

Parameter structure	Keypad and display	Parameter x.00	Parameter description format	Advanced parameter descriptions	Macros	Serial comms protocol	Electronic nameplate	Performance	RFC mode
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Table 4-2 Maximum motor rated current (sizes 0 to 6)

Model	Kc A	Maximum Heavy Duty current rating (Pr 11.32) A	Maximum Normal Duty current rating A
SP0201	2.2	2.2	2.2
SP0202	3.1	3.1	3.1
SP0203	4.0	4.0	4.0
SP0204	5.7	5.7	5.7
SP0205	7.5	7.5	7.5
SP1201	4.3	4.3	5.2
SP1202	5.8	5.8	6.8
SP1203	7.5	7.5	9.6
SP1204	10.6	10.6	11
SP2201	12.6	12.6	15.5
SP2202	17.0	17.0	22.0
SP2203	25.0	25.0	28.0
SP3201	31.0	31.0	42.0
SP3202	42.0	42.0	54.0
SP4201	56.0	56.0	68.0
SP4202	68.0	68.0	80.0
SP4203	80.0	80.0	104.0
SP5201	105.0	105.0	130.0
SP5202	130.0	130.0	154.0
SP0401	1.3	1.3	1.3
SP0402	1.7	1.7	1.7
SP0403	2.1	2.1	2.1
SP0404	3.0	3.0	3.0
SP0405	4.2	4.2	4.2
SP1401	2.1	2.1	2.8
SP1402	3.0	3.0	3.8
SP1403	4.2	4.2	5.0
SP1404	5.8	5.8	6.9
SP1405	7.6	7.6	8.8
SP1406	9.5	9.5	11.0
SP2401	13.0	13.0	15.3
SP2402	16.5	16.5	21.0
SP2403	23.0	25.0	29.0
SP2404	29.0	29.0	29.0
SP3401	32.0	32.0	35.0
SP3402	40.0	40.0	43.0
SP3403	46.0	46.0	56.0
SP4401	60.0	60.0	68.0
SP4402	74.0	74.0	83.0
SP4403	96.0	96.0	104.0
SP5401	124.0	124.0	138.0
SP5402	156.0	156.0	168.0
SP6401	154.2	180.0	205.0
SP6402	180.0	210.0	236.0
SP3501	4.1	4.1	5.4
SP3502	5.4	5.4	6.1
SP3503	6.1	6.1	8.4
SP3504	9.5	9.5	11.0
SP3505	12.0	12.0	16.0
SP3506	18.0	18.0	22.0
SP3507	22.0	22.0	27.0
SP4601	19.0	19.0	22.0
SP4602	22.0	22.0	27.0
SP4603	27.0	27.0	36.0
SP4604	36.0	36.0	43.0
SP4605	43.0	43.0	52.0
SP4606	52.0	52.0	62.0
SP5601	63.0	63.0	84.0
SP5602	85.0	85.0	99.0
SP6601	85.7	100.0	125.0
SP6602	107.1	125.0	144.0

5.6 Menu 4: Torque and current control

The scaling of the current feedback is based on the rating of the drive as follows:

Level	x current scaling (Kc)
Over-current trip	1/0.45 = 2.22
Open-loop peak limit	1.75
Closed-loop vector, Servo and Regen maximum standard operating current	1.75
Open-loop maximum standard operating current	1.5
Current scaling (Kc)	1.0
Maximum Normal Duty current rating	≤1.36
Maximum motor rated current	≤1.36

Current scaling (Kc) is 1 per unit current and is related to the scaling of the drive current feedback. For most drive sizes Kc is the same as the Maximum heavy duty current rating defined by Pr 11.32. The Maximum heavy duty current rating is the maximum value of rated motor current (defined by Pr 5.07 or Pr 21.07) that can be set for operation with the force vented motor protection characteristic - Pr 4.25 = 0 (see Pr 4.16 for more details). If the Kc and Maximum heavy duty current rating are the same then the drive uses 1.75 x Maximum heavy duty current rating for the open-loop peak limit and the maximum standard operating current for closed-loop modes. This is the limit up to which the drive can control current normally. The current range above this is allowed for current controller overshoot and for additional current feedback pulses associated with long cable operation. For some drive sizes the Maximum heavy duty current rating is larger than Kc, therefore the potential overload is reduced below 1.75 x Kc. The motor rated current (defined by Pr 5.07 or Pr 21.07) may be increased above the maximum Heavy Duty current rating up to the maximum Normal Duty rated current. When the motor rated current is above the maximum Heavy Duty current rating the drive always provides motor protection scheme that is intended for variable torque applications (see Pr 4.16 on page 105 for more details). The maximum rated current is the maximum rated current allowed for Normal Duty operation.

Table below gives the current scaling (Kc), Maximum heavy duty current rating and Maximum normal duty rated current for all drive sizes and voltage ratings.

