SD 100
Series

VARIABLE SPEED DRIVE

Variable Speed Drive

User's Manual

POWER ELECTRONICS®

SD 100
Series

VARIABLE SPEED DRIVE

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User´s Manual SD10MT01BI Rev. B

POWER ELECTRONICS ESPAÑA
C/ Leonardo da Vinci, 24 - 26
PARQUE TECNOLOGICO
46980 · PATERNA · VALENCIA · ESPAÑA
Atención al Cliente. 902 40 20 70
Tel. +34 96 136 65 57 · Fax. +34 96 131 82 01
www.power-electronics.com
power@power-electronics.com

POWER ELECTRONICS®

IMPORTANT NOTES

RECEPTION

The SD100 are carefully tested and perfectly packed before leaving the factory.
In case of transport damage, notify it to transport agency and to **POWER ELECTRONICS** Tf. International +34 96 136 65 57, not later than 24hrs from delivery date.

UNPACKING

Make sure model and serial number of the variable speed drive are the same in the box, delivery note and unit.
Each variable speed drive is supplied with el SD100 Technical manual in spanish, german and english.

SAFETY

It's electrcian's responsability to ensure the configuraction and installation of the SD-100 SERIES meets the requirements of any site specific, local and national electrical regulations.
The SD100 Series operates from HIGH VOLTAGE, HIGH ENERGY ELECTRICAL SUPPLIES. Always isolate before servicing.
Service only by qualified personnel. For any question or enquiry please contact POWER ELECTRONICS Technical Departament or with your local distributor.
The SDRIVE100 Series contains static sensitive printed circuit boards. Use statisc safe procedures when handling these boards.

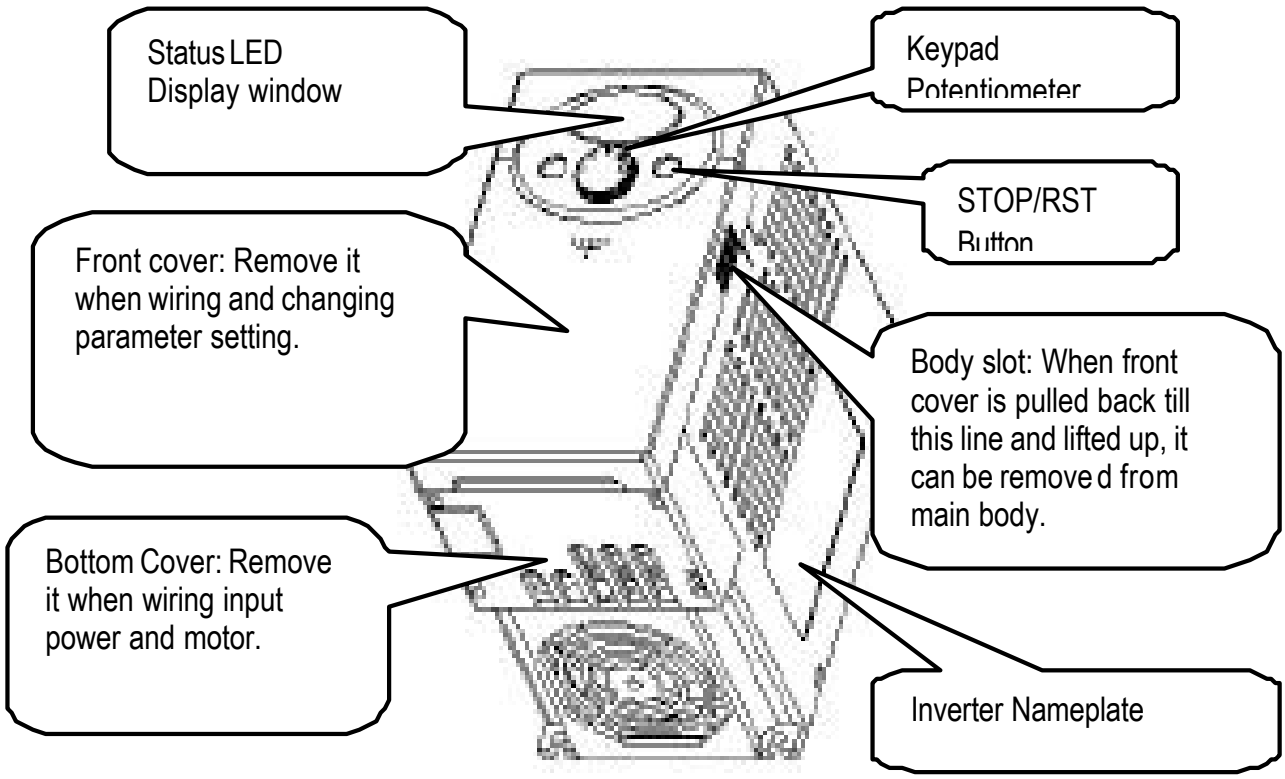
REVISIONS

Date	Revision	Description
May 2003	A	

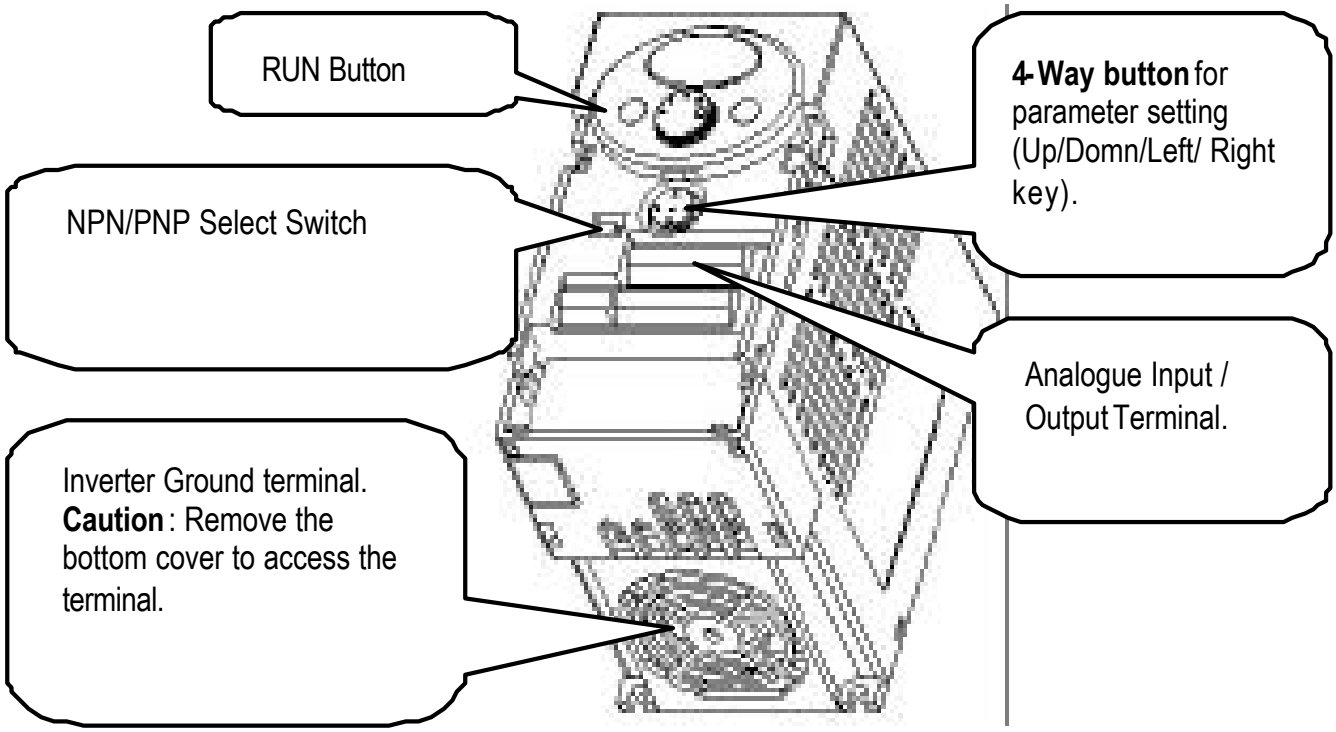
INDEX

1. DESCRIPTION SD100

1.1. Product details.



1.2. View without the front cover.



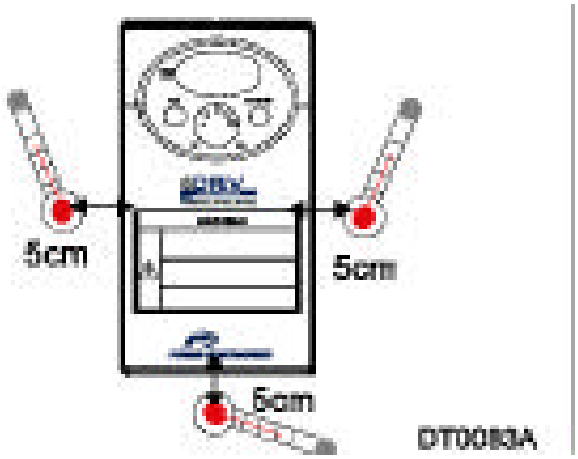
2. MOUNTING AND WIRING

2.1 Installation precautions

Handle the inverter with care to prevent damage to the plastic components. Do not hold the inverter by the front cover. It may fall off.

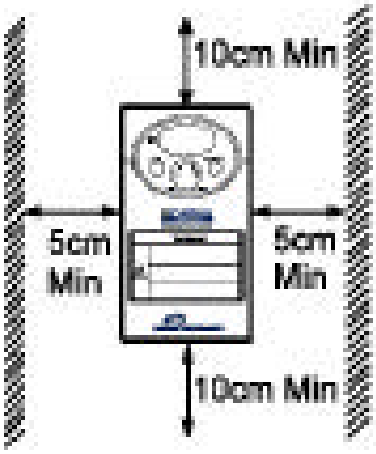
IInstall the inverter in a place where it is immune to vibration **(5.9 m/s^2 or less)**.

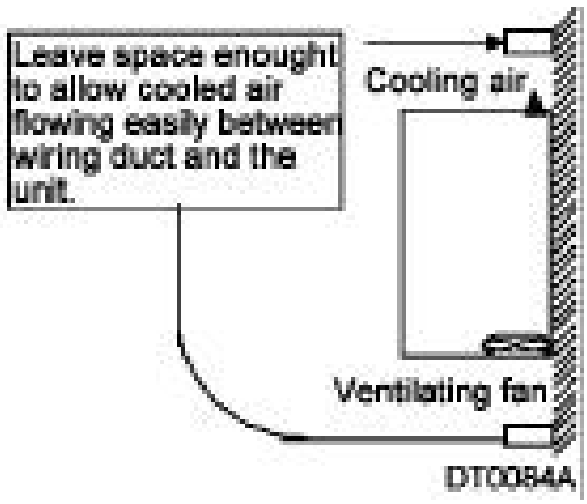
IThe inverter is under great influence of ambient temperature. Install in a location where temperature is within the permissible range **(-10~50°C)**.



Ambient Temp Checking Location.

The inverter will be very hot during operation. Install it on a non-combustible surface. Mount the inverter on a flat, vertical and level surface. Inverter orientation must be vertical (top up) for proper heat dissipation. Also leave sufficient clearances around the inverter.

