EXTRUDER OPTION

VLT® Series 5000

These instructions form an appendix to the manual that comes with the VLT 5000 unit.
The functionalities of parameters 221-224 and 319-326 will be replaced by new functions, when the extruder option circuit board is fitted in the VLT frequency converter.
The descriptions of these parameters are given in these instructions.
Furthermore, the status messages have been modified.

221 Torque limit for motor mode (TORQ LIMIT MOTOR)

Value:

0.0 % - 160.0 % of $T_{M,N}$ ★ 160 % of $T_{M,N}$

Function:

This is where to set the torque limit for motor-driven operation.

Description of choice:

In order to protect the motor from reaching pull-out torque, the factory setting is 1.6 x the rated motor torque (calculated value).

222 Torque limit for generating operation (TORQ LIMIT GENER)

Value:

0.0 % - xxx.x % of $T_{M,N}$ ★ 10 %

Function:

This is where to set the torque limit for regenerating operation.

Description of choice:

If *Resistor brake* [1] has been selected in parameter 400, the torque limit is changed to 1.6 x the rated motor torque.

223 Warning: Low torque (WARN. TORQUE LOW)

Value:

0.0 - parameter 224 ★ 0.0 %

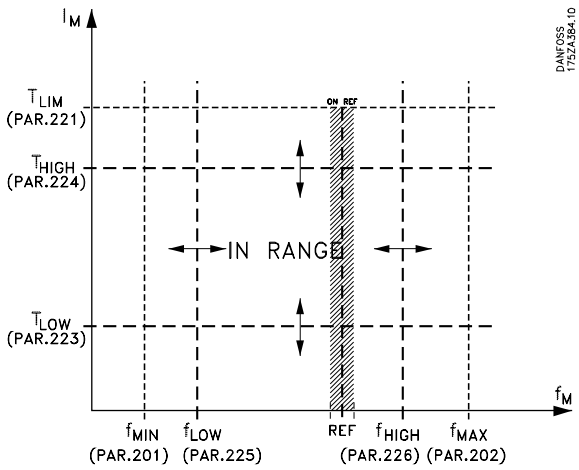
Function:

When the motor torque is below the limit, T_{LOW}, programmed in this parameter, the display indicates TORQUE LOW.

The signal outputs can be programmed to transmit a status signal via terminal 42 or 45 as well as via relay output 01 or 04 (parameter 319, 321, 323 or 326).

Description of choice:

The lower signal limit T_{LOW} of the motor torque must be programmed within the normal working range of the frequency converter.



224 Warning: High torque (WARN. TORQUE HI)

Value:

Parameter 223 - $T_{M,N}$ ★ $T_{M,N}$

Function:

If the motor torque gets above the limit programmed in this parameter, T_{HIGH}, the display will indicate TORQUE HIGH.

The signal outputs can be programmed to transmit a status signal via terminal 42 or 45 and via relay output 01 or 04 (parameter 319, 321, 323 or 326).

Description of choice:

The upper signal limit of the motor torque, T_{HIGH}, must be programmed within the normal working range of the frequency converter. See drawing at parameter 223.

319 Terminal 42 output, (AO 42 FUNCT.)

Outputs	terminal no.	42	45	01(relay)	04 (relay)
	parameter	319	321	323	326
Value:					
No function	(NO OPERATION)	[0]	[0]	[0]	[0]
Control ready	(CONTROL READY)	[1]	[1]	[1]	[1]
Ready signal	(UNIT READY)	[2]	[2]	[2]	[2]
Ready - remote control	(UNIT READY/REM CTRL)	[3]	[3]	[3]	[3] (★)
Enable, no warning	(ENABLE/NO WARNING)	[4]	[4]	[4]	[4]
Running	(VLT RUNNING)	[5]	[5]	[5]	[5]
Running, no warning	(RUNNING/NO WARNING)	[6]	[6]	[6]	[6]
Running within range, no warning	(RUN IN RANGE/NO WARN)	[7]	[7]	[7]	[7]
Running at reference value, no warning	(RUN ON REF/NO WARN)	[8]	[8]	[8]	[8]
Fault	(ALARM)	[9]	[9]	[9]	[9]
Fault or warning	(ALARM OR WARNING)	[10]	[10]	[10]	[10]
Torque limit	(TORQUE LIMIT)	[11]	[11]	[11]	[11]
Out of torque range	(OUT OF TORQUE RANGE)	[12]	[12]	[12]	[12]
Over T low	(ABOVE TORQUE, LOW)	[13]	[13]	[13]	[13]
Under T high	(BELOW TORQUE, HIGH)	[14]	[14]	[14]	[14]
Out of frequency range	(OUT OF FREQ RANGE)	[15]	[15]	[15]	[15]
Over f low	(ABOVE FREQUENCY LOW)	[16]	[16]	[16]	[16]
Under f high	(BELOW FREQUENCY HIGH)	[17]	[17]	[17]	[17]
Out of feedback range	(OUT OF FDBK RANGE)	[18]	[18]	[18]	[18]
Over feedback low	(ABOVE FDBK, LOW)	[19]	[19]	[19]	[19]
Under feedback high	(BELOW FDBK, HIGH)	[20]	[20]	[20]	[20]
Thermal warning	(THERMAL WARNING)	[21]	[21]	[21]	[21]
Ready - no thermal warning	(READY &NOTHERM WARN)	[22]	[22]	[22] (★)	[22]
Ready - remote control - no therm. warn.	(REM RDY&NO THERMWAR)	[23]	[23]	[23]	[23]
Ready - mains voltage within range	(RDY NO OVER/UNDERVOL)	[24]	[24]	[24]	[24]
Reversing	(REVERSE)	[25]	[25]	[25]	[25]
Bus ok	(BUS OK)	[26]	[26]	[26]	[26]
Reserved	(RESERVED)	[27]	[27]	[27]	[27]
Brake, no warning	(BRAKE NO WARNING)	[28]	[28]	[28]	[28]
Brake ready, no fault	(BRAKE RDY (NO FAULT))	[29]	[29]	[29]	[29]
Brake fault	(BRAKE FAULT (IGBT))	[30]	[30]	[30]	[30]
Relay 123	(RELAY 123)	[31]	[31]	[31]	[31]
Mechanical brake control	(MECH. BRAKE CONTROL)			[32]	[32]
Control word bit 11/12	(CTRL WORD BIT 11/12)			[33]	[33]
Reserved	(RESERVED)	[32]	[32]		
Reserved	(RESERVED)	[33]	[33]		
Reserved	(RESERVED)	[34]	[34]		
Reserved	(RESERVED)	[35]	[35]		

