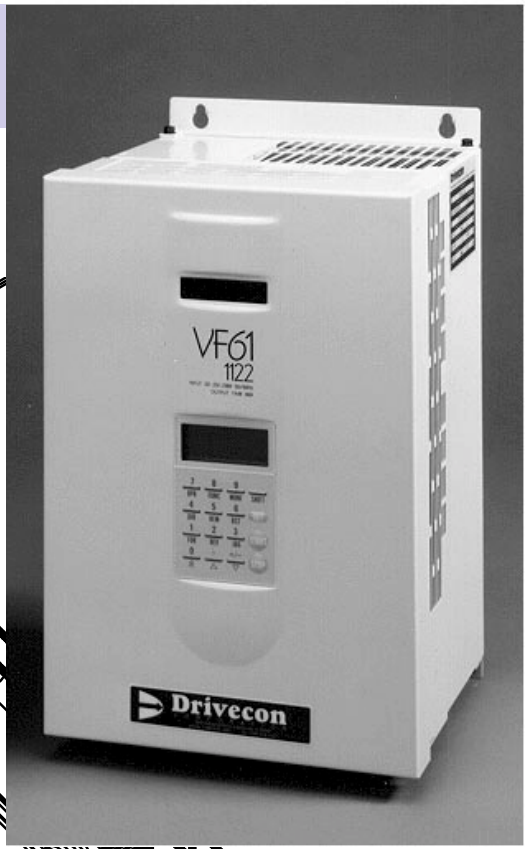
Drivecon

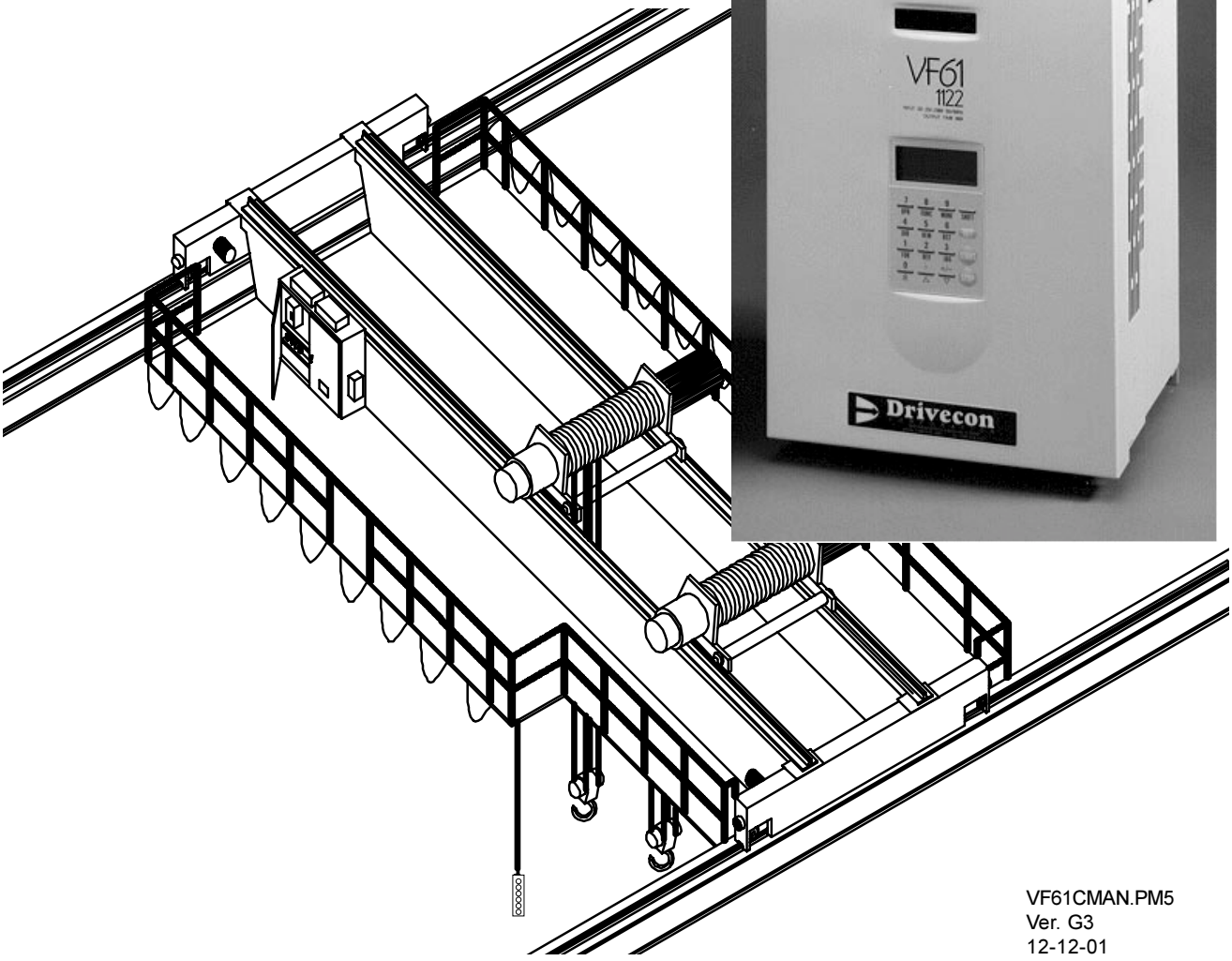
MOTOR DRIVES AND CONTROLS

VF61C

Series AC Crane/Hoist Flux Vector Drives

INSTRUCTION MANUAL





VF61CMAN.PM5
Ver. G3
12-12-01

"the Sine of Quality"

VF61C Crane Type Flux Vector Drive
Table of Contents

DANGER!

The VF61C Flux Vector drive contains hazardous internal voltages and should be serviced only by qualified personnel. Most components are not user serviceable therefore, consult Drivecon Corporation if a problem should arise.

Drivecon Corporation
820 Lakeside Drive
Gurnee, IL 60031 USA

Phone: (847) 855-9150
Fax: (847) 855-9650

Definitions:

Qualified Person:
For the purpose of this instruction manual and product labels, a QUALIFIED PERSON is one who is familiar with the installation, construction, operation and maintenance of the equipment, and the hazards involved. In addition, the person must have the following qualifications:

1. Is trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety practices.
2. Is trained in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
3. Is trained in rendering first aid.

DANGER: For the purpose of this manual and product labels, DANGER indicates loss of life, severe personal injury or substantial property damage WILL result if proper precautions are not taken.

WARNING: For the purpose of this manual and product labels, WARNING indicates loss of life, severe personal injury or substantial property damage CAN result if proper precautions are not taken.

CAUTION: For the purpose of this manual and product labels, CAUTION indicates minor personal injury or property damage can result if precautions are not taken.

NOTE: For the purpose of this manual and product labels, NOTES merely call attention to information that is especially significant in understanding and operating the drive.

Thank You!

We at Drivecon and affiliated dealer appreciate your purchase of this VF61C Flux Vector drive. When properly installed, operated and maintained, the inverter will provide a lifetime of reliable operation. It is mandatory that the person who operates, inspects, and maintains this equipment thoroughly read and understand this manual.

This instruction manual has been designed to serve as a self-supporting guide for the proper installation, operation, and maintenance of the inverter adjustable frequency drive. If you require additional assistance please feel free to contact either your local supplier or Drivecon at (847) 855-9150.

DANGER: DO NOT touch any circuit components while AC main power is on or immediately after the main AC power is disconnected from the unit. You must wait until the red charge lamp ('CHG' LED) on the main control board goes out before servicing the inverter or any component of the system. Typically 2 minutes.

DANGER: DO NOT make any contact with the circuit before inverter is disconnected from the AC line and discharged. Failure to adhere to this warning could result in serious or personal injury.

Drivecon strongly suggests a complete OSHA approved load test of any hoist equipment after installation of this equipment to overhead cranes or hoists. Drivecon Corporation is always available for on-site commissioning of this equipment. The VF61C is designed for operation of traverse motions or hoist motions with or without load brakes. Consult Drivecon for operating hoists without mechanical load brakes. The VF61C is suited for CMAA class A-F use.

WARRANTY:

Drivecon Corporation warrants that all products manufactured by it to be free from defects in material and/ or workmanship under proper and normal use by the initial user. This warranty shall expire eighteen (18) months following the date of shipment of such product to the purchaser or twelve (12) months after such parts or products are first placed in service or operation, whichever shall first expire. Drivecon Corporation is the sole determinant of all claims under warranty and no credit will be allowed for damaged equipment resulting from improper installation or unauthorized repairs or alterations. During this warranty period, Drivecon will repair or replace, FOB its plant, any parts reported to and found to be defective by its inspection. Drivecon will not assume any expenses or liability for any work done on its equipment outside of Drivecon plant without its written consent and such unauthorized work will automatically void Drivecon's warranty. Equipment purchased from others and resold by Drivecon, will carry the warranty of the manufacturer. This warranty is in lieu of all other warranties expressed or implied including warranty of merchantability of fitness for a particular use. Also Drivecon specifically does not warrant for any consequential damages whatsoever. Drivecon does not assume or authorize any other person to assume for it any obligation in connection with the sale of its products, except as herin expressly stated.

1. Preliminary

1.1 Checking supplied components and parts.

When you receive the VF61C, check it carefully.

(1) Make sure that the specifications of VF61C, accessories and spare parts are in accordance with your order. Check the nameplate on the cover to see if the unit type is as you ordered.

Example: 2R2: 2.2
3R7: 3.7
5R5: 5.5
7R5: 7.5
Inverter capacity (kW)

VF61 C
7R522

200V type: 22
400V type: 44
Voltage (V)

Example: Applicable power source INPUT: 380 to 460V, 3-phase, 50/60 Hz
OUTPUT: 2.2kW, 5.5A

(2) Make sure that the supplied VF61C hasn't been damaged during transportation.

(3) Make sure that no screws, or components, etc. are loose or dislocated within unit.

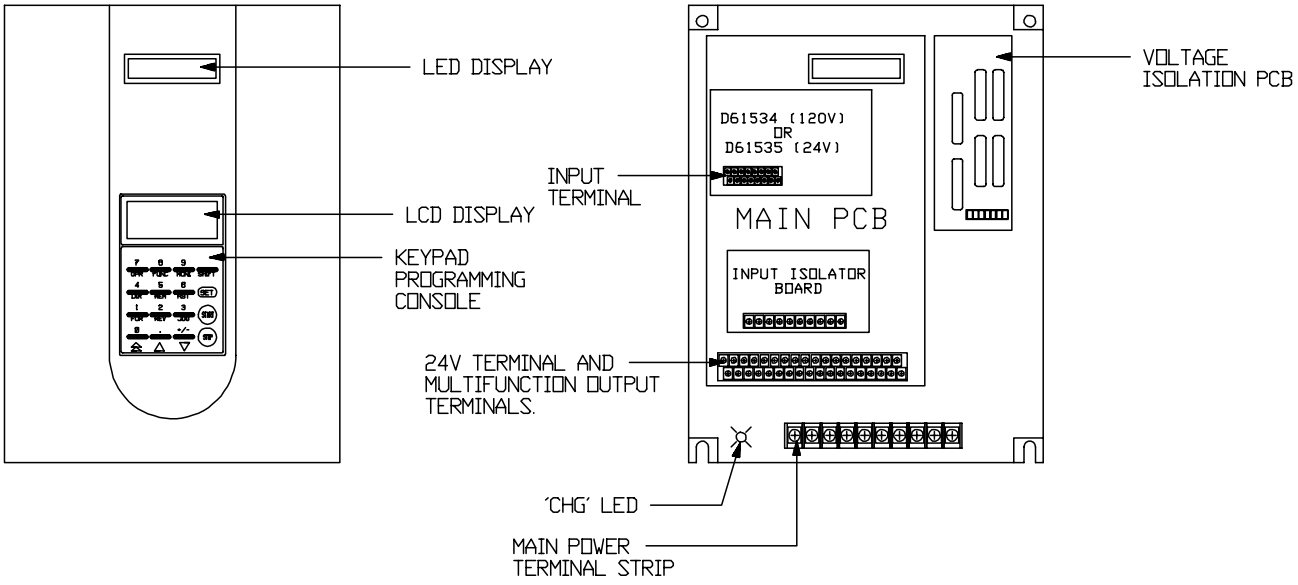
If you encounter problems, contact the dealer you purchased the VF61C from or Drivecon Corporation.

1.2 Structure of the unit

1.2.1 Appearance of unit and contents

VF61C
EXTERNAL VIEW

VF61C
SHOWN WITH
COVER AND KEYPAD REMOVED



DANGER: Always remove power from unit and allow red 'CHG' LED to extinguish before working on unit. Internal capacitors may remain charged for up to 2 minutes after power has been switched off.

1.2.2 Opening of front cover

(1) Remove the fixing screws from the bottom of the front cover.
(2) Pull the front cover towards you.
(3) When the front cover is opened, push up and lift off.
(4) Models with plastic front cover have a cover latch as shown below to hold cover in open position.

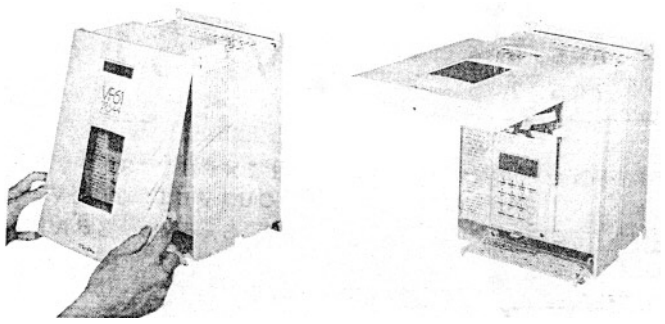


Fig. 1.2.2

1.3 Installation

1.3.1 The installation condition has great influences upon the service life and reliability of the inverter. Do not use the inverter in the locations demonstrated below.

(1) Damp or dusty locations. Any place exposed to water or oil, as the circuits insulation may be deteriorated, resulting in shorter service life of the parts.
(2) Extreme heat or cold out of the specified temperature range.
If the service temperature is too high, overheating may result in damage.
Enclosure type -10° to 50°C.
(3) Exposure to corrosive gas.
Corrosive gas deteriorates the reliability of the parts and/or connectors.
(4) Exposure to high vibration. (0.5G maximum)
Vibrations cause poor contact of the connectors, disconnection of wires, damage to parts, etc.
(5) Insure supply voltage meets VF61C's specifications and is within tolerance.
(6) Provide circuit protection of proper capacity.
(7) Insure vector drive is grounded. It is suggested that a 4th pickup is used on crane collector systems as a dedicated ground conductor.
(8) Do not connect live supply to output of inverter.
(9) Suppress all inductive loads in circuit.
(10) Do not connect a power factor correction capacitor to the output of the vector drive.
(11) Use double shoe pick-ups on all sliding collector systems.

1.3.2 Installation guidelines
If the VF61C is mounted separately or built into a control panel, follow the instructions given below.

(1) Installation orientation
For cooling and maintenance purposes, sufficient distances as shown in figure 1.3.2 is necessary to keep effective ventilation. Inverter must be installed with heatsink fins oriented vertically.

(2) Securing proper cooling.
Provide the VF61C with proper cooling spaces as shown on the right. The cooling fan takes air from the bottom and exhausts it to the top. Secure enough space so that wire duct, etc. do not hinder proper ventilation.
Install peripheral devices so that heat generated by them does not reduce the cooling efficiency of the VF61C.

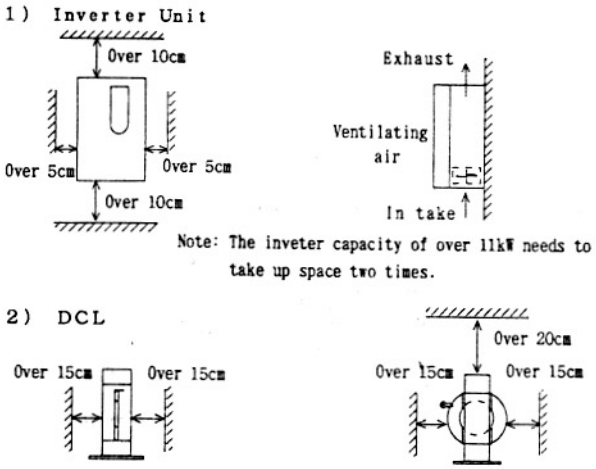


Fig. 1.3.2

(3) Inverter thermal characteristics.
Heat loss generated by inverter is approximately 5% of inverter capacity when operating a motor of same capacity rating over a continuous basis.
Example: 3.7KW (5HP) x 5% = 185W.
Expect 185 watts of heat generated during inverter operation at full load.

An adequate cooling aparatus must be equipped with the panel to prevent the interior panel temperature from exceeding 50°C.

1.3.3 Mounting dimensions

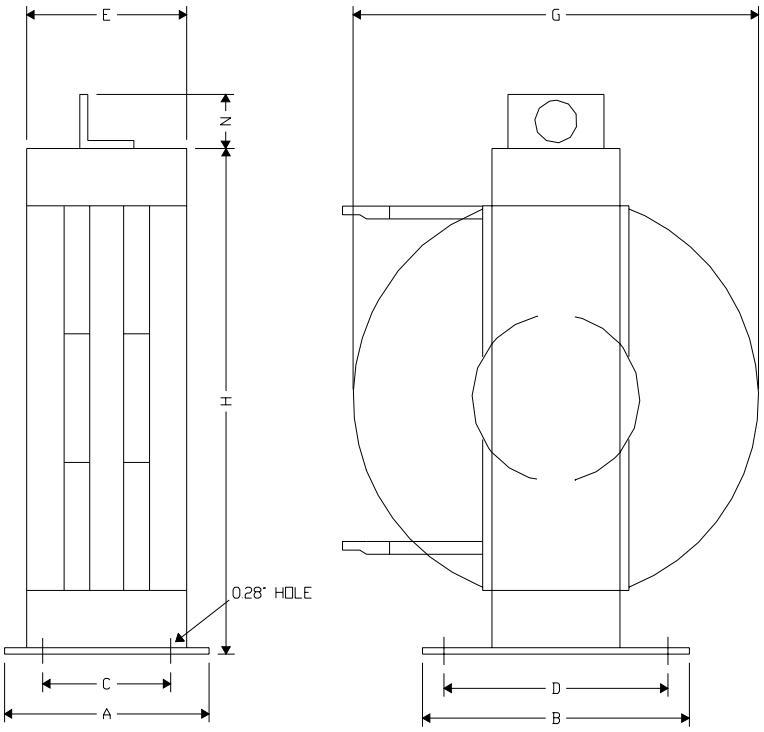
Table 1.3.3 is given as a guide for mounting dimensions for all VF61C models. Also provided is a disk in appendix 7.4 with all unit outlines and dimensions.

1.3.4 Mounting configuration

(1) The VF61C can be panel mounted entirelly within an enclosure. When doing this, the mounting hole locations are outlined with H1 and W1. On units of 55KW and less the mounting brackets can be moved so that a portion of the VF61C enclosure can be extended through the enclosure. When done, it removes at least 60% of the heat load. Dimensions W2 and H2 outline the cutout dimensions.

Note: Now external cooling fans must be maintained after exposure to the exterior atmosphere.

(2) Drivecon always recommends the use of sufficiently sized mounting hardware with lock washers for each threaded fasteners.



