

Surface Preparation and Finishing.

Faults and Trouble shooting - PG530, 680 & 820

Due to the nature of the Surface Preparation & Finishing industry, there are many different applications and environments in which the equipment can be used. This can potentially expose a grinding machine to a large range of challenges, and from time to time, can create a situation in which the operator needs to respond to an abnormal operating behaviour from the machine.

The 3 main areas which can cause these abnormal behaviours can be termed as follows:

- Mechanical fault.
- Electrical fault.
- Operator practices.

This guide seeks ensure that when complications do arise, the problem and cause can be located quickly. This is done by looking at the possible cause and potential solutions for many of the common, and some of the less common problems that arise during operation and / or a service.

The following Guide covers:

- Addressing operator practices that can contribute to both mechanical and electrical faults.
- Spotting and assessing mechanical faults.
- Spotting and assessing electrical faults.

Faults and Trouble shooting.

Operating faults and trouble shooting.

Problem	Possible Cause	Potential Solution
Grinder is hard to hold onto.	Not enough diamonds under the machine (if grinding thick glue or soft floors, too few diamonds under the machine will greatly increase the load on grinder and on the operator). Usually also accompanied by high current draw by large motor.	Increase number of diamonds under machine to reduce load on grinder and operator. Try Piranha tools -18 pieces (if grinding thick carpet glue, levelling compound, thick epoxy)
	Large motor not working (this can be caused by a fault with motor, a fault with wiring to motor, or a fault on large variable speed drive.	Check large motor is plugged in. Check there are no faults on larger variable speed drive. Check that large variable speed drive is on. Check that large variable speed drive is functioning properly (unplug both motors, set display on keypad to Output Frequency, switch machine to RUN, see if numbers on screen change from zero and begin counting up. If numbers stay on zero, large variable speed is not receiving run command from switch on control panel. Machine needs to be checked by an electrician or trained Husqvarna Service agent.
	Drive belt is slipping.	Remove belt tensioner cover plate on bottom of machine and check there is not water or dust on the inside of the machine that may be causing the belt to slip on the drive pulleys. Contact your Husqvarna service agent for belt tension specifications.
	Drive belt is broken. This can be confirmed by turning one of the grinding heads by hand. If only one of the grinding heads turns the belt is broken.	Replace internal drive belt or contact your local Husqvarna service agent.

Problem	Possible Cause	Potential Solution
Grinder in hard to hold onto. Cont.	Demanding too much of the machine.	In some applications even when the right number and type of diamonds have been selected, it can still be necessary to slow the speed of both drive motors as well as the forward speed of the machine across the floor.
	Only 1 phase is coming into the machine. Machine will not fault and will draw <1 amp motor current, fan (large motor) will be turning slowly.	Check in-coming power supply,
Grinder is jumping around.	Grinding heads may be worn-out or damaged.	Check grinding heads for broken parts (e.g. spring steel springs) or excess movement.
	Diamonds may not be fitted correctly or different height diamonds may be on the grinding heads.	Check to ensure all diamonds are fitted correctly and are the same height. In the event of uneven diamond segments space out uneven diamonds evenly on the diamond holder disc and run machine on an abrasive surface till all segments are the equal heights again.
	Head locks may be loose or missing.	Check to ensure all head locks are present and tight.
	Small motor not working (this can be caused by fault with motor, fault with wiring to motor, or fault on the small variable speed drive.	<p>Check that the small variable speed drive is on.</p> <p>Check that there are no faults on the small variable speed drive.</p> <p>Reset if required, at the control panel near the handle bars.</p> <p>Check that small variable speed drive is functioning properly (unplug both motors, set display on keypad to Output Frequency, switch machine to RUN, see if numbers on screen change from zero and begin counting up. If numbers stay on zero, small variable speed drive is not receiving run command from switch on control panel. Machine needs to be checked by an electrician or a Husqvarna service agent.</p>

