



EMERSON[™]
Industrial Automation

Unidrive SPM

AC Drive Power Modules
for High Power Systems

60 - 2,900hp (45 - 1,900kW)
208 - 240V / 380 - 480V / 575V / 690V



Unidrive SPM - Flexible Power from 60 to 2,900hp (45 to 1,900kW)

The flexibility of the Unidrive SPM AC Drive Power Modules allows the optimum solution to be chosen to meet the exact requirements of the design application.

SPM Benefits

Unidrive SPM is a part of the Unidrive SP family of high performance drives. SPM stands for 'Solution Platform Modular' and is a family of power modules that can be combined to build custom high-power systems using standard power modules. With proven reliability and short lead times, the compact IP20 modules are easy to handle and install.

Cleaner power is achieved with Unidrive SPMs by minimizing input harmonics with 12-, 18- or 24-pulse rectifiers to reduce or eliminate harmonics with an active input configuration. Dynamic loads are controlled with the built-in dynamic brake controller or full regenerative energy control with an active input. Running costs are reduced by circulating energy between braking and motoring drives using a common DC bus system and by returning excess energy to the supply with an active input. Achieve high-performance motor control with simple set-up and no position feedback using Rotor Flux Control (RFC). Integration is simple with common control and options used throughout the Unidrive SP family.

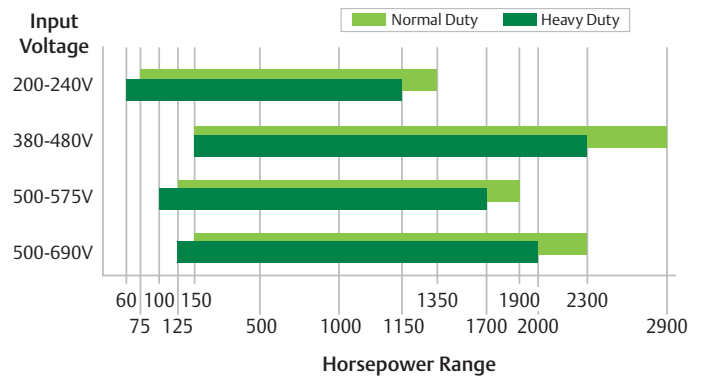
Design Requirement	Solution
Optimize initial cost	Lowest total material cost
Simplest installation	Select configuration with minimum interconnections
Optimize spares inventory	Select configuration for site standardization
Optimize energy costs	Select multi-phase, active input or common DC bus configuration

All popular high-power system configurations can be implemented with compact, flexible modules:

System Requirement	Configuration
High-power motors	Parallel drives
Harmonic minimization	Multi-pulse rectifier (12, 18, 24)
Harmonic elimination	Active input
Energy transfer - braking to motoring	DC Bus connected drives



Ratings



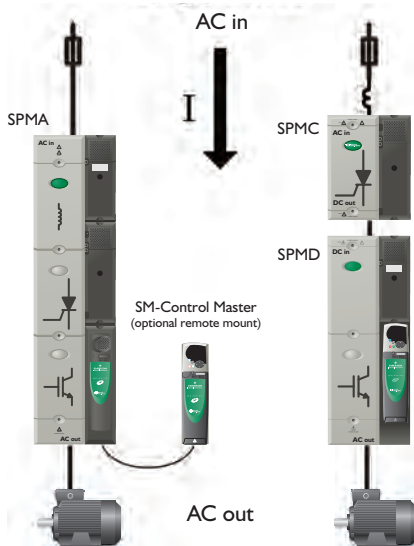
RoHS Compliant



Basic Configurations

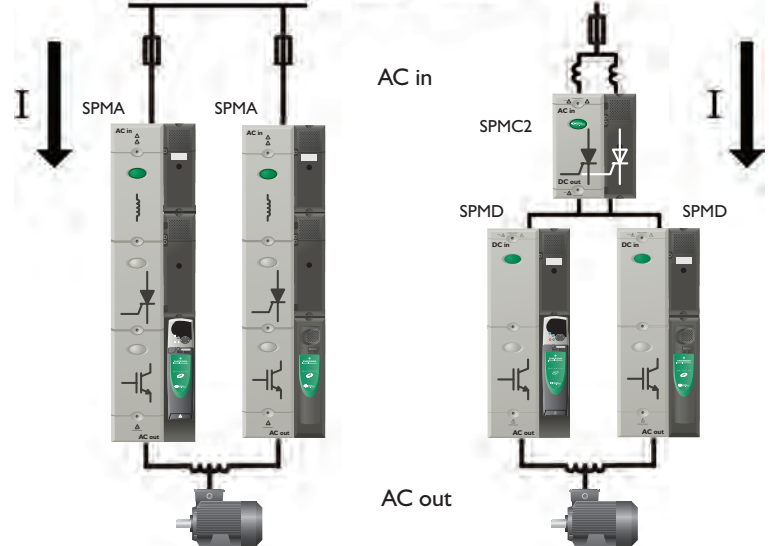
The examples below demonstrate the versatility of the Unidrive SPM in creating a wide range of high-power AC drives.

