

Variable Frequency Drive Information

1PH/115V in and 3PH/230V out



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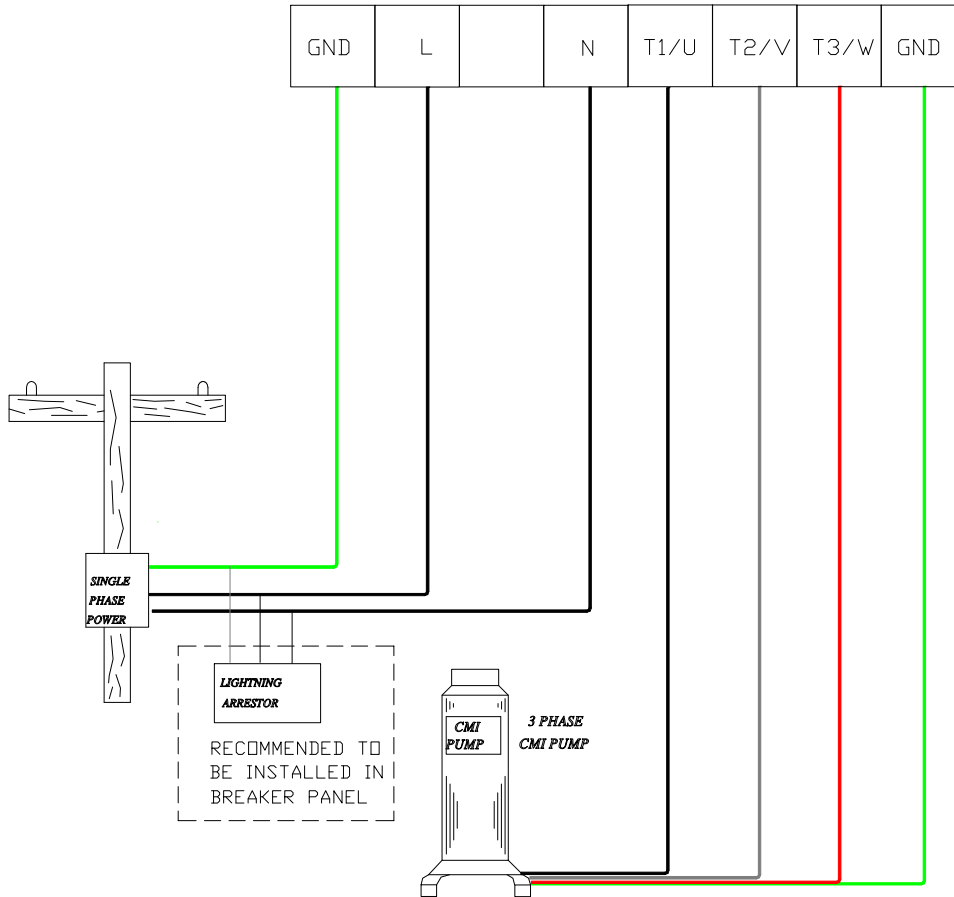
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**CARRY MANUFACTURING, INC.
VARIABLE FREQUENCY DRIVE
WIRING HOOK-UP**

WIRING DIAGRAM
VFD CONTROLLER



WARNING!!

The wiring must be hooked up according to the drawing and all connections must be tight. Failure to do so, could result in damage to your system.

Incoming Power Source - Single Phase, 115 volts

The incoming power is connected to L, N and GND on the terminal strip.

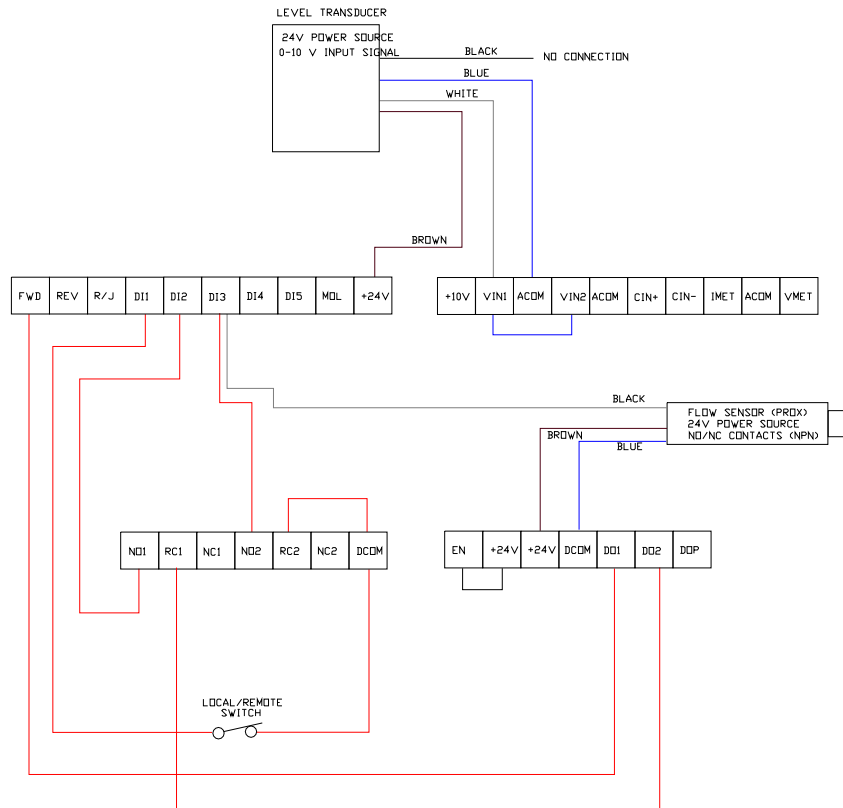
Pump Connections -

Pump leads are connected as follows: Black lead to T1/U on the terminal strip, White lead to T2/V on the terminal strip, Red lead to T3/W on the terminal strip and Green lead to the GND on the terminal strip. Exact placement of Black, Red and White wires will be determined by testing the pump and using the connection that runs the pump in the proper direction. See the Franklin Electric Motor Manual, page33 for more information.

