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CUSTOMER SERVICE

Contact information

DEKKER VACUUM TECHNOLOGIES, INC.
935 SOUTH WOODLAND AVENUE, MICHIGAN CITY, IN 46360-5672
Bus. Hours: 7:30 a.m. – 4:30 p.m. CST
Website: www.DEKKERVacuum.com

Order Information
When calling for service, parts or system information always have the pump or system model number and serial number(s) ready. Refer to the bill of lading, the gold-colored system information plate attached to the system (see image below), or the white label on the inner door of the control panel (see image below).

Gold-colored system information plate

Control panel nameplate label

Parts should be purchased from the nearest authorized DEKKER Vacuum Technologies, Inc. (hereafter referred to as DEKKER) representative (visit www.dekkervacuum.com to find a distributor near you via the Distributor Locator) or from the vacuum pump system supplier. If, for any reason parts, cannot be obtained in this manner, contact the factory directly.
INTRODUCTION

The ControlDEK PLC is a combination PLC and HMI mounted on the door of the panel. The ControlDEK panel may include expansion I/O which is located inside the panel on the backplane. The standard ControlDEK panel is designed for a Simplex system, but can be easily expanded. A Duplex system would have two ControlDEK panels; a Triplex System would have three ControlDEK panels.

The screen displays can be broken down into four categories: 1) process screen, 2) menu screens, 3) system screens, and 4) setup screens. Each group is described separately, below.

THE PROCESS SCREEN

The Process Screen provides an overview of the unit operation as a whole. The process screen also displays a number of important process variables.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System Vacuum Level</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Circulation Pump Pressure (if equipped)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Oil (Seal Fluid) Temperature</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Filter Backpressure</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Minimum Run Timer</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Total Run Time</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Vacuum Setpoint (VFD only)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Hand/Auto Switch Status</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Temperature Status</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Backpressure Status</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Lead/Lag Status</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Fluid Level Status (if equipped)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Motor Starter Status</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Menu Soft Button</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Hand/Auto Button</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Start Button</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Stop Button</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Reset Button</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>ESC Button</td>
<td></td>
</tr>
</tbody>
</table>

The system vacuum level (1) is featured prominently on this screen along with Circulation Pump Pressure (if equipped) (2), Oil Temperature (3), Filter Backpressure (4), Minimum Run Timer (5), and Total Run Time (6). If equipped with a VFD, the Vacuum Setpoint (7) for the VFD is also displayed. The vacuum setpoint can be changed by touching the setpoint numeric value, which will bring up an editor screen.
Quick Status/Alarm Indicators
Along the bottom of the process screen are six status and alarm indicators. These indicators provide an at-a-glance view of system status. For each indicator, normal status is displayed in green; warning status is displayed in yellow; and fault status is displayed in red.

Hand/Auto Switch Status Indicator
The top-left status indicator is the Hand/Auto Switch indicator (8). It indicates whether the panel is set to Hand or Auto. Pressing the HAND/AUTO button (15) will change this status indicator. Hand mode is displayed in orange; Auto mode is displayed in green.

Temperature Status Indicator
The top-middle status indicator is the Seal Fluid Temperature Status indicator (9). This indicator displays temperature status measured by the RTD. The temperature status is based on the setpoints within the setpoints menu. This indicator displays a High Temperature in yellow for Warning; and a High Temperature in red for a Fault.

Backpressure Status Indicator
The top-right status indicator is the Backpressure Status indicator (10). This indicator displays backpressure status as measured by a transducer. The backpressure status is based on the setpoints within the setpoints menu. This indicator displays a Backpressure High in yellow for a Warning; and a Backpressure High in red for a Fault.

Lead/Lag Status Indicator
The bottom-left status indicator is the Lead/Lag Status indicator (11). This indicator displays the lead/lag status for a multiplex system. A simplex machine will show Lead status when placed in auto mode. Lead, 1st Lag, and 2nd Lag are displayed in green. In addition, this indicator will display Hand in orange if the machine is in Hand mode, and Fault in red if the machine is in Fault mode.

Fluid Level Status Indicator
The bottom-middle status indicator is the Fluid Level Status indicator (12). This indicator displays the fluid level status based on level switch inputs. If the Low Level Switch opens, the indicator displays Low Level Fault in red. If the High Level Switch opens, the indicator displays High Level Fault in red. If neither switch is equipped, the indicator will always display Fluid Level Normal in green.

Motor Starter Status Indicator
The bottom-right status indicator is the Motor Starter Status indicator (13). This indicator displays faults related to the motor starter. The motor starter statuses are as follows:

- Status Normal – There are no motor faults and the unit has not been started.
- No Contact – The motor contactor has been sent a start command, but has not been started.
- Motor Overload – The Motor Overload has tripped.
- VFD Fault – A fault has occurred on the VFD.
- VFD Failed to Start – The VFD has been sent a start command, but has not started.
- Running – The Motor is running.
- Standby – The controller is set to Auto mode, but there is not demand for vacuum.
- Circ Pump Overload – The Circulation Pump Motor Overload has tripped.
- Fan Overload – The Fan Motor Overload has tripped.
- Soft Start Fault – A fault has occurred on the Soft Starter.
- Soft Start Fail to Run – The Soft Starter has been sent a start command, but has not started.
THE MENU SCREENS

There are two menu screens: 1) System Menu and 2) Setup Menu. The System Menu contains navigation buttons to the various process and alarm screens, while the Setup Menu contains navigation buttons to the setting screens.

