OUTDOOR-RATED STANDALONE VARIABLE FREQUENCY DRIVE 230V and 460V

CARRY PUMPS

VACON VFD
ELECTRICAL WIRING

CAUTION: ALWAYS VERIFY INCOMING POWER IS WITHIN THE VOLTAGE RANGE LISTED ON THE VFD MANUFACTURER'S MODEL NUMBER STICKER.

EXAMPLE: **230V VFD SHOULD HAVE 200V-230V +/- 15%**
                 460V VFD SHOULD HAVE 380V-460V +/- 15%

CAUTION
ALWAYS VERIFY CORRECT VOLTAGE

GND	L1/R	L2/S	L3/T	B+	DB	T1/U	T2/V	T3/W	GND

USED FOR 3 PHASE POWER ONLY

BLACK   WHITE   RED   GREEN

POWER SUPPLY

LIGHTNING ARRESTER

RECOMMEND INSTALLING AT BREAKER PANEL

CARRY MFG 3 PHASE PUMP
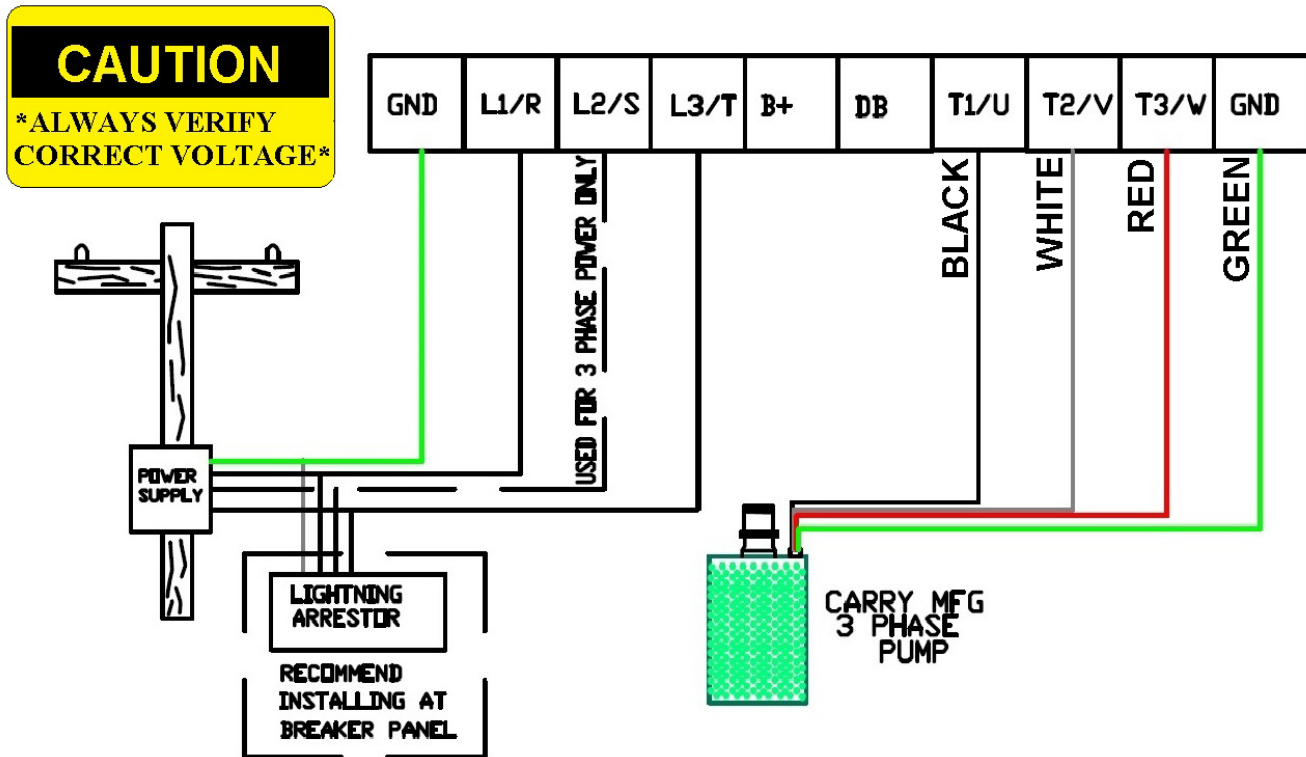
WARNING!!