CAUTION: Failure to ground the control frame can result in a serious electrical shock hazard if a circuit fault occurs.

CARRY MANUFACTURING, INC. PRESSURE TRANSDUCER HOOK-UP

WIRING DIAGRAM VFD CONTROLLER W/ FLOW SENSOR



- *DI1 IS THE LOCAL/REMOTE INPUT
- *DI2 IS THE USER FAULT INPUT. DRY PUMP SIGNAL FROM THE FLOW SENSOR OR LOW CURRENT THRESHOLD. TIMER 2 IS ALSO IN SERIES WITH THESE.
- *DI3 IS THE INPUT TO START TIMER 2 WITH THE FLOW SENSOR AND LOW CURRENT THRESHOLD.
- *RC1 AND NO1 ARE A RELAY CONTACT THAT IS ACTIVE WHEN THE DRIVE IS RUNNING. TIMER 1 IS IN SERIES WITH THIS CONTACT.
- *RC2 AND NO2 ARE A RELAY CONTACT THAT IS ACTIVE WHEN THE LOW CURRENT IS TRIPPED.
- *DD1 IS A DIGITAL OUTPUT USED TO START THE PUMP IN REMOTE MODE.
- *DD2 IS A DIGITAL OUTPUT THAT IS ACTIVE WHEN THE LOW CURRENT THRESHOLD OR FLOW SENSOR ARE TRIPPED AND TIMER 2 IS TIMED OUT.

DIRECTIONS:

Pressure Transducer Connections -

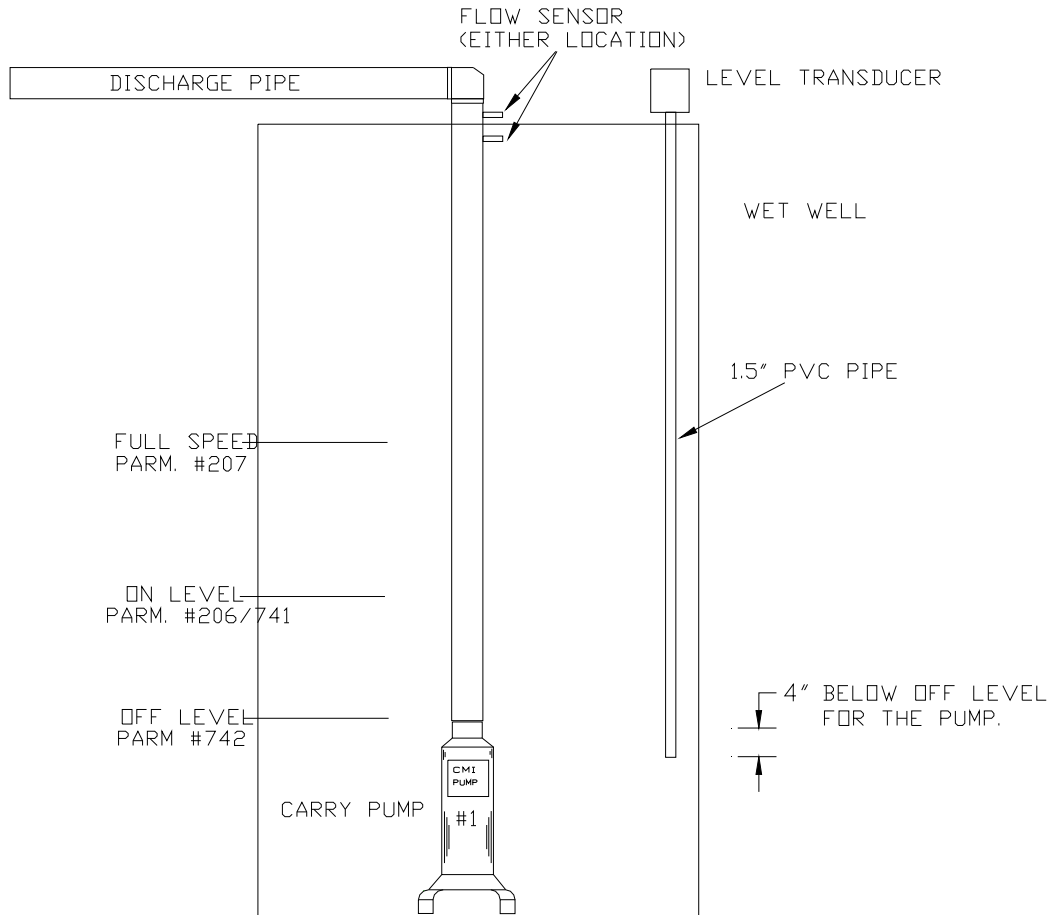
Transducer leads are connected as follows: Brown lead to +24V on the terminal strip, White lead to VIN1 on the terminal strip, and Blue lead to ACOM on the terminal strip. Black lead - no connection.

Flow Sensor Connections -

Flow Sensor leads are connected as follows: White lead to DI13 on terminal strip, Black lead - no connection, Brown lead to +24 on terminal strip and Blue lead to DCOM on terminal strip. Verify that the sensor is operational: After the pump is in operation, verify that the indicator light on the sensor changes state once the water is flowing in the discharge pipe.

