MODEL 9526/9552 RIPENING SYSTEM USER MANUAL

VERSION 4.00 MARCH 2013

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1 UNPACKING & INSTALLATION CHECKS

1.1 Remove machine from packaging & save packaging for re-use when returning machine for servicing or warranty repairs.

1.2 Open the cover by removing the screw at the bottom, & sliding cover unnpwards & remove the mains lead which is packed inside.

1.3 Prior to connecting to electrical supply, it is recommended that the power outlet to be used is checked for correct polarity & good earthing (grounding). There should not be more than approx 50 milliVolts AC between the Neutral & Earth (Ground) pins on the power outlet. The machine can operate safely with reversed live & neutral supply, using a non polarised socket outlet as is used in continental Europe. The machine has internal fuses in the LINE & NEUTRAL which are not user accessible without dismantling.

1.4 If connecting by means of a three phase plug, ensure that the mains lead is connected with the correct polarity to Live & Neutral and not across two phases. Also ensure that the earth connection is properly connected.

1.5 **Mains Lead Colour Code**

UNPACKING & INSTALLATION CHECKS

Live (Line)	Brown
Neutral	Blue
Earth (Ground)	Yellow/Green

1.6 **Power Requirements**

The maximum supply voltage is **280 Volts AC 50/60 Hz.**

Above 260 Volts, operation is automatically interrupted to protect the components from damage, with automatic resetting when supply returns to safe limits.

Nominal working voltage is **200 to 250 Volts at 1,2 Amps Model 9526**
200 to 250 Volts at 2.4 Amps Model 9552

Model 9526
Max Power during warm up is **234 watts,**
and average power consumption over a 6 hour ripening cycle is **95 watts**

Model 9552
Max Power during warm up is **480 watts,**
and average power consumption over a 6 hour ripening cycle is **190 watts**

1.7 **External current Protection.**

No external protection is necessary, however if a fused plug such as the UK 13A plug is used, any fuse from **6- 13 A** is suitable.

1.8 Having satisfied that the power supply is correctly connected, the machine can be put into service. We recommend that the machine be placed in the ripening room at a height of **3 ft (1 Metre)** above floor levels, preferably positioned so that maximum air flows across the machine, & with a minimum space all round the machine of **20" (500 mm).** Also ensure the machine is clear of any fork lift trucks or any other mechanical handling equipment that could cause damage.

1.9 **Installation Options**

The **VENTECH FRUIT RIPENING SYSTEM** is normally used as a portable unit which is plugged into the room to be gassed, then moved onto the next room.

There is an optional mounting bracket kit available which allows quick fitting & removal, & comprises two mounting brackets that are bolted to the back of the machine using the 4 X M5 bushes provided. The brackets have keyhole slots that allow a machine fitted with the brackets to be lifted of the mounting screws quickly

However for high volume ripening rooms, there are available certain add-on options as follows:

1.9.1 **Gas Pipe Adaptor**

This option also permits mounting the generator outside the ripening room. The exhaust nozzle of the generator can be replaced with a **1/8 " NPT** tube connector obtainable from any hydraulics supplier, that allows connection to a gas pipe.

The gas pipe in turn can be connected to a gas manifold feeding individual rooms, with the gas supply to each room controlled by a butterfly or ball valve.

This option is particularly useful for converting an existing bottled gas fed ripening room to catalytic generator operation.

1.9.2 **External Tank Option**

This option can be used in conjunction with the previously described options to enable the gassing period to be extended by means of an external tank mounted outside the ripening room, which increases the capacity of the generator thus extending the gassing time.

This external tank is connected to a 1/8" NPT bulkead connector on the side of the machine which is supplied as part of the external tank option kit, and connected inside the machine directly to the solenoid valve, replacing the tank. The external tank can be manufactured locally to VENTECH specifications, or supplied by VENTECH. The tank capacity can be sized to suit local Health & Safety codes which is usually 20 Litres. However this & other tanks can be in turn refilled automatically from a 210L drum outside the building.