Single Drives



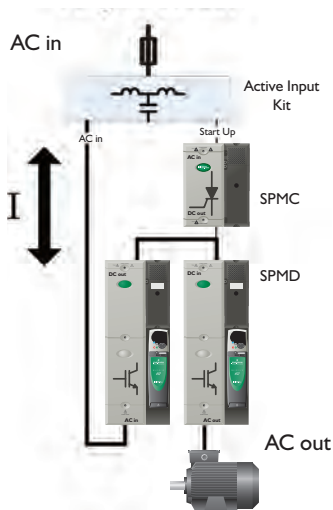
The SPMA solution will be lower cost but the SPMD solution may give site standardization. The master control module on the drive may be replaced by a follower module and the master can be remotely mounted, as the application requires.

Parallel Drives



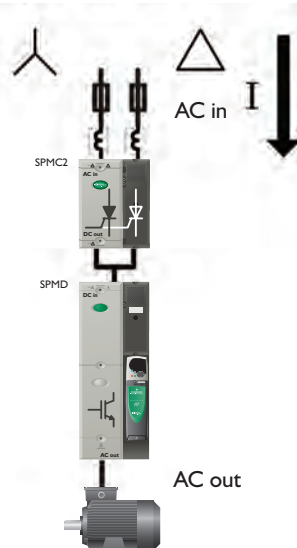
For higher currents, multiple SPMA's or SPMD's may be configured in parallel. The SPMA may give shorter installation time with less interconnections but the SPMD may provide lower cost. Site standardization may also be a consideration.

Active Input and Regeneration



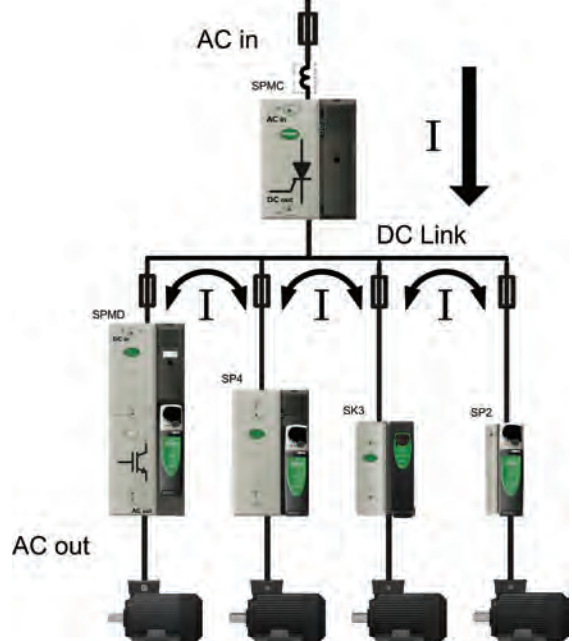
Active inputs for harmonic elimination and regenerating excess energy can be configured with standard drive modules for motoring or regeneration.

12 Pulse Input Current



Multi-pulse rectifiers can be configured (12, 18 and 24) to minimize input harmonics and help to meet local supply authority regulations.

Common DC Bus



Drives from the Unidrive and Commander families can be connected on a common DC bus system, in order to circulate energy between drives with opposing energy flow, supplied from a controlled rectifier input (SPMC), an active input (SPMA or SPMD) or an existing DC source.

Unique Benefits of Unidrive SPM

Electrical Design

The units that make up the SPM range can be used to implement most system types. The separation of the power circuit into rectifier and drive stages enables compact active input configurations to be implemented. For example this 750hp (550kW) four-quadrant test stand system consists of six identical drive modules in a 7.87ft (2.4m) enclosure.



Maintenance

The SPMD drive is capable of controlling 350A at 300hp (200kW) motor and yet is extremely compact. The picture shows it being installed in a 15.75in (400mm) wide cubicle.



Any system designed with SPM is constructed with standard compact drive modules that are typically stocked. This means that in the event of the system being damaged, simply exchange the damaged module with a factory-built and tested one. This avoids rebuilding power circuits down to the semiconductor level.

Installation Flexibility

All SPM modules have an IP54 rated heatsink and may be installed with their heatsinks “through the panel.”



This allows the main cooling to occur outside the enclosure, simplifying the design and reducing the thermal stress on the rest of the control system.

The modular power circuit allows drive systems to be constructed in non-standard enclosures. For example, it is possible to implement a drive system of between 60 and 2,900hp (45 and 1,900kW) in an enclosure no taller than 3.28ft (1m). This is achieved by mounting the drives, rectifiers and inductors side by side. This is a great solution for crane hoists, mine conveyors and any compact machine designs.

