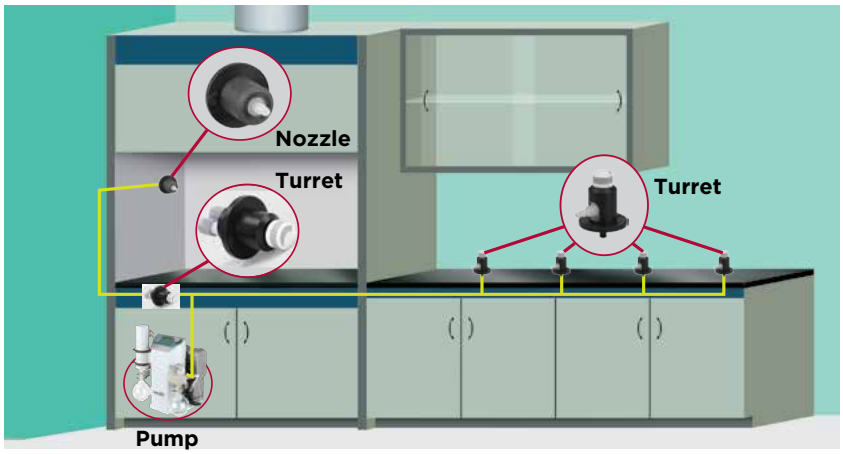
WelchNet™ | Modular Lab Vacuum Network



- **Quick & simple to install a modular lab vacuum network**
- **Resistant to chemical attack**
- **Provides stable vacuum**
- **Expands easily as needs change**

WelchNet provides built-in vacuum to benches and fume hoods. A WelchNet modular lab vacuum network consists of an oil-free pump, turrets, compression fittings and tubing and is economical & easy to install. The turrets are mounted on furniture, hoods or walls and are connected to the oil-free vacuum pump via tubing and compression fittings.

The modular network can be modified to tailor to a researcher's latest lab work and material flow needs. WelchNet can be installed within furniture during renovation of a lab, building a new lab facility, or added on to an existing laboratory. WelchNet has become a powerful new alternative to central vacuum for lab managers, architects and researchers.

WelchNet consists of three distinct vacuum source options depending on your needs and budget

Type I - Switch On/Off - Pump
A a cost effective pump option for a basic WelchNet vacuum system is either a chemical duty PTFE diaphragm vacuum pump or a standard duty WOB-L® vacuum pump. A catchpot in-line is always recomended. The pump chosen will depend on your application.

Using standard turrets, initial WelchNet costs are typically 30-50% lower than a contractor installed central vacuum system.

Type II - On-Demand - Pump System
WelchNet On-Demand LVS diaphragm pump system provide the perfect vacuum for multiple laboratory turrets.

The On-Demand Vacuum System only activates the pump when vacuum pressure is required. The system can be adjusted to vacuum level set point within control band to trigger pump activation.

Type III - Mobile Pump Bank
WelchNet Titan is a microprocessor controlled system of high capacity PTFE diaphragm vacuum pumps. The pumps work individually or in tandem holding vacuum level even if an individual pump needs maintenance.

One or more pumps in a Titan come on in response to vacuum demand, rotating usage to distribute pump wear and extend maintenance interval.

The Advantages of WelchNet Modular Vacuum Network to a Central/House Vacuum System

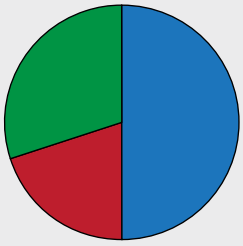
WelchNet Modular Network Vacuum	Central/House Vacuum
1. Flexible modular design is easily adapted as needs change	1. Commonly located in basement
2. Oil-free vacuum pump is an environmentally friendly solution	2. Pumps periodically need fluid change and disposal of hazardous fluid
3. Chemically resistant WelchNet turrets	3 Standard turret left open will lead to unstable vacuum for other users
4. Low capital outlay	4. Typically 50% more expense to purchase and install
5. Control cross-contamination between labs	5. Waste vapors spreading thru whole building plumbing
6. On-demand usage saves energy and money	6. Always-on wastes energy

4 Steps to Properly Size A Modular Vacuum Network[2]

Step 1

Identify the applications that you use built in vacuum in your laboratory.