Continued..

★ = factory setting. ( ) = display text [ ] = value for use in communication via serial communication port

Outputs	terminal no.	42		45	01(relay)	04 (relay)
	parameter	319		321	323	326
Value (cont.)						
0-100 Hz ⇒ 0-20 mA	(0-100 Hz = 0-20 mA)	[36]		[36]		
0-100 Hz ⇒ 4-20 mA	(0-100 Hz = 4-20 mA)	[37]		[37]		
0-100 Hz ⇒ 0-32000 p	(0-100 Hz = 0-32000P)	[38]		[38]		
0 - f_{MAX} ⇒ 0-20 mA	(0-FMAX = 0-20 mA)	[39]		[39]	✯	
0 - f_{MAX} ⇒ 4-20 mA	(0-FMAX = 4-20 mA)	[40]		[40]		
0 - f_{MAX} ⇒ 0-32000 p	(0-FMAX = 0-32000P)	[41]		[41]		
Ref_{MIN} - Ref_{MAX} ⇒ 0-20 mA	(REF MIN-MAX = 0-20 mA)	[42]		[42]		
Ref_{MIN} - Ref_{MAX} ⇒ 4-20 mA	(REF MIN-MAX = 4-20 mA)	[43]		[43]		
Ref_{MIN} - Ref_{MAX} ⇒ 0-32000 p	(REF MIN-MAX = 0-32000P)	[44]		[44]		
FB_{MIN} - FB_{MAX} ⇒ 0-20 mA	(FB MIN-MAX = 0-20 mA)	[45]		[45]		
FB_{MIN} - FB_{MAX} ⇒ 4-20 mA	(FB MIN-MAX = 4-20 mA)	[46]		[46]		
FB_{MIN} - FB_{MAX} ⇒ 0-32000 p	(FB MIN-MAX = 0-32000P)	[47]		[47]		
0 - I_{MAX} ⇒ 0-20 mA	(0-IMAX = 0-20 mA)	[48]	★	[48]		
0 - I_{MAX} ⇒ 4-20 mA	(0-IMAX = 4-20 mA)	[49]		[49]		
0 - I_{MAX} ⇒ 0-32000 p	(0-IMAX = 0-32000P)	[50]		[50]		
0 - I_{LIM} ⇒ 0-20 mA	(0-TLIM = 0-20 mA)	[51]		[51]		
0 - I_{LIM} ⇒ 4-20 mA	(0-TLIM = 4-20 mA)	[52]		[52]		
0 - I_{LIM} ⇒ 0-32000 p	(0-TLIM = 0-32000P)	[53]		[53]		
0 - T_{MAX} ⇒ 0-20 mA	(0-TNOM = 0-20 mA)	[54]		[54]		
0 - T_{MAX} ⇒ 4-20 mA	(0-TNOM = 4-20 mA)	[55]		[55]		
0 - T_{MAX} ⇒ 0-32000 p	(0-TNOM = 0-32000P)	[56]		[56]		
0 - P_{NOM} ⇒ 0-20 mA	(0-PNOM = 0-20 mA)	[57]		[57]		
0 - P_{NOM} ⇒ 4-20 mA	(0-PNOM = 4-20 mA)	[58]		[58]		
0 - P_{NOM} ⇒ 0-32000 p	(0-PNOM = 0-32000P)	[59]		[59]		

✯ = factory setting. ( ) = display text [ ] = value for use in communication via serial communication port

Function:

This output can act both as a digital and an analogue output. If used as a digital output (data value [0]-[59]), a 24 V DC signal is transmitted; if used as an analogue output either a 0-20 mA signal, a 4-20 mA signal or as a pulse output.

