tap can also be pushed a limited distance for making small volume dispenses. The dispense can be interrupted, until the selected quantity has been completed. However, too many or too frequent tap interruptions may cause a flow rate error message and the system to “close”, see 2.5.2.
- For all delivery quantities of lager/cider and stout the tap lever can remain in the downward position until the completion of delivery.
- For deliveries of stout the tap lever may be returned to the upright position approximately ⅔ into the delivery. After a short time period the tap lever should be re-opened to complete the delivery.
- When the correct quantity is delivered the solenoid valve will close. The tap lever should then be returned to the upright position.
- The RFID card can remain on the card reader and another delivery quantity can be selected and whilst the card remains on the reader a running total of delivery volumes can be viewed, (as shown in the image above). This is for information only. If the card is removed after a dispense has been completed the delivery options disappear and the

running total is reset to zero. All dispense volume information is sent to the LAN server and stored. This can be viewed on the Controller iPad when required.

3.3.2 Whilst best practice for a delivery is explained above, the flow meter monitoring software algorithms can compensate for additional tap lever interruptions during a dispense and deliver the correct quantity within the applicable Limit of Error (L.o.E.):

- 1 Pint delivery of stout, at least to 4 interruptions
- 1/3 Pint delivery of stout, at least to 2 interruptions

- 1 Pint delivery of lager, at least 4 interruptions
- 1/3 pint delivery of lager, at least 2 interruptions

3.3.3 If during a dispense the RFID card is removed from the reader a message will appear (or similar), on the Customer iPad and the dispense is paused:

- “Flow Interrupted! Place card back on reader and complete the in-progress dispense”

An alternative RFID card at this point will not register and the table will remain paused. The correct RFID card can be re-placed on the reader and the delivery will continue.

- A 1 pint delivery can accommodate up to 2 card removal events and deliver the correct quantity within the applicable L.o.E.

4 AUTHORISED ALTERNATIVES

4.1 Having a dual-tap font system, see Fig 4, using two individual single input/output Barflow Controller Mk3's, see Fig 12 and connected to dedicated RFID readers, flow meters and solenoid valves.

4.2 Having an alternative single-tap font system in conjunction with the alternative single input/output Barflow Controller (Mk3), RFID reader, flow meter and solenoid valve. See figures 11 and 12 and 13.

4.3 An alternative customer LCD touch panel with reduced screen size, typically an Apple Inc. iPod. A vertically aligned card reader (not visible), with an RFID card slot (visible). Some of the screen messages may also be re-worded. See Fig. 14.

4.4 Having a Bluetooth™ paired communication between the RFID card readers and iPads as a replacement for the hard wired connection into the Barflow Controller (Mk3) model only. See example schematic in figure 15.

4.5 Having references to the Manufacturer's name: **Robot Pub Group**, amended to **Tabology** (sections 1, 2.6.1, 2.7.1, 5.1 and Figures 2 and 10).

4.6 Having the instrument configured to dispense still wine in quantities of 125 ml or 175 ml. The configuration may include either an electrical or a pneumatic pump, and an adjustable flow restrictor may also be fitted after the solenoid valve.

4.6.1 The legend in section 2.6.1 is amended accordingly

- Specified quantity legend: **125 ml, 175 ml**

The specific quantity legend may differ depending on the chosen system configuration.

4.7 Having the system configured as a triple-tap font system, which uses three individual single input/output Barflow Controller Mk3's connected to dedicated RFID readers, flow meters and solenoid valves.

4.8 Having the system configured without the RFID card(s) and reader(s). The controller iPad is used to authorise/activate the customer iPad and will link the customer iPad to the customer. The table dispense fonts will be booked to one group at a time.

4.8.1 The Interlocks in section 2.5.1, relating to RFID card reader/readers, and in section 2.5.3, relating to the removal of the customer RFID card from reader, do not apply. Authorised personnel will be required to log into the controller iPad using a 4 digit PIN.

4.8.2 In Section 3.3.1 the authorisation/activation of the customer iPad, by authorised personnel, using the controller iPad replaces the action of the card being placed on the customer RFID card reader.

4.8.3 Section 3.3.3 would not be applicable as there would not be an RFID card to remove from the customer RFID card reader.