From Welch's experience, the common applications using built-in vacuum sources are as follows:



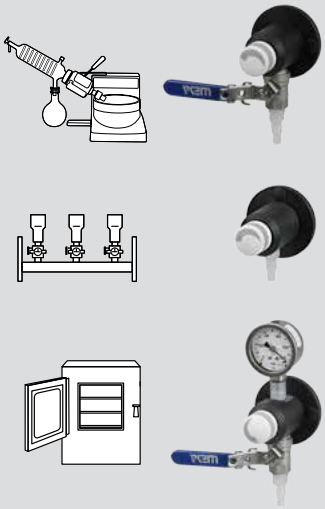
50% Rotary Evaporator

30% Filtration

20% Vacuum Oven, Aspiration, Desiccator

Step 2

Determine the number of turrets that you will need in your laboratory that properly supports the number of users and applications.



Step 3

Review the common rules of thumb for determining distance between applications and vacuum source using 8 mm ID PTFE tubing.

Rule of Thumb 1: For aspiration and filtration, the maximum distance recommended between farthest turret and the vacuum pump is 66 ft(20 m).

Rule of Thumb 2: If the vacuum level at application needs to below 10 torr(29.5 in Hg), the maximum distance from pump to the turret is 33 ft(10 m).

Rule of Thumb 3: The maximum distance from Mini-Vacuum Network to the vacuum pump is 33 ft(10 m).

Rule of Thumb 4: The maximum linear feet of 0.5 in. ID(13 mm) pvc or copper tubing is 200 ft(61 m); a flow rate factor of 1 lpm per 1 linear ft. of tubing is recommended.

Step 4

Select the type of turret that best suits your lab needs and budget.

Standard Lab Turret
- Plated Metal
- Non Regulated
- On/Off

VS

WelchNet Turret
- Chemically Resistant
- Fine Vacuum Regulation
- On/Off
- Check Valve to Prevent Cross Contamination

Note 2: Please contact your local representative for assistance in specifying a WelchNet system for your lab.

Model Selector | WelchNet

Application	Vacuum Pump Model		Type	Ultimate Vacuum Pressure of Application	Number of Turrets				
	Standard Duty Applications	Chemical Duty Applications			3 Turret Mini-Network	5 Turrets	8-10 Turrets[1]	20 Turrets[1]	30 Turrets[1]
Aspiration & Filtration	2546B-01 45 lpm	2037B-01 50 lpm	Type I	27.6 in. Hg (<60 torr)	✔	✔			
	2567B-50 100 lpm	2047B-01 70lpm	Type I				✔		
	2585B-50 201 lpm	2067B-01 221 lpm	Type I					✔	
	---	LVS 2410 E ef 283 lpm	Type II					✔	
	---	2634C-01 640 lpm	Type III						✔
Vacuum Oven, 0.6 ft³	2561B-50 66 lpm	2042B-01 35 lpm	Type I	29.5 in. Hg (<10 torr)	✔				
		2052B-01 65lpm	Type I			✔			
		LVS 310 Z en 41 lpm	Type II		✔				

Note 1: Assumes 50% of the turrets used at one time.

Application Note | Care and Feeding of Pump

WelchNet Pump
- In-house repair easily done in less than an hour
- Maintenance kits readily available, usually stocked by repair dept.
- Spare pump typically available to eliminate down-time
- Typically greater than one year maintenance interval

Central/House Vacuum Pump
- Periodically need to change oil and dispose of hazardous waste oil
- Repairs may take weeks on large pumps
- Difficult to access repair area
- Typically quarterly maintenance interval

Flush Mount

Surface Mount

- **Quick & easy to install**
- **Easily controls flow rate**
- **Chemically resistant**
- **Built-in check valve for stable vacuum**
- **Two mount options**

WelchNet turrets are designed for easy installation. A flush mount turret hides the vacuum tubing in the wall, bench or hood. A surface mount turret is commonly used when tubing cannot be installed behind a wall.

