



VACUUMIZER®

MODEL VM-H

LOW-TEMPERATURE VACUUM STEAM HEATING SYSTEM

Benefits

Provide rapid start-up, uniform heating and accurate control of jacketed vessels and conical or cylinder dryers.

1. Steam temperature control of ± 1.8 °F ensures consistent production quality.
2. Delivers heating temperature as low as 86 °F to improve manufactured quality of temperature sensitive products.
3. Using the latent heat and “U” value of steam significantly increases production capability over hot water heating alternatives.
4. Package models facilitate piping installation.



Specifications of Vacuum Heating System



Vacuum Steam Temperature Range	86* to 230 °F
Vacuum Steam Temperature Stability	Set temperature ± 1.8 °F

* If make up water temperature is 41 °F or higher, minimum steam temperature is make up water temperature + 45 °F



To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

Product Series

Type (Model)	Usage	Features
VM1HP 	Laboratory and pilot plant ● Applications: • Jacket reacting tank (Capacity: 1.2 to 12 gal) • Shell and tube type heat exchanger (Shell capacity: Up to 8 gal)	• Can operate with single-phase 115 V AC • Moves easily on casters • Includes water cooling function • Incorporates control equipment
Package Type VM3HP 	Production process and pilot plant ● Applications: • Jacket reacting tank (Capacity: up to 528 gal) • Shell and tube type heat exchanger, Hot air dryer, Roll heater, etc. * Maximum possible heat energy supplied is 1,058,000 BTU/h.	• Since package includes all necessary equipment, piping installation is easy • Moves easily on casters
Engineering Type	Production process ● Applications: • Jacket reacting tank, Shell and tube type heat exchanger • Roll heater, etc.	• System can be designed flexibly according to required specifications

