

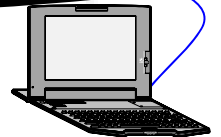
## **HYUNDAI N-Series Industrial Inverter**

### **➤ N700E Series Inverter Function Explanation**



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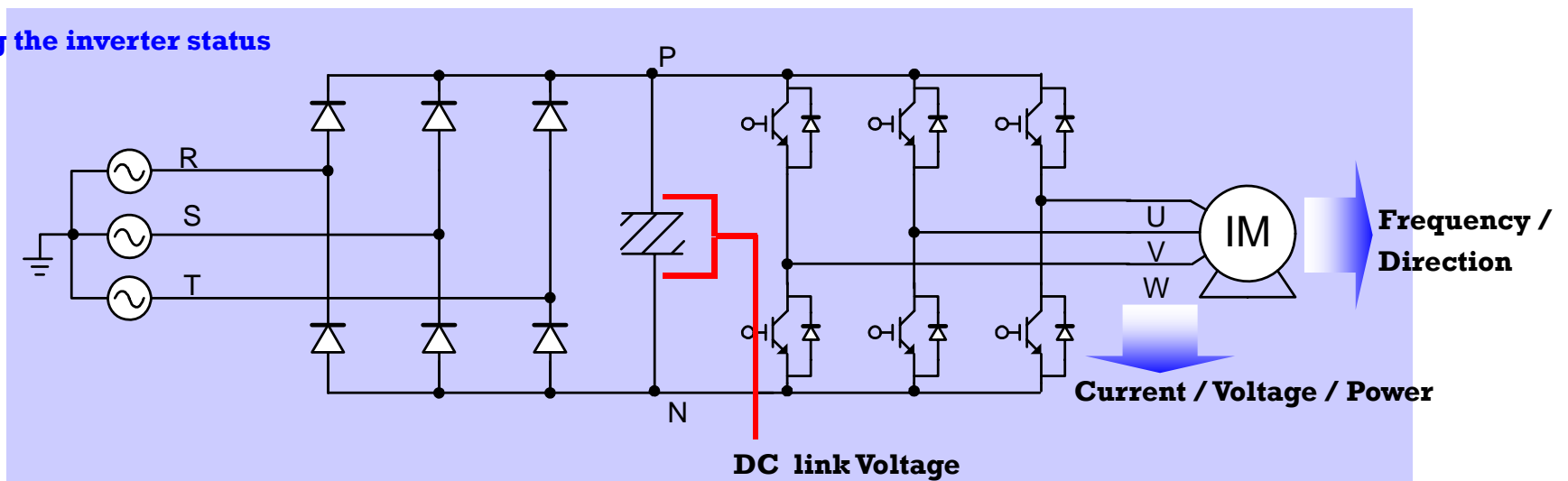


**1 d- parameter group**

➤ d-group is for display mode group.

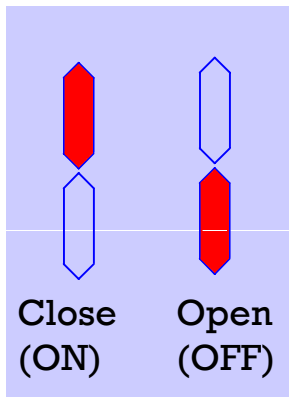
Code	Function Name	Description	Note
d01	Output Frequency Monitor	0 ~ 99.99, 100.0~400.0[Hz]	
d02	Output Current Monitor	0.0 ~ 99.9 [A]	
d03	Output Voltage Monitor	0.0 ~ 999.9 [V]	
d04	Motor Rotation Direction Monitor	F : Forward R : Reverse o : Stop	
d05	PID feedback Monitor	0.00 ~ 100.0	

**Checking the inverter status**

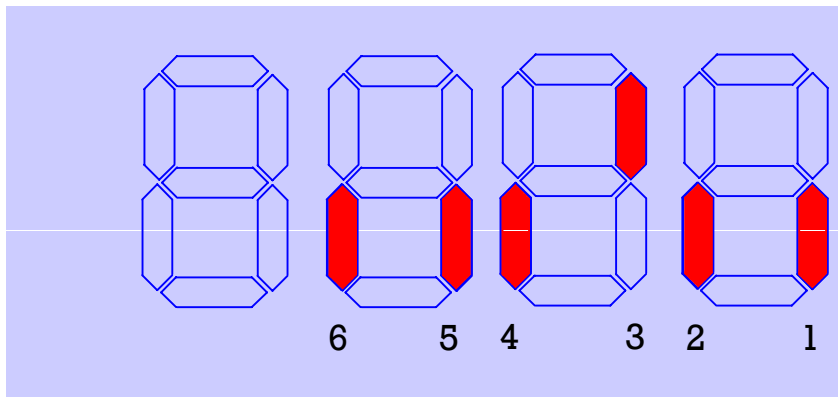


Code	Function Name	Description	Note
d06	Intelligent Input Terminal Monitor		
d07	Intelligent Output Terminal Monitor		
d08	scaled output frequency monitoring	0 ~ 9999	d01 X b14
d09	power consumption monitoring	0.00 ~ 999.9 [kW]	
d10	operating time accumulation	0 ~ 9999 [hr]	
d11	running time monitoring	0 ~ 59 [min]	
d12	DC link voltage	0 ~ 999 [V]	

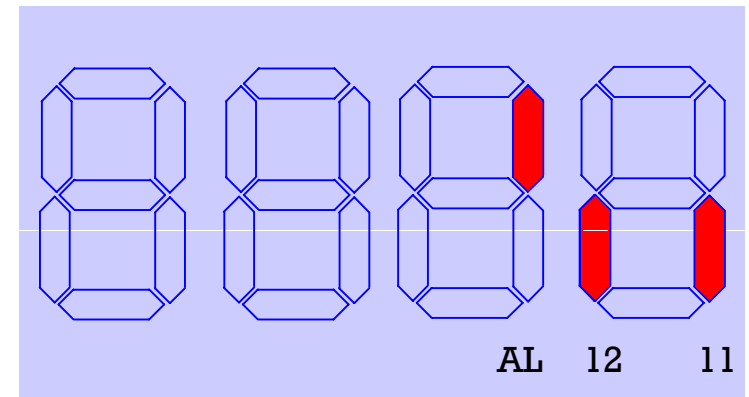
terminal status



Intelligent input terminal (1~6)



Intelligent output terminal (AL, 11, 12)



Code	Function Name	Description	Note
d13	Trip monitor	Current trip	
d14 ~ d16	previous trip monitor (1~3)	previous trips	
d17	trip count		

✓ trip display procedure ;

trip occur →  $\left. \begin{array}{l} \blacksquare \text{ moving the parameter to d13 automatically} \\ \blacksquare \text{ trip counting up (d17)} \end{array} \right\} \rightarrow \text{d13 value is moved to d14}$

→ d15 value is moved to d16 → d17 value is erased

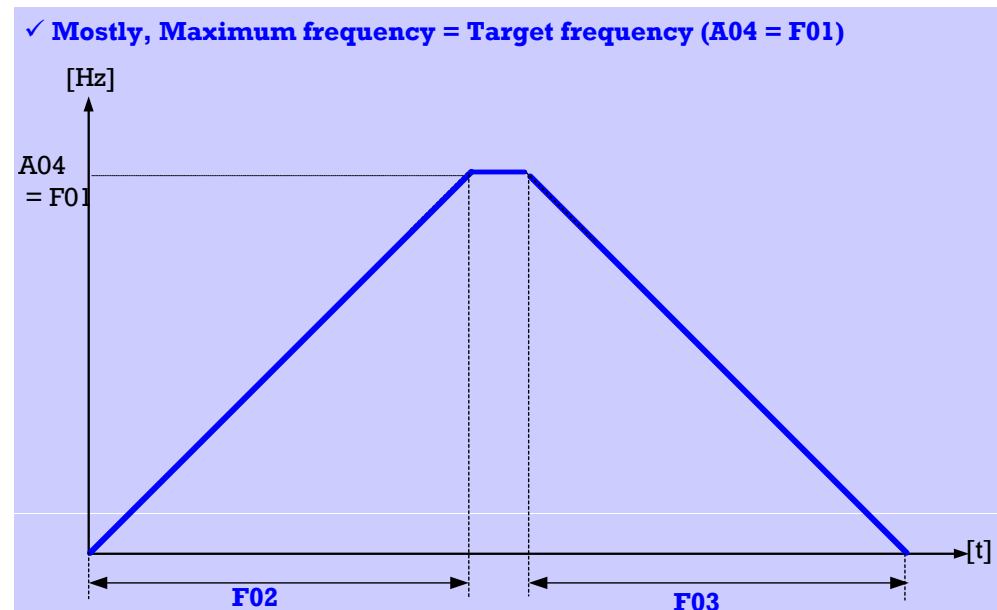
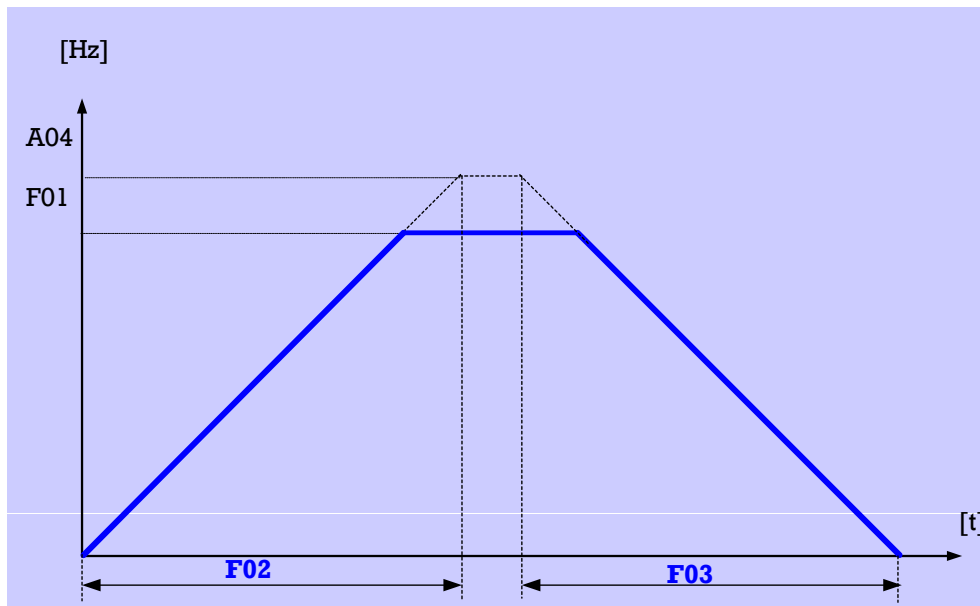
✓ trip codes (d13~d17) can be cleared using b12 code & initializing

