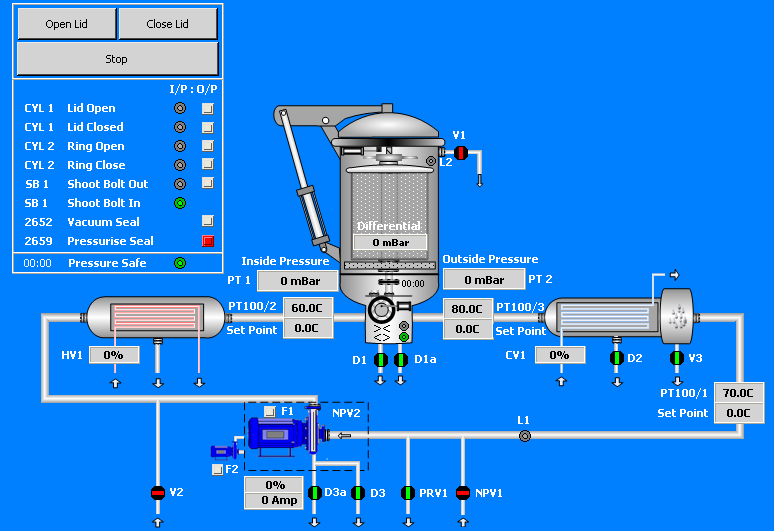


**Convatec**

**Thies Pressure Dryer**

**Operating Manual**

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# Contents:

[Contents: 2](#_Toc237161623)

[Fan and Flow Control Commands: 3](#_Toc237161624)

[Temperature Control Commands. 4](#_Toc237161625)

[Machine Function Commands: 6](#_Toc237161626)

[Alarms: 8](#_Toc237161627)

[Shutting The Controller Down: 12](#_Toc237161628)

[Index: 13](#_Toc237161629)

# Fan and Flow Control Commands:

#### ****FL Flow****

**Sets the direction of the Fan.**

**Stop, In-Out, Out-In**

**Display Flow: 0=Stop, 1 = I/O, 2=O/I** *Parameter ?*

*Parameter: 0=Stop, 1 = I/O, 2=O/I*

**Notes:** This command is used to program the direction of the fan if the **FR** (flow reversals) command is not used. It can also be used to stop the fan.

**Task:** Background.

#### FR Flow Reversals

**Sets the flow reversal times for the flow directions, In-Out or Out-In.**

**Display Flow Reversals: I/O** *Parameter1* **: O/I** *Parameter2* **: Start*:*** *Parameter3*

*Parameter1: 0-99:0-59 Minutes: Seconds*

*Parameter2: 0-99: 0-59 Minutes: Seconds*

*Parameter3: Starting Direction 1 = I/O, 0=O/I*.

**Notes:** This command is used to set the flow reversal times for the I/O (in-out) and O/I (out-in) flow and to select the start direction. This command should be used in conjunction with the **FS** (Fan Speed) command.

**Task:** Background.

#### ****FS Fan Speed****

**Sets the percentage speed to run the fan at when the flow direction is**

**In-Out or Out-In.**

**Display Fan Speed: I/O :** *Parameter*1 **% O/I :** *Parameter* 2 ***%***

*Parameter1 : 0-100****%*** *: Parameter2 : 0-100****%***

**Notes:** This command is used to program the percentage speed for I/O (In-Out) and O/I (Out-In) flow. This command should be used in conjunction with the **FR** (Flow Reversal) or the **FL** (Flow) commands.

**Task:** Background.

#### FP Fan Pressure

**Sets the differential pressure in the kier that the fan adjust to and maintain.**

**Display Fan Pressure I/O :** *Parameter1* **mB-O/I :** *Parameter1* ***mB***

*Parameter1 0-999* ***mB***

**Notes:** This command is used to program the differential pressure you want in kier in the I/O and the O/I directions. The fan speed will be adjusted throughout to maintain this pressure. This command over-rides the **FS**.