Problem	Possible Cause	Potential Solution
Grinder is leaving an irregular scratch pattern.	Diamonds may not be fitted correctly or different height diamonds may be on the grinding heads.	Check to ensure all diamonds are fitted correctly and are the same height. In the event of uneven diamond segments space out uneven diamonds evenly and run machine on an abrasive surface till all segments are the equal heights again.
	Head locks may be loose or missing.	Check that all head locks are present and tight.
	Diamond tool may be mixed.	Check to ensure that all segments are the same grit and bond.
	Resin tools may be mixed or have picked up a contaminant.	Check to ensure that all resins are the same grit and bond and free of "glazing or infections" on surface from contaminants. To clean resins, briefly run them on a lightly abrasive surface (e.g. such as a surface that has been ground with 20 grit diamond).
	Grinding heads may be worn-out or damaged.	Check grinding heads for broken parts or excess movement.
Grinder sounds like it is "over revving".	Large motor not working (this can be caused by fault with motor, fault with wiring to motor, or fault on large variable speed drive.	Check that there are no faults on either the small or the large variable speed drives. Reset if required, at the control panel on the handle bar
	Small motor not working (this can be caused by fault with motor, fault with wiring to motor, or fault on small variable speed drive.	Check that small variable speed drive is functioning properly (unplug both motors, set display on keypad to Output Frequency, switch machine to RUN, see if numbers on screen change from zero and begin counting up. If numbers stay on zero, small variable speed drive is not receiving run command from switch on control panel. Machine needs to be checked by a Husqvarna service agent. In some applications even when the right number and type of diamonds have been selected, it can still be necessary to slow down both the motors speeds and the forward speed of the machine across the floor.

Variable Speed Drives or Frequency Converters.

1. Functionality Overview.

Each of the PG680 and PG820 grinders are equipped with 2 variable speed drives, the PG530 is only equipped with one. These variable speed drives are incorporated into the machine for the following reasons:

Functionality

- Manipulate incoming power to enable increase and decrease in speed & directional change.
- Regulate current and voltage supply to the motors to ensure motors run at optimum levels (e.g. torque boost).

Protection

- Monitor incoming power to ensure suitability for a machine and the application being performed.
- Controls current being drawn by motors to ensure motors are running within safe operational limits (to prevent damage to motor).
- Monitoring load on machine to ensure the grinder is not being overloaded thus offering protection for belt, bearings and other internal components.
- Protects motors from faulty power supply (e.g. running on 2 phases).

Diagnostics

- Identifies electrical faults with the machine and registers fault code.
- Has monitoring menus that help isolate cause of potential electrical faults.
- Monitoring menus enable operator to gauge how hard the machine is working.

Keypad / Display.

Each variable speed drive has a keypad, the NXL keypad (PG680and PG820) as seen below on the left and will appear as below when the Grinder is powered-up but not in operation. The NXS keypad (PG 530 single phase) will appear as seen below on the right, when the Grinder is turned on but not in operation.

