



DIGIDRIVE SK

AC variable speed drive for induction motors

Technical data

General Information

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation or adjustment of the optional parameters of the equipment or from mismatching the variable speed drive with the motor.

The contents of this guide are believed to be correct at the time of printing. In the interests of commitment to a policy of continuous development and improvement, the manufacturer reserves the right to change the specification of the product or its performance, or the content of the guide without notice.

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Drive software version

This product is supplied with the latest version of user-interface and machine control software. If this product is to be used in a new or existing system with other drives, there may be some differences between their software and the software in this product. These differences may cause the product to function differently. This may also apply to drives returned from LEROY-SOMER.

If there is any doubt, please contact LEROY-SOMER.

Environmental Statement

LEROY-SOMER is committed to minimising the environmental impacts of its manufacturing operations and of its products throughout their life cycle. To this end, we operate an Environmental Management System (EMS) which is certified to the International Standard ISO 14001.

The electronic variable speed drives manufactured by LEROY-SOMER have the potential to save energy and (through increased machine/process efficiency) reduce raw material consumption and scrap throughout their long working lifetime. In typical applications, these positive environmental effects far outweigh the negative impacts of product manufacture and end-of-life disposal.

Nevertheless, when the products eventually reach the end of their useful life, they can very easily be dismantled into their major component parts for efficient recycling. Many parts snap together and can be separated without the use of tools, while other parts are secured with conventional screws. Virtually all parts of the product are suitable for recycling.

Product packaging is of good quality and can be re-used. Large products are packed in wooden crates, while smaller products come in strong cardboard cartons which themselves have a high-recycled fibre content. If not re-used, these containers can be recycled. Polythene, used on the protective film and bags from wrapping product, can be recycled in the same way. LEROY-SOMER' packaging strategy favours easily recyclable materials of low environmental impact, and regular reviews identify opportunities for improvement.

When preparing to recycle or dispose of any product or packaging, please observe local legislation and best practice.

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Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lino ohokoo	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC IIIters	Line chokes	lengths	data	specification	types	Options

1 Technical data

Figure 1-1 Model code explanation

DIGIDRIVE SK 0.5 M
L 1 phase 200-240V (M), 1 or 3 phases 200-240V (M/TL), 3 phases 380-480V (T)
Type Variable speed drive range
With open loop control

1.1 Digidrive SK 200V units

Table 1-1 Ratings

	LS	0.5M	1M	1.2M	1.5M	2M	/TL	2.5	//TL	3.5N	//TL
MODEL	ст	SKA12	SKA12	SKA12	SKA12	SKBD	200110	SKBD	200150	SKCD	200220
	CI	00025	00037	00055	00075	1ph	3ph	1ph	3ph	1ph	3ph
AC supply voltage and frequency		Single pha	se 200 to 24	0V ±10% 48	Hz to 62Hz	Single	or 3 phas	e 200 to	240V ±10	% 48Hz t	o 62Hz
Input displacement factor (cos∅)						>0.97					
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 phas	e, 0 to drive	rating (24	0), 0 to 1	500Hz			
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 curren	t (A)*		•	•	•		9.2		12.6		17
Typical inrush current (A) (<10ms)			17	7.9			8	.9		6.	.0
Weight (kg)		0.	95	1	.0	1.	3	1	.4	2.	.1
Weight (Ib)		2	.1	2	.2	2.	9	3	.1	4.	.6
Internal EMC filter				•		Yes		•			
DC bus terminals			Ν	10			es				
Din rail mounting					Yes					N	0

* For 3ph input only at 2% negative phase sequence.

Table 1-2 Cables

	LS	0.5M	1M	1.2M	1.5M	2M	/TL	2.5	//TL	3.5N	//TL	
MODEL	ст	SKA12	SKA12	SKA12	SKA12	SKBD	200110	SKBD	200150	SKCD	200220	
	01	00025	00037	00055	00075	1ph	3ph	1ph	3ph	1ph	3ph	
Recommended input supply fuse	(A)	6	1	0	16	16 10 20 16 25					20	
Control cable	(mm ²)		≥().5	≥0.5							
	(AWG)		2	20		20						
Recommended input cable	(mm ²)		1.0		1.5	2.5	1.5	2.5	1.5	4.0	2.5	
	(AWG)		16		14	12 14 12 14				10	12	
Recommended motor cable	(mm ²)	1.0					1		1.	.5		
	(AWG)		1	6			1	6		1	4	
Recommended brake resistor	(mm ²)		1	.0			1	.0		1.5		
	(AWG)		1	6		16				14		

Table 1-3 Braking resistor

	LS	0.5M	1M	1.2M	1.5M	2M	/TL	2.5	//TL	3.5M/TL	
MODEL	СТ	SKA12 SKA12 SKA1		SKA12	SKA12	SKBD	200110	SKBD200150		SKCD200220	
51		00025	00037	00055	00075	1ph	3ph	1ph	3ph	1ph	3ph
Minimum braking resistor value (Ω	2)			2	28						
Recommended braking resistor va	alue (Ω)		200		150	100				50	
Resistor peak power rating (kW)			0.9		1.1		1		3.4		
Maximum braking current (A)		14.8				14.8					

data and losses levels design installation two metrics line cloces lengths data specification types	Technical Derat	ting curves Drive vo d losses leve	ge DC bus design	Mechanical installation	EMC filters	Line chokes	Motor cable lengths	General data	I/O specification	Supply types	Options
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Table 1-4 Cooling fan

	LS	0.5M	1M	1.2M	1.5M	2M	/TL	2.5	//TL	3.5N	M/TL
MODEL	СТ	SKA12	SKA12	SKA12	SKA12	SKBD	200110	SKBD	200150	SKCD200220	
	01	00025	00037	00055	00075	1ph	3ph	1ph	3ph	1ph	3ph
Cooling fan fitted		Ν	lo	Yes Yes							
Air flow	(feet ³ /minute)							3	.8	_	
(m ³ /minute)			0.4								

1.2 Digidrive SK 400V units

Table 1-5 Ratings

	LS	1T	1.2T	1.5T	2T	2.5T	3.5T	4.5T	5.5T		
MODEL	СТ	SKB34	SKB34	SKB34	SKB34	SKB34	SKC34	SKC34	SKC34		
	01	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 (cosØ)					>0	.97					
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 rat	ing (480), 0 f	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			
Weight (kg)			1.2		1	.3		2.1			
Weight (lb)			2.7		2	.9		4.6			
Internal EMC filter		Yes									
DC bus terminals					Ye	es					
Din rail mounting		Yes No									

* For 3ph input only at 2% negative phase sequence.

