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vacuum technologies

# **UPGRADE PROGRAM**

# V200 oil Series Pumps vs V301 Series Pumps

**Technical Memo** 

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# **Outline Drawing ISO100**



Replacement Suggested



Technical Table

|   | V200 ISO100       | V301 ISO100           |  |
|---|-------------------|-----------------------|--|
| Total height  | 273.50            | 174.0                 |  |
| Vent port height from bottom<br>Foreline port height fm. bottom | 193.50            | 85.0                  |  |
|   | 125.00            | 47.0                  |  |
| Vent thread/port  | KF10              | M8                    |  |
| Purge thread  | N.A.              | Std: M12              |  |
| Water fitting thread  | 2 riffled nozzles | 1/8G                  |  |
| Inlet flange  | ISO100            | ISO100                |  |
| Foreline Flange   | KF25              | KF16 (KF25 optional)* |  |
| Vent port position referring to<br>Foreline Flange              | 60°               | On the right 153°     |  |
| Purge port position referring to<br>Foreline Flange             | N.A.              | On the left<br>83°    |  |

\* the NW25 optional flange pn 9699130 must be offered with.

Technical Specification: Pumping Speed Curve: V200 ISO100



### V301 ISO100



# **Outline Drawing CF6**



Water Cooling 1/8 GAS

3.3 (66.0)

4.2 [10

Water Cooling

1/8 GAS

### Technical Table

|   | V200 CFF6"                          | V301 CFF6"            |  |
|---|-------------------------------------|-----------------------|--|
| Total height  | 273.50                              | 174.0                 |  |
| Vent port height from bottom                        | 193.50                              | 85.0                  |  |
| Foreline port height fm. bottom                     | eline port height fm. bottom 125.00 |                       |  |
| Vent thread/port                                    | KF10                                | M8                    |  |
| Purge thread  | N.A.                                | Std: M12              |  |
| Water fitting thread                                | 2 riffled nozzles                   | 1/8G                  |  |
| Inlet flange  | CFF6''                              | CFF6"                 |  |
| Foreline Flange                                     | KF25                                | KF16 (KF25 optional)* |  |
| Vent port position referring to<br>Foreline Flange  | 60°                                 | On the right 153°     |  |
| Purge port position referring to<br>Foreline Flange | N.A.                                | On the left<br>83°    |  |

 $\ast$  the optional NW25 foreline flange pn 9699130 must be offered with.

Technical Specification: Pumping Speed Curve

refer to pumping speed curves for ISO100

# **Technical Specification:**

|   | V200  | V301   |
|---|---|--|
| Connection nominal diameter<br>Inlet<br>Outlet        | ISO100<br>CFF6''<br>NW25KF  | ISO100<br>CFF6''<br>NW16KF (KF25 optional)*  |
| Pumping speed 1/s                                     |   |  |
| N2<br>He<br>H2  | 200<br>190<br>150   | 250<br>220<br>200  |
| Compression ration for<br>N2<br>He<br>H2              | 2x10e+8<br>1x10e+3<br>2x10e+2   | 7x10e+8<br>1x10e+5<br>1x10e+4  |
| Max Forevacuum pressure mbar<br>N2                    | N.A.  | 18   |
| Gas Throughput mbar.l/s<br>N2<br>He<br>H2             | No limit<br>No limit<br>No limit  | No limit<br>No limit<br>No limit   |
| Recommended baking pump<br>Diaphragm<br>Rotary<br>Dry | SD200   | DS402<br>Triscroll 300   |
| Ultimate pressure mbar<br>With rotary<br>With dry     | 1x10e-9   | <5x10e-10<br><5x10e-9  |
| Operating position                                    | Vertical (max slope 10°)  | Any  |
| Rotational speed                                      | 51000   | 56000  |
| Run up time min.                                      | 1   | 2.5  |
| Cooling   | Forced Air<br>Optional Water  | Forced Air<br>Optional water   |
| Coolant water   | flow: 20 l/h (0.09 GPM)<br>temperature:<br>+ $10^{\circ}$ C to + $25^{\circ}$ C<br>pressure: 2 to 4 bar | flow: 200 l/h (0.89 GPM)<br>temperature:<br>+ $10^{\circ}$ C to + $30^{\circ}$ C<br>pressure: 3 to 5 bar |
| Power consumption W                                   | 170   | 150  |
| Vibration level<br>(displacement)                     | <0.02 µm at inlet flange  | < 0.01 µm at inlet flange  |
| Noise level   | < 50 dB (A) at 1 meter  | 45 dB (A) at 1 meter   |
| Motor technology                                      | Asynchronus   | Asynchronous   |
| input   | 54 Vac, three phases, 850 Hz  | 75 Vac, three phase, 963 Hz  |
| Weight Kg   | 10.0  | 4.5  |

\*optional NW25 foreline flange has pn 9699130

## **Technical Advantages**

The major technical advantage of the V301 is the higher and newer technology of the turbo pump, the better vacuum performances, the presence of MacroTorr® stages that allow a higher foreline pressure.

The V301 is completely oil free for clean vacuum and consequently maintenance free, since it doesn't require any oil refill or pump cleaning.

The inlet flange has not changed, ISO100 or CFF6, as the existing V200 pump; the foreline flange of the V301 must be replaced with the optional KF25 (pn 9699130).

The water cooling fittings have changed; two water cooling kit are available (either 9699337 or 9699347); please contact our Tech.Support Office.

The controller is not compatible and must be exchanged. This is available in 2 versions, Navigator on board or AG Rack controller; in both cases, it's much more easier to see the pump operating parameters as current and power consumption.