CARRY MANUFACTURING, INC.

WET WELL LAYOUT



DIRECTIONS:

Pressure Transducer Mounting/Placement -

1. Attach a 1.5" PVC Pipe to the Transducer Coupling. 2. Make sure all pipe connections are glued and air tight. 3. Mount the Transducer and pipe so that the bottom of the pipe is 4" below the OFF location of the pump. 4. The Preset ON position of the Transducer is 15" above the bottom of the pipe. The Preset FULL SPEED position of the Transducer is 23" above the bottom of the pipe. The Preset OFF position of the Transducer is 4" above the bottom of the pipe. The Preset positions may be changed in the Parameters of the VFD. See the VFD manual for more instructions. **DO NOT** mount the transducer using the Tabs on the box. Secure the PVC pipe with a clamp. Mounting the Transducer with the box tabs may cause stress on the fittings and create an air leak. Note: The Transducer box has a breather hole in the bottom of the plastic box. This hole allows for atmospheric air in the box for the sensor. If this hole becomes blocked, the Transducer may not operate correctly. Mount so that this hole has clearance.

Flow Sensor Mounting/Placement -

The flow sensor should be mounted to the vertical pump discharge pipe. 1. Drill a 1" hole in the side of the PVC pipe. 2. Using PVC Primer, prime both the PVC saddle and the mounting area on the vertical pipe. 3. Using PVC Cement, attach the saddle to the vertical pipe. 4. Hook up the sensor wires according to the wiring diagram. Verify that the sensor is operational: After the pump is in operation, verify that the indicator light on the sensor changes state once the water is flowing in the discharge pipe.

Flow Sensor Adjustment -

If the Flow Sensor does not activate when water passes by it, then adjustment is necessary. The Sensor can be repositioned by loosening the compressing nut and sliding the sensor in and out. The sensitivity of the unit may be changed by the adjustment screw on the back of the sensor. Turn the adjustment screw clockwise to increase the sensitivity and counter-clockwise to decrease the sensitivity.

CARRY MANUFACTURING, INC.
VACON VFD PARAMETER OVERVIEW:

PARAMETER: DESCRIPTION:

#201	Local/Remote enabled. To be able to use the toggle switch.
#206	Drive speed scaling lower reference. 0-100% equals 0-10v from the transducer. 1% basically equals 1" of water above the OFF setting. This was preset at 23%. It is the pump start setting. Adjust this setting to change at what water level the pump starts.
#207	Drive speed scaling upper reference. Full speed operation 0-100% equals 0-10v signal from transducer. 1% basically equals 1" of water above the OFF setting. This was preset at 31%. This is the water level when the pump will be at full speed. Adjust this setting to change the water level location that the pump will be at full speed.
#214	Analog input dampening. 0-10 volt signal from level transducer.
#216	Analog input dampening. 0-10 volt signal from level transducer.
#301	Minimum frequency. Preset at 30-35 Hertz.
#302	Maximum frequency. Preset at 65 Hertz.
#303	Jog frequency. Preset at 30 Hertz.
#402	Accel time. Preset at 1 second.
#403	Decel time. Preset at 1 second.
#406	DC braking upon stopping.
#407	DC braking time. Preset at 5 seconds.
#408	DC brake level. Preset at 50%.
#410	Cold weather operation. Preset to Arctic.
#501	Vector control. Current based operation for maximum speed.
#510	Motor full load amps. This is preset at 4.2 AMPS for 1 HP pumps.
#511	Motor rated RPM. Preset at 3450.
#514	Measure the motor resistance for proper operation.
#516	Slip compensation enabled.
#517	Single phase operation enabled.
#601	Current limit based on full load amps.
#608	Number of restarts. Preset at 3.
#609	Timer in between restarts. Preset at 30 seconds.
#610	30 second Overcurrent trip.
#705	Run timer for dry pump fault. Preset at 10 seconds.
#706	Undercurrent timer for dry pump fault. Preset at 20 seconds.
#707	Output set for threshold #1 for auto start based on analog signal.
#720	Active low logic enabled.
#721	DI1 input set for the local/remote switch.
#722	DI2 input set for dry pump fault.

CARRY MANUFACTURING, INC.
VACON VFD PARAMETER OVERVIEW:

<u>PARAMETER:</u>	<u>DESCRIPTION:</u>
#723	DI3 input set for no assignment.
#740	Threshold 1 set for analog input signal high.
#741	Start threshold based on analog signal. This needs to be set the same as #206. Turn on point for pump.
#742	Stop threshold based on analog signal. 0-10v equal 0-100%. Preset at 7%. Turn off point for the pump.
#743	Threshold #2 set for current low limit for dry pump fault.
#744	Threshold #2 high set point to signify pump is running OK. This is the dry pump safety set point. Set this as a percentage of full load amps. Set this 1% higher than #745.
#745	Threshold #2 low set point to trip dry pump fault. This is a dry pump safety set point. Set this as a percentage of full load amps. If the pump current goes below this setting, the VFD will trip out and display DRY PUMP. This is to detect a loss of load or loss of water.
#746	Timer 1 set up. Preset for on-delay.
#747	Timer 1 signal source. Preset for drive run.
#748	Timer 1 set point. Preset for 10 seconds.
#749	Timer 2 set up. Preset for on-delay.
#750	Timer 2 signal source. Preset for DI3.
#751	Timer 2 set point. Preset at 20 seconds. After this preset time, the pump will trip out on DRY PUMP.
#801	Use this to save or recall program changes. Entering a #2 will save the current program. Entering a #3 will recall the current program.
#802	Drive set to be able to auto start.
#814	Display setting.
#819	Dry pump fault set up.
#912	VIN2 status. This displays the current level of water as seen by the transducer. It is represented as a percentage.