2 OPERATION

2.1 Unscrew the lid of the tank & fill with 2 litre (US 2 quarts) of VENTECH Ethylene Generator fluid or an approved equivalent.

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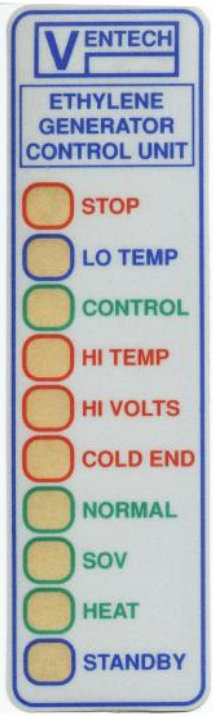
WARNING - The ripening fluid is highly inflammable & of low flashpoint.

Disconnect from electrical supply by unplugging before filling.

Keep away from naked flame when filling & preferably fill in an open space or well ventilated room.

The use of solvents not approved by use is not recommended since, although apparently normal ripening will be achieved, accelerated degradation of system components occur, resulting in expensive long term repair costs.

OPERATION



2.2 Placed generator in ripening room & plug in to power outlet. The control panel status lights will light as follows:

LOW TEMP	Yellow
CONTROL	Green
NORMAL	Green
HEAT	Green

2.3 After about 10 minutes the Yellow **LO TEMP** light will go out & the **SOV** lamp will start to flash briefly at approx 9 second intervals, accompanied by a click. This is the solenoid valve opening allowing ripening fluid to be admitted to the reactor to be converted to ethylene. Ethylene gas will be emitted from the nozzle on the top of the machine.

CAUTION - THE EXHAUST NOZZLE OPERATES AT OVER 100 DEG C. DO NOT TOUCH WHEN OPERATING OR FOR HALF AN HOUR AFTER SWITCHING OFF!

After reaching operating temperature the **HEAT** & **CONTROL** lights will flash on & off as the system enters pulse width modulation mode which gives proportional control of the element temeperature. This gives very accurate control of the catalytic conversion temperature, and by preventing temperature cycling of the element, gives longer element life than on-off control.

2.4 After approx **6 - 8** hrs,(9552) or 12 -16 hours (9526) operation, the ripening fluid will have been used up & the fluid bottle will be empty. At this point, since there is no fluid in the bottom of the reactor, the temperature will rise from **70 Deg C** (the boiling point of the fluid). At **90 Deg C,** the cold end sensor mounted on the bottom of the element will switch on the **STOP** light & switch off the **SOV** & the heater (indicated by the **CONTROL** & **HEAT** lights switching off). This will allow the machine to cool down, until the sensor switches on again, and the machine will cycle on & off, keeping it ready to start a new ripening session once refilled, but preventing damage to the element . Once refilled, if the **STOP** light is on, it will restart automatically, once cooled, & the inflow of fluid will prevent it coming on again.
NB: If the time is substantially longer, it could be that the catalyst is becoming fouled & requires changing.

Note:
It is important that the machine is level, otherwise the fluid will not flow into the reactor when it is almost finished, and the STOP light will switch off earlier.

OPERATION

2.5 WARNING INDICATORS.

2.5.1 **HI TEMP** (red light)
After start-up, the temperature will sometimes initially overshoot the correct set-point, causing the **HI TEMP** red light to turn on. This is no cause for alarm and should go out after a few minutes & will not come on again.

This can also occur in the event of a power failure when power is restored. This provides backup protection to avoid incorrect gas generation which could cause degraded ripening.

2.5.2 **HI VOLTS** (red light)
If this light comes on it is an indication that the mains power supply voltage is too high (**above 260 Volts**)

Normally, the nominal voltage, depending on country is from **220 to 250 Volts**. Normal variations in supply voltage should be within **+/- 6% (UK) to +/- 10% (S Africa)**

It is unlikely that any country will have a supply that intentionally exceeds the 10% limit, although under fault conditions, or very heavily loaded distribution systems, the voltage can exceed these limits late at night when the gas generator will still be working but most industrial & domestic load is switched off. In some developing countries, these limits can also be exceeded.