Description of choice:

Control ready, the VLT frequency converter is ready for use; the control card receives supply voltage.

Ready signal, the VLT frequency converter is ready for use, there is a supply voltage on the control card and no control signals on the inputs.

Ready, remote control, the VLT frequency converter is ready for use and set at remote control; there is a supply voltage on the control card and no control signals on the inputs.

Enable, no warning, the VLT frequency converter is ready for use; no start or stop command has been given (start/disable). No warning.

Running, the output frequency is higher than the frequency set in parameter 123. A start command has been given.

Running, no warning, the output frequency is higher than the frequency set in parameter 123. A start command has been given. No warning.

Runs in range, no warning, runs within the programmed current/frequency ranges set in parameters 223-226.

Runs on reference, no warning, speed according to reference. No warning.

Fault, output is activated by alarm.

Fault or warning, the output is activated by alarm or warning.

Torque limit, the torque limit in parameter 221 has been exceeded.

Out of torque range, the motor torque is outside the range programmed in parameters 223 and 224.

Over T low, the motor torque is higher than set in parameter 223.

Under T high, the motor torque is lower than set in parameter 224.

Out of frequency range, the output frequency is outside the frequency range programmed in parameters 225 and 226.

Over f low, the output frequency is higher than the value set in parameter 225.

Under f high, the output frequency is lower than the value set in parameter 226.

Out of feedback range, the feedback signal is outside the range programmed in parameters 227 and 228.

Over feedback low, the feedback signal is higher than the value set in parameter 227.

Under feedback high, the feedback signal is lower that the value set in parameter 228.

Thermal warning, above the temperature limit in either the motor, the VLT frequency converter, the brake resistor or the thermistor.

Ready - no thermal warning, the VLT frequency converter is ready for use, the control card receives supply voltage and there are no control signals on the inputs. No over-temperature.

Ready - remote control - no thermal warning, the VLT frequency converter is ready for use and set at remote control, the control card receives supply voltage. No over-temperature.

Ready - mains voltage within range, the VLT frequency converter is ready for use, the control card receives supply voltage and there are no control signals on the inputs. The mains voltage is within the permitted voltage range (see chapter 8).

Reversing. *Logic '1'* = relay activated, 24 V DC on the output when the direction of rotation of the motor is clockwise. Logic '0' = relay not activated, no signal on the output, when the direction of rotation of the motor is anti-clockwise.

Bus-ok, active communication (no time-out) via the serial communication port.

Relay 123, if Profidrive [0] has been selected in parameter 512, the relay is activated. If either OFF1, OFF2 or OFF3 (bit in the control word) is logic '1'.

Mechanical brake control, enables control of an external mechanical brake, see description in chapter 5.

Control word bits 11/12, relay controlled via bits 11/12 in serial control word. Bit 11 relates to relay 01 and bit 12 to relay 04.
See section on serial communication in the Design Guide.

0-100 Hz ⇒ 0-20 mA and
0-100 Hz ⇒ 4-20 mA and
0-100 Hz ⇒ 0-32000 p, a pulse output signal proportional to the output frequency in the range 0-100 Hz.

0-f_{MAX} ⇒ 0-20 mA and
0-f_{MAX} ⇒ 4-20 mA and
0-f_{MAX} ⇒ 0-32000 p, an output signal proportional to the output frequency range in the range 0 - f_{MAX} (parameter 202).

Ref_{MIN} - Ref_{MAX} ⇒ 0-20 mA and
Ref_{MIN} - Ref_{MAX} ⇒ 4-20 mA and
Ref_{MIN} - Ref_{MAX} ⇒ 0-32000 p, an output signal proportional to the reference value in the interval Ref_{MIN} - Ref_{MAX} (parameters 204/205) is obtained.

FB_{LOW}-FB_{HIGH} ⇒ 0-20 mA and
FB_{LOW}-FB_{HIGH} ⇒ 4-20 mA and
FB_{LOW}-FB_{HIGH} ⇒ 0-32000 p, an output signal proportional to the reference value in the interval FB_{LOW} - FB_{HIGH} (parameters 414/415) is obtained.

0 - $I_{VLT, MAX}$ ⇒ 0-20 mA and
0 - $I_{VLT, MAX}$ ⇒ 4-20 mA and
0 - $I_{VLT, MAX}$ ⇒ 0-32000 p, an output signal proportional to the output current in the interval 0 - $I_{VLT,MAX}$ is obtained.

0 - T_{LIM} ⇒ 0-20 mA and
0 - T_{LIM} ⇒ 4-20 mA and
0 - T_{LIM} ⇒ 0-32000 p, an output proportional to the output torque in the interval 0 - T_{LIM} (parameter 221) is obtained.

