

The inverter with the highest performance in the industry. FRENIC-MEGA is a high performance, multifunctional inverter Fuji Electric has developed by gathering the best of its technologies. With our own state-of-the-art technology, the control performance has evolved to a new dimension. FRENIC-MEGA has been developed with unyielding standards of quality and flexibility to meet the demands of both simple and complex industrial applications. Meeting the requirements for various applications, achieving lower maintenance, and improved protection to environmental conditions. FRENIC-MEGA, the inverter with the highest performance in the industry, is about to redefine the common sense of general-purpose inverters. Now, it is ready to provide a solution to your application needs!

Best in class vector control for general-purpose inverters

Powerful Solutions for versatile applications

Expanded power rating with flexible configuration

Connectivity to many industrial networks

Designed for long life cycle with improved maintenance functions

Environmentally Friendly Designed

Global compatibility



Available Models

Nominal applied motor (HP)	Standard Inverter				
	Three-phase 230 V series		Three-phase 460 V series		
	LD spec (120%)	HD spec (150%)	LD spec (120%)	MD spec (150%)	HD spec (150%)
0.5	FRNF50G1S-2U	FRNF50G1S-2U	FRNF50G1S-4U		FRNF50G1S-4U
1	FRN001G1S-2U	FRN001G1S-2U	FRN001G1S-4U		FRN001G1S-4U
2	FRN002G1S-2U	FRN002G1S-2U	FRN002G1S-4U		FRN002G1S-4U
3	FRN003G1S-2U	FRN003G1S-2U	FRN003G1S-4U		FRN003G1S-4U
5	FRN005G1S-2U	FRN005G1S-2U	FRN005G1S-4U		FRN005G1S-4U
7.5	FRN007G1S-2U	FRN007G1S-2U	FRN007G1S-4U		FRN007G1S-4U
7.5		FRN010G1S-2U			FRN010G1S-4U
10	FRN010G1S-2U	FRN015G1S-2U	FRN010G1S-4U		FRN015G1S-4U
15	FRN015G1S-2U	FRN020G1S-2U	FRN015G1S-4U		FRN020G1S-4U
20	FRN020G1S-2U	FRN025G1S-2U	FRN020G1S-4U		FRN025G1S-4U
25	FRN025G1S-2U	FRN030G1S-2U	FRN025G1S-4U		FRN030G1S-4U
30	FRN030G1S-2U	FRN040G1S-2U	FRN030G1S-4U		FRN040G1S-4U
40	FRN040G1S-2U	FRN050G1S-2U	FRN040G1S-4U		FRN050G1S-4U
50	FRN050G1S-2U	FRN060G1S-2U	FRN050G1S-4U		FRN060G1S-4U
60	FRN060G1S-2U	FRN075G1S-2U	FRN060G1S-4U		FRN075G1S-4U
75	FRN075G1S-2U	FRN100G1S-2U	FRN075G1S-4U		FRN100G1S-4U

Nominal applied motor (HP)	Standard Inverter				
	Three-phase 230 V series		Three-phase 460 V series		
	LD spec (120%)	HD spec (150%)	LD spec (120%)	MD spec (150%)	HD spec (150%)
100	FRN100G1S-2U	FRN125G1S-2U	FRN100G1S-4U		FRN125G1S-4U
125	FRN125G1S-2U	FRN150G1S-2U	FRN125G1S-4U		FRN150G1S-4U
150	FRN150G1S-2U		FRN150G1S-4U	FRN150G1S-4U	FRN200G1S-4U
200			FRN200G1S-4U	FRN200G1S-4U	FRN250G1S-4U
250			FRN250G1S-4U	FRN250G1S-4U	FRN300G1S-4U
300			FRN300G1S-4U	FRN300G1S-4U	FRN350G1S-4U
350			FRN350G1S-4U	FRN350G1S-4U	FRN450G1S-4U
350				FRN450G1S-4U	
400					FRN500G1S-4U
450			FRN450G1S-4U	FRN500G1S-4U	FRN600G1S-4U
500			FRN500G1S-4U	FRN600G1S-4U	FRN700G1S-4U
600			FRN600G1S-4U	FRN700G1S-4U	FRN800G1S-4U
700			FRN700G1S-4U	FRN800G1S-4U	
800			FRN800G1S-4U		FRN900G1S-4U
900			FRN900G1S-4U		FRN1000G1S-4U
1000			FRN1000G1S-4U		

Specifications (Standard Unit)

