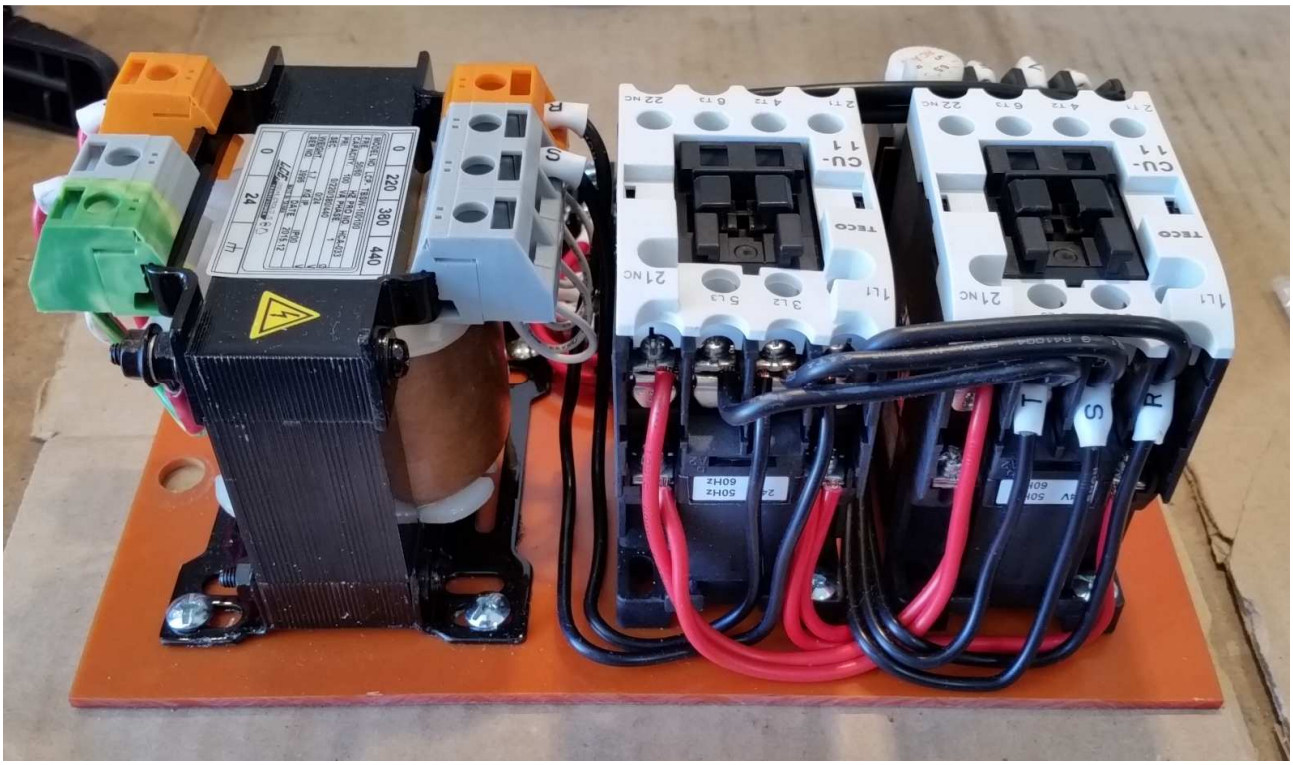
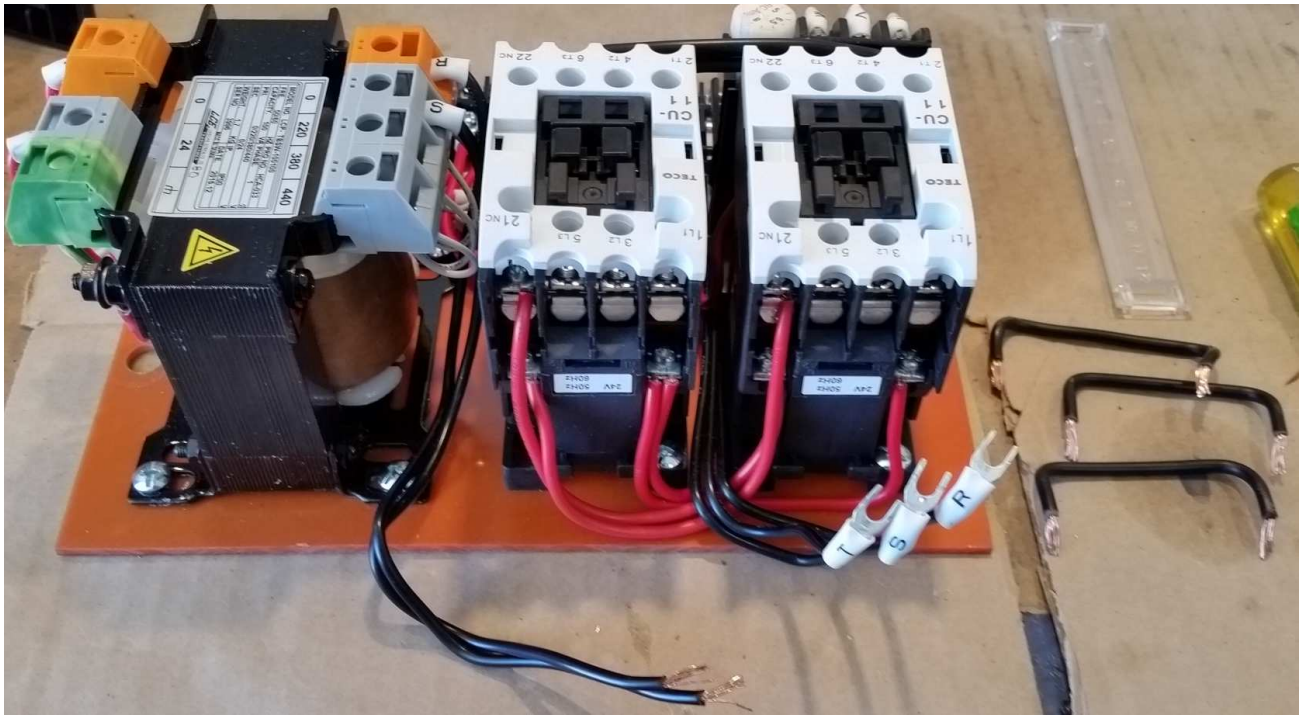
PM1340GT BASIC VFD CONVERSION USING THE STOCK CONTROL SYSTEM AND CONTROLS

The stock 3 phase (or single phase) PM1340GT control board and switches can be reconfigured so that the contactors are used to activate the VFD control inputs for forward and reverse, the JOG button on the front panel activates the forward contactor which will work exactly as the non-VFD configuration, i.e. the motor will jog at the same speed as the forward command would. The conversion is best made by removing the wires from the control system terminal and removing the control board from the machine. The front of the control board looks like this:

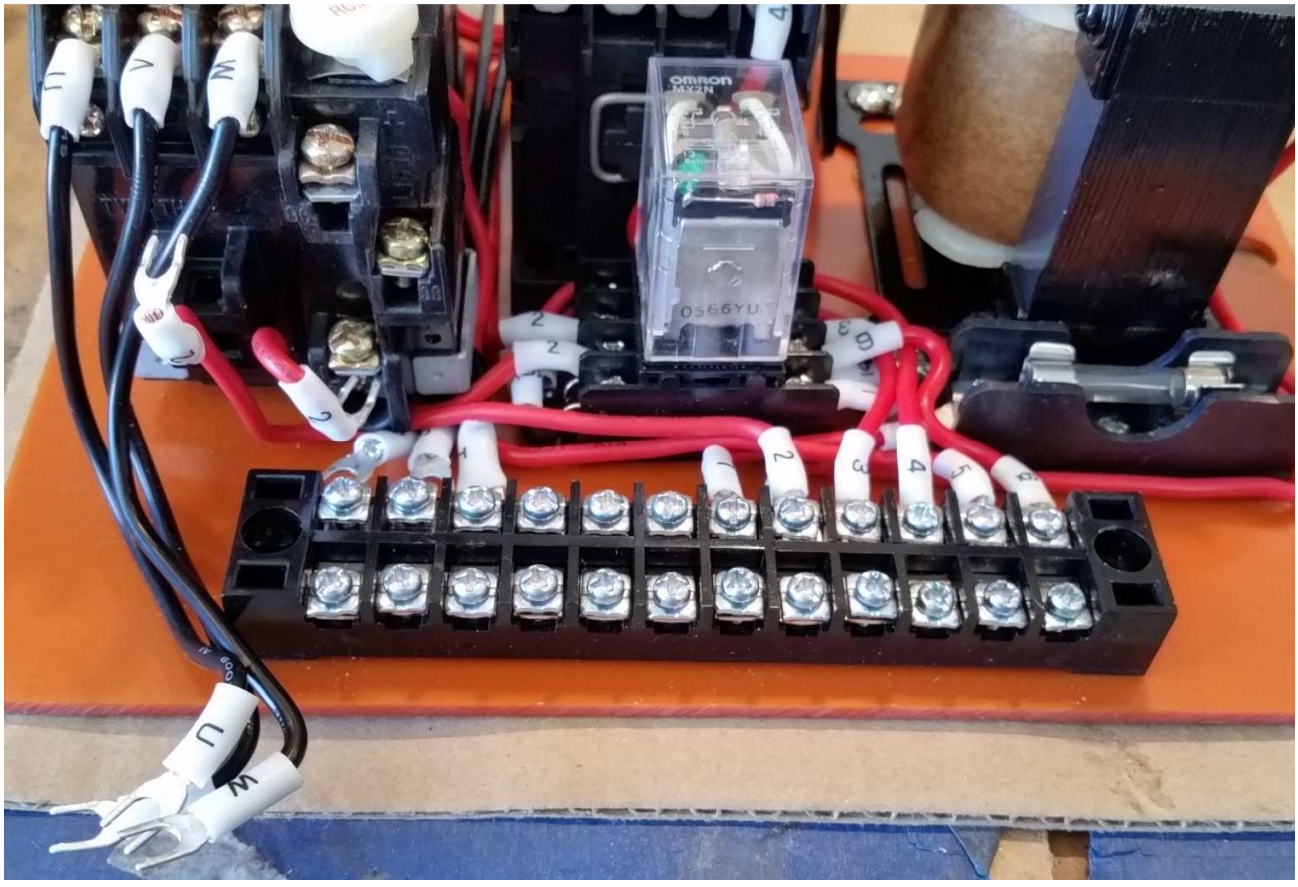
The rear looks like this:



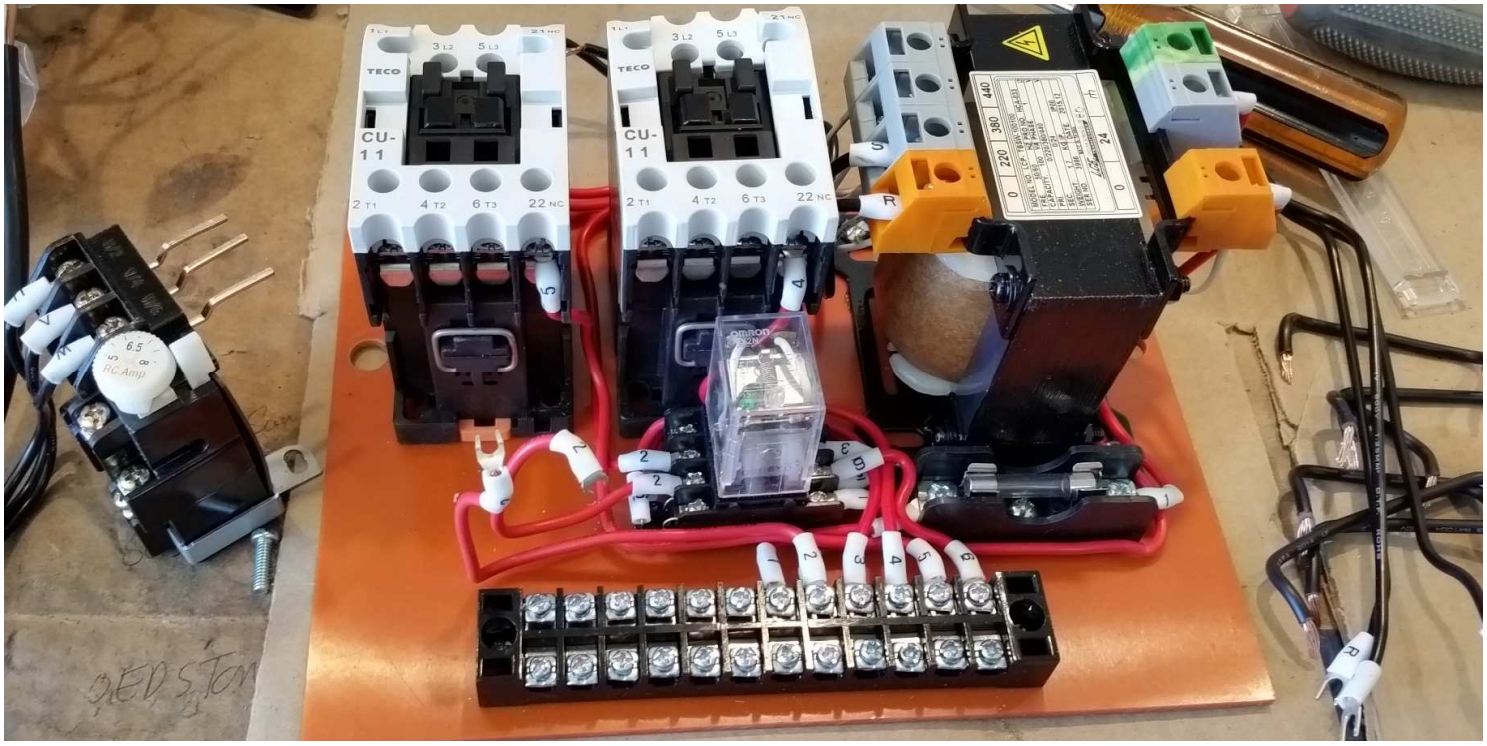
The first thing that needs to be removed is the high voltage wiring, the Black wires. Do not remove any of the red wires unless directed to do so. Loosen the screw for L1, L2 and L3 (1, 3, 5) on both contactors and disconnect the black wires. Leave the R and S black wires connected to the transformer.



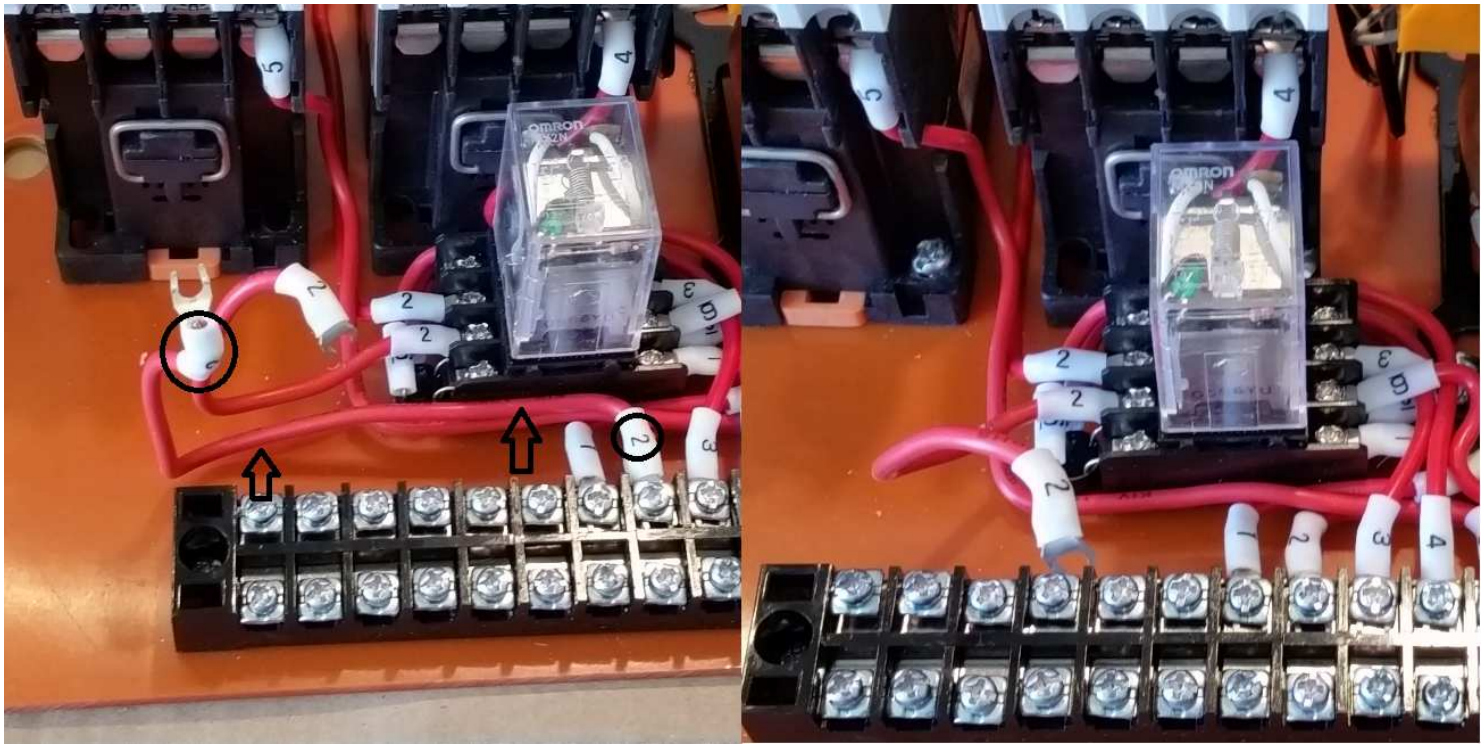
Turn the control board so the front is facing you, Loosen the power connects at the terminal strip which connected wires R, S, T and U, V, W and disconnect from the terminal strip. Also loosen the terminals for the two wires that attach to the thermal oveload relay.



