ROBERT C SCUTT LTD

Installation and Maintenance Hand Book

Beer Cellar Systems

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Beer Cellar Systems Installation and Maintenance Manual

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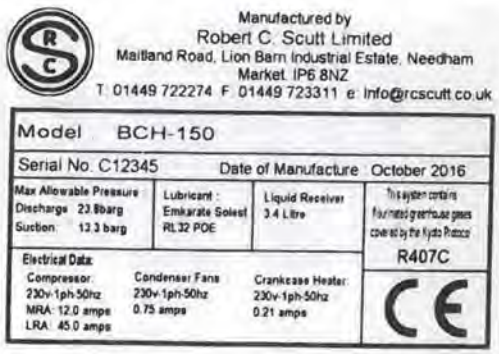
Product Range Description

The BCH/BCS range of cellar cooling systems are designed to automatically maintain the pre-set beer cellar temperature under the control of an electronic digital controller that is built into the evaporator section.

The BCH (Hermetic compressor systems) are designed to operate on R407C only, whereas the BCS (Scroll compressor systems) are designed to operate of either R407C or R134a
A quick selection guide is available in the Robert C Scutt Beer Cellar Sales catalogue. The guide is based on system refrigeration capacity and/or beer cellar volume for both above ground and below ground applications.

Application Range: The Hermetic (R407C) systems range from the BCH50 (1/2hp) up to the BHC650 (6.1/2hp) and cover above ground cellars from 10m^3 up to 170m^3 @ 10°C. The BCH Hermetic units are all supplied in standard form with AC condenser fans and no sound attenuation.
The BCS R407C/R134a Scroll models range from the BCS100LN (1hp) up to the BCS500LN (5hp) and cover above ground cellars from 16m^3 up to 140m^3 @ 10°C. The BCS Scroll models are all supplied in standard form with EC condenser fans and sound attenuation.
Twin evaporators are available on the larger units for those awkward shaped cellars.

Model Identification: Each individual model leaves the factory fitted with an identification plate attached to the condensing unit section. The identification plate is unique to each unit in that it contains the unit serial number together with a number of other basic details specific to the unit as follows:-



Serial Number: This is a unique identification number and must be quoted when requesting technical support and or warranty claims as it is used to reference the original bill of materials and the manufactured date.

Max Allowable Pressure: This is the maximum refrigerant pressure that the system has been designed to contain.
The HP switch and Pressure relief valve have been selected to protect the system against pressures in excess of this value.

Lubricant: This is the approved oil that the system contains.

Liquid Receiver: This is the total internal volume of the liquid receiver.

Refrigerant Type: This is the refrigerant for which the system has been designed. If refrigerants other than this are used the system performance may be compromised and warranty may become null and void. Contact the RCS technical team for advice before applying any other refrigerants.

Electrical Data: These values show whether the system is designed for 3 phase or 1 phase operation together with the maximum compressor and condenser fan running amps.
Note: The evaporator Model and Serial No. together with its electrical data are shown on the manufacturers serial plate attached to each evaporator unit.

General Safety Rules, Engineers Qualifications and Production Standards

Installation & Maintenance Engineers Qualifications:

- All work on the compressors and any component or refrigerant control incorporated into this system must only be carried out by refrigeration engineers who hold the current level of refrigerant handling qualification (City & Guilds 2079 or CITB J11-14) at the required level for the task being performed.

Operating Temperatures and Pressures:

- During normal operation surface temperatures exceeding 80°C and below -20°C can be reached therefore extreme caution must be taken as serious burns and frostbite are possible.
- Operating pressures in excess of 25 barg and below 0.5 barg can be reached therefore great care must be taken when working on this plant.
- The appropriate personal protective clothing must be worn at all times when working on this equipment.

Refrigerant type and Operating range:

- The system data/quotation will specify the type of refrigerant and the operating range which this equipment has been designed to operate with and no other refrigerant or operating range must be employed without the consent in writing of Robert C. Scutt Ltd.

Production Standards

- All Refrigeration equipment manufactured by Robert C. Scutt Ltd is in accordance with the following design standard and specifications :-

  The Pressure Equipment Directive 2014/68/EU (Formally 97/23/EC)
  BS EN 378-1:2008, EN14276-2-2006
  Machinery Directive BS EN 2006/42/EC
  Institute of Refrigeration Safety Code of Practice for Refrigeration Systems utilising groups A1 and A2 refrigerants.