## 2 F-parameter group

➤ F-group is for basic function setting group.

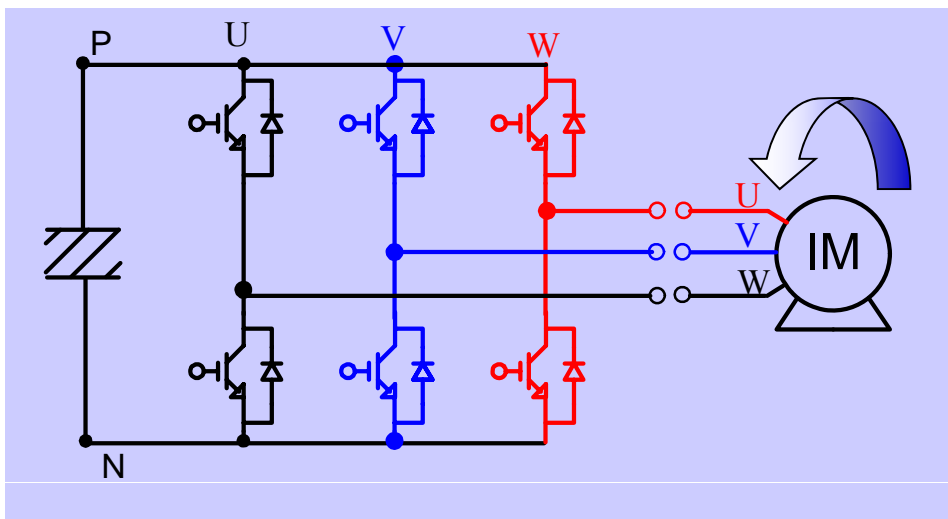
Code	Function Name	min.	Max.	Default	Description
F01	Output frequency setting	0.00	400.0	0.00	
F02	Accelerating time setting	0.1	3600	30.0 [sec]	
F03	Decelerating time setting	0.1	3600	30.0 [sec]	

- ✓ Output frequency means target frequency.
- ✓ Acceleration time : 0Hz → Maximum frequency (A04)  
Deceleration time : Maximum frequency(A04) → 0Hz

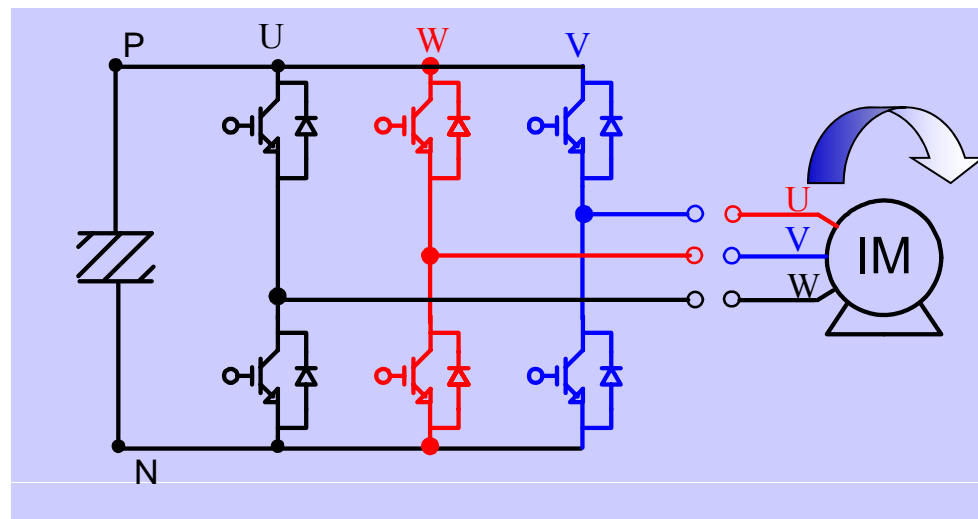


Code	Function Name	min.	Max.	Default	Description
F04	motor rotating direction setting	0	1	0	0:forward 1:reverse

▪ F04 = 0 ; Forward running command



▪ F04 = 1 ; Reverse running command

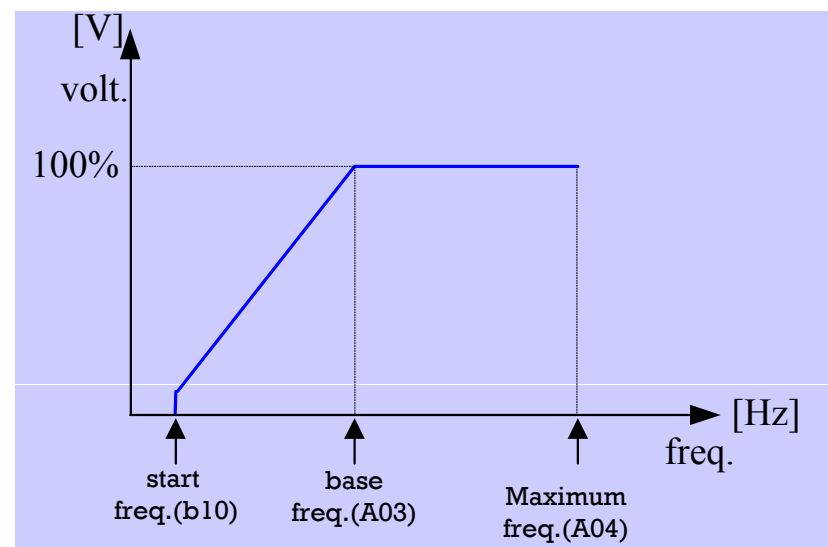


**3 A-parameter group**

➤ A-group is extended function group regarding frequency setting & control mode.

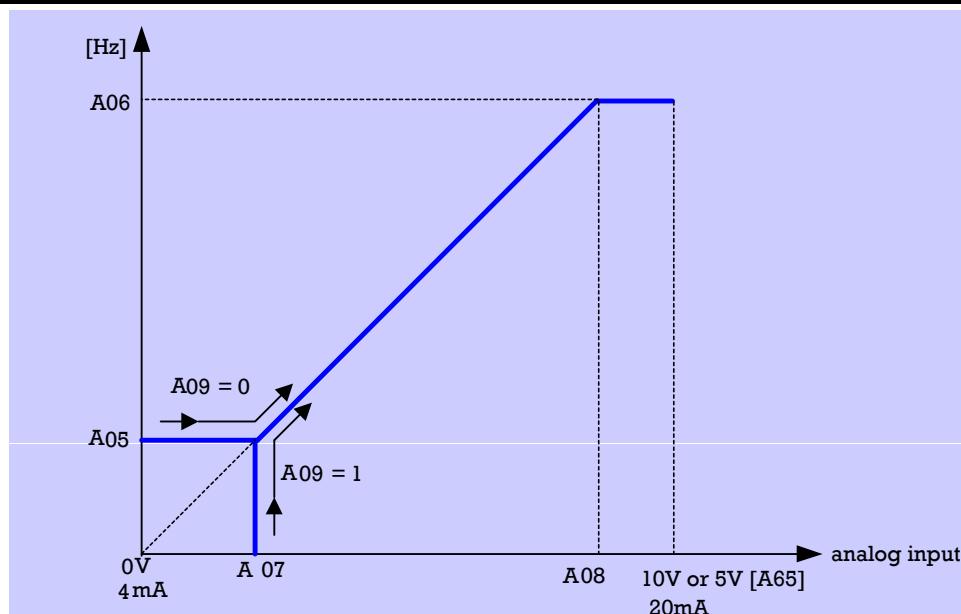
Code	Function Name	min.	Max.	Default	Description
A01	Frequency setting selection	0	3	0	0:Keypad potentiometer 1:control terminal 2:standard operator 3:remote operator (communication)
A02	RUN command setting selection	0	2	0	0:standard operator 1:control terminal 2:remote operator (communication)
A03	Base frequency setting	0.1	400.0	60.00	A03 ≤ A04
A04	Maximum frequency setting	0.1	400.0	60.00	