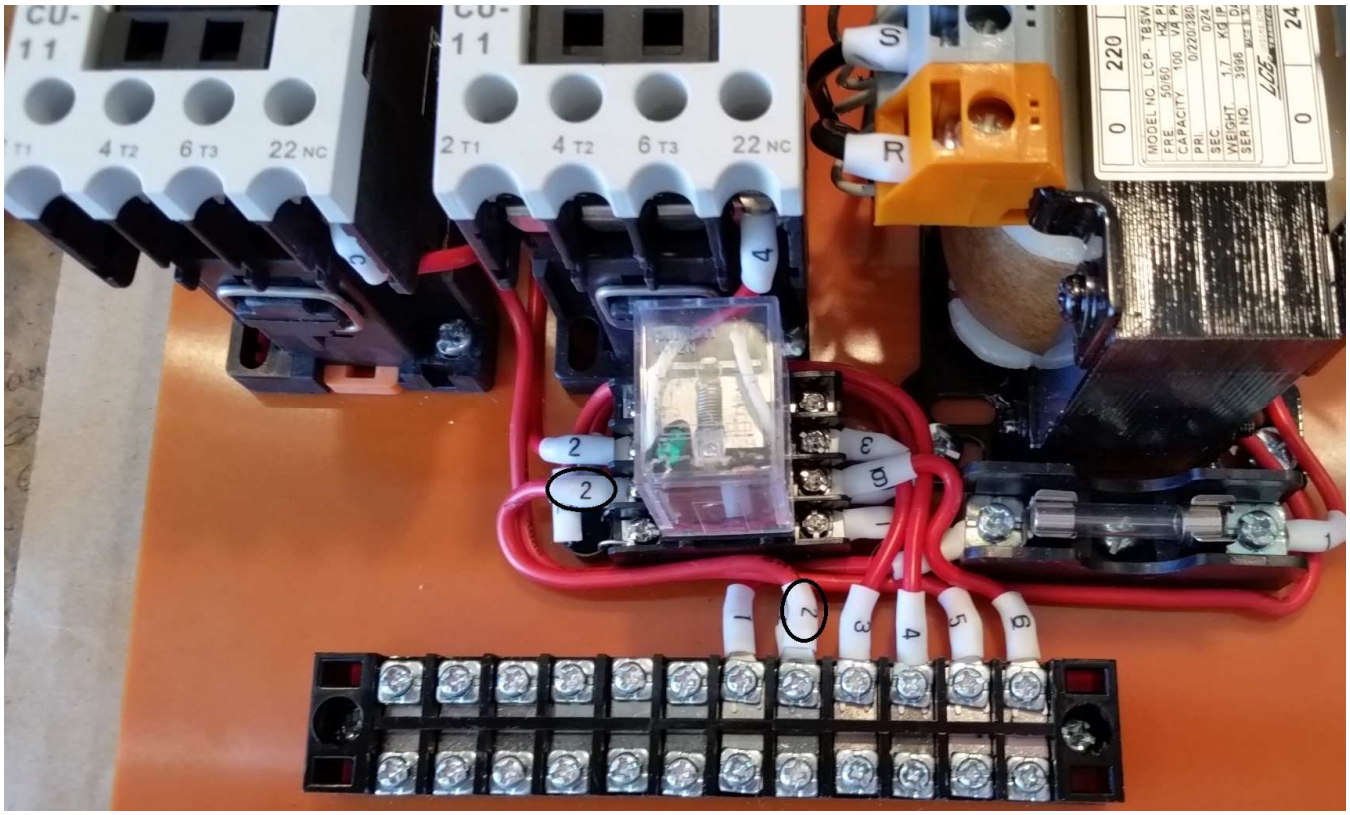
Loosen the terminals T1, T2 and T3 (2, 4, 6) on BOTH contactors, remove the black wires between the contactors, then loosen the thermal oveload mounting screw (the same one that holds the forward contactor in). Remove the thermal overload relay as shown, and then reinstall the contactor mounting screw.



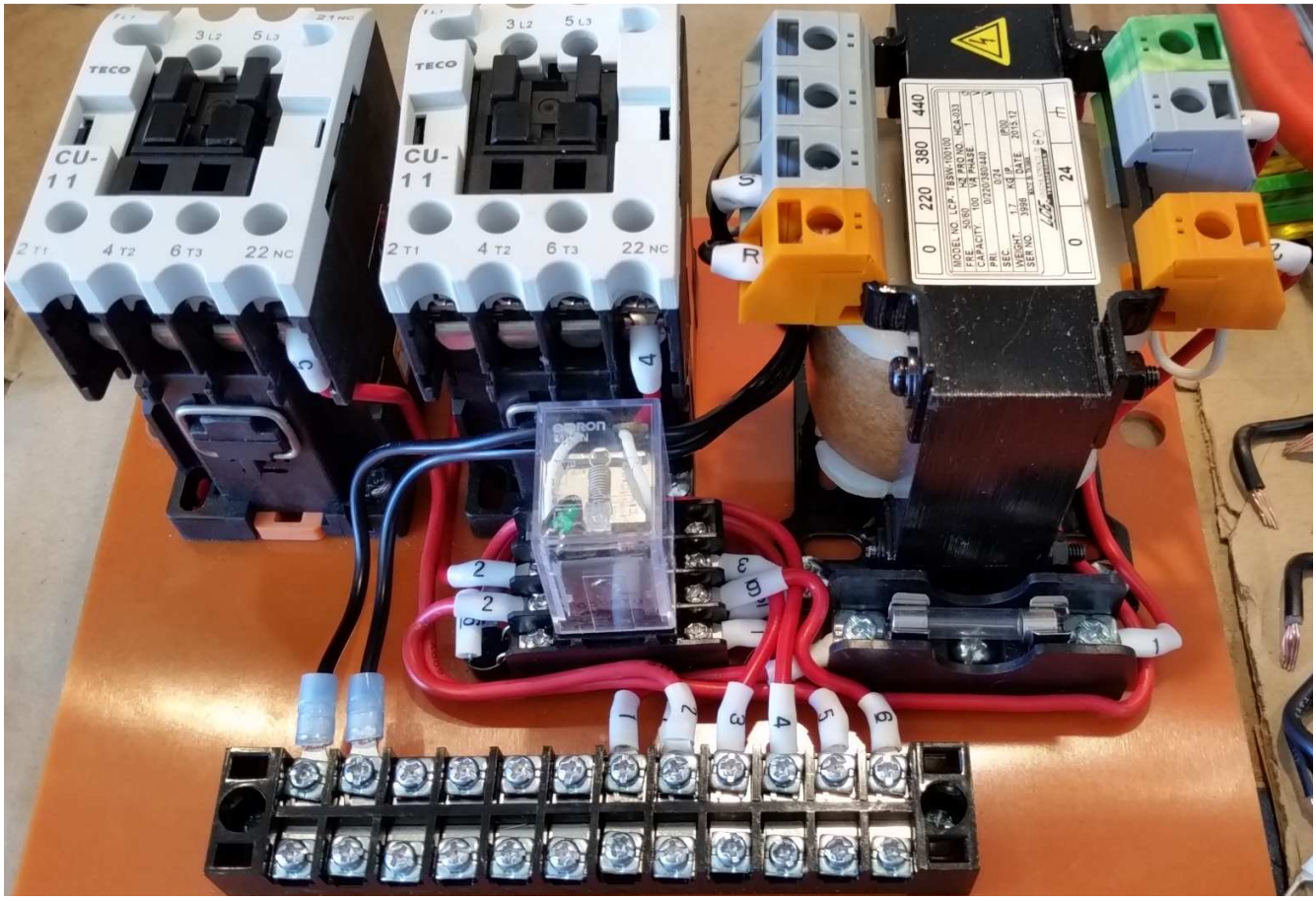
Remove the red wire labeled 2 that connects to the terminal strip, leave the red labeled 2 wire connected to the small relay.



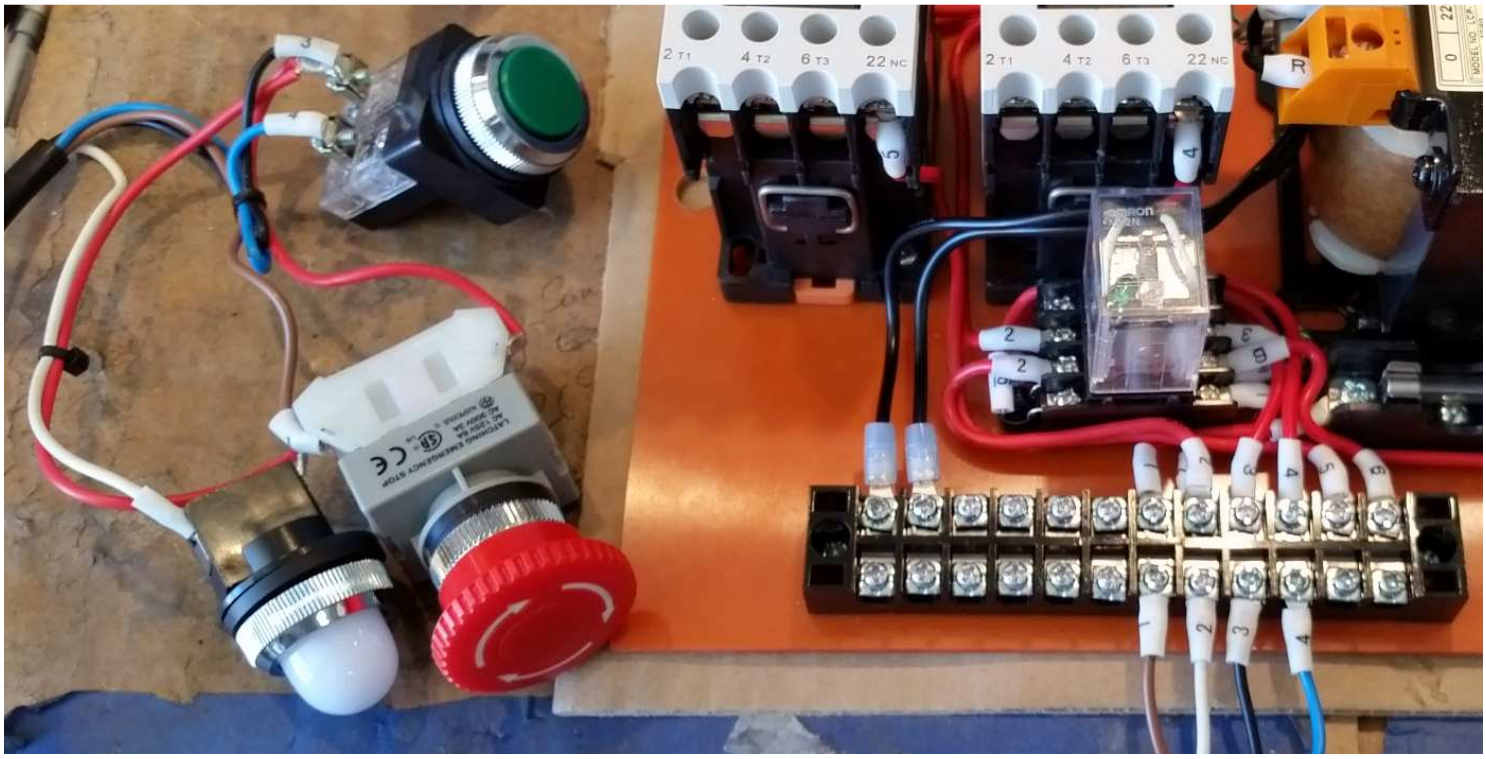
Connect the short red wire labeled 2 which connects to the small relay to the same terminal that the previous red wire was attached at the terminal strip labeled 2. The spade may need to be bent so it slides into the terminal.



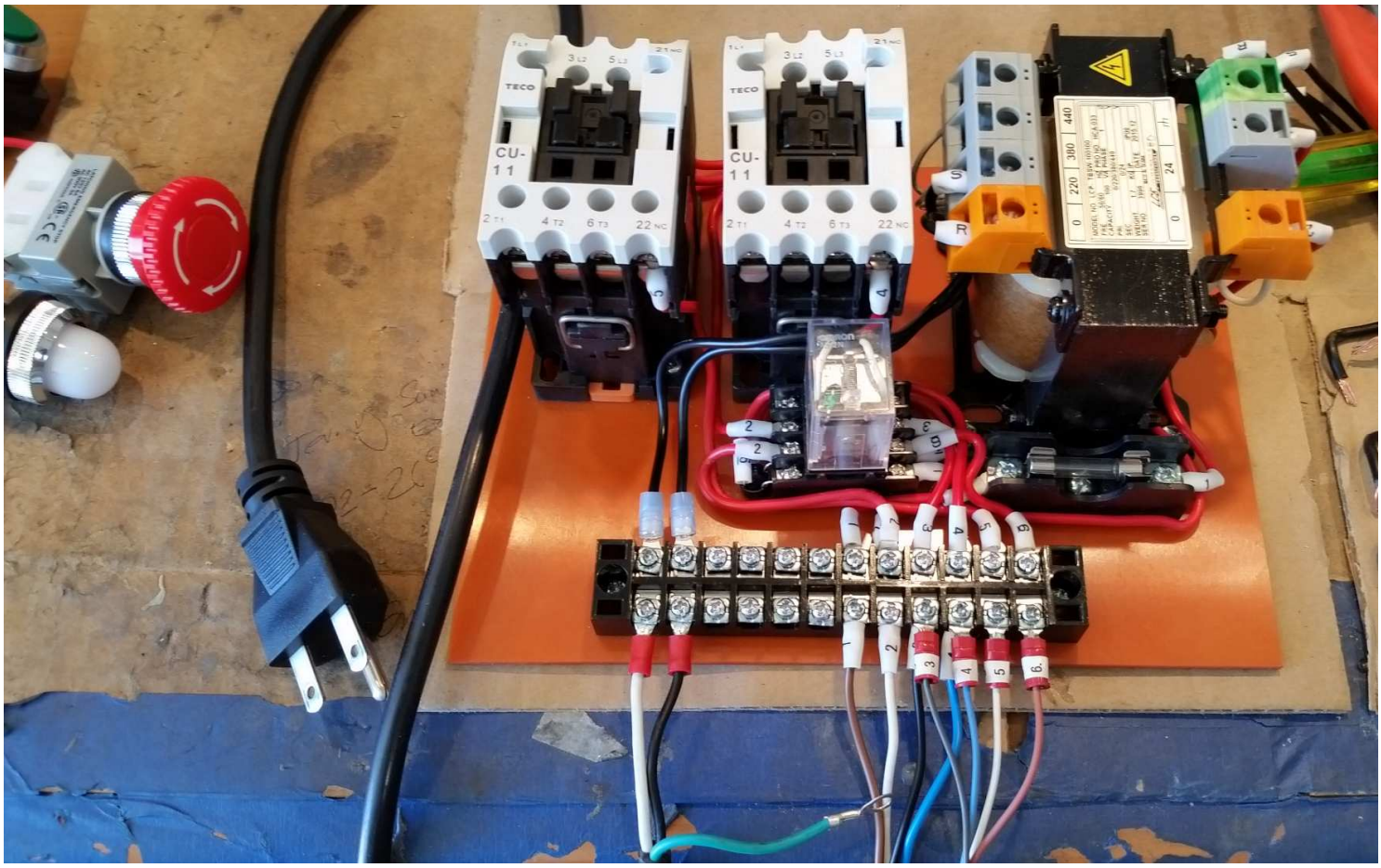
Terminate the two black wires (220 VAC in) from the transformer R and S with spades and connect to the first two connections on the terminal strip.



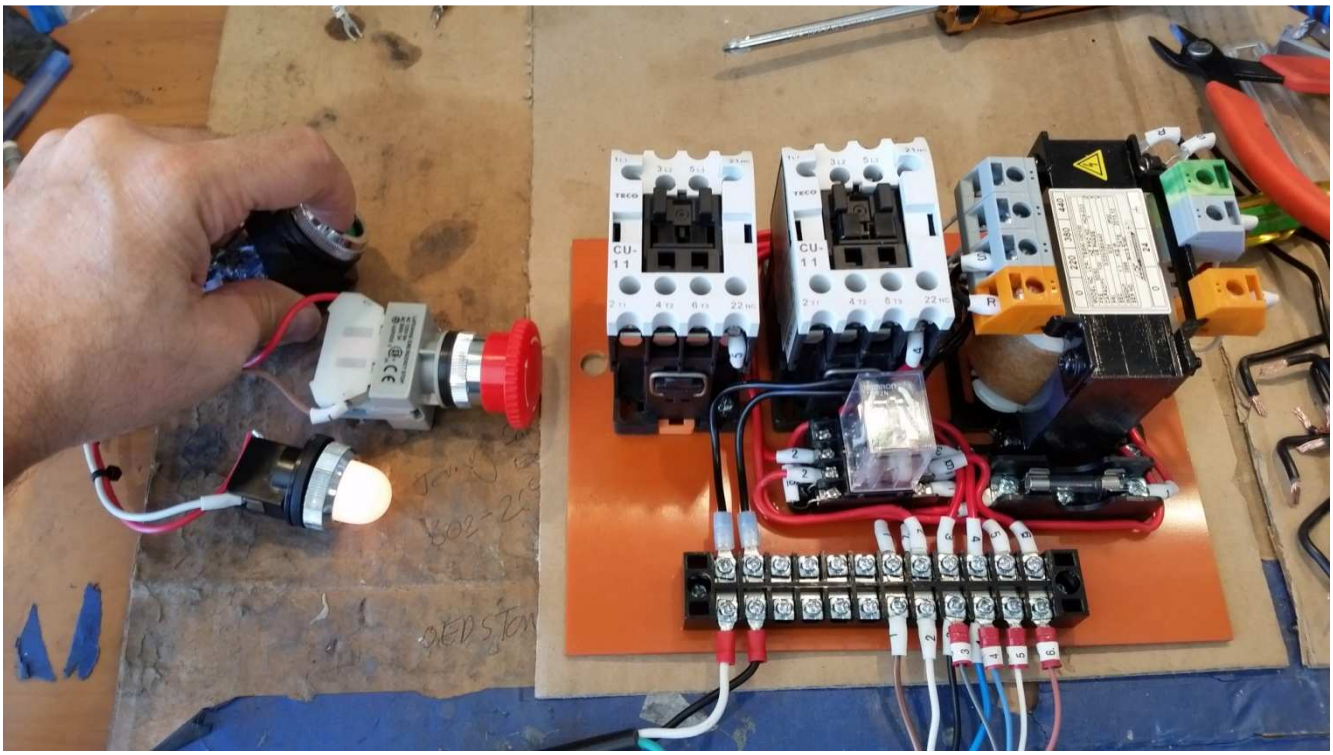
Reinsert the control board into the cabinet and mount, be sure to add some sealant on the 6 mm mounting bolts, since they go directly into the headstock case. Reconnect the front control wires labeled 1, 2, 3 and 4.



