a guide to transition...

from **Commander SE**

to **Commander SK**

RETROFIT GUIDE

CONTROL TECHNIQUES

www.controltechniques.com

Commander SE to Commander SK Retrofit Guide

Commander SK is the latest product in the family of AC inverters from Control Techniques, designed to meet today's customer needs of simple installation and ease of use, yet also providing a flexible solution to a diverse range of applications.

This guide is part of a series to provide you with an easy way of retrofitting existing Control Techniques Commander SE, applications with Commander SK.

Due to the potential flexibility of Control Techniques Drives, these retrofit guides only show the Drives in their default terminal and parameter states.

The Commander SK has 3 levels of parameter menus.

Level 1 has only 10 parameters which quickly lets you access these parameters most frequently required for simple applications.

Level 2 gives access to additional parameters for increased flexibility.

Level 3 gives access to extended menu parameters. All levels are accessible via the keypad and display on the Commander SK.

We trust these guides will ease your transition to our latest range of Drives.

Please refer to the user manual of each Drive if more information is required or contact your local Drive Centre/Distributor

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1. I/O Comparison

Commander SE

Analog out - Frequency

Analog in - Local speed reference

Analog in - Remote speed reference

Digital in - Enable

Digital in - Run forward

Digital in - Run reverse

Digital in - Local / Remote / Preset select

Digital in - Jog / Preset select / Motor thermistor

Digital out - Zero speed

Commander SK

Analog out - Frequency

Analog in - Local speed reference

Analog in - Remote speed refrence

Digital in - Enable

Digital in - Run forward

Digital in - Run Reverse

Digital in - Local / Remote / Preset select

Digital out - Zero speed

2. Rating Tables

Commander SE

MODEL	SE1200...			
	025	037	055	075
AC supply voltage and frequency	Single phase 200 - 240V +/- 10% 48 - 62Hz			
Input displacement factor (cos ϕ)	>0.97			
Nominal motor power - kW	0.25	0.37	0.55	0.75
Nominal motor power - hp		0.50		1.0
Output voltage and frequency	3 phase, 0 to input voltage, 0 to 1000Hz			
100% RMS output current - A	1.5	2.3	3.1	4.3
150% overload current for 60 secs - A	2.3	3.5	4.7	6.5
Typical full load input current - A	5.6	6.5	8.8	11.4
Typical inrush current - A (duration <10ms)	100			
Drive power losses at 230VAC at 6kHz switching frequency - W	18	24	37	56
Weight - kg/lb	1.1/2.4		1.25/2.75	
Cooling fan fitted	No			

2. Rating Tables

Commander SE

MODEL	SE2D200...							
	075		110		150		220	
AC supply voltage and frequency	Single or 3 phase 200 to 240V +/- 10%. 48 to 62Hz							
Input displacement factor (cos ϕ)	>0.97							
Nominal motor power - kW	0.75		1.1		1.5		2.2	
Nominal motor power - hp	1.0		1.5		2.0		3.0	
Output voltage and frequency	3 phase, 0 to input voltage, 0 to 1000Hz							
100% RMS output current - A	4.3		5.8		7.5		10.0	
150% overload current for 60 secs - A	6.5		8.7		11.3		15.0	
Typical full load input current - A	11.0	5.5	15.1	7.9	19.3	9.6	23.9	13.1
Typical inrush current - A (duration <10ms)	55				35			
Drive power losses at 230VAC at 6kHz switching frequency - W	54		69		88		125	
Weight - kg/lb	2.75 / 6							
Cooling fan fitted	No				Yes			

Commander SE

MODEL	SE23200400
AC supply voltage and frequency	3 phase 200 to 240V +/- 10%. 48 to 62Hz
Input displacement factor (cos ϕ)	>0.97
Nominal motor power - kW	4
Nominal motor power - hp	5
Output voltage and frequency	3 phase, 0 to input voltage, o to 1000Hz
100% RMS output current - A	17.0
150% overload current for 60 secs - A	25.5
Typical full load input current - A	21
Typical inrush current - A (duration <10ms)	35
Drive power losses at 230VAC at 6kHz switching frequency - W	174
Weight - kg/lb	2.75 / 6
Cooling fan fitted	Yes

2. Rating Tables

Commander SE

MODEL	SE23400...					
	075	110	150	220	300	400
AC supply voltage and frequency	3 phase 380 to 480V +/- 10%, 48 to 62 Hz					
Input displacement factor (cos ϕ)	>0.97					
Nominal motor power - kW	0.75	1.1	1.5	2.2	3.0	4.0
Nominal motor power - hp	1.0	1.5	2.0	3.0	3.0	5.0
Output voltage and frequency	3 phase, 0 to input voltage, 0 to 1000Hz					
100% RMS output current - A	2.1	3.0	4.2	5.8	7.6	9.5
150% overload current for 60 secs - A	3.2	4.5	6.3	8.7	11.4	14.3
Typical full load input current - A	3.6	4.8	6.4	9.3	11	14
Typical inrush current - A (duration <10ms)	90			60		
Drive power losses at 230VAC at 6kHz switching frequency - W	43	57	77	97	122	158
Weight - kg/lb	2.75 / 6					
Cooling fan fitted	No		Yes			

