

## Basis – Parameterization Fv frequency converter



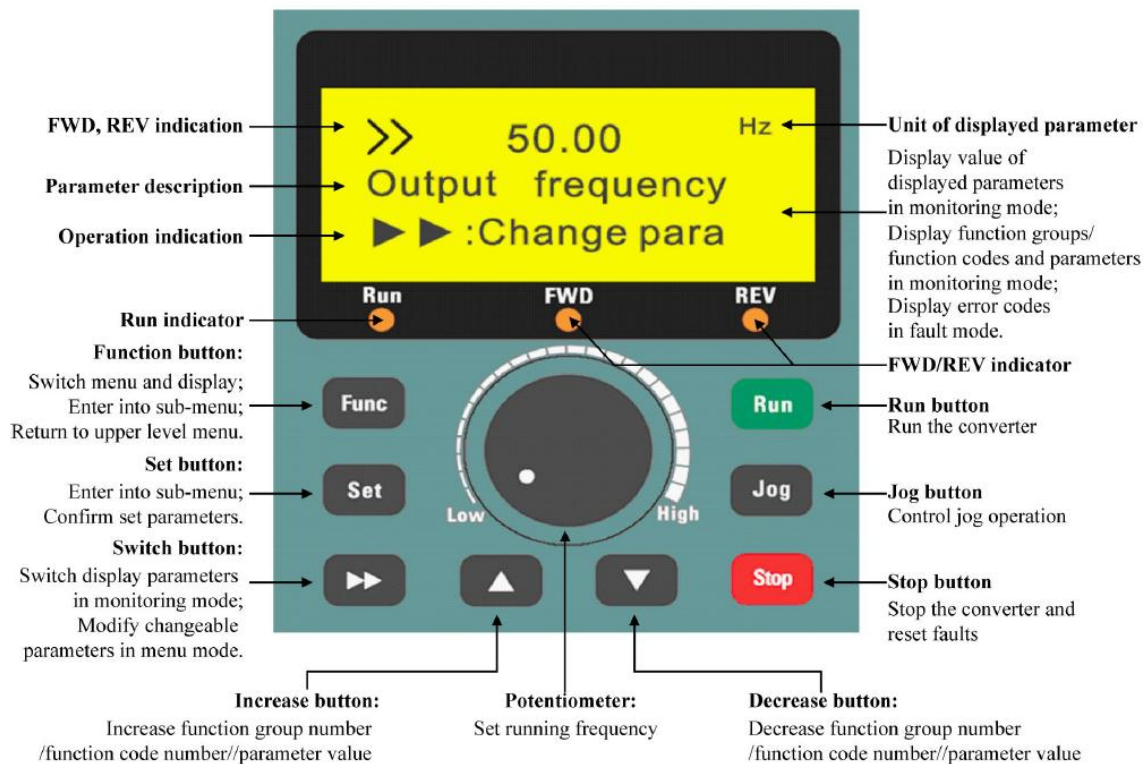
# Rexroth Fv - Training

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
Commissioning	Multispeed	Simple PLC