- ✓ Base frequency is nominal frequency of the motor.  
The base frequency must less than or equal to the maximum frequency. (A03 ≤ A04)



✓ **analog input for frequency setting**

Code	Function Name	min.	Max.	Default	Description
A05	external frequency start setting	0.00	A04	0.00	Output freq. at 0V or 4mA
A06	external frequency end setting	0.00	A04	0.00	Output freq. at 10V or 20mA 10V(20mA)
A07	external frequency start rate	0.0	100.0	0.0	starting point (offset) for the active analog input range
A08	external frequency end rate	0.0	100.0	100.0	Ending point (offset) for the active analog input range
A09	external frequency start pattern	1	1	0	0 : start at start freq. (=A05) 1 : start at 0Hz
A65	external voltage input selection	0	1	0	0 : 0~5V input      1 : 0~10V input

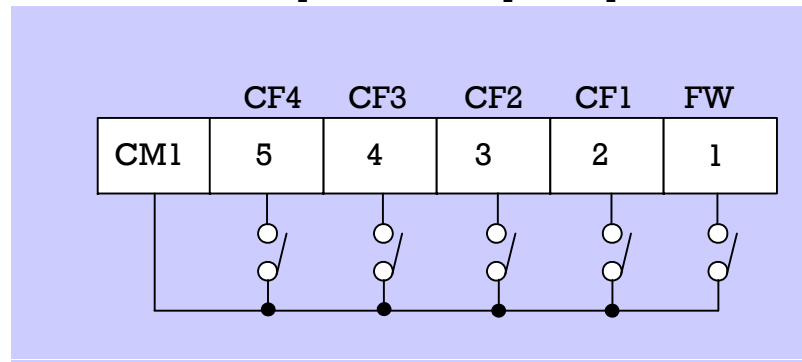




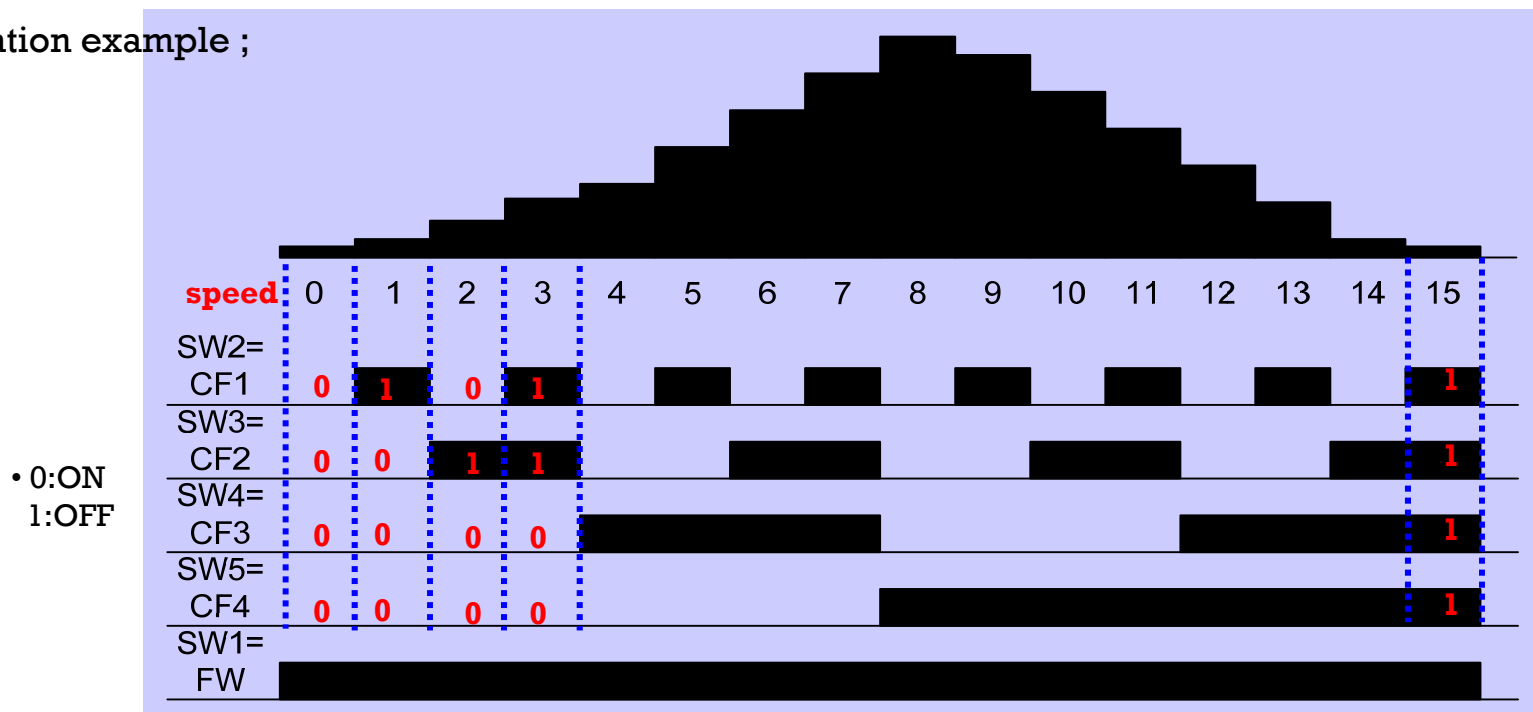
## ✓ Multi-speed function

Code	Function Name	min.	Max.	Default	Description
F01	Multi speed 0	0.00	A04	0.00	
A11	Multi speed 1	0.00	A04	0.00	
A12	Multi speed 2	0.00	A04	0.00	
A13 ~ A25	Multi speed 3 ~ Multi speed 15	0.00	A04	0.00	

## ✓ connection example for multi-speed operation ;



✓ multi-speed operation example ;



multi-speed	Intelligent input					setting Value (Hz)	para- meter
	SW5	SW4	SW3	SW2	SW1		
	CF4	CF3	CF2	CF1	FW		
0-speed	0	0	0	0	1	2	F01
1-speed	0	0	0	1	1	5	A11
2-speed	0	0	1	0	1	10	A12
3-speed	0	0	1	1	1	15	A13
4-speed	0	1	0	0	1	20	A14
5-speed	0	1	0	1	1	30	A15
6-speed	0	1	1	0	1	40	A16
7-speed	0	1	1	1	1	50	A17

multi-speed	Intelligent input					setting Value (Hz)	para- meter
	SW5	SW4	SW3	SW2	SW1		
	CF4	CF3	CF2	CF1	FW		
8-speed	1	0	0	0	1	60	A18
9-speed	1	0	0	1	1	55	A19
10-speed	1	0	1	0	1	45	A20
11-speed	1	0	1	1	1	35	A21
12-speed	1	1	0	0	1	25	A22
13-speed	1	1	0	1	1	15	A23
14-speed	1	1	1	0	1	5	A24
15-speed	1	1	1	1	1	2	A25

✓ **jogging operation**

Code	Function Name	min.	Max.	Default	Description
A26	jogging frequency setting	0.50	10.00	0.50	jogging operation frequency setting
A27	jogging stop operation selection	0	2	0	0 : Free Run Stop [FRS] 1 : deceleration stop 2 : DC braking

## ▪ Free-run stop

A26=10.0, A27=0

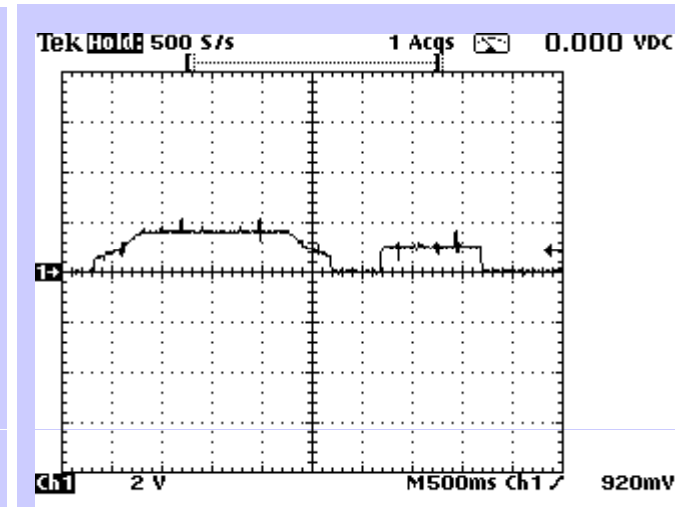
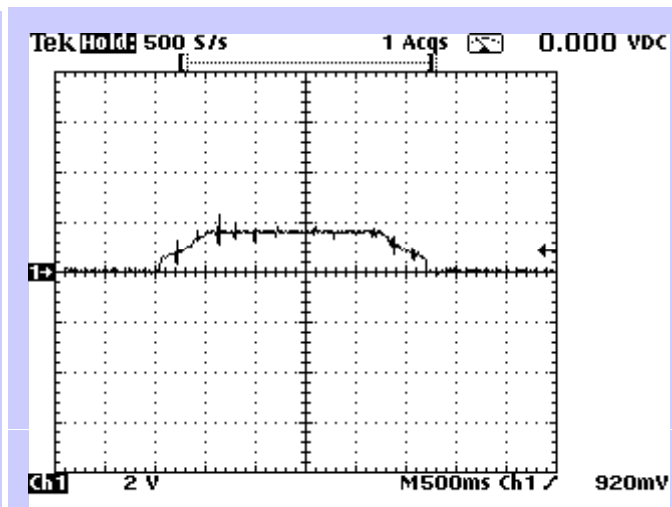
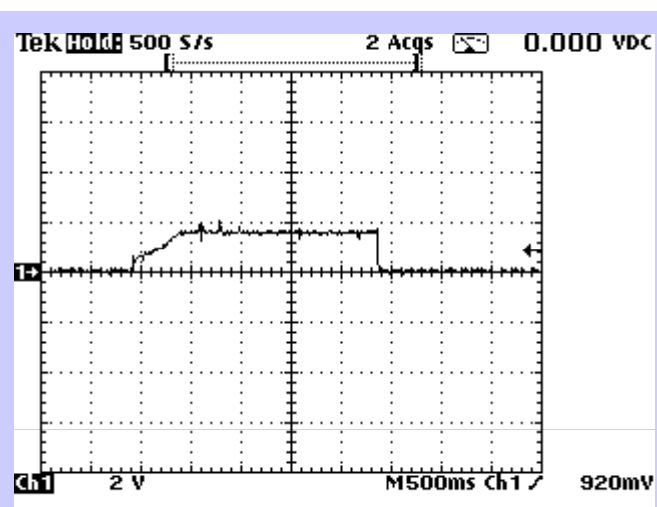
## ▪ deceleration stop