Three-phase 230V series

Rating for LD (Low Duty) mode inverters for light load, (HD(High Duty) and MD (Medium Duty) motor rating are available in sales catalog and manual)

Type(FRN□G1S-2U)		F50	001	002	003	005	007	010	015	020	025	030	040	050	060	075	100	125	150	
Output ratings	Nominal applied motor (HP) (Output rating) *1	0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	
	Rated capacity (kVA) *2	1.2	2.0	3.2	4.4	7.2	11	13	18	24	30	35	46	58	72	86	113	138	165	
	Rated voltage (V) *3	Three-phase 200 to 240 V (with AVR function)												Three-phase 200 to 230 V (with AVR function)						
	Rated current (A) *4	3	5	8	11	18	27	31.8 (29)	46.2 (42)	59.4 (55)	74.8 (68)	88 (80)	115 (107)	146	180	215	283	346	415	
Input power	Overload capability	150%-1 min, 200%-3.0 s						120%-1 min												
	Voltage, frequency	200 to 240 V, 50/60 Hz												200 to 220 V, 50 Hz, 200 to 230 V, 60 Hz						
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																		
Braking	Required capacity (with DCR) (kVA) *6	0.6	1.2	2.2	3.1	5.2	7.4	10.0	15.0	20.0	25.0	30.0	40.0	48.0	58.0	71.0	98.0	116	143	
	Torque (%) *7	150%			100%			70%			15%			7 to 12%						
	Braking transistor	Built-in																		
	Built-in braking resistor	Built-in																		
	Braking time (s)	5 s					3.7 s		3.4 s											
	Duty cycle (%ED)	5	3	5	3	2	2.2		1.4											
DC reactor (DCR)	Option																Standard *8			
Applicable safety standards	UL508C, C22.2 No.14, EN61800-5-1:2007																			
Enclosure (IEC60529)	IP20, UL open type												IP00, UL open type							
Cooling method	Natural cooling									Fan cooling										
Weight / Mass lbs (kg)	3.8 (1.7)	4.4 (2.0)	6.2 (2.8)	6.6 (3.0)	6.6 (3.0)	14 (6.5)	14 (6.5)	14 (6.5)	13 (5.8)	21 (9.5)	21 (9.5)	22 (10)	55 (25)	71 (32)	93 (42)	95 (43)	137 (62)	232 (105)		

Three-phase 460V series

Rating for LD (Low Duty) mode inverters for light load, (HD(High Duty) and MD (Medium Duty) motor rating are available in sales catalog and manual) (0.5 to 100 HP)

Type (FRN□□G1S-4U)		F50	001	002	003	005	007	010	015	020	025	030	040	050	060	075	100		
Output ratings	Nominal applied motor (HP) (Output rating) *1	0.5	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100		
	Rated capacity (kVA) *2	1.2	2.0	3.2	4.4	7.2	11	13.1	18.3	24	29	36	48	60	73	89	120		
	Rated voltage (V) *3	Three-phase 380 to 480 V (with AVR function)																	
	Rated current (A)	1.5	2.5	4	5.5	9	13.5	16.5	23	30.5	37	45	60	75	91	112	150		
Input power	Overload capability	150%-1 min, 200%-3.0 s						120%-1 min											
	Voltage, frequency	380 to 480 V, 50/60 Hz																	
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																	
Braking	Required capacity (with DCR) (kVA) *6	0.6	1.2	2.2	3.1	5.2	7.4	10	15	20	25	29	40	48	58	71	96		
	Torque (%) *7	150%			100%			70%			15%			7 to 12%					
	Braking transistor	Built-in																	
	Built-in braking resistor	Built-in																	
	Braking time (s)	5 s					3.7 s		3.4 s										
	Duty cycle (%ED)	5	3	5	3	2	2.2		1.4										
DC reactor (DCR)	Option																Standard *8		
Applicable safety standards	UL508C, C22.2 No.14, EN61800-5-1:2007																		
Enclosure (IEC60529)	IP20, UL open type												IP00, UL open type						
Cooling method	Natural cooling									Fan cooling									
Weight / Mass lbs (kg)	3.8 (1.7)	4.4 (2.0)	5.7 (2.6)	6.0 (2.7)	6.6 (3.0)	14 (6.5)	14 (6.5)	14 (6.5)	13 (5.8)	21 (9.5)	21 (9.5)	22 (10)	55 (25)	57 (26)	68 (31)	73 (33)			

(125 to 1000 HP)