**Task:** Background.

# Temperature Control Commands.

#### ****CT Cooler Temperature****

**Sets the desired temperature in the Cooler.**

**Display Cooler Temperature: Cool To:** *Parameter1* ***°C***

*Parameter1: 0-150* ***°C***

**Notes:** This command is used to program the desired temperature to be achieved and maintained in the cooler. The fan must be on for this command to operate.

**Task:** Background.

#### ****IT Inlet Temperature****

**Sets the desired Inlet temperature.**

**Display Inlet Temperature:** *Parameter1* ***°C***

*Parameter1: 0-150* ***°C***

**Notes:** This command is used to program the desired temperature to be achieved and maintained at the inlet to the Kier. The fan does not need to be on for this command to operate.

**Task:** Background.

#### ****OT Outlet Temperature****

**Sets the desired Outlet temperature.**

**Display Outlet Temperature:** *Parameter1* ***°C***

*Parameter1: 0-150* ***°C***

**Notes:** This command is used to program the desired Outlet temperature.

Should be used in conjunction with the IT (Inlet Temperature) and the CT (Cooler Temperature) commands

**Task:** Foreground.

#### ****FT Final Temperature****

**Sets the desired Final temperature.**

**Display Final Temperature:** *Parameter1* ***°C***

*Parameter1: 0-150* ***°C***

**Notes:** This command is used to program the desired Final temperature. This is the temperature after the kier has held at the desired Outlet temperature for a time that it will cool down to.

The Inlet and Cooler Temperature commands are cancelled and the Cooler cooling valve opens a fixed amount (set by parameter ‘Final Temp Cooling Percent’)

**Task:** Foreground.



Figure : Drying Temperature Profile

# Machine Function Commands:

#### ****HT Hold Time****

**Hold on this Step for the programmed time.**

**Display Hold Time:** *Parameter1 Parameter2* **Minutes/Seconds**

*Parameter1: 0 – 99* ***Mins*** *Parameter2: 0 – 59* ***Secs***

**Notes:** This command allows all active commands to run for the programmed time before advancing to the next step.

**Task:** Foreground.

#### ****PK Pressurise Kier****

**Pressurises the Kier.**

**Display Pressurise Kier:**

**Notes:** This command is used to pressurise the kier to the programmed pressure.

**Task:** Foreground.

#### ****DK Depressurise Kier****

**Depressurises the Kier.**

**Display Depressurise Kier:**

**Notes:** This command is used to depressurise the kier.

**Task:** Foreground.

#### ****NP Nitrogen Purge****

**Purges the kier with Nitrogen**

**Display Nitrogen Purge: Number of Purges** *Parameter1*

*Parameter1: 0-9: Number of purge cycles.*

**Notes:** This command purges the kier with Nitrogen to remove all the oxygen.

**Purge sequence:**

Inject nitrogen in the Kier to a Pressure set by Parameter ‘Nitrogen Purge Pressure’

Hold the pressure for time (60secs)

Depressurise the Kier and release the nitrogen.

At 0.5 bar open the Fan drain valve and turn off fan seal (makes sure all the ethanol has drained out)

When kier pressure drops below 0.2bar open the Sump Drain

**Repeat for the programmed number of purges.**

**Task:**  Foreground. .

#### CK Clean Kier

**Run the clean kier cycle**

**Display Clean Kier**

**Notes:** This command is used to run the cleaning cycle.

**Task:** Foreground.

**Cleaning cycle:**

Fill the Kier up to level 2. (Kier water vents valve stays open throughout)

Heat the Kier to the temperature set by parameter “Clean Temperature Setting”.

Hold for a time set by parameter “Clean Hold Time”.

Drain the Kier until level 1 is lost. Continue draining for Parameter ‘Kier Drain Time’.

