SALUS

S-Series Digital Thermostat

Model No ST320RF

WARRANTY 2 YEARS

CE

Instruction Manual

PRODUCT COMPLIANCE

This product complies with the essential requirements of the following EC Directives:

- **Electro-Magnetic Compatibility directive 2004/108/EC**
- **Low Voltage Directive 2006/95/EEC**
- **EC Marking directive 93/68/EEC**

SAFETY INFORMATION

These instructions are applicable to the Salus Controls model stated on the front cover of this manual only, and must not be used with any other make or model.

These instructions are intended to apply in the United Kingdom only, and should be followed along with any other statutory obligations.

This accessory must be fitted by a Competent person, and installation must comply with the guidance provided in the current editions of BS7671 (IEE Wiring Regulations) and Part 'P' of the Building Regulations. Failure to comply with the requirements of these publications could lead to prosecution.

When fitting the receiver always isolate the AC Mains supply before opening or removing the unit from the wall or wall box.

When fitting batteries don't mix old and new batteries together. Do not use rechargable batteries.

Please leave these instructions with the end user where they should be kept in a safe place for future reference.

INTRODUCTION

A thermostat is a device that is used to switch the heating system in your home on and off as needed. It works by sensing the air temperature and switching on the heating when the air temperature falls below the thermostat setting, and switching it off once the set temperature has been reached.

The ST320RF from Salus Controls is a stylish and accurate electronic thermostat with a large, easy to read LCD display. The thermostat has been specifically designed to be used Volt Free. Unlike ordinary single unit design thermostats, this is a new type of thermostat separating the operational functions into two units.

The Receiver is used for wiring connections and heat on/off control. The Control Centre provides the user interface and temperature sensing / control. The two units are linked together by a Radio Frequency (RF) signal.

The use of the revolutionary Touch Ring technology makes for simple usage, and is coupled with a unique, smart design. The LCD display will show the current room temperature and the 'one touch' operation makes the ST320RF easy to operate.

FEATURES

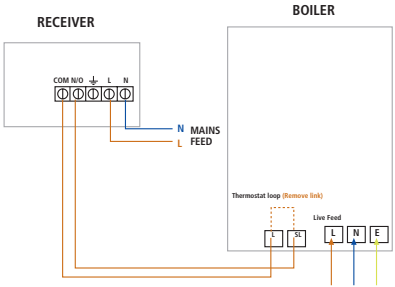
- Touch Ring Technology
- Large LCD with white backlight
- Stylish Casing
- Volt Free Contacts
- Intelligent Communication Technology
- Battery Powered with Replacement Indicator
- Frost Protection
- Burner on symbol
- Secure RF Transmission (one million unique RF address codes)

INSTALLATION

Please read the important safety information at the start of this manual before you start to install the device.

The ideal position to locate the Control Centre is about 1.5m above floor level. It should be mounted in a location where the thermostat is accessible, reasonably lit and free from extremes of temperature and draughts. Do not mount the thermostat on an outside wall, above a radiator or in a location where it may be subjected to direct sunlight.

To ensure trouble free operation of the Radio Frequency (RF) signal, always ensure that the programmable thermostat is mounted away from any possible sources of interference (such as radios, TV sets, computers, etc.), and is not mounted on or in close proximity to large metal objects. Installing the ST320RF in enclosed areas such as cellars and basements is not recommended.



CONNECTING THE ST320RF RECEIVER

NOTE: All electrical installation work should be carried out by a suitably qualified Electrician or other competent person. If you are not sure how to install this digital thermostat consult either with a qualified electrician, heating engineer or your boiler / heating system supplier for advice on how to continue.

The ST320RF Receiver should be mounted in a suitable location that is both accessible for the connection of mains and control wiring, and allows good reception of the RF signal. The Receiver needs a 230V AC mains supply to operate, and this should be fused appropriately (16A max.). The Receiver should be mounted in a location where it will not come into contact with water, moisture or condensation. Please be reminded that touch can be held up by condensation on the touch ring surface and can reduce sensitivity.

There are few electrical connections required to the ST320RF, and these connections should be made to the terminal block inside the Receiver. No Earth connection is required for the correct and safe operation of the ST320RF, but a parking terminal is provided to connect an Earth wire if one is present.

