DEKKER
VACUUM TECHNOLOGIES, INC.

Operation Manual

controlDEK 2

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controlDEK 2

OPERATION MANUAL

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CUSTOMER SERVICE

Contact information

DEKKER
VACUUM TECHNOLOGIES, INC.

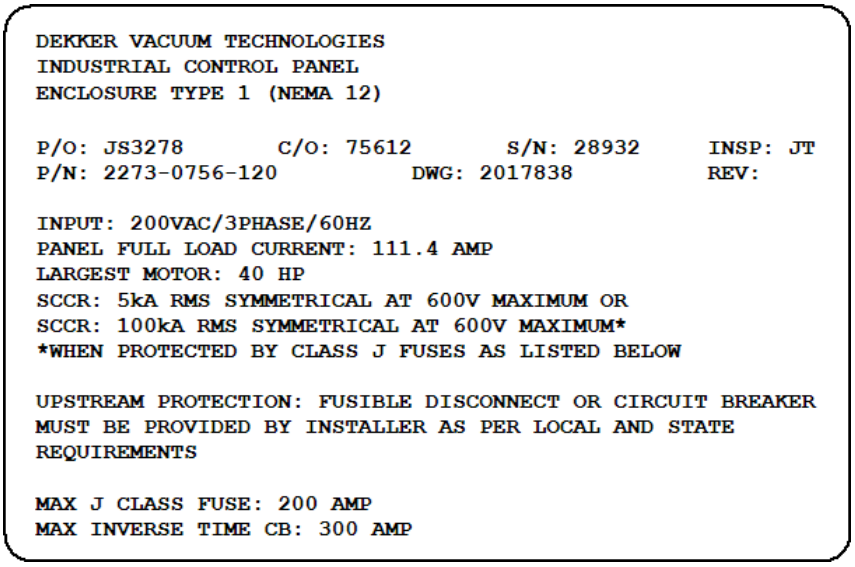
935 SOUTH WOODLAND AVENUE, MICHIGAN CITY, IN 46360-5672

TEL.: 219-861-0661 – FAX: 219-861-0662 – TOLL-FREE: 888-925-5444

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 or the gold-colored system information plate attached to the system (see image below).



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 up to nine systems.

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.



1	System Vacuum Level
2	Circulation Pump Pressure (if equipped)
3	Oil (Seal Fluid) Temperature
4	Filter Backpressure
5	Minimum Run Timer
6	Total Run Time
7	Vacuum Setpoint (if equipped)
8	Hand/Auto Switch Status
9	Seal Fluid Temperature Status
10	Backpressure Status
11	Lead/Lag Status
12	Fluid Level Status (if equipped)
13	System Status
14	Menu Button
15	Hand/Auto Button
16	Start Button
17	Stop Button
18	Reset Button
19	ESC Button

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 adjustable Vacuum Setpoint (7) for the VFD is also displayed.

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 simply 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 yellow; 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 process setpoints screen. 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 process setpoints screen. 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 position for a multiplex system, Hand if the machine is in Hand mode, Fault if the machine is faulted, and Offline if the Skid ID is set to 0 (Simplex setup).

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 be grayed out.

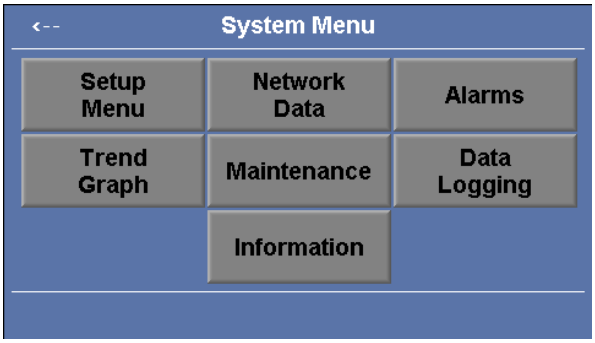
System Status Indicator
The bottom-right status indicator is the System Status indicator (13). This indicator displays the current state of the system. Possible messages are:

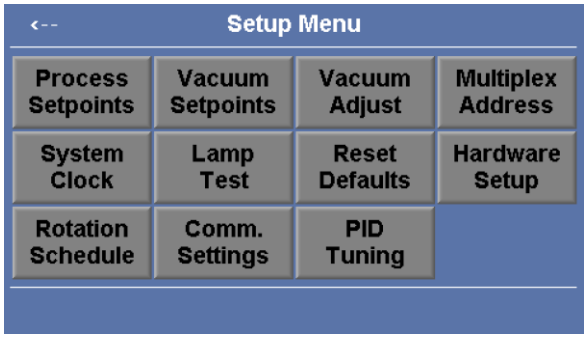
- Stopped – There are no motor faults and the unit has not been started.
- Vacuum Contactor – The vacuum motor contactor has not engaged when required.
- Vacuum Overload – The vacuum motor overload has tripped.
- VFD Fault – A fault has occurred on the VFD.
- VFD Failed to Start – The VFD has been sent a start command, but has not started.
- Running – The vacuum motor is running.
- Standby – The controller is set to Auto mode, but there is no 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, bus 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.





