VBC-16VFP QUICK START GUIDE

The Arthur G. Russell Co., Inc
750 Clark Ave. P.O. Box 237
Bristol CT, 06011-0237
Phone: 860-583-4109 Fax: 860-583-0686
www.arthurgrussell.com
agr@arthurgrussell.com

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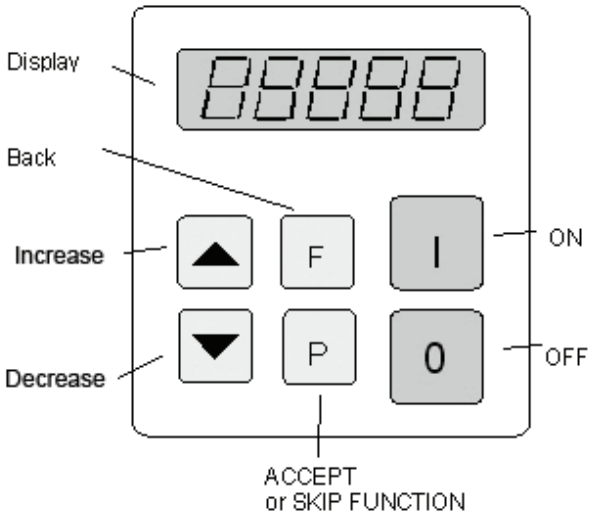
QUICK START OVERVIEW

This Quick Start Guide is not intended to replace the full Operating Instructions manual. It is intended to be used in conjunction with the manual. The Quick Start Guide contains important initial setup parameters as well as the most common parameters used to get started setting up a VibroBlock® feed system. There are many other features available in the VBC-16VFP that are not covered here. Please refer to the Operating Instruction manual for all available features. With this guide, you will find it quick and easy to get a VBC-16VFP up and running. Follow the steps **(1)-(6)** for setting up a new system.

NAVIGATION

Press the **P** button until you reach a display that starts with **C** followed by 3 digits such as **C000**. Press the ▲ ▼ buttons to select the desired parameter number. Press the **P** button to select the parameter selection you would like to change. Press the ▲ ▼ buttons to change your selections value. Always press **P** to save before moving to the next step. (You may step backwards at any time by using the **F** button). The **1** and **0** buttons will start and stop vibration if the control is enabled. ***Follow these navigation instructions for all the following steps.***



(STEP 1) RECALL FACTORY SETTINGS

When powering up a VBC-16VFP controller for the first time, it is recommended that you RECALL FACTORY SETTINGS. A New control should already have these settings, but performing this step ensures that no parameters have been changed since the control was manufactured. Perform the following steps:

- Use the up/down buttons to get to **C210** (RECALL FACTORY SETTINGS)
    1. Press the **P** button.
    2. At the **FAC** display, press the ▲ button and the controller will flash **SAFE** on the screen. This step resets the controller back to factory defaults, so that any incorrect settings are cleared.
    3. Press the **P** button until you see **C210**.

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(STEP 2) CONFIGURE THE SERVICE MENU ITEMS

1. In order to use all the parameters of the Service Menu, Service Mode must be enabled. Go to **C127**, and select **En.S**. Change it to **EN.S1**. You can now access all the Service Menu parameters. We can now proceed to the Service Menu: **C. 040**. Change only parameters: **I.xxx.x**, **F.L.xx**, **F.H.xx** and **P.L.xxx**.

2. The first parameter we will change is current limit. It is displayed as **I. 100.0.** 100.0 equals 100% output of the controller which is 16 amps. It is important that this parameter be set for the number of VibroBlocks® that are connected to the controller times the current rating of the VibroBlock®. An example might be: A 30 inch driver with 6 VB-32 VibroBlocks®. 6X2 amps per block equals 12 amps. The parameter is set to: **I. 075.0**. The formula is: **(Total VibroBlock® amps) /16 X 100**. For the above example: **(12 amps) / 16 X 100 = 75%.** Proper setting of this parameter will prevent burning out of the VibroBlock® coils.

3. The next 2 parameters we will change are the low frequency limit and high frequency limit. These parameters limit the frequency range of the controller output as well as the range of the automatic frequency search. Since VibroBlock® feeder frequencies change very little over time, it is advisable to set these limits close. Plus and minus 20% is usually a good range. For a feeder tuned at 60Hz, the range would be: **F.L. 48** and **F.H. 72**.