POWER SUPPLY VOLTAGE	APPLICABLE MOTOR HP	CAPACITY kVA	INVERTER DCL TYPE	DIMENSIONS (in.)									WGT (LBS)
				A	B	C	D	E	G	H	N	J	
200V/230V SERIES	20	24	DCL1522	2.36	4.33	1.57	3.54	1.90	6.70	8.35	-	.343	11.02
	25/30	34	DCL2222	2.36	4.33	1.57	3.54	1.90	7.17	8.90	-	.385	13.23
	40	48	DCL3022	3.54	4.72	2.76	3.94	2.95	7.13	8.82	-	.385	22.05
	50	58	DCL3722	3.54	4.72	2.76	3.94	3.03	7.17	8.90	-	.385	22.05
	60	70	DCL4522	4.33	4.92	3.54	4.13	3.19	6.70	8.43	-	.531	24.25
	75	85	DCL5522	4.72	5.71	3.94	4.92	4.21	7.17	9.30	-	.531	33.07
	100	107	DCL7522	4.33	4.92	3.54	4.13	3.62	8.07	10.20	-	.531	35.30
	125	130	DCL9022	5.31	5.31	4.53	4.53	4.37	8.46	11.00	1.57	.531	44.09

POWER SUPPLY VOLTAGE	APPLICABLE MOTOR HP	CAPACITY kVA	INVERTER DCL TYPE	DIMENSIONS (in.)									WGT (LBS)
				A	B	C	D	E	G	H	N	J	
400V/480V SERIES	25/30	37	DCL2244	2.36	4.72	1.57	3.94	1.89	7.56	9.25	-	.27	13.23
	40	50	DCL3044	2.36	4.72	1.57	3.94	1.89	7.56	9.25	-	.343	14.33
	50	60	DCL3744	3.54	4.72	2.76	3.94	2.95	7.68	9.37	-	.343	22.05
	60	70	DCL4544	3.54	4.72	2.76	3.94	2.95	7.32	9.06	-	.385	22.05
	75	93	DCL5544	4.33	4.92	3.54	4.13	3.54	7.64	9.76	-	.385	30.86
	100	112	DCL7544	4.33	4.92	3.54	4.13	3.62	8.23	10.35	-	.385	35.27
	150	160	DCL11044	5.31	5.31	4.53	4.53	4.61	8.62	11.14	1.57	.531	52.91
	200	229	DCL16044	5.71	5.71	4.92	4.92	4.88	9.88	12.80	1.57	.531	61.73
	250	282	DCL20044	5.71	5.71	4.92	4.92	5.12	10.08	13.00	1.57	.531	77.16
	300	351	DCL25044	6.10	6.10	5.31	5.31	5.55	11.14	14.45	1.57	.656	88.18
	400	457	DCL31544	6.10	6.10	5.31	5.31	5.60	12.30	15.31	1.57	.656	99.21

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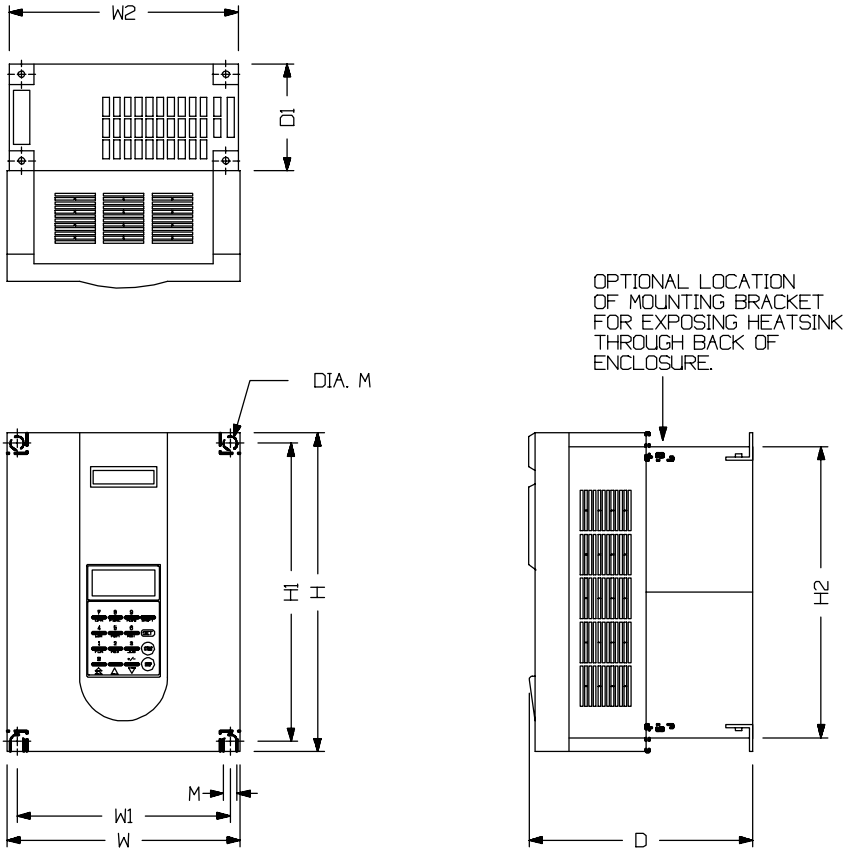
TITLE: DC LINE INDUCTOR FOR VF SERIES DRIVES	CLIENT:		VERSION: AS BUILT
200/230V SERIES AND 400/480V SERIES SHOWN	LOCATION:		REVISION # / REV. DATE
	PROJECT: DCL DIMENSIONS		
	STARTUP DATE: XX/XX/XX	DRAWN BY: MTW	DATE: 1/28/02
	SHEET # 001 OF 001	CHECKED BY:	DESIGNER: RMP

Table 1.3.3
Mounting dimensions

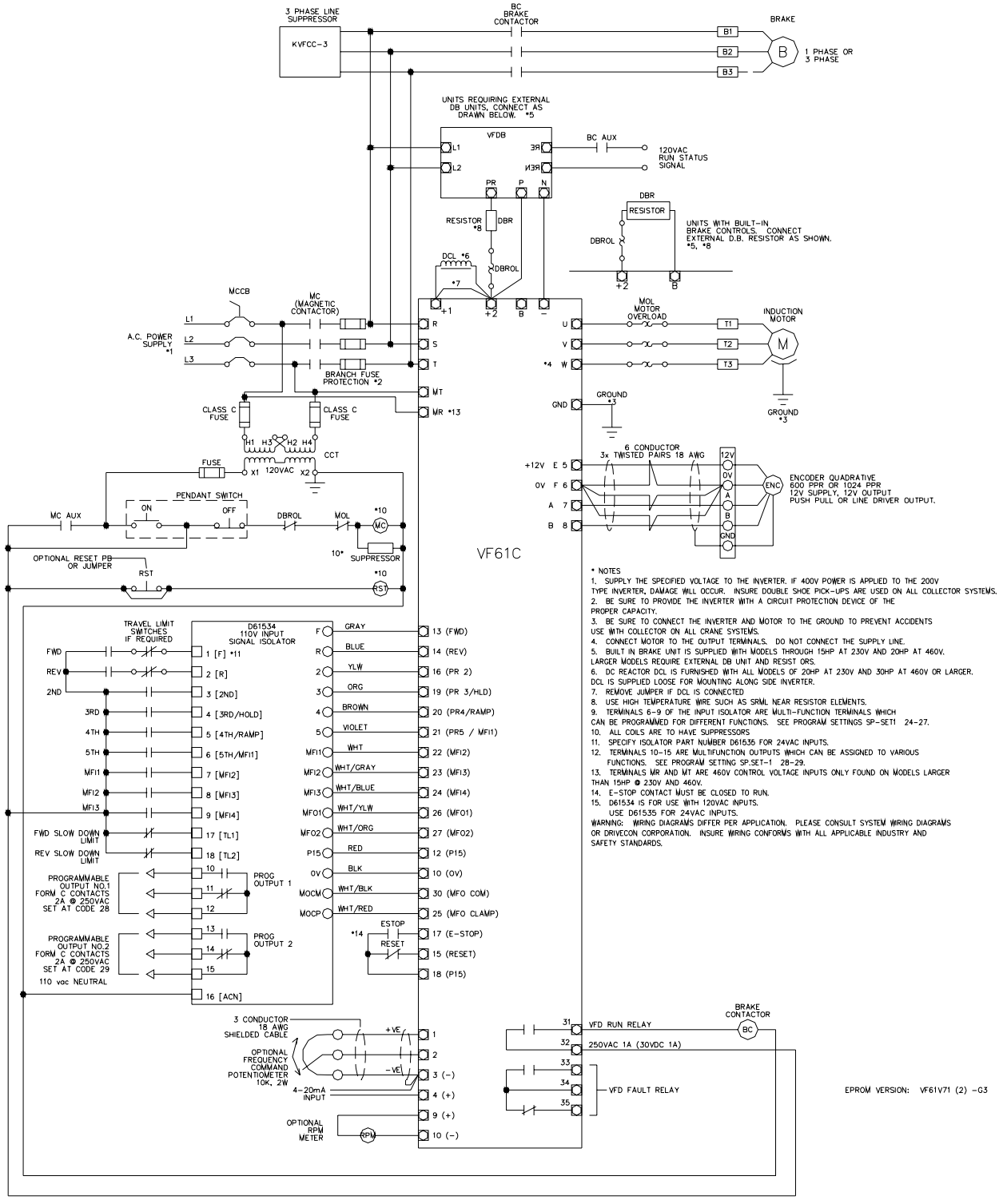


Voltage	Type	W	W1	W2	D	D1	H	H1	H2	M	WEIGHT (LBS)
230V	VF61C-1R12	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79	.25	14.31
	VF61C-2R22	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79		14.98
	VF61C-3R72	5.90	5.12	5.71	9.84	3.55	11.81	11.23	10.79		14.98
	VF61C-5R52	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79		14.31
	VF61C-7R52	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79		14.98
	VF61C-1122	10.04	7.88	9.61	11.22	5.32	16.14	15.55	15.16		39.65
	VF61C-1522	10.04	7.88	9.61	11.22	5.32	16.14	15.55	15.16		39.65
	VF61C-2222	11.82	7.48	11.57	11.22	5.32	18.10	17.52	17.13		50.66
	VF61C-3022	16.93	7.48	16.7	12.2	6.61	22.64	21.85	21.46	.375	94.7
	VF61C-3722	16.93	14.17	16.7	12.2	6.61	22.64	21.85	21.46		94.7
	VF61C-4522	19.68	16.14	-	11.81	-	23.62	22.64	-		105.73
	VF61C-5522	19.68	16.14	-	11.81	-	23.62	22.64	-		105.73
	VF61C-7522	19.68	16.14	-	13.78	-	28.35	27.36	-		165.2
	VF61C-9022	24.41	20.87	-	13.78	-	30.31	29.33	-		200.44
460V	VF61C-1R14	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79	0.25	13.87
	VF61C-2R24	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79		13.87
	VF61C-5R54	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79		13.87
	VF61C-7R54	8.67	7.88	8.47	9.84	3.94	11.81	11.23	10.79		14.31
	VF61C-1144	10.04	7.48	9.61	11.22	5.32	16.14	15.55	15.16		39.65
	VF61C-1544	10.04	7.48	9.61	11.22	5.32	16.14	15.55	15.16		39.65
	VF61C-2244	11.82	9.45	11.57	11.22	5.32	18.10	17.52	17.13		50.66
	VF61C-3044	16.93	14.17	16.7	12.2	6.61	22.64	21.85	21.46	.375	88.11
	VF61C-3744	16.93	14.17	16.7	12.2	6.61	22.64	21.85	21.46		88.11
	VF61C-4544	19.68	16.14	19.68	11.81	-	23.62	22.64	-		94.7
	VF61C-5544	19.68	16.14	19.68	11.81	-	23.62	22.64	-		94.7
	VF61C-7544	19.68	16.14	19.68	13.78	-	28.35	27.36	-		134.4
	VF61C-11044	24.41	20.87	24.41	13.78	-	30.31	29.33	-		174
	VF61C-16044	19.7	16.14	-	13.78	-	39.37	38.39	-		218
	VF61C-20044	26.97	23.72	-	14.96	-	39.37	38.39	-		411
	VF61C-25044	26.97	23.72	-	14.96	-	39.37	38.39	-		427
	VF61C-31544	33.86	29.15	-	19.65	-	44.49	43.31	-		605.7

1.4 Circuit construction and wiring diagram.

The following pages show the standard circuit construction of the VF61C. Also provided is a disk in Appendix 7.4 with all schematics for reference.

Fig. 1.4.1 Typical Traverse wiring of VF61C interconnection diagram.
(Some devices are optional and may not be required in all cases.)



* NOTES
1. SUPPLY THE SPECIFIED VOLTAGE TO THE INVERTER. IF 400V POWER IS APPLIED TO THE 200V TYPE INVERTER, DAMAGE WILL OCCUR. INSURE DOUBLE SHOE PICK-UPS ARE USED ON ALL COLLECTOR SYSTEMS.
2. BE SURE TO PROVIDE THE INVERTER WITH A CIRCUIT PROTECTION DEVICE OF THE PROPER CAPACITY.
3. BE SURE TO CONNECT THE INVERTER AND MOTOR TO THE GROUND TO PREVENT ACCIDENTS USE WITH COLLECTOR ON ALL CRANE SYSTEMS.
4. CONNECT MOTOR TO THE OUTPUT TERMINALS. DO NOT CONNECT THE SUPPLY LINE.
5. BUILT IN BRAKE UNIT IS SUPPLIED WITH MODELS THROUGH 15HP AT 230V AND 20HP AT 460V. LARGER MODELS REQUIRE EXTERNAL DB UNIT AND RESIST ORS.
6. DC REACTOR DCL IS FURNISHED WITH ALL MODELS OF 20HP AT 230V AND 30HP AT 460V OR LARGER. DCL IS SUPPLIED LOOSE FOR MOUNTING ALONG SIDE INVERTER.
7. REMOVE JUMPER IF DCL IS CONNECTED
8. USE HIGH TEMPERATURE WIRE SUCH AS SRML NEAR RESISTOR ELEMENTS.
9. TERMINALS 6-9 OF THE INPUT ISOLATOR ARE MULTI-FUNCTION TERMINALS WHICH CAN BE PROGRAMMED FOR DIFFERENT FUNCTIONS. SEE PROGRAM SETTINGS SP-SET1 24-27.
10. ALL COILS ARE TO HAVE SUPPRESSORS
11. SPECIFY ISOLATOR PART NUMBER D61535 FOR 24VAC INPUTS.
12. TERMINALS 10-15 ARE MULTIFUNCTION OUTPUTS WHICH CAN BE ASSIGNED TO VARIOUS FUNCTIONS. SEE PROGRAM SETTING SP.SET-1 28-29.
13. TERMINALS MR AND MT ARE 460V CONTROL VOLTAGE INPUTS ONLY FOUND ON MODELS LARGER THAN 15HP @ 230V AND 460V.
14. E-STOP CONTACT MUST BE CLOSED TO RUN.
15. D61534 IS FOR USE WITH 120VAC INPUTS. USE D61535 FOR 24VAC INPUTS.

WARNING: WIRING DIAGRAMS DIFFER PER APPLICATION. PLEASE CONSULT SYSTEM WIRING DIAGRAMS OR DRIVECON CORPORATION. INSURE WIRING CONFORMS WITH ALL APPLICABLE INDUSTRY AND SAFETY STANDARDS.

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Gurnee, IL 60031
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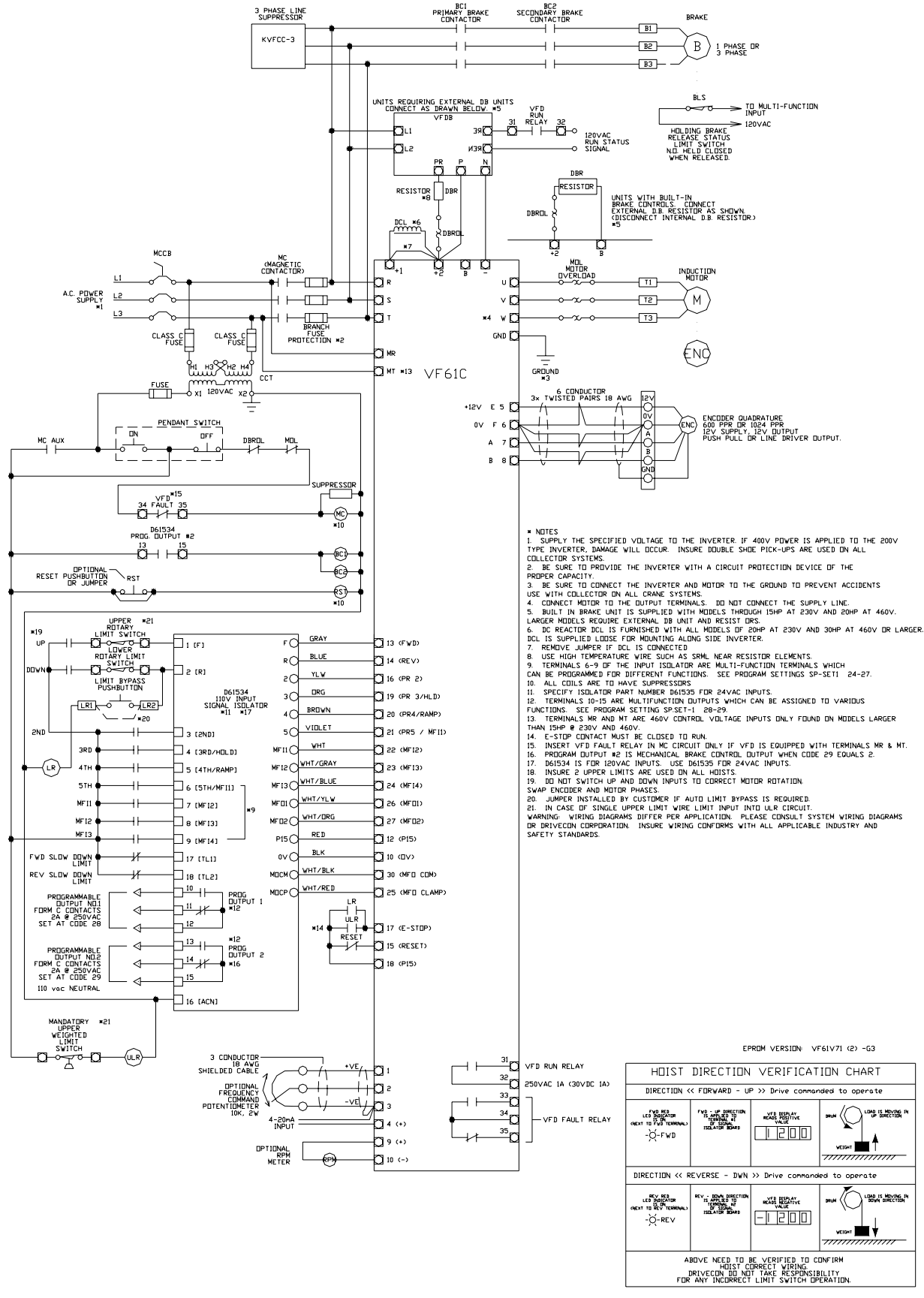
Fax: (847) 855-9550

TITLE: VF61C TYPICAL TRAVERSE CONNECTIONS	CLIENT:		VERSION: FINAL
	LOCATION:		REVISION # / REV. DATE
			REV. 1 12-4-98
	PROJECT: 61C-WD1		REV. 2 2-9-99
	STARTUP DATE: XX/XX/XX	DRAWN BY: MTW / DATE: 9/10/98	REV. 3 8-2-99
	SHEET # XXX OF XXX	CHECKED BY: / DESIGNER:	

Fig. 1.4.2 Typical Hoist wiring of VF61C interconnection diagram.
(Some devices are optional and may not be required in all cases)



* NOTES
1. SUPPLY THE SPECIFIED VOLTAGE TO THE INVERTER. IF 400V POWER IS APPLIED TO THE 200V TYPE INVERTER, DAMAGE WILL OCCUR. INSURE DOUBLE SHOE PICK-UPS ARE USED ON ALL COLLECTOR SYSTEMS.
2. BE SURE TO PROVIDE THE INVERTER WITH A CIRCUIT PROTECTION DEVICE OF THE PROPER CAPACITY.
3. BE SURE TO CONNECT THE INVERTER AND MOTOR TO THE GROUND TO PREVENT ACCIDENTS USE WITH COLLECTOR ON ALL CRANE SYSTEMS.
4. CONNECT MOTOR TO THE OUTPUT TERMINALS. DO NOT CONNECT THE SUPPLY LINE.
5. BUILT IN BRAKE UNIT IS SUPPLIED WITH MODELS THROUGH 15HP AT 230V AND 20HP AT 460V. LARGER MODELS REQUIRE EXTERNAL DB UNIT AND RESIST ORS.
6. DC REACTOR DCL IS FURNISHED WITH ALL MODELS OF 20HP AT 230V AND 30HP AT 460V OR LARGER. DCL IS SUPPLIED LOOSE FOR MOUNTING ALONG SIDE INVERTER.
7. REMOVE JUMPER IF DCL IS CONNECTED
8. USE HIGH TEMPERATURE WIRE SUCH AS SRML NEAR RESISTOR ELEMENTS.
9. TERMINALS 6-9 OF THE INPUT ISOLATOR ARE MULTI-FUNCTION TERMINALS WHICH CAN BE PROGRAMMED FOR DIFFERENT FUNCTIONS. SEE PROGRAM SETTINGS SP-SET1 24-27.
10. ALL COILS ARE TO HAVE SUPPRESSORS
11. SPECIFY ISOLATOR PART NUMBER D61535 FOR 24VAC INPUTS.
12. TERMINALS 10-15 ARE MULTIFUNCTION OUTPUTS WHICH CAN BE ASSIGNED TO VARIOUS FUNCTIONS. SEE PROGRAM SETTING SP.SET-1 28-29.
13. TERMINALS MR AND MT ARE 460V CONTROL VOLTAGE INPUTS ONLY FOUND ON MODELS LARGER THAN 15HP @ 230V AND 460V.
14. E-STOP CONTACT MUST BE CLOSED TO RUN.
15. INSERT VFD FAULT RELAY IN MC CIRCUIT ONLY IF VFD IS EQUIPPED WITH TERMINALS MR & MT.
16. PROGRAM OUTPUT #2 IS MECHANICAL BRAKE CONTROL OUTPUT WHEN CODE 29 EQUALS 2.
17. D61534 IS FOR 120VAC INPUTS. USE D61535 FOR 24VAC INPUTS.
18. INSURE 2 UPPER LIMITS ARE USED ON ALL HOISTS.
19. DO NOT SWITCH UP AND DOWN INPUTS TO CORRECT MOTOR ROTATION. SWAP ENCODER AND MOTOR PHASES.
20. JUMPER INSTALLED BY CUSTOMER IF AUTO LIMIT BYPASS IS REQUIRED.
21. IN CASE OF SINGLE UPPER LIMIT WIRE LIMIT INPUT INTO ULR CIRCUIT.

