

Instruction manual

NXL/NXS

VARIABLE SPEED DRIVE FOR CIAT APPLICATIONS



NA 09.23 E

05 - 2015

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1 - CIAT APPLICATIONS

The following pages give the list of parameters for the various units

Table headers:

- Code = Code displayed on the operator panel; indicates the parameter number
- Parameter = Parameter name
- Min. = Min. parameter value
- Max. = Max. parameter value
- Unit = Parameter value unit (if applicable)
- Factory setting = Value preset in the factory
- User setting = Value set by the user
- ID = Parameter identification number (used with software tools)

P2.1.6 = On parameter code: the parameter code may only be changed when the frequency inverter is off.

1.1 Values displayed (Control Panel menu M1)

The values displayed are the parameter and signal values, as well as the status and measurement values. These cannot be changed by the user.

For further information, see the Vacon NXL and NXS user manual.

Code	Parameter	Unit	ID	Description
V1.1	Motor frequency	Hz	1	Frequency supplied to the motor
V1.2	Frequency reference	Hz	25	
V1.3	Motor speed	rpm	2	Calculated motor speed
V1.4	Motor current	A	3	Motor current measured
V1.5	Motor torque	%	4	Actual nominal/calculated motor torque
V1.6	Motor output	%	5	Actual nominal/calculated motor output
V1.7	Motor voltage	V	6	Calculated motor voltage
V1.8	DC bus voltage	V	7	Measured DC bus voltage
V1.9	Temperature	°C	8	Radiator temperature
V1.10	Analogue input 1		13	AI1
V1.11	Analogue input 2		14	AI2
V1.12	Analogue output current	mA	26	AO1
V1.13	Analogue output 1 current, expansion board	mA	31	
V1.14	Analogue output 2 current, expansion board	mA	32	
V1.15	DIN1, DIN2, DIN3		15	Status of logic inputs
V1.16	DIE1, DIE2, DIE3		33	I/O expansion board: status of logic inputs
V1.17	RO1		34	Status of relay 1 output
V1.18	ROE1, ROE2, ROE3		35	I/O expansion board: status of relay outputs
V1.19	DOE 1		36	I/O expansion board: status of logic output 1
V1.20	PID: reference	%	20	In % of max. process reference
V1.21	PID: return	%	21	In % of max. measurement
V1.22	PID: error	%	22	In % of max. error
V1.23	PID: output	%	23	In % of max. output value
V1.24	Outputs Change1, Change2, Change3		30	Available with pump/fan control in series
V1.25	Mode		66	0 =Standard 1 =1 sensor 2 =2 sensors 3 =Differential pressure (Flow rate)

1.2 Basic parameters (Control Panel: Menu P2 → P2.1)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.1.1	Min. frequency	0,00	Par. 2.1.2	Hz	20,00		101	
P2.1.2	Max. frequency	Par. 2.1.1	320,00	Hz	50,00		102	NOTE: if $f_{max.} >$ synchronous speed of the motor, check the compatibility of the motor and the drive system
P2.1.3	Acceleration time 1	0,1	3000,0	s	10		103	
P2.1.4	Deceleration time 1	0,1	3000,0	s	10		104	
P2.1.5	Max. output current	0.1 x IL	1.5 x IL	A	IL		107	NOTE: The formulae apply approximately to frequency inverters up to size MF3. For larger sizes, contact Vacon.
P2.1.6	Nominal motor voltage	180	690	V	NXL2:230 V NXL5:400 V		110	
P2.1.7	Nominal motor frequency	30,00	320,00	Hz	50,00		111	See data plate on motor
P2.1.8	Nominal motor speed	300	20 000	rpm	1440		112	The factory setting applies to a 4-pole motor corresponding to the frequency inverter rating.
P2.1.9	Nominal motor current	0.3 x IL	1.5 x IL	A	IL		113	See data plate on motor
P2.1.10	cosφ motor	0,30	1,00		0,85		120	See data plate on motor
P2.1.11	Start mode	0	2		0		505	0 = Ramp 1 = Flying start 2 = Conditional flying start
P2.1.12	Stop mode	0	1		0		506	0 = Coasting 1 = Ramp
P2.1.13	U/f optimisation	0	1		0		109	0 = Not used 1 = Automatic torque boost
P2.1.14	I/O reference	0	5		0		117	0 = Analogue input 1 (AI1) 1 = Analogue input 2 (AI2) 2 = Panel reference 3 = Fieldbus reference (FBSpeedReference) 4 = Motor potentiometer 5 = AI1/AI2 selection 6 = Analogue input 3 (AI3)
P2.1.15	AI2: scale	1	4		2		390	Not used if AI2: Min. user <> 0 % or AI2: Max. user <> 100% 1 = 0 mA – 20 mA 2 = 4 mA – 20 mA 3 = 0 V – 10 V 4 = 2 V – 10 V 5 = 0 V – 5 V 6 = 0.5 V – 4.5 V
P2.1.16	Analogue output: function	0	12		1		307	0 = Not used 1 = Motor freq. (0- $f_{max.}$) 2 = Freq. ref. (0- $f_{max.}$) 3 = Motor speed (0- n_{nMotor}) 4 = Mot. current (0- I_{nMotor}) 5 = Mot. torque (0- C_{nMotor}) 6 = Mot. output (0- P_{nMotor}) 7 = Mot. voltage (0- U_{nMotor}) 8 = DC voltage (0-1000 V) 9 = PID: reference 10 = PID: return 1 11 = PID: error 12 = PID: output
P2.1.17	DIN2: function	0	10		5		319	0 = Not used 1 = Start Reverse (DIN1= Start Forwards) 2 = Reverse rotation direction (DIN1=Start) 3 = Stop pulse (DIN1=Start pulse.) 4 = External fault., contact n.o. 5 = External fault., contact n.c. 6 = Run enable 7 = Preset speed 2 8 = Motor Pot. UP (n.o.) 9 = Disable PID (Direct freq. ref.) 10 = Interlock 1