These electrical connections are shown in the table below:

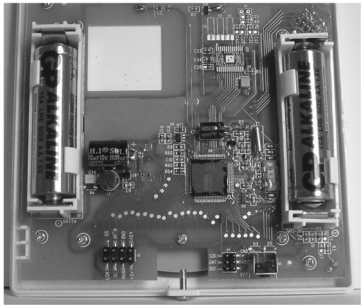
Terminal	Function
COM	Common Contact (volt free input)
NO	Normally Open Contact (volt free output)
⏚	Earth Parking (No electrical connection)
L	Incoming Mains - Live
N	Incoming Mains - Neutral

INSTALLING AND REPLACING BATTERIES

Installing or replacing the ST320RF Control Centre batteries is a straightforward operation, but does require you to open the case of the thermostat.

To open the ST320RF case, undo the securing screw on the bottom of the case (just to the right of the hole for the Reset Button):

After undoing the screw pull it forward until the screw stops moving, then carefully separate the two halves of the case by gently pulling in an upwards direction. Once the case has been separated, the batteries should be visible:



Ensure that the batteries are inserted correctly, paying careful attention to the polarity markings on the battery and next to the battery holders. After inserting the batteries, refit the ST320RF case and retighten the securing screw.

PAIRING THE ST320RF RECEIVER AND CONTROL CENTRE

It is important to correctly pair both the Receiver and Control Centre to ensure that the RF address codes are matched and that reliable communication is established between the units. Please follow the instructions below to ensure that the units are configured correctly.

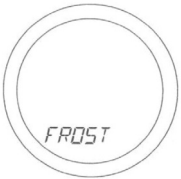
ON THE RECEIVER:

Press and hold the SYNC button to allow the Receiver to enter the learning mode. The Red SYNC LED will turn on to indicate it is ready to receive a signal and pair with another unit.

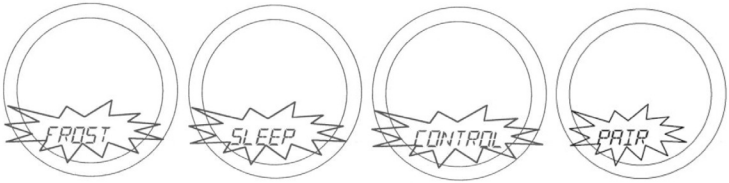
While the signal is being received, the SYNC LED will turn on until the pairing has completed successfully; the SYNC LED will then turn off and the Green Power LED will turn on again. The Control Centre will continue to transmit a pairing signal for 10 minutes before returning to NORMAL mode.

ON THE CONTROL CENTRE:

The Arrow key is not active when the ST320RF is in NORMAL mode. To access the Menu screens, press the OK key once. The first menu displayed is the FROST menu:

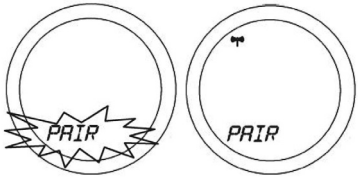


Use the Touch Ring to scroll through the Menus, and press the OK key to select the PAIR menu:



You can scroll through the menus in either direction (forwards or backwards) depending on the direction you move your finger around the Touch Ring. The menus are displayed in the order shown in the picture above.

After selecting the PAIR Menu, PAIR and the RF icon are displayed.



Press the OK key to start sending the RF address code to the Receiver.
The ST320RF Control Centre display will change to show a rundown timer:

The unit counts down for a period of 10 minutes, with the RF Signal indicator flashing while the signal is being transmitted. The RF address code will be generated randomly and the Control Centre will transmit the signal every second for the full 10 minutes until:

- The Arrow key is pressed to return to the previous display
- The OK key is pressed to return to NORMAL mode
- The 10 minute timer runs out

Note that the Receiver must be already in learning mode BEFORE attempting to access the PAIR menu on the Control Centre. If the Red SYNC LED has not turned off after 10 minutes, repeat the whole pairing process.

Pressing the Reset button on the Control Centre and the Receiver will clear the RF address code and generate a new default code which will be saved into the internal memory of the unit; there is no need to re-pair the Receiver and Control Centre. This is a quick and easy way to directly link the units in many applications.

Replacing the Control Centre batteries will not affect the RF code setting. Pressing and holding the SYNC button on the Receiver will however clear the RF address code saved into the internal memory, and switch the Receiver into learning mode, as previously described.