4.9 Having the customer "application" in section 3.2.2 changed to "TableTab" (for the standard version) or PourTab (for authorised alternative 4.3), and controller iPad "application" in section 3.2.3 changed to "BarTab".

5 RECOMMENDED TESTS

5.1 Accuracy

5.1.1 Accuracy tests shall be carried out to verify that the amount dispensed is within the specified L.o.E.

5.1.2 As an additional accuracy test include,

- during either a 1 Pint, ½ Pint or ⅓ dispense:
 - at least 2 interruptions for a stout and/or
 - at least one interruption for a lager/cider,
- during either a 125 ml or 175 ml dispense
 - at least one interruption for a still wine

Note: For verification purposes always use the product intended for use as this will have been calibrated prior to verification. However, it is possible if required, to adjust the volume

delivered during verification tests. This should only be performed by a Robot Pub Group employee who has access to the LAN server, which shall then be secured as described in section 5.7.

5.2 Temperature

5.2.1 Verify the temperature of the completed delivery is between 2 and 6 degrees Celsius.

5.3 Pressure

5.3.1 Close the tap supplying gas to the keg. Verify that when the pressure slows the flow rate to below the set threshold the appropriate warning is displayed on the Customer iPad. This delivery will be declared void. Verify that the last fully completed delivery prior to the voided delivery is within the L.o.E.

5.4 Froth on beer (FOB)

5.4.1 Disconnect the product supply line from the keg. Initiate a dispense (due to the length of pipe work from the cellar and through the cooling system, this may take more than a single 1 pint dispense). Verify that the FOB detector operates and that an appropriate warning message appears on the Customer iPad, e.g. the display still shows “pouring” see lower left corner of figure 20.

5.5 Interlocks

5.5.1 Verify the operation of the interlocks as described in section 2.5.

5.6 Labels and markings

5.6.1 Verify that the printing or label bearing the certificate number, specific quantity legend, serial number and the name of the manufacturer as described in section 2.6 is present on the Barflow Controller instrument box.

5.7 Securing

5.7.1 On completion of tests, verify that the following items are secured with secure housing, fixings, key locks or tamper evident seals/labels, as described in section 2.7.1.

- Barflow Controller (Mk2) or (Mk3) box.
- Flow meter and solenoid valve.
- The case housing the Customer and Controller iPads.
- Cabinet that houses the LAN server, network switch and LAN router.

5.7.2 The items detailed in 5.7.1, except for the cabinet that houses the LAN server, network switch and LAN router, are to be secured as described in section 2.7.1 by a sticker containing the mark of an authorised verification authority. An example of the sticker is shown in Figure 19. Where the items are already secured by the manufacturer's security sticker, the sticker of the authorised verification authority should be applied onto, or partially onto, the manufacturer's sticker such that it will be destroyed if removed.

6 ILLUSTRATIONS

Figure 1 - Key component diagram

Figure 2 - Barflow Controller (Mk2) twin channel and security sticker placement

Figure 3 - Product flow schematic

Figure 4 - Example of a dual-tap font

Figure 5 - Customer iPad case with optional key lock

Figure 6 - Customer RFID card reader with RFID card and Controller iPad card reader

Figure 7 - Cabinet housing the LAN Server, network switch, LAN router and the security sticker placement

Figure 8 - Example of the Wireless Access Point (WAP)

Figure 9 - Examples of the legend print, fixed metallic plate or a label

Figure 10 - Example of the security sticker

Figure 11 - Example of an authorised alternative single-tap font

Figure 12 - Authorised alternative single input/output Barflow Controller (Mk3)

Figure 13 - Component diagram for Barflow Controller (Mk3)

Figure 14 - Authorised alternative customer LCD touch panel and RFID card reader slot

Figure 15 - Bluetooth RFID reader set-up including Barflow Controller (Mk3)

Figure 16 - Security box for flow meter and solenoid switch.

Figure 17 - Optional in-line flow restrictor and position of security sticker.