0 - T_{NOM} ⇒ 0-20 mA and
0 - T_{NOM} ⇒ 4-20 mA and
0 - T_{NOM} ⇒ 0-32000 p, an output signal proportional to the highest permissible output torque (calculated by the VLT frequency converter) is obtained.

0 - P_{NOM} ⇒ 0-20 mA and
0 - P_{NOM} ⇒ 4-20 mA and
0 - P_{NOM} ⇒ 0-32000 p, an output signal proportional to the highest permissible output power (calculated by the VLT frequency converter) is obtained.

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624 Nameplate: Software version no. (SOFTWARE VERSION)

Value:

Software version no. 10.00

Function:

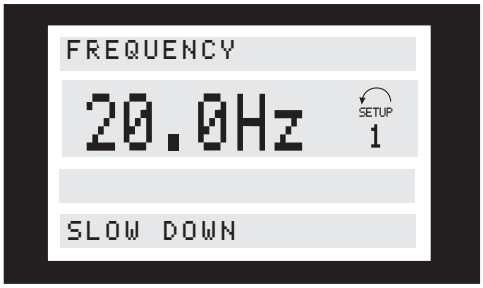
The key data of the unit can be read out via the display or the serial communication port.

Description of choice:

Software version gives the version number.

■ Status messages

Status messages appear in the 4th line of the display, see the below example. The status message will be on the display for approx. 3 seconds.



Start clockwise/anti-clockwise (START FORW./REV):
Input on digital inputs and parameter data are in conflict.

Slow-down (SLOW DOWN):
The output frequency of the VLT frequency converter is reduced by the percentage value chosen in parameter 219.

Catch-up (CATCH UP):
The output frequency of the VLT frequency converter is increased by the percentage value chosen in parameter 219.

Feedback High (FEEDBACK HIGH):
The FB value is higher than the value set in parameter 228. This message is only shown when the motor is running.

Feedback low (FEEDBACK LOW):
The FB value is lower than the value set in parameter 227. This message is only shown when the motor is running.

Output frequency high (FREQUENCY HIGH):
The output frequency is higher than the value set in parameter 226. This message is only shown when the motor is running.

Output frequency low (FREQUENCY LOW):
The output frequency is lower than the value set in parameter 225. This message is only shown when the motor is running.

Output torque high (TORQUE HIGH):
The output torque is higher than the value set in parameter 224. This message is only shown when the motor is running.

Output torque low (TORQUE LOW):
The output torque is lower than the value set in parameter 223. This message is only shown when the motor is running.

Braking max. (BRAKING MAX):
The brake is functioning.
Brakes to its maximum when running 100% duty cycle.

Braking (BRAKING):
The brake is functioning.

Ramp operation (REM/ RAMPING):
Remote has been selected in parameter 002 and the output frequency is changed in accordance with the ramps set.

Ramp operation (LOCAL/ RAMPING):
Local has been selected in parameter 002 and the output frequency is changed in accordance with the ramps set.