CARRY MANUFACTURING, INC.

PROCEDURE FOR ADJUSTING LEVEL PARAMETERS IN PUMP CONTROLLER

1. Turn the VFD controller on.
2. Switch the **LOC/REM** toggle switch (located underneath the drive unit) in the **LOC** (local or manual) position. The display should read “LOC”.
3. Press the **PROG** and **SHIFT** keys at the same time. This will display the access code screen - Parameter #811.
4. The access code is 88. This can be input by using the **INC** and **DEC** keys until 88 is displayed. After 88 is displayed, press the **ENTER** key. The display will flash “Stored” before returning to the Access Code display.
5. Press the **PROG** key. This will return the display back to the default screen.
6. Press the **PROG** and **SHIFT** keys at the same time to get into the parameter list.
7. Using the **INC** and **DEC** keys, move up and down through the parameters. Parameters #206 and #741 are the parameters that start the pump. They are scaled in percentages. One percent equals one inch of water above the level transducer pipe. Theoretically, the top of the pump location is the zero percent level. Parameter #207 is the parameter for the full speed operation of the pump. It is also scaled in percentages.
8. Once a parameter is displayed on the screen, it can be adjusted to fit the pump system. Pressing the **SHIFT** key will make the parameter flash. Use the **INC** and **DEC** keys to adjust value of the parameter. Once the correct value is displayed, press the **ENTER** key to save the value. You can move to another parameter by using the **INC** and **DEC** keys. Follow the above instructions for changing the desired parameters.
9. Parameters #206 and #741 should be set to the same value. The value of Parameter #207 should be greater than the value of Parameters #206 and #741. Decreasing Parameters #206 and #741 will result in the pump starting at a lower water level. Increasing Parameters #206 and #741 will result in the pump starting at a higher water level. Decreasing the differential between (#206,#741) and #207 will make the pump ramp up faster. Increasing the differential between (#206,#741) and #207 will make the pump ramp up slower.
10. After all parameters have been adjusted to meet the needs of the pump station, the Parameters need to be saved. To save the Parameters, use the **INC** and **DEC** keys to scroll to Parameter #801. Press **SHIFT** to edit this Parameter. Use the **INC** and **DEC** keys to change the value to 2 (Store). Press **ENTER** to initiate the store function. Turn the **LOC/REM** toggle switch to the **REM** (remote or automatic) position to put the pump in automatic mode.
11. This procedure can be repeated as many times necessary to get the pump operating to suit the needs of the customer.

CARRY MANUFACTURING, INC.
LEVEL TRANSDUCER OPERATION AND ADJUSTMENT

1. The level transducer is normally mounted on top of the wet well with a 1.5" PVC pipe extending down into the wet well to about 4" below the top of the pump.
2. Water rising in the wet well will pressurize the air inside the PVC pipe and be sensed by the transducer.
3. The transducer has a 0-100" of water column range. Its output is 0-10 vdc (Volts DC). This corresponds to 0-100 % at the VFD controller. One percent equals one inch of water above the bottom of the transducer PVC pipe. This value can be viewed at Parameter #912 on the VFD controller.
4. It is essential for proper operation that the PVC pipe is air tight. If the air is allowed to purge out of the pipe, the transducer will read an incorrect water level.
5. In the event that the transducer is reading the wrong water level, the transducer pipe can be purged. This can be accomplished in one of two ways. The first way is to lift the transducer pipe out of the water and allow all of the water to be drained out of the pipe. The second way is to place the VFD controller in the **LOC** (local or manual) mode using the **LOC/REM** toggle switch, and run the pump at maximum speed until the water level drops below the bottom of the PVC pipe and purges all the water from the pipe.
6. If the transducer continues to give incorrect readings, then the transducer pipe may have a leak in it. This will need to be fixed for proper operation.
7. To view the water level on the VFD controller complete the following procedure:
 - A. Place the **LOC/REM** toggle switch in the **LOC** (local or manual) mode.
 - B. Press the **PROG** and **SHIFT** keys at the same time. This will display the access code screen - Parameter #811.
 - C. The access code is 88. This can be input by using the **INC** and **DEC** keys until 88 is displayed. After 88 is displayed, press the **ENTER** key. The display will flash "Stored" before returning to the Access Code display.
 - D. Press the **PROG** key. This will return the display back to the default screen.
 - E. Press the **PROG** and **SHIFT** keys at the same time to get into the parameter list.
 - F. Using the **INC** and **DEC** keys move up and down through the parameters. Scroll through the Parameters until #912 is displayed. The level will be represented as a percentage. One percent equals one inch of water above the bottom of the transducer PVC pipe.
 - G. Press the **PROG** key to return to the default screen.