Figure 18 - Example of Product flow schematic for Still wine

Figure 19 - Example of the mark of the authorised verification authority

Figure 20 - Indication of dispense operation

CERTIFICATE HISTORY

| ISSUE NUMBER | DATE | DESCRIPTION |
|-----------------|-----------------|---|
| 2998 | 27 August 2014 | Type examination certificate first issued. |
| 2998 Revision 1 | 20 May 2015 | <p>Revision 1 Issued</p> <p>Section 2.2.1, adjustable flow restrictor option added, figure 3 updated</p> <p>Section 2.7.1, Flow meter and solenoid secure box sealing added with associated figure 16. Adjustable flow restrictor security added with associated figure 17. iPad case optional key lock added, associated figure 5 updated.</p> <p>Section 3.2.1, software description clarified to explain audit record updates.</p> <p>Section 3.3.1, editorial changes to dispensing sequence.</p> |
| 2998 Revision 2 | 11 January 2018 | <p>Revision 2 Issued</p> <p>Front page: change of company name (from Robot Pub Group)</p> <p>Addition of: sections 4.5, 4.6, 4.7 4.8, 4.9 and Figure 18.</p> <p>The text in section 5.1.1 has been separated and section 5.1.2 has been added, with additional text.</p> <p>The text: "N/CO₂" is removed from 3.1.6, and "mixed" is removed from 5.3.1.</p> <p>Addition of: sections 5.7.2 and Figures 19 & 20.</p> |
| 2998 Revision 3 | 24 May 2018 | <p>Revision 3 issued</p> <p>Amendment to Section 1 to include the text "The instrument may be used to dispense non-prescribed beverages."</p> |