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 - 230V/460V
Single Phase incoming power is connected to L1/R, L3/T and GND on the terminal strip.
Three Phase incoming power is connected to L1/R, L2/S, L3/T and GND on the terminal strip.
Pump Connections -
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.
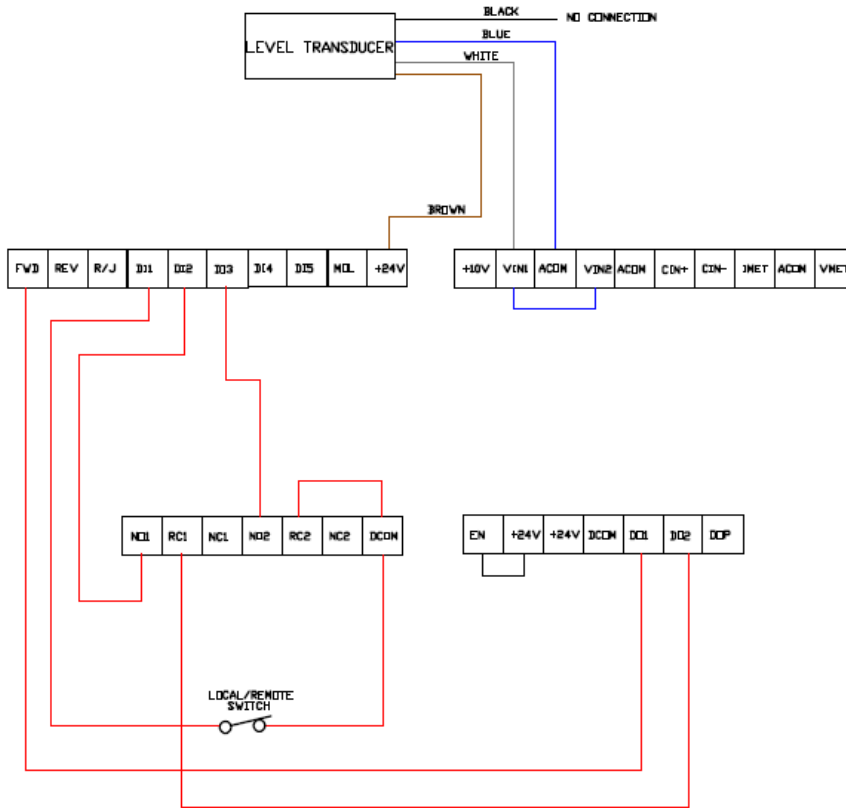
CAUTION: Failure to ground the control frame can result in a serious electrical shock hazard if a circuit fault occurs.

VACON VFD
PRESSURE TRANSDUCER
And
LOC/REM SWITCH WIRING

*DI1 IS THE LOCAL/REMOTE INPUT
*DI2 IS THE USER FAULT INPUT. DRY PUMP SIGNAL FROM THE LOW
       CURRENT THRESHOLD. TIMER 2 IS ALSO IN SERIES WITH THESE.
*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.
*DO1 IS A DIGITAL OUTPUT USED TO START THE PUMP IN REMOTE MODE.
*DO2 IS A DIGITAL OUTPUT THAT IS ACTIVE WHEN THE LOW CURRENT THRESHOLD
       IS TRIPPED AND TIMER 2 IS TIMED OUT.

DIRECTIONS
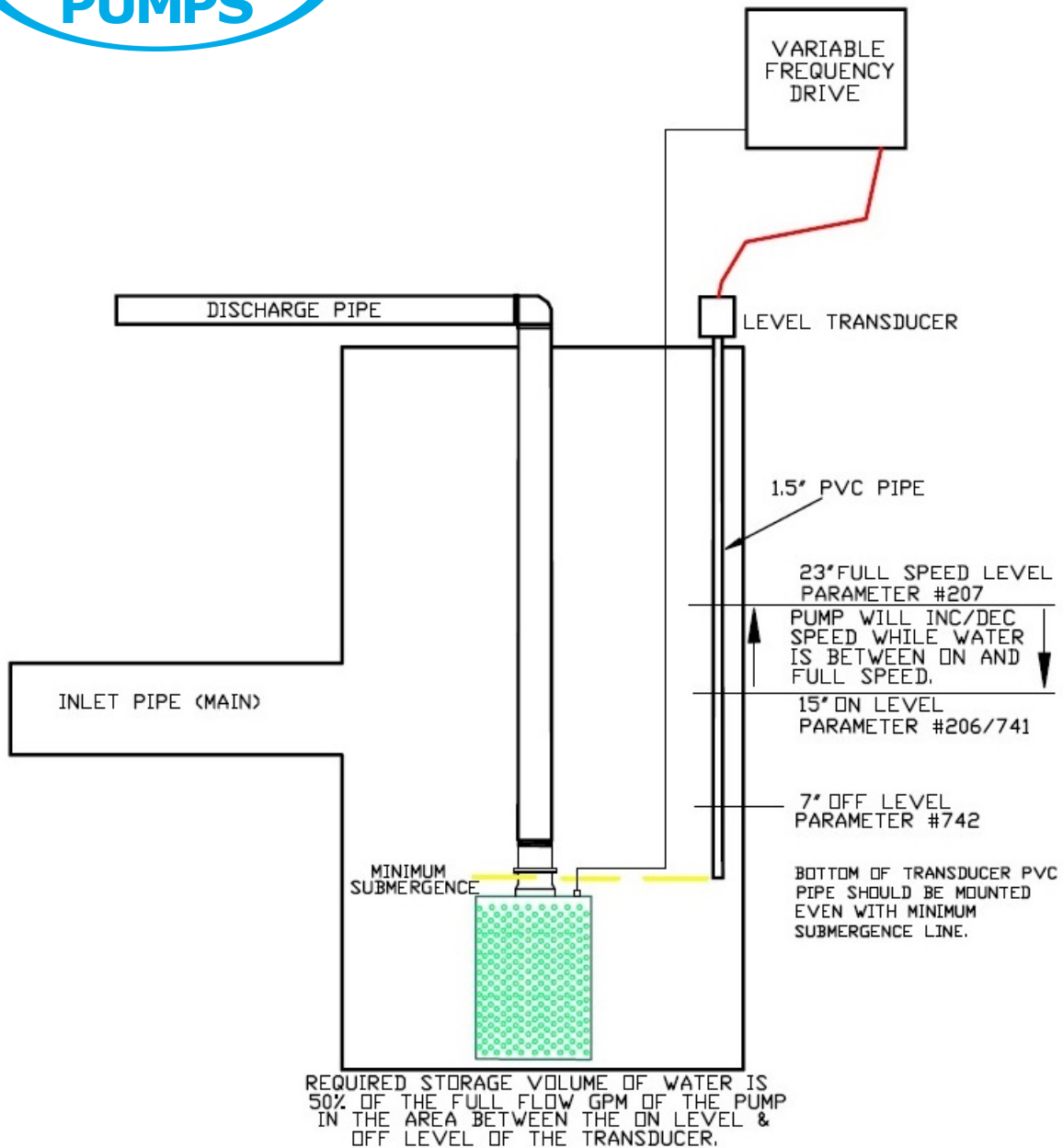
Pressure Transducer Connections -