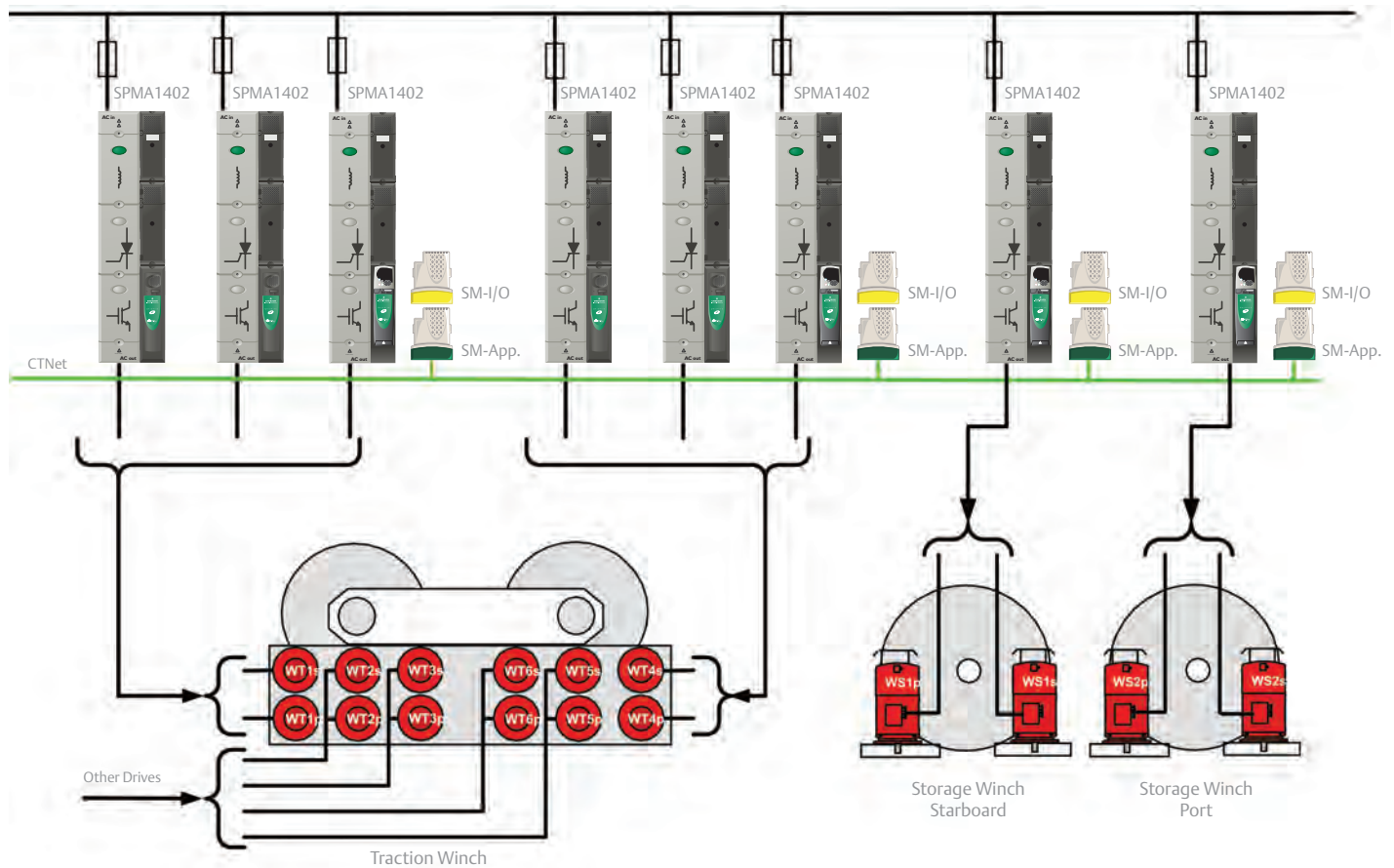
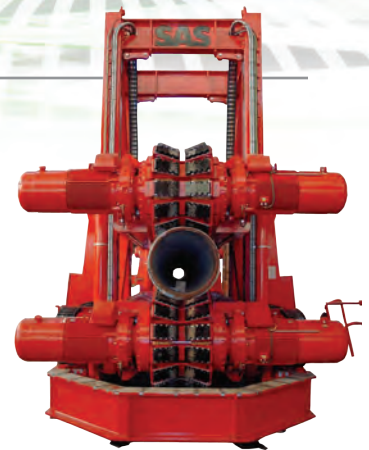
Mechanical Design

In this power generation example, the requirement was to find a 200hp (132kW) drive that would fit inside a standard motor control enclosure, to increase reliability and maximize generating efficiency. The SPMA was the perfect solution.



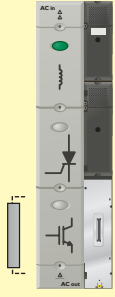



Optimize Spares Inventory

Standardizing on a single, compact drive module is highlighted by the following schematic. It is based on an actual marine project that incorporated a wide range of applications and motor ratings, but with each one implemented by various combinations of SPMA1402. In addition to minimizing spares inventory, this approach also standardizes the system build, with many of the enclosures being identical.



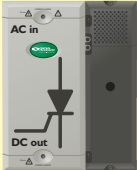
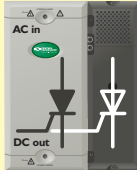

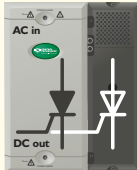
Drive Product Range and Control Modules

Model Reference			SPMA						SPMD					
Operating Mode	Motoring		AC in AC out						DC in AC out					
	Regenerating		AC in AC out and DC link soft start						AC in and DC out					
Voltage, Current and Power Range	Supply (V)	Duty	From			To			From			To		
			(A)	(hp)	(kW)	(A)	(hp)	(kW)	(A)	(hp)	(kW)	(A)	(hp)	(kW)
	200	Normal							192		55	3333		950
		Heavy							156		45	2761		750
	230	Normal							192	75		3333	1450	
		Heavy							156	60		2761	1200	
	400	Normal	205		110	2247			205		110	3333		1900
		Heavy	180		90	2000			180		90	2761		1500
	460	Normal	205	150		2247	1950		205	150		3333	2900	
		Heavy	180	150		2000	1750		180	150		2761	2400	
575	Normal	125	125		1371	1500		125	125		1828	2000		
	Heavy	100	100		1190	1300		100	100		1600	1750		
690	Normal	125		110	1371			125		110	1828		1800	
	Heavy	100		90	1190			100		90	1600		1550	