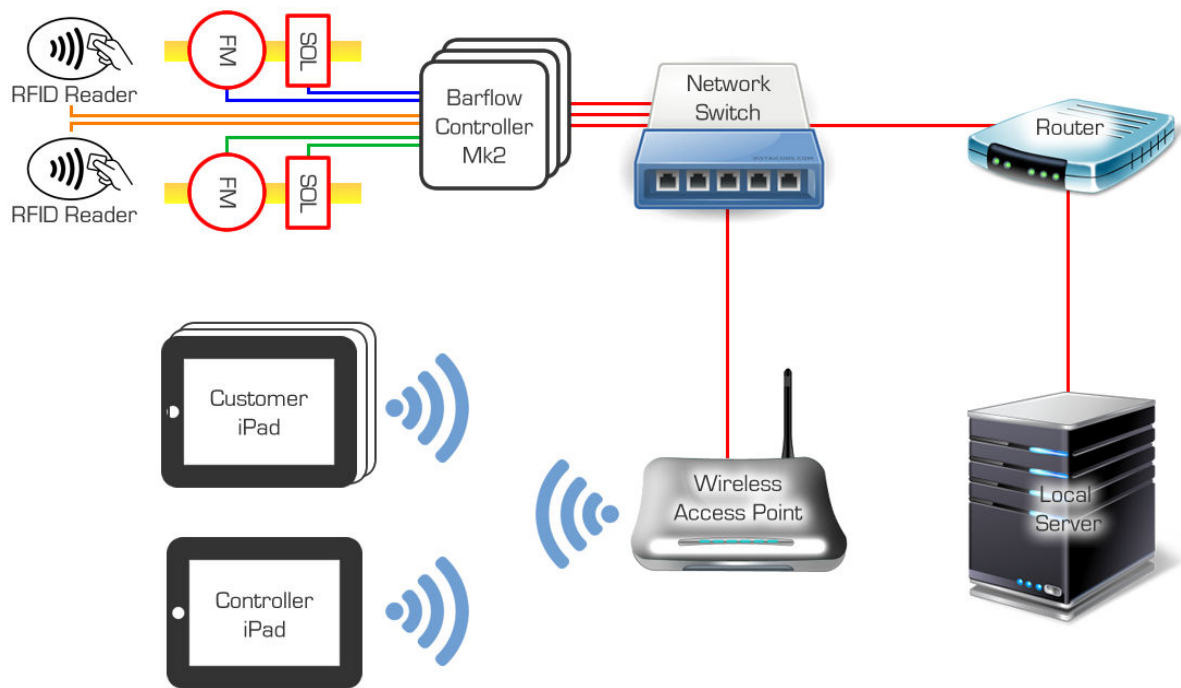


Figure 1 - Key component diagram

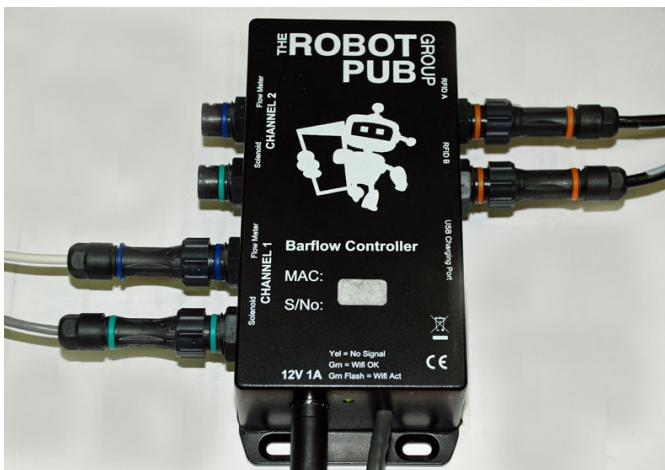


Figure 2 - Barflow Controller (Mk2) twin channel and security sticker placement

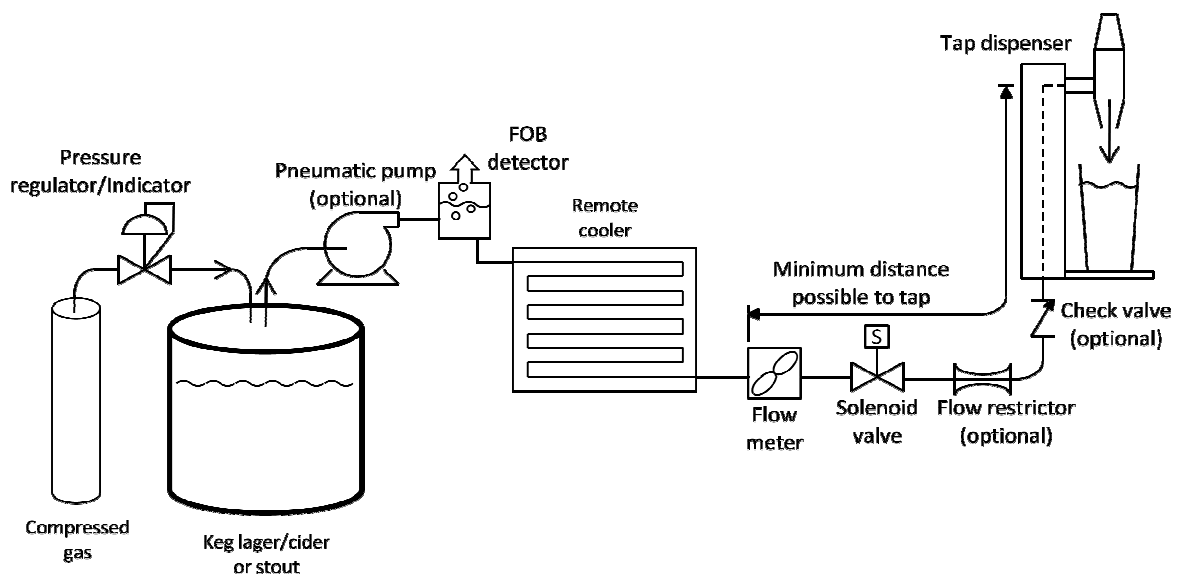


Figure 3 - Product flow schematic



Figure 4 - Example of a dual-tap font



Figure 5 - Customer iPad case with optional key lock



Figure 6 - Customer RFID card reader with RFID card and Controller iPad card reader



Figure 7 - Example of a cabinet housing the LAN Server, Network switch, LAN router and the security sticker placement



Figure 8 - Example of the Wireless Access Point (WAP)



