

USER GUIDE
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UGE103-0716



Instructions and Operations Manual

Model VC Series Vacuum Calibration Tanks

VC64P20PSF Vacuum Tank

Machine Model Number: VC44P20PSF

Machine Serial Number: 07 1620 270

Electrical Schematic Number: 154-138-3000

For technical service, spare parts or anything else you may need relative to this machine, please use the above numbers when you call our customer service department.

Caution

Please make sure to disconnect power to this or any other machine at the power source and make sure all machine motion has stopped before opening control box panels or removing any machine guarding.

Operator and maintenance personnel safety is the primary importance in the operation of any machinery. The following point should be observed in order to provide for the safe as well as long lasting operation of MPM equipment.

- Always be sure to replace guarding before restarting this equipment.
- Train operators to understand the operation of all moving components.
- Follow simple instructions regarding lubrication and preventative maintenance.
- Keep machine clean and clear of debris.

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Section 1

General Information

1:1- General Specifications

	VC44 P20PSF
Compartments	2
Compartment Lengths (Feet)	1-10' 1-10'
Product Capacity (Inches)	4.5" Dia
Product Capacity (mm)	114
Overall Tank Length (Feet)	22'
Overall Tank Length (Meters)	6.7

1:2- Vacuum Calibrator Function

A vacuum calibration tank when equipped with an appropriate calibrator tool is used to size, cool and condition a moving hollow extrudate as it is continuously supplied through the extrusion line by the extruder. At high extrusion speeds or with heavy extruded product, additional cooling tanks may be required after the vacuum calibrator to produce adequate cooling levels. With some extrudates, additional controlled water heating may be required to obtain satisfactory product quality.

In a vacuum calibrator, vacuum is applied to a closed and gasketed chamber (the tank body), creating a negative pressure, or vacuum environment. This negative pressure allows the positive pressure inside of the hollow extrudate to expand it. A mechanical tool, or calibrator head, provides a mechanical limit to this expansion. This calibrator head is shaped as the finished product is and when the extrusion leaves this calibrator head, it should be cooled enough to hold its desired shape. After leaving the calibrator head, the extrusion remains under vacuum while it is further cooled to insure that no deformation takes place.

One of three vacuum systems can be used in today's calibration applications. Each one has its own applications and are discussed as follows;

- **Venturi** vacuum is used for smaller thin walled tubing or hollow profiles. It creates a low level vacuum, usually

measured in “H₂O. The vacuum is generated using a water pump that draws water from a frame-mounted reservoir and delivers it at a high velocity, through a venturi eductor. This eductor is connected to the compartment standpipe and as this high velocity water passes through the eductor, air and excess compartment water are drawn through it, creating the desired vacuum level. The water and air are returned to the reservoir to close the circuit loop.

- **Direct (liquid ring)** vacuum is used on heavy walled tubing, pipe and profiles. This vacuum style creates a high vacuum with greater CFM levels. The vacuum is generated by actual vacuum pumps that draw excess air and water directly from the compartment standpipe. This water is thrown radially inside the vacuum pump housing, creating the necessary vacuum. The water and air are then discharged to drain.

- **Air/Water Separation** vacuum is used for closer tolerance sizing requirements. Vacuum is drawn from a closed and sealed reservoir with either a centrifugal blower or a direct vacuum pump. Lines from this reservoir are then connected to the upper chambers. When vacuum is applied to the reservoir, the air and water are drawn from the upper tank through the connected lines. This allows a separation of air and water that was being fed through the vacuum generators in both of the previous discussed systems. This separation creates a more

stabilized vacuum system and also allows for a smaller vacuum pump and less required CFM because less work is now required.

The closed reservoir and other associated system costs will generally make this a more expensive arrangement, but will result in better finished product quality and reduced maintenance costs with fewer pump failures.

1:3- Placement in Line

This unit is supplied for either a right to left or left to right extrusion direction. The tank is completely tested and lubricated prior to shipment. After inspection for any possible shipment damage, the unit is ready for placement in the line. The machine is mounted on v-groove casters for positioning onto floor rails in the extrusion line.

There are also floor screws that should be adjusted to lift the weight of the unit off of the casters, permanently positioning it in line when position is set.

After connecting the incoming power according to the machine nameplate and water supply to the labeled water inlet connection, the machine is ready for operation.

Warning

This equipment is powered by three phase, alternating current, as specified on the machine nameplate.

Connect the machine power through a fused disconnect of proper rating. Make sure the power is grounded through the power cable to the plant electrical ground.

1:4- Unit Operation

While each sold system can be either a standard arrangement or customized to your particular application, the basic operation of a vacuum tank will remain similar. There may be a different number or size or style of vacuum and water pumps, so for simplicity, we can discuss the operation based on using one direct vacuum and one re-circulating water pump.

Initial plant water connection will be located on the rear side of the re-circulation reservoir. This connection should be made to match the size of the inlet fitting and should not be reduced.