PNU #	Parameter-description	Factory setting	Range	Online	4-Setup	Size index[1]	Conversion index[1]	Data type[2]
001	**Language**	English		Yes	No	0	0	5
002	**Local/remote control**	Remote control		Yes	Yes	0	0	5
003	**Local reference**	000.000		Yes	Yes	0	-3	4
004	**Active setup**	Setup 1		Yes	No	0	0	5
005	**Programming setup**	Active setup		Yes	No	0	0	5
006	**Copying of setups**	No copying		No	No	0	0	5
007	**LCP copy**	No copying		No	No	0	0	5
008	**Display scaling of motor frequency**	1	0.01 - 100.00	Yes	Yes	0	-2	6
009	**Display linie 2**	Frequency [Hz]		Yes	Yes	0	0	5
010	**Display line 1.1**	Reference [%]		Yes	Yes	0	0	5
011	**Display line 1.2**	Motor current [A]		Yes	Yes	0	0	5
012	**Display line 1.3**	Power [kW]		Yes	Yes	0	0	5
013	**Local control/configura**	LCP digital control/as parameter 100		Yes	Yes	0	0	5
014	**Local stop**	Possible		Yes	Yes	0	0	5
015	**Local jog**	Not possible		Yes	Yes	0	0	5
016	**Local reversing**	Not possible		Yes	Yes	0	0	5
017	**Local reset of trip**	Possible		Yes	Yes	0	0	5
018	**Lock for data change**	Not locked		Yes	Yes	0	0	5
019	**Operating state at power-up, local control**	Forced stop, use saved ref.		Yes	Yes	0	0	5
100	**Configuration**	Speed, open loop mode		No	Yes	0	0	5
101	**Torque characteristics**	High - constant torque		Yes	Yes	0	0	5
102	**Motor power**	Depends on the unit	0.18-45 kW	No	Yes	9	1	6
103	**Motor voltage**	Depends on the unit	200 - 500 V	No	Yes	21	0	6
104	**Motor frequency**	50 Hz		No	Yes	28	0	6
105	**Motor current**	Depends on the choice of motor	0.01 - $I_{VLT,MAX}$	No	Yes	22	-2	7
106	**Rated motor speed**	Depends on the choice of motor	100-60000 rpm	No	Yes	11	0	6
107	**Automatic motor adaptation, AMA**	Adaptation off		No	No	0	0	5
108	**Stator resistor**	Depends on the choice of motor		No	Yes	23	-4	7
109	**Stator reactance**	Depends on the choice of motor		No	Yes	23	-2	7
110	**Motor magnetizing, 0 rpm**	100 %	0 - 300 %	Yes	Yes	24	0	6
111	**Min. frequency normal magnetizing**	1.0 Hz	0.1 - 10.0 Hz	Yes	Yes	28	-1	6
112								
113	**Load compensation at low speed**	100 %	0 - 300 %	Yes	Yes	27	0	6
114	**Load compensation at high speed**	100 %	0 - 300 %	Yes	Yes	27	0	6
115	**Slip compensation**	100 %	-500 - 500 %	Yes	Yes	24	0	3
116	**Slip compensation time constant**	0.50 s	0.05 - 1.00 s	Yes	Yes	4	-2	6
117	**Resonance dampening**	100 %	0 - 500 %	Yes	Yes	27	0	6
118	**Resonance dampening time constant**	5 ms	5 - 50 ms	Yes	Yes	4	-3	6
119	**High starting torque**	0.0 sec.	0.0 - 0.5 s	Yes	Yes	4	-1	5
120	**Start delay**	0.0 sec.	0.0 - 10.0 s	Yes	Yes	4	-1	5
121	**Start function**	Coasting in start delay time		Yes	Yes	0	0	5
122	**Function at stop**	Coasting		Yes	Yes	0	0	5
123	**Min. frequency for activating function at stop**	0.0 Hz	0.0 - 10.0 Hz	Yes	Yes	28	-1	5
124	**DC holding current**	50 %	0 - 100 %	Yes	Yes	27	0	6
125	**DC braking current**	50 %	0 - 100 %	Yes	Yes	24	0	6
126	**DC braking time**	10.0 sec.	0.0 - 60.0 sec.	Yes	Yes	4	-1	6
127	**DC brake cut-in frequency**	0.0 Hz	0.0-parameter 202	Yes	Yes	28	-1	6
128	**Motor thermal protection**	No protection		Yes	Yes	0	0	5
129	**External motor fan**	No		Yes	Yes	0	0	5
130	**Start frequency**	0.0 Hz	0.0-10.0 Hz	Yes	Yes	28	-1	5
131	**Initial voltage**	0.0 Volt	0.0-parameter 103	Yes	Yes	21	-1	6

PNU #	Parameter description	Factory setting	Range	Online	4-Setup	Size index[1]	Conversion index[1]	Data type[2]
200	**Output frequency range/direction**	Only clockwise, 0-132 Hz	Hz	No	Yes	0	0	5
201	**Output frequency low limit**	0.0 Hz	0.0 - f_{MAX}	Yes	Yes	28	-1	6
202	**Output frequency high limit**	132 Hz	f_{MIN} - par. 200	Yes	Yes	28	-1	6
203	**Reference/feedback area**	Min - max		Yes	Yes	0	0	5
204	**Minimum reference**	0.000	-100,000.000-Ref_{MAX}	Yes	Yes	-1	-3	4
205	**Maximum reference**	50.000	Ref_{MIN}-100.000.000	Yes	Yes	-1	-3	4
206	**Ramp type**	Linear		Yes	Yes	0	0	5
207	**Ramp-up time 1**	Depends on unit	0.05 - 3600	Yes	Yes	4	-2	7
208	**Ramp-down time 1**	Depends on unit	0.05 - 3600	Yes	Yes	4	-2	7
209	**Ramp-up time 2**	Depends on unit	0.05 - 3600	Yes	Yes	4	-2	7
210	**Ramp-down time 2**	Depends on unit	0.05 - 3600	Yes	Yes	4	-2	7
211	**Jog ramp time**	Depends on unit	0.05 - 3600	Yes	Yes	4	-2	7
212	**Quick stop ramp-down time**	Depends on unit	0.05 - 3600	Yes	Yes	4	-2	7
213	**Jog frequency**	10.0 Hz	0.0 - par. 202	Yes	Yes	28	-1	6
214	**Reference function**	Sum		Yes	Yes	0	0	5
215	**Preset reference 1**	0.00 %	- 100.00 - + 100.00 %	Yes	Yes	24	-2	3
216	**Preset reference 2**	0.00 %	- 100.00 - + 100.00 %	Yes	Yes	24	-2	3
217	**Preset reference 3**	0.00 %	- 100.00 - + 100.00 %	Yes	Yes	24	-2	3
218	**Preset reference 4**	0.00 %	- 100.00 - + 100.00 %	Yes	Yes	24	-2	3
219	**Catch up/slow down value**	0.00 %	0.00 - + 100 %	Yes	Yes	24	-2	6
220								
221	**Torque limit for motor mode**	160 % of $T_{M,N}$	0.0 % - xxx %	Yes	Yes	24	-1	6
222	**Torque limit for regenerative operation**	10 %	0.0 % - xxx %	Yes	Yes	24	-1	6
223	**Warning: Low torque**	0.0 %	0.0 - par. 224	Yes	Yes	22	-1	6
224	**Warning: High torque**	$T_{M,N}$	Par. 223 - $I_{VLT,MAX}$	Yes	Yes	22	-1	6
225	**Warning: Low frequency**	0.0 Hz	0.0 - par. 226	Yes	Yes	28	-1	6
226	**Warning: High frequency**	132.0 Hz	Par. 225 - par. 202	Yes	Yes	28	-1	6
227	**Warning: Low feedback**	-4000.000	-100,000.000 - par. 228	Yes	Yes	-1	-3	4
228	**Warning: High feedback**	4000.000	Par. 227 - 100,000.000	Yes	Yes	-1	-3	4
229	**Frequency bypass, bandwidth**	0 (OFF) %	0 - 100 %	Yes	Yes	24	0	6
230	**Frequency bypass 1**	0.0 Hz	0.0 - par. 200	Yes	Yes	28	-1	6
231	**Frequency bypass 2**	0.0 Hz	0.0 - par. 200	Yes	Yes	28	-1	6
232	**Frequency bypass 3**	0.0 Hz	0.0 - par. 200	Yes	Yes	28	-1	6
233	**Frequency bypass 4**	0.0 Hz	0.0 - par. 200	Yes	Yes	28	-1	6

