VG5 CRANE CONTROL

INSTRUCTION MANUAL

WARNING

1. Do not touch any circuit components while the main AC power is on. In addition, after main power is removed the internal DC Bus capacitors will remained charged for up to 10 minutes. Please insure that the RED "CHARGE" LED is out before performing any inspections. Failure to adhere to this warning could result in injury.

2. Do not connect the main AC power to terminals T1,T2 or T3, this will damage the unit!

3. Do not attempt to program the unit without fully reading and understanding the manual.

Moreover, because Cranetrol is constantly improving it's products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, Cranetrol assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

WELCOME

Thank you for purchasing the Cranetrol VG5 Crane and Hoist controller. The VG5 controller employs the latest hardware and software technology to provide unmatched performance, reliability and application flexibility for your overhead material handling equipment.

The VG5's flexible programming software allows quick and simple adaptation to your application. The **VG5 "CH"** series is designed for use in **No Load Brake** hoisting applications, which requires a close loop system for torque proving and 100% torque at zero speed. The **VG5 "CH"** series offers a 1000:1 speed range, compared to 3:1 or 10:1 of typical hoisting systems.

The **VG5 "C"** series controller is designed for use in the **Traverse axis or Load Brake Hoist** applications. The **VG5 "C"** series controller operates in either open loop volts per hertz mode or closed loop flux vector mode.
Here is a sample of the VG5's crane specific software features.

- ***Load Catch***™ - This feature monitors the Hoist motor when the VG5 is not running to detect any motion and automatically enable the VG5 to holsd the load.
- ***Torque Proving Function*** - Monitors output **TORQUE NOT CURRENT**, to insure that the VG5 has sufficient torque to support the load before releasing the brake unlike most crane controllers that simply monitor current.
- ***Distinct Speed Control*** - Up to 5 step speeds, as well as infinitely variable speed control. Analog speed control as well.
- ***Micro-Speed*** - Allows precise positioning of loads without jogging or plugging your motor.
- ***Turbo Lift*** - Allows the overspeeding of the hoist axis automatically if an empty hook condition is detected.
- **Slack Cable Detection** - Used to detect when the load has been positioned to prevent further motion causing the cable to unreel.
- ***Fast Stop*** - Allows a rapid deceleration to stop once a STOP command is given.
- ***EOTA and EOTB*** - Intelligent end of travel limit inputs. The EOTA input commands the VG5 to decel to minimum speed, indicating an end of travel warning. The EOTB input commands the VG5 to STOP immediately, display a visual warning and only allowing travel in the opposite direction.
- ***Plug Reverse Function*** - Allows a rapid change of direction, in the Traverse axis, by reversing the motor's phase sequence without setting the brake.
- ***TL Gain Function*** - Prevents the VG5 from attempting to lift a load beyond the capacity of the hoist. This also may be used as a load certification test.
- ***Input and Output Phase Loss protection***
- ***Fault History Log*** - Recording the last 4 faults and the operating conditions at the time of the fault.
- ***Analog/Digital Speed Reference Switchover*** - Allows switching between analog type reference and digital type reference, without reconfiguring the input wiring.
- ***Saflink Software*** - Providing complete serial communications to the VG5 via a PC, for uploading and downloading parameter files, diagnostics as well as a six channel oscilloscope with triggering and storage capabilities.
- ***Cranelink Radio Contol*** - Provides complete diagnostic, programming and monitoring of the crane while safetly on the ground.

Contents

Contents

1.1 PRELIMINARY INSPECTION

RECEIVING:

After unpacking the VG5 controller:

- Verify that the part number on the unit nameplate corresponds to the packing slip.
- Check the unit for physical damage that may have occurred during shipment If any part of the unit is missing or damaged, **notify the carrier immediately**
- Verify that all internal hardware(i.e. components, screws, etc.) are seated properly and fastened securely.
- If find any irregularities in the above items, contact your Cranetrol representative.

Checking the Nameplate:

MODEL: VG5U43P7 SPEC: 43P71A
INPUT: AC 3PH 380-440V 50Hz 9.6A 380-460V 60Hz
OUTPUT: AC 3PH 0-460V 6.1kVA 8.0A
LOT NO: MASS: 3.0kg
SER NO:
UL FILE NO: E131457

Drive Specification Data

MODEL: E8001-26FH
SER NO:FM-1-030399-0033
SO NO:99999 / QC: KP
OPTIONS: PG-X2, 120V I/F
SOFTWARE: Foley NLB Hoist V0.00

Model & Serial Number Label

FIG. 1

The above nameplate information is located on your VG5 controler. Two seperate lables containing the drive specification data, such as voltage, current, weight, etc. and model/ serial number data. Insure all information is correct before installing or applying your VG5 controller.

The Model & Serial Number lable contains the folowing information:

- Model: this is the Cranetrol Part Number. The suffix denotes the type of crane controller, "C" is the suffix for a Traverse/ Load Brake controller. The "CH" suffix denotes a No Load Brake Hoist controller.
- Ser No: This is the controller's serial number. Please refer to this for any service or technical assistance you may need.
- So No: This is your Sales Order Number.
- Options: This denotes the option cards installed on the VG5 controller.
- Software: This denotes the type of software installed in the VG5 controller.

1.2 Specifications:

230V *Table 1*

Inverter Model	20P4	20P7	21P5	22P2	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055	2075
Output Current (A)	3.2	6	8	11	17.5	25	33	49	64	80	96	130	160	183	224	300
Capacity (kVA)	1.2	2.3	3.0	4.2	6.7	9.5	13	19	24	30	37	50	61	70	85	110
Input Current (A)	3.9	7.2	9.6	13.2	21	30	40	59	77	88	106	143	176	202	247	330

460V *Table 2*

Inverter Model	40P4	40P7	41P5	42P2	43P7	44P0	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4110	4160	4185	4220	4300
Output Current (A)	1.8	3.4	4.8	6.2	8	11	14	21	27	34	41	52	65	80	96	128	165	224	302	340	450	605
Capacity (kVA)	1.4	2.6	3.7	4.7	6.1	8.4	11	16	21	26	31	40	50	61	73	98	130	170	230	260	340	460
Input Current (A)	2.2	4.1	5.8	7.5	9.6	13.2	16.8	26	33	40	46	58	72	88	106	141	182	247	330	408	540	726

575V *Table 3*

Inverter Model	51P5	52P2	53P7	55P5	57P5	5011	5015	5018	5022	5030	5037	5045	5055	5075	5090	5110	5160
Output Current (A)	3.5	4.1	6.3	9.8	12.5	17	22	27	32	41	52	62	77	99	130	172	200
Capacity (kVA)	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200
Input Current (A)	4.3	5.1	7.7	12.1	15.4	21	28	33	40	51	64	76	95	122	160	211	246

Note: All VG5 inverters should be sized based on CURRENT not HP.

230V,460 and 575V Specifications:

Table 4

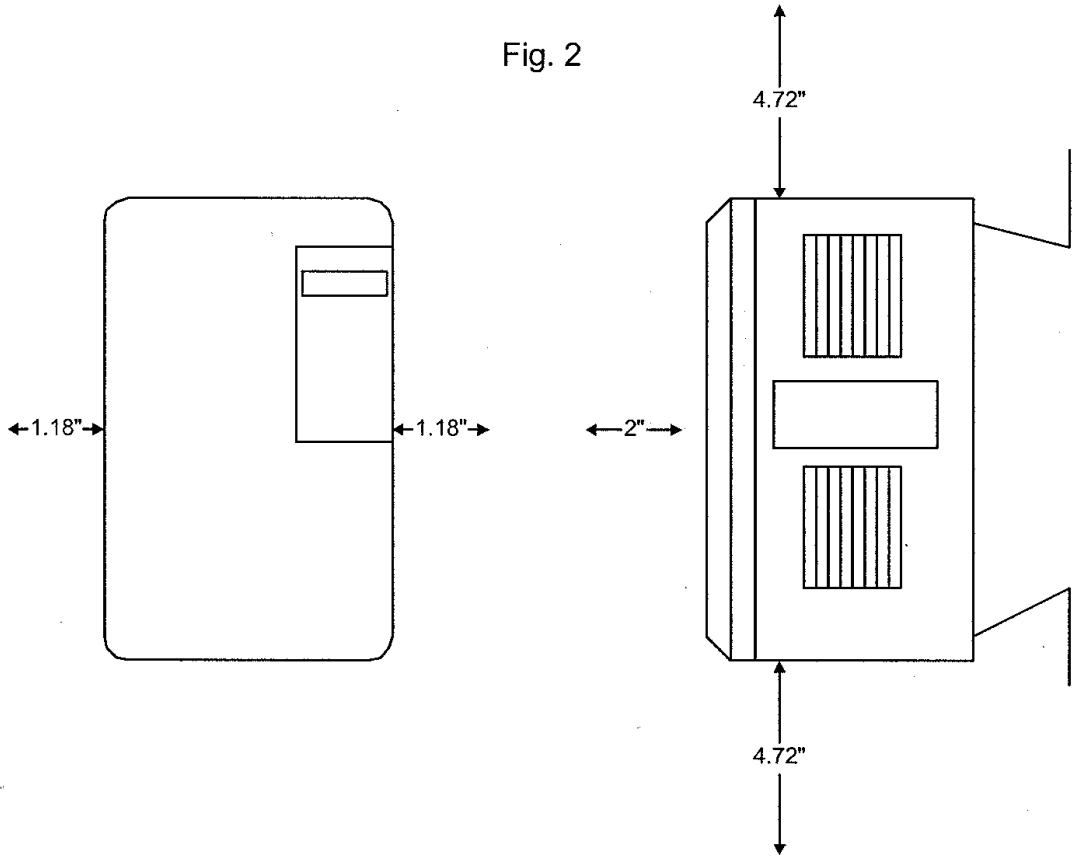
Specifications	Description
Certification	UL, cUL
Input Volts and Freq.	3 Phase 200/400, 208/415, 220/440, 230/460, 575 VAC; 50 or 60Hz
Allowable Voltage Fluctuation	+10% or -15% of nominal
Allowable Frequency Fluctuation	±5% of nominal
Control Method	Fully digital, Sine Wave PWM
Rated Output Frequency	Up to twice the motor nameplate RPM
Speed Control Range	40:1 V/F/ 100:1 Open Loop / 1000:1 Closed Loop
Output Frequency Accuracy	Digital Command: 0.01%, Analog Command: 0.1%
Frequency Setting Resolution	Digital Reference: 0.01Hz, Analog: 0.03Hz (@ 60Hz)
Output Frequency Resolution	0.01Hz
Overload Capacity	150% for 1 Min.
Frequency Reference sources	Multi-Step input, 0 - ±10VDC, 4-20 mA, Serial (option)
Braking Torque	150% Minimum with Dynamic Braking
Motor Overload Protection	UL recognized electronic thermal overload; adjustable
Overcurrent Protection	200% of rated current
Circuit Protection	Ground Fault and Blown Fuse
Overvoltage/Undervoltage	400/800VDC; 190/380VDC
Heatsink Overheat protection	Thermistor detection
Torque Limit Selection	FWD,REV and REGEN; all selectable to 300%
Other Protective Features	Speed Deviation, Overspeed, Input/Output Phase Loss
	Brake Fail, Torque Proving, Encoder Failure,
DC Bus Indication	Charge LED provided
Location	Indoors; protected from moisture, corrosive gases/liquids
Ambient Operating Temperature	14 - 104 degrees F.
Storage Temperature	-4 - 140 degrees F.
Humidity	90% relative, noncondensing
Vibration	1G less than 20 Hz; 0.2 G at 20 - 50 Hz

1.3 Mounting

PRECAUTIONS:

1. When preparing to mount the VG5, lift it by it's base. Never lift it by the front cover
2. On larger units use lifting eyehooks provided.
3. Mount the inverter in an approved enclosure, designated by local codes.
4. The unit should be oriented vertically, as to dissipate the generated heat.
5. The unit should be mounted in an enclosure that is sized to dissipate the heat generated by the unit. Refer to pages 9 and 10 for Dimensions/Heat Loss.
6. When mounting multiple units in one enclosure, be sure to maintain the clearances shown below.
7. For inverter models 25HP and below, the top and bottom cover may be removed for increased cooling efficiency.

Fig. 2



DIMENSIONS:

230V Series

Table 5

Model VG5U-	W "	H "	D"	W1 "	H1 "	Mass lbs
20P4, 20P7, 21P5	5.51	11.02	6.30	4.96	10.47	6.5
22P2, 23P7	5.51	11.02	7.09	4.96	10.47	10
25P5, 27P5	7.87	11.81	8.07	7.32	11.22	13
2011	9.84	14.96	8.86	9.29	14.37	24
2015	9.84	15.75	8.86	9.29	14.37	24
2018	12.99	24.02	11.22	10.83	17.13	71
2022	12.99	26.57	11.22	10.83	17.13	71
2030, 2037	16.73	26.57	13.78	12.60	25.59	137
2045, 2055	18.70	31.50	13.78	14.57	30.51	176
2075	22.64	36.42	15.75	17.52	35.24	298

460V Series

Table6

Model VG5U-	W "	H "	D "	W1 "	H1 "	Mass lbs
40P4, 40P7	5.51	11.02	6.30	4.96	10.47	6.5
41P5	5.51	11.02	6.30	4.96	10.47	8.8
42P2, 43P7, 44P0	5.51	11.02	7.09	4.96	1047	10
45P5,- 47P5	7.87	11.81	8.07	7.32	11.22	13
4011.- 4015	9.84	14.96	8.86	9.29	14.37	24
4018, 4022	12.99	24.02	11.22	10.83	17.13	68
4030, 4037	12.99	30.91	11.22	10.83	24.02	106
4045	12.99	33.46	11.22	10.83	24.02	106
4055, 4075	18.11	44.49	13.78	13.78	31.30	190
4110	22.83	50.79	14.76	17.52	35.24	320
4160	22.83	50.79	15.75	17.52	35.24	342

575V Series

Table 7

Model VG5U-	W "	H "	D"	W1 "	H1 "	Mass lbs
51P5, 52P2	5.51	11.02	7.09	4.96	10.47	10
53P7, 55P5, 57P5	7.87	11.81	8.07	7.32	11.22	13
5011, 5015	9.84	14.96	8.86	9.29	14.37	28
5018, 5022	15.75	29.53	11.22	11.81	28.74	97
5030, 5037, 5045	22.64	33.46	11.81	18.70	32.48	156
5055, 5075	22.64	41.97	12.80	18.70	40.35	195
5090	22.64	49.21	12.99	18.70	48.23	262
5110, 5160	22.64	62.99	13.98	18.70	61.81	318/- 329

Note: For larger HP units, consult the factory.

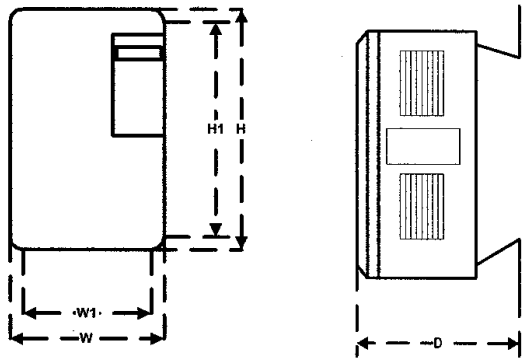


Fig. 3

HEAT LOSS DATA:

Table 6

230V

Model VG5U	Heat sink Watt loss(W)	Internal Watt loss(W)	Total Watt loss(W)
20P4	15	50	65
20P7	25	65	90
21P5	40	80	120
22P2	80	60	140
23P7	135	80	215
25P5	210	90	300
27P5	235	110	345
2011	425	160	585
2015	525	200	725
2018	655	230	885
2022	830	280	1110
2030	930	440	1370
2037	1110	620	1730
2045	1380	660	2040
2055	1740	890	2630
2075	2050	1160	3210
460V			
40P4	10	50	60
40P7	20	65	85
41P5	30	80	110
42P2	65	60	125
43P7	80	65	145
44P0	120	80	200
45P5	135	85	220
47P5	240	120	360
4011	305	150	455
4015	390	180	570
4018	465	195	660
4022	620	260	880
4030	705	315	1020
4037	875	370	1245
4045	970	415	1385
4055	1110	710	1820
4075	1430	890	2320
4110	1870	1160	3030
4160	2670	1520	4190
4185	3400	1510	4910
4220	4740	2110	6850
4300	6820	2910	9730

575V

Model VG5U	Heat sink Watt loss(W)	Internal Watt loss(W)	Total Watt loss(W)
51P5	35	55	90
52P2	45	60	105
53P7	65	75	140
55P5	100	105	205
57P5	130	90	220
5011	180	150	330
5015	250	210	460
5018	310	230	540
5022	380	340	730
5030	430	390	820
5037	680	540	1220
5045	900	750	1650
5055	1000	750	1750
5075	1100	1150	2250
5090	1150	1200	2350
5110	1400	1800	3200
5160	1870	2830	4700

When installing the VG5 inside an enclosure be sure to observe precautions on page 8.

- Allowable intake air temp: 14°F - 113°F
- Be sure to install a cooling device to limit the air temperature within the VG5 to 113°F.

1.4 WIRING:

⚠ CAUTION

1. Do not connect or disconnect any wiring while power is on.
2. Do not connect a phase-advancing capacitor or an LC/RC noise filter to the output of the VG5.
3. Be sure to install fusing or MCCB's between the AC main supply and the VG5, to protect the wiring.
4. Do not connect a magnetic starter or contactor to the output circuit for the purpose of starting and stopping the VG5.
5. Ensure that the power wiring and control wiring are separated.
6. Ensure that ALL low voltage control wiring, as well as Encoder wiring, is twisted pair, shielded type.
7. Ensure that all inductive loads(i.e. contactors, relays, magnetic valves, solenoids, etc.) have RC surge absorbers connected.
8. Never connect 120V user input directly to the control board terminals. The 120V user input should be connected to the 120V I/F option card (See pg.16).
9. Observe NEC codes as well as local wiring codes.
10. When using a ground fault interrupter, select one that is not affected by high frequency.
11. Ensure proper grounding resistance. 230V class: 100 Ohms or less/ 460V class 10 Ohms or less.
12. Never ground the VG5 in common with welding machines, motors, or other high current electrical equipment.
13. When using several VG5 units side by side, ground the units as shown below.

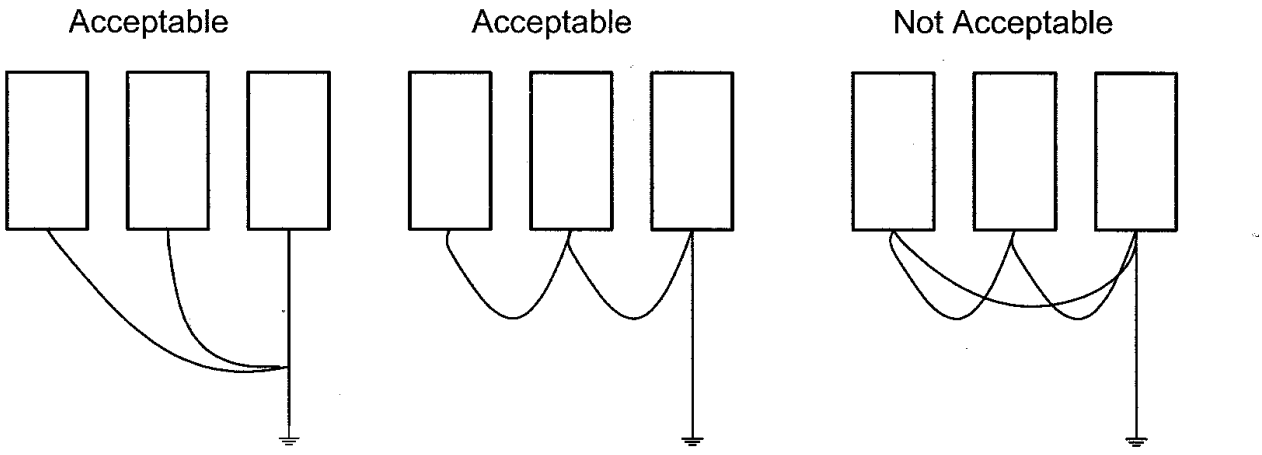


Fig. 4

Standard VG5 Connection Diagram, 230/460V

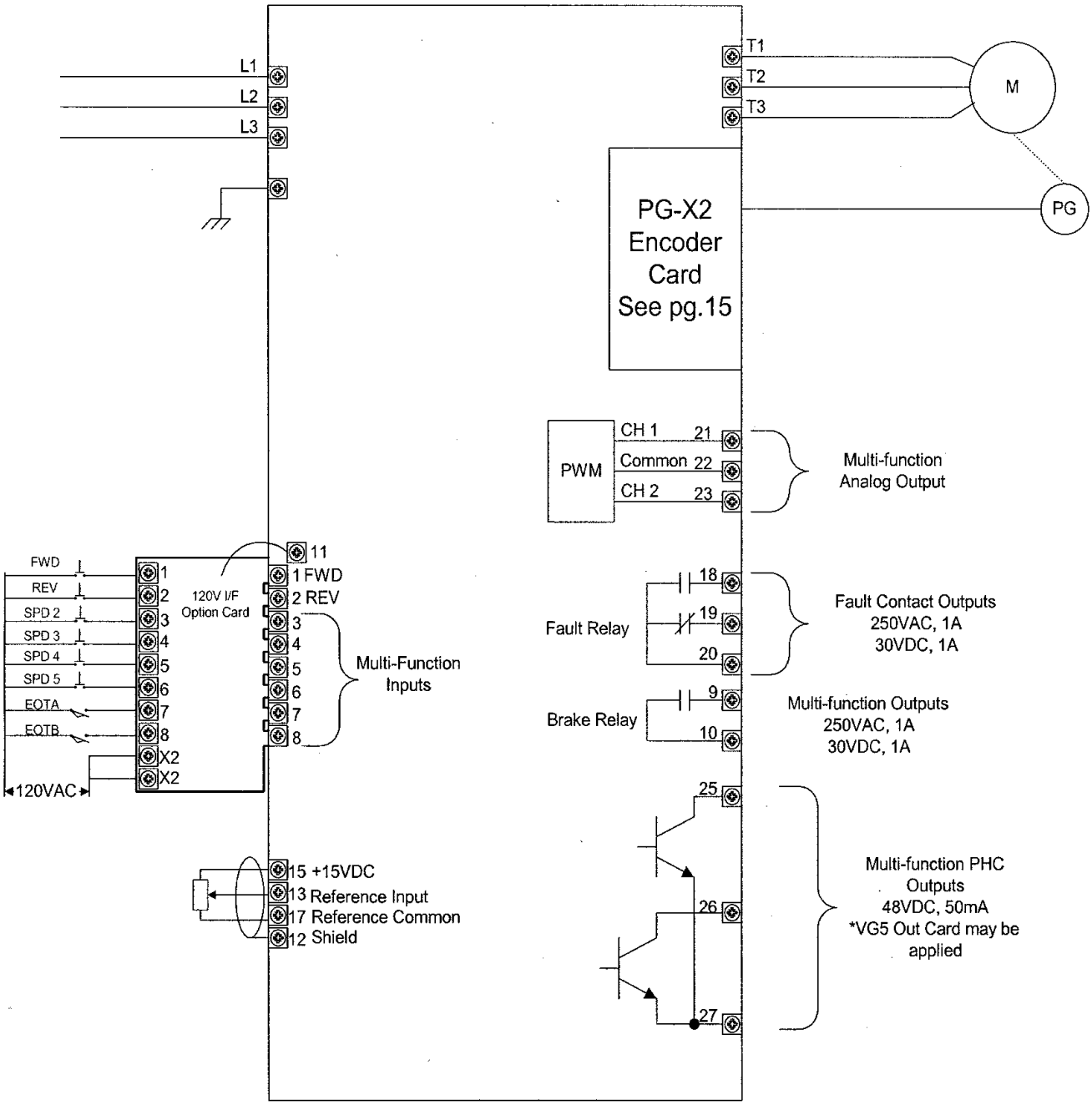


Fig. 5

VG5 Control Circuit Terminal Functions

Table 7

Classification	Terminal	Description		Signal Level
Sequence Input Signals	1	Raise/Forward when closed		Photo-coupler insulated input: +24VDC,8mA
	2	Lower/Reverse when closed		
	3	Speed 2*	Multi-function inputs, H1-01 to H1-06	
	4	Speed 3*		
	5	Speed 4*		
	6	Speed 5*		
	7	End of Travel A*		
	8	End of Travel B*		
	11	Sequence Common		
Analog Input Signals	12	Connection to shield of analog cable		
	13	Master Speed Reference (Analog)		-10 to +10VDC (20kOhm)
	14	Master Speed Reference (current)		4-20mA (250 Ohm)
	15	+ 15VDC Power supply output		+15VDC, 20mA
	16	Multi-function analog input (parameter H3-05)		-10 to +10VDC (20kOhm)
	17	Control Circuit comman		
	33	+ 15VDC Power supply output		-15VDC, 20mA
Digital Output Signals	9	Brake Relay; closed after torque proving sequence*		Dry contact 250VAC, 1A 30VDC, 1A
	10			
	18	Form "C" Fault Contact	N.O. Contact	Dry contact 250VAC, 1A 30VDC, 1A
	19		N.C. Contact	
	20		Common	
	25	Brake Relay*	Ch1 Output (H2-02)	Multi-function type Open Collector Output 48V, 50mA
	26	Brake Fault*	CH2 Output (H2-03)	
	27	Common		
Analog Outputs	21	Analog Outputs Multi-function type	Output Freq. (H4-01)	0 to + 10VDC, 2ma or -10 to +10VDC, 2mA (H4-07)
	22		Common	
	23		Output Current (H4-04)	

*Note: Factory Default Settings

VG5 Option Card Locations

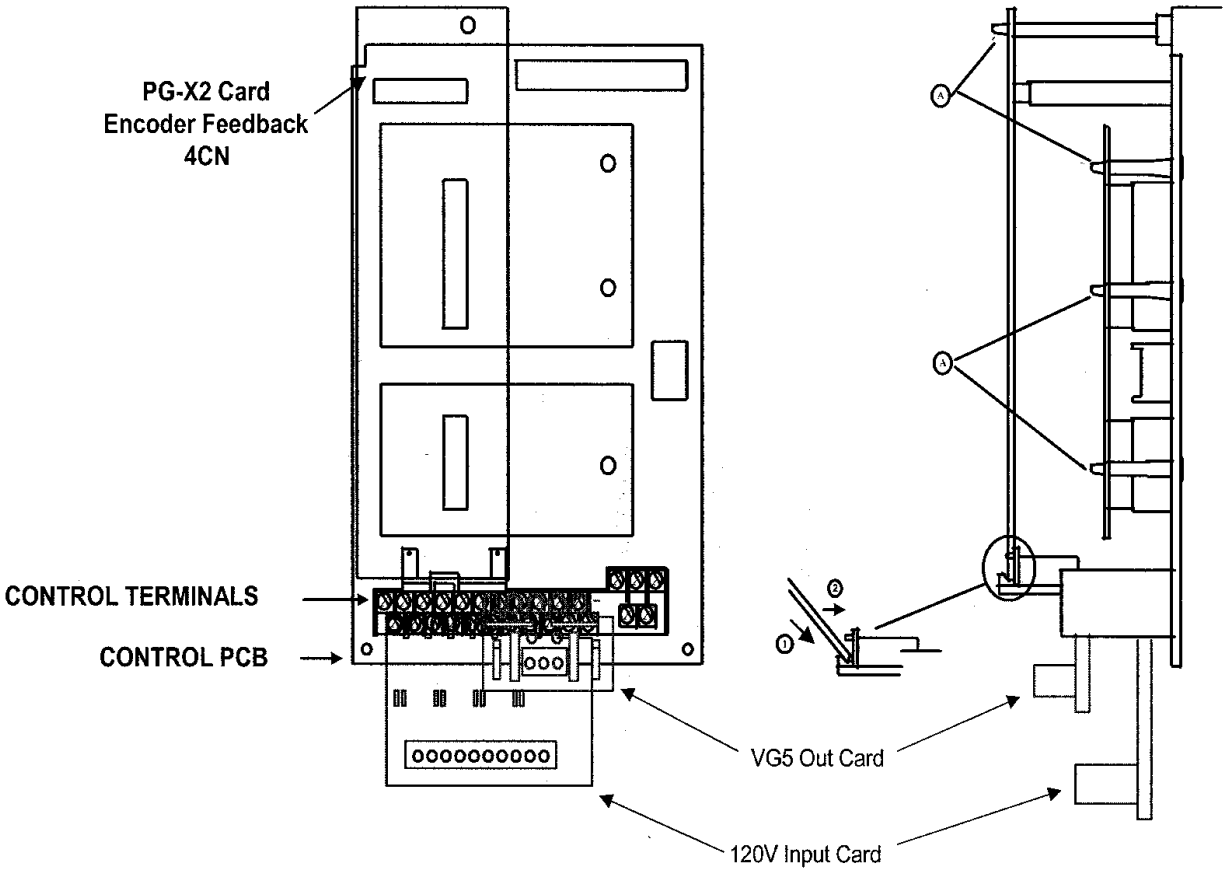


Fig. 6

NOTE:
1. The 120V I/F card is mounted as standard for both "C" and "CH" series units.
2. The VG5 Out card may be used on both "C" and "CH" units for additional relay outputs (see pg.17).
3. The Encoder feedback card, PG-X2, is standard for the "CH" series units. However, the PG-X2 may also be applied to the "C" series units as an option. (see pg.15)