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
001	Model Number	Model dependent	READ-ONLY	1,2	
002	Software Rev	0.00-99.99	READ-ONLY	2	
003	Rated Current	0.0-200.0 A	READ-ONLY	2	
005	Serial No 1	0-65535	READ-ONLY	2	
006	Serial No 2	0-65535	READ-ONLY	2	
007	USB Soft. Rev		READ-ONLY		
008	Option Installed		READ-ONLY		
009	Fbus Soft. Rev		READ-ONLY		
030	Pwr Down Date		READ-ONLY		
031	Pwr Down Time		READ-ONLY		
102	Output Freq	0.0-400.0 Hz	READ-ONLY	1,2	
103	Output Voltage	0-600V	READ-ONLY	1,2	
104	Output Current	0.0-200.0A	READ-ONLY	1,2	
105	Drive Load	-200.0-200.0%	READ-ONLY	1,2	
106	Load Torque	-200.0-200.0%	READ-ONLY	1,2	
107	Drive Temp	-20.0 -200.0 DegC	READ-ONLY	1,2	
108	Total Run Time	0.0 - 6553.5 h	READ-ONLY	2	
109	Power On Hours	0 - 65535 h	READ-ONLY	2	
110	Stator Freq	0.0-400.0 Hz	READ-ONLY	2	
111	DC Bus Voltage	0 - 1000 Vdc	READ-ONLY	1,2	
115	Drive Power Out	0.0% - 200.0%	READ-ONLY	2	
116	Out Power(kW)	0.0 - 327.67	READ-ONLY	2	
117	MWh Meter	0 - 32767	READ-ONLY	2	
118	kWh Meter	0.0 - 999.9	READ-ONLY	2	
120	Today's Date	MM/DD/YY	READ-ONLY	2	
121	Today's Time	hh:mm	READ-ONLY	2	
150	Show Clock Param	text string	0 (No)	2	
151	Time Zone Setup	text string	12="-5 East. US"	2	

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
152	TOD Run Enable	0-23 hours, 0-59 min	12:00	2(Clock)	
154	TOD Run Disable	0-23 hours, 0-59 min	12:00	2(Clock)	
156	TOD Run En 2	0-23 hours, 0-59 min	12:00	2(Clock)	
158	TOD Run Dis 2	0-23 hours, 0-59 min	12:00	2(Clock)	
160	Weekend TOD En	0-23 hours, 0-59 min	12:00	2(Clock)	
162	Weekend TOD Dis	0-23 hours, 0-59 min	12:00	2(Clock)	
171	Reminder 1 Conf.	text string	Disabled	2	
172	Reminder 1 Time	1 to 32000 Min	1	2	
173	Reminder 1 ETA	+/- 32000 Min	READ-ONLY	2	
174	Reminder 2 Conf.	text string	Disabled	2	
175	Reminder 2 Time	1 to 32000 Hrs	1	2	
176	Reminder 2 ETA	+/- 32000 Hrs	READ-ONLY	2	
177	Reminder 3 Conf.	text string	Disabled	2	
178	Reminder 3 Time	1 to 32000 Hrs	1	2	
179	Reminder 3 ETA	+/- 32000 Hrs	READ-ONLY	2	
201	Input Mode	text string	0= "Local Only"	1,2	L/R Rem Bth
202	Rev Enable	text string	0= "Forward"	1,2	
203	Stop Key Remote	text string	0="Coast"	2	
204	Ref Select	text string	0= "Vin1"	2	
205	Vin1 Config	text string	0-10V	2	
206	Vin1 Offset	0.0% to 100.0%	0.00%	2	15.00%
207	Vin1 Span	10.0% to 200.0%	100.00%	2	23.00%
208	Cin Config	text string	2= "0-20mA 50"	2	
209	Cin Offset	0.0% to 100.0%	0.0%	2	
210	Cin Span	10.0% to 200.0%	100.0%	2	
211	Vin2 Config	text string	0-10V	2	
212	Vin2 Offset	0.0% to 100.0%	0.0%	2	
213	Vin2 Span	10.0% to 200.0%	100.0%	2	

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
214	Vin1 Filter Time	0 to 1000 ms	20 ms	2	1000 ms
215	Cin Filter Time	0 to 1000 ms	20 ms	2	
216	Vin2 Filter Time	0 to 1000 ms	20 ms	2	1000 ms
217	Trim Ref Enable	text string	0="Disabled'	2	
218	Trim % Factor	0.0 to 100.0%	10.0%	2	
222	Ref Loss Config	text string	No Fault	2	
301	Min Frequency	0.0 - Max Freq	0.0Hz	1,2	30 Hz
302	Max Frequency	20.0 - 400.0 Hz	60.0Hz	1,2	65.0 Hz
303	Preset Freq 1	Min Freq- Max Freq	5.0Hz	1,2	30.0 Hz
304	Preset Freq 2	Min Freq- Max Freq	10.0Hz	2	
305	Preset Freq 3	Min Freq- Max Freq	20.0Hz	2	
306	Preset Freq 4	Min Freq- Max Freq	30.0Hz	2	
307	Preset Freq 5	Min Freq- Max Freq	40.0Hz	2	
308	Preset Freq 6	Min Freq- Max Freq	50.0Hz	2	
309	Cut-off Freq	0.0 - 5.0 Hz	0.0Hz	2	
310	Preset Freq 7	Min Freq- Max Freq	60.0Hz	2	
311	Preset Freq 8	Min Freq- Max Freq	0.0Hz	2	
312	Preset Freq 9	Min Freq- Max Freq	2.5Hz	2	
313	Preset Freq 10	Min Freq- Max Freq	7.5Hz	2	
314	Preset Freq 11	Min Freq- Max Freq	15.0Hz	2	
315	Preset Freq 12	Min Freq- Max Freq	25.0Hz	2	
316	Preset Freq 13	Min Freq- Max Freq	35.0Hz	2	
317	Preset Freq 14	Min Freq- Max Freq	45.0Hz	2	
318	Preset Freq 15	Min Freq- Max Freq	55.0Hz	2	
380	Keeper Input Cfg	text string	4="Disabled'	2(Clock)	
381	Keeper Max Scale	0-32000	1000	2(Clock)	
382	Keeper Save Time	00:00 -23:59	0:00	2(Clock)	
384	Keeper Save Rate	text string	0="24 Hour"	2(Clock)	