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.1.18	DIN3: function	0	17		6		301H	0 = Not used 1 = Reverse rotation direction 2 = Ext. fault, contact n.o. 3 =Ext. fault, contact n.c. 4 = Fault reset 5 = Run enable 6 = Preset speed 1 7 = Preset speed 2 8 = DC inj. braking command 9 = Motor Pot. UP (n.o.) 10 = Motor Pot. DOWN (n.o.) 11 = Disable PID (Direct freq. ref.) 12 = PID: Panel reference 2 selection 13 = Interlock 2 14 = Motor thermistor input (See User Manual, Chapter 6.2.4) 15 = Override I/O terminal cmd 16 = Override Fieldbus cmd 17 = AI1/AI2 selection for I/O reference
P2.1.19	Preset speed 1	0,00	Par. 2.1.2	Hz	10,00		105	
P2.1.20	Preset speed 2	0,00	Par. 2.1.2	Hz	50,00		106	
P2.1.21	Auto restart	0	1		0		731	0 = No 1 =Yes
P2.1.22	Hidden parameters	0	1		0		115	0 = All parameters and menus are displayed 1 = Only the group P2.1 and menus M1 to H5 are displayed
P2.1.23	Start mode	0	3		0			0 = Standard 1 = 1 PID sensor 2 = 2 PID sensor 3 = PID differential pressure