Type (FRN□□G1S-4U)		125	150	200	250	300	350	450	500	600	700	800	900	1000					
Output ratings	Nominal applied motor (HP) (Output rating) *1	125	150	200	250	300	350	450	500	600	700	800	900	1000					
	Rated capacity (kVA) *2	140	167	202	242	300	331	414	518	590	669	765	932	1092					
	Rated voltage (V) *3	Three-phase 380 to 480 V (with AVR function)																	
	Rated current (A)	176	210	253	304	377	415	520	650	740	840	960	1170	1370					
Input power	Overload capability	120%-1 min																	
	Voltage, frequency	380 to 440 V, 50 Hz 380 to 480 V, 60 Hz																	
	Allowable voltage/frequency	Voltage: +10 to -15% (Interphase voltage unbalance: 2% or less) *5, Frequency: +5 to -5%																	
Braking	Required capacity (with DCR) (kVA) *6	114	140	165	199	248	271	347	436	489	547	611	773	871					
	Torque (%) *7	7 to 12%																	
	Braking transistor	-																	
	Built-in braking resistor	-																	
	Braking time (s)	-																	
	Duty cycle (%ED)	-																	
DC reactor (DCR)	Standard *8																		
Applicable safety standards	UL508C, C22.2 No.14, EN61800-5-1:2007																		
Enclosure (IEC60529)	IP00, UL open type																		
Cooling method	Fan cooling																		
Weight / Mass lbs (kg)	93 (42)	137 (62)	141 (64)	207 (94)	216 (98)	284 (129)	309 (140)	540 (245)	540 (245)	728 (330)	728 (330)	1169 (530)	1169 (530)						

*1 US-4P standard induction motor *2 Rated capacity is calculated assuming the rated output voltage as 230 V for 230 V series and 460 V for 460 V series. *3 Output voltage cannot exceed the power supply voltage.


*4 To use the inverter with the carrier frequency of 3 kHz or more at the surrounding temperature of 40°C (104°F) or higher, manage the load so that the current comes to be within the rated ones enclosed in parentheses () in continuous running.

*5 Voltage unbalance(%) = $\frac{\text{Max. voltage (V)} - \text{Min. voltage (V)}}{\text{Three-phase average voltage (V)}} \times 67(\text{IEC 61800-3})$
If this value is 2 to 3%, use an optional AC reactor (ACR).

*6 Required when a DC reactor (DCR) is used.

*7 Average braking torque for the motor running alone, without external braking resistor. (It varies with the efficiency of the motor.)

*8 The FRN100G1S-2U or higher type comes with a DC reactor (DCR).



Safety Precautions

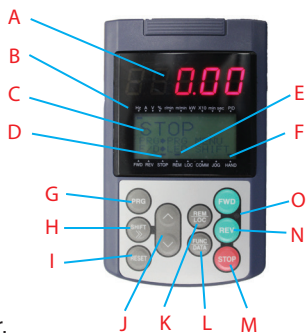
Before using this inverter, carefully read the instruction manual, specifications, etc. or consult us at the shop of purchase to fully understand the correct usage of the inverter.

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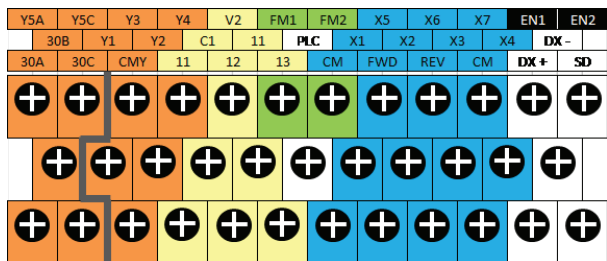
FRENIC-MEGA Quick Start Guide

Multi-Function Keypad TP-G1 (W)-J1



- A. LED display.
- B. LED monitor bar.
- C. RUN/STOP indicator.
- D. Run direction/stop indicator bar.
- E. Local Remote indicator bar.
- F. Hand and Jog mode indicator bars.
- G. Program button for calling menu screen and returning to home screen.
- H. Shift button for moving cursor or quick navigation through function code menus.
- I. Reset button for clearing alarm codes or returning to previous screen.
- J. Up/Down scroll buttons.
- K. Remote Local toggle.
- L. Function Data key for storing data and advancing in menus.
- M. Stop key for local control, E-Stop for remote control.
- N. Run direction control for local mode.
- O. Run indicator green LED.