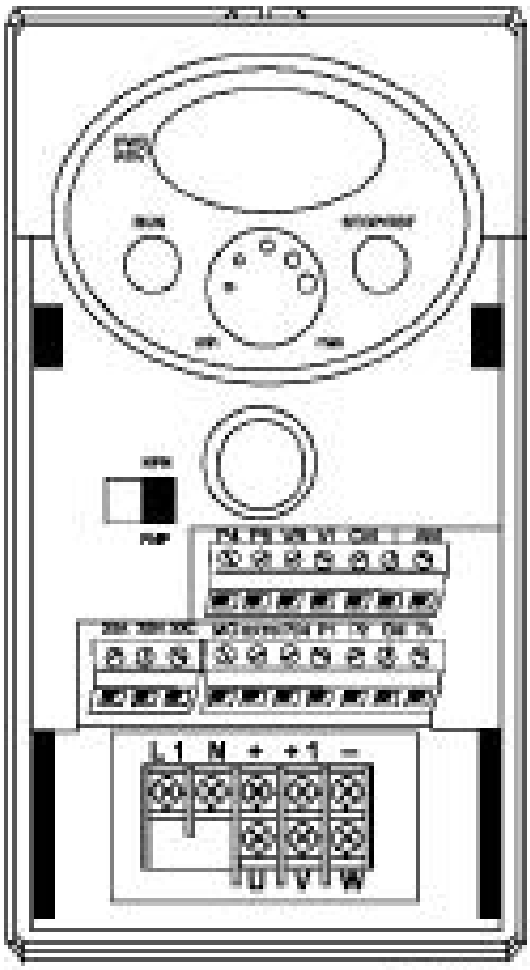


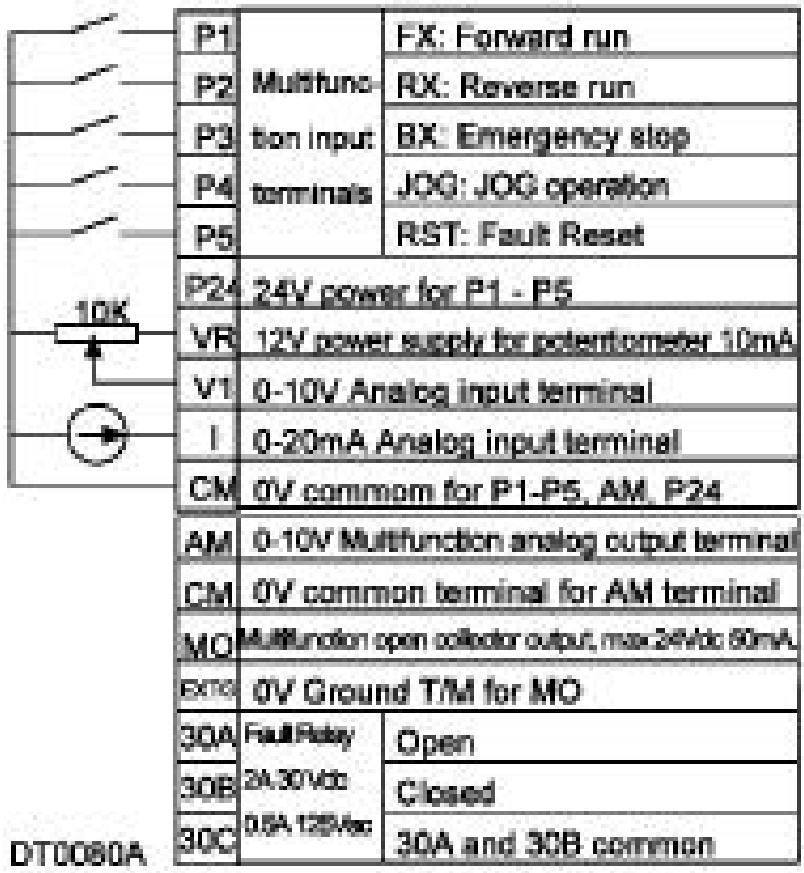


Protect from moisture and direct sunlight.

Do not install the inverter in any environment where it is exposed to waterdrops, oil mist, dust, etc. Install the inverter in a clean place or inside a "totally enclosed" panel which does not accept any suspended matter.

2.2 WIRING TERMINALS

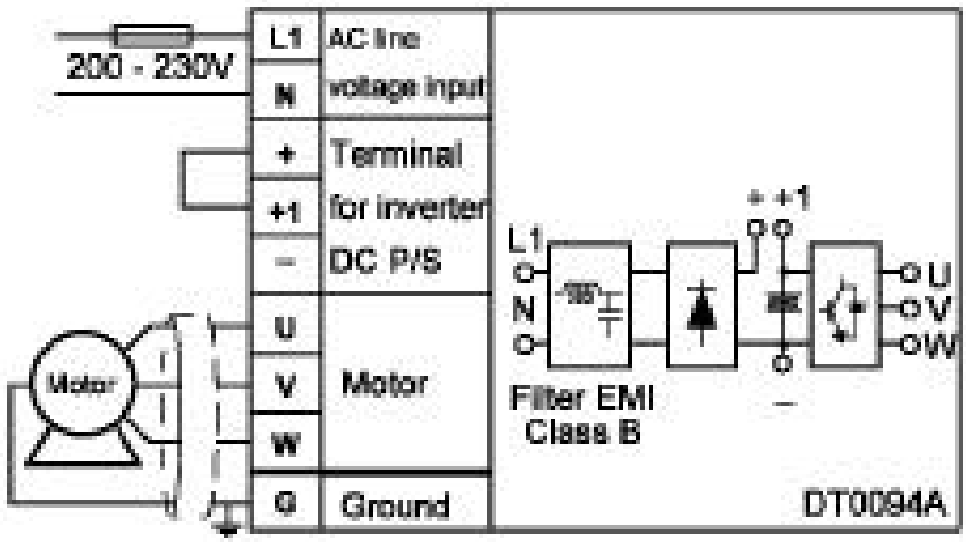




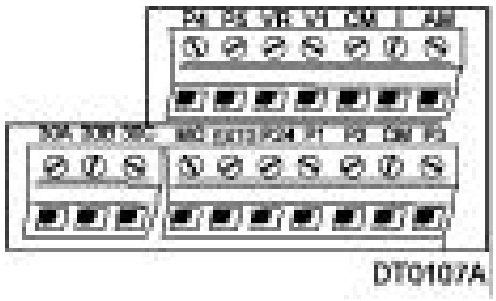
P1	Multifunction input terminals	FX: Forward run
P2		RX: Reverse run
P3		BX: Emergency stop
P4		JOG: JOG operation
P5		RST: Fault Reset
P24	24V power for P1 - P5	
VR	12V power supply for potentiometer 10mA	
V1	0-10V Analog input terminal	
I	0-20mA Analog input terminal	
CM	0V commom for P1-P5, AM, P24	
AM	0-10V Multifunction analog output terminal	
CM	0V common terminal for AM terminal	
MO	Multifunction open collector output, max.24Vdc 50mA	
EXTG	0V Ground T/M for MO	
30A	Fault Relay 2A 30Vdc 0.6A 125Vac	Open
30B		Closed
30C		30A and 30B common

DT0093A DT0080A

2.3 POWER TERMINALS



2.4 SPECIFICATIONS FOR CONTROL TERMINALS

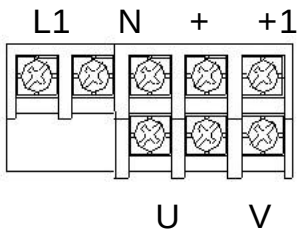
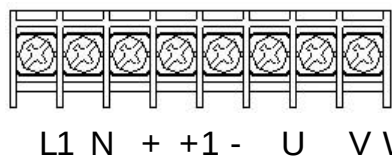


Terminal	Terminal Description	Wire size	Torque (Nm)
P1/P2/P3 P4/P5	Multi-function input T/M P1-P5	22 AWG, 0.3 mm^2	0.4
CM	Common Terminal for P1-P5, AM, P24	22 AWG, 0.3 mm^2	0.4
VR	12V power supply for external potentiometer	22 AWG, 0.3 mm^2	0.4
V1	0-10V Analog Voltage input	22 AWG, 0.3 mm^2	0.4
I	0-20mA Analog Current input	22 AWG, 0.3 mm^2	0.4
AM	Multi-function Analog output	22 AWG, 0.3 mm^2	0.4
MO	Multi-function open collector output T/M	20 AWG, 0.5 mm^2	0.4
EXTG	Ground T/M for MO	20 AWG, 0.5 mm^2	0.4
P24	24V Power Supply for P1-P5	20 AWG, 0.5 mm^2	0.4
30A	Fault relay A/B contact output	20 AWG, 0.5 mm^2	0.4
30B		20 AWG, 0.5 mm^2	0.4
30C	30A, B Common	20 AWG, 0.5 mm^2	0.4

NOTE: *Tie the control wires more than 15cm away from the control terminals. Otherwise, it interferes front cover reinstallation.*

When you use external power supply for multi-function input terminal (P1~P5), apply voltage more than 12V to activate.

2.5 SPECIFICATIONS FOR POWER TERMINALS

	SD1103	SD1105	SD1108	SD1112
				
Input wire size	2mm^2	2mm^2	3.5mm^2	3.5mm^2
Out wire	2mm^2	2mm^2	3.5mm^2	3.5mm^2
Ground Wire	2mm^2	2mm^2	3.5mm^2	3.5mm^2
Terminal Lug	2mm^2 ,3.5 ϕ	2mm^2 ,3.5 ϕ	3.5mm^2 ,3.5 ϕ	3.5mm^2 ,3.5 ϕ
Tightening Torque	13kgf/cm	13kgf/cm	15kgf/cm	15kgf/m

3. ELECTRICAL SPECIFICATIONS

INPUT

Voltage supply	200 to 230V/AC ±10 single phase 0,4KW - 2,2KW.
Input frequency	50 - 60 Hz. ±5%
Input power factor	> 0,98 (over fundamental frequency)
Momentary power loss	< 15 mS (continuous operation). > 15 mS (autoreset).

OUTPUT

Motor output voltage	0 to input voltage
Current overload capacity	150% during 60sec. 200% during 1 sec.
Frequency range	0 to ±400Hz
Efficiency (full load)	> 98%
Modulation method	Vector space modulation
Modulation frequency	15 kHz maximum

ENVIRONMENT CONDITIONS

Degree of protection	IP20
Operation temperature	-10ºC to 50°C
Storage temperature	-20ºC to +65°C
Relative humidity	< 90%, no condensation
Altitude	1000m
Altitude loss factor (>1000m)	-1% per 100m; max. 3000m.
Vibration	Max. 5.9m/sec2 (0.6G)
Application site	Protected from corrosive gas, combustible gas, oil mist or dust.