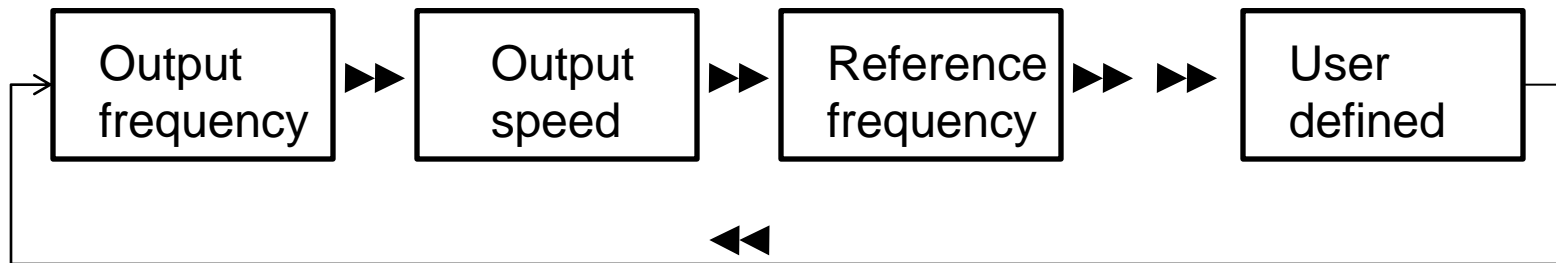


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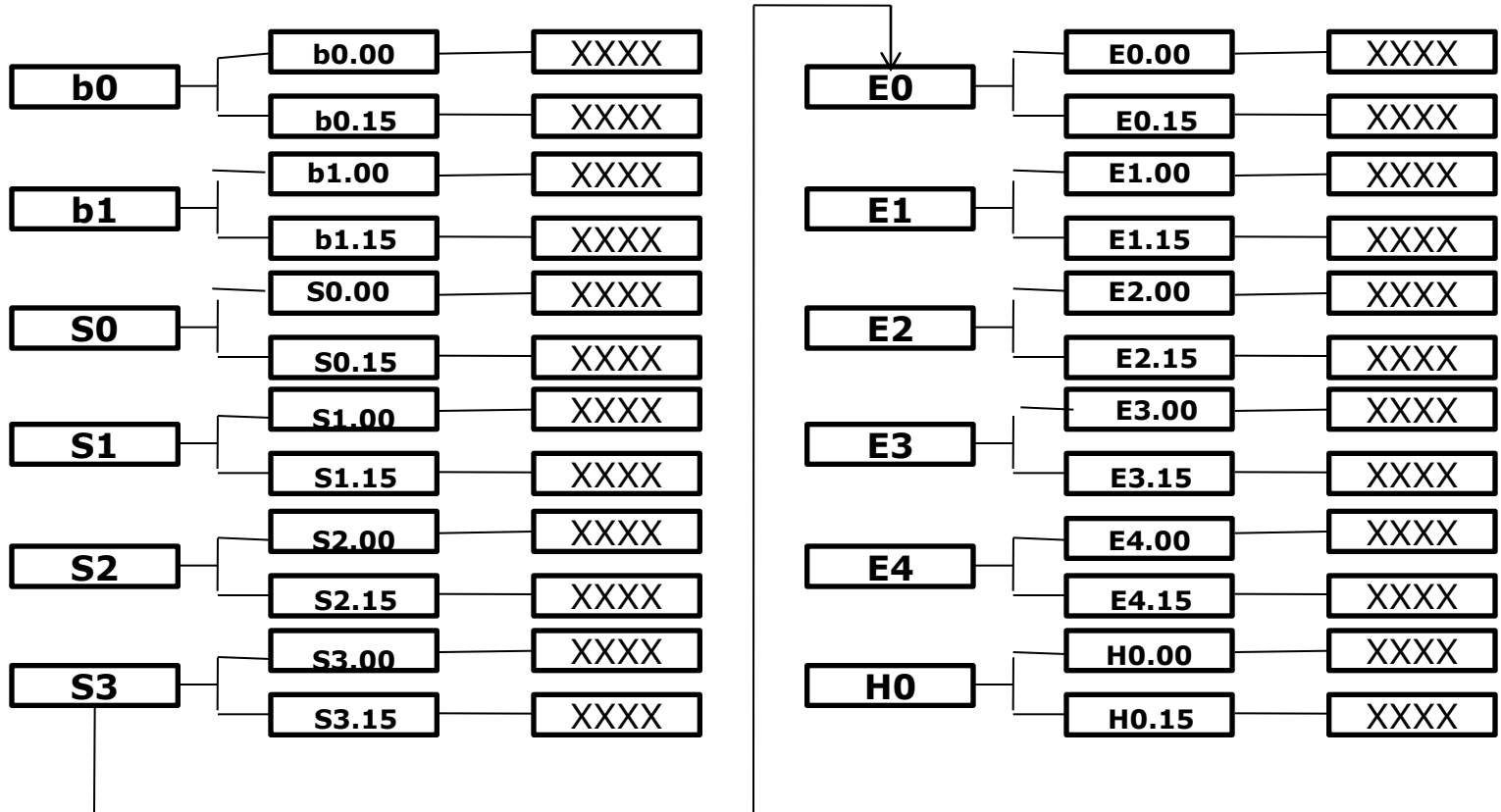
Output frequency Press Func  ▲  ▲