PNU #	Parameter description	Factory setting	Range	Online	4-Setup	Size index[1]	Conversion index[1]	Data type[2]
300	**Terminal 16, input**	Reset		Yes	Yes	0	0	5
301	**Terminal 17, input**	Freeze reference		Yes	Yes	0	0	5
302	**Terminal 18 Start, input**	Start		Yes	Yes	0	0	5
303	**Terminal 19, input**	Reversing		Yes	Yes	0	0	5
304	**Terminal 27, input**	Coasting stop, inverse		Yes	Yes	0	0	5
305	**Terminal 29, input**	Jog		Yes	Yes	0	0	5
306	**Terminal 32, input**	Choice of setup, msb/speed up		Yes	Yes	0	0	5
307	**Terminal 33, input**	Choice of setup, lsb/speed down		Yes	Yes	0	0	5
308	**Terminal 53, analogue input voltage**	Reference		Yes	Yes	0	0	5
309	**Terminal 53, min. scaling**	0.0 Volt	0.0 - 10.0 V	Yes	Yes	21	-1	5
310	**Terminal 53, max. scaling**	10.0 Volt	0.0 - 10.0 V	Yes	Yes	21	-1	5
311	**Terminal 54, analogue input voltage**	No operation		Yes	Yes	0	0	5
312	**Terminal 54, min. scaling**	0.0 Volt	0.0 - 10.0 V	Yes	Yes	21	-1	5
313	**Terminal 54, max. scaling**	10.0 Volt	0.0 - 10.0 V	Yes	Yes	21	-1	5
314	**Terminal 60, analogue input current**	Reference		Yes	Yes	0	0	5
315	**Terminal 60, min. scaling**	0.0 mA	0.0 - 20.0 mA	Yes	Yes	22	-4	5
316	**Terminal 60, max. scaling**	20.0 mA	0.0 - 20.0 mA	Yes	Yes	22	-4	5
317	**Time out**	10 sec.	1 - 99 sec.	Yes	Yes	4	0	5
318	**Function after time out**	Off		Yes	Yes	0	0	5
319	**Terminal 42, output**	0 - I_{MAX} ⇒ 0-20 mA		Yes	Yes	0	0	5
320	**Terminal 42, output, pulse scaling**	5000 Hz	1 - 32000 Hz	Yes	Yes	28	0	6
321	**Terminal 45, output**	0 - f_{MAX} ⇒ 0-20 mA		Yes	Yes	0	0	5
322	**Terminal 45, output, pulse scaling**	5000 Hz	1 - 32000 Hz	Yes	Yes	28	0	6
323	**Relay 01, output**	Ready - no thermal warning		Yes	Yes	0	0	5
324	**Relay 01, ON delay**	0.00 sec.	0.00 - 10.00 min	Yes	Yes	4	-2	6
325	**Relay 01, OFF delay**	0.00 sec.	0.00 - 10.00 min	Yes	Yes	4	-2	6
326	**Relay 04, output**	Ready - remote control		Yes	Yes	0	0	5
327	**Pulse reference, max. frequency**	5000 Hz		Yes	Yes	28	0	6
328	**Pulse feedback, max. frequency**	25000 Hz		Yes	Yes	28	0	6
329	**Encoder feedback pulse/rev.**	1024 pulses/rev.	1 - 4096 pulses/rev.	Yes	Yes	0	0	6