4. The last parameter is Output Voltage Limit. Leave it at the factory default value of: **P.L.100** when operating the control from supply voltages of: 100-125 volts. When operating the control from supply voltages above 125 volts, set **P.L.** using this formula: **120 / (supply voltage) X 100**. Example for 208 volts: **120 / 208 X 100 = 57.69**. Round up to **58**.This is very important because it limits the output voltage to the VibroBlocks® to 120 volts and could prevent possible damage from high voltage.

5. When you are done with the steps above, go to **C127** and change **En.S 1** back to **En.S 0**. This will prevent someone from accidentally changing any of these important parameters.

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(STEP 3) ENABLE TO RUN

In order to perform the next step: Auto Tune, the control must be enabled to run. If the enable input is wired to a PLC, it may be possible to turn on the enable input. If not, the following steps will need to be performed in order for the system to run. You will be inverting the enable input, which will allow the system to run when the enable input is off. This is the **En.x** parameter, found in **C003**.

- Use the up/down arrow keys until you see **C 003**.
- Press the "P" key until you come to the **En.x** parameter.
  Use the ▲ ▼ keys to set **En.1**. (The enable input is now inverted).

(STEP 4) AUTO TUNE

- Use the ▲ ▼buttons to get to **C008**. Press the **"P"** button to get into the **C008** parameter lists.
  1. Set the **A** (amplitude) parameter to 20% as starting point, using the ▲ ▼ keys.
  2. Press the **"P"** button to go to the next parameter.
  3. Set the **P** (power) parameter to 20% to start, using the ▲ ▼ keys.
  4. Press the **"P"** button to go to the next parameter.
  5. Do not change the **"F"** (frequency) parameter. This will be set during auto-tune. Press the **"P"** button to skip the **F** parameter.
  6. Change the **ACC** parameter from "**0**" to "**1**" using the ▲ ▼ keys. This enables the transducer.
  7. Press the **"P"** button to go to the next parameter.
  8. The **"PA"** parameter is the gain setting. Lowering the number will reduce oscillations in output. Leave the setting at default for auto-tune.
  9. Press the **"P"** button to go to the next parameter.
  10. The **"IA"** parameter is the acceleration setting. Start with 20% for tuning. A HIGHER number will lessen the rapping on vibration start.
  11. Press the **"P"** button to go to the next parameter.
  12. When at the **"AFC"** parameter, use the ▲ ▼ buttons to change the "**0**" to a "**1**". This will turn on automatic frequency control.
  13. Press the **"P"** button to go to the next parameter.
  14. When at the **"AFS"** parameter, press ▲ or ▼ button to start auto-tuning.

<u>Auto-Tuning Completed</u> –

- Auto-Tuning is complete when the display stops flashing.
- Set **I.A** to approximately 50-80% to lessen any rapping on vibration start.
- Proceed to step **5A** or **5B**.

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PERFORM (STEP 5A) or (STEP 5B)

Note: The "**A**" parameter is the parameter that the operator would normally change in order to adjust amplitude. The "**P**" parameter is used as a high limit to protect the equipment from damage from overly high amplitude. It should be set slightly higher than the highest amplitude that is needed with "**A**" at **100**. **"P**" and other setup parameters can be hidden if desired after setup is complete. (See Operator Manual 10.2.10)

(STEP 5A) NON-ANALOG APPLICATIONS:

Set the "**A**" amplitude parameter to **100**%.

Adjust the "**P**" power setting upwards until the vibration level is optimum, and then increase the "**P**" setting slightly more than needed. This should be set to no more than the maximum safe vibration amplitude.

Adjust "**A**" for the desired running amplitude.

(STEP 5B) ANALOG CONTROL APPLICATIONS:

"Amplitude/Power" Parameters Set-Up -
Set the analog input to **100**%, with the "**P**" power setting at some lower value (maybe 50% to start).

Adjust the "**P**" power setting upwards until the vibration level is optimum, and then increase the "**P**" setting slightly more than needed. This should be set to no more than the maximum safe vibration amplitude

Lower the analog input "**A**" (amplitude) until vibration is back at optimal. You can now use the full range of the analog input from zero to 100% without any danger of damaging the equipment.

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NOTES

- To use analog control, make sure that the "**A**" parameter amplitude setting is set to "**0**".

- At start of tuning, make sure that the enable – **C003**, (-**EN.x**) is set to "**1**". Return the enable to (-**En.0**) for normal operation from an external enable.