Press Set

▲

b0.00 to b0.15

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Nr	Parameter	Option	Standard
b0.00	User Password	0 to 6535	0
b0.01	LCD Language	0: Chinese; 1: English	0
b0.02	Restore factory default	0: No action 1: Restore parameter to factory default	0
b0.03	Parameter copy	0: no action 1: Copy from frequency converter to operating panel 2: Copy from operating panel to frequency converter Note: The value is automatically set to 0 after parameter copy.	0
b0.04	Mains voltage	380 to 480 V	380
b0.05	PWM frequency	1.0 to 15.0 kHz	Depends on model
b0.11	Parameter filter setting	0: b Parameter 1: b, S Parameter 2: b, S, E Parameter 3: b, S, E, H Parameter	0

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Nr	Parameter	Options	Standard
b1.00	Frequency setting mode	0: Set by operating panel potentiometer	0
		1: Set by operating panel	
		2: Set by analog inputs	
		3: Set by pulse frequency	
		4: Set by digital inputs Up/Down	
		5: Set via communication	

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Nr	Parameter	Options	Standard
b1.02	Frequency converter control commands	0: Set control commands via operating panel	0
		1: Set control commands via digital inputs	
		2: Set control commands via communication	
b1.03	2: Set control commands via communication	0: V/F control (V/F)	0
		1: Senseless vector control (SVC)	
		2: Field oriented vector control (FOC)	



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Nr	Parameter	Options	Standard
b1.04	Digital set frequency	b1.07 to b1.06	50 Hz
b1.05	Maximum frequency	50.00 to 400.00 Hz	50 Hz
b1.06	Upper frequency – UF	between b1.07 to b1.05	50 Hz
b1.07	Lower frequency – LF	0.00 to b1.06	0 Hz
b1.08	Operating panel controlled direction	0: Forward rotation – FWD 1: Reverse rotation – REV	0
b1.09	Acceleration time 1	0.1 to 3600 s	10 s
b1.10	Deceleration time 1	0.1 to 3600 s	10 s
b1.16	Start Mode	0: Mode 1 (Standard) 1: Mode 2 (DC brake) 2: Rotation speed capture mode	0
b1.17	Start frequency	0.00 to 15.00 Hz	0.5 Hz
b1.19	Stop Mode	0: Decelerate to stop 1: Freewheel to stop	0

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Nr	Parameter	Options	Standard
S0.00	V / f Mode	0: Linear Mode 1: Square mode 2: User-defined multipoint mode	0
S0.01	V/F frequency 1	0.00 to S0.03	0 Hz
S0.02	V/F voltage 1	0.0 % to 120% (of rated motor voltage) (S2.03)	0.0 %
S0.03	V/F frequency 2	S0.01 to S0.05	0 Hz
S0.04	V/F voltage 2	0.0 % to 120% (of rated motor voltage) (S2.03)	0.0 %
S0.05	V/F frequency 3	S0.03 to b1.05	0 Hz
S0.06	V/F voltage 3	0.0 % to 120% (of rated motor voltage) (S2.03)	0.0 %
S0.07	Slip compensation	0.00 to 10.00 Hz	0 Hz
S0.08	Torque increase at 0 Hz	0.0 automatic increase; 0.1% - 20.0% of nominal voltage (manual increase)	0.1 %

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Nr	Parameter	Options	Standard
S1.00	Speed feedback proportional gain	0.000 to 10.000	1.000
S1.01	Speed feedback integral time	0.000 to 10.000 s 0.000 means inactive	1.000s
S1.02	Torque limit	0.0% - 200.0% of rated motor torque	150%
S1.03	Slip compensation gain	0.0 % to 250.0%	100.0%
S1.04	Torque control selection	0: Inputs control (Terminal X1 ... X8 Range 17) 1: Always active	0
S1.05	Torque control reference	0: Input +I 1: Input VR1	0

Agenda	Operating panel	System parameter
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<b>Motor and Encoder</b>	Control parameter	Input Outp.Terminals
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Nr	Parameter	Options	Standard
S2.00	Rated motor frequency	8.00 to 400.00 Hz	50.0
S2.01	Rated motor speed	1 to 24000 rpm	1440
S2.02	Rated motor power	0.4 to 1000.0 kW	Depends on model
S2.03	Rated motor voltage	0 to 480 V	Depends on model
S2.04	Rated motor current	0.1 to 1000.0 A	Depends on model
S2.10	Parameter auto-tuning *	0: no action	0
		1: Auto tuning with running motor	
		2: Auto tuning with static motor	

\* Note: The value is automatically set to 0 after auto-tuning.