WARNING: WIRING DIAGRAMS DIFFER PER APPLICATION. PLEASE CONSULT SYSTEM WIRING DIAGRAMS OR DRIVECON CORPORATION. INSURE WIRING CONFORMS WITH ALL APPLICABLE INDUSTRY AND SAFETY STANDARDS.

EPROM VERSION: VF61V71 (2) -G3

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Gurnee, IL 60031
Phone: (847) 855-9150
Fax: (847) 855-9650

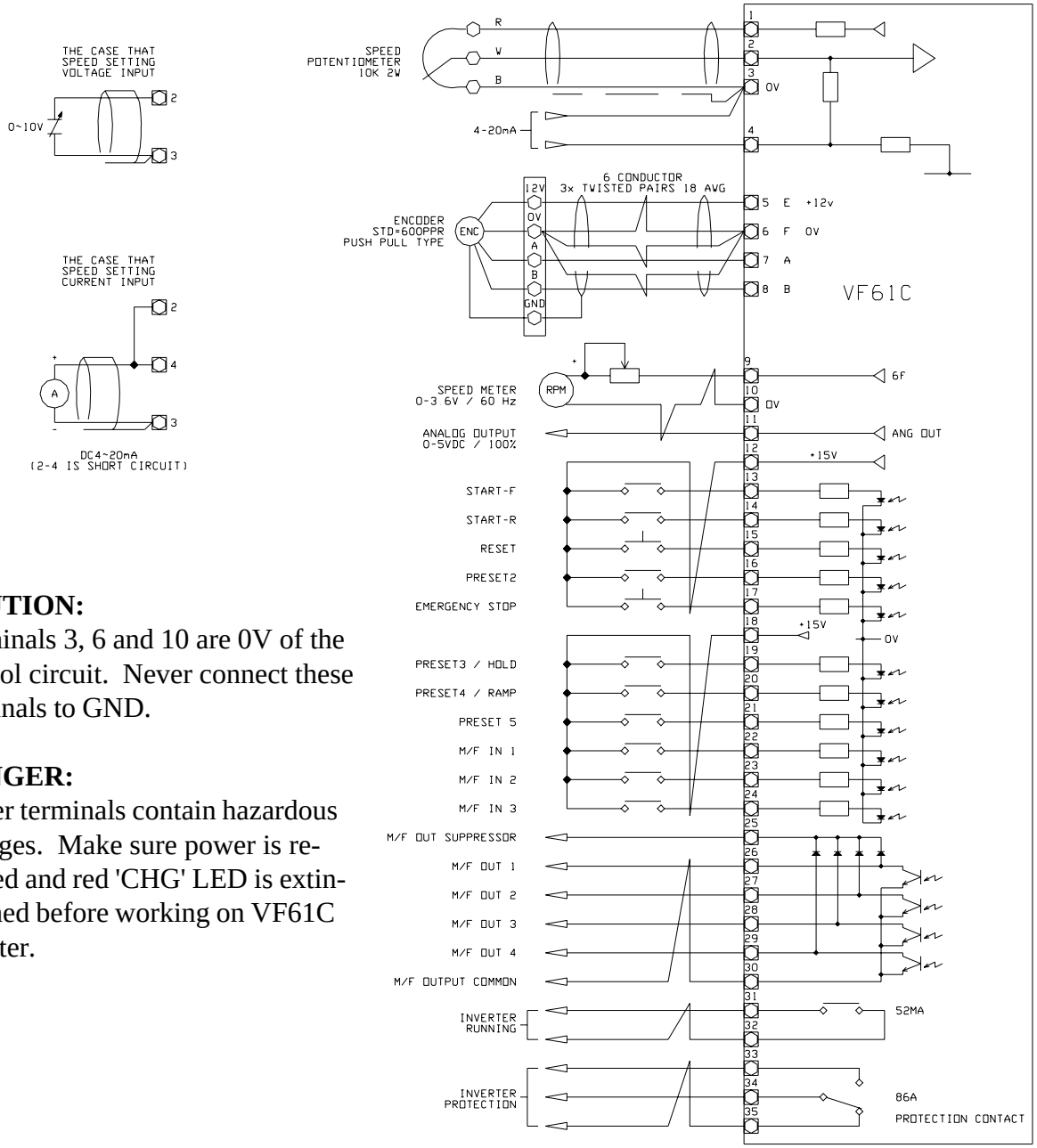
TITLE: VF61C TYPICAL HOIST CONNECTIONS.	CLIENT:		VERSION: FINAL
	LOCATION:		REVISION # / REV. DATE
	PROJECT: 61C-WD2		REV. 1 12-4-98; REV. 2 8-9-99; REV. 3 8-2-99; REV. 4 5-17-00; REV. 5 9-19-01; REV. 6 12-12-01
	STARTUP DATE: XX/XX/XX	DRAWN BY: MTW / DATE: 9/10/98	
	SHEET # XXX OF XXX	CHECKED BY: / DESIGNER:	

1.4.3 Terminal blocks

(1) Main power circuit terminal block

R, S and T	Connect AC power to these terminals. (Do not supply 400V to the 200V type inverter.)
U,V, and W	Motor connections.
Terminal +1 and +2	Connect the wires of the optional DC reactor DCL to these terminals. These terminals are short circuited at shipment with a jumper. Remove when DCL is used.
Terminal +2 and B	Connect the optional dynamic braking (DB) resistor to these terminals.
Terminal +2 and -	Connect the optional external DB unit and resistor to these terminals.
MT and RT	They are power supply source terminals for control circuits equipped in inverters over 1122, 1144 model inverters (Not present on inverters of lower capacity than 11KW.)

(2) Control terminal block layout less 120V isolation card



CAUTION:

Terminals 3, 6 and 10 are 0V of the control circuit. Never connect these terminals to GND.

DANGER:

Power terminals contain hazardous voltages. Make sure power is removed and red 'CHG' LED is extinguished before working on VF61C inverter.

1.5 Standard drive ratings and specifications

1.5.1 VF61C Standard Drive Ratings

Type VF61C-_ _ _ _		200V series														
		1R122	1R522	2R222	3R722	5R522	7R522	1122	1522	2222	3022	3722	4522	5522	7522	9022
Inverter	Applied motor (HP)*1	1/1.5	2	3	5	7.5	10	15	20	25/30	40	50	60	75	100	125
	Rated current (A)*1	6.00	8.00	10.00	17.00	24.00	32.50	46.00	62.50	87.00	121.00	146.00	185.00	222.00	280.00	340.00
	Input voltage (V)*2	3 phase 3 wire 200~230V (50/60 Hz Voltage ± 10%, Frequency ± 5%.														
	Capacity (kVA)*4	1.60	3.30	4.00	6.80	9.50	13.00	18.00	24.00	34.00	48.00	58.00	70.00	85.00	107.00	130.00
	Input power factor*3	(Lagging) about 0.7 to 0.9 (*3)						(Lagging) about 0.9								
	DC reactor (DCL)	Option							DCL152	DCL222	DCL302	DCL372	DCL452	DCL552	DCL752	DCL9022
	Cooling method	Forced air cooling														

Type VF61C-_ _ _ _		400V series																		
		1R144	1R544	2R244	3R744	5R544	7R544	1144	1544	2244	3044	3744	4544	5544	7544	11044	16044	20044	25044	31544
Inverter	Applied motor (HP)*1	1/1.5	2	3	5	7.5	10	15	20	25/30	40	50	60	75	100	150	200	250	300	400
	Rated current (A)*1	3.10	-	5.50	9.20	13.00	17.00	24.00	32.50	46.00	62.50	75.50	92.50	111.00	146.00	210.00	300.00	370.00	460.00	600.00
	Input voltage (V)*2	3 phase 3 wire 400~460V (50/60 Hz Voltage ± 10%, Frequency ± 5%.																		
	Capacity (kVA) *1*4	1.6	3.3	4.4	7.3	10.3	13.5	19.1	25.8	36.6	49.7	60	70.5	92.5	112	160	229	282	351	457
	Input power factor *3	(Lagging) about 0.9 (*3)								(Lagging) about 0.9										
	DC reactor (DCL)	Option								DCL2244	DCL3044	DCL3744	DCL4544	DCL5544	DCL7544	DCL11044	DCL16044	DCL20044	DCL25044	DCL31544
	Cooling method	Forced air cooling																		

Item		Specifications	
Control functions	Control system	Spatial vector control, PWM system	
	Carrier frequency	1~15kHz variable (Whereas below 3722, 3744 type: Capacity is reduced at more than 9kHz. Up to 4522, 4544 type: Capacity is reduced at more than 6kHz.)	
	Maximum speed / minimum speed	Equivalent to 200Hz~ 0 RPM	
	Speed control	0-10VDC, 4-20mA analog. 1-5 fixed speeds, 2 or 3 step infinitely variable, 10K ohm potentiometer.	
	Operation mode	Remote 120V terminal input or keypad start momentary.	
	ACC./DEC. time	0.1~30 sec. 2 settings for each selected automatically by 'Quick Stop' or 'Quick Change'.	
	DC brake	Deceleration adoption is 0.5~5 sec., magnetic flux 20~140%, wheras DC brake is possible unrelated to rotational speed by contact input from terminal block.	
	Automatic restart after instantaneous power failure	Inhibition/restart possible for selection, whereas if control power source is off, time until restart depending on motor constant is set automatically.	
	Dynamic brake (DB)	Dynamic brake unit built in models: 1R122~1122 and 1R144~1544. Braking resistor option is externally mounted on all larger models.	
	Brake torque detection	Level setting available from console active on release of brake and setting of brake.	
	Torque limit	Forward running powering, reverse running powering are respectively possible for setting 0~150%. Forward running braking and reverse running braking are fixed at maximum (whereas range changes by motor capacity setting).	
Protective functions	Fault detection codes	Motor overheat, Overload, Output overcurrent, Grounding protection, Over voltage of DC, Over speed, Main circuit fuse, Power module abnormality, Control circuit abnormality, Console panel abnormality, Option board abnormality, Stall prevention, Instantaneous power failure (under voltage), Emergency stop, Brake slip, Slack cable, Rotation error, Brake release, Starting torque, Output phase.	
Input / output functions	Multifunction input terminals (contact input)	Travel limit, Micro speed, Top-N change, ARC2, Free RUN, Quick Pick, Brake Answer Back, Motor Select, changing motor nameplates, changing ASR/ATR	Possible to select 4 points from these functions.
	Multifunction output terminals (4 open collector outputs, DC24V/20mA assigned to one of 2 programmable output relays)	Slack cable detection, Mechanical brake control, Brake slip alarm, Rotation error alarm, Quick Pick enable, Brake release answer back, Brake setting answer back, Starting torque detection, No phase of output current fault, Overspeed error, Travel limit detection, Weight measurement error.	Possible to assign 4 relays from these functions.
	Speed output (6f output)	Frequency conversion of speed/ PWM pulse of 6 times output frequency (possible to connect analog meter 3.6V/60Hz) Output 1/2 frequency divider of PG pulse.	
	Analog output	Selection of one point from output current, Reference torque, Speed (5V/100%)	
	Contact outputs dedicated	Actuation by protection function (contact 86A, AC230V, 0.5A) Actuation by running (contact 1A, AC230V, 0.5A)	
Ambient conditions	Operating temperature	0~50°C	
	Humidity	Less than 90% (non-condensing)	
	Altitude	Less than 1000m (3300 ft)	
	Storage temperature	-20~60°C	
Enclosure		IP20 protected chassis type	

*1 Motor type general purpose 4 poles - always size inverter to exceed motor current.
*2 Output voltage can not exceed input AC voltage
*3 Varies depending on impedance value of power supply.
*4 KVA ratings based on 230V or 460V supply.

+ Wound rotor motor re-use is subject to proper rehabilitation of motor.
ie: shorted slip rings.

1.6 Peripheral devices and wire sizes

1.6.1 Selection of protection devices and precautions for main circuit wiring.
The following shows the protection devices of the VF61C unit and their wire sizes.

200V type

Type		VF61C-__ __ __22													
		1R122	2R222	3R722	5R522	7R522	1122	1522	2222	3022	3722	4522	5522	7522	9022
Applicable motor (HP) (1)		1/1.5	2/3	5	7.5	10	15	20	30	40	50	60	75	100	125
Peripheral device	Input MCCB (2)	10A	15A	20A	30A	40A	60A	75A	100A	150A	175A	225A	250A	325A	400A
	Input MC (3) (5)	A09	A12	A18	A24	A30	A45	A60	A75	B110	B180	B180	B250	B300	B400
	Output MC (3) (6)	A09	A12	A18	A24	A30	A45	A60	A75	B110	B180	B180	B250	B300	B400
Wire size AWG	Input side	14	12	12	10	8	6	4	2	0	1/0	2/0	3/0	4/0	300MCM
	Output side (4)	14	12	12	10	8	6	4	2	0	1/0	2/0	3/0	4/0	300MCM
	DCL terminals	---	---	---	---	---	---	2	0	1/0	2/0	3/0	4/0	250MCM	400MCM

400V type

Type		VF61C-__ __ __44																
		1R144	2R244	3R722	5R544	7R544	1144	1544	2244	3044	3744	4544	5544	7544	11044	16044	20044	25044
Applicable motor (HP) (1)		1/1.5	2/3	5	7.5	10	15	20	30	40	50	60	75	100	125/150	200	250	300
Peripheral device	Input MCCB (2)	5A	10A	15A	20A	25A	30A	40A	60A	75A	100A	125A	125A	175A	250A	350A	400A	500A
	Input MC (3) (5)	A09	A09	A09	A18	A24	A30	A38	A45	A60	A75	B110	B180	B180	B250	B400	B400	B600
	Output MC (3) (6)	A09	A09	A09	A18	A24	A30	A38	A45	A60	A75	B110	B180	B180	B250	B400	B400	B600
Wire size AWG	Input side	14	14	14	12	12	10	8	6	4	4	2	0	1/0	2/0	4/0	300MCM	600MCM
	Output side (4)	14	14	14	12	12	10	8	6	4	4	2	0	1/0	2/0	4/0	300MCM	600MCM
	DCL terminals	---	---	---	---	---	---	---	4	4	2	0	1/0	2/0	3/0	250MCM	300MCM	600MCM

Note:

(Note 1) Motor applied is an example of standard 4 pole motor.
(Note 2) Input MCCB shows rated current value.
(Note 3) Example of magnetic contactactors of Allen Bradley 100 Series is shown.
(Note 4) Output side wiring is such that cable length between VF61C and motor is set + 30m and CV electric wire is selected. (At the time of rated output current, voltage drop by cables less than 2% of rated voltage.)
(Note 5) In the case of inserting input MC, do not start or stop inverter by opening and closing MC contactor.
(Note 6) Do not open or close output MC while inverter is running.

1.7 Function of DIP switch on main PCB (SW1)

1.7.1 The functions of the VFC61C printed board SW1 are shown as follows.

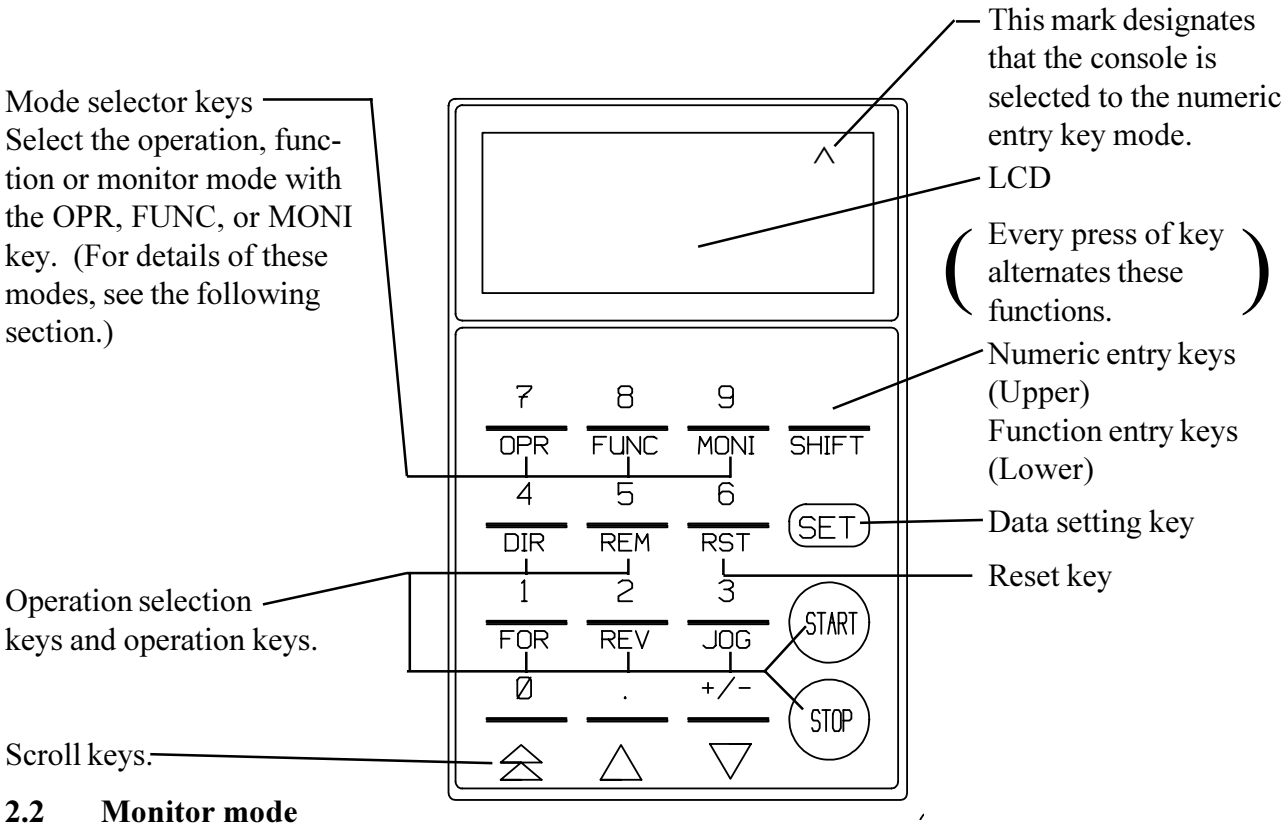
1) Write protection - Prevents any changes made to inverter program.
2) Not used - Keep OFF
3) Not used - Keep OFF
4) Not used - Keep OFF
5) Not used - Keep OFF
6) Auto-tuning. See Auto tuning section for details (3.4)
7) Initialization data load. Set up for reinitialization once LED display shows 'sure'. Press black reset button next to DIP switches. Depress button until correct capacity of inverter is displayed. ie: '2R244'. Set switch off when completed. Note: Record all critical application program values since data will be lost.
8) Open/closed loop mode select. OFF= open loop ON= closed loop

(Note 1) Open loop mode is not available for crane software.