PG-X2 Encoder Feedback Card Wiring

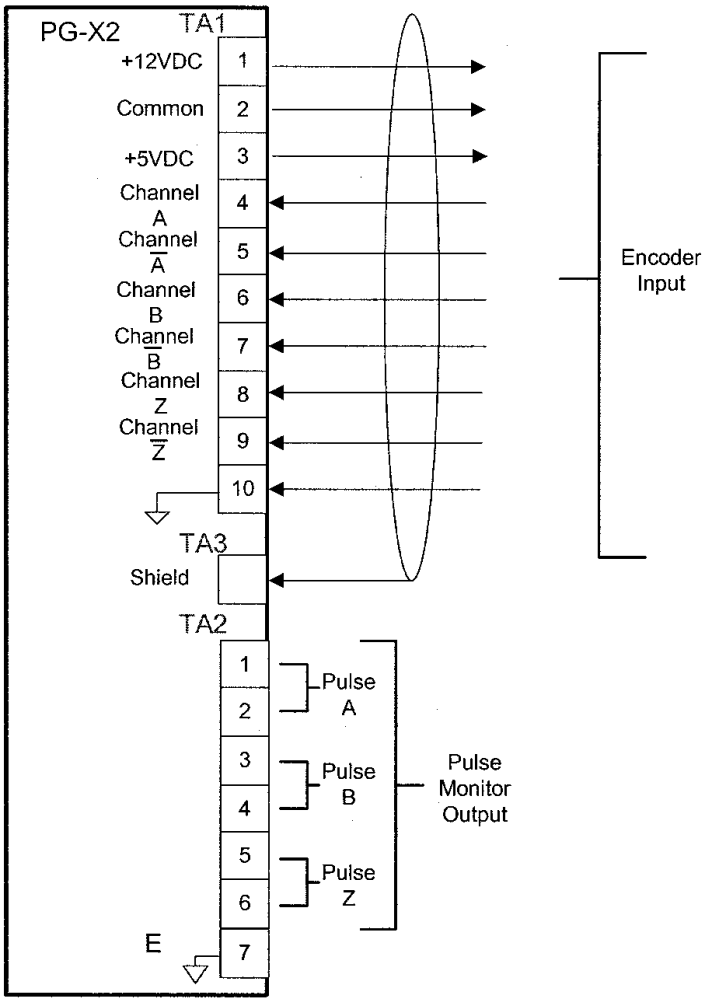
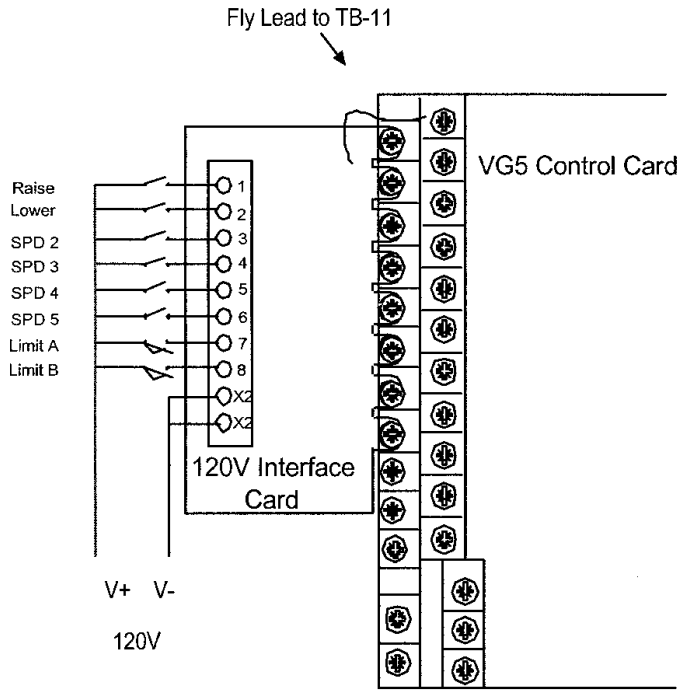


Fig. 7

Encoder feedback from the motor shaft is required for NLB Hoist applications. The encoder wiring to the VG5 should follow the above diagram(Z channel not required).

1. Direct coupling of the encoder to the motor shaft is required, if unable to direct connect the encoder, contact your Cranetrol Representative.
2. Do not connect the encoder to the low speed shaft of a speed reducer.
3. Use twisted pair, shielded cable separated from ANY high voltage wiring. Separate conduit for the encoder wiring is recommended.
4. Only one power supply may be used at one time. (terminals 1, 2 and 3)

VG5 120V I/F Card Wiring



The 120V Input Card connects to terminals 1 thru 8, with a fly lead to terminal 11.

This drawing represents a typical five step speed interconnection, the factory default.

NOTE: P1-02 parameter sets the speed reference type interconnection. It also sets the default parameters and inputs for the selected speed function.

Pre set speeds are set in the D1 parameter group.

Fig. 8

The VG5 120V I/F card is required for use with 120VAC input logic control. The 120V I/F card mounts directly to the main control card terminal strip. The above diagram represents a typical 5 step speed interconnection(factory default). Refer to parameter P1-02 for other speed control options, and parameter group H1 for more information on the multi-function input functions. The speed control method determines how many multi-function input are available to you. For example, if you choose 3 step I/V speed control, terminals 1 thru 4 are dedicated for the speed control inputs and leaves terminals 5 thru 8 available for multi-function programming.

VG5 Out Card Wiring

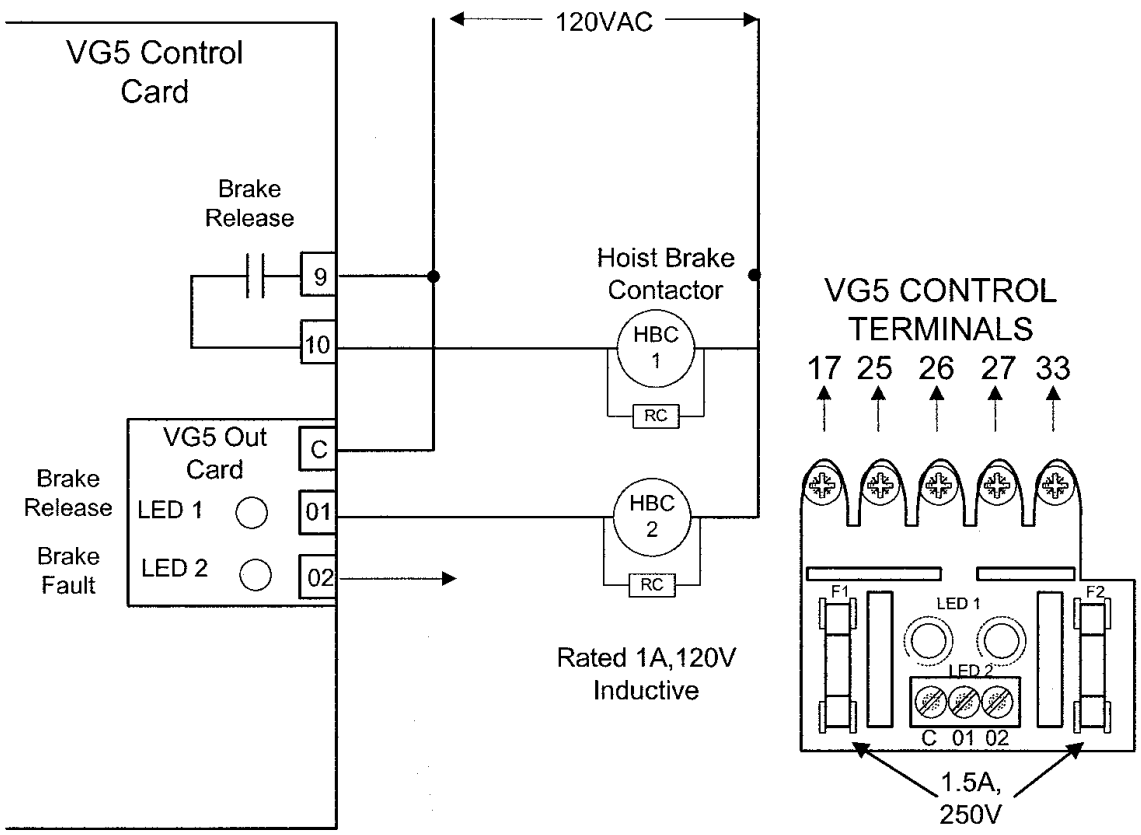


Fig. 9

The VG5 Out card is used if additional outputs are required. The VG5 Out card is connected to the VG5's photo-coupler type output terminals, converting these outputs to relay type outputs. Refer to parameter group H2 for more information on output functions. The output function for 01, corresponds to parameter H2-02 and output 02, corresponds to parameter H2-03. Terminal C is the common for both outputs.

VG5 Dynamic Braking Wiring

VG5 Dynamic Braking wiring for 230V, 460V and 575V units. The following diagram is for use on 230V VG5's, model 20P4 through 27P5 and 460V VG5's, model 40P4 through 4015 and 575V VG5's, model 51P5 through 5022.

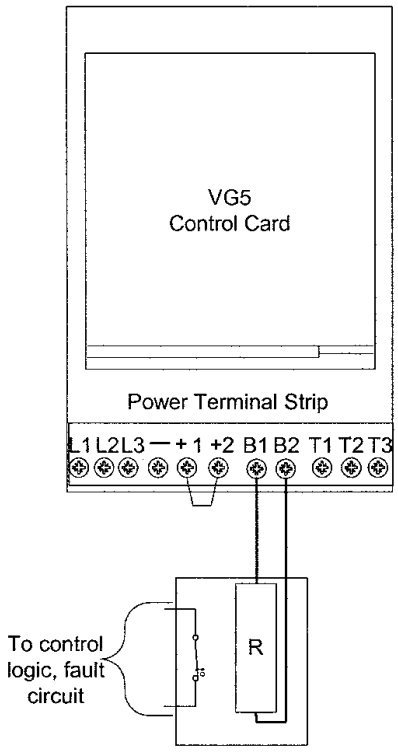


Fig.10

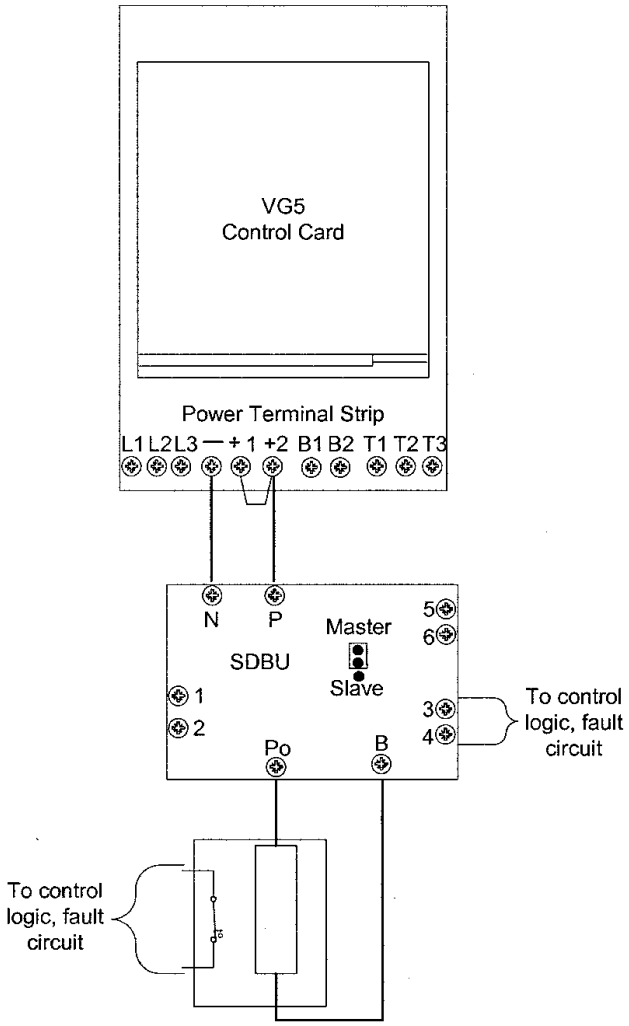


Fig.10a

Note:
The VG5 unit has a built in DB transistor, for models 20P4 thru 27P5 and models 40P4 thru 4015. Generally, these units only require an external DB resistor to be connected to terminals B1 and B2. However, when an external DB module is used, the DB module should be connected per fig.10a.
In either case a thermistor should be used to protect the resistor and disconnect main power to the unit. If an external DB module is used, the Fault output (term. 3 and 4) in the module should be wired in series with the thermistor, to disconnect power to the unit if either the DB module or the DB resistor fail.

VG5 Multiple Dynamic Brake Module wiring

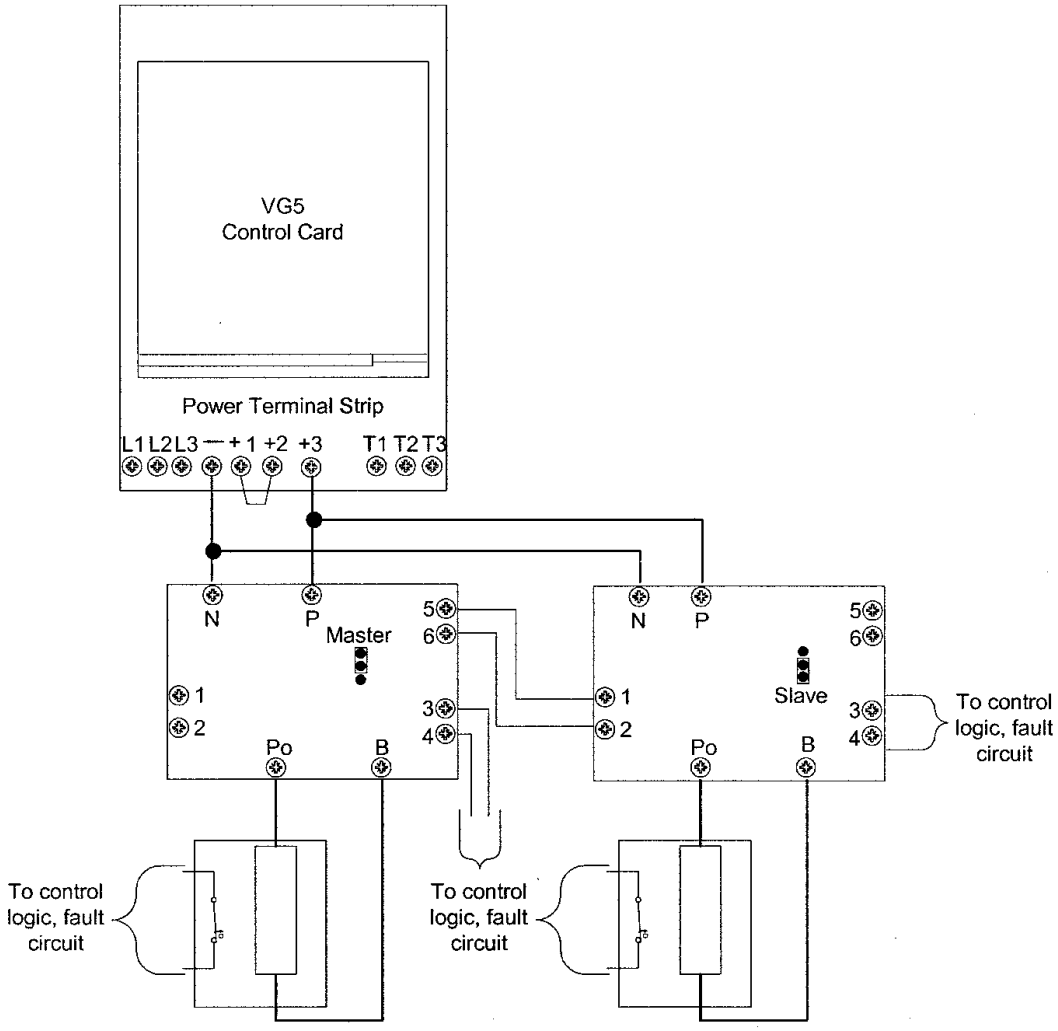
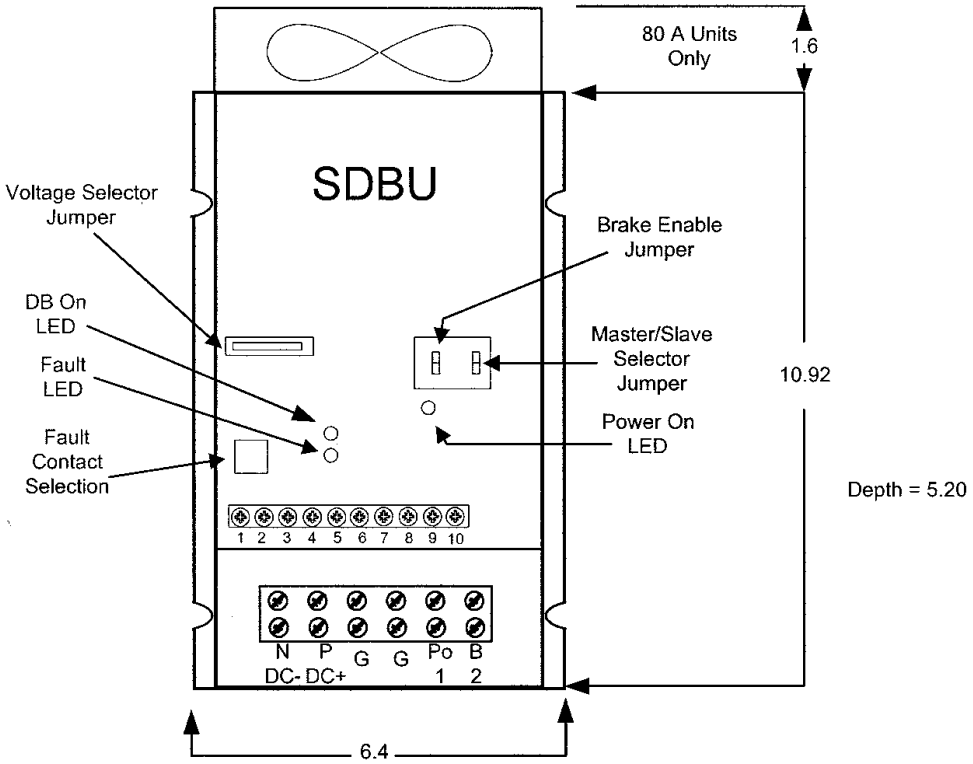


Fig. 11

Note:
When connecting multiple SDBU's in parallel, ensure that the first SDBU is set up as the Master unit and the following SDBU's are set up as slave units.

SDBU Terminal Diagram



Terminal Number	Description
N (DC-)	Negative Power Connection from VG5 DC Bus.
P (DC+)	Positive Power Connection from VG5 DC Bus.
G	Ground
Po (1)	Output Power to DB Resistor
B (2)	Output Power to DB Resistor
1	Slave Input (+)
2	Slave Input (-)
3	Fault Output(N.O. or N.C. Selectable)
4	Fault Output(Common)
5	Master Output (+)
6	Master Output (-)
7	Isolated Input (+)
8	Isolated Input (-)
9	120VAC Fan/ Brake Enable
10	120VAC Fan/ Brake Enable

SDBU Settings and LED Indicators

Voltage Level Jumpers - JP1 - JP5

Jumpers	200V Class	400V Class	575V Class
JP1	-	380V	-
JP2	200V	400V	500V
JP3	208V	415V	-
JP4	220V	440V	-
JP5	230V	460V	575V

Brake Enable Selection - JP6

This function is used to select the SDBU enable safety feature. If the VG5 is not running, but power is applied, the input supply voltage could rise and trigger the SDBU module on. In this situation, the SDBU would be on 100% of the time, and may cause overheating or failure of the DB resistors. This safety enable function allows you to enable the SDBU while running and disable it while idle. Please see page 22 for SDBU recomended control wiring.

JP6 - Upper Position = Enabled

JP6 - Lower Position = Disabled

Master/Slave Selection - JP7

This function allows the configuration setting of the SDBU. In single SDBU module applications, the module is always set as the Master. In multiple SDBU applications the module closest to the VG5 is set as the Master, and the remaining modules are set as the Slave module.

Power On LED - DS1

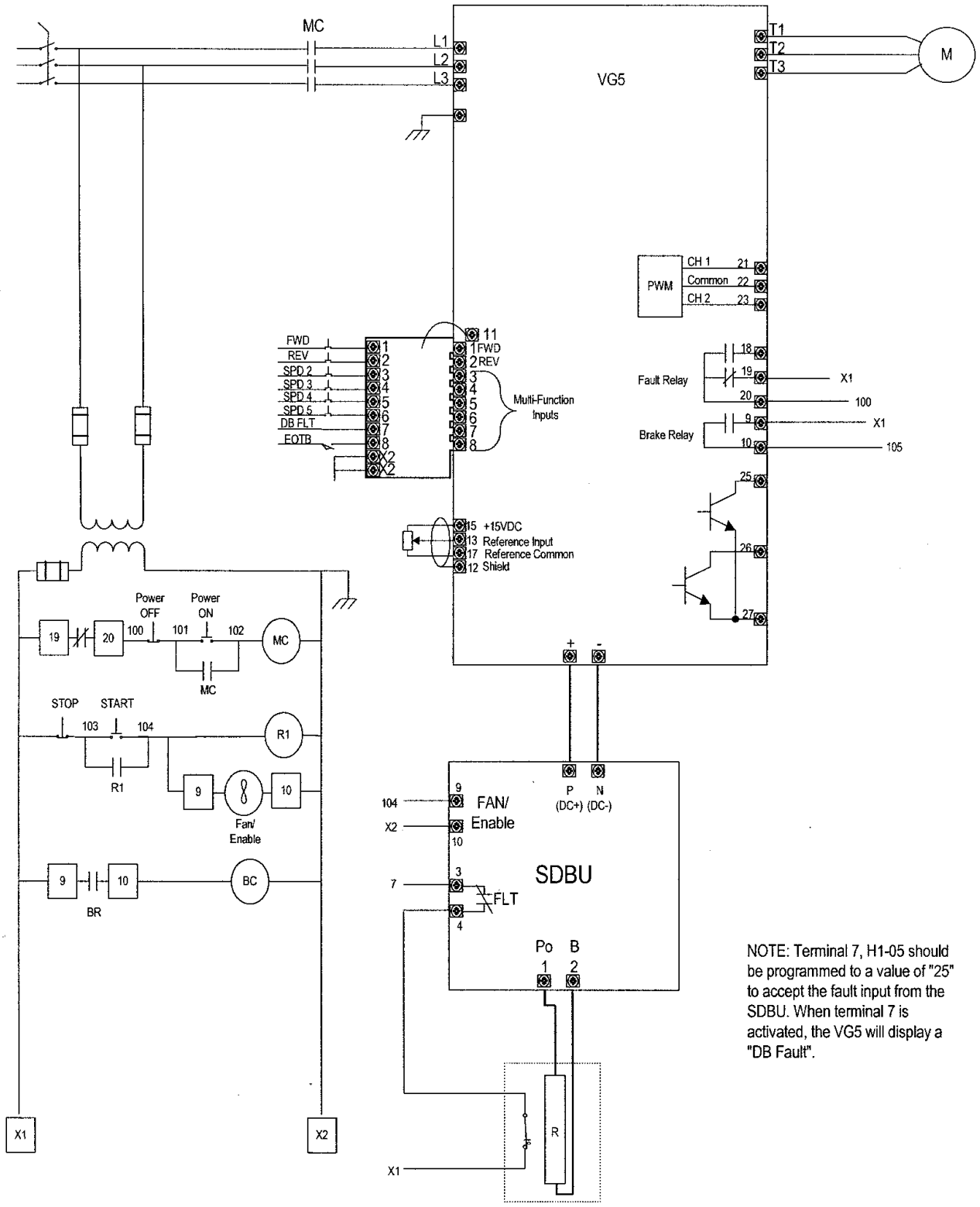
This LED verifies that DC voltage is present on terminals N(DC-) and P(DC+).

Brake On LED - DS2

This LED indicates that the SDBU unit is active(braking).

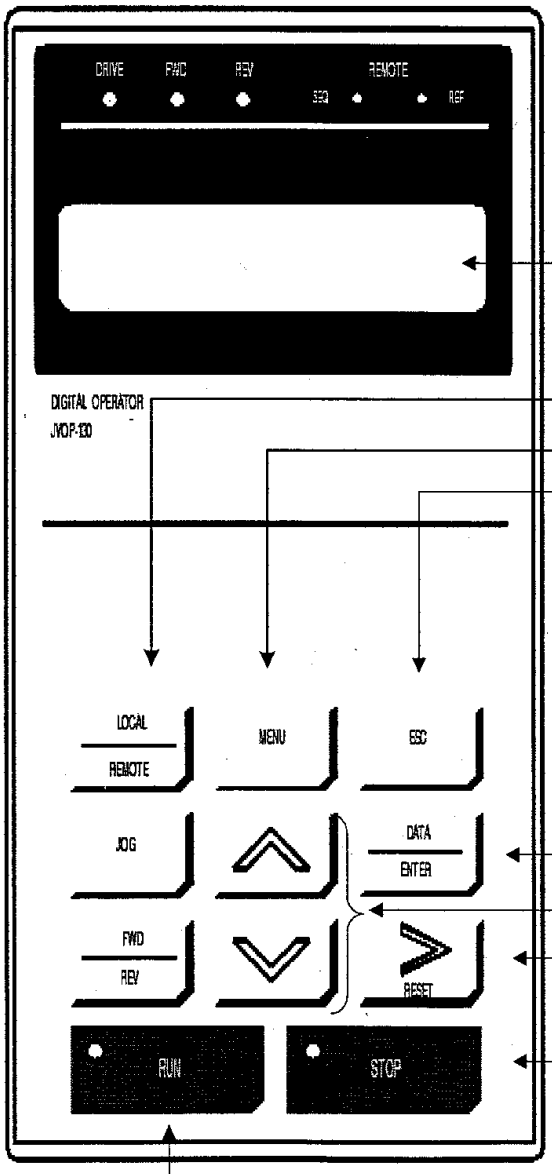
Fault LED - DS3

This LED indicates a SDBU fault.



NOTE: Terminal 7, H1-05 should be programmed to a value of "25" to accept the fault input from the SDBU. When terminal 7 is activated, the VG5 will display a "DB Fault".

2.0 USING THE DIGITAL OPERATOR



Mode LED
When Drive LED is on, operation is possible.
When Drive LED is off, programming is possible, no operation is possible

Direction LED's
Indicates drive run direction

Remote Mode LED's
Both the SEQ and REF LED's should be on for normal operation. Depressing the Local/Remote key changes the LED's state.

Main Display
Displays all monitoring and programming values(2 lines X 16 Characters).

Menu Key
Returns you to Main Menu - top of programming tree.

Escape Key
Backs up one level to the previous display.

Data/Enter Key
When in Drive mode, the DATA function displays the parameter value. When in PROGRAM mode, the ENTER function sets and stores the parameter setting.

Menu/Value Change Keys
Increments or decrements the mode,group,function, parameter or value.