Table 1-6 Cables

	LS	1T	1.2T	1.5T	2T	2.5T	3.5T	4.5T	5.5T
MODEL	СТ	SKB34	SKB34	SKB34	SKB34	SKB34	SKC34	SKC34	SKC34
		00037	00055	00075	00110	00150	00220	00300	00400
Recommended input supply fuse	(A)		6	6		10		16	
Control cable	(mm ²)	≥0.5						≥0.5	
	(AWG)			20	20				
Recommended input cable	(mm ²)			1.0			1	2.5	
	(AWG)			16			1	4	12
Recommended motor cable	(mm ²)			1.0			1	.0	1.5
	(AWG)			16			1	6	14
Recommended brake resistor cable	(mm ²)	1.5 1.5			1.5				
	(AWG)			14	14				

Table 1-7 Braking resistor

	LS	1T	1.2T	1.5T	2T	2.5T	3.5T	4.5T	5.5T
MODEL	СТ	SKB34	SKB34	SKB34	SKB34	SKB34	SKC34	SKC34	SKC34
		00037	00055	00075	00110	00150	00220	00300	00400
Minimum braking resistor value $(\Omega)^{**}$	· · · · ·			100			100	5	5
Recommended braking resistor value (2)		-	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		

Table 1-8 Cooling fan

	LS	1T	1.2T	1.5T	2T	2.5T	3.5T	4.5T	5.5T
MODEL	СТ	SKB34	SKB34	SKB34	SKB34	SKB34	SKC34	SKC34	SKC34
	•••	00037	00055	00075	00110	00150	00220	00300	00400
Cooling fan fitted			No		Ye	es	Yes		
Air flow	(feet ³ /minute)						3.8		
	(m ³ /minute)						0.4		

Technical	Derating curves Dri	ive voltage	DC bus	Mechanical	EMC filtoro	Lino ohokoo	Motor cable	General	I/O	Supply types	Ontiona
data	and losses	levels	design	installation	EMC IIIters	Line chokes	lengths	data	specification	Supply types	Options

2 Derating curves and losses

2.1 Derating curves

NOTE

The de-rating curves are based on the results of heatruns that are carried out to measure temperatures at various key points (components) within the drive at different switching frequencies / loads /ambient temperatures: These key points are things like:

- Heatsink
- Bridge rectifier
- IGBTs
- DC bus capacitors
- Various electrolytic capacitorsVarious resistors
- etc

It is not always the heatsink temperature that is the limiting factor for the de-rating curves.

At 3 and 6kHz, the limiting factor tends to be capacitor temperatures.

At 12 and 18kHz, the limiting factor tends to be the heatsink temperature.

At 3 and 6kHz, operating outside the de-rating curves will cause some of the capacitors within the drive to run outside of their maximum operating temperature and this could lead to the drives design operating lifetime being reduced.

At 12 and 18kHz, operating outside the de-rating curves will cause the heatsink temperature to increase and may cause the drive to trip on Oht2. If the auto-switching frequency change is enabled (Pr **5.35** = 0 [by default]), the drive will automatically decrease the switching frequency when the heatsink temperature rises above pre-determined levels to reduce the heatsink temperature. When the drive switches down the switching frequency, the drives display will flash 'hot'.

It is important that operating within these de-rating curves is observed.

Figure 2-1 Digidrive SK Size A 0.25kW derating curve











2.2 Drive Losses

The following tables indicate the total drive losses at the de-rating curve points.

Ambient Temperature (°C)	Loss (W)							
And the remperature (0)	3kHz	6kHz	12kHz	18kHz				
30	30	32	35	35				
40	30	32	35	35				
50	29	30	33	32				
55	29	29	33	31				

 Table 2-1
 Digidrive SK size A 0.25kW losses

Ambient Temperature (°C)	Loss (W)						
	3kHz	6kHz	12kHz	18kHz			
30	33	33	35	35			
40	33	33	35	35			
50	29	30	33	32			
55	29	29	33	31			

Table 2-3 Digidrive SK size A 0.55kW losses

Ambient Temperature (°C)	Loss (W)						
Ambient Temperature (0)	3kHz	6kHz	12kHz	18kHz			
30	42	46	53	61			
40	42	43	44	47			
50	35	36	37	38			
55	31	33					

Technical	Derating curves Drive v	oltage DC b	us Mechanical	EMC filtore	Line chokes	Motor cable	General	I/O	Supply types	Ontions
data	and losses lev	els desig	n installation	LINC Inters	LINE CHOKES	lengths	data	specification	Supply types	Options

Table 2-4 Digidrive SK size A 0.75kW losses

Ambient Temperature (°C)	Loss (W)						
Ambient Temperature (C)	3kHz	6kHz	12kHz	18kHz			
30	48	50	59	62			
40	48	43	44	47			
50	35	36	37	38			
55	31	33					

Technical	Derating curves	Drive voltage	DC bus	Mechanical		Line shekes	Motor cable	General	I/O	Cumply types	Ontiona
data	and losses	levels	design	installation	EIVIC IIILEIS	Line chokes	lengths	data	specification	Supply types	Options

3 Drive voltage levels

Condition	200V drives	400V drives
OV trip level	415 Vdc	830 Vdc
Braking level	390 Vdc	780 Vdc
Rated upper level (AC mains +10% x 1.4142)	373 Vdc	747 Vdc
Rated lower level (AC mains -10% x 1.4142)	255 Vdc	484 Vdc
*UV reset level	215 Vdc	425 Vdc
UV trip level	175 Vdc	330 Vdc
Standard ramp voltage	375 Vdc	EUR: 750 Vdc USA: 775 Vdc

* These are the absolute minimum DC voltages that the drive can be supplied with. If the drive is not supplied with at least this voltage, it will not reset out of a UU trip at power up.

Output frequency: 0 to 1500Hz

Output voltage: 3 phase, 0 to drive rating (240 or 480Vac maximum set by Pr 08).

Low DC bus operation (Pr 6.10)

- 0 Low DC bus operation disabled
- 1 Low DC bus operation enabled

The Low DC bus operation is designed to enable 3 phase 400VAC (medium voltage) Digidrive SKs to be run off a single phase 200VAC (low voltage) supply in the event of a primary 400VAC supply failure.

When the primary supply fails, the back up supply can be switched in. This will allow the drive to control the motor at a reduced power, for example to move an elevator up or down to the next floor.

There is no de-rating as such when low DC bus operation is enabled however the power will be limited by the reduced voltage and ripple generated on the DC bus of the drive.

Figure 3-1 Low DC bus operation



When Pr 6.10 is enabled and the DC bus voltage is less than 330VDC, the drives display will flash LoAC (Low AC) to indicate that it is running off the low voltage back up supply.

NOTE

This mode is designed for use with a backup power supply and not for using a 400VAC (medium voltage) Digidrive SK in a 200VAC (low voltage) application. As shown in the above diagram, the drives power down save parameters are saved at point 2. If the drive was to be used on a 200VAC supply, the DC bus will never fall through point 2 and power down save parameters will not be saved.