Commander SK

MODEL	SKA12				SKBD2				SKCD2	
	00025	00037	00055	00075	00110		00150		00220	
					1ph	3ph	1ph	3ph	1ph	3ph
AC supply voltage and frequency	Single phase 200 to 240V ±10% 48Hz to 62Hz				Single or 3 phase 200 to 240V ±10% 48Hz to 62Hz					
Input displacement factor (cos ϕ)										
Nominal motor power (kW)	0.25	0.37	0.55	0.75	1.1		1.5		2.2	
Nominal motor power (hp)	0.33	0.50	0.75	1.0	1.5		2.0		3.0	
Output voltage and frequency	3 phase, 0 to drive rating (240), 0 to 1500Hz									
100% RMS output current (A)	1.7	2.2	3.0	4.0	5.2		7.0		9.6	
150% overload current for 60s (A)	2.6	3.3	4.5	6	7.8		10.5		14.4	
Typical full load input current (A)	4.3	5.8	8.1	10.5	14.2	6.7	17.4	8.7	23.2	11.9
Maximum continuous input current (A)						9.2		12.6		17
Typical inrush current (A) (<10ms)	17.9				8.9				6.0	
Drive power losses at 230VAC at 3kHz switching frequency (W)										
Weight (kg)	1.0				1.35				2.1	
Internal EMC filter	Yes									
DC bus terminals	No				Yes					
Din rail mounting	Yes								No	

2. Rating Tables

Commander SK

MODEL	SKB34					SKC34		
	00037	00055	00075	00110	00150	00220	00300	00400
AC supply voltage and frequency	3 phase 380 to 480V ±10% 48Hz to 62Hz							
Input displacement factor (cos∅)								
Nominal motor power (kW)	0.37	0.55	0.75	1.1	1.5	2.2	3.0	4.0
Nominal motor power (hp)	0.5	0.75	1.0	1.5	2.0	3.0	3.0	5.0
Output voltage and frequency	3 phase, 0 to drive rating (480), 0 to 1500Hz							
100% RMS output current (A)	1.3	1.7	2.1	2.8	3.8	5.1	7.2	9.0
150% overload current for 60s (A)	2	2.6	3.2	4.2	5.7	7.7	10.8	13.5
Typical full load input current (A)	1.7	2.5	3.1	4	5.2	7.3	9.5	11.9
Maximum continuous input current (A)	2.5	3.1	3.75	4.6	5.9	9.6	11.2	13.4
Typical inrush current (A) (<10ms)	17.9					11.9		
Drive power losses at 400VAC at 3kHz switching frequency (W)								
Weight (kg)	1.35					2.1		
Internal EMC filter	Yes							
DC bus terminals	Yes							
Din rail mounting	Yes					No		

3. Dynamic Braking Comparison

Commander SE

On board dynamic braking not possible on Size 1

MODEL	SE2D200...				SE23200400	SE23400...					
	075	110	150	220		075	110	150	220	300	400
Minimum braking resistor value (Ω)	50			40	30	100			75		
Recommended braking resistor value (Ω)	100		75	50	30	200			100		
Maximum braking current (A)	9			11	14	10			12.5		
Resistor peak power rating (kW)	1.8		2.4	3.5	5.9	3.4			6.9		

Commander SK

MODEL	SKA12				SKBD2		SKCD2
	00025	00037	00055	00075	00110	00150	00220
Minimum braking resistor value (Ω)	68				28		28
Recommended braking resistor value (Ω)	200			150	100		50
Resistor peak power rating (kW)	0.9			1.1	1.7		3.4
Maximum braking current (A)	6.1				14.8		14.8

MODEL	SKB34					SKC34		
	00037	00055	00075	00110	00150	00220	00300	00400
Minimum braking resistor value (Ω)	100					100	55	
Recommended braking resistor value (Ω)	200					200	150	100
Resistor peak power rating (kW)	3.4					3.4	4.6	6.9
Maximum braking current (A)	8.3					8.3	15.1	

4. General Feature Comparison

Commander SE

Commander SE applications that require negative logic, set p8.29 = 0 and perform a save routine.

To configure terminal 12 as ET input.
set **Pr8.39** = 1, set **Pr8.15** = 1, and also **Pr8.25 = Pr10.32** and perform a save routine.
Terminal 12 is now active as an ET input.