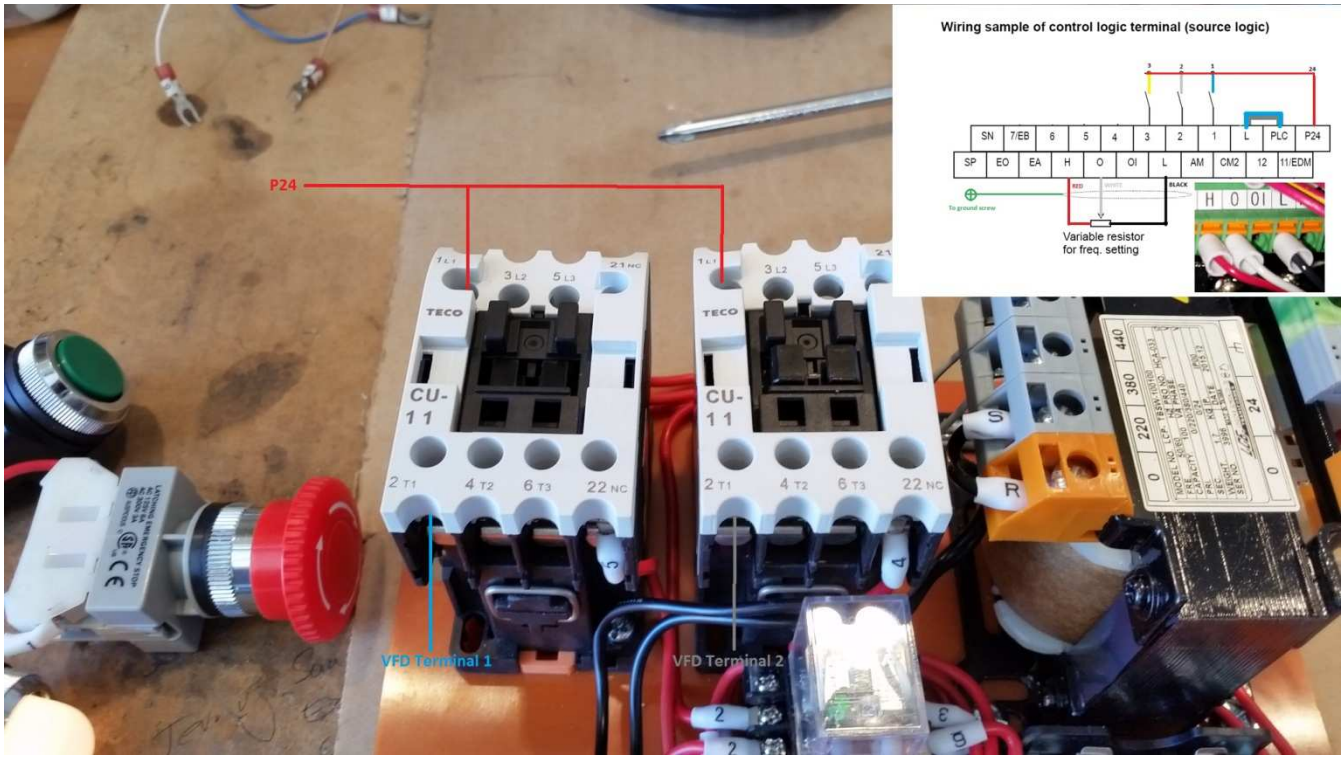
Reconnect the spindle cables wires, 3, 4, 5 and 6. Connect 220-240VAC in to the two transformer input wires and connect the ground to your cabinet. The stock 24VAC light if ordered would connect to the wires labeled 1 (brown) and 2 (white).



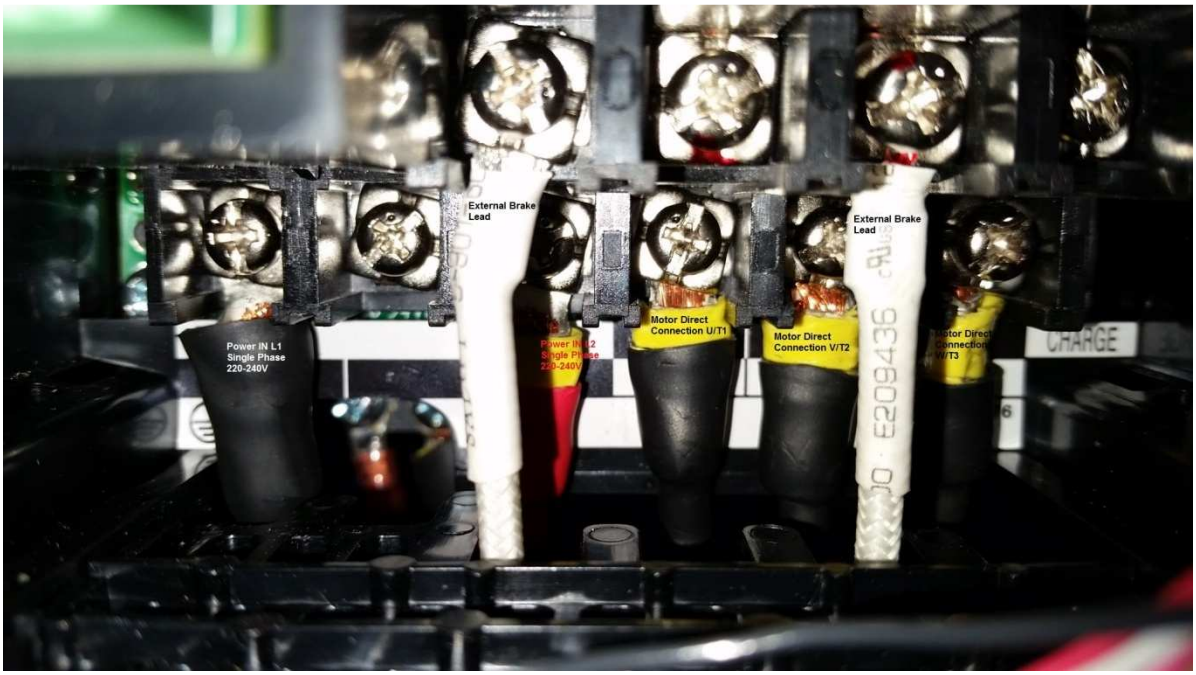
So when the system is now powered, the contactor on the left (Forward) will be activated when the spindle lever is down or the Jog button is pressed, the contactor on the right will be activated when the spindle lever is up. Only one contactor will activate at a time, neither will activate if the machine is turned on with the spindle lever switch in the forward or reverse run position. Picture below is with the Jog button pressed and the left contactor is activated.



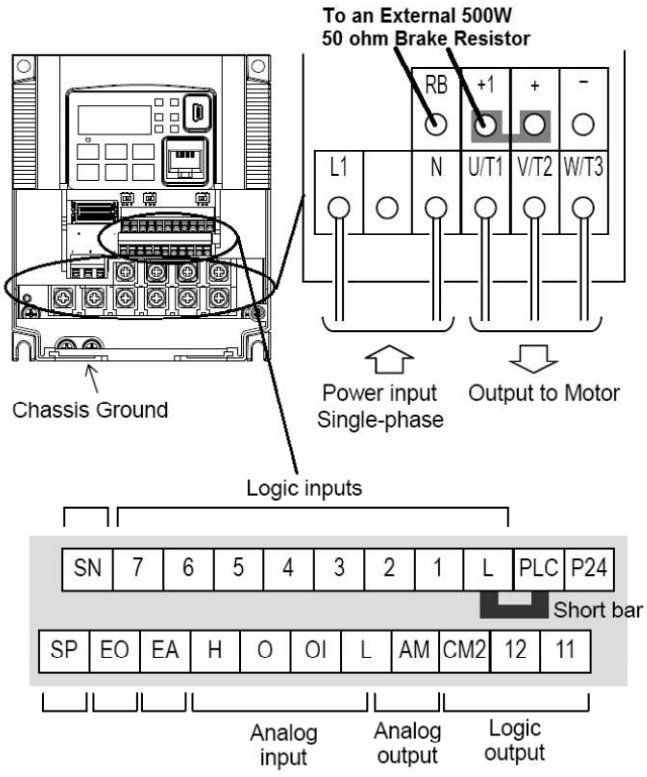
The VFD input terminals by default, input 1 is forward and input 2 is reverse. It is possible to add a VFD Jog function by changing the Jog button to a dual pole with two NO switch contacts. One contact side connects the same #3 and #4 wires which will activate the forward contactor, the other switch block would connect to P24 and go to the VFD terminal input #3. When the button is engaged, the forward contactor will be engaged, input 3 when programmed for Jog will set the "Jog" frequency to 6 Hz.



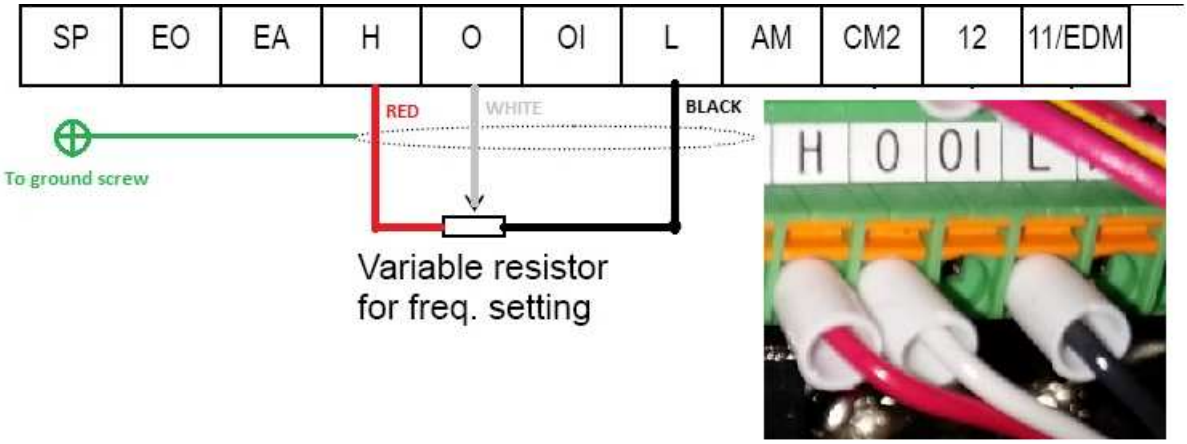
The motor power cable connects to terminals U, V, W at the VFD and the same terminals on the motor, and connect the green ground wire to the ground terminal at the motor. The connection order of the black motor power wires is not important, if the motor is running in the wrong direction, switch any 2 black wires at the motor end. I like to but a small dab of medium strength lock-tight on the end of the motor terminal studs to prevent the nuts from loosing. Be sure that all the wires are neatly placed in the motor control box, be sure the wires are not pinched or shorted. The main power cable going to your VFD should be 12G for short distance (up to ~25'), if longer than 10G (I often like to use 600V rated SOOW or similar wire cable because of the thicker insulation is more durable). The 240V main power to your VFD is connected as shown in the picture below.



Single-phase 200V 0.75 to 2.2kW



The VFD speed potentiometer is usually 1 to 5 K Ohms and uses 3 wires between the Pot and the VFD. When you connect to the VFD cable, there is Red wire goes to H (+10V), White to O (variable), and Black to L (low) as shown. The cables should be shielded, as well as the motor cable and control wires between the VFD and the control board. Connect the shield drain/ground wire to the ground screw at the bottom of the VFD or the star ground if it is close enough. Connect all grounds to the incoming power ground lead. It is important that once all that grounds are connected to the star ground post in the VFD enclosure, that you then tighten the nut so all the grounds are securely fastened.



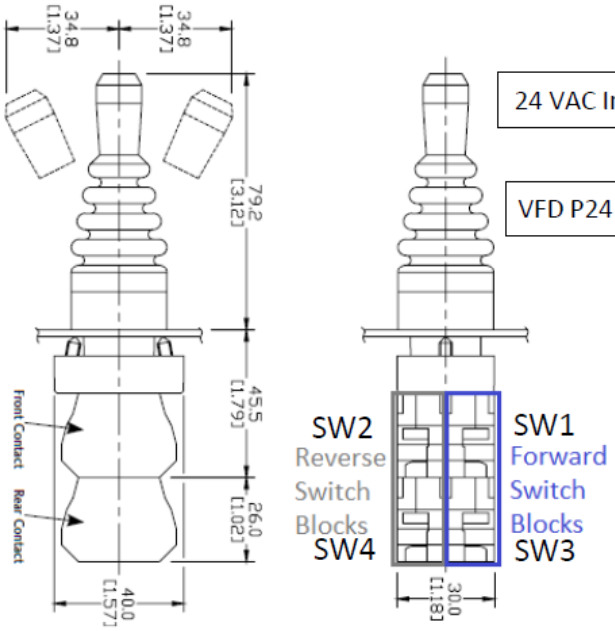
Two way Joystick Jog using For/Rev contactors for Hitachi WJ200

ECX Series 22mm Plastic Joystick ECX3510 and *ECX1040-2*

(two additional NO switch blocks). Total of 4 NO switch blocks.

Lighted E-Stop with TWO NC switch blocks (GCX1226-24L + ECX1030, AR22V0L-01E3R + AR9B291)

Optional: 1 and 2 Stage Braking



X1 24 V Power light in E-Stop X2

Connect to white wire #2 going to control box terminal #2

Connect to black wire #3 going to control box terminal #3

E- Stop

NC

24 VAC In #1

2nd SW Block for E- Stop

NC

VFD P24 or L

Contactor inputs

FOR 1 (L1)

REV 1 (L1)

FOR 1 (T1)

REV 1 (T1)

Input 1

Input 2

JOG
On – Off - On

JOG FOR SWB1 Momentary

JOG REV SWB2 Momentary

NO

NO

JOG FOR SWB3 Momentary

JOG REV SWB4 Momentary

NO

NO

Connect a new wire to terminal 5 White Wire (this operates the reverse contactor).

Connect a new wire to terminal 4 Blue Wire (this operates the forward contactor), one can use current blue wire from the jog sw

Input 3

NOTE: Input 3 must be programmed for Jog

Input 5

NOTE: Input 5 must be programmed for 2 stage braking

Braking SW - sustained
Open = 1 stage
Closed = 2 stage

The VFD will need to be programmed to accept commands from the terminal inputs and to set all the parameters. It will not operate until this is done. Load the Hitachi software and driver to your computer. Remove the little rubber port and connect the USB cable to the port on the WJ200, . Do not connect the USB cable to the computer yet, you must first power up the WJ200 and the computer, then connect the cable to your computer. It should show the USB driver is loaded under your devices. See the separate PDF file for the specific programming via a computer.

http://www.hitachi-america.us/ice/inverters/products/ac_variable_speed_drives/wj200/
Software is available at no cost from the Hitachi website site:
http://www.hitachi-america.us/ice/inverters/support_service_sales/software_dloads

You must install BOTH the Then ProDriveNext (2.1.1) AND the USB driver software. The USB driver must be installed before connecting a computer to the VFD. With the WJ200 turned on and the USB cable connected to your computer, check in Windows under "Devices and Printers" the your Hitachi shows up in the pop up window. Then run the ProDriveNext software program. **The ProDriveNext software program has FOUR separate modules that are sequentially installed, so continue the installation until it says it is completed. NOTE: THIS SOFTWARE MAY NOT WORK WITH WINDOWS 10.**

1. The software in NOT intuitive until you have used it for awhile. When you load the software, click on the "File" tap at the top menu, then select "New Solution" each time when connecting to the VFD. Otherwise it tries to load old saved VFD files that are saved on your computer. There may be a way to edit them and download back to the VFD, but haven't been able to do this.

2. In the window tab "Add device" check the lower two check boxes, "Read Items:....", then click the "Online&Read" button below. A pop-up screen should indicate that the VFD is on-line and connected, hit the OK button, and this will start the download of the VFD programmed parameters to the computer program.

3. In the left Toolbox pane you will see the VFD is connected. Click on the Parameter Data, a series of tabs and screen should come up in the right viewing pane. Note the series if Taps for each Parameter Group (F, A B, C, H and P). Each Group Tab is a separate list of programmable functions, so you need to click on that tab to see the parameter group.