Power Modules	SPMA		SPMD	
				
	SPMA 1x0x Brake Transistor Included	SPMA 1x2x No Brake Transistor	SPMD 1x0x Brake Transistor Included	SPMD 1x2x No Brake Transistor

Model Reference	SM-Control Master	SM-Control Follower
Control Modules For assembly to Power Module		
	Illustrated with optional SM-Keypad fitted	

Rectifier Product Range

Rectifier Type	Single Rectifier (AC in /DC out)	Dual Rectifier (2 x AC in /DC out)
Controlled DC link soft start for drive system	 <p>SPMC1x0x</p>	 <p>SPMC2x0x</p>
Uncontrolled DC link supply for conditions where a controlled rectifier is impractical. A separate soft start must be provided for the DC link.	 <p>SPMU1x0x</p>	 <p>SPMU2x0x</p>

Rectifier ratings

Supply (V)	Model References	Max AC Input Current (A)	Max DC Output Current (A)	Max AC Input Current (A)	Max DC Output Current (A)
400	SPMC and SPMU	344	379	2x312	2x345
690		195	209	2x173	2x185

Equivalent SPMD AC Output

Supply (V)	Model References	From (1 x SPMC1)			To (10 x SPMC1)			From (1 x SPMC2)			To (5 x SPMC2)		
		(A)	(hp)	(kW)	(A)	(hp)	(kW)	(A)	(hp)	(kW)	(A)	(hp)	(kW)
200	SPMU	192		55	3333		950	384		110	3333		950
230		192	75		3333	1450		384	150		3333	1450	
400	SPMC and SPMU	205		110	3333		1900	410		220	3333		1900
460		205	150		3333	2900		410	300		3333	2900	
575		125	125		1828	2000		250	250		1828	2000	
690		125		110	1828		1550	250		250	1828		1800

SPMA Simplest Installation - Minimum Interconnections

Fig 1. SPMA x 1



Fig 2. SPMA x 2



Fig 3. SPMA x 3 to x 10

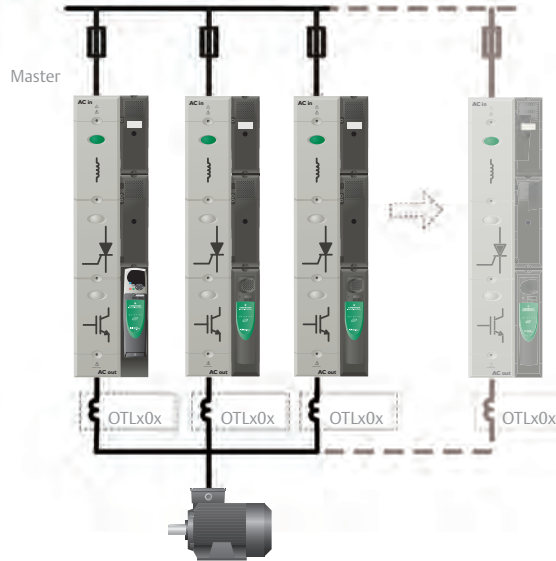


Fig.	Top Level Drive Order Code	Drive Order Code Items				Normal Duty			Heavy Duty		
		Modules		Inductors		Max Continuous Current (A)	Typical Motor Output		Max Continuous Current (A)	Typical Motor Output	
		Drive	Master	Follower	Output		@ 460V (hp)	@ 400V (kW)		@ 460V (hp)	@ 400V (kW)
400V	1 SPMA1401-1S	1 x SPMA1401	1			205	150	110	180	150	90
	1 SPMA1402-1S	1 x SPMA1402	1			236	200	132	210	150	110
	2 SPMA1401-2S	2 x SPMA1401	1	1	1 x OTL411	390	300	225	342	300	185
	2 SPMA1402-2S	2 x SPMA1402	1	1	1 x OTL412	449	400	250	400	350	225
	3 SPMA1401-3S	3 x SPMA1401	1	2	3 x OTL401	585	500	315	514	450	280
	3 SPMA1402-3S	3 x SPMA1402	1	2	3 x OTL402	674	550	355	600	500	315
	3 SPMA1401-4S	4 x SPMA1401	1	3	4 x OTL401	780	650	400	685	600	355
	3 SPMA1402-4S	4 x SPMA1402	1	3	4 x OTL402	899	750	500	800	700	400
	3 SPMA1401-5S	5 x SPMA1401	1	4	5 x OTL401	976	850	550	857	750	450
	3 SPMA1402-5S	5 x SPMA1402	1	4	5 x OTL402	1123	950	600	1000	850	550
	3 SPMA1401-6S	6 x SPMA1401	1	5	6 x OTL401	1171	1000	650	1028	900	550
	3 SPMA1402-6S	6 x SPMA1402	1	5	6 x OTL402	1348	1150	750	1200	1050	650
For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:											
3	SPMA1402-10S	10 x SPMA1402	1	9	10 x OTL402	2247	1950	1250	2000	1750	1100