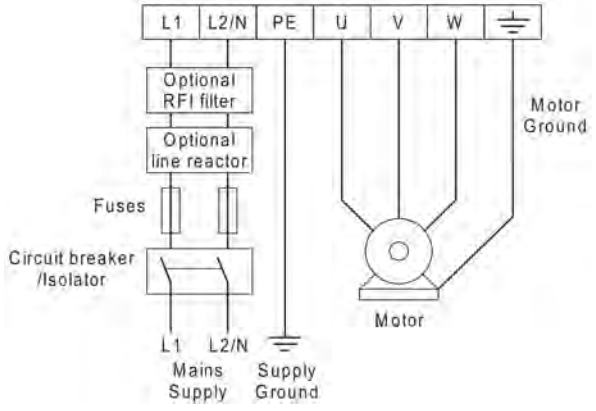
Commander SK

Commander SK by default is positive and cannot be set up into negative logic.

To configure terminal B7 as an "ET" terminal.
Set **Pr8.15** = 1, **Pr8.25** = 10.32 and perform a save routine. Terminal B7 is now active as an ET input.

5. Power Terminal Comparison

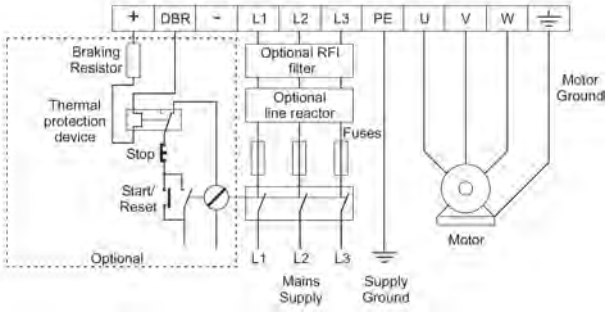
Commander SE



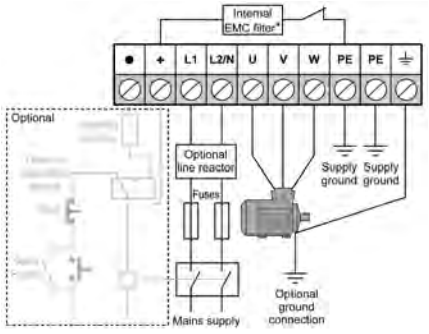
Commander SE Size 1 power terminal connections.

NOTE: On Commander SE Size 1 no DC Bus connections are available and hence dynamic braking is not available.

Commander SE Size 2 power terminal connections

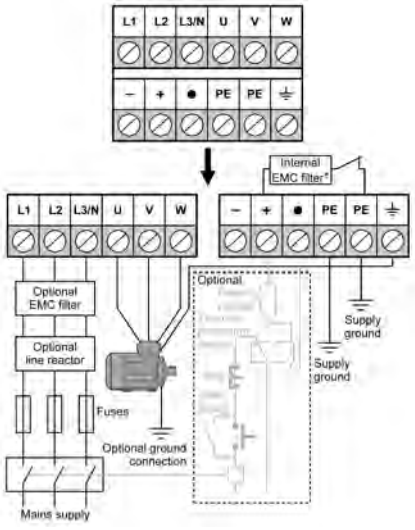


Commander SK



Commander SK Size A Power Terminal Connections

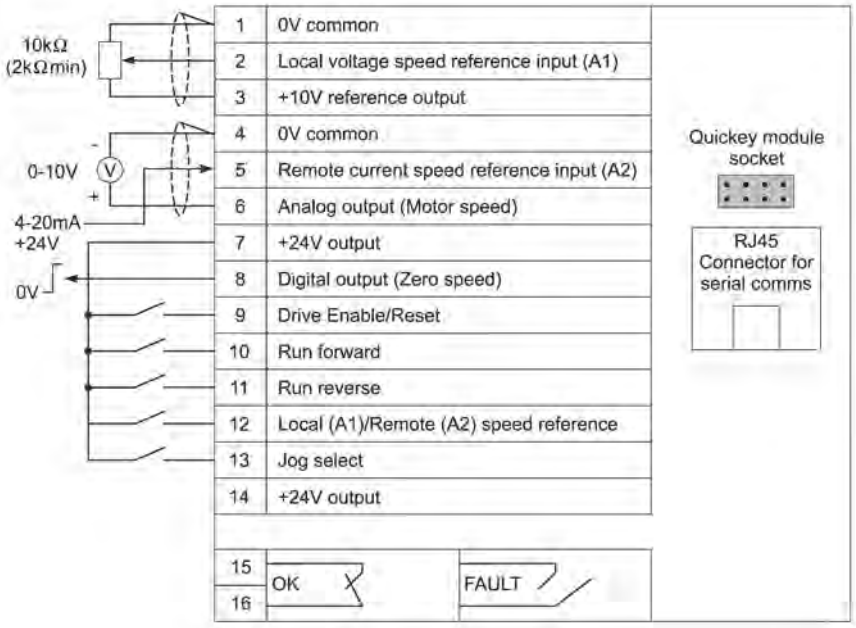
Commander SK Size B & C Power Terminal Connections