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Nr	Parameter	Options	Standard
S2.12	Pulses per revolution of pulse encoder	1 to 20000	1024
S2.13	Pulse encoder direction reverse	0: No reverse 1: Reverse	0
S2.14	Pulse encoder fault detection extent	0.0 no protection 0.1 to 1000.0 rpm (error, if speed set point is smaller than S2.14)	0.0
S2.15	Pulse encoder fault detection time	0.1 to 10.0 s	1.0 s

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Nr	Parameter	Options	Standard
S3.07	Restart after power off or power fault	0: Deactivated 1: Activated	0
S3.08	Waiting time to restart after power off or power fault	0.1 to 10.0 s	1.0s
S3.09	Direction change dead time	0.0 to 3600.0 s	4.0 s
S3.10	Droop Control – (Balances across multiple drives to a load)	0.00 to 10 Hz	0.00
S3.11	Setting velocity via Up/Down	0.10 to 100.0 Hz /s	1.00
S3.14	Motor standard rotation direction	0: Standard motor direction 1: Reverse motor direction 2: Deactivate reverse motor direction	0

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Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	<b>Input Outp.Terminals</b>
Commissioning	Multispeed	Simple PLC

Nr	Parameter	Options	Standard
E0.00		0: Forward/Stop; Revers/Stop 1: Forward/Revers, Run/Stop 2: 3 Wire control	0
E0.01	Terminal X1	0: Inactive 9: Frequency Up 10: Frequency Down 14: Switch between control with operating panel and with digital inputs 17: Switch between speed control and torque control 18: Switch between VR1 analog reference and +I analog reference	
E0.02	Terminal X2		
E0.03	Terminal X3		
E0.04	Terminal X4		
E0.05	Terminal X5		
E0.06	Terminal X6		
E0.07	Terminal X7		
E0.08	Terminal X8		

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	<b>Input Outp.Terminals</b>
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Nr	Parameter	Options	Standard
E1.00	Open collector output OUT1	0: Converter ready to run 1: Converter is running 3: Converter runs at zero speed (up to 11 different functions)	0
E1.01	Open collector output OUT2		



Agenda	Operating panel	System parameter
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## Quick set up

- Setting language, operating mode, parameter access
- Selection control via Operating panel
- Enter frequency limitations and acceleration and deceleration times
- Enter motor data –motor identification
- Enter encoder data

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
<b>Commissioning</b>	Multispeed	Simple PLC

Nr	Parameter	Options	Standard
b0.00	User password	Number from 0 - 65335 (normally 0)	0
b0.01	Language	Set b0.01 == 1: English	0
b0.11	Parameter filter setting	Set b0.11 == 3: b, S, E, H parameter read and write	0
b1.00	Frequency setting mode	0: Set by operating panel potentiometer	0
b1.02	Frequency converter control command	0: Set control commands via operating panel	0
b1.03	Control mode	0: V/f; <b>1: sensorless vector control (SVC);</b> 2: field orientated vector control	0

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Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
<b>Commissioning</b>	Multispeed	Simple PLC

Nr	Parameter	Options	Standard
b1.04	Digital Set frequency	Between b1.07 and b1.06	50 Hz
b1.05	Maximum frequency	50.00 to 400.00 Hz	50 Hz
b1.06	Upper frequency limit	Between b1.07 and b1.05	50 Hz
b1.07	Lower frequency limit	0.00 to b1.06	0 Hz
b1.08	Operating panel controller direction	0: Forwards – FWD 1: Backwards – REV	0
b1.09	Acceleration time	0.1 to 3600 s	10 s
b1.10	Deceleration time	0.1 to 3600 s	10 s

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Agenda	Operating panel	System parameter
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<b>Commissioning</b>	Multispeed	Simple PLC

Nr	Parameter	Options	Standard
S2.00	Rated motor frequency	8.00 to 400.00 Hz	50.0
S2.01	Rated motor speed	1 to 30000 rpm	1440
S2.02	Rated motor power	0.4 to 1000.0 kW	model
S2.03	Rated motor voltage	0 to 480 V	model
S2.04	Rated motor current	0.1 to 1000.0 A	model
S2.10	Parameter auto tuning	0: No action	0
		1: Auto tuning with running motor	
		2: Auto tuning with static motor	

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
<b>Commissioning</b>	Multispeed	Simple PLC

Nr	Parameter	Options	Standard
S2.12	Pulses per revolution of pulse encoder	1 bis 20000	1024
S2.14	Encoder fault detection extend	0.0 no protection 0.1 to 1000.0 rpm (error, if: setpoint smaller than S2.14)	0.0
S2.15	Encoder fault detection time	0.1 to 10.0 s	1.0 s