Low DC bus operation voltage levels (Pr 6.10 enabled)

>425VDC - normal operation <330VDC - LoAC operation <230VDC - UV trip

Technical	Derating curves	Orive voltage	DC bus	Mechanical	EMC filtoro	Lino ohokoo	Motor cable	General	I/O	Supply types	Ontiona
data	and losses	levels	design	installation	EIVIC IIILEIS	LINE CHOKES	lengths	data	specification	Supply types	Options

3.1 Input voltage

3.1.1 Single phase 200V to 240V ±10%

48Hz to 62Hz

3.1.2 Three phase 200V

200V to 240V ±10³/ 48Hz to 62Hz Phase imbalance 3% (between phases) or 2% negative phase sequence (IEC 146-1-1 Immunity class C)

3.1.3 Three phase 400V

380V to 480V ±10%

48Hz to 62Hz

Phase imbalance 3% (between phases) or 2% negative phase sequence (IEC 146-1-1 Immunity class C)

It is possible to run the drives on lower supply voltages than those specified above (up to -20%) but only with de-rating of the product. Running a 400V product on a 230V single phase supply (at a very much reduced output power) is possible on frame sizes B & C.

On products without a DC bus choke (up to 4kW), the maximum supply capacity connected to the drive without using external line chokes will be 5kA short circuit current.

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Line ebekee	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC IIIters	Line chokes	lengths	data	specification	types	Options

4 DC bus design

Table 4-1 Digidrive SK 200V units DC bus data

LS Model	CT Model	DC Bus Capacitance μF	DC bus inductance mH	Inrush resistance Ω at 25°C
0.5M	SKA1200025	330		22
1M	SKA1200037	390		22
1.2M	SKA1200055	660		22
1.5M	SKA1200075	780		22
2M/TL	SKBD200110	940		44
2.5M/TL	SKBD200150	1410		44
3.5M/TL	SKCD200220	1880		66

Table 4-2 Digidrive SK 400V units DC bus data

LS Model	CT Model	DC Bus Capacitance μF	DC bus inductance mH	Inrush resistance Ω at 25°C
1T	SKB3400037	165		44
1.2T	SKB3400055	165		44
1.5T	SKB3400075	165		44
2T	SKB3400110	195		44
2.5T	SKB3400150	235		44
3.5T	SKC3400220	470		66
4.5T	SKC3400300	470		66
5.5T	SKC3400400	470		66

Table 4-3 Inrush resistor

Frame	Voltage	Power Rating (kW)	Inrush Resistor (Ω)	Number in series	Effective Inrush Resistance (Ω)	Pk Inrush Current (A)
А	200	0.25	22	1	22	17.9
А	200	0.37	22	1	22	17.9
А	200	0.55	22	1	22	17.9
А	200	0.75	22	1	22	17.9
В	200	1.1	22	2	44	8.9
В	200	1.5	22	2	44	8.9
В	400	0.37	22	2	44	17.9
В	400	0.55	22	2	44	17.9
В	400	0.75	22	2	44	17.9
В	400	1.1	22	2	44	17.9
В	400	1.5	22	2	44	17.9
С	200	2.2	22	3	66	6.0
С	400	2.2	22	3	66	11.9
С	400	3	22	3	66	11.9
С	400	4	22	3	66	11.9

Technical	Derating curves	Drive voltage	DC bus	Mechanical EMC filter	Line ebekee	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	LITIE CHOKES	lengths	data	specification	types	Options

5 Mechanical installation

5.1 Mechanical dimensions

Figure 5-1 Size A mounting dimensions



NOTE

If DIN rail mounting is used in an installation where the drive is to be subjected to shock or vibration, it is recommended that the bottom mounting screws are used to secure the drive to the back plate. If the installation is going to be subjected to heavy shock and vibration, then it is recommended that the drive is surface mounted rather than DIN rail mounted



NOTE

If DIN rail mounting is used in an installation where the drive is to be subjected to shock or vibration, it is recommended that the bottom mounting screws are used to secure the drive to the back plate. If the installation is going to be subjected to heavy shock and vibration, then it is recommended that the drive is surface mounted rather than DIN rail mounted



Technical	Derating curves	Drive voltage	DC bus	Mechanical TMC filters	Line shekes	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	Line chokes	lengths	data	specification	types	Options

5.2 Minimum mounting clearances

Figure 5-4 Minimum mounting clearances



Drivo sizo		4	E	3	С		
Drive Size	mm	in	mm	in	mm	in	
A			0	0			
B (≤0.75kW)	10	0.39	10	0.39	100	3.94	
B (≥1.1kW)			0	0			
С							

	data and losses levels design installation EMC filters Line chokes lengths data specification types Option	Technical Derating curves Drive voltage DC hus Mechanical Motor cable General I/O Supply	Technical data	Derating curves and losses	Drive voltage levels	DC bus design	Mechanical installation	EMC filters	Line chokes	Motor cable lengths	General data	I/O specification	Supply types	Options
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6 EMC filters

EMC filters are available as optional extra parts where required.

Table 6-1 EMC filters

Used	with	Number of	0 1 11 1	Filte	er type	Mou	nting	Max motor
LS Model	CT Model	phases	Schaffner reference	Standard	Low leakage	Footprint	Side	cable length (m)
	SKA1200025		FS6512-12-07	Y		Y	Y	50m
0.5M and 1M	and SKA1200037	1	FS6512-12-07-LL		Y	Y	Y	30m
	SKA1200055		FS6512-12-07	Y		Y	Y	75m
1.2M and 1.5M	and SKA1200075	1	FS6512-12-07-LL		Y	Y	Y	30m
2M/TL to	SKBD200110		FS6513-20-07	Y		Y	Y	
2.5M/TL	to SKBD200150	1	FS6513-20-07-LL		Y	Y	Y	
2M/TL to	SKBD200110		FS6513-10-07	Y		Y	Y	
2.5M/TL	to SKBD200150	3	FS6513-10-07-LL		Y	Y	Y	
1T to 2 5T	SKB3400037 to	3	FS6513-10-07	Y		Y	Y	
11 to 2.51	SKB3400150	5	FS6513-10-07-LL		Y	Y	Y	
3 5M/TI	SKCD200220	1	FS6514-24-07	Y		Y	Y	
0.010//12	GIGDZOUZZO		FS6514-24-07-LL		Y	Y	Y	
3 5M/TI	SKCD200220	3	FS6514-14-07	Y		Y	Y	
0.000/12	01002200220	5	FS6514-14-07-LL		Y	Y	Y	
3 5T to 5 5T	SKC3400220 to	3	FS6514-14-07	Y		Y	Y	
0.01 10 0.01	SKC3400400	5	FS6514-14-07-LL		Y	Y	Y	