2. Console use and programming

2.1 Console function keys

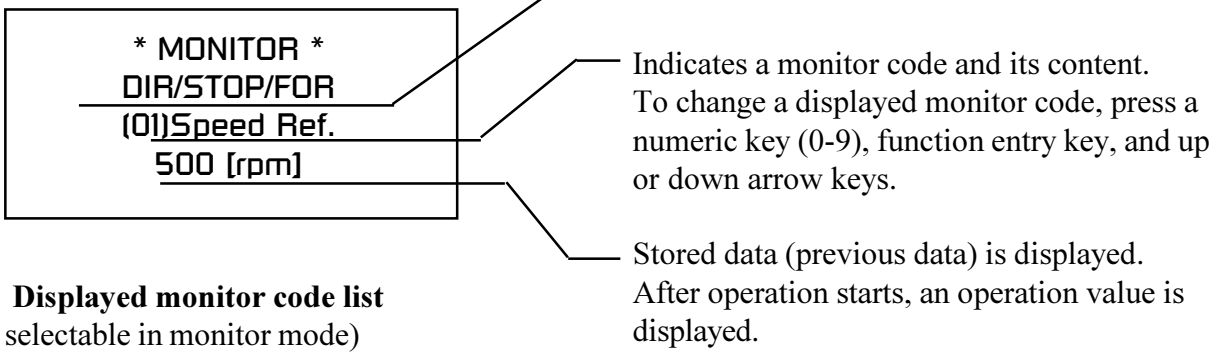
The console has 16 columns x 4 lines LCD and operation keys as shown below.



2.2 Monitor mode

Press the MONI key, and the current setting is displayed as shown below.

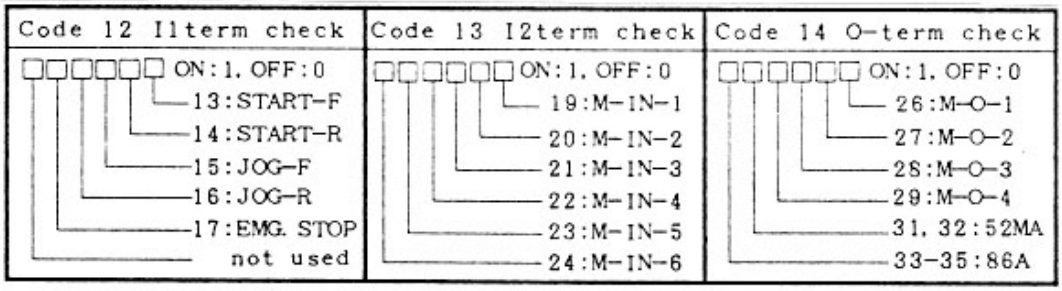
2.2.1 A monitor code and operation condition are displayed.
(See 2.2.2 for displayed items)



2.2.2 Displayed monitor code list

(Items selectable in monitor mode)

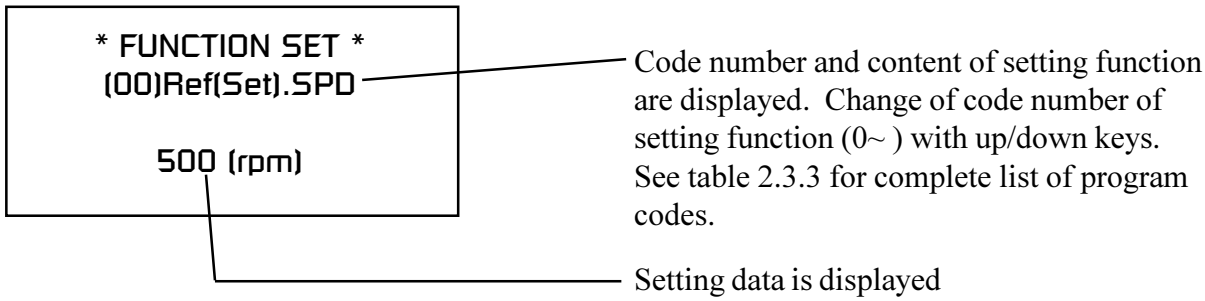
	Display on LCD	Items	Units
00	Motor speed	Motor rotational speed	rpm
01	Speed Ref.	Speed command	rpm
02	Iout	Output current	A
03	Torq. Ref.	Torque command	%
04	Vdc	DC voltage	V
05	Fout	Output frequency	Hz
06	OL counter	OL counter	%
07	Line speed	Line speed	...
08	Motor Temp.	Motor temperature	°C
09	MPU ROM ver.	MPU side ROM version	-
10	DSP ROM ver.	DSP side ROM version	-
11	Option Moni.	Option adjusting mode	-
12	I1term.Check	Input terminal check (1)	-
13	I2term.Check	Input terminal check (2)	-
14	O-term.Check	Output terminal check	-
15	-----		-
16	Special Moni	For manufacturers adjustment	-
17	Trouble moni	Reading error records.	-



2.3 Function mode

Press the FUNC key, and current data is displayed as shown below.

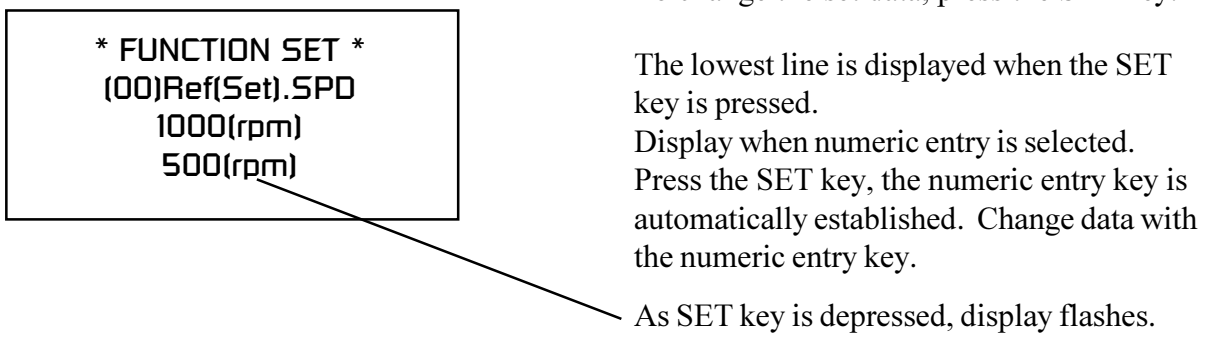
2.3.1 The internal data of the setting functions may be checked and changed. (See 2.3.3 below.)



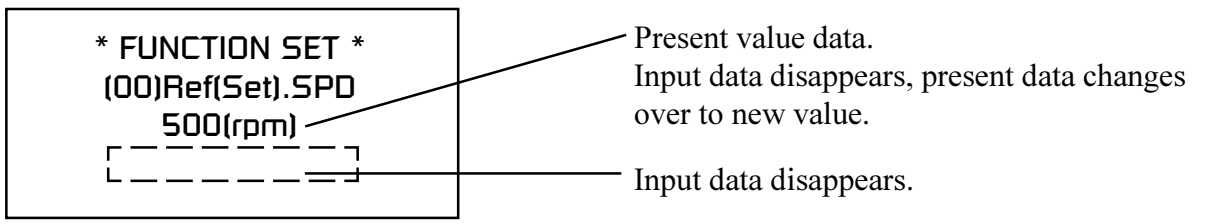
Note: Use basic setting #16 to gain access to higher level codes by programming desired code in setting data field.

2.3.2 Changing set data

(1) Before changing data



(2) After changing data



Warning: Before making any changes to the program it is imperative that the result of the changes be fully understood. The VF61C is used to suspend overhead loads and unauthorized changes in the operation data could cause malfunction. Consult Drivecon before making any changes in data codes which will affect performance of the drive.

VF61C Programming Chart Table 2.3.3

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
1) Basic Setting Items							
0	Ref(set)SPD	Ref., set speed	rpm	REV-Max.SPD~FOR-Max.SPD except -Min.SPD~+Min.SPD	Possible	0rpm	
1	FOR-MAX.SPD.	Forward maximum speed	rpm	Positive 71~400% of motor rated speed	Impossible	1800rpm	
2	REV-MAX.SPD.	Reverse maximum speed	rpm	Negative 71~400% of motor rated speed	Impossible	-1800rpm	
3	Min.SPD.	Minimum speed	rpm	0 ~ (Forward max. speed x 0.9)	Impossible	0rpm	
4	Preset6.SPD	Quick Pick Max. Speed	rpm	Motor rated speed~2x (±) motor rated speed.	Impossible	1800rpm	
5	Preset7.SPD	Quick Pick threshold speed	rpm	100rpm~MAX.SPD.	Impossible	1200rpm	
6	ASR.P-Gain1	ASR proportional gain 1	% / %	3~100	Possible	15	
7	ASR.I-Time	ASR integrated time	msec	10~10000	Possible	40	
8	Acc1.Time	Acceleration time (1)	sec	0.1~30 Acc(1) (2), Dec (1) (2) is selected by input terminal blocks, reverse plugging simulation or 'Quick Stop'	Possible	5.00	
9	Acc2.Time	Acceleration time (2)			Possible	3.00	
10	Dec1.Time	Deceleration time (1)			Possible	5.00	
11	Dec2.Time	Deceleration time (2)			Possible	3.00	
12	ASR.P-Gain2	DC Brake Magnitude	% / %	3~100	Possible	3	
13	DC-Br.Time	DC brake time	sec	0.5~30.0	Possible	3.0	
14	Stop SPD.	Stop speed	rpm	0~300	Possible	0	
15	Stop mode	Stop mode selection	N/A	Decl.Stop: Deceleration stop Dec.Stop (DC): 0 speed hold after deceleration stop. Free stop: Free run stop	Impossible	Dec.Stop (DC)	
16	Function up	Selection of special setting items	N/A	Sp.Set-1: Special setting 1 Sp.Set-2: Special setting 2 Sp.Set-3: Special setting 3 Sp.Set-4: Special setting 4 Sp.Set-5: Special setting 5 Disp.Set: Monitor output setting items PGM Mode: Program operation setting items Option: Option setting items	Possible	Sp.Set-1	
2) Special setting items (Sp.Set-1)							
17	FOR-Lim.T(P)	Torque limit (forward powering)	%	0~200	Impossible	150	
18	FOR-Lim.T(B)	Torque limit (forward braking)	%	200 fixed	Impossible	200	
19	REV-Lim.T(P)	Torque limit (reverse powering)	%	0~200	Impossible	150	
20	REV-Lim.T(B)	Torque limit (reverse braking)	%	200 fixed	Impossible	200	
21	FOR-Over SPD	Forward over speed	rpm	0~140% of FOR-MAX.SPD.	Impossible	1980	
22	REV-Over SPD	Reverse over speed	rpm	0~140% of REV-MAX.SPD.	Impossible	-1980	

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

VF61C Programming Chart Table 2.3.3

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (Selective items)	Change during operation	Default	User value
2) Special Setting Items (Sp.Set-1) (continued)							
23	Term.In.Sel	Multifunctional input command selection	N/A	Terminal: Terminal block Option: Option (communication)	Impossible	Terminal	
24	Term-21.Sel	Multi-function input. Setting (1)	N/A	1) Travel limit 2) Creep Speed 3) Top-N change 4) ARC2 5) Free RUN (base block) 6) Quick Pick 7) Brake Answer Back 8) Changing motor parameters 9) Changing ASR / ATR 10) 5 step / Analog input	Impossible	1	
25	Term-22.Sel	Multi-function input. Setting (2)	N/A		Impossible	2	
26	Term-23.Sel	Multi-function input. Setting (3)	N/A		Impossible	3	
27	Term-24.Sel	Multi-function input. Setting (4)	N/A		Impossible	7	
28	Term-26.Sel	Multi-function output. Setting (1)	N/A	1) Slack Cable Detection 2) Mechanical Brake Control 3) Brake Slip Alarm 4) Rotation Error Alarm 5) Quick Pick Enable 6) Brake Release Answer Back 7) Brake Setting Answer Back 8) Starting Torque Detection 9) Output phase loss 10) Over Speed Error 11) Travel Limit Detection 12) Weight Measurement Error	Impossible	1	
29	Term-27.Sel	Multi-function output. Setting (2)	N/A		Impossible	2	
30	Term-28.Sel	Multi-function output. Setting (3)	N/A		Impossible	3	
31	Term-29.Sel	Multi-function output. Setting (4)	N/A		Impossible	4	
32	Rotation Sel	Rotating direction selection	N/A	Min-SPD.Off: (not used) -SPD.Off: Inhibition of minus analog speed reference. Inhibit.REV: Inhibition of reverse running setting input.	Impossible	-SPD.Of	
33	IPF.Restart	Selection of restart from instantaneous power failure	N/A	OFF: Automatic restart off. ON: Automatic restart on.	Impossible	OFF	
34	SPD.Stall	Automatic deceleration ramp extend (stall prevention)	N/A	OFF: Stall prevention off. ON: Stall prevention on.	Impossible	OFF	
35	Retrial CNT	Number of automatic reset attempts	N/A	0~5 (0: No reset attempts = 0 times)	Impossible	0	
36	PI/MFC Sel.	Selection of PI/MFC control	N/A	PI: PI control system MFC: Robust control system	Impossible	PI	
37	REM.Term/DG.	Selection of remote setting place at DIR/REM	N/A	Terminal: Selection of terminal block. Option: Selection of digital option (Case of No.38~39 is set to "DIR/REM")	Impossible	Terminal	
38	Ref.SPD.Sel.	Selection of speed command setting location.	N/A	DIR/REM: Interlock to DIR/REM mode Terminal: Command from terminal block. Console: Command from console. AN.Option: Command from analog option. DG.Option: Command from digital option.	Impossible	DIR/ REM	
39	START-Sw.Sel	Selection of running command setting location.	N/A	DIR/REM: Linked to DIR/REM mode. Terminal: Command from terminal blocks. Console: Command from console. DG.Option: Command from digital option.	Impossible	DIR/ REM	
40	Mode Sel.	Operation mode speed/torque priority.	N/A	SPD.: Speed control mode. Torque: Torque control mode. Torque +: + direction of torque command takes priority. Torque -: - direction of torque command takes priority. SPD/Torq.: Changeover by contact (D-I) of speed/ torque control. Sync.Run: Synchronous running control	Impossible	SPD.	
41	Ext.SPD.Sel.	Selection of type of external speed reference input.	N/A	+,-10V: Voltage input (0~±10V) 4-20mA: Current input Pulse train: Pulse train input (0~150kHz)	Impossible	+,-10	
42	Ext.Ref.SPD.	Analog input selection.	N/A	Offset: Stack up method. Exhibit band: Insensitive band system	Impossible	Exhibi band	
43	Analog.-0.Lim.	Analog limit.	mV	0~999mV	Possible	0	
44	Trq.Ref Sel	Torque setting location selection.	N/A	Terminal: Command from terminal block. AN.Option: Command from analog option. DG.Option: Command from digital option.	Impossible	AN. Option	
45	Trq.Mode.Sel	Torque setting mode selection.	N/A	%: % command (at power constant area) ABS: absolute value command (at power constant area)	Impossible	%	
46	----------	Not used					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

VF61C Programming Chart Table 2.3.3

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
2) Special Setting Items (Sp.Set-1) (continued)							
47	Data-A.1	Selection of operation mode for CRANE USE	N/A	1) Analog voltage (current) 2) Multi-step input 3) Infinitely variable speed control (2 step) 4) Infinitely variable speed control (3 step)	Impossible	2	
48	Data-A.2	Travel limit detect	N/A	OFF: Disabled ON: Enabled	Impossible	OFF	
49	Data-A.3	Creep Speed ratio	%	2~100	Impossible	100	
50	Data-A.4	TopN Change ratio	%	2~100	Impossible	100	
51	Data-A.5	Quick Stop mode select (ARC2 function select)	N/A	1) No Quick Stop operation 2) Quick Stop 3) Reverse Plugging simulation 4) ARC2 mode is controlled by Terminal block	Impossible	1	
52	Data-B.1	Start Torque detect time	sec.	0.5~10.0	Impossible	3.00	
53	Data-B.2	Brake Setting Time setting	sec.	0.5~30.0	Impossible	3.00	
54	Data-B.3	Brake release / Setting Answer back error	N/A	Off: Not enabled On: Answer back error enabled	Impossible	OFF	
55	Data-B.4	Brake release / Setting Answer back detect time	sec.	0.5~10.0	Impossible	10.00	
56	Data-B.5	Start torque detection error	N/A	Off: Starting torque detection error off On: Starting torque detection error on	Impossible	ON	
57	Data-C.1	Start torque detect level	%	0~100	Impossible	0	
58	Data-C.2	Slack cable detect	N/A	1) Slack cable detect disabled 2) Only alarm 3) Alarm + Stop mode + up only + Ref.Set.Spd 4) Alarm + stop mode + up only operation	Impossible	1	
59	Data-C.3	Slack cable detect torque	%	0~20	Impossible	5	
60	- - - - -	Slack cable detect mode. Starting torque setting.	%	0~20	Impossible	5	
61	Data-C.4	Quick Pick operation	N/A	Off: Quick Pick operation disabled On: Quick Pick operation enabled	Impossible	OFF	
62	Data-C.5	Quick Pick delay time	sec.	0.1~3.0	Impossible	1	
63	Data-D.1	Quick Pick stop torque	%	0~100	Impossible	20	
64	Data-D.2	Selection of rotation error detection & Brake slip alarm detection	N/A	0) Rotation Error off and Brake Slip Alarm off 1) Rotation Error off and Brake Slip Alarm on. 2) Rotation Error on and Brake Slip Alarm off 3) Rotation Error on and Brake Slip Alarm on	Impossible	0	
65	Data-D.3	Rotation error and brake slip alarm detect speed	rpm	0.1~10.0	Impossible	1	
66	Data-D.4	Motor current protection. Max. motor current setting.	%	105~300	Impossible	150	
67	----	Motor current protection. Base motor current setting.	%	20~100	Impossible	100	
68	Data-D.5	Output phase loss rotation value	rpm	0~500	Impossible	10	
69	Data-E.1	Output phase loss current value setting	%	0~100	Impossible	10	
70	Data-E.2	Output phase loss time setting	ms	10~2000	Impossible	655	
71	Data-E.3	Weight measurement mode	N/A	0) Weight measurement mode disabled 1) No load test 2) Full load test calibration 3) Programmed stop + down mode only	Impossible	0	
72	Data-E.4	Weight measurement during full load test	Ton (M)	0.1~1000	Impossible	0.1	
73	Data-E.5	Weight measurement trip point	Ton (M)	0.1~1000	Impossible	0.1	
74	----	Selection of Auto tuning	-	1: Motor 1 2: Motor 2	Impossible	1	
75	----	Start torque detect filter	msec	21~5000	Impossible	21	
76	-----	Slack cable torque detect filter	msec	41~5000	Impossible	120	
77	----	Quick Pick torque detect filter	msec	41~5000	Impossible	3000	
78	----	Weight measurement torque detect filter	msec	21~5000	Impossible	120	
79	----	Mechanical brake control time delay	sec	0.5~5.0	Impossible	3.00	
80 and above	----	Blank functions					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

