

# **BDA Installation Guidance Manual for New and Existing Accounts**

Produced by BDA Technical Group

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**Registered with BFBi on behalf of BDA Technical Group**

# **BDA Installation Standards Manual**

## **Issue 5.0**

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## 1 Introduction

### **Greenfield site/complete refurb.**

Principle Brewer should install cellar boards, taking in consideration for any Other Brewers equipment that may be required.

### **Additional products in existing outlet.**

Where there is no additional room on the existing boards for any additional dispense equipment, the ingoing Brewer should install sufficient back board of a suitable size and quality to install the required dispense equipment.

Electric Mains Cabling should not be installed in beer lines trunking. Fit spacers behind the trunking to enable cables to run behind trunking.

This Manual generally informs what to install as well as how to install but does not overrule any brand specific instruction.

These principles are intended for new and existing accounts.

Installations in existing accounts that are adding some brands may be difficult to implement the guidance on part of a system. We should aim at this standard but accept that sometimes we cannot deliver 100 % at the present time in this account.

If the account is later refurbished, then the general guidance should be applied.

In Conjunction with this manual, also refer to:

- Legislation manual
- Brand Specification manual
- Fault Diagnosis manual
- Customer Specific Specifications (outside of BDA agreement)

## 2 Installation of backboard

### **Greenfield site/complete refurb.**

Principle Brewer should install cellar boards, taking in consideration for any Other Brewers equipment that may be required.

### **Additional products in existing outlet.**

Where there is no additional room on the existing boards for any additional dispense equipment, the ingoing Brewer should install sufficient back board of a suitable size and quality to install the required dispense equipment.

Electric Mains Cabling should not be installed in beer lines trunking. Fit spacers behind the trunking to enable cables to run behind trunking.

### 3 Couplers

Couplers should be made from stainless steel but can be made from brass with either tin or nickel plating. (Note: 316 stainless steel probe type Couplers must be used on Cider).

- The standard thread for gas and beer fittings is ½ " BSP (British Standard Pipe).
- The product probe should be made in stainless steel fitted with a non-return valve.
- All couplers must be fitted with the appropriate brand specific fittings.
- All couplers to have Non-Return Valve (NRV) in product and Gas lines.
- When Fitting product and gas lines to a coupler, always fit the gas line first and then cut the product line to suit. This will give the correct bend radius for the gas line preventing excessive strain.

#### 3.1 Typical UK Couplers



Below are flow diagrams of a dispense head in both open and closed positions showing the gas and product flow in and out of the keg. The blue colour denotes gas, and the orange colour denotes product.



Dispense Head in Open Position







Dispense Head in Closed Position

### 3.2 Push in Coupler Fittings



When installing push in fittings to a coupler it is good practice to follow the guidelines below.





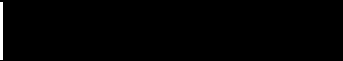

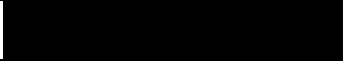
<b>Gas Inlet Fittings</b>	
	
<p>For the gas inlet, it is recommended to use a gas fitting with a built-in non-return valve (NRV). The NRV is easily spotted in the white fitting, as above.</p>	
<b>Product Outlet Fittings</b>	
	
<p>This method this will result in a better seal with less gas leaks on the fitting. You can see that the product fitting is unrestricted through its centre.</p>	

## 4 Tubing

The following standards should be observed when using tubing on BDA installations. Pipe materials should be food grade quality.

- Gas pipe. MDP, EVA or Nylon
- Product pipe. MDP, PVC, EVA, or Multi-Layer (Nylon, PET etc)
- All python lines are 3/8" OD.
- The water recirculation lines are 15mm OD x 11.5mm ID MDP.
- Gas & Air lines are 3/8 OD MDP.

### 4.1 Pipe Colours

Pipe usage	Colour	
100% CO <sub>2</sub> Gas pipe	French Grey	
30 / 70 Mixed Gas pipe	Green	
60 / 40 Mixed Gas pipe	White	
50 / 50 Mixed Gas pipe	Violet / Purple	
15mm OD x 10mm ID Heat dump pipe	Black	
Compressed air gas pipe	Blue	
100% N <sub>2</sub> Gas pipe	Black	

### 4.2 Product Drop Lines

All keg drop lines will be either,

- 3/8<sup>th</sup> or 1/2" OD MDP or nylon lined.
- 3/8<sup>th</sup> ID braided.

All cask ale drop lines will be either,

- 3/8<sup>th</sup> or 1/2" ID braided.

## 5 Fob Detectors

Fob detectors are required to stop gas entering the line when a keg is empty, which causes the product in line to fob-wasting beer. 1 fob detector per keg.

### Fob detectors have 2 modes.

- **Dispense** – This is the ‘normal’ position and allows the float to drop when a keg empties. The float stops product being dispensed from the tap and preserves the product in the line.
- **Cleaning** - Fob Detectors have a cleaning override facility and should only be used only when line cleaning is taking place. The release mechanism is activated and stops the float sealing the product line, allowing liquid to pass to the tap. The Customer must be shown this operation at the time of installation.

Pipework can be connected into the fob detector directly or via the use of appropriate fittings as per brand owner specifications.

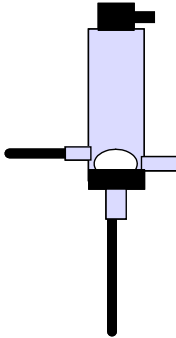
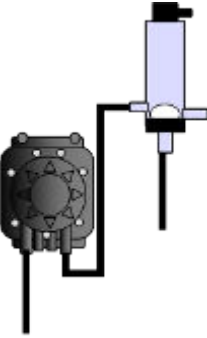
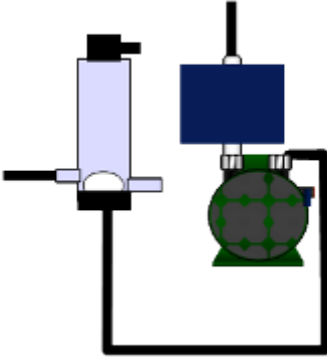
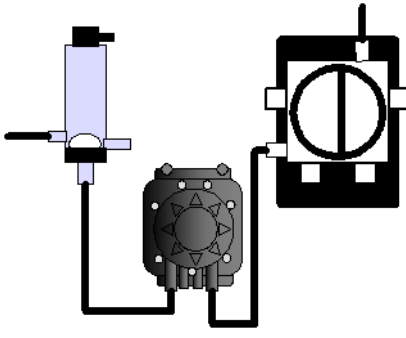


Examples of fob detectors



### 5.1 Installation Position

Please note that the installation of Metered & Free Flow systems differs in respect of where the fob detector fits in the system.

<p style="text-align: center;"><b>5.1.1</b> <b>Top Pressure Free Flow</b></p>	<p style="text-align: center;"><b>5.1.2</b> <b>Gas pump Assist Free Flow</b></p>
	
<p>The Coupler feeds directly into the Fob Detector</p>	<p>The Gas Pump is installed <b>BEFORE</b> the Fob Detector</p>
<p style="text-align: center;"><b>5.1.3</b> <b>Electric Pump Assist Free Flow</b></p>	<p style="text-align: center;"><b>5.1.4</b> <b>Cellar Metered Systems</b></p>
	
<p>The electric Pump is installed <b>AFTER</b> the Fob Detector</p>	<p>The Pump <b>GAS or ELECTRIC</b> is fitted <b>AFTER</b> the Fob Detector</p>

### 5.2 Bleed Pipes

- Fob Detectors should have individual bleed pipes.
- **Under no circumstances** must bleed pipes be connected in a ring main even if the Customer insists as this can cause back infection.

## 6 Gas Pumps

Gas pumps are used to achieve dispense speeds when the product dispense gas top pressure applied to the container is not high enough to both control equilibrium and provide a drive pressure to the point of dispense as demanded in the brand specification.

- Gas pumps should only be installed when absolutely necessary with due regard to the brand requirements and specifications.
- Not all bars in the same outlet may need a gas pump.
- Maximum number of dispense points per pump is 3.

**(Note:** Maximum number of secondary regulators is 15 off one primary ring main).

### **Gas pumps can be used under the following circumstances:**

- The length of line run from the beer storage area is excessive or the vertical lift is excessive.
- The dispense system being installed is a metered variant.
- Cask beer installations.

#### **6.1 Gas Pump Setup Procedure.**

Gas pumps have a range between 10 and 45psi e.g. maximum available pressure is 45psi from the secondary valve. Gas pumps must have one secondary each with the exception of cask dispense, to enable the pressure to be set accurately.

**Note:** when multiple taps are operated simultaneously from a single pump the dispense speed of each point will drop.

### **To set up the gas pump:**

1. Gas pumps can be driven by CO<sub>2</sub>, mixed gas, Nitrogen (from the gas supply system), or compressed air (from a compressor).
2. Ensure the equilibrium gas pressure to the container has been calculated (see section 8) and set first before setting the gas pump drive pressure.
3. Set the gas pump pressure at the minimum operating pressure e.g. 10psi.
4. Fully open any flow controller (if fitted) to give optimum flow.
5. Check the dispense speed and adjust the gas pump pressure as required to attain the speed as per brand owners' specification.
6. Adjust flow controller (where fitted) to fine tune the speed.
7. The gas pump should only have enough pressure to dispense the product at the correct speed.

## 6.2 Exhaust Venting

All gas pump exhausts must have a vent line leading to the external atmosphere to prevent gas being vented indoors and creating a safety hazard, e.g. increasing the background CO<sub>2</sub> levels.

### Gas pump exhausts must be vented using the following method:

#### 1–7 Gas Pumps.

- 3/8th Natural Coloured MDP or Nylon pipework must be used with push fit T-piece.

#### 7–17 Gas Pumps.

- 3/8th Natural Coloured MDP from Gas Pumps to a 3/8th by 15mm push fit T-piece.
- 15mm Natural Coloured MDP from T-pieces to atmosphere.

**Note:** 3/8" solution can be used if split down to maximum of 7 pumps per exhaust.

#### 17 + Gas Pumps

- Install a new vent line system as appropriate to the number of gas pumps detailed above.
- Gas pumps can be vented to atmosphere utilising the vent line incorporated alongside the Glycol flow and return lines to the Heat Dump Unit in Split Remote Cooler Installations (ref: 12.1.4).

## 6.3 Gas Pump Pipe Work Colour Codes

The feed pipe work for the gas pumps should match the gas/air type used to provide the drive pressure. Refer to the section on tubing for the correct colour code.

## 6.4 Understanding Gas Pump Drive Pressures

The maximum cumulative line pressure that can be applied to any dispense system is 100psi.

### Worked example:

CO <sub>2</sub> Volume	Cellar Temperature	Equilibrium Pressure PSI (100% CO <sub>2</sub> )	Lift Pressure PSI	Drive Pressure Applied PSI	Total Line Pressure PSI
2.5 v/v	12°C	18 PSI	2 PSI	20 PSI	40 PSI

The above table shows how the various pressures are cumulative e.g. keg gas pressure and gas pump drive pressure = total line pressure.

## 6.5 Gas Pump Fitting Criteria (for brands that use mixed gas as top pressure)

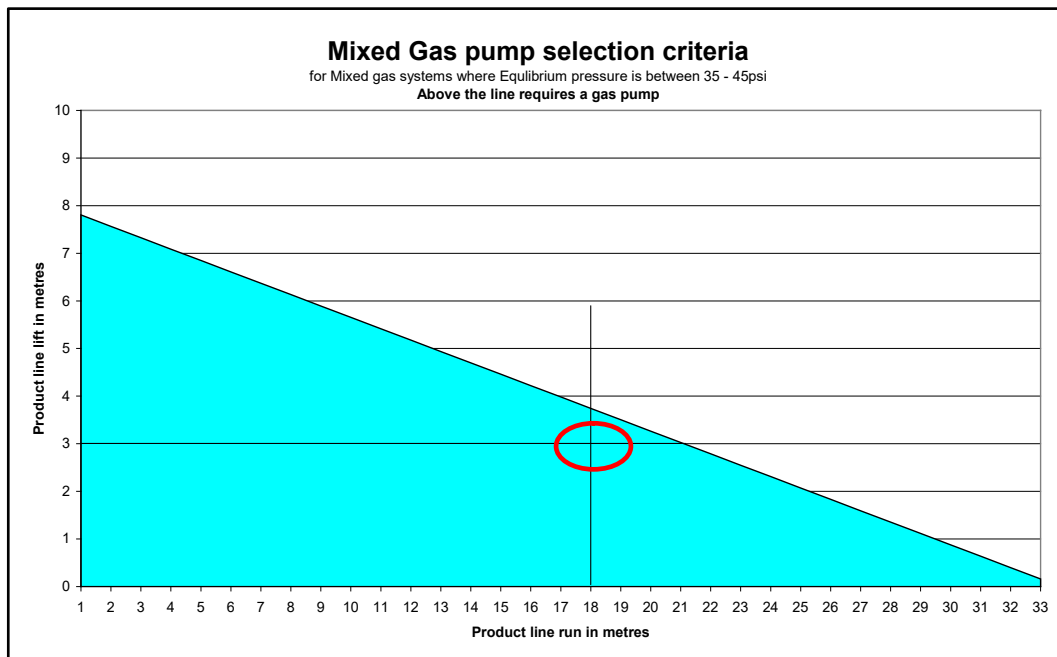
The following section can be used as a guide to determine if a gas pump should be fitted.

- Using the Equilibrium Pressure determine which graph should be used.
- Using the lift and run determine where they meet on the graph by drawing a horizontal line across for the lift and a vertical line up for the run.
- If the two lines drawn above cross in the area below the graph line (i.e. in the shaded area) then you do not require a gas pump fitting. If the two lines drawn above cross in the area above the graph line, then a pump should be fitted.

An example pump calculation is shown below with graphs following.

### Example:

CO2 Content (v/v)	Cellar Temperature	Gas Type	Calculated Equilibrium	Account Lift	Length of Run
2.2	13	60/40	35 psi	3 meters	18 meters



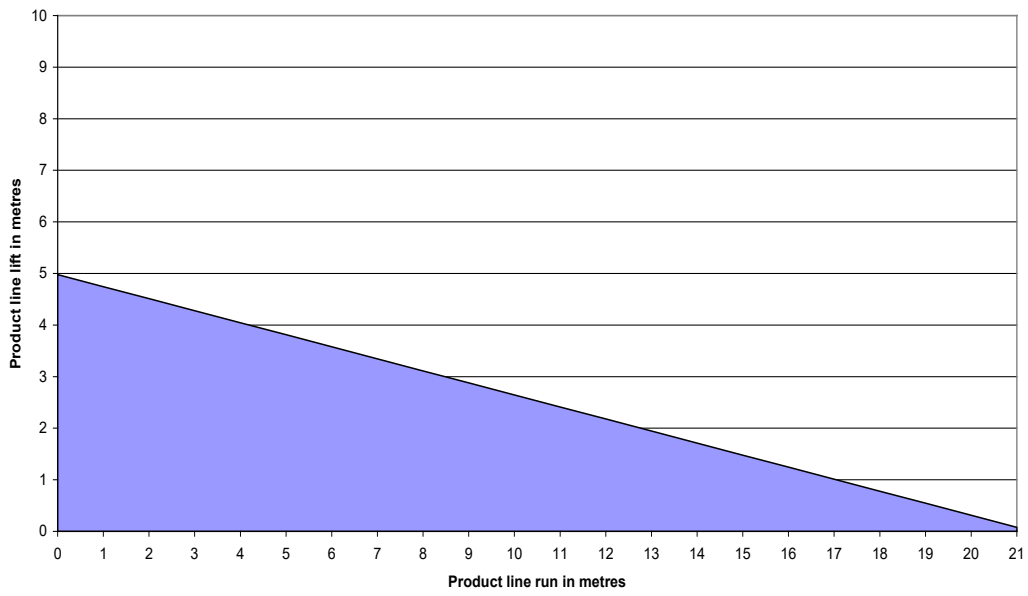
The lines cross in the blue area below the graph line (highlighted with a red circle) therefore a gas pump should not be fitted.

