# CU20
# Coolant Circulator

## Description

**Coolant Cooling System**

## Important Information

All persons authorised to use, repair or service the CU20 Coolant Circulator unit, should read the section on safety, before any work is undertaken. Further information is available in publication HSG118 'Electric safety in arc welding', which may be obtained from the Health & Safety Executive. Please contact your distributor should you not understand any of the information within this document.

INSTRUCTION MANUAL 10/20

Newarc Ltd.
UK's Leading Manufacturer Of Welding Equipment
Newcastle +44 (0) 191 295 0111
Aberdeen +44 (0) 1224 771 063
www.newarc.co.uk

# PLEASE NOTE.

The manufacturer reserves the right to change and alter the Equipment without prior notice. This includes, but is not limited to: Operating procedures, technical specifications, technical schematics and manuals.

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## Fire and Explosions

**Pay attention to fire and safety regulations in force at the welding site.**

- Remove all flammable or combustible materials from the welding area and the immediate vicinity.
- Suitable fire fighting equipment must always be present where welding is carried out.
- Be aware that a fire risk is present for a considerable time after welding operations have ceased because of sparks and hot slag etc. Take suitable precautions when you have finished welding.
- Take care when welding containers that have held flammable or combustible material, these should have been specially cleaned before being given to the welder. If in doubt do not weld them.

## Burns

**Be aware that burns may be the result of the heat involved in the welding process, welding spatter or the Ultra Violet Radiation given off by the arc itself.**

- Wear suitable fireproof clothing over all your body.
- Wear protective gauntlets designed for welding use.
- Wear a welding facemask fitted with the correct filter shade suitable for the current at which you will be welding.
- Avoid wearing oily or greasy clothing as a spark may ignite them. Where possible ensure that a suitable first aid kit and a first aid person qualified in the treatment of burns are available nearby.

## Fumes

**Welding operations give off harmful fumes that are hazardous to your health.**

- Make sure the welding area is well ventilated. Use suitable fume extractors or exhaust fans if necessary.
- If the ventilation is not suitable then breathing apparatus may have to be used.
- Do not weld plated metals or metals which contain Lead, cadmium, Zinc, Mercury or Beryllium unless you are wearing suitable breathing apparatus.

## Electric Shock

- Do not touch live electrical parts.
- Do not work in wet or excessively humid areas and do not site the unit on a wet surface.
- Avoid touching the work piece whilst welding.
- Do not use the unit without the protective cover.
- Keep your clothing and body dry.

## The safe handling of gas cylinders

- Gas cylinders are under pressure and can explode if punctured. Please ensure the cylinder is secured in a stable location, away from any heat source or potential mechanical damage.
- The cylinder must be securely fastened to a wall or placed in a specially designed cylinder carrier.
- Do not use gas cylinders whose contents you are unsure of.
- Do not try to directly connect a gas cylinder to Newarc equipment without using a pressure-reducing regulator designed for use with argon.
- Always install and use pressure regulators in accordance with the manufacturers instructions.
- It is advisable, when attaching the regulator to the gas bottle, to briefly turn on the bottle valve to expel any foreign objects that may be present. These may later block the solenoid valve of the machine if not dealt with. Turn your face away from the bottle valve when undertaking this action.
- Check the gas cylinder, pressure regulator and gas hoses regularly for leaks and discard any suspect item.
- Always turn off the valve on the gas cylinder when you have finished welding.

**Further information is available in publication HSG118 'The safe use of compressed gases in welding, flame cutting and allied processes', which may be obtained from the Health & Safety Executive**.

## Welding and earth return cables

- Earth return and electrode holder cables must have a cross sectional area of at least 35mm$^2$.
- Only use copper cables, the use of Aluminium cables may have a detrimental effect on the performance of the machine.
- Regularly inspect welding cables and connectors for wear abrasion and corrosion. Corroded cables and connectors may overheat and become a fire hazard.
- Ensure that all welding connectors are fully mated, the connectors should be pushed fully home and then turned clockwise to lock. If the connectors are not mated fully they may overheat and become a fire hazard.
- If possible, fasten the earth return clamp directly to the job to be welded and ensure that the surface is free from rust and paint.