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
385	Keeper Input Value	0-32000	READ-ONLY	2(Clock)	
386	Keeper Time Rate	text string	1="Minute"	2(Clock)	
387	Keeper Rec. Num	0-255	READ-ONLY	2(Clock)	
388	Active Kpr. Rec.	0-255	READ-ONLY	2(Clock)	
389	Keeper Units	text string	1="GPM"	2(Clock)	
401	Ramp Select	text string	0= "ART-DI"	2	
402	Accel Time 1	0.1-3200.0 sec	5.0 sec	1,2	1.0 sec
403	Decel Time 1	0.1-3200.0 sec	5.0 sec	1,2	1.0 sec
404	Accel Time 2	0.1-3200.0 sec	3.0 sec	2	
405	Decel Time 2	0.1-3200.0 sec	3.0 sec	2	
406	DC Inject Config	text string	"DC at Stop"	2	DC at Stop
407	DC Inject Time	0.0-5.0 sec	0.2 sec	2	5.0 sec
408	DC Inject Level	0.0% to 100.0%	50.0%	2	50.00%
409	DC Inj Freq	0.0 to 20.0Hz	0.0Hz	2	
410	DB Config	text string	1= "Internal"	2	Int - Arctic
414	S Ramp Rounding	1-100 %	25%	2	
415	Accel Time 3	0.1-3200.0 sec	10.0 sec		
416	Decel Time 3	0.1-3200.0 sec	10.0 sec		
417	Accel Time 4	0.1-3200.0 sec	15.0 sec		
418	Decel Time 4	0.1-3200.0 sec	15.0 sec		
490	Appl Macro	text string	0= "Factory"	Macro	
491	Seq Appl	text string	0= "Disabled"	Macro	
492	SIO Visible	text string	0= "No"	Macro	
501	V/Hz Select	text string	0= "Linear Auto"	2	Vector
502	Voltage Boost	0.0 - 50.0 %	0.0%	1,2	
503	V/Hz Knee Freq	25.0 - 400.0Hz	60.0Hz	2	
504	Skip Freq Band	0.2-20.0Hz	0.2Hz	2	
505	Skip Freq 1	Min Freq- Max Freq	0.0Hz	2	

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
506	Skip Freq 2	Min Freq- Max Freq	0.0Hz	2	
507	Skip Freq 3	Min Freq- Max Freq	0.0Hz	2	
508	Skip Freq 4	Min Freq- Max Freq	0.0Hz	2	
509	Rated Mtr Volt	100V-690V	Model Depend	2, Macro	
510	Rated Mtr FLA	0.1A-85.0A	ND Rating	2, Macro	4.2A
511	Rated Mtr RPM	1-24000 rpm	1750 rpm	2, Macro	3450
512	Midpoint Freq	0.0Hz - V/Hz Knee Freq	60.0Hz	2	
513	Midpoint Volt	0.0-100.0%	100.0%	2	
514	Motor RS	0.00-655.35 Ω	Model Depend	2	
515	Power Factor	0.50-0.99	0.80	2	
516	Slip Comp Enable	text string	0= "No"	2	Yes
517	Single Phase	text string	0 = "No"	2	Yes
519	Find Mtr Data	text string	0="Not Active"	2	
520	Filter Fstator	1-100ms	8ms	2(SVC)	
521	Start Field En	text string	0="No"	2(SVC)	Yes
522	Filter Time Slip	10 - 1000 ms	100 ms	2(SVC)	
523	ID Percent	0 - 200 %	READ-ONLY	2(SVC)	
524	IQ Percent	0 - 200 %	READ-ONLY	2(SVC)	
525	Power Fail Config	text string	CTS No Msg	2(SVC)	
526	UV Ride-Thru En	text string	w/ LVT	2(SVC)	
600	Current Lim Sel	text string	0 = "Fixed Lvls"	2	
601	Cur Lim Mtr Fwd	5% - 150%	120%	2	98.00%
602	Cur Lim Mtr Rev	5% - 150%	120%	2	
603	Cur Lim Reg Fwd	5% - 150%	80%	2	
604	Cur Lim Reg Rev	5% - 150%	80%	2	
605	Cur Lim Freq	Min Freq- Max Freq	3.0Hz	2	
606	Ramp Time CL	0.1-3200.0 sec	1.0 sec	2	
607	Cur Lim Minimum	0 -50 %	10%	2	

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
608	Restart Number	0-8	0	2	3
609	Restart Delay	0-60 sec	60 sec	2	30 sec
610	Timed OL Select	text string	0= "Std Ind 60s"	2	Std Ind 30S
613	Max Regen Ramp	100 - 1000%	300%	2	
700	Vmet Config	text string	1= "Out Freq"	1,2	
701	Vmet Span	0.0-200.0%	100.0%	2	
702	Imet Config	text string	4= "Drive Load"	2	
703	Imet Span	0.0-200.0%	100.0%	2	
704	Imet Offset	0.0-90.0%	0.0%	2	
705	Relay 1 Select	text string	2= "Faulted"	1,2	Timer 1
706	Relay 2 Select	text string	3= "Drive Run"	1,2	Thres 2
707	DO1 Select	text string	1= "Drv Ready"	2	Thres 1
708	DO2 Select	text string	7= "At Speed"	2	Timer 2
719	Digital Input Filter Time	1-1000 msec	5 msec	2	
720	Active Logic	text string	1= "Active High"	2	Active Low
721	DI1 Configure	text string	0= "Preset 1"	2	Loc/Rem
722	DI2 Configure	text string	1= "Preset 2"	2	User Flt 1
723	DI3 Configure	text string	2= "Preset 3"	2	Not Assigned
724	DI4 Configure	text string	6= "Alt Ramp"	2	
725	DI5 Configure	text string	7= "Fault Reset"	2	
727	MOL Configure	text string	21= "MOL NO"	2	
726	MOL Polarity	text string	1="NO Operate	2	
740	Thres 1 Select	text string	9= "Load High"	2	Vin 2 High
741	Thres 1 High	-300.00% to 300.00%	100.00%	2	15.00%
742	Thres 1 Low	-300.00% to 300.00%	0.00%	2	7.00%
743	Thres 2 Select	text string	15= "Curr High"	2	Curr Low
744	Thres 2 High	-300.00% to 300.00%	100.00%	2	52.00%
745	Thres 2 Low	-300.00% to 300.00%	0.00%	2	51.00%