6.1 Filter data

Table 6-2 EMC filter data

Used	with	Number of phases	Schaffner reference	Power losses at rated current	IP rating	Wei	ght	Operational leakage current	Worstcase leakage current	Filter te tighte tore	erminal ening que	Filter current rating
LS Model	CT Model			w		Kg	lb	mA	mA	Nm	lb ft	Α
	SKA1200025		FS6512-12-07	4.1	20	0.42	0.9	25.7	49.5	0.8	0.6	12
0.5M to 1.5M	to SKA1200075	1	FS6512-12-07-LL	6.7	20	0.44	1.0	2.5	5	0.8	0.6	12
2M/TL to	SKBD200110		FS6513-20-07	11.2	20	0.57	1.3	25.7	50	0.8	0.6	20
2.5M/TL	to SKBD200150	1	FS6513-20-07-LL	12.8	20	0.64	1.4	3.6	7	0.8	0.6	20
2M/TL to	SKBD200110	_	FS6513-10-07	7.5	20	0.63	1.4	40	137.2	0.8	0.6	10
2.5M/TL	to SKBD200150	3	FS6513-10-07-LL	7.5	20	0.63	1.4	3	18.3	0.8	0.6	10
	SKB3400037		FS6513-10-07	7.5	20	0.63	1.4	40	137.2	0.8	0.6	10
1T to 2.5T	to SKB3400150	3	FS6513-10-07-LL	7.5	20	0.63	1.4	3	18.3	0.8	0.6	10
3 5M/TI	SKCD200220	1	FS6514-24-07	16.2	20	0.84	1.9	25.7	50	0.8	0.6	24
0.000/12	ONODE00220	•	FS6514-24-07-LL	18.5	20	0.91	2.0	3.6	7	0.8	0.6	24
3.5M/TI	SKCD200220	3	FS6514-14-07	11.8	20	0.75	1.7	40	137.2	0.8	0.6	14
0.000712	GITODEGGEEG	Ū	FS6514-14-07-LL	11.8	20	0.74	1.6	3	18.3	0.8	0.6	14
	SKC3400220		FS6514-14-07	11.8	20	0.75	1.7	40	137.2	0.8	0.6	14
3.51 to 5.5T	to SKC3400400	3	FS6514-14-07-LL	11.8	20	0.74	1.6	3	18.3	0.8	0.6	14

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lino ohokoo	Motor cable	General	I/O	Supply	Ontiono
data	and losses	levels	design	installation	EMC filters	Line chokes	lengths	data	specification	types	Options

6.2 Conformity

Table 6-3 Conformity

U	sed with	Number	Motor					Filter a	nd swite	hing fre	quency				
		of	cable length		Inte	ernal			Stan	dard			Low le	eakage	
LS WOOD	CIWODEI	phases	m	3kHz	6kHz	12kHz	18kHz	3kHz	6kHz	12kHz	18kHz	3kHz	6kHz	12kHz	18kHz
			5	E2U	E2U	E2R	E2R	R	I	I	I	R	I	I	Ι
0.5M and	SKA1200025 and		10	E2U	E2R	E2R	E2R	R	Ι	Ι	Ι	R	Ι	I	I
0.5W and 1M	SKA1200025 and SKA1200037	1	20		E	2R		R	Ι	Ι	Ι			I	
	0.0.120000		30		E	2R				I		Ι			
			50		E	2R			_	I	_				-
			5	E2U	E2U	E2R	E2R	R	I	I	I	R	I	I	I
			10	E2U	E2R	E2R	E2R	R	Ι	-	Ι	R	Ι	I	Ι
1.2M and	SKA1200055 and	1	20		E	2R		R	Ι	-	Ι				
1.5M	SKA1200075	·	30		E	2R				I		Ι			
			50		E	2R				I					
			75		E	2R		I	I	I	E2U				
			5												
2M/TL to	SKBD200110 to		15												
2.5M/L	SKBD200150	1	20												
			50												
			80												
			5												
2M/TL to	SKBD200110 to		15												
2.5M/L	SKBD200150	3	20												
-			50												
			80												
			5												
	SKB3400037 to		15												
1T to 2.5T	SKB3400150	3	20												
			50												
			80												
			5												
			15												
3.5M/TL	SKCD200110	1	20												
			50												
			80												
			5												
			15												
3.5M/TL	SKCD200110	3	20												
			50												
			80												
			5												
3 5T to	SKC3400220 to		15												
5.5T	SKC3400400	3	20												
			50												
			80												

data and losses levels design installation lengths data specification types	data data	and losses	levels	design	installation	EMC filters	Line chokes	Motor cable lengths	General data	I/O specification	types	Options
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Key to Table 6-3 Conformity

The requirements are listed in descending order of severity, so that if a particular requirement is met then all requirements listed after it are also met.

	Standard	Description	Frequency range	Limits	Application			
	EN 61000-6-3	Generic emission standard for the	0.15 - 0.5MHz limits decrease linearly with log frequency	66-56dBμV quasi peak 56-46dBμV average				
P	(previously EN 50081-1)	residential commercial and light - industrial	0.5 - 5MHz	56dBμV quasi peak 46dBμV average	lines			
		environment	5 - 30MHz	60dBμV quasi peak 50dBμV average				
	EN 61800-3 IEC 61800-3	Product standard for adjustable speed power drive systems	Requirements for the	e first environment ¹ , with distribution	unrestricted			
	EN 61000-6-4	Generic emission	0.15 - 0.5MHz	79dBμV quasi peak 66dBμV average	AC supply			
I	50081-2)	industrial environment	0.5 -30MHz	73dBμV quasi peak lines 60dBμV average				
	EN 61800-3 IEC 61800-3	Product standard for adjustable speed power drive systems	Requirements for the first environment ¹ with restricted distribution ²					
E2U	EN 61800-3 IEC 61800-3	Product standard for adjustable speed power drive systems	Requirements for the	second environment with distribution	n unrestricted			
E2R	EN 61800-3 IEC 61800-3	Product standard for adjustable speed power drive systems	Requirements for th	e second environment wi distribution ²	th restricted			
	Operation		this condition is not reco	ommended				
1	The first env	ironment is one where the	e the low voltage supply network also supplies domestic premises					
2	When di	stribution is restricted, driv	ves are available only to	installers with EMC comp	etence			



This caution applies where the drive is used in the first environment according to EN 61800-3.

This is a product of the restricted distribution class according to IEC 61800-3. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

NOTE

Where the drive is incorporated into a system with rated input current exceeding 100A, the higher emission limits of EN 61800-3 for the second environment are applicable, and no filter is then required.

NOTE

Operation without an external filter is a practical cost-effective possibility in an industrial installation where existing levels of electrical noise are likely to be high, and any electronic equipment in operation has been designed for such an environment. This is in accordance with EN 61800-3 in the second environment, with restricted distribution. There is some risk of disturbance to other equipment, and in this case the user and supplier of the drive system must jointly take responsibility for correcting any problem which occurs.

