

8 Parameters

8.1 Overview of parameters

8.1.1 Standard parameters

Parameter	Description	Range of values	Factory setting	Brief description
Speed limits				
P-01	Maximum speed	P-02 to 5 × P-09 but max. 500 Hz (default, P-10 = 0) Or P-02 to 5×P-10, but max. 30,000 rpm (P-10>0)	50 Hz ¹⁾	This is the upper speed limit in Hz or rpm, see P-10.
P-02	Minimum speed	0 – P-01	0 Hz	This is the upper speed limit in Hz or rpm, see P-10.
Ramps				
P-03	Acceleration ramp	0 – 600 s	5 s	Acceleration ramp time in seconds. The ramp time is based on a setpoint step change of 0 – 50 Hz (1500 rpm).
P-04	Deceleration ramp	0 – 600 s	5 s	Deceleration ramp time in seconds. The ramp time is based on a setpoint step change of 50 Hz (1500 rpm) – 0 Hz.
P-05	Stop mode selection	0 – 3 See "Advanced parameter description" (→ 65).	0	Defines the deceleration behavior of the drive for normal operation and power failure.
P-06	Energy saving function	0: off 1: on	0	When active, this function automatically reduces the applied motor voltage in the case of light loads. In this case, the smallest possible motor voltage is 50% of the nominal voltage.
Nominal motor data				
P-07	Nominal motor voltage	0 – 250 V ²⁾ 0 – 500 V (for 400 V units)	230 V ²⁾ 400 V ³⁾	Nominal voltage according to motor nameplate. With P-07 = "0", voltage compensation is deactivated. See "Advanced parameter description" (→ 65).
P-08	Nominal motor current	25 – 100% of frequency inverter output current	DR.. motor specification	Rated motor current of motor according to nameplate.
P-09	Rated motor frequency	25 – 500 Hz	50 Hz	Nominal frequency of motor according to nameplate.
P-10	Nominal motor speed	0 – 30,000 rpm	0	0 = slip compensation deactivated + display of all parameters in Hz 1 = slip compensation active + display of all parameters in rpm See "Advanced parameter description" (→ 65).
P-11	Additional voltage/boost	0 – 20% of max. output voltage (resolution 0.1%) • Size 1: max. 20% • Size 2: max. 15% • Size 3: max. 10%	Depending on frequency inverter power rating	Raises the output voltage of the frequency inverter by a scalable value at low speeds to enable higher torque development of the motor in this speed range. See "Advanced parameter description" (→ 66).
P-12	Control signal source	0 – 6	0 (terminal control)	See "Advanced parameter description" (→ 66).
P-13	Error log	The 4 most recent errors are logged.	No error	The last 4 errors are saved in chronological order. The most recent error is displayed first. You can view the saved errors by pressing the <Up/Down> key. See section "Error codes" (→ 59).
P-14	Advanced menu access code	0 – 9999	0	101: (standard) for advanced menu access. Change the code in P-37 to prevent unauthorized access to the advanced parameter set.

1) 60 Hz (American variant only)

2) For 230 V and 115 V units

3) 460 V (American variant only)

8.1.2 Advanced parameters

Parameter	Description	Range of values	Factory setting	Brief description
P-15	Digital input function setting	0 – 12	0	Specifies the functions of the digital inputs. See section "P-15 Functions of the binary inputs" (→ 76).
P-16	Analog input V/mA	0 – 10 V, b 0 – 10 V, 0 – 20 mA t 4 – 20 mA, r 4 – 20 mA t 20 – 4 mA, r 20 – 4 mA	0 – 10 V	Configures the format of the analog input. See "Advanced parameter description" (→ 67).
P-17	Pulse-width-modulated switching frequency (PWM)	2 – 16 kHz, depending on nominal inverter power	Depending on nominal inverter power	See "Advanced parameter description" (→ 68).
User relay				
P-18	Selection of user relay output	0 – 7	1 (inverter OK)	Selects the function of the user relay output. See "Advanced parameter description" (→ 68).
P-19	Relay threshold level	0 – 200% of maximum speed <i>P-01</i> or nominal motor current <i>P-08</i>	100%	Specifies the limit value for <i>P-18</i> and <i>P-25</i> .
Setpoint speeds				
P-20	Fixed setpoint speed 1	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 1 if <i>P-10</i> > 0 Entry in rpm
P-21	Fixed setpoint speed 2	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 2 if <i>P-10</i> > 0 Entry in rpm
P-22	Fixed setpoint speed 3	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 3 if <i>P-10</i> > 0 Entry in rpm
P-23	Fixed setpoint speed 4	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Internal setpoint for speed 4 if <i>P-10</i> > 0 Entry in rpm
P-24	Deceleration ramp 2	0 – 25 s	0 s	Via digital input or in the event of power failure according to <i>P-05</i> .
AO/DO				
P-25	Function selection analog output	0 – 9	8	Selects the function of the analog output. See "Advanced parameter description" (→ 69).
Speed skip function				
P-26	Speed skip function, frequency band	0 – <i>P-01</i>	0 Hz	Size of frequency band to be skipped. See "Advanced parameter description" (→ 69).
P-27	Skip center	<i>P-02</i> (min.) – <i>P-01</i> (max.)	0 Hz	Skip center See "Advanced parameter description" (→ 69).
Adjustment of V/f characteristic curves				
P-28	Adjustment of V/f characteristic curves (voltage value)	0 – <i>P-07</i>	0 V	V/f characteristic curve adjustment – voltage value of new operating point. See "Advanced parameter description" (→ 70).
P-29	Adjustment of V/f characteristic curves (frequency value)	0 – <i>P-09</i>	0 Hz	V/f characteristic curve adjustment – frequency value of new operating point. See "Advanced parameter description" (→ 70).
Inverter behavior in case of enable/restart				
P-30	Terminal mode restart function	Edge-R Auto-0 Auto-1 – Auto-5	Auto-0	Defines the inverter behavior with regard to the enable digital input and configures the automatic restart function. See "Advanced parameter description" (→ 71).
P-31	Operator terminal mode restart function	0 – 3	1	Defines the enable behavior of the inverter when controlled via the integrated operator terminal. See "Advanced parameter description" (→ 71).
HVAC functions				
P-32	DC hold function	0 – 25 s	0 s	Presents restarting of the rotor due to airflow for the period specified in <i>P-32</i> . See "Advanced parameter description" (→ 72).
P-33	Flying start function	0: off 1: on	0	Flying start function. See "Advanced parameter description" (→ 73).