6. Control Terminal Comparison

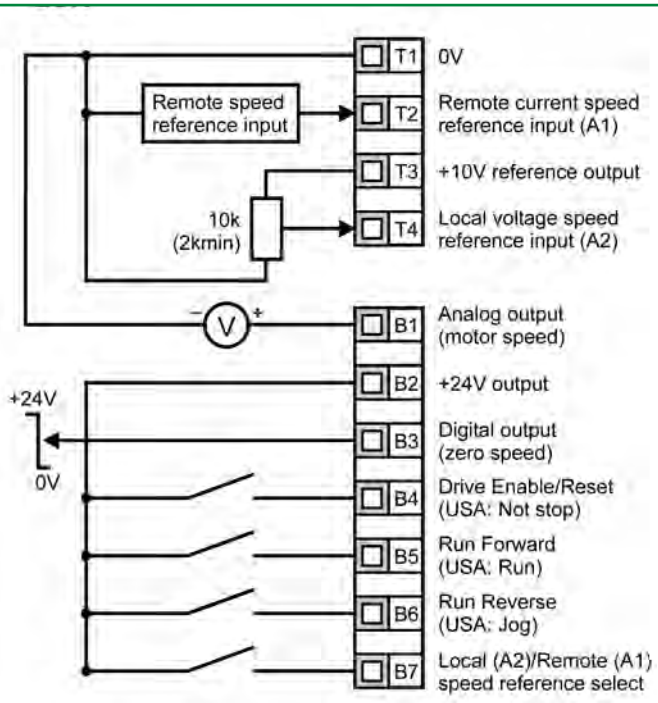
Commander SE

European Details



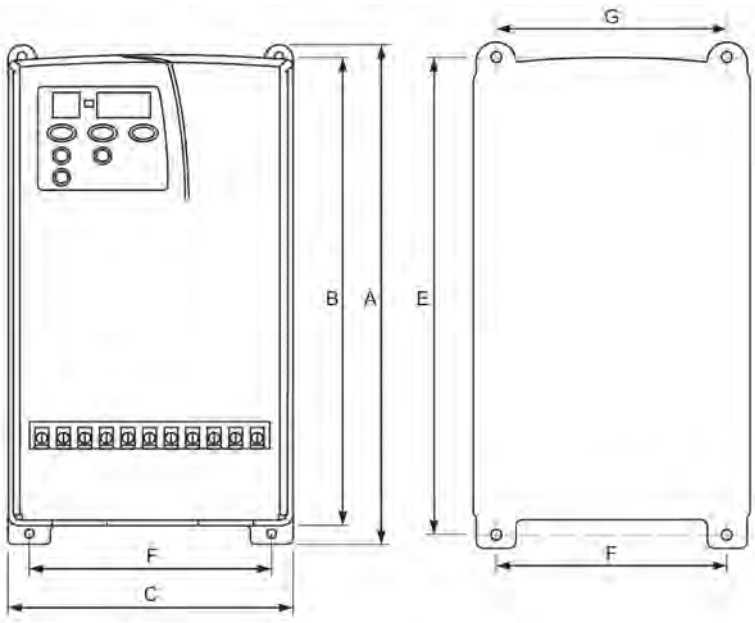
Commander SK

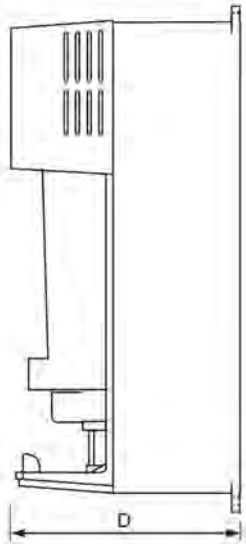
European Details



7. Installation Comparison

Commander SE dimensions





Commander SE Size 1 & 2
4 x M4 holes in heatsink

Drive Size	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
1	191	7 33/64	175	6 57/64	102	4 1/64	130	5 7/64	181.5	7 9/64
2	280	1 11/64	259	10 3/16	147	5 25/32	130	5 7/64	265	10 7/16

Drive Size	F		G	
	mm	in	mm	in
1	84	3 5/16	84	3 5/16
2	121.5	4 25/32	121.5	4 25/32