Technical data	Derating curves and losses	Drive voltage levels	DC bus design	Mechanical installation	EMC filters	Line chokes	Motor cable lengths	General data	I/O specification	Supply types	Options
Table 6-4	EMC filter dim	nensions									



Schaffner part no.	Α	В	С	D	E	F	Н	U	V	w	Х	Y	Z
FS6512-12-07	155mm (6.10in)	183.5mm (7.22in)	45mm (1.77in)	40mm (1.57in)	20mm (0.78in)	144mm (5.66in)	203mm (7.99in)	16 AWG	M4	75mm (2.95in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6512-12-07-LL	155mm (6.10in)	183.5mm (7.22in)	45mm (1.77in)	40mm (1.57in)	20mm (0.78in)	144mm (5.66in)	203mm (7.99in)	16 AWG	M4	75mm (2.95in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6513-20-07	209mm (8.22in)	237.7mm (9.35in)	50mm (1.96in)	40mm (1.57in)	20mm (0.78in)	193.5mm (7.61in)	257.2mm (10.12in)	14 AWG	M4	80mm (3.15in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6513-20-07-LL	209mm (8.22in)	237.7mm (9.35in)	50mm (1.96in)	40mm (1.57in)	20mm (0.78in)	193.5mm (7.61in)	257.2mm (10.12in)	14 AWG	M4	80mm (3.15in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6513-10-07	209mm (8.22in)	237.7mm (9.35in)	50mm (1.96in)	40mm (1.57in)	20mm (0.78in)	193.5mm (7.61in)	257.2mm (10.12in)	14 AWG	M4	80mm (3.15in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6513-10-07-LL	209mm (8.22in)	237.7mm (9.35in)	50mm (1.96in)	40mm (1.57in)	20mm (0.78in)	193.5mm (7.61in)	257.2mm (10.12in)	14 AWG	M4	80mm (3.15in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6514-24-07	260mm (10.23in)	288.5mm (11.35in)	65mm (2.55in)	45mm (1.77in)	20mm (0.78in)	244mm (9.60in)	308mm (12.12in)	12 AWG	M4	94mm (3.70in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6514-24-07-LL	260mm (10.23in)	288.5mm (11.35in)	65mm (2.55in)	45mm (1.77in)	20mm (0.78in)	244mm (9.60in)	308mm (12.12in)	12 AWG	M4	94mm (3.70in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6514-14-07	260mm (10.23in)	288.5mm (11.35in)	65mm (2.55in)	45mm (1.77in)	20mm (0.78in)	244mm (9.60in)	308mm (12.12in)	16 AWG	M4	94mm (3.70in)	M4	8.7mm (0.34in)	4.5mm (0.17in)
FS6514-14-07-LL	260mm (10.23in)	288.5mm (11.35in)	65mm (2.55in)	45mm (1.77in)	20mm (0.78in)	244mm (9.60in)	308mm (12.12in)	16 AWG	M4	94mm (3.70in)	M4	8.7mm (0.34in)	4.5mm (0.17in)

|--|

7 Line chokes

Line chokes can be used to attenuate transient interference from the mains supply which could affect the drive.

Table 7-1 Characteristics

Digidrive SK ratings	Soff reference	Current	Inductance	
Digitarive on ratings	Sen reference	(A)	mH	
0.5M to 1.2M	4.5A/16mH Consult LEROY-SOMER	4.5	16	
1 5M and 2M/TI	7.3A/1mH	13	1	
	Consult LEROY-SOMER	1.0	•	
2 5M/TL and 3 5M/TL	19A/0.5mH	19	0.5	
2.000/12 010 0.000/12	Consult LEROY-SOMER	10	0.0	
1T to 3.5T	9 ST 2.5	8.6	2.5	
4.5T and 5.5T	16 ST 1.5	16	1.5	

Dimensions and weight

These are given by way of example and may vary depending on the manufacturer.



Table 7-2 Dimensions and weight

Choke reference	L	Н	Р	Weight
onoke reference	(mm)	(mm)	(mm)	(kg)
4.5A/16mH	82	90	85	
7.3A/1mH	82	100	75	
19A/0.5mH	82	105	90	
9 ST 2.5	140	160	85	1.8

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lino obokoo	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC IIIters	Line chokes	lengths	data	specification	types	Options

8 Motor cable lengths

Table 8-1 Motor cable lengths

Drive frame size	kW rating	Maximum motor cable length
Δ	0.25 and 0.37	50m
~	0.55 and 0.75	75m
В		100m
С		100m

The capacitive loading of the drive by the motor cable means that the cable length limits shown in table 8-1 must be observed. Failure to do so can result in spurious OI.AC tripping of the drive. If longer cable lengths are required, consult LEROY-SOMER.

The maximum cable lengths were measured using cable with capacitance of 130pF/m.

This capacitance was measured by taking one phase as one node and the screen (shield) and earth (ground) (if any) as the other node, then measuring the capacitance between the two points.

Technical data	Derating curves and losses	Drive voltage levels	DC bus design	Mechanical installation	EMC filters	Line chokes	Motor cable lengths	General data	I/O specification	Supply types	Options
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9 General data

9.1 Ratings

9.1.1 IP rating

IP20

• The drive complies with the requirements of IP20 as standard. **IP4X**

• The top surface of the drive complies with the requirements of IP4X with the optional top cover fitted.

First digit: Protection against contact and ingress of foreign bodies.

2 - Protection against medium size foreign bodies Ø> 12mm (finger)

Second digit: protection against ingress of water.

0 - No protection

9.2 Input phase imbalance

3% between phases or 2% negative phase sequence.

9.3 Ambient temperature

-10°C (14°F) to 40°C (104°F) at 3kHz

Operation up to 55°C (131°F) with de-rating.

(see de-rating curves for further information)

NOTE

The drive can be powered up and run at a minimum temperature of -10°C (14°F).

9.4 Storage temperature

-40 to +60°C (-40 to +140°F) for 12 months max

9.5 Altitude

Rated altitude: 1000m (3250 ft)

Reduce the normal full load current by 1% for every 100m (325 ft) above 1000m (3250 ft) up to a maximum of 3000m (9750 ft).

9.6 Humidity

Maximum relative humidity 95% (non-condensing).

9.7 Storage humidity

Maximum relative humidity 93%, 40°C, 4 days.

9.8 Pollution degree

Designed for operation in Pollution degree 2 environments (dry, non-conductive contamination only)

9.9 Materials

9.10 Vibration

9.10.1 Random

Standard: In accordance with IEC68-2-64 and IEC68-2-36: Test Fh

Severity: 1.0 m²/s³ (0.01g²/Hz) ASD from 5 to 20Hz, -3dB/octave from 20 to 200Hz

Duration: 30 minutes in each of 3 mutually perpendicular axes.