PNU #	Parameter description	Factory setting	Range	Online	4-Setup	Size index[1]	Conversion index[1]	Data type[2]
400	**Brake function**	Off		Yes	No	0	0	5
401	**Brake resistor, ohm**	Depends on the unit		Yes	No	23	-1	6
402	**Brake power limit, kW**	Depends on the unit		Yes	No	9	2	6
403	**Power monitoring**	On		Yes	No	0	0	5
404	**Brake check**	Off		Yes	No	0	0	5
405	**Reset function**	Manual reset		Yes	Yes	0	0	5
406	**Automatic restart time**	5 sec.	0 - 10 sec.	Yes	Yes	4	0	5
407	**Mains Failure**	No function		Yes	Yes	0	0	5
408	**Quick discharge**	Not possible		Yes	Yes	0	0	5
409	**Trip delay torque**	OFF	0 - 60 sec.	Yes	Yes	4	0	5
410	**Trip delay-inverter**	Depends on type of unit	0 - 35 sec.	Yes	Yes	4	0	5
411	**Switching frequency**	Depends on the unit output.	3 - 5 kHz	Yes	Yes	28	2	6
412	**Output frequency dependent switching frequency**	Not possible		Yes	Yes	0	0	5
413	**Overmodulation function**	On		Yes	Yes	0	-1	5
414	**Minimum feedback**	0.000	-100,000.000 - FB_{HIGH}	Yes	Yes	-1	-3	4
415	**Maximum feedback**	1500.000	FB_{LOW} - 100,000.000	Yes	Yes	-1	-3	4
416	**Process unit**	%		Yes	Yes	0	0	5
417	**Speed PID proportional gain**	0.015	0.000 - 0.150	Yes	Yes	0	-3	6
418	**Speed PID integral time**	8 ms	2.00 - 999.99 ms	Yes	Yes	4	-4	7
419	**Speed PID differential time**	30 ms	0.00 - 200.00 ms	Yes	Yes	4	-4	6
420	**Speed PID D-gain limit**	5.0	5.0 - 50.0	Yes	Yes	0	-1	6
421	**Speed PID lowpass filter time**	10 ms	5 - 200 ms	Yes	Yes	4	-4	6
422	**U 0 voltage at 0 Hz**	20.0 Volt	0.0 - parameter 103	Yes	Yes	21	-1	6
423	**U 1 voltage**	parameter 103	0.0 - $U_{VLT, MAX}$	Yes	Yes	21	-1	6
424	**F 1 frequency**	parameter 104	0.0 - parameter 426	Yes	Yes	28	-1	6
425	**U 2 voltage**	parameter 103	0.0 - $U_{VLT, MAX}$	Yes	Yes	21	-1	6
426	**F 2 frequency**	parameter 104	parameter 424- parameter 428	Yes	Yes	28	-1	6
427	**U 3 voltage**	parameter 103	0.0 - $U_{VLT, MAX}$	Yes	Yes	21	-1	6
428	**F 3 frequency**	parameter 104	parameter 426 - parameter 430	Yes	Yes	28	-1	6
429	**U 4 voltage**	parameter 103	0.0 - $U_{VLT, MAX}$	Yes	Yes	21	-1	6
430	**F 4 frequency**	parameter 104	parameter 428- parameter 432	Yes	Yes	28	-1	6
431	**U 5 voltage**	parameter 103	0.0 - $U_{VLT, MAX}$	Yes	Yes	21	-1	6
432	**F 5 frequency**	parameter 104	parameter 430 - 1000 Hz	Yes	Yes	28	-1	6
433	**Torque proportional gain**	100%	0 (Off) - 500%	Yes	Yes	24	0	6
434	**Torque integral time**	0.02 sec.	0.002 - 2.000 sec.	Yes	Yes	4	-3	7
437	**Process PID Normal/inverse control**	Normal		Yes	Yes	0	0	5
438	**Process PID anti windup**	On		Yes	Yes	0	0	5
439	**Process PID start frequency**	parameter 201	f_{MIN} - f_{MAX}	Yes	Yes	28	28	6
440	**Process PID proportional gain**	0.01	0.00 - 10.00	Yes	Yes	0	0	6
441	**Process PID integral time**	OFF	0.01 - 9999.99 sec.	Yes	Yes	4	4	7
442	**Process PID differentiation time**	0.00 sec. (OFF)	0.00 - 10.00 sec.	Yes	Yes	4	4	6
443	**Process PID diff. gain limit**	5.0	5.0 - 50.0	Yes	Yes	0	0	6
444	**Process PID lowpass filter time**	0.01	0.01 - 10.00	Yes	Yes	4	4	6
445	**Flying start**	off		Yes	Yes	0	0	5
446	**Switching pattern**	Automatic		Yes	Yes	0	0	5