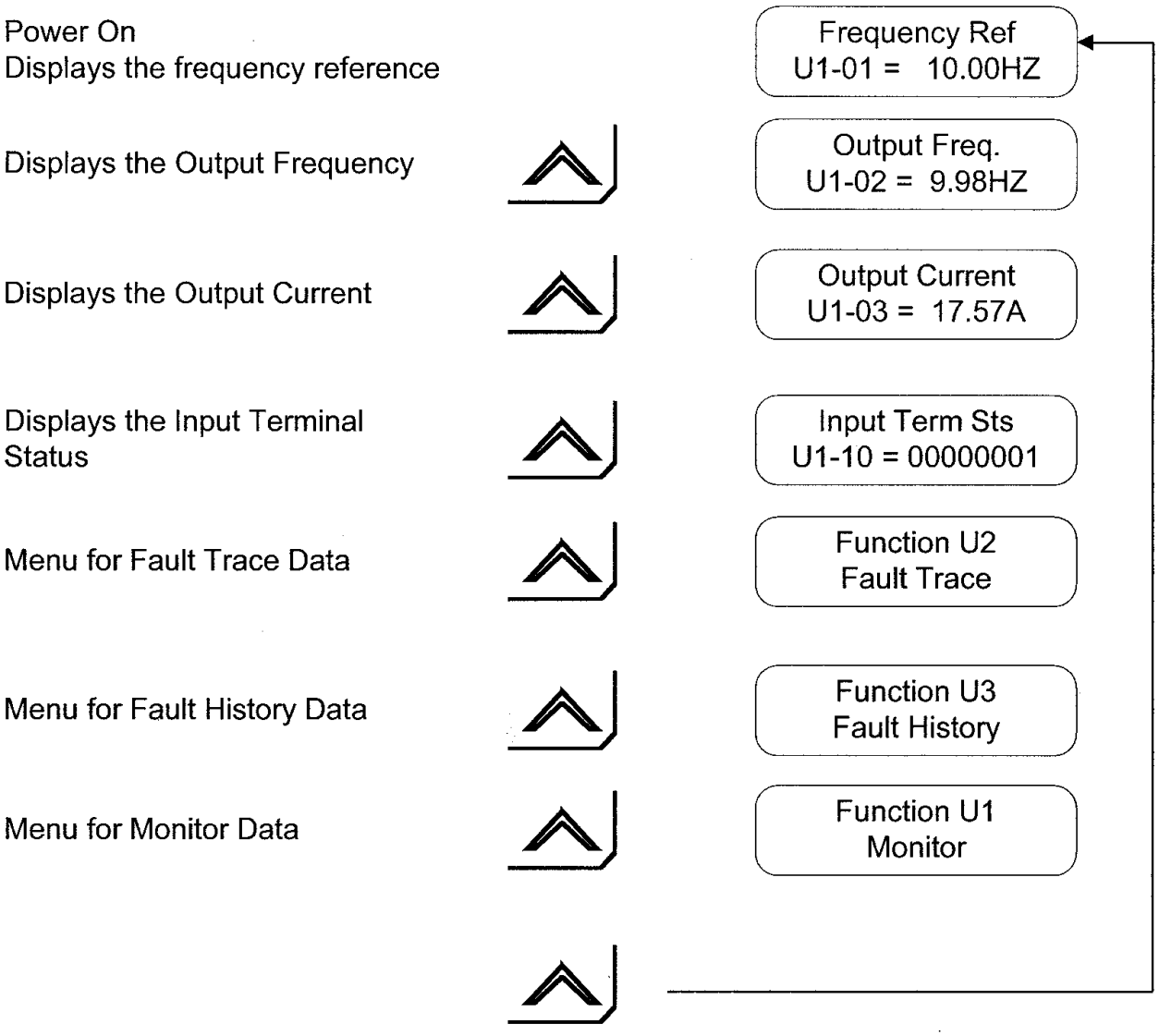
Digit Select/Reset Key
Selects the digit, from left to right, to be changed. Also, used as a Fault Reset Key.

Stop Key
Stops drive operation. The Stop LED is on when the drive is not running. The LED will blink if a stop command is given, but the drive is still decelerating.

Run Key
Run LED indicates that the drive is running

Fig. 12

2.1 Using the VG5 Digital Operator



Note:
FUNCTION U2 - Fault Trace: Depressing the DATA ENTER key will display the last 2 faults as well as display 14 monitor parameters. These parameters are values stored at the time of the fault.

FUNCTION U3 - Fault History: Depressing the DATA ENTER key will display the last 4 faults as well as the time of each fault.

FUNCTION U1 - Monitor: Depressing the DATA ENTER key will display up to 28 monitor parameter values while the drive is running.

2.1 Programming menu structure using the VG5 Digital Operator

Power On
Displays the frequency reference

Frequency Ref
U1-01 = 10.00HZ

Menu Selection
Selects programming menu to access

CRANEtrol
Operation

Scroll up key to access the next programming Menu

CRANEtrol
Initialize

The Initialize group allows you to set up the drive characteristics. Such as programming access levels, Control Method, etc.

Scroll up key to access the next programming Menu

CRANEtrol
Programming

The Programming group allows you to program your application specific parameters. Such as Accel times, Pre-Set speeds, Terminal functions,etc.

Scroll up key to access the next programming Menu

CRANEtrol
Auto-Tuning

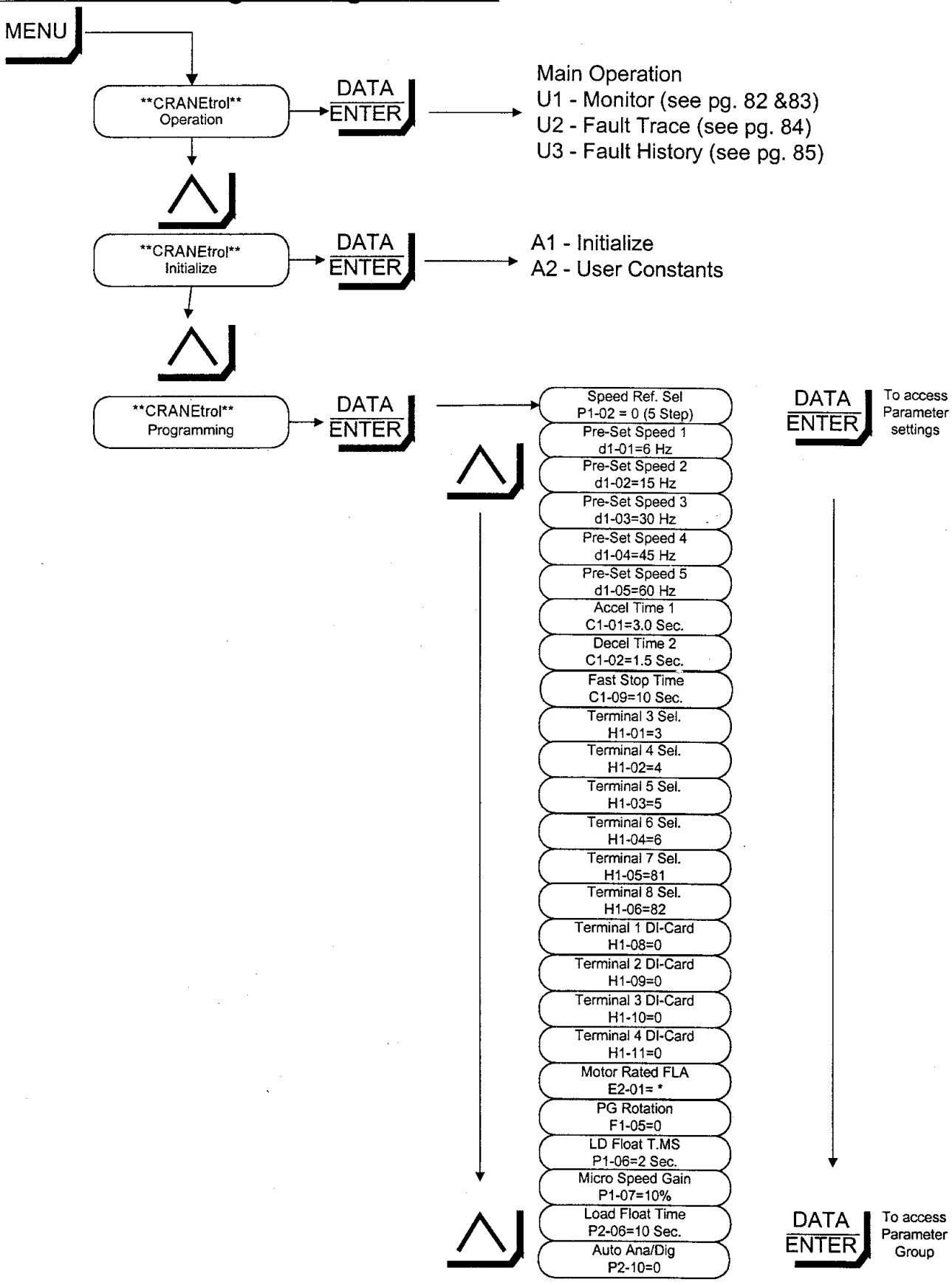
The Auto-Tuning group allows you to tune your VG5 to the motor, for optimum performance.

Scroll up key to access the next programming Menu

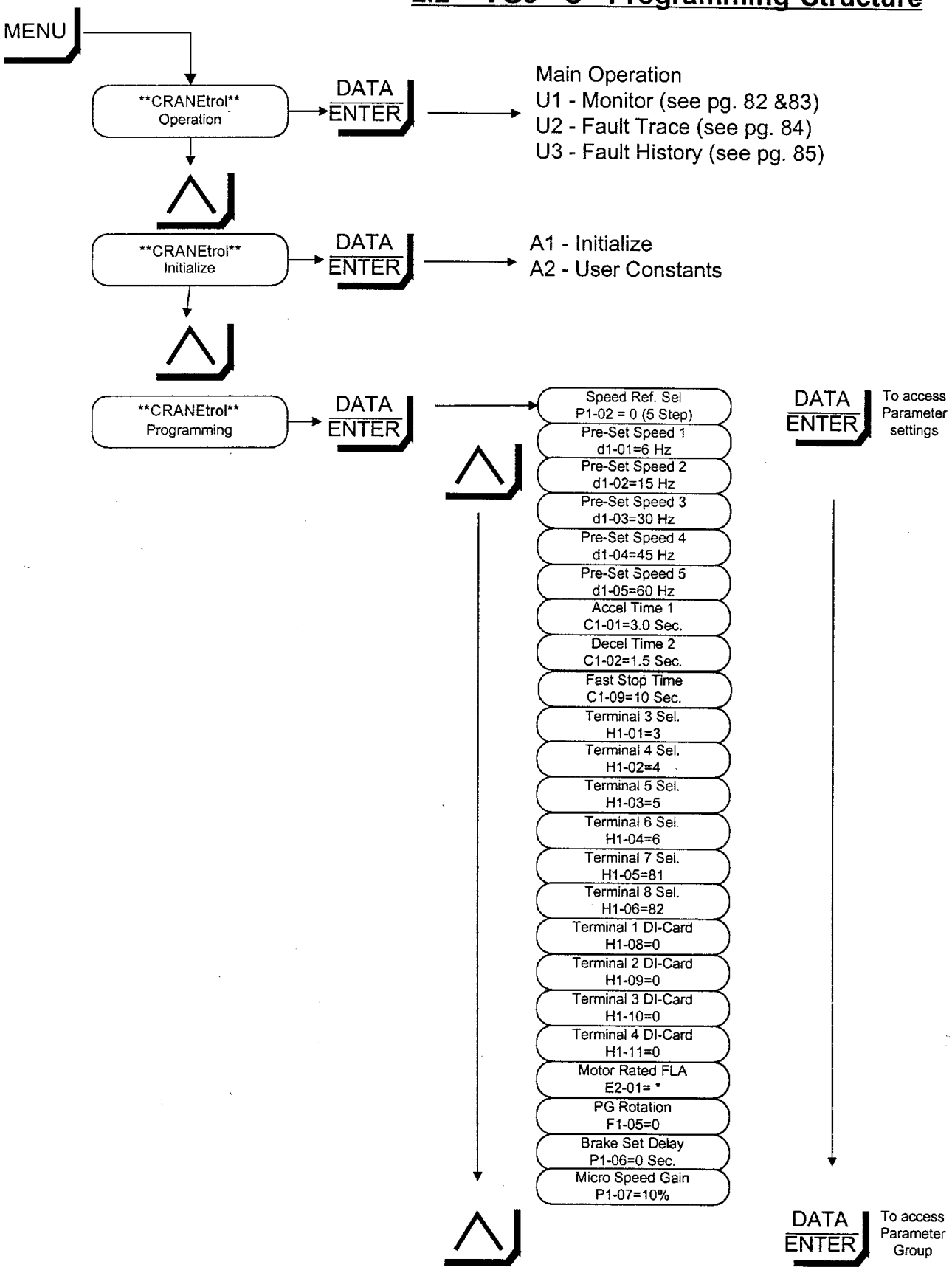
CRANEtrol
Modified Constants

The Modified Constants group allows you to view the parameters that have been changed from the factory default. These parameters should be recorded for future reference.

2.2 VG5 "CH" Programming Structure

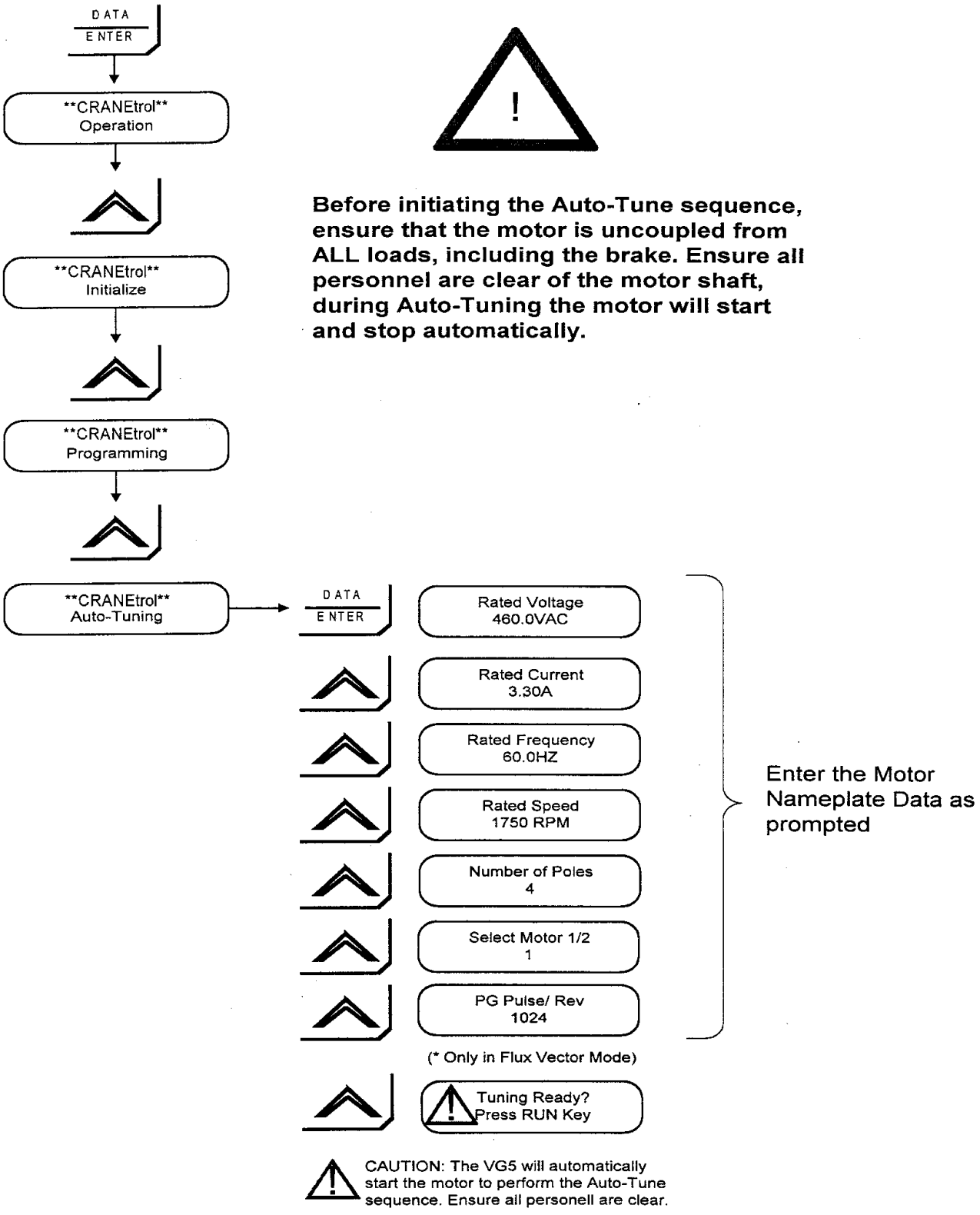


2.2 VG5 "C" Programming Structure



2.3 VG5 Auto-tuning Sequence

To ensure optimum performance of your crane or hoist system, you must Auto-tune the VG5. In the Auto-tune sequence, simply enter the requested data from the motors nameplate.



Before initiating the Auto-Tune sequence, ensure that the motor is uncoupled from ALL loads, including the brake. Ensure all personnel are clear of the motor shaft, during Auto-Tuning the motor will start and stop automatically.

CAUTION: The VG5 will automatically start the motor to perform the Auto-Tune sequence. Ensure all personell are clear.

2.3 VG5 Auto-tune Sequence

After the motor's nameplate data has been entered into the Auto-tune parameters, the VG5 will prompt you to press the RUN key to proceed with the Auto-tuning sequence. Once the RUN key is depressed, the VG5 will automatically run the motor and display "Tune Proceeding". If the STOP key is depressed during this procedure, the motor will coast to a stop and the Auto-tune routine will be stopped.

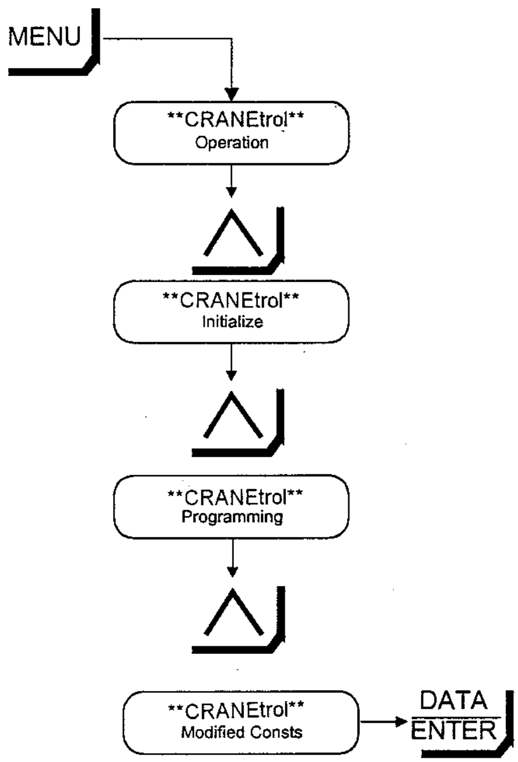
After completion of the Auto-tuning sequence, the VG5 will display "Tune Successful". Depress the MENU key to store the motor data and return to the "Operation" mode. You have now successfully auto-tuned the VG5. The motor data in E1 and E2, should be documented in the VG5's parameter list. If for any reason the VG5 must be replaced, this data can be reentered without having to uncouple the motor and Auto-tune again.

Common Auto-Tune Problems:
During the Auto-Tuning procedure, may display "Tune Aborted" indicating that the procedure was unsuccessful. This condition is most commonly caused by invalid data entered in the VG5. The following table list the most common causes.

Fault	Description	Corrective Action
PG Direction	Encoder feedback signal does not match the VG5 direction signal.	Change F1-05 setting.
Invalid Data	This fault may include several different descriptions including Resistance, Rated Slip, Saturation 1, etc. This is due to the programming data not matching the tuning results. This may be caused by invalid Motor Nameplate data or a mismatch of drive and motor.	Insure that the entered data matches the Motor Nameplate. Insure that the Motor is disconnected from the load. Insure that the drive and motor are the same size. Insure that the drives kVa setting matches the motor size.
Overcurrent	Excessive current during Auto-tuning.	Change C8-30 to = "1".

2.4 VG5 Modified Constants

Once you have completed programming and Auto-Tuning your VG5, the modified constants should be viewed. The Modified Constants contain only the parameters that you have changed from the factory settings. These settings should be recorded for future reference in troubleshooting or drive replacement.



Parameter	*Value*

3.1 Initialize Parameters - Group A

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
A1-01	Access Level	Parameter Access Level 0: Operator 3: Basic Level 1: User Level 2: Quick Start Level 3: Basic Level 4: Advanced	0 - 4	1	X	X	X
A1-02	Control Method	Determines Control Method 0: V/F Mode 3: Flux Vector 2: Open Loop Vector	0 - 3	*	X	X	X
A1-03	Init Parameters	Resets parameters 0: No Initialize 1110: User Default 2220: Factory Default	0 - 2220	0	X	X	X
A1-04	Enter Password	Password setting	0000-9999	0	X	X	X
A2-01 - A2-32	User Constants	User selected parameters. Program selected parameters here, and set to User Level.	Parameter No.		X	X	X

* NOTE: Default control method is series dependant. "C" = 0, "CH" = 3.

A1-01 Access Level

This parameter determines the level of access to the VG5's parameters.

A1-02 Control Method Selection

This parameter determines what type of control system the VG5 will be operated.
* When using the "CH" series, No Load Brake inverter, this parameter MUST be set to "3" Flux Vector.

A1-03 Initialize Parameters

This function is used to reset all the VG5's parameters. Selecting the "2220" value, sets all parameters to the setting as they left the factory at Cranetrol. Selecting the "1110" value, sets all parameters to the values you set before setting O2-03 to "1".

3.0 Programming

3.2 Application Parameters - Group B

3.2.1 DC Injection Braking

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
B2-01	DCInj Start Freql	DC Injection braking Start Frequency	0.0 - 20.0Hz	*	X	X	X
B2-02	DCInj Current	DC Braking Current Level	0 - 100%	50	X	X	0
B2-03	DCInj Time@ Start	DC Injection Time duration at start	0.00 - 10.0 Sec	0.00	X	X	0
B2-04	DCInj Time@ Stop	DC Injection Time duration at Stop	0.00-10.0 Sec	0.00	X	X	0

*Series dependant

B2-01 DC Braking Frequency
Sets the output frequency level at which the unit will start applying DC Injection Current to the motor. This level is for both the starting and stopping sequence. When B2-01< E1-09, DC Injection braking starts from the minimum frequency of E1-09. In the "CH"series VG5, this parameter sets the turn on level of load float.

B2-02 DC Braking Current
Sets the amount of DC Current applied to the motor as a percentage of the inverter rated current. This parameter should not be set too high or motor overexcitation may occur.

B2-03 DC Braking Time at Start
Sets the amount of time that the VG5 will apply DC Current to the motor, during the start sequence. If B2-03 is set to "0", DC Injection Braking is disabled.

B2-04 DC Braking Time at Stop
Sets the amount of time that the VG5 will apply DC Current to the motor, during the stop sequence. If B2-03 is set to "0", DC Injection Braking is disabled.

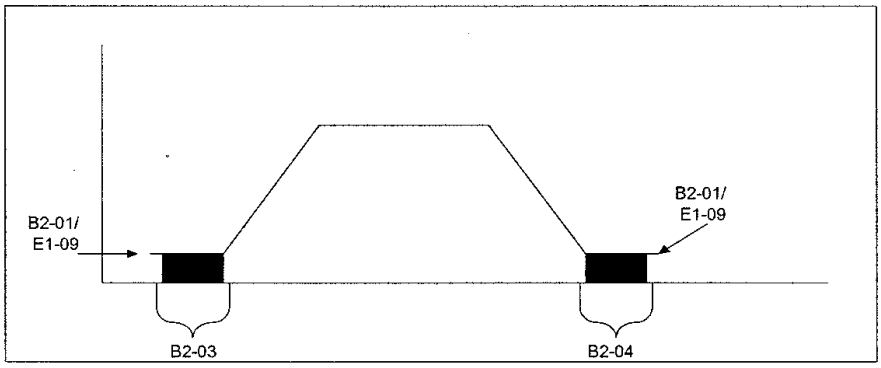


Fig.13

3.2 Application Parameters - Group B

3.2.2 Droop Control

No.	Display	Description	Range	Defau-lt	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
B7-01	Droop Quantity	Droop control gain	0.0 - 100.0%	0.0	O	O	X
B7-02	Droop Delay Time	Droop control delay time	0.03 - 2.00 Sec	0.05	O	O	X

Droop Control

The Droop Control function allows the user to enter the amount of motor slip. This function is used when a single load is operated with two motors. These parameters are used to "load balance" the two motors by matching the motors slip characteristics.

B7-01 Droop Quantity sets the amount of slip as the percentage of slip when the maximum output frequency is input and the rated torque is generated. The *B7-02 Droop Delay Time* is used to set the responsiveness of the droop control. Setting this value too low may cause hunting or oscillations to occur, increase this value if this occurs. When b7-01 is set to 0.0, the Droop function is disabled.

3.0 Programming

3.3 Tuning Parameters - Group C

3.3.1 Accel/Decel

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C1-01	Accel Time 1	Acceleration Time 1	0.00 - 6000.0 Sec	3.0	X	X	X
C1-02	Decel Time 1	Deceleration Time 1	0.00 - 6000.0 Sec	*	X	X	X
C1-03	Accel Time 2	Acceleration Time 2	0.00 - 6000.0 Sec	10.0	X	X	X
C1-04	Decel Time 2	Deceleration Time 2	0.00 - 6000.0 Sec	10.0	X	X	X
C1-05	Accel Time 3	Acceleration Time 3	0.00 - 6000.0 Sec	10.0	X	X	X
C1-06	Decel Time 3	Deceleration Time 3	0.00 - 6000.0 Sec	10.0	X	X	X
C1-07	Accel Time 4	Acceleration Time 4	0.00 - 6000.0 Sec	10.0	X	X	X
C1-08	Decel Time 4	Deceleration Time 4	0.00 - 6000.0 Sec	10.0	X	X	X
C1-09	Fast Stop Time	Fast Stop Time	0.00 - 6000.0 Sec	10.0	X	X	X
C1-10	Acc/Dec Units	Accel / Decel Time Settings Units 0: C1-01 - C1-09 setting range is in units of 0.01 seconds (setting range - 0.00 - 600.00) 1: C1-01 - C1-09 setting range is in units of 0.1 seconds (setting range - 0.0 - 600.0)	0 - 1	1	X	X	X
C1-11	Acc/Dec SW Freq	Accel / Decel Time Switching Frequency	0.0 - 400.0Hz	0.0	X	X	X

C1-01 - C1-02 Acceleration / Deceleration Time 1
These parameters are the primary Accel/Decel times for the VG5. The time value is set in seconds, and reflects the time it takes the VG5 to accel/decel from 0 to max speed and vice versa.

NOTE: Setting the Accel Time 1 (C1-01) too short may cause an Overcurrent condition due to high inrush current. Conversely, setting the Decel Time (C1-02) too short may cause an Overvoltage condition due to the increase in regenerative energy to the DC bus.

* C1-02 default is dependant on Series type. "C" = default 3.0 sec. / "CH" = default 1.5 sec.

3.3 Tuning Parameters - Group C

3.3.1 Accel/Decel

C1-03 - C1-08 Accel / Decel Times 2 through 4

These parameters are alternate accel/decel times that are activated by activating one of the multi-function inputs. When the multi-function inputs, H1-01 to H1-06, are set to "7" and "1A", up to four accel/decel times may be selected by input contact commands (terminals 3-8).

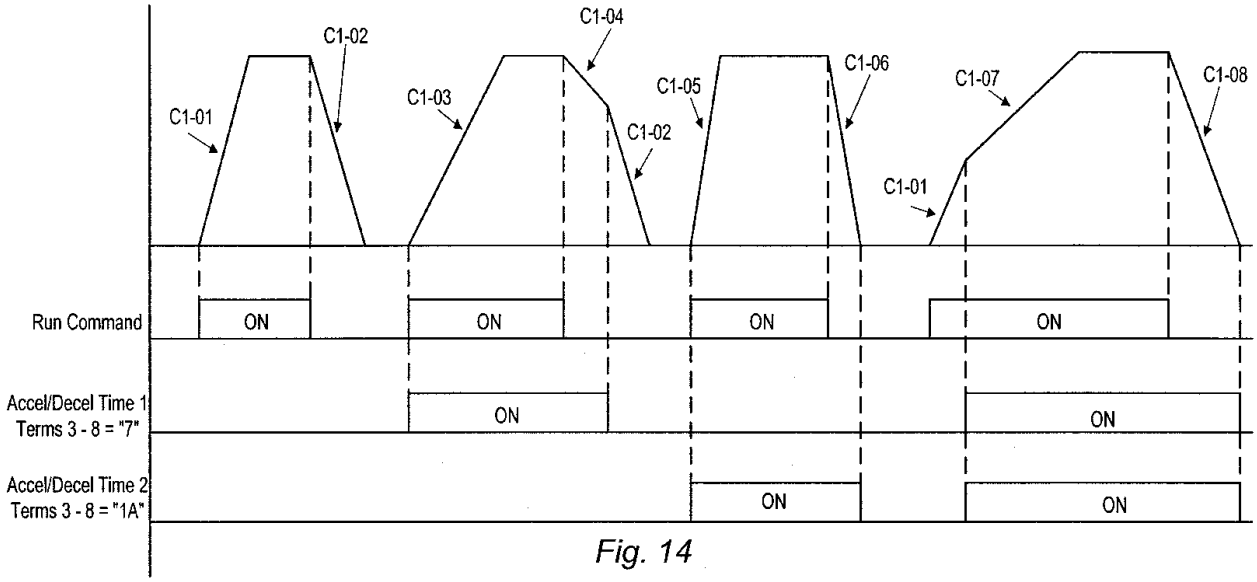


Fig. 14

C1-09 Fast Stop Time

This parameter may be set to give a faster stop time than C1-02, when a STOP command is received. If C1-09 value is greater than C1-02, the stop time is equal to C1-02. However, if the value of C1-09 is less than C1-02, the decel time when a STOP command is received will equal C1-09.