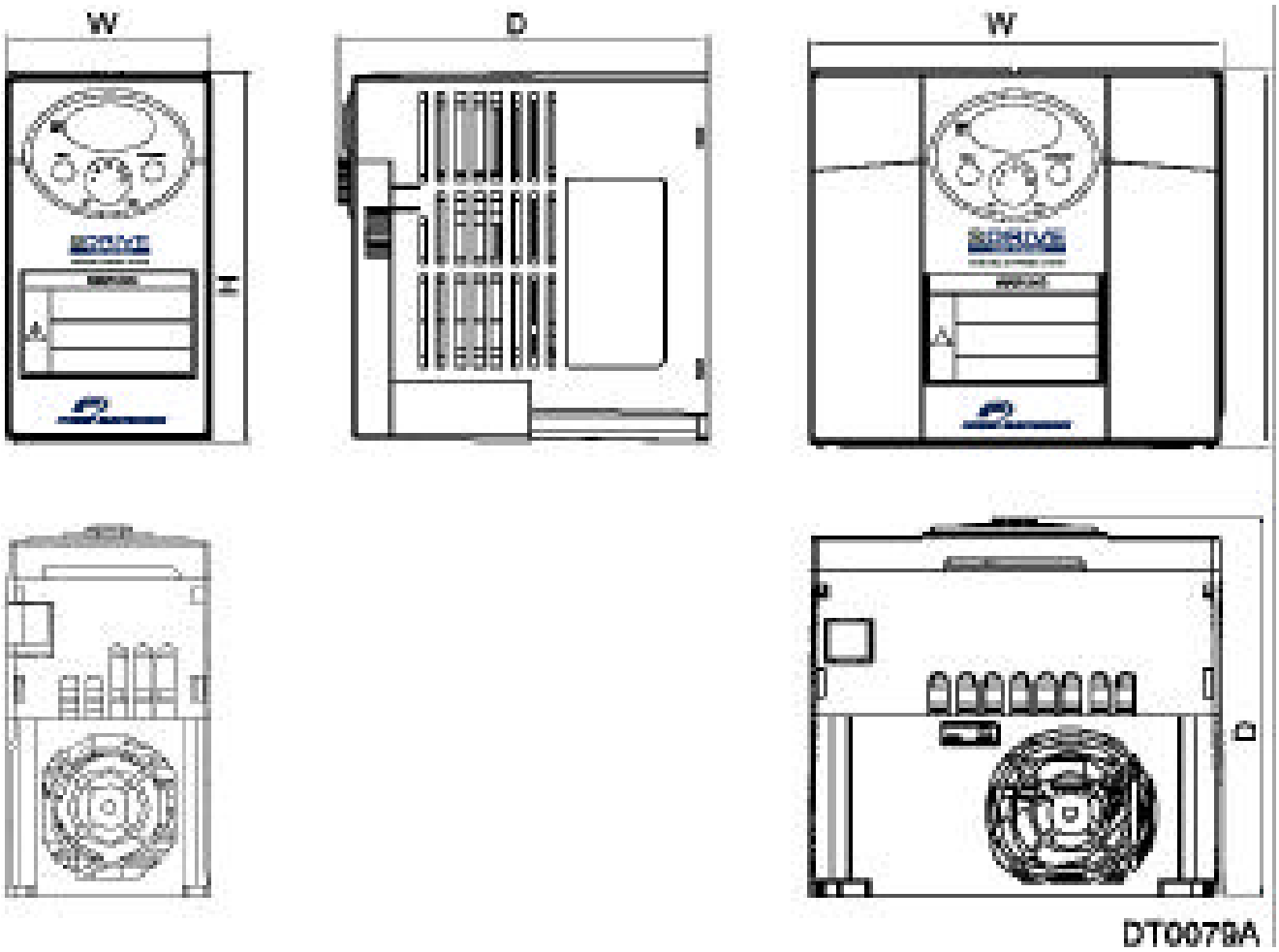
PROTECTIONS SD100

Drive trip	Over-voltage. Under-voltage. Over-current. Ground fault current detection. Over-temperature of inverter and motor. Output phase open. Overload. Communication error. Loss of frequency command. H / W fault.
Alarm condition	Stall prevention Overload

CONTROL

Control method	V /Hz, Vector sensorless
Analogue inputs	1 input 0 - 10Vcc and 1 input 0- 20mA.
Digital inputs	5 multifunction inputs
Analogue outputs	1 output 0 - 10V
Digital output	1 multifunction output, open collector.
Relay output	1 fault relay 2A 30Vdc 0.5A 125Vac
Communications port	RS485 and Modbus RTU protocol (as accesory)
Operation features	PID control, 3-wire, up-down operation.
Standards	CE, ISO9001and ISO14000

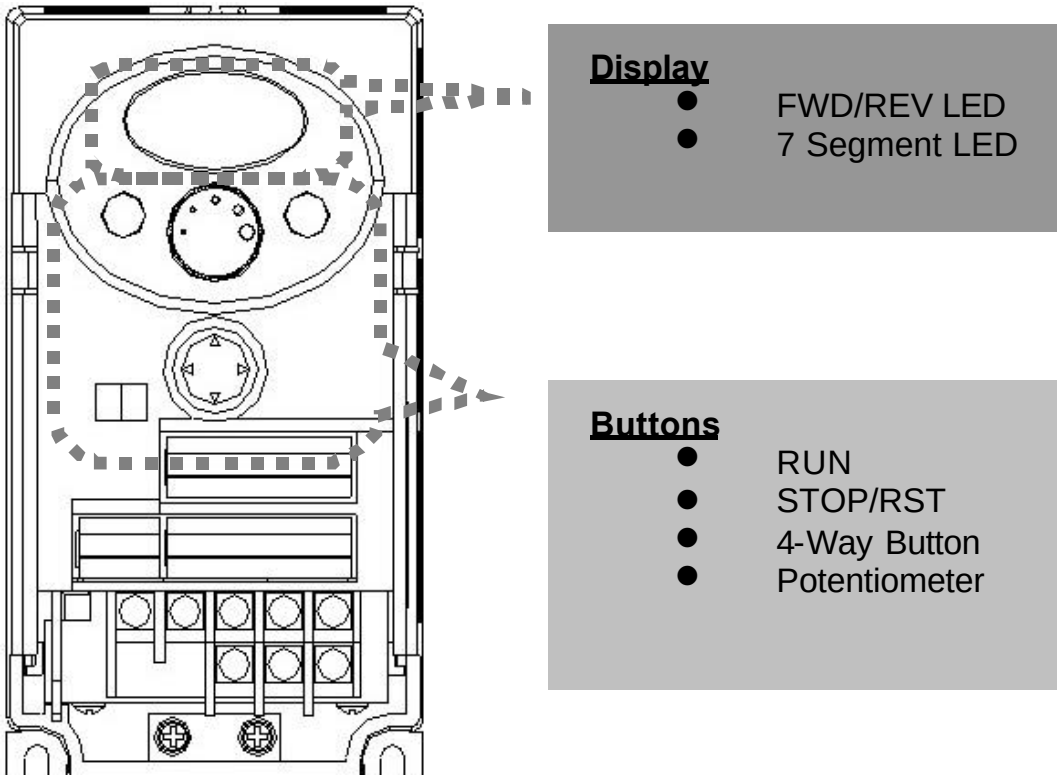
4. DIMMENSIONS AND STANDARD RATINGS



REFERENCE	STANDARD RATINGS				DIMENSIONS			WEIGHT
	I (A)	kW	HP	V	W	H	D	(Kg.)
SD1103	3	0,4	0,5	230II	79	143	143	0,87
SD1103F	3	0,4	0,5	230II	79	143	143	0,95
SD1105	5	0,75	1	230II	79	143	143	0,89
SD1105F	5	0,75	1	230II	79	143	143	0,97
SD1108	8	1,5	2	230II	156	143	143	1,79
SD1108F	8	1,5	2	230II	156	143	143	1,94
SD1112	12	2	3	230II	156	143	143	1,85
SD1112F	12	2	3	230II	156	143	143	2

5. PROGRAMMING KEYPAD

5.1 KEYPAD FEATURES

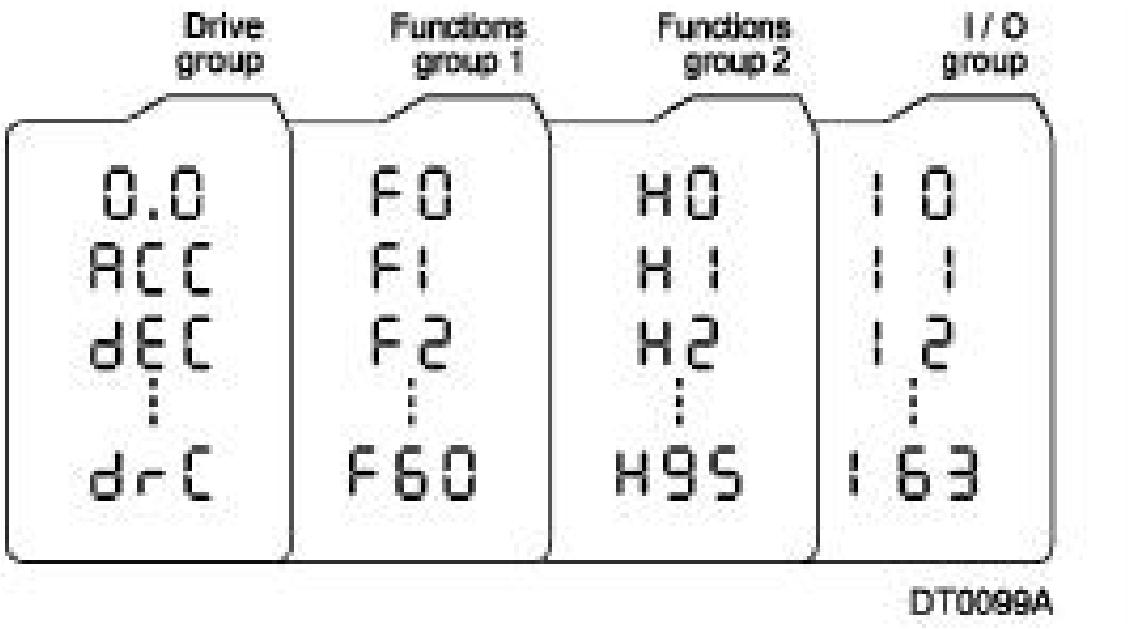


Display		
FWD	Lit during forward run	Blinks when a fault occurs
REV	Lit during reverse run	
7-Segment (LED Display)	Displays operation status and parameter information.	

Keys		
RUN		Used to give a run command
STOP/RST		STOP : Stop the operation RST: Reset faults
4-Way button		Programming keys: (Up/Down/Left/Right arrow and Prog/Ent keys).
▲	Up	Used to scroll through codes or increase parameter value
▼	Down	Used to scroll through codes or decrease parameter value
◄	Left	Used to jump to other parameter groups or move a cursor to the left to change the parameter
►	Right	Used to jump to other parameter groups or move a cursor to the righ to change the parameter
●	Prog/Ent Key	Used to set the parameter value or save the changed parameter value
Potentiometer		Used to change the value of run frequency

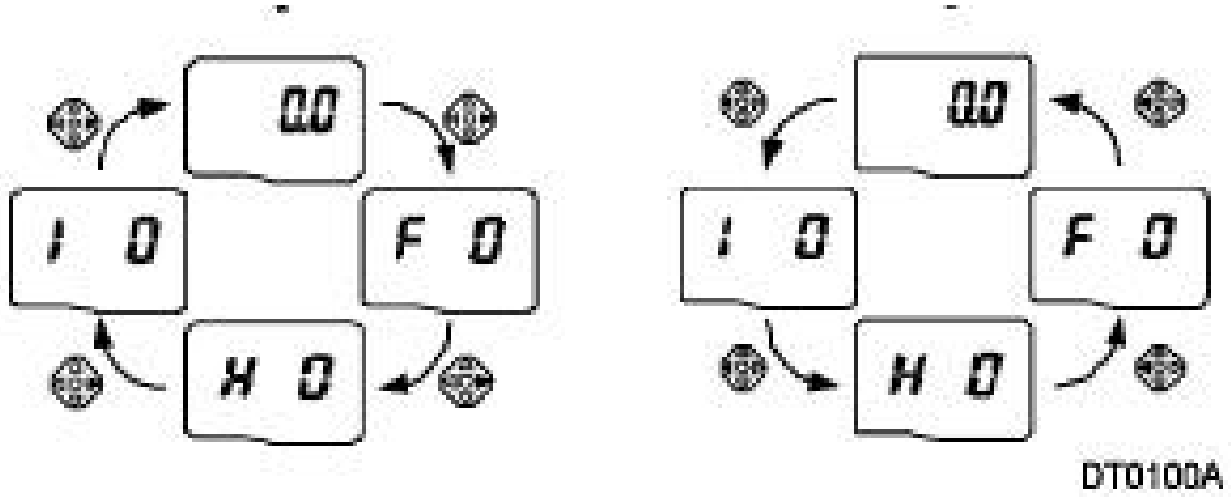
5.2 PARAMETER GROUPS IN SD100

There are 4 different parameter groups in SD100 series as shown below.