1.3 Input configuration (Control Panel: Menu P2 → P2.2)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.2.1	Expansion board, DIE1: function	0	13		7		368	0 = Not used 1 = Reverse rotation direction 2 = External fault., contact n.o. 3 = External fault., contact n.c. 4 = Fault reset 5 = Run enable 6 = Preset speed 1 7 = Preset speed 2 8 = DC inj. braking command 9 = Motor Pot. UP (n.o.) 10 = Motor Pot. DOWN (n.o.) 10 = Disable PID (PID controller sel.) 12 = PID: Panel reference 2 selection 13 = Interlock 1
P2.2.2	Expansion board, DIE2: function	0	13		4		330	Idem P2.1.18
P2.2.3	Expansion board, DIE3: function	0	13		11		369	0 = Not used 1 = Reverse rotation direction 2 = External fault., contact n.o. 3 = External fault., contact n.c. 4 = Fault reset 5 = Run enable 6 = Preset speed 1 7 = Preset speed 2 8 = DC inj. braking command 9 = Motor Pot. UP (n.o.) 10 = Motor Pot. DOWN (n.o.) 11 = Disable PID (PID controller sel.) 12 = PID: Panel reference 2 selection 13 = Interlock 3
P2.2.4	DIN4: function (AI1)	0	13		2		499	Idem P2.2.3 if P2.2.6 = 0
P2.2.5	AI1: selection	0			10		377	10 =AI1 (1 =Local, 0 =Input 1) 11 =AI2 (1 =Local, 1 =Input 2) 20 =Exp. AI1(2 =exp. board 0 =Input 1) 21 =Exp. AI2(2 =exp. board 1 =Input 2)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.2.6	AI1: scale	0	6		3		379	Not used if AI2: user min. <> 0% or AI2: user max. <> 100% 1 = 0-20 mA 2 = 4-20 mA 3 = 0 V – 10 V 4 = 2 V – 10 V 5 = 0 V – 5 V 6 = 0.5 V – 4.5 V
P2.2.7	AI1: user min.	0,00	100,00	%	0,00		380	
P2.2.8	AI1: user max.	0,00	100,00	%	100,00		381	
P2.2.9	AI1: inversion	0	1		0		387	0 = Not inverted 1 = Signal inverted
P2.2.10	AI1: filtering time	0,00	10,00	s	1		378	0 = No filtering
P2.2.11	AI2: selection	0			11		388	Idem par. 2.2.5
P2.2.12	AI2: scale	0	6		2		390	Not used if AI2: min. user <> 0% or AI2: user max. <> 100% 1 = 0-20 mA 2 = 4-20 mA 3 = 0 V – 10 V 4 = 2 V – 10 V 5 = 0 V – 5 V 6 = 0.5 V – 4.5 V
P2.2.13	AI2: user min.	0,00	100,00	%	0,00		391	
P2.2.14	AI2: user max.	0,00	100,00	%	100,00		392	
P2.2.15	AI2: inversion	0	1		0		398	0 = Not inverted 1 = Signal inverted
P2.2.16	AI2: filtering time	0,00	10,00	s	1		389	0 = No filtering
P2.2.17	Motor potentiometer: frequency reference reset	0	2		1		367	0 = No reset 1 = Reset if stopped or powered down 2 = Reset if powered down
P2.2.18	Reference: Min. value	0,00	P2.2.19		0,00		344	Does not affect the fieldbus reference (scaled between par 2.1.1 and par 2.1.2)
P2.2.19	Reference: Max. value	P2.2.18	320,00		0,00		345	Does not affect the fieldbus reference (scaled between par 2.1.1 and par 2.1.2)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.2.20	Panel reference selection	0	6		2		121	0 = Analogue input 1 (AI1) 1 = Analogue input 2 (AI2) 2 = Panel reference 3 = Fieldbus reference (FBSpeedReference) 4 = Motor potentiometer 5 = AI1/A12 selection 6 = Analogue input 3 (AI3)
P2.2.21	Fieldbus reference selection	0	6		2		122	0 = Analogue input 1 (AI1) 1 = Analogue input 2 (AI2) 2 = Panel reference 3 = Fieldbus reference (FBSpeedReference) 4 = Motor potentiometer 5 = AI1/A12 selection 6 = Analogue input 3 (AI3)
P2.2.22	AI3: selection	0	B.10/ E.10 NXS		B.1/ C.1 NXS		1550	Idem par. 2.2.5
P2.2.23	AI3: scale	0	6		2		1551	Not used if AI2: user min. <> 0% or AI2: user max. <> 100% 1 = 0-20 mA 2 = 4-20 mA 3 = 0 V – 10 V 4 = 2 V – 10 V 5 = 0 V – 5 V 6 = 0.5 V – 4.5 V
P2.2.24	AI3: user min.	0,00	100,00	%	0,00		1552	
P2.2.25	AI3: user max.	0,00	100,00	%	100,00		1553	
P2.2.26	AI3: inversion	0,00	100,00	%	0,00		380	
P2.2.27	AI3: filtering time	1		0		1554	381	

1.4 Output configuration (Control Panel: Menu P2 → P2.3)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.3.1	Relay 1 output: function	0	22		3		313	0 = Not used 1 = Ready 2 = On 3 = Fault 4 = Fault inverted 5 = NXL overheat alarm 6 = Ext. fault or alarm 7 = Fault or alarm ref. 8 = Alarm 9 = Inverted 10 = Preset speed 11 = At speed 12 = Control active 13 = Freq.1 supervision 14 = I/O terminal ctrl 15 = Thermistor fault/alarm 16 = PID return supervision 17 = Change.1: ctrl 18 = Change.2: ctrl 19 = Change.3: ctrl 20 = AI supervision 21 = FB Digital input 2 (FB CW BIT 4) 22 = FB Digital input 1 (FB CW BIT 3)
P2.3.2	Expansion board, relay output 1: function	0	22		2		314	Idem parameter 2.3.1
P2.3.3	Expansion board, relay output 2: function	0	22		3		317	Idem parameter 2.3.1
P2.3.4	Expansion board, logic output 1: function	0	22		1		312	Idem parameter 2.3.1
P2.3.5	Analogue output: function	0	12		1		307	See par. 2.1.16
P2.3.6	Analogue output: filtering time	0,00	10,00	s	1,00		308	0 = No filtering