Testing the RF Transmission

It is important to site both the Receiver and Control Centre in locations where the RF signal cannot be interrupted.

The receiving range between Control Centre and Receiver is 100 metres in open air, however many factors can affect the RF transmission and shorten the operating distance, e.g. shielding by thick walls, foil back plasterboard, metal objects such as filing cabinets, general RF interference, and so on.

The operating range is generally around 30 metres, which is large enough for most household applications, but it is advisable to test the RF transmission from the intended Control Centre location to the Receiver location before fixing the Control Centre to the wall. If you are unable to get a stable RF connection between the Receiver and Control Centre, check that the Receiver is both switched on and has a mains supply (green LED lit).

The RF communication is one way, from the Control Centre to the Receiver – the Receiver does not send any signal back to the Control Centre.

The RF signal indicator  **only flashes once when a signal is being transmitted. Once the Receiver has established communication successfully, the green Power LED will flash for 4 seconds to indicate the process has completed correctly.**

It will transmit only when there is a need to control the heating system.

RECEIVER LED INDICATORS

The LED indicators on the ST320RF Receiver are designed to give a clear and easily understood indication of the current state of the system.

The various LED signal combinations and descriptions of what they indicate are shown in the table below:

LED	State	Indication
Blue	Flashing once per second	Receiver is in Automatic mode and system is calling for heat.
Blue	Off	Receiver is in Automatic mode and system is NOT calling for heat
Blue	On (Not Flash)	Receiver is in Manual mode and system is calling for heat
Green	On	Power is on
Green	Flashing for 4 seconds	Receiver has received correct RF address and Command signal when in Failsafe mode
Red	On and flashing	Receiver is either ready to receive a new RF address code in SYNC mode, or has failed to store the new RF address code when in SYNC mode
Yellow	On	Receiver is in Failsafe mode after no RF signal received for over 1 hour

AFTER INSTALLATION

After completing installation and powering up the ST320RF for the first time the programmable thermostat will behave in the following way:

All the indicators on the display and the backlight will be turned on. After two seconds, the display will change to show the currently installed firmware version.

The ST320RF will then operate in NORMAL mode and display the current room temperature.

All programmable thermostat settings will have been returned to default values.

If the Reset Button is pressed, the ST320RF will behave in the same way as described above, except that any previously saved user settings stored in the internal memory will be deleted and overwritten with the default settings.

USER INTERFACE AND CONTROLS

The status and operation of the ST320 is clearly shown on the large backlit Liquid Crystal Display (LCD).

The display consists of a combination of symbols and alphanumeric displays. The top row is a set of status symbols, the centre row is used to indicate temperature (in Celsius), and the bottom row is an alphanumeric display for menu and status messages.

The status symbol functions are:

Indicator	Description	Function
	RF Signal indicator (Not used with ST320)	Indicates the unit is transmitting a wireless signal
	Touch Lock indicator	Indicates touch lock is activated
	Heat Mode indicator	Indicates heating output is turned on.
	Frost Mode indicator	Indicates frost setting is turned on
	Battery Status	Indicates battery is low

There are few user controls for the ST320RF, making the thermostat very easy to operate. The controls on the Control Centre are a Touch Ring (which surrounds the user display), two touch sensitive buttons, a reset button and a slide operated switch mounted on the side of the thermostat. The ST320RF Receiver has only two slide switches, a Sync button and a Reset button.

These controls are shown below, along with a description of each of their functions:

USER CONTROL FUNCTION SUMMARY:

Key / Operation	Functions
Touch Ring (move clockwise)	Increases the set temperature and scrolls down the menu selection
Touch Ring (move anti- clockwise)	Decreases the set temperature and scrolls up the menu selection
OK Key	Enters Menu or confirms a menu selection
Arrow (Back) Key	Single touch- sets the unit back 1 step. Hold for 2 seconds sets unit back to normal mode
Reset Button	Resets the thermostat to default (original factory) settings
Slide Switch	Activates and deactivates the key lock function (prevents accidental changes)

The status of the ST320RF Receiver is indicated by the use of two bi-colour Light Emitting Diodes (LEDs). The status indicators are:

Indicator	Colour	Operating Function
Blue / Yellow	Blue	Heat call mode
	Yellow	Failsafe mode
Green / Red	Green	Power on
	Red	SYNC mode