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

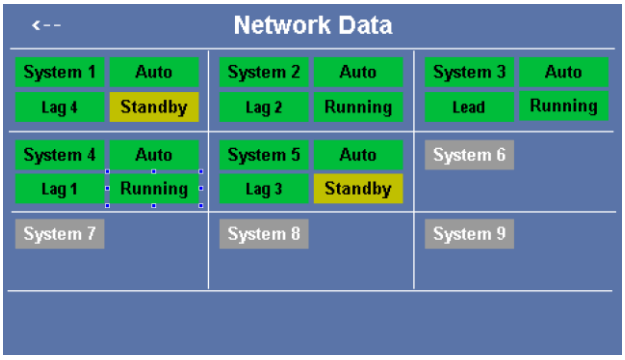
SYSTEM MENU SCREENS

The system screens are used to view various settings and parameters of the unit.

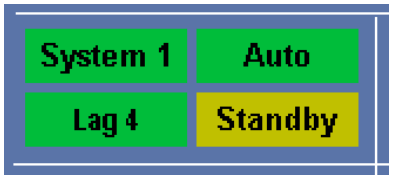
Network Data

The ControlDEK panels come standard with a hybrid CANbus port allowing up to nine systems to be networked together. Once networked, the systems will be able to sync data and setpoints to operate as a single multiplexed machine.

The Network Data screen displays a simple status of all networked ControlDEK controllers.



Up to four indicators will be displayed for each networked system:



- Top Left indicator - Green while online, Gray for offline
- Top Right indicator – Hand or Auto (not shown if offline)
- Bottom Left indicator – Assigned Position (not shown if offline)
- Bottom Right indicator – Operating Status (not shown if offline)

Alarms

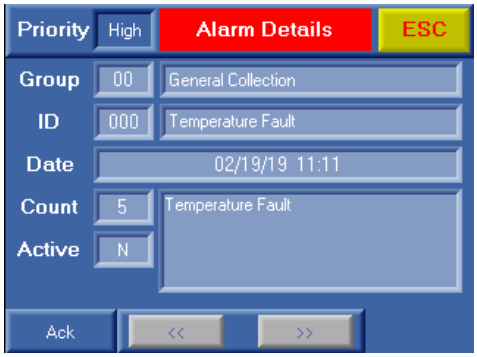
The Alarm screen can be called into view via the System Menu screen.



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.



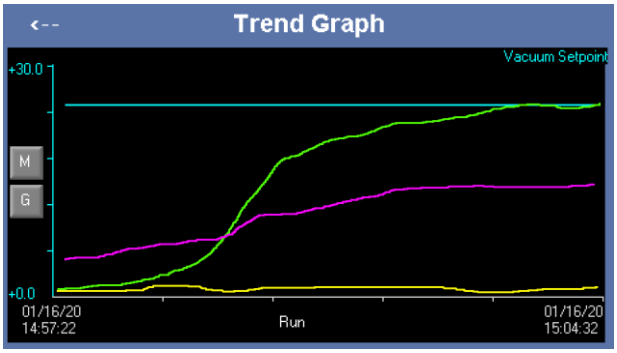


The Alarm Details screen shows all information about the chosen alarm. The Group, Group Name, ID, Alarm Name, Timestamp, Count, Active State and Alarm Description are shown. There is also an Acknowledge button at the bottom of the screen.

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

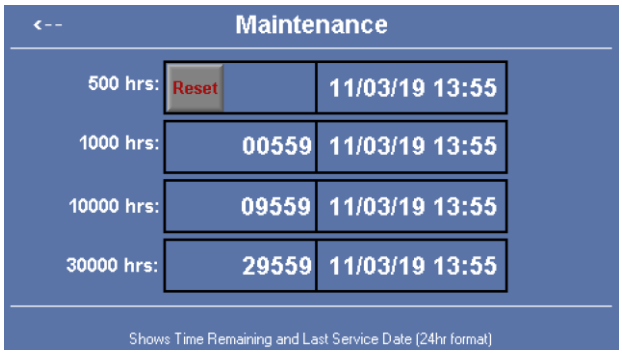
Trend Graph

The Trend graph screen displays 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.