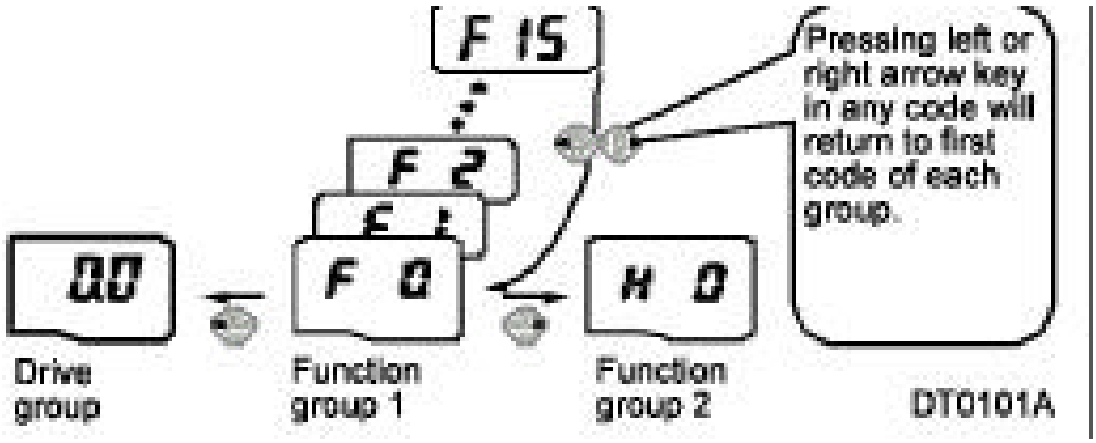


Drive group	Basic parameters necessary for the inverter to run. Parameters such as Target frequency, Accel/Decel time are settable.
Function group 1	Basic function parameters to adjust output frequency and voltage.
Function group 2	Advanced function parameters to set parameters for such as PID Operation and second motor operation.
I / O Group	Parameters necessary to make up a sequence using Multi-function input/output terminal.

5.3 MOVING BETWEEN GROUPS



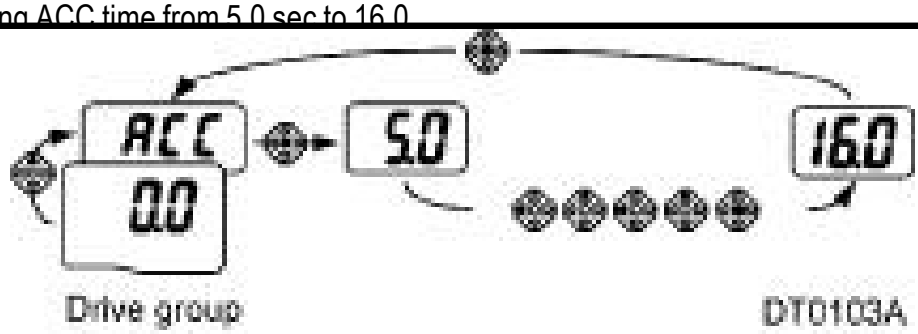
5.4 MOVING TO OTHER GROUPS FROM ANY CODES OTHER THAN THE FIRST CODE



5.5 PARAMETER SETTING METHOD

Changing parameter value in Drive group.

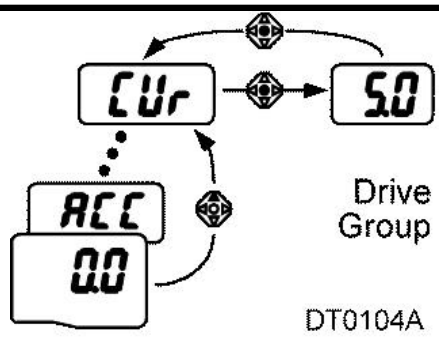
When changing ACC time from 5.0 sec to 16.0



1	**0.0**	-. In the first code "0.0", press the Up (▲) key once to go to the second code.
2	**ACC**	-. ACC [Accel time] is displayed. -. Press the Prog/Ent key (●) once.
3	5.**0**	-. Preset value is 5.**0**, and the cursor is in the digit **0**. -. Press the Left (◀) key once to move the cursor to the left.
4	**5**.0	-. The digit **5** in **5**.0 is active. Then press the Up (▲) key once.
5	**6**.0	-. The value is increased to **6**.0 -. Press the Left (◀) key to move the cursor to the left.
6	**0**6.0	-. **0**.60 is displayed. The first **0** in **0**.60 is active. -. Press the Up (▲) key once.
7	**1**6.0	-. **1**6.0 is set. -. Press the Prog/Ent (●) key once. -. **1**6.0 is blinking. -. Press the Prog/Ent (●) key once again to return to the parameter name.
8	**ACC**	-. **ACC** is displayed. **Accel time** is changed from 5.0 to 16.0 sec.

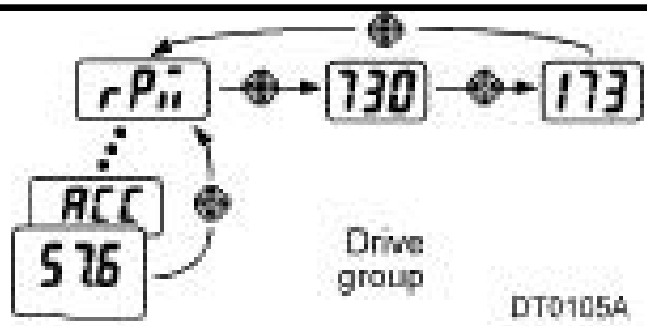
In step 7, pressing the Left (◀) or Right (▶) key while 16.0 is blinking will disable the setting.

5.6 MONITORING OF OPERATION STATUS



1	**0.0**	-. In [0.0], continue pressing the Up (▲) or Down (▼) key until [Cur] is displayed.
2	**CUr**	-. Monitoring output current is provided in this parameter. -. Press the Prog/Ent (●) key once to check the current.
3	**5.0**	-. Present output current is 5.0 A. -. Press the Prog/Ent (●) key once to return to the parameter name.
4	**CUr**	-. Return to the output current monitoring code.
Other parameters in Drive group such as dCL (Inverter DC link current) or vOL (Inverter output voltage) can be monitored via the same method.		

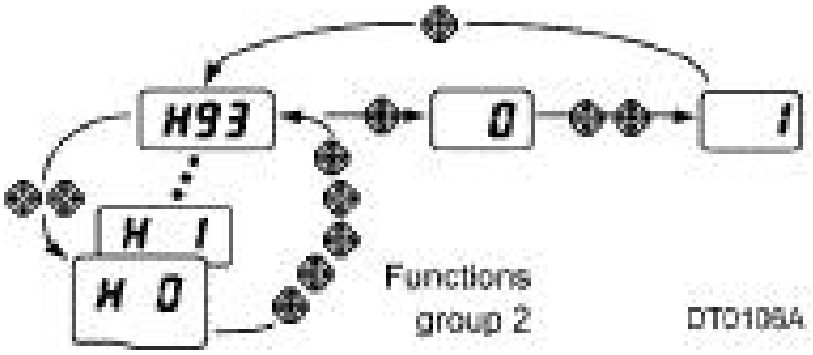
5.7 MONITORING OF MOTOR RPM.



1	**57.6**	-. Present run frequency can be monitored in the first code of Function group 1. The preset frequency is 57.6Hz. -. Continue pressing the Up (▲) /Down (▼) key until rPM is displayed.
2	**rPM**	-. Motor rpm can be monitored in this code. -. Press the Prog/Ent (●) key once.
3	**730**	-. Last three digits **730** in 1**730** rpm is shown on the LED. -. Press the Left (◀) key once.
4	**173**	-. First three digits**173** in 1730 rpm are shown on the LED. -. Press the Prog/Ent (●) key once.
5	**rPM**	-. Return to the rPM code.

5.8 PARAMETER INITIALIZE

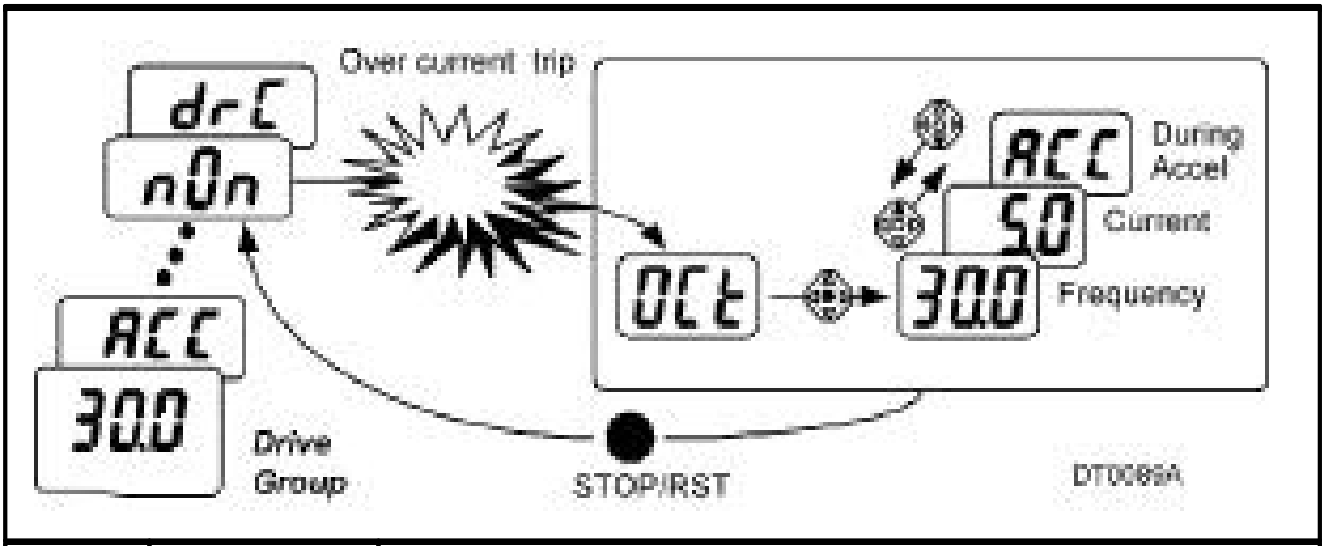
How to initialize parameters of all four groups in H93



1	**H 0**	-. In H0, press the Prog/Ent (●) key once.
2	**1**	-. Code number of H0 is displayed. -. Increase the value to 3 by pressing the Up (▲) key.
3	**3**	-. In **3**, press the Left (◀) key once to move the cursor to the left.
4	**0**3	-. **0**3 is displayed. **0** in **0**3 is active. -. Increase the value to 9 by pressing the Up (▲) key.
5	**9**3	-. **9**3 is set. -. Press the Prog/Ent (●) key once.
6	**H 93**	-. The parameter number is displayed. -. Press the Prog/Ent (●) key once.
7	**0**	-. Present setting is 0. -. Press the Up (▲) key once to set to 1 to activate parameter initialize.
8	**1**	-. Press the Prog/Ent (●) key once.
9	**H 93**	-. Return to the parameter number after blinking. **Parameter initialize** has been complete. -. Press the either Left (◀) or Right (▶) key.
10	**H 0**	-. Return to H0.

