MOELLER

Quick Reference Guide

DV5-...
Vector Frequency Inverters

02/02 AWB8230-1448GB

1st published 2002, edition 02/02

Author: Holger Friedrich
Editor: Michael Kämper
Translator: Dominik Kreuzer

Quick Reference Guide DV5 Frequency Inverter

Keypad

The following illustration shows the LCD keypad of the DV5.

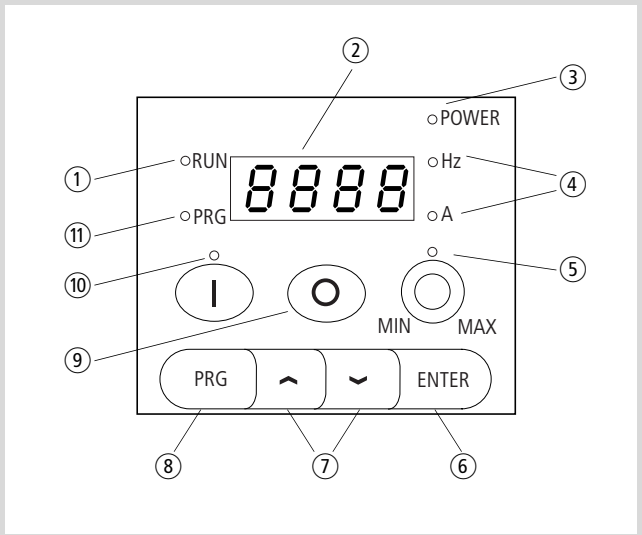


Figure 1: Keypad view

For an explanation of each of the elements, → table 1.

Table 1: Explanation of the operating and indication elements

Number	Name	Explanation
①	RUN LED	LED lights up in **RUN mode** if the frequency inverter is ready for operation or operational.
②	7 segment display	Display for frequency, motor current, fault messages, etc.
③	POWER LED	LED is lit when the frequency inverter has power.
④	Hz or A LED	Indication in ②: Output frequency (Hz) or output current (A)
⑤	Potentiometer and LED	Frequency setpoint setting LED is lit when the potentiometer is activated.
⑥	ENTER key ENTER	This key is used for saving entered or changed parameters.
⑦	Arrow keys ^ v	Selecting functions, changing numeric values ^ Increase v Reduce
⑧	PRG key PRG	For selecting and exiting the programming mode.
⑨	OFF key O	Stops the running motor and acknowledges a fault message. Active by default, also when actuation is through terminals. This key is used for saving entered or changed parameters.
⑩	On key and LED I	Starts the motor in the specified direction (not active by default).
⑪	PRG LED	LED is lit during parameterization. For selecting and exiting the programming mode.

Using the keypad

Example for changing over the control mode from control signal terminals (default) to the keypad.