4. On any one Group Page, you can modify each parameter by clicking on the "Set Value" cell and entering the new numerical value. The parameter line will be highlighted with any changes you make, you can do one or many changes on multiple lines. Note: the value is not changed in the VFD memory until you either hit the "Program" tab at the top and select "Download (PC->Device), or you can place your cursor over the changed parameter, hit the "right " mouse key, and a pop-up menu will give you the same options. I recommend changing a few parameters, downloading them to the VFD and checking that everything is working. Then doing a few more within a group. Also for tweaking values once you get familiar with the effects.

5. There is a software Auto-tune motor function, used to determine your motor's parameters H031-H034. **You need to run the Auto-Tune to load the motor parameters, if doing this with motor rotation, you must remove the motor drive belt. Once you run Auto-tune set H002 to 02:(Auto tuned data) to run the VFD off of your motor data.**

6. The WJ200 may need to be programmed before it will work using the terminal commands and external speed control. Some of the software operated motor

controls may change some of the VFD programming and it may stop responding to command (they change A001 and A002, so recheck these if the terminal block commands and external pot speed control stop working). Keep a hard copy of the program changes so you make. Be sure that the "Logic input" wiring connections match up with their assigned programmed functions "C001-C007".

READ THIS: If you manually program the WJ200 via the keypad you must first:

1. **Change B037 to "00"** for full display of all functions. You must press both the up and down arrows to access single-digit edit mode since this feature is not accessible in the default basic display. You must change B037 before you can change B031.

AND THEN

2. **Change B031 to "10"**. This unlocks all the high level program functions for editing. Then make the following program changes that are highlighted.

WJ200 **ProDriveNext**

Type: Parameter Set **Version:2.3.1.0**

KEY: _____ Not applicable unless you have 2 motors

Changes made to default VFD values

High Importance

BOLD/RED - Important to note.

F Group						
Data ID	***Data Name***	***Set value***	***Unit***	***Default value***	***Range***	***Comments***
F001	Output frequency setting	0	Hz	0	0.00, 0.50 ... 80.00	Set by VFD
F002	**Acceleration time (1)**	**5**	**s**	**10**	**0.01 ... 3600.00**	**Acceleration time of 5 seconds with an S acceleration curves works well**
F202	Acceleration time (1),2nd motor	10	s	10	0.01 ... 3600.00	
F003	**Deceleration time (1)**	**1**	**s**	**10**	**0.01 ... 3600.00**	**Requires external 50 ohm 500W brake resistor for 1-2 second stop times, decreasing time may trip the overvoltage error, increase the time as needed to prevent this. If no braking resistor use 2 seconds.**
F203	Deceleration time (1),2nd motor	10	s	10	0.01 ... 3600.00	
F004	Keypad RUN key routing	00:(Forward)		00:(Forward)		

A Group						
Data ID	Data Name	Set value	Unit	Default value	Range	
A001	**Frequency source**	**01:(Control terminal)**		**02:(Function F001 setting)**		**THIS MUST BE SET TO "01" IF YOU USE AN EXTERNAL POT CONNECTED TO TERMINALS "H, O & L" TO SET YOUR RPM SPEED CONTROL.**
~~A201~~	~~Frequency source,2nd motor~~	~~02:(Function F001 setting)~~	-	~~02:(Function F001 setting)~~	-	
A002	**Run command source**	**01:(Control terminal)**		**02:(Run key on keypad, or digital operator)**		**THIS MUST BE SET TO "01" IF YOU USE COMMANDS SENT TO THE VFD VIA CONTROL BLOCK TERMINAL "1-7", THIS MAY GET RESET TO "02" WHEN YOU DO THE MOTOR AUTOTUNE AND THE VFD WILL NO LONGER RESPONDS TO THE TERMINALS, SO MAY NEED TO BE RESET BACK TO "02". WHEN SET TO "01" VFD RUN KEY WILL NOT WORK, ONLY STOP KEY.**
~~A202~~	~~Run command source,2nd motor~~	~~02:(Run key on keypad, or digital operator)~~	-	~~02:(Run key on keypad, or digital operator)~~	-	
A003	**Base frequency**	**60**	**Hz**	**60**	**30.0 ... 80.0**	**SET TO MOTOR BASE FREQUENCY ON NAME PLATE, DEFAULT =60**
~~A203~~	~~Base frequency, 2nd motor~~	~~60~~	~~Hz~~	~~60~~	~~30.0 ... 60.0~~	
A004	**Maximum frequency**	**90**	**Hz**	**60**	**60.0 ... 400.0**	**Recommend 80 or 90 Hz for motors with a base frequency of 60 Hz. I use 90 on the stock motor with no issues.**
~~A204~~	~~Maximum frequency, 2nd motor~~	~~60~~	~~Hz~~	~~60~~	~~60.0 ... 400.0~~	
A005	[AT] selection	00:(Select between [O] and [OI] at [AT] (ON=OI, OFF=O))		00:(Select between [O] and [OI] at [AT] (ON=OI, OFF=O))		
A011	[O] input active range start frequency	0	Hz	0	0.00 ... 400.00	
A012	[O] input active range end frequency	0	Hz	0	0.00 ... 400.00	

A013	[O] input active range start voltage	0	%	0	0 ... 100	
A014	[O] input active range end voltage	100	%	100	0 ... 100	
A015	[O] input start frequency enable	01:(Use 0Hz)		01:(Use 0Hz)		
A016	**Analog input filter**	**31**		**8**	**1 ... 30, 31**	**It is strongly recommend this is set to "31" if you use an external speed control, such as a wired speed pot. When set to "31" the VFD averages the pot readings and only allows changes above a 0.1Hz threshold. This reduces noise spikes picked up in the wiring going to the pot which cause RPM fluctuations when the pot is set to a fixed RPM setting.**
A017	EzSQ selection	00:(disabling)		00:(disabling)		
A038	Jog frequency	6	Hz	6	0.50 ... 9.99	
A039	Jog stop mode	04:(Controlled deceleration (valid during run))		04:(Controlled deceleration (valid during run))		
A041	**Torque boost select**	**01:(Automatic torque boost)**		**00:(Manual torque boost)**		
~~A241~~	~~Torque boost select, 2nd motor~~	~~00:(Manual torque boost)~~	-	~~00:(Manual torque boost)~~	-	
A042	Manual torque boost value	1	%	1	0.0 ... 20.0	
A242	Manual torque boost value, 2nd motor	1	%	1	0.0 ... 20.0	
A043	Manual torque boost frequency	5	%	5	0.0 ... 50.0	
A243	Manual torque boost frequency,2nd motor	5	%	5	0.0 ... 50.0	
A044	**V/f characteristic curve**	**03:(Sensorless vector (SLV))**		**00:(Constant torque)**		**IMPORTANT TO SET TO "03" Sensorless Vector for best performance**
~~A244~~	~~V/f characteristic curve,2nd motor~~	~~00:(Constant torque)~~	-	~~00:(Constant torque)~~	-	
A045	V/f gain	100	%	100	20 ... 100	
~~A245~~	~~V/f gain, 2nd motor~~	~~100~~	~~%~~	~~100~~	~~20 ... 100~~	
A046	Voltage compensation gain for automatic torque boost	100		100	0 ... 255	

~~A246~~	~~Voltage compensation gain for automatic torque boost, 2nd motor~~	~~100~~	~~-~~	~~100~~	~~0 ... 255~~	
A047	Slip compensation gain for automatic torque boost	100		100	0 ... 255	
~~A247~~	~~Slip compensation gain for automatic torque boost, 2nd motor~~	~~100~~	~~-~~	~~100~~	~~0 ... 255~~	
A051	DC braking enable	00:(Disable)		00:(Disable)		**DO NOT CHANGE THIS, IT APPLIES TO A ELECTRO-MECHANICAL BRAKE**
A052	DC braking frequency	0.5	Hz	0.5	0.00 ... 60.00	
A053	DC braking wait time	0	s	0	0.0 ... 5.0	
A054	**DC braking force for deceleration**	**80**	**%**	**50**	**0 ... 100**	**If set too high will get overvoltage error due to braking regeneration**
A055	**DC braking time for deceleration**	**0**	**s**	**0.5**	**0.0 ... 60.0**	
A056	DC braking / edge or level detection for [DB] input	01:(Level detection)		01:(Level detection)		
A057	DC braking force at start	0	%	0	0 ... 100	
A058	DC braking time at start	0	s	0	0.0 ... 60.0	
A059	**Carrier frequency during DC braking**	**8**	**kHz**	**5**	**2.0 ... 15.0**	
A061	**Frequency upper limit**	**90**	**Hz**	**0**	**0.00 ... 80.00**	**Upper limit range is = A004, Maximum Frequency, use either 80 or 90Hz**
~~A261~~	~~Frequency upper limit,2nd motor~~	~~0~~	~~Hz~~	~~0~~	~~0.00 ... 60.00~~	
A062	Frequency lower limit	0	Hz	0	0.00, 0.50 ... 80.00	
~~A262~~	~~Frequency lower limit,2nd motor~~	~~0~~	~~Hz~~	~~0~~	~~0.00, 0.50 ... 60.00~~	
A063	Jump freq. (center) 1	0	Hz	0	0.00 ... 400.00	
A064	Jump freq. width (hysteresis) 1	0.5	Hz	0.5	0.00 ... 10.00	
A065	Jump freq. (center) 2	0	Hz	0	0.00 ... 400.00	
A066	Jump freq. width (hysteresis) 2	0.5	Hz	0.5	0.00 ... 10.00	
A067	Jump freq. (center) 3	0	Hz	0	0.00 ...	

					400.00	
A068	Jump freq. width (hysteresis) 3	0.5	Hz	0.5	0.00 ... 10.00	
A069	Acceleration hold frequency	0	Hz	0	0.00 ... 400.00	
A070	Acceleration hold time	0	s	0	0.0 ... 60.0	
A071	PID enable	00:(PID Disable)		00:(PID Disable)		
A072	PID proportional gain	1		1	0.00 ... 25.00	
A073	PID integral time constant	1	s	1	0.0 ... 3600.0	
A074	PID derivative time constant	0	s	0	0.00 ... 100.00	
A075	PV scale conversion	1		1	0.01 ... 99.99	
A076	**PV source**	**01:([O] terminal (voltage in))**		**00:([OI] terminal (current in))**		**This is the source of your Hz (rpm) adjustment, i.e. external speed pot**
A077	Reverse PID action	00:(PID input = SP-PV)		00:(PID input = SP-PV)		
A078	PID output limit	0	%	0	0.0 ... 100.0	
A079	PID feed forward selection	00:(Disabled)		00:(Disabled)		
A081	AVR function select	02:(AVR enabled except during deceleration)		02:(AVR enabled except during deceleration)		
A281	AVR function select,2nd motor	02:(AVR enabled except during deceleration)		02:(AVR enabled except during deceleration)		
A082	**AVR voltage select**	**02:(220)**	**V**	**00:(200)**		**SET TO YOUR MOTOR NAMEPLATE VOLTAGE, 220, 230, 240V. PM1340GT stock 3 phase motor is 220V**
~~A282~~	~~AVR voltage select,2nd motor~~	~~00:(200)~~	~~V~~	~~00:(200)~~		
A083	**AVR filter time constant**	**1**	**s**	**0.3**	**0.000 ... 10.000**	**Longer voltage sampling time decreases overvoltage fault error**
A084	AVR deceleration gain	100	%	100	50 ... 200	
A085	Energy-saving operation mode	00:(Normal operation)		00:(Normal operation)		Normal operation No Energy Saving Needed
A086	**Energy-saving mode tuning**	**0**	**%**	**50**	**0.0 ... 100.0**	
A092	**Acceleration time (2)**	**5**	**s**	**10**	**0.01 ...**	**When 2 stage acceleration used, adjust as**

					3600.00	**needed**
~~A292~~	~~Acceleration time (2),2nd motor~~	~~10~~	~~s~~	~~10~~	~~0.01 ... 3600.00~~	
A093	**Deceleration time (2)**	**3**	**s**	**10**	**0.01 ... 3600.00**	**When 2 stage braking used, this is the second stage braking time added to the 1 stage time. Adjust as needed, suggest 1-3 seconds. But need to adjust as needed.**
~~A293~~	~~Deceleration time (2),2nd motor~~	~~10~~	~~s~~	~~10~~	~~0.01 ... 3600.00~~	
A094	Select method to switch to Acc2/Dec2 profile	00:(2CH input from terminal)		00:(2CH input from terminal)		
~~A294~~	~~Select method to switch to Acc2/Dec2 profile, 2nd motor~~	~~00:(2CH input from terminal)~~	~~-~~	~~00:(2CH input from terminal)~~	~~-~~	
A095	Acc1 to Acc2 frequency transition point	0	Hz	0	0.00 ... 400.00	
~~A295~~	~~Acc1 to Acc2 frequency transition point, 2nd motor~~	~~0~~	~~Hz~~	~~0~~	~~0.00 ... 400.00~~	
A096	Dec1 to Dec2 frequency transition point	0	Hz	0	0.00 ... 400.00	
~~A296~~	~~Dec1 to Dec2 frequency transition point, 2nd motor~~	~~0~~	~~Hz~~	~~0~~	~~0.00 ... 400.00~~	
A097	Acceleration curve selection	01:(S-curve)		01:(S-curve)		Acceleration is default S curve, seems to work well
A098	**Deceleration curve selection**	**00:(linear)**		**01:(S-curve)**		**Deceleration is linear. S curve may be more likely to trip the overvoltage error.**
A101	[OI] input active range start frequency	0	Hz	0	0.00 ... 400.00	
A102	[OI] input active range end frequency	0	Hz	0	0.00 ... 400.00	
A103	[OI] input active range start current	20	%	20	0 ... 100	
A104	[OI] input active range end current	100	%	100	20 ... 100	
A105	[OI] input start frequency select	00:(Use offset (A101 value))		00:(Use offset (A101 value))		
A131	Acceleration curve constant	2		2	1 ... 10	
A132	Deceleration curve constant	2		2	1 ... 10	

A141	A input select for calculate function	02:(Terminal [O] input)		02:(Terminal [O] input)		
A142	**B input select for calculate function**	**02:(Terminal [O] input)**		**03:(Terminal [OI] input)**		**MUST be set to "02" which is speed adjust base on voltage "O" terminal, "03, Terminal OI" is current which is not used**
A143	Calculation symbol	00:(ADD (A input + B input))		00:(ADD (A input + B input))		
A145	ADD frequency	0	Hz	0	0.00 ... 400.00	
A146	ADD direction select	00:(Plus (adds A145 value to the output frequency setting))		00:(Plus (adds A145 value to the output frequency setting))		
A150	Curvature of EL-S-curve at the start of acceleration	10	%	10	0 ... 50	
A151	Curvature of EL-S-curve at the end of acceleration	10	%	10	0 ... 50	
A152	Curvature of EL-S-curve at the start of deceleration	10	%	10	0 ... 50	
A153	Curvature of EL-S-curve at the end of deceleration	10	%	10	0 ... 50	
A154	Deceleration hold frequency	0	Hz	0	0.00 ... 400.00	
A155	Deceleration hold time	0	s	0	0.0 ... 60.0	
A156	PID sleep function action threshold	0	Hz	0	0.00 ... 400.00	
A157	PID sleep function action delay time	0	s	0	0.0 ... 25.5	
A161	[VR] input active range start frequency	0	Hz	0	0.00 ... 400.00	
A162	[VR] input active range end frequency	0	Hz	0	0.00 ... 400.00	
A163	[VR] input active range start	0	%	0	0 ... 100	
A164	[VR] input active range end	100	%	100	0 ... 100	
A165	[VR] input start frequency select	01:(Use 0Hz)		01:(Use 0Hz)		