The results shows that the system described should dispense to speed specification without the need for a gas pump and therefore one should not be fitted.

**Note:** This is a guide and ultimately the dispense speed must be met in all situations.

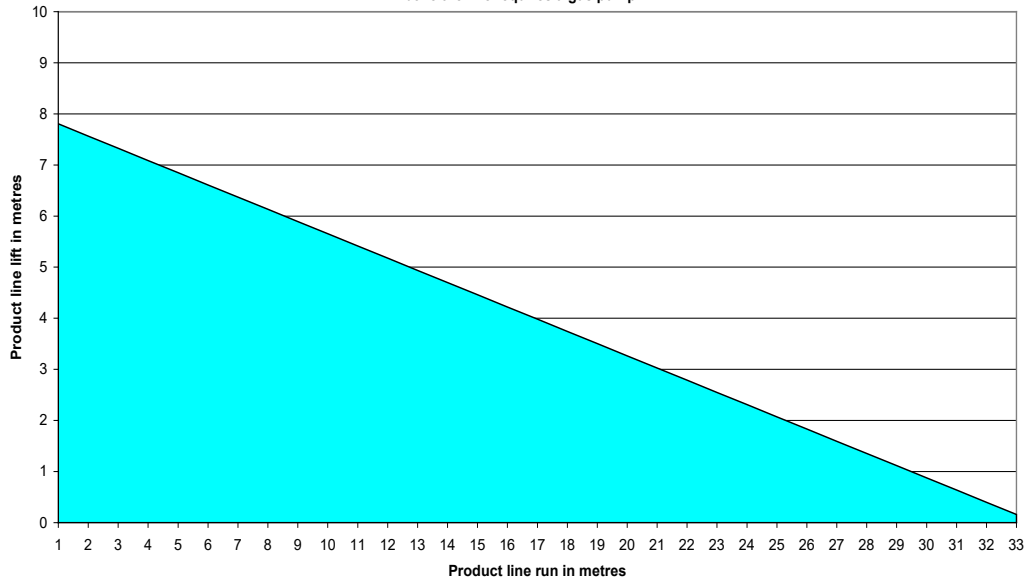
### Mixed Gas pump selection criteria

for Mixed gas systems where Equilibrium pressure is between 30 - 34psi  
Above the line requires a gas pump



### Mixed Gas pump selection criteria

for Mixed gas systems where Equilibrium pressure is between 35 - 45psi  
Above the line requires a gas pump



## 7 Compressors

Compressors are Brand Owner / Customer specified equipment. If a compressor is to be fitted, then the following rules will apply:

- Compressors can be provided for large accounts normally 12 or more gas pumps.
- The pump supplied for line cleaning should not be taken into account when assessing if a compressor is required e.g. count the gas pumps installed to the actual dispense system only.
- Under normal circumstances ONE Compressor has sufficient capacity to meet typical trading conditions.
- Each compressor has the capacity to supply drive pressure to 8 gas pumps working at the same time at full capacity.
- For high volume throughput accounts the throughput should be assessed to evaluate the need for an extra compressor(s). Again, more than 8 gas pumps working at the same time.
- Technicians should record the service inspection date as identified on the Compressor Tank label.
- Compressors are not part of the 6<sup>th</sup> Edition Pressure COP procedure but are subject to the Pressure Systems Safety Regulations
- If gas pumps cannot be vented to atmosphere the Compressor should NOT have a gas back up fitted.

## 7.1 Compressor Gas Back Up

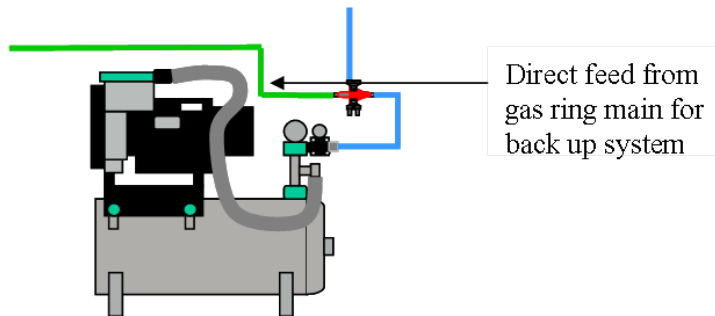
The gas back up system provides a temporary solution in the event of a compressor failure.

**Important! The compressor should be repaired ASAP and the changeover valve returned to its normal operating position.**

This back up can be taken off the Mixed Gas supply line if available as this allows a greater pressure to be used e.g. 45 PSI. CO<sub>2</sub> can be used if Mixed Gas is not available.

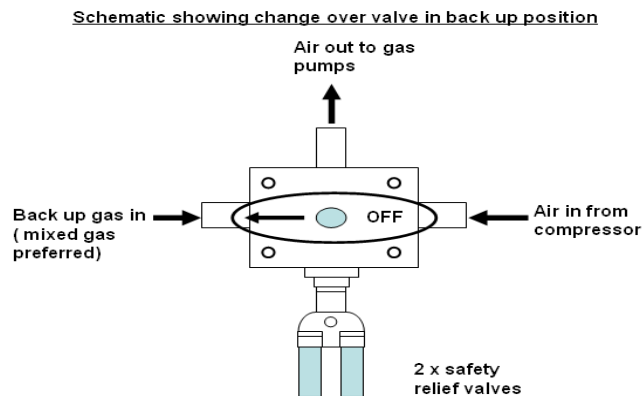
This should be a Tee off the Mixed Gas / CO<sub>2</sub> supply system with a 3-way changeover valve to normally isolate from the compressor, see schematic below.

- A direct supply from the main gas main which should be, if available, mixed gas (either 30/70 or 60/40).
- Mixed gas is preferred as it has a higher set pressure of 45 PSI.
- CO<sub>2</sub> can be used if mixed gas is not available.
- When 2 or more compressors are installed then 'T' into the gas back up line.

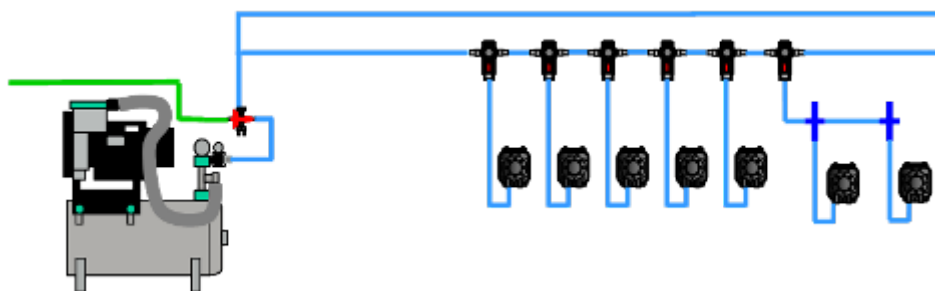


### The change over valve has 3 positions.

- The normal operating position.
- The gas back up position used when the compressor is faulty.
- The OFF position which isolates the ring main to the gas pumps. This is for use by Technicians when making a repair to supply ring main.



## 7.2 Gas Pump – Secondary Reducing Valve Set Up



Individual secondary reducing regulators fitted ONLY to keg drop products to allow varying pressures to be applied. Cask beer gas pumps can have a single secondary regulator which then feeds individual on/off cocks. Outlets with bars that have vastly different run lengths for the cask gas pumps may require an individual secondary regulator.

When gas pumps are used on a ring main dispensing both cask and keg products no more than 8 should be operated simultaneously.

## 7.3 Primary Gas Systems

### Primary & Secondary Gas Systems

All equipment supplied & installed must meet the specifications as laid out in the British Beer & Pub Association (BBPA) pressure code of practice model written scheme of examination (6th Edition 2022) for the dispense of beer by pressure systems in licenced premises.

The aim of the primary reducing system is to reduce the high-pressure supply from the cylinder/source to lower pressure within the safe working pressure of a beer container.

The primary reducing valves also incorporate pressure relief valves to protect the downstream system in the event of any valve failure. The valves are pre-set so must not be adjusted on site.

There will need to be a primary system installed for each dispense gas required in the outlet, these are typically on of the following:

- **CO2** – 100%
- **60/40** – 60% CO2 – 40% Nitrogen
- **30/70** – 30% CO2 – 60% Nitrogen
- **50/50** – 50% CO2 – 50% Nitrogen

The primary gas system provides the supply for the secondary gas system.



### 7.3.1 Categories of Primary Gas Systems

**There are 2 main categories of Primary Gas Systems**

#### **CO2 Primary Gas (Standard Pressure – Grey Bonnet)**

- Primary valve reducing bottle contents from 800 – 900 PSI to 35 PSI.
- Primary output pressure set to a maximum of 35 PSI.
- Twin blow off valves protecting the system at 45 PSI.




#### **CO2 Primary Gas (High Pressure – Red Bonnet)**

- Primary valve reducing bottle contents from 800 – 900 PSI to 45 PSI.
- Primary output pressure set to a maximum of 45 PSI.
- Twin blow off valves protecting the system at 55 PSI.

#### **Mixed Gas (Black Bonnet)**

- Primary valve reducing bottle contents from 3000 PSI to 45 PSI.
- Primary output pressure set at a maximum of 45 PSI.
- Twin blow off valves protecting the system at 55 PSI.

Gas primary valves can be either wall-mounted or fixed direct to the cylinder. When fitting a wall-mounted valve ensure it is mounted to reduce the risk of strain or kinking to the high-pressure hose. The gauge does not need to be positioned at the top.

<b>Wall Mounted Mixed Gas Valve (Standard Pressure – 45PSI)</b>	<b>Wall Mounted CO2 Valve (Standard Pressure – 35PSI)</b>	<b>Wall Mounted CO2 Valve (High Pressure – 45PSI)</b>
		
<p>Install the valve so that the strain on the hose is minimised. In most cases this will be with the hose pointing vertically down</p>		

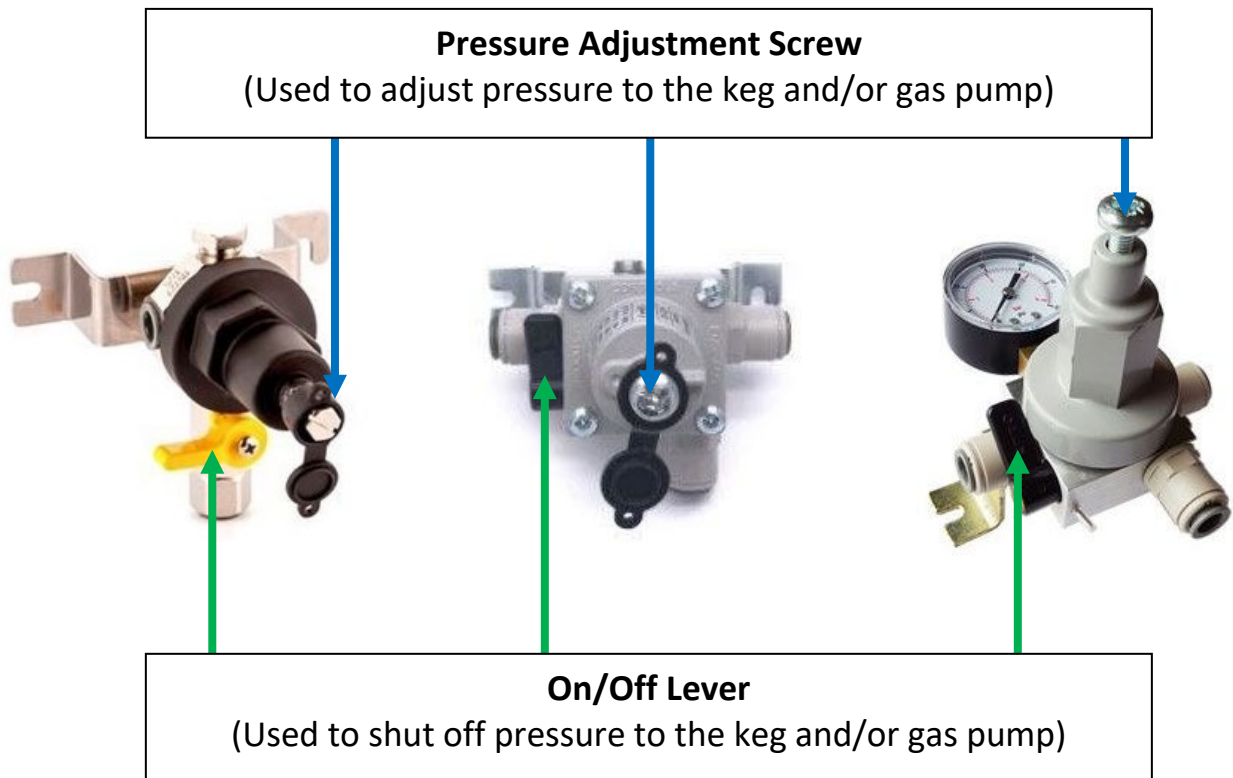
## 7.4 Secondary Gas Systems

All gas feeds to keg couplers must have an individual, adjustable secondary reducing valve to permit the following.

- Turning the gas supply on/off to each container.
- Setting the correct gas pressure for equilibrium & lift/run to the bar.

All secondary valves are restricted by the manufacturer to only allow a maximum output pressure of 45 PSI and must not be re-adjusted above this pressure.

- Under no circumstances must a secondary reducing valve be connected directly to a gas cylinder/high-pressure supply.



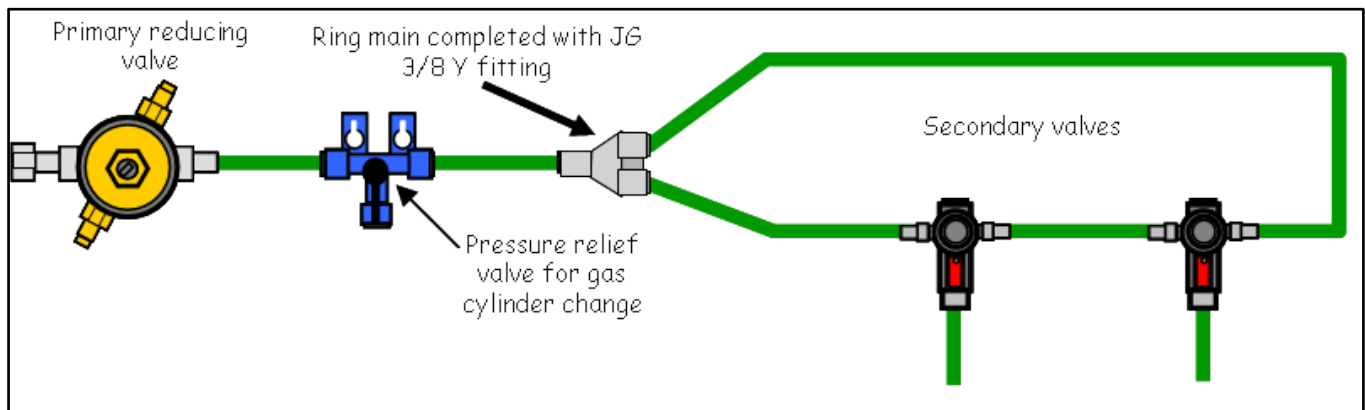
*Examples of Secondary Reducing Valves*

### 7.4.1 Gas Ring Mains

When installing a gas dispense system if there are more than 2 secondary valves off one primary valve, a full ring main must be completed to remove the risk of gas starvation to secondary valves at peak demand.