- If the VBC-16VFP is used with analog control, set these **C003** parameters accordingly:
    1. **ESP.1** = External set point
    2. **ESP.0** = Internal set point
    3. **420 0** = 0-10Vdc analog input
    4. **420 1** = 4-20ma analog input
    5. **POT.0** = Use analog input
    6. **POT.1** = Use keypad/potentiometer

(STEP 6) USING TWO SETPOINTS:

It is possible to program two different internal set points and switch between them using digital wiring signals. This is useful if a controlled item might need to "slow down" in the event of a high level.
To use two set points, wire the primary "enable" signal to terminal #5 (terminal #4 is DC common).
Wire a second "enable" input to terminal #2.

Logic operation for these signals is as follows:

- Enable #1 ON = Set point #1 (normal) activates.
- Enable #1 AND #2 ON = Set point #2 activates.

To activate the programming for two set points –

- Use the ▲ ▼buttons to get to **C003**. Press the **"P"** button to get into the **C003** parameter lists.

- Set these **C003** parameters accordingly:
    1. **SP.2.0** = Level sensor control
    2. **SP.2.1** = 2nd Set Point Active
    3. **S2.d.0** = Level sensor control
    4. **S2.d.1** = Time delayed changeover to 2nd set point.

- Set these **C002** parameters accordingly:
    1. **A.** = 1st Set point amplitude
       2. = 2nd Set point amplitude

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PARAMETER REFERENCE (From Operator Manual)

Parameter:		Code	**Factory setting:**	Entry Code:
Vibratory feeder				
• Amplitude (throughput)	0...100 %	A.	0 %	000, 002

The following variable parameters are available for setting up the feed system

Parameter:		Display	**Factory setting:**	Entry Code:
Vibratory feeder				
• Amplitude (throughput))	0...100 %	A.	0 %	000, 002, 020, 096
• Maximum control limit (U_{max})	5...100 %	P.	90 %	008, 020, 096
• Vibrating frequency	30...140 Hz (5...300 Hz)	F.	100 Hz	008, 020 040, 096,
• Soft start ramp up	0...60 Sec.	/.	0.1 Sec.	020, 096
• Soft stop ramp down	0...60 Sec.	\.	0.1 Sec.	020, 096
• Switch to external set point	0 / I	E.S.P.	0	003
• Set point 0(4)...20 mA	0 / I	4.20	0	003
• Potentiometer set point	0 / I	POT.	0	003
• Coarse / Fine control	0 / I	S.P.2.	0	003
• Invert enable	0 / I	-En.	0	003
• Pulse feed	0 / I	HOP.	0	064
• On time delay (only if HOP. = I)	0…60 Sec.	H.	1.0 Sec.	064
• Off time delay (only if HOP. = I)	0…60 Sec.	h	1.0 Sec.	064
• Invert hopper sensor (not active)	0 / I	-Ho.	0	064
Regulation (with sensor)				
• Switch to regulation	0 / I	ACC.	0	008
• P characteristic	0...100	P.A.	40	008
• I characteristic	0...100	I.A.	100	008
• Automatic frequency control	0 / I	A.F.C	0	008
• Start automatic frequency search		A.F.S.		008
Track control				
• Switch on time delay	0...60 Sec.	I.	1.0 Sec.	007, 167
• Switch off time delay	0...60 Sec.	O.	1.0 Sec.	007, 167
• Invert sensor	PNP / PNP invert	-SE.	PNP	007, 167
• Sensor Time-out	0 / I	E.En.	0	015, 167
• Sense time delay (Sensor Time-out)	1...240 Sec.	E.	180	015, 167
• Not Used		A.i.	4	015
Service				
• Display actual output current		i.		040
• Display actual frequency		F.		040
• Save user settings		PUSH.		143
• Recall factory settings		FAC.		210
• Recall user settings		US.PA.		210
• Hide programming menus	0 / I	Hd.C.	0	117
• Hide set point adjustment	0 / I	di.S.	0	137
• Display software version				001

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USER GUIDELINES

USER GUIDELINES OVERVIEW

The VBC-16 VFP is a variable frequency controller designed to operate Arthur G. Russell Co. VibroBlock® feeder systems. It is our next generation of controllers, and is intended to be used in place of the VBC-2000, or earlier controllers such as the VBC-73S. It is capable of providing the same features as the VBC-2000 with one important addition: The ability of operating VibroBlock® feeder systems at different frequencies than what are available from the power line, such as 60hz or 50hz. This document will explain some ways of taking maximum advantage of this feature.