B Group					
Data ID	Data Name	Set value	Unit	Default value	Range
b001	Restart mode on power failure / under-voltage trip	00:(Alarm output after trip, no automatic restart)		00:(Alarm output after trip, no automatic restart)	
b002	Allowable under-voltage power failure time	1	s	1	0.3 ... 25.0
b003	Retry wait time before motor restart	1	s	1	0.3 ... 100.0
b004	Instantaneous power failure / under-voltage trip alarm enable	00:(Disable)		00:(Disable)	
b005	Number of restarts on power failure / under-voltage trip events	00:(Restart 16 times)		00:(Restart 16 times)	
b007	Restart frequency threshold	0	Hz	0	0.00 ... 400.00
b008	Restart mode on over voltage / over current trip	00:(Alarm output after trip, no automatic restart)		00:(Alarm output after trip, no automatic restart)	
b010	Number of retry on over voltage / over current trip	3	times	3	1 ... 3
b011	Retry wait time on over voltage / over current trip	1	s	1	0.3 ... 100.0
b012	Level of electronic thermal	100	%	100	20.0 ... 100.0
b212	Level of electronic thermal, 2nd motor	100	%	100	20.0 ... 100.0
b013	Electronic thermal characteristic	01:(Constant torque)		01:(Constant torque)	
~~b213~~	~~Electronic thermal characteristic, 2nd motor~~	~~01:(Constant torque)~~	-	~~01:(Constant torque)~~	-
b015	Free setting, electronic thermal frequency (1)	0	Hz	0	0

b016	Free setting, electronic thermal current (1)	0	%	0	0.0 ... 100.0	
b017	Free setting, electronic thermal frequency (2)	0	Hz	0	0	
b018	Free setting, electronic thermal current (2)	0	%	0	0.0 ... 100.0	
b019	Free setting, electronic thermal frequency (3)	0	Hz	0	0 ... 400	
b020	Free setting, electronic thermal current (3)	0	%	0	0.0 ... 100.0	
b021	Overload restriction operation mode	01:(Enabled for acceleration and constant speed)		01:(Enabled for acceleration and constant speed)		
b221	Overload restriction operation mode, 2nd motor	01:(Enabled for acceleration and constant speed)		01:(Enabled for acceleration and constant speed)		
b022	Overload restriction level	150	%	150	20.0 ... 200.0	I recommend leaving this the default value, when programming by computer this is shown as %. When programmed from the keyboard it is shown as A (amps) and should be ~10.0A for a 2 Hp motor.
~~b222~~	~~Overload restriction level, 2nd motor~~	~~150~~	~~%~~	~~150~~	~~20.0 ... 200.0~~	
b023	Deceleration rate at overload restriction	1	s	1	0.1 ... 3000.0	
~~b223~~	~~Deceleration rate at overload restriction, 2nd motor~~	~~1~~	~~s~~	~~1~~	~~0.1 ... 3000.0~~	
b024	**Overload restriction operation mode 2**	**00:(Disabled)**		**01:(Enabled for acceleration and constant speed)**		
b025	Overload restriction level 2	150	%	150	20.0 ... 200.0	
b026	Deceleration rate 2 at overload restriction	1	s	1	0.1 ... 3000.0	
b027	OC suppression selection	01:(Enabled)		01:(Enabled)		
b028	Current level of active freq.matching	100	%	100	20.0 ... 200.0	
b029	**Deceleration rate of active freq. matching**	**0.5**	**s**	**0.5**	**0.1 ... 3000.0**	**Slightly longer sampling duration decreases overvoltage tripping of device.**

b030	Start freq. of active freq. matching	00:(freq at previous shutoff)		00:(freq at previous shutoff)		
b031	**Software lock mode selection**	**10:unlock high level program parameters**		**01:(all parameters except B031 and output frequency F001 are locked when [SFT] terminal is ON)**		**Must be set to 10 to program by keyboard, must set B037 to "00" first**
b033	**Motor cable length parameter**	**5**		**10**	**5 ... 20**	**Specify motor cable length, in most cases it will be short = 5M (or under 15')**
b034	Run/power ON warning time	0	hr	0	0 ... 65535	
b035	Rotation direction restriction	00:(No restriction)		00:(No restriction)		
b036	Reduced voltage start selection	2		2	0 ... 255	
b037	**Function code display restriction**	**00:(Full display)**		**04:(Basic display)**		**Allows full display access, no need to limit display.**
b038	Initial display selection	001:(d001)		001:(d001)		
b039	Automatic user parameter registration	00:(Disable)		00:(Disable)		
b040	Torque limit selection	00:(Quadrant-specific setting mode)		00:(Quadrant-specific setting mode)		
b041	Torque limit 1 (fwd/power)	200	%	200	0 ... 200, 255	
b042	Torque limit 2 (rev/regen.)	200	%	200	0 ... 200, 255	
b043	Torque limit 3 (rev/power)	200	%	200	0 ... 200, 255	
b044	Torque limit 4 (fwd/regen.)	200	%	200	0 ... 200, 255	
b045	Torque LAD STOP selection	00:(Disable)		00:(Disable)		
b046	Reverse run protection	01:(Reverse rotation is protected)		01:(Reverse rotation is protected)		
b049	Dual Rating Selection	00:(CT mode)		00:(CT mode)		
b050	**Controlled deceleration on power loss**	**01:(Decelerates to a stop)**		**00:(Trips)**		**Permits some braking to stop, even with power loss**
b051	DC bus voltage trigger level of ctrl. decel.	220	V	220	0.0 ... 1000.0	
b052	Over-voltage threshold of ctrl. decel.	360	V	360	0.0 ... 1000.0	

b053	Deceleration time of ctrl. decel.	1	s	1	0.01 ... 3600.00	
b054	Initial freq. drop of ctrl. decel.	0	Hz	0	0.00 ... 10.00	
b060	Maximum-limit level of window comparators O	100	%	100	0 ... 100	
b061	Minimum-limit level of window comparators O	0	%	0	0 ... 100	
b062	Hysteresis width of window comparators O	0	%	0	0 ... 10	
b063	Maximum-limit level of window comparators OI	100	%	100	0 ... 100	
b064	Minimum-limit level of window comparators OI	0	%	0	0 ... 100	
b065	Hysteresis width of window comparator OI	0	%	0	0 ... 10	
b070	Operation level at O disconnection	255	%	255	0 ... 100, 255	
b071	Operation level at OI disconnection	255	%	255	0 ... 100, 255	
b075	Ambient temperature	40	C	40	-10 ... 50	
b078	Watt-hour clearance	00:(OFF)		00:(OFF)		
b079	Watt-hour display gain	1		1	1 ... 1000	
b082	Start frequency	0.5	Hz	0.5	0.10 ... 9.99	
b083	**Carrier frequency**	**12**	**kHz**	**2**	**2.0 ... 15.0**	**Higher carrier Khz = less motor wine. But can increase motor heat high loads. Try 12, if too much whine go to 14 or 15.**
b084	Initialization mode (parameters or trip history)	00:(Initialization disabled)		00:(Initialization disabled)		
b085	Country for initialization	00:(Standard)		00:(Standard)		
b086	**Frequency scaling conversion factor**	**29**		**1**	**0.01 ... 99.99**	**Permits motor RPM to be displayed if desired on VFD, scales Hz to RPM.**
b087	STOP key enable	00:(Enabled)		00:(Enabled)		
b088	Restart mode after FRS	00:(Restart from 0Hz)		00:(Restart from 0Hz)		
b089	Automatic carrier frequency reduction	01:(Enabled, depending on the output current)		01:(Enabled, depending on the output current)		

b090	**Dynamic braking usage ratio**	**10**	**%**	**0**	**0.0 ... 10.0**	**When using an external 50ohm 500W resistor, duty "ON' cycle is 10% or maximum value.**
b091	Stop mode selection	00:(DEC (decelerate to stop))		00:(DEC (decelerate to stop))		
b092	**Cooling fan control**	**01:(Fan is ON during run, OFF during stop (5 minute delay from ON to OFF))**		**01:(Fan is ON during run, OFF during stop (5 minute delay from ON to OFF))**		**Otherwise 02:(Fan is temperature controlled). Use 01 in cabinet without a cooling fan.**
b093	Clear elapsed time of cooling fan	00:(Count)		00:(Count)		
b094	Initialization target data	00:(All parameters)		00:(All parameters)		
b095	Dynamic braking control (BRD) selection	01:(Enable during run only)		01:(Enable during run only)		
b096	**BRD activation level**	**360**	**V**	**360**	**330 ... 380**	**factory default, try 340V if one gets overvoltage VFD error when stopping**
b097	**BRD resistor value**	**50**	**Ohm**	**50**	**50.0 ... 600.0**	**This is set automatically when you add an external brake resistor**
b100	Free-setting V/F freq. (1)	0	Hz	0	0	
b101	Free-setting V/F volt. (1)	0	V	0	0.0 ... 800.0	
b102	Free-setting V/F freq. (2)	0	Hz	0	0	
b103	Free-setting V/F volt. (2)	0	V	0	0.0 ... 800.0	
b104	Free-setting V/F freq. (3)	0	Hz	0	0	
b105	Free-setting V/F volt. (3)	0	V	0	0.0 ... 800.0	
b106	Free-setting V/F freq. (4)	0	Hz	0	0	
b107	Free-setting V/F volt. (4)	0	V	0	0.0 ... 800.0	
b108	Free-setting V/F freq. (5)	0	Hz	0	0	
b109	Free-setting V/F volt. (5)	0	V	0	0.0 ... 800.0	
b110	Free-setting V/F freq. (6)	0	Hz	0	0	
b111	Free-setting V/F volt. (6)	0	V	0	0.0 ... 800.0	
b112	Free-setting V/F freq. (7)	0	Hz	0	0 ... 400	
b113	Free-setting V/F volt. (7)	0	V	0	0.0 ... 800.0	
b120	Brake control enable	00:(Disable)		00:(Disable)		

b121	Brake Wait Time for Release	0	s	0	0.00 ... 5.00	
b122	Brake Wait Time for Acceleration	0	s	0	0.00 ... 5.00	
b123	Brake Wait Time for Stopping	0	s	0	0.00 ... 5.00	
b124	Brake Wait Time for Confirmation	0	s	0	0.00 ... 5.00	
b125	Brake release freq.	0	Hz	0	0.00 ... 400.00	
b126	Brake release current	100	%	100	0.0 ... 200.0	
b127	Braking frequency	0	Hz	0	0.00 ... 400.00	
b130	**Deceleration overvoltage suppression enable**	**01:(Enabled)**		**00:(Disabled)**		
b131	**Decel. overvolt. suppress level**	**390**	**V**	**380**	**330 ... 395**	**Set higher to prevent VFD error from regenerative overvoltage when braking**
b132	Decel. overvolt. suppress const.	1	s	1	0.10 ... 30.00	
b133	**Decel. overvolt. suppress proportional gain**	**1**	**times**	**0.2**	**0.00 ... 5.00**	**Set higher to prevent VFD error from regenerative overvoltage when braking**
b134	Decel. overvolt. suppress integral time	1	s	1	0.0 ... 150.0	
b145	GS input mode	00:(No trip (Hardware shutoff only))		00:(No trip (Hardware shutoff only))		
b150	Display ex.operator connected	d001		d001		
b160	1st parameter of Dual Monitor	d001		d001		
b161	2nd parameter of Dual Monitor	d002		d002		
b163	Freq. set in monitoring	00:(Freq. set disabled)		00:(Freq. set disabled)		
b164	Automatic return to the initial display	00:(Disable)		00:(Disable)		
b165	Ex. operator com. loss action	02:(Ignore)		02:(Ignore)		
b166	Data read/write selection	00:(R/W enable)		00:(R/W enable)		
b171	Inverter mode selection	00:(Disabling)		00:(Disabling)		
b180	Initialization trigger	00:(Initialization disable)		00:(Initialization disable)		

C Group						
Data ID	Data Name	Set value	Unit	Default value	Range	
C001	Input [1] function	**00:(FW:FORWARD Run/Stop)**		00:(FW:FORWARD Run/Stop)		"O1" TERMINAL OR "INPUT 1" IS FORWARD
C002	Input [2] function	**01:(RV:Reverse Run/Stop)**		01:(RV:Reverse Run/Stop)		"02" TERMINAL "INPUT 2" IS REVERSE
C003	**Input [3] function**	**06:(JG:Jogging)**		**02:(CF1:Multi-speed Select,Bit 0 (LSB))**		**"03" TERMINAL INPUT IS REPROGRAMMED FOR JOGGING**
C004	**Input [4] function**	**13:(USP:Unattended Start Protection)**		**03:(CF2:Multi-speed Select,Bit 1)**		**"04" TERMINAL INPUT IS IF YOU USE A STOP COMMAND which can be connected to a separate NORMALLY OPEN terminal switch block on the kill button (connects P24 on one side, the other side goes to VFD terminal 4), OVERIDES ALL OTHER COMMANDS. CAN USE WITH E-STOP (SEPARATE NO SWITCH BLOCK), WHEN E-STOP PRESSED 2ND NO SWITCH CLOSES AND ACTIVETS THIS COMMAND WHEN BUTTON PUSHED. YOU CAN NOT PROGRAM THIS INPUT TO 13 UNTIL YOU HAVE CHANGED INPUT 7 FUNCTION TO 255. (TWO TERMINALS CANNOT HAVE THE SAME SET VALUE AT THE SAME TIME)**
C005	**Input [5] function**	**09:(2CH:2-stage Acceleration and Deceleration)**		**09:(2CH:2-stage Acceleration and Deceleration)**		**"05" TERMINAL INPUT Can use this function to control 2 step deceleration, may be needed for high RPM braking to prevent overvoltage error, i.e. longer total deceleration time. Can be controlled by manual switch, can also be controlled by E-stop or any series switch going to this input. When P24 is connected to terminal 5 via a switch, 2nd Stage Acceleration and deceleration will be**
C006	**Input [6] function**	**255:No function**		**18:(RS:Reset Inverter)**		

						engaged.
C007	**Input [7] function**	**255:No function**		**13:(USP:Unattended Start Protection)**		**"INPUT 6" AND "INPUT 7" are NOT USED. They need to be reprogrammed to "255" No function, deactivates the terminal to any command. The 255 value may not be available if programming from the keypad, then I then recommended setting C006 should be "03", and C007 should be "04". These a multi-speed settings, (CF2 and CF3), but they are not used as nothing is connected to these inputs**
C011	Input [1] active state	00:normally open [NO]		00:normally open [NO]		
C012	Input [2] active state	00:normally open [NO]		00:normally open [NO]		
C013	Input [3] active state	00:normally open [NO]		00:normally open [NO]		
C014	Input [4] active state	00:normally open [NO]		00:normally open [NO]		
C015	Input [5] active state	00:normally open [NO]		00:normally open [NO]		
C016	Input [6] active state	00:normally open [NO]		00:normally open [NO]		
C017	Input [7] active state	00:normally open [NO]		00:normally open [NO]		
C021	Output [11] function	01:(FA1:Frequency Arrival Type 1-Constant Speed)		01:(FA1:Frequency Arrival Type 1-Constant Speed)		
C022	Output [12] function	00:(RUN:Run Signal)		00:(RUN:Run Signal)		
C026	Alarm relay function	05:(AL:Alarm Signal)		05:(AL:Alarm Signal)		
C027	[EO] terminal selection(Pulse/PWM output)	07:(LAD frequency (PWM))		07:(LAD frequency (PWM))		
C028	[AM] terminal selection(Analog voltage output 0...10V)	07:(LAD frequency)		07:(LAD frequency)		

C030	Digital current monitor reference value	100	%	100	20.0 ... 200.0
C031	Output [11] active state	00:normally open [NO]		00:normally open [NO]	
C032	Output [12] active state	00:normally open [NO]		00:normally open [NO]	
C036	Alarm relay active state	01:normally closed [NC]		01:normally closed [NC]	
C038	Output mode of low current detection	01:(During constant speed only)		01:(During constant speed only)	
C039	Low current detection level	100	%	100	0.0 ... 200.0
C040	Output mode of overload warning	01:(During constant speed only)		01:(During constant speed only)	
C041	Overload warning level	115	%	115	0.0 ... 200.0
C241	Overload warning level, 2nd motor	115	%	115	0.0 ... 200.0
C042	Frequency arrival setting for acceleration	0	Hz	0	0.00 ... 400.00
C043	Frequency arrival setting for deceleration	0	Hz	0	0.00 ... 400.00
C044	PID deviation level	3	%	3	0.0 ... 100.0
C045	Frequency arrival setting 2 for acceleration	0	Hz	0	0.00 ... 400.00
C046	Frequency arrival setting 2 for deceleration	0	Hz	0	0.00 ... 400.00
C047	Pulse train input/output scale conversion	1		1	0.01 ... 99.99
C052	PID FBV output high limit	100	%	100	0.0 ... 100.0
C053	PID FBV output low limit	0	%	0	0.0 ... 100.0
C054	Over-torque/under-torque selection	00:(Over-torque)		00:(Over-torque)	
C055	Over/under-torque level(Forward powering mode)	100	%	100	0 ... 200
C056	Over/under-torque level(Reverse regen. mode)	100	%	100	0 ... 200
C057	Over/under-torque level(Reverse	100	%	100	0 ... 200

	powering mode)				
C058	Over/under-torque level(Forward regen. mode)	100	%	100	0 ... 200
C059	Signal output mode of Over/under-torque	01:(During constant speed only)		01:(During constant speed only)	
C061	Electronic thermal warning level	90	%	90	0 ... 100
C063	Zero speed detection level	0	Hz	0	0.00 ... 100.00
C064	Heat sink overheat warning	100	C	100	0 ... 110
C071	Communication speed	05:(9600bps)		05:(9600bps)	
C072	Modbus address	1		1	1 ... 247
C074	Communication parity	00:(No parity)		00:(No parity)	
C075	Communication stop bit	01:(1bit)		01:(1bit)	
C076	Communication error select	02:(Disable)		02:(Disable)	
C077	Communication error time-out	0	s	0	0.00 ... 99.99
C078	Communication wait time	0	ms	0	0 ... 1000
C081	O input span calibration	100	%	100	0.0 ... 200.0
C082	OI input span calibration	100	%	100	0.0 ... 200.0
C085	Thermistor input (PTC) span calibration	100	%	100	0.0 ... 200.0
C091	Debug mode enable	00:(Disable)		00:(Disable)	
C096	Communication selection	00:(Modbus-RTU)		00:(Modbus-RTU)	
C098	EzCOM start adr. of master	1		1	1 ... 8
C099	EzCOM end adr. of master	1		1	1 ... 8
C100	EzCOM starting trigger	00:(Input terminal(485RUN))		00:(Input terminal(485RUN))	
C101	Up/Down memory mode selection	00:(Clear last frequency (return to default frequency F001))		00:(Clear last frequency (return to default frequency F001))	