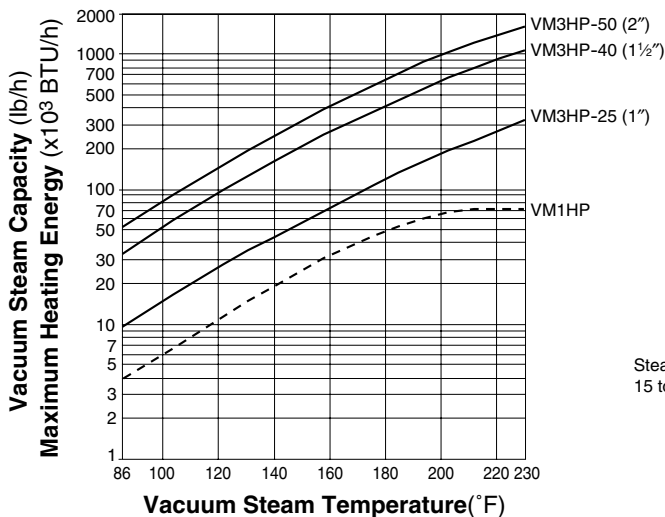
Package Types

• Specifications

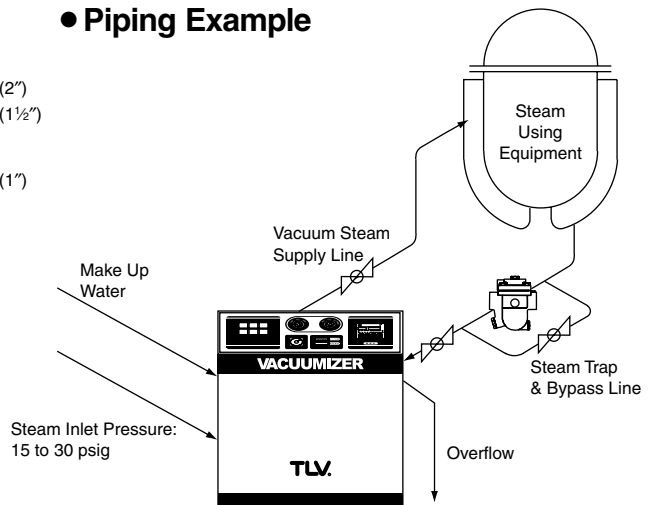
Model	VM1HP	VM3HP-25	VM3HP-40	VM3HP-50
Supply Steam Inlet Pressure (psig)	15 - 30	15 - 30		
Vacuum Steam Capacity (lb/h) (Maximum Heating Energy ($\times 10^3$ BTU/h))	154 (143)	220 (205)	772 (717)	1146 (1060)
Vacuum Generated Steam	Condensate Load (lb/h)	220		
	Exhaust Speed (scfm)	1.06		
	Motor Power	$\frac{3}{4}$ hp		
Cooling Function (Using Water)	Yes			—
Power Supply	115 V AC (60 Hz) single-phase		230 V AC (60 Hz) three-phase	
Safety Specification (Motor, Control Valve, Sensor)	Non-flameproof (Consult TLV for higher specification)		Non-flameproof (Consult TLV for higher specification)	
Location for Installation	Indoor		Indoor or outdoor	
Material*	Control Valve	Cast bronze B548 C83600		Cast iron A126 Cl. B
	Vacuum Generation Unit (Wetted Portions)	Pump: Cast iron A126 Cl. A Tank: Vinyl chloride PVC Ejector: Stainless steel AISI304		Stainless steel AISI304
	Steam Piping Unit	Carbon steel A53 Type F		Stainless steel AISI304
	Casing	Steel plate A591		Steel plate A591
Connection	Steam Inlet/Outlet	Inlet Screwed $\frac{1}{2}$ " NPT Outlet Screwed $\frac{3}{4}$ " NPT		1" 1 $\frac{1}{2}$ " 2" ASME Class 150 RF
	Steam Condensate Inlet	Screwed $\frac{3}{4}$ " NPT		2" ASME Class 150 RF
	Overflow Connection	Screwed $\frac{3}{8}$ " NPT		Screwed $\frac{1}{2}$ " NPT
	Make Up Water Inlet	Screwed $\frac{3}{8}$ " NPT		Screwed $\frac{1}{2}$ " NPT
	Tank Condensate Blow Connection	Screwed $\frac{1}{2}$ " NPT		Screwed $\frac{1}{2}$ " NPT
External Dimensions (Width \times Depth \times Height)	22 $\frac{13}{16}$ " \times 31 $\frac{1}{2}$ " \times 26 $\frac{3}{8}$ "		25 $\frac{9}{16}$ " \times 39 $\frac{3}{8}$ " \times 60"	
Weight	Approx. 176 lb		Approx. 700 lb	
Control Panel	Incorporated • Tank water temperature: Automatic adjustment • Steam temperature: Automatic control		Refer to standard control panel specifications	

* ASTM/AISI materials shown are equivalent materials

• Vacuum Steam & Heating Energy



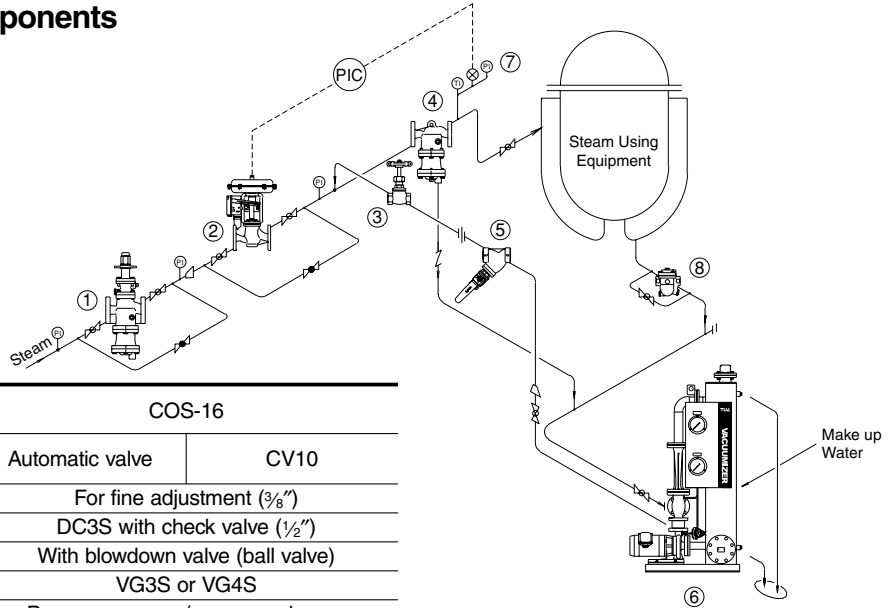
• Piping Example



* A steam trap & bypass line is required for the following cases:
 VM1HP: When set steam temperature is 140 °F or higher
 VM3HP: When set steam temperature is 203 °F or higher

Engineering Type

• Standard System Components



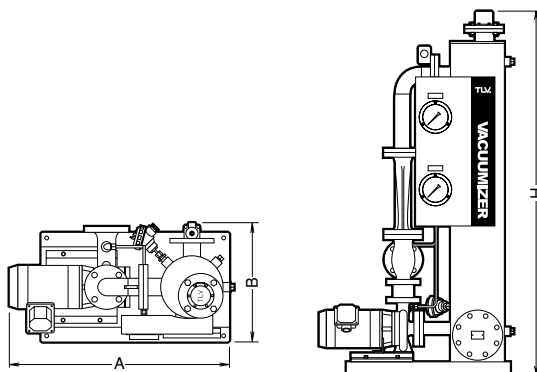
①	Pressure Control Valve	COS-16	
②	Vacuum Control Valve	Automatic valve	CV10
③	Steam Needle Valve	For fine adjustment (3/8")	
④	Desuperheating Unit	DC3S with check valve (1/2")	
⑤	Strainer	With blowdown valve (ball valve)	
⑥	Vacuum Generation Unit	VG3S or VG4S	
⑦	Instruments	Pressure sensor / compound gage	
⑧	Steam Trap*	JX series	
⑨	Control Panel	Refer to standard control panel specifications	