User Control Function Summary – ST320RF Receiver

Key/Operation	Functions
Auto	Sets Receiver to Automatic mode (default setting)
Manual	Sets Receiver to Manual mode
On	Means the relay output is always on
Cycle	Switches Receiver output on and off in a 15 minute cycle (4 minutes on, 11 minutes off)
Off	Means the relay output is always off
SYNC Button	Enables RF signal synchronisation with ST320RF Control Centre
Reset Button	Resets the Receiver to default (original factory) settings

OPERATION

The ST320RF is configured and adjusted by the use of an innovative and stylish Touch Ring, and two touch sensitive buttons. The Touch Ring surrounds the thermostat display, and is operated very easily by moving your finger around the ring.

The backlit Liquid Crystal Display (LCD) gives a highly visible, easily readable indication of the thermostat status.

REVIEWING THE SET TEMPERATURE

If you press the Touch Ring anywhere except the OK and Arrow keys when the ST320RF is in NORMAL mode (NORMAL mode is when the thermostat is displaying the room temperature), you can check the set temperature setting.

This will display the current set temperature. The set temperature will be displayed for two seconds before the LCD changes to display the room temperature again.

If the ST320RF is operating in Frost Mode the LCD will display both the room temperature and also the Frost Mode indicator . To turn off FROST mode, select the FROST menu and then by using the Touch Ring scroll to the OFF setting. OFF will then be displayed on the LCD.

After pressing the Touch Ring, the LCD will display the preset Frost Mode temperature of 5 °C (this temperature is factory set and cannot be adjusted).

Pressing the OK or Arrow keys will return the ST320RF to NORMAL mode.

CHANGING THE SET TEMPERATURE

When the ST320RF is in NORMAL mode, press the Touch Ring anywhere except the OK and Arrow keys (as described in the previous section), to enter the Review Set Temperature mode. The currently set temperature will be displayed on the LCD and will flash.

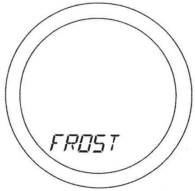
When the set temperature is flashing, press the Touch Ring and move your finger clockwise to increase the set temperature, or anti-clockwise to decrease the set temperature. Press OK at any time to confirm the selection. Note that the set temperature display will not flash while being adjusted – this is normal and the display will start to flash again approximately 0.5 seconds after the Touch Ring is released.

The ST320RF will go back to NORMAL mode without changing the set temperature after 10 seconds of inactivity, or after pressing the Arrow key.

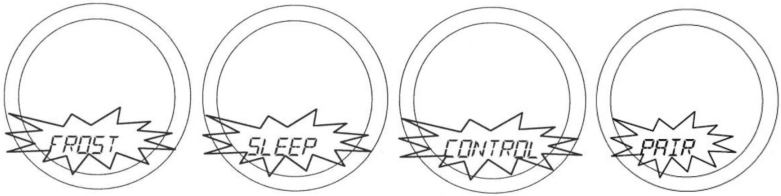
If the ST320RF is in FROST mode, the set temperature cannot be adjusted. Turn off FROST mode as described below to allow the set temperature to be changed.

ACCESSING THE MENUS

The Arrow key is not active when the ST320RF is in NORMAL mode. To access the Menu screens, press the OK key once. The first menu displayed is the FROST menu:



Use the Touch Ring to scroll through the Menus, and press the OK key to select the menu you want to enter:

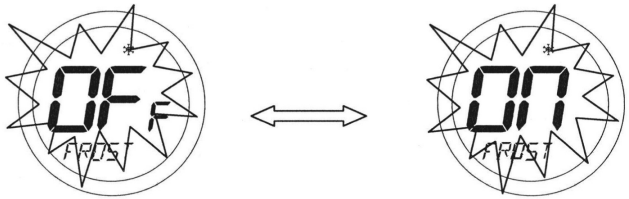


Pressing the Arrow key will return the ST320RF to NORMAL mode. The thermostat will also return to NORMAL mode after 10 seconds if no Key is pressed or if no movement is detected on the Touch Ring.

FROST MENU

Entering the FROST menu allows you to turn the frost protection mode of the ST320RF on or off. The FROST mode temperature is preset at 5 °C; this temperature is factory set and cannot be adjusted.

The FROST mode indicator will be displayed in all the FROST menu screens.