C102	Reset selection	00:(Cancel trip state at input signal ON transition, stops inverter if in Run Mode)		00:(Cancel trip state at input signal ON transition, stops inverter if in Run Mode)	
C103	Restart mode after reset	00:(Start with 0 Hz)		00:(Start with 0 Hz)	
C104	UP/DWN clear mode	00:(0Hz)		00:(0Hz)	
C105	EO gain adjustment	100	%	100	50 ... 200
C106	AM gain adjustment	100	%	100	50 ... 200
C109	AM bias adjustment	0	%	0	0 ... 100
C111	Overload warning level 2	115	%	115	0.0 ... 200.0
C130	Output [11] on delay	0	s	0	0.0 ... 100.0
C131	Output [11] off delay	0	s	0	0.0 ... 100.0
C132	Output [12] on delay	0	s	0	0.0 ... 100.0
C133	Output [12] off delay	0	s	0	0.0 ... 100.0
C140	Relay output on delay	0	s	0	0.0 ... 100.0
C141	Relay output off delay	0	s	0	0.0 ... 100.0
C142	Logic output 1 operand A	00:(RUN:Run Signal)		00:(RUN:Run Signal)	
C143	Logic output 1 operand B	00:(RUN:Run Signal)		00:(RUN:Run Signal)	
C144	Logic output 1 operator	00:([LOG] = A AND B)		00:([LOG] = A AND B)	
C145	Logic output 2 operand A	00:(RUN:Run Signal)		00:(RUN:Run Signal)	
C146	Logic output 2 operand B	00:(RUN:Run Signal)		00:(RUN:Run Signal)	
C147	Logic output 2 operator	00:([LOG] = A AND B)		00:([LOG] = A AND B)	
C148	Logic output 3 operand A	00:(RUN:Run Signal)		00:(RUN:Run Signal)	
C149	Logic output 3 operand B	00:(RUN:Run Signal)		00:(RUN:Run Signal)	

C150	Logic output 3 operator	00:([LOG] = A AND B)		00:([LOG] = A AND B)	
C160	Input [1] response time	1		1	0 ... 200
C161	Input [2] response time	1		1	0 ... 200
C162	Input [3] response time	1		1	0 ... 200
C163	Input [4] response time	1		1	0 ... 200
C164	Input [5] response time	1		1	0 ... 200
C165	Input [6] response time	1		1	0 ... 200
C166	Input [7] response time	1		1	0 ... 200
C169	Multistage speed/position determination time	0		0	0 ... 200
H Group					
Data ID	Data Name	Set value	Unit	Default value	Range
H001	Auto-tuning selection	00:(Disabled)		00:(Disabled)	
H002	Motor constant selection	02:(Auto tuned data) **CHANGE ONLY AFTER AUTOTUNE IS RUN**		00:(Hitachi standard motor)	
~~H202~~	~~Motor constant selection, 2nd motor~~	~~02:(Auto tuned data)~~	-	~~00:(Hitachi standard motor)~~	-
H003	Motor capacity	06:(1.5)	kW	06:(1.5)	ASSUMES 2HP
~~H203~~	~~Motor capacity,2nd motor~~	~~06:(1.5)~~	~~kW~~	~~06:(1.5)~~	-
H004	Motor poles setting	01:(4P)		01:(4P)	
~~H204~~	~~Motor poles setting,2nd motor~~	~~01:(4P)~~	-	~~01:(4P)~~	-

When all the other parameters have been set and the VFD is running correctly, then use the autotune feature to determine your motor's parameters H031-H034, the information is stored in the VFD. I run the autotune feature through the Hitachi software. To run autotune WITH MOTION, take the belt off of the motor. Set H001 to "02", then put your spindle lever in the forward run position until the front panel indicates that the autotune was successful. Put the spindle in the STOP position and press the red stop button on the VFD. The auto tune sequence takes about 1 minute. It is only done once (unless you ccahnge the motor) and it resets H001 back to 00 when completed. The autotune motor parameters are stored in the VFD. You must then program H002 = 02 so the VFD uses the Autotune data. When completed, reconnect the drive belt with the power off.

H005	Motor speed response constant	100	%	100	1 ... 1000
H006	Motor stabilization constant	100		100	0 ... 255
H020	Motor constant R1 (Hitachi motor)	1.477	Ohm	1.477	0.001 ... 65.535
H021	Motor constant R2 (Hitachi motor)	0.801	Ohm	0.801	0.001 ... 65.535
H022	Motor constant L (Hitachi motor)	12.8	mH	12.8	0.01 ... 655.35
H023	Motor constant I0 (Hitachi motor)	4.16	A	4.16	0.01 ... 655.35
H024	Motor constant J (Hitachi motor)	0.017	kgm2	0.017	0.001 ... 9999.000
H030	Motor constant R1 (Auto tuned data)	1.477	Ohm	1.477	0.001 ... 65.535
H031	Motor constant R2 (Auto tuned data)	0.801	Ohm	0.801	0.001 ... 65.535
H032	Motor constant L (Auto tuned data)	12.8	mH	12.8	0.01 ... 655.35
H033	Motor constant I0 (Auto tuned data)	4.16	A	4.16	0.01 ... 655.35
H034	Motor constant J (Auto tuned data)	0.017	kgm2	0.017	0.001 ... 9999.000
H050	Slip compensation P gain for V/f control with FB	0.2	times	0.2	0.00 ... 10.00
H051	Slip compensation I gain for V/f control with FB	2	s	2	0 ... 1000

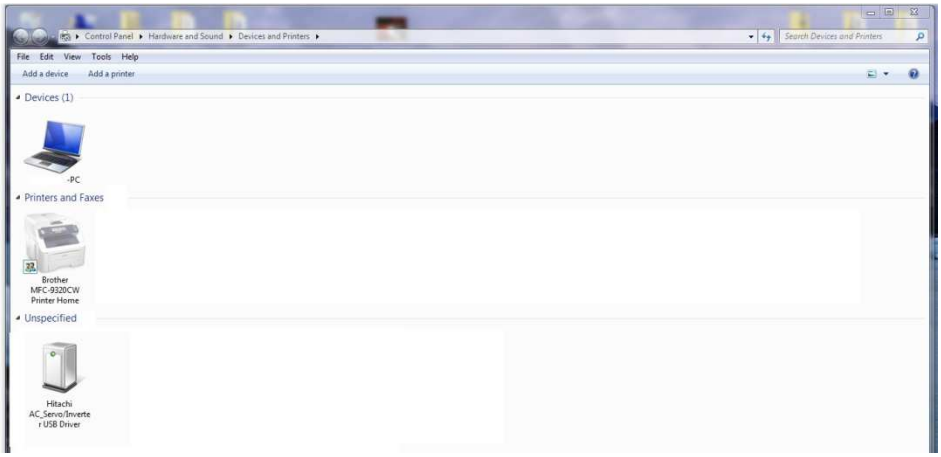
If the spindle control direction stops to function after autotune, check A001 is set to "01" AND H001 is set to "00" (Autotune disabled). When Autotune is completed make sure H002 = 02.

Notes on how to use Hitachi ProDriveNext (PDN) Software

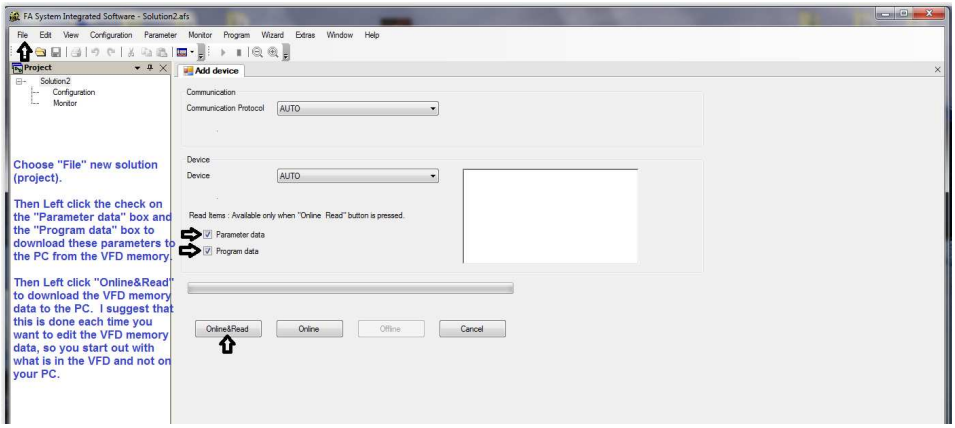
- Open up software on Laptop w/o USB connected to VFD
- Boot up VFD
- After VFD and PDN software are up, connect your USB cable.
- On PDN software the File tab on the upper toolbar, select New Project. A popup will ask about creating a new project, say yes.
- Go to Add Device tab and click the two boxes to read the parameters and programs, and then select the button labeled Online & Read.
- The software will then load the parameters from the VFD's memory. There will be popups with the process of loading that you will answer and to let you know when it is complete.
- When you have loaded the VFD parameters into the software, they become available via clicking on Parameters in the file structure window (top left panel). Clicking on the Parameters in the file structure map will bring them up so you can edit them.
- A new window with corresponding tab will appear in primary working window of the software. You will see two tabs for this window, Add Device and Parameters. It is in the Parameters window that you will edit the set values for the parameters. Use Mark Jacobs set values as provided.
- Choose a parameter group (F, A, etc.) and edit the individual set values as needed. You edit the value by clicking on it and putting the new value in or choosing one from a dropdown. Some of the set values are choosing from a function list and some are numerical values you input. Move through all Parameter Groups as necessary. Be careful with your scroll down arrow on keyboard since it can change some of the choices when you are editing if you haven't yet entered or chosen the predefined set value.
- When all groups are complete and you are ready to save, go to the Parameters toolbar and select "Download all (PC -> Device)". This moves the revised parameter set back to the VFD and stores it in its memory via EPROM. The software will ask you if you want to store it in EPROM and you say yes.
- Exit the PDN software and disconnect the USB.
- Reboot the VFD to assure that the revised parameters are functional. Note that the VFD takes 30 seconds or more to power down properly, so give it time to shutdown properly before turning it back on.

If you wish to revise any of the set values later, go through this process again and download the VFD's memory and you will find your previous set values and you can change/modify them as needed.

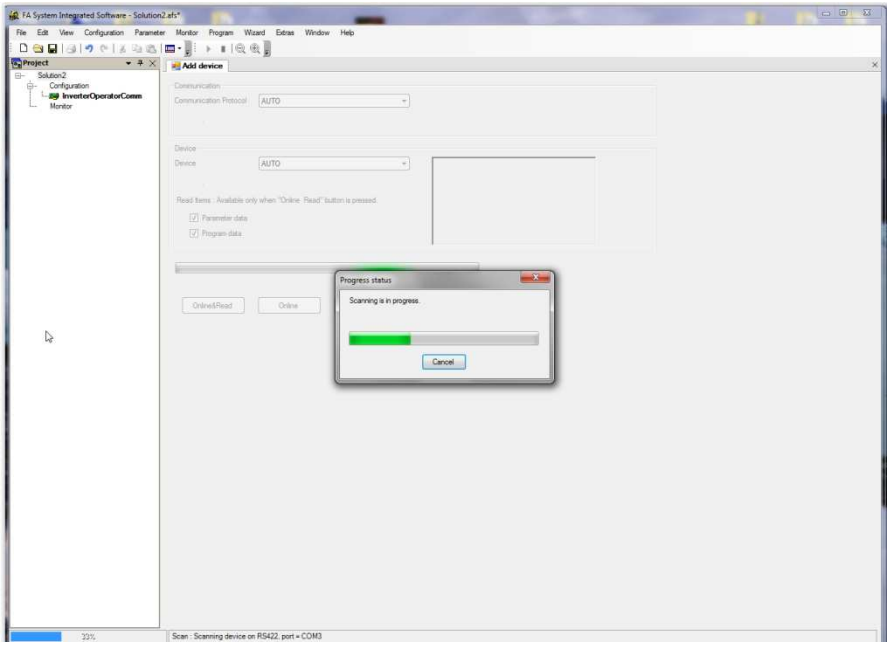
Programming the WJ200 via the computer. Load Hitachi VFD Software AND USB Driver first before connecting the VFD. Turn on VFD and connect to PC, verify USB Driver is working as shown.



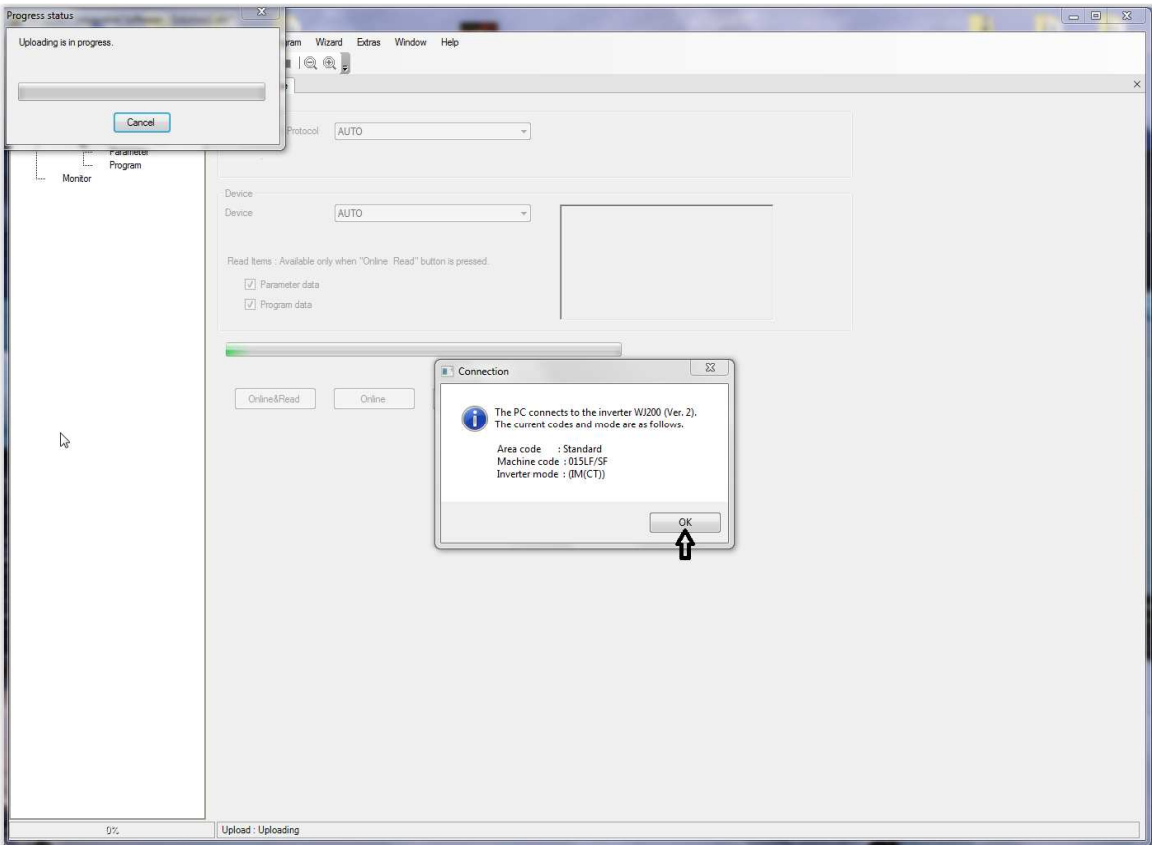
Run Hitachi VFD Software program, click on File and choose new project. Click to download Parameter and Program data and then click on Online&Read.



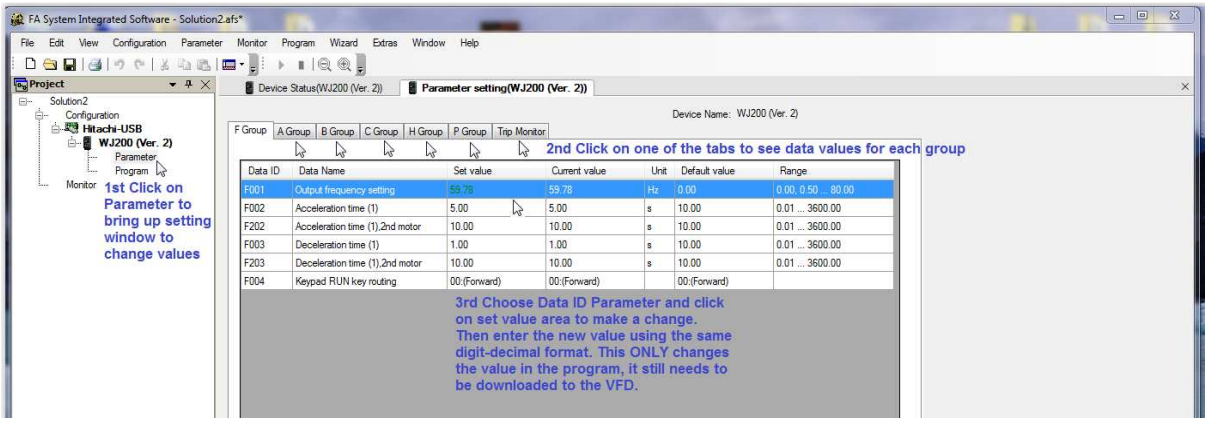
Indicates it is looking for the VFD and Data



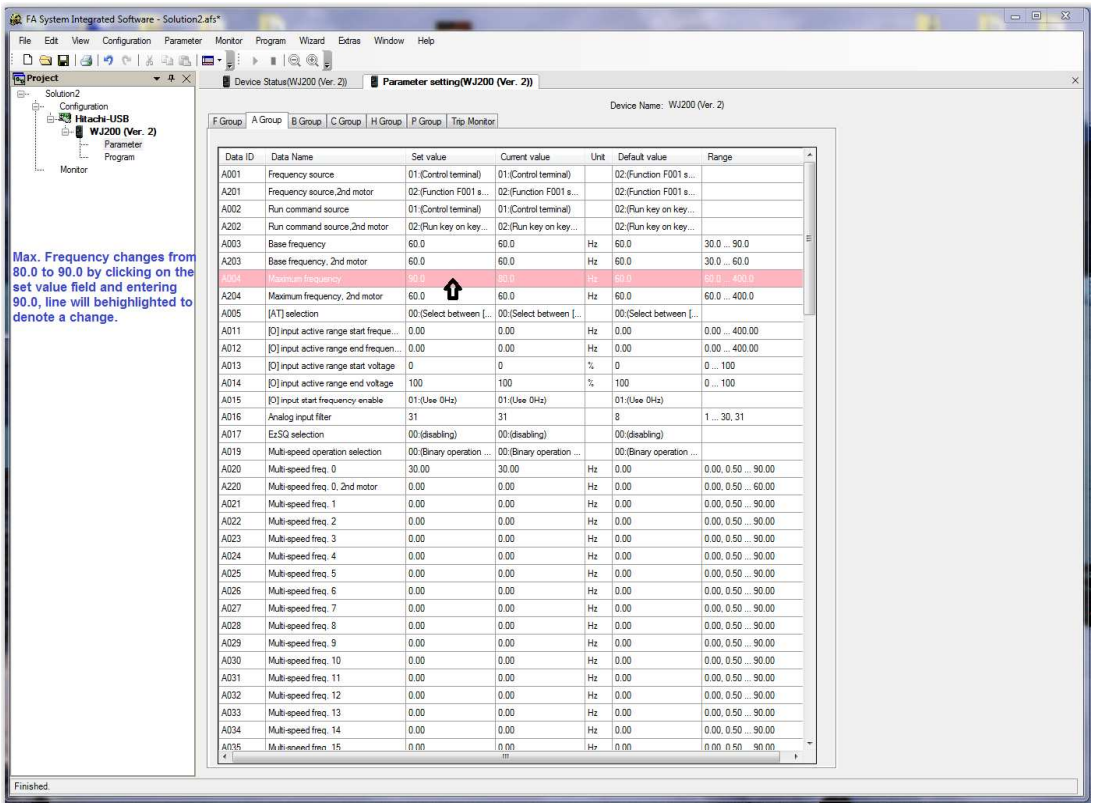
Verifies that it is connected to the WJ200 VFD, click n OK to continue and upload parameters to your PC.