TUNING NOT NECESSARY

When setting up a new VibroBlock® system such as a feeder, track or bin, we no longer have to tune it to a particular frequency. For most applications you will need to calculate the SRU's for 60hz as shown in the VibroBlock® Feeder Instruction Manual. No further tuning is required. No weights will be generally necessary on tracks and bins. The only weights that will be required will be on feeder bowls, and only enough to achieve proper balance. Balance a bowl, using the Arthur G. Russell bowl balancing device as described in the VibroBlock® Feeder Instruction Manual. The only reason to start off with a frequency of 60hz is that we have the most experience with 60hz and are familiar with the way parts feed at this frequency. The VBC-16 VFP can auto-search and find the resonant frequency of a VibroBlock® system. That frequency is saved and used as a starting point when the feeder, track or bin is run. The controller will make automatic adjustments as tuning changes over time. This eliminates periodic maintenance for the purpose of re-tuning.

SPECIAL CONSIDERATIONS WITH VARIABLE FREQUENCY

When operating a feeder and a track together, it is important to pay close attention to the gap between the two. They will never stay in sync as they vibrate as they do with conventional controllers. A larger gap will be necessary to prevent the two from hitting each other. In some cases an overlapping transfer may be required when feeding small parts.

Proper isolation of mass bars is more important when using variable frequency controllers. Two vibratory devices operating on the same machine will create a third frequency that is equal to the difference between the two. As an example, a feeder operating at 60hz and a track operating at 61hz will produce a once per second vibration that can be felt and heard traveling through the machine. More than 2 controllers will create multiple frequencies as they interact with one another. These frequencies are often referred to as harmonics. In some cases harmonics can actually be seen in a vibratory device that appears to be pulsating or not running smoothly. Often building

lighting provided by fluorescent or HID lighting causes this. This type of lighting will act like a strobe light at building line frequency such as 60hz or 50hz. This will appear as a pulsation that moves at the difference between building frequency and vibratory frequency. It is most visible on the amplitude sticker. If you suspect that you have a problem, shine a flashlight at the sticker while shielding it from building lighting. If the pulsation goes away, it was just an optical illusion caused by the strobe effect. If it remains, gain adjustment or service may be required.

Harmonics can also be produced in a feed system in other ways, such as: Loose mounting screws on a bowl or track. Tooling that is not rigid or securely fastened. Loose tuning weights or any other loose components. Harmonics can be particularly troublesome when performing an Automatic Frequency Search with the VBC-16 VFP. Automatic Frequency Search should never be performed with any product in the feed system. It also should not be done on a bowl until after the bowl has been balanced. It should be repeated after any addition or removal of tooling. The Automatic Frequency Search outputs it's full range of frequencies in order to find the resonant frequency. This can take several minutes and sometimes needs to be repeated. Follow the directions in the VBC-16 VFP manual or our Quick Start Guide.

SPECIAL APPLICATIONS

Another major advantage of variable frequency is the ability to operate at frequencies other than the ones available from the power line. This can be very helpful in solving difficult feeding problems. The first special application we will discuss is: Tuning to a higher frequency. If you have a feed system that is having trouble making rate, you may need to try a higher than line frequency. Higher frequencies can be helpful when feeding small or light parts. All that is required to raise the frequency is to add springs to the VibroBlocks®, followed by an Automatic Frequency Search. Springs can be added up to the limit allowed, although only enough should be added to do the job. Higher frequencies will cause more audible noise and may shorten the life of VibroBlock® components such as springs and spring mounting screws. Higher frequencies may cause the need to lower VibroBlock® angles. The second special application we will discuss is: Tuning to a lower frequency. There is rarely a need to tune to a lower frequency. The main reason to do so is in the case of a very large or heavy bowl that requires a maximum spring stack. In this case, lowering the frequency may increase the life of VibroBlock® components. Another reason would be a feed system that can vastly over feed. Reducing the frequency will decrease audible noise. Please note that VibroBlock® angles may need to be increased at lower frequencies. Lower frequencies will generally cause VibroBlocks® to run cooler as higher frequencies will generally cause VibroBlocks® to run hotter. Experimenting with different frequencies can often help solve problem applications but is not usually necessary.