6. FAULT MESSAGES

6.1 MONITOR FAULTS



1	**OCt**	-. This message appears when an Overcurrent fault occurs. - Press the Prog/Ent (●) key once.
2	**30.0**	-. The **run frequency** at the time of fault (30.0) is displayed. - Press the Up (▲) key once.
3	**5.0**	-. The **output current** at the time of fault is displayed. - Press the Up (▲) key once.
4	**ACC**	-. Operating status is displayed. A fault occurred during acceleration. - Press the STOP/RST key once.
5	**nOn**	-. A fault condition is cleared and "nOn" is displayed.

6.2 FAULT DISPLAY AND INFORMATION

Display	Fault	Description
Oct	Over current	The inverter turns off its output when the output current of the inverter flows more than 200% of the inverter rated current.
Oft	Ground fault current	The inverter turns off its output when a ground fault occurs and the ground fault current is more than the internal setting value of the inverter.
I OL	Inverter Overload	The inverter turns off its output when the output current of the inverter flows more than the rated level (150% for 1 minute).
OL t	Overload trip	The inverter turns off its output if the output current of the inverter flows at 150% of the inverter rated current for more than the current limit time (1 min).

Display	Fault	Description
OH t	Heat sink overheat	The inverter turns off its output if the heat sink overheats due to a damaged cooling fan or an alien substance in the cooling fan by detecting the temperature of the heat sink.
COL	DC link capacitor overload	The inverter turns off its output when it is time to replace the old DC link capacitor to a new one.
Pot	Output Phase loss	The inverter turns off its output when the one or more of the output (U, V, W) phase is open. The inverter detects the output current to check the phase loss of the output.
Out	Over voltage	The inverter turns off its output if the DC voltage of the main circuit increases higher than 400 V when the motor decelerates. This fault can also occur due to a surge voltage generated at the power supply system.
Out	Low voltage	The inverter turns off its output if the DC voltage is below 200V because insufficient torque or overheating of the motor can occur when the input voltage of the inverter drops.
E t H	Electronic Thermal	The internal electronic thermal of the inverter determines the overheating of the motor. If the motor is overloaded the inverter turns off the output. The inverter cannot protect the motor when driving a motor having more than 4 poles or multi motors.
EEP	Parameter save error	This fault message is displayed when user-setting parameters fails to be entered into memory.
HWE	Inverter hardware fault	This fault message is displayed when an error occurs in the control circuitry of the inverter.
Err	Communication Error	This fault message is displayed when the inverter cannot communicate with the keypad.
FAn	Cooling fan fault	This fault message is displayed when a fault condition occurs in the inverter cooling fan.
ESt	Instant cut off	Used for the emergency stop of the inverter. The inverter instantly turns off the output when the EST terminal is turned on. **Caution :** The inverter starts to regular operation when turning off the BX terminal while FX or RX terminal is ON.
EtA	External fault A contact input	When multi-fun ction input terminal (I20-I24) is set to 18 {External fault signal input : A (Normal Open Contact)}, the inverter turns off the output.
EtB	External fault B contact input	When multi-function input terminal (I20-I24) is set to 18 {External fault signal input : B (Normal Close Contact)}, the inverter turns off the output.
_ _ L	Operating method when the frequency command is lost	When inverter operation is set via Analog input (0-10V or 0-20mA input) or option (RS485) and no signal is applied, operation is done according to the method set in I62 (Operating method when the frequency reference is lost).

7. FUNCTION LIST

7.1 DRIVE GROUP

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
0.0	Frequency command	0/400 [Hz]	This parameter sets the frequency that the inverter is commanded to output. During Stop: Frequency Command During Run: Output Frequency During Multi-step operation: ~~Multi-step frequency 0~~. It cannot be set greater than F21 - [Max frequency].	0.0	O
ACC	Accel time	0/6000 [s]	During Multi-Accel/Decel operation, this parameter serves as Accel/Decel time 0	5.0	O
dEC	Decel time			10.0	O
Drv	Drive mode (Run/Stop mode)	0/3	0 Run/Stop via Run/Stop key on the keypad 1 Run/Stop via control terminal — FX : Motor forward run; RX : Motor reverse run 2 Run/Stop via control terminal — FX : Run/Stop enable; RX : Motor reverse rotation 3 Operation via Communication Option	1	X
Frq	Frequency mode	0/8	0 Digital — Setting via Keypad 1 1 Digital — Setting via Keypad 2 2 Analog — Setting via potentiometer on the keypad(V0) 3 Analog — Setting via V1 terminal 4 Analog — Setting via I terminal 5 Analog — Setting via potentiometer on the keypad + I terminal 6 Analog — Setting via V1 + I terminal 7 Analog — Setting via potentiometer on the keypad + V1 terminal 8 Analog — Modbus-RTU Communication	0	X
St1	Multi-Step frequency 1	0/400 [Hz]	This parameter sets Multi-Step frequency 1 during Multi-step operation.	10.0	O
St2	Multi-Step frequency 2		This parameter sets Multi-Step frequency 2 during Multi-step operation.	20.0	O
St3	Multi-Step frequency 3		This parameter sets Multi-Step frequency 3 during Multi-step operation.	30.0	O
CUr	Output current		This parameter displays the output current to the motor.	-	-
rPM	Motor RPM		This parameter displays the number of Motor RPM.	-	-
dCL	Inverter DC link voltage		This parameter displays DC link voltage inside the inverter.	-	-

LED display	Parameter name	Min/Max range	Description		Factory defaults	Adjustable during run
vOL	User display select		This parameter displays the item selected at H73- [Monitoring item select]		vOL	-
			vOL	Output voltage		
			POr	Output power		
			tOr	Torque		
nOn	Fault Display		This parameter displays the types of faults, frequency and operating status at the time of the fault.		-	-
drC	Direction of motor rotation select	F/r	This parameter sets the direction of motor rotation when drv - [Drive mode] is set to either 0 or 1.		F	O
			F	Forward		
			r	Reverse		

7.2 FUNCTION GROUP 1

LED display	Parameter name	Min/Max range	Description		Factory defaults	Adjustable during run
F 0	Jump code	0/60	This parameter sets the parameter code number to jump.		1	O
F 1	Forward/ Reverse run disable]	0/2	0	Fwd and rev run enable	0	X
			1	Forward run disable		
			2	Reverse run disable		
F 2	Accel pattern	0/1	0	Linear	0	X
F 3	Decel pattern		1	S-curve		
F 4	Stop mode select	0/2	0	Decelerate to stop	0	X
			1	Stop via DC brake		
			2	Free run to stop		
F 8	DC Brake start frequency	0/60 [Hz]	This parameter sets DC brake start frequency. It cannot be set below F23 - [Start frequency].		5.0	X
F 9	DC Brake wait time	0/60 [s]	When DC brake frequency is reached, the inverter holds the output for the setting time before starting DC brake.		1.0	X
F10	DC B rake voltage	0/200 [%]	This parameter sets the amount of DC voltage applied to a motor. It is set in percent of H33 – [Motor rated current]		50	X

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
F11	DC Brake time	0/60 [s]	This parameter sets the time taken to apply DC current to a motor while motor is at a stop.	1.0	X
F12	DC Brake start voltage	0/200 [%]	This parameter sets the amount of DC voltage before a motor starts to run. It is set in percent of H33 – [Motor rated current]	50	X
F13	DC Brake start time	0/60 [s]	DC voltage is applied to the motor for DC Brake start time before motor accelerates.	0	X
F14	Time for magnetizing a motor	0/60 [s]	This parameter applies the current to a motor for the set time before motor accelerates during Sensorless vector control	1.0	X
F20	Jog frequency	0/400 [Hz]	This parameter sets the frequency for Jog operation. It cannot be set above F21 – [Max frequency].	10.0	O
F21	Max frequency	40/400 * [Hz]	This parameter sets the highest frequency the inverter can output. It is frequency reference for Accel/Decel (See H70) If H40 is set to 3(Sensorless vector), it can be settable up to 300Hz *. **Caution : Any frequency cannot be set above Max frequency**	60.0	X
F22	Base frequency	30/400 [Hz]	The inverter outputs its rated voltage to the motor at this frequency (see motor nameplate). In case of using a 50Hz motor, set this to 50Hz.	60.0	X
F23	Start frequency	0/10 [Hz]	The inverter starts to output its voltage at this frequency. It is the frequency low limit.	0.5	X
F24	Frequency high/low limit select	0/1	This parameter sets high and low limit of run frequency.	0	X

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
F25	Frequency high limit	0/400 [Hz]	This parameter sets high limit of the run frequency. It cannot be set above F21 – [Max frequency]	60.0	X
F26	Frequency low limit	0/400 [Hz]	This parameter sets low limit of the run frequency. It cannot be set above F25 - [Frequency high limit] and below F23 – [Start frequency].	0.5	X
F27	Torque Boost select	0/1	0 Manual torque boost 1 Auto torque boost	0	X
F28	Torque boost in forward direction	0/15 [%]	This parameter sets the amount of torque boost applied to a motor during forward run. It is set in percent of Max output voltage.	5	X
F29	Torque boost in reverse direction	0/15 [%]	This parameter sets the amount of torque boost applied to a motor during reverse run. It is set as a percent of Max output voltage.	5	X
F30	V/F pattern	0/2	0 Linear 1 Square 2 User V/F	0	X
F31	User V/F frequency 1	0/400 [Hz]	This parameter is active when F30 – [V/F pattern] is set to 2 {User V/F}. It cannot be set above F21 – [Max frequency]. The value of voltage is set in percent of H70 – [Motor rated voltage]. The values of the lower-numbered parameters cannot be set above those of higher-numbered.	15.0	X
F32	User V/F voltage 1	0/100 [%]		25	X
F33	User V/F frequency 2	0/400 [Hz]		30.0	X
F34	User V/F voltage 2	0/100 [%]		50	X
F35	User V/F frequency 3	0/400 [Hz]		45.0	X
F36	User V/F voltage 3	0/100 [%]		75	X
F37	User V/F frequency 4	0/400 [Hz]		60.0	X
F38	User V/F voltage 4	0/100 [%]		100	X