On entering the menu, use the Touch Ring to scroll to the preferred option (OFF or ON), and confirm the choice using the OK button. Use the Arrow key to return to the Menu Option display.

SLEEP MENU

The SLEEP mode allows the ST320RF to conserve power by turning off the LCD display. Entering the SLEEP menu allows you to activate this power saving feature from a 5 second run down timer.

N.B unit will not control the heating while in SLEEP mode.

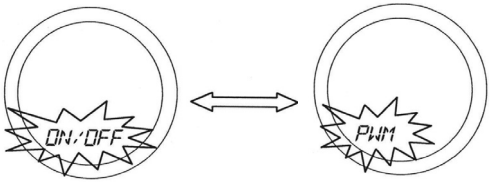
Pressing the OK Key at any time within the 5 seconds will cause the ST320RF to immediately go into SLEEP mode, as will allowing the countdown to complete. Pressing the Arrow key will return the ST320RF to the Menu display mode.

Pressing the Touch Ring for 1 second will turn on the LCD backlight, and pressing the Touch Ring for 3 seconds will wake the ST320RF from SLEEP mode and restore the thermostat to NORMAL mode.

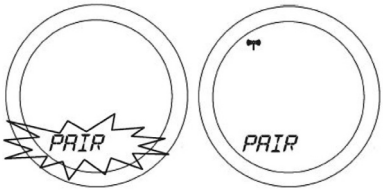
CONTROL MENU

By selecting the Control menu, the user can change the control method used by the thermostat - either ON/OFF or Pulse Width Modulation (PWM).

On entering the menu, scroll to select the preferred option (ON/OFF or PWM control), and confirm the choice using the OK button. Use the Arrow key to return to the Menu Option display. **PWM mode should only be selected by the Engineer carrying out the installation or other qualified person.**



PAIR MENU



The PAIR mode allows the ST320RF Control Centre and Receiver to communicate with each other.

On entering the menu, scroll to select the preferred option (Pairing ON or OFF), and confirm the choice using the OK button.

Please consult the Installation section of this manual for full instructions on how to Pair the ST320RF units.

OFF MODE

The Low Battery indicator will be displayed if battery voltage is detected as "low", in this case the thermostat functions normally during battery low except the backlight is turned off. The ST320RF will enter into OFF mode if the battery voltage falls drastically low, and all outputs will turn off.

As all functions except sampling the battery voltage are disabled in OFF mode, it is recommended that you replace the ST320RF batteries as soon as possible to restore normal operation.

If the voltage of the replaced batteries is not high enough (if older batteries have been used) the unit will remain in OFF mode and will not reset.

SLIDE SWITCH

The control centre has two slide switches. The Slide Switch has two positions: UNLOCKED and LOCKED.

In the LOCKED position, the Touch Lock indicator will be visible on the LCD, and it will not be possible to change the ST320RF settings. If you are unable to change any thermostat settings, check that the Slide Switch is in the UNLOCKED position.

RESET BUTTON

The Reset Button is provided as a way to restore the thermostat to its default factory settings. Pressing this button will delete any previously entered settings.

a.The set temperature is 18°C.
b.Frost:Off
c:Sleep:Off
d.Control method: On/Off.
e: RF address code:00000000000000000000 (20bits).

RECEIVER MODES

The ST320RF Receiver can operate in three different modes – AUTO or MANUAL, and also has a FAILSAFE mode of operation. These modes are selected by using the slide switches on the front of the Receiver:

AUTO MODE

Moving the slide switch to the 'AUTO' position selects the Automatic operation mode of the ST320RF. In this mode, the Receiver will automatically receive an RF signal from the Control Centre and control the output relay.

When in Auto Mode, if RF communication between the Receiver and Control Centre is lost for less than one hour, the Receiver remains in the same operating state it was in when the signal was lost. If the RF signal is lost for more than one hour, the Receiver will enter Failsafe mode, and control of the Receiver output will be based on the setting of the Failsafe mode switch. Please be aware that if the Control Centre is operating in Service mode when changing the Receiver switch position, the relay output may be affected.

MANUAL MODE

Moving the slide switch to the 'MANUAL' position selects the Manual operation mode of the ST320RF. In Manual mode, the Receiver ignores the RF signal from the Control Centre and controls the output relay manually, based on the setting of the Failsafe mode switch.