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.

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WET WELL LAYOUT

VARIABLE FREQUENCY DRIVE

DISCHARGE PIPE

LEVEL TRANSDUCER

1.5" PVC PIPE

23" FULL SPEED LEVEL PARAMETER #207

PUMP WILL INC/DEC SPEED WHILE WATER IS BETWEEN ON AND FULL SPEED.

15" ON LEVEL PARAMETER #206/741

INLET PIPE (MAIN)

7" OFF LEVEL PARAMETER #742

BOTTOM OF TRANSDUCER PVC PIPE SHOULD BE MOUNTED EVEN WITH MINIMUM SUBMERGENCE LINE.

MINIMUM SUBMERGENCE

REQUIRED STORAGE VOLUME OF WATER IS 50% OF THE FULL FLOW GPM OF THE PUMP IN THE AREA BETWEEN THE ON LEVEL & OFF LEVEL OF THE TRANSDUCER.

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 even with the Minimum submergence line. (Top 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 7" 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.

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VACON VFD
PARAMETER OVERVIEW

PARAMETER   DESCRIPTION

#201 Local/Remote enabled.   This allows you to use the toggle switch.

#206 (Slow Speed/On Level) Based on a 0-10v signal from the transducer. Every 1% equals approximately 1" of water above the pump's minimum submergence level . This is pre set to 15%. This means the pump will start in slow speed when the water is 15" above the minimum submergence level and then steadily increase the pump speed as the water level rises until the Full speed level has been reached. Adjusting this setting will change the water level at which the pump starts. This needs to be set the same as #741.

#741 Start threshold based on analog signal. This needs to be set the same as #206.

#207 (Full Speed Level) Based on a 0-10v signal from the transducer. Every 1% equals ap proximately 1" of water above the pump's minimum submergence level. This is preset to 23%. This means the pump will reach Full speed when the water is 23" above the mini mum submergence level. Adjusting this setting will change the water level at which the pump reaches full speed.

#301 Minimum frequency is preset at 30 hertz. Minimum frequency can be adjusted as need ed for each application but should <u>not</u> be set lower than 30 hertz. Setting the Minimum frequency below 30 Hertz can cause damage to the pump motor. See the "Procedure for Adjusting Level Parameters in Pump Controller " for further instruction on increasing Slow speed.

#302 Maximum frequency is preset at 65 hertz. Maximum frequency should remain at 65 hertz.

#303 Jog frequency is preset at 30 hertz

#509 Motor Rated Voltage

#510 Motor Full Load Amps

#511 Motor Rated RPM is set at 3450.

#517 Incoming power should be set to Single or Three phase operation based on the incom- ing power source.

#742 (Shutoff Level) Based on a 0-10v signal from the transducer. Every 1% equals approxi mately 1" of water above the pump's minimum submergence level.   This is preset at 7% which means the pump will turn off 7" above minimum submergence. In order to avoid damaging the pump, we recommend this setting not be changed.