This connection will allow the process reservoir to fill to a pre-determined level that has been set at the factory. An automatic float arrangement will shut off the incoming water when this level is reached.

When the valve shuts off, the upper tank can be filled. By turning on the pump through it's labeled motor starter, water will be drawn from the reservoir and delivered through the ball valves in the upper chamber. These valves should be opened approximately half way on initial start up and can be adjusted to any desired level when running product.

As the water level begins to drop in the reservoir, the float valve will again allow additional water in until the float valve closes. This will continue until the upper chamber reaches it's desired level and water begins to go over the compartment standpipe.

At this time, the system water requirements are met. The float valve will only open again if the system loses any water due to spillage or evaporation.

After extruder requirements are met and product is delivered through the vacuum tank, vacuum can now be generated.

With the re-circulation pump running and the tank lids open, the vacuum pump can be turned on with its labeled motor starter. Water will begin to be drawn down through the standpipe and vacuum is being generated. At this time the tank lid can be closed and a vacuum seal will occur. The vacuum gage will begin to move as the air is evacuated from the closed chamber. A relief valve and a metering valve are fitted with the gage for vacuum level control. The metering valve should be adjusted so as to get the proper gage reading for the desired level of vacuum. The relief valve is only used on system shut down to allow quick release of the chamber vacuum that will allow the lid to be opened.

1:5- Chilled Water Connections

When the unit is supplied with a closed loop water re-circulation system, a heat exchanger is plumbed into the circuit to aid in the removal of generated heat from the process. This heat exchanger has been sized according to the designed system or to your particular heat load requirements.

In either case, this heat exchanger will need to be connected to a chilled water source in your plant which will either be a portable chiller or central plant system. It is necessary to have a properly sized chilling source that matches the unit requirements.

1:6- Automatic Water Fill

The unit may optionally be supplied with automatic water fill. This will operate as long as the electrical disconnect switch is on. A float switch will add water to the tank whenever the water level is below the switch. An adjustable delay timer adds hysteresis to the level switch to prevent excessive cycling of the fill valve.

1:7- Automatic Water Temperature Control

The unit may optionally be supplied with an automatic water temperature control that will prevent the water temperature from going over the setpoint. The control will open the discharge valve causing water to be pumped out of the system. When the water level drops below the float switch the discharge is shut off and cold water is added back to the tank until the float switch closes. This action continues until the setpoint temperature is reached. The temperature controller uses a Type J thermocouple located inside a thermowell. This prevents the tank from having to be drained to replace the thermocouple and protects the thermocouple from physical damage inside the tank.

The top line of the display is the actual temperature and the bottom line is the temperature setpoint.

To change the temperature that the discharge valve opens at, press and hold the asterisk button on the left while pressing the up or down buttons on the right until the desired temperature is achieved. Display will automatically go back to default when the buttons are released.

Section 2

Mechanical and Plumbing System

2:1- Machine Frame and Support System

The machine frame is constructed of welded steel that has been primed and painted to resist corrosion and provide a maintenance free finish. It is supported by four swivel casters to help in the movement of the unit around the plant. It also has four leveling screws to permanently fix the position of the unit and also help accommodate any uneven flooring. These screws have a welded hex nut to allow adjustment with either a wrench or socket drive.

The motors and system components are mounted inside the frame.

2:2- Tank Adjustments

Because vacuum tanks are required to be centered with the extruder die, it is necessary to have three planes of adjustment.

1. *Longitudinal-*

Adjusts the tank body towards or away from the extruder in a linear plane. This adjustment is critical in allowing the tank to get right up close to the die for better extrudate control. It also allows for additional room for die and tooling changes in the away position. An optional traverse can jog the tank forward and reverse using an electric motor and screw.

2. *Lateral-*

This adjustment, also called side to side, allows the tank to be adjusted across the die face for centering purposes.

3. *Height-*

Adjust the tank height from the floor. This is necessary to allow centering to the die with the fixed height of the extruder, which can vary from manufacturer to manufacturer.

2:3- Vacuum Pumps

The system vacuum pump(s) are contained units that are wired to a motor starter of proper rating equipped with overload protection. These pumps will run consistently with little maintenance requirements. The direct pumps will have flow regulator at the pump seal to provide a liquid ring for the pump seal and a y-strainer to help keep the regulator clean.

The direct vacuum pumps or the venturi water pumps should never be run dry. Running these pumps dry for any period of time will likely damage the pump. Direction arrows on the pump body also tell which way the rotor should be spinning. Plant electrical phasing may be different than what these units were tested for and pump rotation should be verified before running the system.

2:4- Re-circulation System

If your unit was supplied with a closed water re-circulation system, it will be equipped with a water pump and holding reservoir. This pump again requires little maintenance and is wired to a motor starter of proper rating with overload protection. A filter/strainer mounted in the reservoir prior to entry into the pump will capture any large particles and prevent them from going through the pump. This strainer should be cleaned daily to prevent the pump from starving.