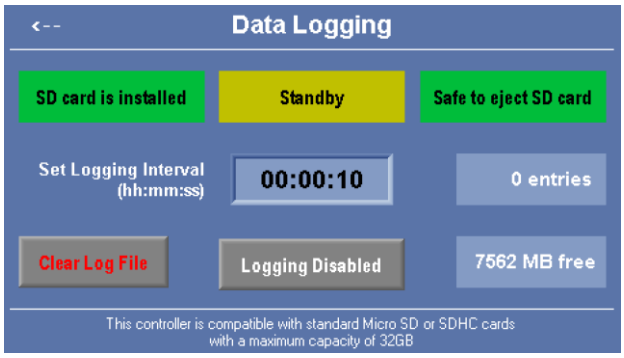
Maintenance

The Maintenance screen displays the time remaining for predefined scheduled maintenance intervals. For each hour a pump is running, the scheduled maintenance counters will decrement. Once a counter has decremented to zero, a RESET button will appear on the Maintenance screen and a "Maintenance Required" message will be displayed on the main screen. To reset a maintenance counter, press the corresponding RESET button.



Data Logging

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 also for any alarms or warning events. Enter the desired logging interval in the Set Logging Interval field, and Enable Logging by pressing the Enable/Disable button. Additional indicators and registers will show the status of the MicroSD card installed. To delete the logging file on the MicroSD card, press the Clear Log File button. The MicroSD card can be removed from the PLC and installed into a PC to open and view the saved CSV file.



THE SETUP SCREENS

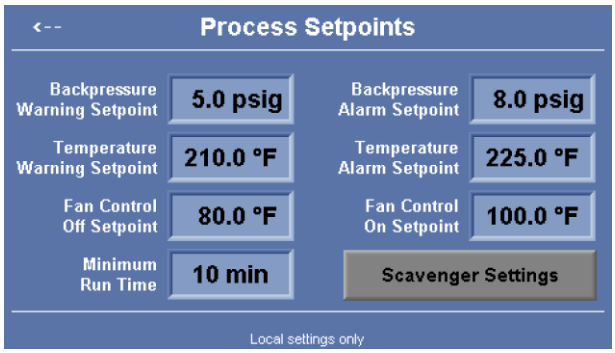
The setup screens are used to configure the vacuum system.

Process Setpoints

This screen allows the operating parameters to be set. The available parameters are dependant on hardaware options installed.

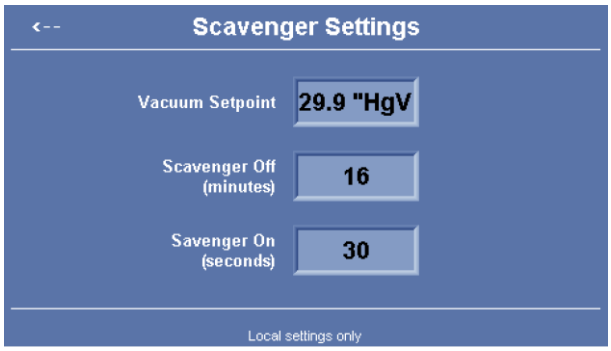
A warning setpoint is solely to alert operators that the temperature or backpressure is above normal. A warning will not shut down the unit.

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.



Scavenger Setpoints (if equipped)

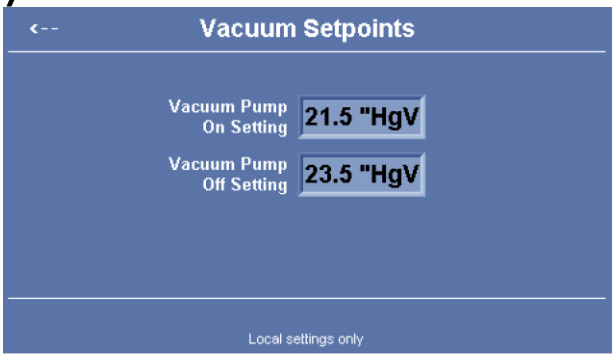
This screen allows setting the parameters for operation of a scavenger solenois.