General Safety Considerations

- To avoid potential injury, use care when working around heat exchanger coil surfaces (fins) or the sharp edges of metal cabinets. All piping and electrical wiring must be installed in accordance with applicable codes of practice, and current legislation.

Inspection of Equipment prior to Installation

All equipment must be visually inspected before it is unpacked for signs of damage or loss. Check the delivery note against the material received to ensure the shipment is complete.

Important: Remember, you are the consignee and it is your responsibility to report any shipping damage or missing parts as soon as delivery is accepted or at least within 12 hours. Should the packaging be damaged, but damage to the equipment is not obvious, a claim should be filed for "concealed damage" and the product signed for as "unexamined".

Important Electrical Inspection: Check the electrical ratings on the equipment *(voltage, phase and frequency) to make sure they correspond to those ordered and to the electrical power available at the installation site.

Shipping documents: All shipping papers, tags and instruction sheets must be retained and kept in a safe place for reference by the installer and/or the owner of the equipment.

General Warranty Policy

General Policy:

Subject to the terms and conditions set out in this General Warranty Policy, during the first 12 months after installation of this equipment we will supply under warranty any component part(s) of our product found to be defective in materials or workmanship. Replacement parts will be supplied and invoiced under our normal terms of payment pending the return of the suspect component. If the component is proved to be defective and is accepted under warranty by our supplier, a credit will be issued for our replacement part invoice. If warranty is not accepted by our supplier our replacement part(s) invoice will become due for payment.

Any replacement parts supplied under warranty will inherit the unexpired warranty life of the original component e.g. if a component fails after 3 months and is accepted under warranty the replacement will inherit 9 months of unexpired warranty of the original component. In the event that warranty is rejected the replacement part will (once paid for) carry 12 months warranty from the date of our replacement invoice.

It is a condition of this warranty that the part(s) to be replaced must be made available in exchange for the replacement parts and proof of the original installation date of the parent product must be provided together with the R C Scutt Serial number e.g. C12136 in order to establish the effective warranty date. In order to remove any uncertainty if the installation date is not supplied the effective date will be based on the manufactured date plus 30 days which will be calculated using the unit serial number.

Any labour, material, refrigerant, transportation, freight of other charges incurred in connection with the performance of this warranty will be the responsibility of the owner of the equipment.

It is an express condition of this warranty that regular maintenance and servicing is carried our by qualified personnel in accordance with the qualifications set out in the Installation & Maintenance Engineers Qualifications section above.

This warranty may be transferred to a subsequent owner of the product.

Warranty Exclusions:

Damages and Expenses caused by:-

a) Accident, abuse, negligence, misuse, riot, fire or flood.
b) Operation of the equipment in a corrosive atmosphere
c) Any unauthorized alteration or repair to the system affecting the equipment's reliability of performance.
d) Improper matching or application of the equipment to other system components not in our control such as evaporators, expansion valves and controllers.
e) Failing to provide routine and proper maintenance or service to the equipment.
f) Parts use in connection with routine service and maintenance such as filters, oil, refrigerant etc.
g) The equipment being moved and re-installed at a location other than the original site.
h) Equipment installed and operated other than in accordance with the printed instructions.

Handling, Positioning and Installation Location

When selecting a location for the condensing unit, the following constraints and design issues must be considered:-

- The smaller units in the range can be man handled into position by no less than 2 people utilizing safe and proper manual lifting techniques
- The larger units must be positioned by a fully qualified and properly equipped crew with the necessary lifting tackle and rigging who should be engaged to locate the equipment into position. When lifting the unit, spreader bars and chafing gear should be used to prevent damage.
- Loading capacity of the floor or roof must be confirmed.
- A flat and level site must be selected.
- Distance to suitable electrical supply must be within current electrical guidelines.
- Adequate air circulation and ventilation. (allow a minimum of 300mm behind the unit air intake to the nearest wall and 1000mm space in front of the air exhaust)
- Accessibility for maintenance and service.
- Local building regulations and/or planning permission must be confirmed.
- Adjacent buildings relative to noise output levels.