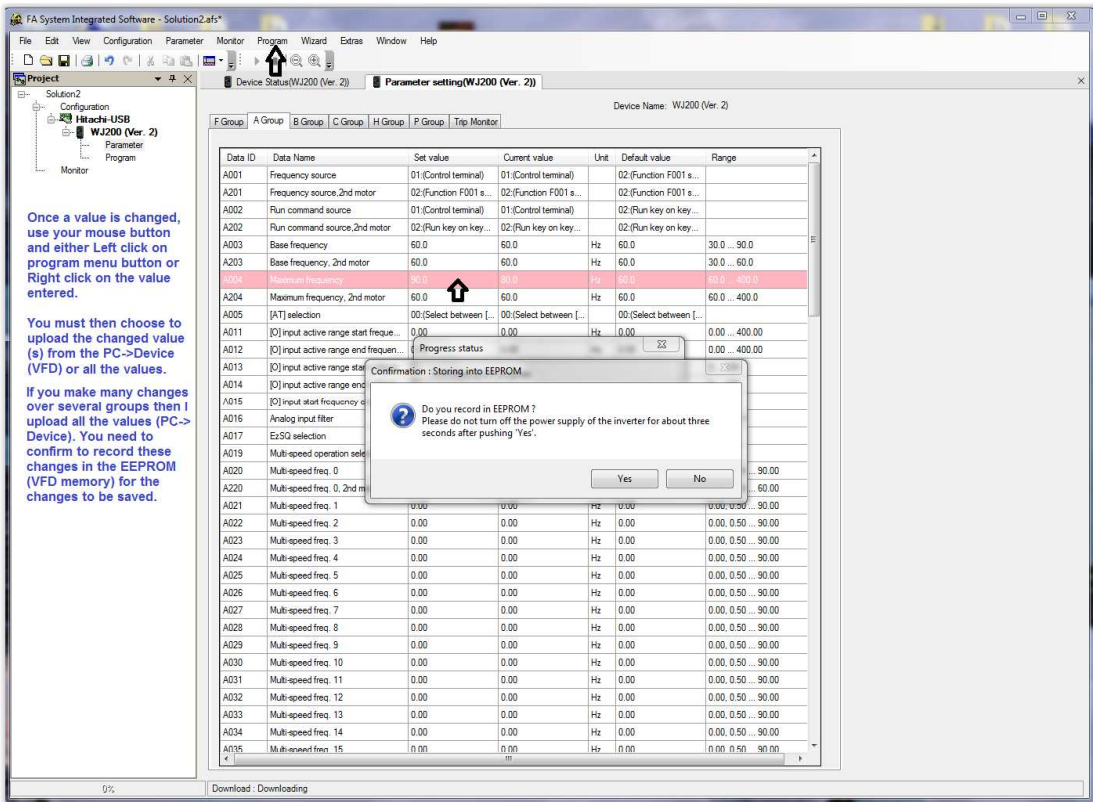
Click on Parmater as shown to pull up Parameter setting WJ200 window. Click on Group tab you want to edit.



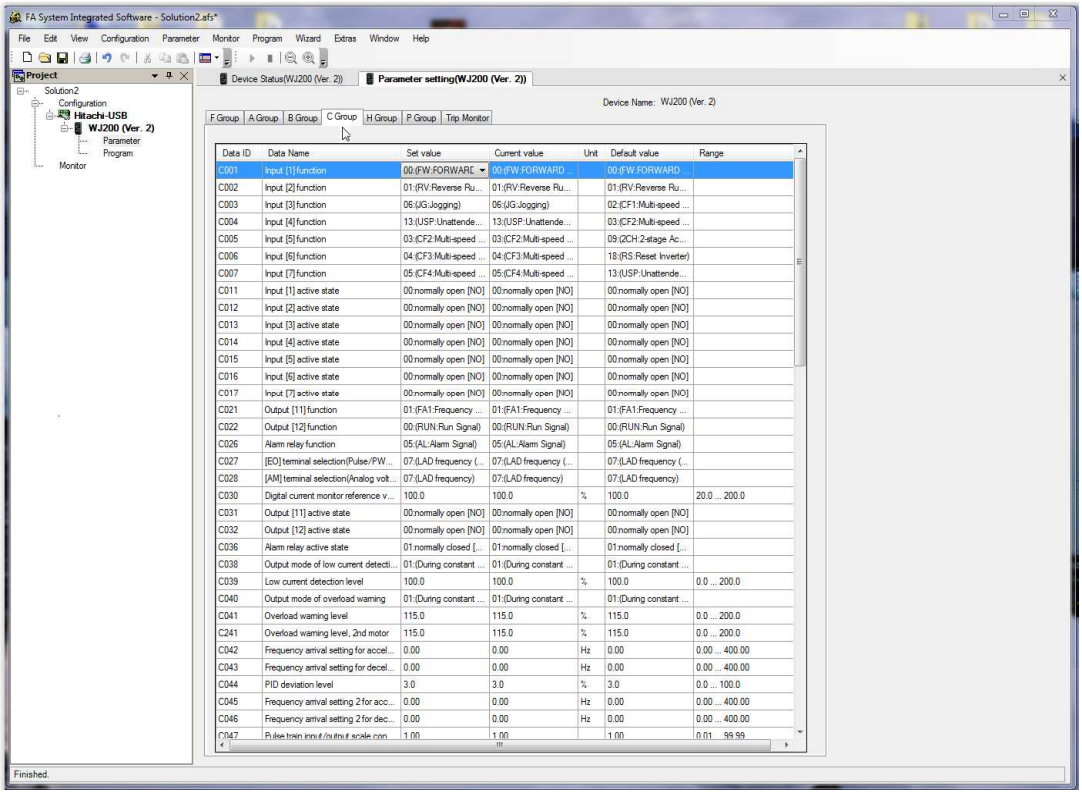
You make changes in the 'Set value" Column, the line(s) will be highlighted to indicate a change(s). The change(s) must then be sent to the VFD.



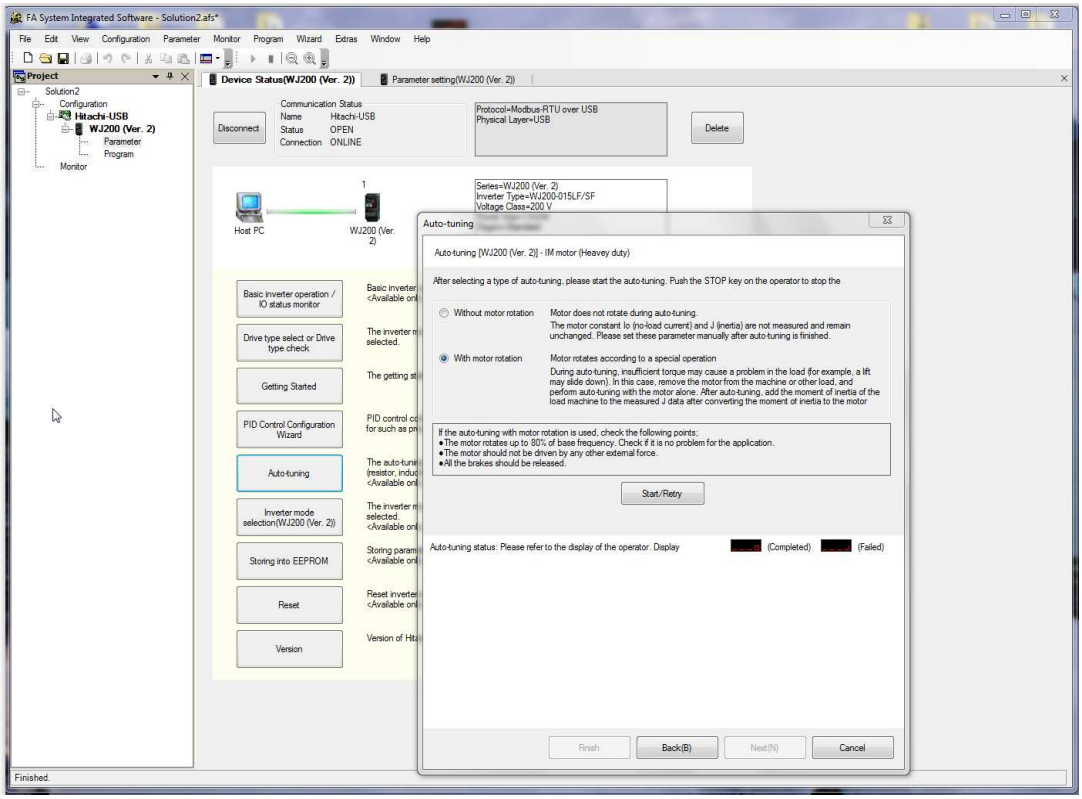
Program variable changes must be sent from the PC to the VFD, either Left click on the "Program" pull down menu tab, or Right click on the highlighted parameter to pull up the menu.

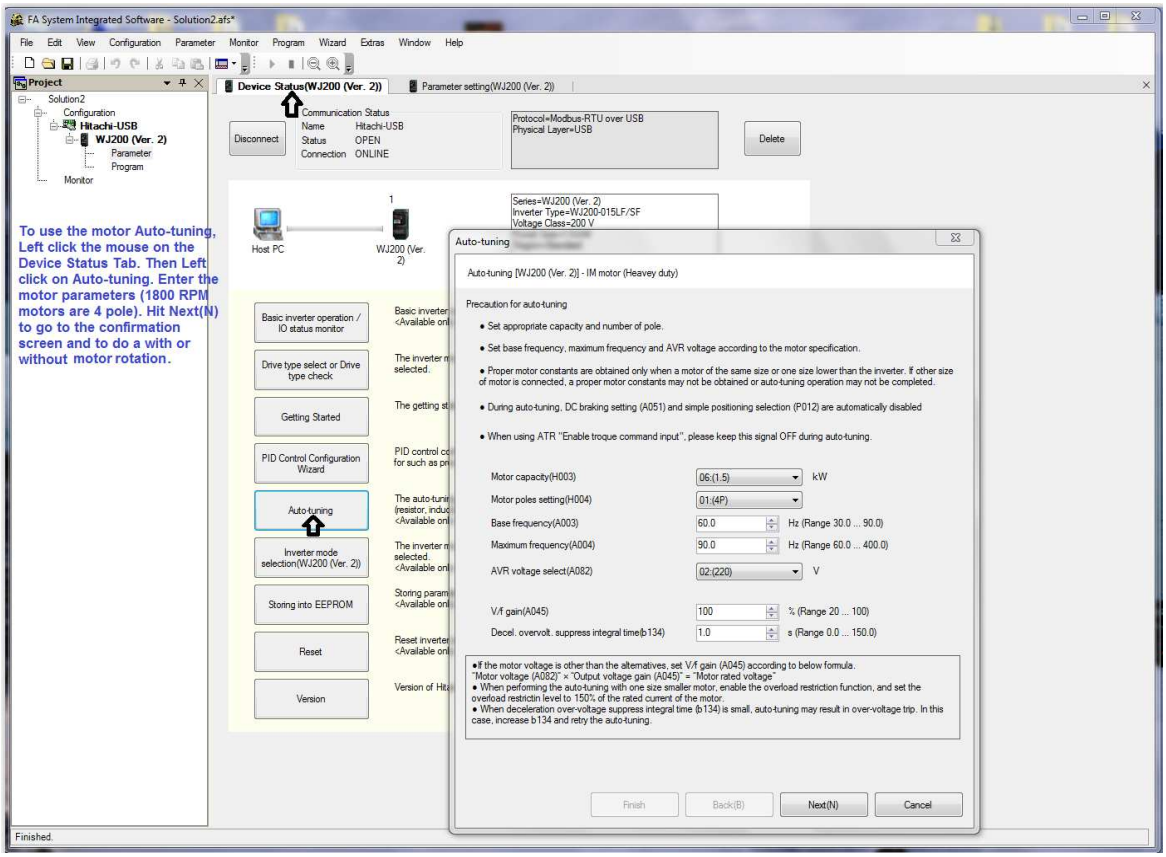


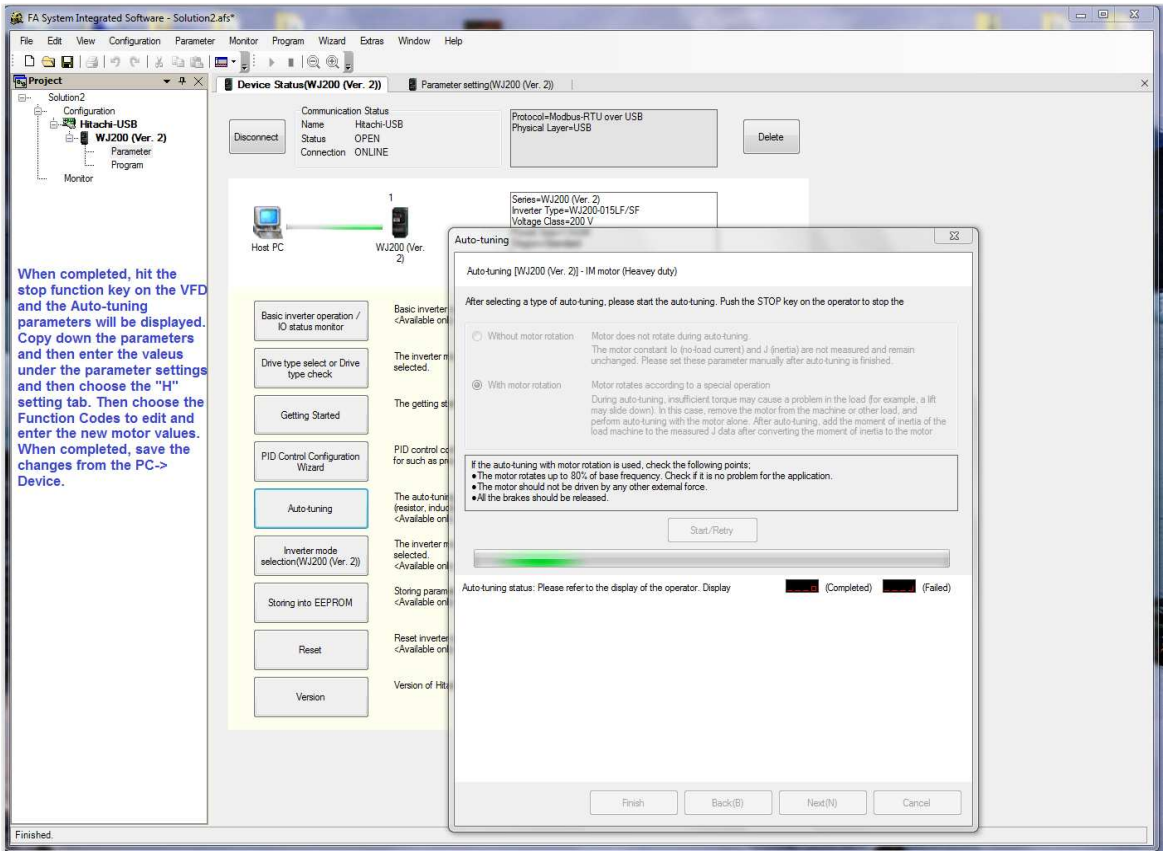
C Group Tab pulls up the program variables for the Input functions