VF61C Programming Chart Table 2.3.3

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
3) Special setting items 2 (Sp.Set-2)							
17	Motor Cap.	Motor capacity	kW	Within inverter capacity	Impossible	0.00	
18	Motor V.	Motor rated voltage	200V	100~230	Impossible	0.00	
			400V	220~460	Impossible	0.00	
19	Motor I.	Motor rated current	A	Within inverter capacity	Impossible	0.00	
20	Motor SPD.	Motor rated speed	rpm	100~12000	Impossible	0.00	
21	Motor Pole	Motor poles	Pole	2~12	Impossible	4.00	
22	Motor Freq.	Motor rated frequency	Hz	At motor rated speed	Impossible	0.00	
23	Leakage L	Leakage inductance	mH	Set automatically during auto tuning. Do not change unless motor control or drive circuit boards are changed.	Impossible	0.00	
24	Mutual L	Mutual inductance	mH		Impossible	0.00	
25	Motor M1 Comp.	Motor compensation rate (1)	%		Impossible	0.00	
26	Motor M2 Comp.	Motor compensation rate (2)	%		Impossible	0.00	
27	Motor R1	Primary resistance	m ohm		Impossible	0.00	
28	Motor R2	Secondary resistance	m ohm		Impossible	0.00	
29	Conductance	Conductance	mMho		Impossible	0.00	
30	PG-Pulse	Number of pulses per revolution of encoder	p/r	65~2400	Impossible	600	
31	System J.	System moment of inertia	gmm	1~32767	Possible	10	
32	FCL Level	FCL level	%	210~270	Possible	270	
33	DB-V	Dynamic braking voltage threshold	200V	320~360	Possible	340	
			400V	540~720	Possible	720	
34	Vdc Ref. Adj.	Basic VDC voltage fine adjustment	V	200~750	Possible	0	
35	An. In (+)	Analog input (term. No.2) (+) side gain adjustment.	-	0~1.100	Possible	1	
36	An. In (-)	Analog input (term. No.2) (-) side gain adjustment.	-	0~1.100	Possible	1	
37	Ref. Flux	Magnetic flux command	%	25~100	Impossible	100	
38	Flux Ref. Sel.	Selection of magnetic flux command changeover.	N/A	Internal: Usually used AN.Option: Analog option (terminal 2) DG.Option: Digital option	Impossible	Internal	
39	----------	Not used.					
40	----------	Not used.					
41	----------	Not used.					
42	----------	Not used.					
43	----------	Not used.					
44	Trq.Gain Adj	Torque gain fine adjustment.	%	-5.0~+10.0	Possible	0.00	
45	Trq.(AN).Gain	Torque command input gain adjustment.	%	-50.0~+100.0	Possible	0.00	
46	SPD.(AN).Gai	Speed command input	%	-50.0~+100.0	Possible	0.00	
47	OT.Sel.	Overload torque protection selection	N/A	OFF: No protection ON: Protection available	Impossible	OFF	
48	Over torque	Overload torque setting	%	-	Possible	150	
49	OT Base Torq.	Basic torque of over torque protection.	%	50~105	Possible	105	
50	OL.Current	Overload alarm current setting.	%	20~100	Possible	100	
51	OL.Pre.Alarm	Overload prealarm load factor	%	1~100	Possible	80	
52	Carrier F.	Carrier frequency	kHz	1.0~15.0	Possible	6.00	
53 and above	----------	Blank functions					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
4) Special setting items 3 (Sp.Set-3)							
17	Weaken Flux	Weak field magnetic flux command	%	50~205	Impossible	100	
18	Lim.SPD (Ref)	Speed setting limit	%	10~105	Possible	105	
19	CHG.Max.SPD.	Max. speed reduced setting	%	50.0~100.0	Possible	90.9	
20	Trq.Limit Up	Torque limit value up at start.	%	100~150	Possible	100	
21	Start Trq. Up	Starting torque up.	%	100~150	Possible	100	
22	SPD.Cont.Err	Selection of speed control error protection.	N/A	OFF: No protection of speed control error. ON: Speed control error protection is available.	Impossible	ON	
23	Pre.Flux sel.	Initial excitation AC/DC changeover selection.	N/A	AC: AC (rotation) excitation from time of start. DC: DC excitation from time of start.	Impossible	AC	
24	Pre.Flux SPD.	AC/DC initial excitation changeover speed.	rpm	0~100	Impossible	25	
25	Pre.Flux time	Completion time of initial excitation.	%	100~1000 (Value against initial excitation time)	Impossible	100	
26	Ext.86A Sel.	Changeover of external protection relay.	N/A	OFF: Not active ON: Active	Impossible	ON	
27	Power DN.86A	Changeover of under voltage relay.	N/A	OFF: Not active ON: Active	Impossible	OFF	
28 and above	----------	Blank functions					

Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
5) Special setting items 4 (Sp.Set-4)							
17	Motor Capacity	Motor 2 capacity	kW	Within inverter capacity	Impossible	0.00	
18	Motor V	Motor 2 rated voltage	V	100~230	Impossible	0	
		Motor 2 rated voltage	V	220~460	Impossible	0.00	
19	Motor I	Motor 2 rated current	A	Within inverter capacity	Impossible	0	
20	Motor SPD	Motor 2 rated speed	rpm	400~12000	Impossible	0.00	
21	Motor Pole	Motor 2 poles	Pole	2~12	Impossible	4.00	
22	Motor Freq.	Motor 2 rated frequency	Hz	At motor rated speed	Impossible	0.00	
23	Leakage L	Motor 2 leakage inductance	mH	Set automatically during auto tunining. Do not change unless motor or drive control circuit boards are changed.	Impossible	0.00	
24	Mutual L	Motor 2 mutual inductance	mH		Impossible	0.00	
25	Motor M1 Cmp.	Motor 2 compensation rate (1)	%		Impossible	0.00	
26	Motor M2 Cmp.	Motor 2 compensation rate (2)	%		Impossible	0.00	
27	Motor R1	Motor 2 primary resistance	m ohm		Impossible	0.00	
28	Motor R2	Motor 2 secondary resistance	m ohm		Impossible	0.00	
29	Conductance	Motor 2 conductance	mMho		Impossible	0.00	
30	PG-Pulse	Motor 2 number of pulses per revolution of encoder.	p/r	65~2400	Impossible	600.00	
31 and above	----------	Blank functions					

Note: **VF61V-71-G3 Eprom for models VF61C-1R1~55**
VF61V-72-G3 Eprom for models VF61C-75~315

* Depends upon capacity of inverter

VF61C Programming Chart

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
6) Monitor output setting items (Disp.Set)							
17	Trace count	Count after trace back trigger.	-	1~90	Possible	50	
18	Trace pitch	Trace back pitch.	ms	1~100	Possible	1	
19	Analog output	Analog output selection.	N/A	Iout: Output current Torq.Ref.: Torque command Internal Mon: For our adjustment SPD.Ref.: Reference setting speed Calib.: For output calibration	Possible	Iout	
20	Amp-0V.Adj.	Analog meter 0V adjustment.	-	-50~+50 (Current / torque)	Possible	0	
21	Fout Sel.	Selection of output item of terminal block No.9	N/A	Speed: Actual speed (frequency) 1/2-PG: Output of 1/2 frequency divider Frequency: Frequency output. Calib.: For output calibration.	Possible	Speed	
22	LED-Disp.Sel.	Selection of main body LED display.	N/A	Motor speed: Motor speed Speed ref.: Reference speed Iout: Output current. Torq. Ref.: Torque command. Vdc: DC bus voltage. Fout: Output frequency. OL.counter: Overload counter. Line speed: Line speed by conversion. MPU ROM ver.: MPU ROM version DSP ROM ver.: DSP ROM version I1 term check: Input terminal blocks check (1) I2 term check: Input terminal blocks check (2) 0-term check: Output terminal block check. Option Moni: Option monitor. Special Monitor: For internal use. Trouble Monitor: Trouble history display.	Possible	Motor speed	
23	----------	Selection of LED display indication of Mechanical Brake Control	N/A	Off: No indication On: Indication is available	Possible	Off	
28 and above	----------	Blank functions.					
Code No.	LCD indication	Setting Contents	Unit	Setting range (Selective items)	Change during operation	Default	User value
7) Program Mode (PGM.Mode)							
17	Preset1.SPD.	Multi-step speed command (1)	rpm	Minimum ~maximum speed	Impossible	300	
18	Preset2.SPD.	Multi-step speed command (2)	rpm	Preset1 ~maximum speed	Impossible	600	
19	Preset3.SPD.	Multi-step speed command (3)	rpm	Preset2 ~maximum speed	Impossible	900	
20	Preset4.SPD.	Multi-step speed command (4)	rpm	Preset3 ~maximum speed	Impossible	1200	
21	Preset5.SPD.	Multi-step speed command (5)	rpm	Preset4 ~maximum speed	Impossible	1800	
22 and above	----------	Blank functions					
Code No.	LCD indication	Setting Contents	Unit	Setting range (Selective items)	Change during operation	Default	User value
8) Option Setting items (Option)							
17	ISO61V Adj.	Isolation input offset adjustment.	V	-50.00~50.00	Impossible	0.0	
18	ISO61V Sel.	Isolation input form selection.	V	± 10V: Voltage input 4-20mA: Current input	Impossible	± 10V	
19 and above	----------	Blank functions					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

2.3.4 Data write protection and recording

(1) When data of each function has been set, we recommend Write Protection. See section 1.7.1

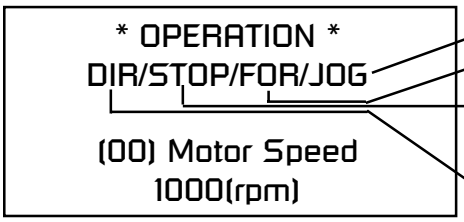
(2) We recommend that all function data be recorded and stored for future reference. Use section 7.3 for recording all data codes.

2.4 Operation mode

2.4.1 Running operation

DANGER: Make sure equipment is in safe operating condition prior to operating drive.

As OPR key is depressed, setting monitor of present condition is displayed. Changeover of REM/ DIR, FOR/REV, and running operation of console can be made. Also display is interlocked. VF61C must be auto tuned at this point before motor operation can commence.



JOG is displayed at jog running and ALM is displayed at trouble.
FOR is displayed at selection of forward running and REV is displayed at selection of reverse running.
Display of RUN during running,
STOP during stop and DCBR during DC brake and ALM is displayed at trouble.
Display of DIR at selection of console and REM at selection of terminal block. ALM is displayed at trouble.

3. Automatic Motor Tuning

3.1 Automatic Motor Tuning

Caution: Motor operates automatically. Insure machine is in a safe condition for auto tuning.

The exact equivalent circuit parameters of the motor must be measured in order for the vector drive to operate properly. Carry out auto tuning for the motor load only. Disconnect the motor from the load to prevent any influence of load inertia. Any holding brakes connected to motor must be disconnected or open manually for autotuning. Warning: Make sure load is secure prior to disconnecting brakes. Motor must be able to turn freely. Any external load will skew autotuning readings.

3.2 Connection between vector drive and motor

To perform auto tuning, there is the need to connect motor and inverter if not done already. Please connect 3 line loads of motor to respective output direction terminals of U, V, W of inverter. Although motor rotates when conducting auto tuning, rotational direction at that time is forward operation. If running in reverse, please exchange only two of 3 output terminals to motor after tuning is complete. Note: encoder is not required for Auto Tuning.

3.2 Entering motor nameplate data.

3.3 Motor 1 and Motor 2 nameplate data.

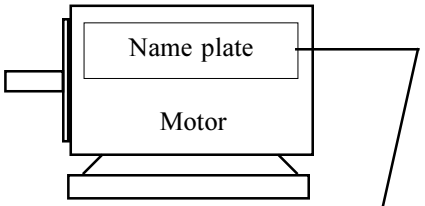
(1) Press the FUNC key.

(2) Select code number 16. Press the SET key, select SP, set-2 with the up arrow key, and press the SET key again.

(3) Scroll through the code number until code 17 is displayed. Set the data shown on the right according to the rating indicated on the name plate of the motor. Scroll up one code until all codes 17-22 are set.

(4) Encoder is not required for autotuning.

(5) Set code Sp.Set-1, #56 to OFF for tuning process. Return to ON after tuning is complete.



Set the values shown on the name plate of the motor.

Code #	Functions	Set items	Data
17	Motor.Cap	Rated capacity	7.5kW
18	Motor.V	Rated voltage	200V
19	Motor.I	Rated current	30A
20	Motor.SPD	Rated speed	1740rpm
21	Motor.Poles	Number of poles	4
22	Motor.Freq	Rated frequency	60 Hz

(Above table shows default set values for model 7r522)

3.4 Auto tuning procedure

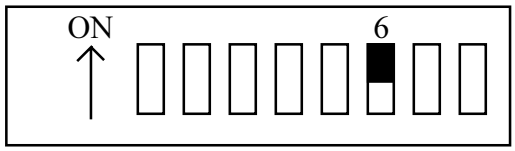
CAUTION: As the voltage is impressed to the motor with auto tuning, connect the GND terminal of the motor to ground.

WARNING: Motor will operate without input command.
Insure motor and load is in stable condition. Check for any possibility of personal injury during auto tuning.
NOTE: Auto tuning can be stopped by depressing STOP. Make motor selection No74 of Sp.Set-1. No=1 for motor 1, No=2 for motor 2.

Execute the operation of auto tuning after programming the input of above-mentioned motor name-plate value and choosing motor 1 or 2.

Remove the cover of the unit. Swing console to the right. Locate VFC printed circuit board and turn DIP-SW1 number 6 to ON position. Auto tuning is now operational.

DIP SW1



(1) SW1-No. 6 on control printed board of VFC61V is set ON. At that time, LED located on the printed board reads tun. (tuning)
(2) Set console to "Operation mode", and enter as "DIR" mode. Press JOG key once. LED display reads: tunSt. (tuning start)
(3) For 90 seconds, auto tuning takes place. When auto tuning is completed, LED display reads: tuned. (tuning end)
(4) When abnormality arises during auto tuning or auto tuning fails, display reads: tun--. In this case, SW1-No. 6 should be restored to OFF once and confirm connections to motor or input of motor nameplate input is correct. Then execute auto tuning once again.
(5) SW1-No.6 set to OFF.
(6) Restoring console to its original location, close the cover.
(7) Once auto tuning is completed, record data values of SP.Set-2 23 through 29 for motor 1 in Appendix program sheet for future reference.
(8) Current auto tune values are relative to particular motor. Should motor require rewinding or replacement auto tuning procedure must be completed again.
(9) Return code Sp-set-1, #56 to appropriate value after autotuning.
(10) Return inverter to REM mode of operation by depressing REM key. (key #5)

Note: If motor runs roughly or demonstrates unstable speed characteristics auto tuning must be completed again.
If auto tuning cannot be completed after 3 trials contact Drivecon Corporation for assistance.
In order to autotune motor 2 select No74=2 of Sp.Set-1. Repeat steps (1) through (7) to autotune motor 2.

4 Operation procedure

4.1 Test Operation

WARNING: When conducting test operations for maximum safety, please perform this operation when the motor is disconnected from machine or when the machine is unloaded.

DANGER: Motor may exhibit irregular operation during first time operation. Notify all personnel in general area of machine. Insure the inverter and motor are in safe operating condition prior to turning on the supply voltage.

Precautionary checks before test running.

CAUTION: After mounting and interconnections are completed please re-check for:

- Correct connections. Miswiring of R, S, T and U, V, W will destroy output section of unit.
- No short circuits exist on output circuit.
- No loose screws, wire scraps or tools are left behind.
- Correct input power supply is present at primary side of disconnect.

WARNING: 460VAC line power to 230V series inverter will destroy power section of unit.

CAUTION:

Only start the motor if motor shaft rotation is completely stopped.

Even with light loading never use a motor whose nameplate amperage exceeds the rating of inverter.

When starting and stopping the inverter be sure to use the START/STOP key or remote control input. Never apply a contactor between the drive and motor or on the input of the drive to start and stop the drive.

4.2 Setting of basic data

General settings such as speed control mode, stop mode, preset speeds, maximum rotational speed, and acceleration/deceleration time should be set. As regards the method of setting, refer to section 2.3 of this manual for programming instructions.

4.3 Operation by console (not required)

Operation by console is possible for VF61C. In the case of operation by console, please operate by the following procedures listed below:

(1) Set the rotational speed desired at Ref (set)SPD code 0.
(2) Depress OPR key. "Operation Mode" will be displayed on LCD display.
(3) Depress DIR key. "DIR" will be displayed on LCD display. ("DIR" allows operation from console, REM allows operation from terminal block)
(4) As START key is depressed, operation signal (52A) relay actuates and motor accelerates.
(5) As long as START key is depressed, motor accelerate up to RefSPD. Start key is momentary.
(6) To change the rotating direction of motor, change over is conducted by depressing FOR key (forward operation) or REV key (reverse operation).
(7) JOG operation is available with VF61C type inverter for testing the operation of the VF61C and system. Be careful in operation since the limits controlling the motion are not operationable.
(8) Depress REM key to return inverter to remote mode of operation.

WARNING: When operating from the console, many safety interlocks may be bypassed. It is important to use direct mode only when motor is disconnected from load.

4.4 Operation by terminal block input / remote mode

For normal operation of VF61C by terminal block ie. 'REM' remote mode is described below.

(1) Depress OPR key and set "Operation mode" in LCD display.
(2) Enter remote operation mode by depressing REM key. Note: LCD display will read REM/ STOP/FOR (REV).
(3) Programmed speed control mode set at Sp.Set-1 code 47 Data-A.1 will determine which type of speed control mode will be used. This will determine the actual connections to the D61532 input isolator from remote operator controls. The choices are:
    a) Analog voltage or current input with separate discrete run signals
    b) Multi-step mode (up to 5 speeds)
    c) 2 step infinitely variable speed control.
    d) 3 step infinitely variable speed control.
(4) With the D61534 (110VAC) or D61535 (24VAC) interface installed, the relative AC input at each of #1 through #9 terminals will produce the desired inverter command. All inputs are momentary.

Note: When (START-F) and (START-R) are commanded at the same time, inverter remains at 0 rpm and display shows Ein.

Note: Should E-stop input open and run command be active for 10 seconds at same time, STrF will occur.
Note: Should switching sequence occur out of order ie.. speed 3 before speed 2, SEF will be displayed.
Note: The VF61C will remain in the selected operation mode of the power supply is removed or until another operation mode is selected.
Note: Reset function will not be acknowledged until run signal is turned off.

4.5 Adjustment of speed control processing system

In VF61C, two different speed control processing modes are available for different response characteristics.
(1) Robust control (MFC)
(2) PI control

(1) Robust control (MFC) control is such that by presuming the amount of load speed overshoot is minimized therefore suppressing the fluctuation of speed during rapid change of load.
System moment of inertia [J] code 31 Sp.Set-2 needs to be programmed because VF61C is set to Robust control at time of shipment. System moment of inertia is calculated by the following formula for GD^2 of load:

$J\ [gm^2] = 1/4GD^2\ [kgm^2] \times 1000 \times (0.2 \sim 0.5)$

To be set 20%~50% of calculated value.

Calculated value [J] is set at No. 31 [System moment of inertia (System J.)]. When GD^2 of load is unknown, System moment of inertia should be programmed to the value of about 2 times for GD^2 of motor. After setting of [J], please operate and adjust code 6 Sp.Set-1 [ASR proportional Gain (ASR P-Gain1)] and code 7 Sp.Set-1 {ASR.I-Time)].

4.6 Weight Measurement Function

Codes for setting: **Special Set #1 - 71** (Weight Measurement mode)

0 – disable,
1 – empty hook test mode (hook, block and any elements considered as empty integrated with hook)
2 – Certified load calibration test mode max crane tested load e.g. 125%
3 – Operation mode – (programmed stop+ down only allowed)
Special Set #1 – code 72 (Certified load value-known load rated in tons)- Must be max crane test weight e.g. 125% crane capacity
Special Set #1 – code 73 (Weight measurement threshold level rated in tons)

General notes:
1 – Code 73 must be always set for lower value than code 72.
2 – Any setting change should be done when VFD is in the stop mode.
3 – Changing code 72 and 73 after calibration test is not permitted.
4 – If threshold level should change recalibration is required.
5 – Set-up sequence is critical to proper functioning.
6 – Insure inverter direction corresponds with display of inverter and motor direction. Negative sign should be displayed in down mode only.

Set up procedure:

1 – Raise the hook off the ground, and any other devices associated with the hook (block and any elements considered as empty integrated with hook) should be off the ground before processing to the next step.

2 – Set code 71=1. Operate hoist in up direction until "1ET" will display on LED. VFD records torque value and stops in 1-2 seconds according with stop mode. Hoist could be operated either in DIR or REM mode. VFD will stop in selected mode right after "1ET" displayed. No further hoisting permitted. Down operation allowed. Do not reset drive. Change code 71=0 and bring the hook down to pick up certified load.

3 – Because certified load should be raised off the ground before proceeding to certified load calibration test mode, raise the certified load off the ground with code 71 set for 0.

With load in the air set:
code 72 = certified load value [ton]
code 73 = threshold level – trip point level [ton] consult with crane user
code 71 = 2

4 - Operate hoist in up direction until "2ET" will display on LED. VFD records torque value and stops in 1-2 seconds according with stop mode. Hoist could be operated either in DIR or REM mode. VFD will stop in selected mode right after "2ET" displayed. No further hoisting permitted. Down operation allowed however for better operation code 71 set for 0 is recommended after certified load test is done. Do not reset display.

5 – Lower the certified load with code 71=0 and disconnect load of the hook. Set code 71 = 3. Crane is ready for operation.
If load on the hook exceed values set to code 73 VFD trips on "Ler" and only lower direction is permitted.

4.7 Raise direction torque limit adjustment

Using the Hoist VFD keypad:

1. Depress the FUNC key. This will cause the LCG display to show “Function” mode.
2. Hit the Shift key, the cursor will be flashing in the upper left hand corner. Using the numeric keys enter 16 and hit the SET button. The LCD will display “Sp.Set 1”. Hit the SET button again. Use the Up arrow key to advance the code number shown in the upper left hand corner until it shows code number 17 “For-Lim.T(P).
3. Hit the SET button again. Use the numeric keys to enter the new torque limit level. Try a setting of 100 to start. After entering the new value of 100, hit the set button again to enter the new value.
4. Try to lift the new 95% test load.
5. Adjust code 17 , “For-Lim.T(P). Up or down until the hoist just stops lifting the test weight.

To lock out any programming changes to the Hoist VFD’s, on the 8 position DIP switch SW1 [located under the front cover of the vfd, on the lower portion of the main control board] set switch element number 1 to the UP position.

To lock out any program changes to the Trolley drives, set code 60 to 3 from the default setting of 0. Set it back to 0 to re-enable if you need to.