**Note:** Maximum of 15 secondary valves are permitted on a single ring main.

#### Schematic of a Typical Gas Ring Main



## 8 Equilibrium Pressure

The Equilibrium pressure on a keg is the gas pressure applied to keep the CO<sub>2</sub> dissolved in the product while the keg is on serve.

The drop line pressure is the pressure applied from the secondary valve to prevent break out of gas in the product up to the fob detector.

All keg drops must have gas supplied from an independent secondary valve. This valve is used to set the drop line pressure to the keg, which is calculated from the keg equilibrium pressure.

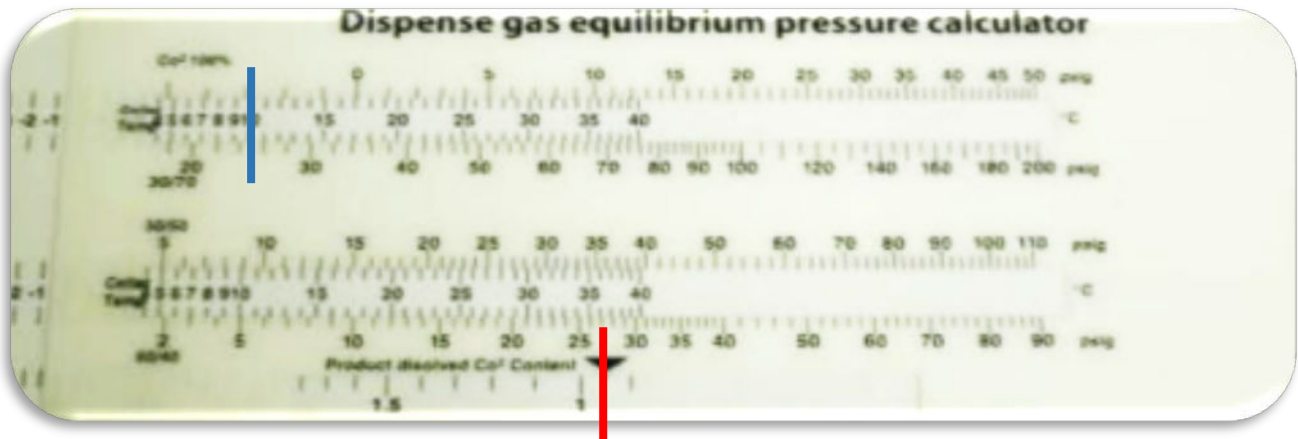
Equilibrium pressure calculations require the following information:

- CO<sub>2</sub> content in v/v for the product to be dispensed (found on the Brand Matrix sheet).
- Cellar temperature where the keg is stored (measured using a calibrated thermometer).
- Specified dispense gas type; i.e. 100% CO<sub>2</sub> or 60/40 mixed gas (found on the Brand Matrix sheet).
- Equilibrium pressure slide rule.

## 8.1 Using a Slide Rule

There are various types of slide rules that can be used to calculate the correct equilibrium pressure based on the following criteria:

- CO2 Volume (v/v)
- Cellar Temperature
- Gas Type



Align the slide rule arrow to the products dissolved CO2 content (**Red line**).  
Using the scale that is marked with the preferred gas, read off the pressure that aligns to the cellar temperature (**Blue line**).

## 8.2 Calculating the Keg Drop Line Pressure

Use the follow rule to calculate the Keg drop line pressure for **all Gas types**:

The Target pressure should be calculated as follows:

- Calculate equilibrium pressure using a slide rule.
- Variance of up to 5 PSI offset to compensate for lift to the fob and temperature fluctuations.

### NOTE:

- The minimum pressure to apply is 6 PSI, any calculation below this value should be rounded up to 6 PSI.
- The Maximum pressure to apply is 45 PSI.
- Minimum cellar temperatures. Some ground level cellars can be subjected in winter to large fluctuations at the low end of the scale e.g. below 10°C.

Do not calculate the gas pressure settings below 10°C e.g. if the temp at the point of install is 7°C use 10°C as the lowest limit. The reason for this is if the cellar then rises back to 10°C or more the pressure will not be enough to hold the gas in solution.

### 8.2.1 Examples

Example 1					
CO2 Content (v/v)	Cellar Temperature	Gas Type	Calculated Equilibrium	Additional PSI for Lift	Pressure Applied to Keg
2.25	12°C	100% CO2	15 PSI	+2 PSI	17 PSI

Example 2					
CO2 Content (v/v)	Cellar Temperature	Gas Type	Calculated Equilibrium	Additional PSI for Lift	Pressure Applied to Keg
2.2	13°C	60/40	36 PSI	+2 PSI	38 PSI

Example 3					
CO2 Content (v/v)	Cellar Temperature	Gas Type	Calculated Equilibrium	Additional PSI for Lift	Pressure Applied to Keg
0.95	12°C	30/70	27 PSI	+2 PSI	29 PSI

## 9 Line Cleaning

It is necessary to keep beer lines clean on a regular basis. In the UK, line cleaning should be carried out every 7 days to an agreed Brewing Industry Code of Practice. Line cleaning frequency can be extended by using specialist dispense equipment i.e. smart dispense, CellarPlus, etc.

When beer lines are initially installed, they are clean.

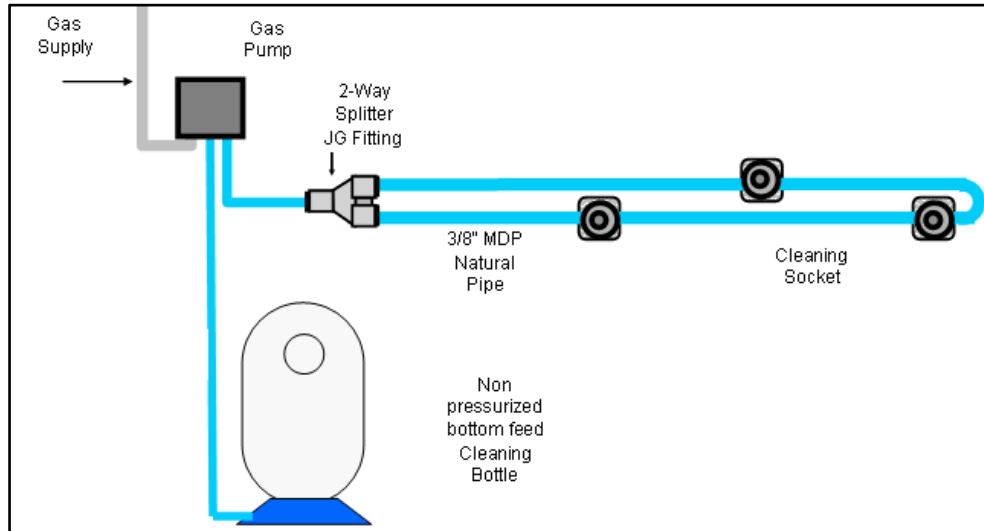
Line cleaning is carried out to ensure the standard of cleanliness is maintained and to inhibit any bacterial / yeast growth inside the lines.

Cleaning is carried out using a potable water supply and cleaning chemicals, as recommended by the brand owner, used with a cleaning container and a ring main system.

## 9.1 Cleaning Keg Systems

The BDA standard for cleaning keg products uses a non-pressurised cleaning container and ring main configuration.

Schematic of a keg product cleaning ring main system



- Only one cleaning bottle per outlet/ring main to be installed for quality & H&S standards.
- This system supports 3 taps open at any one time during the cleaning process.
- Pressurised containers should only be used by exception. i.e. for one tap outlets only.
- Where pressurised containers are used, they need to be fitted with a safety relief valve, which has to be part of the written scheme of the BBPA Gas Pressure Code of Practice.

### 9.1.1 Cleaning Cask Systems

The standard method for cleaning cask dispenses systems is:

- To draw cleaning fluid /rinse water into the product lines, by immersing the drop line into the non- pressurised cleaning bottle or a bucket.
- Cask taps cleaned using customer supplied buckets.
- Cask extractor rods cleaned using an extractor cleaning bath, to allow full immersion of the extractor rods.
- It is recommended that cask lines are cleaned between cask changes.

## 9.2 Cleaning – User Instruction Training

- The relevant cleaning instruction poster must be installed for each system.
- Users of the cleaning system must follow recommended guidance on correct use of the system and must ensure staff follow these instructions along with any relevant health & safety points.
- It is recommended that customers keep staff training records related to line cleaning procedures.

## 10 Electrical Code of Practice

Legislation affecting electrical safety means the licensee & brewer are responsible for the maintenance & installation of dispense equipment. Under the Health & Safety at Work act and Electricity at Work Regulations, a clear accountability for ensuring their respective compliance is required. These are reflected in the BBPA Code of Practice.

**Note:** It is not acceptable for extension leads and or socket adaptors to be used.

### 10.1 Outlet Responsibilities

- Ensure that there are sufficient sockets for the dispense equipment to be installed, one plug to one socket.
- Ensure that the circuits are adequately protected against overload, short circuit & earth leakage i.e; Fused/MCB/RCD
- Test the circuit at regular intervals by pressing the trip test button.
- To arrange for any hazards or defects reported to be rectified by a competent electrician.

### 10.2 Equipment Owner Responsibilities

Electrically test any socket in the outlet before any item of beer dispense equipment is connected. Tests should include checks for polarity & earth.

On all new installations or refurbishments, complete the Electrical Safety Form in the Electrical Guidance Booklet. On the installation of additional electrical equipment, issue the Electrical Guidance Booklet if no booklet currently exists on site.

Examples of issuing an electrical guidance booklet:

**Install a lighting transformer in an account where the ingoing brand owner is not the principal brewer.**

- Technician should issue the booklet if one does not exist in the account.

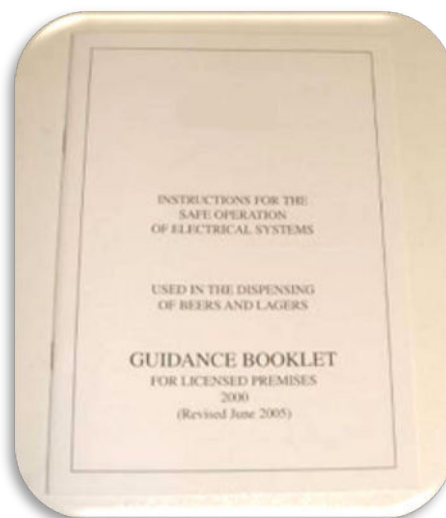
**Install a lighting transformer in an account where the ingoing brand owner is the principal brewer, and the account has already been issued with a booklet.**

- There is no need to issue a booklet.

**Note: If in doubt, it is always better to issue a booklet to the account.**

Any non-conformances identified at point of installation/maintenance must be notified to the outlet and a non-conformance certificate issued from the electrical booklet. This must be reviewed to ensure non-conformances have been rectified in a timely manner (maximum 4 weeks from issue date). Service can be withheld at the brewer's discretion if failure to adhere.

## Example of guidance booklet for safe operation of electrical systems.



### **11 Pressure Code of Practice**

This document outlines the industry legal requirements & any operational requirements within the 6<sup>th</sup> edition of the British Beer & Pub Association (BBPA) code of practice for the dispense of beer by pressure systems in Licensed premises. The complete details are to be found within the BBPA 6<sup>th</sup> edition booklet.

**Note:** Air compressors are not included within this code.

#### **11.1 Elements Included in the 6th Edition Code of Practice**

- One standard for the industry for participating brewers.
- Fixed anniversary examination for all pressure relief devices.
- The new code is only to be implemented when the existing code expires in the outlet.
- All relevant COP details to be displayed in the outlet.
- The 6<sup>th</sup> edition does not include:
  - Mobile bars.
  - Air compressors.

##### **11.1.1 Operational Responsibilities**

The user of the pressure system is responsible for the code of practice & maintenance within the outlet unless those duties have been transferred in writing back to the owner or supplier. Items which must be inspected include:

- All protective devices.
- Pressure vessels in which a defect may give rise to danger.
- All parts of pipe work in which defects may give rise to danger.
- The user of the system must only use the system for its designed purpose.



### 11.1.2 Equipment Specifications

Maximum ring main pressures

- CO2 systems maximum pressure is 35 PSI – 45 PSI
- Mixed gas systems maximum pressure is 45 PSI

### 11.1.3 Outlet Records to be Maintained

Every dispense pressure system must display a cellar record card.

The responsible person representing the account must sign and retain their copy of the BBPA booklet “Instructions for the safe operation of gas pressure systems used in the dispensing of beers and lagers”.

Signing the booklet transfers the responsibilities that may be transferred, from the user of the system to the owner of the system (see page 13 of the booklet).

A copy of the certificate is recorded with the owner of the system or their designated service provider.

This signed certificate can be captured and stored digitally in place of the paper copy.