7. Installation Comparison

Commander SK dimensions

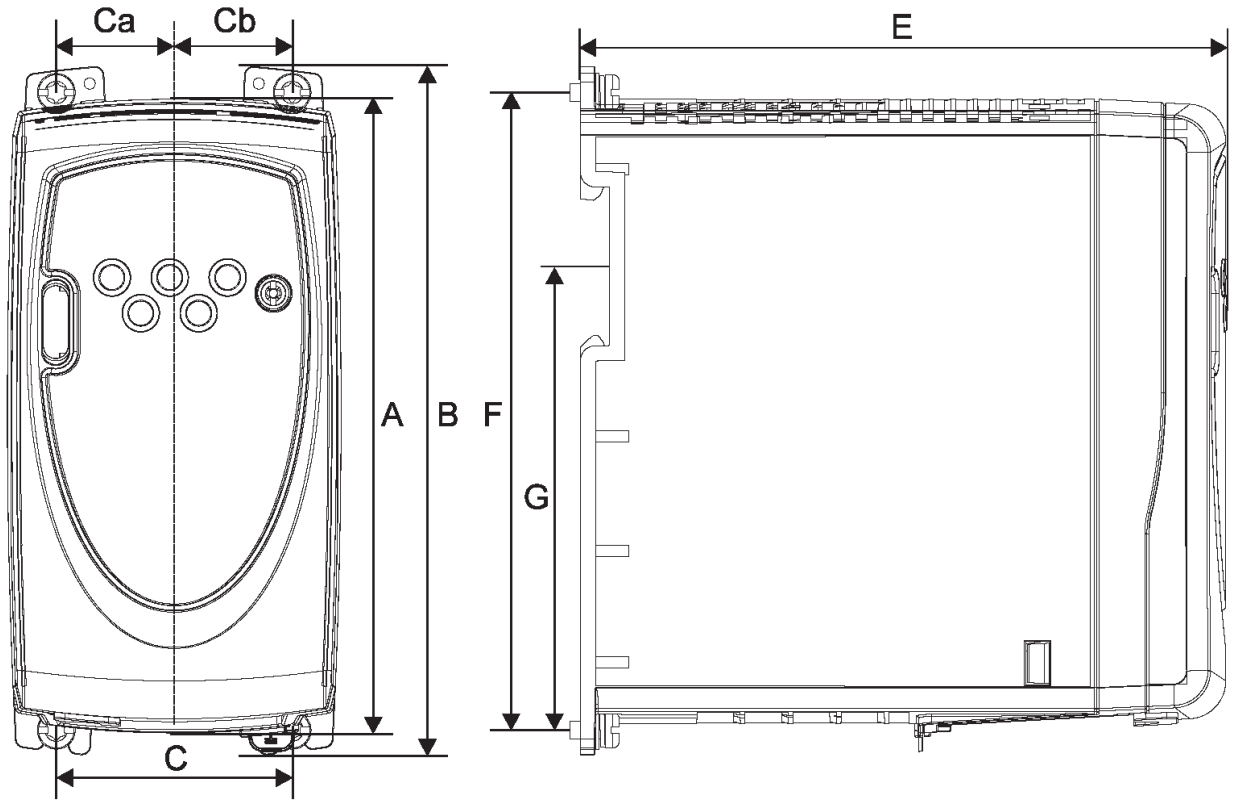


Table 4.1

Drive Size	A		B		C		Ca		Cb	
	mm	in	mm	in	mm	in	mm	in	mm	in
A	140	5.51	154	6.06	53	2.09	26.5	1.04	26.5	1.04
B	190	7.48	205	8.07	55	2.17	23.5	0.93	31.5	1.24
C	240	9.45	258	10.16	70.5	2.78	31	1.22	39.5	1.56

Drive Size	D		E		F		G*	
	mm	in	mm	in	mm	in	mm	in
A	75	2.95	145	5.71	143	5.63	86.3	3.40
B	85	3.35	156	6.14	194	7.64	155.5	6.12
C	100	3.94	173	6.81	244	9.61		

On size A, the mounting feet are equal distance from the centre line of the drive.

On size B and C, the mounting feet are not an equal distance from the centre line of the drive, hence the Ca and Cb dimensions.

*Size C is not DIN rail mountable.