9.10.2 Sinusiodal

Standard:	IEC68-2-6: Test Fc
Frequency range:	2 to 500Hz
Severity:	3.5mm peak displacement from 2 to 9Hz
	10m/s ² peak displacement from 9 to 200Hz
	15m/s ² peak displacement from 200 to 500Hz
Sweep rate:	1 octave/minute
Duration:	15 minutes in each of 3 mutually perpendicular axes

9.10.3 Bump

Standard:IEC68-2-29: Test EbSeverity:18g, 6ms, half sineNumber of bumps:600 (100 in each direction of axes)

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Line chekee	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	ENIC IIIters	Line chokes	lengths	data	specification	types	Options

9.11 Frequency accuracy

0.01%

9.12 Resolution

0.1Hz

9.13 Output frequency range

0 to 1500Hz

9.14 Starts per hour

Electric starts

With the supply permanently connected the number of electronic motor starts per hour is only limited by motor and drive thermal limits.

Power starts

The number of starts by connection of the ac supply is limited. The start up circuit will allow for three consecutive starts at 3-second intervals on initial power up. Exceeding the rated number of starts per hour, presented in the table below, could result in damage to the start up circuit.

Drive frame size	Maximum AC line starts per hour evenly spaced in time
A, B & C	20

9.15 Start-up time

The soft-start circuit must charge the dc bus and SMPS outputs and stabilise to allow the control processor to start operation in the following times:-

Drive frame size	Maximum time taken to charge DC bus and SMPS outputs to stabilise
A, B & C	1s

9.16 Serial communications

Modbus RTU

9.17 Switching frequencies

The software allows for the following switching frequencies: Size A & B: 3, 6, 12, 18kHz Size C: 3, 6, 12kHz

9.18 Harmonics

The Digidrive SK industrial AC variable speed drives are classified as class A professional equipment as defined in BS EN61000-3-2: 1995. Drives with input power equal to or below 1kW that do not meet the requirements of EN61000-3-2 are to be corrected, to ensure compliance, at the point of installation using suitable AC line chokes. See 7.1 (Reactor current ratings)

9.19 Acoustic noise

Frame	Power ratings	Condition	Max SPL measurement (dBA)
A	All ratings	N/A	None contributed by drive (no fan).
В	≤0.75kW	N/A	None contributed by drive (no fan).
В	≥1.1kW	rd mode, fan on	50
С	All ratings	rd mode, fan on	53

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lino ohokoo	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC IIIters	LINE CHOKES	lengths	data	specification	types	Options

10 I/O specification



The control circuits are isolated from the power circuits in the drive by basic insulation (single insulation) only. The installer must ensure that the external control circuits are insulated from human contact by at least one layer of insulation (supplementary insulation) rated for use at the AC supply voltage.



If the control circuits are to be connected to other circuits classified as Safety Extra Low Voltage (SELV) (e.g. to personal computer), an additional isolating barrier must be included in order to maintain the SELV classification.

T1 0V comm

0V common	
-----------	--

T2 Analog input 1 (A1), either voltage or current
Voltage : Current input	0 to 10V : mA as parameter range
Parameter range	4-20, 20-4, 0-20, 20-0, 420, 204, Volt
Scaling	Input range automatically scaled to Pr 01 (<i>Minimum set speed</i>) to Pr 02 (<i>Maximum set speed</i>)
Input impedance	200Ω (current) : 100kΩ (voltage)
Resolution	0.1%
Accuracy	±2%
Sample time	6ms
Absolute maximum voltage range	+35V to -18V with respect to 0V common

Т3	+10V reference output			
Maximum output	t current	5mA		
Protection		Tolerates continuous short circuit to 0V		
Accuracy		± 2%		

T4 Analog input 2 (A2)	Analog input 2 (A2), either voltage or digital input				
Voltage : Digital input	0 to +10V : 0 to +24V				
Scaling (as voltage input)	Input range automatically scaled to Pr 01 <i>Minimum set</i> speed / Pr 02 <i>Maximum set speed</i>				
Input impedance	100kΩ (voltage) : 6k8 (digital input)				
Resolution	0.1%				
Accuracy	±2%				
Sample time	6ms				
Nominal threshold voltage	+10V (positive logic only)				
Absolute maximum voltage range	+35V to -18V with respect to 0V common				

T5 T6	Status relay - Drive healthy (Normally open)			
Voltage rating		240Vac 30DC		
Current rating		2A 6A resistive		
Contact isolation		1.5kVac (over voltage category II)		
Update time		1.5ms		
Operation of con	tact	OPEN - AC supply removed from drive. - AC supply applied to drive with drive in tripped condition. CLOSED - AC supply applied to drive with drive in a 'ready to run' or 'running' condition (not tripped)		

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lino ohokoo	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC IIIters	Line chokes	lengths	data	specification	types	Options



Provide fuse or other over-current protection in status relay circuit.

- Anal	og voltage output - Motor speed
Voltage output	0 to +10V
Scaling	0V represents 0Hz/rpm output +10V represents the value in Pr 02 , maximum set speed
Maximum output currer	it 5mA
Resolution	0.1%
Accuracy	± 5%
Update time	6ms
Protection	Tolerates continuous short circuit to 0V

B2 -	+24V output	
Maximum output current		100mA
Protection		Tolerates continuous short circuit to 0V
Accuracy		± 15%

B3	Digital output - Zero speed		
Voltage range		0 to +24V	
Maximum output current		50mA at +24V (current source)	
Output impedance		6.8kΩ	
Update time		1.5ms	
Absolute maximum voltage range		+35V to -1V with respect to 0V common	

NOTE

The total available current from the digital output plus the +24V output is 100mA

B4Digital Input - EnabB5Digital Input - Run FB6Digital Input - Run FB7Digital Input - Local	Digital Input - Enable/Reset */** Digital Input - Run Forward ** Digital Input - Run Reverse ** Digital Input - Local/Remote speed reference select (A1/A2)			
Logic	Positive logic only			
Voltage range	0 to +24V			
Input impedance	6.8kΩ			
Sample time	1.5ms			
Nominal threshold voltage	+10V			
Absolute maximum voltage range	+35V to -18V with respect to 0V common			

NOTE

If the drives enable terminal is opened, the drives output is disabled and the motor will coast to a stop. The drive will not re-enable for 0.5s after the enable terminal is closed again.

10.1 Drive reset

If the enable terminal is opened, the drive's output is disabled and the motor will coast to a stop. The drive will not re-enable for 1.0s after the enable terminal is closed again.

*Following a drive trip, opening and closing the enable terminal will reset the drive. If the run forward or run reverse terminal is closed, the drive will run straight away.