#801 Use this to save parameter changes. Entering #2 will save the current programming.

#912 VIN2 status is a display of the current water level as seen by the transducer. It is repre- sented as a percentage.

VACON VFD
INSTRUCTIONS TO CHANGE
LEVEL PARAMETERS

1. Turn the VFD controller on.

2. Switch the **LOC/REM** toggle switch (located underneath the drive unit) to the LOC (local) 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 minimum submergence line 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 the 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.

VACON VFD
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. The bottom of the PVC pipe should be even with minimum submergence line.

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. 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 **LOC** (local 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.

VACON VFD PARAMETERS

CARRY MANUFACTURING, INC.
VACON VFD PARAMETERS

230V

No.	Parameter Name	1 HP/230V	1.5 HP/230V	2 HP/230V	3 HP/230V	5 HP/230V	7.5 HP/230V	10 HP/230V	15 HP/230V
201	Input Mode	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth
206	Vin1 Offset	15%	15%	15%	15%	15%	15%	15%	15%
207	Vin1 Span	23%	23%	23%	23%	23%	23%	23%	23%
301	Min Frequency	30%	30%	30%	30%	30%	30%	30%	30%
302	Max Frequency	65%	65%	65%	65%	65%	65%	65%	65%
303	Preset Freq 1	30%	30%	30%	30%	30%	30%	30%	30%
510	Rated Motor FLA	4.7A	5.9A	8.1A	10.9A	17.0A	24.6A	32.2A	47.4
511	Rated Motor RPM	3450	3450	3450	3450	3450	3450	3450	3450
741	Thres 1 High	15%	15%	15%	15%	15%	15%	15%	15%
742	Thres 1 Low	7%	7%	7%	7%	7%	7%	7%	7%

460V

No.	Parameter Name	1 HP/460V	1.5 HP/460V	2 HP/460V	3 HP/460V	5 HP/460V	7.5 HP/460V	10 HP/460V	15 HP/460V
201	Input Mode	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth
206	Vin1 Offset	15%	15%	15%	15%	15%	15%	15%	15%
207	Vin1 Span	23%	23%	23%	23%	23%	23%	23%	23%
301	Min Frequency	30%	30%	30%	30%	30%	30%	30%	30%
302	Max Frequency	65%	65%	65%	65%	65%	65%	65%	65%
303	Preset Freq 1	30%	30%	30%	30%	30%	30%	30%	30%
510	Rated Motor FLA	2.4A	2.5A	4.1A	5.5A	8.8A	12.3A	16.1A	23.7A
511	Rated Motor RPM	3450	3450	3450	3450	3450	3450	3450	3450
741	Thres 1 High	15%	15%	15%	15%	15%	15%	15%	15%
742	Thres 1 Low	7%	7%	7%	7%	7%	7%	7%	7%

CAUTION: ALL VFDS ARE PROGRAMMED FOR CARRY SUBMERSIBLE PUMPS AND FRANKLIN ELECTRIC MOTORS. OTHER APPLICATIONS MAY REQUIRE PARAMETER CHANGES.

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VACON VFD PARAMETERS
230V

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 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								
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)								

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
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 to32000 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	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	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%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
207	Vin1 Span	10.0% to 200.0%	100.00%	2	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	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								
214	Vin1 Filter Time	0 to 1000 ms	20 ms	2	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	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	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	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								

CARRY PUMPS, INC.
VACON VFD PARAMETERS
230V

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
301	Min Frequency	0.0 - Max Freq	0.0Hz	1,2	30 Hz	30 Hz	30 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	45.0 Hz
302	Max Frequency	20.0 - 400.0 Hz	60.0Hz	1,2	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz
303	Preset Freq 1	Min Freq- Max Freq	5.0Hz	1,2	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	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)								
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	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec
403	Decel Time 1	0.1-3200.0 sec	5.0 sec	1,2	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec
404	Accel Time 2	0.1-3200.0 sec	3.0 sec	2								