For this reason, the Ventech gas generator has a built-in protection circuit which will automatically switch off once this safe working limit has been exceeded without damage to the components. After supply has returned to normal, the **HI VOLT** light will go out & normal operation will be resumed.

2.5.3 **STOP** (Red light)

This light will be lit if the temperature at the bottom of the reactor exceeds safe limits, and when lit, switches off power to the reactor & solenoid valve.

This can be caused by several reasons.

(a) **Machine not level.**

This results in the ripening fluid not being able to flow into the reactor when nearly empty. Since the cooling effect of the ripening fluid is no longer applied to the base of the reactor, the temperature will tend to rise, with the risk of damage to the reactor element terminals. This protection, by removing power to the element, maintains the temperature within safe limits & therefore provides protection, should the machine not be level.

OPERATION

(b) **Element failure**

The element, as most heating elements has a finite working life and will eventually require replacement. When it eventually fails, it can possibly overheat, by-passing the control system. Normally this will be picked up by the **HI TEMP** protection, but should this fail for any reason, the **STOP** protection will provide backup protection and prevent any risk of fire or damage to the metalwork of the machine.

(c) **Total control failure**

In the event of a direct lightning strike of magnitude too great for the lightning protection, the **HI TEMP** protection may fail and the **STOP** protection provides back-up protection to prevent dangerous high temperatures occuring which could cause a fire. This has happened on more than one occasion with machines made by other manufacturers who do not offer such comprehensive protection.

Note that it is extremely unlikely that this will occur, since a lightning strike or surge greater than the capacity of the ultra fast surge diodes will normally blow one or other the mains fuses.

2.5.4 **INDICATOR LAMPS COLOUR CODES**

Green Normal operation modes

Yellow Temporary operating modes such as low fluid or low temp on startup.

Red Abnormal operating modes.

Note further that the **VOLTS TOO HI** indication is outside the control of the gas generator and is not a machine fault as such, being an external fault resulting from incorrect supply voltage.

A MACHINE SHOWING THIS INDICATION SHOULD NOT BE RETURNED FOR SERVICE WITHOUT FIRST CHECKING THAT THE SUPPLY VOLTAGE IS IN FACT TOO HIGH BY MEASURING WITH A DIGITAL METER PREFERABLY OVER A LONG PERIOD OF TIME. PLEASE REMEMBER THAT THIS CONDITION WILL NORMALLY OCCUR INTERMITTENTLY & IT IS IMPORTANT TO HAVE YOUR MACHINE CONNECTED TO THE SUPPLY WHEN CHECKING.

3 SERVICING

3.1 Catalyst Changing

The catalyst used in the machine will need changing after after between **6** & **12** months use. Due to the restrictions imposed by Customs & Excise departments, the **Ventech Ripening Fluid** contains de-naturants which will eventually poison the catalyst causing reduced gas generation. **We also recommend that if you are have problems ripening**, t**hat you check the gas levels with with a gas sampler such as the GASTEC** details of which are at the end of the manual.

This is supplied by us, & it is possible that a group of ripeners in one area share the cost of one kit, since it is only used infrequently.

We recommend that the user checks the catalyst once a month after the first six months operation from new or after a catalyst change, and examine the catalyst by unscrewing the exhaust nozzle, when cold, and viewing the catalyst, which consists of small white tubes filling the reactor. These should be loose & not welded together by carbon. If left too long, it is difficult to remove the old catalyst, and will require an exchange reactor. Once the catalyst starts getting heavily carbonated, it should be emptied by turning the machine upside down and shaking out the old catalyst. It may be necessary to loosen the catalyst with a long thin screwdriver or skewer. Once all the catalyst is removed, the reactor can be refilled with a new catalyst pack, taking care not to overtighten the exhaust nozzle when replacing. When refilling, some of the catalyst consist of triangular ceramic chips that should be put in first, followed by the tubular active catalyst.

