



USER'S MANUAL
NX FREQUENCY CONVERTERS

HIGH SPEED MULTIMOTOR APPLICATION

ASFIFF16

Vacon HighSpeed MultiMotor Application (SW ASF1F16)**INDEX**

1.	GENERAL	3
2.	APPLICATION SPECIFIC	3
2.1	Switch description	3
2.2	Used parameters for selections.....	4
3.	PARAMETER DESCRIPTION	5
3.1	Monitoring values (Control keypad: menu M1).....	5
3.2	Basic parameters (Control keypad: Menu M2 → G2.1).....	6
3.3	Input signals (Control keypad: Menu M2 → G2.2)	7
3.4	Output signals (Control keypad: Menu M2 → G2.3).....	8
3.5	Drive control parameters (Control keypad: Menu M2 → G2.4).....	9
3.6	Prohibit frequency parameters (Control keypad: Menu M2 → G2.5).....	9
3.7	Motor control parameters (Control keypad: Menu M2 → G2.6).....	10
3.8	Protections (Control keypad: Menu M2 → G2.7).....	11
3.9	Autorestart parameters (Control keypad: Menu M2 → G2.8).....	12
3.10	Monitor settings.....	12
3.11	Motor 2 Parameters	13
3.12	Motor 3 Parameters	14
3.13	Motor 4 Parameters	15
3.14	Motor 5 Parameters	16
3.15	Motor 6 Parameters	17
3.16	Motor 7 Parameters	18
3.17	Motor 8 Parameters	19
4.	KEYPAD CONTROL (CONTROL KEYPAD: MENU M3)	20

1. General

This application is based on the “Standard” application of the “ALL IN ONE” – package.
For detailed information of the parameters see this section in the “USER’S MANUAL” of the NX drive.

2. Application specific

By using this application is it possible to connect 1 + 7 different motors to the same frequency converter. The different motor set-ups are selected by DIN4, DIN5 and DIN6.

Depending of the function of DIN4 and DIN5 (both programmable) it is also possible to use 2 pre-set speeds.

It is also possible to choose motor set-up via fieldbus.

The application is suitable for high-speed applications where use of PID regulator is required. The maximum frequency to be used is 1900Hz (default 50Hz), and the frequency is displayed with one decimal.

The unit for the motor speed is krpm. The maximum frequency (1900Hz) is corresponding to the maximum nominal speed of the motor of 114.00 krpm (1 pole pair).

2.1 Switch description

The Basic parameters are set in groups 2.1 - 2.8

Param Set / Group	DIN4	DIN5	DIN6
1 / Basic	Off	Off	Off
2 / 12	On	Off	Off
3 / 13	Off	On	Off
4 / 14	On	On	Off
5 / 15	Off	Off	On
6 / 16	On	Off	On
7 / 17	Off	On	On
8 / 18	On	On	On

After the parameter is changed, a 1s delay is needed before start command

2.2 Used parameters for selections

P2.1.16 MotorSet IO/FB

0 I/O Terminal

1 Fieldbus

Selects if the motor set-up is chosen via I/O Terminal or via Fieldbus (FBProcessDataIN1).

The parameter sets are chosen through the fieldbus according to following table:

FBProcessDataIN1	0	1	2	3	4	5	6	7
Parameter set	1/Basic	2	3	4	5	6	7	8

Note: It is required to use PP02, PP04 or PP05 in Profibus communication to be able to send ProcessData to the drive.

P2.2.2 DIN3 function

9 Fault Reset

10 Preset Speed 1

P2.2.3 DIN4 Function

1 MotorSet 001

2 Preset Speed 2

3 Fault Reset

P2.2.4 DIN5 Function

1 MotorSet 010

2 Preset Speed 2

3 Fault Reset

MotorSet 100 is handled by DIN6. This input is NOT programmable.

NOTE!

The default value for Motor Nominal Voltage in all motor groups is 400V, i.e. not according to the size of the drive

3. Parameter description

3.1 Monitoring values (Control keypad: menu M1)

The monitoring values are the actual values of parameters and signals as well as statuses and measurements. Monitoring values cannot be edited.