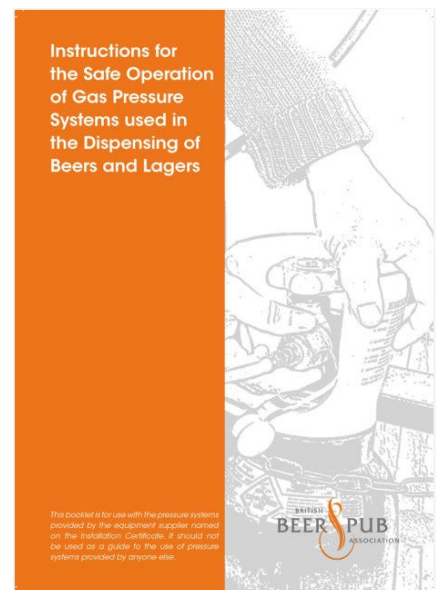
### Industry adherence to a safe system of use

- Unauthorised modifications are not permitted under the Pressure System Safety Regulations 2000 (2<sup>nd</sup> Edition 2014); The Consumer Protection Health and Safety Pressure Equipment (Safety) Regulations 2016 (formerly the Pressure Equipment Regulations) and other legislation.
- Periodic Inspection includes an audit of equipment, ancillary to the primary gas system when undertaking the examination. A potential consequence, if there is no commitment to compliance, is that the User will be unable to demonstrate operating a safe system of use to Regulatory Authorities

### Example Cellar record card



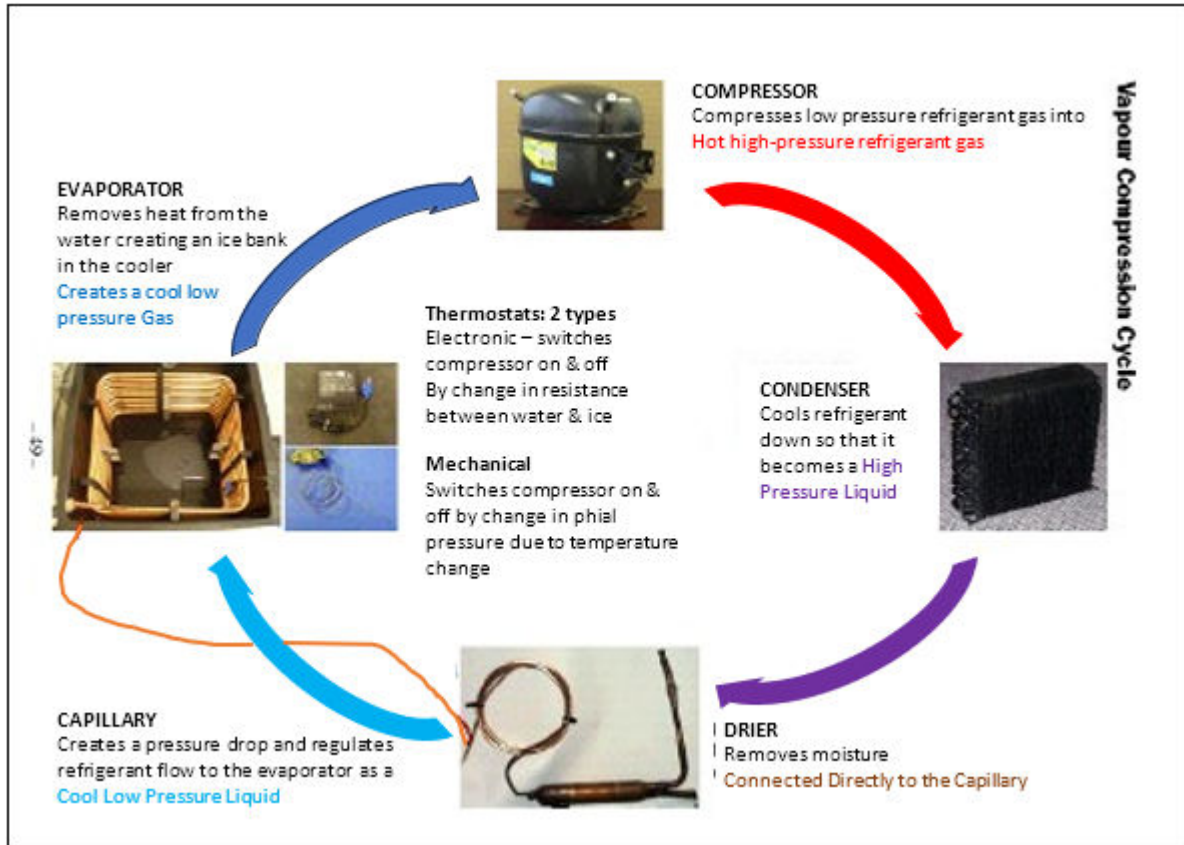
### Instructions booklet



## 12 Cooling Solutions

The aim of any remote cooler & python system is to maintain the temperature of the drink once it has left the cooler coil in the cellar.

### 12.1 Remote Coolers



Remote coolers operate similar to a basic fridge and use the standard vapour compression refrigeration cycle as shown below:

**Remote coolers are supplied mainly as 2 variants these are.**

**Integral design:**

- Designed for installation into areas where the heat generated by the unit can be dispersed without causing the ambient temperature to increase.
- The maximum ambient temperature where an Integral unit would be placed is 24°C; this includes the operating heat output of the unit(s).



**Water split design:**

- Designed to be installed into areas where additional heat dispersion would cause the ambient temperature to increase excessively.



Both Integrals and Water splits are available in:

Refrigerant Type	Standard Compressor	High-Capacity Compressor
R134a	21cc	34cc
R290	11cc	14cc

- 21cc coolers have circa 800 watts continuous cooling capacity.
- 34cc coolers have circa 1000 watts continuous cooling capacity.

Generally, 34cc coolers will have slightly larger capacity and a faster recovery to build ice. 34cc Coolers can be utilised in high throughput accounts.

Where multiple coolers are used then the product load should be shared equally e.g. Number of product coils and high volume brands.

Remote coolers are designed to have the following configurations, depending on python type:

**Standard Python** – Maximum 10 lines through cooler with standard coils (3.8m).

**InnCool** – 10 lines through cooler with medium coils (5m).

**Coil and Foil Python** – 8 lines with a long coil (10m).

A maximum of 12 standard length coils is permissible where throughput volumes are not excessive and meets brand owners' specifications in peak trading periods and no secondary python dependant cooling is present.

Remote coolers are designed to run in conjunction with Cellar Temperature Control (CTC) systems set at 11°C – 13°C.

- When planning an installation, the throughput volumes of the accounts should be calculated to ensure the correct sized remote cooler is used.
- Remote coolers must be placed in areas where they can be accessed easily for both repair and replacement.

**Note: Under no circumstances must the product line be split after the coil.**



### 12.1.1 Coolers Using R290 Refrigerant Gas

#### **Electrical Components (All)**

Precautions should be taken to avoid the possibility of direct sources of ignition from exposed electrical contacts. Electrical items that have the potential to produce electrical sparks during normal operation should receive particular attention to eliminate them as potential sources of ignition.

The following methods can be applied:

- Insulate terminals.
- Locate within IP65 enclosure.
- Replace with solid state type component.
- Replace with Ex type component.
- Locate externally.

Providing such items only comprise of solid-state parts or have casings which are solid encapsulated or otherwise sealed to at least IP54 or are located externally to the casing of the refrigerant containing parts then adequate precautions as required above are normally achieved.

**Note:** For manufactured appliances rather than installed equipment, an alternative option exists. For systems containing less than 150g of refrigerant, a leakage test from the refrigeration circuit can be conducted to determine whether sufficient refrigerant reaches the components to present a hazardous situation This test should be conducted under controlled conditions.

Care should be taken to ensure that electrical terminations, including capacitor terminations are adequately tightened and secured against loosening and that adequate insulation is provided to avoid live parts shorting together.

Fan motors should be of brushless design.

Components to consider as possible sources of ignition are:

- On/off manual switches Liquid level switch Condensate pump switch.
- Thermostats Flow switches Fan speed controllers.
- Pressure switches Start relays Humidity controllers.
- Oil differential switches Thermal overload relays Programmable controllers.
- Fan delay switches Potential relays Defrost timers/switches.
- Contactors Universal relays Time switches/relays.
- Isolator switches.

**Note:** This list is not exhaustive.

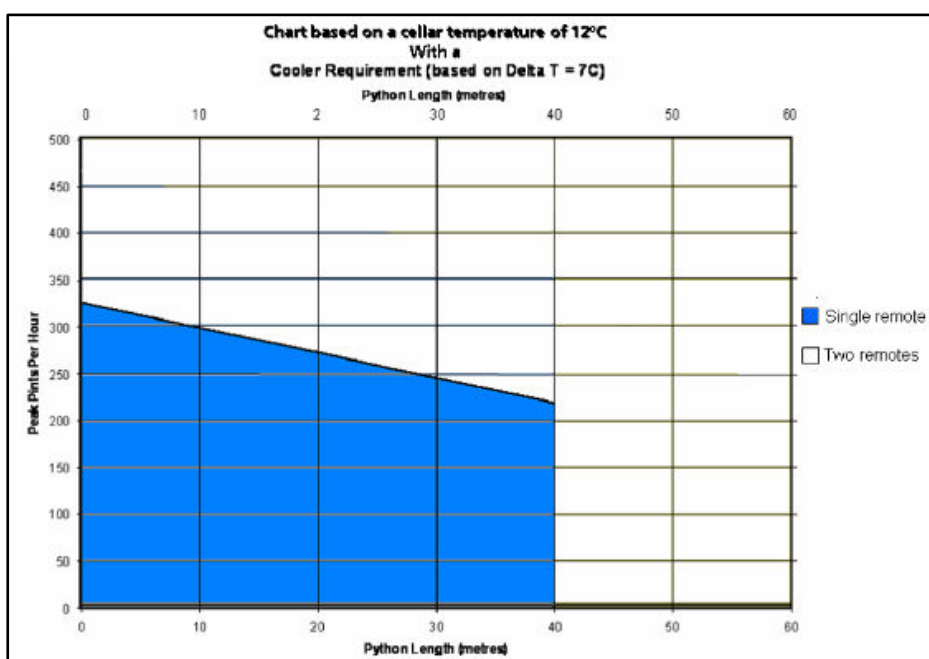
### 12.1.2 Remote Coolers Installation / Pythons

Consideration of the following should be given when planning the installation.

- Volume trading / peak times of trading.
- Length of runs from the remote to the bar.
- Number of pythons installed.
- Number of live product lines being connected.

Determine the peak pints per hour for the bar, read across to the python length if they cross in the blue segment, a single remote/python will support standard lager temperatures. Peak pints per hour will diminish if product is stored at higher than 12°C.

The below graph is to be used as a guide only, environmental considerations should be taken into account i.e. python runs through hot spots.



Remote Coolers are connected to pythons using 15mm service valves. These are required to be able to adjust the flow rate back into the water bath of the cooler. The minimum requirement is a service valve on the return line of the python.

A minimum of 4 litres / minute flow rate as measured from the recirculation lines back into the cooler. Generally, most accounts would need 1 remote per python loom. The exception being where there are 2 pythons installed which total 40m or less.

For exceptions see below.

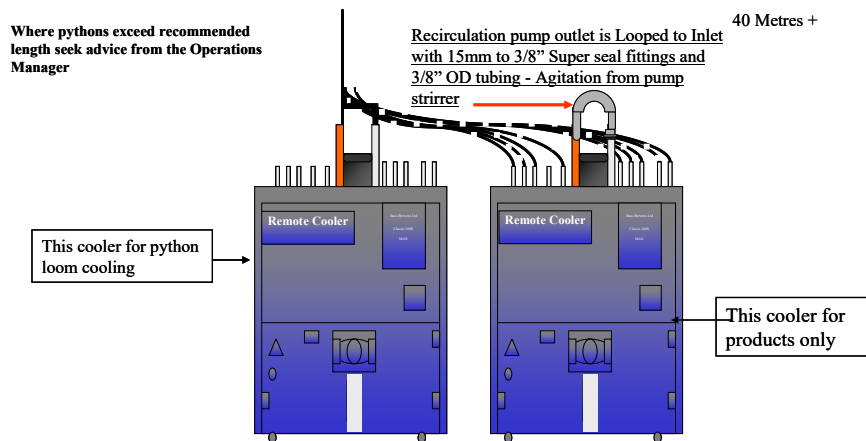
- Under 40m python = 1 cooler.
- Over 40m python = 2 coolers.

### 12.1.3 Python Run & Impact on Cooling Capacity

**Loom Length:** The overall length of a python loom is critical in remote unit assessment. Python looms consume 100 -140 watts of energy for every 10 metres of loom (*equivalent to 16% of the remote coolers compressor cooling capacity*). Any python runs over 40m (from a single remote) may require additional considerations based the on outlets environment. This usage assumes ambient python temperatures of 24C.

Example: A remote with a 40 metre loom would require 4 \*140 watts of cooling power. In real terms this represents 75% of a standard coolers capacity. In addition to this loading consideration must also be given to heat gain from electric recirculation pumps. This will account for at least another 100 watts of cooling capacity. Where python looms are in excess of 40 metres the system will require assistance for product cooling. See Diagram below:

Note. if the flow rate is excessive on the 'slave' remote it will adversely affect the ice bank properties. Always reduce the flow rate to between 4 – 8l/pm using a speed fit 15mm service valve on the return recirculation connection on the pump.  
Remote Coolers **MUST** not have the re-circulating pump disconnected or blocked off, they should always be looped, flow rates set correct as the return water is used for ice wash.  
The schematic below shows loading.



## 12.1.4 BDA Installation Guidelines for Remote Coolers

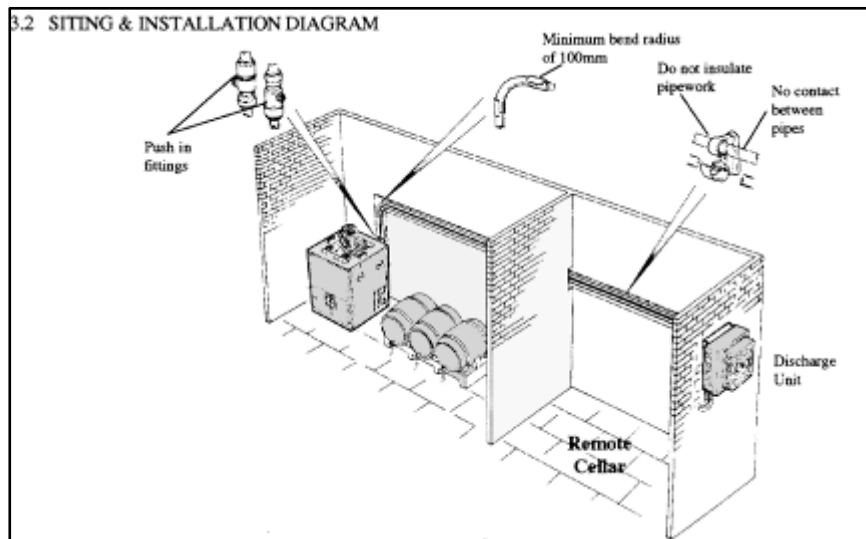
### **BDA Order of Preference for Type of Remote Employed on Installation**

<b><u>First Choice: Integral cooler outside the cellar</u></b>	<b>Answer</b>	<b>Next Step</b>
1. Can an Integral cooler be installed outside the cellar to BDA specification?	Yes	Proceed to next question
	No	<i>Proceed to 2nd Choice</i>
2. Is there an adjacent room to the cellar with adequate ventilation to site the remote cooler?	Yes	Proceed to next question
	No	<i>Proceed to 2nd Choice</i>
<b><u>Second Choice: Integral cooler inside the cellar</u></b>	<b>Answer</b>	<b>Next Step</b>
1. Can an Integral cooler be installed inside the cellar to BDA specification?	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
2. Dependant on cellar size, will a maximum of 2 integral coolers be installed? <i>(Please seek technical guidance for clarity on cellar size and limitations)</i>	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
3. The Coolers should be sited away from the kegs as far as possible, avoiding the blown air from the cooler fan directly affecting the kegs.	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
4. All attempts should be made to keep direct heat sources away from where the kegs are sited. If possible, site kegs near the cellar cooling.	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
5. Is the existing cellar cooling operating and has the ability to maintain the cellar temperature at 13°C?	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
6. Is the outlet free from temperature related dispense issues?	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
<b><u>Third Choice: Water Cooled remote cooler</u></b>	<b>Answer</b>	<b>Next Step</b>
1. Can I install the cooler to BDA specification?	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>
2. Can I install the heat dump to BDA specification?	Yes	Proceed to next question
	No	<i>Proceed to 3rd Choice</i>



### 12.1.5 Heat Dumps

- Heat dumps should always be installed outside of the building. In certain circumstances where the heat can dissipate satisfactorily e.g. the area has forced ventilation and does not exceed 24°C, they can be installed inside the building.
- One heat dump per water split remote cooler.
- The heat dump must be sited at a safe working height from the ground level (measured from the top of the heat dump).
- Avoid where possible installing heat dumps on a South Facing wall.
- Heat dumps should be installed adjacent to each other NOT one above each other as the heat can rise and be drawn into the dump above.
- The distance from the Remote to the heat dump must be kept to a minimum.