Control Card Terminals



Orange = Outputs, Yellow = Analog Inputs, Blue = Digital Inputs

- FWD, Rev, plus 7 Digital inputs. Configurable for Source or Sink.

Item		Min.	Max.
Operating Voltage (Sink)	ON level	0V	2V
	Off level	22V	27V
Operating Voltage (Sink)	ON level	22V	27V
	Off level	0V	2V

- 2 0-10VDC analog inputs.
- 4-20mA analog input.
- 4 Transistor outputs.

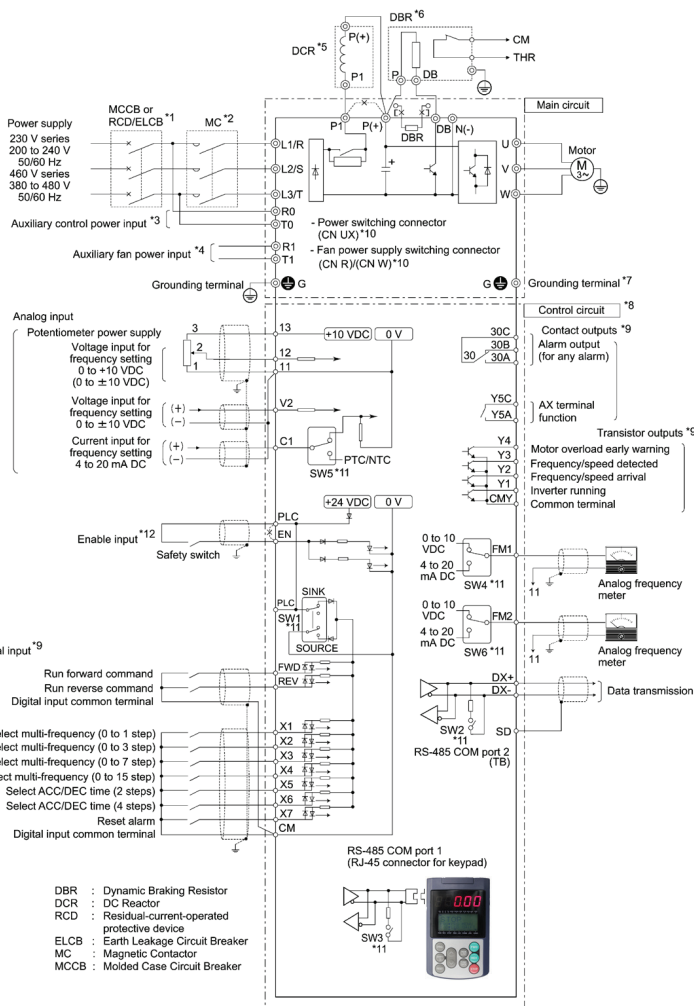
Item	Max.
Operating Voltage	2V
Off level	27V
Maximum Current at on.	50mA

- 2 0-10V or 4-20mA analog outputs.
- Form A contact relay
 - o (250VAC 0.3A, cosφ=0.3), (48VDC, .5A).
- Form C contact relay
 - o (250VAC 0.3A, cosφ=0.3), (48VDC, .5A).
- 24VDC max 200mA DC output power.
- 10VDC output power for potentiometer.
- 2 Source only, safe torque off Enable Inputs.
- RS-485 wiring connections.

Other Control Terminal

- RJ-45 keypad connection port.
- USB Type B connection port when using USB keypad (TP-E1U).
- 3 Option card expansion ports.