Special note for the larger condensing units:

- Great care must be taken with the larger models in the range as there is a risk of damage and/or personal injury if they are not handled correctly. A fully qualified and properly equipped crew with the necessary tackle and rigging should be engaged to locate these condensing units into position. Spreader bars should be used to prevent damage to the sides of housing. Do not sling directly around the base of unit. The unit should be placed on a base which is level and even.

When all of the above points have been considered and a specific location chosen, it is advisable to obtain written approval of this location from the building and/or condensing unit owner. This may be a means of avoiding disagreement and expense at a later date.

Positioning the Condensing Unit and Evaporator:

- The condensing units are all housed in a weather proof steel housing and are all designed to be positioned outside and require no special protection from the elements.
- The unit should be placed on a base, which is level and even. Place the unit where it will not be subject to damage by traffic or flooding.
- On critical installations where noise is liable to be transmitted through the floor structure, vibration isolators should be installed. Air bourn noise emissions must also be considered.
- **DO NOT USE THE SHIPPING PALLET AS A PERMANENT CONDENSING UNIT BASE**
- The evaporator must be positioned in the coldroom so as to allow unrestricted air circulation away from the air-off face and into the air-return face. Consideration must also be given to the air throw available from the evaporator fans. Restricted air flow may cause a reduction in capacity and/or ice buildup leading to fan failure and possible compressor damage as well as product spoilage. Insufficient air throw may cause *'warm'* areas in the beer cellar leading to poor beer storage capability.
- A suitable defrost drain line route must be considered together with trace heating capability if the drain line is going to be subjected by low temperature.
- The equipment should be positioned to allow adequate space for performing service work, and air inlet and exhaust

General Installation Guidance

Refrigerant Pipework Connections

- The condensing units leave the factory with a holding charge of OFN (1.4bar, 20psi) in order that the installation engineer can be confident that there have been no leaks created by the delivery process prior to installation and to ensure that the system remains fully de-hydrated. This charge can be released to atmosphere at the time the pipework connections are made.
- The Suction and liquid lines must be brazed in place and the lines must be at least the same diameter as the connections fitted to the condensing unit. These diameters are only valid up to a maximum pipe run of 10 meters. For longer pipe runs the diameters must be verified to ensure the correct refrigerant velocity to ensure correct oil return and line pressure drops. Excessive pressure drops will diminish the system capacity. Good refrigeration practice must be followed at all times

Suction Line Insulation

- It is advisable to insulate the suction line with ½" wall thickness Nitrile insulation with the correct fire rating in order to safe guard against condensation causing damage to the building.

Adding Oil

- If the pipe run is less than 10 meters it will not normally be necessary to add oil to the system, however for longer runs and larger pipe work a small quantity of oil should be added. After a few days of normal operation compressor oil levels should be checked (1/2 sight glass) and adjustments made if necessary.

System Evacuation Dehydration

- When the system is completely free of refrigerant leaks, an evacuation of the entire system should be completed by using a "high vacuum" pump. This evacuation, if completed correctly, will ensure long life for the system as well as elimination of moisture and non-condensable gas problems. Moisture problems causing compressor failure will void warranty.
- **Caution: Do not use the refrigeration compressor to evacuate the system. Never start the compressor or perform a megger insulation test while the system is in a vacuum.**

Dehydration Procedure

- Use only a "high vacuum" pump capable of drawing a vacuum of 100 microns. Change the vacuum pump oil frequently. Gauges or vacuum measuring instruments should be suitable to measure conditions at any stage of the process in order to give the refrigeration engineer indications of progress.

Refrigerant Charging

Refrigeration equipment must only be charged with the refrigerant for which it has been designed. The type of refrigerant for which the system has been designed is specified on the serial plate of the unit. Installing a liquid line drier between the service gauge and the liquid service port when charging a unit will ensure the refrigerant supplied to the system is clean and dry. This is especially important when charging a system using a blended refrigerant such as R407C.