A26=10.0, A27=1

## ▪ DC braking stop

A26=10.0, A27=2

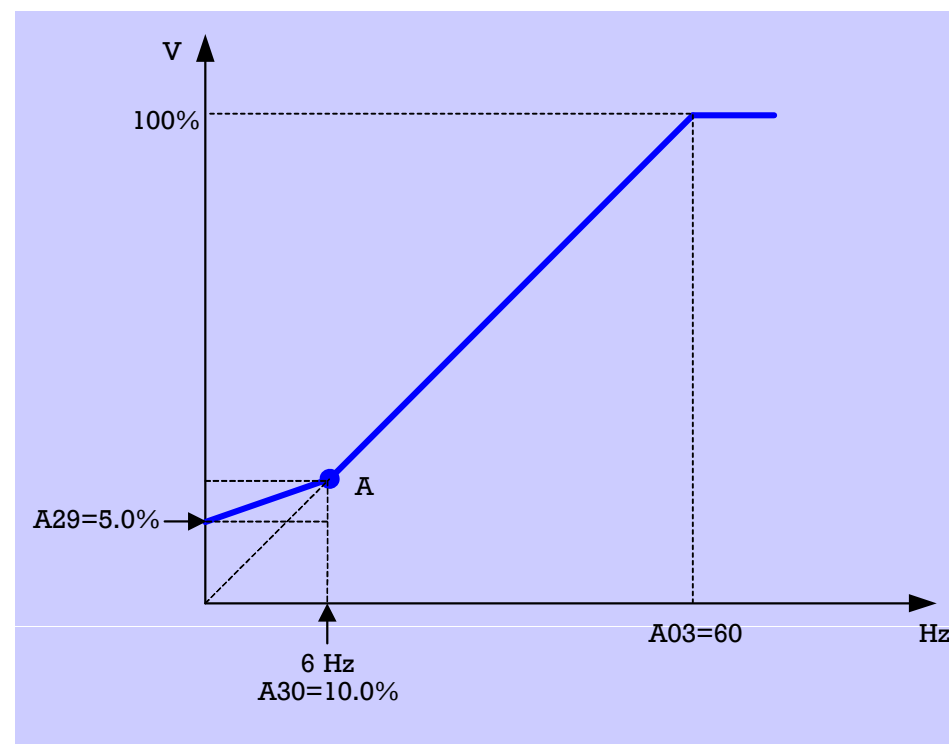
dc braking : A34=1.00Hz / A35=0.5  
A36=10.0 / A37=1.0

**Test waveform using FM output-terminal**

## ✓ torque boost

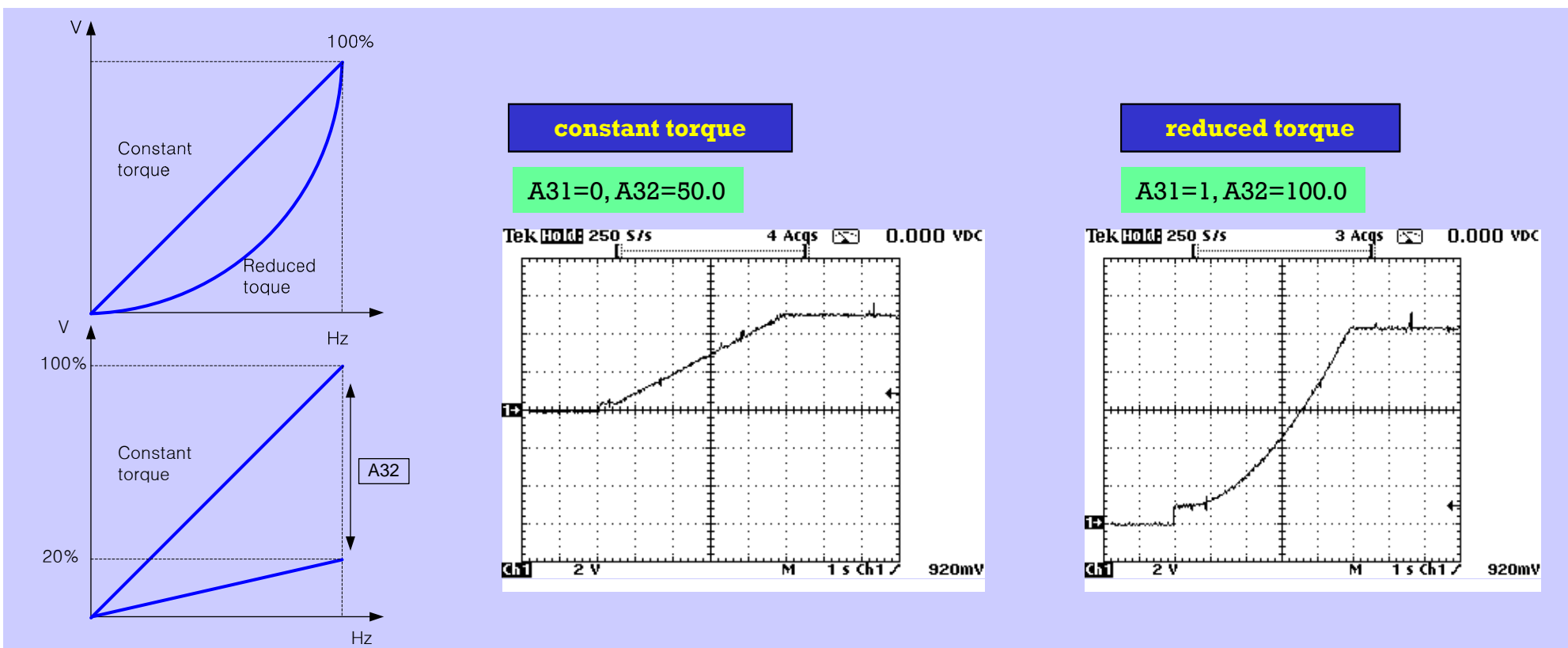
Code	Function Name	min.	Max.	Default	Description
A28	torque boost mode selection	0	1	0	0 : manual torque boost 1 : automatic torque boost
A29	Manual torque boost setting	0	50.0	5.0	Set manual torque boost voltage
A30	Manual torque boost frequency setting	0	100	10.0	

- Boost starting torque at insufficiency starting torque in case of V/f control
- Be aware that excessive torque boost can cause motor damage and inverter trip.

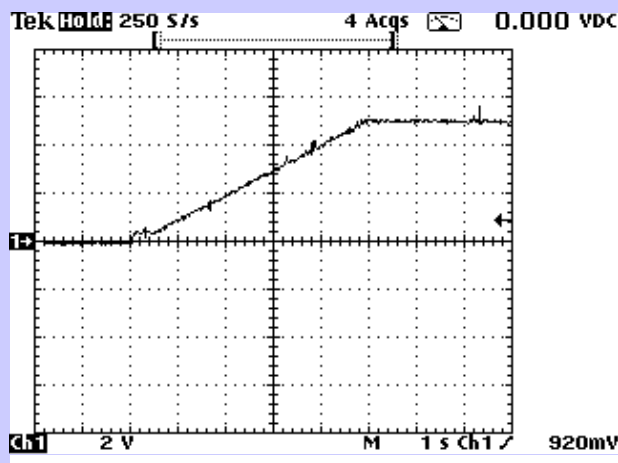


✓ **control mode**

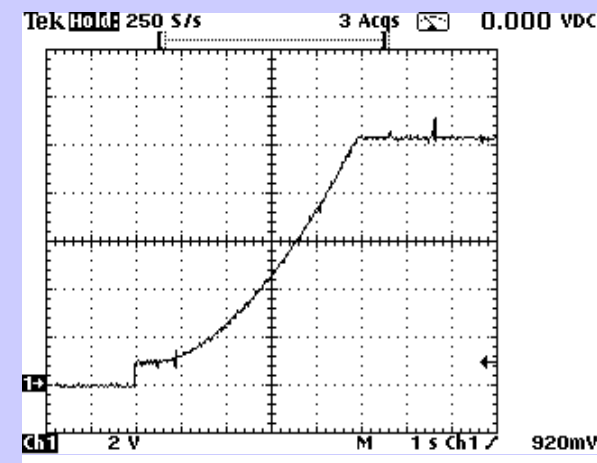
Code	Function Name	min.	Max.	Default	Description
A31	Control method	0	2	0	0 : constant torque 1 : reduced torque (reduction of the 1.7 power) 2 : sensorless vector control
A32	V/F gain	20	100	100.0	Output voltage gain