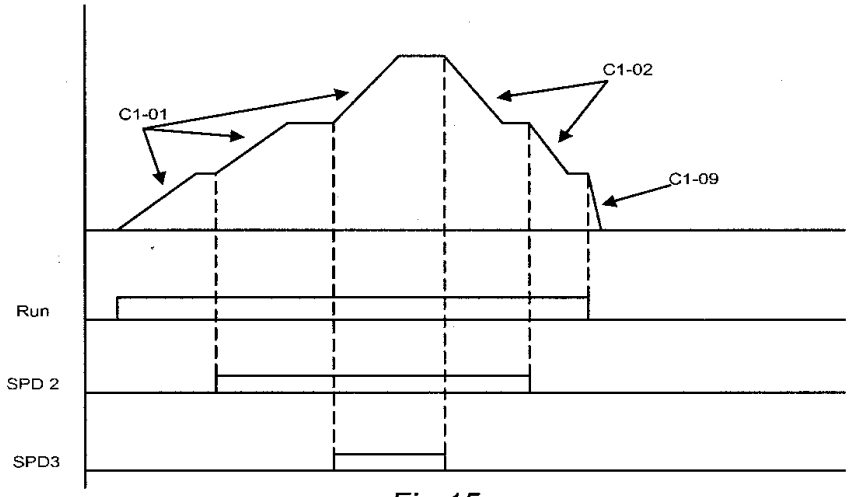


Fig 15

3.0 Programming

3.3 Tuning Parameters - Group C

3.3.1 Accel/Decel

C1-10 Accel/Decel Time Setting Units
This parameter allows you to change the resolution of the Accel/Decel time units. If any of the parameters C1-09 to C1-09 is set to 600.1 Sec. or more, C1-10 can not be set to "0".

C1-11 Accel/Decel Time Switching Frequency Level
This parameter allows you to automatically change the Accel/Decel times based on output frequency, rather than multi-function inputs. When parameter C1-11 is set the VG5 will follow the values of C1-07 and C1-08 if the output is below C1-11 value. When the output frequency is greater than C1-11, the VG5 will follow the values of C1-01 and C1-02.

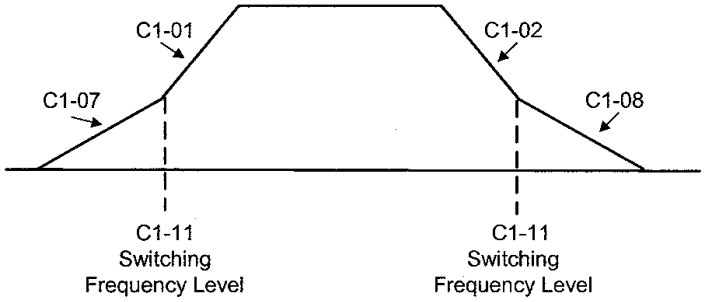


Fig. 16

3.3 Tuning Parameters - Group C

3.3.2 "S" Curve for Accel/Decel

No.	Display	Description	Range	Defau-lt	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C2-01	SCrv Acc @ Start	S-curve time at start of Accel ramp	0.00 - 2.5 Sec	0.20	X	X	X
C2-02	SCrv Acc @ End	S-curve time at end of Accel ramp	0.00 - 2.5 Sec	0.20	X	X	X
C2-03	SCrv Dec @ Start	S-curve time at start of Decel ramp	0.00 - 2.5 Sec	0.20	X	X	X
C2-04	SCrv Dec @ End	S-curve time at end of Decel ramp	0.00 - 2.5 Sec	0.00	X	X	X

C2-01 to C2-04 S-curve for Accel/Decel

The S-curve pattern is used to reduce shock and provide smooth transitions during acceleration and deceleration. Setting the S-curve pattern extends the total time of the Accel/Decel times in C1-01 to C1-08. The complete Accel/Decel time is shown in the following formula.

Accel Time C1-01 + (C2-02 + C2-02) / 2 = Total Accel Time
Decel Time C1-02 + (C2-03 + C2-04) / 2 = Total Decel Time

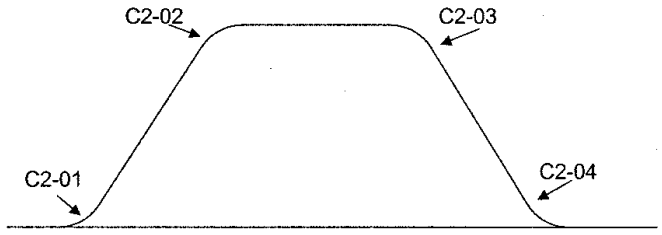


Fig. 17

3.0 Programming

3.3 Tuning Parameters - Group C

3.3.3 Motor Slip Compensation

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C3-01	Slip Comp Gain	Slip Compensation Gain	0.0 - 2.5	*	X	X	X
C3-02	Slip Comp Time	Slip compensation primary delay time	0 - 10000 msec	200	X	X	0
C3-03	Slip Comp Limit	Slip compensation limit	0 - 250 %	200	X	X	0
C3-04	Slip Comp Regen	Slip compensation during regeneration 0: Disabled 1: Enabled	0 - 1	0	X	X	0
C3-05	Flux Select	Flux calculation method 0: After compensation 1: Before compensation	0 - 1	0	0	X	0
C3-06	Output V Limit	Output voltage limit 0: Disable 1: Enable	0 - 1	0	0	X	X

** Default setting dependant on Mode selection.*

Motor Slip Compensation

The slip compensation function keeps the motor speed constant under varying loads, by adjusting the output frequency based on load.

C3-01 Slip Compensation Gain

This function controls the amount of increase in output frequency as the load increases. During Flux Vector control mode, this function compensates for motor slip caused by changes in rotor temperature. Normally, this value does not need to be adjusted.

C3-02 Slip Compensation Primary Delay Time

This constant acts as a first order time filter for the C3-01 parameter. This function prevents the motor from becoming unstable or sluggish in response. If the motor is unstable, reduce this time in 10ms increments. If the motor is sluggish , increase this time in 10ms increments

C3-03 Slip Compensation Limit

This function sets the slip compensation limit as a percentage of motor rated slip, the value of E2-02.

C3-04 Slip Compensation During Regeneration

This function selects if slip compensation is enabled or disabled during the regenerative portion of operation.

C3-05 Flux Select during Slip Compensation

This function selects when the Flux calculations are performed, before or after slip compensation is performed.

C3-06 Output Voltage Limit

This function when active, reduces the output voltage when operating above 90% base speed.

3.3 Tuning Parameters - Group C

3.3.4 Torque Compensation

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C4-01	Torq Comp Gain	Torque Compensation Gain	0.00 - 2.50	1.00	X	X	0
C4-02	Torq Comp Time	Torque Compensation time constant	0 - 10000 msec	200	X	X	0

Torque Compensation

This function is designed to automatically adjust the V/F pattern of the VG5, to provide a torque boost when required. During operation, the motors torque requirement changes as load condition change. The VG5 automatically adjusts the voltage during constant speed operation, as well as during acceleration.

C4-01 Torque Compensation Gain

This parameter controls the amount of torque compensation (voltage boost) that is delivered to the motor as the load increases. Normally, no adjustment is required for this parameter. However, when more torque is required, increase the value of C4-01 in one tenth (0.1) increments. Increasing the value of C4-01 increases the motor torque, but an excessive increase may cause the motor to be overexcited and cause the following :

Overcurrent
Overload
excessive vibration

C4-02 Torque Compensation Time Constant

This function controls the response time of the Torque Compensation. If this time is set too high, the motor may become unstable. If the setting is too low, the speed response may be sluggish. Adjust this parameter in 10ms increments.

3.0 Programming

3.3 Tuning Parameters - Group C

3.3.5 Automatic Speed Regulator (ASR) Tuning

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C5-01	ASR P Gain 1	ASR Proportional Gain 1	0.00 - 300.00	20.0	0	0	X
C5-02	ASR I Time1	ASR Integral Time 1	0.000 - 10.0 Sec	0.1	0	0	X
C5-03	ASR P Gain 2	ASR Proportional Gain 2	0.00 - 300.00	20.0	0	0	X
C5-04	ASR I Time2	ASR Integral Time 2		0.5	0	0	X
C5-06	ASR Delay Time	ASR Output Primary Delay Time	0.000 - 0.0500 Sec	0.004	0	0	X
C5-07	ASR Gain SW Freq.	Frequency level for changing ASR Gain	0.0 - 400.0 Hz	0.0	0	0	X
C5-08	ASR I Limit	Selects ASR Limit level	0 - 400.%	400	0	0	X

C5-01 ASR Proportional Gain 1

Speed response increases as the gain is increased.
However, if the gain value is too high, the motor may become unstable and produce oscillations in the motor. Normally this parameter does not need to be adjusted.

C5-02 ASR Integral Time 1

This parameter adjusts the response time to a load change. With the integration time decreased, the response to speed changes increases. However, if the time value is set too low the motor may become unstable. Normally this parameter does not need to be adjusted

C5-03 ASR Proportional Gain 2

This parameter has the same function as C5-01, except it is enabled by a multi-function input or by programming C5-07.

C5-04 ASR Integral Time 2

This parameter has the same function as C5-02, except it is enabled by a multi-function input or by programming C5-07.

C5-06 ASR Output Primary Delay Time

This parameter should be adjusted if motor instability occurs, before adjusting any other ASR parameters. This function reduces current instability, especially instability due to mechanical backlash.

C5-07 ASR Switching Frequency Level

This parameter is used to automatically switch between the P&I values of C5-01 and C5-02 to C5-03 and C5-04, based on output frequency.

3.3 Tuning Parameters - Group C

3.3.5 Automatic Speed Regulator (ASR) Tuning

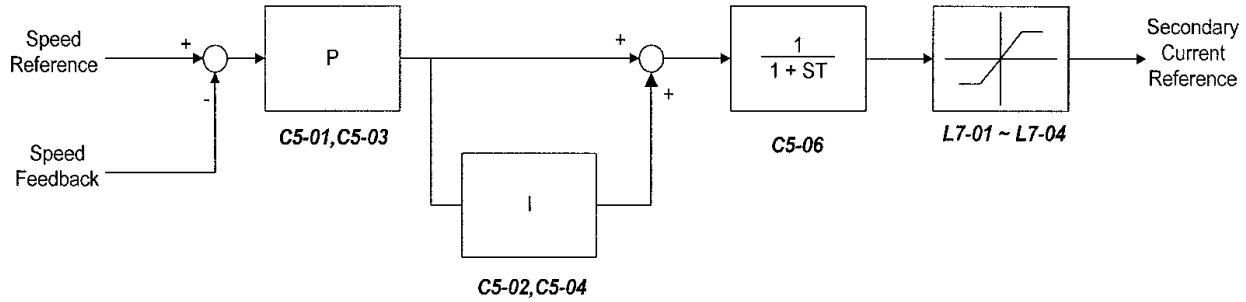


Fig. 18

ASR Block Diagram in Flux Vector Mode

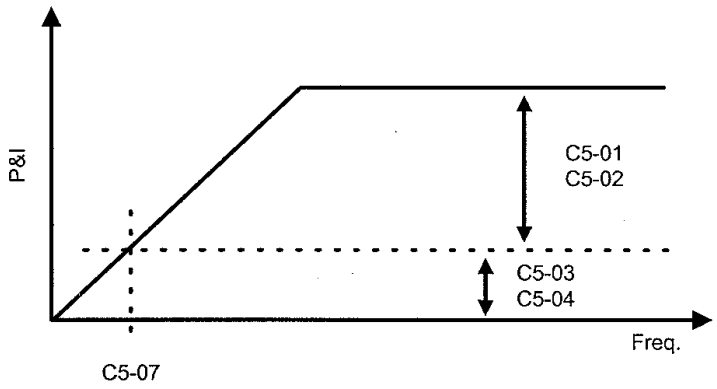


Fig. 19

ASR Switching Level Function

3.0 Programming

3.3 Tuning Parameters - Group C

3.3.6 Carrier Frequency Tuning

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C6-01	Carrier Freq Max	Carrier Frequency upper limit	0.4 - 15.0 kHz	*	X	X	X
C6-02	Carrier Freq Min	Carrier Frequency lower limit	0.4 - 15.0 kHz	*	X	0	0
C6-03	Carrier Freq Gain	Carrier Frequency proportional gain	0 - 99	0	X	0	0

*Note: Default values are model dependant

3.3.7 Hunting Prevention Tuning

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C7-01	Hunt Prev Select	Hunting Prevention selection 0: Disabled 1: Enabled	0 - 1	1	X	0	0
C7-02	Hunt Prev Gain	Hunting Prevention gain	0.00 - 2.5	1.00	X	0	0

C7 Hunting Prevention Function

Occasionally, resonance between the internal control system and the mechanical system causes current instability, especially at low speeds. This instability is called hunting, the hunting prevention circuit monitors the motors flux and uses a special control circuit to "smooth out" any peaks in the output current waveform.

C7-01 Hunting Prevention Selection

This function either enables or disables the hunting prevention circuit.

C7-02 Hunting Prevention Gain

This function sets the hunting prevention gain value in units of 0.01. If hunting occurs during light load conditions, increase this value. If hunting occurs during heavy load conditions, decrease this value. Adjusting this parameter usually does not have to be performed. However, if adjustments are necessary, increase or decrease the value in 0.1 increments

3.3 Tuning Parameters - Group C

3.3.8 Factory Tuning

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C8-08	AFR Gain	Automatic Frequency Regulator Adjustment	0.00 - 10.00	1.00	0	X	0
C8-30	Carrier in Tune	Carrier Frequency during Auto-Tune 0: 2kHz 1: C6-01 2: 5kHz	0 - 2	2	O	X	X

C8-08 Automatic Frequency Regulator Adjustment

This function is only available in Open Loop Vector mode. This parameter controls oscillations and sluggish speed response. If oscillations occur, decrease this value. If sluggish response occurs, increase this value. This parameter normally does not need adjustment. However, if adjustments are necessary, change the value in 0.1 increments.

C8-30 Carrier Frequency during Auto-Tuning

This function controls the carrier frequency during the Auto-tuning sequence. If an overcurrent fault occurs during Auto-tuning, select "1" for C8-30.

3.0 Programming

3.4 Reference Parameters - Group D

3.4.1 Preset Speeds

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
D1-01	Pre-Set Speed 1	Pre-Set Speed 1	0.00 - 120.0 Hz	6.0	X	X	X
D1-02	Pre-Set Speed 2	Pre-Set Speed 2	0.00 - 120.0 Hz	15.0	X	X	X
D1-03	Pre-Set Speed 3	Pre-Set Speed 3	0.00 - 120.0 Hz	30.0	X	X	X
D1-04	Pre-Set Speed 4	Pre-Set Speed 4	0.00 - 120.0 Hz	45.0	X	X	X
D1-05	Pre-Set Speed 5	Pre-Set Speed 5	0.00 - 120.0 Hz	60.0	X	X	X
D1-06		Reserved					
D1-07		Reserved					
D1-08		Reserved					
D1-09		Reserved					

D1 Pre-Set Speed Point Settings

D1 -01 to D1-05 Pre-Set Speeds

These parameters are used to set your multi-step speed values. Depending on the setting of P1-02, up to 5 step , including infinitely variable, speeds can be set. The setting of P1-02 selects the type of speed control used, set the D1 values to match the control method. Example:

If P1-02 is set for 3 Step I/V
The D1 settings are as follows:

D1-01 = Speed 1(min speed)
D1-02 = Speed 2
D1-05 = Speed 3(max Speed)*
***NOTE: In all speed methods, D1-05 is the Max Speed setting.**

3.4 Reference Parameters - Group D

3.4.1 Preset Speeds

5 - Step Speed

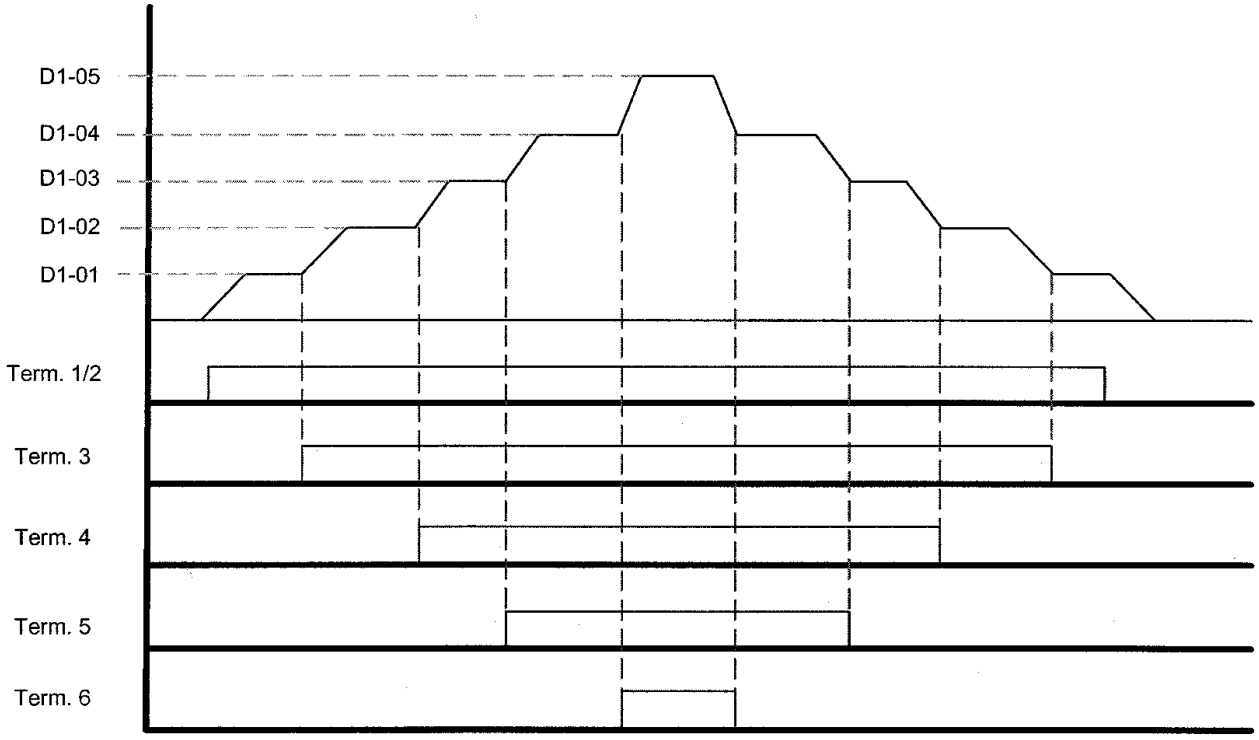


Fig. 20

3 - Step Speed

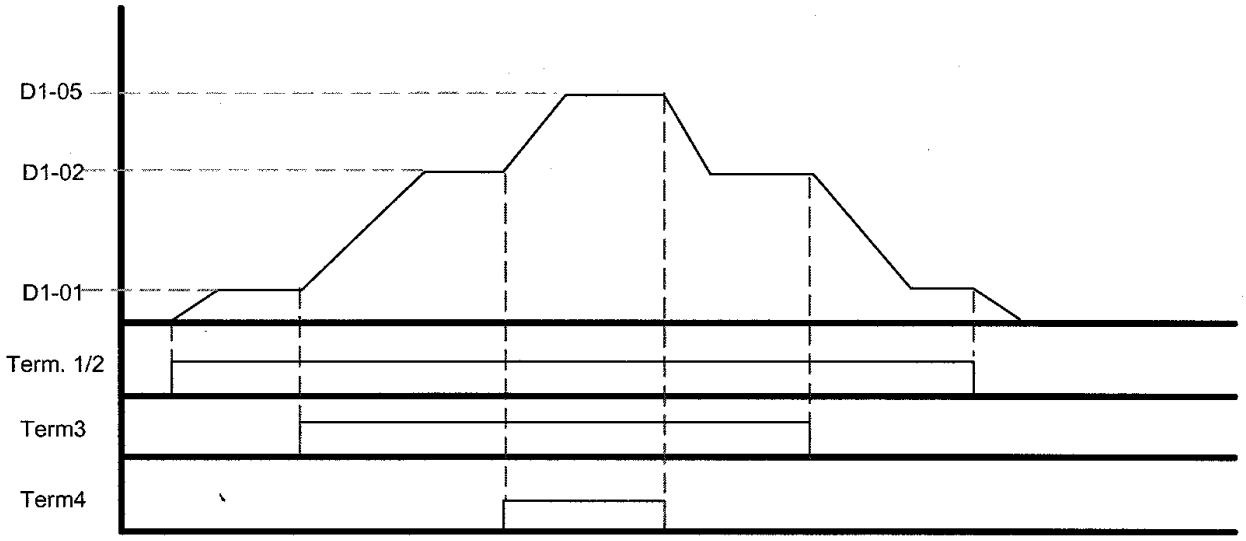


Fig. 21

3.0 Programming

3.4 Reference Parameters - Group D

3.4.1 Preset Speeds

2 - Step I/V

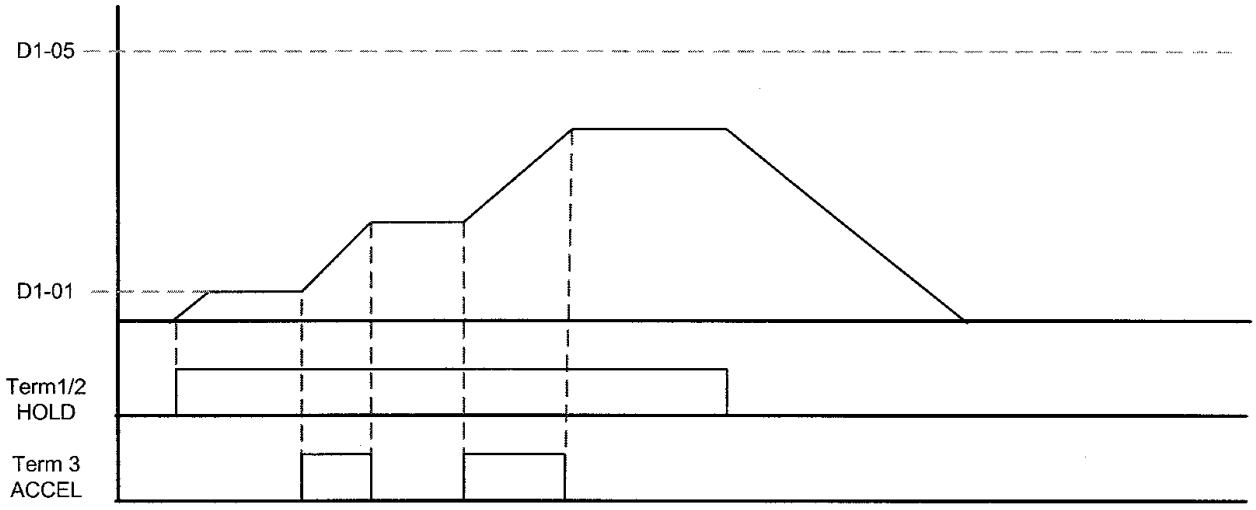


Fig. 22

3 - Step I/V

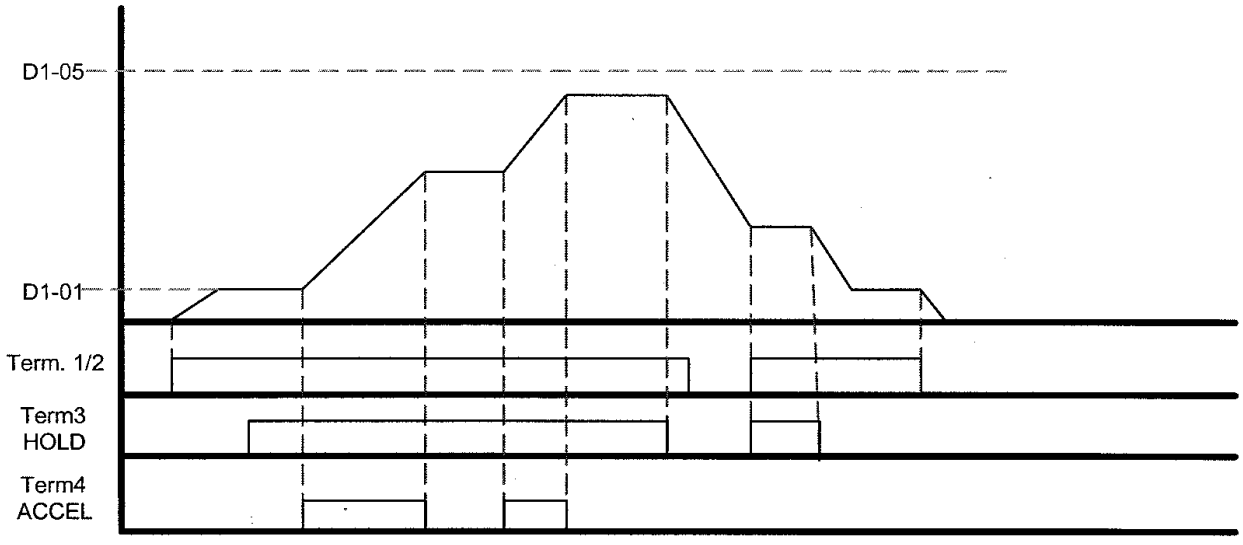


Fig. 23

3.4 Reference Parameters - Group D

3.4.2 Reference Limits

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
D2-01	Ref Upper Limit	Reference upper limit	0.0 - 110.0%	100	X	X	X
D2-02	Ref Lower Limit	Reference lower limit	0.0 - 109.0%	0.0	X	X	X

Reference Limits

The frequency reference upper and lower limits are set as a percentage of the maximum output frequency (E1-04), in increments of 1%.

3.4.3 Jump Frequencies

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
D3-01	Jump Freq 1	Jump frequency reference 1	0.0 - 400.0Hz	0	X	X	X
D3-02	Jump Freq 2	Jump frequency reference 2	0.0 - 400.0Hz	0	X	X	X
D3-03	Jump Freq 3	Jump frequency reference 3	0.0 - 400.0Hz	0	X	X	X
D3-04	Jump Bandwidth	Jump frequency reference bandwidth	0.0 - 20.0Hz	1.0	X	X	X

Jump Frequencies

The jump frequencies function allows the prohibition or "jumping" of critical frequencies that may cause resonant vibrations in some machinery. This function allows 3 "jump" frequencies to be set, as well as a bandwidth for each. The VG5 will not operate at these frequencies during running. If the input speed signal commands the drive to operate at these frequencies, the VG5 will operate above or below the jump frequency.