* Required when steam supply temperature is 203 °F or higher

• Vacuum Generation Unit Specifications

Model	VG3S	VG4S
Motor Power	1 hp	2 hp
Safety Specification (Motor & Other Electric Equipment)	Non-flameproof (Consult TLV for higher specification)	Non-flameproof (Consult TLV for higher specification)
Process Fluid	Air, Steam (Steam Condensate), Water	
Condensate Load	1300 lb/h	3300 lb/h
Exhaust Speed	6.36 scfm	12.71 scfm
Lowest Attainable Pressure	Saturation pressure of the motive water (at corresponding temperature)	
Connection:	Steam Condensate Inlet	2" ASME Class 150 RF
	Overflow Connection	3" ASME Class 150 RF
	Make Up Water Inlet	1/2" NPT
	Discharge Connection	3/4" NPT
	Tank Condensate Blow Connection	1/2"
Material	Stainless steel equivalent to AISI304	
Control	Tank water automatic priming Automatic control of tank water temperature	

• External Dimensions of Vacuum Generation Unit

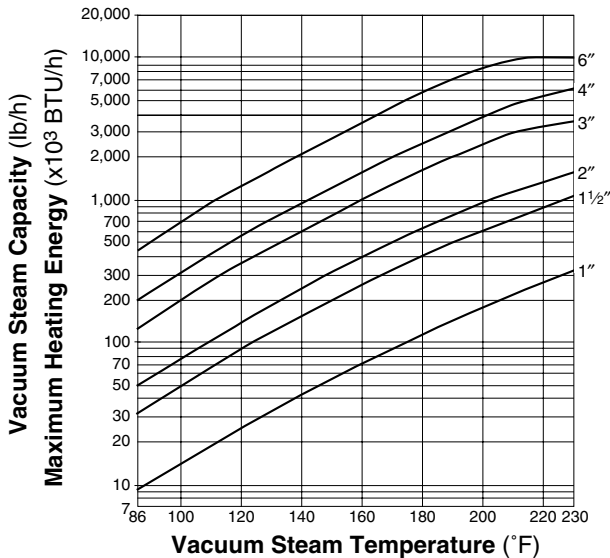


Model	Unit: inch			Weight (lb)
	A	B	H	
VG3S	30 3/4	15 3/4	57	285
VG4S	36	19 3/4	60	400

All dimensions are approximate

Engineering Type

• Vacuum Pressure Control Valve Size & Vacuum Steam Capacity



Select the size for the vacuum pressure reducing valve using the table left after determining the temperature of the steam used and maximum required heating energy.

• Options

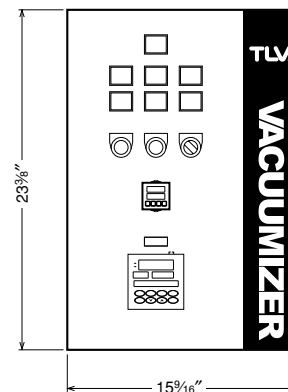
Material	Non stainless steel parts: Pump (cast iron), ejector (cast iron), others (carbon steel)
Discharge Valve for Condensate Recovery	<ul style="list-style-type: none"> • Detect the water level in the tank of the vacuum generation unit and pump condensate by opening and closing the discharge valve automatically • Discharge pressure: 18 psig • Maximum discharge capacity: VG3: 3300 lb/h, VG4: 6600 lb/h

Standard Control Panel (VM3HP & Engineering Type)

• Specifications

Basic Functions	<ul style="list-style-type: none"> • Tank water: Automatic priming • Tank water temperature: Automatic adjustment • Steam temperature: Automatic control
Selected Function	<ul style="list-style-type: none"> • Steam temperature remote setting (Programmed in memory or analog current setting) • On/Off: Contact signal input • On/Off/Overload: Relay control output
Power Supply Voltage	Motor: 230 V AC 3-phase Instrumentation: 115 V AC
Installation	Indoor wall mounted
Safety Specification	Non-flameproof (Consult TLV for higher specification)

• Dimensions



Note: Other non-standard specifications are available; contact TLV for details.

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Manufacturer

ISO 9001/ISO 14001

TLV CO., LTD.
 Kakogawa, Japan
 is approved by LRQA Ltd. to ISO 9001/14001