Due to the low cost of the catalyst, it is better to change it sooner, rather than later. This will be done automatically, if your machine is covered by a service contract, or sent in for any service or repairs.

3.2 Before returning a machine for repair a few simple checks should be carried out, which could save you the transport costs & downtime involved in sending a machine in to your service centre.

3.3 Condition - No lights lit

3.3.1 First check the electrical supply to your machine, and if you have testmeter check that you have mains supply across the two outside pins on the connector that plugs into the socket.

3.3.2 If there is supply, the electronics module must be faulty. You can either return the whole machine to the agent for repair, or remove the electronics module, & fit an

3.3.2 exchange unit. to do this, unplug the machine from the mains supply, and remove the

RIPENING GUIDES

(Cont) door, then unplug the six way & two way plugs from the electronic module. These are plugged in through the side of the main enclosure. There is a retaining latch on the connector that has to be squeezed in to release the connector.

3.3.3 Undo the centre thumb screw holding the module into the main enclosure & withdraw the module. from the main enclosure. Refitting is the reverse. Ensure that when the new connectors are plugged in, they are pushed home to engage the latches. Note that the electronics module does not need any adjustment after fitting. The mass is 1.3 Kg which results in a considerable cost saving & time saving compared to returning the whole machine for repair.

4 RIPENING GUIDES

4.1 BANANAS

For best taste, **ripen bananas according to the following schedule,** then hold at **14.5 Deg C** for delayed shipment. Ensure that bananas, are not chilled as this can cause damage.

RECOMMENDED GUIDE FOR BANANA RIPENING

Day No	Ripening Schedule - no of days 4	5	6	7	8	
1	17.8	16.7	16.7	15.6	14.4	GAS
2	17.8	16.7	16.7	15.6	14.4	
3	16.7	16.7	15.6	15.6	14.4	
4	15.6	16.7	15.6	15.6	14.4	
5		15.6	15.6	15.6	14.4	
6			14.4	14.4	14.4	
7				14.4	14.4	
8					14.4	

STORE AT 14.4 Deg C for delayed shipment

RIPENING GUIDES

4.2

RECOMMENDED GUIDE FOR TOMATO RIPENING

Day No	Ripening Schedule - no of days 5	6	7	8	9	10	11	12	
1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	**GAS**
2	21.1	21.1	21.1	21.1	20.0	20.0	20.0	20.0	**GAS**
3	20.0	18.3	18.3	18.3	16.7	15.6	15.6	15.6	
4	18.3	18.3	16.7	16.7	16.7	15.6	14.4	14.4	
5	16.7	16.7	15.6	15.6	15.6	14.4	14.4	13.3	
6		15.6	14.4	14.4	14.4	14.4	14.4	13.3	
7			13.3	13.3	13.3	13.3	13.3	13.3	
8				12.8	12.8	12.8	12.8	13.3	
9					12.8	12.8	12.8	13.3	
10						12.8	12.8	12.8	
11							12.8	12.8	
12								12.8	

STORE AT **12.8 Deg C** for delayed shipment

RIPENING GUIDES

4.3 AVOCADOES

Gas for **12 hours at 23 Deg C** then ventilate. Maintain temperature till ripe (2-3 days total).

Minimum safe storage temperature : **4.5 to 13 Deg C.**

4.4 CITRUS

Gas for 12 hours at 27 Deg C then ventilate. Maintain temperature till ripe (3-4 days total)

Minimum safe storage temperature : **3 Deg C.**

4.5 MANGOES

Wash in hot water at **53 to 55 Deg C** for **5 mins**, then pack into lug boxes & stack in ripening room.