**constant torque**

A31=0, A32=50.0

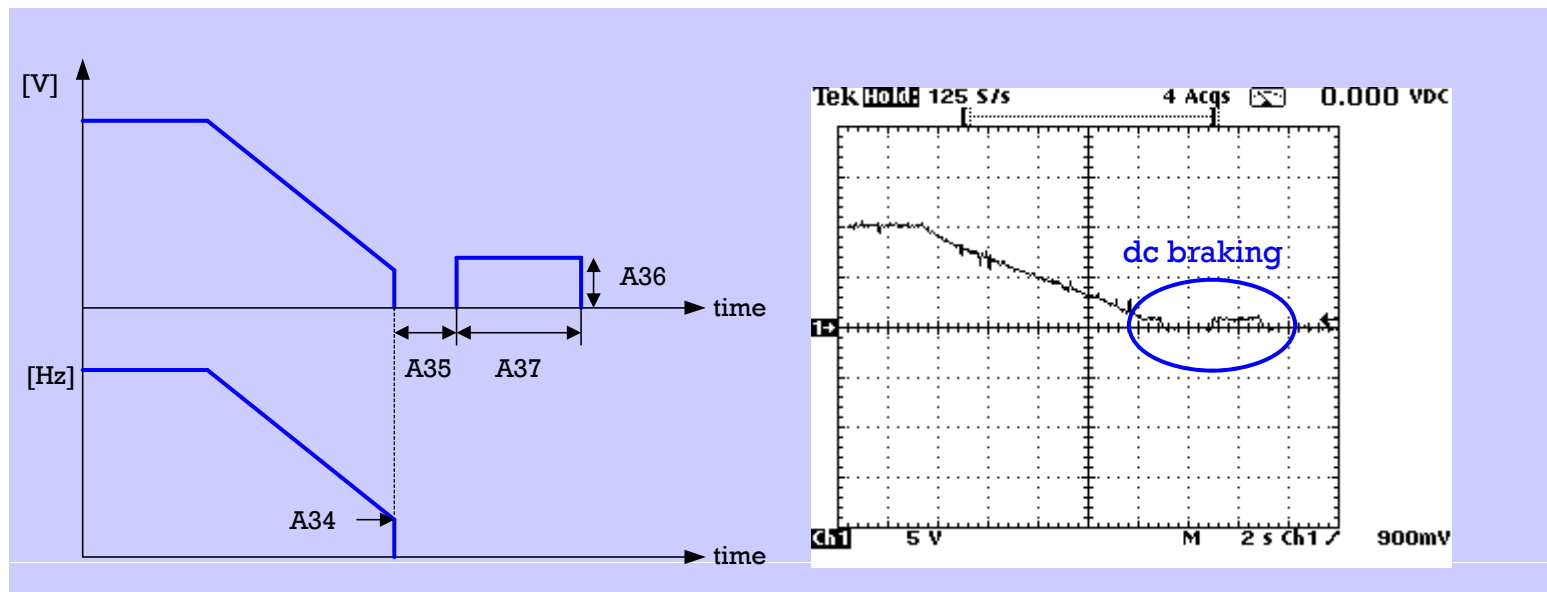
**reduced torque**

A31=1, A32=100.0



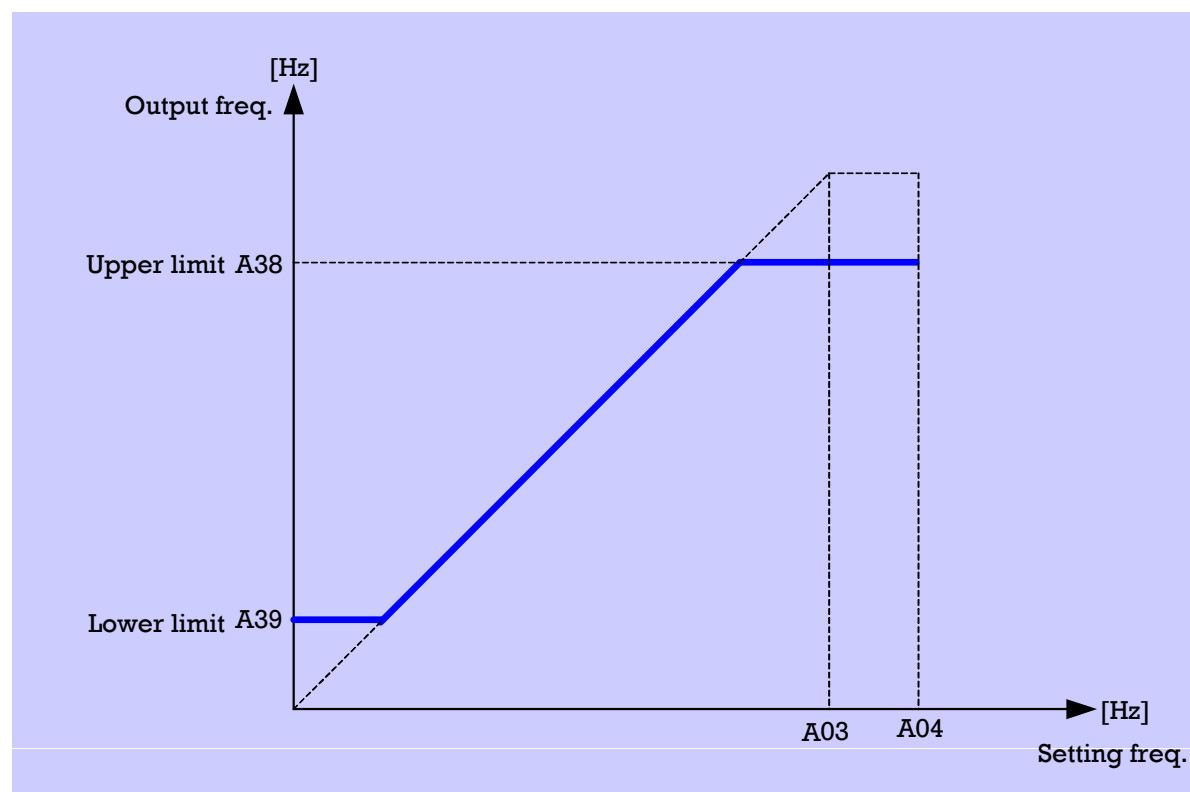
✓ **DC braking**

Code	Function Name	min.	Max.	Default	Description
A33	dc braking function selection	0	1	0	0 : dc braking disable 1 : dc braking enable
A34	dc braking freq.	0.0	10.0	0.50	Set the freq. at which dc braking occurs
A35	dc braking output delay time	0.1	5.0	0.0	delay time from dc braking freq. to starting dc braking
A36	dc braking force	0	50	10.0	
A37	dc braking time	0.1	10.0	0.0	Duration for dc braking



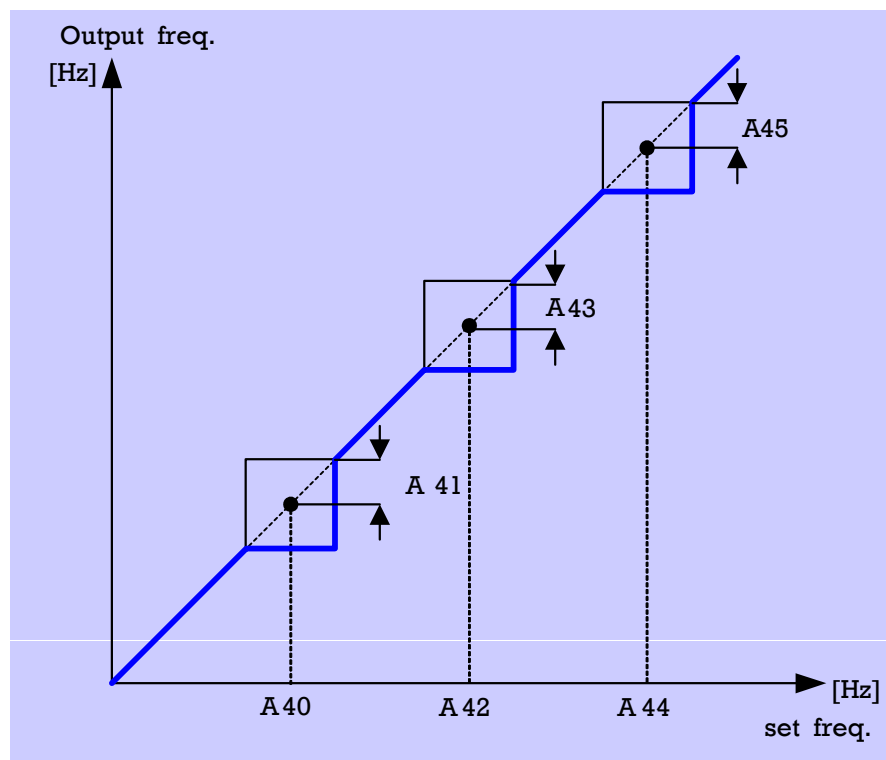
✓ **frequency limit setting**

Code	Function Name	min.	Max.	Default	Description
A38	frequency upper limit setting	0.0	A04	60.00	frequency setting at maximum frequency command
A39	frequency lower limit setting	A03	400	60.00	frequency setting at minimum frequency command



✓ **jump frequency setting**

Code	Function Name	min.	Max.	Default	Description
A40 A42 A44	jump (center) frequency setting	0.00	400.0	0.00	Up to 3 output frequencies can be defined for the output to jump past to avoid motor resonances.
A41 A43 A45	jump frequency width setting	0.00	400.0	0.00	Defines the distance from the center freq. at which the jump around occurs.