Code	Parameter	Unit	ID	Description
V1.1	Output frequency	Hz	1	Output frequency to motor
V1.2	Frequency reference	Hz	25	Frequency reference to motor control
V1.3	Motor speed	krpm	2	Motor speed in krpm
V1.4	Motor current	A	3	
V1.5	Motor torque	%	4	
V1.6	Motor power	%	5	Motor shaft power
V1.7	Motor voltage	V	6	
V1.8	DC link voltage	V	7	
V1.9	Unit temperature	°C	8	Heat sink temperature
V1.10	Motor Temperature	°C	9	Calculated motor temperature
V1.11	Analogue input 1	V	13	AIA1
V1.12	Analogue input 2	mA	14	AIA2
V1.13	DIN1, DIN2, DIN3		15	Digital input statuses
V1.14	DIN4, DIN4, DIN6		16	Digital input statuses
V1.15	DO1, RO1, RO2		17	
V1.16	Analogue I _{out}	mA	26	AOA1
V1.17	Multi monitor page			3 monitor parameters shown at the same time
V1.18	Special			
V1.18.1	U Phase Current		1030	
V1.18.2	V Phase Current		1031	
V1.18.3	W Phase Current		1032	
V1.19	To Motor			Shows the values that is sent to the motor
V1.19.1	Min Frequency		1001	
V1.19.2	Max frequency		1002	
V1.19.3	Accel time 1		1003	
V1.19.4	Decel time 1		1004	
V1.19.5	Current limit		1005	
V1.19.6	Motor nom vole		1006	
V1.19.7	Motor nom freq		1007	
V1.19.8	Motor nom speed		1008	
V1.19.9	Motor nom current		1009	
V1.19.10	Motor Cos ϕ		1010	
V1.19.11	I/O reference		1011	
V1.19.12	U/f optimization		1012	
V1.19.13	lout content		1013	
V1.19.14	RO1 content		1014	
V1.19.15	Start function		1015	
V1.19.16	Stop function		1016	
V1.19.17	DC-brake current		1017	
V1.19.18	Stop DC-brake time		1018	
V1.19.19	Motor control mode		1019	
V1.19.20	U/f mid freq		1020	
V1.19.21	U/f mid volt		1021	
V1.19.22	Zero freq voltage		1022	

Table 3-1. Monitoring values

3.2 Basic parameters (Control keypad: Menu M2 → G2.1)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.1.1	Min frequency	0,00	Par. 2.1.2	Hz	0,0		1501	
P2.1.2	Max frequency	Par. 2.1.1	1900,0	Hz	50,0		1502	NOTE: If f_{max} > than the motor synchronous speed, check suitability for motor and drive system
P2.1.3	Acceleration time 1	0,1	3000,0	s	3,0		1503	
P2.1.4	Deceleration time 1	0,1	3000,0	s	3,0		1504	
P2.1.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1505	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.1.6	Nominal voltage of the motor	180	690	V	400V		1506	
P2.1.7	Nominal frequency of the motor	30,00	3200,0	Hz	50,0		1507	Check the rating plate of the motor
P2.1.8	Nominal speed of the motor	30	114,00	krpm	1,44		1508	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.1.9	Nominal current of the motor	$0,1 \times I_L$	Varies	A	I_L		1509	Check the rating plate of the motor
2.1.10	Motor cosφ	0,30	1,00		0,85		1510	Check the rating plate of the motor
2.1.11	I/O reference	0	3		0		1511	0=AI1 1=AI2 2=Keypad 3=Fieldbus
2.1.12	Keypad control reference	0	3		2		121	0=AI1 1=AI2 2=Keypad 3=Fieldbus
2.1.13	Fieldbus control reference	0	3		3		122	0=AI1 1=AI2 2=Keypad 3=Fieldbus
2.1.14	Preset speed 1	0,00	Par. 2.1.2	Hz	10,0		105	Speeds preset by operator
2.1.15	Preset speed 2	0,00	Par. 2.1.2	Hz	50,0		106	
2.1.16	MotorSet I/O/FB	0	1		0		1800	0=I/O Terminal 1=Fieldbus (FBProcessDataIN1)

Table 3-2. Basic parameters G2.1

Text shown as **THIS** means that the parameter value can only be changed after the FC has been stopped

3.3 Input signals (Control keypad: Menu M2 → G2.2)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note	
								DIN1	DIN2
P2.2.1	Start/Stop logic	0	6		0		300	0 Start fwd 1 Start/Stop 2 Start/Stop 3 Start pulse 4 Fwd* 5 Start*/Stop 6 Start*/Stop	Start rvs Rvs/Fwd Run enable Stop pulse Rvs* Rvs/Fwd Run enable
P2.2.2	DIN3 function	0	8		1		301	0=Not used 1=Ext. fault, closing cont. 2=Ext. fault, opening cont. 3=Run enable 4=Acc./Dec. time select. 5=Force cp. to IO 6=Force cp. to keypad 7=Force cp. to fieldbus 8=Rvs (if par. 2.2.1=3) 9= Fault Reset 10=Preset speed1	
P2.2.3	DIN4 Function	0	3		1		1525	0=Not used 1=Motor set 001 2=Preset speed 2 3=Fault Reset	
P2.2.4	DIN5 Function	0	3		1		1526	0=Not used 1=Motor set 010 2=Preset speed 2 3=Fault Reset	
P2.2.5	Current reference offset	0	1		1		302	0=0—20mA 1=4—20mA	
P2.2.6	Reference scaling minimum value	0,00	par. 2.2.5	Hz	0,00		303	Selects the frequency that corresponds to the min. reference signal 0,00 = No scaling	
P2.2.7	Reference scaling maximum value	0,00	320,00	Hz	0,00		304	Selects the frequency that corresponds to the max. reference signal 0,00 = No scaling	
P2.2.8	Reference inversion	0	1		0		305	0 = Not inverted 1 = Inverted	
P2.2.9	Reference filter time	0,00	10,00	s	0,10		306	0 = No filtering	
P2.2.8	AI1 signal selection				A.1		377	TTF programming method used. See PFC application.	
P2.2.9	AI2 signal selection				A.2		388	TTF programming method used. See PFC application.	