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.3.7	Analogue output: inversion	0	1		0		309	0 = Not inverted 1 = Signal inverted
P2.3.8	Analogue output: min.	0	1		0		310	0 = 0 mA 1 = 4 mA
P2.3.9	Analogue output: scale	10	1000	%	100		311	
P2.3.10	Expansion board, analogue output 1: function	0	12		0		472	Idem parameter 2.1.16
P2.3.11	Expansion board, analogue output 2: function	0	12		0		479	Idem parameter 2.1.16
P2.3.12	Frequency 1 supervision function	0	2		0		315	0 = No supervision 1 = Low limit supervision 2 = High limit supervision
P2.3.13	Frequency 1 value monitored	0,00	Par. 2.1.2	Hz	0,00		316	
P2.3.14	Analogue input (AI): supervision	0	2		0		356	0 = No supervision 1 = AI1 2 = AI2
P2.3.15	AI supervision: disabling limit	0,00	100,00	%	10,00		357	
P2.3.16	AI supervision: enabling limit	0,00	100,00	%	90,00		358	
P2.3.17	Relay output 1 time delay ON	0,00	320,00	s	0,00		487	RO1 time delay ON
P2.3.18	Relay output 1 time delay OFF	0,00	320,00	s	0,00		488	RO1 time delay ON

1.5 Variable drive control (Control Panel: Menu P2 → P2.4)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.4.1	Ramp 1 shape	0,0	10,0	s	0,0		500	0 = Linear >0 = Ramp time S
P2.4.2	Brake chopper	0	3		0		504	0 = Not validated 1 = Used in Run state 2 = Used in Run and Stop state
P2.4.3	DC braking current	0.15 x I _n	1.5 x I _n	A	Varies		507	
P2.4.4	DC braking time at stop	0,00	600,00	s	0,00		508	0 = DC braking disabled at stop
P2.4.5	DC braking frequency threshold	0,10	10,00	Hz	1,50		515	Idem parameter 2.1.16
P2.4.6	DC braking time at start	0,00	600,00	s	0,00		516	0 = DC braking disabled at start
P2.4.7	Flux braking	0	1		0		520	0 = Disabled 1 = Enabled
P2.4.8	Flux braking current	0,0	Varies	A	0,0		519	

1.6 Frequency hopping (Control Panel: Menu P2 → P2.5)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.5.1	Frequency 1 range: low limit	0,0	Par. 2.5.2	Hz	0,0		509	0 = Not used
P2.5.2	Frequency 1 range: high limit	0,0	Par. 2.1.2	Hz	0,0		510	0 = Not used
P2.5.3	Acc./Dec. ramp reduction	0,1	10,0	Time (s)	1,0		518	Multiplier of the selected ramp time between frequency hopping limits

1.7 Motor control (Control Panel: Menu P2 → M2.6)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.6.1	Test mode	0	1		0		600	0 = Frequency control 1 = Speed control
P2.6.2	U/f ratio	0	3		0		108	0 = Linear 1 = Quadratic 2 = Configurable 3 = Linear with flux optim.
P2.6.3	Field weakening point	30,00	320,00	Hz	50,00		602	
P2.6.4	U/f: voltage at field weakening point	10,00	200,00	%	100,00		603	n% x Unmot
P2.6.5	U/f: midpoint frequency	0,00	par. P2.6.3	Hz	50,00		604	
P2.6.6	U/f: midpoint voltage	0,00	100,00	%	100,00		605	n% x Unmot Max. parameter value = par. 2.6.4
P2.6.7	U/f: voltage at 0 Hz	0,00	40,00	%	1,5		606	n% x Unmot
P2.6.8	Switching frequency	1,0	16,0	kHz	6,0		601	Varies according to output (kW)
P2.6.9	Overvoltage controller	0	1		1		607	0 = Not used 1 = Used
P2.6.10	Undervoltage controller	0	1		1		608	0 = Not used 1 = Used
P2.6.11	Identification	0	1		0		631	0 = No action 1 = ID no run