Vacuum provided by a WelchNet modular vacuum network is inherently more stable than a central vacuum system using standard lab turrets. The reason is the check valve within each WelchNet turret. The benefit of the check valve is it minimizes the risk of interference/cross contamination between applications when turrets are opened and closed.

All wetted surfaces of WelchNet turrets are made of chemically resistant materials. The turret body is black polypropylene. The check valve in the turret is made of perfluoroelastomer (FFKM) and the wetted flow regulator is made of polyvinylidene difluoride (PVDF).

Manual Vacuum Regulation Turret Flush Mount

700562/700562-01

- Open/close the vacuum line and easily control flow rate

Turret has stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Dimensions: 6.9 cm(2.7 in.) diameter, 8.2 cm(3.2 in.) protrusion from wall and 2 cm(0.8 in) into wall.

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Wood Furniture	PVDF compression fitting(not included)	700562
Sheet Metal Furniture	PVDF adapter, compression fitting to G3/8 male thread (not included)	700562-01

Manual Vacuum Regulation Turret Surface Mount

700532-15

- Open/close the vacuum line and easily control flow rate

Turret has stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Dimensions: 6.9 cm(2.7 in.) diameter, 8.2 cm(3.2 in.) protrusion from wall and 2 cm(0.8 in) into wall.

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Wall and Wood Furniture	PVDF compression fitting(included in turret assembly)	700532-15

On/Off with Manual Vacuum Regulation Turret , Flush Mount

700563

- Quick opening/closing via ball valve of vacuum line plus manual vacuum control
- Stainless steel On/Off ball valve allows easy repeat of flow rate setting

Connect PTFE 10 mm OD tubing to valve using a PVDF compression fitting. SS Ball Valve has stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Dimensions: 6.9 cm(2.7 in.) diameter, 8.2 cm(3.2 in.) protrusion from wall and 2 cm(0.8 in) into wall.

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Wood Furniture	PVDF compression fitting(not included)	700563
Sheet Metal Furniture	PVDF adapter, compression fitting to G3/8 male thread (not included)	700563-01

On/Off with Manual Vacuum Regulation Turret, Surface Mount

700535-15

- Quick opening/closing via ball valve of vacuum line plus manual vacuum control
- Stainless steel On/Off ball valve allows easy repeat of flow rate setting

SS Ball Valve has stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Dimensions: 6.9 cm(2.7 in.) diameter, 8.2 cm(3.2 in.) protrusion from wall and 2 cm(0.8 in) into wall.

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Wall and Wood Furniture	PVDF compression fitting(included in turret assembly)	700535-15

On/Off with Manual Vacuum Regulation Turret with Dial Gauge, Flush Mount

700566 700566-01

- Quick opening/closing via ball valve of vacuum line plus manual vacuum control and dial gauge
- On/Off ball valve allows easy repeat of flow rate setting

Connect PTFE 10 mm OD tubing to turret using a PVDF compression fitting. Stainless steel dial vacuum gauge 0-1000 mbar. SS Ball Valve has stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Dimensions: 6.9 cm(2.7 in.) diameter, 8.2 cm(3.2 in.) protrusion from wall and 2 cm(0.8 in) into wall.

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Wood Furniture	PVDF compression fitting(not included)	700566
Sheet Metal Furniture	PVDF adapter, compression fitting to G3/8 male thread (not included)	700566-01

On/Off with Manual Vacuum Regulation Turret with Dial Gauge, Surface Mount

700538-04

- Quick opening/closing via ball valve of vacuum line plus manual vacuum control
- Stainless steel On/Off ball valve allows easy repeat of flow rate setting

SS Ball Valve has stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Stainless Steel dial vacuum gauge 0-1000 mbar. Dimensions: 6.9 cm(2.7 in.) diameter, 8.2 cm(3.2 in.) protrusion from wall and 2 cm(0.8 in) into wall.