#### Accessories:

- 1. The fan and the water cooling kits for the V200 are not compatible with the new V301 Pump, they must be replaced (please contact the Tech.Support Office).
- 2. The vent valve has changed and must be replaced.
- 3. Vent port has changed from KF10 to M8 thread; anyway an optional vent flange is available, pn 9699108.
- 4. Inlet screen has not changed (DN100 9699302)
- 5. Purge port is now available with M12 thread.
- 6. For controllers, please refer to following section.

## **Controller comparison**

V200 controllers 9699422-9699522 are not able to operate the V301 pump, it must be exchanged. This is available in 2 versions, either ¼ AG Rack V301 pn 9698991-9698992-9698993 or Navigator on board pn 9698973.

### V301 AG Rack controller

Varian offers also the possibility to have a <sup>1</sup>/<sub>4</sub> Rack AG (Active Gauge) controller that is very innovative from the operational point of view, and with increased control and communication capabilities.

The new rack controller is micro-processor-controlled, solid-state, frequency converter with selfdiagnostic and self-protection features.

The most important features are:

- ➢ Front/remote/serial operation,
- > 24Vdc pump fan cooling drive,
- > Vent valve drive (valve delay and opening time are adjustable),

Pump speed reading after stop command (allows monitoring of pump slow down time after the stop command during the venting phase),

Regenerative braking (most effective pump deceleration without heat generation at the motor level),

- > Pressure reading through Varian EyeSys Mini-IMG Gauge,
- Input voltage auto setting,
- > Remote I/O compatible with previous version,
- > Navigator default serial compatible with the previous RS232 and RS485 version,
- Profibus interface (optional).

The controller is available in three models: base version (pn 9698991), with RS232-485 option (pn 9698992), with Profibus option (pn 9698993).

If the customer was using the remote I/O devices on the old V200 controller, this interface can still be used thanks to the adapter box pn 9699859 (Contact Technical Support)

#### V301 Navigator on board controller

The V301 Navigator on board controller is more compact than any other controller; furthermore, it can be easily installed and disinstalled from the pump; it can be either mounted on the bottom or on the side of the turbo pump using the dedicated bracket.; it offers as std both serial communication options, RS232 and RS485; it offers the communication via Navigator Software (Contact Technical Support), for parameters setting and downloading through a PC.

The V301 Navigator on board controller offers more features in the I/O signals if compared to the previous V200 controller, it's easy to use with the new concept plug-and-pump.





### Outline V301 AG rack controller:



V301 Navigator on board:



Interconnection schematic:

|  | V200                                  | V301 AG rack                       |  |
|--|---------------------------------------|------------------------------------|--|
|  | On P21                                | J7 – J6                            |  |
| Accessories and Option interconnections (forepump, vent valve, fan, etc) | 1b-3a, 3b-3a, 2b-2a<br>120 Vac, 0.4 A | J7: 24 Vdc vent<br>J6: 24 Vdc, fan |  |
| -  | On P22                                | On P1                              |  |
| Remote START   | 14-5                                  | 1-6                                |  |
| Remote LOW SPEED   | 12-4                                  | 2-7                                |  |
| Interlock  | 13-5                                  | 3-8                                |  |
| System override  | N.A.                                  | 4-9                                |  |
| SOFT START   | N.A.                                  | 5-9                                |  |
| -  |                                       | On P2                              |  |
| Analog output voltage  | 15-8<br>(0.1 Vdc proportional to 4A)  | 1-2<br>(1 Vdc proportional to 1A)  |  |
| R1 signal  | N.A.                                  | 4-11                               |  |
| LOW SPEED signal   | 7-6 (5 Vdc)                           | 5-12 (24Vdc)                       |  |
| Remote START signal  | 1-9 (5 Vdc)                           | 6-13 (24 Vdc)                      |  |
| FAULT signal   | 2-10 (N.O. contact)                   | 8-15 (24Vdc)                       |  |
| Remote NORMAL SPEED  | 11-3 (open collector transistor)      | 1-9 (frequency analog signal)      |  |
| R1   | N.A.                                  | 4-11 (24 Vdc)                      |  |
| R2   | N.A.                                  | 7-14 (24 Vdc)                      |  |

## NOTE:

Was the customer using the remote signals on old V200 controller, these signals must be converted to the Remote I/O signals available on V301 AG rack controller.

| 1  | START/STOP (+)                   | IN  |
|----|----------------------------------|-----|
| 2  | START/STOP (-)                   | IN  |
| 3  | INTERLOCK (+)                    | IN  |
| 4  | INTERLOCK (-)                    | IN  |
| 5  | SPEED SETTING (+)                | IN  |
| 6  | SPEED SETTING (-)                | IN  |
| 7  | SOFT START(+)                    | IN  |
| 8  | SOFT START(-)                    | IN  |
| 9  | + 24 Vdc                         | OUT |
| 10 | SPARE                            | OUT |
| 11 | PROGRAMMABLE SET POINT           | OUT |
| 12 | SPARE                            | OUT |
| 13 | FAULT                            | OUT |
| 14 | PROGRAMMABLE ANALOG SIGNAL (+)   | OUT |
| 15 | • GROUND                         | OUT |
|    | • PROGRAMMABLE ANALOG SIGNAL (-) |     |

On V301 Navigator on board controller all signals are available on the same connector J5:

No adapter box is available from existing I/O devices to the navigator ones.

For signal complete description, please refer to instruction manual.

Main cable must be specified (9699957 EU plug; 9699958 US plug); controller-to-pump cable is supplied.