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
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	DC at Stop	DC at Stop	DC at Stop	DC at Stop	DC at Stop	DC at Stop	DC at Stop
407	DC Inject Time	0.0-5.0 sec	0.2 sec	2	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec
408	DC Inject Level	0.0% to 100.0%	50.0%	2	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
409	DC Inj Freq	0.0 to 20.0Hz	0.0Hz	2								
410	DB Config	text string	1="Internal"	2	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	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	Vector	Vector	Vector	Vector	Vector	Vector	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								
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	5.5A	7.5A	10.2 A	16 A	23.5 A	31.0 A	42.0 A
511	Rated Mtr RPM	1-24000 rpm	1750 rpm	2, Macro	3450	3450	3450	3450	3450	3450	3450	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	1.534 Ω	1.534 Ω	1.534 Ω	1.028 Ω	0.625 Ω	0.380 Ω	0.302 Ω	0.186 Ω
515	Power Factor	0.50-0.99	0.80	2								
516	Slip Comp Enable	text string	0="No"	2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
517	Single Phase	text string	0 ="No"	2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
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	Yes	Yes	Yes	Yes	Yes	Yes	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%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	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								
608	Restart Number	0-8	0	2	3	3	3	3	3	3	3	3
609	Restart Delay	0-60 sec	60 sec	2	30 sec	30 sec	30 sec	30 sec	30 sec	30 sec	30 sec	30 sec
610	Timed OL Select	text string	0="Std Ind 60s"	2	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	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	Timer 1	Timer 1	Timer 1	Timer 1	Timer 1	Timer 1	Timer 1
706	Relay 2 Select	text string	3="Drive Run"	1,2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2
707	DO1 Select	text string	1="Drv Ready"	2	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1
708	DO2 Select	text string	7="At Speed"	2	Timer 2	Timer 2	Timer 2	Timer 2	Timer 2	Timer 2	Timer 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	Active Low	Active Low	Active Low	Active Low	Active Low	Active Low	Active Low

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
721	DI1 Configure	text string	0="Preset 1"	2	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem
722	DI2 Configure	text string	1="Preset 2"	2	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1
723	DI3 Configure	text string	2="Preset 3"	2	Not Assigned	Not Assigned	Not Assigned	Not Assigned	Not Assigned	Not Assigned	Not Assigned	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	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High
741	Thres 1 High	-300.00% to 300.00%	100.00%	2	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
742	Thres 1 Low	-300.00% to 300.00%	0.00%	2	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
743	Thres 2 Select	text string	15="Curr High"	2	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low
744	Thres 2 High	-300.00% to 300.00%	100.00%	2	52.00%	52.00%	52.00%	41.00%	41.00%	41.00%	41.00%	41.00%
745	Thres 2 Low	-300.00% to 300.00%	0.00%	2	51.00%	51.00%	51.00%	40.00%	40.00%	40.00%	40.00%	40.00%
746	Timer 1 Type	text string	0="On Delay"	2	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay
747	Timer 1 Signal	text string		2	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run
748	Timer 1 Time	0.0-320.0 sec	1.0 sec	2	10 sec	10 sec	10 sec	10.0 sec	10.0 sec	10.0 sec	10.0 sec	10.0 sec
749	Timer 2 Type	text string	0="On Delay"	2	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay
750	Timer 2 Signal	text string		2	DI3	DI3	DI3	DI3	DI3	DI3	DI3	DI3
751	Timer 2 Time	0.0-320.0 sec	1.0 sec	2	20.0 sec	20.0 sec	20.0 sec	20.0 sec	20.0 sec	20.0 sec	20.0 sec	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	AutoStart	AutoStart	AutoStart	AutoStart	AutoStart	AutoStart	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	88	88	88	88	88	88	88
812	Freq Ref Output	text string	0="6FS"	2								
813	Speed Ratio	0.0-200.0%	100.0%	2								

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814	Display Status	text string	0= "Drive Load"	2	Current Out	Current Out	Current Out	Current Out	Current Out	Current Out	Current Out	Current Out
816	Fly Catch Mode	text string	0="Sweep FWD"	2								
819	Flt Text #1	text string	User Flt 1	2	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	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								
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)								

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
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)								
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	Infared 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)								

No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
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)								
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)								

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No.	Parameter Name	Options	Default	Level	1 HP/230V User Setting	1.5 HP/230V User Setting	2 HP/230V User Setting	3 HP/230V User Setting	5 HP/230V User Setting	7.5 HP/230V User Setting	10 HP/230V User Setting	15 HP/230V User Setting
970	Seq Count 16	0-65535	0	2(SEQ)								
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								

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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V 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								
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)								

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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
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 to32000 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	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	L/R Rem Bth	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%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
207	Vin1 Span	10.0% to 200.0%	100.00%	2	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	23.00%	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								
214	Vin1 Filter Time	0 to 1000 ms	20 ms	2	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	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	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	1000 ms	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								

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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
301	Min Frequency	0.0 - Max Freq	0.0Hz	1,2	30 Hz	30 Hz	30 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz
302	Max Frequency	20.0 - 400.0 Hz	60.0Hz	1,2	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz	65.0 Hz
303	Preset Freq 1	Min Freq- Max Freq	5.0Hz	1,2	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	30.0 Hz	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)								
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	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec
403	Decel Time 1	0.1-3200.0 sec	5.0 sec	1,2	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec	1.0 sec
404	Accel Time 2	0.1-3200.0 sec	3.0 sec	2								