3.0 Programming

3.5 Motor Parameters - Group E

3.5.1 V/F Pattern

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
E1-01	Input Voltage	Input Voltage	155 - 255V 310 - 510V	230 460	X	X	X
E1-02	Motor Selection	0: Std Fan Cooled 1: Std Blower Cooled(Inverter Duty)	0 - 1	*	X	X	0
E1-03	V/F Selection	V/F Pattern Selection 0: 50 Hz 1: 60Hz Saturation 2: 50Hz Saturation 3: 72 Hz 4: 50Hz Variable Torque1 5: 50Hz Variable Torque2 6: 60Hz Variable Torque1 7: 60Hz Variable Torque2 8: 50Hz High Torque 1 9: 50Hz High Torque 2 A: 60Hz High Torque 1 B: 60Hz High Torque 2 C: 90Hz D: 120Hz E: 180Hz F: User Defined V/F pattern	0 - F	F	X	0	0
E1-04	Max Frequency	Maximum Frequency or TURBO LIFT frequency (if function selected)	50.0 - 120.0Hz	60.0	X	X	X
E1-05	Max Voltage	Maximum Output Voltage	0.0 - 255.0V 0.0 - 510V	230 460	X	X	X
E1-06	Base Frequency	Motor Base Frequency	0.0 - 120.0Hz	60.0	X	X	X
E1-07	Mid Frequency A	Mid Output Frequency A	0.0 - 120.0Hz	*	X	X	0
E1-08	Mid Voltage A	Mid Output Voltage A	0.0 - 255.0V 0.0 - 510V	*	X	X	0
E1-09	Min Frequency	Minimum Output Frequency	0.00 - 120.0Hz	*	X	X	X
E1-10	Min Voltage	Minimum Output Voltage	0.0 - 255.0V 0.0 - 510V	*	X	X	0
E1-11	Mid Frequency B	Mid Output Frequency B	0.0 - 120.0Hz	*	X	X	X
E1-12	Mid Voltage B	Mid Output Voltage B	0.0 - 255.0V 0.0 - 510V	*	X	X	X
E1-13	Base Voltage	Motor Base Voltage	0.0 - 255.0V 0.0 - 510V	*	X	X	X

Note: * Factory default depends on Mode setting Voltage class and/or Software type.

3.5 Motor Parameters - Group E

3.5.1 V/F Pattern

E1-01 Input Voltage

This parameter sets the input voltage to the inverter. This parameter does not need to be changed usually. Setting changes may be necessary for overseas operation.

E1-02 Motor Selection

This parameter selects the thermal characteristics of the electronic overload. If a standard fan cooled motor is used, and E1-02 is set to 0, the electronic overload will adjust the trip point based on motor speed. This to protect the motor at lower speeds when the cooling fan is not able to produce the necessary air flow. If an inverter vector duty motor is used, E1-02 should be set to 1, allowing a much larger speed range without overload adjustment.

E1-03 V/F Pattern Selection

This parameter allows you to select a V/F pattern to fit your application. This function is only for use in V/F mode. The VG5 has 15 preset pattern selections, generally one of these settings will fit your application needs. However, if a custom V/F pattern is required, the "F" setting needs to be set.

Considerations for selecting a custom V/F:

- The voltage and frequency specifications of the motor are not standard.
- Your application requires operation above base of the motor.
- Your application requires to use of the TURBO LIFT function.

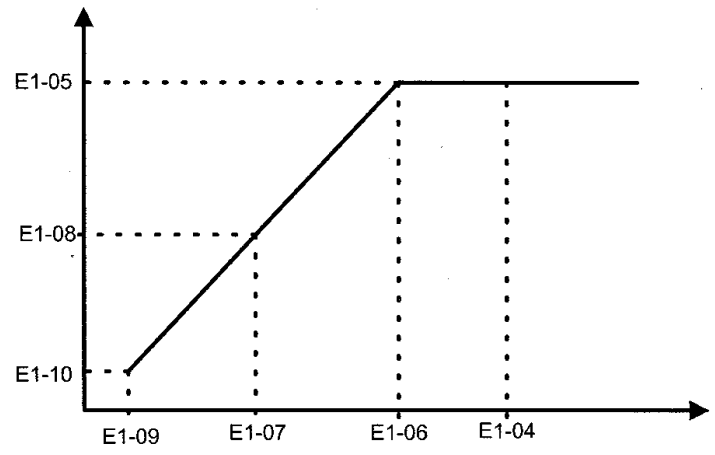


Fig. 24

3.0 Programming

3.5 Motor Parameters - Group E

3.5.2 Motor Set - Up

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
E2-01	Motor Rated FLA	Motor Rated Current	0 - 1500A	*	X	X	X
E2-02	Motor Rated Slip	Motor rated slip frequency	0.00 - 20.00Hz	*	X	X	X
E2-03	No-Load Current	Motor No Load current - Magnatizing Current	0 - 1500A	*	X	X	X
E2-04	Number of Poles	Number of motor poles	2 - 48	4	0	0	X
E2-05	Term Resistance	Motor Terminal Resistance	Ω	*	X	X	X
E2-06	Leak Inductance	Motor Leakage Inductance	0.0 - 30%	*	0	X	X
E2-07	Saturation Comp1	Motor iron core saturation coefficient 1	0.00 - 1.00	*	0	X	X
E2-08	Saturation Comp2	Motor iron core saturation coefficient 2	0.00 - 1.00	*	0	X	X
E2-09	Mechanical Loss	Motor Mechanical Loss	0.0 - 10.0%	*	0	X	X
E2-10	T comp Iron Loss	Motor Iron Loss Torque Compensation	0 - 65535	*	X	0	0

E2-01 Motor Rated Current

This parameter is used to set the motor's nameplate full load amps (FLA). This function sets the Overload levels.

E2-02 Motor Rated Slip Frequency

This parameter sets the motor's slip characteristics, for optimum speed regulation.
This parameter is automatically set if Auto-Tuning is performed
The following equation should be used to calculate the motor slip:

$$\text{E2-02} = \text{Motor Rated Frequency} - \frac{(\text{RPM X No. of Poles})}{120}$$

E2-03 Motor No Load Current

This parameter sets the no-load or magnetizing current of the motor. This value is automatically set if Auto-Tuning is performed.

E2-04 Number of Motor Poles

This parameter sets the motor poles for Closed Loop Vector Mode.
Note: Factory default depends on the Mode selection and Voltage class.

3.5 Motor Parameters - Group E

3.5.2 Motor Set - Up

E2-05 Motor Terminal Resistance

This parameter is used to set the motors terminal to terminal resistance. This value is automatically set if Auto-Tuning is performed. These values must be obtained from the motor manufacturer if Auto-Tuning is not performed

E2-06 Leakage Inductance

This parameter is used to set the voltage drop due to motor leakage inductance.This value is automati cally set if Auto-Tuning is performed. These values must be obtained from the motor manufacture if Auto-Tuning is not performed

E2-07 Core Saturation Compensation Coefficient 1

This parameter is used to set the motor iron - core saturation coefficient at 50%.This value is automati cally set if Auto-Tuning is performed. These values must be obtained from the motor manufacture if Auto-Tuning is not performed

E2-08 Core Saturation Compensation Coefficient 2

This parameter is used to set the motor iron - core saturation coefficient at 75%.This value is automati cally set if Auto-Tuning is performed. These values must be obtained from the motor manufacture if Auto-Tuning is not performed

E2-09 Motor Mechanical Loss

This parameter is used to set the mechanical losses of the motor. This value is automatically set if Auto-Tuning is performed.

E2-10 Motor Iron Loss Torque Compensation

This parameter sets the motor iron loss of the torque compensation.

3.0 Programming

3.6 Option Parameters - Group F

3.6.1 PG Option Setup

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
F1-05	PG Rotation Sel	PG Rotation 0: CCW Counter Clock Wise 1: CW Clock Wise	0 - 1	0	0	0	X
F1-01	PG Pulses / Rev	Pulses per Revolution - Encoder	0-60000	1024	0	0	X

F1-05 PG Rotation Selection

This function sets whether phase A or phase B lead when run in Forward. If the motor is unstable or draws high current at start, the PG rotation is probably wrong. If the motor runs fine, but the direction selected is opposite from your machine, swap any two motor leads and change the F1-05 setting.

3.6.2 AO-08/12 Analog Output Selection

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
F4-01	AO Ch1 Select	Analog Output Channel 1 Selection 1: Frequency Reference 2: Output Frequency 3: Output Current 5: Motor Speed 6: Output Voltage 7: DC Bus Voltage 8: Output Power kW 9: Torque Reference(internal) 15: External terminal 13 input voltage 16: External terminal 14 input voltage 17: External terminal 16 input voltage 18: Motor secondary current 19: Motor excitation current 20: Primary frequency after SFS 21: ASR Input 22: ASR Output 23: Speed deviation 26: Voltage Reference (Vq) 27: Voltage Reference (Vd) 31: Not Used 32: ACR(q) Output 33: ACR(d) Output 50: Iq Monitor 51: Weight	0 - 33	2	X	X	X
F4-02	AO CH1 Gain	Analog output channel 1 gain	0.00 - 2.50	1.0	X	X	X
F4-03	AO CH2 Select	Analog Output Channel 2 Selection Same as F4-01	0 - 33	3	X	X	X
F4-04	AO CH2 Gain	Analog output channel 2 gain	0.00 - 2.50	0.50	X	X	X
F4-05	AO CH1 Bias	Analog Output Channel 1 bias	+/- 10%	0.0	X	X	X
F4-06	AO CH2 Bias	Analog Output Channel2 bias	+/- 10%	0.0	X	X	X

3.6 Option Parameters - Group F

3.6.2 Analog Output Selection

F4-01 Analog Output Selection CH1

Selects the output signal function of Ch1(term 21)

F4-02 Analog Output Ch1 Gain

This function allows the output analog signal to be adjusted via a gain level.
This value is a multiplier of the output signal.

F4-03 and F4-04

Same as F4-01 and F4-02 respectively for Ch 2.

F4-05 and F4-06

This function allows the output signal to be biased. Either positively or negatively.
F4-05 is used for CH1 and F4-06 is used for CH2.

3.6.3 Pulse Monitor Output Selection for PO-36F Card

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
F7-01	PO - 36F Select	PO - 36 Output Signal Selection 0: 1 X output frequency 1: 6 X output frequency 2: 10 X output frequency 3: 12 X output frequency 4: 36 X output frequency	0 - 4	1	X	X	X

F7-01 PO - 36F Output Signal Selection

This parameter sets the output signal level when a PO - 36F option card is used.

3.0 Programming

3.7 Terminal Parameters - Group H

3.7.1 Input Terminal Programming - Multi-Function Type

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H1-01	Term 3 Sel	Multi-function input terminal 3 selection	0 - 86	3	X	X	X
H1-02	Term 4 Sel	Multi-function input terminal 4 selection	0 - 86	4	X	X	X
H1-03	Term 5 Sel	Multi-function input terminal 5 selection	0 - 86	5	X	X	X
H1-04	Term 6 Sel	Multi-function input terminal 6 selection	0 - 86	6	X	X	X
H1-05	Term 7 Sel	Multi-function input terminal 7 selection	0 - 86	81	X	X	X
H1-06	Term 8 Sel	Multi-function input terminal 7 selection	0 - 86	82	X	X	X
H1-08	Term 1 of DI Card	Multi-function input terminal 1 of DI Card	0-86	0	X	X	X
H1-09	Term 2 of DI Card	Multi-function input terminal 2 of DI Card	0-86	0	X	X	X
H1-10	Term 3 of DI Card	Multi-function input terminal 3 of DI Card	0-86	0	X	X	X
H1-11	Term 4 of DI Card	Multi-function input terminal 4 of DI Card	0-86	0	X	X	X
Multi - function input selections		7: Accel/Decel time 1 B: OH2 Alarm C: Multi-function analog input F: Not used **14: Fault reset** 15: E-Stop 1A: Accel/Decel 2 **1B: Programming lock out** **24 ~ 2F: External Faults** **30: Analog ref./Digital ref. switch** 60: DC Injection braking command 65: KEB command N.C. 66: KEB command N.O. 77: ASR proportional gain switch **80: Turbo Lift command** **81: End of Travel A (EOTA)** **82: End of Travel B (EOTB)** **83: Torque Limit Gain** **84: Micro-Speed** **85: Load Catch** **86: Slack Cable**					

3.7 Terminal Parameters - Group H

3.7.1 Input Terminal Programming - Multi-Function Type

H1-01 ~ H1-06 Multi-Function Input Terminals

The VG5 is designed with 6 inputs that may be programmed for various functions. The 6 multi-function inputs are terminals 3 thru 8 on the main control card, which accept a sinking type input. In both the "C" and "CH" version units, these inputs are interfaced with a 120V I/F card for use with 120VAC control logic. The VG5 comes factory programmed for 5 step speed control, EOTA and EOTB. An additional option card, DI Card, may be added to the input option port for 4 additional multi-function in puts

Before programming any multi-function inputs, determine the speed control method your application requires by setting P1-02. The speed method chosen, determines how many multi-function inputs you have to program.

Example:

If your speed control method is 2 step infinitely variable (P1-02 = 2). The VG5 automatically programs the multi-function input terminals 1,2 and 3 for speed control. This allows you to program terminals 4,5,6,7 and 8 for various functions in the H1-02 ~ H1-06 parameters.

If your speed control method is 3 step infinitely variable (P1-02 = 3). The VG5 automatically programs the multi-function input terminals 1,2 3 and 4 for speed control. This allows you to program terminals 5,6,7 and 8 for various functions in the H1-03 ~ H1-06 parameters.

Remember, do not set any of the multi-function inputs for speed control, this is automatically programmed by P1-02 parameter. The multi-function inputs should only be programmed for additional functions such as Turbo Lift, Micro-Speed, etc.

The multi-function inputs may be programmed for a wide variety of functions. However, this manual will describe only the most commonly used functions in the material handling industry, please consult your Cranetrol representative for further information on functions not described here.

H1-01 ~ H1-06 Functions

"14" Fault Reset

This value may be programmed to provide an external reset command from the terminals of the 120V I/F card.

3.0 Programming

3.7 Terminal Parameters - Group H

3.7.1 Input Terminal Programming - Multi-Function Type

H1-01 ~ H1-06 Functions

"1B" Programming Lock Out

This function may be programmed to provide an input that may be selected to prevent programming of the drive. If the programmed input is open, all programming is disabled. If the programmed input is closed, all programming is possible. This input could be wired to a key switch to allow only authorized personnel the ability to reprogram the VG5.

"24 ~ 2F" Fault inputs

The VG5 may be programmed to except external fault inputs. These fault inputs may be selected to function in a variety of combinations, the following conditions must be determined.

- Input Level — Normally Open or Normally Closed
- Detection Method — Always or During Operation Only
- Fault Action — Immediate Stop(Major Fault), Continue Operation(Minor Fault)

Setting	Input Level		Detection Method		Fault Action	
	N.O.	N.C.	Always	During Operation	Immediate Stop	Continue Operation
24	X		X		X	
25		X	X		X	
26	X			X	X	
27		X		X	X	
2C	X		X			X
2D		X	X			X
2E	X			X		X
2F		X		X		X

When the multi-function input terminal(s) are programmed for a Fault input, the VG5 will display an "EF" with the corresponding terminal number. For example if terminal 6 has been programmed with a fault input, and the input is activated, the VG5 will display an "EF6" fault. The "EF" fault simply means that the VG5 has received an external command indicating a fault condition. The VG5 will not reset unless the run command is removed and the fault input cleared. NOTE, terminal 7 has been reserved for the SDBU fault input. Activating this input will display a "DB Fault" message. See page 21.

3.7 Terminal Parameters - Group H

3.7.1 Input Terminal Programming - Multi-Function Type

"30" Analog/Digital Reference Switch

This function allows the VG5 to be switched from Analog speed control to Digital speed reference. If the programmed input is open, the speed reference will be taken from the analog reference. If the programmed input is closed, the speed reference will be taken from the input terminal(pendant).

"80" Turbo Lift Function

This function allows the overspeeding of an unloaded hook. When the programmed input is activated, the VG5 will monitor the output torque of the motor and determine if the hoist is unloaded based on the Turbo Lift settings in the "P" group parameters. If these conditions are meet, the VG5 will accelerate to the frequency setting of E1-04.

Turbo Lift Conditions:

1. The VG5 must be running at maximum speed, D1-05 value or 10V analog input.
2. The output torque must be below the value of P1-08.
3. The output torque must be below the value of P1-08 for the time value of P1-09.
4. If any of the above conditions are not maintained, the Turbo Lift function will be disabled.

"81" End of Travel A

This function allows an input from a WARNING limit switch. When this input is activated, the VG5 will decelerate to minimum speed. This input may be used for both direction limits.

"82" End of Travel B

This function allows an input from a SAFETY limit switch. When this input is activated, the VG5 will immediately stop, set the brake and give a visual warning of EOTB. The VG5 records what direction the crane was moving when the EOTB fault occurred and allows movement in the opposite direction only. This input may be used for both direction limits.

"83" Torque Limit Gain Function

This function allows the VG5's torque limits to be changed when the programmed input is activated. The torque limit value is multiplied by the setting of P1-10. This function is used for load certification test.

"84" Micro-Speed Function

This function allows the precise positioning of loads by reducing the speed references by the value of P1-07.

3.0 Programming

3.7 Terminal Parameters - Group H

3.7.2 Output Terminal Programming - Multi-Function Type

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H2-01	Term 9 Sel	Multi-function output terminal 9 - 10	0 - 41	40	X	X	X
H2-02	Term 25 Sel	Multi-function output terminal 25 - 27	0 - 41	40	X	X	X
H2-03	Term 26 Sel	Multi-function output terminal 26 - 27	0 - 41	*	X	X	X
Multi-function selections		0: Run 1: Zero Speed 2: Frequency out agree 1 3: Frequency in agree1 4: Frequency detection 1 5: Frequency detection 2 6: Inverter ready 7: DC Bus Overvoltage 8: Baseblock 1 B: Torque Detect 1(N.O.) E: Fault F: Not Used 10: Minor Fault 13: Fref/Fout Agree 2 14: Fref/Fset Agree 2 15: Freq Detect 3 16: Freq Detect 4 17: Torque Detection 1(N.C.) 18: Torque Detection 2(N.O.) 19: Torque Detection 2(N.C.) 1A: Reverse Direction 1D: Regeneration 1E: Restart Enabled 1F: Overload (OL1) 20: Overheat 30: Current/Torque Limit 33: Slack Cable 37: Load Weigh 40: Brake Release 41: Brake Fault 42: Load Catch					

*CH Series = 41 C Series = E

H2 Multi-function Outputs

The VG5 is designed with 3 multi-function type outputs. One output, terminals 9 and 10, is a dry contact type and terminals 25,26 and 27 are photo-coupler type outputs. The VG5 Out card may be applied to convert the photo-coupler type outputs to dry contact types. In either case the output may be programmed for various output functions.

For more information on output terminal wiring refer to pages 12 & 17.

3.7 Terminal Parameters - Group H

3.7.3 Analog Inputs

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H3-01	Term 13 Sel	Terminal 13 signal level 0: 0 - 10VDC 1: -10 to +10VDC	0 - 1	0	X	X	X
H3-02	Term 13 Gain	Tereminal 13 Gain level	0.0 - 1000.0%	100	X	X	X
H3-03	Term 13 Bias	Terminal 13 Bias Level	-100.0 - 100.0%	0.0	X	X	X
H3-04	Term 16 Signal	Terminal 13 signal level 0: 0 - 10VDC 1: -10 to +10VDC	0 - 1	0	X	X	X
H3-05	Term 16 Sel	Multi-function analog input 16 selection 0: Aux reference 1: Frequency Gain 2: Frequency Bias 5: Accel/Decel change 6: DC Injection Current 7: Overtorque level 9: Reference lower limit A: Jump Frequency 1F: Not Used	0 - 1F	0	X	X	X
H3-06	Term 16 Gain	Terminal 16 Gain Level	0.0 - 1000.0%	100	X	X	X
H3-07	Term 16 Bias	Terminal 16 Bias Level	-100.0 - 100.0%	0.0	X	X	X
H3-08	Term 14 Signal	Terminal 13 signal level 0: 0 - 10VDC 1: -10 to +10VDC 2: 4 - 20mA	0 - 2	2	X	X	X
H3-09	Term 14 Sel	Multi-function analog Terminal 14 selection (same as H3-05)	0 - 1F	1F	X	X	X
H3-10	Term 14 Gain	Terminal 14 Gain Level	0.0 - 1000.0%	100	X	X	X
H3-11	Term 14 Bias	Terminal 14 Bias Level	-100.0 - 100.0%	0.0	X	X	X
H3-12	Filter Avg Time	Analog input signal filter time constant	0.00 - 2.00 Sec	0.00	X	X	X

3.0 Programming

3.7 Terminal Parameters - Group H

3.7.4 Analog Outputs

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H4-01	Term 21 Select	Analog Output Terminal 21 Selection 1: Frequency Reference 2: Output Frequency 3: Output Current 5: Motor Speed 6: Output Voltage 7: DC Bus Voltage 8: Output Power kW 9: Torque Reference(internal) 15: External terminal 13 input voltage 16: External terminal 14 input voltage 17: External terminal 16 input voltage 18: Motor secondary current 19: Motor excitation current 20: Primary frequency after SFS 21: ASR Input 22: ASR Output 23: Speed deviation 26: Voltage Reference (Vq) 27: Voltage Reference (Vd) 31: Not Used 32: ACR(q) Output 33: ACR(d) Output 50: Iq Monitor 51: Weight	0 - 33	2	X	X	X
H4-02	Term 21 Gain	Terminal 21 Gain	0.00 - 2.50	1.00	X	X	X
H4-03	Term 21 Bias	Terminal 21 Bias	-10.0 to 10.0	0.0	X	X	X
H4-04	Term 23 Sel	Analog Output Terminal 23 Selection (same as H4-01)	0 - 33	3	X	X	X
H4-05	Term 23 Gain	Terminal 23 Gain	0.00 - 2.50	.50	X	X	X
H4-06	Term 23 Bias	Terminal 23 Bias	-10.0 to 10.0	0.0	X	X	X
H4-07	AO Level Select	Analog output signal level 0: 0 - 10V 1: -10 to 10V	0 - 1	0	X	X	X

H4 Analog Outputs

The VG5 is designed with 2 analog outputs for connection to external devices for monitoring various drive conditions. These outputs are a multi-function type, allowing various drive parameters to be selected for outputs. The output signals may be set for 0-10VDC or -10 to +10VDC, as well as a gain or bias applied for fine tuning of the output signal level.

3.7 Terminal Parameters - Group H

3.7.5 Serial Communication Setup

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H5-01	Serial Comm Adr	Serial Communication address selection	0 - 1F	1F	X	X	X
H5-02	Serial Baud Rate	Serial Communications Baud Rate selection 0: 1200 Baud 1: 2400 Baud 2: 4800 Baud 3: 9600 Baud 4: 19200 Baud	0 - 4	3	X	X	X
H5-03	Serial Comm Sel	Serial Communication selection 0: No Parity 1: Even Parity 2: Odd Parity	0 - 2	0	X	X	X
H5-04	Serial Fault Sel	Communication failure action 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only	0 - 3	3	X	X	X
H5-05	Serial Flt Dtct	Serial Fault detection for time over 0: Disable 1: Enable	0 - 1	1	X	X	X

3.8 Protection Parameters - Group L

3.8.1 Motor Overload Setup

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L1-01	MOL Fault Select	Electronic motor overload protection selection 0: Disable 1: Coast to Stop	0 - 1	1	X	X	X
L1-02	MOL Time Const	Motor overload time constant	1.0 - 5.0Min	1.0	X	X	0

L1-01 Motor Overload Protection Selection

The VG5 employes an UL recognized overload circuit. This function allows you to disable the overload circuit. Disabling this circuit should be done if multiple motors are controlled from one VG5, with separate overloads rated for the individual motors.

L1-02 Motor Overload Protection Time Constant

This function allows you to set the time constant or time to trip level of the electronic overload. The time setting is the time the VG5 will allow 150% operation before tripping on an OL1 fault. This value is factory set at 150% for 1min, if your motor has different overload characteristics, this time may be changed.

3.0 Programming

3.8 Protection Parameters - Group L

3.8.2 Reference Detection Circuit

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L4-01	SPD Agree Level	Speed Agreed detection level	0.0 - 400.0 Hz	0	X	X	X
L4-02	SPD Agree Width	Speed Agreed detection width	0.0 - 20.0 Hz	2.0	X	X	X
L4-03	SPD Agree Lvl ±	Speed Agreed detection level with sign	0.0 - ± 400.0 Hz	0	X	X	X
L4-04	SPD Agree Width ±	Speed Agreed detection width with sign	0.0 - ± 20.0 Hz	2.0	X	X	X

3.8.3 Fault Reset Circuit

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L5-01	Num of Restarts	Number of automatic restart attempts	0 - 10	0	X	X	X
L5-02	Restart Sel	Fault Relay action at Restart 0: No Fault Relay 1: Fault Relay Active	0 - 1	0	X	X	X

L5 Fault Restart Circuit

The VG5 may be programmed to automatically reset a fault and continue operation. This function is used to prevent nuisance faults. However, this function should be used with caution, as not to damage the inverter. If faults are occurring, insure that the faults are not actual problems that need to be corrected. The fault reset function is effective with the following faults.

- OC (Overcurrent)
- OV (Overvoltage)
- UV1 (Undervoltage)
- OL2 (Inverter Overload)
- OL4 (Overtorque)
- GF (Ground Fault)
- LF (Output Phase Loss)
- OL1 (Motor Overload)
- OL3 (Overtorque)

The number of restart attempts is set in L5-02, determining how many retry attempts to clear a fault is allowed. Again, use caution when setting this value as not to damage the VG5. The fault restart count is cleared in the following cases.

- When operation is normal, no faults, for 10 minutes.
- When power is cycled.

3.8 Protection Parameters - Group L

3.8.4 Torque Detection Circuit

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L6-01	Torq Det 1 Sel	Torque Detection 1 Selection 0: Disabled 1: Alarm at Speed 2: Alarm at Run 3: Fault at Speed 4: Fault at Run	0 - 4	0	X	X	X
L6-02	Torq Det 1 Lvl	Torque Detection 1 Level	0 - 300%	150	X	X	X
L6-03	Torq Det 1 Time	Torque Detection 1 Time	0.0 - 10.0Sec	0.1	X	X	X
L6-04	Torq Det 2 Sel	Torque Detection 2 Selection 0: Disabled 1: Alarm at Speed 2: Alarm at Run 3: Fault at Speed 4: Fault at Run	0 - 4	0	X	X	X
L6-05	Torq Det 2 Lvl	Torque Detection 2 Level	0 - 300%	150	X	X	X
L6-06	Torq Det 2 Time	Torque Detection 2 Time	0.0 - 10.0Sec	0.1	X	X	X

L6-01 Torque Detection 2 Selection

This function enables or disables an output torque monitoring circuit. This circuit may be programmed to detect a set value of output torque.

L6-02 Torque Detection 2 Level

This function sets the level that the output torque must be above to activate the overtorque detection circuit.

L6-03 Torque Detection 2 Time

This function sets the time that the output torque must be above the L6-05 level before an overtorque 2 condition is detected.

3.0 Programming

3.8 Protection Parameters - Group L

3.8.4 Torque Detection Circuit

L6-04 Torque Detection 2 Selection

This function enables or disables an output torque monitoring circuit. This circuit may be programmed to detect a set value of output torque.

L6-05 Torque Detection 2 Level

This function sets the level that the output torque must be above to activate the overtorque detection circuit.

L6-06 Torque Detection 2 Time

This function sets the time that the output torque must be above the L6-05 level before an overtorque 2 condition is detected.

3.8 Protection Parameter - Group L

3.8.5 Torque Limits

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L7-01	Torq Limit FWD	Forward Torque Limit	100 - 300%	200	0	X	X
L7-02	Torq Limit REV	Reverse Torque Limit	100 - 300%	200	0	X	X
L7-03	Torq Lmt Fwd Rgn	Forward Regen Torque Limit	100 - 300%	200	0	X	X
L7-04	Torq Lmt Rev Rgn	Reverse Regen Torque Limit	100 - 300%	200	0	X	X

L7 Torque Limits

The VG5 in vector mode, has a torque limit circuit to limit the motor torque in all four quadrants of operation. This value limits the amount of load the crane can lift.

3.8 Protection Parameters - Group L

3.8.6 Hardware Protection Circuit

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L8-02	OH-Pre Alarm Lvl	Overheat alarm level	50 - 130°C	95	X	X	X
L8-03	OH-Pre Alarm Sel	Overheat alarm selection 0: Ramp to Stop 2: Fast Stop 1: Coast to Stop 3: Alarm Only	0 - 3	3	X	X	X
L8-05	Ph Loss In Sel	Input Phase Loss selection 0: Disabled 1: Enabled	0 - 1	1	X	X	X
L8-07	Ph Loss Out Sel	Output Phase Loss selection 0: Disabled 1: Enabled	0 - 1	1	X	X	X

L8-02 Overheat Pre-Alarm Protection

This constant allows you to change the temperature level of the Overheat detection circuit. This function may be used to alarm the user when the ambient temperature is near the value of L8-02.