SINK Mode Input by Factory Default



- *1 Install a recommended molded case circuit breaker (MCCB) or residual-current-operated protective device (RCD)/earth leakage circuit breaker (ELCB) (with overcurrent protection function) in the primary circuit of the inverter to protect wiring. Ensure that the circuit breaker capacity is equivalent to or lower than the recommended capacity.
 - *2 Install a magnetic contactor (MC) for each inverter to separate the inverter from the power supply, apart from the MCCB or RCD/ELCB, when necessary. Connect a surge absorber in parallel when installing a coil such as the MC or solenoid near the inverter.
 - *3 The R0 and T0 terminals are provided for inverters of 2 HP or above. To retain an alarm output signal ALM issued on inverter's programmable output terminals by the protective function or to keep the keypad alive even if the main power has shut down, connect these terminals to the power supply lines. Without power supply to these terminals, the inverter can run.
 - *4 Normally no need to be connected. Use these terminals when the inverter is equipped with a high power-factor, regenerative PWM converter (RHC series).
 - *5 When connecting an optional DC reactor (DCR), remove the jumper bar from the terminals P1 and P(+). The FRN100G1S-2/4U and higher types come with a DCR. Be sure to connect the DCR. Use a DCR when the capacity of the power supply transformer exceeds 500 kVA and is 10 times or more the inverter rated capacity, or when there are thyristor-driven loads in the same power supply line. The DCR built-in type has no DCR at this location.
 - *6 Inverters of 15 HP or below have a built-in braking resistor (DBR) between the terminals P(+) and DB. When connecting an external braking resistor (DBR), be sure to disconnect the built-in one.
 - *7 A grounding terminal for a motor. Use this terminal if needed.
 - *8 For control signal wires, use twisted or shielded-twisted wires. When using shielded-twisted wires, connect the shield of them to the common terminals of the control circuit. To prevent malfunction due to noise, keep the control circuit wiring away from the main circuit wiring as far as possible (recommended: 3.9 inches (10 cm) or more). Never install them in the same wire duct. When crossing the control circuit wiring with the main circuit wiring, set them at right angles.
 - *9 The connection diagram shows factory default functions assigned to digital input terminals [X1] to [X7], [FWD] and [REV], transistor output terminals [Y1] to [Y4], and relay contact output terminals [Y5A/C] and [30A/B/C].
 - *10 Switching connectors in the main circuits. For details, refer to "Switching connectors" later in this section.
 - *11 Slide switches on the control printed circuit board (control PCB). Use these switches to customize the inverter operations. For details, refer to Section 2.3.6 "Setting up the slide switches."
 - *12 When using the Enable input function, be sure to remove the jumper wire from terminals [EN] and [PLC]. For opening and closing the hardware circuit between terminals [EN] and [PLC], use safety components such as safety relays and safety switches that comply with EN954-1, Category 3 or higher. Be sure to use shielded wires exclusive to terminals [EN] and [PLC]. (Do not put them together with any other control signal wire in the same shielded core.) Ground the shielding layer. For details, refer to Chapter 9, Section 9.4 "Compliance with EN954-1, Category 3."
- When not using the Enable input function, keep the terminals between [EN] and [PLC] short-circuited with the jumper wire (factory default).

Quick Start Menus

0. Quick set
1. Data Set
2. Data Check
3. Operation monitor
4. I/O Check
5. Maintenance
6. Alarm Info
7. Alarm Cause
8. Data Copy
9. Load Factor
10. User set
11. Comm Debug

1. Data Set 2. Data Check
F. Fundamental Codes
E. Extension Codes
C. Control Functions
P. Motor Parameters
H. High Performance Functions
J. Application Functions
A. Motor 2 Parameters
b. Motor 3 Parameters
r. Motor 4 Parameters
d. Application Functions 2
y. Link Functions
U. Customizable Logic Functions

3. Operation Monitor		
1.	Fot1	Output Frequency Before slip compensation
	Fot2	Output Frequency after slip compensation
	Iout	Output Current
	Vout	Output Voltage
2.	TRQ	Calculated Output Torque
	Fref	Frequency Specified by a Frequency command
	FWD	Run Direction Forward Reverse Stop
	Rev	
	(Blank)	
	IL	
	LU	Under voltage detected
	VL	Voltage Limiting
	SL	Speed Limiting
	M1-M4	Motor 1-4
	VF	V/F control without slip compensation
	DTV	Dynamic torque vector control
	VF-SC	V/F control with slip compensation
	VF-PG	Dynamic torque vector control speed sensor
VC-PG	Vector control without speed sensor	
VC-PG	Vector control with speed sensor	
3.	SVN	Motor Speed
	LOD	Load Shaft Speed
	LIN	Line Speed
	LSC	Constant peripheral speed control monitor
4.	SV	PID Setpoint
	PV	PID Feedback Value
	MV	PID Output Value
5.	TLA	Torque Limit Value A
	TLB	Torque Limit Value B
6.	trqb	Reference Torque Bias
	P	Current Position Pulse
	E4	Stop position target pulse
	dP	Position deviation pulse
7.	MODE	Positioning control status
	NTC	Motor temperature
	Rati	Ratio setting
	FLUX	Magnetic flux command value
8.	SY-d	Deviation in synchronous operation
	P4	Current position pulse
	E4	Stop position target pulse
	dP4	Position deviation pulse
MODE	Reserved	