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Wall and Wood Furniture	PVDF compression fitting(included in turret assembly)	700538-04

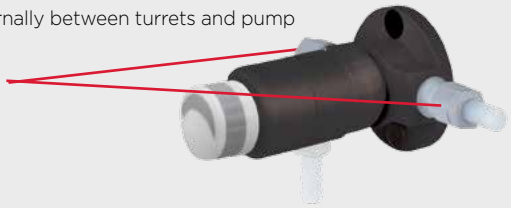
Comparison of Flush Mount Turret Versus Surface Mount Turret

Flush Mount Turret

- Drilled cut outs
- Tubing installed through cut-outs in furniture, wall or fume hood
- Tubing concealed

Surface Mount Turret

- Secure turret with screws
- Installed externally between turrets and pump
- Tubing visible



Fume Hood Turret and Nozzle

Two components are needed for control of vacuum on a fume hood. The manual flow-control turret (CAT. No. 700571) is mounted outside of the fume hood. The nozzle is mounted inside the fume hood.

Manual Flow Control Turret Flush Mount

700571

- Regulation of vacuum on the outside of fume hood

Turret easily mounts to outside wall of fume hood with 2 screws. Turret to be used in conjunction with nozzle (CAT No. 700561 or 700561-01). Dimensions: 69mm(2.7 in.) diameter, 67mm(2.6 in.) protrusion from wall (49mm(1.9 in) into fume hood wall).

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Fume Hood	Two PVDF compression fitting(included in turret assembly)	700571
	Kit including turret 700571 and nozzle 700561	700561-20
	Kit including turret 700571 and nozzle 700561-01	700561-21

Nozzle Flush Mount

700561/700561-01

- Nozzle normally located inside a fume hood with external vacuum control

Nozzle is connected via PTFE tubing to manual regulation turret(CAT. No. 700571). Comes with stepped hose barb that accepts 1/4 - 3/8 in. vacuum hose(DN8-10). Dimensions: 6.9cm(2.7 in.) diameter, 7.6cm(3 in.) protrusion from fume hood wall (20cm/0.8 in. into wall).

Use With	Connection Type For 10 mm OD PTFE Tubing	CAT. No.
Fume Hood	PVDF compression fitting(not included)	700561
Fume Hood	PVDF adapter, compression fitting to G3/8 male thread (not included)	700561-01

Mini-Vacuum Network

- Run up to three applications using a single pump
- Easy to mount on wall, fume hood, or lab frame
- Built-in check valves minimizes the risk of cross contamination
- Create six port network by connecting two mini-vacuum networks

700556

The mini-vacuum network is a space-saving and prefabricated, vacuum manifold with three turrets. The turrets are chemically-resistant and allow regulation of flow rate and also turn off/on.

The manifold containing the turrets is easily installed on a lab frame, wall, fume hood or lab furniture. The result is a mini-vacuum network ready to connect to a single vacuum source such as an oil-free chemical duty PTFE diaphragm pump/system or a Wob-l® vacuum pump. Use a high flow pump with two mini-vacuum networks to create a six valve network.

Each turret is equipped with a FFKM check valve. The check valve minimizes the risk of interference/cross contamination between applications when turrets are opened and closed. The mini-vacuum network is leak tight and can operate between 1 and 760 torr. Turrets have stepped hose barbs that accept 1/4- 3/8 in. ID vacuum hose(DN8-10). Hose barb on manifold accepts 1/4 in. ID(DN8) vacuum hose.
Dimensions: LxWxH: 13.8x2.5x3 in.(35x6.4x7.6 cm).

Use With	Description	CAT. No.
2042B-01, 2014B-01, 2044B-01, 2052B-01, 2561B-50, 2581B-50, 2546B-01, 2019B-01	Mini-Vacuum Network with Three turrets.	700556

Compression Fittings, PVDF

- Quick and easy connection of 10mm OD, 8mm ID PTFE vacuum tubing

829930

829983

829945-2

829984

Use With	Description	CAT. No.
10 mm OD PTFE tubing, 700562, 700563, 700566	Tee, 10-10-10	829930
	Elbow, 10-10	829983
	Union, 10-10	829945-2
700571	Elbow, 10-1/4	829984
700562, 700563-01, 700566-01	Straight adapter, 10-3/8 in	829931-3
	Elbow, adapter male 10-3/8 in	829984-2