# SECTION 2 - SPECIFICATION

## 2.1 - Description

The CU20 Coolant Circulator is designed to accompany Newarc's range of power sources to provide the ability to cool the welding torch during welding. The power source units can be fixed on top of the cooling unit and provide the power to the CU20 creating a coolant cooling capable welding unit.

The CU20 has an inbuilt flow sensing system that checks that the coolant is flowing correctly and shuts down the machine if a fault is detected protecting the torch and CU20 from damage.

## 2.2 - Technical Specification

| Technical data | CU20 |
|---|---|
| Input voltage range | 2ph 400V; 24VAC |
| Power Consumption | > 0.5kW |
| Coolant Tank Volume | 2.5 Litres |
| Insulation Class | F |
| H x W x L | 225 x 310 x 590 mm |
| Weight | 10kg |

# SECTION 3 - INSTALLATION

## 3.1 Sitting the CU20

- Site the CU20 on a clean dry surface, preferable above ground level.
- Make sure there is at least 20cm clearance at the front, rear and right side of the machine to allow good circulation of the cooling air.
- Protect the machine from heavy rain and if used in hot climates, against direct sunlight.
- Ensure that the machine is positioned in such a way that particles created by grinding and cutting operations do not enter the machine.

**Note! Damage caused by metal particles and water entering the machine will not be covered under warranty.**

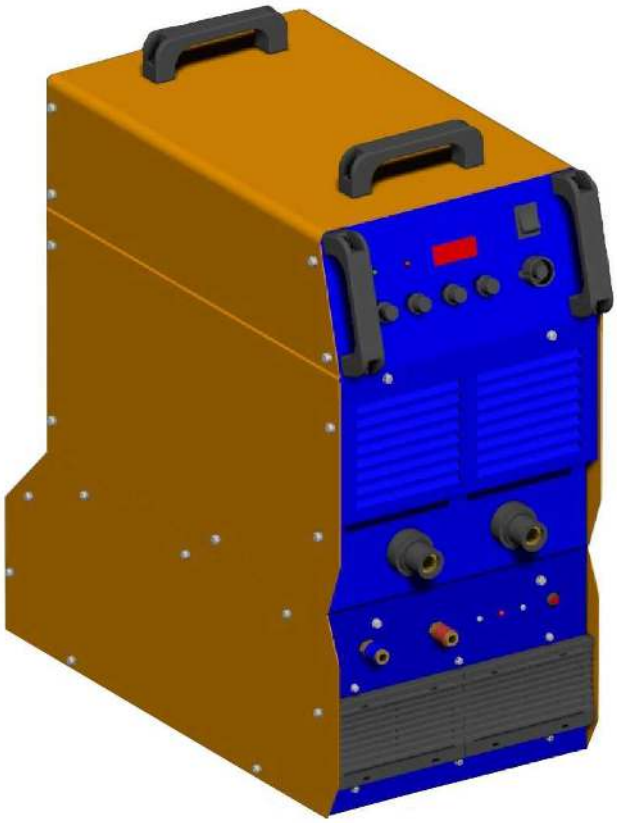
## 3.3 Setting Up

- Fill the coolant tank of the CU20 via the coolant filler cap at the rear of the machine.
- Due to the position of the coolant tank, it cannot be overfilled. If the coolant level is too low however, the CU20 may not function correctly.
- It is recommended that a **20-40% anti-freeze to water mix** is used. The ratio of antifreeze to water depends on the climate and any risk of freezing when not in use.