**If the pressure exceeds O.3 bar heating is disabled and alarm**

**If the pressure continues to rise the cycle is aborted and the Kier is drained off.**

#### ****LO Lid Open****

**Opens the lid if the machine is safe.**

**Display Lid Open**

**Notes:** This command is used to open the Lid once the process has finished and the machine is safe.

**Opening sequence (once the machine is safe)**

The Lid seal pressure turns off.

The Lid Lock Shoot bolt retracts,

The Lid seal vacuum comes on.

The Lid locking ring rotates to the open position.

Once the locking ring open switch is made the lid will start to lift.

When the Lid Closed Switch is lost the lid seal vacuum turns off.

The lid continues to open until the Lid open switch is made.

**Task:** Foreground.

#### ****LC Lid Close****

**Closes the machine lid.**

**Display Lid Close**

**Notes:** This command is used to close the machine Lid.

**Closing Sequence**

The Lid closes.

When the Lid Closed Switch is made the lid seal vacuum turns on.

The lid locking ring rotates to the closed position.

Once the locking ring closed switch is made the lid seal vacuum turns off.

The Lid Lock Shoot bolt extends,

The Lid seal pressure turns on.

**Task:** Foreground.

# Alarms:

**Aborted Pressure At Max** The cycle has been aborted because the machine has exceeded its maximum pressure setting.

**Condenser PT100 Probe Fault** There is a fault with the reading from the Condenser Temperature probe.

**Cooler Fan Motor Fault** The cooler fan motor is showing a fault condition. Reset the Cooler Fan motor. If the fault continues then an engineer must check out the motor.

**Cooler Fan Motor Not Running** The software is requesting the cooler fan to run but there is no running signal. Reset the Cooler Fan motor. If the fault continues then an engineer must check out the motor.

**Cooling Slow** There is a problem with the cooling. The temperature is not decreasing at an acceptable rate.

**Emergency Stop Pressed** The emergency stop has been activated.

**Fan Current Exceeded** The current reading for the Fan motor has exceeded its expected limit for a pre-determined time. Set by parameters ‘Fan Current At 10%’Etc.

**Fan Inverter Fault** The fan inverter is showing a fault condition. Press the Reset button on the inverter panel. If the fault continues then an engineer must check out the motor and inverter.

**Fan Max Current Exceeded** The current reading for the Fan motor has exceeded the maximum allowable current limit as set by parameter ‘Fan Maximum Current’

**Fan Not Running** The software is requesting the fan to run but there is no running signal from the inverter showing.. Press the Reset button on the inverter panel. If the fault continues then an engineer must check out the motor and inverter.

**Heating Slow** There is a problem with the heating. The temperature is not increasing at an acceptable rate.

**Inlet PT100 Probe Fault** There is a fault with the reading from the Inlet Temperature probe.

**Inside Pressure Fault** There is a fault with the reading from the Inside pressure sensor.

**Interlock Cage Switch** The cage interlock switch is not engaged.

**Kier Has Not Depressurised** The Kier should have depressurised but there are signals present showing the machine still has pressure in it.

**Kier Max Pressure Exceeded** The pressure in the kier has exceeded the maximum allowable pressure as set by parameter ‘Kier Maximum Pressure’

**Kier Max Temp Exceeded** The temperature in the kier has exceeded the maximum allowable temperature as set by parameter ‘Kier Maximum Temperature’

**Level Fault** The Kier Full Level probe is indicating it is on but the Kier Empty level is not. Check the Levels.

**Lid Not Closed** There is a fault with the Lid. The Lid should be in the closed position but the feedback switch is not indicating this. Check Switch feedback.

**Lid Not Locked** There is a fault with the Lid lock. The Lid should be in the locked position but the feedback switch is not indicating this. Check Switch feedback.

**Lid Not Open** There is a fault with the Lid. The Lid should be in the open position but the feedback switch is not indicating this. Check Switch feedback.

**Missing 24Vdc Supply** The 24Vdc supply to the panel is missing. Check circuit breakers.

**No Plc Coms** Communications to the PLC has failed. Check connections.

**Outlet PT100 Probe Fault** There is a fault with the reading from the Outlet Temperature probe.

**Pressure Switch Fault** There is a difference with the readings from the pressure switch and the Inside pressure sensor.