PTFE Tubing

- Dimensions: 10mm OD & 8 mm ID with 1 mm wall
- Chemically resistant PTFE

828332-5

Type	Tube Size mm	Length, ft(m)	CAT No.
PTFE Tubing	10/8x1	16(5)	828332-5
		32(10)	828332-10
		82(25)	828332-25
		164(50)	828332-50

Tubing For Condenser

- PVC tubing to connect LVS exhaust condenser to tap water

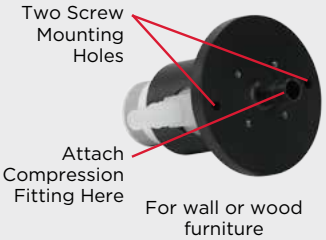
828346-5

Type	CAT. No.
Hose for potable water to condenser 14/8x3	828346-5

Connecting 10 mm OD PTFE Tubing to Flush Mount Turrets

Compression fittings made of PVDF are used to connect turrets to PTFE tubing to pump.

The vacuum network is vacuum tight to 2 mbar(1.5 torr/29.9 in. Hg)



VCB 521 Vacuum Controller

600053

600052-04/600052-05

- Quick and easy automated, digital vacuum setting and control
- Controls vacuum level, cooling water and venting

Controller available in table top version and flush mount for installation into furniture panel. The controller has integrated sensor to measure pressure from 1100-1 mbar (825 – 0.75 torr), display numerical & graphically the vacuum pressure, control vacuum level.

Model	Tubing Connection to Controller In	Tubing Connection to Controller To Pump	Dimensions in. (cm)	CAT. No
VCB 521 cv Table top	¼ in ID(DN8)	¼ in ID(DN8)	7.6x7x4.1 (20x14x11)	600053
VCB 521 Panel Mount	¼ in ID(DN8)	10 mm OD PTFE tubing	9.4x4.7 (24x12)	600052-04
VCB 521 Panel Mount	10 mm OD PTFE tubing	10 mm OD PTFE tubing	9.4x4.7 (24x12)	600052-05

Flush Mount VCB 521 Vacuum Controller with Pump Kit

LVS 610 T ef

- External control panel to monitor and control vacuum level, cooling water and venting
- Hardware needed to connect controller to LVS vacuum system

Kit including LVS vacuum system and flush mount controller. LVS system includes chemical duty diaphragm pump and capture solvent recovery system. Flush mount controller and LVS system is ready to be installed in lab furniture to remotely control the LVS providing vacuum for the WelchNet modular vacuum network.

LVS Model	LVS 310 Z ef	LVS 610 T ef	LVSF 1210 T ef	LVSF 2410 E ef
Free Air Displacement m^3/hr (lpm)	2.6(43)	4.9(81)	12.5(208)	19.5(325)
Ultimate Vacuum Pressure mbar(torr)	<8(6)	<1.5(1.1)	<2(1.5)	<75(56)
Ordering Information				
230V 50/60Hz 1Ph	115244-04	115254-04	116264-02	116274-02
115V 60H 1Ph	116047-11	115254-10	116264-03	116274-05

Peltier Cooling System

112043

- Compact cooling system
- Use to cool condenser on LVS to trap exhaust solvent vapors

Peltier cooling system used to cool the solvent vapors passing thru LVS exhaust condenser. More efficient than use of tap water since cooling systems operates at 7 to 10 °C. compared to warmer tap water. Only for use on exhaust condenser of LVS. Comes complete with connecting tubing to LVS condenser.

Compact cooling system fits under cup space. Saves on tap water usage and is maintenance free.

Type	Dim.(LxWxH) mm	Weight, kg	CAT. No.
KWR 3	350x145x230	5.3	112043

Cooling Water Solenoid Valve for LVS and VCB521

- 2 way water flow valve for the demand-responsive cooling water supply.
- Input: G 3/4 inch sleeve nut,
- output: hose nozzle for hose inside diameters 8 mm

Type	CAT. No.
WV 2 (24V), G3/4 in. - DN8	700300-02

Liquid Level Sensor

115522

- Non-contact sensor to shut down LVS when exhaust is full
- Sends signal to VCB 521 cont roller when liquid level is high and requires emptying

Use with	Volume of Catchpot	CAT. No.
All Models of LVS	500 ml	115522