1.8 Protection devices (Control Panel: Menu P2 → P2.7)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.7.1	Response to 4 mA reference fault	0	3		0		700	0 = No action 1 = Alarm 2 = Fault, stop according to 2.1.12 3 = Fault, stop coasting
P2.7.2	Response to external fault	0	3		2		701	0 = No action
P2.7.3	Response to undervoltage fault	1	3		1		727	1 = Alarm
P2.7.4	Motor phase supervision	0	3		2		702	2 = Fault, stop according to 2.1.12
P2.7.5	Earth fault protection	0	3		2		703	3 = Fault, stop coasting
P2.7.6	Motor thermal protection (MTP)	0	3		2		704	
P2.7.7	MTP: ambient temperature	-100,0	100,0	%	0,0		705	
P2.7.8	MTP: I at 0 Hz	0,0	150,0	%	40,0		706	
P2.7.9	MTP: time constant	1	200	min	varies		707	
P2.7.10	Mot. Service Factor	0	100	%	100		708	
P2.7.11	Motor stall protection (MSP)	0	3		1		709	Idem par. 2.7.1
P2.7.12	MSP: current limit	0,1	$I_{n\text{motor}} \times 2$	A	$I_{n\text{motor}} \times 1,3$		710	
P2.7.13	MSP: time delay	1,00	120,0	s	15,0		711	
P2.7.14	MSP: frequency threshold	1,0	P2.1.2	Hz	25,0		712	
P2.7.15	Underload protection (U.P.)	0	3		0		713	Idem par. 2.7.1
P2.7.16	U.P.: torque at f _{nom}	10,0	150,0	%	50,0		714	
P2.7.17	U.P.: torque at 0 Hz	5,0	150,0	%	10,0		715	
P2.7.18	U.P.: time delay	2,00	600,00	s	20,00		716	
P2.7.19	Response to thermistor fault	0	3		2		732	Idem par. 2.7.1
P2.7.20	Response to communication fault (on fieldbus)	0	3		2		733	Idem par. 2.7.1
P2.7.21	Response to board (slot) fault	0	3		2		734	Idem par. 2.7.1
P2.7.22	PID return supervision	0	4		0		735	0 = No action 1 = Alarm if < limit 2 = Alarm if > limit 3 = Fault if < limit 4 = Fault if > limit
P2.7.23	PID return supervision limit	0,0	100,0	%	100		736	
P2.7.24	PID return supervision time delay	0	3600	s	5		737	

1.9 Automatic restart (Control Panel: Menu P2 → P2.8)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.8.1	Waiting time	0,10	10,00	s	0,50		717	
P2.8.2	Reset time delay	0,00	60,00	s	30,00		718	
P2.8.3	Restart type	0	2		0		719	0 = Ramp 1 = Flying start 2 = Conditional flying start

1.10 PID controller (Control Panel: Menu P2 → P2.9)

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.9.1	PID controller	0	1		0		163	0 = Not used 1 = PID controller enabled 2 = Pump/fan control enabled, group P2.10 accessible
P2.9.2	PID: reference	0	4		2		332	0 = Analogue input 1 (AI1) 1 = Analogue input 2 (AI2) 2 = Panel ref. (PID Ref. 1) 3 = Fieldbus ref. (ProcessDataIN1) 4 = Analogue input 3 (AI3)
P2.9.3	PID return selection	0	9		0		334	0 = Signal AI1 (analog. input 1) 1 = Signal AI2 (analog. input 2) 2 = Fieldbus (ProcessDataIN2) 3 = Motor torque 4 = Motor speed 5 = Motor current 6 = Motor output 7 = signal AI1 – signal AI2 8 = Max. value between AI1 and AI2 9 = Signal AI3 (analog. input 3) 10 = Max. value between AI3 and AI2
P2.9.4	PID: gain	0,0	1000,0	%	100,0		118	
P2.9.5	PID: integration time	0,00	320,00	s	10,00		119	
P2.9.6	PID: derivation time	0,00	10,00	s	0,00		132	
P2.9.7	Min. measurement 1	-32000	32000		0		1504	Sensor minimum measurement range (Bar, T°, Pa)
P2.9.8	Max. measurement 1	0	32000		100		1505	Sensor maximum measurement range (Bar, T°, Pa)
P2.9.9	Error inversion	0	1		0		340	
P2.9.10	Sleep frequency	Par. 2.1.1	Par. 2.1.2	Hz	2		1016	
P2.9.11	Sleep delay	0	3600	s	30		1017	
P2.9.12	Wake-up level	0,00	100,00	%	25,00		1018	
P2.9.13	Wake-up mode	0	3		0		1019	0 = Wake-up if measurement below wake-up level (2.9.12) 1 = Wake-up if measurement above wake-up level (2.9.12) 2 = Wake-up if measurement below PIDRef% x P2.9.12 3 = Wake-up if measurement above PIDRef% x P2.9.12
P2.9.14	Decimals (value display format)	0	0		0		1503	0 = XXX 1 = XX.X 2 = X.XX
P2.9.15	K coefficient	0	2200		0		1502	Coefficient of pressure and flow rate (see fan technical specification) 0 = Inhibited
P2.9.16	Min. process setpoint	0	65535		0		1506	Minimum setpoint range (°C/Pa, Bar, M or M3/h)
P2.9.17	Max. process setpoint	0	65535		100		1507	Maximum setpoint range (°C/Pa, Bar, M or M3/h)
P2.9.18	An.Inp. Min.PI.Ref.	0	100.00	%	0		1556	Min. PI ref. set by an analogue input
P2.9.19	Ana.Inp. Max. PI Ref.	0	100.00	%	100.00		1557	Max. PI ref. set by an analogue input
P2.9.20 Only on NXS	Unit on the display screen	0	5		0		1036	0 = . 1 = °C 2 = Pa 3 = bar 4 = M 5 = M3/h

1.11 Pump/fan control (Control Panel: Menu P2 -> P2.10)

Note: The group P2.10 is only accessible if par. 2.9.1 is set to 2.