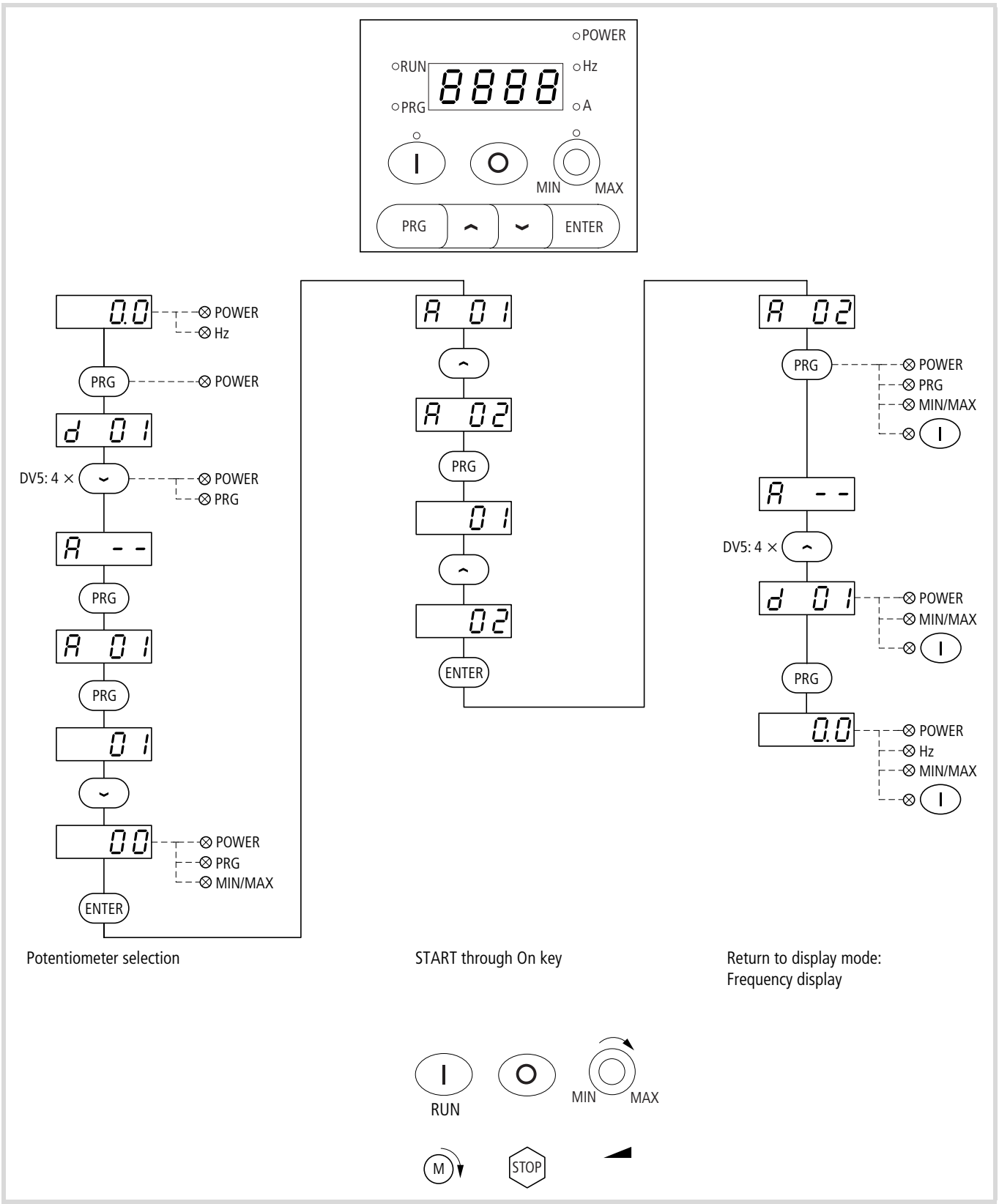


Figure 2: Specify setpoint definition through keypad

Restoring the Default Settings

Initialization

Two different types of initialization are available:

- Clearing the fault history register
- Restoring the default parameter settings

To delete the fault history register or to restore the default settings, proceed as follows:

▶ Make sure that PNU b85 holds the value.
▶ Under PNU b84 (initialization), enter 00 or 01.
▶ Press the ENTER key to save the value.
▶ On the keypad, press both arrow keys and the PRG key at the same time and keep them pressed.
▶ While holding the arrow and PRG keys, briefly press the OFF key.
▶ Keep the other three keys pressed for three further seconds until the following flashing display appears: d 00.
▶ Now release all keys again.

Initialization is now complete.

PNU	Name	Adjustable in RUN mode	Value	Function	Def.
b84	Initialization	–	00	Clearing the fault history register	00
			01	Restoring the default parameter settings	

Country version

Here, you define the country-specific parameter set which will be loaded during initialization (→ PNU b84).