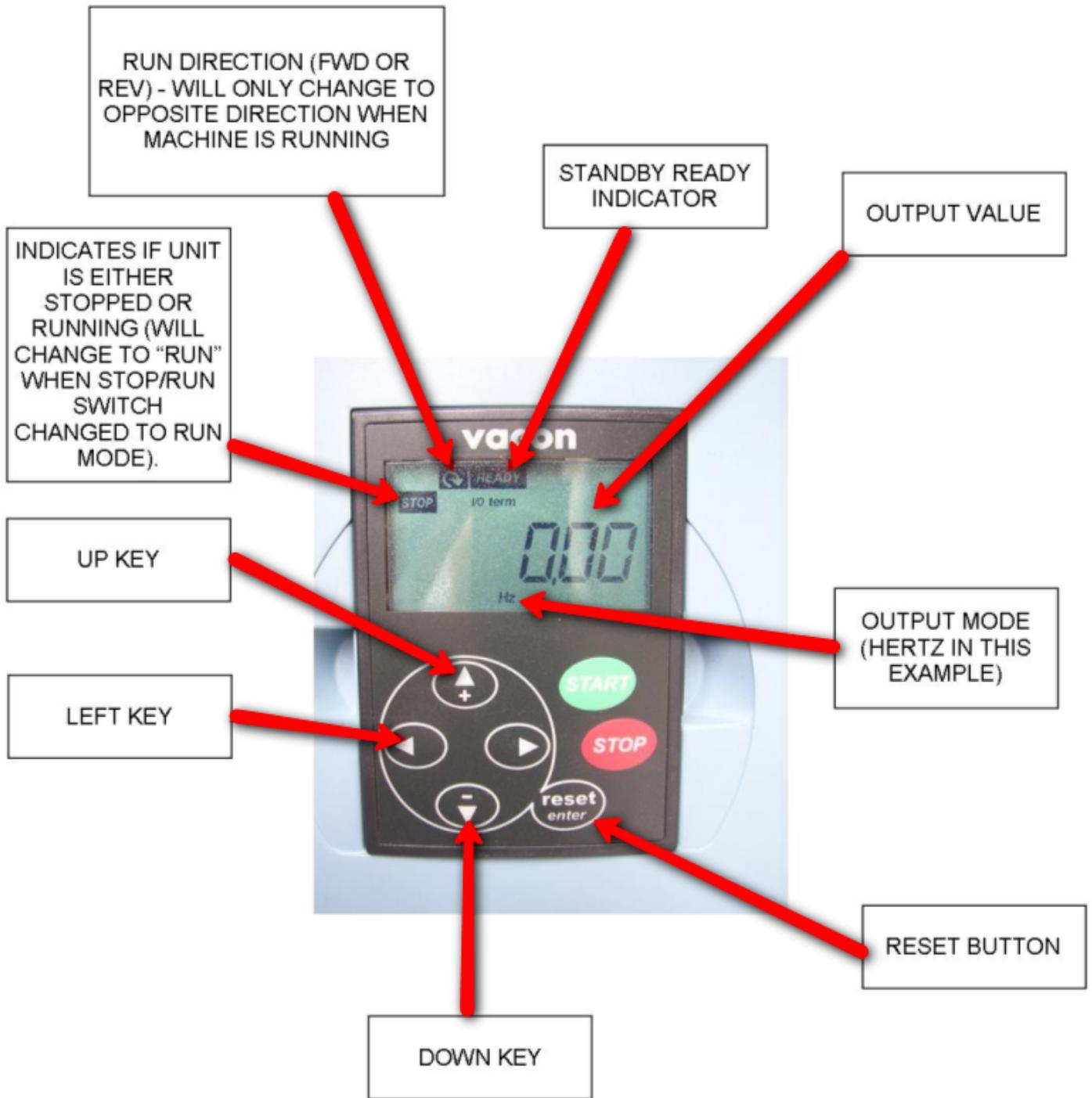


NXI (model of frequency inverter) keypad.



NXS (model of frequency inverter) keypad.