8. Parameter Comparison

Parameter number	Commander SE description	Default setting
01	Min speed	0.0Hz
02	Max speed	50.0Hz 60.0Hz
03	Acceleration rate	5.0s/100Hz
04	Deceleration rate	10.0s/100Hz
05	Speed reference selector	A1.A2
06	Motor rated current	Drive rating
07	Motor rated speed	1500rpm 1800rpm
08	Motor rated voltage	230/400V 230/460V
09	Motor rated power factor	0.85
10	Parameter access	L1
11	Preset speed 1	0.0Hz
12	Preset speed 2	0.0Hz
13	Preset speed 3	0.0Hz
14	Preset speed 4	0.0Hz
15	Jog reference	1.5Hz
16	Current mode	4-.20mA
17	Enable negative preset speeds	OFF
18	Last trip	
19	Trip before Pr 18	
20	Trip before Pr 19	
21	Trip before Pr 20	
22	Load display units	Ld
23	Speed display units	Fr
24	Customer defined scaling	1.00
25	Security set-up	0
26	Fwd/Rev key enable	OFF
27	Power up keypad reference	0
28	Parameter cloning	no
29	Load defaults	no
30	Ramp mode select	1

Parameter number	Commander SK description	Default setting
01	Min speed	0.0Hz
02	Max speed	50.0Hz 60.0Hz
03	Acceleration rate	5.0s/100Hz
04	Deceleration rate	10.0s/100Hz
05	Speed reference selector	AI.AV
06	Motor rated current	Drive rating
07	Motor rated speed	1500rpm 1800rpm
08	Motor rated voltage	230/400V 230/460V
09	Motor rated power factor	0.85
10	Parameter access	L1
11	Start/stop logic	0 4
12	Brake enable	diS
13	Not used	
14	Not used	
15	Jog reference	1.5Hz
16	Analog input 1 mode	4-.20mA
17	Enable negative preset speeds	OFF
18	Preset speed 1	0.0Hz
19	Preset speed 2	0.0Hz
20	Preset speed 3	0.0Hz
21	Preset speed 4	0.0Hz
22	Load display units	Ld
23	Speed display units	Fr
24	Customer defined scaling	1.00
25	Security set-up	0
26	Not used	
27	Power up keypad reference	0
28	Parameter cloning	no
29	Load defaults	no
30	Ramp mode select	1

8. Parameter Comparison

Parameter number	Commander SE description	Default setting
31	Stopping mode	1
32	Variable torque select	OFF
33	Spinning motor select	0
34	Positive logic select	On
35	Start/stop logic select	0 4
36	Analog output select	Fr
37	Switching frequency	6kHz
38	Autotune	0
39	Rated frequency	50.0Hz 60.0Hz
40	No. of poles	Auto
41	Serial mode	AnSI
42	Baud rate	4.8
43	Serial address	11
44	Software version	0
45	Fieldbus node address	0
46	Fieldbus baudrate	0
47	Fieldbus diagnostics	3
48	Voltage mode selector	3.0
49	Low frequency voltage boost	OFF
50	Motor thermistor select	1.0
51	Zero speed threshold	0
52	Motor current threshold	0
53	Motor current threshold hysteresis	0
54	Brake release delay time	-
55	-	-
56	-	-
57	-	-
58	-	-
59	-	-
60	-	-
61	-	-
62	-	

Parameter number	Commander SK description	Default setting
31	Stopping mode	1
32	Variable torque select	OFF
33	Spinning motor select	0
34	Terminal B7 mode select	dig
35	Digital output function	n=0
36	Analog output function	Fr
37	Maximum switching frequency	3kHz
38	Autotune	0
39	Rated frequency	50.0Hz 60.0Hz
40	No. of poles	Auto
41	Voltage mode selector	Ur I
42	Low frequency voltage boost	3.0
43	Baud rate	19.2
44	Serial address	1
45	Software version	
46	Brake release current threshold	50%
47	Brake applied current threshold	10%
48	Brake release frequency	1.0Hz
49	Brake applied frequency	2.0Hz
50	Pre-brake release delay	1.0s
51	Post brake release delay	1.0s
52	Fieldbus node address	0
53	Fieldbus baud rate	0
54	Fieldbus diagnostics	0
55	Last trip	
56	Trip before Pr 55	
57	Trip before Pr 56	
58	Trip before Pr 57	
59	Drive user program enable	0
60	Drive user program status	
61	Configurable parameter 1	
62	Configurable parameter 2	

8. Parameter Comparison

Parameter number	Commander SE description	Default setting
63	-	-
64	-	-
65	-	-
66	-	-
67	-	-
68	-	-
69	-	-
70	-	-
71	-	-
72	-	-
73	-	-
74	-	-
75	-	-
76	-	-
77	-	-
78	-	-
79	-	-
80	-	-
	Diagnostics Parameters	
81	-	-
82	-	-
83	-	-
84	-	-
85	-	-
86	-	-
87	-	-
88	-	-
89	-	-
90	-	-
91	-	-
92	-	-
93	-	-
94	-	-
95	-	-