L8-03 Overheat Pre-Alarm Selection

This function determines the action of the VG5 when the temperature is near L8-02 level.

L8-05 Input Phase Loss Protection

This function simply enables or disables the Input Phase Loss Circuit.

L8-07 Output Phase Loss Protection

This function simply enables or disables the Output Phase Loss Circuit.

NOTE: In both the L8-05 and L8-07 parameters, false trips may occur if the VG5 is applied to a smaller motor than the rating of the VG5. Trips may also occur if the VG5 is lightly loaded.

3.0 Programming

3.9 Operator Parameters - Group O

3.9.1 Monitor Select 1

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
O1-01	User Monitor Sel	Monitor Selection 4: Control Method 5: Motor Speed 6: Output Voltage 7: DC Bus Voltage 8: Output Power 9: Torque Reference 10: Input terminal status 11: Output terminal stus 12: Internal control status 1 13: Elapsed Time 14: Flash Software ID 15: External Terminal 13 Voltage Level 16: External Terminal 14 Voltage Level 17: External Terminal 16 Voltage Level 18: Motor Secondary Current(Iq) 19: Motor Excitation Current(Id) 20: Primary Frequency after SFS 21: ASR Input 22: ASR Output 23: Speed Deviation 25: DI-16H reference 26: Vq Output 27: Vd Output 28: CPU ID number 32: ACR (Q) Output 33: ACR (d) Output 35: Zero Servo Pulse 36: PID I/P 37: PID I/P 38: PID I/P 50: PID I/P	4 - 28	10	X	X	X
O1-02	Power-On Monitor	Monitor Selection after power up 1: Frequency Reference 2: Output Frequency 3: Output Current 4: User Monitor	1 - 4	1	X	X	X
O1-03	Display Scaling	Units for setting and reading frequency	0 - 39999	0	X	X	X
O1-04	Display Units	Sets speed units for all applicable parameters 0: Hz 1: RPM	0 - 1	0	0	0	X
O1-05	Address Display	Parameter Disply selection 0: Parameter No. 1: Modbus Address	0 - 1	0	X	X	X

3.9 Operator Parameters - Group O

3.9.2 Monitor Selection 2

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
O2-03	User Default	User Defined default value setting 0: No Change 1: Set Defaults 2: Clear All	0 - 3	0	X	X	X
O2-04	Inverter Model #	Inverter Model selection	_	_	X	X	X
O2-07	Elapsed Time Set	Elapsed Time setting	H	-	X	X	X
O2-08	Elapsed Time Run	Elapsed Time Meter setting 0: Power On Time 1: Running Time	0 - 1	0	X	X	X
O2-09	Init Mode Sel	Initialization mode setting 0: Japanese 1: American 2: European	0 - 2	1	X	X	X

O2-03 User Defaults Setting

This function is used after you have completed programming of the VG5 for your application. By setting a value of "1", you have now set the default settings to your programmed values instead of the factory defaults. This allows you to do a USER DEFAULT reset in parameter A1-03 to set all parameters back to your settings.

O2-04 Inverter Model Setting

This parameter sets the inverter model you are using. This parameter must be set if you replace the control card, simply enter the VG5's model number located on the right hand side of the unit.

3.0 Programming

3.10 Crane Function - Group P - "C" Series-Traverse and LB Hoist

3.10.1 Crane Set Up 1

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
P1-01	Axis Selection	Axis of motion selection 0: Traverse 1:LB Hoist	0 - 1	0	X	X	X
P1-02	Speed Ref. Sel.	Speed Reference Selection 0: 5 Step Speed 3: 3 Step I/V 1: 3 Step Speed 4: Analog Ref. 2: 2 Step I/V 5: Serial Ref.	0 - 5	0	X	X	X
P1-03	Pushbutton Fault	Pushbutton fault detection 0: Disable 1: Enable	0 - 1	0	X	X	X
P1-04	Plug Reverse	Plug Reverse 0: Disable 1: Enable	0 - 1	0	X	X	X
P1-05	Brake Rel. Time	Brake Release Time	0.00 - 10.00Sec	0.00	X	X	X
P1-06	Brake Set Delay	Brake Set Delay Time	0.00 - 10.00Sec	0.00	X	X	X
P1-07	Micro Speed Gain	Micro Speed Gain Value	0 - 100%	10%	X	X	X
P1-08	TL Detect Torque	Turbo-Lift Detect Torque value	0 - 300%	20%	X	X	X
P1-09	Turbo Lift Time	Turbo - Lift Time value	0.00 - 3.00Sec	0.2	X	X	X
P1-10	Trq Limit Gain	Torque Limit Gain value	0 - 255%	100%	X	X	X

P1-01 Axis Selection

This function selects which axis of travel on which the VG5 will be operating. This also determines which parameters in the P1 Group that will be active. For example if the Traverse Axis is selected, you will not have access to the Turbo-Lift parameters.

P1-02 Speed Reference Selection

This function selects the type of speed control method your application requires. This parameter automatically sets up the multi-function inputs(H1 parameters). DO NOT SELECT ANY MULTI-SPEED SETTINGS IN THE H1 PARAMETERS. Simply select the speed method desired and wire per the following graphs. The multi-function input available for programming is determined by the speed method that is selected.

Example: If P1-02 = 3(3 Step I/V), then terminals 1,2,3 and 4 are reserved for speed control. Terminals 5,6,7 and 8 are available for multi-function programming, for such features as Micro-Speed or Turbo Lift.

3.10 Crane Function - Group P - "C" Series - Traverse and LB Hoist

3.10.1 Crane Set Up 1

5 - Step Speed

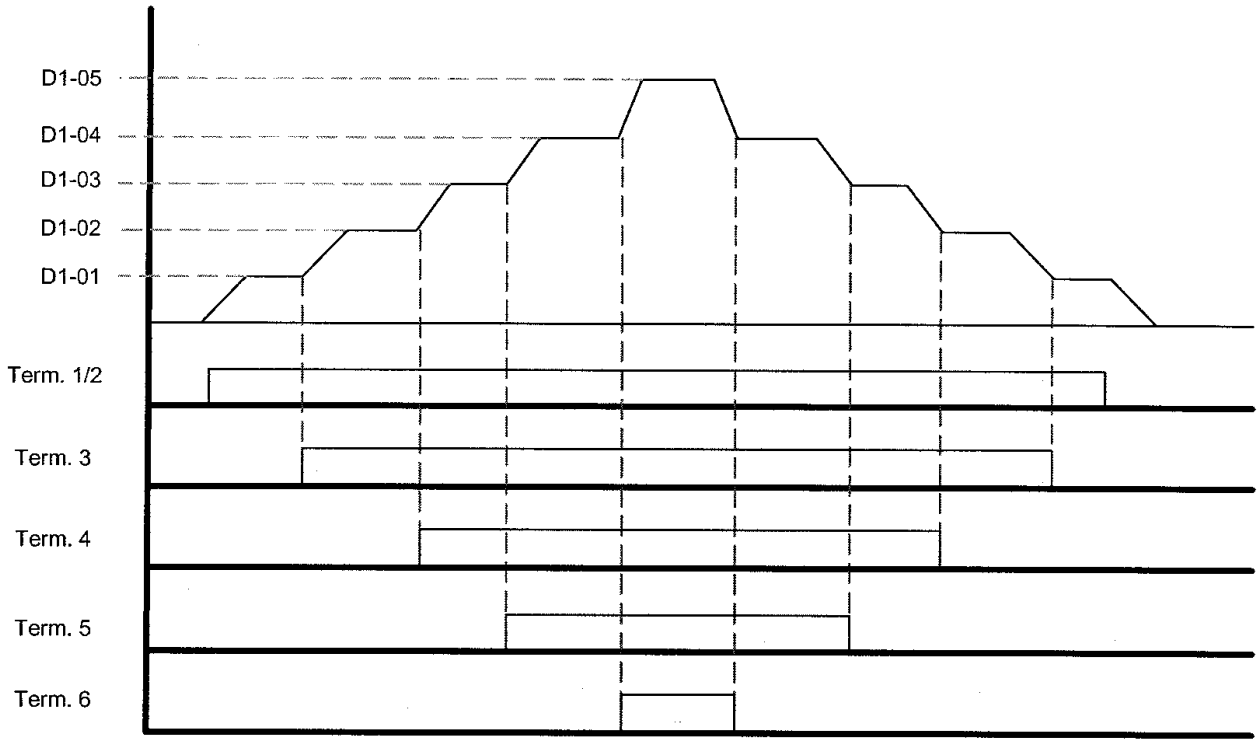


Fig. 25

3 - Step Speed

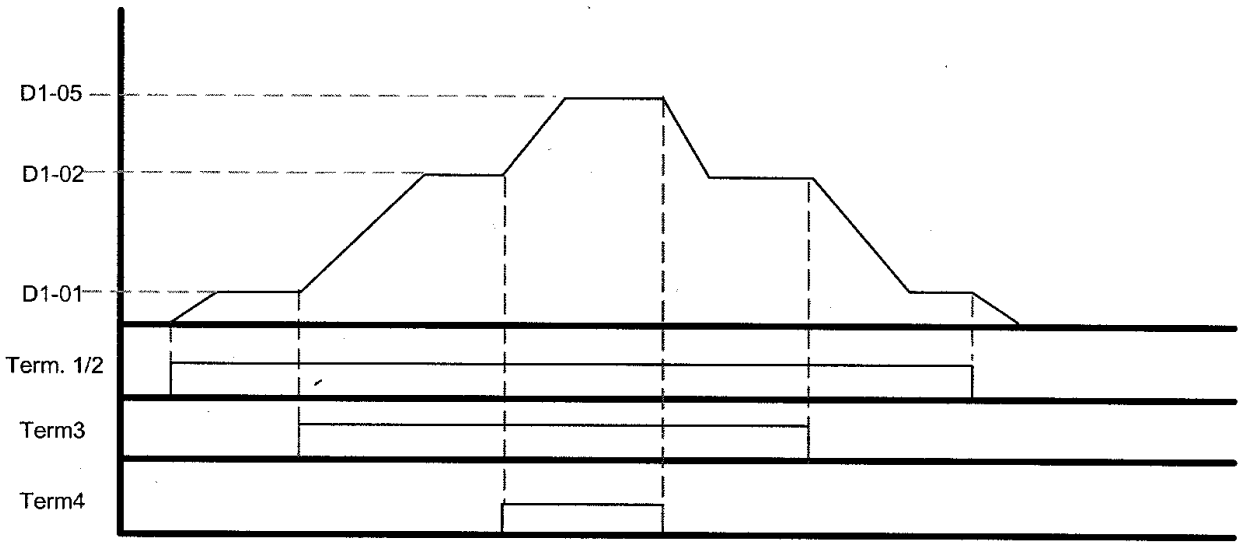


Fig. 26

3.0 Programming

3.10 Crane Function - Group P - "C" Series - Traverse and LB Hoist

3.10.1 Crane Set Up 1

2 - Step I/V

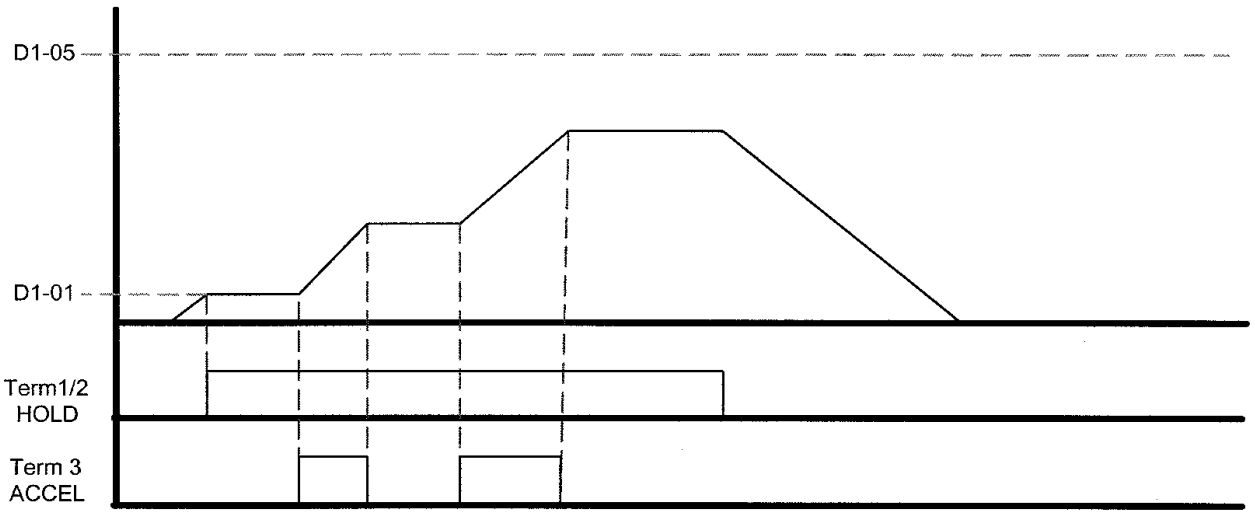


Fig. 27

3 - Step I/V

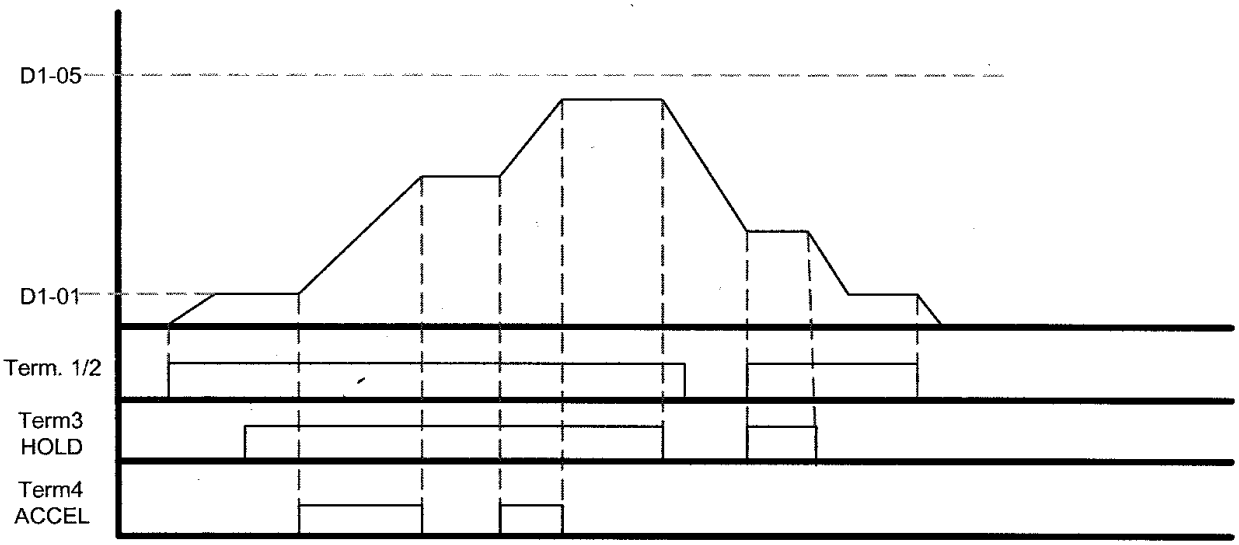


Fig. 28

3.10 Crane Function - Group P - "C" Series - Traverse and LB Hoist

3.10.1 Crane Set Up 1

P1-03 Pushbutton Wiring Fault
This function is used with a pendant station type control, to detect an out of sequence input. An out of sequence input indicates a wiring mistake.

P1-04 Plug Reverse
This function is only available in the Traverse axis. This allows you to rapidly reverse directions without setting the brake. When plug reverse is enabled, and a direction change is commanded, the VG5 will decel and accel in the time settings of C1-03 and C1-04.

P1-05 Brake Release Time
This function sets the amount of time delay before the brake release command is activated when the start command is received. This function may be used to generate motor torque before the brake is released.

P1-06 Brake Set Delay Time
This function is only available in the Traverse axis. This allows the crane to be stopped and restarted without setting the brake.

P1-07 Micro Speed Gain
This function is available when a multi-function input is programmed to a value of "84". This function allows the VG5 to run at a percentage of your normal speed reference for precise positioning.

P1-08 Turbo-Lift Detect Torque
This function is only available in the LB Hoist axis. It is available when a multi-function input is programmed to a value of "80". This function allows the VG5 to overspeed the motor when the load is below the value of P1-08. The amount of overspeed is determined by the value of E1-04.

P1-09 Turbo-Lift Time
This function works in conjunction with parameter P1-08, setting the amount of time that the torque must be below the value of P1-08 before the Turbo-Lift function is activated. This time ensures that the Hoist is truly unloaded.

P1-10 Torque Limit Gain
This function is only available in LB Hoist axis. This function is activated by programming a multi-function input to a value of "83". This parameter is used for load certification tests.

3.0 Programming

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist

3.11.1 Crane Set Up 1

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
P1-01	Torque Value	Proving Torque value	0 - 255%	100%	0	0	X
P1-02	Speed Ref. Sel.	Speed Reference Selection 0: 5 Step Speed 3: 3 Step I/V 1: 3 Step Speed 4: Analog Ref. 2: 2 Step I/V 5: Serial Ref.	0 - 5	0	0	0	X
P1-03	Pushbutton Fault	Pushbutton fault detection 0: Disable 1: Enable	0 - 1	0	0	0	X
P1-04	LC PG Count	Load Catch PG Counter	10 -10000	10	0	0	X
P1-05	Load Catch Time	Load Catch Time	0.00-9.99	0.10	0	0	X
P1-06	LD Float T. MS	Load Float Time during Micro-Speed	0.01 - 60.00Sec	2.00	0	0	X
P1-07	Micro Speed Gain	Micro Speed Gain Value	0 - 255%	10%	0	0	X
P1-08	TL Detect Torque	Turbo-Lift Detect Torque value	0 - 300%	50%	0	0	X
P1-09	Turbo Lift Time	Turbo - Lift Time value	0.00 - 3.00Sec	1.00	0	0	X
P1-10	Trq Limit Gain	Torque Limit Gain value	0 - 255%	100%	0	0	X

P1-01 Proving Torque Value

Sets the amount of output torque that must be developed before the Brake Release command is activated.

P1-02 Speed Reference Selection

This function selects the type of speed control method your application requires. This parameter automatically sets up the multi-function inputs(H1 parameters). DO NOT SELECT ANY MULTI-SPEED SETTINGS IN THE H1 PARAMETERS. Simply select the speed method desired and wire per the following graphs. The multi-function input available for programming is determined by the speed method that is selected.
Example: If P1-02 = 3(3 Step I/V), then terminals 1,2,3 and 4 are reserved for speed control. Terminals 5,6,7 and 8 are available for multi-function programming, for such features as Micro-Speed or Turbo Lift.

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist

3.11.1 Crane Set Up 1

5 - Step Speed

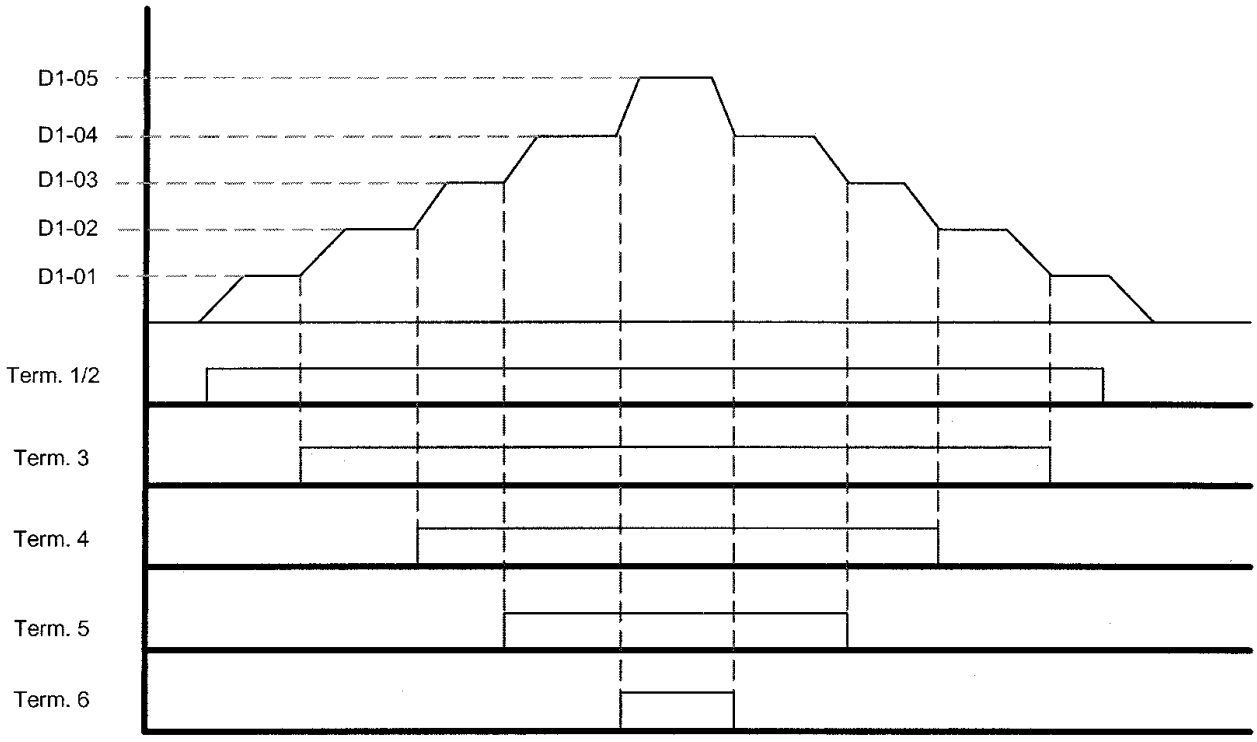


Fig. 29

3 - Step Speed

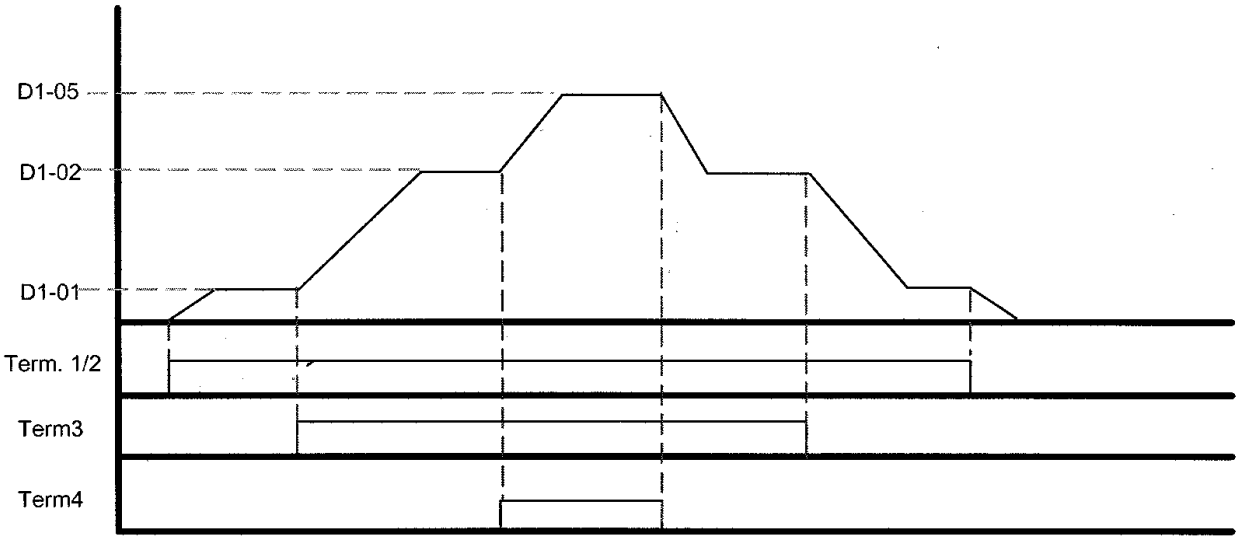


Fig. 30

3.0 Programming

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist

3.11.1 Crane Set Up 1

2 - Step I/V

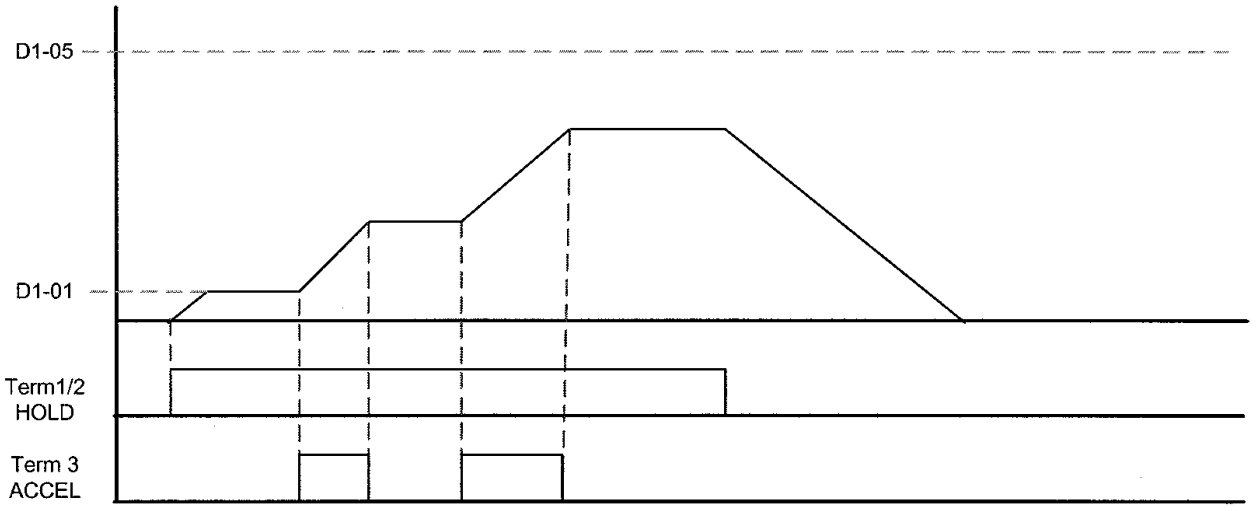


Fig. 31

3 - Step I/V

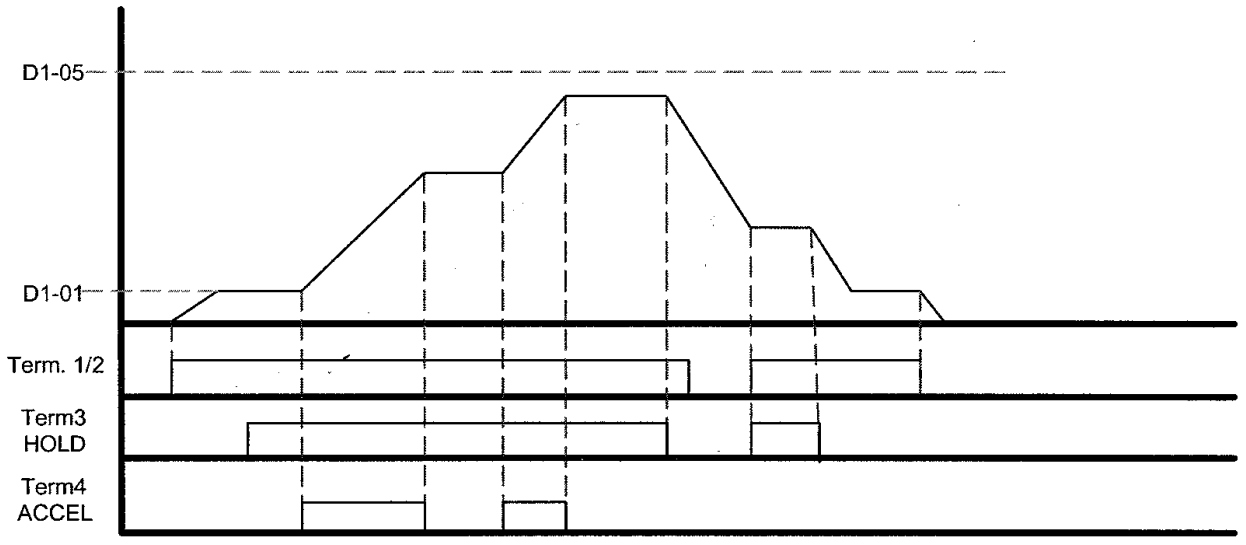


Fig. 32

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist

3.11.1 Crane Set Up 1

P1-03 Pushbutton Wiring Fault

This function is used with a pendant station type control, to detect an out of sequence input. An out of sequence input indicates a wiring mistake.