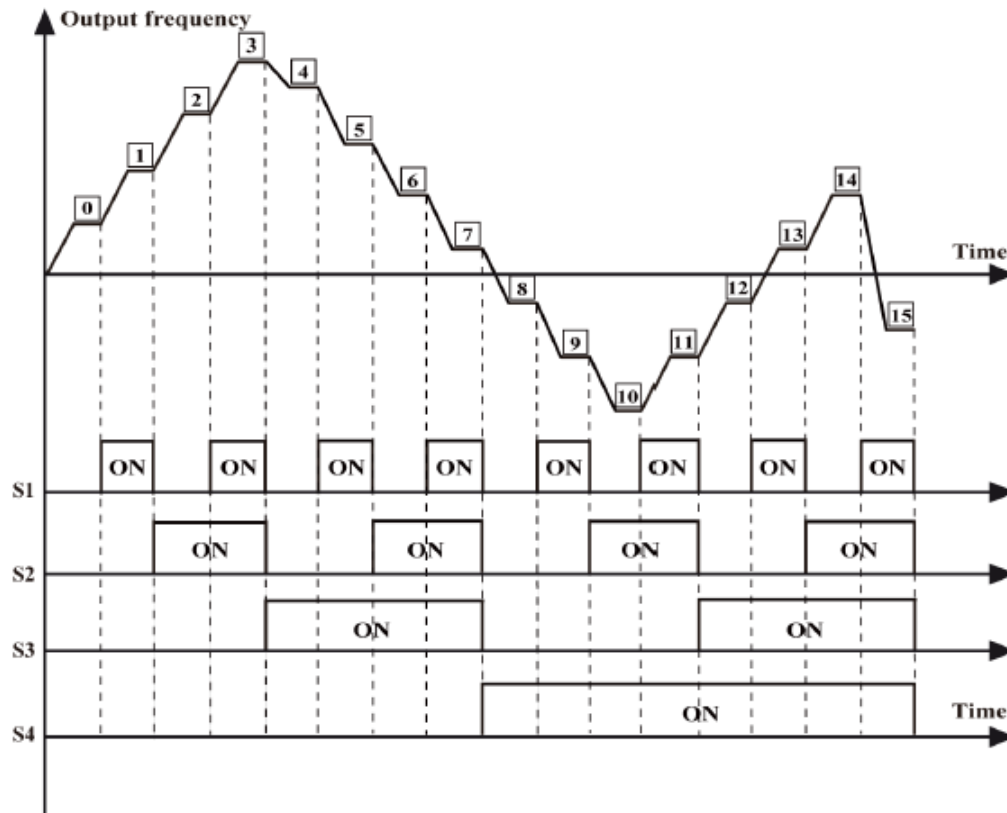
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Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
Commissioning	<b>Multispeed</b>	Simple PLC

## Variable- and fixed motor frequency set (multi speed)

- Set up from up to 15 fixed motor frequencies with adjustable acceleration and deceleration times
- Variable motor frequency via analogue input of potentiometer on the operating panel

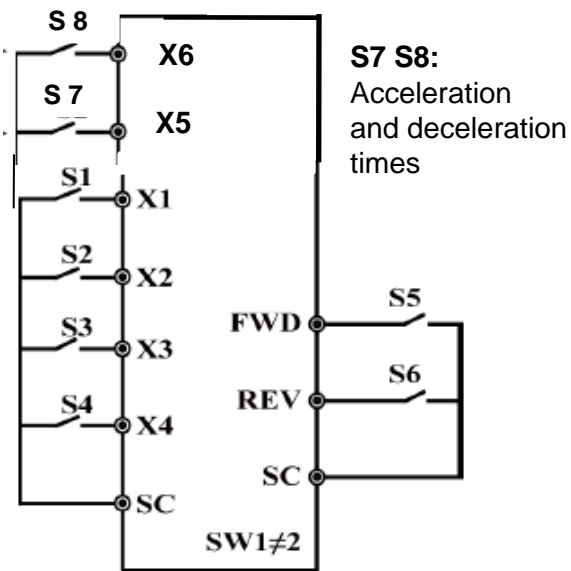
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**S1 to S4:** selection motor frequency  
**S1 to S4 Off:** frequency set point via analogue input or potentiometer