Examples of different styles of heat dumps

### 12.1.6 Glycol Lines

- Only use black 15mm OD by 10mm ID glycol pipe. Under no circumstances must PVC/ python recirc. be used.
- Connect the glycol lines to the cooler using 15mm push fit service valves. This will allow the cooler to be changed without draining the heat dump lines.
- Heat dump pythons with vent pipe to be secured using appropriate fixings.
- Heat dump pythons with a cable within that are routed above a doorway, fire escape or stairway must be secured using metal fixtures in accordance with latest wiring regulations.
- The cable type is 2 core 1.5mm and 1 cable per heat dump.
- Target flow rate must be between 4 – 8 l/pm measured coming back into the cooler.

### 12.1.7 Glycol Pump Values

Glycol Pump	Lift
Standard 2 Stage	11m
Special 3 Stage	16m

### 12.2 Python Types and Sizing

Pythons may be MDP or nylon core variety surrounded by 19mm soft foam insulation.

The following pythons are standard variants:

- 10 product lines + 2 water recirculation, wrapped 19mm foam.
- 14 product lines + 2 water recirculation, wrapped 19mm foam.
- 18 product lines + 2 water recirculation, wrapped 19mm foam.
- 10 product lines + 4 water recirculation with foil, wrapped 19mm foam.
- 14 product lines + 4 water recirculation with foil, wrapped 19mm foam.

**Note:** Other pythons are available by exception.

Select python size, taking due care of product types being installed, cask, keg beer & lager, not forgetting future potential for spare lines. Consideration MAY be given to use a special barrier python for cask lines i.e. where number of lines in conjunction with python length would cause any cask product (or in some cases keg ale) to be too cold.

In some cases, if the number of lines required demands it a separate ale python may be needed.

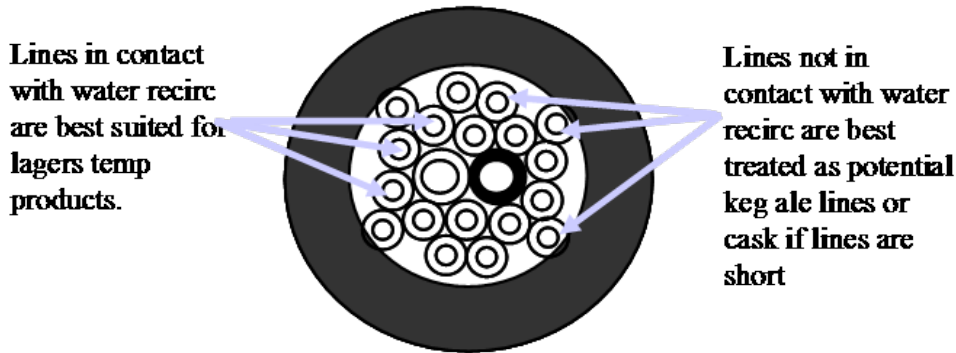
Maximum 3 cask products on a 14+2 standard python. Must use the external (2 stripe) product pipes.

### 12.2.1 Python Installation & Recirculation Line Identification

The following guidelines should be used when installing pythons.

- Choose a route where each python will require a duct of not less than 150mm, which is ideally underground (to take advantage of a stable ambient).
- Terminate at the bar end furthest away from the cellar. This will enable any post installation increase in the number of taps to be accommodated.
- Python lines must be cut using the correct tool, NOT CRAFT KNIVES, ONLY use the correct cutters.
- Identify all pipes clearly at bar & remote by coloured tape.
- Never install pythons into unsound ducting, (ensure it is free from water and debris before installation).
- Pythons must be installed without contacting each other as this leads to condensation and the growth of mould.
- The python breaks should be made adjacent to the Font/T Bar. Under NO CIRCUMSTANCES should the insulation be cut back, and the lines removed across the length of the python in the bar.
- To maintain the integrity of the python across the whole of its length, it's important that the amount of invasive work is kept to a minimum. This means that the product line is cut and extended at each tap feed point and the redundant line left in situ. Always ensure the exit areas are fully insulated and made good.
- The ends of spare python lines must be taped over to prevent foreign objects entering.
- Plan the python runs to the bars to avoid high ambient temperatures if possible as this reduces the effectiveness of the python.
- Seal lines when pulling pythons through ducting etc to prevent damage and the ingress of foreign objects to the lines.
- When specifying ducts ensure they have 'slow' bends i.e. not 90 degree as this will cause difficulties when installing and also if in the future the python requires changing.
- All joints must be lagged and sealed fully otherwise condensation will occur especially in bar areas with higher temperatures and high humidity.
- Flush all product lines with clean cold potable water after installation.
- The number of lines run from the coolers back to the dispense equipment board in the cellar must match the number of python lines.

## Plan to deliver brand dispense temperature



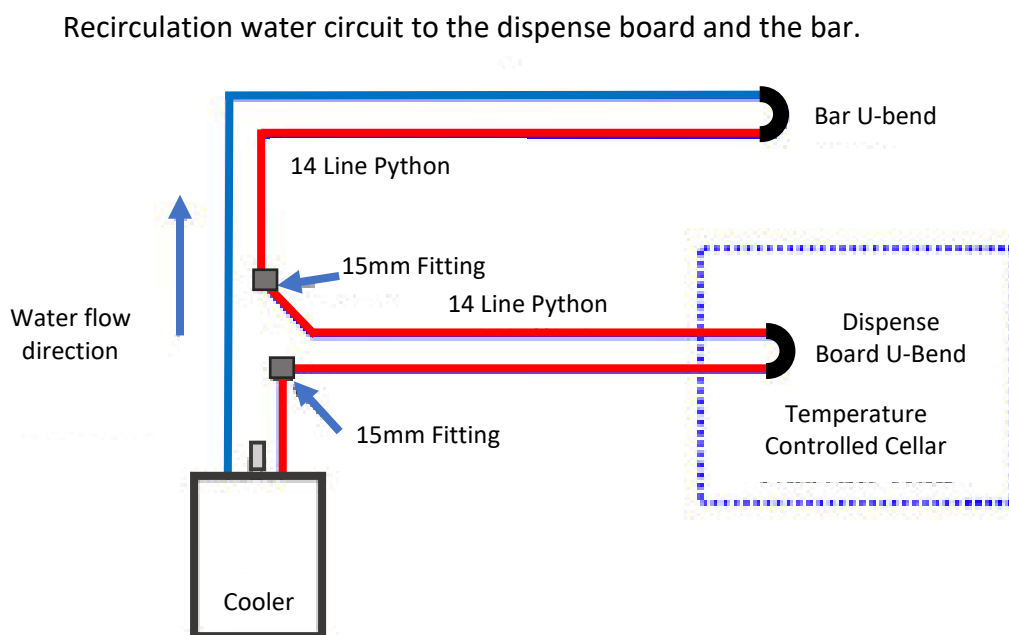
To help identify flow back into the cooler and which lines to fit secondary cooling to (i.e. flow lines), the following pipe colours should be used for recirculation flow rates.

Python Type	Flow lines (from the pump)	Return lines (back to the pump)
Single recirc. loop (2 x 15mm)	Black	Clear
Twin recirc loop (4 x 15mm)	Black & Blue	Clear & Red

### 12.2.2 Python Back Looming

The circulation cooling water should only be connected on the loom back to the dispense board if the cooler is not located in the temperature-controlled cellar.

For water flow direction see diagram.



### **12.3 Secondary Cooling Principles**

The term secondary cooling applies to all cooling systems which are in 'addition' to some form of cooling applied known as primary cooling. These systems are usually used to obtain extra cold / super-chilled products.

Typical examples of secondary cooling devices are:

- Shelf coolers
- Cooling pods/modules
- Cooling plates/blocks
- CoolTubes/Pancake coolers

In general, they contain either a refrigeration plant (shelf coolers) or a tank of water supplied from the primary cooling system with coils running through the water flow. Some plates / blocks have product coils encased in aluminium with a recirculation line also encased in the aluminium block.

The secondary systems typically lower the temperature by 2-5°C, when supplied from an ice bank type primary cooler.

The practice of double dipping at the remote cooler is not an acceptable method for Secondary Cooling, or use of long coil. (10m).

### **12.4 Python Dependent Secondary Cooling**

- Where Main pythons exceed 40 metres, a Slave Remote is required.
- Minimum return flow rate on the main python to be used is no less than 4 litres a minute.
- Return water recirc no greater than 2°C during normal trading periods.
- Temperature and flow rate to be measured before and after installation of Secondary cooling.
- No more than 10 coils in use on remote cooler.
- No other devices or technologies e.g. Ale Python Controller (APC) or Cask Ale cylinder cooling must be in use on the proposed python/remote.

### 12.4.1 Specific Rules

- Each python dependent device has an agreed BDA value and the values of all devices can be found in the python dependent devices matrix.
- When fitting python dependent devices the total BDA value of any individual python system should not exceed 10 BDA units.
- The below table gives an example of BDA values of differing devices.

**EXAMPLE.** A 30 metre python/remote system with 10 coils in use, with no PTC's or secondary cooling or condensing fonts has a BDA value of 0. It is possible to install 2 x Micro Cooler pods and 2 flooded condensing fonts. System OK as new BDA value of 10 does not exceed maximum BDA value.

MAXIMUM LOADING <b>10 BDA</b> UNITS FOR COLDER DEVICES PYTHON/REMOTE MUST COMPLY WITH GENERAL RULE	
ITEM	VALUE
1x 1out Chiller Plate	2
1x 1out Pod	1
1x 4out Chiller Plate	2
1x 6out Chiller Plate	3
1x Flooded condensing font	1
1x Pancake Cooler	1.5

### 12.4.2 Installation Specifications

- All secondary cooling systems must be sited within 2 metres of the dispense point.
- Always use the correct ID size insulation and cover all fittings. This will ensure condensation does not form.
- Never use ONLY foam insulation tape to insulate; this should be used to connect lagging together.
- When sealing joints DO NOT squeeze the lagging as this will lead to condensation forming.
- When fitting the lagging always cut the line shorter than the lagging. This allows the lagging to 'spring' back and make a seal.
- Pod/Module and Block/Plate which are water filled must be installed the correct way around (refer to manufacturer's instructions) as if they are installed the wrong way around, they can 'airlock'.
- Where blocks are supplied with carry bags for transportation the bag should be always removed when installed.
- Even push fit connections can be the cause of condensation formation, always ensure they are insulated.
- It is recommended that red collets are fitted to all push fit connections that are used on water recirculation to prevent leakage e.g. cooling manifolds, 15mm fitting on pods and blocks.

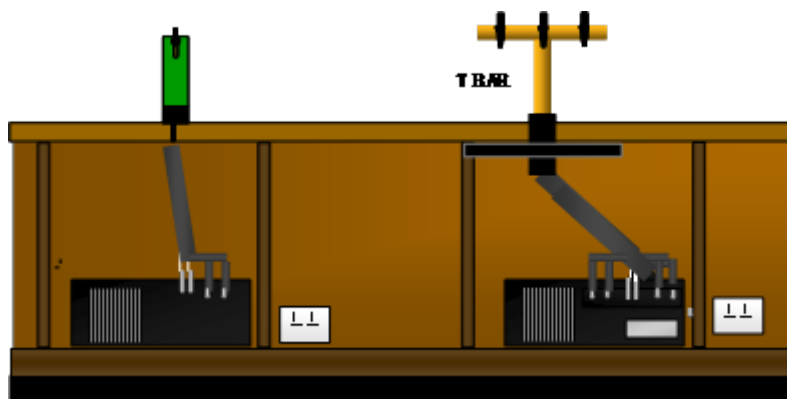
### 12.4.3 Installation Examples



Example of correctly insulated pod

### 12.5 Python Independent Devices

- For extra cold dispense specifications to be achieved, dispense temp ex python must be within standard product specification.
- When fitting the device ensure there is a minimum 50mm gap to sides and top and 115mm to the rear to allow for pipe work and airflow.
- Product lines ex cooler to be correctly insulated.
- Max length of pipe work from the cooler to the underside of font or T bar should not exceed 2 metres.
- A dedicated 240v supply is required for each device. The use of multi way adaptors and extension leads is prohibited.
- Where appropriate connect trace cooling and font condensation



## **12.6 Cellar Based Cooling Systems Options**

### **12.6.1 Cooling Suppressants**

Cooling suppressants are systems that use various liquids to reduce the bath temperature of the remote cooler to below the traditional operating temperatures of standard remote coolers.

These systems deliver extra cold temperatures without using secondary cooling devices. Standard remote coolers are not compatible for use with cooling suppressants and require modification all remote coolers used in conjunction with cooling suppressants must have labelling to identify the suppressant used.

Standard python installation guidelines apply, and cooling suppressants can be installed on new installation or can be retrofitted to existing systems.

When using cooling suppressants please refer to manufacturers operating instructions.

### **12.6.2 Coil and Foil**

Coil and Foil is a cooling system that delivers extra cold dispense temperatures without using secondary cooling devices e.g. cooling modules, pods, plates or shelf coolers.

- This primary cooling system utilises existing “Ice Bank” Remote Coolers to deliver extra cold “In Glass” dispense temperatures of 2 to 5°C including “first off” drinks.
- The main features of the system employ a specifically designed python & 10 meter coils.
- The python specification is based on an inner foil wrap surrounding both the product pipes and double water recirculation lines, the tubing bundle is enclosed in 19mm insulation.
- The system is intended to provide a complete extra cold solution per bar. i.e. all products should be extra cold
- The general principles of python installations apply to this system.
- Particular care must be taken when assessing the number of coolers required per account if the system is to perform to its capabilities (see chart in installation section).

The system should ONLY be used for products which are deemed to be Extra Cold / Super Chilled.

Standard products e.g. 6°C – 8°C or cask beers will need to be installed on a separate python and cooling system.

The remote coolers are standard ice bank coolers fitted with maximum of 8 x 10m coils attached to either a 10+4 or 14+4 foil wrapped python.



### 12.6.3 Coil and Foil Python

- Consists of either 10 or 14 product lines + 4 x 15mm recirculation lines with foil wrapping encapsulated with 19 mm foam insulation.



10+4 python with foil wrap



Clear & Red – Return Lines  
Blue & Black – Flow Lines

### 12.6.4 Coil and Foil Remote Cooler

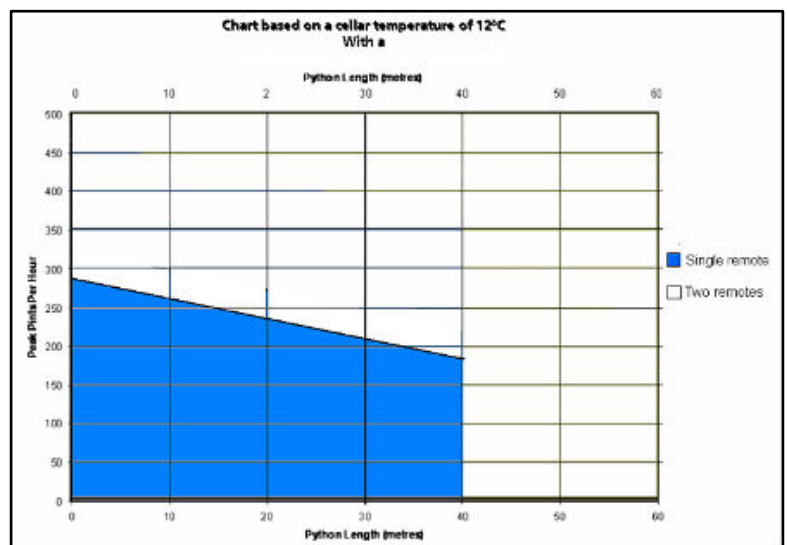
- The remote cooler must have a maximum of 8 coils with blanking plates for coils 9 & 10.
- The coil lengths are 10m.
- Only Extra Cold / Super Chilled lines should pass through these coils.
- The coolers can be either 21cc or 34cc units if R134a or 11cc – 14cc if R290.