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
746	Timer 1 Type	text string	0="On Delay"	2	On Delay
747	Timer 1 Signal	text string		2	Drive Run
748	Timer 1 Time	0.0-320.0 sec	1.0 sec	2	10 sec
749	Timer 2 Type	text string	0="On Delay"	2	On Delay
750	Timer 2 Signal	text string		2	DI3
751	Timer 2 Time	0.0-320.0 sec	1.0 sec	2	20.0 sec
794	Drive Name	text string	serial number	2	
799	Config USB Mode	text string	0="Disabled'	2	
801	Program Number	0-9999	0	2, Macro	
802	Start Options	text string	0= "LS Lockout"	2	AutoStart
803	PWM Frequency	0.6 - 16.0 kHz	3.0kHz	2	
804	Display Mode	text string	0= "Std Disply"	2	
805	Display Units	alphanumeric	0= Blank	2	
809	Display Scale	1-65535	18000	2	
810	Language	text string	0= "English"	2, Macro	
811	Access Code	0-9999	0	2	88
812	Freq Ref Output	text string	0= "6FS"	2	
813	Speed Ratio	0.0-200.0%	100.0%	2	
814	Display Status	text string	0= "Drive Load"	2	Current Out
816	Fly Catch Mode	text string	0="Sweep FWD"	2	
819	Flt Text #1	text string	User Flt 1	2	DRY PUMP
825	Flt Text #2	text string	User Flt 2	2	
850	PID Configure	text string	0= "No PI"	2	
851	PID FBk Config	text string	0= "Vin1"	2	
852	PID Prop Gain	0-2000	0	2	
853	PID Int Gain	0-10000	0	2	
854	PID Feed Gain	0-2000	1000	2	
855	PID Error 1	0.00 -100.00%	READ-ONLY	2	

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
856	PID Error 2	0.00 - 100.00%	READ-ONLY	2	
857	PID High Corr	0.00 - 100.00%	100.00%	2	
858	PID Low Corr	0.00 - 100.00%	0.00%	2	
859	PID Deriv Gain	0 -200	0.00%	2	
860	PID Sleep Cfg	text string	0="Disabled'	2	
861	PID Sleep Lvl	0.00 - 100.00%	0.00%	2	
862	PID Wake-up Lvl	0.00 - 100.00%	100.00%	2	
863	Sleep Delay Time	0.0 - 300.0 sec	0.0 sec	2	
864	Wake-up Delay	0.0 - 300.0 sec	0.0 sec	2	
865	PID Feedback	0.00 - 100.00%	READ-ONLY	2	
866	PID Reference	0.00 - 100.00%	READ-ONLY	2	
867	PID User Units	text string	0="No"	2	
880	FBus Read 1	0-65535	103	2(SIO)	
881	FBus Read 2	0-65535	104	2(SIO)	
882	FBus Read 3	0-65535	105	2(SIO)	
883	FBus Read 4	0-65535	107	2(SIO)	
884	FBus Read 5	0-65535	909	2(SIO)	
890	FBus Write 1	0-65535	907	2(SIO)	
891	FBus Write 2	0-65535	402	2(SIO)	
892	FBus Write 3	0-65535	403	2(SIO)	
893	FBus Write 4	0-65535	920	2(SIO)	
894	Fbus Write 5	0-65535	921	2(SIO)	
900	SIO Protocol	text string	0= "RTU N81"	2(SIO)	
901	SIO Baud Rate	text string	"2=9600"	2(SIO)	
902	Comm Drop #	1-247	1	2(SIO)	
903	SIO Timer	0.0-60.0 sec	1.0 sec	2(SIO)	
904	SIO Cntl Word	Bit 0-15	0x0000	2(SIO)	
905	Ext Ref Freq 1	Min Freq- Max Freq	0.00Hz	2(SIO)	