**Warning!**
**The use of Incorrect coolant mixture may cause corrosion and/or pipe furring. This will invalidate the warranty.**

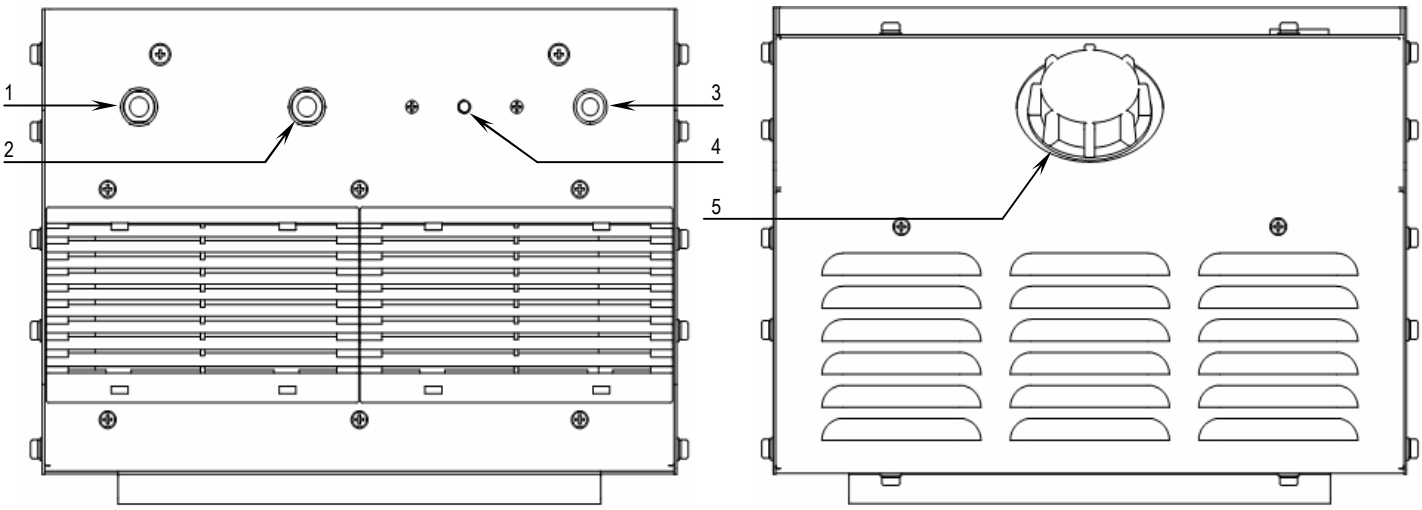
## 3.2 Connecting to Power Source

- Disconnect the power source from the mains supply.
- Remove one of the side panels of the CU20 unit. Place the power source on top of the CU20. Align the holes with the support rails on the base of the power source. Secure together with M6 Bolts.
- Feed the wires protruding from the top of the CU20 through the hole in the base of the power source.
- Remove the side panel from the power source to access the wires and connect the two connectors together inside the power source.
- Replace both side panels.



# SECTION 4 - OPERATION

## 4.1 Operating controls and connections




### 4.1.1 Description

1. **Coolant Outlet, "Cold"** - Attach the torch inlet here to feed cold coolant to the torch head.

2. **Coolant Inlet, "Hot"** - Attach the torch outlet here to feed the hot coolant into the cooling unit.

3. **Start/Stop Button** - Push to start and stop the flow of coolant. Press and hold to 'prime'. See section 4.2 for full operation.

4. **Red Indicator LED** - Shows status of the CU20. See section 4.2 & Section 6 for full description.

5. **Coolant Filler Cap** - Access to the coolant tank to add coolant to the unit.

## 4.2 Operation

- Set up the power source as normal following instructions in its own manual. Attach the torch's coolant inlet to the Blue Connector on the front of the CU20. Attach the torch's hot coolant outlet to the Red Connector .
- When the power source is turned on the CU20 will automatically start up and begin circulating the coolant. If the CU20 detects coolant flow, the indicator LED will remain on and flow will continue. If flow is not detected the LED will flash and the coolant circulator will stop.
- If the torch's coolant pipes were empty it is likely that the system will need 'priming'. i.e. manually pushing the coolant though the pipe so it returns in to the CU20 inlet and flow can be detected. To do this press and hold the button (3) on the front of the CU20 and maintain pressing until the LED remains on, indicating that flow has been detected.
- To stop the machine at any time press the push button (3) once. The LED will turn off but flash briefly every 10 seconds to show that power is still connected.
- Turning off the power to the power source will also shutdown the CU20.
- If at any point the flow stops being detected a warning light will flash. If flow is not re-detected within 5 seconds the coolant circulator will shut down and the LED flashes to indicate the error. (See Section 6)