4. I/O Check			
1.	Input signal	FWD_Rev, X1-X7 EN1, EN2	
2.	Input signal via communication signal	FWD_Rev, X1-X7, XF, XR, RST	
3.	Output signals	Y1-Y4, Y5AC, 30 ABC	
4.	I/O Signals (hexadecimal)	Di Link	
		Do Link	
		LNK	
5.	Analog Input signals	12= Voltage on terminal 12	
		C1= Current on terminal C1	
		V2= Voltage on terminal V2	
6.	Analog Output signals	FM1 (Volts)	
		FM1 (AMPS)	
		FM2 (Volts)	
		FM2 (AMPS)	
7.	Input signal	Di-o	
	Output signals	do-o	
8.	PG Pulse rate	Pulse train input	X7
		P1= p/s of A/B phase	
		Z1= p/s of Z phase	
		P1= p/s of A/B phase	
9.	I/O Signal of input (option card)	Z2= p/s of Z phase	
		32= Voltage on terminal 32	
		C2= Input current on terminal C2	
		A0 Output voltage on terminal A0	
A0 Output voltage on terminal C5			

5. Maintenance		
1.	Time	Cumulative run time
	EDC	DC link bus voltage
	TMPI	Max temperature inside the inverter every hour
	TMPF	Max temperature of the heat sink every hour
2.	Imax	Maximum current in RMS every hour
	CAP	Capacitance of the DC link bus capacitor
	MTIM	Cumulative motor run time
	REMT1	Remaining time before next maintenance for motor 1
3.	TCAP	Cumulative run time of electrolytic capacitors
	TFAN	Cumulative run time of the cooling fan
4.	NST	Number of startups
	Wh	Input watt-hours
	PD	Input watt-hour data
	REMN1	Remaining startup times before next maintenance
5.	NRR1	Number of RS-485 errors
	NRR2	Error code of RS-485
	NRO	Count of option errors
6.	MAIN	Rom version of inverter
	KP	Rom version of Keypad
	OP1	Rom version of option 1
7.	OP2	Rom version of option 2
	OP3	Rom version of option 3
	8.	TMPIM
TMPFM		Temperature of the heat sink real time value
CAPEH		Lifetime of DC link capacitor
CAPRH		Lifetime of DC link capacitor
9.	MTIM1	Cumulative run time of motor 1
	MTIM2	Cumulative run time of motor 2
	MTIM3	Cumulative run time of motor 3
	MTIM4	Cumulative run time of motor 4
10.	NST1	Number of startups motor 1
	NST2	Number of startups motor 2
	NST3	Number of startups motor 3
	NST4	Number of startups motor 4
11.	LALM1	Light alarm latest
	LALM2	Light alarm last
	LALM2	Light alarm 2nd last
	LALM3	Light alarm 3rd last
12.	LALM4	Light alarm 4th last
	NROA	Number of errors Option 1
	NROB	Number of errors Option 2
	NROC	Number of errors Option 3

6. Alarm Info		
0/1	Latest Alarm	
-1	Last Alarm	
-2	2nd Last Alarm	
-3	3rd Last Alarm	

6. Alarm Info		
Fot1	Output Frequency	
Iout	Output Current	
Vout	Output Voltage	
TRQ	Calculated Torque	
Fref	Reference Frequency	
FWD	Run Direction	Forward
Rev		Reverse
(Blank)		Stop
IL		Current limiting
LU	Under voltage	
VL	Voltage limiting	
TL	Torque limiting	
TIME	Cumulative run time	
SL	Speed limit	
M1-M4	Motor being selected	
VF	Drive Control	V/F control without slip compensation
DTV		Dynamic torque vector control
VF-SC		V/F control with slip compensation
VF-PG		Dynamic torque vector control speed sensor
VC-PG		Vector control without speed sensor
VC-PG		Vector control with speed sensor
NST	Number of starts	
EDC	DC link bus Voltage	
TMPI	Temperature inside the inverter	
TMPF	Temperature inside the heat sink	
TRM	Input signals of Control circuit	
LNK	Input signals of Communication link	
-	Output Signals	
3	Multiple Alarm	
2	Multiple Alarm	
SUB	Error sub-code	
SPEED	Detected Speed	

8. Data Copy		
KP <- INV Read	Store inverter program in the keypad	
KP >- INV write	Write program from keypad into inverter	
KP <- INV verify	Verify the program matches saved file	
KPDATA Check		

9. Load factor		
Hours SET		
Start->Stop		

10. User set		
Select the function codes for quick start menu		

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