



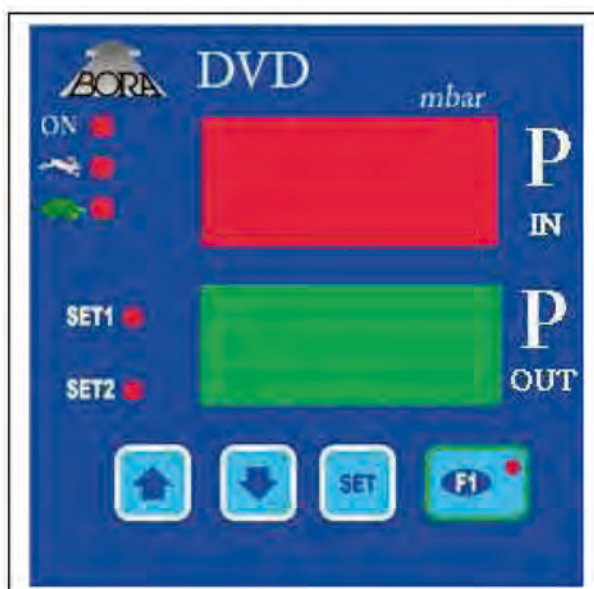
pompetravaini-BORA



DVD₂

DVD₂ START



At the start up the DVD₂ instrument makes a preliminary test and shows the memorised release of the firmware. During this step, the consistency of program and settings are tested. In case of inconsistency, configuration and tune up page is open. F1 LED and the three top left LEDs are ON. DVD₂ calibration can only be done by BORA-PT personnel.





DVD₂ OPERATOR INTERFACE

When the DVD₂ is running, displays indicate values; while LEDs show how the system works. F1 led is blinking, by pressing up down Keys, it is possible to recall on displays the following parameters:

- sensors pressure reading. The 2 green LEDs are OFF. Upper display indicates P IN sensor pressure, bottom display indicates P OUT sensor pressure. When pressure exceed 999 mbar the bottom display is blinking showing only the last 3 digits.
- Output signal sent to inverter: The upper display shows "out", green LEDs are on. The lower display indicates the percentage of inverter max frequency sent to inverter. The indicated value range is 0 (inverter at 0 Hz) to 100 (Inverter at maximum programmed frequency).
- 4 digit version shows pressure converted into Torr measure unit and a "t" letter appears. Instrument accuracy remains ± 1 mbar; for pressure lower than 100 Torr it is shown one decimal digit due to conversion $1 \text{ mbar} = .75 \text{ Torr}$

The red LEDs “ON”, “  “ “  ”, are indicating:

- a) ON Led:
 - OFF: Inverter not activated
 - ON: Inverter activated
- b) Led  :
 - OFF: Inverter not activated
 - ON: Inverter accelerating
 - Blinking: Inverter on highest frequency
- c) Led  :
 - OFF: Inverter not activated
 - ON: Inverter decelerating
 - Blinking: Inverter at lowest frequency

By simultaneously pushing the F1 and SET Keys, the DVD enters the operative parameters programming area.

Holding the F1 Key for 5 seconds it drives activation/deactivation of inverter.

CONFIGURING DRIVE PARAMETERS

By simultaneously pushing F1 and SET Keys, the DVD2 enters the operative parameters programming area. The upper display is flashing indicating the parameter name. By pressing the Up and Down keys, it is possible to scroll all the available parameters. Once the parameter to be modified is flashing on upper display, press the SET key to modify it. Once SET is pressed, the parameter name on upper display stops flashing; while value on lower display starts flashing. By pressing the UP or DOWN keys, it is now possible to increase or decrease the flashing value. When the right value is selected, press SET for confirming the new value. Once the input of new settings has been completed, press F1 and SET Keys simultaneously to exit the programming area.

Parameters that can be programmed are:

LPO: This is the target pressure. It is the P IN value that the booster has to reach and maintain. If the value 0 is input, the booster will try to reach the minimum absolute pressure possible (or highest vacuum possible).

Default : 0 - Domain: 0 / 800

LPT: Changes the behaviour of the system adding a “dynamic” target pressure to be reached. It is the **programmed Time (in UTR units)** that the system takes to move from parameter LPO to LPF in a linear slope. For instance, if LPO is 5 (mbar), LPT 10 (UTR 60 = 1min) and LPF 15 (mbar), the system will increase each minute the target pressure by 1 mbar ((15-5)/10). If the set value is 0, this parameter is disabled. **Default : 0 - Domain: 0 / 999**

UTR: time units (seconds) for LPT calculation. **Default : 60 - Domain: 1 / 60**

LPF: See the previous parameter LPT. Please note that LPF may be higher or lower than LPO; in the first case each minute the target pressure will increase while in the former it will decrease.