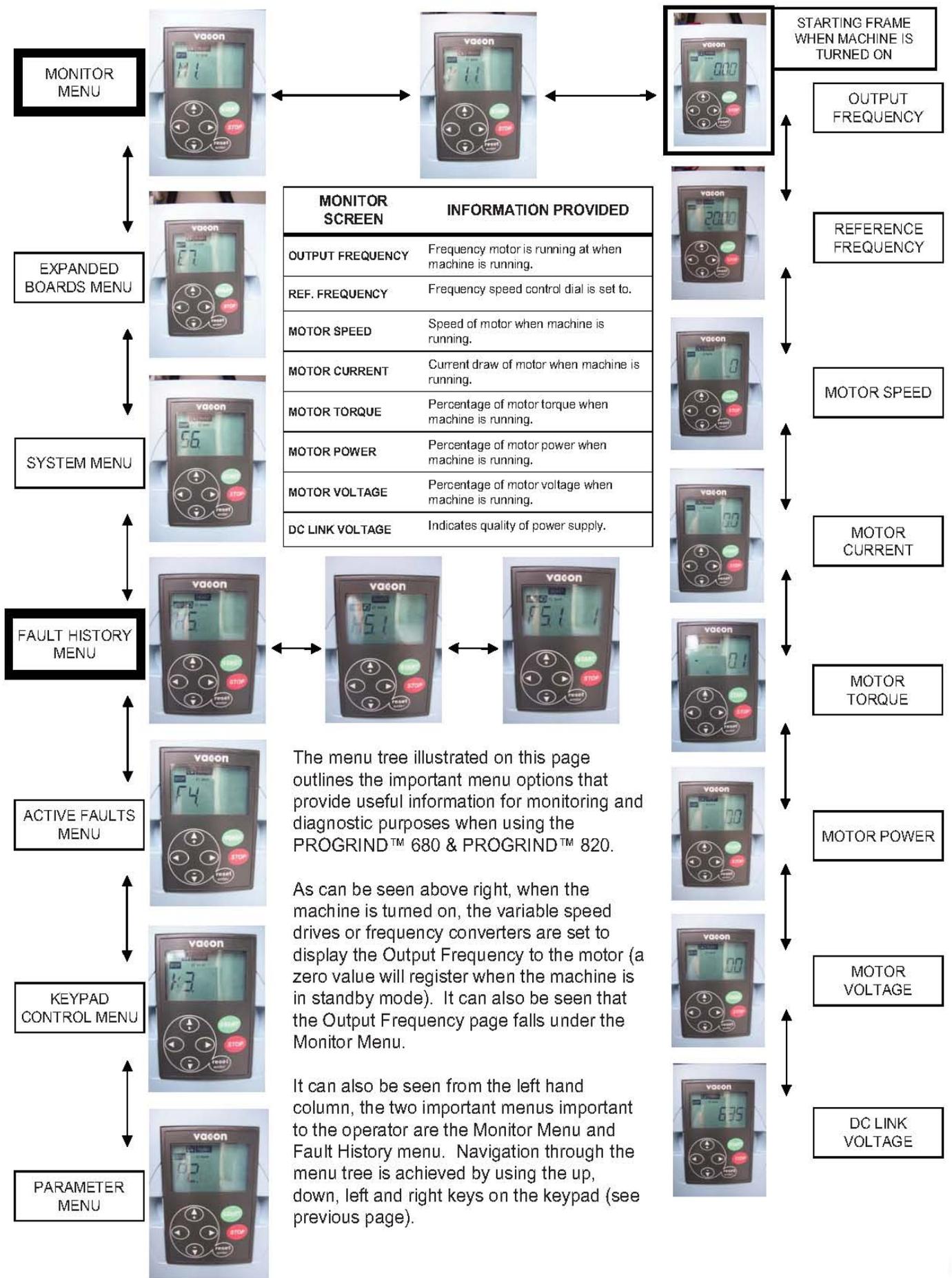
Whilst it is not essential for an operator to intimately know every feature of the variable speed drives, it is useful to know what the screen symbols mean and to be familiar with some of the monitoring menus and the fault codes.



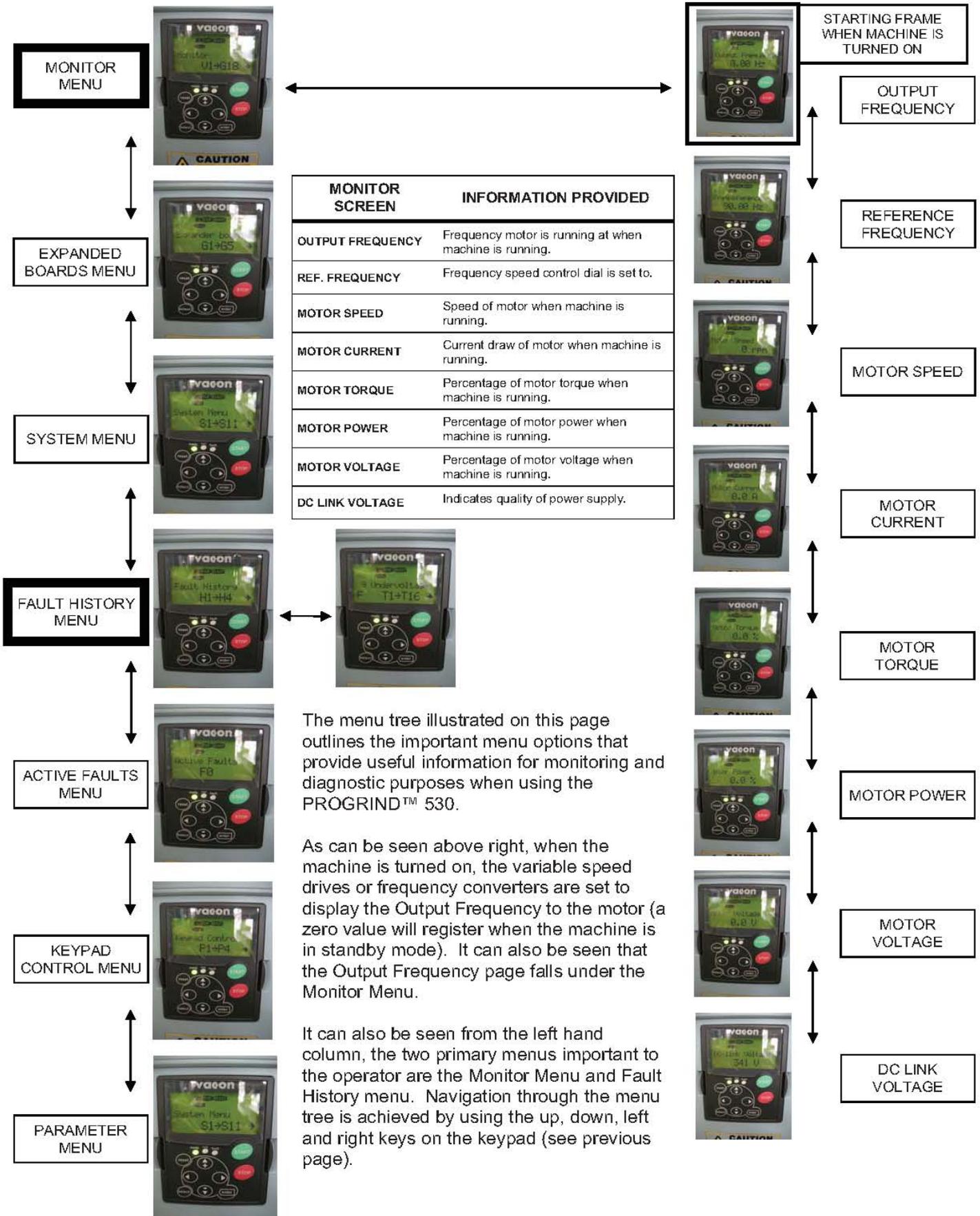
MENU TREE.