The ESC button (19) on any screen will take the operator back to the process screen. Pressing “<--” will return the operator to the previous screen. The operator may switch between the two menu screens using the System Menu and Setup Menu navigation buttons on the menu screens.

Note: Menu options may vary depending on system options installed.

THE SYSTEM SCREENS

The system screens are used to view various settings and parameters of the unit. There are up to six screens, each used to view a different aspect of the unit.

Process Data

The Process Data button brings the operator back to the Process Screen. The Process Screen is described in detail on page 5 of this manual.

Network Data

The ControlDEK panels have been designed as expandable simplex systems. This means that panels can be networked together via CANbus (Controller Area Network ) to expand to duplex or triplex system.

The Network Data screen displays a simple status of all ControlDEK controllers connected via the CANbus network. On a simplex system, Skid 2 and Skid 3 will display as Not Detected.
Analog Trends/Historical Trends
The Analog Trends and Historical Trends screens both display the vacuum setpoint, vacuum level, backpressure, and seal temperature. An operator can press the G or M button to switch between the data gathering and data browsing modes. In the browsing mode, the operator can use the Forward (>>) and Backward (<<) buttons to scroll through the data in the PLC buffer.

The PLC buffer is not large enough to store weeks or months of trend data, however, the PLC features historical trending where the data is written to an onboard SD card.

Alarms
The Alarm screen can be called into view via the System Menu screen.

The count value indicates how many alarms are active. To see a listing of the alarms for a group, press the magnifying glass symbol on the group banner. This will bring up the Alarms in Group screen.

The Alarms in Group screen will list the individual alarms for the group. Each alarm is listed with an ID, Time On (time the alarm occurred), Ack (alarm acknowledgement), and Alarm Name. The magnifying glass symbol on an alarm banner will open the Alarm Details screen, which provides details for an individual alarm.
The Alarm Details screen shows all information about the chosen alarm. The Group, Group Name, ID, Alarm Name, Timestamp, Count, Active State and Alarm Description are shown. There is also an Acknowledge button at the bottom of the screen.

If multiple alarms exist, a set of navigation buttons are displayed allowing the operator to scroll between alarms.

VFD Data (if equipped)
In systems that include a Variable Frequency Drive, the VFD Data screen is available. The VFD data screen shows various parameters gathered from the Drive. The parameters are VFD Run Status, VFD setpoint, Last Fault Code, Torque, Frequency, Speed, Current, Power, Bus Voltage, and Output Voltage.

**VFD Run Status**
VFD Run Status displays the run status of the Drive. The available statuses are VFD Off, VFD Running, VFD Fault, Standby, or Hand.

**VFD Setpoint**
Rather than running off of Lead and Lag setpoints, the VFD systems target a specific setpoint. The VFD speed will be adjusted based on the relation between the actual vacuum level and the VFD setpoint.

**Last Fault Code**
This is the last code communicated by the VFD. This fault code can help with troubleshooting if the VFD is faulted. On its own the fault code does not present any concerns.

**Torque**
The torque load of the motor measured in percent (%).

**Frequency**
The current speed of the motor measured in Hertz (Hz).

**Speed**
The current speed of the motor in rotations per minute (rpm).

**Current**
The current in amps (A) being drawn by the motor.

**Power**
The current power consumption of the motor in horsepower (HP).

**Bus Voltage**
The voltage of the drive’s DC Voltage bus (V).

**Output Voltage**
The output voltage of the drive. This is the effective input voltage to the motor (V).
THE SETUP SCREENS

The setup screens are used to configure the vacuum system to run as needed in the customer facility. There are a maximum of seven screens, each used to define a different aspect of system performance.

Process Setpoints
This screen allows the process parameters to be set. Depending on the installed equipment, some of these settings may not be available.

The warning is solely to alert operators of a potential fault condition. A warning will not shut down the unit.

An alarm is a shutdown event. If an alarm condition occurs, the cause of the alarm should be investigated before the alarm is cleared and the unit restarted.

### Process Setpoints

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backpressure Warning Setpoint</td>
<td>5.0 psig</td>
</tr>
<tr>
<td>Oil Temperature Warning Setpoint</td>
<td>210.0 °F</td>
</tr>
<tr>
<td>Fan Control Off Setpoint</td>
<td>80.0 °F</td>
</tr>
</tbody>
</table>

---

Scavenger Settings (if equipped)
This screen allows setting the parameters for operation of a scavenger solenoids.