5. Fault Diagnostics

5.1 Error Messages

When the inverter malfunctions or diagnostic trouble, an error message and an error code are displayed on the console and 7-segment LEDs. The inverter stops and error contacts 3, 4, and 5 change state. In such a case, see the table shown below, locate the error display, and take proper countermeasures. Also refer to the contents and values of monitor code 17 Trouble monitor (i.e., reading past error records).

Display on console	Display on LEDs	Error contents	Protection	Error contacts	Retry	Causes and countermeasures
Overcurrent	oC	Excessive output current	Inverter Stops	Active		The inverter output current exceeds the allowable value. See 5.2.2
IGBT Fault	iGbt	IGBT error (7.5kW or less)	Inverter Stops	Active		The IGBT(IPM) is out of order. Error details: Overcurrent, abnormal gate power supply, or overheat. See 5.2.4
IGBT(U) Fault	iGt1	IGBT (U phase) error (11kW or larger)	Inverter Stops	Active		
IGBT(V) Fault	iGt2	IGBT (v phase) error (11kW or larger)	Inverter Stops	Active		
IGBT(W) Fault	iGt3	IGBT (W phase) error (11kW or larger)	Inverter Stops	Active		
Over Voltage	oU	Excessive DC voltage	Inverter Stops	Active	O	The DC voltage exceeds the allowable value. See 5.2.3
Over Load	oL	Overload (Electronic thermal)	Inverter Stops	Active		Overload current flows for long time. See 5.2.5
Blown DC fuse	FU	Main circuit fuse blown	Inverter Stops	Active		The IGBT is broken, and the fuse blows out. See 5.2.6
Start Failure	StrF	Malfunctioning in starting	Inverter Stops	Active		The inverter fails to start operation, though an operation signal is inputted. (Instantaneous stop occurs in the instantaneous stop mode)
Over Speed	oS	Over-speed	Inverter Stops	Active	O	Actuation takes place when motor exceeds forward running overspeed and reverse running overspeed of special setting item (1).
Over torque	ot	Over torque	Inverter Stops	Active		When torque command exceeds 105%, count is started. When count exceeds 100, actuation takes place.
DSP ROM error	cS3	ROM for DSP is abnormal	Inverter Stops	Active		ROM or printed board is abnormal.
EXT Failure-1	En1	External error 1	Inverter Stops	Active		An external error. Check the input.
EXT Failure-2	En2	External error 2	Inverter Stops	Active		An external error. Check the input.
None	SCd	Slack cable detection signal	Inverter Stops	N/A		Slack cable detected.
None	brC	Mechanical brake control signal	Inverter Runs	N/A		None. Normal brake release operation.
None	bSA	Brake slip alarm signal	OSPD	N/A		Brake slip detected.
None	rtE	Rotation error signal	OSPD	Active		Misrotation detected.
None	O.up	'Quick Pick' signal	None	N/A		'Quick Pick' function active.
None	brE	Brake release answer back error signal	OSPD	N/A		Brake release abnormal.
None	bSE	Brake setting answer back signal	OSPD	Active		Brake setting abnormal.
None	StE	Starting torque detection error signal	Inverter Stops	Active		Motor starting torque insufficient.
None	SEF	Sequence error fault signal.	Inverter Stops	N/A		Input sequence error.
None	Ein	Both in error fault signal.	Inverter Stops	N/A		Both directions signaled together.
None	noP	No phase of output current error.	Inverter Stops	Active		Output current abnormal.
None	tLd	Travel limit detection signal.	Inverter Stops	N/A		Travel limit detected.
None	LEr	Weight measurement error signal.	Inverter Stops	N/A		Weight limit exceeded.

Display on console	Display on LEDs	Error contents	Protection	Error contacts	Retry	Causes and countermeasures
EXT Failure-3	En3	External error 3	Inverter stops	Active		Check the external error input side.
EXT Failure-4	En4	External error 4	Inverter stops	Active		Check the external error input side.
Panel Error	PnEr	Console panel error	Inverter stops	Active		Check the connector of the console panel.
Option Error	OPEr	Internal optional board error	Inverter stops	Active		Check the optional printed circuit board.
EEPROM Error	cS2	Data storage error	Inverter stops	Active		The default data is not stored, or the control board is out of order.
None	cS1	Program memory (ROM) error	Inverter stops	Active		ROM memory on CPU board is corrupted. Change ROM by replacing control board.
TX/RX Error	tS	Communication is abnormal	Inverter stops	Active	O	Actuation takes place when serial communication becomes abnormal.
SPD.Cont. Error	SPd	Speed control error. Note: 2	Inverter stops	Active		Actuation takes place when deviation of speed command value and motor speed become OFF from slant line part.
None	uU	Under voltage (Power failure)	Inverter stops	Inactive		With display of LED alone, restart is possible without reset. To erase display, depress RST key setting operation mode.
None	LUbt	Battery for backup is abnormal. Note: 1	-	Inactive		Display is conducted when battery for memory backup drops below 2.0V. Although running is possible during display replace within 1 week. Refer to 5.2.9
None	EnGon	Emergency stop During ON of (12)-(17) terminals.	Inverter stops	Inactive		When emergency stop is set OFF, display is erased. (In the case other abnormality display takes priority)

Note: 1 Should ROM abnormality arise, display alone of LED of inverter is active. LCD display in console is active.

Caution: In the case of serious alarm such as ground fault, please reset only after removing root cause of problem or serious damage to inverter may result.

Note: Inverter can be reset only after run signal is removed from inverter.

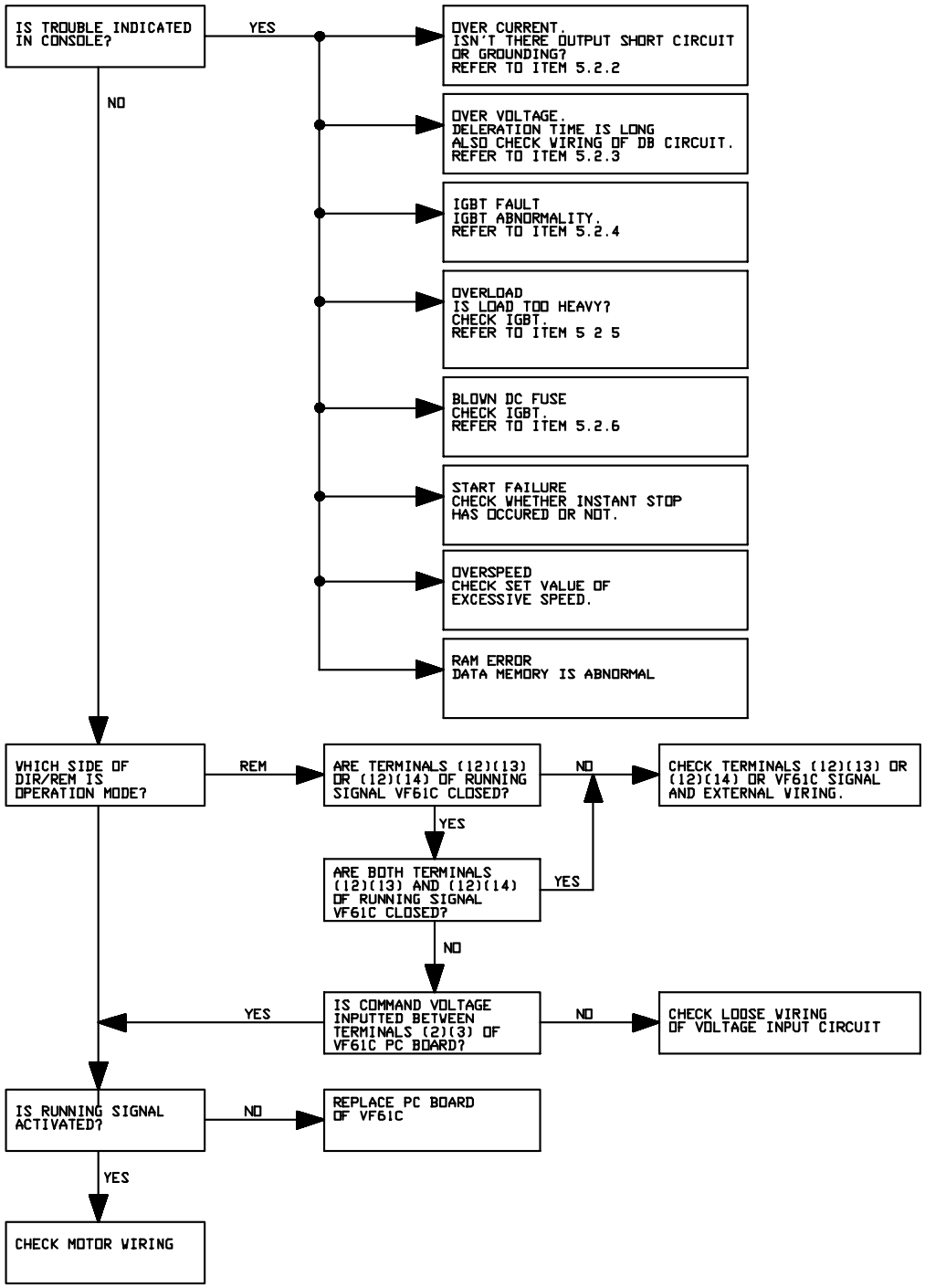
5.2 Troubleshooting

If an error occurs during operation, locate the cause in the procedures shown below. If there are no applicable items below, contact Drivecon Corporation or the dealer you purchased your VF61C from.

CAUTION:

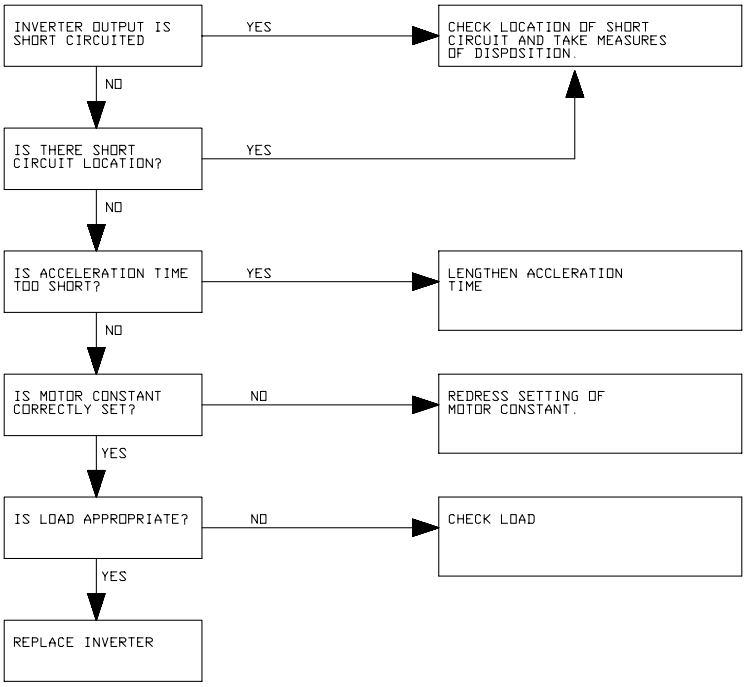
1. Never open the cover while the power is being supplied to the inverter.
2. Before inspecting the inverter, turn the inverter power off, open the inverter cover, and make sure that the CHG LED on the printed board is off.
3. Note that the heat sink may be hot according to the use conditions.

5.2.1 Motor does not run

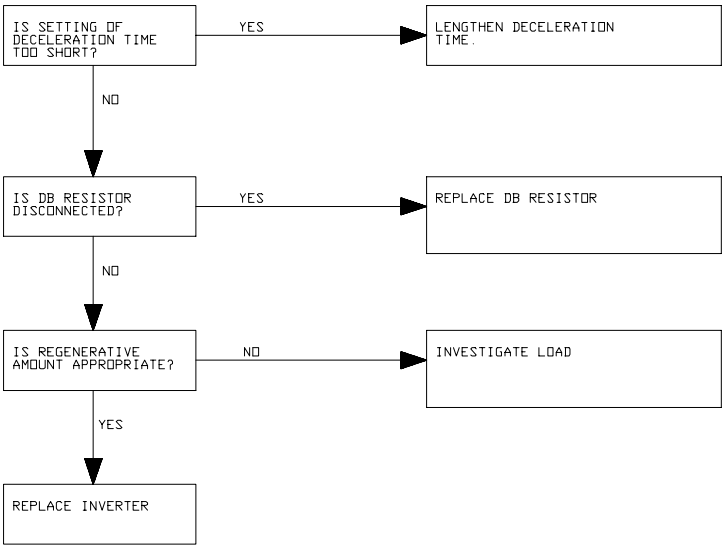


Note 1: Input conditions of terminals (12)-(13), (12)-(14) can be confirmed by measuring DC voltage at specific terminals: 15VDC signal is off. 0VDC signal is on.

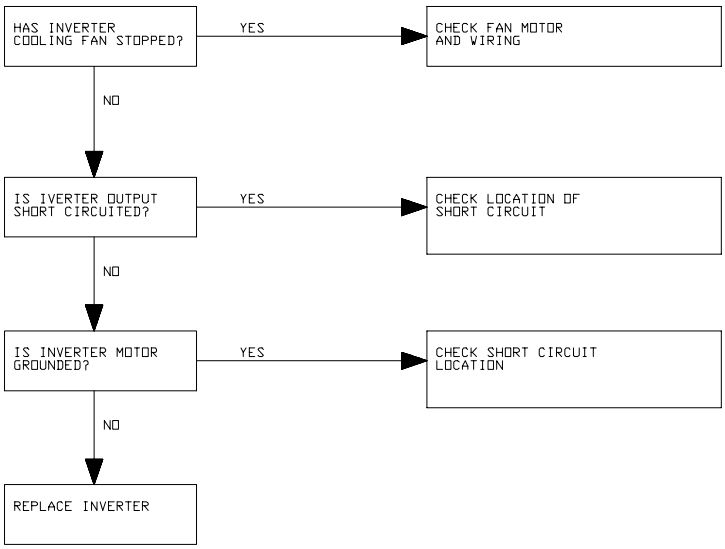
5.2.2 oc display flickering



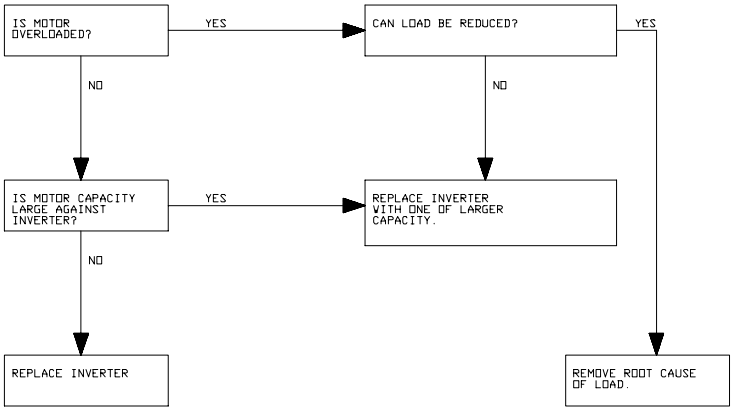
5.2.3 oU display flickering



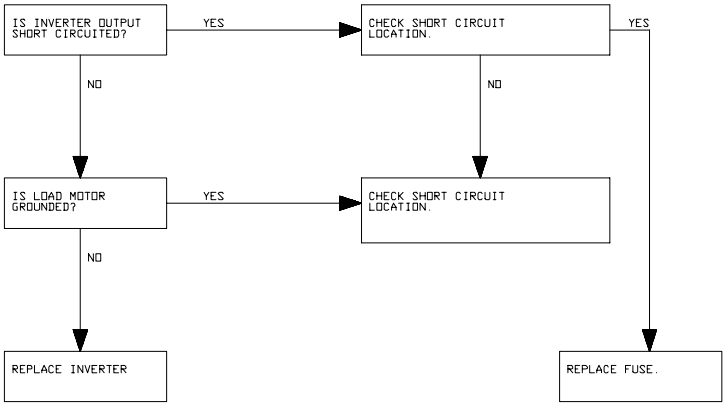
5.2.4 iGbt display flickering



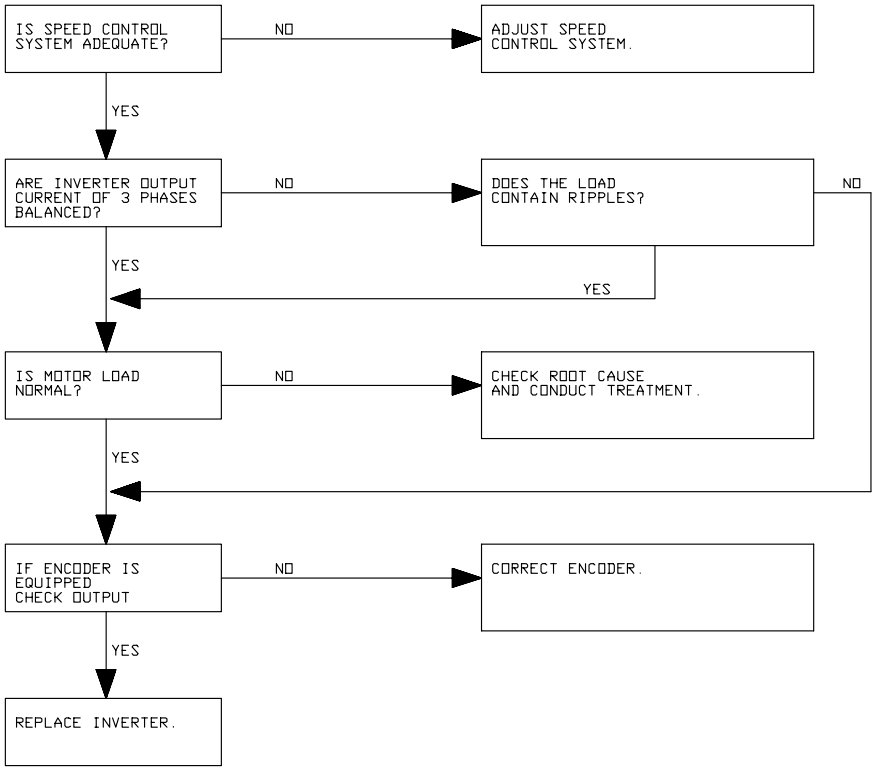
5.2.5 oL display flickering



5.2.6 Fu display flickering



5.2.7 Motor rotation is not smooth. First try auto tuning process since motor characteristics may have changed.



CAUTION:
1) In no event should cover be opened when power supply is present.
2) After power supply is cut off and after the CHG light is out, it is safe to conduct the inspection.
3) Heatsink temperature will become hot. Do not touch.

5.2.9 LUbt display flickering

In the case this display is lit, this indicates that it is time to replace the battery used for retaining memory data. Whereas, despite this display is flickering, unless the power supply line is turned off for longer than one week, data in any event will be erased. Also, there is no prevention from normal operations. (Incidentally, the life of the battery is about 7 years under normal conditions. Also in the case of closing power supply source, there is no consumption of battery.)

5.3 Phase lack of input power supply source.

Under normal conditions loss of input phase will trigger a uU fault. It is strongly recommended that the root cause of this failure be identified and corrected immediately.

6. Inspection and Maintenance

6.1 Periodical Inspection

In order to maintain the inverter in the best condition and allow it to realize its full performance, carry out periodical inspection once every six months.
The inverter and its peripheral equipment should be inspected by an engineer familiar with safety precautions and proper handling of electric apparatus.

CAUTION:

1. Turn the inverter power off to avoid electrocution. Open the front cover, and make sure that the CHG LED in the lower part of the printed circuit board is off.
2. Note that the heatsink may be hot in some operating conditions.

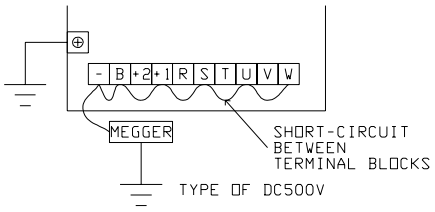
Inspection list

Applicable parts	Check points
General chassis	Check the ventilation holes and heat sink for dust or foreign debris. Clean if dusty.
Cooling fan	Check the cooling fan for dust or foreign debris. Clean it if dusty. We recommend that the cooling fan be replaced after 3 to 5 years of operation, provided the inverter is used for 12 hours a day.
Inside of unit	Check the printed circuit board and other electronic parts for dust or foreign debris. Clean them if dusty.
Terminal blocks & set screws	Check the terminal blocks and set screws for tightness. Retighten them if loose.
Connectors	Check the connectors and terminals of the control PCB for looseness.
Wiring	Check the insulating covering of the wires for cracks, deformation or other defects.
Electrolytic capacitors	Check the electrolytic capacitors for leakage of electrolyte, discoloration or other defects. Replace it if some abnormalities are found. The capacitors should be replaced every five years, provided the inverter is used for 10 hours a day at the average ambient temperature of 35°C. (See Note below)

Note: 1 In the case of using condenser that was kept as spare part for more than 3 years, please use this condenser after conducting aging as described below.
Use of aging condensers:
Before running inverter, output wires of inverter are removed, impose 1/2 rated input voltage on inverter for 1 hour. Increase to rull rating for extra 8 hours before use.