The following pages outline the menu tree / screen layout of the variable speed drives. These provide useful information to the service agent and operator, both functionally and for diagnostic purposes including trouble shooting. The outlined "tree" on the next 2 pages are displayed in the same manner as it would be to navigate within the different menu items / screens on the frequency converter itself.

NXL PG680 and PG820



PG530 NXS



Monitoring Menus cont.

- Output Frequency

This screen tells the operator the frequency (Hertz) the motor is running at when the machine is in operation. The value for output frequency should be constant when the machine is running. If there is a fluctuation (+/- 5Hz) in output frequency when the machine is running, generally this indicates the motor is running at or near the limit of its programmed current limit. The current limits are as follows:

PG680 and PG820:

1. Large motor - 25 amps
2. Small - 5 amps

PG530

1. Both motors combined - 15 amps

If there is a fluctuation in output frequency when the machine is in operation, it is advisable to check the motor current as well. This can be found on the NXL by pressing the UP arrow on the keypad 3 times. For trouble free operation (concerning current overload), it is best to keep output current at or below 21-22 amps for the large motor of the PG680 / PG820, 14 amps for PG530 three-phase, and around 12-13 amps for the single phase PG530. The current draw of the motor can be reduced by reducing the speed of the motor using the speed dial on the control panel near the handle bars.

Most over-current problems will be associated with the large motor. This is monitored / displayed on the large variable speed drive for the PG680 and PG820. Keep the current draw of the small motor under 3.5amps for consistent operation.

- Motor Current

This screen displays the current draw of the corresponding motor (i.e. large variable speed drive monitors function of large motor, small variable speed drive monitors function of small motor) when the motor is running.

-See comments already covered under 'Output Frequency' relating to motor current.

- DC-LINK Voltage

This screen displays the quality of the power supply to the machine. It will read higher values when the machine is in standby and lower values when the machine is in operation. When DC-LINK voltage is reduced (in the case of poor power supply) the variable speed drive will draw more current to compensate. This is why poor power supply may lead to the grinder prematurely drawing maximum current.

- Fault History

The fault history menu displays the last series of faults experienced by the variable speed drive. If there is a recurring fault pattern experienced by the machine, the information will be stored in the fault history menu. This information is displayed by a code number and can be used for assisting to identify both mechanical faults with an electric symptom, such as an obstructed planetary motor causing a "Motor stall" (F15) fault, of electrical faults such as damaged power cables causing a short circuit will result in an "Over current" (F1) Fault. These fault codes can also help to assist in identifying operator practices that can contribute to both mechanical and /or electrical faults. For example a 'Motor over temperature' (F16) is signalling that the operator has been over-working the machine for an extended period of time.