Figure 9 - Examples of the legend print, fixed metallic plate or a label



Figure 10 - Example of the security sticker



Figure 11 - Example of an authorised alternative single-tap font

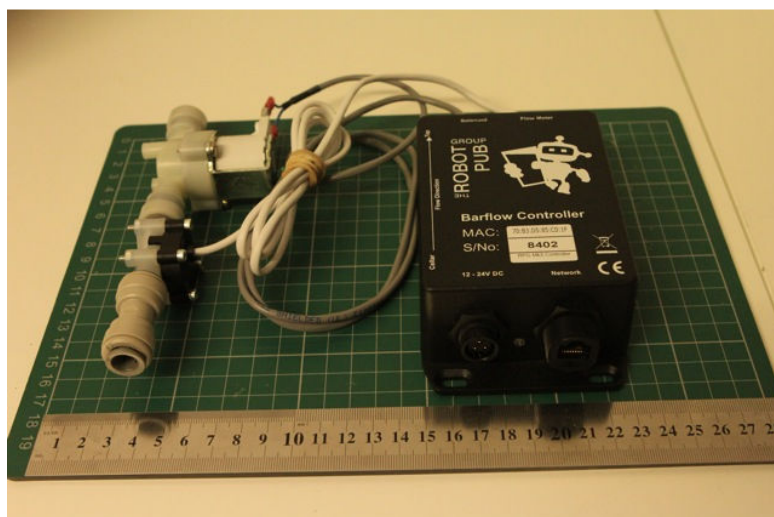


Figure 12 - Authorised alternative single input/output Barflow Controller (Mk3)

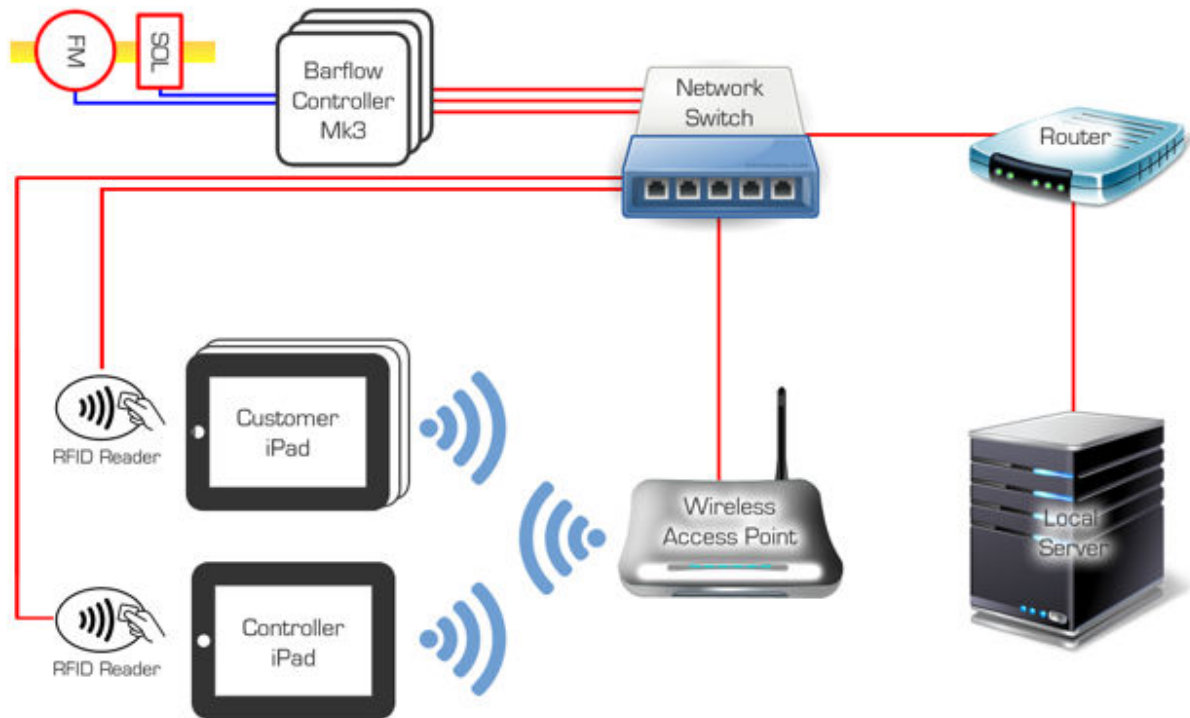


Figure 13 - Component diagram for Barflow Controller (Mk3)



Figure 14 - Authorized alternative customer LCD touch panel and RFID card reader slot