Parameter number	Commander SK description	Default setting
63	Configurable parameter 3	
64	Configurable parameter 4	
65	Configurable parameter 5	
66	Configurable parameter 6	
67	Configurable parameter 7	
68	Configurable parameter 8	
69	Configurable parameter 9	
70	Configurable parameter 10	
71	Pr 61 set-up parameter	
72	Pr 62 set-up parameter	
73	Pr 63 set-up parameter	
74	Pr 64 set-up parameter	
75	Pr 65 set-up parameter	
76	Pr 66 set-up parameter	
77	Pr 67 set-up parameter	
78	Pr 68 set-up parameter	
79	Pr 69 set-up parameter	
80	Pr 70 set-up parameter	
	Diagnostics Parameters	
81	Reference selected	Hz
82	Pre-ramp reference	Hz
83	Post-ramp reference	Hz
84	DC bus voltage	VDC
85	Motor frequency	Hz
86	Motor voltage	V
87	Motor speed	rpm
88	Motor current	A
89	Motor active current	A
90	Digital I/O read word	0 to 95
91	Reference on indicator	OFF
92	Reverse selected indicator	OFF
93	Jog selected indicator	OFF
94	Analog input 1	%
95	Analog input 2	%

9. Advanced Menu Comparison

Menu 1

All Commander SE menu 1 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
1.04	Reference offset
1.09	Reference offset select
1.38	Percentage trim

Menu 2

All Commander SE menu 2 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
2.30	Acceleration selected indicator
2.31	Deceleration selected indicator
2.39	Ramp rate units

Menu 3

All Commander SE menu 3 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
3.17	Frequency output or PWM output scaling
3.18	Maximum output frequency
3.22	Hard frequency reference
3.23	Hard frequency reference selector
3.29	Position
3.32	Position counter reset
3.33	Position scaling numerator
3.34	Position scaling denominator
3.43	Maximum reference frequency
3.44	Frequency reference scaling
3.45	Frequency reference

Menu 4

All Commander SE menu 4 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
4.24	User current maximum scaling
4.25	Low speed thermal protection mode
4.26	Percentage torque

Menu 5

All Commander SE menu 5 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
5.20	Over modulation enable
5.27	Enable slip compensation
5.35	Disable auto-switching frequency change
5.37	Actual switching frequency
5.50	Security unlock

9. Advanced Menu Comparison

Menu 6

Menu 6 parameters with functionality changes.

Commander SE		Commander SK	
Parameter number	**Description**	**Parameter number**	**Description**
6.13	Keypad Fwd/Rev key enable	6.13	Function key enable
6.14	Unused parameter	6.14	Disable auto reset on enable
6.31	Jog	6.31	Jog forward
6.37	Unused parameter	6.37	Jog reverse
6.41	Control word mask	6.41	Unused parameter

Menu 6 new parameters

Parameter number	Description
6.10	Low DC link operation
6.11	Remote LED keypad function key status
6.35	Forward limit switch
6.36	Reverse limit switch
6.45	Force cooling fan to run at full speed

Menu 7

All Commander SE menu 7 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
7.06	Analog input 1 mode
7.30	Analog input 1 offset
7.31	Analog input 2 offset
7.34	IGBT junction temperature
7.35	Drive thermal protection accumulator

9. Advanced Menu Comparison

Menu 8

Menu 8 parameters with functionality changes.

Commander SE		Commander SK	
Parameter number	**Description**	**Parameter number**	**Description**
8.06	Digital input 6 indicator	8.06	Unused parameter
8.16	Digital input 6 invert	8.16	Unused parameter
8.26	Digital input 6 destination	8.26	Unused parameter
8.29	Logic input polarity	8.29	Unused parameter
8.31	Activate digital output 1	8.31	Terminal B3 function select
8.35	Unused parameter	8.35	Terminal B7 function select
8.39	Disable digital inputs 5 and 6 auto-selection	8.39	Unused parameter
8.40	Digital input 6 as a thermistor	8.40	Unused parameter

Menu 8 new parameters

Parameter number	Description
8.20	Digital I/O read word
8.41	Digital output control

Menu 9

All Commander SE menu 9 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
9.14	Logic function 2 source 1
9.15	Logic function 2 source 1 invert
9.16	Logic function 2 source 2
9.17	Logic function 2 source 2 invert
9.18	Logic function 2 output invert
9.19	Logic function 2 delay
9.20	Logic function 2 destination
9.29	Binary sum one's input
9.30	Binary sum two's input
9.31	Binary sum four's input
9.32	Binary sum output
9.33	Binary sum output
9.34	Binary sum destination

9. Advanced Menu Comparison

Menu 10

Menu 10 parameters are exactly the same on Commander SE and Commander SK

Menu 11

Menu 11 parameters with functionality changes.

Commander SE		Commander SK	
Parameter number	**Description**	**Parameter number**	**Description**
11.24	Serial comms mode	11.24	Modbus RTU serial comms set-up
11.26	Serial comms minimum transmit delay	11.26	Silent period extension
11.27	Unused parameter	11.27	Drive configuration

Menu 11 new parameters

Parameter number	Description
11.46	Defaults previously loaded
11.47	Drive user program enable
11.48	Drive user program status
11.50	Drive user program maximum scan time

Menu 12

Menu 12 parameters with functionality changes.