**Ring Not Closed** There is a fault with the Locking Ring. The Lid ring should be in the closed position but the feedback switch is not indicating this. Check Switch feedback.

**Ring Not Open** There is a fault with the Locking Ring. The Lid ring should be in the open position but the feedback switch is not indicating this. Check Switch feedback.

**Shoot Bolt Fault** The shoot bolt should be in the locked position but the feedback switch is not indicating this. Check Switch feedback.

**System In Debug** The controller has been switched to Debug mode. Press “Expert”, “

Engineer” and select “Run” on the dial.

**System In Override** The controller has been switched to Debug mode. Press “Expert”, “ Engineer” and select “Run” on the dial.

**System In Test** The controller has been switched to Debug mode. Press “Expert”, “ Engineer” and select “Run” on the dial.

**System Paused**  The controller has been “paused” (or the Halt button pressed), to continue press “Run”.

# 

# Parameters:

**Cleaning Control:**

**Clean Fill Settle Time** When using the CK command, once the working level is reached and the overfill time has timed out, wait for this settle time before heating. **Seconds.**

**Clean Heat Change Delay** The time delay before a making a new change to the heating output. **Seconds.**

**Clean Heat Max Change** The maximum change to the Heating output after Clean Heat Change Delay times out**. %**

**Clean Heat Prop Band** The proportional band for Heating when using the CK command.**C°**

**Clean Hold Time** When using the CK command, once the Kier Temperature has been reached (set by parameter ‘Clean Temperature Setting’)then hold for this time . **Seconds.**

**Clean Over Fill Time** Continue filling for this time after the Kier full signal comes on. (Input 20 ‘Kier Full Level') **Seconds.**

**Clean Temperature Setting** The target temperature when using the CK command**. C°.**

**Kier Drain Time** Once the Kier has lost its Empty Level signal (input 19 'Kier Empty Level')continue draining for this time. **Seconds.**

**Cooler Temperature Control:**

**CT Cooling Prop Band** The proportional band for Cooling when using the CT command. **C°**

**CT Heat Change Delay** The time delay before a making a new change to the cooling output. **Seconds.**

**CT Heat Max Change** The maximum change to the Cooling output after CT Heat Change Delay times out**. %**

**Fan Current :**

**Fan Current At 10 Percent** The expected fan current when the fan speed is running at 10%. **Tenths of Amps.**

**Fan Current At 20 Percent** The expected fan current when the fan speed is running at 20%. **Tenths of Amps.**

**Fan Current At 30 Percent** The expected fan current when the fan speed is running at 30%. **Tenths of Amps.**

**Fan Current At 40 Percent** The expected fan current when the fan speed is running at 40%. **Tenths of Amps.**

**Fan Current At 50 Percent** The expected fan current when the fan speed is running at 50%. **Tenths of Amps.**

**Fan Current At 60 Percent** The expected fan current when the fan speed is running at 60%. **Tenths of Amps.**

**Fan Current At 70 Percent** The expected fan current when the fan speed is running at 70%. **Tenths of Amps.**

**Fan Current At 80 Percent** The expected fan current when the fan speed is running at 80%. **Tenths of Amps.**

**Fan Current At 90 Percent** The expected fan current when the fan speed is running at 90%. **Tenths of Amps.**

**Fan Current At 100 Percent** The expected fan current when the fan speed is running at 10%. **Tenths of Amps.**

**Flow Control :**

**Fan Maximum Current** Maximum allowable Fan Current. **Tenths of Amps.**

**Flow Dwell Time** The Dwell Time between flow reversals. Seconds.

**Max In To Out Pressure** The Maxiumum pressure for in to out flow when using the FP command. **mBar.**

**Max Out To In Pressure** The maxiumum pressure for out to in flow when using the FP command. **mBar**.

**Inlet Temperature Control**

**IT Heat Change Delay** The time delay before a making a new change to the heating output. **Seconds.**

**IT Heat Max Change** The Maximum amount of change applied to the Heating output after IT Heat Change Delay**. %.**

**IT Heat Prop Band** The proportional band for Heating when using the IT command. **C°.**

**Temperature At 10 Percent Open** The measured temperature reading with the inlet control valve open at 10%. **Degrees C°.**