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.10.1	Number of auxiliary motors	0	3		1		1001	
P2.10.2	Aux. start-up time delay	0,0	300,0	s	4,0		1010	
P2.10.3	Aux. stop time delay	0,0	300,0	s	2,0		1011	
P2.10.4	Changeover	0	4		0		1027	0 = Not used 1 = Changeover with aux. pumps 2 = Changeover with freq. inv. & aux. pumps 3 = Changeover & interlock (aux. pumps) 4 = Changeover & interlock (freq. inv. & aux. pumps)
P2.10.5	Changeover interval	0,0	3000,0	h	48,0		1029	0.0 = TEST=40 s Changeover time delay
P2.10.6	Changeover: max. no. of aux. motors	0	3		1		1030	Max. no. of motors during changeover
P2.10.7	Changeover frequency limit	0,00	par. 2.1.2	Hz	25,00		1031	Max. frequency during changeover
P2.10.8	Start-up frequency, Aux1	Par. 2.10.9	320,00	Hz	51,00		1002	
P2.10.9	Stop frequency, Aux1	Par. 2.1.1	Par. 2.10.8	Hz	10,00		1003	

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P2.11.1	Fieldbus protocol	0	1		1/Validated		1600	0 = Modbus inhibited 1 = Modbus validated
P2.11.2	Slave address	1	250		12		1601	Modbus slave address
P2.11.3	Flow rate	1	9		5/9600 Bds		1602	Modbus rate 5 = 96 Bds 6 = 19,200 Bds
P2.11.4	Stop bits	0	1		0/1StopBit		1604	No. of Modbus StopBits 0 = 1 Stop Bit 1 = 2 Stop Bits
P2.11.5	Parity	0	2		0/No parity		1605	Modbus parity 0 = no parity 1 = Even 2 = Odd
P2.11.6	Communication breakdown time-out	0	1000	Sec.	5		1606	Modbus watchdog time delay
P2.11.7	Internal fan sensor	0	1		0		1607	NX internal fan sensor 0 = Permanent 1 = Thermostatically controlled
P2.11.8	F10 Filter	0	1000	Sec.	0		1608	Network phase fault filtering time
P2.11.9	F10 Voltage	1	50	V	100		1610	Network phase fault voltage threshold

1.12 Control via operator panel (Control Panel: Menu K3)

The parameters for control source selection and motor direction of rotation using the operator panel are given below.

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
P3.1	Control source	1	3		1		125	1 = I/O terminal 2 = Operator panel 3 = Fieldbus
R3.2	Panel reference	Par. 2.1.1	Par. 2.1.2	Hz				
P3.3	Direction of rotation (Panel Dir)	0	1		0		123	0 = Front 1 = Rear
P3.4	Stop button	0	1		1		114	0 =Stop button only operational on control panel 1 =Stop button always operational
P3.5	PID: reference 1	0	65535		1000			Setpoint 1
P3.6	PID: reference 2	0	65535		1000			Setpoint 2

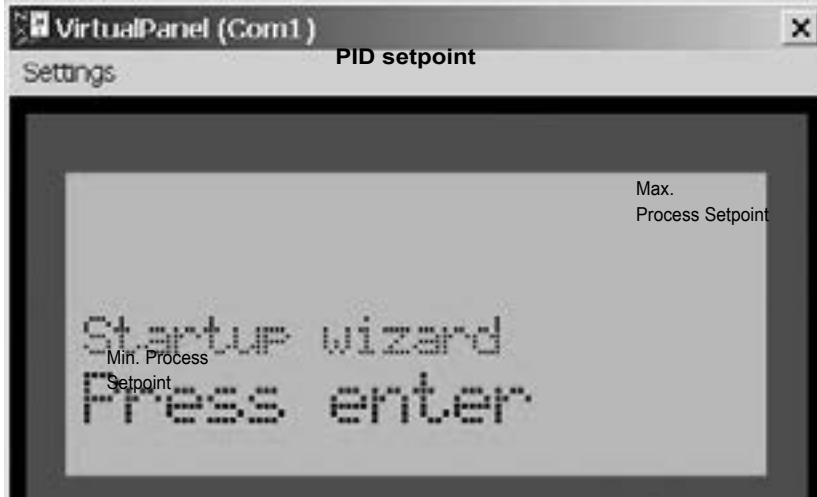
1.13 Setpoint adjustment mode using analogue input

This operating mode is available from version 102 of the application.