FAILSAFE MODES

Failsafe mode has three user selectable settings – 'ON', 'CYCLE' and 'OFF'.

With the Failsafe switch in the ON position, the output relay will be turned on, in the OFF position the output relay will be turned off, and in the CYCLE position the output relay will be operated according to a preset time sequence (on for 4 minutes and off for 11 minutes).

When operating in Failsafe mode, the LEDs will indicate the Receiver relay status as follows:

Mode	LEDs	Indication
On	Blue and Yellow	Each LED lights alternately, approx. once per second
Off	Yellow	On
Cycle	Blue	On for 4 minutes, off for 11 minutes

If required the user can switch to another mode 'on the fly' without having to reset the ST320RF; for instance you can switch from Auto Mode to Manual Mode with the output relay being controlled accordingly.

To illustrate this point, even when switched into Manual Mode the Receiver can still receive the RF signal from the Control Centre and once the user switches to Auto Mode, the output relay will be controlled to turn on or turn off automatically once more.

ENERGY TIP

One way to set and use your room thermostat is to find the lowest temperature setting that you are comfortable with, and then leave it set at this temperature. You can do this by setting the room thermostat to a low temperature, (for example 17 °C) and then increasing the setting by one degree each day until you are comfortable with the room temperature - you won't have to adjust the thermostat further, as adjustment above this setting will waste energy - a 1 °C increase in temperature is equal to 3% of your heating costs.

MAINTENANCE

The ST320RF thermostat requires no special maintenance. Periodically, the outer casing can be wiped clean using a dry cloth (please DO NOT use solvents, polishes, detergents or abrasive cleaners, as these can damage the thermostat).

There are no user serviceable parts within the unit; any servicing or repairs should only be carried out by Salus Controls or their appointed agents.

Should the ST320RF thermostat fail to function correctly, check:

- Thermostat batteries are the correct type, fitted correctly and are not exhausted - fit new batteries if in doubt.
- The ST320RF Receiver has mains power (Green LED on)
- The ST320RF Receiver is switched on.
- If fitted, the heating system time switch or programmer is switched on.
- If the ST320RF is still not functioning correctly, press the Reset Button.

PRODUCT SPECIFICATION

Model:	**ST320RF**
Type:	**Electronic programmable thermostat with RF module, designed for Volt Free heating applications.**

Temperature

Scale:	**Celsius**
Tolerance:	**Less than ± 0.5 °C at 25 °C**
Sampling Rate:	**Every 15 seconds**
Display Range:	**0.0 °C to + 45.0 °C**
Display Resolution:	**0.5 °C**
Set Temperature Range:	**5.0 °C to + 35 °C**
Resolution:	**0.5 °C**

Control

Control Method:	**1. On – Off control** **2. PWM control**

Memory Backup

Type:	**Electrically Erasable Programmable Read Only Memory (EEPROM)**

Power Supply – Control Centre

Power Source:	2 x AA alkaline batteries (don't use rechargeable batteries)
Battery Life:	Approximately 1 year

Power Supply – Receiver

Power Source:	230V AC / 50Hz

Switching

Switching Voltage:	230V AC / 50Hz
Switching Current:	16A resistive, 5A inductive
Contact Type:	Volt Free

Radio Frequency (RF) Settings

Operating Frequency:	868 MHz
Max. Operating Range:	100 metres (free air) 30 metres (indoors)
Protection rating:	IP30

Environment

Operating Temperature:	0 °C to + 50 °C
Storage Temperature:	- 10 °C to + 60 °C

ST320RF Warranty

Salus Controls warrants that this product will be free from any defect in materials or workmanship, and shall perform in accordance with its specification, for a period of two years from the date of purchase. Salus Controls sole liability for breach of this warranty will be (at its option) to repair or replace the defective product.

Customer Name: .....
Customer Address: .....
..... Post Code: .....
Tel No: ..... Email: .....

Engineers Company: .....
Tel No: ..... Email: .....
Intallation Date: .....
Engineers Name: .....
Engineers Signature: .....

www.salus-tech.com

Sales: Email: sales@salus-tech.com Tel: 01226 323961
Technical: Email: tech@salus-tech.com Tel: 01226 323961

Salus Controls plc, Salus House, Dodworth Business Park South,
Whinby Road, Dodworth, Barnsley S75 3SP