**Following a drive trip and a reset via the stop/reset key, the enable, run forward or run reverse terminals will need to be opened and closed to allow the drive to run. This ensures that the drive does not run when the stop/reset key is pressed.

The enable, run forward and run reverse terminals are level triggered apart from after a trip where they become edge triggered. See * and ** above. If the enable and run forward or enable and run reverse terminals are closed when the drive is powered up, the drive will run straight away up to a set speed.

If both the run forward and run reverse terminals are closed, the drive will stop under the control of the ramp and stopping modes set in Pr **30** and Pr **31**

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filters	Lino ohokoo	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation		Line chokes	lengths	data	specification	types	Options

10.2 Sample/update times

The sample/update times shown in the control terminal specification within the *Digidrive SK Technical Guide* are the default sample/update times for the default terminal set-up. The sample/update time depends on the destination/source parameter of the digital or analog inputs/outputs. These sample/update times are the sample or update times for the control microprocessor. The actual sample/update time maybe slightly longer due to the design of the Digidrive SK.

10.3 Task routine times

At the beginning of each menu, there is a single line parameter description and this contains the update rate for each parameter. This time signifies the task routine time in the software that the parameter is updated on. For a background task, the time depends on processor loading i.e. what functions the drive is carrying out and what advanced menus are being used.

Update rate	Microprocessor update time	Comments				
2ms	2ms	Updated every 2ms				
5ms	5ms	Updated every 5ms				
21ms	21ms	Updated every 21ms				
128ms	128ms	Updated every 128ms				
Reset	N/A	Destination/source parameter changed on a Reset				
В	Background	Lindated on a background tack. Lindate rate depende				
BR	Background read	on processor loading				
BW	Background write					

From practical tests carried out:

Condition	Minimum	Maximum	Average
Time for drive to respond to a run command	4.1ms	5.62ms	5.02ms
Time for the drive to respond to a stop command	2.82ms	3.94ms	3.31ms
Time for the drive to respond to a step change in analog input voltage			7.93ms

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lina abakaa	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC IIIters	Line chokes	lengths	data	specification	types	Options

11 Supply types

Digidrive SK is suitable for use with any supply type, i.e. TN-S, TN-C-S, TT, IT, with a grounding at any potential, i.e. neutral, centre or corner ('grounded-delta').

Drives are suitable for use on supplies of installation category III and lower, according to IEC60664-1. This means they may be connected permanently to the supply at its origin in a building, but for outdoor installation, additional over-voltage suppression (transient voltage surge suppression) must be provided to reduce category IV to category III.

11.1 AC supply requirements

Single phase drives

Single phase - Between one phase and neutral of a star connected three phase supply.

- Between two phases of a three phase supply.

Three phase models

Three-phase star or delta supply of the correct voltage.

Dual rated models Any of the above supplies can be used.

11.2 Safety



Electric shock risk

The voltages present in the following locations can cause severe electric shock and may be lethal:

AC supply cables and connections

- DC and brake cables and connections
- Output cables and connections

Many internal parts of the drive, and external option units

Unless otherwise indicated, control terminals are single insulated and must not be touched.



Isolation device

The AC supply must be disconnected from the drive using an approved isolation device before any cover is removed from the drive or before any servicing work is performed.



STOP function

The STOP function does not remove dangerous voltages from the drive, the motor or any external option units.



Stored charge

The drive contains capacitors that remain charged to a potentially lethal voltage after the AC supply has been disconnected. If the drive has been energized, the AC supply must be isolated at least ten minutes before work may continue.

Normally, the capacitors are discharged by an internal resistor. Under certain, unusual fault conditions, it is possible that the capacitors may fail to discharge, or be prevented from being discharged by a voltage applied to the output terminals. If the drive has failed in a manner that causes the display to go blank immediately, it is possible the capacitors will not be discharged. In this case, consult LEROY-SOMER.



Equipment supplied by plug and socket

Special attention must be given if the drive is installed in equipment which is connected to the AC supply by a plug and socket. The AC supply terminals of the drive are connected to the internal capacitors through rectifier diodes which are not intended to give safety isolation. If the plug terminals can be touched when the plug is disconnected from the socket, a means of automatically isolating the plug from the drive must be used (e.g. a latching relay).

11.3 Cables

Recommended cable sizes are given in tables 1-2 & 1-7. They are only a guide; refer to local wiring regulations for correct size of cables. In some cases, a larger cable size is required to avoid excessive voltage drop.

Use 105°C (221°F) (UL 60/75°C temp rise) PVC-insulated cable with copper conductors having a suitable voltage rating, for the following power connectors:

- AC supply to external EMC filter (when used)
- AC supply (or external EMC filter) to drive
- Drive to motor
- Drive to braking resistor

Motor cables

The recommended output cable sizes assume that the motor maximum current matches that of the drive. Where a motor of reduced rating is used, the cable rating may be chosen to match that of the motor. To ensure that the motor and cable are protected against overload, the drive must be programmed with the correct motor rated voltage.

data and losses levels design installation lengths data specification types	llation EMC filters Line	on EMC filte	installation	design	levels	osses	data and losses	data
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11.4 Fuses

The AC supply to the drive must be fitted with suitable protection against overload and short circuits. Tables 1-2 & 1-7 show the recommended fuse ratings. Failure to observe this requirement will cause risk of fire.

A fuse or other protection device must be included in all live connectors to the AC supply.

An MCB (miniature circuit breaker) or MCCB (moulded case circuit breaker) with type C tripping characteristics maybe used in place of fuses as long as the fault clearing capacity is sufficient for the installation.

Fuse types

Europe: Type gG HRC fuses complying with EN60269 parts 1 and 2 (BS88)

USA: Bussman Limitron KTK series, class CC fast acting fuses up to 30A, class J above 30A.

11.5 Ground connections

The drive must be connected to the system ground of the AC supply. The ground wiring must conform to local regulations and codes of practice. The ground loop impedance must conform to the requirements of local safety regulations. The ground connections must be inspected and tested at appropriate intervals.

Use of RCDs - residual current device

There are three common types of RCD/ELCB

Type AC - detects AC fault currents

Type A - detects AC and pulsating DC fault currents (provided the DC current reaches zero at least once every half cycle)

Type B - detects AC, pulsating DC, and smooth DC fault currents

- Type AC should never be used with inverter drives
- Type A can only be used with single phase drives
- Type B must be used with three phase drives.

It is recommended that only Type B RCDs be used with inverter drives

If an external EMC filter is used, a delay of at least 50ms should be incorporated in the RCD to ensure spurious trips are not seen. The leakage current is likely to exceed the trip level if all of the phases are not energised simultaneously.

11.6 Ground leakage

The ground leakage current depends upon the internal EMC filter is fitted. The drive is supplied with the filter fitted. Instructions for removal of the internal EMC filter are given in Section 4.3.1 of the getting started guide.