PNU	Name	Adjustable in RUN mode	Value	Function	Def.
b85	Country version	–	00	Japan	01
			01	Europe	
			02	USA	
			03	Reserved	

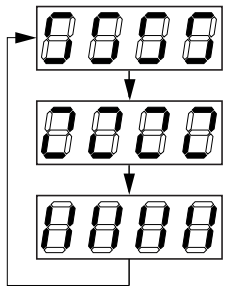
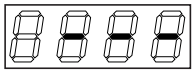
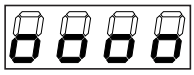
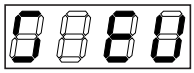
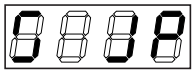
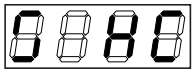
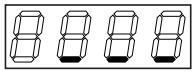
Fault messages

When an overcurrent, overvoltage or undervoltage occurs, the output of the DV5 frequency inverter is disabled to protect the DV5 from damage. The connected motor then coasts to a stop. The inverter remains in this condition until the fault message is acknowledged with the OFF key or the RST input.

Display	Cause	Description
E 01	Overcurrent in the output stage in static operation	If the output current reaches an excessive level, the output voltage is switched off. This happens when • the frequency inverter's output is short-circuited, • the motor is blocked, • an excessive load is suddenly applied to the output.
E 02	Overcurrent in the output stage during deceleration	
E 03	Overcurrent in the output stage during acceleration	
E 04	Overcurrent in the output stage at standstill	
E 05	Overload	The internal electronic motor protection has switched off the output voltage because the motor was overloaded.
E 06	Overload	If the duty factor of the built-in braking transistor of the DV5 is too great, the braking transistor is switched off (the generated overvoltage disconnects the output voltage).
E 07	Overvoltage	The output voltage has been switched off because the motor was operating regeneratively.
E 08	EEPROM fault	If the program memory does not operate reliably due to radio frequency interference or excessive temperature, the output voltage is switched off. If the supply voltage is switched off while the RST input is active, an EEPROM fault occurs when the supply voltage is reapplied.
E 09	Undervoltage	If the DC voltage is too low, the output voltage is switched off (fault-free function of electronics no longer possible; any problems, such as overheating of motor and insufficient torque).
E 10	Fault in current transformer	The output voltage is disconnected when a fault occurs in the built-in current transformer of the DV5.
E 11	Processor malfunction	The processor does not operate correctly. The output voltage is switched off.
E 12	External fault message	The output voltage is switched off due to an external fault message which is present on a digital input configured as an EXT input.
E 13	Restart inhibit activated	The mains voltage was switched on or an intermittent interruption in the supply voltage has occurred while unattended start protection (input USP) was active.
E 14	Earth fault	Earth faults between the U, V or W terminals and earth are being reliably detected. A protective circuit prevents destruction of the frequency inverter, but does not protect the operating personnel.
E 15	Mains overvoltage	If the supply voltage is higher than permitted, the output voltage is switched off 100 seconds after the voltage supply has been switched on.
E 21	Overtemperature	If the temperature sensor installed in the power section records an operating temperature above the permissible limit value, the output voltage is switched off.
E 22	Processor malfunction	The processor does not operate correctly. The output voltage is switched off.
E 35	PTC fault signal	If the resistance of the external PTC thermistor connected to the PTC input (digital input configured as a PTC thermistor input) is too high, the output voltage is switched off.
...U	Wait state	The frequency inverter is in a wait state because the input voltage is too low.

Other messages

This section describes the messages issued by the DV5 frequency inverter, for example in standby mode when mains power is switched off.

Display	Cause
	The frequency inverter is in standby mode or a reset signal is active.
	The mains voltage has been switched off.
	The waiting time before an automatic restart is counting down (PNU b01 and b03, → AWB8230-1414GB section "Automatic restart after a fault", page 101).
  	The default settings have been selected and the frequency inverter is in the initialization phase (PNU b84 and b85, → AWB8230-1414GB section "Initialization", page 105). The values for the European market (EU) are being initialized. For non-European models, versions for North America (USA) and Japan (JP) are available.
	Initialization of the fault history register
	Copy station – copying in progress.
	No data available, e.g. display under PNU d81 and d86, when the fault history register is empty the display under PNU d04, when PID control is not active.