## 4.3 Programming of the flow rate cut-off point (Torch protection)

The CU20/Inverter has a protection circuit built in that detects a low coolant flow rate to the torch. This is to protect the torch from overheating due to no coolant or poor flow rate because of a blocked pipe, a pipe leaking or a lack of coolant, etc.
Different makes, models and sizes of torches have different flow rates therefore the low flow rate cut-off point may need adjusting for different torches to reduce the risk of the CU20/Inverter going into protection mode.

- Prime the CU20 system with the torch attached as described in section 4.2operation to fill the torch and CU20 pipe-work with coolant. Refill the coolant tank back up to the maximum level with coolant as the level will have dropped due to some of the coolant now been in the torch & CU20 pipe-work.
- Switch off the Inverter power source.
- Press and hold the start/stop button(3) on the CU20.
- Switching on the inverter.
- The Red indicator LED(4) on the CU20 unit will now flash at a rate of once every second. Keep the start/stop button(3) pressed for at least a further 6 seconds and the Red indicator LED(4) will start to flash a lot faster. TheCU20 has now entered programming mode.
- When the Red indicator LED(4) starts flashing quickly (program mode), release the start/stop button(3) .
- The CU20 will now do a short learning process to program the CU20 control PCB with the correct flow rate for the torch fitted.
- After a few seconds the Red indicator LED(4) will flash twice to show it has saved the test data to the CU20 control PCB and has exited programming mode.

# SECTION 5 - FAULT FINDING



### No Power to CU20

- Check the power leads form the CU20 are correctly connected to the power source.
- Check the power source is connected to power and functioning correctly and all fuses are not blown.

### CU20 Shuts Down after 5 seconds

- Check coolant level in coolant tank, top up if necessary.
- 'Prime' the torch until the coolant has passed through the entire torch and is returning to the coolant circulator.
- Check the pipes of the CU20 to check for any leaks or obstructions that may inhibit coolant flow.

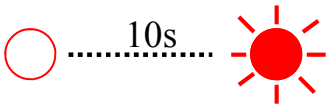
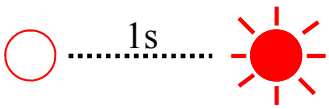
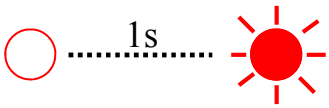
### Coolant Visibly Flowing Yet CU20 Shuts Down After 5 seconds

- Make sure flow sensor is fitted correctly and securely plugged into the PCB.
- Check there is no obstruction on the torch that may be causing the flow rate to be too low to be detected.
- See section 4.3 for instructions on setting the flow rate cut-off point on the CU20 for the torch.

### "CU_OFF" Error Displayed on Power Sauce

- Check the black wire connecting the Flow Sensor Control PCB to the TIG card on the power source for any damage or faulty connections.