✓ **PID control function**

Code	Function Name	min.	Max.	Default	Description
A46	PID function selection	0	1	0	0 : PID control disable 1 : PID control enable
A47	P gain	0.1	100	10.0	
A48	I gain	0.0	100.0	10.0	
A49	D gain	0.0	100.0	0.0	
A50	PID scale factor	0.1	1000	100.0	Set PID scale factor (multiplier)
A51	Feed-back source Selection	0	1	0	0 : current input 1 : voltage input

✓ **AVR (Automatic Voltage Regulation) function**

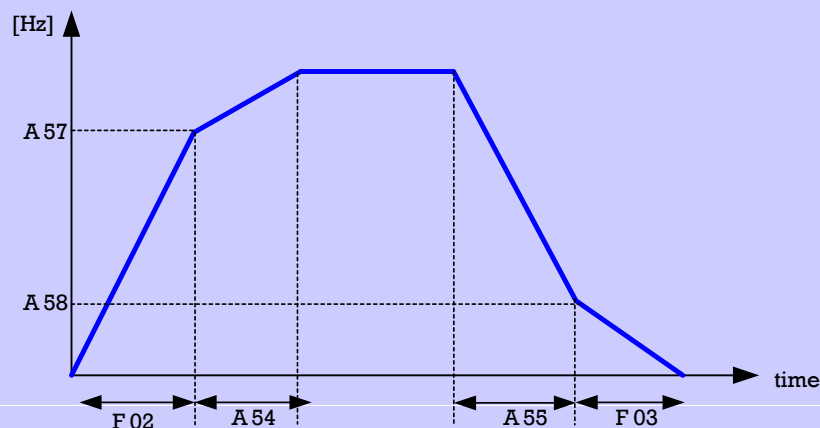
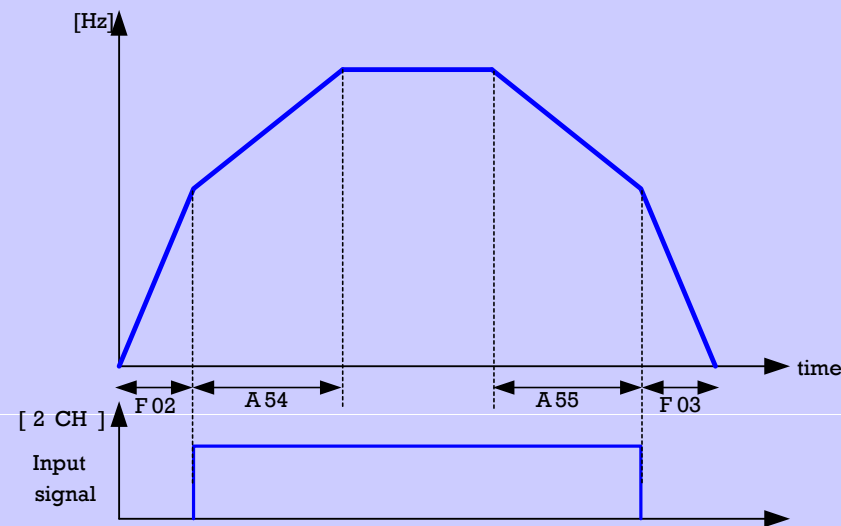
Code	Function Name	min.	Max.	Default	Description
A52	AVR function selection	0	2	0	0 : always ON 1 : always OFF 2 : OFF during deceleration
A53	Motor input voltage	200/ 380	240/ 460	220/ 380	200/220/230/240 (200V class) 380/400/415/440/460 (400V class)

✓ **cooling FAN ON/OFF function**

Code	Function Name	min.	Max.	Default	Description
A65	Cooling FAN ON / OFF function	0	1	0	

✓ **2-stage acceleration / deceleration time setting**

Code	Function Name	min.	Max.	Default	Description
A54	Set 2 <sup>nd</sup> acc. time	0.0	3000	10.0	Settable 2 <sup>nd</sup> acceleration time from 0.1 to 3000
A55	Set 2 <sup>nd</sup> dec. time	0.0	3000	10.0	Settable 2 <sup>nd</sup> deceleration time from 0.1 to 3000
A56	acc./dec. switching method selection	0	1	0	0 : [2CH] intelligent input terminal 1 : transition frequency
A57	acc.1 to acc.2 frequency transition point	0.00	400.0	0.00	output frequency at which acc. 1 switched to acc. 2
A58	Set 2 <sup>nd</sup> acc. time	0.00	400.0	0.00	output frequency at which dec. 2 switched to dec. 1

**A56 = 1****A56 = 0**

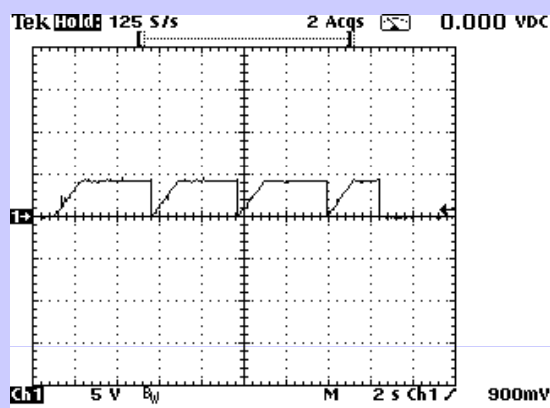
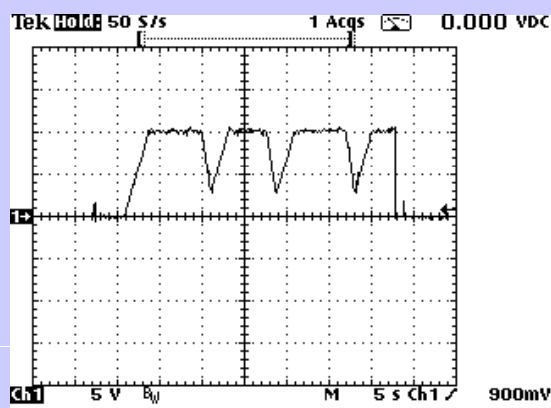
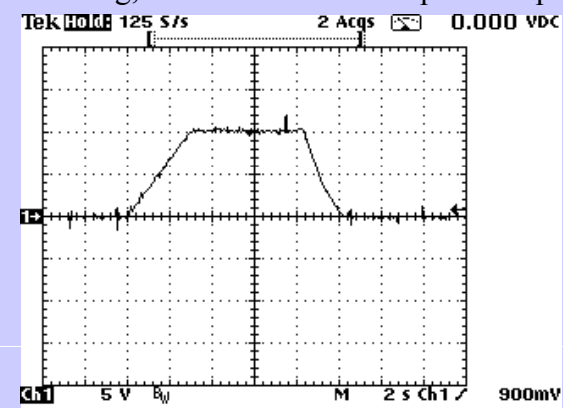
✓ **acceleration / deceleration pattern selection**

Code	Function Name	min.	Max.	Default	Description
A59	Acceleration pattern setting	0	2	0	0:linear      1:S-curve
A60	Deceleration pattern setting	0	2	0	2:U-curve

setting	0 (linear)	1 (S-curve)	2 (U-curve)
A59			
A60			
Application	Linear accelerate & decelerate	Suitable to conveyor, lift application for prevent falling	Suitable to tension control application for prevent material cutting

✓ **restart operation**

code	Function Name	min.	Max.	Default	Description
b01	Selection of restart mode	0	0	3	0 : alarm output after trip 1 : restart at 0Hz 2 : resume operation at frequency matching 3 : frequency matching then decelerate to stop and display trip
b02	Allowable instantaneous power failure time	1.0	0.3	1.0	amount of time a power input under voltage can occur without tripping the power failure alarm
b03	Reclosing stand by after instantaneous power failure recovered	1.0	0.3	3	Time delay after under voltage condition goes away, before the inverter runs motor again

 restart at 0Hz resume operation at frequency matching resume previous frequency after frequency matching, then decelerate to stop and display trip

✓ **electronic thermal overload alarm**

code	Function Name	min.	Max.	Default	Description
b04	electronic thermal level setting	20	120	100[%]	electronic thermal level = (inverter rating current) X (0.2 ~ 1.2)
b05	electronic thermal characteristic selection	0	1	0	0:reduced torque characteristic 1:constant torque characteristic