Standard form for user defined parameter settings

The DV5 frequency inverters have programmable parameters. For a detailed description of the parameters, see the specified page in the manual (AWB8230-1414GB). In the free Setpoint columns below, you can list the changes you have made to the default settings.

PNU	Meaning	Value range	Def.	Setpoint		
A01	Frequency setpoint input	• 00: Potentiometer • 01: Input O/OI • 02: PNU F01 or A20	01			
A02	Start signal definition	• 01: Input FWD/REV • 02: ON key	01			
A03	Base frequency	50 to 360 Hz	50			
A203	Base frequency (second parameter set)	50 to 360 Hz	50			
A04	Maximum end frequency	50 to 360 Hz	50			
A204	End frequency (second parameter set)	50 to 360 Hz	50			
A11	Frequency with minimum setpoint value	0 to 360 Hz	0			
A12	Frequency with maximum setpoint value	0 to 360 Hz	0			
A13	Minimum setpoint value	0 to 100 %	0			
A14	Maximum setpoint value	0 to 100 %	100			
A15	Starting frequency	• 00: Apply PNU A11 to motor • 01: Apply 0 Hz to motor	01			
A16	Analog input filter time constant	0 to 8	8			
A20	Frequency setpoint definition PNU A01 must be 02	0.5 to 360 Hz	0.0			
A220	Frequency setpoint definition; PNU A01 must be 02 (second parameter set)	0.5 to 360 Hz	0.0			
A21	1st fixed frequency	0.5 to 360 Hz	0.0			
A22	2nd fixed frequency	0.5 to 360 Hz	0.0			
A23	3rd fixed frequency	0.5 to 360 Hz	0.0			
A24	4th fixed frequency	0.5 to 360 Hz	0.0			
A25	5th fixed frequency	0.5 to 360 Hz	0.0			
A26	6th fixed frequency	0.5 to 360 Hz	0.0			
A27	7th fixed frequency	0.5 to 360 Hz	0.0			
A28	8th fixed frequency	0.5 to 360 Hz	0.0			
A29	9th fixed frequency	0.5 to 360 Hz	0.0			
A30	10th fixed frequency	0.5 to 360 Hz	0.0			
A31	11th fixed frequency	0.5 to 360 Hz	0.0			
A32	12th fixed frequency	0.5 to 360 Hz	0.0			
A33	13th fixed frequency	0.5 to 360 Hz	0.0			
A34	14th fixed frequency	0.5 to 360 Hz	0.0			
A35	15th fixed frequency	0.5 to 360 Hz	0.0			
A38	Frequency in jog mode	0.5 to 9.99 Hz	1.0			