### Scavenger Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Setpoint</td>
<td>29.9 inHg</td>
</tr>
<tr>
<td>Scavenger Off (minutes)</td>
<td>16</td>
</tr>
<tr>
<td>Scavenger On (seconds)</td>
<td>30</td>
</tr>
</tbody>
</table>

---

Multiplex Vacuum Setpoints (Lead/Lag)
This screen displays the vacuum setpoints for adding and dropping pumps in response to vacuum demand. If the installed system is Simplex, only the Lead Pump values are needed.

When the system vacuum falls below the Lead Pump On level, the lead pump will come on. The lead pump remains running until the system vacuum reaches the Lead Pump Off setpoint, (assuming the pump has been running for ten minutes). The Lag 1 and Lag 2 setpoints are the same as the lead setpoints, only set at a shallower vacuum level than the lead pump.

If the system vacuum is below the Lag 2 Pump On setpoint, all three pumps will start. Each pump will be turned off when its respective Pump Off setpoint has been reached, (assuming the pump has been running for ten minutes).

**NOTE: The vacuum Pump Off setpoints must be below the maximum vacuum that the system can achieve. If not, pump(s) may remain running and never stop.**

### Multiplex Vacuum Setpoints

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead Pump On</td>
<td>21.5 inHg</td>
</tr>
<tr>
<td>Lead Pump Off</td>
<td>23.5 inHg</td>
</tr>
<tr>
<td>Lag 1 Pump On</td>
<td>21.0 inHg</td>
</tr>
<tr>
<td>Lag 1 Pump Off</td>
<td>23.0 inHg</td>
</tr>
<tr>
<td>Lag 2 Pump On</td>
<td>20.5 inHg</td>
</tr>
<tr>
<td>Lag 2 Pump Off</td>
<td>22.5 inHg</td>
</tr>
</tbody>
</table>

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**Vacuum Adjustment**

The Vacuum Adjustment screen allows the operator to adjust the system vacuum. The vacuum adjust value will be subtracted from the system vacuum as measured by the PLC. If the PLC is reading a vacuum level of 18.7” Hg, a value of 2” HgV on the Vacuum Adjust screen would change the PLC reading to 16.7” Hg.

**Customer Modbus Settings**

The Customer Modbus screen allows the operator to adjust the PLC Modbus settings. The Modbus settings screen is always available whether or not Modbus is actually available.

**Set PLC Real Time Clock**

The Time and Date screen serves two functions. The first is to allow the operator to set the PLC real time clock date and time. The second is to sync the time across all networked controllers.

**Pump Rotation Schedule**

The Pump Rotation Schedule screen allows the operator to set the pump rotation. A pump rotation will occur at the selected time on the selected days. The time is entered as 24 hour time. In addition, this screen shows at a glance Lead/Lag status of the specific pump.

**NOTE:** Rotation is based on Run Hours. If Run Hours are already balanced, rotation will not occur.
Skid ID (Multiplex System)
The Multiplex Addressing screen allows the operator to set the ID of each pump for multiplex operation. From the factory, all simplex pumps are set to an ID of 1. If two simplex machines are connected as a duplex, one of the pumps will need to be changed to an ID of 2.

**NOTE:** If two pumps share the same Skid ID multiplex operation will not function properly.

PID Loop Tuning (if VFD equipped)
This PID Loop Tuning screen is an adjustment for the PID control of the VFD. In order to optimize the VFD control for the customer facility, these settings can be adjusted. After setting the new values, press APPLY to apply the new settings. For most installations, these settings should typically not need adjustment.

Data Logging (.csv)
Each ControlDEK PLC includes a MicroSD card. The software is set to log data to a CSV file on the included MicroSD card. The Data Log for the ControlDEK PLC writes a line of data at a user set interval and for any alarms or warning events.

Adjustable Values
A numeric keypad will be displayed when an adjustable value is pressed. The Esc button will close the editor without accepting an entered value. The arrow keys will reposition the cursor to allow entry at a particular location. Pressing the enter key after entering a valid value will close the editor and update the HMI field and associated PLC register.

Several fields have limits that prevent entry of values that are outside of a valid range. If an invalid value is entered, the editor will not close and the display will revert to the previous value.
MULTIPLEX SYSTEMS

The ControlDEK controller is designed for expandable vacuum systems. A Duplex system would include two ControlDEK panels, and a Triplex system would include three ControlDEK panels.

Multiplex Wiring

In order to multiplex ControlDEK panels, certain considerations need to be made. Each ControlDEK panel would require its own power feed, and wiring would need to be added in between panels. The ControlDEK controllers communicate with each other using a CANbus network. The CANbus terminals are labeled as “H”, “L”, “V+”, “V-”, and “SH”. These terminals must be connected together for each panel as per the following diagram.

Controller Multiplex Setup

When operating as a Duplex or Triplex system, the ControlDEK requires an ID to be assigned to each pump controller. Within the setup menu select the Multiplex Addressing menu. Each pump controller requires a unique ID. Pump 1 should be set to an ID of 1, Pump 2 should be set to an ID of 2, and Pump 3 should be set to an ID of 3.