Default : 0 - Domain: 0 / 800

SPI: Pressure start point – absolute mbar. When P OUT is smaller, for at least 2 seconds, than the set value, the DVD2 starts controlling the inverter. When P OUT is larger than the “set value + DPI value”, or 850 abs mbar, for at least 1 second, the DVD2 disables the frequency converter

Default : 600 - Domain: 5 / 800

OPT: Optimization, When P OUT is below 2 mbar for at least 5 seconds (continuously), and LPO = 0, DVD2 sends to inverter the percentage of maximum frequency that has been set. If the set value is 100, this parameter is disabled.

Default : 100 - Domain: 65 / 100

OFI : Offset P IN sensor **Default : 0 Domain: – 5 / + 5**

OFO : Offset P OUT sensor **Default : 0 Domain: – 5 / + 5**

These are offsets to be added to sensors readings (in mbar) in order to compensate spawn errors.

AU1 when there is an Auxiliary device it is the Pout pressure threshold under which it is given (taken away) actuation. **Default : 0 - Domain: 0 / 1000**

AU2 when there is an Auxiliary device it is the Pout pressure threshold above which it is taken away (given) actuation. If AU2 = 0 the function is excluded – Between AU1 and AU2 there is the hysteresis band. **Default : 0 - Domain: 0 / 1000**

NOD : (optional) RS485 network node number

PIS: Preset limited speed. **Default : 0 Domain: 0 / 100**

Two options - the alarm contact is used: a) to actuate emergency stop b) to force a limited speed. Value = 0 enables the normal functioning with emergency stop capability.

If value is between 1 and 100, whenever the normally opened contact is closed, the DVD2 makes the system run at the pre-set speed, if it is lower than the speed calculated by DVD2

The value between 1 and 100 indicates the percentage of the Max frequency programmed into the frequency converter. The end of limited speed period starts LPT timer (if enabled)

PUD : Password request. Once the password is entered, it is possible to visualise and modify the following parameters: (* / ● / ●●). **Domain: 0 / 999**

* **PST:** preset - is activated from **PUD = 33** This allows selection and input one of the memorised presets among the ones available. A Preset is a combination of parameter values specifically studied for an application.

Available Application Presets are:

0 Reset to ALL Default Parameters

1 Liquid Ring – LRVP application – Long cycle solvent stripping.

2 High Vacuum – Vessel discharge, optimisation of final vacuum.

3 Autoclave – Process time optimisation.

4 Pasta Production – Precise evaporation vacuum level control

5 Safe – High inlet gas temperature and/or instable process conditions

6 Stable – Stable running slower adjustment reaction to changes

7 Fast - Fast adjustment reaction to changes

8 Dual Target - dynamic vacuum target between two sets

9 X -

10 X -

DVD2 ERROR CODES

When there are problems and failures that put the DVD2 in ALARM condition, the inverter control is deactivated. During this ALARM condition, all LEDs are OFF and displays are flashing. Upper display shows "Err" message. The lower display shows error type.

"ERR SED": This indicates that it is not possible to read pressure from sensor(s). Analog current received from sensor is smaller than 0,5 mA; meaning it is disconnected or defective.

"ERR LOG": Analogic to digital converter failure. DVD2 requires service

"ERR ESP": Emergency STOP Button Pushed. To activate such function on DVD2, a Normally Open switch on the emergency button must be connected to the digital inlet connection number 1 of the DVD2.

"ERR IAL": Inverter Error. To activate such function on DVD2, a Normally Open switch from the inverter alarm has to be connected on digital input 2 of DVD2.

To reset the error condition, press the F1 and UP keys simultaneously. Throughout the Error duration, the K2 relays of DVD2 are activated. This relays has a Normally Open contact which allows connection to an audio or visual ALARM.

FREQUENCY CONVERTER CONFIGURATION

The DVD2 is able to drive any inverters through the standard interface Start / Stop and the emission of an analog voltage 0..5 or 0..10 V CC reference signal for the frequency.

The main criteria we suggest for the inverter setting as follows:

1. Set the electrical motor plate values of the motor to be driven, the over-current value, and thermal protection value of motor.
2. Set the signal of START FORWARD / STOP that will be piloted by the K1 relay of the DVD2 (it is supplied with a normally open or normally closed switch).
3. Set the maximum running frequency from the inverter to the motor being driven.
4. Set the voltage of the analog signal for the reference of frequency (the DVD2 is supplied with double exit 0..5 and 0..10 V CC., both synchronous).
5. Set the maximum frequency emitted by the inverter in correspondence of the maximum analog reference signal (It MUST match the selected exit between 0..5 and 0..10 V CC).
6. Set the acceleration and deceleration ramps of the inverter, to a reasonably low level (indicatively 10 Hz/second). The ramps are managed by the DVD2.
7. Set the alarm signal, on clean contact Normally Open of the terminal block of the inverter. If connected to the digital entry number 2 of the DVD2, the instruments will be able to detect the alarm condition and respond accordingly.

SCHEMA ELETTRICO BORA DVD₂

BORA DVD₂ WIRING DIAGRAM