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
F39	Output voltage adjustment	40/110 [%]	This parameter adjusts the amount of output voltage. The set value is the percentage of input voltage.	100	X
F40	Energy-saving level	0/30 [%]	This parameter decreases output voltage according to load status.	0	0
F50	Electronic thermal select	0/1	This parameter is activated when the motor is overheated (time-inverse).	0	0
F51	Electronic thermal level for 1 minute	50/200 [%]	This parameter sets max current capable of flowing to the motor continuously for 1 minute. The set value is the percentage of H33 – [Motor rated current]. It cannot be set below F52 –[Electronic thermal level for continuous].	150	0
F52	Electronic thermal level for continuous		This parameter sets the amount of current to keep the motor running continuously. It cannot be set higher than F51 – [Electronic thermal level for 1 minute].	100	0
F53	Motor cooling method	0/1	0 Standard motor having cooling fan directly connected to the shaft 1 A motor using a separate motor to power a cooling fan.	0	0
F54	Overload warning level	30/150 [%]	This parameter sets the amount of current to issue an alarm signal at a relay or multi-function output terminal (see I54, I55). The set value is the percentage of H33-[Motor rated current].	150	0
F55	Overload warning time	0/30 [s]	This parameter issues an alarm signal when the current greater than F54-[Overload warning level] flows to the motor for F55- [Overload warning time].	10	0
F56	Overload trip select	0/1	This parameter turns off the inverter output when motor is overloaded.	1	0
F57	Overload trip level	30/200 [%]	This parameter sets the amount of overload current. The value is the percentage of H33-[Motor rated current].	180	0
F58	Overload trip time	0/60 [s]	This parameter turns off the inverter output when the F57- [Overload trip level] of current flows to the motor for F58- [Overload trip time].	60	0

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
F59	Stall prevention select	0/7	This parameter stops accelerating during acceleration, decelerating during constant speed run and stops decelerating during deceleration.	0	X

	During Deceleration	During constant speed	During Acceleration
	Bit 2	**Bit 1**	**Bit 0**
0	-	-	-
1	-	-	✓
2	-	✓	-
3	-	✓	✓
4	✓	-	-
5	✓	-	✓
6	✓	✓	-
7	✓	✓	✓

F60	Stall prevention level	30/150 [%]	This parameter sets the amount of current to activate stall prevention function during Accel, constant or Decel run. The set value is the percentage of the H33 - [Motor rated current].	150	X

7.3 FUNCTION GROUP 2

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
H 0	Jump code	1/95	This parameter sets the code number jump.	1	O
H 1	Fault history 1	-	This parameter stores information on the types of faults, the frequency, the current and the Accel/Decel condition at the time of fault. The last fault is automatically stored in the H 1 - [Fault history 1].	nOn	-
H 2	Fault history 2	-		nOn	-
H 3	Fault history 3	-		nOn	-
H 4	Fault history 4	-		nOn	-
H 5	Fault history 5	-		nOn	-
H 6	Reset fault history	0/1	This parameter clears the fault history saved in H 1-5.	0	O
H 7	Dwell frequency	F23/400 [Hz]	When run frequency is issued, motor starts to accelerate after dwell frequency is applied to the motor during H8 - [Dwell time]. [Dwell frequency] can be set within the range of F21- [Max frequency] and F23- [Start frequency].	5.0	X

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
H 8	Dwell time	0/10 [s]	This parameter sets the time for dwell operation.	0.0	X
H10	Skip frequency select	0/1	This parameter sets the frequency range to skip to prevent undesirable resonance and vibration on the structure of the machine.	0	X
H11	Skip frequency low limit 1	0/400 [Hz]	Run frequency cannot be set within the range of H11 thru H16. The frequency values of the low numbered parameters cannot be set above those of the high numbered ones.	10.0	X
H12	Skip frequency high limit 1			15.0	X
H13	Skip frequency low limit 2			20.0	X
H14	Skip frequency high limit 2			25.0	X
H15	Skip frequency low limit 3			30.0	X
H16	Skip frequency high limit 3			35.0	X
H17	S-Curve accel/decel start side	1/100 [%]	Set the speed reference value to form a curve at the start during accel/decel. If it is set higher, linear zone gets smaller.	40	X
H18	S-Curve accel/decel end side	1/100 [%]	Set the speed reference value to form ac urve at the end during accel/decel. If it is set higher, linear zone gets smaller.	40	X
H19	Output phase loss protection select	0/1	Inverter turns off the output when the phase of the inverter output (U, V, W) is not properly connected.	0	O
H20	Power On Start select	0/1	This parameter is activated when drv is set to 1 or 2 (Run/Stop via Control terminal). Motor starts acceleration after AC power is applied while FX or RX terminal is ON.	0	O
H21	Restart after fault reset		This parameter is active when drv is set to 1 or 2 (Run/Stop via Control terminal). Motor accelerates after the fault condition is reset while the FX or RX terminal is ON.		

<table>
<tr><th>LED display</th><th>Parameter name</th><th>Min/Max range</th><th>Description</th><th>Factory defaults</th><th>Adjustable during run</th></tr>
<tr><td rowspan="18">H22</td><td rowspan="18">Speed Search Select</td><td rowspan="18">0/15</td><td>This parameter is active to prevent any possible fault when the inverter outputs its voltage to the running motor.

<table>
<tr><th></th><th>1. H20- Power On start</th><th>2.Restart after instant power failure</th><th>3.Operation after fault occurred</th><th>4.Normal acceleration</th></tr>
<tr><th></th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr>
<tr><td>0</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>1</td><td>-</td><td>-</td><td>-</td><td>✓</td></tr>
<tr><td>2</td><td>-</td><td>-</td><td>✓</td><td></td></tr>
<tr><td>3</td><td>-</td><td>-</td><td>✓</td><td>✓</td></tr>
<tr><td>4</td><td>-</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>5</td><td>-</td><td>✓</td><td>-</td><td>✓</td></tr>
<tr><td>6</td><td>-</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>7</td><td>-</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>8</td><td>✓</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>9</td><td>✓</td><td>-</td><td>-</td><td>✓</td></tr>
<tr><td>10</td><td>✓</td><td>-</td><td>✓</td><td>-</td></tr>
<tr><td>11</td><td>✓</td><td>-</td><td>✓</td><td>✓</td></tr>
<tr><td>12</td><td>✓</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>13</td><td>✓</td><td>✓</td><td>-</td><td>✓</td></tr>
<tr><td>14</td><td>✓</td><td>✓</td><td>✓</td><td>-</td></tr>
<tr><td>15</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table></td><td rowspan="18">0</td><td rowspan="18">O</td></tr>
<tr><td>H23</td><td>Current level during Speed search</td><td>80/200 [%]</td><td>This parameter limits the amount of current during speed search.
The set value is the percentage of the H33- [Motor rated current].</td><td>100</td><td>O</td></tr>
<tr><td>H24</td><td>P gain during Speed search</td><td>0/9999</td><td>It is the Proportional gain used for Speed Search PI controller.</td><td>100</td><td>O</td></tr>
<tr><td>H25</td><td>I gain during speed search</td><td>0/9999</td><td>It is the Integral gain used for Speed search PI controller.</td><td>1000</td><td>O</td></tr>
<tr><td>H26</td><td>Number of Auto Restart try</td><td>0/10</td><td>This parameter sets the number of restart tries after a fault occurs.
Auto Restart is deactivated if the fault outnumbers the restart tries.
This function is active when [drv] is set to 1 or 2 {Run/Stop via control terminal}.
Deactivated during active protection function (OHT, LVT, EXT, HWT etc.)</td><td>0</td><td>O</td></tr>
</table>

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
H27	Auto Restart time	0/60 [s]	·This parameter sets the time between restart tries.	1.0	O
H30	Motor type select	0.2/2.2	0.2 0.2 kW 0.4 0.4 kW 0.75 0.75 kW 1.5 1.5 kW 2.2 2.2 kW	0.4	X
H31	Number of motor poles	2/12	This setting is displayed via rPM in drive group.	4	X
H32	Rated slip frequency	0/10 [Hz]	$f_s = f_r - \left(\frac{rpm \times P}{120} \right)$ f_s = Rated slip frequency f_r = Rated frequency rpm = Motor nameplate RPM P = Number of Motor poles	3.0	X
H33	Motor rated current	1.0/20 [A]	Enter motor rated current on the nameplate.	1.8	X
H34	No Load Motor Current	0.1/12 [A]	Enter the current value detected when the motor is rotating in rated rpm after the load connected to the motor shaft is removed. Enter the 50% of the rated current value when it is difficult to measure H34 - [No Load Motor Current]	0.9	X
H36	Motor efficiency	50/100 [%]	Enter the motor efficiency (see motor nameplate).	72	X
H37	Load inertia rate	0/2	Select one of the following according to motor inertia. 0 Less than 10 times that of motor inertia 1 About 10 times that of motor inertia 2 More than 10 times that of motor inertia	0	X

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
H39	Carrier frequency select	1/15 [kHz]	·This parameter affects the audible sound of the motor, noise emission from the inverter, inverter temp, and leakage current. If the value is set higher, the inverter sound is quieter but the noise from the inverter and leakage current will become greater.	3	O
H40	Control mode select	0/3	0 {Volts/frequency Control} 1 {Slip compensation control} 2 {PID Feedback control} 3 {Sensorless vector control}	0	X
H41	Auto tuning	0/1	If this parameter is set to 1, it automatically measures parameters of the H42 and H43.	0	X
H42	[Stator resistance (Rs)]	0/5.0[Ω]	This is the value of the motor stator resistance.	-	X
H44	[Leakage inductance (L_σ)]	0/300.0 [mH]	This is leakage inductance of the stator and rotor of the motor.	-	X
H45	Sensorless P gain	0/32767	P gain for Sensorless control	1000	O
H46	Sensorless I gain		I gain for Sensorless control	100	O
H50	PID Feedback select	0/1	0 Terminal I input (0 ~ 20 mA) 1 Terminal V1 input (0 ~ 10 V)	0	X
H51	[P gain for PID controller]	0/999.9 [%]	This parameter sets the gains for the PID controller.	300.0	O
H52	[Integral time for PID controller (I gain)]	0.1/32.0 [sec]		1.0	O
H53	Differential time for PID controller (D gain)	0.0/30.0 [sec]		0.0	O
H54	F gain for PID controller	0/999.9 [%]	This is the Feed forward gain for the PID controller.	0.0	O

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
H70	Frequency Reference for Accel/Decel	0/1	0 The Accel/Decel time is the time that takes to reach the F21 – [Max frequency] from 0 Hz. 1 The Accel/Decel time is the time that takes to reach a target frequency from the run frequency.	0	X
H71	Accel/Decel time scale	0/2	0 Settable unit: 0.01 second. 1 Settable unit: 0.1 second. 2 Settable unit: 1 second.	1	O
H72	Power on display	0/13	This parameter selects the parameter to be displayed on the keypad when the input power is first applied. 0 Frequency command 1 Accel time 2 Decel time 3 Drive mode 4 Frequency mode 5 Multi-Step frequency 1 6 Multi-Step frequency 2 7 Multi-Step frequency 3 8 Output current 9 Motor rpm 10 Inverter DC link voltage 11 User display select 12 Fault display 13 Direction of motor rotation select	0	O
H73	Monitoring item select	0/2	One of the following can be monitored via vOL - [User display select]. 0 Output voltage [V] 1 Output power [kW] 2 Torque [kgf · m]	0	O
H74	Gain for Motor rpm display	1/1000 [%]	$RPM = \left(\frac{120 \times f}{H31}\right) \times \frac{H74}{100}$ This parameter is used to change the motor speed display to rotating speed (r/min) or mechanical speed (m/mi).		
H79	Software version	0/10.0	This parameter displays the inverter software version.	1.0	X