PNU #	Parameter description	Factory setting	Range	Online	4-Setup	Size index[1]	Conversion index[1]	Data type[2]
500	**Address**	1	0 - 126	Yes	No	0	0	6
501	**Baudrate**	9600 Baud		Yes	No	0	0	5
502	**Coasting**	Logic or		Yes	Yes	0	0	5
503	**Quick-stop**	Logic or		Yes	Yes	0	0	5
504	**DC-brake**	Logic or		Yes	Yes	0	0	5
505	**Start**	Logic or		Yes	Yes	0	0	5
506	**Reversing**	Logic or		Yes	Yes	0	0	5
507	**Selection of setup**	Logic or		Yes	Yes	0	0	5
508	**Selection of speed**	Logic or		Yes	Yes	0	0	5
509	**Bus jog 1**	10.0 Hz	0.0 - parameter 202	Yes	Yes	28	-1	6
510	**Bus jog 2**	10.0 Hz	0.0 - parameter 202	Yes	Yes	28	-1	6
511								
512	**Telegram profile**	Danfoss		No	Yes	0	0	5
513	**Bus time interval**	1 sec.	1 - 99 s	ja	Yes	4	0	5
514	**Bus time interval function**	Off		ja	Yes	0	0	5
515	**Data read-out: Reference %**			No	Yes	24	-1	3
516	**Data read-out: Reference unit**			No	Yes	-1	-3	4
517	**Data read-out: Feedback**			No	Yes	-1	-3	4
518	**Data read-out: Frequency**			No	Yes	28	-1	6
519	**Data read-out: Frequency x Scaling**			No	Yes	0	-2	7
520	**Data read-out: Current**			No	Yes	22	-2	7
521	**Data read-out: Torque**			No	Yes	24	-1	3
522	**Data read-out: Power, kW**			No	Yes	9	-1	7
523	**Data read-out: Power, HP**			No	Yes	9	-2	7
524	**Data read-out: Motor voltage**			No	Yes	21	-1	6
525	**Data read-out: DC link voltage**			No	Yes	21	0	6
526	**Data read-out: Motor temp.**			No	Yes	24	0	5
527	**Data read-out: VLT temp.**			No	Yes	24	0	5
528	**Data read-out: Digital input**			No	Yes	0	0	5
529	**Data read-out: Terminal 53, analogue input**			No	Yes	21	-1	3
530	**Data read-out: Terminal 54, analogue input**			No	Yes	21	-1	3
531	**Data read-out: Terminal 60, analogue input**			No	Yes	22	-4	3
532	**Data read-out: Pulse reference**			No	Yes	28	-1	7
533	**Data read-out: External reference %**			No	Yes	24	-1	3
534	**Data read-out: Status word, binary**			No	Yes	0	0	6
535	**Data read-out: Brake power/2 min.**			No	Yes	9	2	6
536	**Data read-out: Brake power/sec.**			No	Yes	9	2	6
537	**Data read-out: Heat sink temperature**			No	Yes	17	0	5
538	**Data read-out: Alarm word, binary**			No	Yes	0	0	7
539	**Data read-out: VLT control word, binary**			No	Yes	0	0	6
540	**Data read-out: Warning word, 1**			No	Yes	0	0	7
541	**Data read-out: Warning word, 2**			No	Yes	0	0	7

PNU #	Parameter-description	Factory setting	Range	Online	4-Setup	Size index[1]	Conversion index[1]	Data type[2]
600	**Operating data: Operating hours**			No	No	4	73	7
601	**Operating data: Hours run**			No	No	4	73	7
602	**Operating data: kWh counter**			No	No	8	2	7
603	**Operating data: Number of power-up's**			No	No	0	0	6
604	**Operating data: Number of overtemperatures**			No	No	0	0	6
605	**Operating data: Number of overvoltages**			No	No	0	0	6
606	**Data log: Digital input**			No	No	0	0	5
607	**Data log: Bus commands**			No	No	0	0	6
608	**Data log: Bus status word**			No	No	0	0	6
609	**Data log: Reference**			No	No	24	-1	3
610	**Data log: Feedback**			No	No	0	-3	4
611	**Data log: Motor frequency**			No	No	28	-1	3
612	**Data log: Motor voltage**			No	No	21	-1	6
613	**Data log: Motor current**			No	No	22	-2	3
614	**Data log: DC link voltage**			No	No	21	0	6
615	**Fault log: Error code**			No	No	0	0	5
616	**Fault log: Time**			No	No	0	0	7
617	**Fault log: Value**			No	No	0	0	3
618	**Reset of kWh counter**	No reset		Yes	No	0	0	5
619	**Reset of hours-run counter**	No reset		Yes	No	0	0	5
620	**Operating mode Normal function**	Normal function		Yes	No	0	0	5
621	**Nameplate: VLT type**			No	No	0	0	9
622	**Nameplate: Power section**			No	No	0	0	9
623	**Nameplate: VLT ordering number**			No	No	0	0	9
624	**Nameplate: Software version no.**	10,00		No	No	0	0	9
625	**Nameplate: LCP identification no.**			No	No	0	0	9
626	**Nameplate: Database identification no.**			No	No	0	-2	9
627	**Nameplate: Power section identification no.**			No	No	0	0	9
628	**Nameplate: Application option type**			No	No	0	0	9
629	**Nameplate: Application option ordering no.**			No	No	0	0	9
630	**Nameplate: Communication option type**			No	No	0	0	9
631	**Nameplate: Communication option ordering no.**			No	No	0	0	9