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Parameter	Description	Range of values	Factory setting	Brief description
P-34	Activation of brake chopper	0: off 1: activated, with SW protection for BWLT 100 002 only 2: activated, for other BWxxxx with external protection	0	Activates the internal brake chopper. If SW protection is activated, an error message is issued when the max. permissible current is exceeded.
P-35	Scaling factor analog input	0 – 500%	100%	Scaling factor of analog input See "Advanced parameter description" (→ 73).
Fieldbus settings				
P-36	Fieldbus settings for SBus, Modbus RTU	Address, 1 – 63 SBus baud rate: 125 k – 1 Mbd Modbus baud rate: 9.6 – 115.2 kbd Timeout: 0 – 3000 ms	1, 500 kbd (SBus), 115.2 kbd (Modbus), 0	See "Advanced parameter description" (→ 74).
Parameter lock functions				
P-37	Access code definition	0 – 9999	101	Defines access code for <i>advanced parameter set</i> in P-14.
P-38	Block parameter access	0 = read and write access, automatic protection in case of power failure 1 = read access only	0	Controls user access to the parameters.
P-39	Analog input offset	-500 – 500%	0%	Analog input offset See "Advanced parameter description" (→ 75).
P-40	Actual speed value scaling factor	0 – 6	0	Actual speed = setpoint speed x P-40 See "Advanced parameter description" (→ 75).
P-41	Thermal motor protection according to UL 508C	0: deactivated 1: activated	0	See "Advanced parameter description" (→ 75).

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8.2 Advanced parameter description

8.2.1 P-05 stop mode selection

Defines the deceleration behavior of the drive for normal operation and power failure.

Range of values:

0 – 2

In the event of power failure:

- 0: Operation continues
- 1: Motor coasts to a halt
- 2: Rapid stop along *P-24*

Normal stop:

- 0: Stop along ramp *P-04*
- 1: Motor coasts to a halt
- 2: Stop along ramp *P-04*

If *P-05* = 0, the frequency inverter attempts to continue operation in the case of a power failure by reducing the motor speed and using the load as a generator.

8.2.2 P-07 nominal motor voltage

Range of values:

- 0 – 230 – 250 V
- 0 – 400 (460 → American variant only) – 500 V

Nominal voltage of motor according to nameplate. For low-voltage drives, this value is limited to 250 V.

Voltage compensation

P-07 > 0 V: activated

If this function is activated, the pulse-width-modulated output voltage of the frequency inverter is kept constant through variable adjustment of the pulses. This allows negative effects, such as a drop in the line-side input voltage, to be compensated and the motor can maintain its nominal torque. In addition, thermal losses of the motor resulting from regenerative energy produced during braking operation are alleviated.

P-07 = 0 V: deactivated

If voltage compensation is deactivated, higher thermal losses are produced in the motor during braking and the motor torque can be influenced by external influences, such as a drop in the line voltage. This setting reduces the load on the DC link of the frequency inverter.

8.2.3 P-10 nominal motor speed

Range of values:

0 – 30,000 rpm

- 0: Slip compensation deactivated, display of all parameters in Hz
- 1: Slip compensation activated, display of all parameters in rpm

With active slip compensation, the frequency inverter compensates the load-dependent drop in speed by raising the output frequency f_o by the calculated load-dependent share Δf in the relevant operating point.