PNU	Meaning	Value range	Def.	Setpoint		
A39	Motor stop in jog mode through	• 00: Coasting • 01: Deceleration ramp • 02: DC braking	00			
A41	Voltage boost characteristics	• 00: Manual • 01: Automatic	00			
A241	Boost characteristic (second parameter set)	• 00: Manual • 01: Automatic	00			
A42	Percentage voltage increase with manual boost	0 to 99 %	11			
A242	Percentage voltage increase on manual boost (second parameter set)	0 to 99 %	11			
A43	Maximum boost at x % of the base frequency	0 to 50 %	10.0			
A243	Maximum boost at x % of the base frequency (second parameter set)	0 to 50 %	10.0			
A44	*U/f* characteristic	• 00: Constant torque curve • 01: Reduced torque curve • 02: SLV control active	00			
A244	*U/f* characteristic (second parameter set)	• 00: Constant torque curve • 01: Reduced torque curve • 02: SLV control active	00			
A45	Output voltage	50 to 100 %	100			
A51	DC braking	• 00: Inactive • 01: Active	00			
A52	DC braking starting frequency	0.5 to 10 Hz	0.5			
A53	DC braking waiting time	0.0 to 5 s	0.0			
A54	DC braking torque	0 to 100 %	0			
A55	DC braking duration	0.0 to 60 s	0.0			
A61	Maximum operating frequency	0.5 to 360 Hz	0.0			
A62	Minimum operating frequency	0.5 to 360 Hz	0.0			
A63	1st frequency jump	0.1 to 360 Hz	0.0			
A64	Jump width of the 1st frequency jump	0.1 to 10 Hz	0.5			
A65	2nd frequency jump	0.1 to 360 Hz	0.0			
A66	Jump width of the 2nd frequency jump	0.1 to 10 Hz	0.5			
A67	3rd frequency jump	0.1 to 360 Hz	0.0			
A68	Jump width of the 3rd frequency jump	0.1 to 10 Hz	0.5			
A71	PID control	• 00: Inactive • 01: Active	00			
A72	P component of the PID control	0.2 to 50	1.0			
A73	I component of the PID control	0.0 to 150 s	1.0			
A74	D component of the PID control	0.0 to 100 s	0.0			
A75	Setpoint factor of the PID control	0.01 to 99.99	1.00			
A76	Input actual value signal for PID control	• 00: Input OI • 01: Input O	00			

PNU	Meaning	Value range	Def.	Setpoint		
A81	AVR function	• 00: Active • 01: Inactive • 02: Inactive during deceleration	02			
A82	Motor voltage for AVR function	• 200, 220, 230, 240 V • 380, 400, 415, 440, 460 V	230/ 400			
A92	2nd acceleration time	0.1 to 3000 s	15.0			
A292	2nd acceleration time (second parameter set)	0.1 to 3000 s	15.0			
A93	2nd deceleration time	0.1 to 3000 s	15.0			
A293	2nd deceleration time (second parameter set)	0.1 to 3000 s	15.0			
A94	Changeover from 1st to 2nd time ramp	• 00: Input 2CH • 01: PNU A95 or A96	00			
A294	Changeover from 1st to 2nd time ramp (second parameter set)	• 00: Input 2CH • 01: PNU A95 or A96	00			
A95	Changeover frequency on changeover from first to second acceleration time	0.0 to 360 Hz	0.0			
A295	Changeover frequency on changeover from first to second acceleration time (second parameter set)	0.0 to 360 Hz	0.0			
A96	Changeover frequency on changeover from first to second deceleration time	0.0 to 360 Hz	0.0			
A296	Changeover frequency on changeover from first to second deceleration time (second parameter set)	0.0 to 360 Hz	0.0			
A97	Acceleration characteristic	• 00: Linear • 01: S curve	00			
A98	Deceleration characteristic	• 00: Linear • 01: S curve	00			

PNU	Meaning	Value range	Def.	Setpoint	
b01	Restart mode	• 00: Fault message • 01: 0 Hz start • 02: Synchronization to current motor speed and acceleration • 03: Synchronization and deceleration	00		
b02	Permissible power failure duration	0.3 to 25 s	1.0		
b03	Waiting time before restart	0.3 to 100 s	1.0		
b12	Tripping current for electronic motor protection device	0.5 to 1.2 × I_e [A]	I_e (inverter)		
b212	Tripping current for electronic motor protection device (second parameter set)	0.5 to 1.2 × I_e [A]	I_e (inverter)		
b13	Characteristic for electronic motor protection device	• 00: Enhanced protection • 01: Normal protection	01		
b213	Characteristic for electronic motor protection device (second parameter set)	• 00: Enhanced protection • 01: Normal protection	01		