Fig.	Top Level Drive Order Code	Drive Order Code Items				Normal Duty			Heavy Duty		
		Modules		Inductors		Max Continuous Current (A)	Typical Motor Output		Max Continuous Current (A)	Typical Motor Output	
		Drive	Master	Follower	Output		@ 575V (hp)	@ 690V (kW)		@ 575V (hp)	@ 690V (kW)
575V / 690V	1 SPMA1601-1S	1 x SPMA1601	1			125	125	110	100	100	90
	1 SPMA1602-1S	1 x SPMA1602	1			144	150	132	125	125	110
	2 SPMA1601-2S	2 x SPMA1601	1	1	1 x OTL611	238	250	200	190	200	185
	2 SPMA1602-2S	2 x SPMA1602	1	1	1 x OTL612	274	300	250	238	250	200
	3 SPMA1601-3S	3 x SPMA1601	1	2	3 x OTL601	357	350	350	285	300	250
	3 SPMA1602-3S	3 x SPMA1602	1	2	3 x OTL602	411	450	400	357	350	300
	3 SPMA1601-4S	4 x SPMA1601	1	3	4 x OTL601	476	500	450	380	400	350
	3 SPMA1602-4S	4 x SPMA1602	1	3	4 x OTL602	548	600	500	476	500	450
	3 SPMA1601-5S	5 x SPMA1601	1	4	5 x OTL601	595	650	550	476	500	450
	3 SPMA1602-5S	5 x SPMA1602	1	4	5 x OTL602	685	700	650	595	650	550
	3 SPMA1601-6S	6 x SPMA1601	1	5	6 x OTL601	714	750	700	571	600	550
	3 SPMA1602-6S	6 x SPMA1602	1	5	6 x OTL602	822	900	800	714	750	700
For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:											
3	SPMA1602-10S	10 x SPMA1602	1	9	10 x OTL602	1371	1500	1350	1190	1300	1150

SPMA 12 Pulse - Reduced Harmonics

This principle may be extrapolated to 18- and 24-pulse configurations.

Fig 4. SPMA x 2



Fig 5. SPMA x 4 to 10 (pairs only)

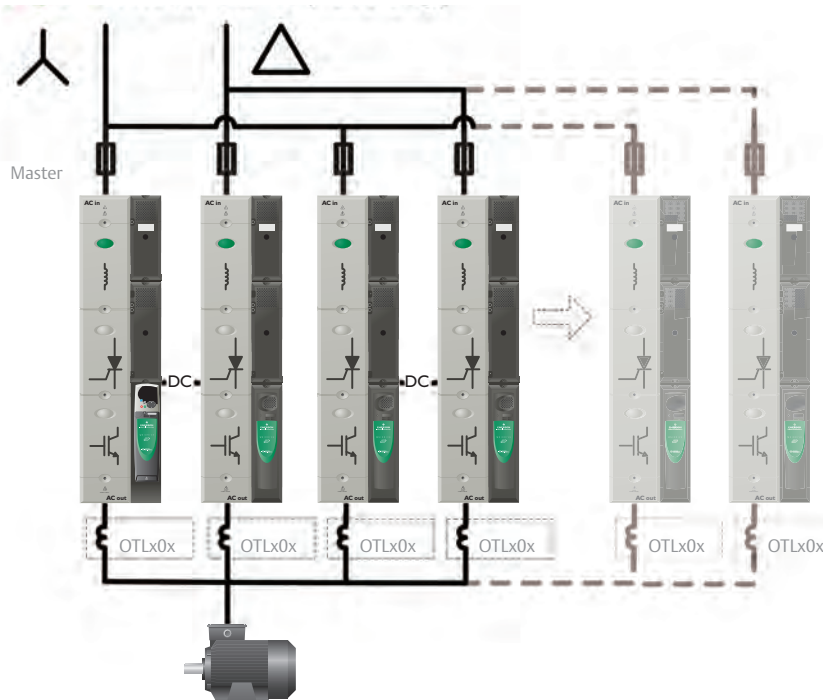


Fig.	Top Level Drive Order Code	Drive Order Code Items				Normal Duty			Heavy Duty		
		Modules		Inductors		Max Continuous Current (A)	Typical Motor Output		Max Continuous Current (A)	Typical Motor Output	
		Drive	Master	Follower	Output		@ 460V (hp)	@ 400V (kW)		@ 460V (hp)	@ 400V (kW)
400V	4 SPMA1401-2T	2 x SPMA1401	1	1	1 x OTL411	390	300	225	342	300	185
	4 SPMA1402-2T	2 x SPMA1402	1	1	1 x OTL412	449	400	250	400	350	225
	5 SPMA1401-4T	4 x SPMA1401	1	3	4 x OTL401	780	650	400	685	600	355
	5 SPMA1402-4T	4 x SPMA1402	1	3	4 x OTL402	899	750	500	800	700	400
	5 SPMA1401-6T	6 x SPMA1401	1	5	6 x OTL401	1171	1000	650	1028	900	550
	5 SPMA1402-6T	6 x SPMA1402	1	5	6 x OTL402	1348	1150	750	1200	1050	650
	For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:										
5	SPMA1402-10T	10 x SPMA1402	1	9	10 x OTL402	2247	1950	1250	2000	1750	1100
575V / 690V	4 SPMA1601-2T	2 x SPMA1601	1	1	1 x OTL611	238	250	200	190	200	185
	4 SPMA1602-2T	2 x SPMA1602	1	1	1 x OTL612	274	300	250	238	250	200
	5 SPMA1601-4T	4 x SPMA1601	1	3	4 x OTL601	476	500	450	380	400	350
	5 SPMA1602-4T	4 x SPMA1602	1	3	4 x OTL602	548	600	500	476	500	450
	5 SPMA1601-6T	6 x SPMA1601	1	5	6 x OTL601	714	750	700	571	600	550
	5 SPMA1602-6T	6 x SPMA1602	1	5	6 x OTL602	822	900	800	714	750	700
	For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:										
5	SPMA1602-10T	10 x SPMA1602	1	9	10 x OTL602	1371	1500	1350	1190	1300	1150