Table 3-3. Input signals, G2.2

* = Rising edge required to start

3.4 Output signals (Control keypad: Menu M2 → G2.3)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.3.1	Analogue output 1 signal selection	0			A.1		464	TTF programming method used. See PFC application.
P2.3.2	Analogue output function	0	8		1		1512	0=Not used 1=Output freq. (0— f_{max}) 2=Freq. reference (0— f_{max}) 3=Motor speed (0—Motor nominal speed) 4=Output current (0— I_{nMotor}) 5=Motor torque (0— T_{nMotor}) 6=Motor power (0— P_{nMotor}) 7=Motor voltage (0— U_{nMotor}) 8=DC-link volt (0—1000V)
P2.3.3	Analogue output filter time	0,00	10,00	s	1,00		308	
P2.3.4	Analogue output inversion	0	1		0		309	0 = Not inverted 1 = Inverted
P2.3.5	Analogue output minimum	0	1		0		310	0 = 0 mA 1 = 4 mA
P2.3.6	Analogue output scale	10	1000	%	100		311	
P2.3.7	Digital output 1 function	0	14		1		312	0=Not used 1=Ready 2=Run 3=Fault 4=Fault inverted 5=FC overheat warning 6=Ext. fault or warning 7=Ref. fault or warning 8=Warning 9=Reversed 10=Preset speed 11=At speed 12=Mot. regulator active 13=OP freq. limit superv. 14=Control place: IO
P2.3.8	Relay output 1 function	0	14		2		1513	As parameter 2.3.6
P2.3.9	Relay output 2 function	0	14		3		314	As parameter 2.3.6
P2.3.10	Output frequency limit 1 supervision	0	2		0		315	0=No limit 1=Low limit supervision 2=High limit supervision
P2.3.11	Output frequency limit 1; Supervised value	0,00	320,00	Hz	0,00		316	
P2.3.12	Analogue output 2 signal selection	0			0.1		471	TTF programming method used. See PFC application.
P2.3.13	Analogue output 2 function	0	8		4		472	As parameter 2.3.1
P2.3.14	Analogue output 2 filter time	0,00	10,00	s	1,00		473	
P2.3.15	Analogue output 2 inversion	0	1		0		474	0=Not inverted 1=Inverted
P2.3.16	Analogue output 2 minimum	0	1		0		475	0=0 mA 1=4 mA
P2.3.17	Analogue output 2 scaling	10	1000	%	1000		476	

Table 3-4. Output signals, G2.3

3.5 Drive control parameters (Control keypad: Menu M2 → G2.4)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.4.1	Ramp 1 shape	0,0	10,0	s	0,0		500	0 = Linear >0 = S-curve ramp time
P2.4.2	Ramp 2 shape	0,0	10,0	s	0,0		501	0 = Linear >0 = S-curve ramp time
P2.4.3	Acceleration time 2	0,1	3000,0	s	10,0		502	
P2.4.4	Deceleration time 2	0,1	3000,0	s	10,0		503	
P2.4.5	Brake chopper	0	3		0		504	0=Disabled 1=Used when running 2=External brake chopper 3=Used when stopped/running
P2.4.6	Start function	0	1		0		1514	0=Ramp 1=Flying start
P2.4.7	Stop function	0	3		0		1515	0=Coasting 1=Ramp 2=Ramp+Run enable coast 3=Coast+Run enable ramp
P2.4.8	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1516	
P2.4.9	DC braking time at stop	0,00	600,00	s	0,00		1517	0 = DC brake is off at stop
P2.4.10	Frequency to start DC braking during ramp stop	0,1	100,0	Hz	1,5		515	
P2.4.11	DC braking time at start	0,00	600,00	s	0,00		516	0 = DC brake is off at start
P2.4.12	Flux brake	0	1		0		520	0 = Off 1 = On
P2.4.13	Flux braking current	0,0	200,0	%	100,0		1523	Flux brake current as % of motor nominal current in active motor set

Table 3-5. Drive control parameters, G2.4

3.6 Prohibit frequency parameters (Control keypad: Menu M2 → G2.5)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.5.1	Prohibit frequency range 1 low limit	0,00	par. 2.5.2	Hz	0,00		509	
P2.5.2	Prohibit frequency range 1 high limit	0,00	320,00	Hz	0,0		510	
P2.5.3	Prohibit acc./dec. ramp	0,1	10,0		1,0		518	