Blended 400 Series refrigerants such as R407C, R404A, R407A, R407F, R448A, R449A etc. must not be vapour charged unless the cylinder is completely emptied into the system. These

refrigerants only retain their correct formulation in the liquid phase therefore they must always be charged in liquid form to ensure the correct blend is in the system. This may mean inverting the refrigerant cylinder if it only has a single (vapour) outlet valve. Larger cylinders with a double outlet valve will have an internal liquid dip tube and therefore inverting these cylinders is not necessary.

Weigh the refrigerant cylinder before and after charging in order to keep an accurate record of the weight of refrigerant put into the system in accordance with the 'F' Gas Regulations. The total system charge must then be recorded in the plant record log that must be left on site as a permanent record of refrigerant usage in the system.

- **DO NOT** charge strictly by the holding capacity of the receiver.
- **DO NOT** assume that bubbles in a sight glass, when located at the condensing unit, indicates the system is undercharged.

System Components

Protection Devices – General range:

Condensing units manufactured by Robert C Scutt are extremely flexible in their application and may incorporate a built-in range of safety devices to protect the equipment against malfunction. The safety devises that are applied to equipment will be automatically selected by Robert C. Scutt, unless specifically requested by the customer, dependent on the size and type of equipment and the application. The range of devises that may be applied are as follows:-

- Thermistor Sensor or Klixon: The Scroll compressors fitted to this equipment contain an electronic thermistor sensor fitted into the compressor terminal box or a Klixon thermal overload if a Hermetic compressor has been fitted. These sensors protect against compressor motor overheating. These are auto-reset devices and if tripped will automatically restart the compressor once the motor windings have cooled down to a safe operating level.

- Crankcase Oil Level Control: On multi-compressor systems and inverter controlled single compressor systems each compressor is fitted with an electronic oil level controller which feeds and monitors each individual crankcase oil level. If this level falls too low for safe operation of the compressor the control will automatically stop the compressor. This is an auto-reset control and if tripped will automatically restart the compressor once the optimum oil level has been restored.

- Oil Separators: The compressor crankcase oil level control valves are fed directly from an oil separator mounted in the common discharge line.
  There are two types of oil separator design applied to Robert C Scutt equipment dependant on the type of application.
  - Impingement type: This design is applied to smaller single compressor condensing units and compressor/receiver units. Oil return from this design of oil separator is fed directly into the compressor crankcase.
  - Coalescent type: This design is applied to larger single compressor applications and multi compressor systems, particularly where compressors are inverter speed controlled. Oil return from this design is generally fed to the compressor crankcase via an electronic oil level control. Due to the high filtration efficiency of these oil separators they may be fitted with a monitoring device which displays the pressure drop through the separator vessel.

- High and Low Pressure Controls: Dependant on the application and system design equipment may be fitted with a range of electro-mechanical or transducer high and low pressure controls as follows:-

  - Auto/Manual Dual pressure safety controls to safeguard against too high discharge pressure or too low a suction pressure.
  - Transducers that sense suction and discharge pressure and convert it into electrical output to control the operation of the system.

- Pressure Relief Valves: In order to protect the equipment from excessive internal pressure equipment may be fitted with pressure relief valve(s). The design, pressure setting and number of valves will be in accordance with EN378-2008 and the discharge rate and valve size has been applied in accordance with EN13136. The application of these valves is also governed by the

rules set out in the Pressure Equipment Directive 97/23/EC. Typical valve settings for various refrigerants for operation at a design ambient temperature of 32°C are as follows:-

- R404A, R407A: HP = 24.8bar LP = 14.09bar
- R407F, R448A: HP = 27.6bar LP = 15.3bar
- R134a: HP = 14.0bar LP = 7.20bar

Pressure relief valves for HP protection are generally fitted directly onto the liquid receiver.

- Crankcase Heaters: Crankcase heaters may be fitted to each individual compressor to protect the compressor against refrigerant being dissolved into to oil and the subsequent oil foaming at start-up which can damage the compressor crank shaft, bearings and pistons. These heaters are automatically energised during compressor standstill, periods.