2. Fault Codes and Fault Tracing.

When either one of the variable speed drives in the machine experience a fault and “trip” out, they will cease to run and an error message will appear flashing on the keypad display (see below).



Fault code F1 “Over Current”

A fault is displayed (as above) by the “F” representing an active fault and the “1”. The number 1 is the reference code to the type of fault as outlined in the Vacon Frequency Converters Manual; in this picture we see an Over Current fault.

It is important to note that the fault codes will not always tell you the actual problem or cause, in many cases it will only point you in the right direction as to what the contributing factors to the fault could be.

3. Fault Tracing Table.

The following table outlines some of the more common problems and fault codes and a list of potential causes and solutions for each that may be experienced when setting up and using the PG grinders.

Problem / Fault Code	Possible Cause	Potential Solution and / or Action
Machine will not turn on.	The incoming power cable is not live.	Check that the power coming into the machine is turned on.
	The "EMERGENCY STOP" button is engaged.	Twist the "Emergency Stop" button to release.
	The safety circuit breaker inside the electrical cabinet is switched to the "off" position.	Switch the circuit breaker to "on" position.
	Problem with the contactor block on the back of the "POWER" button on the control panel near the handle bars.	Check the wires are connected properly on the back of the "POWER" button as per the machine model wiring schematic. Check that the contactor is completely engaging when the "POWER" button is pressed.

Problem / Fault Code	Possible Cause	Potential Solution and / or Action
Default display screens (V.1.1) does not change from 0.00Hz on BOTH Variable speed drives when I switch my machine from STOP to RUN.	Problem with the connection of the wires to "STOP/RUN" switch.	Check that the stop run switch wires inside the control panel are connected properly.
	Problem with the contactor block on the back of the "STOP/RUN" switch.	Check that the contactor block on back of STOP/RUN switch is functioning properly.
Default display screen (V.1.1) stays on 0.00Hz on only ONE of the Variable speed drives when I switch my machine from STOP to RUN.	Problem with the electrical connection from STOP/RUN switch to one of the FWD/REV switches.	Check that linkage wires between the STOP/RUN switch and the FWD/REV switches are connected and properly as per the machine model wiring schematic.
	Problem with the wire connection from FWD/REV switch to the frequency inverter.	Check that the linkage wires between the FWD/REV switches and frequency inverter are connected and correct as per the machine model wiring schematic.
	Problem with the contact block on the back of the FWD/REV switch.	Check that the contact blocks on the back of the FWD/REV switch is functioning correctly.
Display screen when set to Frequency reference (V1.1.2) will not go all the way to 80Hz on the Large Variable speed drive (PG 680 or PG 820), or 100Hz (PG530 three phase), or 90Hz (PG530 single phase)	Problem with the "Disc speed" Potentiometer on the control panel near the Handle bars.	Check wires into potentiometer, as per the machine model wiring schematic. Replace potentiometer if required.
	Problem with the wiring communications into the Variable speed drive.	Check the control panel cable for damage, including into the Variable speed drive terminals.
	Problem with the data and programming of the variable speed drive	Re-programming required. Machine needs to be checked by a Husqvarna service agent.
Display screen when on Frequency reference display (V1.1.2) will not go all the way to 120Hz on the Small Variable speed drive on the PG 680 or PG 820.	Problem with the "Disc speed" Potentiometer on the control panel near the handle bars.	Check wires into potentiometer, as per the machine model wiring schematic. Replace potentiometer if required.
	Problem with the wiring communications into the Variable speed drive.	Check the control panel cable for damage, including an into the variable speed drive terminals.
	Problem with the data and programming of the Variable speed drive	Re-programming required. Machine needs to be checked by a Husqvarna service agent.