### 12.6.5 Remote Calculator

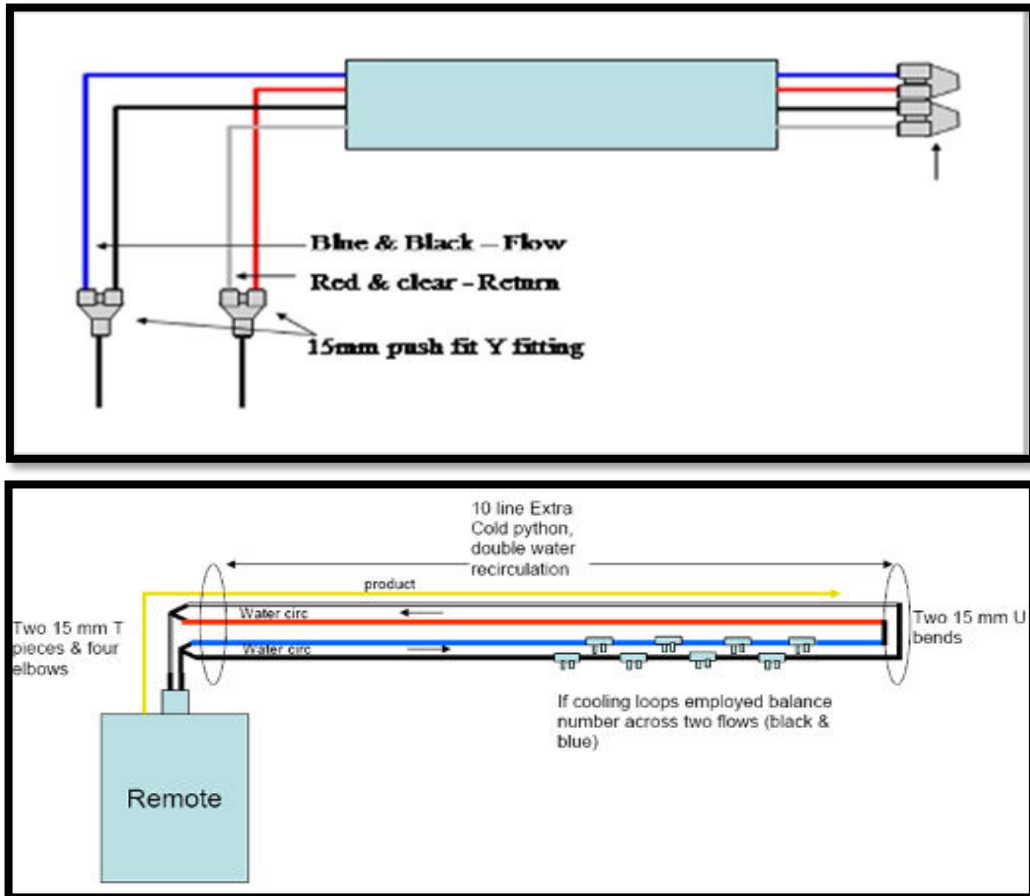
This chart should be used to determine the number of remotes required to enable the system to perform at its optimum.

- Determine the peak pints per hour for the bar.
- Read across to the python length.
- If they cross in the blue segment, a single remote/python will support Extra Cold temperatures, if they cross in the white segment then two remotes will be required.

**Note: Peak pints per hour will diminish if product is stored at higher than 12°C.**



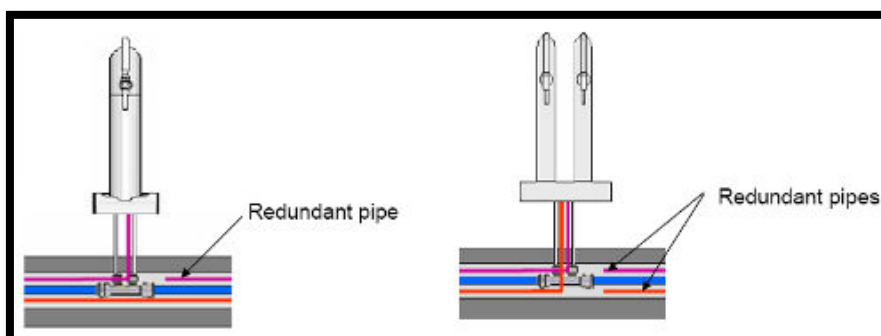
## 12.6.6 Standard Installation



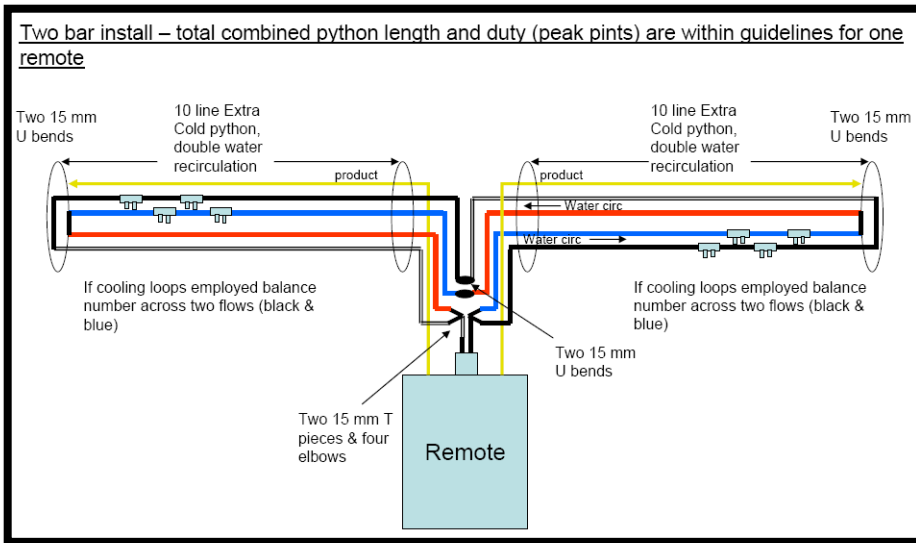
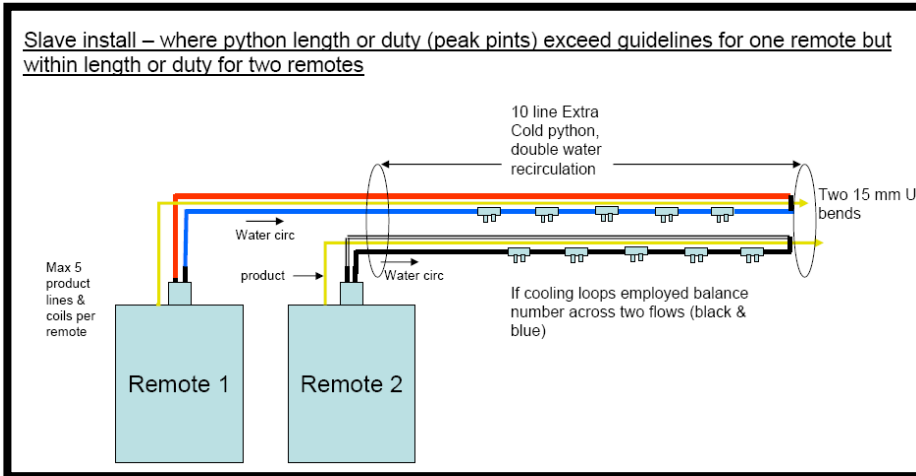
- Connect the Fonts / Bars to both the 15mm flow lines (blue & black) to balance the flow rates.
- Connect the Python to the remote cooler using 15mm service valves.
- Connect Fonts as per the schematic below, balance the recirculation flow lines, example shows 8 x Fonts. Maximum number of dispense points off 1 x python is 8.
- The python breaks should be made adjacent to the Font/T Bar. Under **NO CIRCUMSTANCES** should the insulation be cut back and the foil removed across the length of the python in the bar.
- To maintain the integrity of the python across the whole of its length, it's important that the amount of invasive work is kept to a minimum. This means that the product line is cut and extended at each tap feed point and the redundant line left in situ. Always ensure the exit areas are fully insulated and made good.

### **Examples**

Access to the python has been made to allow the installation of a cooling loop fitting to supply chilled water recirculation to the Font. The product lines have been cut and extended to supply the font taps. You will note the redundant pipes are left in situ.



## 12.6.7 Slave Remotes



## 13 T Bars

T Bars are fundamentally split into two categories these are:

- Water Cooled.
- Non-Water Cooled.

**If trace cooling and / or Condensation is part of the design of the Tbar it must be connected.**

**For all T Bars without trace cool to tap, cooling recirc lines must be installed to the base of the T bar.**

The variations mean they are installed very differently as water cooled variants need to have a chilled water supply piped in & out.

- All push fittings used for water recirculation must have the red collets fitted to prevent leakage. e.g. cooling manifolds, 15mm fittings.
- Some brand owners may have developed or bought brand specific T bars which are designed to accommodate only their brands.

### Installing T Bars above Sinks & Ice Storage Containers.

T bars and should not be installed under any circumstances above sinks or open ice storage containers.

#### 13.1 Water Cooled T Bars

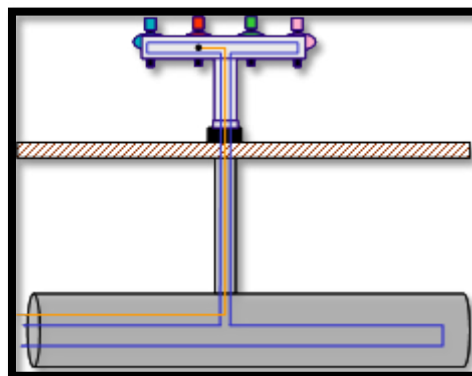
All water-cooled T Bars have a recirculation loop fitted inside the unit to run cold water / glycol lines to the back of the tap. This is designed to keep the product cool all the way to the point of dispense.

##### 13.1.1 T bars Fitted with 15mm Recirculation Lines

On units fitted with 15mm recirculation lines:

- The connection to the water recirculation line on the python is via a 15mm push fit elbow to direct the water flow through the T Bar (in series)
- The water recirculation then rejoins the python again via a 15mm push fit elbow

The schematic shows water-cooled T Bar with associated connections to the python water recirculation system.

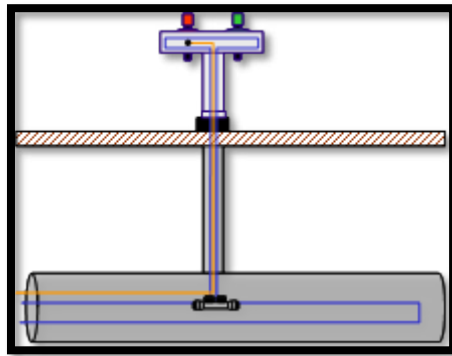


### 13.1.2 T bars Fitted with Other Pipe Diameters

On units fitted with any other pipe size:

- The connection to the water recirculation line on the python is via a Cooling manifold to direct the water flow through the T Bar

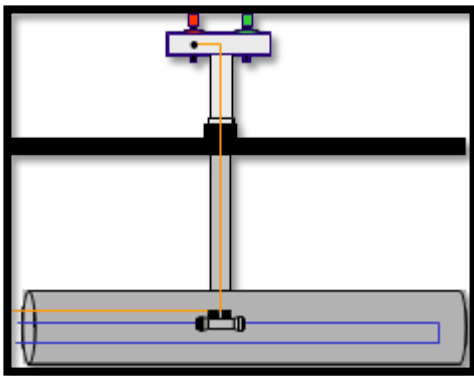
The schematic shows water cooled T Bar with associated connections to the python water recirculation system only for 3 or less dispense points.



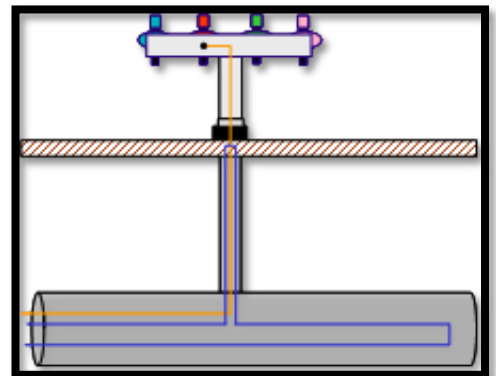
### 13.2 Standard T Bars

Recirculation cooling must be installed to the base of the T bar to prevent heat gain to the product line between the python and the T Bar.

This can be done either by 15mm push fit elbows or cooling manifolds as per water cooled T bar section



3/8 loop with cooling manifold



15mm loop with 15mm fittings

## 14 Fonts

Fonts are dispensing points which have an integral tap built into the design rather than a separate Tap & Bracket attached to a cowl or advertising display. Non-branded fonts (single generic towers can also be used).

For specific brand variations see 'Brand Specific' documentation. All fonts must be installed as per the Brand Owners specification.

**If trace cooling and / or Condensation is part of the design of the font it must be connected.**

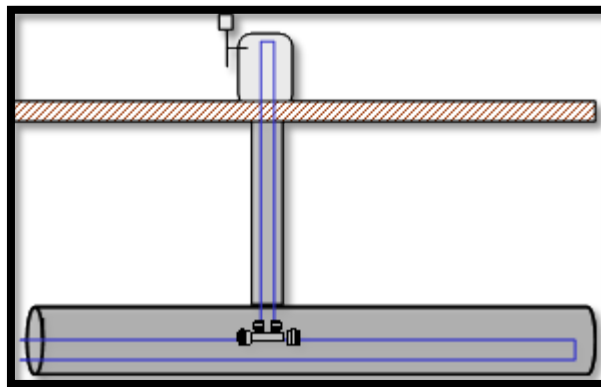
**For all Fonts without trace cool to tap, cooling recirc lines must be installed to the base of the Font.**

- All push fit connections used for water recirculation must have the red collets fitted to prevent leakage. E.g. cooling manifolds, 15mm fittings.

### Installing fonts above Sinks & Ice Storage Containers.

- **Fonts should not be installed under any circumstances above sinks or open ice storage containers.**

#### 14.1 Font with Trace Cooling

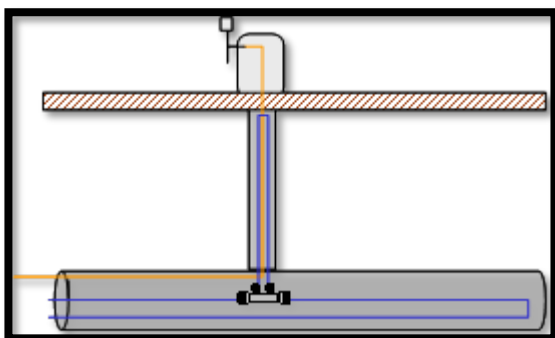


Connections for trace cooled fonts.