This function has been developed to obtain the PID control setpoint according to external data, e.g. CMS setpoint or ambient temperature sensor, humidity.

This function is used to define an analogue input as a control setpoint, via the parameter "PID: reference" P2.9.2 to be set on one of the analogue inputs. If the reference is on 2/"Panel ref.", there is no change in operation compared with version 101.

Example of change to PID setpoint via an analogue input:



Note: the operating mode can be combined by selecting one analogue input as the main PID setpoint, and one fixed PID setpoint, adjustable in P3.6, selected according to the position of the logic input 3 (DIN3), with parameter P2.1.18 set to 12/"PID: Sel panel ref. 2": logic input 3 closed, the setpoint then comes from P3.6.

Application example:

- In summer, automatic PID setpoint according to temperature sensor
- In winter, DIN3 closed, PID setpoint fixed

1.14 NXL (S6) system menu

The System Menu can be accessed via the Main Menu by pressing button **S6** when **S6** is displayed.

The frequency inverter general control functions can be accessed in the System Menu; these include operator panel settings, user parameter groups and information on software and hardware configuration.

The table below lists all the System Menu functions.

System Menu Functions

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
S6.3	Param. transfer							
P6.3.1	Parameter groups							0 = Select 1 = Save User1 2 = Load User1 3 = Save User2 4 = Load User2 5 = Restore factory settings 6 = Fault 7 = Wait 8 = OK
S6.5	Safety							
P6.5.2	Lock parameters	0	1		0			0 = Changes authorised 1 = Changes prohibited
S6.6	Panel Settings							
P6.6.1	Default page	0		.				
P6.6.3	Default/return page time delay	5	65535	s	30			
S6.7	Hardware settings							
P6.7.2	Fan control	0			1			0 = Permanent 1 = According to temperature (only sizes MF4 and +)
P6.7.3	HMI comm. breakdown	200	5000	ms	200			
S6.7.4	HMI comm. restored	1	10		5			
S6.8	System info							

Code	Parameter	Min.	Max.	Unit	Factory setting	User setting	ID	Note
S6.8.1	Meters menu							
C6.8.1.1	MWh meter			KWh				
C6.8.1.2	Operating days meter			hh:mm:ss				
C6.8.1.3	Operating hours meter			hh:mm:ss				
S6.8.2	Reset meters							
T6.8.2.1	Reset MWh meter			kWh.				
P6.8.2.2	Reset MWh meter							0 = No action 1 = Reset MWh meter
T6.8.2.3	Reset operating days meter							
T6.8.2.4	Reset operating hours meter			hh:mm:ss				
P6.8.2.5	Reset operating-hour meter							0 = No action 1 = Reset T6.8.2.3, T6.8.2.4
S6.8.3	Software info							
I6.8.3.1	Software pack							Access information with the right menu button
I6.8.3.2	Software version							
I6.8.3.3	Operator interface							
I6.8.3.4	System load			%				
S6.8.4	Application info							
S6.8.4.1	Application							
A6.8.4.1.1	Application ID							
A6.8.4.1.2	Application version							
A6.8.4.1.3	Application operator interface							
S6.8.5	Hardware info							
I6.8.5.2	Unit voltage			V				
I6.8.5.3	Brake chopper							0 = Absent, 1 = Present
S6.8.6	Options							
S6.8.6.1	E OPT- location							Note: The submenus are not displayed if no optional board is installed
I6.8.6.1.1	E Status location							1 = Loss of connection 2 = Initialisation in progress 3 = On 5 = Fault
I6.8.6.1.2	E program version location							
S6.8.6.2	D OPT- location							Note: The submenus are not displayed if no optional board is installed
I6.8.6.2.1	D Status location							1 = Loss of connection 2 = Initialisation in progress 3 = On 5 = Fault
I6.8.6.2.2	D program version location							
S6.9	AI mode							
P6.9.1	AIA1 mode	0	1		0			0 = Voltage input 1 = Current input (Types MF4 – MF6)
P6.9.2	AIA2 mode	0	1					0 = Voltage input 1 = Current input
S6.10	Fieldbus parameters							
I6.10.1	Communication status							
P6.10.2	Fieldbus protocol	1	1		1			0 = Not used 1 = Modbus protocol
P6.10.3	Slave address	1	255		1			Address 1 – 255
P6.10.4	Flow rate	0	8		5			0 = 300 baud 1 = 600 baud 2 = 1200 baud 3 = 2400 baud 4 = 4800 baud 5 = 9600 baud 6 = 19,200 baud 7 = 38,400 baud 8 = 57,600 baud
P6.10.5	Stop bits	0	1		0			0 = 1 1 = 2
P6.10.6	Parity	0	2		0			0 = None 1 = Odd 2 = Even
P6.10.7	Communication breakdown time-out	0	300	s	0			0 = Not used 1 = 1 second 2 = 2 seconds, etc.