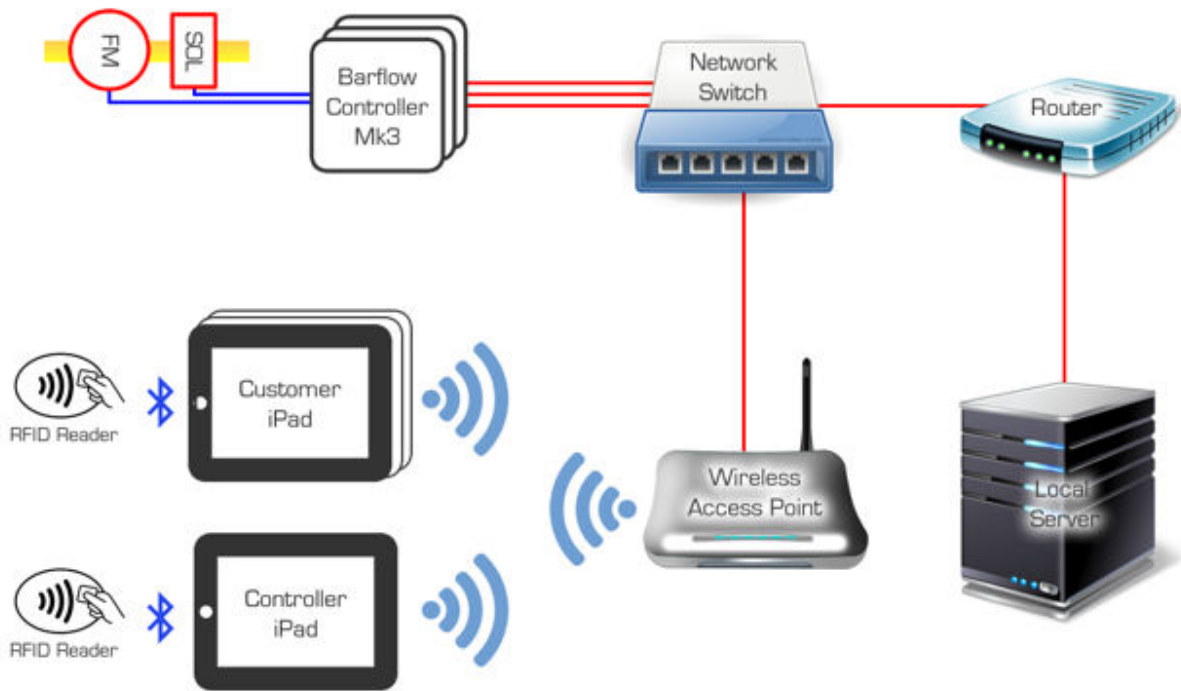


Figure 15 - Bluetooth RFID reader set-up including Barflow Controller (Mk3)

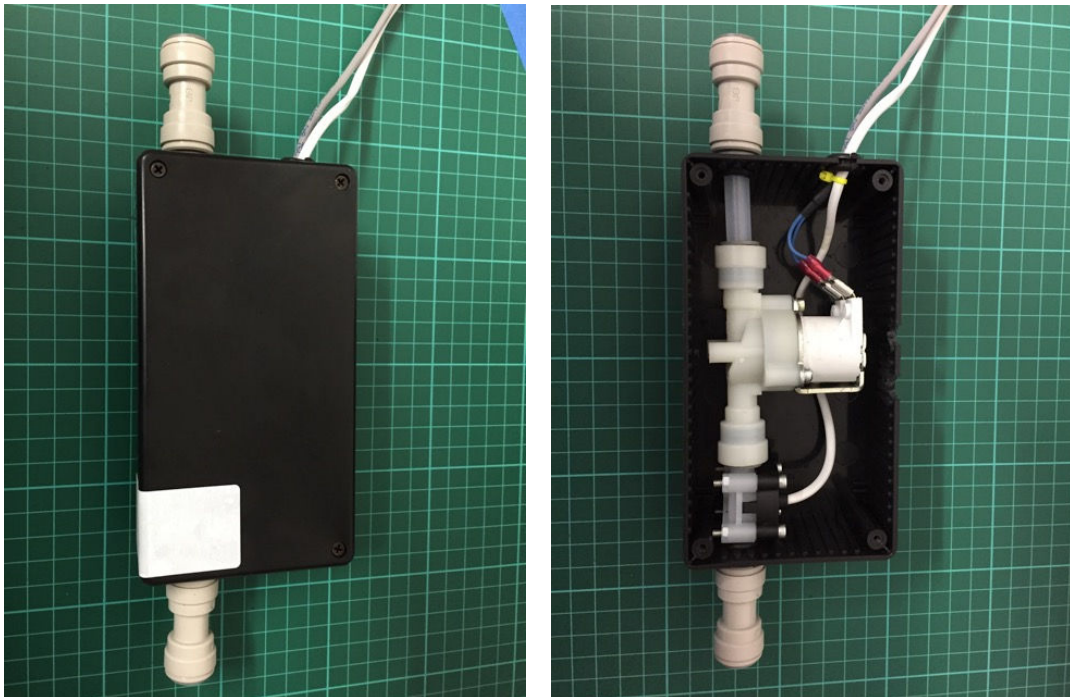


Figure 16 - Security box for flow meter and solenoid switch.