Vacuum Setpoints for Standard Simplex System

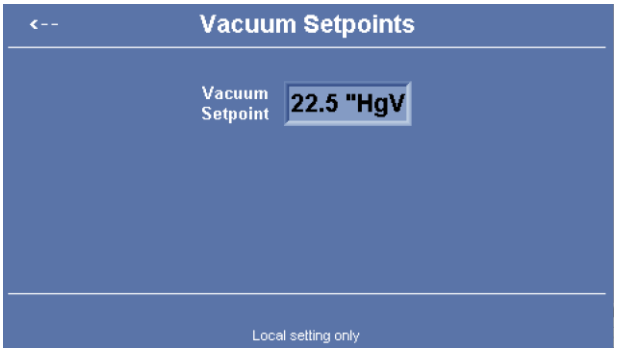
This screen displays the vacuum setpoints for turning on and off the vacuum pump to meet demand.

When the system vacuum falls below the Pump On level, the vacuum pump will come on line. The vacuum pump remains running until the system vacuum reaches the Pump Off setpoint, assuming the pump has been running for its minimum run timer.



Vacuum Setpoint for VFD Simplex System

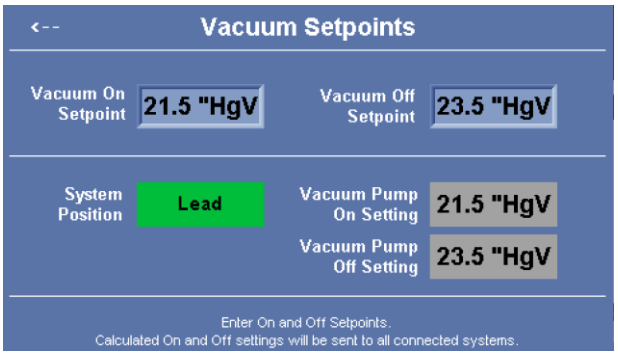
This screen displays the target vacuum for the VFD system.



Vacuum Setpoints for Multiplexed System

This screen displays the vacuum setpoints for all networked systems. By setting the Vacuum On and Off setpoints, the Pump On and Pump Off settings will be calculated and sent to each networked system.

When the system vacuum falls below the Pump On level, the vacuum pump will come on line. The vacuum pump remains running until the system vacuum reaches the Pump Off setpoint, assuming the pump has been running for its minimum run time.



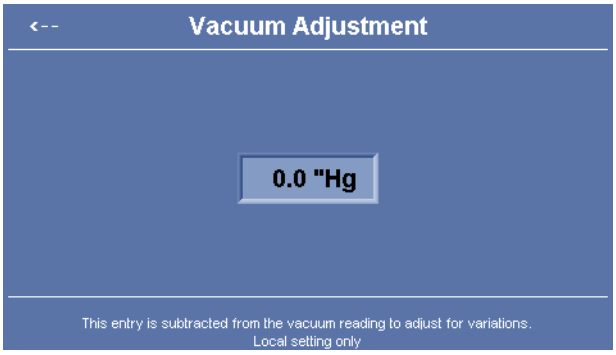
Example: Setting Vacuum On to 18"HgV and Vacuum Off to 20"HgV will result in the following setpoints:

PUMP	ON	OFF
Lead	18	20
Lag 1	17.78	19.78
Lag 2	17.56	19.56
Lag 3	17.33	19.33
Lag 4	17.11	19.11
Lag 5	16.89	18.89
Lag 6	16.67	18.67
Lag 7	16.44	18.44
Lag 8	16.22	18.22

Note: when the Lead pump is a VFD system, this screen will not show the calculated on/off settings. This is because the lead VFD pump continues running at its minimum speed when demand is met.

Vacuum Adjust

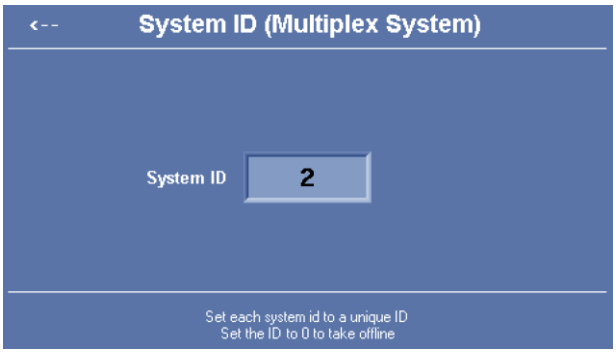
The Vacuum Adjust screen allows the operator to adjust the system vacuum. The vacuum adjust value will be subtracted from the system vacuum as measured by the PLC. If the PLC is reading a vacuum level of 18.7"HgV, a value of 2"Hg on the Vacuum Adjust screen would change the PLC reading to 16.7"HgV.