# SECTION 6 - Quick Reference Guide

| Mode | LED Status | Function |
|---|---|---|
| **STANDBY**<br><br>Pump: OFF<br>Fans: OFF<br>Flow Detected: N/A |  <br>Short Flash<br>every 10 seconds | Remain in Standby Mode until user input received<br><br>**Short Switch Press:** Enter Priming Mode<br><br>**Long Switch Press:** Enter Priming Mode and remain whilst switch pressed for up to 30 seconds |
| **PRIMING**<br><br>Pump: ON<br>Fans: ON<br>Flow Detected: NO |  <br>Slow Flash (1Hz) | If flow detected enter Running Mode<br><br>If no flow detected after 5 seconds enter Error Mode.<br><br>If switch held remain in Priming Mode until flow detected (enter Running Mode) or 30 seconds elapse (enter Error Mode).<br><br>**Short Switch Press:** Enter Standby Mode<br><br>**Long Switch Press:** No extra function |
| **RUNNING**<br><br>Pump: ON<br>Fans: ON<br>Flow Detected: YES |  <br>Continuously On | If flow detected remain in Running Mode until user input received<br><br>If no flow detected enter Warning Mode<br><br>**Short Switch Press:** Enter Standby Mode<br><br>**Long Switch Press:** No extra function |
| **WARNING**<br><br>Pump: ON<br>Fans: ON<br>Flow Detected: NO |  <br>Slow Flash (1Hz) | If flow is re-detected return to Running Mode<br><br>If no flow is detected after 5 seconds enter Error Mode<br><br>**Short Switch Press:** Enter Standby Mode<br><br>**Long Switch Press:** No extra function |
| **ERROR**<br><br>Pump: OFF<br>Fans: OFF<br>Flow Detected: NO |  <br>Fast Flash (10Hz) | Remain in Error Mode until user input received<br><br>**Short Switch Press:** Enter Standby Mode<br><br>**Long Switch Press:** No extra function |

# SECTION 7 - MAINTAINANCE



## 7.1 Maintenance

**Note! All Electric shocks are potentially fatal, switch off the machine and unplug from the mains supply before carrying out any maintenance work.**

It is very important that the CU20 is regularly maintained. The amount of use and the working environment must be taken into account when scheduling the maintenance periods.

Careful use and regular preventative maintenance will prolong the life of the machine and ensure trouble free operation.

### 7.1.1 Weekly

- Clean the exterior of the machine.
- Inspect the machines exterior for obvious signs of damage.
- Check the coolant level in the coolant tank and top up if necessary. NB The coolant tank cannot be over filled; a low coolant level may result in faulty operation.
- Check for any signs of coolant leakage coming from the machine.