- Discharge Pressure Optimisation: This control enhances the operational efficiency of the equipment by automatically maintaining a constant refrigerant discharge pressure. This is achieved by varying the speed of the condenser fans for air cooled plant or alternatively by-passing the water flow around the condenser on water cooled equipment. Dependant on application and size of equipment the controls are as follows:-
  - Small single compressor air cooled condensing units are fitted with AC fans may be fitted with an electro-mechanical fan speed controller which controls the speed of all fans at the same time. This form of control can be applied to single or three phase fans dependant on total absorbed power.
  - Larger air cooled condensing units and multi fan remote air cooled condensers fitted with AC fans may be speed controlled by an inverter system driven by pressure transducers.
  - EC fans can be applied to any of the condensing units or remote condensers in the RC Scutt range. Speed control is achieved by output from transducer pressure sensors directly controlling the motor speed.
  - Water cooled systems are fitted with either electronic or mechanical by-pass valves dependant on customer requirements. The water flow through the condenser is controlled via a by-pass system which reacts to the pre-set discharge design pressure.

- Suction Line Filters & Liquid Line Driers & Sight Glasses: In order to protect the compressor motion work from foreign bodies and moisture the equipment may be fitted with a suction line filter and a liquid line filter/drier.
  - Suction Line Filter: Normally only applied to larger condensing units and multi compressor systems these filters have replaceable cores that can be replaced on site. Various types of cores are available e.g. Standard filtration quality, High filtration quality, Moisture/Acid absorption and Felt filters.
  - Liquid Line Filter Drier: These filter driers are installed in the liquid line and are selected against the system capacity. The function of this filter is to dehydrate the refrigerant as it passes through the desiccant contained in the shell and to protect any downstream components from foreign matter.

- Evaporator Section:
  - The Evaporator section is fitted with a thermostatic expansion valve which automatically controls the flow of refrigerant into the evaporator against system demand.
  - An electrically operated solenoid valve may be fitted to the liquid inlet to the expansion valve which is incorporated into the system control logic to operate a 'pump-down' cycle to control compressor off cycles for beer cellar applications.

Electronic Controllers and Electrical Installation

The Cellar temperature is controlled by a digital electronic controller which is mounted on the front of the evaporator.

There are two control logics employed by the RCS Cellar Systems.

3 phase Condensing Units: require a three phase and neutral power supply adjacent to the condensing unit as well as a separate 1 phase and neutral power supply adjacent to the evaporator. The evaporator mounted controller opens and closes a solenoid valve as the cellar temperature is satisfied which creates a pump-down cycle. The condensing unit stops and starts under the control of a low pressure switch mounted on the compressor. The evaporator fans run continuously.

1 phase Condensing Units: require a 1 phase and neutral power supply mounted adjacent to the evaporator. The evaporator and condensing unit are interconnected via a 5 core (L, N & E + control pair). The compressor stops and starts under the control of the digital controller mounted on the evaporator. The evaporator fans run continuously.

Controller Settings: The controller will be set for the application before the system leaves the factory however in the event of on-site maintenance work or adjustments being necessary full operating instructions are available from our technical support team on 01449-722274. The settings shown in the following table are the factory settings

Controller Factory Setting

REGULATION		Factory Setting
Hy	Differential	3
LS	Minimum Set Point	8
US	Maximum Set Point	15
ot	First Probe Calibration	0

DISPLAY		Factory Setting
CF	Measurement Units	°C
rE	Resolution (only for °C)	dE
dy	Display delay	0

DEFROST		Factory Setting
Id	Interval between defrosts	0
Md	Maximum length of defrost	0
dF	Display during defrost	It