✓ **overload / overvoltage restriction**

code	Function Name	min.	Max.	Default	Description
b06	over-load/over-voltage restriction mode selection	1	0	3	0 : over-load/over-voltage restriction OFF 1 : over-load restriction ON 2 : over-voltage restriction ON 3 : over-load/over-voltage restriction ON
b07	over-load restriction level	125	20	200[%]	overload restriction level setting [ = (inverter rating current) X (0.2 ~ 2.0) ]
b08	over-load restriction constant	0.1	0.1	1.0 [sec]	deceleration time setting during overload operation

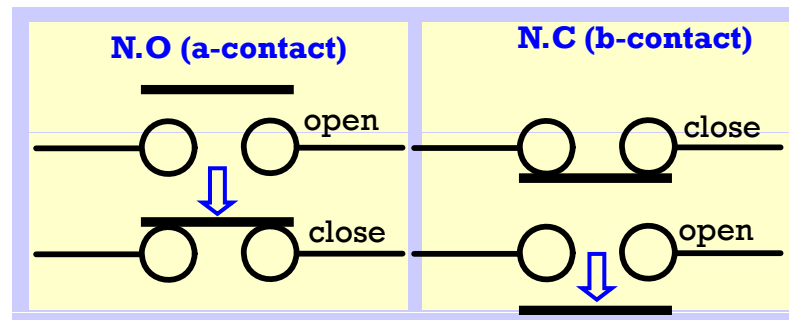
✓ other function

Code	Function Name	min.	Max.	Default	Description
b09	software lock mode selection	0	3	0	
b10	start frequency setting	0.5	10	0.5[Hz]	
b11	carrier frequency setting	0.5	15	5[kHz]	
b12	initialization mode	0	1	0	0:trip history clear 1:parameter initialization
b13	country code	0	2	0	0:KOREA 1:Europe 1:USA
b14	frequency conversion scale setting	0.1	99.9	1	[d08] = [b14] X [d01]
b15	STOP key validity setting	0	1	0	0:stop key enable 1:stop key disable
b16	FRS mode selection	0	2	0	Select inverter operation when FRS signal is cancelled 0:0Hz restart 1:frequency matching restart 2:Free Run Stop
b17	communication number	1	32	1	Communication number set
b18	Ground fault	0	1	0	0:don't detect ground fault 0.1~100%:detect ground fault as the [%] level of rating current

➤ C-group is for control terminal.

Code	Function Name	min.	Max.	Default	Default Function
C01	Intelligent input 1 setting	1	14	0	0:[FW] forward running command
C02	Intelligent input 2 setting	1	14	1	1:[RV] reverse running command
C03	Intelligent input 3 setting	1	14	2	2:[CF1] 1 <sup>st</sup> multi speed command
C04	Intelligent input 4 setting	1	14	3	3:[CF2] 2 <sup>nd</sup> multi speed command
C05	Intelligent input 5 setting	1	14	13	13:[AT] analog input voltage/current selection
C06	Intelligent input 6 setting	1	14	14	14:[RS] reset

Code	Function Name	min.	Max.	Default	Description
C07 ~ C12	Intelligent input terminal 1~6 contact selection	0	1	0	1:Normally Open [N.O] / a-contact 2:Normally Close [N.C] / b-contact

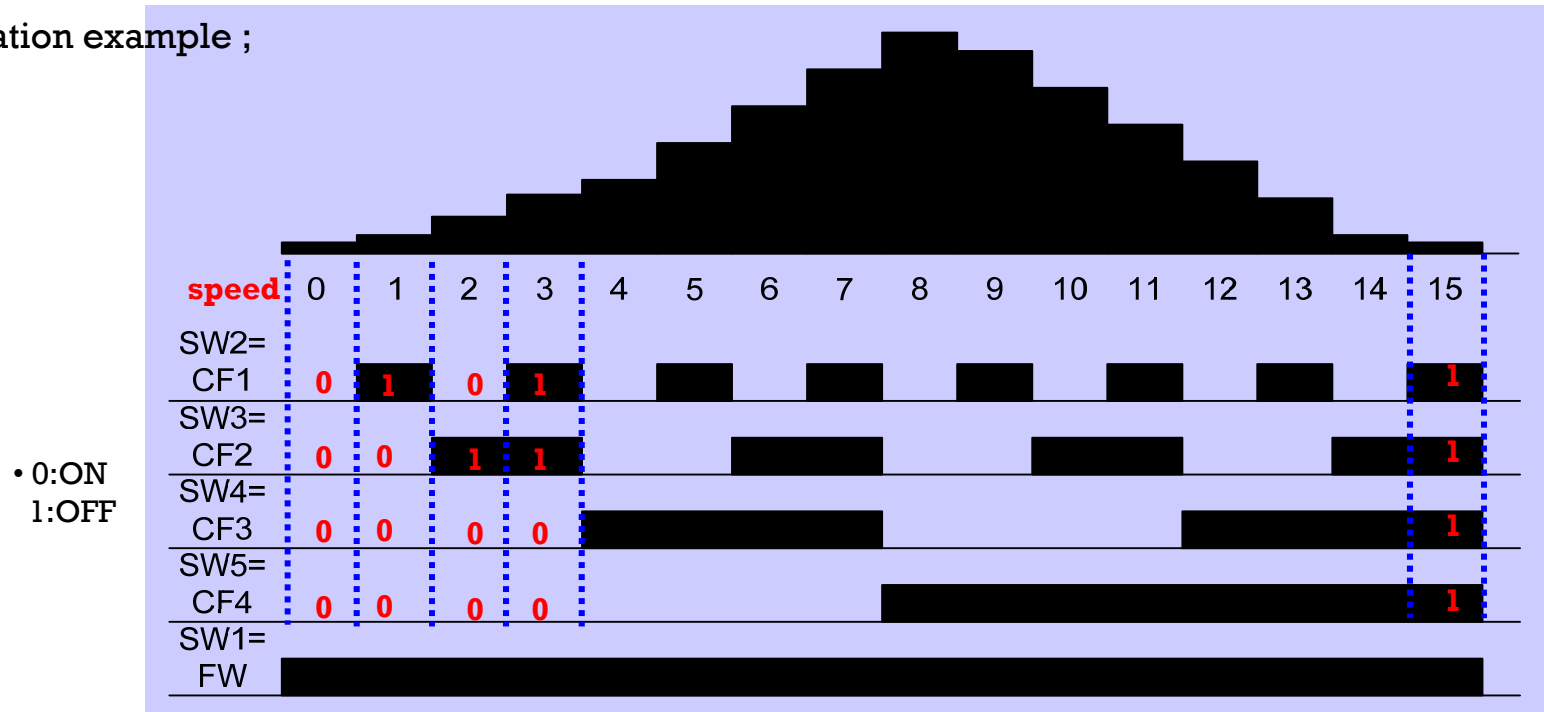




## ✓ intelligent input terminal function

code	setting	Function		Description	
C01 ~ C06	0	FW	Forward run command		
	1	REV	Reverse run command		
	2	CF1	Multi-Speed 1	Multi Speed operation	
	3	CF2	Multi-Speed 2		
	4	CF3	Multi-Speed 3		
	5	CF4	Multi-Speed 4		
	6	JOG	Jogging operation		
	8	2CH	2-stage acc./dec. time		
	9	FRS	Free Run Stop		
	10	EXT	External Trip		
	11	USP	Unintended Start Protection		
	12	SFT	Software Lock		
	13	AT	Analog voltage/current selection		
	14	RS	Reset		

✓ multi-speed operation example ;



multi-speed	Intelligent input					setting Value (Hz)	para- meter
	SW5	SW4	SW3	SW2	SW1		
	CF4	CF3	CF2	CF1	FW		
0-speed	0	0	0	0	1	2	F01
1-speed	0	0	0	1	1	5	A11
2-speed	0	0	1	0	1	10	A12
3-speed	0	0	1	1	1	15	A13
4-speed	0	1	0	0	1	20	A14
5-speed	0	1	0	1	1	30	A15
6-speed	0	1	1	0	1	40	A16
7-speed	0	1	1	1	1	50	A17