8.2.4 P-11 additional voltage/boost

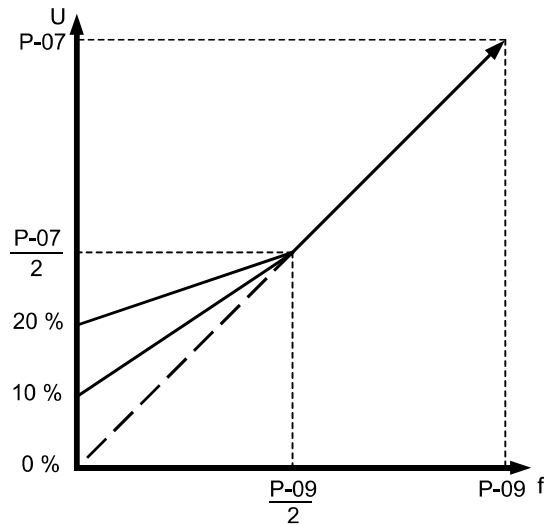
Range of values:

0 – 20% of the max. output voltage. Resolution 0.1%

- Size 1: max. 20%
- Size 2: max. 15%
- Size 3: max. 10%

Factory setting: dependent on rated frequency inverter power

Raises the output voltage of the frequency inverter by a scalable value at low speeds to enable higher torque development of the motor in this speed range.



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A motor with forced cooling fan must be used for continuous duty at low speeds.

8.2.5 P-12 control signal source

Range of values:

0 – 6

0	Terminal control
1	Control with operator terminal (forwards only)
2	Control with operator terminal (press <Start> key to toggle between forwards/backwards)
3	SBus network control with internal acceleration/deceleration ramps
4	SBus network control with adjustment of acceleration/deceleration ramp via bus
5	Modbus RTU – network control with internal acceleration/deceleration ramps
6	Modbus RTU – network control with adjustment of acceleration/deceleration ramps via bus

8.2.6 P-16 analog input

Range of values:

Display	Range of values	Explanation
U	0 – 10	0 – 10 V
b	0 – 10	-10 – 10 V
A	0 – 20	0 – 20 mA
t	4 – 20	4 – 20 mA
r	4 – 20	4 – 20 mA
t	20 – 4	4 – 20 mA (inv.)
r	20 – 4	4 – 20 mA (inv.)

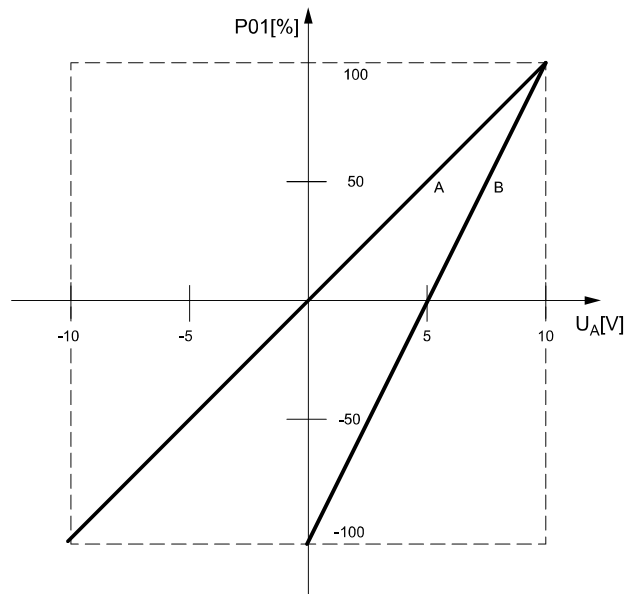
b = Bipolar mode

t = The frequency inverter switches off if the signal is revoked when the inverter is enabled.

r = Indicates that the frequency inverter moves along a ramp to the speed set in *P-20*.

Bipolar mode

This function enables infinite speed adjustment across the entire *P-01* speed range from -100% to +100% without switching the digital input. Alternatively, a characteristic curve similar to [B] is possible.



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A characteristic curve

When using an analog input signal with a voltage range of -10 V to +10 V (bipolar mode)

P-16 = 0 – 10b

B characteristic curve

With this characteristic curve, operation can be implemented with the following frequency inverter settings:

P-16 = 0 – 10 V (factory setting)

P-35 = 50%

P-39 = 200%

8.2.7 P-17 PWM switching frequency

Setting of the pulse-width-modulated switching frequency. A higher switching frequency means less motor noise, but also higher losses in the output stage. The following table shows the performance-class-dependent values for the PWM switching frequency.

Input voltage V	Performance class kW	PWM factory setting kHz	min. PWM kHz	max. PWM kHz
1×110	0.37 – 1.1	8	2	16
1×230 3×230	0.37 – 2.2	8	2	16
1×230 3×230	4	4	2	12
3×400	0.75 – 4	4	2	16
3×400	5.5 – 7.5	4	2	12
3×400	11	4	2	8

8.2.8 P-18 selection of user relay output

Range of values:

0 – 1 – 7

0	Frequency inverter is enabled. Select this function to control the electromechanical holding brake of the motor. The installation of the brake control is covered in the chapter "Installation" (→ 27).
1	Frequency inverter is ready for operation
2	Motor at setpoint speed
3	Frequency inverter in error state
4	Motor speed \geq limit value <i>P-19</i>
5	Motor current \geq limit value <i>P-19</i>
6	Motor speed $<$ limit value <i>P-19</i>
7	Motor current $<$ limit value <i>P-19</i>

The switching point of the limit value is defined in *P-19*.

The relay contact is designed as a NO contact.