**S5 and S6:** forwards/backwards



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S4	S3	S2	S1	Selected frequency	frequency of parameter
OFF	OFF	OFF	OFF	Multi speed frequency 0	b1.00
OFF	OFF	OFF	ON	Multi speed frequency 1	E2.06
OFF	OFF	ON	OFF	Multi speed frequency 2	E2.07
OFF	OFF	ON	ON	Multi speed frequency 3	E2.08
OFF	ON	OFF	OFF	Multi speed frequency 4	E2.09
OFF	ON	OFF	ON	Multi speed frequency 5	E2.10
OFF	ON	ON	OFF	Multi speed frequency 6	E2.11
OFF	ON	ON	ON	Multi speed frequency 7	E2.12
ON	OFF	OFF	OFF	Multi speed frequency 8	E2.13
ON	OFF	OFF	ON	Multi speed frequency 9	E2.14
ON	OFF	ON	OFF	Multi speed frequency 10	E2.15
ON	OFF	ON	ON	Multi speed frequency 11	E2.16
ON	ON	OFF	OFF	Multi speed frequency 12	E2.17
ON	ON	OFF	ON	Multi speed frequency 13	E2.18
ON	ON	ON	OFF	Multi speed frequency 14	E2.19
ON	ON	ON	ON	Multi speed frequency 15	E2.20



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S8	S7	Selected times	Time of . Parameter
OFF	OFF	Acceleration time 1	b1.09
		Deceleration time 1	b1.10
OFF	ON	Acceleration time 2	E2.00
		Deceleration time 2	E2.01
ON	OFF	Acceleration time 3	E2.02
		Deceleration time 3	E2.03
ON	ON	Acceleration time 4	E2.04
		Deceleration time 4	E2.05

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
Commissioning	Multispeed	Simple PLC

Nr	Parameter	Options	Standard
E0.00	2-wire / 3-wire Control mode	<b>0: Forwards/Stop and Backwards/Stop</b> 1: Forwards/Backwards; Run/Stop 2: 3-wire Control mode	0
E0.01	Terminal X1	1: Multispeed Control 1	0
E0.02	Terminal X2	1: Multispeed Control 2	0
E0.03	Terminal X3	1: Multispeed Control 3	0
E0.04	Terminal X4	1: Multispeed Control 4	0
E0.05	Terminal X5	5: Acceleration/Deceleration time Terminal 1	0
E0.06	Terminal X6	6: Acceleration/Deceleration time Terminal 2	0

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
Commissioning	<b>Multispeed</b>	Simple PLC

Type	Parameter	Description	Setting range	Factory Default
Acceleration and deceleration times 2, 3, 4	E2.00	Acceleration time 2	0.1 to 3600.0	10.0 s
	E2.01	Deceleration time 2	0.1 to 3600.0	10.0 s
	E2.02	Acceleration time 3	0.1 to 3600.0	10.0 s
	E2.03	Deceleration time 3	0.1 to 3600.0	10.0 s
	E2.04	Acceleration time 4	0.1 to 3600.0	10.0 s
	E2.05	Deceleration time 4	0.1 to 3600.0	10.0 s

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Motor and Encoder	Control parameter	Input Outp.Terminals
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Type	Parameter	Description	Setting range	Factory Default
Multi speed - frequency	E2.06	Multi speed frequency 0	b1.07 to b1.06	0.00 Hz
	E2.07	Multi speed frequency 1	b1.07 to b1.06	0.00 Hz
	E2.08	Multi speed frequency 2	b1.07 to b1.06	0.00 Hz
	E2.09	Multi speed frequency 3	b1.07 to b1.06	0.00 Hz
	E2.10	Multi speed frequency 4	b1.07 to b1.06	0.00 Hz
	E2.11	Multi speed frequency 5	b1.07 to b1.06	0.00 Hz
	E2.12	Multi speed frequency 6	b1.07 to b1.06	0.00 Hz
	E2.13	Multi speed frequency 7	b1.07 to b1.06	0.00 Hz
	E2.14	Multi speed frequency 8	b1.07 to b1.06	0.00 Hz
	E2.15	Multi speed frequency 9	b1.07 to b1.06	0.00 Hz
	E2.16	Multi speed frequency 10	b1.07 to b1.06	0.00 Hz
	E2.17	Multi speed frequency 11	b1.07 to b1.06	0.00 Hz
	E2.18	Multi speed frequency 12	b1.07 to b1.06	0.00 Hz
	E2.19	Multi speed frequency 13	b1.07 to b1.06	0.00 Hz
E2.20	Multi speed frequency 14	b1.07 to b1.06	0.00 Hz	