A float assembly mounted in the reservoir provides the process operating level. This valve will only open when there is a loss to this operating level due to spillage or long term evaporation. This valve is factory set and should not require any adjustment. An overflow coupling is fitted to the rear of the reservoir for hook up to plant drain. This will prevent water from getting on the floor when the complete system is drained for clean out.

Warning

Always lockout main power disconnect and wait until all machine motion has stopped before removing any guards or performing any adjustments or maintenance to this machine.

“Safety is more important than production”
“Use common sense whenever around mechanical or electrical equipment”

Section 3

Electrical System

3:1- Power Supply

This equipment is powered by three phase, alternating current, as specified on the machine nameplate.

Connect the machine power through a fused disconnect of proper rating. Make sure the power is grounded through the power cable to the plant electrical ground.

3:2- Control Panel

The main control panel has a lockable disconnect for operator and maintenance personnel. This disconnect should be locked and tagged prior to any entry to either box or maintenance to any portion of the vacuum calibrator unit.

Section 4

Servicing the Unit

4:1- Machine Lubrication

The machine is supplied to you completely lubricated. After running the unit for long periods of time, this lubrication will break down and become useless.

For this reason, the following lubrication chart should be adhered to.

<u>Component</u>	<u>Type of Lubricant</u>	<u>Duration</u>
Flange Bearings	Chassis Lube	6-9 Months
Motor Bearings	Mobil Synthetic	6-9 Months

4:2- Component Inspection

Most components in a vacuum calibration system are designed to require little maintenance.

However, the production requirements of this type of equipment are such that the unit should be inspected at regular intervals for any potential issues.

Things to check for are any loose or cracked hose connections, tank lid and product seal wear and pump filter clogging. These are items that are easily remedied and can allow you to enjoy trouble free production if maintained and inspected regularly.

4:3- Spare Parts

Because of continuous operation and the wear and tear that production equipment can be subject to, it is usually necessary to have spare parts on hand in case of component failure.

It is advisable to stock a level of spare parts to insure of minimal downtime if and when a component failure should arise.

Electrical

Part Number

ZB4BW343

ZB4BVBG4

ZBE101

CA2KN31G7

DILET-70-A

E26BQV4

46815K23

Description

22.5mm, RED ILLUM FLUSH MOMENTARY PB

22.5mm, RED LED MOUNTING LATCH

1NO CONTACT BLOCK

120VAC, 3NO-1NC

24-240V AC/DC, MULTIFUNCTION, MULTIRANGE
STACKLIGHT ALARM, MONO-TONAL, 120V AC/DC

LIQUID LEVEL SWITCH, SS, HORIZ MOUNT

Mechanical

Part Number

A23-6R
123830
6295K192
EC28-260-EM
MF1-50
2140GXB(0-30VAC)
6338K471
A23-6R
9775K12
4652K13
006120
WJ201U2S-6.00-STDX-STDX-X
1406-4Vx2
3406-4Vx2
6FS12
123806
A23-6R
123830
C-1736-8.4-6-T
C620AMBF-10HP
C615J-BF
LPHR 3408 AB 001 0A2
L34-184T
MOTOR FOR LPHR
1/4ZH10-B
2141GXB 0-160psi
415087
AM1DP200

Description

HANDWHEEL
BEARING, PILLOW BLOCK
GEAR RACK
SEAL, TRIM
VALVE, IN-LINE SPEED CONTROL
GAUGE, GLYCERIN FILLED VACUUM
BUSHING, BRONZE FLANGED
HANDWHEEL
FLOAT, OBLONG
VALVE, FLOAT
BEARING, BABBITT SLEEVE
SCREW JACK, MACHINE
CASTER, SWIVEL; V-GROOVE
CASTER, RIGID; V-GROOVE
SPUR GEAR SET, 12 TEETH, TYPE B, 14.5 DEG
BEARING, PILLOW BLOCK
HANDWHEEL
BEARING, PILLOW BLOCK
HEAT EXCHANGER
PUMP, RECIRCULATION
PUMP, 5HP
VACUUM PUMP
BASE ASSEMBLY
PUMP MOTOR
SPRAY NOZZLE, BRASS 76 DEGREE
GAUGE, PRESSURE
THERMOMETER
TERMINAL

We're Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Department for a nominal fee.


Most manuals can be downloaded free of charge from the product section of the Conair website.

www.conairgroup.com

How to Contact Customer Service

To contact Customer Service personnel, call:



 **NOTE:** Normal operating hours are 8:00 am - 5:00 pm EST. After hours emergency service is available at the same phone number.

From outside the United States, call: 814-437-6861

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call...

If you do have a problem, please complete the following checklist before calling Conair:

- Make sure you have all model, control type from the serial tag, and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- Make sure power is supplied to the equipment.
- Make sure that all connectors and wires within and between control systems and related components have been installed correctly.
- Check the troubleshooting guide of this manual for a solution.
- Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.

Equipment Guarantee

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

Performance Warranty

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated, and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices, or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

Warranty Limitations

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.