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
H81	Software version	0/6000 [s]	This parameter is active when the selected terminal is ON after I20-I24 is set to 12 {2nd motor select}.	5.0	O
H82	2nd motor Accel time			10.0	O
H83	2nd motor Decel time	30/400 [Hz]		60.0	X
H84	2nd motor base frequency	0/2		0	X
H85	2nd motor V/F pattern	0/15 [%]		5	X
H86	2nd motor forward torque boost			5	X
H87	2nd motor reverse torque boost	30/150 [%]		150	X
H88	2nd motor stall prevention level	50/200 [%]		150	O
H89	2nd motor Electronic thermal level for 1 min			100	O
H90	2nd motor Electronic thermal level for continuous	0.1/20 [A]		1.8	X
H93	Parameter initialize	0/5	This parameter is used to initialize parameters back to the factory default values. 0 - 1 All parameter groups are initialized to factory default value. 2 Only Drive group is initialized. 3 Only Function group 1 is initialized. 4 Only Function group 2 is initialized.	0	X
H94	Password register	0/FFF	Password for H95-[Parameter lock].	0	O
H95	Parameter lock	0/FFF	This parameter is able to lock or unlock parameters by typing password registered in H94. UL (Unlock) Parameter change enable L (Lock) Parameter change disable	0	O

7.4 I / O GROUP

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
I 0	Jump code	0/63	This parameter sets the code number to jump	1	O
I 1	Filter time constant for V0 input	0/9999	This is used to adjust the analog voltage input signal via keypad potentiometer.	10	O
I 2	V0 input Min voltage	0/10 [V]	Set the minimum voltage of the V0 input.	0	O
I 3	Frequency corresponding to I 2	0/400 [Hz]	Set the inverter output minimum frequency at minimum voltage of the V0 input.	0.0	O
I 4	V0 input Max voltage	0/10 [V]	Set the maximum voltage of the V0 input.	10	O
I 5	Frequency corresponding to I 4	0/400 [Hz]	Set the inverter output maximum frequency at maximum voltage of the V0 input	60.0	O
I 6	Filter time constant for V1 input	0/9999	Set the input section's internal filter constant for V1 input.	10	O
I 7	V1 input Min voltage	0/10 [V]	Set the minimum voltage of the V1 input.	0	O
I 8	Frequency corresponding to I 7	0/400 [Hz]	Set the inverter output minimum frequency at minimum voltage of the V1 input.	0.0	O
I 9	V1 input max voltage	0/10 [V]	Set the maximum voltage of the V1 input.	10	O
I10	Frequency corresponding to I 9	0/400 [Hz]	Set the inverter output maximum frequency at maximum voltage of the V1 input	60.0	O
I11	Filter time constant for I input	0/9999	Set the input section's internal filter constant for I input.	10	O
I12	I input minimum current	0/20 [mA]	Set the Minimum Current of I input.	4	O
I13	Frequency corresponding to I 12	0/400 [Hz]	Set the inverter output minimum frequency at minimum current of I input.	0.0	O
I14	I input max current	0/20 [mA]	Set the Maximum Current of I input.	20	O
I15	Frequency corresponding to I 14	0/400 [Hz]	Set the inverter output maximum frequency at maximum current of I input.	60.0	O

LED display	Parameter name	Min/Max range	Description					Factory defaults	Adjustable during run
I16	Criteria for Analog Input Signal loss	0/2	0	Disabled				0	O
			1	Less than half the value set in I 2/7/12 entered					
			2	Below the value set in I 2/7/12 entered					
I20	Multi-function input terminal P1 define	0/24	0	Forward run command {FX}				0	O
			1	Reverse run command {RX}					
I21	Multi-function input terminal P2 define		2	Emergency Stop Trip {EST}				1	O
			3	Reset when a fault occurs {RST}.					
I22	Multi-function input terminal P3 define		4	Jog operation command {JOG}				2	O
			5	Multi-Step frequency – Low					
I23	Multi-function input terminal P4 define		6	Multi-Step frequency – Mid				3	O
			7	Multi-Step frequency – High					
I24	Multi-function input terminal P5 define		8	Multi Accel/Decel – Low				4	O
			9	Multi Accel/Decel – Mid					
			10	Multi Accel/Decel – High					
			11	DC brake during stop					
			12	2nd motor select					
			13	-					
			14	-					
			15	Up-down operation	Frequency increase command (UP)				
			16		Frequency decrease command (DOWN)				
			17	3-wire operation					
			18	External trip: A Contact (EtA)					
			19	External trip: B Contact (EtB)					
			20	-					
			21	Exchange between PID operation and V/F operation					
			22	Exchange between option and Inverter					
			23	Analog Hold					
			24	Accel/Decel Disable					
I25	Input terminal status display		BIT4	BIT3	BIT2	BIT1	BIT0	-	-
			P5	P4	P3	P2	P1		
I26	Output terminal status display					BIT1	BIT0		
						30AC	MO		

LED display	Parameter name	Min/Max range	Description	Factory defaults	Adjustable during run
I27	Filtering time constant for Multi-function Input terminal	2/50	If the value is set higher, the response of the Input terminal is getting slower.	15	O
I30	Multi-Step frequency 4	0/400 [Hz]	It cannot be set greater than F21 – [Max frequency].	30.0	O
I31	Multi-Step frequency 5			25.0	O
I32	Multi-Step frequency 6			20.0	O
I33	Multi-Step frequency 7			15.0	O
I34	Multi-Accel time 1	0/6000 [s]		3.0	O
I35	Multi-Decel time 1			3.0	
I36	Multi-Accel time 2			4.0	
I37	Multi-Decel time 2			4.0	
I38	Multi-Accel time 3			5.0	
I39	Multi-Decel time 3			5.0	
I40	Multi-Accel time 4			6.0	
I41	Multi-Decel time 4			6.0	
I42	Multi-Accel time 5			7.0	
I43	Multi-Decel time 5			7.0	
I44	Multi-Accel time 6			8.0	
I45	Multi-Decel time 6			8.0	
I46	Multi-Accel time 7			9.0	
I47	Multi-Decel time 7			9.0	

LED display	Parameter name	Min/Max range	Description			Factory defaults	Adjustable during run
I50	Analog output item select	0/3			10[V] Output	0	O
			0	Max frequency	Max frequency		
			1	150 %	150 %		
			2	282 V	282 V		
			3	DC 400V	400V/DC		
I51	Analog output level adjustment	10/200 [%]				100	O
I52	Frequency detection level	0/400 [Hz]	·This parameter is used when I54 – [Multi-function output terminal select] or I55 – [Multi-function relay select] are set to 0-4. ·It cannot be set greater than F21 – [Max frequency].			30.0	O
I53	Frequency detection bandwidth					10.0	O
I54	Multi-function output terminal select	0/17	0	FDT-1		12	
			1	FDT-2			
I55	Multi-function relay select		2	FDT-3		17	
			3	FDT-4			
			4	FDT-5			
			5	Overload {OL}			
			6	Inverter Overbad {IOL}			
			7	Motor stall {STALL}			
			8	Over voltage trip {OV}			
			9	Low voltage trip {LV}			
			10	Inverter cooling fan overheat {OH}			
			11	Command loss			
			12	During run			
			13	During stop			
			14	During constant run			
			15	During speed searching			
			16	Wait time for run signal input			
			17	Fault relay output			
I56	Fault relay output	0/7		When setting the H26– [Number of auto restart try]	When the trip other than low voltage trip occurs	When the low voltage trip occurs	
				Bit 2	Bit 1	Bit 0	
			0	-	-	-	
			1	-	-	✓	
			2	-	✓	-	

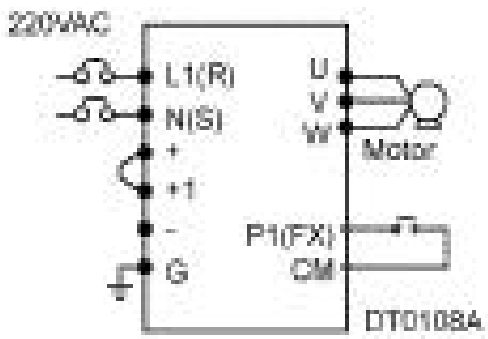
LED display	Parameter name	Min/Max range	Description				Factory defaults	Adjustable during run
I56	Fault relay output	0/7	3	-	✓	✓	2	O
			4	✓	-	-		
			5	✓	-	✓		
			6	✓	✓	-		
			7	✓	✓	✓		
I60	Inverter station number	1/32	This parameter is set when the inverter uses RS485 communication option.				1	O
I61	Baud rate	0/4	Select the Baud rate of the RS485				3	O
			0	1200 bps				
			1	2400 bps				
			2	4800 bps				
			3	9600 bps				
			4	19200 bps				
I62	Drive mode select after loss of frequency command	0/2	It is used when frequency command is given via V1 and I terminal or communication option				0	O
			0	Continuous operation				
			1	Free Run stop (Coast to stop)				
			2	Decel to stop				
I63	Wait time after loss of frequency command	0.1/12 [sec]	This is the time inverter determines whether there is the input frequency command or not. If there is no frequency command input during this time, inverter starts operation via the mode selected at I62				1.0	-

8. BASIC OPERATION

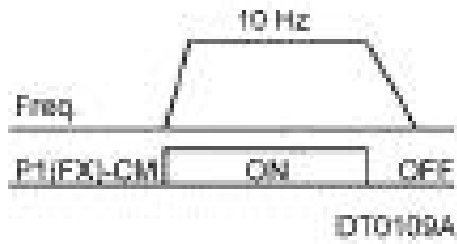
Caution : The following instructions are given based on the fact that all parameters are set to factory defaults. Results could be different if parameter values are changed. In this case, initialize parameter values (see page 10-17) back to factory defaults and follow the instructions below.

8.1 FREQUENCY SETTING VIA KEYPAD & OPERATING VIA TERMINALS.

1	**0.0**	-. Apply AC input power to the inverter.
2	0.**0**	-. When 0.0 appears, press the Prog/Ent (●) key once.
3	**0**0.0	-. The second digit in 0.**0** is lit as shown left. -. Press the Left (◀) key twice.
4	**1**0.0	-. **0**0.0 is displayed and the first **0** is lit. -. Press the Up (▲) key.
5	**10.0**	-. **1**0.0 is set. Press the Prog/Ent (●) key once. -. 10.0 is blinking. Press the Prog/Ent (●) key once.
6	**:10.0**	-. Run frequency is set to **10.0** Hz when the blinking stops. -. Turn on the switch between P1 (FX) and CM terminals.
7	**:10.0**	-. FWD (Forward run) lamp begins to blink and accelerating frequency is displayed on the LED. -. When target run frequency 10Hz is reached, **10.0** is displayed. -. Turn off the switch between P1 (FX) and CM terminals.
8	**0.0**	-. FWD lamp begins to blink and decelerating frequency is displayed on the LED. -. When run frequency is reached to 0Hz, FWD lamp is turned off and **10.0** is displayed.