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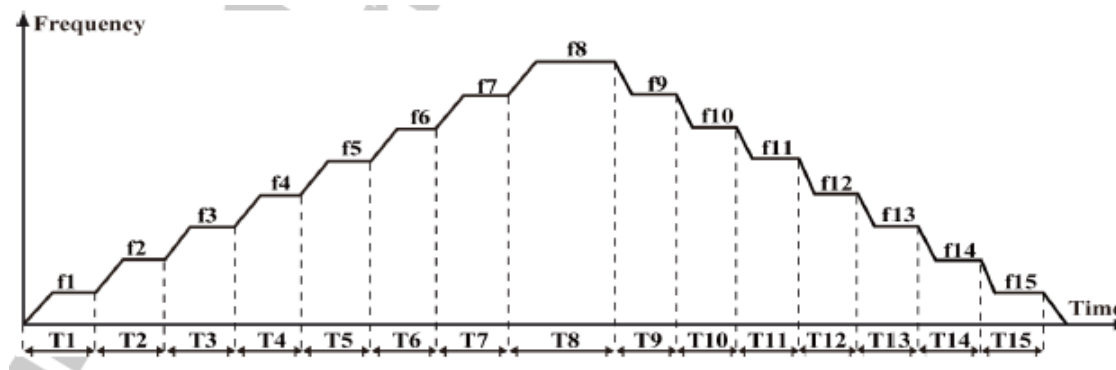
## Further settings

- Settings referred to quick set up
- set b1.02 == 1 (Set Control via external terminals)

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
Commissioning	Multispeed	Simple PLC

## Simple PLC

- Adjustment of up to 15 frequency set points with adjustable:
  - Acceleration and deceleration times
  - Dwell time for each motor frequency f1 to f15
  - Selection of each particular direction



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## Simple PLC

- Selection of different modes
  - cycle will be driven once
  - cycle will be repeated
  - After one cycle the drive runs with the frequency f15
- PLC is in all control modes possible: V/f, SVC, FOC
- Operation via operating panel or terminals possible
- At first set parameters of the list “quick setup”

Agenda	Operating panel	System parameter
Basic settings	V/f control	Field orient.-control
Motor and Encoder	Control parameter	Input Outp.Terminals
Commissioning	Multispeed	Simple PLC

Type	Parameter	Description	Setting range	Factory Default
Multi speed – frequency	E2.23	Stage 1 action selection	0 to 31	0
	E2.24	Stage 1 running time	0.0 to 5000.0 s	0.0 s
	E2.25	Stage 2 action selection	0 to 31	0
	E2.26	Stage 2 running time	0.0 to 5000.0 s	0.0 s
	E2.27	Stage 3 action selection	0 to 31	0
	E2.28	Stage 3 running time	0.0 to 5000.0 s	0.0 s
	E2.29	Stage 4 action selection	0 to 31	0
	E2.30	Stage 4 running time	0.0 to 5000.0 s	0.0 s
	E2.31	Stage 5 action selection	0 to 31	0
	E2.32	Stage 5 running time	0.0 to 5000.0 s	0.0 s
	E2.33	Stage 6 action selection	0 to 31	0
	E2.34	Stage 6 running time	0.0 to 5000.0 s	0.0 s
	E2.35	Stage 7 action selection	0 to 31	0
	E2.36	Stage 7 running time	0.0 to 5000.0 s	0.0 s



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Type	Parameter	Type	Parameter	Description
Multi speed – frequency	E2.37	Stage 8 action selection	0 to 31	0
	E2.38	Stage 8 running time	0.0 to 5000.0 s	0.0 s
	E2.39	Stage 9 action selection	0 to 31	0
	E2.40	Stage 9 running time	0.0 to 5000.0 s	0.0 s
	E2.41	Stage 10 action selection	0 to 31	0
	E2.42	Stage 10 running time	0.0 to 5000.0 s	0.0 s
	E2.43	Stage 11 action selection	0 to 31	0
	E2.44	Stage 11 running time	0.0 to 5000.0 s	0.0 s
	E2.45	Stage 12 action selection	0 to 31	0
	E2.46	Stage 12 running time	0.0 to 5000.0 s	0.0 s
	E2.47	Stage 13 action selection	0 to 31	0
	E2.48	Stage 13 running time	0.0 to 5000.0 s	0.0 s