6.2 Isolation resistance test

DANGER: Insure all power is removed from inverter and 'CHG' LED is extinguished before working on inverter.
(1) Clean respective parts and conduct isolation resistance test using DC 500V megger. Megger test is such that all wiring should be removed once and sections between terminal blocks of main circuit should be short-circuited as shown in the following drawing.



CAUTION: Do not perform megger test on terminal block of control circuit PC board.

(2) On completion of preparation, measure insulation resistance between the terminals and GND terminal of TB1 on the main power terminal block.
(3) On completion of testing, remove the shorting wire and connect all conductors with care not to misplace them.

6.3 Precautions for replacing Printed Circuit Board

DANGER: Insure all power is removed from inverter and that 'CHG' LED is extinguished before working on inverter.

When the printed board VFC61C is replaced with a spare board, input the previously-used function set values from the console. Please conduct initial adjustment as per the procedure described below.

1) Register the stored data of printed board before replacement. Remove power from inverter once recorded and lock out power.
2) Setting of No. 8 of DIP-SW1 must be the same as that of old printed board.
3) Replace PCB by disconnecting all wires and terminal connectors. It is advised that all connections are marked to insure correct re-connection.
4) Install new PCB and double check all connections. Reconnect power to unit once checked.
5) Set No.l (write protect) of DIP-SW1 to **OFF** and set No.7 (initialization of setting) to **ON**.
6) Display as rEturn to FActorY SEttinG (return to factory setting) appears in LED and flickering takes place by SurE (sure).
7) As push button SW2 is depressed, since inverter type name of 2r222 is displayed, depress SW2 until correct type is obtained.
8) When type of inverter is obtained, release SW2. Unless SW2 is operated within 3 seconds, value displayed is stored in memory.
9) When End (end) is displayed in LED, the adjustment is complete. Restore No.7 of SW1 to OFF. If error is made, repeat steps starting at number 5.
10) Measure the voltage between (+2) and (-) of main circuit terminals using DVM. That value should be set to special setting #3 code 34 (Basic VDC voltage fine adjustment (Vdc.Ref.Adj) of special setting item (Sp.Set2). (WARNING: Main circuit contains high voltage.)
11) Input set data from old PCB. Once the above has been done, replacement is complete.

Once the above has been done, replacement is complete.

Appendix 7.1

D61534 110vac Input Signal Isolator Board
P/N 10561534 PCB Revision 1
D61535 24vac Input Signal Isolator Board
P/N 10561535 PCB Revision 1

For use with Drivecon VF61 V/S Flux Vector or VF61C Crane Specific series variable frequency drives

Introduction

The D61534 / D61535 Input Signal Isolator Boards are for use with Drivecon VF61 V/S/C Flux Vector series of variable frequency drives. They are designed to accept external 110vac or 24vac inputs from switch or relay contacts. The D61534 will accept 110-120vac signals and the D61535 will accept 24vac input signals. The D61534 will not function with 24vac input signals and the D61535 will be damaged if used with 110vac input signals.

Either model of input isolator boards will provide direction [run forward / run reverse] and up to 4 additional preset speeds. Another input is assigned as an external fault reset. Two additional inputs can be assigned individual functions from a list of 7 programmable functions. Also available are two separate relay outputs that can be individually assigned separate functions from a list of 12 programmable functions. Each input has a red LED indicator that illuminates when the input is active and is optically isolated from the VFD main control board. Each programmable relay output has a green LED indicator that illuminates when the output is active. Each relay has "dry" form C contacts available at the terminal strip for external use. There are also two slowdown travel limit switch inputs, one for each direction that will cause the VFD to slow down to the programmed minimum speed level in the affected direction. Normal travel and speed control are still available for the other direction. The slowdown limit switch should open to cause the VFD to slowdown. A yellow LED indicator is illuminated when the limit switch is closed indicating normal travel and speed are available.

Table 1 Basic Program List for VF61C Flux Vector Crane Specific Drives

D61534 / D61535 terminal No.	Code Group to assign function	Code number to assign function	Code Group to set values	Code No. to set values
1 Fwd	Sp.Set 1	Code 47	PGM. Mode	Code 17
2 Rev	Sp.Set 1	Code 47	PGM. Mode	Code 17
3 2nd speed	Sp.Set 1	Code 47	PGM. Mode	Code 18
4 3rd speed	Sp.Set 1	Code 47	PGM. Mode	Code 19
5 4th speed	Sp.Set 1	Code 47	PGM. Mode	Code 20
6 5th speed/Prog input 1	Sp.Set 1	Code 24 (not available in 5 step mode)	PGM. Mode	Code 21
7 Prog input 2	Sp.Set 1	Code 25		
8 Prog input 3	Sp.Set 1	Code 26		
9 Prog input 4	Sp.Set 1	Code 27		
10-12 Prog output 1	Sp.Set 1	Code 28		
13-15 Prog output 2	Sp.Set 1	Code 29		
16 110vac neutral	Not programmable	110 v neutral only		

Table 2 Basic Program List for VF61V/S Flux Vector Variable Frequency Drives

D61534 / D61535 terminal No.	Code Group to assign function	Code number to assign function	Code Group to set values	Code No. to set values
1 Fwd	Sp.Set1	Code 54	Sp.Set1	Code 0
2 Rev	Sp.Set1	Code 54	Sp.Set1	Code 0
3 2nd speed	Sp.Set1	Code 32	PGM.Mode	Code 17
4 3rd speed	Sp.Set1	Code33	PGM.Mode	Code 19
5 4th speed	Sp.Set1	Code 34	PGM.Mode	Code 23
6 Prog input 1	Sp.Set1	Code 35		
7 Prog input 2	Sp.Set 1	Code 36		
8 Prog input 3	Sp.Set 1	Code 37		
10-12 Prog output 1	Sp.Set 1	Code 28		
13-15 Prog output 2	Sp.Set 1	Code 29		
16 110vac neutral	Not programmable	110 v neutral only		

Specifications

Table 3

110v input level	100 vac minimum	125 vac maximum	½ watt burden - 5mA per input. Red LED illuminates on input activation
110v input isolation	2000 VRMS	Optically isolated	
Relay output 1	Form C contacts rated at 250 vac @ 2 amps	Terminal 10 - N/O Terminal 11 - N/C Terminal 12 - COM	Green LED illuminates on relay pick-up
Relay output 2	Form C contacts rated at 250 vac @ 2 amps	Terminal 13 - N/O Terminal 14 - N/C Terminal 15 - COM	Green LED illuminates on relay pick-up
Power requirements	15 vdc @ 75 mA from VFD main control board	No external DC power required	
Temperature Range	0 - 50° C		
Humidity	Less than 90 %		
Altitude	Less than 3000 ft		
Storage temperature	-20° C to +70° C		

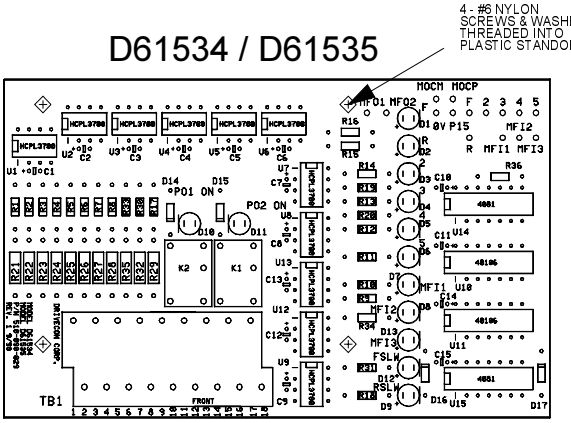
Wiring Diagram

Refer to Drivecon Drawing Number 61534CON.VCD for electrical connection information.

CAUTION: This solid state isolator will be damaged if the output (connection to drive terminals) are wired in parallel with any external circuits.

VF61C SERIES
FLUX VECTOR VFD

D61534 / D61535



MAIN PCB

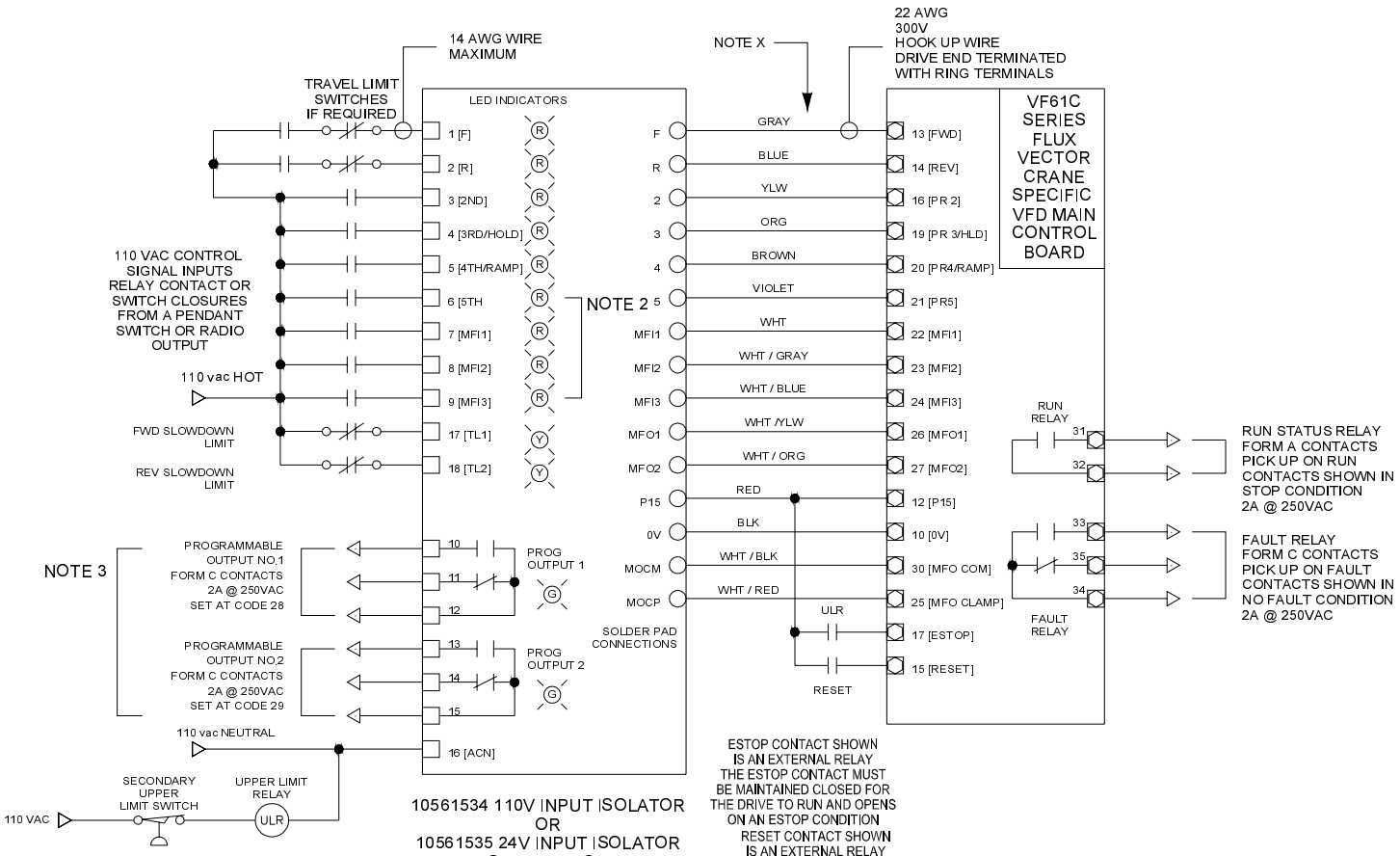
D61534 / D61535
MOUNTED UNDER FRONT
COVER OF VFD

DRIVECON CORPORATION
820 Lakeside Drive
Gurnee, IL 60031
Phone: (847) 855 – 9150
Fax: (847) 855-9650

REV. #	DATE	COMMENTS
REV. 0	9/9/98	

DRAWN BY:
CHECKED BY:

Title: D61534 / D61535 SIGNAL ISOLATOR MOUNTING ILLUSTRATION
Date: 9/9/98
Designer: RMP
Client:
DOCUMENT NUMBER: 615341N.VCD
Location:
A



NOTE 1 INSTALL SUPPRESSION ACROSS ALL INDUCTIVE LOADS.

NOTE 2 REFER TO PROGRAM GROUP [SP.SET1] CODES 24-27 FOR MULTI FUNCTION INPUT TERMINAL FUNCTION ASSIGMENTS

NOTE 3 REFER TO PROGRAM GROUP [SP.SET1] CODES 28-31 FOR MULTI FUNCTION OUTPUT TERMINAL FUNCTION ASSIGNMENTS

WARNING !!! WIRING DIAGRAMS DIFFER PER APPLICATION. PLEASE CONSULT THE SYSTEM WIRING DIAGRAMS OR CONTACT DRIVECON CORPORATION INSURE THAT ALL WIRING CONFORMS TO ALL INDUSTRY AND SAFETY STANDARDS

ULR REQUIRED TO E-STOP DRIVE IF SECONDARY TRAVEL LIMIT SWITCH IS OPENED. CAN BE MANUALLY BYPASSED OR BYPASSED WITH DOWN DIRECTIONS.

NOTE X: DO NOT MAKE ANY EXTERNAL CONNECTIONS IN PARALLEL WITH ISOLATOR PCB'S OUTPUT.

Title: 10561534 110VAC INPUT SIGNAL ISOLATOR BOARD. 10561535 24VAC INPUT SIGNAL ISOLATOR BOARD FOR USE WITH VECTOR VF61C SERIES CRANE SPECIFIC VFD CONNECTION DIAGRAM	Date: 9/9/98	REV. # / DATE / COMMENTS	
Client:	Designer: RMP	REV.0 9-9-98 GENERAL CONNECTION DIAGRAM. REV.1 10-9-98 ADDED SLOWDOWN LIMIT INPUTS REV.2 8-30-99 ADDED UPPER LIMIT RELAY REV.3 9-25-01 TERMINAL DESIGNATIONS	
Location:	Job Number: 61534CON.VCD	DRAWN BY: CHECKED BY:	

DRIVECON CORPORATION
820 Lakeside Drive
Gurnee, IL 60031
Phone: (847) 855-9150
Fax: (847) 855-9650

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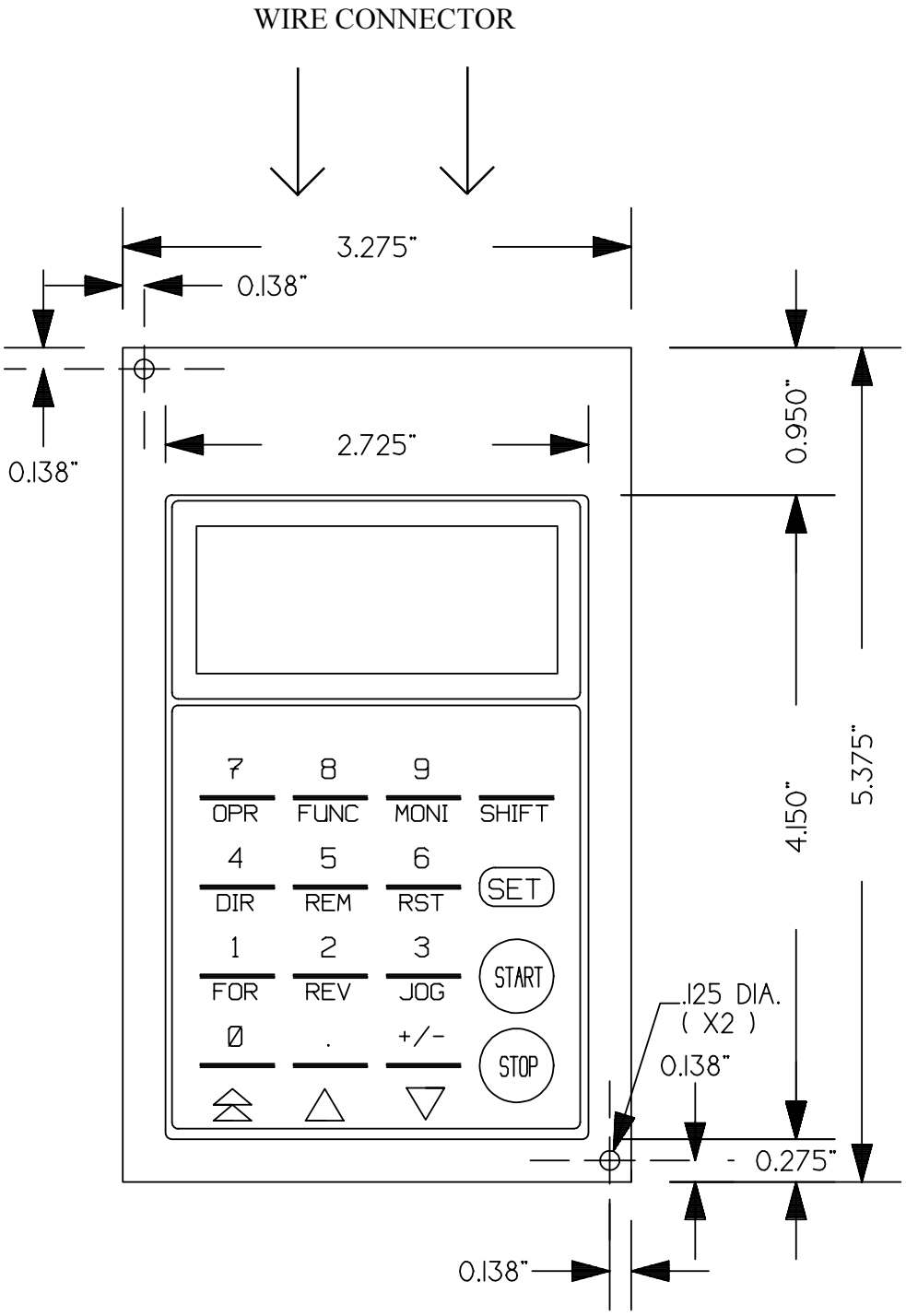
Appendix 7.2

11"x17" drawings of interconnection

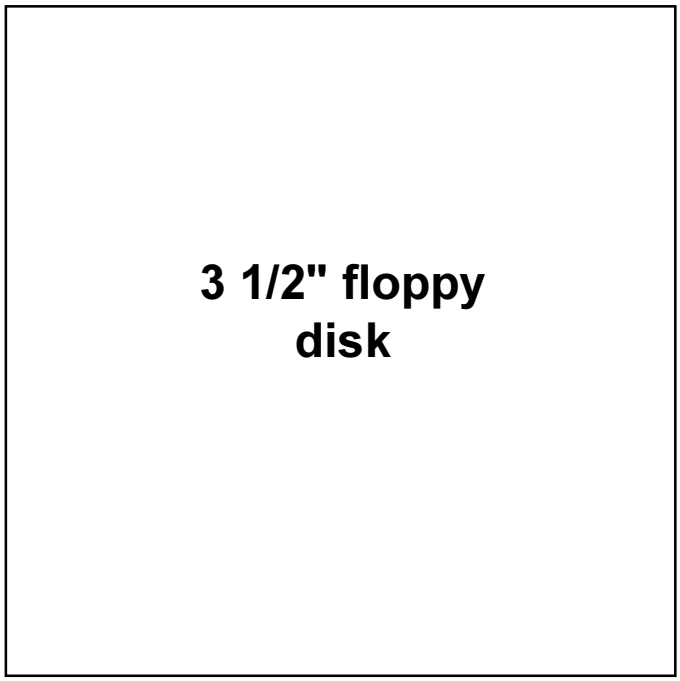
See page 5 and 6 of this manual.
11"x17" versions not available in electronic version.

Appendix 7.3 Operator Unit Dimensions



Appendix 7.4

Not available in electronic version.
Contact Drivecon if CAD files are needed.