Table 3-6. Prohibit frequency parameters, G2.5

3.7 Motor control parameters (Control keypad: Menu M2 → G2.6)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.6.1	Motor control mode	0	2/6		0		600	NXS: 0=Frequency control 1=Speed control 2=Torque control Additionally for NXP: 3=Closed loop speed ctrl 4=Closed loop torque ctrl 5=Adv. open loop freq. control 6=Advanced open loop speed control
P2.6.2	U/f optimisation	0	1		0		109	0=Not used 1=Automatic torque boost
P2.6.3	U/f ratio selection	0	3		0		108	0=Linear 1=Squared 2=Programmable 3=Linear with flux optim.
P2.6.4	Field weakening point	30,0	3200,0	Hz	50,0		602	Read only parameter! Set to same value as nominal frequency of the motor in active set
P2.6.5	Voltage at field weakening point	10,00	200,00	%	100,00		603	$n\% \times U_{nmot}$
P2.6.6	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,00		604	
P2.6.7	U/f curve midpoint voltage	0,00	100,00	%	100,00		605	$n\% \times U_{nmot}$ Parameter max. value = par. 2.6.5
P2.6.8	Output voltage at zero frequency	0,00	40,00	%	0,00		606	$n\% \times U_{nmot}$
P2.6.9	Switching frequency	1,0	16,0	kHz	Varies		601	Depends on kW
P2.6.10	Overvoltage controller	0	1		1		607	0=Not used 1=Used
P2.6.11	Undervoltage controller	0	1		1		608	0=Not used 1=Used
Closed Loop parameter group 2.6.12 (NXP only)								
P2.6.12.1	Magnetizing current	0,00	100,00	A	0,00		612	
P2.6.12.2	Speed control P gain	0	1000		30		613	
P2.6.12.3	Speed control I time	0,0	500,0	ms	30,0		614	
P2.6.12.4	Load drooping	0,00	100,00	%	0,00		620	
P2.6.12.5	Acceleration compensation	0,00	300,00	s	0,00		626	
P2.6.12.6	Slip adjust	0	500	%	100		619	
P2.6.12.9	0-speed time at start	0	32000	ms	100		615	
P2.6.12.10	0-speed time at stop	0	32000	ms	100		616	
P2.6.12.11	Start-up torque	0	3		0		621	0=Not used 1=Torque memory 2=Torque reference 3=Start-up torque fwd/rev
P2.6.12.12	Start-up torque FWD	-300,0	300,0	s	0,0		633	
P2.6.12.13	Start-up torque REV	-300,0	300,0	s	0,0		634	
P2.6.12.15	Encoder filter time	0	1000	ms	0		618	
P2.6.12.17	Current control P gain	0,00	100,00	%	40,00		617	

Advanced Open Loop parameter group 2.6.13 (NXP only)								
P2.6.13.1	Zero speed current	0,0	250,0	%	120,0		625	
P2.6.13.2	Minimum current	0,0	100,0	%	80,0		622	
P2.6.13.3	Flux reference	0,0	100,0	%	80,0		623	
P2.6.13.4	Frequency limit	0,0	100,0	%	20,0		635	
P2.6.13.5	U/f boost	0	1		0		632	

Table 3-7. Motor control parameters, G2.6

3.8 Protections (Control keypad: Menu M2 → G2.7)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.7.1	Response to reference fault	0	5		0		700	0=No response 1=Warning 2=Warning+Old Freq. 3=Wrrng+PresetFreq 2.7.2 4=Fault,stop acc. to 2.4.7 5=Fault,stop by coasting
P2.7.2	Reference fault frequency	0,00	Par. 2.1.2	Hz	0,00		728	
P2.7.3	Response to external fault	0	3		2		701	0=No response 1=Warning 2=Fault,stop acc. to 2.4.7 3=Fault,stop by coasting
P2.7.4	Input phase supervision	0	3		0		730	
P2.7.5	Response to undervoltage fault	1	3		2		727	
P2.7.6	Output phase supervision	0	3		2		702	
P2.7.7	Earth fault protection	0	3		2		703	
P2.7.8	Thermal protection of the motor	0	3		2		704	
P2.7.9	Motor ambient temperature factor	-100,0	100,0	%	0,0		705	
P2.7.10	Motor cooling factor at zero speed	0,0	150,0	%	40,0		706	
P2.7.11	Motor thermal time constant	1	200	min	10		707	
P2.7.12	Motor duty cycle	0	100	%	100		708	
P2.7.13	Stall protection	0	3		0		709	0=No response 1=Warning 2=Fault,stop acc. to 2.4.7 3=Fault,stop by coasting
P2.7.14	Stall current	50,0	200,0	%	130,0		1524	Stall current as % of motor nominal current in active motor set
P2.7.15	Stall time limit	1,00	120,00	s	15,00		711	
P2.7.16	Stall frequency limit	1,0	Max frequency	Hz	25,0		712	
P2.7.17	Underload protection	0	3		0		713	0=No response 1=Warning 2=Fault,stop acc. to 2.4.7 3=Fault,stop by coasting
P2.7.18	Underload curve at nominal frequency	10	150	%	50		714	
P2.7.19	Underload curve at zero frequency	5,0	150,0	%	10,0		715	