Multiplex Address

The Multiplex Addressing screen allows setting the ID of each pump for multiplex operation. Each pump in a networked setup must be set to a unique ID.

NOTE: To exclude a pump from operating as part of a connected network, set the ID to 0.



System Time and Date

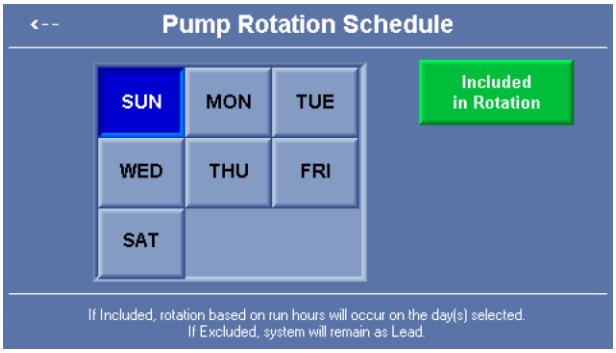
The Time and Date screen serves two functions. The first is to allow the operator to set the PLC real time clock date and time. The second is to sync the time across all networked controllers.



Pump Rotation Schedule

The Pump Rotation Schedule screen allows the operator to set the pump rotation. A pump rotation will occur on the selected day of the week. Optionally, individual pumps can be excluded from rotation if desired.

NOTE: Rotation is based on Run Hours. If Run Hours are already balanced, rotation will not occur.



Comm. Settings

When the Comm. Settings button is pressed, a screen (or series of screens) will be displayed allowing the setting of variables relating to optionally installed communications networks.

Lamp Test Button

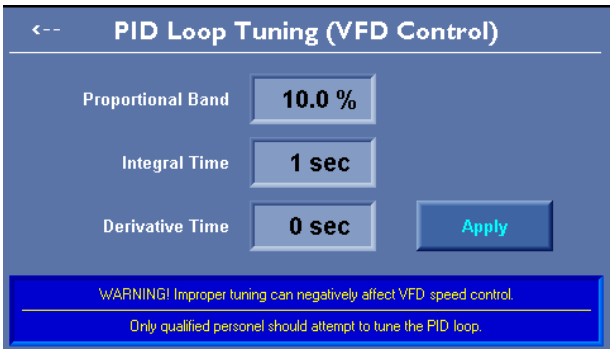
This button tests the operation of the System Fault, Lag, and Horn outputs.

Reset Defaults Button

This button will reset all operating parameters to their factory setting.

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 a particular 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.



Hardware Setup

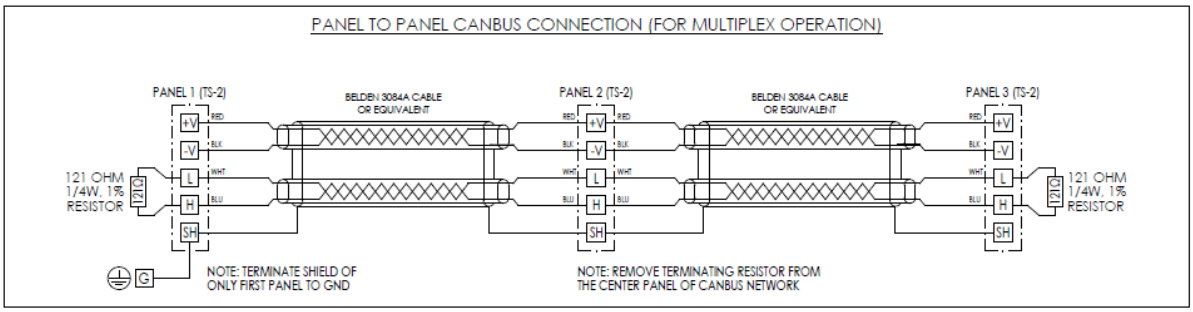
This option is for factory setup only.

MULTIPLEX SYSTEMS

The ControlDEK controller was designed for field expandability. It can be expanded up to a total of nine systems

Multiplex Wiring

In order to multiplex ControlDEK panels, certain considerations need to be made. 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 multiplex system, the ControlDEK requires a unique ID to be assigned to each pump controller. The Multiplex Addressing screen allows setting the ID of each pump for multiplex operation.

NOTE: To exclude a pump from operating as part of a connected network, set the ID to 0.