CARRY PUMPS, INC.
VACON VFD PARAMETERS
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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
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	DC at Stop	DC at Stop	DC at Stop	DC at Stop	DC at Stop	DC at Stop	DC at Stop
407	DC Inject Time	0.0-5.0 sec	0.2 sec	2	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec	5.0 sec
408	DC Inject Level	0.0% to 100.0%	50.0%	2	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
409	DC Inj Freq	0.0 to 20.0Hz	0.0Hz	2								
410	DB Config	text string	1="Internal"	2	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	Int - Arctic	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	Vector	Vector	Vector	Vector	Vector	Vector	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								
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	2.2A	2.8A	3.8A	5.2 a	8.0 A	12.0 A	15.0 A	22.5 A
511	Rated Mtr RPM	1-24000 rpm	1750 rpm	2, Macro	3450	3450	3450	3450	3450	3450	3450	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			5.303 Ω	7.200 Ω	2.334 Ω	1.546 Ω	1.159 Ω	0.689 Ω
515	Power Factor	0.50-0.99	0.80	2								
516	Slip Comp Enable	text string	0="No"	2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
517	Single Phase	text string	0 ="No"	2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
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	Yes	Yes	Yes	Yes	Yes	Yes	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%	98.00%	98.00%	98.00%	98.00%	98.00%	98.00%	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								
608	Restart Number	0-8	0	2	3	3	3	3	3	3	3	3
609	Restart Delay	0-60 sec	60 sec	2	30 sec	30 sec	30 sec	30 sec	30 sec	30 sec	30 sec	30 sec
610	Timed OL Select	text string	0="Std Ind 60s"	2	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	Std Ind 30S	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	Timer 1	Timer 1	Timer 1	Timer 1	Timer 1	Timer 1	Timer 1
706	Relay 2 Select	text string	3 = "Drive Run"	1,2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2	Thres 2
707	DO1 Select	text string	1 = "Drv Ready"	2	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1	Thres 1
708	DO2 Select	text string	7 ="At Speed"	2	Timer 2	Timer 2	Timer 2	Timer 2	Timer 2	Timer 2	Timer 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	Active Low	Active Low	Active Low	Active Low	Active Low	Active Low	Active Low

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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
721	DI1 Configure	text string	0= "Preset 1"	2	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem	Loc/Rem
722	DI2 Configure	text string	1= "Preset 2"	2	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1	User Flt 1
723	DI3 Configure	text string	2= "Preset 3"	2	Not Assigned	Not Assigned	Not Assigned	Not Assigned	Not Assigned	Not Assigned	Not Assigned	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	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High	Vin 2 High
741	Thres 1 High	-300.00% to 300.00%	100.00%	2	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
742	Thres 1 Low	-300.00% to 300.00%	0.00%	2	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
743	Thres 2 Select	text string	15= "Curr High"	2	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low	Curr Low
744	Thres 2 High	-300.00% to 300.00%	100.00%	2	52.00%	52.00%	52.00%	41.00%	41.00%	41.00%	41.00%	41.00%
745	Thres 2 Low	-300.00% to 300.00%	0.00%	2	51.00%	51.00%	51.00%	40.00%	40.00%	40.00%	40.00%	40.00%
746	Timer 1 Type	text string	0="On Delay"	2	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay
747	Timer 1 Signal	text string		2	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run	Drive Run
748	Timer 1 Time	0.0-320.0 sec	1.0 sec	2	20 sec	20 sec	20 sec	20 sec	20 sec	20 sec	20 sec	20 sec
749	Timer 2 Type	text string	0="On Delay"	2	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay	On Delay
750	Timer 2 Signal	text string		2	DI3	DI3	DI3	DI3	DI3	DI3	DI3	DI3
751	Timer 2 Time	0.0-320.0 sec	1.0 sec	2	20.0 sec	20.0 sec	20.0 sec	20.0 sec	20.0 sec	20.0 sec	20.0 sec	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	AutoStart	AutoStart	AutoStart	AutoStart	AutoStart	AutoStart	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	88	88	88	88	88	88	88
812	Freq Ref Output	text string	0="6FS"	2								
813	Speed Ratio	0.0-200.0%	100.0%	2								

No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
814	Display Status	text string	0= "Drive Load"	2	Current Out	Current Out	Current Out	Current Out	Current Out	Current Out	Current Out	Current Out
816	Fly Catch Mode	text string	0="Sweep FWD"	2								
819	Flt Text #1	text string	User Flt 1	2	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	DRY PUMP	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								
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)								

No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
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)								
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	Infared 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)								

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No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
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)								
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)								

No.	Parameter Name	Options	Default	Level	1 HP/460V User Setting	1.5 HP/460V User Setting	2 HP/460V User Setting	3 HP/460V User Setting	5 HP/460V User Setting	7.5 HP/460V User Setting	10 HP/460V User Setting	15 HP/460V User Setting
970	Seq Count 16	0-65535	0	2(SEQ)								
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								

STANDARD WARRANTY AND CONDITIONS OF SALE

PRELIMINARY INFORMATION: Any preliminary drawings and illustrative materials used in the specification build-up process show general arrangement and approximate dimensions only. Certified drawings will be submitted after receipt of an order, if required.