SPMD Simplest Installation - Minimum Interconnections

Fig 6. SPMD x 1

Fig 7. SPMD x 2

Fig 8. SPMD x 3 to x 10

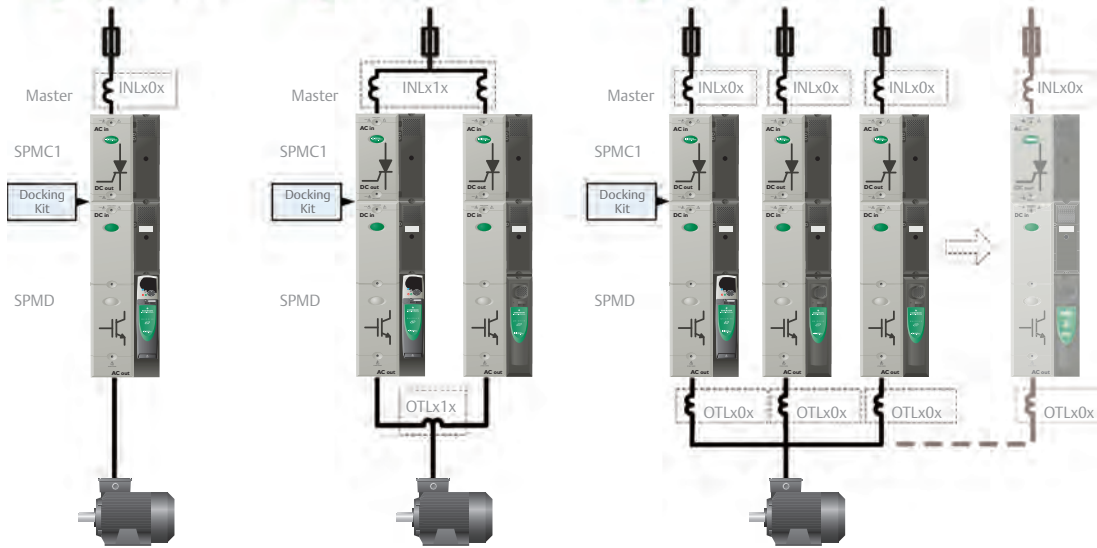


Fig.	Top Level Drive Order Code	Drive Order Code Items							Normal Duty			Heavy Duty			
		Modules			Inductors		Docking Kit	Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output			
		Drive	Master	Follower	Rectifier	Output			Input	@ 460V (hp)		@ 400V (kW)	@ 460V (hp)	@ 400V (kW)	
															(A)
6	SPMD 1401-1S	1 x SPMD 1401	1		1 x SPMC 1402		1 x INL401	1	205	150	110	180	150	90	
6	SPMD 1402-1S	1 x SPMD 1402	1		1 x SPMC 1402		1 x INL401	1	246	200	132	210	150	110	
6	SPMD 1403-1S	1 x SPMD 1403	1		1 x SPMC 1402		1 x INL402	1	290	250	160	246	200	132	
6	SPMD 1404-1S	1 x SPMD 1404	1		1 x SPMC 1402		1 x INL402	1	335 ^[1]	300 ^[1]	185 ^[1]	290	250	160	
7	SPMD 1401-2S	2 x SPMD 1401	1	1	2 x SPMC 1402	1 x OTL411	1 x INL411	2	390	300	225	342	300	185	
7	PMD 1402-2S	2 x SPMD 1402	1	1	2 x SPMC 1402	1 x OTL412	1 x INL411	2	468	400	280	400	300	225	
7	SPMD 1403-2S	2 x SPMD 1403	1	1	2 x SPMC 1402	1 x OTL413	1 x INL412	2	552	450	315	468	400	280	
7	SPMD 1404-2S	2 x SPMD 1404	1	1	2 x SPMC 1402	1 x OTL414	1 x INL412	2	638	500	355	552	450	315	
8	SPMD 1402-3S	3 x SPMD 1402	1	2	3 x SPMC 1402	3 x OTL402	3 x INL401	3	702	600	400	600	500	315	
8	SPMD 1403-3S	3 x SPMD 1403	1	2	3 x SPMC 1402	3 x OTL403	3 x INL402	3	828	700	450	702	650	400	
8	SPMD 1404-3S	3 x SPMD 1404	1	2	3 x SPMC 1402	3 x OTL404	3 x INL402	3	957	800	560	828	750	450	
8	SPMD 1403-4S	4 x SPMD 1403	1	3	4 x SPMC 1402	4 x OTL403	4 x INL402	4	1104	900	630	937	800	550	
8	SPMD 1404-4S	4 x SPMD 1404	1	3	4 x SPMC 1402	4 x OTL404	4 x INL402	4	1276	1000	710	1104	900	630	
For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:										3190	2800	1800	2761	2400	1500
8	SPMD 1404-10S	10 x SPMD 1404	1	9	10 x SPMC 1402	10 x OTL402	10 x INL402	10							