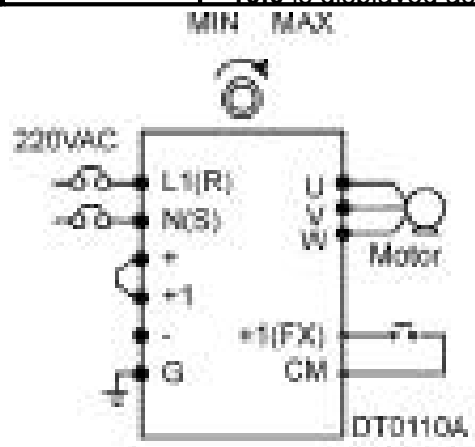
Wiring



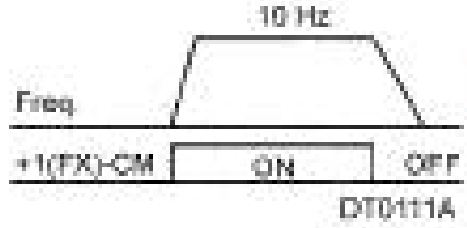
Operating pattern

8.2 FREQUENCY SETTING VIA POTENTIOMETER & OPERATING VIA TERMINALS .

1		-. Apply AC input power to the inverter.
2	**0.0**	-. When 0.0 appears Press the Up (▲) key four times.
3	**Frq**	-. Frq is displayed. Frequency setting mode is selectable. -. Press the Prog/Ent (●) key once.
4	**0**	-. Present setting method is set to 0 (frequency setting via keypad). -. Press the Up (▲) key twice.
5	**2**	-. After 2 (Frequency setting via potentiometer) is set, press the Prog/Ent (●) key once.
6	**Frq**	-. Frq is redisplayed after 2 stops blinking. -. Turn the potentiometer to set to 10.0 Hz in either Max or Min direction.
7	**: 10.0**	-. Turn on the switch between P1 (FX) and CM (See Wiring below). -. FWD lamp begins to blink and the accelerating frequency is displayed on the LED. -. When run frequency 10Hz is reached, the value is displayed as shown left. -. Turn off the switch between P1 (FX) and CM terminals.
8	**: 10.0**	-. FWD lamp begins to blink and the decelerating frequency is displayed on the LED. -. When the run frequency is reached to 0 Hz, FWD lamp is turned off and **10.0** is displayed as shown left.



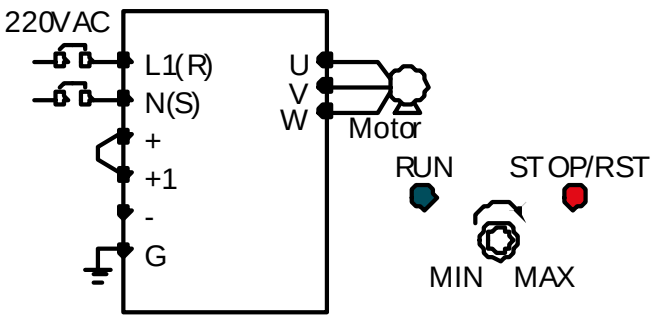
Wiring



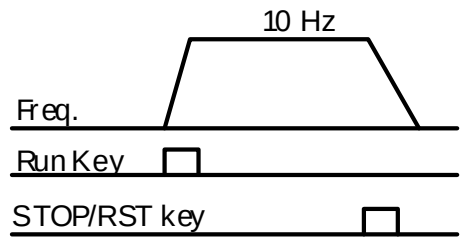
Operating pattern

8.3 FREQUENCY SETTING VIA POTENTIOMETER & OPERATING VIA THE RUN KEY.

1		-. Apply AC input power to the inverter.
2	**0.0**	-. When 0.0 is displayed, press the Up (▲) key three times.
3	**Drv**	-. drv is displayed. Operating method is selectable. -. Press the Prog/Ent (●) key.
4	**1**	-. Check the present operating method ("1" is run via control terminal) -. Press the Prog/Ent (●) key and then Down (▼) key once.
5	**0**	-. After setting "0", press the Prog/Ent (●) key.
6	**Drv**	-. "drv" is displayed after "0" is blinking. Operation method is set via the Run key on the keypad. -. Press the Up (▲) key once.
7	**Frq**	-. Different frequency setting method is selectable in this code. -. Press the Prog/Ent (●) key.
8	**0**	-. Check the present frequency setting method ("**0**" is run via keypad). -. Press the Up (▲) key twice.
9	**2**	-. After checking "**2**" (frequency setting via potentiometer), press the Prog/Ent (●) key.
10	**Frq**	-. "**Frq**" is displayed after "2" is blinking. Frequency setting is set via the potentiometer on the keypad. -. Turn the potentiometer to set to 10.0 Hz in either Max or Min direction.
11	**:10.0**	-. Press the Run key on the keypad. -. FWD lamp begins to blink and accelerating frequency is displayed on the LED. -. When run frequency 10Hz is reached, **10.0** is displayed as shown left. -. Press the STOP/RST key.
12	**:10.0**	-. FWD lamp begins to blink and decelerating frequency is displayed on the LED. -. When run frequency is reached to 0Hz, FWD lamp is turned off and **10.0** is displayed as shown left.



Wiring



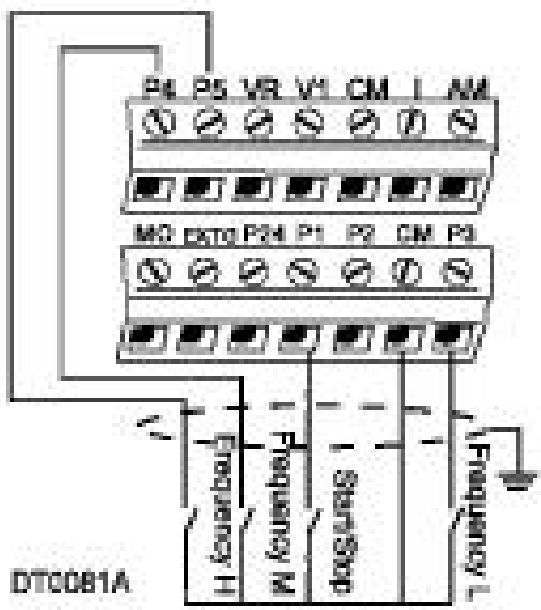
Operating pattern

8.4 MULTI-SPEED CONTROL VIA TERMINALS P3, P4, P5.

Screen	Description	Setting	
00.0	Frequency command	50Hz	
acc	Accel time	10s	
dec	Decel time	10s	
drv	Drive mode (Run/stop mode)	0	Run/Stop via equipad
		1	Run stop via terminal RX , FX.
		2	Operation via communication option.
Frq	Frequency mode	0	Setting via keypad 1
ST 1	Multi-step frequency 1	30 Hz	(Multivelocidad 1)
ST 2	Multi-step frequency 2	35 Hz	(Multivelocidad 2)
ST 3	Multi-step frequency 3	40 Hz	(Multivelocidad 3)
F 21	Max frequency	50 Hz	Velocidad límite del equipo.
F 22	Base frequency	50 Hz	
F 23	Start frequency	0.1 Hz	Velocidad mínima en el arranque
H 30	Motor type select	0.4	0.37Kw
		0.8	0.75Kw
		1.5	1.50Kw
		2.2	2.2Kw
		3.7	3.7Kw
H 33	Motor rated current	1.0/20A	
I 20	Terminal P1 configuration	Configurables	
I 21	Terminal P2 configuration	Configurables	
I 22	Terminal P3 configuration	5 – Speed – L	
I 23	Terminal P4 configuration	6 – Speed – M	
I 24	Terminal P5 configuration	7 – Spped – H	
I 30	Multi-Step frequency 4	42 Hz	
I 31	Multi-Step frequency 5	43 Hz	
I 32	Multi-Step frequency 6	44 Hz	
I 33	Multi-Step frequency 7	45 Hz	

Depending P3, P4, P5 digital input status the following preset different frequencies can be selected:

Screen	Preset frequency	Fx / Rx	P5	P4	P3
0.00	50Hz	1	0	0	0
St 1	30Hz	1	0	0	1
St 2	35Hz	1	0	1	0
St 3	40Hz	1	0	1	1
I 30	45Hz	1	1	0	0
I 31	50Hz	1	1	0	1
I 32	47Hz	1	1	1	0
I 33	42Hz	1	1	1	1



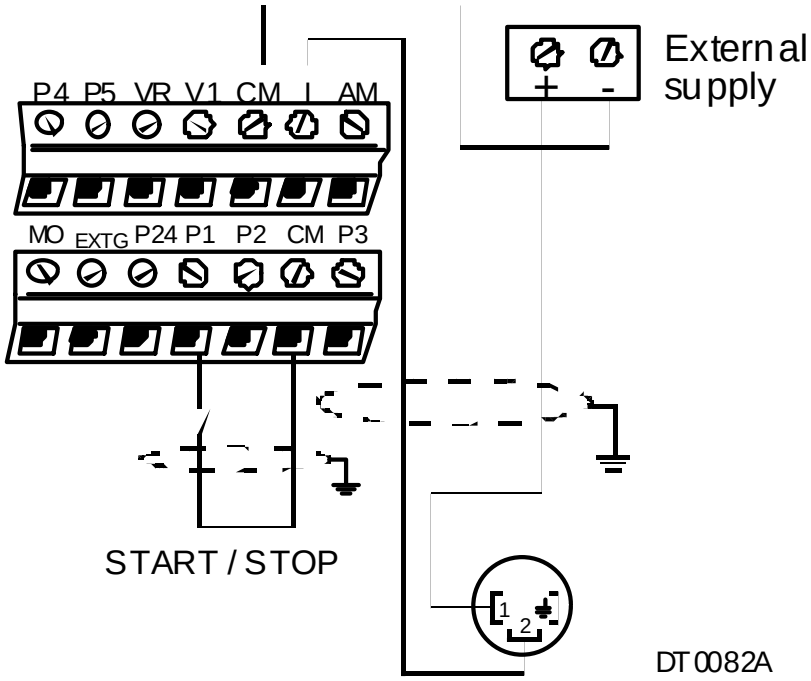
Multi-speed control wiring configuration.

8.5 PID FOR PRESSURE CONTROL CONFIGURATION.

Screen	Description	Setting	
0.0.0	Frequency command	50Hz	
ACC	Accel time	10s	
DEC	Decel time	10s	
DRV	Drive mode (Run/stop mode)	0	Run/Stop via equipad
		1	Run stop via terminal RX , FX
		2	Operation via communication option
FRQ	Frequency mode	0	Setting via keypad 1
		8	Modbus-RTU communication
F 21	Max frequency	50 Hz	
F 22	Base frequency	50 Hz	
F 23	Start frequency	0.1 Hz	
F 24	Frequency high/low limit select	0	NO (Limits are set by F21 and F23)
		1	YES (Limits are set by F25 and 26)
F 25	Frquency high limit	0Hz	
F 26	Frequency low limit	50Hz	
H 30	Motor type select	0.2	0.2Kw
		0.4	0.4Kw
		0.75	0.75Kw
		1.5	1.5Kw
		2.2	2.2Kw
H 33	Motor rated current	A	
H 40	Control mode select	2	PID feedback control
H 50	PID feedback select	0	Terminal input I (0-20mA)
		1	Terminal input V1 (0-10V)
H 51	P gain for PID controller	300.0	
H 52	Integral time for PID controller	1.0	
H 53	Differential time for PID controller	0	
H 79	Software version	1.3	
I 6	Filter time constant for V1 input	10ms	
I 7	V1 input Min voltage	0.00V	
I 8	Frequency corresponding to I7	0Hz	
I 9	V1 input Max voltage	10.0V	
I 10	Frequency corresponding to I9	50Hz	
I 11	Filter time constant for I input	10ms	
I 12	I input minimum current	0mA	
I 13	Frequency corresponding to I12	0Hz	
I 14	I input max current	20.0mA	
I 15	Frequency corresponding to I14	50Hz	

NOTE: Maximum and minimumfrequency limits are set in screen F21(max frequency) and F23 (Start frequency).

NOTE: SD100 do not have 12-30Vdc power supply. External power supply must be required.



PID for pressure control wiring configuration.

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