PRICES: Any listed price is subject to change without notice. Orders are accepted with the understanding that the product will be billed at the price in effect at the time of shipment, unless otherwise specified by Carry Manufacturing, Inc.

QUOTATIONS: Any quotation 60 days old is subject to change without notice. The price of each order is subject to the resource availability and costs incurred by Carry Manufacturing, Inc. at the time of manufacture.

FREIGHT: F.O.B. Carry's factory in Caro, Michigan. Catalog weights are careful estimates, but they are not guaranteed. No allowance will be made for cartage at destination.

TAXES AND OTHER CHARGES: The prices do not include any Federal, State or Local sales, use or other taxes, or brokerage fees that may be applicable. The amount of any such applicable taxes or fees will be added to the invoice at the rate in effect at the time of shipment.

ACCEPTANCE: No order shall be binding upon Carry Manufacturing, Inc. until accepted in writing by an authorized official at its home office in Caro, Michigan. Any contract for the sale of product and these Conditions of Sale, shall be governed by and construed according to the Uniform Commercial Code as adopted in the State of Michigan. If the product quoted is not approved by the Consulting Engineer, Carry Manufacturing, Inc. assumes no responsibility to furnish any item manufactured by others.

CREDIT: Credit worthiness of a Purchaser will be determined upon receipt of the contract. Credit terms, if authorized, are subject to change during the life of the contract if the financial condition of the Purchaser changes.

CANCELLATION: Cancellation of orders will be accepted with the understanding that Carry Manufacturing, Inc. will be entitled to reimbursement for expenses incurred at the time of cancellation, including any and all special engineering, design, tooling, manufacturing, storage or transportation costs.

TERMS, PAYMENT & INVOICING: Standard payment terms are COD. Payment is due prior to shipment. For Open Accounts (with approved credit), payment terms are NET 30 days from the date of invoice. Retaining a percentage of the contract sale amount is prohibited without prior, written agreement. Payment must be made in U.S. Funds. An invoice will be rendered as of the date product is ready for shipment. A service fee of 1-1/2% per month on all invoices over 30 days past due will be imposed. In the event of any default by the Purchaser, Carry Manufacturing, Inc. shall have the right to repossess the product as well as all other rights afforded to a conditional seller under the provisions of the Uniform Conditional Sales Act and any other applicable laws.

MANUALS: One (1) owner's/service manual will be provided with each purchase of a single pump, included with the pump, control panel or variable frequency drive. Additional owner's/service manuals are available on our website: www.carrymfg.com. Specialty Owner's Manuals for custom products will be available upon request.

DELIVERY: Standard lead times for Storm Water products is 7-10 business days. 316 Stainless Steel and custom designed products have an 8-10 week lead time. The estimated shipping date is based on the production time required to process the order commencing with the date the order is accepted by Carry Manufacturing, Inc. In the event it is necessary to revise the design, specifications, or Conditions of Sale, the shipping date shall be automatically extended by the period of time required to achieve the mutually agreed upon correction or adjustments of the design, specifications or Conditions of Sale.

Carry Manufacturing, Inc. reserves the right to make shipment of completed segments of an order and pro rate the invoice for those segments as shipments are made.

DELAYS IN DELIVERY: Carry Manufacturing, Inc. shall not be responsible for any delay or for any damages suffered by the Purchaser by reason of any delay due to fires, strikes, riots, Acts of God, priorities, Government orders or restriction, delays in transportation, delays of suppliers of materials or parts, inability to obtain necessary labor, or other causes beyond the control of Carry Manufacturing, Inc. In the event of such a delay, the shipping date shall be extended for a period of time equal to the time lost by reason of such a delay.

Any product held more than three (3) weeks after the estimated shipping date at the Purchaser's request will be stored at the Purchaser's expense unless otherwise agreed upon.

DAMAGE OR LOSS IN TRANSIT: Delivery of the product to a carrier at Carry Manufacturing's plant or other shipping point selected by Carry Manufacturing shall constitute delivery to the Purchaser. Regardless of freight payment, all risk, loss or damage in transit shall pass to the Purchaser at that time. The Purchaser shall make claims for loss or damage to product while in transit, against the carrier and not against Carry Manufacturing, Inc. Carry Manufacturing, Inc. will assist the Purchaser in securing satisfactory adjustment of such claims.

BETWEEN SHIPMENT AND PAYMENT: The Purchaser shall be responsible for the care, maintenance and protection of the material or product after delivery. The Purchaser agrees to provide and maintain adequate insurance for the product or materials shipped to the Purchaser against loss or damage by fire, explosion or other causes during the time between shipment and final payment in an amount fully protecting Carry Manufacturing, Inc.