Appendix 7.5

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
1) Basic Setting Items							
0	Ref(set)SPD	Ref., set speed	rpm	REV-Max.SPD~FOR-Max.SPD except -Min.SPD~+Min.SPD	Possible	0rpm	
1	FOR-MAX.SPD.	Forward maximum speed	rpm	Positive 71~400% of motor rated speed	Impossible	1800rpm	
2	REV-MAX.SPD.	Reverse maximum speed	rpm	Negative 71~400% of motor rated speed	Impossible	-1800rpm	
3	Min.SPD.	Minimum speed	rpm	0 ~ (Forward max. speed x 0.9)	Impossible	0rpm	
4	Preset6.SPD	Quick Pick Max. Speed	rpm	Motor rated speed~2x (±) motor rated speed.	Impossible	1800rpm	
5	Preset7.SPD	Quick Pick threshold speed	rpm	100rpm~MAX.SPD.	Impossible	1200rpm	
6	ASR.P-Gain1	ASR proportional gain 1	% / %	3~100	Possible	15	
7	ASR.I-Time	ASR integrated time	msec	10~10000	Possible	40	
8	Acc1.Time	Acceleration time (1)	sec	0.1~30 Acc(1) (2), Dec (1) (2) is selected by input terminal blocks, reverse plugging simulation or 'Quick Stop'	Possible	5.00	
9	Acc2.Time	Acceleration time (2)			Possible	3.00	
10	Dec1.Time	Deceleration time (1)			Possible	5.00	
11	Dec2.Time	Deceleration time (2)			Possible	3.00	
12	ASR.P-Gain2	DC Brake Magnitude	% / %	3~100	Possible	3	
13	DC-Br.Time	DC brake time	sec	0.5~30.0	Possible	3.0	
14	Stop SPD.	Stop speed	rpm	0~300	Possible	0	
15	Stop mode	Stop mode selection	N/A	Decl.Stop: Deceleration stop Dec.Stop (DC): 0 speed hold after deceleration stop. Free stop: Free run stop	Impossible	Dec.Stop (DC)	
16	Function up	Selection of special setting items	N/A	Sp.Set-1: Special setting 1 Sp.Set-2: Special setting 2 Sp.Set-3: Special setting 3 Sp.Set-4: Special setting 4 Sp.Set-5: Special setting 5 Disp.Set: Monitor output setting items PGM Mode: Program operation setting items Option: Option setting items	Possible	Sp.Set-1	
2) Special setting items (Sp.Set-1)							
17	FOR-Lim.T(P)	Torque limit (forward powering)	%	0~200	Impossible	150	
18	FOR-Lim.T(B)	Torque limit (forward braking)	%	200 fixed	Impossible	200	
19	REV-Lim.T(P)	Torque limit (reverse powering)	%	0~200	Impossible	150	
20	REV-Lim.T(B)	Torque limit (reverse braking)	%	200 fixed	Impossible	200	
21	FOR-Over SPD	Forward over speed	rpm	0~140% of FOR-MAX.SPD.	Impossible	1980	
22	REV-Over SPD	Reverse over speed	rpm	0~140% of REV-MAX.SPD.	Impossible	-1980	

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

Appendix 7.5

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (Selective items)	Change during operation	Default	User value
2) Special Setting Items (Sp.Set-1) (continued)							
23	Term.In.Sel	Multifunctional input command selection	N/A	Terminal: Terminal block Option: Option (communication)	Impossible	Terminal	
24	Term-21.Sel	Multi-function input. Setting (1)	N/A	1) Travel limit 2) Creep Speed 3) Top-N change 4) ARC2 5) Free RUN (base block) 6) Quick Pick 7) Brake Answer Back 8) Changing motor parameters 9) Changing ASR / ATR 10) 5 step / Analog input	Impossible	1	
25	Term-22.Sel	Multi-function input. Setting (2)	N/A		Impossible	2	
26	Term-23.Sel	Multi-function input. Setting (3)	N/A		Impossible	3	
27	Term-24.Sel	Multi-function input. Setting (4)	N/A		Impossible	7	
28	Term-26.Sel	Multi-function output. Setting (1)	N/A	1) Slack Cable Detection 2) Mechanical Brake Control 3) Brake Slip Alarm 4) Rotation Error Alarm 5) Quick Pick Enable 6) Brake Release Answer Back 7) Brake Setting Answer Back 8) Starting Torque Detection 9) Output phase loss 10) Over Speed Error 11) Travel Limit Detection 12) Weight Measurement Error	Impossible	1	
29	Term-27.Sel	Multi-function output. Setting (2)	N/A		Impossible	2	
30	Term-28.Sel	Multi-function output. Setting (3)	N/A		Impossible	3	
31	Term-29.Sel	Multi-function output. Setting (4)	N/A		Impossible	4	
32	Rotation Sel	Rotating direction selection	N/A	Min-SPD.Off: (not used) -SPD.Off: Inhibition of minus analog speed reference. Inhibit.REV: Inhibition of reverse running setting input.	Impossible	-SPD.Of	
33	IPF.Restart	Selection of restart from instantaneous power failure	N/A	OFF: Automatic restart off. ON: Automatic restart on.	Impossible	OFF	
34	SPD.Stall	Automatic deceleration ramp extend (stall prevention)	N/A	OFF: Stall prevention off. ON: Stall prevention on.	Impossible	OFF	
35	Retrial CNT	Number of automatic reset attempts	N/A	0~5 (0: No reset attempts = 0 times)	Impossible	0	
36	PI/MFC Sel.	Selection of PI/MFC control	N/A	PI: PI control system MFC: Robust control system	Impossible	PI	
37	REM.Term/DG.	Selection of remote setting place at DIR/REM	N/A	Terminal: Selection of terminal block. Option: Selection of digital option (Case of No.38~39 is set to "DIR/REM")	Impossible	Terminal	
38	Ref.SPD.Sel.	Selection of speed command setting location.	N/A	DIR/REM: Interlock to DIR/REM mode Terminal: Command from terminal block. Console: Command from console. AN.Option: Command from analog option. DG.Option: Command from digital option.	Impossible	DIR/ REM	
39	START-Sw.Sel	Selection of running command setting location.	N/A	DIR/REM: Linked to DIR/REM mode. Terminal: Command from terminal blocks. Console: Command from console. DG.Option: Command from digital option.	Impossible	DIR/ REM	
40	Mode Sel.	Operation mode speed/torque priority.	N/A	SPD.: Speed control mode. Torque: Torque control mode. Torque +: + direction of torque command takes priority. Torque -: - direction of torque command takes priority. SPD/Torq.: Changeover by contact (D-I) of speed/ torque control. Sync.Run: Synchronous running control	Impossible	SPD.	
41	Ext.SPD.Sel.	Selection of type of external speed reference input.	N/A	+,-10V: Voltage input (0~±10V) 4-20mA: Current input Pulse train: Pulse train input (0~150kHz)	Impossible	+,-10	
42	Ext.Ref.SPD.	Analog input selection.	N/A	Offset: Stack up method. Exhibit band: Insensitive band system	Impossible	Exhibi band	
43	Analog.-0.Lim.	Analog limit.	mV	0~999mV	Possible	0	
44	Trq.Ref Sel	Torque setting location selection.	N/A	Terminal: Command from terminal block. AN.Option: Command from analog option. DG.Option: Command from digital option.	Impossible	AN. Option	
45	Trq.Mode.Sel	Torque setting mode selection.	N/A	%: % command (at power constant area) ABS: absolute value command (at power constant area)	Impossible	%	
46	----------	Not used					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

Appendix 7.5

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
2) Special Setting items (Sp.Set-1) (continued)							
47	Data-A.1	Selection of operation mode for CRANE USE	N/A	1) Analog voltage (current) 2) Multi-step input 3) Infinitely variable speed control (2 step) 4) Infinitely variable speed control (3 step)	Impossible	2	
48	Data-A.2	Travel limit detect	N/A	OFF: Disabled ON: Enabled	Impossible	OFF	
49	Data-A.3	Creep Speed ratio	%	2~100	Impossible	100	
50	Data-A.4	TopN Change ratio	%	2~100	Impossible	100	
51	Data-A.5	Quick Stop mode select (ARC2 function select)	N/A	1) No Quick Stop operation 2) Quick Stop 3) Reverse Plugging simulation 4) ARC2 mode is controlled by Terminal block	Impossible	1	
52	Data-B.1	Start Torque detect time	sec.	0.5~10.0	Impossible	3.00	
53	Data-B.2	Brake Setting Time setting	sec.	0.5~30.0	Impossible	3.00	
54	Data-B.3	Brake release / Setting Answer back error	N/A	Off: Not enabled On: Answer back error enabled	Impossible	OFF	
55	Data-B.4	Brake release / Setting Answer back detect time	sec.	0.5~10.0	Impossible	10.00	
56	Data-B.5	Start torque detection error	N/A	Off: Starting torque detection error off On: Starting torque detection error on	Impossible	ON	
57	Data-C.1	Start torque detect level	%	0~100	Impossible	0	
58	Data-C.2	Slack cable detect	N/A	1) Slack cable detect disabled 2) Only alarm 3) Alarm + Stop mode + up only + Ref.Set.Spd 4) Alarm + stop mode + up only operation	Impossible	1	
59	Data-C.3	Slack cable detect torque	%	0~20	Impossible	5	
60	- - - - -	Slack cable detect mode. Starting torque setting.	%	0~20	Impossible	5	
61	Data-C.4	Quick Pick operation	N/A	Off: Quick Pick operation disabled On: Quick Pick operation enabled	Impossible	OFF	
62	Data-C.5	Quick Pick delay time	sec.	0.1~3.0	Impossible	1	
63	Data-D.1	Quick Pick stop torque	%	0~100	Impossible	20	
64	Data-D.2	Selection of rotation error detection & Brake slip alarm detection	N/A	0) Rotation Error off and Brake Slip Alarm off 1) Rotation Error off and Brake Slip Alarm on. 2) Rotation Error on and Brake Slip Alarm off 3) Rotation Error on and Brake Slip Alarm on	Impossible	0	
65	Data-D.3	Rotation error and brake slip alarm detect speed	rpm	0.1~10.0	Impossible	1	
66	Data-D.4	Motor current protection. Max. motor current setting.	%	105~300	Impossible	150	
67	----	Motor current protection. Base motor current setting.	%	20~100	Impossible	100	
68	Data-D.5	Output phase loss rotation value	rpm	0~500	Impossible	10	
69	Data-E.1	Output phase loss current value setting	%	0~100	Impossible	10	
70	Data-E.2	Output phase loss time setting	ms	10~2000	Impossible	655	
71	Data-E.3	Weight measurement mode	N/A	0) Weight measurement mode disabled 1) No load test 2) Full load test calibration 3) Programmed stop + down mode only	Impossible	0	
72	Data-E.4	Weight measurement during full load test	Ton (M)	0.1~1000	Impossible	0.1	
73	Data-E.5	Weight measurement trip point	Ton (M)	0.1~1000	Impossible	0.1	
74	----	Selection of Auto tuning	-	1: Motor 1 2: Motor 2	Impossible	1	
75	----	Start torque detect filter	msec	21~5000	Impossible	21	
76	-----	Slack cable torque detect filter	msec	41~5000	Impossible	120	
77	----	Quick Pick torque detect filter	msec	41~5000	Impossible	3000	
78	----	Weight measurement torque detect filter	msec	21~5000	Impossible	120	
79	----	Mechanical brake control time delay	sec	0.5~5.0	Impossible	3.00	
80 and above	----	Blank functions					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

Appendix 7.5

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
3) Special setting items 2 (Sp.Set-2)							
17	Motor Cap.	Motor capacity	kW	Within inverter capacity	Impossible	0.00	
18	Motor V.	Motor rated voltage	200V	100~230	Impossible	0.00	
			400V	220~460	Impossible	0.00	
19	Motor I.	Motor rated current	A	Within inverter capacity	Impossible	0.00	
20	Motor SPD.	Motor rated speed	rpm	100~12000	Impossible	0.00	
21	Motor Pole	Motor poles	Pole	2~12	Impossible	4.00	
22	Motor Freq.	Motor rated frequency	Hz	At motor rated speed	Impossible	0.00	
23	Leakage L	Leakage inductance	mH	Set automatically during auto tuning. Do not change unless motor control or drive circuit boards are changed.	Impossible	0.00	
24	Mutual L	Mutual inductance	mH		Impossible	0.00	
25	Motor M1 Comp.	Motor compensation rate (1)	%		Impossible	0.00	
26	Motor M2 Comp.	Motor compensation rate (2)	%		Impossible	0.00	
27	Motor R1	Primary resistance	m ohm		Impossible	0.00	
28	Motor R2	Secondary resistance	m ohm		Impossible	0.00	
29	Conductance	Conductance	mMho		Impossible	0.00	
30	PG-Pulse	Number of pulses per revolution of encoder	p/r	65~2400	Impossible	600	
31	System J.	System moment of inertia	gmm	1~32767	Possible	10	
32	FCL Level	FCL level	%	210~270	Possible	270	
33	DB-V	Dynamic braking voltage threshold	200V	320~360	Possible	340	
			400V	540~720	Possible	720	
34	Vdc Ref. Adj.	Basic VDC voltage fine adjustment	V	200~750	Possible	0	
35	An. In (+)	Analog input (term. No.2) (+) side gain adjustment.	-	0~1.100	Possible	1	
36	An. In (-)	Analog input (term. No.2) (-) side gain adjustment.	-	0~1.100	Possible	1	
37	Ref. Flux	Magnetic flux command	%	25~100	Impossible	100	
38	Flux Ref. Sel.	Selection of magnetic flux command changeover.	N/A	Internal: Usually used AN.Option: Analog option (terminal 2) DG.Option: Digital option	Impossible	Internal	
39	----------	Not used.					
40	----------	Not used.					
41	----------	Not used.					
42	----------	Not used.					
43	----------	Not used.					
44	Trq.Gain Adj	Torque gain fine adjustment.	%	-5.0~+10.0	Possible	0.00	
45	Trq.(AN).Gain	Torque command input gain adjustment.	%	-50.0~+100.0	Possible	0.00	
46	SPD.(AN).Gai	Speed command input	%	-50.0~+100.0	Possible	0.00	
47	OT.Sel.	Overload torque protection selection	N/A	OFF: No protection ON: Protection available	Impossible	OFF	
48	Over torque	Overload torque setting	%	-	Possible	150	
49	OT Base Torq.	Basic torque of over torque protection.	%	50~105	Possible	105	
50	OL.Current	Overload alarm current setting.	%	20~100	Possible	100	
51	OL.Pre.Alarm	Overload prealarm load factor	%	1~100	Possible	80	
52	Carrier F.	Carrier frequency	kHz	1.0~15.0	Possible	6.00	
53 and above	----------	Blank functions					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

Appendix 7.5

Model VF61C_____ SN:_____ EPROM: VF61V-71(2)-G3							
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
4) Special setting items 3 (Sp.Set-3)							
17	Weaken Flux	Weak field magnetic flux command	%	50~205	Impossible	100	
18	Lim.SPD (Ref)	Speed setting limit	%	10~105	Possible	105	
19	CHG.Max.SPD.	Max. speed reduced setting	%	50.0~100.0	Possible	90.9	
20	Trq.Limit Up	Torque limit value up at start.	%	100~150	Possible	100	
21	Start Trq. Up	Starting torque up.	%	100~150	Possible	100	
22	SPD.Cont.Err	Selection of speed control error protection.	N/A	OFF: No protection of speed control error. ON: Speed control error protection is available.	Impossible	ON	
23	Pre.Flux sel.	Initial excitation AC/DC changeover selection.	N/A	AC: AC (rotation) excitation from time of start. DC: DC excitation from time of start.	Impossible	AC	
24	Pre.Flux SPD.	AC/DC initial excitation changeover speed.	rpm	0~100	Impossible	25	
25	Pre.Flux time	Completion time of initial excitation.	%	100~1000 (Value against initial excitation time)	Impossible	100	
26	Ext.86A Sel.	Changeover of external protection relay.	N/A	OFF: Not active ON: Active	Impossible	ON	
27	Power DN.86A	Changeover of under voltage relay.	N/A	OFF: Not active ON: Active	Impossible	OFF	
28 and above	----------	Blank functions					
Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
5) Special setting items 4 (Sp.Set-4)							
17	Motor Capacity	Motor 2 capacity	kW	Within inverter capacity	Impossible	0.00	
18	Motor V	Motor 2 rated voltage	V	100~230	Impossible	0	
		Motor 2 rated voltage	V	220~460	Impossible	0.00	
19	Motor I	Motor 2 rated current	A	Within inverter capacity	Impossible	0	
20	Motor SPD	Motor 2 rated speed	rpm	400~12000	Impossible	0.00	
21	Motor Pole	Motor 2 poles	Pole	2~12	Impossible	4.00	
22	Motor Freq.	Motor 2 rated frequency	Hz	At motor rated speed	Impossible	0.00	
23	Leakage L	Motor 2 leakage inductance	mH	Set automatically during auto tunining. Do not change unless motor or drive control circuit boards are changed.	Impossible	0.00	
24	Mutual L	Motor 2 mutual inductance	mH		Impossible	0.00	
25	Motor M1 Cmp.	Motor 2 compensation rate (1)	%		Impossible	0.00	
26	Motor M2 Cmp.	Motor 2 compensation rate (2)	%		Impossible	0.00	
27	Motor R1	Motor 2 primary resistance	m ohm		Impossible	0.00	
28	Motor R2	Motor 2 secondary resistance	m ohm		Impossible	0.00	
29	Conductance	Motor 2 conductance	mMho		Impossible	0.00	
30	PG-Pulse	Motor 2 number of pulses per revolution of encoder.	p/r	65~2400	Impossible	600.00	
31 and above	----------	Blank functions					

Note: **VF61V-71-G3 Eprom for models VF61C-1R1~55**
VF61V-72-G3 Eprom for models VF61C-75~315

* Depends upon capacity of inverter

Appendix 7.5

Model VF61C_____	SN:_____	EPROM: VF61V-71(2)-G3

Code No.	LCD indication	Setting Contents	Unit	Setting range (selective items)	Change during operation	Default	User value
6) Monitor output setting items (Disp.Set)							
17	Trace count	Count after trace back trigger.	-	1~90	Possible	50	
18	Trace pitch	Trace back pitch.	ms	1~100	Possible	1	
19	Analog output	Analog output selection.	N/A	Iout: Output current Torq.Ref.: Torque command Internal Mon: For our adjustment SPD.Ref.: Reference setting speed Calib.: For output calibration	Possible	Iout	
20	Amp-0V.Adj.	Analog meter 0V adjustment.	-	-50~+50 (Current / torque)	Possible	0	
21	Fout Sel.	Selection of output item of terminal block No.9	N/A	Speed: Actual speed (frequency) 1/2-PG: Output of 1/2 frequency divider Frequency: Frequency output. Calib.: For output calibration.	Possible	Speed	
22	LED-Disp.Sel.	Selection of main body LED display.	N/A	Motor speed: Motor speed Speed ref.: Reference speed Iout: Output current. Torq. Ref.: Torque command. Vdc: DC bus voltage. Fout: Output frequency. OL.counter: Overload counter. Line speed: Line speed by conversion. MPU ROM ver.: MPU ROM version DSP ROM ver.: DSP ROM version I1 term check: Input terminal blocks check (1) I2 term check: Input terminal blocks check (2) 0-term check: Output terminal block check. Option Moni: Option monitor.	Possible	Motor speed	
23	----------	Selection of LED display indication of Mechanical Brake Control	N/A	Off: No indication On: Indication is available	Possible	Off	
28 and above	----------	Blank functions.					

Code No.	LCD indication	Setting Contents	Unit	Setting range (Selective items)	Change during operation	Default	User value
7) Program Mode (PGM.Mode)							
17	Preset1.SPD.	Multi-step speed command (1)	rpm	Minimum ~maximum speed	Impossible	300	
18	Preset2.SPD.	Multi-step speed command (2)	rpm	Preset1 ~maximum speed	Impossible	600	
19	Preset3.SPD.	Multi-step speed command (3)	rpm	Preset2 ~maximum speed	Impossible	900	
20	Preset4.SPD.	Multi-step speed command (4)	rpm	Preset3 ~maximum speed	Impossible	1200	
21	Preset5.SPD.	Multi-step speed command (5)	rpm	Preset4 ~maximum speed	Impossible	1800	
22 and above	----------	Blank functions					

Code No.	LCD indication	Setting Contents	Unit	Setting range (Selective items)	Change during operation	Default	User value
8) Option Setting items (Option)							
17	ISO61V Adj.	Isolation input offset adjustment.	V	-50.00~50.00	Impossible	0.0	
18	ISO61V Sel.	Isolation input form selection.	V	± 10V: Voltage input 4-20mA: Current input	Impossible	± 10V	
19 and	----------	Blank functions					

Note: VF61V-71-G3 Eprom for models VF61C-1R1~55
VF61V-72-G3 Eprom for models VF61C-75~315

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