1.15 System start-up assistant

The system start-up assistant simplifies programming of the variable drive by selecting the desired operating mode. This assistant starts after the "stop" button is pressed for 5 seconds.

Assistant parameters table

Parameters	Setting range	Settings				
		Specifications of equipment installed	No sensor	1 sensor	2 sensors	Diff. pressure
P2.1.8 Nominal motor speed	300...20,000 rpm	Speed on rating plate	Speed on rating plate	Speed on rating plate	Speed on rating plate	
P2.1.9 Nominal motor current	0.0...210.0 A	Motor no. X rating plate current	Motor no. X rating plate current	Motor no. X rating plate current	Rating plate current	
P2.1.1 Minimum frequency	0.00...320.00 Hz	20	20	20	Depending on requirement	
P2.1.2 Maximum frequency	0.00...320.00 Hz	50	50	50	Depending on requirement	
P2.1.15 Analogue inputs scale (type of sensor installed)	1 = 0/20 mA 2 = 4/20 mA 3 = 0/10 V 4 = 2/10 V 5 = 0/5 V 6 = 0.5 V/4.5 V	3 (0/10 V)	2 (4/20 mA)	2 (4/20 mA)	3 (0/10 V)	
P2.9.18 Unit on display (only on NXS)	0 = . 1 = °C 2 = Pa 3 = bar 4 = M 5 = m3/h	0	1 (°C) or 3 (bar)	1 (°C) or 3 (bar)	5 (m³/h)	
P2.9.7 Min. measurement 1 (sensor measurement value for min. electrical signal U/I)	- 32 000...32 000	NOT APPLICABLE	Min. value on sensor plate (b/°C)	Min. value on sensor plate (b/°C)	Min. value on sensor plate (Pa)	
P2.9.8 Max. measurement 1 (sensor measurement value for max. electrical signal U/I)	0... 19 000	NOT APPLICABLE	Max. value on sensor plate (b/°C)	Max. value on sensor plate (b/°C)	Max. value on sensor plate (Pa)	
Operating specifications						
P2.1.23 Mode	0 = Standard without sensor (frequency control)	0 (No sensor)	1 (1 sensor)	2 (2 sensors)	3 (Diff. pressure)	
	1 = 1 sensor (PID controller reversed)					
	2 = 2 sensors (PID controller reversed)					
	3 = Diff. pressure (PID flow rate controller)					
P2.9.16 Min. Process Setpoint	0...65 535	NOT APPLICABLE	Min. control value (b/°C)	Min. control value (b/°C)	Min. control value (m3/h)	
P2.9.17 Max. Process Setpoint	0...65 535	NOT APPLICABLE	Max. control value (b/°C)	Max. control value (b/°C)	Max. control value (m3/h)	
P2.9.15 K Coeff	0 (inhibited) 1...2 200	0 (not used)	0 (not used)	0 (not used)	K value	
P35 PID reference (Fixed control setpoint)	0...65 535	NOT APPLICABLE	Depending on requirement	Depending on requirement	Depending on requirement	
Configuration assistant end		Done	Done	Done	Done	

For NXS-type variable drives, the system start-up assistant is presented differently and additional questions are asked. The assistant either starts up when the equipment is first powered up, or else by pressing the "STOP" button for 5 seconds then switching the variable drive off and on again.



1. ENTER button



2. Select the display language using the up or down arrows, then press ENTER to confirm.



3. Press ENTER.



4. Press ENTER.



5. Enter the installation data according to the system start-up assistant grid described (see above).
At the end of the assistant, the display asks you if you want to accept the settings made:



6. Reply "No" -> press left arrow.



7. Press ENTER.



8. Press ENTER.

The operator panel has a memory which can archive the variable drive settings.

Simplified maintenance:

1. Copy and paste between several variable drives during system start-up.
2. Automatically recopy parameters when replacing a variable drive



9. Reply "Yes" -> press right arrow.



10. Reply "Yes" -> press right arrow.



11. It takes around 30 seconds to copy existing settings from the variable drive memory in the display panel memory





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