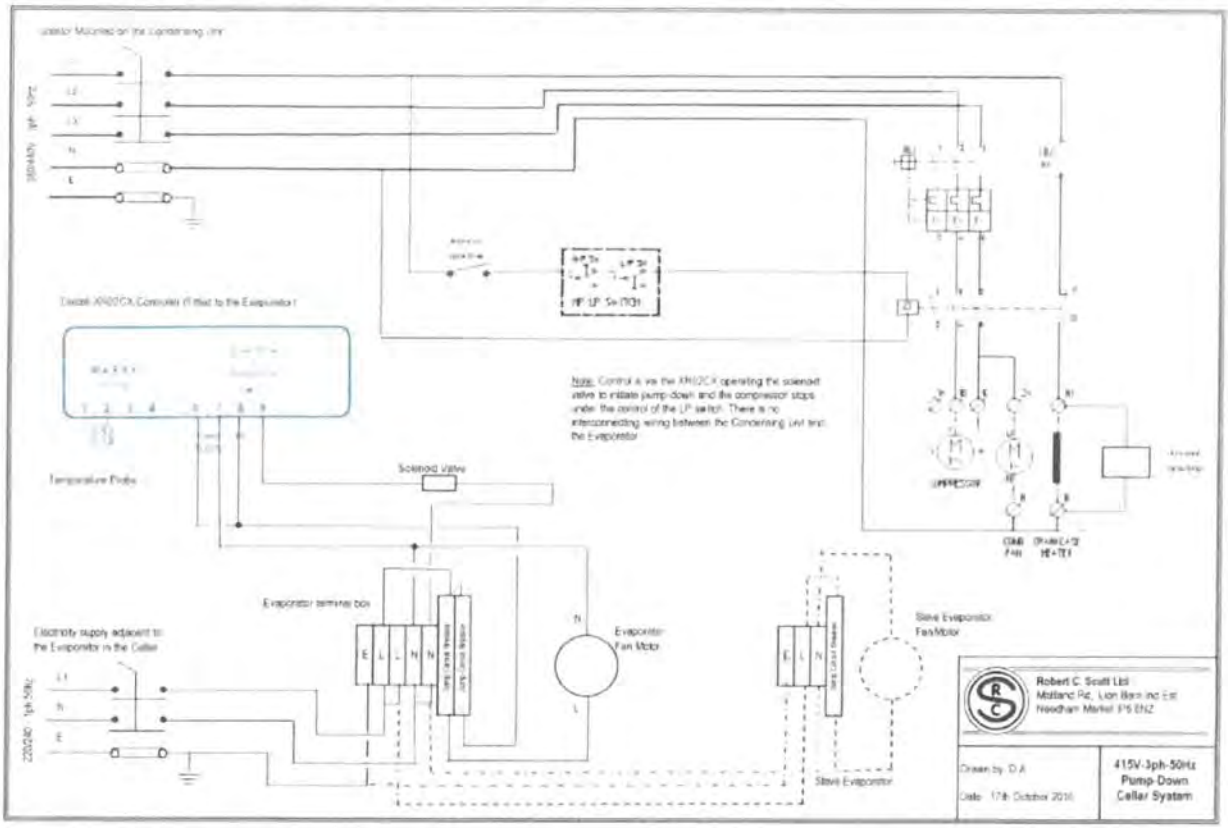
ALARMS		Factory Setting
AU	Maximum temperature alarm	99
AL	Minimum temperature alarm	0
Ad	Temperature alarm delay	15
dA	Exclusion of temperature alarm at start-up	90

DIGITAL INPUT		Factory Setting
IP	Digital Input polarity	cL
IF	Digital Input configuration	EA
Di	Digital Input delay	5
dC	Compressor and fan status when open door	NO
rd	Regulation with door open	Y