Gas for **12 hours at 30 to 32 Deg C** then ventilate. Maintain temperature till ripe (2 days total). Reducing temperature to **24 to 25 Deg C** will extend ripening time to 2 1/2 to 3 days. NB Mangoes can also be mixed with bananas, which are ripened at 15 to 18 Deg C.

Gas for **12 hours at 27 Deg C** then ventilate. Maintain temperature till ripe (3-4 days total)

Minimum safe storage temperature : **10 to 13 Deg C.**

4.6 OTHER FRUITS

Many other fruits can be ripened with the VENTECH RIPENING SYSTEM. Please contact us or your distributor/agent for details.

4.7 TOBACCO

Tobacco can be succesfully cured with a 15% reduction in curing time. Please contact us or your distributor/agent for a copy of our tobacco curing guide.

5 RIPENING ROOM MAINTENANCE

A good preventative maintenance program is the best way to avoid ripening room problems. We would like to recommend the following:

5.1. TEMPERATURE CONTROLLERS AND PROGRAMMERS.

Regular calibration checks should be carried to avoid incorrect ripening room temperatures.

5.1.1 Check capillary tubing to be sure it is free of kinks. Capillary tube & bulb temperature controllers should be replaced if possible with an electronic temperature controller, preferably with a digital display reading to 0.1 Deg C.

Thermocouple type controllers should be avoided, since the accuracy is not so good at low temperatures. Platinum resistance (Pt100) type controllers are best.

The capilliary type controller has too high a differential (Difference between switching off and switching on), to give accurate temperature control, and the capilliary tube is easily damaged and cannot be replaced. If damaged, the complete instrument has to be replaced.

5.1.2 An independent high/low temperature alarm & chart recorder is recommended especially if you are in an area that has a high incidence of power failures.

5.2 AIR HANDLING & LEAKS

5.2.1 Evaporator & condensor coils should cleaned at least every 6 months.

5.2.2 Check drain lines regularly.

5.2.3 Check compressors, fan motors, belts, etc. and service as recommended by manufacturer.

5.2.4 Replace damaged or worn door gaskets as necessary.

5.2.5 Check rooms for gas tightness at least once a year.

RIPENING ROOM MAINTENANCE

5.3 ELECTRICAL

5.3.1 Check that your electrical panel has protection against Low voltage, high voltage, phase failure, phase reversal and a three minute timer to prevent damage due to operation of the power company's auto-reclosers. Any of these faults will damage your compressors and air circulation fans.

5.3.2 If not, we recommend that you ask your electrician to fit suitable equipment. The **VENTECH THREE PHASE LOAD PROTECTOR** combines all these functions in one unit, and one unit can protect a multiple compressor installation.

5.3.3 If you use a standby generator, if not already automatic, have it converted for automatic starting and stopping. A **VENTECH AMF GENERATOR CONTROLLER** can be retro-fitted to virtually any electrically started generator, to provide this facility.

6 SYSTEM INTEGRATION

The model 9500 series gas generators can be integrated into a SCADA or Proba 110 controlled system by connection of the remote control port to a suitable control devices.

Connection

Pin 1 (LH terminal) 0V
Pin 2 (Control)
Pin 3 (+12 VDC)

Pins 1 -2 are hard wired together to enable solenoid valve operation. Remove this link & connect to an interface relay or the output of any opt-isolator as follows:

Pin 1 Emitter
Pin 2 Collector & 1K0 pull-up resistor
Pin 3 1K0 pull-up resistor

Applying 5-10 mA to the Opto input will enable gas generation.

Since the operating voltage & current is low, a single pair telephone cable can be used to interface to the port.

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RIPENING ROOM INSTRUMENTATION

DIGITAL MAX-MIN THERMOMETER

GAS ANALYSER FOR CHECKING ETHYLENE & CO2 LEVELS

DIGITAL MAX-MIN HUMIDITY METER

RIPENING ROOM INSTRUMENTATION SUPPLIED BY VENTECH AGRIONICS

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