**Temperature At 20 Percent Open** The measured temperature reading with the inlet control valve open at 20%. **Degrees C°.**

**Temperature At 30 Percent Open** The measured temperature reading with the inlet control valve open at 30%. **Degrees C°..**

**Temperature At 40 Percent Open** The measured temperature reading with the inlet control valve open at 40%. **Degrees C°.**

**Temperature At 50 Percent Open** The measured temperature reading with the inlet control valve open at 50%. **Degrees C°.**

**Temperature At 60 Percent Open** The measured temperature reading with the inlet control valve open at 60%. **Degrees C°.**

**Temperature At 70 Percent Open** The measured temperature reading with the inlet control valve open at 70%. **Degrees C°.**

**Temperature At 80 Percent Open** The measured temperature reading with the inlet control valve open at 80%. **Degrees C°.**

**Temperature At 90 Percent Open** The measured temperature reading with the inlet control valve open at 90%. **Degrees C°.**

**Temperature At 100 Percent Open** The measured temperature reading with the inlet control valve open at 100%. **Degrees C°.**

**Pressure:**

**Kier Maximum Pressure** Maximum allowable kier pressure. **mBar.**

Pressure Control:

**Pressure Safe Delay Time** The time delay after 'Kier Pressure Safe' (input 9) and the analog pressure indicates safe, before the Kier pressure is regarded as safe. **Seconds.**

**Working Pressure Setting** When the kier is told to pressurise (PK command)

it will pressurise to this setting. **mBar.**

**Temperature:**

**Kier Maximum Temperature** Maximum allowable kier Temperature. **C°.**

# Shutting The Controller Down:

The APC is basically a Personal Computer, and like any computer it must be shut down correctly.

Firstly you must exit the Machine Control program.



Press the Expert button and enter the Expert password.

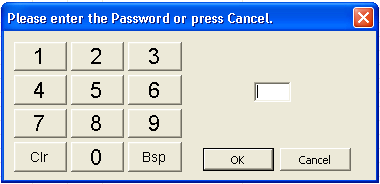


Figure : Expert Password

A new set of buttons that has been enabled near the top of the screen,



Figure : Engineer

Select the Engineer button  , on the engineers screen press the Shutdown button .

The Machine Control program will now shutdown.

You are now in Windows. Press the Start button  and select the  button.

The Shutdown Windows window will appear. Press the TurnOff button. The pc will now shut down.

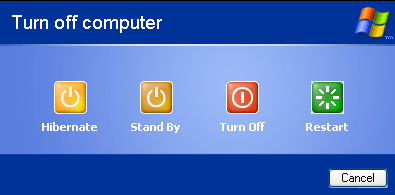


Figure : Shut down Windows

# Index:

Alarms 8

Commands

Fan & Flow

**FL** Flow 3

**FP** Fan Pressure 4

**FR** Flow Reversals 3

**FS** Fan Speed 3

Machine Function

**CK** Clean Kier 7

**DK** Depressurise Kier 6

**HT** Hold Time 6

**LC** Lid Close 7

**LO** Lid Open 7

**NP** Nitrogen Purge 6

**PK** Pressurise Kier 6

Temperature Control

**CT** Cooler Temperature 4

**FT** Final Temperature 5

**IT** Inlet Temperature 4

**OT** Outlet Temperature 4

Parameters

Cleaning Control 10

Cooler Temperature Control 10

Fan Current 10

Flow Control 11

Inlet Temperature Control 11

Pressure 11

Pressure Control 11

Temperature 11

**Shutting The Controller Down** 12