P1-04 Load Catch™ PG Counter

Load Catch™ is an exclusive feature of the Cranetrol VG5 Crane Control inverter. This function constantly monitors the motors encoder pulses while not in operation. When enabled by the Multi-function input, the VG5 will detect PG pulses and enable the drive to hold the load and activate an output alarm. The VG5 can be moved to a safe position and reset. This parameter sets the level of PG counts before Load Catch™ is enabled.

P1-05 Load Catch™ Time

This parameter selects the dwell time after the P1-04 value is reached before the Load Catch™ is enabled.

P1-06 Load Float Timer during Micro-Speed

Sets the load float maximum time during Micro-Speed operation.

P1-07 Micro Speed Gain Value

This function is available when a multi-function input is programmed to a value "84". This function allows the VG5 to run at a percentage of your normal speed reference for precise positioning.

P1-08 Turbo-Lift Detect Torque

This function is available when a multi-function input is programmed to a value of "80". This function allows the VG5 to overspeed the motor when the load is below the value set in P1-08. The amount of overspeed is determined by the value of E1-04.

P1-09 Turbo Lift Time

This function works in conjunction with parameter P1-08, setting the amount of time that the torque must be below the value of P1-08 before the Turbo-Lift function is activated. This time ensures that the Hoist is truly unloaded.

P1-10 Torque Limit Gain

This function is activated by programming a multi-function input to a value of "83". This parameter is used for load certification tests.

3.0 Programming

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist

3.11.2 Crane Set Up 2

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
P2-01	Start Reference	Starting Reference	0 - 10%	1%	0	0	X
P2-02	Proving Time	Proving Torque Time limit value	0.01 - 3.00 Sec	3.00	0	0	X
P2-03	Brake Rel Time	Brake Release Time	0.00 - 3.00 Sec	0.30	0	0	X
P2-04	Brake Slip	Brake Slip Fault Action 0: Fault Drive 1: Alarm Only	0 - 1	1	0	0	X
P2-05	Brake Slip Count	Brake Slip PPR Count	10 - 10000 PPR	100	0	0	X
P2-06	Load Float Time	Load Float Time	0.01 - 60.00 Sec	10.0	0	0	X
P2-07	Brake Set Time	Brake Mechanical Set Time	0.01 - 3.00 Sec	0.30	0	0	X
P2-08	Brake Check Time	Brake Check Time	0.01 - 3.00 Sec	0.50	0	0	X
P2-09	Brake Check Trq.	Brake Check Torque value	0 - 300%	50	0	0	X
P2-10	Auto Ana/Dig	Automatic Analog / Digital Reference Switch 0: Disabled 1: Enabled	0 - 1	0	0	0	X

P2-01 Start Reference

This function applies a positive reference output when a start command is used. This reference generates the output proving torque. No adjustment is necessary.

P2-02 Proving Time

This function sets a limit on the amount of time that the output torque must reach the level in P1-01. If the output torque does not reach the level in P1-01, within the time value of P2-02, the VG5 will trip on a PTO (Proving Time Over) fault.

P2-03 Brake Release Time

This function sets a delay time between the time that the output torque has reached the level in P1-01 and the brake release command is given.

P2-04 Brake Slip Fault Action

This function determines the action of the VG5 when a Brake Slip condition is detected, a fault or an alarm.

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist

3.11.2 Crane Set Up 2

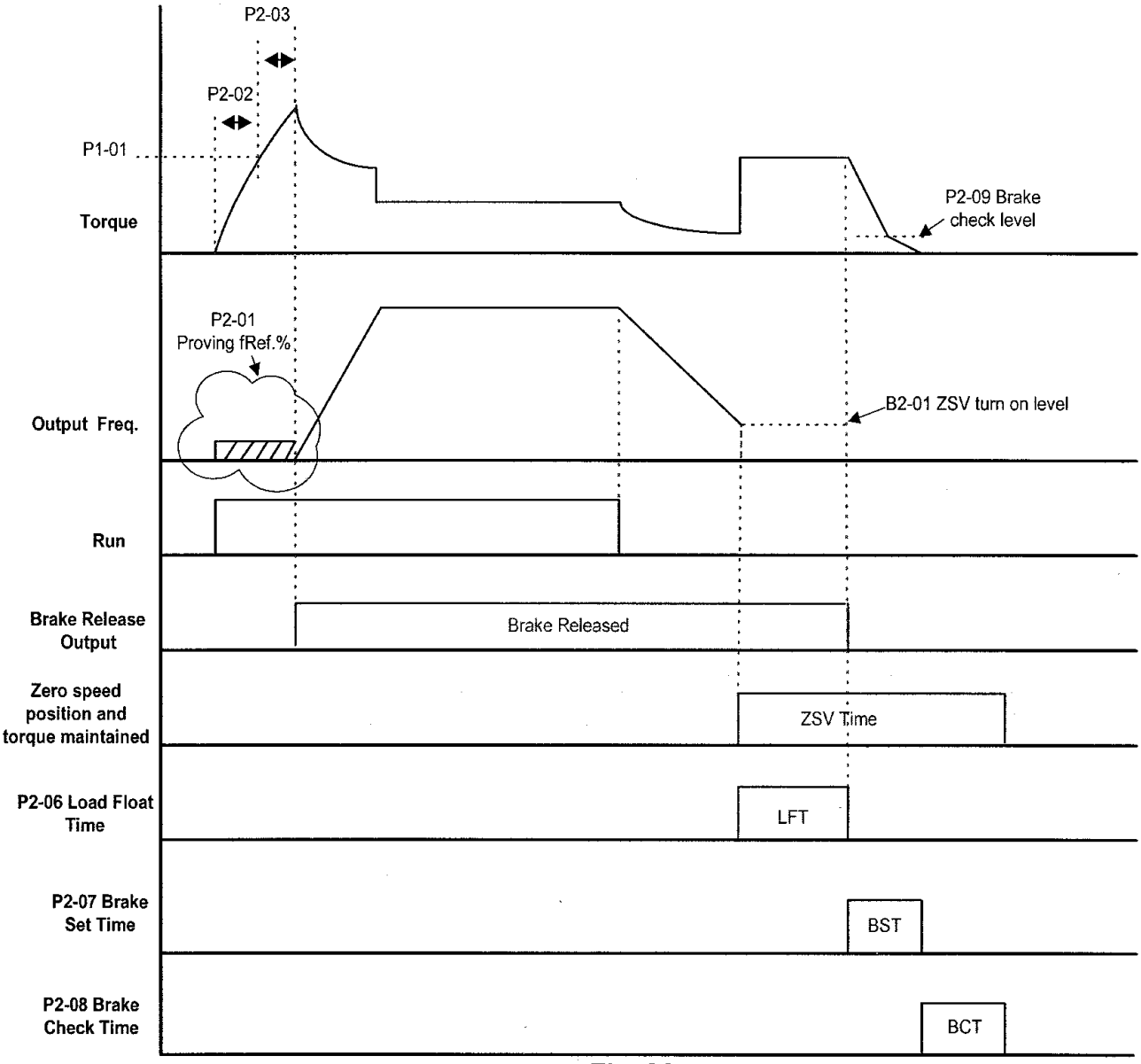


Fig. 33

The above figure reflects the P Group Parameters and their functions during the Start/Stop sequence.

3.0 Programming

3.11 Crane Function - Group P - "CH" Series - No Load Brake Hoist
3.11.2 Crane Set Up 2

P2-05 Brake Slip Pulse Count

The VG5 will detect any movement in the motor shaft before the brake release command is given, during the initial start command. Shaft movement before the brake command is given indicates that the brake is not properly adjusted. This function sets the amount of slip that is permissible before a brake slip fault is given. This value is set in PPR(pulse per revolution) count.

P2-06 Load Float Time

This function sets the amount of time that the VG5 will maintain zero speed and 100% torque during the stop sequence before setting the brake. The Load Float function allows the repositioning of the load after a stop command without going through the brake sequence.

P2-07 Mechanical Brake Set Time

This function sets the time it takes for the brake to mechanically set.

P2-08 Brake Check Time

This function sets the amount of time that the VG5 checks to see if the brake has actually set.

P2-09 Brake Check Torque Value

This function sets the output torque level that the motor must be below in order for the VG5 to shut off.

Parameters P2-07 thru P2-09 are designed to verify if the brake has mechanically set after a stop command. Parameter P2-07 sets the time allowed for the brake to mechanically close, during this time the VG5 maintains zero speed and 100% torque. After the time value in P2-07 has elapsed, the VG5 will monitor output torque for the time set in P2-08. If the output torque level is below the P2-09 level the VG5 will shut off. However, if the output torque is above the P2-09 level, indicating that the brake is not supporting the load, the VG5 will maintain zero speed and 100% torque and output a BRK CK alarm. The run command is active in this alarm mode, allowing repositioning of the load to a safe position for servicing the brake.

3.11 Crane Function - Group P- "CH" Series No Load Brake Hoist
3.11.2 Crane Set Up 2

Brake Check flow chart during the Stop Sequence

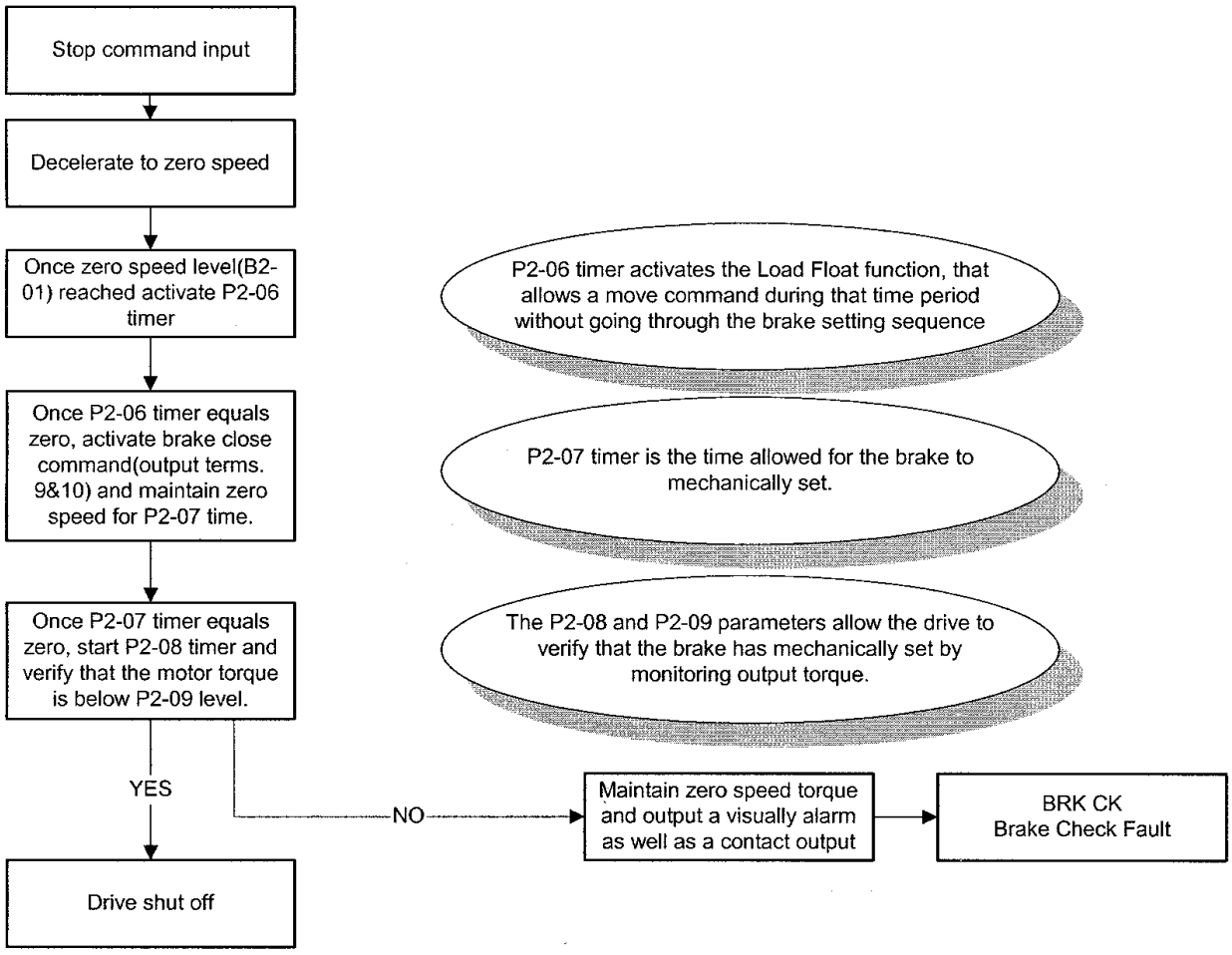
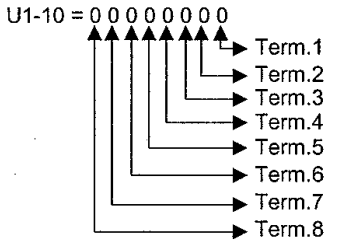
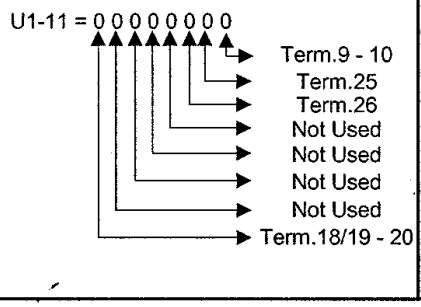


Fig. 34

4.0 Parameter List

U1 - Monitor

No.	Display	Description	Multi-function analog output levels	Min. Units	Mode		
					V/F	OLV	FV
U1-01	Frequency Ref	Input Frequency(speed) reference	0 - 10V -10 - +10V	0.01 Hz	X	X	X
U1-02	Output Freq.	Output Frequency(speed) reference	0 - 10V -10 - +10V	0.01 Hz	X	X	X
U1-03	Output Current	Output motor current	0 - 10V	0.1A	X	X	X
U1-04	Control Method	Displays the control method that the VG5 is operating	_	-	X	X	X
U1-05	Motor Speed	Output motor speed based on PG feedback	0 - 10V -10 - +10V	0.01 Hz	0	0	X
U1-06	Output Voltage	Displays the output voltage to the motor	0 - 10V	0.1V	X	X	X
U1-07	DC Bus Voltage	DC Bus voltage level	0 - 10V	1V	X	X	X
U1-08	Output kWatts	Displays the output kW(Power)	0 - 10V -10 - +10V	0.1 kW	X	X	X
U1-09	Torque Reference	Displays the internal torque reference value	0 - 10V -10 - +10V	0.1%	0	0	X
U1-10	Input Term Sts		Can't be ouptut	-	X	X	X
U1-11	Output Term Sts		Can't be output	-	X	X	X

The monitor parameters 10,11 and 12 are used to determine the status of the input and output terminals of the VG5 as well as the operation status. The eight digit display will show a "0" for OFF and "1" for On status. This function allows easy troubleshooting of the VG5's input and output commands without removing the cover or using measurement instruments.

4.0 Parameter List

U1 - Monitor

No.	Display	Description	Multi-function analog output levels	Min. Units	Mode		
					V/F	OLV	FV
U1-12	Int Ctl Sts	VG5 operation status U1-12 = 0 0 0 0 0 0 0 0 Running Zero Speed Reverse Reset Input Speed Agree VG5 Ready Minor Fault Major Fault	Can't be ouptut	-	X	X	X
U1-13	Elapsed Time	Displays VG5's elapsed operating time.	Can't be output	1Hr	X	X	X
U1-14	Flash ID	Displays the Software Number	Can't be output	-	X	X	X
U1-15	Term 13 level	Displays the signal level of terminal 13	0 - 10V -10 - +10V	0.1%	X	X	X
U1-16	Term 14 level	Displays the signal level of terminal 14	0 - 10V	0.1%	X	X	X
U1-17	Term 16 level	Displays the signal level of terminal 16	0 - 10V -10 - +10V	0.1%	X	X	X
U1-18	Mot SEC Current	Displays the motors secondary current.This value represents the output torque level.	0 - 10V	0.1%	X	X	X
U1-19	Mot EXC Current	Displays the motors excitation current.	0 - 10V	0.1%	0	X	X
U1-20	SFS output	Displays the internal frequency reference, without the compensation functions.	0 - 10V -10 - +10V	0.01Hz	X	X	X
U1-21	ASR input	Displays the input to the speed control loop.	0 - 10V -10 - +10V	0.01%	0	0	X
U1-22	ASR output	Displays the output from the speed control loop.	0 - 10V -10 - +10V	0.01%	0	0	X
U1-23	Speed Deviation	Displays the speed deviation	0 - 10V -10 - +10V	0.01%	0	0	X
U1-24	PID Feedback	Displays the PID value.	0 - 10V -10 - +10V	0.01%	X	X	X
U1-25	DI-16 Reference	Displays the DI-16 option card reference	Can't be output	-	X	X	X
U1-26	Voltage Ref (Vq)	Displays the seconday output voltage	0 - 10V -10 - +10V	0.01%	0	X	X
U1-27	Voltage Ref (Vd)	Displays the excitation output voltage	0 - 10V -10 - +10V	0.01%	0	X	X
U1-28	CPU ID	Displays the CPU number	Can't be output	-	X	X	X
U1-32	ACR(q) Output	Displays the ACR output to the motors secondary	0 - 10V	0.1%	0	X	X
U1-33	ACR(d) Output	Displays the ACR output to the motors excitation circuit	0 - 10V	0.1%	0	X	X
U1-34	OPE Detect		-	-	X	X	X
U1-51	Revision Code						

4.0 Parameter List

U2 - Fault Trace

No.	Display	Description	Min. Units	Mode		
				V/F	OLV	FV
U2-01	Current Fault	Displays current fault	-	X	X	X
U2-02	Last Fault	Displays the last fault	-	X	X	X
U2-03	Frequency Ref.	Displays frequency reference at fault	0.01Hz	X	X	X
U2-04	Output Freq.	Displays the output frequency at fault	0.01Hz	X	X	X
U2-05	Output Current	Displays the output current at fault	0.1A	0	0	X
U2-06	Motor Speed	Displays the motor speed at fault	0.01Hz	0	X	X
U2-07	Output Voltage	Displays the output voltage at fault	0.1V	X	X	X
U2-08	DC Bus Voltage	Displays the DC Bus voltage at fault	1V	X	X	X
U2-09	Output kWatts	Displays the output power at fault	0.1kW	X	X	X
U2-10	Torque Reference	Displays the torque reference at fault	0.1%	0	X	X
U2-11	Input Term Sts	Displays the input terminal status at fault. (Same os U1-10)	-	X	X	X
U2-12	Output Term Sts	Displays the output terminal status at fault. (Same as U1-11)	-	X	X	X
U2-13	Inverter status	Displays the VG5 operating status at fault (Same as U1-12)	-	X	X	X
U2-14	Elapsed Time	Displays Elapsed time at fault	1Hr	X	X	X

The Fault Trace function displays the Current Fault and the Last Fault, as well as 12 Monitor Parameters containing drive operation information at the time of the fault. This function is very useful in troubleshooting the cause/solution of the fault condition.

NOTE: When a CPF00,01,02,03, UV1 and UV2 occur, a fault trace is not performed.

U3 - Fault History

No.	Display	Description	Min. Units	Mode		
				V/F	OLV	FV
U3-01	Last Fault	Displays most recent fault	-	X	X	X
U3-02	Fault Message 2	Displays the second to last fault	-	X	X	X
U3-03	Fault Message 3	Displays the third to last fault	-	X	X	X
U3-04	Fault Message 4	Displays the forth to last fault	-	X	X	X
U3-05	Elapsed Time 1	Displays the elapsed time of the last fault	1Hr	X	X	X
U3-06	Elapsed Time 2	Displays the elapsed time of the second to last fault	1Hr	X	X	X
U3-07	Elapsed Time 3	Displays the elapsed time of the third to last fault	1Hr	X	X	X
U3-08	Elapsed Time 4	Displays the elapsed time of the forth to last fault	1Hr	X	X	X

The Fault History function provides a record of the last 4 faults that has occurred, first in first out, as well as a "time stamp" of when the fault occurred. The 4 faults are listed in order from most recent to least recent, parameters U3-01 - U3-04. The 4 elapsed times are listed in order with respect to the Fault messages, U3-05 - U3-08.

Notes

4.0 Parameter List

Initialize

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
A1-01	Access Level	Parameter Access Level 0: Operator 1: User Level 2: Quick Start Level 3: Basic Level 4: Advanced	0 - 4	1	X	X	X
A1-02	Control Method	Determines Control Method 0: V/F Mode 2: Open Loop Vector 3: Flux Vector		*			
A1-03	Init Parameters	Resets parameters 0: No Initialize 1110: User Default 2220: Factory Default	0 - 2220	0	X	X	X
A1-04	Enter Password	Password setting	0000-9999	0	X	X	X
A2-01 - A2-32	User Constants	User selected parameters. Program selected parameters here, and set to User Level.	Parameter No.		X	X	X

*CH Series = 3 C Series = 0

B2

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
B2-01	DCInj Start Freql	DC Injection braking Start Frequency	0.0 - 10.0Hz	**	X	X	X
B2-02	DCInj Current	DC Braking Current Level	0 - 100%	50	X	X	0
B2-03	DCInj Time@ Start	DC Injection Time duration at start	0.00 - 10.0 Sec	0.00	X	X	X
B2-04	DCInj Time@ Stop	DC Injection Time duration at Stop	0.00-10.0 Sec	0.00	X	X	X

**Series Dependent

4.0 Parameter List

B7

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
B7-01	Droop Quantity	Droop control gain	0.0 - 100.0%	0.0	O	O	X
B7-02	Droop Delay Time	Droop control delay time	0.03 - 2.00 Sec	0.05	O	O	X

C1

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C1-01	Accel Time 1	Acceleration Time 1	0.00 - 6000.0 Sec	3.0	X	X	X
C1-02	Decel Time 1	Deceleration Time 1	0.00 - 6000.0 Sec	3.0*	X	X	X
C1-03	Accel Time 2	Acceleration Time 2	0.00 - 6000.0 Sec	10.0	X	X	X
C1-04	Decel Time 2	Deceleration Time 2	0.00 - 6000.0 Sec	10.0	X	X	X
C1-05	Accel Time 3	Acceleration Time 3	0.00 - 6000.0 Sec	10.0	X	X	X
C1-06	Decel Time 3	Deceleration Time 3	0.00 - 6000.0 Sec	10.0	X	X	X
C1-07	Accel Time 4	Acceleration Time 4	0.00 - 6000.0 Sec	10.0	X	X	X
C1-08	Decel Time 4	Deceleration Time 4	0.00 - 6000.0 Sec	10.0	X	X	X
C1-09	Fast Stop Time	Fast Stop Time	0.00 - 6000.0 Sec	10.0	X	X	X
C1-10	Acc/Dec Units	Accel / Decel Time Settings Units **0**: C1-01 - C1-09 setting range is in units of 0.01 seconds (setting range - 0.00 - 600.00) **1**: C1-01 - C1-09 setting range is in units of 0.1 seconds (setting range - 0.0 - 600.0)	0 - 1	1	X	X	X
C1-11	Acc/Dec SW Freq	Accel / Decel Time Switching Frequency	0.0 - 400.0Hz	0.0	X	X	X

*CH = 1.5 C = 3.0

4.0 Parameter List

C2

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C2-01	SCrv Acc @ Start	S-curve time at start of Accel ramp	0.00 - 2.5 Sec	0.20	X	X	X
C2-02	SCrv Acc @ End	S-curve time at end of Accel ramp	0.00 - 2.5 Sec	0.20	X	X	X
C2-03	SCrv Dec @ Start	S-curve time at start of Decel ramp	0.00 - 2.5 Sec	0.20	X	X	X
C2-04	SCrv Dec @ End	S-curve time at end of Decel ramp	0.00 - 2.5 Sec	0.00	X	X	X

4.0 Parameter List

C3

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
C3-01	Slip Comp Gain	Slip Compensation Gain	0.0 - 2.5	*	X	X	X
C3-02	Slip Comp Time	Slip compensation primary delay time	0 - 10000 msec	200	X	X	0
C3-03	Slip Comp Limit	Slip compensation limit	0 - 250 %	200	X	X	0
C3-04	Slip Comp Regen	Slip compensation during regeneration 0: Disabled 1: Enabled	0 - 1	0	X	X	0
C3-05	Flux Select	Flux calculation method 0: After compensation 1: Before compensation	0 - 1	0	0	X	0
C3-06	Output V Limit	Output voltage limit 0: Disable 1: Enable	0 - 1	0	0	X	X

C4

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C4-01	Torq Comp Gain	Torque Compensation Gain	0.00 - 2.50	1.00	X	X	0
C4-02	Torq Comp Time	Torque Compensation time constant	0 - 10000 msec	20	X	X	0

C5

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C5-01	ASR P Gain 1	ASR Proportional Gain 1	1.00 - 300.00	20.0	0	0	X
C5-02	ASR I Time1	ASR Integral Time 1	0.000 - 10.0 Sec	0.1	0	0	X
C5-03	ASR P Gain 2	ASR Proportional Gain 2	1.00 - 300.00	20.0	0	0	X
C5-04	ASR I Time2	ASR Integral Time 2	0.000 - 10.0 Sec	0.5	0	0	X
C5-05	ASR Limit	ASR Limit	0.0 - 200.0 %	5.0	0	0	X
C5-06	ASR Delay Time	ASR Output Primary Delay Time	0.000 - 0.500 Sec	0.004	0	0	X
C5-07	ASR Gain SW Freq.	Frequency level for changing ASR Gain	0.0 - 400.0 Hz	0.0	0	0	X
C5-08	ASR I Limit	Selects ASR Limit Level	0 - 400.%	400	0	0	X

4.0 Parameter List

C6

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C6-01	Carrier Freq Max	Carrier Frequency upper limit	0.4 - 15.0 kHz	*	X	X	X
C6-02	Carrier Freq Min	Carrier Frequency lower limit	0.4 - 15.0 kHz	*	X	0	0
C6-03	Carrier Freq Gain	Carrier Frequency proportional gain	0 - 99	0	X	0	0

C7

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C7-01	Hunt Prev Select	Hunting Prevention selection 0: Disabled 1: Enabled	0 - 1	1	X	0	0
C7-02	Hunt Prev Gain	Hunting Prevention gain	0.00 - 2.5	1.00	X	0	0

C8

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
C8-08	AFR Gain	Automatic Frequency Regulator Adjustment	0.00 - 10.00	1.00	0	X	0
C8-30	Carrier in Tune	Carrier Frequency during Auto-Tune 0: 2kHz 1: C6-01	0 - 1	0	O	X	X

4.0 Parameter List

D1

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
D1-01	Pre-Set Speed 1	Pre-Set Speed 1	0.00 - 120.0 Hz	6.0	X	X	X
D1-02	Pre-Set Speed 2	Pre-Set Speed 2	0.00 - 120.0 Hz	15.0	X	X	X
D1-03	Pre-Set Speed 3	Pre-Set Speed 3	0.00 - 120.0 Hz	30.0	X	X	X
D1-04	Pre-Set Speed 4	Pre-Set Speed 4	0.00 - 120.0 Hz	45.0	X	X	X
D1-05	Pre-Set Speed 5	Pre-Set Speed 5	0.00 - 120.0 Hz	60.0	X	X	X
D1-06		Reserved					
D1-07		Reserved					
D1-08		Reserved					
D1-09		Reserved					

D2

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
D2-01	Ref Upper Limit	Reference upper limit	0.0 - 110.0%	100	X	X	X
D2-02	Ref Lower Limit	Reference lower limit	0.0 - 109.0%	0.0	X	X	X

D3

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
D3-01	Jump Freq 1	Jump frequency reference 1	0.0 - 400.0Hz	0	X	X	X
D3-02	Jump Freq 2	Jump frequency reference 2	0.0 - 400.0Hz	0	X	X	X
D3-03	Jump Freq 3	Jump frequency reference 3	0.0 - 400.0Hz	0	X	X	X
D3-04	Jump Bandwidth	Jump frequency reference bandwidth	0.0 - 20.0Hz	1.0	X	X	X