Fig.	Top Level Drive Order Code	Drive Order Code Items							Normal Duty			Heavy Duty			
		Modules			Inductors		Docking Kit	Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output			
		Drive	Master	Follower	Rectifier	Output			Input	@ 575V (hp)		@ 690V (kW)	@ 575V (hp)	@ 690V (kW)	
															(A)
6	SPMD 1601-1S	1 x SPMD 1601	1		1 x SPMC 1601		1 x INL601	1	125	125	110	100	100	90	
6	SPMD 1602-1S	1 x SPMD 1602	1		1 x SPMC 1601		1 x INL601	1	140	150	132	125	125	110	
6	SPMD 1603-1S	1 x SPMD 1603	1		1 x SPMC 1601		1 x INL602	1	158	175	155	142	150	132	
6	SPMD 1604-1S	1 x SPMD 1604	1		1 x SPMC 1601		1 x INL602	1	165	180	160	160	175	160	
7	SPMD 1601-2S	2 x SPMD 1601	1	1	2 x SPMC 1601	1 x OTL611	1 x INL611	2	238	260	200	190	200	185	
7	PMD 1602-2S	2 x SPMD 1602	1	1	2 x SPMC 1601	1 x OTL612	1 x INL611	2	266	290	250	238	250	225	
7	SPMD 1603-2S	2 x SPMD 1603	1	1	2 x SPMC 1601	1 x OTL613	1 x INL612	2	300	330	295	269	290	250	
7	SPMD 1604-2S	2 x SPMD 1604	1	1	2 x SPMC 1601	1 x OTL614	1 x INL612	2	313	345	310	304	330	300	
8	SPMD 1602-3S	3 x SPMD 1602	1	2	3 x SPMC 1601	3 x OTL602	3 x INL601	3	399	440	390	357	390	350	
8	SPMD 1603-3S	3 x SPMD 1603	1	2	3 x SPMC 1601	3 x OTL603	3 x INL602	3	450	495	440	404	445	400	
8	SPMD 1604-3S	3 x SPMD 1604	1	2	3 x SPMC 1601	3 x OTL604	3 x INL602	3	470	520	460	456	500	450	
8	SPMD 1603-4S	4 x SPMD 1603	1	3	4 x SPMC 1601	4 x OTL603	4 x INL602	4	600	660	590	539	590	530	
8	SPMD 1604-4S	4 x SPMD 1604	1	3	4 x SPMC 1601	4 x OTL604	4 x INL602	4	627	690	615	608	670	600	
For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:										1567	1725	1540	1520	1675	1500
8	SPMD 1604-10S	10 x SPMD 1604	1	9	10 x SPMC 1601	10 x OTL604	10 x INL602	10							