Commander SE		Commander SK	
Parameter number	**Description**	**Parameter number**	**Description**
12.10	Variable selector bit	12.10	Variable selector 1 mode

9. Advanced Menu Comparison

Menu 12 new parameters

Parameter number	Commander SE description
12.02	Threshold detector 2 output
12.12	Variable selector 1 output
12.13	Variable selector 1 source 1 scaling
12.14	Variable selector 1 source 2 scaling
12.15	Variable selector 1 control
12.23	Threshold detector 2 source
12.24	Threshold detector 2 level
12.25	Threshold detector 2 hysteresis
12.26	Threshold detector 2 output invert
12.27	Threshold detector 2 destination
12.28	Variable selector 2 source 1
12.29	Variable selector 2 source 2
12.30	Variable selector 2 mode
12.31	Variable selector 2 destination
12.32	Variable selector 2 output
12.33	Variable selector 2 source 1 scaling
12.34	Variable selector 2 source 2 scaling
12.35	Variable selector 2 control
12.40	Brake release indicator
12.41	Brake controller enable
12.42	Brake release current threshold
12.43	Brake apply current threshold
12.44	Brake release frequency
12.45	Brake frequency
12.46	Pre-brake release delay
12.47	Post-brake release delay

Menu 14

Menu 14 parameters are exactly the same on Commander SE and Commander SK

Menu 21

All Commander SE menu 21 parameters are available and the same as on Commander SK. However, in addition there are some new parameters on Commander SK.

Parameter number	Description
21.16	Motor 2 thermal time constant
21.29	Motor 2 symmetrical current limit

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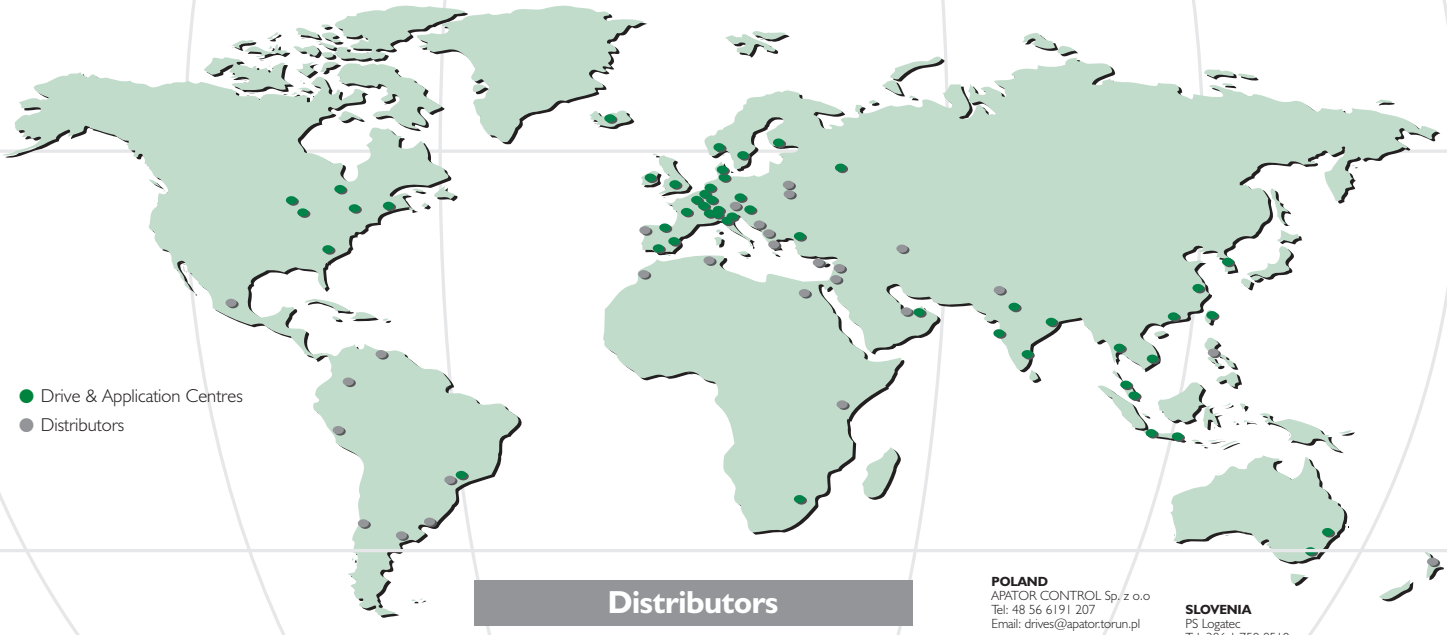

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