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.7.20	Underload protection time limit	2	600	s	20		716	
P2.7.21	Response to thermistor fault	0	3		0		732	0=No response 1=Warning 2=Fault, stop acc. to 2.4.7 3=Fault, stop by coasting
P2.7.22	Response to fieldbus fault	0	3		0		733	See P2.7.21
P2.7.23	Response to slot fault	0	3		0		734	See P2.7.21

Table 3-8. Protections, G2.7

3.9 Autorestart parameters (Control keypad: Menu M2 → G2.8)

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.8.1	Wait time	0,10	10,00	s	0,50		717	
P2.8.2	Trial time	0,00	60,00	s	30,00		718	
P2.8.3	Start function	0	2		0		719	0=Ramp 1=Flying start 2=According to par. 2.4.6
P2.8.4	Number of tries after undervoltage trip	0	10		0		720	
P2.8.5	Number of tries after overvoltage trip	0	10		0		721	
P2.8.6	Number of tries after overcurrent trip	0	3		0		722	
P2.8.7	Number of tries after reference trip	0	10		0		723	
P2.8.8	Number of tries after motor temperature fault trip	0	10		0		726	
P2.8.9	Number of tries after external fault trip	0	10		0		725	

Table 3-9. Autorestart parameters, G2.8

3.10 Monitor settings

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.11.1	CanBus Node No.	1	255		1		1033	Drive number identifies drive in network. (Monitor bus, ...) 0=Not valid number 1...255=Valid number

Table 3-10. Monitor settings

3.11 Motor 2 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.12.1	Min frequency	0,00	P2.12.2	Hz	0,0		1531	
P2.12.2	Max frequency	P2.12.1	1900,0	Hz	50,0		1532	NOTE: If $f_{\max}$ > than the motor synchronous speed, check suitability for motor and drive system
P2.12.3	Acceleration time 1	0,1	3000,0	s	3,0		1533	
P2.12.4	Deceleration time 1	0,1	3000,0	s	3,0		1534	
P2.12.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1535	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.12.6	Nominal voltage of the motor	180	690	V	400V		1536	
P2.12.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1537	Check the rating plate of the motor
P2.12.8	Nominal speed of the motor	30	114,00	krpm	1,44		1538	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.12.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1539	Check the rating plate of the motor
P2.12.10	Motor $\cos\phi$	0,30	1,00		0,85		1540	Check the rating plate of the motor
P2.12.11	I/O reference	0	3		0		1541	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.12.12	U/f optimisation	0	1		0		1542	
P2.12.13	Analogue output function	0	8		1		1543	As parameter 2.3.2
P2.12.14	RO1 content	0	16		2		1544	As parameter 2.3.6
P2.12.15	Start function	0	1		0		1545	As parameter 2.4.6
P2.12.16	Stop function	0	3		0		1546	As parameter 2.4.7
P2.12.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1547	
P2.12.18	DC braking time at stop	0,00	600,00	s	0,00		1548	0 = DC brake is off at stop
P2.12.19	Motor control mode	0	2		0		1549	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.12.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1550	
P2.12.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1551	$n\% \times U_{\text{nmot}}$ Parameter max. value = par. 2.6.5
P2.12.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1552	As parameter 2.6.8

Table 3-11. Motor 2 parameters

3.12 Motor 3 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.13.1	Min frequency	0,00	P2.13.2	Hz	0,0		1561	
P2.13.2	Max frequency	P P2.13.1	1900,0	Hz	50,0		1562	NOTE: If f_{max} > than the motor synchronous speed, check suitability for motor and drive system
P2.13.3	Acceleration time 1	0,1	3000,0	s	3,0		1563	
P2.13.4	Deceleration time 1	0,1	3000,0	s	3,0		1564	
P2.13.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1565	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.13.6	Nominal voltage of the motor	180	690	V	400V		1566	
P2.13.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1567	Check the rating plate of the motor
P2.13.8	Nominal speed of the motor	30	114,00	krpm	1,44		1568	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.13.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1569	Check the rating plate of the motor
P2.13.10	Motor cosφ	0,30	1,00		0,85		1570	Check the rating plate of the motor
P2.13.11	I/O reference	0	3		0		1571	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.13.12	U/f optimisation	0	1		0		1572	
P2.13.13	Analogue output function	0	8		1		1573	As parameter 2.3.2
P2.13.14	RO1 content	0	16		2		1574	As parameter 2.3.6
P2.13.15	Start function	0	1		0		1575	As parameter 2.4.6
P2.13.16	Stop function	0	3		0		1576	As parameter 2.4.7
P2.13.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1577	
P2.13.18	DC braking time at stop	0,00	600,00	s	0,00		1578	0 = DC brake is off at stop
P2.13.19	Motor control mode	0	2		0		1579	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.13.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1580	
P2.13.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1581	$n\% \times U_{n\text{mot}}$ Parameter max. value = par. 2.6.5
P2.13.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1582	As parameter 2.6.8