PNU	Meaning	Value range	Def.	Setpoint	
b21	Motor current limitation	• 00: Inactive • 01: Active in every operating status • 02: Inactive during acceleration, otherwise active	01		
b22	Tripping current for motor current limitation	0.5 to 1.5 × I_e [A]	I_e × 1.25		
b23	Time constant of motor current limitation	0.1 to 30 Hz/s	1.0		
b31	Software dependent parameter protection	• 00: Through SFT input; all functions inhibited • 01: Through SFT input; function F01 possible • 02: Without SFT input; all functions inhibited • 03: Without SFT input; function F01 possible	01		
b32	Magnetizing current	0 to 1.4 × I_e [A]	I_e × 0.58		
b81	Voltmeter compensating value for FM terminal	0 to 255	80		
b82	Increased starting frequency (e.g. with high level of friction)	0.5 to 9.9 Hz	0.5		
b83	Pulse frequency	0.5 to 16 kHz	5.0		
b84	Initialization causes	• 00: Clearing the fault signal register • 01: Selection of default settings (default)	00		
b85	Operating system	• 00: Japan • 01: European version • 02:USA • 03: Reserved	01		
b86	Frequency factor for display through PNU d07	0.1 to 99.9	1.0		
b87	OFF key	• 00: Always active • 01: Not active with control through the FWD/REV terminals	00		
b88	Motor restart after removal of the FRS signal	• 00: At 0 Hz • 01: At current motor speed	00		
b89	Indication when a remote control device is used	• 01: Actual frequency • 02: Motor current • 03: Direction of rotation • 04: PID actual value • 05: Status of the digital inputs • 06: Status of the digital outputs • 07: Actual frequency times frequency factor	01		
b90	Permissible relative percentage duty factor for built-in braking device	0 to 100 %	00		
b91	Type of motor stop when Off button is pressed	• 00: Braking/deceleration ramp • 01: Free run stop (coasting)	00		
b92	Configuration of fan operation	• 00: Fan always switched on • 01: Fan switched on only when motor running	00		

PNU	Meaning	Value range	Def.	Setpoint	
C01	Function of digital input 1	• 00: FWD, clockwise operation • 01: REV, anticlockwise operation • 02: FF1, first fixed frequency input • 03: FF2, second fixed frequency input • 04: FF3, third fixed frequency input • 05: FF4, fourth fixed frequency input • 06: JOG, jog mode • 07: DB, DC braking • 08: SET, second parameter set • 09: 2CH, second time ramp • 11: FRS, controller inhibit • 12: EXT, external fault • 13: USP, unattended start protection • 15: SFT, parameter protection • 16: AT, input OI is used • 18: RST, reset • 19: PTC, PTC thermistor input (digital input 5 only) • 27: UP, remote access/acceleration • 28: DWN, remote access/deceleration	00		
C02	Function of digital input 2	Values → PNU C01	01		
C03	Function of digital input 3	Values → PNU C01	02		
C04	Function of digital input 4	Values → PNU C01	03		
C05	Function of digital input 5	Values → PNU C01	18		
C06	Function of digital input 6	Values → PNU C01	09		
C11	Digital input 1	• 00: Make contact • 01: Break contact	00		
C12	Digital input 2	Values → PNU C11	00		
C13	Digital input 3	Values → PNU C11	00		
C14	Digital input 4	Values → PNU C11	00		
C15	Digital input 5	Values → PNU C11	00		
C16	Digital input 6	Values → PNU C11	00		
C21	Signal on digital output 11	• 00: RUN signal • 01: FA1, frequency reached • 02: FA2, frequency exceeded • 03: OL, Overload • 04: OD, PID deviation exceeded • 05: AL, fault	01		
C22	Signal on digital output 12	Values → PNU C21	00		
C23	Indication through FM output	• 00: Frequency, analog • 01: Motor current, analog • 02: Output frequency pulse signal	00		
C24	Signal at relay output K11-K12	Values → PNU C21	00		
C31	Digital output 11	• 00: Make contact • 01: Break contact	01		
C32	Digital output 12	• 00: Make contact • 01: Break contact	01		
C33	Relay output K11-K12 (signalling relay)	• 00: Make contact • 01: Break contact	01		