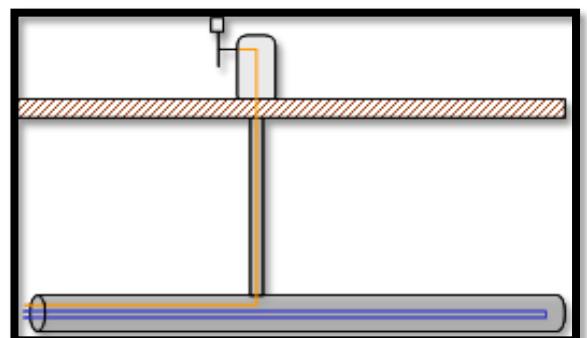
If the font has trace cooling fitted, then use a cooling manifold to connect the trace cooling to the python.

#### 14.2 Font with No Trace Cooling

If the font does not have trace cooling fitted, then there are two methods for connecting to the python. The use of these methods is dependent on the Brand Owners specification.



*Trace cooling to base of font*



*No trace cooling*

## 15 Illumination & Bar Lighting Transformers

### 15.1 Illumination

All fonts and T Bars are fitted with circa 2m of 2 core cable by the manufacturers. Illumination to Fonts / T Bars is by 24v AC/DC via a bar lighting transformer. 240V must not be used under any circumstances. Cellar metered fonts and T bars are generally illuminated via the 4 core cable feed to the bar valve from the cellar.

### 15.2 Transformers

The bar lighting transformer is normally rated at 96VA

A dedicated 240v supply is required for each transformer. The use of multi way adaptors and extension leads is prohibited.

Transformers should always be screwed to the bar or other fixed surface, correct size screws must be used to ensure they do not protrude.

#### 15.2.1 Maximum Connections to Bar Lighting Transformer



- Only one cable to be connected per outlet on the Bar Lighting Transformer.
- Each font or T bar must have a separate supply to the transformer. ie no daisy chaining of fonts.
- In the majority of instances, it should be possible to use one continuous length of cable for each individual font / T bar.
- Where a join is required only use a suitably sited enclosed (i.e. inside the font) insulated jointing connector block.
- Because we are using 24 volts and 0.5mm cable remember that long runs will reduce the voltage at the lamp and could reduce illumination. (93mV/A/M voltage drop for 0.5mm copper cable).

## 16 Cask Beer Dispense

Cask products are “live beer” and as such have specific requirements:

- They must be stored in a temperature-controlled cellar at approx. 12°C
- They require approx. 48 hours to become ready for sale, to allow settling, conditioning, and acclimatisation.
- The traditional dispense temperature is 12°C, i.e. “cellar temperature”.

There are generally two cellar storage systems installed for cask beer.

- Gantry’s or Horizontal stillages
- Vertical or Upright Extraction

There are a number of dispense methods that can be employed to supply the product from the cellar to the bar. The individual outlet dispense method is normally determined by the brand owner or customer specifications and or the individual outlet sales volumes and number of dispense points.

As a general rule:

- If the outlet has only up to 3 cask beer dispense points on the same bar/python, the spare lines in a standard python can be utilised, these must be the outer lines (labelled with 2 stripes).
- If the outlet has more than three cask beer dispense points on the same bar or python a separate cask ale python would be installed.

Utilising lines within a standard python

- The only potential draw back with this system is cask beer can be over chilled by the cold water re circulation lines within the python at times of slow sales. But it is better than uninsulated / uncooled beer lines.

The ideal system for cask beer, is the installation of a separate cask ale python with an appropriately sized remote/mini remote cooler or Python Temperature Control unit (PTC)

Cask beer is usually dispensed via a single clamp on beer engine (either 1/4 or 1/2 pint); these may also have the cylinders water-cooled.

Individual customer specifications may dictate multiple and or through the counter units.

### 16.1 Cask Beer Cellar Equipment

To ensure the customer can employ the correct cleaning methods, spare cask taps, or vertical extractors and a cleaning bath will be required. This allows for equipment to be cleaned whilst beer can still be dispensed.



Vertical Extractor



Cask Tap



Extractor Cleaning Bath



## 16.2 Dispense Methods

In the majority of occasions dispense will be via a 3/8 product line in either a standard python or dedicated cask beer python, in these circumstances a suitable pump will be required, usually a gas pump.

- The installation & set up of the gas pump is the same as in a free flow system.
- All systems using pump assist will need a “check valve” installing on the product line before the beer engine.

On short runs a pump may not always be required and dispense will be via 3/8 ID or 1/2 ID single product pipe.

### 16.2.1 Cask Beer within a Standard Python

Where possible the cask beer should be installed in the python lines furthest away from the cold water re circulation lines (2 stripe) to reduce the risk of further chilling to the beer at dwell time within the python. The cask beer must not pass through the coils with a remote cooler.

### 16.2.2 Cask Beer within a Separate Cask Beer Python

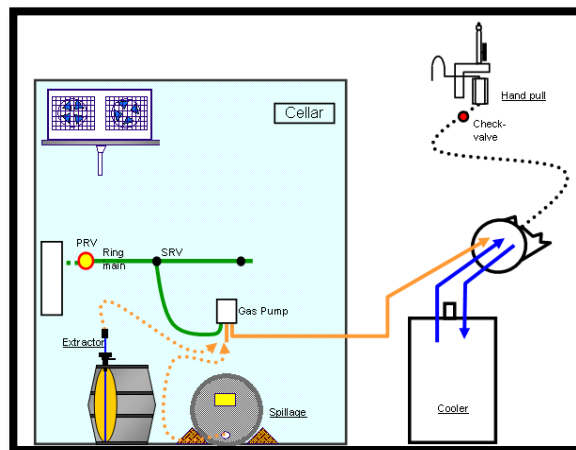
To deliver specification an appropriately sized remote/mini remote cooler should be connected to a dedicated cask beer python. The remote/mini remote cooler should be set so that the water recirculation maintains cellar storage temperature within the python.

For example, set the cooler to around 8°C to maintain a python temperature of around 12°C (dependant on environmental conditions).

- Consideration should be given to the size of the cooler required; a mini remote cooler will generally service up to 6 water cooled beer engines on one cask beer python.
- If there are more than 6 beer engines on one python a standard remote cooler may be required

Other systems may be used to operate a cask beer python and may be customer specific e.g. a PTC unit.

- The PTC unit is connected to the standard remote cooler to provide the cooling energy for the PTC, and then uses its own python recirculation pump.

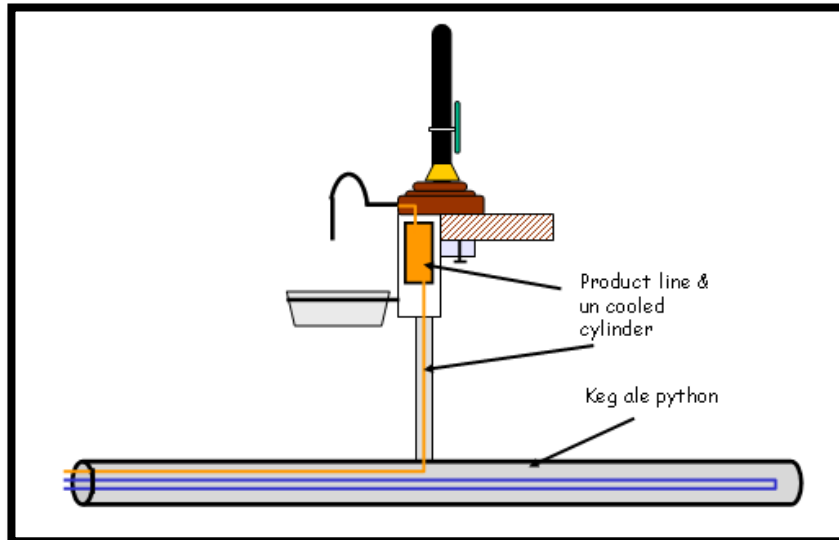


(Schematic of cask beer within a standard python, or cask beer python with a remote cooler)

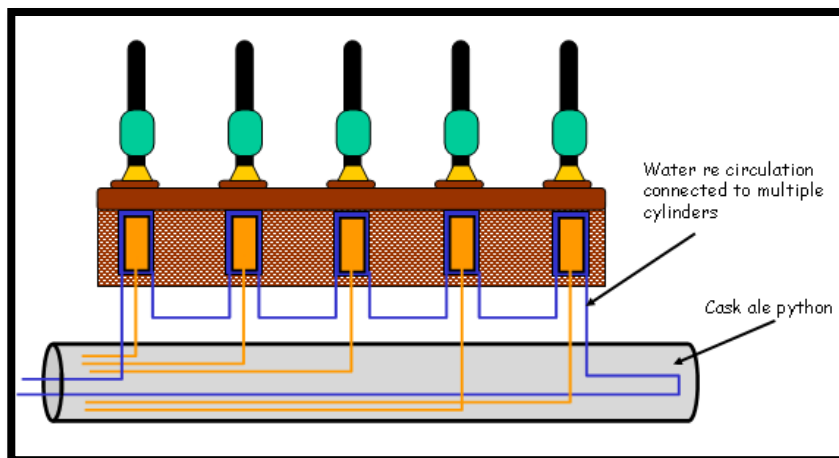
### 16.2.3 Beer Engines

Where beer engines have water-cooled cylinders, the connection (or not) of the water-cooling to the python re circulation system is defined by the customer specifications.

- This applies to clamp on and through the counter beer engines, singles & multiples.



*Schematic of a single clamp on beer engine with no water re circulation connection to the cylinder.*



*Schematic of a single clamp on beer engine with water re circulation connected to the cylinder.*

**Note: Connection of the water jacket is customer specific – under no circumstances should the cask jackets be connected to a python recirculation from an ice-bath. Doing so will likely cause chill haze and affect the overall quality of the product served.**

## 17 Metered Dispense Systems

Metered dispense systems fall into two types:

- Volumetric displacement metered systems
- Turbine metered systems.

Displacement systems are generally fitted in the cellar on the dispense board with a cable run to a switch at the bar.

Turbine systems can be fitted anywhere in the line; however, they are normally fitted at the tap end of the line and all parts are connected locally.

### 17.1 Volumetric Displacement Metered Systems

The standard installation specifications for volumetric metered dispense is as follows.

- Minit meters.
- Metered Fob Detectors should be used as standard.
- Gas / electric pumps.

#### 17.1.1 Cable Specifications

Cable Purpose	Cable Size	Cable Cores	Colour
Mains to power pack	1.5mm	3	Brown / Blue / Green & Yellow
Power pack to pump	0.75mm	3	Brown / Blue / Green & Yellow
Power Pack to Meter	0.75mm	3	Orange / Violet / White
Meter to Bar Valve	0.5mm	4	Orange / Violet / Grey / White

When running cables for metered equipment over ceilings the use of plastic retaining tie tags is not acceptable as during fire they can melt and drop down causing a hazard for persons escaping. Installations should align with current wiring regulations (cables over doorways, stairwells and fire escapes must be secured using metal fixings).

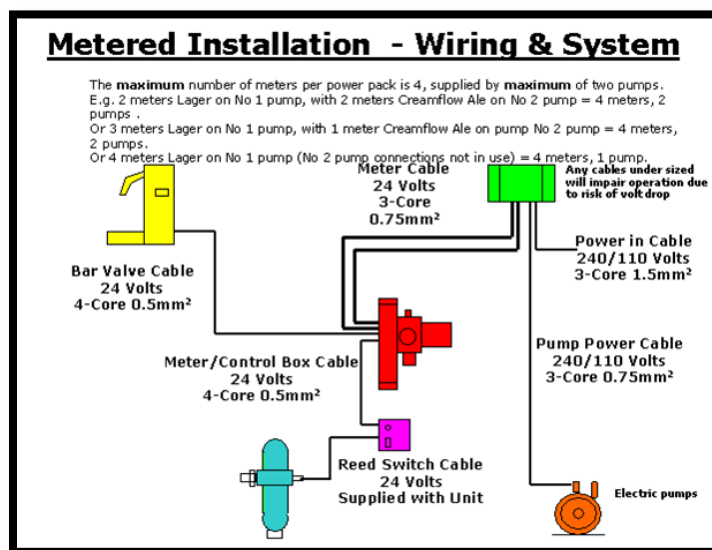
#### **Avoid running electrical cabling within Beer lines Trunking.**

Fit spacers behind trunking to enable cables to be run behind beer lines trunking and not into the trunking.

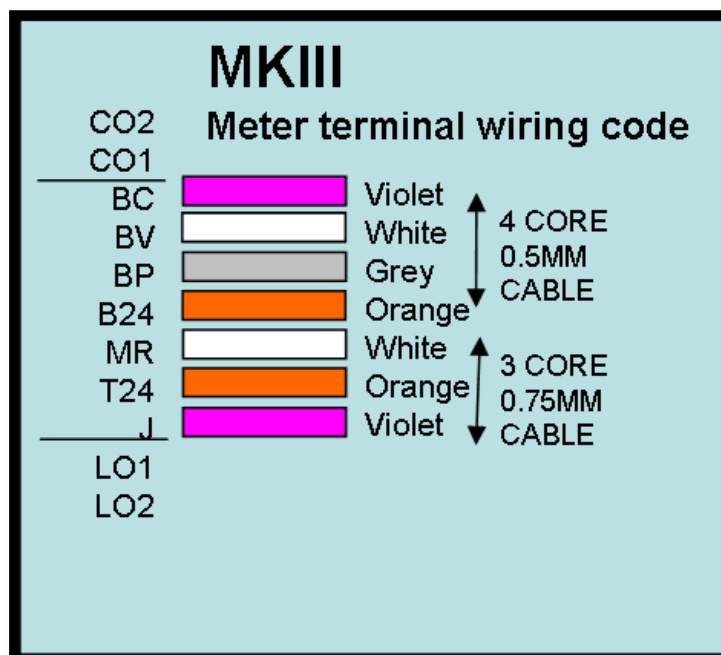
### 17.1.2 Wiring Schematic



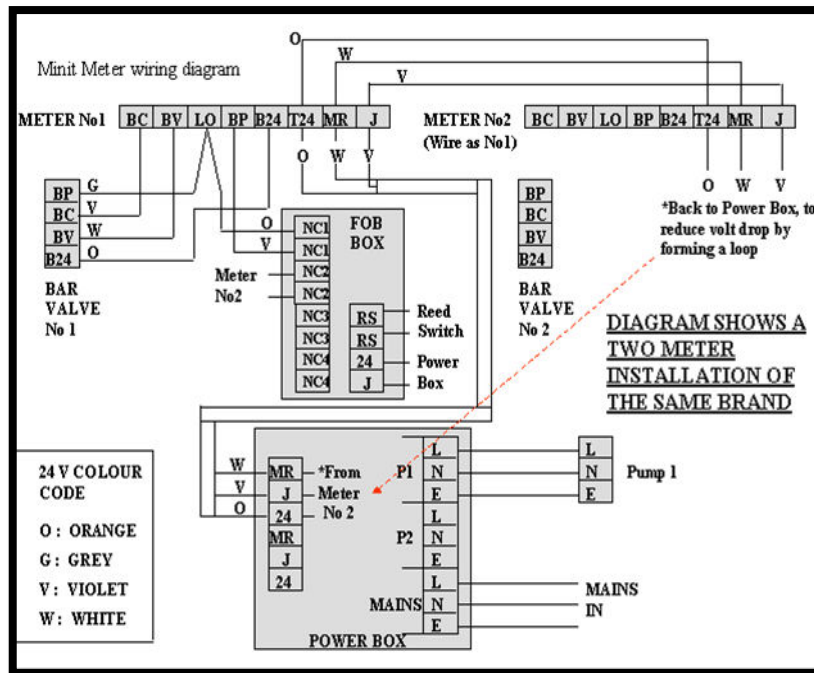
### 17.1.3 Wiring Colour Codes



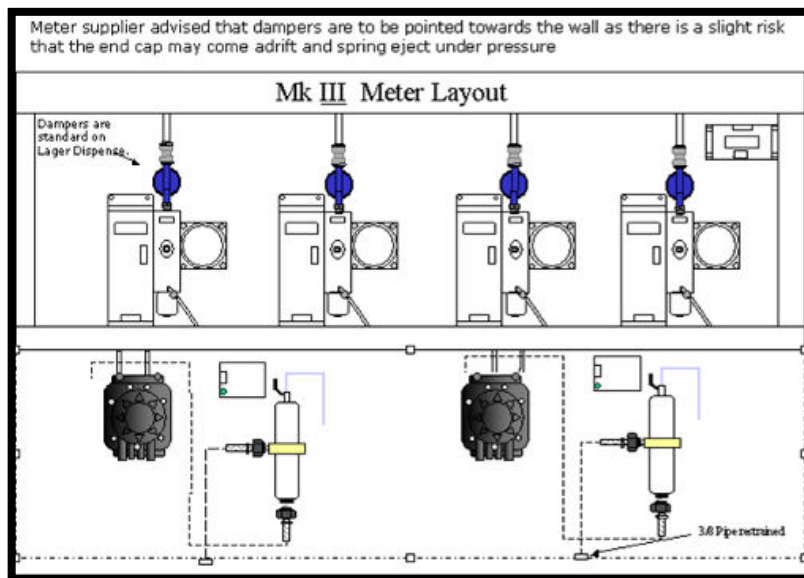
### 17.1.4 Standard Cellarmatic Meter Wiring Diagram