Table 3-12. Motor 3 parameters

3.13 Motor 4 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.14.1	Min frequency	0,00	P2.14.2	Hz	0,0		1591	
P2.14.2	Max frequency	P2.14.1	1900,0	Hz	50,0		1592	NOTE: If $f_{\max}$ > than the motor synchronous speed, check suitability for motor and drive system
P2.14.3	Acceleration time 1	0,1	3000,0	s	3,0		1593	
P2.14.4	Deceleration time 1	0,1	3000,0	s	3,0		1594	
P2.14.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1595	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.14.6	Nominal voltage of the motor	180	690	V	400V		1596	
P2.14.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1597	Check the rating plate of the motor
P2.14.8	Nominal speed of the motor	30	114,00	krpm	1,44		1598	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.14.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1599	Check the rating plate of the motor
P2.14.10	Motor cosφ	0,30	1,00		0,85		1600	Check the rating plate of the motor
P2.14.11	I/O reference	0	3		0		1601	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.14.12	U/f optimisation	0	1		0		1602	
P2.14.13	Analogue output function	0	8		1		1603	As parameter 2.3.2
P2.14.14	RO1 content	0	16		2		1604	As parameter 2.3.6
P2.14.15	Start function	0	1		0		1605	As parameter 2.4.6
P2.14.16	Stop function	0	3		0		1606	As parameter 2.4.7
P2.14.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1607	
P2.14.18	DC braking time at stop	0,00	600,00	s	0,00		1608	0 = DC brake is off at stop
P2.14.19	Motor control mode	0	2		0		1609	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.14.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1610	
P2.14.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1611	$n\% \times U_{\text{nmot}}$ Parameter max. value = par. 2.6.5
P2.14.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1612	As parameter 2.6.8

Table 3-13. Motor 4 parameters

3.14 Motor 5 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.15.1	Min frequency	0,00	P2.15.2	Hz	0,0		1621	
P2.15.2	Max frequency	P2.15.1	1900,0	Hz	50,0		1622	NOTE: If f_{max} > than the motor synchronous speed, check suitability for motor and drive system
P2.15.3	Acceleration time 1	0,1	3000,0	s	3,0		1623	
P2.15.4	Deceleration time 1	0,1	3000,0	s	3,0		1624	
P2.15.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1625	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.15.6	Nominal voltage of the motor	180	690	V	400V		1626	
P2.15.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1627	Check the rating plate of the motor
P2.15.8	Nominal speed of the motor	30	114,00	krpm	1,44		1628	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.15.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1629	Check the rating plate of the motor
P2.15.10	Motor cosφ	0,30	1,00		0,85		1630	Check the rating plate of the motor
P2.15.11	I/O reference	0	3		0		1631	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.15.12	U/f optimisation	0	1		0		1632	
P2.15.13	Analogue output function	0	8		1		1633	As parameter 2.3.2
P2.15.14	RO1 content	0	16		2		1634	As parameter 2.3.6
P2.15.15	Start function	0	1		0		1635	As parameter 2.4.6
P2.15.16	Stop function	0	3		0		1636	As parameter 2.4.7
P2.15.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1637	
P2.15.18	DC braking time at stop	0,00	600,00	s	0,00		1638	0 = DC brake is off at stop
P2.15.19	Motor control mode	0	2		0		1639	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.15.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1640	
P2.15.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1641	$n\% \times U_{n\text{mot}}$ Parameter max. value = par. 2.6.5
P2.15.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1642	As parameter 2.6.8

Table 3-14. Motor 5 parameters

3.15 Motor 6 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.16.1	Min frequency	0,00	P2.16.2	Hz	0,0		1651	
P2.16.2	Max frequency	P2.16.1	1900,0	Hz	50,0		1652	NOTE: If f_{max} > than the motor synchronous speed, check suitability for motor and drive system
P2.16.3	Acceleration time 1	0,1	3000,0	s	3,0		1653	
P2.16.4	Deceleration time 1	0,1	3000,0	s	3,0		1654	
P2.16.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1655	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.16.6	Nominal voltage of the motor	180	690	V	400V		1656	
P2.16.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1657	Check the rating plate of the motor
P2.16.8	Nominal speed of the motor	30	114,00	krpm	1,44		1658	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.16.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1659	Check the rating plate of the motor
P2.16.10	Motor cosφ	0,30	1,00		0,85		1660	Check the rating plate of the motor
P2.16.11	I/O reference	0	3		0		1661	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.16.12	U/f optimisation	0	1		0		1662	
P2.16.13	Analogue output function	0	8		1		1663	As parameter 2.3.2
P2.16.14	RO1 content	0	16		2		1664	As parameter 2.3.6
P2.16.15	Start function	0	1		0		1665	As parameter 2.4.6
P2.16.16	Stop function	0	3		0		1666	As parameter 2.4.7
P2.16.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1667	
P2.16.18	DC braking time at stop	0,00	600,00	s	0,00		1668	0 = DC brake is off at stop
P2.16.19	Motor control mode	0	2		0		1669	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.16.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1670	
P2.16.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1671	$n\% \times U_{nmot}$ Parameter max. value = par. 2.6.5
P2.16.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1672	As parameter 2.6.8