PNU	Meaning	Value range	Def.	Setpoint
C41	Threshold for overload alarm at digital outputs 11 and 12	0 to 2 × I_e [A]	I_e	
C42	Frequency from which FA2 is switched on during acceleration	0 to 360 Hz	0.0	
C43	Frequency from which FA2 is switched off during deceleration	0 to 360 Hz	0.0	
C44	PID control deviation (from the maximum set point value)	0 to 100 %	3.0	
C81	Compensation of setpoint signal at terminal O	0 to 255	Depending on inverter model	
C82	Compensation of setpoint signal at terminal OI	0 to 255		
C91 to C95	Reserved	Reserved	Do not change the values of these parameters.	

PNU	Meaning	Value range	Setpoint
d01	Output frequency display	–	
d02	Output current display	–	
d03	Direction of rotation display	–	
d04	PID feedback display	–	
d05	Status of digital inputs 1 to 6	–	
d06	Status of digital outputs 11 and 12	–	
d07	Scaled output frequency	–	
d08	Display of last alarm	–	
d09	Display of second and third from last alarm	–	

PNU	Meaning	Value range	Def.	Setpoint
F01	Frequency setpoint value	0.5 to 360 Hz	0.0	
F02	Acceleration time 1	0.1 to 3000 s	10.0	
F202	Acceleration time 1 (second parameter set)	0.1 to 3000 s	10.0	
F03	Deceleration time 1	0.1 to 3000 s	10.0	
F203	Deceleration time 1 (second parameter set)	0.1 to 3000 s	10.0	
F04	Direction of rotation	• 00: Right • 01: Left	00	

PNU	Meaning	Value range	Def.	Setpoint	
H01	Autotuning mode	• 00: Autotuning not active • 01: Autotuning/motor operation • 02: Autotuning/motor standstill	00		
H02	Selection of motor data	• 00: Standard motor • 01: Use autotuning data	00		
H202	Selection of motor data (second parameter set)	• 00: Standard motor • 01: Use autotuning data	00		
H03	Motor rating	0.18; 0.37; 0.75; 1.5; 2.2; 3.7 kW	Depending on inverter model		
H203	Motor rating (second parameter set)	0.18; 0.37; 0.75; 1.5; 2.2; 3.7 kW			
H04	Number of motor poles	2, 4, 6, 8	4		
H204	Number of motor poles (second parameter set)	2, 4, 6, 8	4		
H05	Motor constant K_p	0 to 99	20		
H205	Motor constant K_p (second parameter set)	0 to 99	20		
H06	Motor stabilization constant	0 to 255	100		
H206	Motor stabilization constant (second parameter set)	0 to 255	100		
H20	Motor constant R_1	0 to 65 Ω	Depending on inverter model		
H220	Motor constant R_1 (second parameter set)	0 to 65 Ω			
H21	Motor constant R_2	0 to 65 Ω			
H221	Motor constant R_2 (second parameter set)	0 to 65 Ω			
H22	Motor constant L	0 to 65.5 mH			
H222	Motor constant L (second parameter set)	0 to 65.5 mH			
H23	Motor constant I_0	0 to 65.5 A			
H223	Motor constant I_0 (second parameter set)	0 to 65.5 A			
H24	Motor constant J	1.0 to 1000			
H224	Motor constant J (second parameter set)	1.0 to 1000			
H30	Autotuning: Motor constant R_1	–		Do not change these parameters!	
H230	Autotuning: Motor constant R_1 (second parameter set)	–			
H31	Autotuning: Motor constant R_2	–			
H231	Autotuning: Motor constant R_2 (second parameter set)	–			
H32	Autotuning: Motor constant L	–			
H232	Autotuning: Motor constant L (second parameter set)	–			
H33	Autotuning: Motor constant I_0	–			
H233	Autotuning: Motor constant I_0 (second parameter set)	–			
H34	Autotuning: Motor constant J	–			
H234	Autotuning: Motor constant J (second parameter set)	–			