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Type	Parameter	Type	Parameter	Description
Multi speed – frequency	E2.49	Stage 14 action selection	0 to 31	0
	E2.50	Stage 14 running time	0.0 to 5000.0 s	0.0 s
	E2.51	Stage 15 action selection	0 to 31	0
	E2.52	Stage 15 running time	0.0 to 5000.0 s	0.0 s

## Settings reaction in step 1 to 15

- bit 4
  - 0: Forwards
  - 1: Backwards
- bit 3 and bit 2
  - 00: Time with parameter and acceleration time 1 [b1.09]
  - 01: Time with parameter and acceleration time 2 [E2.00]
  - 10: Time with parameter and acceleration time 3 [E2.02]
  - 11: Time with parameter and acceleration time 4 [E2.04]
- bit 1 und bit 0
  - 00: Time with parameter and deceleration time 1 [b1.10]
  - 01: Time with parameter and deceleration time 2 [E2.01]
  - 10: Time with parameter and deceleration time 3 [E2.03]
  - 11: Time with parameter and deceleration time 4 [E2.05]

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Decimal	Bin	bit 4	bit 2 and bit 3		bit 0 and bit 1	
0	00000	FWD	b1.09	set with parameter "Acceleration time 1" [b1.09]	b1.10	set with parameter "deceleartion time 1" [b1.10]
1	00001				E2.01	set with parameter "deceleartion time 2" [E2.01]
2	00010				E2.03	set with parameter "deceleartion time 3" [E2.03]
3	00011		E2.00	set with parameter "Acceleration time 2" [E2.00]	E2.05	set with parameter "deceleartion time 4" [E2.05]
4	00100				b1.10	set with parameter "deceleartion time 1" [b1.10]
5	00101				E2.01	set with parameter "deceleartion time 2" [E2.01]
6	00110				E2.03	set with parameter "deceleartion time 3" [E2.03]
7	00111		E2.02	set with parameter "Acceleration time 3" [E2.02]	E2.05	set with parameter "deceleartion time 4" [E2.05]
8	01000				b1.10	set with parameter "deceleartion time 1" [b1.10]
9	01001				E2.01	set with parameter "deceleartion time 2" [E2.01]
10	01010		E2.04	set with parameter "Acceleration time 4" [E2.04]	E2.03	set with parameter "deceleartion time 3" [E2.03]
11	01011				E2.05	set with parameter "deceleartion time 4" [E2.05]
12	01100				b1.10	set with parameter "deceleartion time 1" [b1.10]
13	01101				E2.01	set with parameter "deceleartion time 2" [E2.01]
14	01110		REV	b1.09	set with parameter "Acceleration time 1" [b1.09]	E2.03
15	01111	E2.05				set with parameter "deceleartion time 4" [E2.05]
16	10000	E2.00				set with parameter "Acceleration time 2" [E2.00]
17	10001			E2.01	set with parameter "deceleartion time 2" [E2.01]	
18	10010			E2.03	set with parameter "deceleartion time 3" [E2.03]	
19	10011			E2.05	set with parameter "deceleartion time 4" [E2.05]	
20	10100	E2.02		set with parameter "Acceleration time 3" [E2.02]	b1.10	set with parameter "deceleartion time 1" [b1.10]
21	10101		E2.01		set with parameter "deceleartion time 2" [E2.01]	
22	10110		E2.03		set with parameter "deceleartion time 3" [E2.03]	
23	10111	E2.04	set with parameter "Acceleration time 4" [E2.04]	E2.05	set with parameter "deceleartion time 4" [E2.05]	
24	11000			b1.10	set with parameter "deceleartion time 1" [b1.10]	
25	11001			E2.01	set with parameter "deceleartion time 2" [E2.01]	
26	11010			E2.03	set with parameter "deceleartion time 3" [E2.03]	
27	11011	E2.04	set with parameter "Acceleration time 4" [E2.04]	E2.05	set with parameter "deceleartion time 4" [E2.05]	
28	11100			b1.10	set with parameter "deceleartion time 1" [b1.10]	
29	11101			E2.01	set with parameter "deceleartion time 2" [E2.01]	
30	11110			E2.03	set with parameter "deceleartion time 3" [E2.03]	
31	11111			E2.05	set with parameter "deceleartion time 4" [E2.05]	



# Thank you for your attention