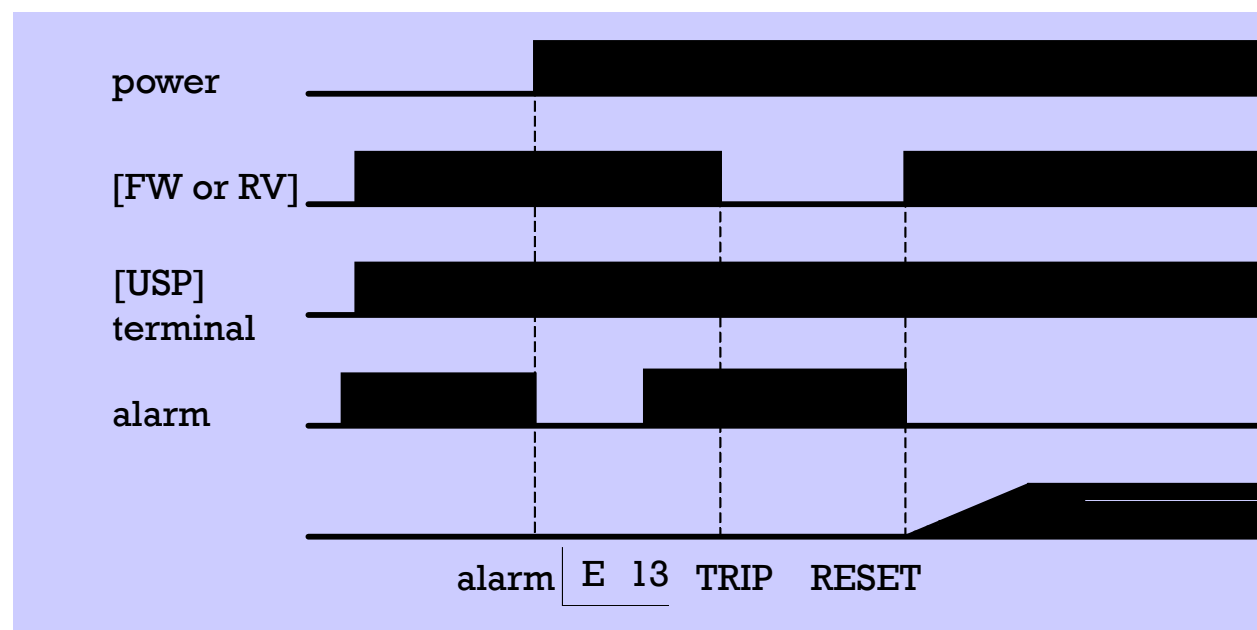
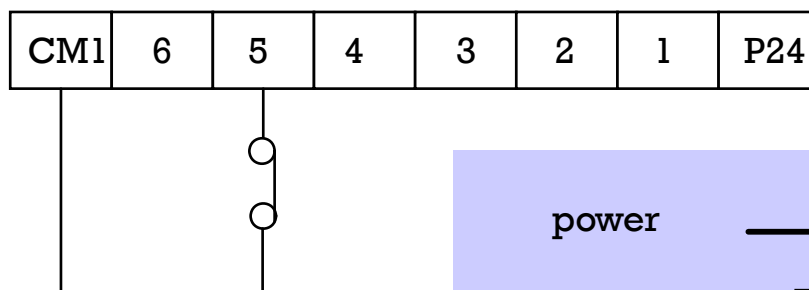
multi-speed	Intelligent input					setting Value (Hz)	para- meter
	SW5	SW4	SW3	SW2	SW1		
	CF4	CF3	CF2	CF1	FW		
8-speed	1	0	0	0	1	60	A18
9-speed	1	0	0	1	1	55	A19
10-speed	1	0	1	0	1	45	A20
11-speed	1	0	1	1	1	35	A21
12-speed	1	1	0	0	1	25	A22
13-speed	1	1	0	1	1	15	A23
14-speed	1	1	1	0	1	5	A24
15-speed	1	1	1	1	1	2	A25

✓ Unintended Start Protection[USP]

- USP function prevents that automatic start up, so that the inverter will not run without outside intervention.

Ex.) terminal setting method

C05 = 11(USP)



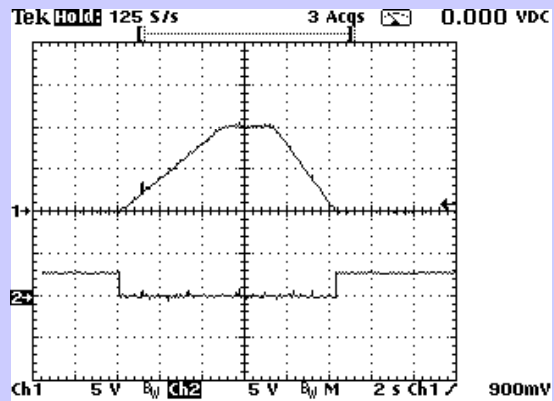
## ✓ intelligent relay output

Code	Function Name	min.	Max.	Default	Default Function
C13	Intelligent relay (RN) output Setting	0	5	0	0 : RUN (Run signal) 1 : FA1 (Frequency arrival signal ; command arrival) 2 : FA2 (Frequency arrival signal ; setting frequency or more) 3 : OL (Overload advance notice signal) 4 : OD (Output deviation for PID control) 5 : AL (alarm signal)

Code	Function Name	min.	Max.	Default	Description
C14	Intelligent relay (RN) contact selection	0	1	0	1:Normally Open [N.O] / a-contact 2:Normally Close [N.C] / b-contact

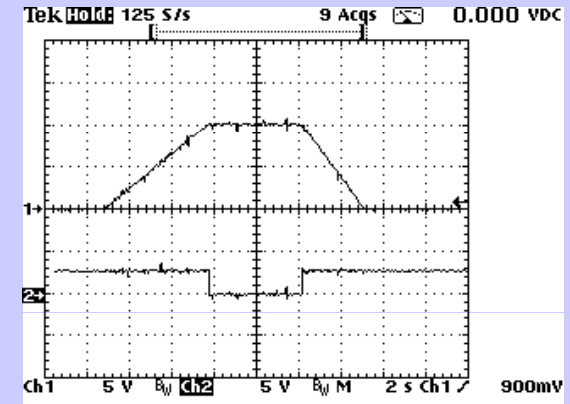
✓ **RUN signal output**

parameter : C13=0, C14=0



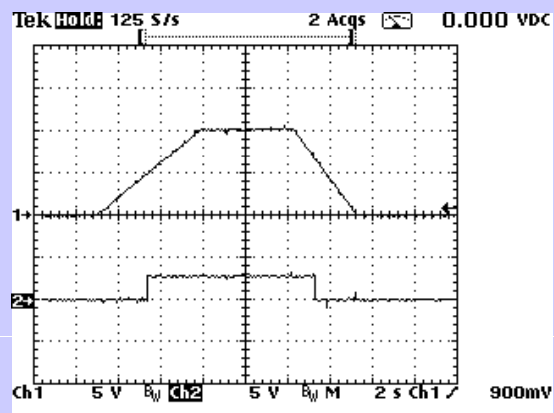
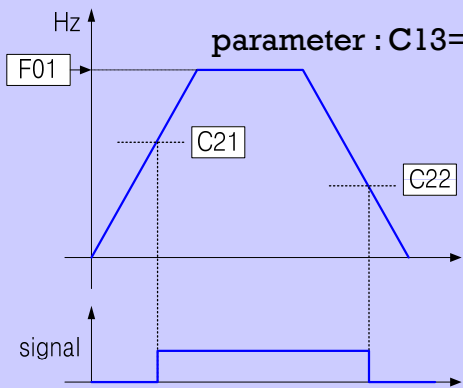
✓ **FA1**

parameter : C13=1, C14=0



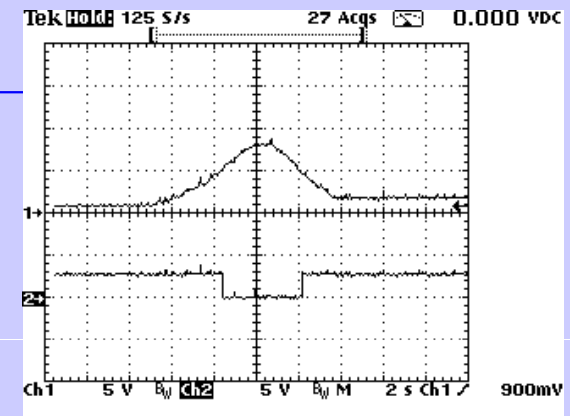
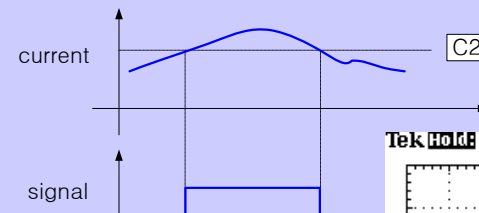
✓ **FA2**

parameter : C13=2, C14=0, C19=30.0, C20=40.0



✓ **OL**

parameter : C13=3, C14=0, C18=100.0



✓ **motor parameters**

Code	Function Name		Description
H01	Auto tuning mode selection		0:auto-tuning OFF 1:auto-tuning ON
H02	Motor parameter selection		0:standard motor parameters 1:auto-tuning motor parameters
H03	Motor capacity setting		0~8: 200V class (2.2/3.7/5.5/7.5/11/15/18.5/22/30kW) 9~17: 400V class (2.2/3.7/5.5/7.5/11/15/18.5/22/30kW)
H04	Motor poles setting		2/4/6/8
H05	Motor rating current setting		
H06	Motor no-load current		
H07	Motor rating slip		
H08	Factory setting value for motor parameter (HYUNDAI standard motor parameter)	Stator resistor (R1) setting	
H09		Transient inductance	
H10		Stator resistor (R1) setting	
H11		Transient inductance	

## Auto Turning

- the function of measuring motor parameter automatically

### Refer. parameter

- (1) H03 : motor capacity  
0~8 : 200V class, 2.2/3.7/5.5/7.5/11/15/18.5/22/30kW  
9~17: 400V class, 2.2/3.7/5.5/7.5/11/15/18.5/22/30kW
- (2) H04 : motor pole
- (3) A01 : A01=0
- (4) A03 : set base frequency
- (5) H01 : H01=1 (auto turning mode)
- (6) run

### Auto-tuning procedure

Motor connection

Auto turning mode  
H01=1

Run command ON

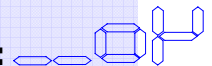
Motor parameter  
setting

Parameter setting  
completed, stop

- ① AC excitation
- ② DC Excitation
- ③ Motor accelerates to 80% of base freq., the stop

Display end

Auto turning completed :



Auto turning failed :