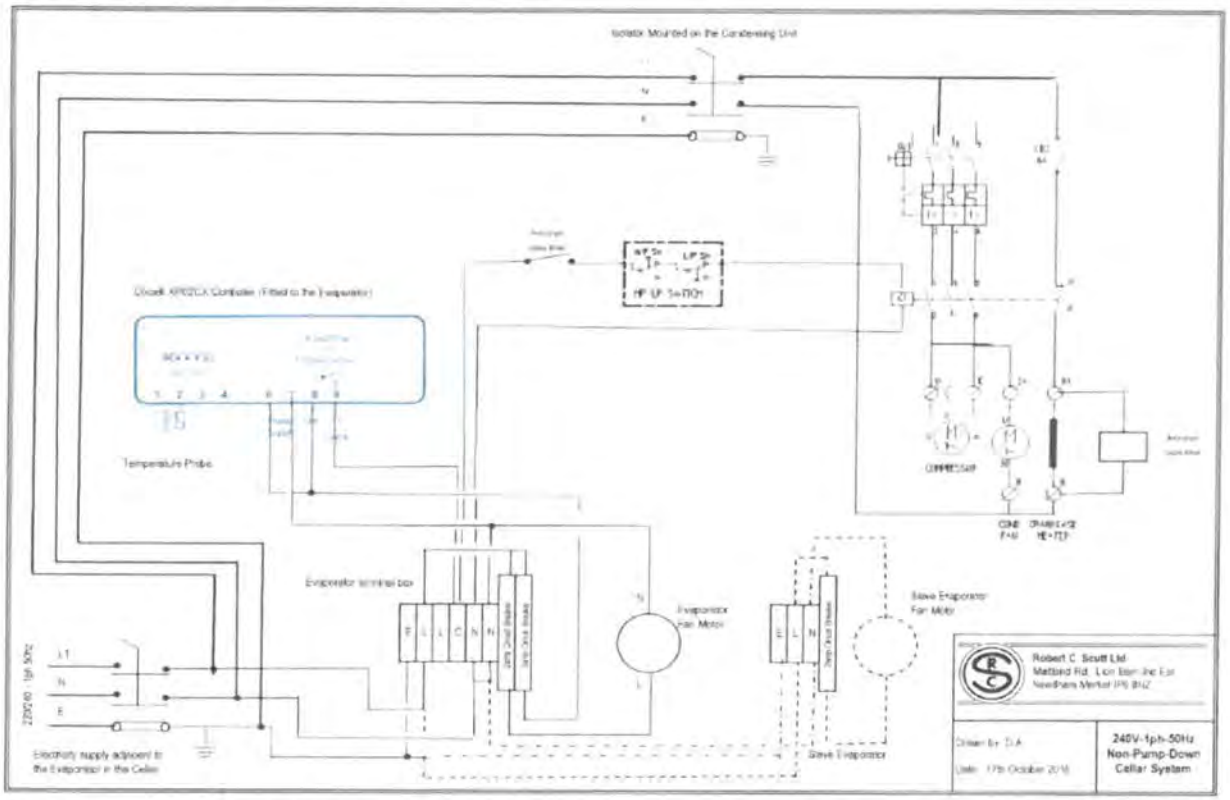
OTHER		Factory Setting
Pt	Parameter code table	2
rL	Firmware release	1

Wiring Diagrams

Suggested wiring diagrams for 3 phase and 1 phase installations.



3 Phase Condensing unit (pump down system)



1 Phase Condensing unit (non-pump down system)

Electrical Installation

The electrical installation must be carried out by a qualified electrician with the relevant skill level and refrigeration industry experience.

The schematic diagrams show the circuit for a typical three phase installation incorporating a pump-down solenoid valve and a typical single phase installation showing the interconnection between the evaporator and the condensing unit.

Special Note: In the case of three phase installations using scroll compressors great care must be taken to check the rotational direction of the compressor as scroll machines will only 'pump' in one direction. This can be easily confirmed by observation of suction and discharge pressures during operation.

Maintenance Schedule

There are a number of items that require regular maintenance checks and although not exhaustive, the following list high lights the major components that require regular attention.

Pressure Relief Valves & Rupture Discs

- The relief valve/rupture disc assemblies are fitted with a pressure gauge that indicates whether the rupture disc has burst and this must be checked at each visit to the plant.
- The manufacturer recommends that in the event of a PRV has discharged it should be replaced as the set pressure can no longer be guaranteed.
- In any event all pressure relief valves should be replaced every 5 years.
- If the operating pressure of the system has exceeded 90% of the rated burst pressure of the rupture disc, the disc should be replaced as it is most likely that fatigue will have occurred and the disc may be susceptible to premature rupture.

Coalescent Oil Separator

- Coalescent oil separators contain a filter element for extreme efficiency. The filter will "clean up" a new system and it may therefore be necessary to replace the filter shortly after commissioning. In order to maintain optimum operation the vessel may be fitted with a visual pressure difference gauge and if this gauge shows a pressure difference in excess of 13psig/0.9bar the filter should be changed.
- This filter must always be changed after the replacement of a compressor.

Refrigerant Charge. (F-Gas Directive)

- During the commissioning process a label must be attached to the plant showing the actual total operating system refrigerant charge and type which must be also recorded on the F-Gas record sheet for the plant. Any additions or subtractions to the charge must be recorded as part of the maintenance regime for the plant.