With internal EMC filter fitted

Size A

10mA AC at 230V, 50Hz (proportional to supply voltage and frequency)

Size B and C

1 phase 200V product

20mA AC at 230V, 50Hz (proportional to supply voltage and frequency)

3-phase 200V product

7mA AC at 230V, 50Hz (proportional to supply voltage and frequency)

3-phase 400V product

8.2mA AC at 415V, 50Hz (proportional to supply voltage and frequency)

30µA DC (10Ω)

NOTE

The above leakage currents are just the leakage currents of the drive with the internal EMC filter connected and do not take into account any leakage currents of the motor or motor cable.

With internal EMC filter removed

<1mA

NOTE

In both cases, there is an internal voltage surge suppression device connected to ground. Under normal circumstances, this carries negligible current.



When the internal EMC filter is fitted, the leakage current is high. In this case, a permanent fixed ground connection must be provided using two independent conductors each with a cross-section equal to or exceeding that of the supply conductors. The drive is provided with two earth terminals to facilitate this. The purpose is to prevent a safety hazard occurring if the connection is lost.

Technical	Derating curves	Drive voltage	DC bus	Mechanical	EMC filtoro	Lina abakaa	Motor cable	General	I/O	Supply	Ontiona
data	and losses	levels	design	installation	EIVIC filters	Line chokes	lengths	data	specification	types	Options

11.7 Use of earth leakage circuit breakers (ELCB)/residual current device (RCD)

There are three common types of ELCB/RCD:

Type AC - detects AC fault currents

Type A - detects AC and pulsating DC fault currents (provided the DC current reaches zero at least once every half cycle)

 $\ensuremath{\text{Type B}}$ - detects AC, pulsating DC and smooth DC fault currents

- Type AC should never be used with drives
- Type A can only be used with single phase drives
- Type B must be used with three phase drives

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12 Options

All Digidrive SK Solutions Modules are colour-coded, in order to make identification easy. The following table shows the colour-code key and gives further details on their function.

* Only used on sizes B & C (not compatible with size A)

Туре	Option	Colour	Name	Further details	Minimum option firmware version	Unidrive SP compatible ?
		Purple	SM-PROFIBUS-DP	PROFIBUS-DP option PROFIBUS-DP adapter for communication with Digidrive SK	03.00.00	Yes
Fieldbus*		Medium Grey	SM-DeviceNet	DeviceNet option DeviceNet adapter for communication with Digidrive SK	03.00.00	Yes
		Dark Grey	SM-INTERBUS	INTERBUS option INTERBUS adapter for communication with Digidrive SK	03.00.00	Yes
		Light Grey	SM-CANopen	CANopen option CANopen adapter for communication with Digidrive SK	03.00.00	Yes
		Beige	SM-Ethernet	Ethernet option Ethernet adapter for communication with Digidrive SK	03.00.00	Yes
Extended IO		Dark Yellow	SM-I/O Lite	 I/O Lite option Increases the I/O capability by adding the following to the existing I/O in the drive: ±10V bi-polar / 4-20mA analog input 1.0-10V / 4-20mA analog output Digital inputs x 3 Encoder speed reference input (A, /A, B, /B) Relay x 1 		Yes
		Dark Red	SM-I/O Timer	Timer I/O option Same features is I/O Lite, but with the addition of a battery backed-up real time clock.		Yes
Automation	Ø	Black	SmartStick	SmartStick option Upload drive parameters to the SmartStick for storage or for easy set-up of identical drives or downloading to replacement drives		No
		White	LogicStick	LogicStick option The LogicStick plugs into the front of the drive and enables the user to program PLC functions within the drive. (The LogicStick can also be used as a SmartStick)		No
Kovrad	000		SM-Keypad Plus	LCD keypad display option Remote panel mounting LCD multilingual text keypad display to IP54 (NEMA 12) with additional help key	ТВА	Yes
кеурац	**		SK-Keypad Remote	LED keypad display option Remote panel mounting LED display to IP54 (NEMA 12) with additional function key		No

Technical Derat data and	ng curves Drive volt losses levels	age DC be desig	us Mechanical installation	EMC filters	Line chokes	Motor cable General lengths data		I/C specific) cation	Supply types	Options
Туре	Type Option Colour		Name		Further details					on are on	Unidrive SP compatible ?
540			EMC Filte	rs tog in a	ese additional ether with the areas of sensit	filters are de drive's own i ive equipmer	signed to o ntegral EM nt	perate C filter			No
EMC			AC input li reactors	пе То	reduce supply	harmonics					
Cablo	And the second		SK-Brack	et Cal	ble manageme	ent bracket					
management			UL type 1	kit cov req	ttom metal glan vers to allow th uirements of L	nd plate, top le drive to co JL type 1	cover and mply with t	side he			No
Top cover			Top cover	kit env in v	e additional top vironmental pro vertical directio	o cover kit wi otection of the n.			No		
	the second second		CT Comms o	cable For usi	Cable with isolation RS232 to RS485 converter. For connecting PC/Laptop to the drive when using LS Soft or SyPTLite						Yes
Communication	s		LS Soft	Sof to c	ftware for PC o commission an	r Laptop whi d store para	ch allows th meter settir	ie user igs	01.04	.00	Yes
	FREE SEftware		SyPTLite	e Sof	ftware for PC o program PLC f	r Laptop whic unctions with	ch allows th nin the drive	ie user e	02.00	.07	Yes
Braking resistors			-	Bra	king resistors				-		-

12.1 Top cover kit

The Top Cover kit will comprise of a top cover which will clip to the top of the drives plastic housing. This Top Cover will stop falling dirt or debris from entering the electronics through the ventilation slots on the top of the drive. This will allow the top of the drive comply with the requirements of IP4X.



When the Top Cover is fitted, the drive must still be mounted in a location which prevents access except by trained and authorised personnel, and which prevents the ingress of harmful contamination. It is designed for use in an environment classified as pollution degree 2 in accordance with IEC 60664-1. This means only dry, non-conducting contamination is acceptable.

12.2 UL Type 1 Kit

The UL Type 1 kit will allow the drive to comply with the requirements of UL Type 1.

The UL Type 1 Kit will comprise of the following parts:

Digidrive SK Size A

- 1 x Conduit entry kit
- 1 x Top Cover
- 1 x Side Cover

Digidrive SK Size B

- 1 x Conduit entry kit
- 1 x Top Cover
- 4 x Side Cover
- Digidrive SK size C
- 1 x Conduit entry kit
- 1 x Top Cover
- 5 x Side Cover



MOTEURS LEROY-SOMER 16015 ANGOULÊME CEDEX - FRANCE

RCS ANGOULÊME N° B 671 820 223 S.A. au capital de 62 779 000 €

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