The title and right of possession to the machinery shall remain with Carry Manufacturing, Inc. and the machinery shall remain personal property irrespective of attachment to, or location on, any foundation or in any structure, until all payments shall have been made in cash. The Purchaser will do all acts necessary to protect the above title and right.

INSTALLATION: Unless specifically stated otherwise, all material or product shall be installed and placed in service by, at the expense of, and under the exclusive responsibility of the Purchaser.

RETURNED PRODUCT: Authorization and shipping instructions for the return of any product must first be obtained by the Purchaser from Carry. Otherwise shipment will be refused. Contact Carry Manufacturing to be issued an RGA form. Complete the form and include a copy with the product to be returned freight pre-paid. Only unused standard product or materials of current design by Carry will be considered for return. Custom products cannot be returned for credit. If the returned product is in sellable condition, a credit memorandum will be issued minus a **minimum restocking charge of 15%** and minus any and all transportation charges paid by Carry.

LIMITED WARRANTY: Carry warrants the product sold by it to be free from defects in materials and workmanship for a period of one (1) year from the date of purchase of the pump.

WARRANTY DISCLAIMER: This warranty does not apply to the product if used in an aquacultural application or to pumps that have been subject to misuse (including use in a manner inconsistent with the design of the pump), abuse, neglect, accident or improper installation or maintenance, or to pumps that have been altered or repaired by anyone other than Carry. The warranties in this agreement are in lieu of all other warranties, express or implied, including without limitation, any warranties of merchantability or fitness for a particular purpose, said warranties being expressly disclaimed.

WARRANTY AMENDMENTS: Prior or subsequent courses of dealing, trade usage and verbal agreements not reduced to a writing signed by Carry, to the extent they differ from, modify, add to or detract from this warranty shall not be binding upon Carry. There are no agreements, promises or understandings, either verbal or written, that are not fully expressed in this warranty. No statements, recommendations or assistance by either party have been relied upon by either party nor shall they be relied upon and shall not constitute a waiver by either party of any of the provisions hereof. This warranty may be amended or altered only if agreed to in writing signed by Carry.

LIMITED REMEDY: Carry and Purchaser agree the repair or replacement of the pump at issue is a commercially reasonable allocation of risk and, therefore, Purchaser agrees that its sole and exclusive remedy against Carry shall be limited to the repair or replacement of the pump at issue. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as Carry is willing and able to repair or replace the pump at issue. In the event Carry is unable to repair or replace the pump at issue in a manner acceptable to purchaser, or in the event it shall be determined by a court having jurisdiction thereof that any provisions of this warranty are unconscionable or fail in its essential purpose, then the maximum liability of Carry shall be that as set forth in the paragraph next following entitled "Limitation on Liability".

LIMITATION ON LIABILITY: Carry shall not be liable for any loss, damage or injury resulting from delay in delivery or installation of the pump or for any failure to perform which is due to circumstances beyond its control. Carry and Purchaser agree it is a commercially reasonable allocation of risk that the maximum liability, if any, of Carry for all damages, including without limitation contract damages and damages for injuries to persons or property, whether arising from Carry's breach of this agreement, breach of warranty, negligence, strict liability or other tort, is limited to an amount not to exceed the purchase price of the pump at issue in the dispute and said liability is so limited. In no event shall Carry be liable to Purchaser for any incidental, consequential or special damages, including without limitation, lost revenues and profits, even if it has been advised of the possibility of such damages.

WARRANTY CLAIM PROCEDURE: This warranty is valid only if the following conditions are complied with by the Purchaser: Purchaser shall notify Carry in writing of the defect in the pump at issue within 30 days of discovery of the defect. The notice shall include with it copies of the warranty card, proof of purchase and the return receipt signed by a representative of Carry as provided above. In the event repair or replacement of the pump at issue is approved by Carry, Purchaser shall, upon written notice by Carry of the approval (RGA), return the pump to Carry, freight prepaid. Carry will return the repaired or replaced pump to Purchaser, freight prepaid. The repair or replacement of the pump shall not extend the duration of the one-year warranty term.

GOVERNING LAW: This warranty shall be governed and controlled by and enforced in accordance with the laws of the State of Michigan, U.S.A., in all respects.

FORUM: The parties agree they are of equal bargaining power and irrevocably submit to the jurisdiction and venue of the Circuit Court for the County of Tuscola, State of Michigan or, if original jurisdiction can be established, the United States District Court for the Eastern District of Michigan, Northern Division, with respect to any performance or breach of this agreement. The parties hereby stipulate that the venues referenced in this agreement are convenient to each of them.

GENERAL: These terms and conditions shall constitute a part of any contract which may be entered into and shall not be altered, modified, or added to unless specifically and expressly agreed to in writing by CMI. All oral agreements and representations of CMI or its representative to the Purchaser shall be embodied in any written contract of which CMI is a part.