Problem / Fault Code	Possible Cause	Potential Solution and / or Action
DC link voltage (screen V.1.18) is less than 550+/- 5V when the machine is in stand by (PG802 & 680, PG530 three phase).	Poor power supply coming into the variable speed drive.	Check both voltage and the phases to grinding machine at the first point of output power to the grinder.
DC link voltage (screen V.1.18) is less than 500+/- 5V when the machine is in operation (PG820 & 680, PG520 three phase).	Poor power supply coming into the Variable speed drive.	Check both voltage and phases to grinding machine at the first point of input power to the grinder, including wiring connections at the contactor and Variable speed drive input
Red light has come on at the control panel during operation.	There will be a Fault Code appearing on the display screen on the frequency inverter (large frequency inverter PG820 & 680) inside the electrical cabinet.	Check the Fault code on the display screen and respond accordingly.
F1.1 on display panel. <ul style="list-style-type: none">• Overcurrent (can happen instantaneously or after some time of operation).	Motor being worked too hard and reaching current limit. (Normally not instantaneous F1.1)	Check current being drawn when machine is running. Reduce speed setting and current draw back into acceptable limits as out lined earlier in this manual.
	Short circuit between phases on output side of variable speed drives. (Normally instantaneous F1.1)	Check wiring in plugs connected to motor cables or inside connection boxes on motors.
	Input phase L1 missing at contactor, will run but then fault. (Normally not instantaneous F1.1)	Check incoming wiring at power plugs and contactor
	Internal Motor failure (very rare) (Normally instantaneous F1.1)	Have motor tested Replace if required,
F1.3 on display panel <ul style="list-style-type: none">• Earth Fault	Short circuit on output side of variable speed drives. (Normally instantaneous F1.3)	Check wiring in plugs connected to motor cables and inside the terminal boxes on motors for loose earth wires

Problem / Fault Code	Possible Cause	Potential Solution and / or Action
F1.3 on display panel. cont. • Earth Fault	Motor failure (very rare) (Normally instantaneous F1.3)	Have motor tested Replace if required.
F1.9 on display panel. Cont. • Under Voltage	Insufficient voltage supply to machine.	Check power supply and ensure correct voltage. Check power supply voltage at source. Check standby and operational levels for DC-Link Voltage.
	Power supply to variable speed drives has been turned off.	Re-connect power to grinder
F1.11 on display panel. • Output Phase Supervision.	Short circuit on output side of variable speed drives, there is no current in one of the power phases at the motor. (Normally instantaneous F1.11)	Check the wiring in the plugs connected to motor cables and inside Terminal boxes on motors.
F1.14 on display panel. • Unit Over Temperature	Variable speed drives are over temperature due to high environmental temperature or faulty temperature sensor.	Open door on electrical cabinet to increase ventilation. If fault persists, return machine to Husqvarna Construction Products.
F1.15 on display panel. • Motor Stall	Motor stall protection has tripped; the motor is working too hard and is drawing too much current.	Check the current being drawn when machine is running. Reduce motor speed settings via the potentiometers on the control panel near the handle bars and draw current back into acceptable working limits as out lined previously in this manual.
	Mechanical jam between one or more of the three grinding discs beneath the Grinding head.	Tilt machine back and inspect the grinding discs for foreign items, rotate grinding discs by hand to see if jam exists. Ensure all three rotate together, if grinding discs rotate individually, a broken belt is causing an internal jam. Contact your local Husqvarna service agent.
	Mechanical jam on the Planetary Drive	Tilt machine back and try rotating the planetary head by hand, to see if jam exists this should be firm but not impossible. Remove cover and clean away any debris.

<p>F1.16 on display panel</p> <ul style="list-style-type: none"> Motor Over Temperature 	<p>Motor being worked too hard and drawing too much current.</p> <p>(Normally not instantaneous F1.16)</p>	<p>Check the current being drawn when machine is running. Reduce motor speed settings via the potentiometers on the control panel near the handle bars and draw current back into acceptable working limits as out lined in "Monitoring Menu Output Frequency" (page 9)</p>
	<p>Motor being worked too hard and reaching current limit.</p> <p>(Normally not instantaneous F1.16)</p>	<p>Check current being drawn when machine is running. Reduce speed setting and current draw back into acceptable limits as out lined earlier in this manual.</p>
	<p>Short circuit between phases on output side of variable speed drives.</p> <p>(Normally instantaneous F1.16)</p>	<p>Check wiring in plugs connected to motor cables or inside connection boxes on motors.</p>
	<p>Input phase L1 missing at contactor, will run but then fault.</p> <p>(Normally not instantaneous F1.16)</p>	<p>Check incoming wiring at power plugs and contactor</p>
	<p>Internal Motor failure (very rare)</p> <p>(Normally instantaneous F1.16)</p>	<p>Have motor tested Replace if required,</p>