### 17.1.5 Minit Meter Wiring Diagram



### 17.1.6 17.1.6 General Wiring Diagram

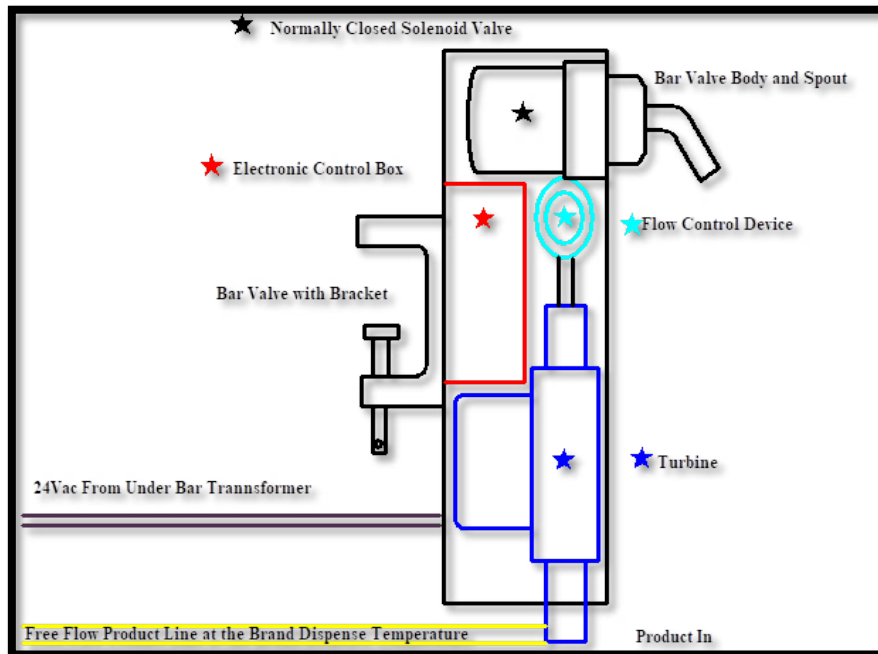


**Note: On metered installations the feed is as follows:**

- Keg feed to inlet of Fob Detector
- Outlet of Fob Detector to pump (gas or electric)
- From pump outlet to Meter(s)
- Pump may be gas or electric.

## 17.2 Turbine Metered Systems

Turbine systems are not as common as cellar systems, but they are often used in Multiple Dispense Units (MDU) and in some bar mounted systems.

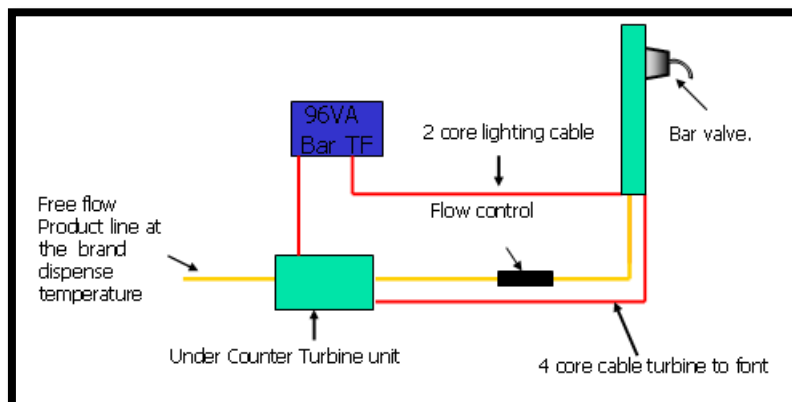


### 17.2.1 Bar Mounted Turbine Unit

The unit is designed for use where traditional cellar volumetric meter installation is not possible due to access for cables to the bar, or restrictions within the cellar. The Bar Mounted turbine unit is able to be installed onto a free flow line at or under the bar, given this it is not possible to wire for stroke completion.

### 17.2.2 Installation Schematic

The turbine flow meter, electronic control box, normally closed solenoid valve, and flow control device are normally housed within the bar valve bracket (see schematic diagram)



### **17.2.3 Installation Specifics**

#### Electrical Power Supply to the Unit

- The 24-volt power supply to the unit must be from its own bar transformer, the only other connection permitted to the transformer being its own font's illumination. No other fonts or T bars can be on the same transformer as fluctuations in power supply will affect the unit's performance.

#### Electrical Connection to the Font or T bar

- If connecting a meter module to a bespoke font or T bar it must be wired in accordance with the manufacturer's instructions. Failure to do so may result in damage to the unit.

#### Product Dispense Speed

- Optimum setting is found to be around 8 to 10 seconds per half in line with the manufacturer's recommendation .Speed settings below 6 seconds and above 14 seconds per half will affect the unit's calibration and cause it to shut down.

#### Set up Tips

- Generally too fast or too slow a speed setting will cause the turbine unit to momentarily pour and stop with the LED flashing.
- In order to operate correctly the unit requires a constant supply of liquid with no fob. So the flow control must be installed after the turbine unit, and avoid the use of any stem elbows into the unit.

### **17.2.4 Dispense Volume Checks**

It is very important that when checking dispense the correct glass is used .It must be an oversized 1/2- or 1-pint glass with the 1 pint indication line. When viewing the glass, it is important the glass is on a level surface & viewed at eye level. Use of 10oz & 20oz "fill to the Brim" glasses should not be used as it will invariably result in liquid over spilling out of the glass when trying to check ½ or 1-pint measures.

### **17.2.5 Commissioning**

Initial set up and calibration can be completed on water. The operation of the unit must be demonstrated to the customer & ideally on product, in line with the volume checks above.

### **17.2.6 Line Cleaning**

The process is just the same as the free flow system the customer will need to operate the dispense button enough times to move the cleaning fluid & water through the system.

## 18 Account Closedown Procedure (Python Preservation)

### BDA Outlet Closedown Procedure (Python Preservation)

#### 18.1 Requirements

Where an outlet ceases trading for a period of time longer in duration that it is hygienic to maintain product in the lines it is necessary to complete a "Closedown Procedure". This will reduce the risk of line taints and the potential subsequent replacement of python/dispense equipment. Generally, these will fall into two categories.

- Outlets that are temporarily closing down between licensees
- Seasonal outlets, (holiday camps, football clubs, racecourses, etc.)

The operational procedure for both categories will be identical but may be carried out by either the licensee/operator or a TS technician. All appropriate PE must be used.

#### 18.2 Basic Procedure

- Turn off remote coolers.
- Ensure that all the beer lines have been cleaned to the recommended suitable standard using the appropriate cleaner\*
- Empty and rinse cleaning bottle
- Pour "Guardian", or equivalent water chemical treatment solution, into cleaning bottle using correct dosage as indicated on the container for the size of cleaning bottle and fill the cleaning bottle with clean water.
- Connect to cleaning system and bleed the Water Chemical Treatment Solution through the bleed valves on the fob detectors where installed.
- Remove nozzles from taps, clean and store hygienically.
- Open the dispense taps and pull solution through.
- (Optional) label coupler " Water Chemical Treatment Solution in Line"

#### 18.3 19.1 Basic Re-Commissioning

- Empty and rinse cleaning bottle.
- Fill with clean water.
- (Optional) remove keg coupler label.
- Connect to cleaning system and bleed clean water through the bleed valves on the fob detectors where installed.
- Reinstall nozzles on dispense taps.
- Open the dispense tap and flush through the volume within the line + 1 gallon of water (e.g. if the line contains 3 pints then 11 pints of water is required through the tap. Note! If the line is split, then the first tap which is dispensed will contain more volume as it will include the fob detector and keg drop line volume)
- Turn remote coolers on
- Connect back to product and draw through to the dispense tap\*\*

Where there is a requirement to ensure adequate attention has been given to any potential H & S/COP issues, and there is a requirement to ensure the ingoing licensee is aware of their obligations a supplement to the procedure can be added.



#### **18.4 Advance Procedure**

- Complete basic procedure as detailed previously.
- Turn off gas supply(s) to kegs and disconnect PRVs.
- Label PRVs “Do not Reconnect, call Technical Services”.

#### **18.5 Advanced Re-Commissioning**

- Outlet contacts relevant T.S. department
- Technician attends and ensures that gas COP is up to date, that the licensee understands their liability and that any required COP paperwork is signed.
- Complete basic re-commissioning procedure as detailed previously.

\* It is essential that all product lines are clean prior to the Water Chemical Treatment solution being added, this may be standard line clean if the lines have been well maintained historically, or if necessary, a specialist “Blitz” type clean.

\*\* There will be no ill effect if the product lines are not flushed with clean water in the re-commissioning process, it is possible to pull product through the lines and serve straight from the Water Chemical Treatment Solution however “Good Practice” would be to flush comprehensively as described.

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## 19 Appendix References

### 19.1 APPENDIX A: Remote cooler selection criteria (Reference 12.1.3)

The following section is the BDA specification for selection of remote coolers when installing new coolers into accounts.

Installations of remote coolers are determined in the following order:

1. Installation of Integral remote cooler outside the chilled cellar.
2. Installation of Integral remote cooler inside the chilled cellar.
3. Installation of Water-Cooled remote cooler.

#### **First Choice: Integral cooler outside the cellar**

The following questions should be answered to enable this choice to proceed.

1. Can an Integral cooler be installed outside the cellar to BDA specification?
2. Is there an adjacent room to the cellar with adequate ventilation to site the remote cooler?
- 3.

If this cannot be achieved, then proceed to the second option.

#### **Second Choice: Integral cooler inside the cellar**

The following questions should be answered to enable this choice to proceed.

1. Can an Integral cooler be installed inside the cellar to BDA specification?
2. You can only install a maximum of 2 integral coolers in one cellar.
3. The Coolers should be sited away from the kegs as far as possible, avoiding the blown air from the cooler fan directly affecting the kegs.
4. All attempts should be made to keep direct heat sources away from where the kegs are sited. If possible, site kegs near the cellar cooling.
5. Is the existing cellar cooling operating and has the ability to maintain the cellar temperature at 13°C?
6. Is the outlet free from temperature related dispense issues?

If this cannot be achieved, then proceed to the water-cooled option.

#### **Third Choice: Water Cooled remote cooler.**

The following questions should be answered to enable this choice to proceed.

1. Can I install the cooler to BDA specification?
  2. Can I install the heat dump to BDA specification?
- .....

## **Key Keg Installations**

### **Lightweight Containers/Key Kegs**

Lightweight plastic beer containers are designed as a one-way container for beers, lagers, and ciders. Unlike the usual aluminium and stainless-steel containers, they are generally designed to be used only once and then disposed of.

In addition to the main difference i.e. plastic material and disposable one way use, the keg is constructed and used differently from normal kegs.

The product inside the keg is contained in a plastic bag similar to wine boxes and so the drive pressure gas/air never comes in direct contact with the product being dispensed. This has implications for the product.

In normal dispense (where the gas is in direct contact with the product) the equilibrium pressure must be maintained. Too much pressure will result in over carbonation and fobbing problems, too little pressure will result in gas breakout in the keg and lines.

As the drive pressure in a plastic container is no longer in direct contact with the product, it is recommended that the maximum ring main pressure available (35 psi on CO<sub>2</sub> and 45 psi on mixed gas) should be applied. No more than 45psi should be applied even if using compressed air.

The higher pressure may result in the need to control the speed of dispense at the tap but will not over carbonate the product.

- A pressure of 35 psi at normal cellar temperature will maintain equilibrium in any product up to 3.6 Vols. or 7.2 gms/litre.
- A pressure of 45 psi at normal cellar temperature will maintain equilibrium in any product up to 4.4 Vols. or 8.8 gms/litre.

### **Connecting a KeyKeg**

A KeyKeg can only be connected via their own coupling head. The thread form on the gas inlet and product outlet accepts UK standard ½ inch or 5/8 BSP fittings (to suit quick connect fittings).

The coupling head has a built-in pressure relief valve operating at 3.5 bar (51psi)  
The pressure relief valve can be seen as a ring pull next to the gas inlet port.

- 1) Remove the snap connector from the new KeyKeg.
- 2) If present remove the blue dust cap in the coupler.
- 3) Sterilise the coupling head and coupler in the normal way using a proprietary cleaner.
- 4) With the operating lever of the coupling head in the up position, locate the coupling head on the KeyKeg coupler and turn to the right until it locks.
- 5) Depress the operating lever on the coupling head, product will flow into the delivery line.



### Empty Kegs and Disposal

Empty kegs should be disposed of according to the supplier's recommendations and not re-used for any other purpose.

- 1) Remove the keg coupler from empty keg.
- 2) In a well-ventilated room or outside, vent the KeyKeg to remove the gas pressure between the outer skin of the keg and the inner bag.

### This can be done by:

- Using the red venting cap. Turn the red cap on the KeyKeg and press and turn a quarter to the right to vent completely.
- Use the safety vent on the KeyKeg tap head to vent the KeyKeg completely, by first closing the gas supply, leaving the tap head connected to the KeyKeg.



- Use the venting key. Hook it on to the coupler to vent the KeyKeg by depressing the shut-off valve.



- Remove the plastic film and the cardboard packaging from the Baseline.
- The KeyKeg can then be placed on the floor for flattening.
- Remove the venting cap for use next time and recycle the plastic.