4.0 Parameter List

E1

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
E1-01	Input Voltage	Input Voltage	155 - 255V 310 - 510V	230 460	X	X	X
E1-02	Motor Selection	0: Std Fan Cooled 1: Std Blower Cooled(Inverter Duty)	0 - 1	0*	X	X	X
E1-03	V/F Selection	V/F Pattern Selection 0: 50 Hz 1: 60Hz Saturation 2: 50Hz Saturation 3: 72 Hz 4: 50Hz Variable Torque1 5: 50Hz Variable Torque2 6: 60Hz Variable Torque1 7: 60Hz Variable Torque2 8: 50Hz High Torque 1 9: 50Hz High Torque 2 A: 60Hz High Torque 1 B: 60Hz High Torque 2 C: 90Hz D: 120Hz E: 180Hz F: User Defined V/F pattern	0 - F	F	X	0	0
E1-04	Max Frequency	Maximum Frequency	50.0 - 400.0Hz	60.0	X	X	X
E1-05	Max Voltage	Maximum Output Voltage	0.0 - 255.0V 0.0 - 510V	230 460	X	X	X
E1-06	Base Frequency	Motor Base Frequency	0.0 - 400.0Hz	60.0	X	X	X
E1-07	Mid Frequency A	Mid Output Frequency A	0.0 - 400.0Hz	3.0	X	X	0
E1-08	Mid Voltage A	Mid Output Voltage A	0.0 - 255.0V 0.0 - 510V	12.0	X	X	0
E1-09	Min Frequency	Minimum Output Frequency	0.00 - 400.0Hz	*	X	X	X
E1-10	Min Voltage	Minimum Output Voltage	0.0 - 255.0V 0.0 - 510V	2.3	X	X	X
E1-11	Mid Frequency B	Mid Output Frequency B	0.0 - 400.0Hz	0.0	X	X	X
E1-12	Mid Voltage B	Mid Output Voltage B	0.0 - 255.0V 0.0 - 510V	0.0	X	X	X
E1-13	Base Voltage	Motor Base Voltage	0.0 - 255.0V 0.0 - 510V	0.0	X	X	X

NOTE: E1-02 Motor selection is dependent on axis of travel

- *Hoist Axis = Default = 1*
- *Travel Axis = Default = 0*

4.0 Parameter List

E2

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
E2-01	Motor Rated FLA	Motor Rated Current	0 - 1500A	*	X	X	X
E2-02	Motor Rated Slip	Motor rated slip frequency	0.00 - 20.00Hz	*	X	X	X
E2-03	No-Load Current	Motor No Load current - Magnatizing Current	0 - 1500A	*	X	X	X
E2-04	Number of Poles	Number of motor poles	2 - 48	4	0	0	X
E2-05	Term Resistance	Motor Terminal Resistance	Ω	*	X	X	X
E2-06	Leak Inductance	Motor Leakage Inductance	0.0 - 30%	*	0	X	X
E2-07	Saturation Comp1	Motor iron core saturation coefficient 1	0.00 - 1.00	*	0	X	X
E2-08	Saturation Comp2	Motor iron core saturation coefficient 2	0.00 - 1.00	*	0	X	X
E2-09	Mechanical Loss	Motor Mechanical Loss	0.0 - 10.0%	*	0	X	X
E2-10	T comp Iron Loss	Motor Iron Loss Torque Compensation	0 - 65535	*	X	0	0

F1

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
F1-05	PG Rotation Sel	PG Rotation 0: CCW Counter Clock Wise 1: CW Clock Wise	0 - 1	0	0	0	X

4.0 Parameter List

F4

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
F4-01	AO Ch1 Select	Analog Output Channel 1 Selection 1: Frequency Reference 2: Output Frequency 3: Output Current 5: Motor Speed 6: Output Voltage 7: DC Bus Voltage 8: Output Power kW 9: Torque Reference(internal) 15: External terminal 13 input voltage 16: External terminal 14 input voltage 17: External terminal 16 input voltage 18: Motor secondary current 19: Motor excitation current 20: Primary frequency after SFS 21: ASR Input 22: ASR Output 23: Speed deviation 24: PID Feedback 26: Voltage Reference (Vq) 27: Voltage Reference (Vd) 31: Not Used 32: ACR(q) Output 33ACR(d) Output	0 - 33	2	X	X	X
F4-02	AO CH1 Gain	Analog output channel 1 gain	0.00 - 2.50	1.0	X	X	X
F4-03	AO CH2 Select	Analog Output Channel 2 Selection Same as F4-01	0 - 33	3	X	X	X
F4-04	AO CH2 Gain	Analog output channel 2 gain	0.00 - 2.50	0.50	X	X	X

4.0 Parameter List

F7

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
F7-01	PO - 36F Select	PO - 36 Output Signal Selection 0: 1 X output frequency 1: 6 X output frequency 2: 10 X output frequency 3: 12 X output frequency 4: 36 X output frequency	0 - 4	1	X	X	X

4.0 Parameter List

H1

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H1-01	Term 3 Sel	Multi-function input terminal 3 selection	0 - 86	3	X	X	X
H1-02	Term 4 Sel	Multi-function input terminal 4 selection	0 - 86	4	X	X	X
H1-03	Term 5 Sel	Multi-function input terminal 5 selection	0 - 86	5	X	X	X
H1-04	Term 6 Sel	Multi-function input terminal 6 selection	0 - 86	6	X	X	X
H1-05	Term 7 Sel	Multi-function input terminal 7 selection	0 - 86	81	X	X	X
H1-06	Term 8 Sel	Multi-function input terminal 7 selection	0 - 86	82	X	X	X
H1-08	Term 1 of DI Card	Multi-function input terminal 1 of DI Card	0-86	0	X	X	X
H1-09	Term 2 of DI Card	Multi-function input terminal 2 of DI Card	0-86	0	X	X	X
H1-10	Term 3 of DI Card	Multi-function input terminal 3 of DI Card	0-86	0	X	X	X
H1-11	Term 4 of DI Card	Multi-function input terminal 4 of DI Card	0-86	0	X	X	X
Multi - function input selections		7: Accel/Decel time 1 B: OH2 Alarm C: Multi-function analog input F: Not used **14: Fault reset** 15: E-Stop 1A: Accel/Decel 2 **1B: Programming lock out** **24 ~ 2F: External Faults** **30: Analog ref./Digital ref. switch** 60: DC Injection braking command 65: KEB command N.C. 66: KEB command N.O. 77: ASR proportional gain switch **80: Turbo Lift command** **81: End of Travel A (EOTA)** **82: End of Travel B (EOTB)** **83: Torque Limit Gain** **84: Micro-Speed** **85: Load Catch** **86: Slack Cable**					

4.0 Parameter List

H2

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H2-01	Term 9 Sel	Multi-function output terminal 9 - 10	0 - 41	40	X	X	X
H2-02	Term 25 Sel	Multi-function output terminal 25 - 27	0 - 41	40	X	X	X
H2-03	Term 26 Sel	Multi-function output terminal 26 - 27	0 - 41	*	X	X	X
Multi-function selections		0: Run 1: Zero Speed 2: Frequency out agree 1 3: Frequency in agree1 4: Frequency detection 1 5: Frequency detection 2 6: Inverter ready 7: DC Bus Overvoltage 8: Baseblock 1 B: Torque Detect 1(N.O.) E: Fault F: Not Used 10: Minor Fault 13: Fref/Fout Agree 2 14: Fref/Fset Agree 2 15: Freq Detect 3 16: Freq Detect 4 17: Torque Detection 1(N.C.) 18: Torque Detection 2(N.O.) 19: Torque Detection 2(N.C.) 1A: Reverse Direction 1D: Regeneration 1E: Restart Enabled 1F: Overload (OL1) 20: Overheat 30: Current/Torque Limit 33: Slack Cable 37: Load Weigh 40: Brake Release 41: Brake Fault 42: Load Catch					

*CH Series = 41 C Series = E

4.0 Parameter List

H3

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
H3-01	Term 13 Sel	Terminal 13 signal level 0: 0 - 10VDC 1: -10 to +10VDC	0 - 1	0	X	X	X
H3-02	Term 13 Gain	Tereminal 13 Gain level	0.0 - 1000.0%	100	X	X	X
H3-03	Term 13 Bias	Terminal 13 Bias Level	-100.0 - 100.0%	0.0	X	X	X
H3-04	Term 16 Signal	Terminal 13 signal level 0: 0 - 10VDC 1: -10 to +10VDC	0 - 1	0	X	X	X
H3-05	Term 16 Sel	Multi-function analog input 16 selection 0: Aux reference 1: Frequency Gain 2: Frequency Bias 5: Accel/Decel change 6: DC Injection Current 7: Overtorque level 9: Reference lower limit A: Jump Frequency 1F: Not Used	0 - 1F	0	X	X	X
H3-06	Term 16 Gain	Terminal 16 Gain Level	0.0 - 1000.0%	100	X	X	X
H3-07	Term 16 Bias	Terminal 16 Bias Level	-100.0 - 100.0%	0.0	X	X	X
H3-08	Term 14 Signal	Terminal 13 signal level 0: 0 - 10VDC 1: -10 to +10VDC 2: 4 - 20mA	0 - 2	2	X	X	X
H3-09	Term 14 Sel	Multi-function analog Terminal 14 selection (same as H3-05)	0 - 1F	1F	X	X	X
H3-10	Term 14 Gain	Terminal 14 Gain Level	0.0 - 1000.0%	100	X	X	X
H3-11	Term 14 Bias	Terminal 14 Bias Level	-100.0 - 100.0%	0.0	X	X	X
H3-12	Filter Avg Time	Analog input signal filter time constant	0.00 - 2.00 Sec	0.00	X	X	X

4.0 Parameter List

H4

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
H4-01	Term 21 Select	Analog Output Terminal 21 Selection 1: Frequency Reference 2: Output Frequency 3: Output Current 5: Motor Speed 6: Output Voltage 7: DC Bus Voltage 8: Output Power kW 9: Torque Reference(internal) 15: External terminal 13 input voltage 16: External terminal 14 input voltage 17: External terminal 16 input voltage 18: Motor secondary current 19: Motor excitation current 20: Primary frequency after SFS 21: ASR Input 22: ASR Output 23: Speed deviation 24: PID Feedback 26: Voltage Reference (Vq) 27: Voltage Reference (Vd) 31: Not Used 32: ACR(q) Output 33ACR(d) Output	0 - 33	2	X	X	X
H4-02	Term 21 Gain	Terminal 21 Gain	0.00 - 2.50	1.00	X	X	X
H4-03	Term 21 Bias	Terminal 21 Bias	-10.0 to 10.0	0.0	X	X	X
H4-04	Term 23 Sel	Analog Output Terminal 23 Selection (same as H4-01)	0 - 33	3	X	X	X
H4-05	Term 23 Gain	Terminal 23 Gain	0.00 - 2.50	1.00	X	X	X
H4-06	Term 23 Bias	Terminal 23 Bias	-10.0 to 10.0	0.0	X	X	X
H4-07	AO Level Select	Analog output signal level 0: 0 - 10V 1: -10 to 10V	0 - 1	0	X	X	X

4.0 Parameter List

H5

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
H5-01	Serial Comm Adr	Serial Communication address selection	0 - 1F	1F	X	X	X
H5-02	Serial Baud Rate	Serial Communications Baud Rate selection 0: 1200 Baud 2: 4800 Baud 1: 2400 Baud 3: 9600 Baud	0 - 3	3	X	X	X
H5-03	Serial Comm Sel	Serial Communication selection 0: No Parity 2: Odd Parity 1: Even Parity	0 - 2	0	X	X	X
H5-04	Serial Fault Sel	Communication failure action 0: Ramp to Stop 3: Fast-Stop 1: Coast to Stop 4: Alarm Only	0 - 4	3	X	X	X
H5-05	Serial Flt Dtct	Serial Fault detection for time over 0: Disable 1: Enable	0 - 1	1	X	X	X

L1

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
L1-01	MOL Fault Select	Electronic motor overload protection selection 0: Disable 1: Enable	0 - 1	1	X	X	X
L1-02	MOL Time Const	Motor overload time constant	1.0 - 5.0Min	1.0	X	X	X

L4

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
L4-01	SPD Agree Level	Speed Agreed detection level	0.0 - 400.0 Hz	0	X	X	X
L4-02	SPD Agree Width	Speed Agreed detection width	0.0 - 20.0 Hz	2.0	X	X	X
L4-03	SPD Agree Lvl ±	Speed Agreed detection level with sign	0.0 - +/- 400.0 Hz	0	X	X	X
L4-02	SPD Agree Width ±	Speed Agreed detection width with sign	0.0 - +/- 20.0 Hz	2.0	X	X	X
L4-05	Ref Loss Sel	Operation when frequency reference missing 0: Stop 1: Run at 80%	0 - 1	0	X	X	X

4.0 Parameter List

L5

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
L5-01	Num of Restarts	Number of automatic restart attempts	0 - 10	0	X	X	X
L5-02	Restart Sel	Fault Relay action at Restart 0: No Fault Relay 1: Fault Reay Active	0 - 1	0	X	X	X

L6

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
L6-01	Torq Det 1 Sel	Torque Detection 1 Selection 0: Disabled 1: Alarm at Speed 2: Alarm at Run 3: Fault at Speed 4: Fault at Run	0 - 4	0	X	X	X
L6-02	Torq Det 1 Lvl	Torque Detection 1 Level	0 - 300%	150	X	X	X
L6-03	Torq Det 1 Time	Torque Detection 1 Time	0.0 - 10.0Sec	0.1	X	X	X
L6-04	Torq Det 2 Sel	Torque Detection 2 Selection 0: Disabled 1: Alarm at Speed 2: Alarm at Run 3: Fault at Speed 4: Fault at Run	0 - 4	0	X	X	X
L6-05	Torq Det 2 Lvl	Torque Detection 2 Level	0 - 300%	150	X	X	X
L6-06	Torq Det 2 Time	Torque Detection 2 Time	0.0 - 10.0Sec	0.1	X	X	X

4.0 Parameter List

L7

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
L7-01	Torq Limit FWD	Forward Torque Limit	100 - 300%	200	0	X	X
L7-02	Torq Limit REV	Reverse Torque Limit	100 - 300%	200	0	X	X
L7-03	Torq Lmt Fwd Rgn	Forward Regen Torque Limit	100 - 300%	200	0	X	X
L7-04	Torq Lmt Rev Rgn	Reverse Regen Torque Limit	100 - 300%	200	0	X	X

L8

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
L8-02	OH-Pre Alarm Lvl	Overheat alarm level	50 - 110°C	95	X	X	X
L8-03	OH-Pre Alarm Sel	Overheat alarm selection 0: Ramp to Stop 2: Fast Stop 1: Coast to Stop 3: Alarm Only	0 - 3	3	X	X	X
L8-05	Ph Loss In Sel	Input Phase Loss selection 0: Disabled 1: Enabled	0 - 1	1	X	X	X
L8-06	Ph Loss Out Sel	Output Phase Loss selection 0: Disabled 1: Enabled	0 - 1	1	X	X	X

4.0 Parameter List

O1

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
O1-01	User Monitor Sel	Monitor Selection 4: Control Method 5: Motor Speed 6: Output Voltage 7: DC Bus Voltage 8: Output Power 9: Torque Reference 10: Input terminal status 11: Output terminal stus 12: Internal control status 1 13: Elapsed Time 14: Flash Software ID 15: External Terminal 13 Voltage level 16: External Terminal 14 Voltage Level 17: External Terminal 16 Voltage Level 18: Motor Secondary Current(Iq) 19: Motor Excitation Current(Id) 20: Primary Frequency after SFS 21: ASR Input 22: ASR Output 23: Speed Deviation 25: DI-16H reference 26: Vq Output 27: Vd Output 28: CPU ID number	4 - 28	6	X	X	X
O1-02	Power-On Monitor	Monitor Selection after power up 1: Frequency Reference 2: Output Frequency 3: Output Current 4: User Monitor	1 - 4	1	X	X	X
O1-03	Display Scaling	Units for setting and reading frequency	0 - 39999	0	X	X	X
O1-04	Display Units	Sets speed units for all applicable parameters 0: Hz 1: RPM	0 - 1	0	X	X	X
O1-05	Address Display	Parameter Disply selection 0: Parameter No. 1: Modbus Address	0 - 1	0	X	X	X

4.0 Parameter List

O2

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
O2-03	User Default	User Defined default value setting 0: No Change 1: Set Defaults 2: Clear All	0 - 3	0	X	X	X
O2-04	Inverter Model #	Inverter Model selection	_	_	X	X	X
O2-05	Operator MOP	Digital operator MOP mode selection 0: Disable 1: Enable	0 - 1	0	X	X	X
O2-07	Elapsed Time Set	Elapsed Time setting	H	-	X	X	X
O2-08	Elapsed Time Run	Elapsed Time Meter setting 0: Power On Time 1: Running Time	0 - 1	0	X	X	X
O2-09	Init Mode Sel	Initialization mode setting 0: Japanese 1: American 2: European	0 - 2	1	X	X	X

4.0 Parameter List

P1 - "C" Series - Traverse/Load Brake Hoist

No.	Display	Description	Range	Default	Mode		
					V/F	OLV	FV
P1-01	Axis Selection	Axis of motion selection 0: Traverse 1:LB Hoist	0 - 1	0	X	X	X
P1-02	Speed Ref. Sel.	Speed Reference Selection 0: 5 Step Speed 1: 3 Step Speed 2: 2 Step I/V 3: 3 Step I/V 4: Analog Ref. 5: Serial Ref.	0 - 5	0	X	X	X
P1-03	Pushbutton Fault	Pushbutton fault detection 0: Disable 1: Enable	0 - 1	0	X	X	X
P1-04	Plug Reverse	Plug Reverse 0: Disable 1: Enable	0 - 1	0	X	X	X
P1-05	Brake Rel. Time	Brake Release Time	0.00 - 10.00Sec	0.00	X	X	X
P1-06	Brake Set Delay	Brake Set Delay Time	0.00 - 10.00Sec	0.00	X	X	X
P1-07	Micro Speed Gain	Micro Speed Gain Value	0 - 100%	10%	X	X	X
P1-08	TL Detect Torque	Turbo-Lift Detect Torque value	0 - 300%	20%	X	X	X
P1-09	Turbo Lift Time	Turbo - Lift Time value	0.00 - 3.00Sec	0.2	X	X	X
P1-10	Trq Limit Gain	Torque Limit Gain value	0 - 255%	100%	X	X	X

P1 - "CH" Series - No-Load Brake Hoist

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
P1-01	Torque Value	Proving Torque value	0 - 255%	100%	0	0	X
P1-02	Speed Ref. Sel.	Speed Reference Selection 0: 5 Step Speed 3: 3 Step I/V 1: 3 Step Speed 4: Analog Ref. 2: 2 Step I/V 5: Serial Ref.	0 - 5	0	0	0	X
P1-03	Pushbutton Fault	Pushbutton fault detection 0: Disable 1: Enable	0 - 1	0	0	0	X
P1-04	LC PG Count	Load Catch PG Counter	10 -10000	10	0	0	X
P1-05	Load Catch Time	Load Catch Time	0.00-9.99	0.10	0	0	X
P1-06	LD Float T. MS	Load Float Time during Micro-Speed	0.01 - 60.00Sec	2.00	0	0	X
P1-07	Micro Speed Gain	Micro Speed Gain Value	0 - 255%	10%	0	0	X
P1-08	TL Detect Torque	Turbo-Lift Detect Torque value	0 - 300%	50%	0	0	X
P1-09	Turbo Lift Time	Turbo - Lift Time value	0.00 - 3.00Sec	1.00	0	0	X
P1-10	Trq Limit Gain	Torque Limit Gain value	0 - 255%	100%	0	0	X

4.0 Parameter List

P2 - "CH" series - N0-Load Brake Hoist

No.	Display	Description	Range	Default	Mode 0 = Not Available X = Available		
					V/F	OLV	FV
P2-01	Start Reference	Starting Reference	0 - 10%	1%	0	0	X
P2-02	Proving Time	Proving Torque Time limit value	0.01 - 3.00 Sec	3.00	0	0	X
P2-03	Brake Rel Time	Brake Release Time	0.00 - 3.00 Sec	0.30	0	0	X
P2-04	Brake Slip	Brake Slip Fault Action 0: Fault Drive 1: Alarm Only	0 - 1	1	0	0	X
P2-05	Brake Slip Count	Brake Slip PPR Count	10 - 10000 PPR	100	0	0	X
P2-06	Load Float Time	Load Float Time	0.01 - 60.00 Sec	10.0	0	0	X
P2-07	Brake Set Time	Brake Mechanical Set Time	0.01 - 3.00 Sec	0.30	0	0	X
P2-08	Brake Check Time	Brake Check Time	0.01 - 3.00 Sec	0.50	0	0	X
P2-09	Brake Check Trq.	Brake Check Torque value	0 - 300%	50	0	0	X
P2-10	Auto Ana/Dig	Automatic Analog / Digital Reference Switch 0: Disabled 1: Enabled	0 - 1	0	0	0	X

5.0 Fault Codes and Diagnostics

The VG5 has a comprehensive Fault/ Diagnostic code capability. Use the following table for a description, cause and possible corrective action in the event of a fault. The VG5's Fault Trace and Fault History parameters may be used to further diagnose a fault. These parameters are found in the Operation menu, parameters U2 and U3 respectively.

Fault Display	Description	Cause	Corrective Action
OC Overcurrent	The output current of the VG5 has exceeded 200% of the VG5 rating.	- Short Circuit on the output - The load is too large - The Accel time is too short - Mechanical lock up	Disconnect output, and run. If OC fault occurs, replace VG5. If no OC fault occurs, correct cause.
GF Ground Fault	The ground fault current has exceeded 50% of the inverter rated current.	Ground fault condition on output of VG5.	Correct cause.
PUF DC Bus Fuse Open	Main Circuit fuse blown	The output transistor(s) have failed.	Replace Inverter.
SC Short Circuit	Output Short Circuit	Short circuit on output of VG5.	Correct cause.
OV Overvoltage	DC Bus Overvoltage	- Decel time too short - SDBU module not properly wired - SDBU resistor not correct size - L3-04 not set to "0" - Input voltage too high	Correct cause.
UV1 DC Bus Undervoltage	Main Circuit Undervoltage	- Input voltage too low - Momentary power loss - Single phase input	Correct cause.
UV2 CTL Undervoltage	Control Power Undervoltage	Control card power supply low	Cycle power. Replace control card. Replace power card. Replace VG5.
UV3 MC Answerback	Precharge contactor fail	Precharge circuit failure	Replace precharge contactor and resistor. Replace VG5.
PF Input Phase Loss	Input Open Phase	- Input phase open - Large input voltage unbalance - Large input voltage fluctuations	Correct cause.
LF Output Phase Loss	Output Open Phase	- Output phase open - The motor being used has a capacity less than 5% of the VG5's capacity	Correct cause.
OH1 Heatsink Over Temp.	Inverter heatsink over heat	- Ambient temp. too high - Large heat sorce near VG5 - Faulty cooling fan	Install cooling unit. Relocate heat source. Replace fan.

5.0 Fault Codes and Diagnostics

Fault Display	Description	Cause	Corrective Action
OL1 Motor Overload	Electronic Motor Overload activated	- Load too large - Incorrect V/F selection - E2-01 setting incorrect	Correct cause.
OL2 Inv. Overload	Inverter Overload activated	- Load too large - Incorrect V/F selection - Inv. too small	Correct cause.
OL3 Overtorque 1	Overtorque Detection 1 active		
OL4 Overtorque 2	Overtorque Detection 2 active		
OS Overspeed	Motor Overspeed	- Encoder noise - Faulty encoder/coupling - Incorrect motor parameters	Correct cause.
PGO PG Open	Encoder disconnect detection	- Encoder noise - Faulty Encoder/coupling - Faulty encoder wiring - Faulty PG-X2 card	Correct cause.
DEV Speed Deviation	Excessive speed deviation detected	- Encoder noise - Faulty encoder/coupling - Mechanical lock up	Correct cause.
PTO Proving Time Over	Proving Torque Time Over. Output torque did not reach P1-01 value in P2-02 time.	- Output wiring fault - Brake not adjusted correctly - P1-01 value too high - P2-02 value too low	Correct wiring fault. Check brake adjustment Check "P" parameters Decrease C5-02 value
BRK Slip Brake Slip	Brake slip indication. Motor rotor motion detected before brake release comand	Brake not properly adjusted	Check brake.
BRK CK	Brake Check fault Brake has not mechanically set after the stop command	- Brake mechanical failure - Brake fuse failure	Correct cause
SEQFLT Wiring Fault	Control wiring fault	Control wiring out of sequence	Correct wiring.
OPE01 kVA Selection	kVA setting error	O2-04 setting wrong	Correct cause.
OPE02 Limit	Parameter setting out of range		Correct parameter setting.
OPE03 Terminal	Multi-function input setting error(H1 Parameters)		Correct parameter setting.
OPE05 Sequence Select	Option Card selection error	Reference option card missing	Connect option card.

5.0 Fault Codes and Diagnostics

Fault Display	Description	Cause	Corrective Action
OPE06 PG Opt. Missing	Encoder card missing	Flux Vector control mode has been selected, but no PG-X2 card installed	Install PG-X2 card.
OPE07 Analog Selection	Analog card missing		Install Analog card.
OPE10 V/F Setting	V/F pattern setting error	Custom V/F pattern parameters set wrong	Correct cause.
OPE11 Carrier Freq.	Carrier frequency setting error	Carrier frequency parameters set wrong	Correct cause.
EF3 External Fault 3	External fault input on terminal 3		Clear fault.
EF4 External Fault 4	External fault input on terminal 4		Clear fault.
EF5 External Fault 5	External fault input on terminal 5		Clear fault.
EF6 External Fault 6	External fault input on terminal 6		Clear fault.
EF7 External Fault 7	External fault input on terminal 7		Clear fault.
EF8 External Fault 8	External fault input on terminal 8		Clear fault.
CPF00 Comm-Err	Digital operator communication error	Digital operator not connected properly	Correct cause. Replace Control card.
CPF01 Comm-Err	Digital operator communication error	Digital operator not connected properly	Correct cause. Replace Control card.
CPF02 BB error	Base Block circuit error		Cycle power. Replace Control card.
CPF03 EEPROM	EE Prom error		Cycle power. Replace Control card.
CPF04 A/D error	A/D converter error		Cycle power. Replace Control card.

5.0 Fault Codes and Diagnostics

Fault Display	Description	Cause	Corrective Action
CPF05 Ext. A/D Error	External A/D error		Cycle power. Replace Control card
CPF06 Option Error	Option card not installed correctly		Reinstall option card.
CPF20 Option A/D Error	Option card A/D error		Replace option card.
CE Memobus Comm	Memobus communication error		Check Comm. cable.

6.0 Maintenance and Inspection

The VG5 will function much longer if it is kept clean, dry, cool and all the precautions in this section are observed. Periodic inspection of the VG5 should be done to ensure a long, safe, trouble - free operation of the VG5.

⚠ CAUTION:

Before performing any service on the VG5, ensure all power has been removed and locked out. After power is removed, wait at least 5 minutes and observe that the CHARGE LED is extinguished.

Component/ Device	Check	Corrective Action
Drive Enclosure	Ambient Temperature Cooling Fans operation Cooling Fan filters	Ensure ambient temp. is within specs. Ensure fans are operational Clean/ replace filters
VG5 Heatsink	Build up of dust and dirt	Blow with dry, compressed air.
VG5 Circuit boards	Build up of dust and dirt	Blow with dry, compressed air.
VG5 Cooling Fans	Build up of dust and dirt Abnormal noise or vibration	Blow with dry, compressed air. Replace cooling fan.
DC Bus Caps	Discoloration or odor	Replace DC Bus Caps.
VG5 terminal connections	Check for loose screws or connectors on all wiring.	Tighten securely.

Periodic inspection time tables vary depending on the VG5's environment and usage conditions. The following table should be kept as a reference for replacement.

Part	Average Replacement Period
Capacitors	5 years
Cooling Fans	2 - 3 years
Fuses	10 years

7.0 Replacement Parts

The following table represents the main components for replacement or spare parts stocking. For a more complete listing of components contact your local Cranetrol representative.

Component	Description	Part Number
Main Control Card	Control Card PCB "C" series "CH" series	 031-7100-01 031-7100-02
Encoder Card	PG-X2 Option Card	E001063-28
120V I/F Card	120V Interface Card	100-0090-01
VG5 Out Card	VG5 Out Option Card	100-0094-01
Digital Operator	Digital Operator/ Programming Keypad	031-7901
Keypad Extension Cable	36 inch 48 inch 60 inch 72 inch 87 inch 120 inch 150 inch 175 inch	018-9001-36 018-9001-48 018-9001-60 018-9001-72 018-9001-87 018-9001-120 018-9001-150 018-9001-175
CRANElinkCommunication Cable	Communication cable for connection from a PC to the VG5	018-9002-72