Table 3-15. Motor 6 parameters

3.16 Motor 7 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.17.1	Min frequency	0,00	P2.17.2	Hz	0,0		1681	
P2.17.2	Max frequency	P2.17.1	1900,0	Hz	50,0		1682	NOTE: If $f_{max} >$ than the motor synchronous speed, check suitability for motor and drive system
P2.17.3	Acceleration time 1	0,1	3000,0	s	3,0		1683	
P2.17.4	Deceleration time 1	0,1	3000,0	s	3,0		1684	
P2.17.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1685	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.17.6	Nominal voltage of the motor	180	690	V	400V		1686	
P2.17.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1687	Check the rating plate of the motor
P2.17.8	Nominal speed of the motor	30	114,00	krpm	1,44		1688	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.17.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1689	Check the rating plate of the motor
P2.17.10	Motor cosφ	0,30	1,00		0,85		1690	Check the rating plate of the motor
P2.17.11	I/O reference	0	3		0		1691	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.17.12	U/f optimisation	0	1		0		1692	
P2.17.13	Analogue output function	0	8		1		1693	As parameter 2.3.2
P2.17.14	RO1 content	0	16		2		1694	As parameter 2.3.6
P2.17.15	Start function	0	1		0		1695	As parameter 2.4.6
P2.17.16	Stop function	0	3		0		1696	As parameter 2.4.7
P2.17.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1697	
P2.17.18	DC braking time at stop	0,00	600,00	s	0,00		1698	0 = DC brake is off at stop
P2.17.19	Motor control mode	0	2		0		1699	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.17.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1700	
P2.17.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1701	$n\% \times U_{n\text{mot}}$ Parameter max. value = par. 2.6.5
P2.17.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1702	As parameter 2.6.8

Table 3-16. Motor 7 parameters

3.17 Motor 8 Parameters

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P2.18.1	Min frequency	0,00	P2.18.2	Hz	0,0		1711	
P2.18.2	Max frequency	P2.18.1	1900,0	Hz	50,0		1712	NOTE: If $f_{\max}$ > than the motor synchronous speed, check suitability for motor and drive system
P2.18.3	Acceleration time 1	0,1	3000,0	s	3,0		1713	
P2.18.4	Deceleration time 1	0,1	3000,0	s	3,0		1714	
P2.18.5	Current limit	$0,1 \times I_L$	$2,5 \times I_L$	A	$1,5 \times I_L$		1715	NOTE: This applies for frequency converters up to FR7. For greater sizes, consult the factory.
P2.18.6	Nominal voltage of the motor	180	690	V	400V		1716	
P2.18.7	Nominal frequency of the motor	30,00	1900,0	Hz	50,0		1717	Check the rating plate of the motor
P2.18.8	Nominal speed of the motor	30	114,00	krpm	1,44		1718	The default applies for a 4-pole motor and a nominal size frequency converter.
P2.18.9	Nominal current of the motor	$1 \times I_L$	$2,5 \times I_L$	A	I_L		1719	Check the rating plate of the motor
P2.18.10	Motor $\cos\phi$	0,30	1,00		0,85		1720	Check the rating plate of the motor
P2.18.11	I/O reference	0	3		0		1721	0=AI1 1=AI2 2=Keypad 3=Fieldbus
P2.18.12	U/f optimisation	0	1		0		1722	
P2.18.13	Analogue output function	0	8		1		1723	As parameter 2.3.2
P2.18.14	RO1 content	0	16		2		1724	As parameter 2.3.6
P2.18.15	Start function	0	1		0		1725	As parameter 2.4.6
P2.18.16	Stop function	0	3		0		1726	As parameter 2.4.7
P2.18.17	DC braking current	$0,15 \times I_n$	$1,5 \times I_n$	A	Varies		1727	
P2.18.18	DC braking time at stop	0,00	600,00	s	0,00		1728	0 = DC brake is off at stop
P2.18.19	Motor control mode	0	2		0		1729	NXS: 0=Frequency control 1=Speed control 2=Torque control
P2.18.20	U/f curve midpoint frequency	0,00	par. P2.6.4	Hz	50,0		1730	
P2.18.21	U/f curve midpoint voltage	0,00	100,00	%	100,00		1731	$n\% \times U_{n\text{mot}}$ Parameter max. value = par. 2.6.5
P2.18.22	Output voltage at zero frequency	0,00	40,00	%	0,0		1732	As parameter 2.6.8

Table 3-17. Motor 8 parameters

4. Keypad control (Control keypad: Menu M3)

The parameters for the selection of control place and direction on the keypad are listed below. See the Keypad control menu in the Vacon NX User's Manual.