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
906	Ext Ref Freq 2	Min Freq- Max Freq	0.00Hz	2(SIO)	
907	Cntl Word 2	Bit 0-15	0x0000	2(SIO)	
908	Status Word	Bit 0-15	READ-ONLY	2(SIO)	
909	DI Status	Bit 0-14	READ-ONLY	2(SIO)	
910	Vin1 Status	0.00 - 100.00%	READ-ONLY	2(SIO)	
911	Cin Status	0.00 - 100.00%	READ-ONLY	2(SIO)	
912	Vin2 Status	0.00 - 100.00%	READ-ONLY	2(SIO)	
913	Output Status	Bit 0-5	READ-ONLY	2(SIO)	
914	Vmet Status	0.00 - 100.00%	READ-ONLY	2(SIO)	
915	Imet Status	0.00 - 100.00%	READ-ONLY	2(SIO)	
916	Infrared Baud	text string	2="9600"	2(SIO)	
917	FBus Port Config	text string		2(SIO)	
920	SIO Vmet Level	0.00-100.00%	100.00%	2(SIO)	
921	SIO Imet Level	0.00-100.00%	100.00%	2(SIO)	
926	Status Word 2	Bit 0-2	READ-ONLY	2(SIO)	
930	Seq Cntl 1	Bit 0-15 (hex control)	0x0000	2(SEQ)	
931	Seq Cntl 2	Bit 0-15 (hex control)	0x0000	2(SEQ)	
932	Seq Cntl 3	Bit 0-15 (hex control)	0x0000	2(SEQ)	
933	Seq Cntl 4	Bit 0-15 (hex control)	0x0000	2(SEQ)	
934	Seq Cntl 5	Bit 0-15 (hex control)	0x0000	2(SEQ)	
935	Seq Cntl 6	Bit 0-15 (hex control)	0x0000	2(SEQ)	
936	Seq Cntl 7	Bit 0-15 (hex control)	0x0000	2(SEQ)	
937	Seq Cntl 8	Bit 0-15 (hex control)	0x0000	2(SEQ)	
938	Seq Cntl 9	Bit 0-15 (hex control)	0x0000	2(SEQ)	
939	Seq Cntl 10	Bit 0-15 (hex control)	0x0000	2(SEQ)	
940	Seq Cntl 11	Bit 0-15 (hex control)	0x0000	2(SEQ)	
941	Seq Cntl 12	Bit 0-15 (hex control)	0x0000	2(SEQ)	
942	Seq Cntl 13	Bit 0-15 (hex control)	0x0000	2(SEQ)	

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
943	Seq Cntl 14	Bit 0-15 (hex control)	0x0000	2(SEQ)	
944	Seq Cntl 15	Bit 0-15 (hex control)	0x0000	2(SEQ)	
945	Seq Cntl 16	Bit 0-15 (hex control)	0x0000	2(SEQ)	
946	Seq Cntl 17	Bit 0-15 (hex control)	0x0000	2(SEQ)	
947	Seq Cntl 18	Bit 0-15 (hex control)	0x0000	2(SEQ)	
948	Seq Cntl 19	Bit 0-15 (hex control)	0x0000	2(SEQ)	
949	Seq Cntl 20	Bit 0-15 (hex control)	0x0000	2(SEQ)	
950	Seq Cntl 21	Bit 0-15 (hex control)	0x0000	2(SEQ)	
951	Seq Cntl 22	Bit 0-15 (hex control)	0x0000	2(SEQ)	
952	Seq Cntl 23	Bit 0-15 (hex control)	0x0000	2(SEQ)	
953	Seq Cntl 24	Bit 0-15 (hex control)	0x0000	2(SEQ)	
954	Seq Cntl 25	Bit 0-15 (hex control)	0x0000	2(SEQ)	
955	Seq Count 1	0-65535	0	2(SEQ)	
956	Seq Count 2	0-65535	0	2(SEQ)	
957	Seq Count 3	0-65535	0	2(SEQ)	
958	Seq Count 4	0-65535	0	2(SEQ)	
959	Seq Count 5	0-65535	0	2(SEQ)	
960	Seq Count 6	0-65535	0	2(SEQ)	
961	Seq Count 7	0-65535	0	2(SEQ)	
962	Seq Count 8	0-65535	0	2(SEQ)	
963	Seq Count 9	0-65535	0	2(SEQ)	
964	Seq Count 10	0-65535	0	2(SEQ)	
965	Seq Count 11	0-65535	0	2(SEQ)	
966	Seq Count 12	0-65535	0	2(SEQ)	
967	Seq Count 13	0-65535	0	2(SEQ)	
968	Seq Count 14	0-65535	0	2(SEQ)	
969	Seq Count 15	0-65535	0	2(SEQ)	
970	Seq Count 16	0-65535	0	2(SEQ)	

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting
971	Seq Count 17	0-65535	0	2(SEQ)	
972	Seq Count 18	0-65535	0	2(SEQ)	
973	Seq Count 19	0-65535	0	2(SEQ)	
974	Seq Count 20	0-65535	0	2(SEQ)	
975	Seq Count 21	0-65535	0	2(SEQ)	
976	Seq Count 22	0-65535	0	2(SEQ)	
977	Seq Count 23	0-65535	0	2(SEQ)	
978	Seq Count 24	0-65535	0	2(SEQ)	
979	Seq Count 25	0-65535	0	2(SEQ)	
980	Seq Decision 1	Bit 0-15	0x0000	2(SEQ)	
981	Seq Decision 2	Bit 0-15	0x0000	2(SEQ)	
982	Seq Decision 3	Bit 0-15	0x0000	2(SEQ)	
983	Seq Decision 4	Bit 0-15	0x0000	2(SEQ)	
984	Seq Decision 5	Bit 0-15	0x0000	2(SEQ)	
1500	Last Fault	All Fault Options	READ-ONLY	1,2	
1527	9th Fault	All Fault Options	READ-ONLY	2	
1554	8th Fault	All Fault Options	READ-ONLY	2	
1581	7th Fault	All Fault Options	READ-ONLY	2	
1608	6th Fault	All Fault Options	READ-ONLY	2	
1635	5th Fault	All Fault Options	READ-ONLY	2	
1662	4th Fault	All Fault Options	READ-ONLY	2	
1689	3rd Fault	All Fault Options	READ-ONLY	2	
1716	2nd Fault	All Fault Options	READ-ONLY	2	
1743	1st Fault	All Fault Options	READ-ONLY	2	