Compressor Oil Charge

- Regular checks must be carried out to verify the compressor oil charge ¼ to ¾ sight glass. It is not normally necessary to change the oil for factory assembled plant but for "field assembled" installations an oil change is recommended after 100 hours operation. This includes cleaning the magnetic oil plug which is fitted to larger semi-hermetic compressors.
- In any event the oil should be completely replaced every 3 years or 10,000 hrs to 12,000 hrs operation.

Liquid Line Filter Driers and Suction Filters

- Multi-compressor pack systems with integral liquid receivers are fitted with replaceable core liquid line driers, which gives the maintenance engineer the opportunity to check for excess

pleasure drop through this vessel. If a pressure drop in excess of 2psig/0.14bar is observed through this vessel it is recommended that the replaceable core is changed.

- Smaller single compressor condensing units are fitted with sealed filter driers which should be replaced every time the system is broken into.

Refrigerant Leak Checks

- Regular leak detection must be carried out, the frequency of which is dependent on the total system operating charge.
    - Systems containing more than 5 tonnes of CO_2 equivalent but less than 500 tonnes equivalent must be checked at least once every 6 months
    - Systems containing 500 tonnes of CO_2 equivalent or more must be checked every 3 months or where a fixed leak detector is fitted at least every 6 months.

Once a leak has been identified and repaired a further leak test must be carried out within one month to ensure that the repair has been successful.

System Operational Check List

When the system has been running trouble free for an extended time (two weeks or more) and design conditions are satisfied, the following check list should be followed:

1) Check that compressor discharge and suction pressures are operating within the allowable design limits for the compressor. If not, take the necessary corrective action.

2) Check compressor rotational direction for three phase scroll compressor systems

3) Check the liquid line sight glass for moisture content and expansion valve operation. If there is an indication that the system is low on refrigerant, thoroughly check the system for leaks before adding refrigerant.

4) Check the level of the oil in the compressor sight glass (if so equipped). Add oil as necessary.

5) Check the thermostatic expansion valve for proper superheat settings.

6) Check the voltage and amperage readings at the compressor terminals. Voltage reading must be within the recommended guidelines. Normal operating amperages can be much lower than the compressor nameplate values.

7) To check the high pressure control setting it is necessary to build up the head pressure to the cut-out point of the control. This can be done by stopping the condenser fan(s) (air cooled condensing units) or pump and watching the pressure rise on a high pressure gauge to make sure the high pressure control is operating at the setting

8) Check the low pressure settings by throttling the compressor shut-off valve and allowing the compressor to pump down. This operation must be done with extreme caution to avoid too sudden a reduction in crankcase pressure, which will cause oil slugging and possible damage to the compressor valves. Close the valve a turn at a time

while watching the compound gauge for change and allowing time for the crankcase pressure to equalize with the pressure control bellows pressure. The slower the pressure is reduced, the more accurate will be the check on the pressure control setting.

9) Recheck all safety and operating controls for proper operation and adjust as necessary.

10) If the system is equipped with winter head pressure controls, check for operation.

End of Life Decommissioning Instructions

Refrigerant: The decommissioning process involves removing the refrigerant from the system which must be carried out by use of a refrigerant recovery unit; the refrigerant must be recovered into a purpose made recovery cylinder. Recovered HFC refrigerant is hazardous waste and must be disposed of under the control of current legislation.

Oil Charge: The compressor will contain oil that is classified as controlled waste and must therefore be disposed of by a licenced waste contractor. Recovered oil cannot be re-used.

System Components: Components such as Filter dries, Sight Glasses, Expansion Valve, and Pressure switches, Electrical Control Panel etc. can be re-used if it is deemed that their condition is such that this is economic. If deemed too worn or damaged they must be disposed of in a manner that is compliant with current legislation.

Condensing Unit and Evaporator: These items can both be re-used providing they are in good working order however care must be taken to ensure that if they are to be used with a refrigerant other than the original for which the system was designed that they are compatible with the intended new refrigerant.

Copper Tube: Copper tube removed from an installation is likely to be contaminated with oil and impurities and should therefore be re-cycled via a licenced scrap metal dealer.

Electrical Installation: Once decommissioned and all equipment has been removed from site the electrical supply apparatus must be left in a safe condition.