Code	Parameter	Min	Max	Unit	Default	Cust	ID	Note
P3.1	Control place	1	3		1		125	0 = I/O terminal 1 = Keypad 2 = Fieldbus
R3.2	Keypad reference	Par. 2.1.1	Par. 2.1.2	Hz				
P3.3	Direction (on keypad)	0	1		0		123	0 = Forward 1 = Reverse
R3.4	Stop button	0	1		1		114	0=Limited function of Stop button 1=Stop button always enabled

Table 4-1. Keypad control parameters, M3

For parameter details, see USER'S MANUAL NX FREQUENCY CONVERTERS, Standard Application.

Vaasa

Vacon Plc (Head office and production)
Runsorintie 7
65380 Vaasa
firstname.lastname@vacon.com
telephone: +358 (0)201 2121
fax: +358 (0)201 212 205

Helsinki

Vacon Plc
Äyritie 12
01510 Vantaa
telephone: +358 (0)201 212 600
fax: +358 (0)201 212 699

Tampere

Vacon Plc
Vehnämyllynkatu 18
33700 Tampere
telephone: +358 (0)201 2121
fax: +358 (0)201 212 750

Vacon Traction Oy

Vehnämyllynkatu 18
33700 Tampere
telephone: +358 (0)201 2121
fax: +358 (0)201 212 710

SALES COMPANIES AND REPRESENTATIVE OFFICES:**Austria**

Vacon AT Antriebssysteme GmbH
Aumühlweg 21
2544 Leobersdorf
telephone: +43 2256 651 66
fax: +43 2256 651 66 66

Belgium

Vacon Benelux NV/SA
Interleuvenlaan 62
3001 Heverlee (Leuven)
telephone: +32 (0)16 394 825
fax: +32 (0)16 394 827

France

Vacon France s.a.s.
1 Rue Jacquard – BP72
91280 Saint Pierre du Perray CDIS
telephone: +33 (0)1 69 89 60 30
fax: +33 (0)1 69 89 60 40

Germany

Vacon GmbH
Gladbecker Strasse 425
45329 Essen
telephone: +49 (0)201 806 700
fax: +49 (0)201 806 7099

Great Britain

Vacon Drives (UK) Ltd.
18, Maizefield
Hinckley Fields Industrial Estate
Hinckley
LE10 1YF Leicestershire
telephone: +44 (0)1455 611 515
fax: +44 (0)1455 611 517

Italy

Vacon S.p.A.
Via F.lli Guerra, 35
42100 Reggio Emilia
telephone: +39 0522 276811
fax: +39 0522 276890

The Netherlands

Vacon Benelux BV
Weide 40
4206 CJ Gorinchem
telephone: +31 (0)183 642 970
fax: +31 (0)183 642 971

Norway

Vacon AS
Langgata 2
3080 Holmestrand
telephone: +47 330 96120
fax: +47 330 96130

PR China

Vacon Suzhou Drives Co. Ltd.
Blk 11A
428 Xinglong Street
Suchun Industrial Square
Suzhou 215126
telephone: +86 512 6283 6630
fax: +86 512 6283 6618

Vacon Suzhou Drives Co. Ltd.
Beijing Office
A205, Grand Pacific Garden Mansion
8A Guanhu Road
Beijing 100026
telephone: +86 10 6581 3734
fax: +86 10 6581 3754

Russia

ZAO Vacon Drives
Bolshaja Jakimanka 31,
stroenie 18
109180 Moscow
telephone: +7 (095) 974 14 47
fax: +7 (095) 974 15 54

ZAO Vacon Drives
2ya Sovetskaya 7, office 210A
191036 St. Petersburg
telephone: +7 (812) 332 1114
fax: +7 (812) 279 9053

Singapore

Vacon Plc
Singapore Representative Office
102F Pasir Panjang Road
#02-06 Citilink Warehouse Complex
Singapore 118530
telephone: +65 6278 8533
fax: +65 6278 1066

Spain

Vacon Drives Ibérica S.A.
Miquel Servet, 2. P.I. Bufalvent
08243 Manresa
telephone: +34 93 877 45 06
fax: +34 93 877 00 09

Sweden

Vacon AB
Torget 1
172 67 Sundbyberg
telephone: +46 (0)8 293 055
fax: +46 (0)8 290 755