Table 5-3 Current ratings

200V				400V				575V				690V			
Model	Current scaling (Kc)	Max Heavy Duty current rating	Max Normal Duty rated current	Model	Current scaling (Kc)	Max Heavy Duty current rating	Max Normal Duty rated current	Model	Current scaling (Kc)	Max Heavy Duty current rating	Max Normal Duty rated current	Model	Current scaling (Kc)	Max Heavy Duty current rating	Max Normal Duty rated current
SP0201	2.2	2.2	2.2	SP0401	1.3	1.3	1.3	SP3501	4.1	4.1	5.4	SP4601	18	18	22
SP0202	3.1	3.1	3.1	SP0402	1.7	1.7	1.7	SP3502	5.4	5.4	6.1	SP4602	22	22	27
SP0203	4.0	4.0	4.0	SP0403	2.1	2.1	2.1	SP3503	6.1	6.1	8.4	SP4603	27	27	36
SP0204	5.7	5.7	5.7	SP0404	3.0	3.0	3.0	SP3504	9.5	9.5	11	SP4604	36	36	43
SP0205	7.5	7.5	7.5	SP0405	4.2	4.2	4.2	SP3505	12	12	16	SP4605	43	43	52
SP1201	4.3	4.3	5.2	SP1401	2.1	2.1	2.8	SP3506	18	18	22	SP4606	52	52	62
SP1202	5.8	5.8	6.8	SP1402	3.0	3.0	3.8	SP3507	22	22	27	SP5601	62	62	84
SP1203	7.5	7.5	9.6	SP1403	4.2	4.2	5.0					SP5602	84	84	99
SP1204	10.6	10.6	11	SP1404	5.8	5.8	6.9					SP6601	85.7	100	125
SP2201	12.6	12.6	15.5	SP1405	7.6	7.6	8.8					SP6602	107.1	125	144
SP2202	17	17	22	SP1406	9.5	9.5	11					SPMA1601	85.7	100	125
SP2203	25	25	28	SP2401	13	13	15.3					SPMA1602	107.1	125	144
SP3201	31	31	42	SP2402	16.5	16.5	21					SPMD1601	85.7	100	125
SP3202	42	42	54	SP2403	23	25	29					SPMD1602	107.1	125	144
SP4201	56	56	68	SP2404	29	29	29					SPMD1603	123.4	144	168
SP4202	68	68	80	SP3401	32	32	35					SPMD1604	144.0	168	192
SP4203	80	80	104	SP3402	40	40	43								
SP5201	105	105	130	SP3403	46	46	56								
SP5202	130	130	154	SP4401	60	60	68								
SPMD1201	133.7	156	192	SP4402	74	74	83								
SPMD1202	164.5	192	248	SP4403	96	96	104								
SPMD1203	214.2	250	312	SP5401	124	124	138								
SPMD1204	248.5	290	350	SP5402	156	156	168								
				SP6401	154.2	180	205								
				SP6402	180	210	236								
				SPMA1401	154.2	180	205								
				SPMA1402	180	210	236								
				SPMD1401	154.2	180	205								
				SPMD1402	180	210	246								
				SPMD1403	205.7	246	290								
				SPMD1404	248.5	290	350								

200V	kHz	400V	kHz	575V	kHz	690V	kHz
SP0201	16	SP0401	16	SP3501	8	SP4601	8
SP0202	16	SP0402	16	SP3502	8	SP4602	8
SP0203	16	SP0403	16	SP3503	8	SP4603	8
SP0204	16	SP0404	16	SP3504	8	SP4604	8
SP0205	16	SP0405	16	SP3505	8	SP4605	8
SP1201	16	SP1401	16	SP3506	8	SP4606	8
SP1202	16	SP1402	16	SP3507	8	SP5601	8
SP1203	16	SP1403	16			SP5602	8
SP1204	16	SP1404	16			SP6601	6
SP2201	16	SP1405	16			SP6602	6
SP2202	16	SP1406	16			SPMA1601	6
SP2203	16	SP2401	16			SPMA1602	6
SP3201	12	SP2402	16			SPMD1601	6
SP3202	12	SP2403	16			SPMD1602	6
SP4201	8	SP2404	16			SPMD1603	6
SP4202	8	SP3401	16			SPMD1604	6
SP4203	8	SP3402	16				
SP5201	8	SP3403	12				
SP5202	8	SP4401	8				
SPMD1201	6	SP4402	8				
SPMD1202	6	SP4403	8				
SPMD1203	6	SP5401	8				
SPMD1204	6	SP5402	8				
		SP6401	6				
		SP6402	6				
		SPMA1401	6				
		SPMA1402	6				
		SPMD1401	6				
		SPMD1402	6				
		SPMD1403	6				
		SPMD1404	6				

This parameter defines the required switching frequency. The drive may automatically reduce the actual switching frequency (without changing this parameter) if the power stage becomes too hot. The switching frequency can reduce from 12kHz to 6kHz to 3kHz, or 16kHz to 8kHz to 4kHz. An estimate of the IGBT junction temperature is made based on the heatsink temperature and an instantaneous temperature drop using the drive output current and switching frequency. The estimated IGBT junction temperature is displayed in Pr 7.34. If the temperature exceeds 135°C the switching frequency is reduced if this is possible (i.e >4kHz) and this mode is enabled (see Pr 5.35 on page 131). Reducing the switching frequency reduces the drive losses and the junction temperature displayed in Pr 7.34 also reduces. If the load condition persists the junction temperature may continue to rise. If the temperature exceeds 145°C and the switching frequency cannot be reduced the drive will initiate an O.ht1 trip. Every 20ms the drive will attempt to restore the switching frequency if the higher switching frequency will not take the IGBT temperature above 135°C.

The following table gives the sampling rate for different sections of the control system for different switching frequencies.

	3, 6, 12kHz	4, 8, 16kHz	Open-loop	Closed-loop vector	Servo	Regen
Level 1	3 = 167µs 6 = 83µs 12 = 83µs	125µs	Peak limit	Current controllers		
Level 2	250µs		Current limit and ramps	Speed controller and ramps		Sequencing and Synchronization
Level 3	1ms		Voltage controller			
Level 4	4ms		Time critical user interface			
Background	N/A		Non-time critical user interface			