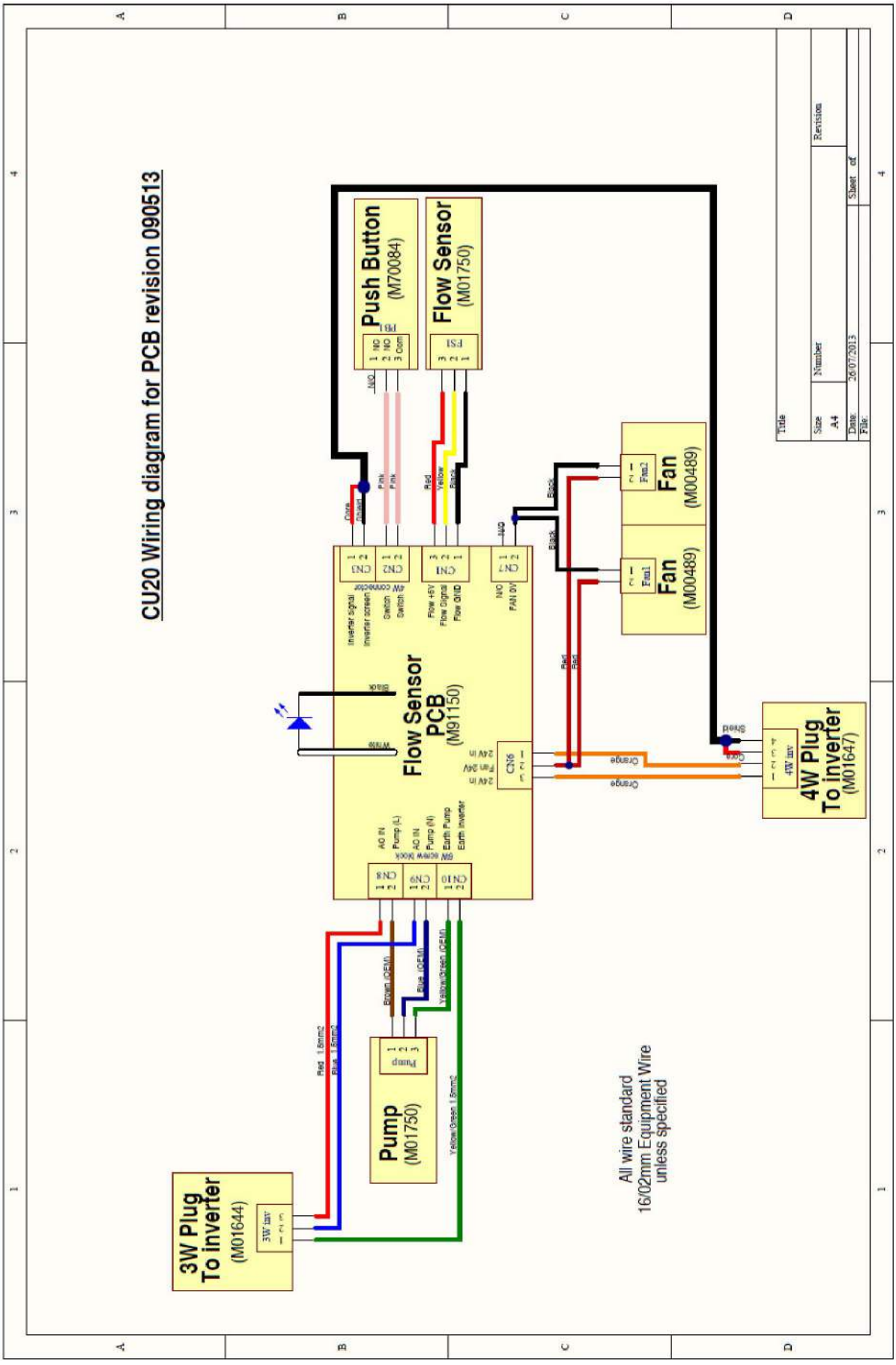
### 7.1.2 Quarterly

**As per the weekly schedule plus:-**

- Remove the side panels from the machine and remove the build up of dust and debris from inside the machine using either compressed air at low pressure or an industrial type vacuum cleaner.
- Make a thorough visual inspection of the interior of the machine, look particularly for pieces of welding wire, or stubs of old welding rods.
- Make sure the earth wire is still securely fastened to the earth stud.
- Check the pipes for any signs of damage or any evidence of leakages. Pay special attention to the connection points.

# SECTION 8 - ELECTRICAL DIAGRAMS

## 8.1 - System Diagram



# SECTION 9 - PARTS BREAKDOWN

## 9.1 - Component Locations


# SECTION 9 - PARTS BREAKDOWN

## 9.2 - Parts list for CU20

| Item no. | Description | Part No. |
|---|---|---|
| | | |
| 1 | Female Panel Mounted Snap Fitting Red | NAWA0001R |
| 2 | Female Panel Mounted Snap Fitting Blue | NAWA0001B |
| 3 | Plastic Moulded Grill 148x90mm | NAM09926 |
| 4 | Red LED (part of CU20 Flow Sensor Control PCB) | NAM60005R |
| 5 | Push Button | NAM70084 |
| 6 | Fan 120x120x38 24VDC | NAM00489 |
| 7 | CU20 Flow Sensor Control PCB | NAM91150 |
| 8 | RS240 Dual Fan Radiator | NAM02465 |
| 9 | FS100A Flow Sensor | NAM01914 |
| 10 | CU20 TY-12SK Coolant Container | NAM01915 |
| 11 | Coolant Pump | NAM01750 |
| When ordering spare components please quote the serial number of the unit for which the parts are intended. | | |

**Head Office**
**Newarc (Newcastle) LTD**
**6 Wincomblee Road**
**Walker Riverside**
**Newcastle upon Tyne**
**NE6 3PF**

**Tel: +44 (0)191 295 0111**
**Fax: +44 (0)191 295 0077**
**Website: www.newarc.co.uk**
**e-mail: sales@newarc.co.uk**

**Aberdeen Office**
**Newarc (Aberdeen) LTD**
**4 Howe Moss Drive**
**Kirkhill Industrial Estate, Dyce**
**Aberdeen**
**AB21 0GL**

**Tel: +44 (0)1224 771063**
**Fax: +44 (0)1224 724536**

**e-mail: scotlandsales@newarc.co.uk**

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