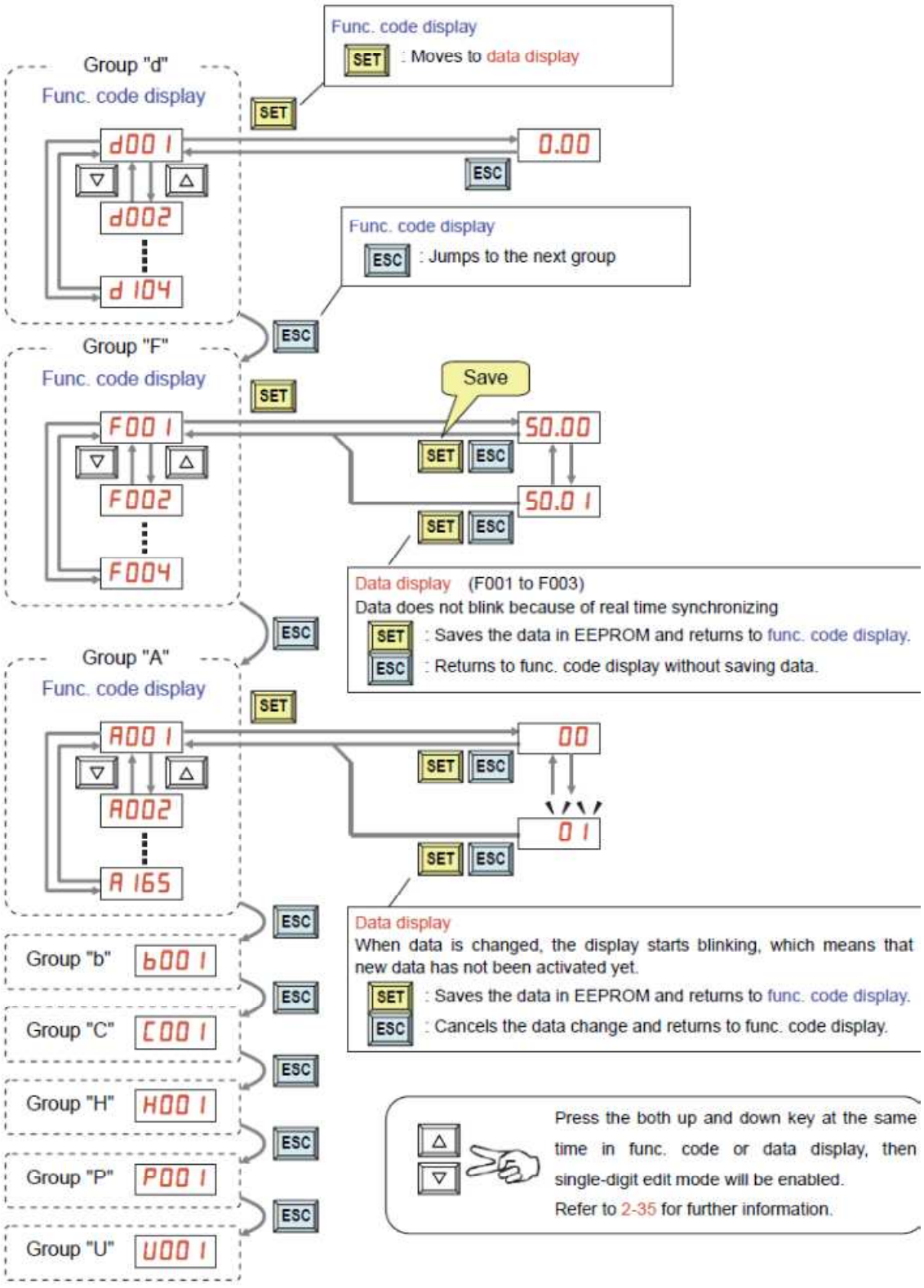
Motor Auto-tune determines your motors actual operating parameters, which can be enetered in the VFD program variables




FA System Integrated Software - Solution2.afs*
File Edit View Configuration Parameter Monitor Program Wizard Extras Window Help
Project
Solution2
Configuration
Hitachi-USB
WJ200 (Ver. 2)
Parameter
Program
Monitor
Device Status(WJ200 (Ver. 2))
Parameter setting(WJ200 (Ver. 2))
Communication Status
Name Hitachi-USB
Status OPEN
Connection ONLINE
Disconnect
Protocol=Modbus-RTU over USB
Physical Layer=USB
Delete
Host PC
WJ200 (Ver. 2)
Series=WJ200 (Ver. 2)
Inverter Type=WJ200-015LF/SF
Voltage Class=200 V
To use the motor Auto-tuning, Left click the mouse on the Device Status Tab. Then Left click on Auto-tuning. Enter the motor parameters (1800 RPM motors are 4 pole). Hit Next(N) to go to the confirmation screen and to do a with or without motor rotation.
Basic inverter operation / IO status monitor
Drive type select or Drive type check
Getting Started
PID Control Configuration Wizard
Auto-tuning
Inverter mode selection(WJ200 (Ver. 2))
Storing into EEPROM
Reset
Version
Auto-tuning
Auto-tuning [WJ200 (Ver. 2)] - IM motor (Heavy duty)
Precaution for auto-tuning
• Set appropriate capacity and number of pole.
• Set base frequency, maximum frequency and AVR voltage according to the motor specification.
• Proper motor constants are obtained only when a motor of the same size or one size lower than the inverter. If other size of motor is connected, a proper motor constants may not be obtained or auto-tuning operation may not be completed.
• During auto-tuning, DC braking setting (A051) and simple positioning selection (P012) are automatically disabled
• When using ATR "Enable troque command input", please keep this signal OFF during auto-tuning.
Motor capacity(H003) 06:(1.5) kW
Motor poles setting(H004) 01:(4P)
Base frequency(A003) 60.0 Hz (Range 30.0 ... 90.0)
Maximum frequency(A004) 90.0 Hz (Range 60.0 ... 400.0)
AVR voltage select(A082) 02:(220) V
V/f gain(A045) 100 % (Range 20 ... 100)
Decel. overvolt. suppress integral time(b134) 1.0 s (Range 0.0 ... 150.0)
•If the motor voltage is other than the alternatives, set V/f gain (A045) according to below formula.
"Motor voltage (A082)" × "Output voltage gain (A045)" = "Motor rated voltage"
• When performing the auto-tuning with one size smaller motor, enable the overload restriction function, and set the overload restrictin level to 150% of the rated current of the motor.
• When deceleration over-voltage suppress integral time (b134) is small, auto-tuning may result in over-voltage trip. In this case, increase b134 and retry the auto-tuning.
Finish
Back(B)
Next(N)
Cancel
Finished.


FA System Integrated Software - Solution2.afs*
File Edit View Configuration Parameter Monitor Program Wizard Extras Window Help
Project
Solution2
Configuration
Hitachi-USB
WJ200 (Ver. 2)
Parameter
Program
Monitor
Device Status(WJ200 (Ver. 2))
Parameter setting(WJ200 (Ver. 2))
Communication Status
Name Hitachi-USB
Status OPEN
Connection ONLINE
Disconnect
Protocol=Modbus-RTU over USB
Physical Layer=USB
Delete
Host PC
WJ200 (Ver. 2)
Series=WJ200 (Ver. 2)
Inverter Type=WJ200-015LF/SF
Voltage Class=200 V
When completed, hit the stop function key on the VFD and the Auto-tuning parameters will be displayed. Copy down the parameters and then enter the valeus under the parameter settings and then choose the "H" setting tab. Then choose the Function Codes to edit and enter the new motor values. When completed, save the changes from the PC-> Device.
Basic inverter operation / IO status monitor
Drive type select or Drive type check
Getting Started
PID Control Configuration Wizard
Auto-tuning
Inverter mode selection(WJ200 (Ver. 2))
Storing into EEPROM
Reset
Version
Auto-tuning
Auto-tuning [WJ200 (Ver. 2)] - IM motor (Heavy duty)
After selecting a type of auto-tuning, please start the auto-tuning. Push the STOP key on the operator to stop the
Without motor rotation
Motor does not rotate during auto-tuning.
The motor constant Io (no-load current) and J (inertia) are not measured and remain unchanged. Please set these parameter manually after auto-tuning is finished.
With motor rotation
Motor rotates according to a special operation
During auto-tuning, insufficient torque may cause a problem in the load (for example, a lift may slide down). In this case, remove the motor from the machine or other load, and perform auto-tuning with the motor alone. After auto-tuning, add the moment of inertia of the load machine to the measured J data after converting the moment of inertia to the motor.
If the auto-tuning with motor rotation is used, check the following points;
• The motor rotates up to 80% of base frequency. Check if it is no problem for the application.
• The motor should not be driven by any other external force.
• All the brakes should be released.
Start/Retry
Auto-tuning status: Please refer to the display of the operator. Display (Completed) (Failed)
Finish
Back(B)
Next(N)
Cancel
Finished.

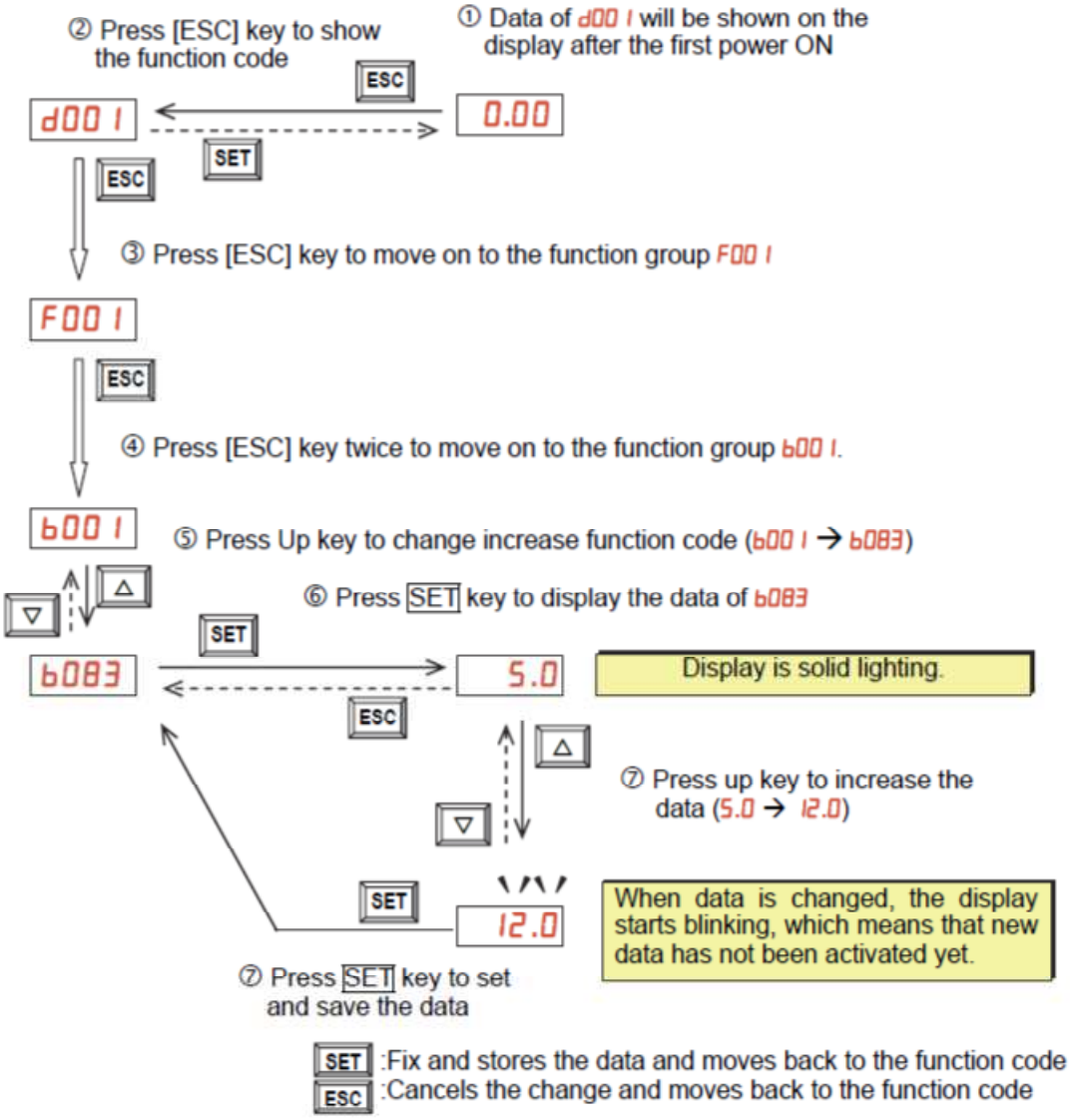
Manually Programming from the Keypad, press the VFD ESC key to enter the programming functions. Press again or use the UP and DOWN buttons to enter each sub menu group, A, b, C, d, etc. Use the UP and DOWN keys to scroll to the function and press SET to change a function. Use the UP and DOWN keys to set/change the parameter VALUE than you MUT hit the SET key to retain the new value. Pressing the ESC key will revert you to the previous programming level. To exit programming press and hold ESC. See WJ200 manual pages 2-25 through 2-36..



NOTE: Pressing the [ESC] key will make the display go to the top of next function group, regardless the display contents. (e.g. A02 1 → [ESC] → b00 1)

[Setting example]

After power ON, changing from 0.00 display to change the b083 (carrier frequency) data.



Function code dxxx are for monitor and not possible to change.
Function codes Fxxx other than F004 are reflected on the performance just after changing the data (before pressing SET key), and there will be no blinking.

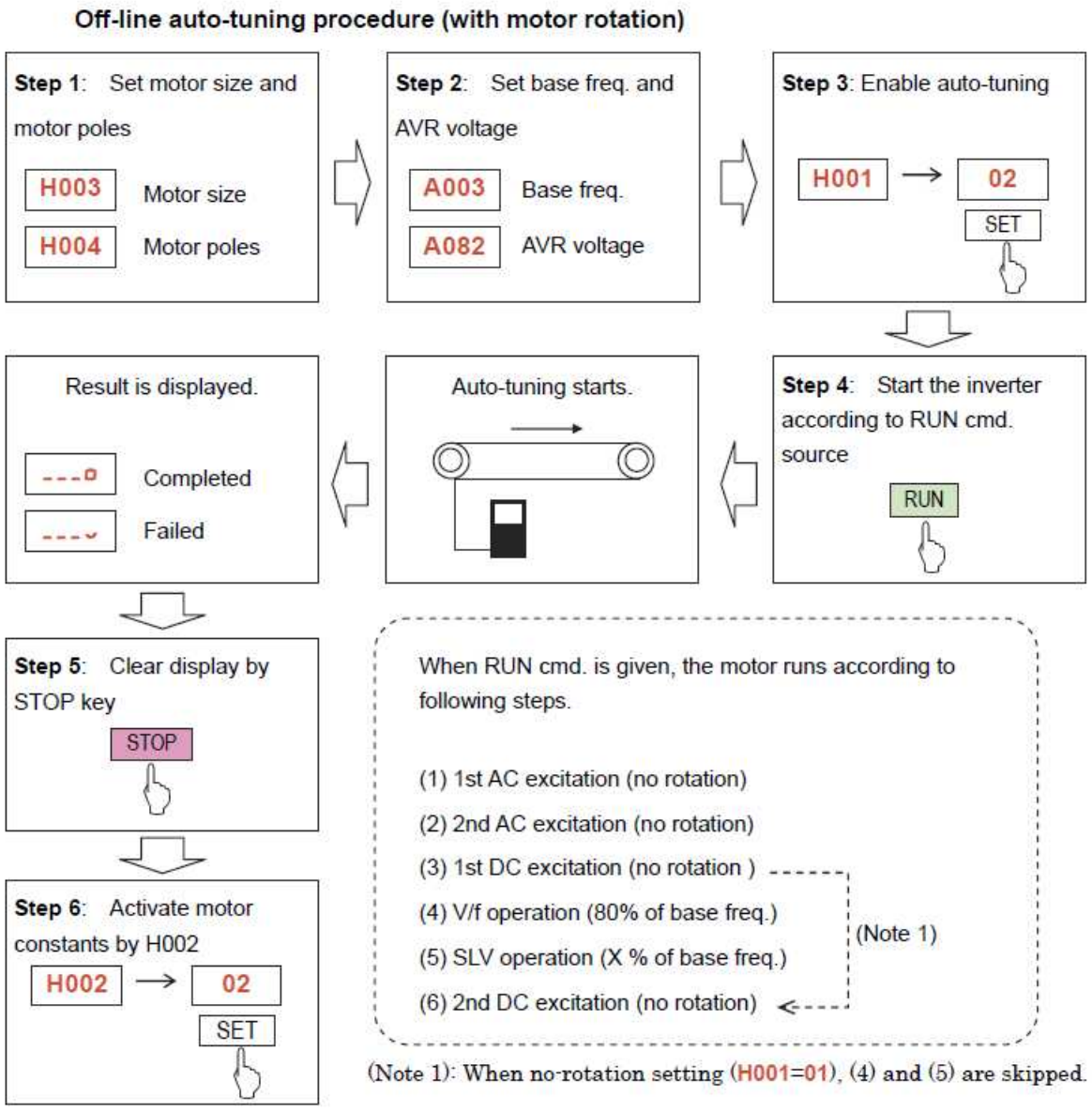
	When a function code is shown…	When a data is shown…
ESC key	Move on to the next function group	Cancels the change and moves back to the function code
SET key	Move on to the data display	Fix and stores the data and moves back to the function code
△ key	Increase function code	Increase data value
▽ key	Decrease function code	Decrease data value

📖 Note
Keep pressing for more than 1 second leads to d001 display, regardless the display situation. But note that the display will circulates while keep pressing the [ESC] key because of the original function of the key.
(e.g. F001 → A001 → b001 → C001 → …→ displays 50.00 after 1 second)

Running and using the motor autotune data, H001 and H002. Leave these the default values until everything else is done/programmed and working. Then remove the motor belt and program H001 = 2 (autotune with motion). Press the SET key to confirm the programming change and then press and hold the ESC. to exit programming. Put your speed pot to 100%, then put the spindle lever into the forward run position. The motor will make some whining noise and then run up to speed twice. When completed you will see _ _ _ o if completed correctly.

Put you spindle lever to the STOP position. Press the VFD STOP button to clear the display.

Go back into the programming mode by pressing the ESC key. Go to H001, it should have been reset to 0000, and check that H002 = 01. This tells the VFD to use the auto-tune parameters for the motor constants. That's it.



(Note 2) After auto-tuning is completed, be sure to set 01 in H002/H202, otherwise measured data is not effective.