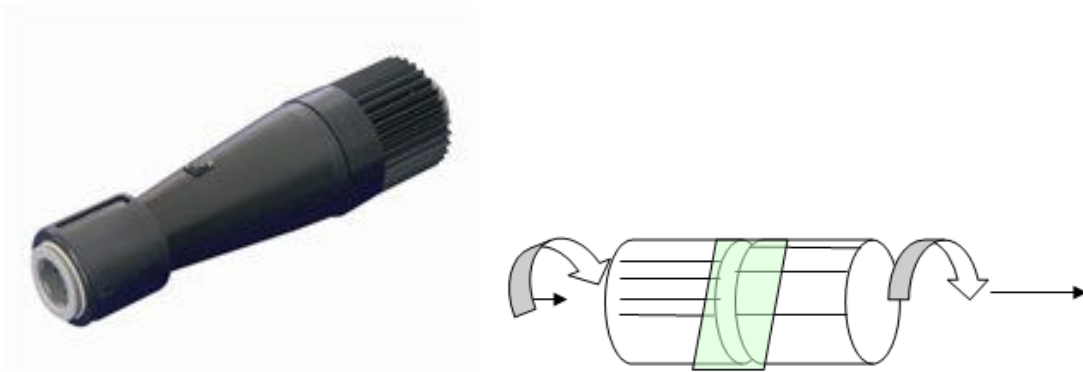


Figure 17 - Optional in-line flow restrictor and position of security sticker

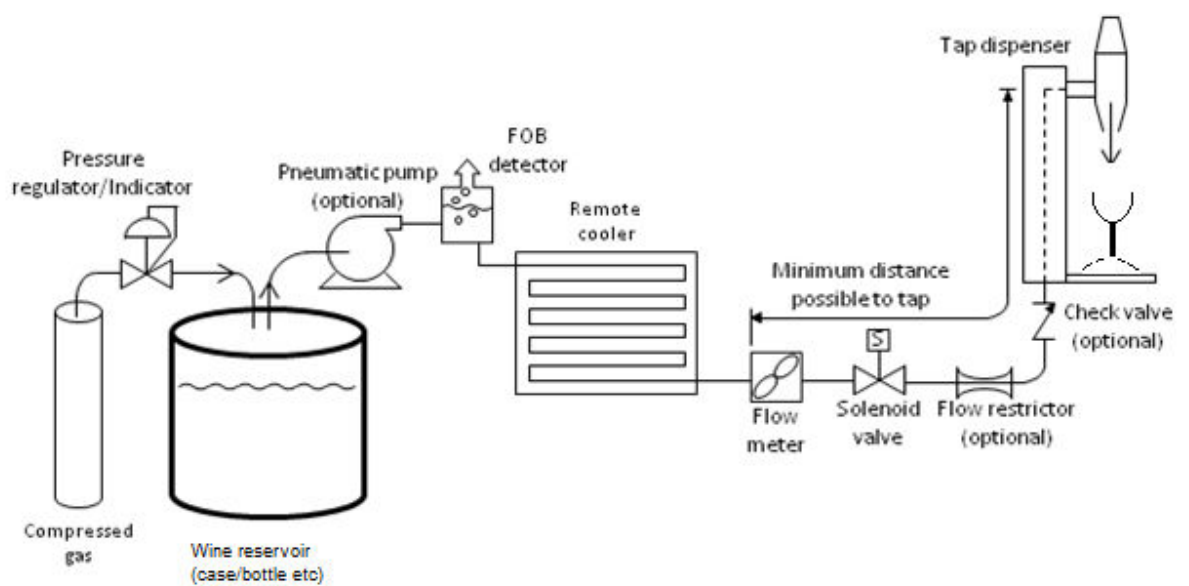


Figure 18 – Example of Product flow schematic for Still wine

INS/0704/08



Figure 19 – Example of the mark of the authorised verification authority



Figure 20 Indication of dispense operation