See notes on page 18

SPMD Lowest Cost - Minimum Total Cost of Modules

Fig 9. SPMD x 2

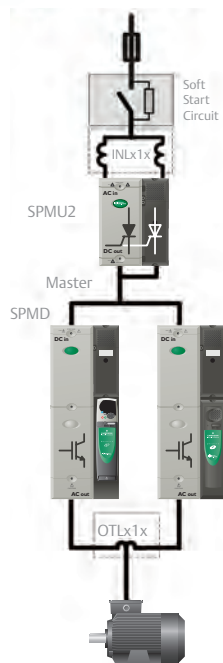


Fig 10. SPMD x 2

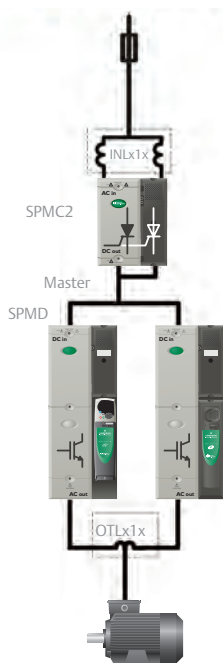


Fig 11. SPMD x 3, 5, 7, 9

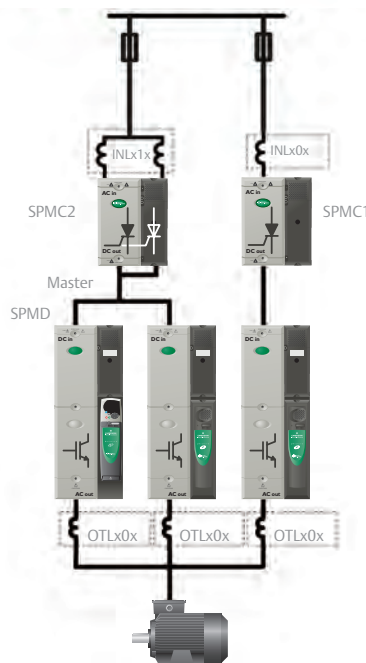


Fig 11. SPMD x 4, 6, 8, 10

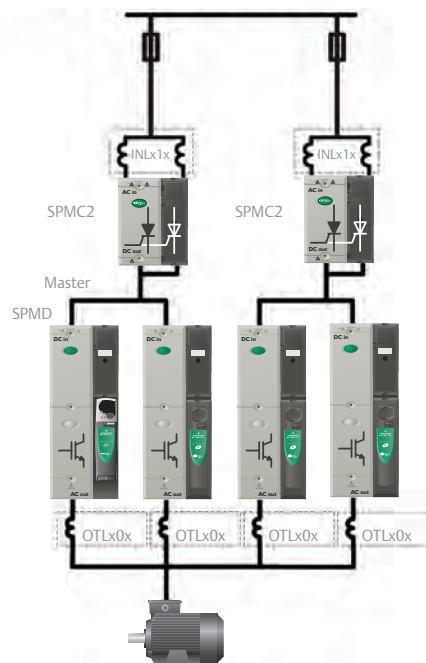


Fig.	Top Level Drive Order Code	Drive Order Code Items						Normal Duty			Heavy Duty		
		Modules			Inductors			Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output	
		Drive	Master	Follower	Rectifier	Output	Input		@ 230V (hp)	@ 220V (kW)		@ 230V (hp)	@ 220V (kW)
200V	9 SPMD 1201-2L	2 x SPMD 1201	1	1	1 x SPMU 2402 ^[5]	1 x OTL411	1 x INL411	364	150	110	296	125	90
	9 SPMD 1202-2L	2 x SPMD 1202	1	1	1 x SPMU 2402 ^[5]	1 x OTL412	1 x INL411	471	200	132	364	150	110
	9 SPMD 1203-2L	2 x SPMD 1203	1	1	1 x SPMU 2402 ^[5]	1 x OTL413	1 x INL412	592	250	160	475	200	150
	9 SPMD 1204-2L	2 x SPMD 1204	1	1	1 x SPMU 2402 ^[5]	1 x OTL414	1 x INL412	665	250	200	551	200	160

For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:

Fig.	Top Level Drive Order Code	Drive Order Code Items						@ 460V (hp) @ 400V (kW)			@ 460V (hp) @ 400V (kW)		
		Modules			Inductors			Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output	
		Drive	Master	Follower	Rectifier	Output	Input		@ 230V (hp)	@ 220V (kW)		@ 230V (hp)	@ 220V (kW)
400V	10 SPMD 1401-2L	2 x SPMD 1401	1	1	1 x SPMC 2402	1 x OTL411	1 x INL411	390	300	225	342	300	185
	10 SPMD 1402-2L	2 x SPMD 1402	1	1	1 x SPMC 2402	1 x OTL412	1 x INL411	468	400	280	400	300	225
	10 SPMD 1403-2L	2 x SPMD 1403	1	1	1 x SPMC 2402	1 x OTL413	1 x INL412	552	450	315	468	400	280
	10 SPMD 1404-2L	2 x SPMD 1404	1	1	1 x SPMC 2402	1 x OTL414	1 x INL412	666 ^[1]	550 ^[1]	350 ^[1]	552	450	315
	11 SPMD 1402-3L	3 x SPMD 1402	1	2	1 x SPMC 2402 + 1 x SPMC 1402	3 x OTL402	1 x INL411 + 1 x INL401	702	600	400	600	500	315
	11 SPMD 1403-3L	3 x SPMD 1403	1	2	1 x SPMC 2402 + 1 x SPMC 1402	3 x OTL403	1 x INL412 + 1 x INL402	828	700	450	702	650	400
	11 SPMD 1404-3L	3 x SPMD 1404	1	2	1 x SPMC 2402 + 1 x SPMC 1402	3 x OTL404	1 x INL412 + 1 x INL402	1000 ^[1]	850 ^[1]	550 ^[1]	828	750	450
	12 SPMD 1403-4L	4 x SPMD 1403	1	3	2 x SPMC 2402	4 x OTL403	2 x INL412	1104	900	630	937	800	550
	12 SPMD 1404-4L	4 x SPMD 1404	1	3	2 x SPMC 2402	4 x OTL404	2 x INL412	1333 ^[1]	1100 ^[1]	750 ^[1]	1104	950	630
	12 SPMD 1404-10L	10 x SPMD 1404	1	9	5 x SPMC 2402	10 x OTL404	5 x INL412	3333 ^[1]	2900 ^[1]	1900 ^[1]	2761	2400	1500

For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:

Fig.	Top Level Drive Order Code	Drive Order Code Items						@ 575V (hp) @ 690V (kW)			@ 575V (hp) @ 690V (kW)		
		Modules			Inductors			Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output	
		Drive	Master	Follower	Rectifier	Output	Input		@ 230V (hp)	@ 220V (kW)		@ 230V (hp)	@ 220V (kW)
575V / 690V	10 SPMD 1601-2L	2 x SPMD 1601	1	1	1 x SPMC 2601	1 x OTL611	1 x INL611	238	250	200	190	200	185
	10 SPMD 1602-2L	2 x SPMD 1602	1	1	1 x SPMC 2601	1 x OTL612	1 x INL611	274	300	250	238	250	200
	10 SPMD 1603-2L	2 x SPMD 1603	1	1	1 x SPMC 2601	1 x OTL613	1 x INL612	320	350	300	274	300	250
	11 SPMD 1602-3L	3 x SPMD 1602	1	2	1 x SPMC 2602 + 1 x SPMC 1601	3 x OTL602	1 x INL611 + 1 x INL601	411	450	400	357	350	350
	11 SPMD 1603-3L	3 x SPMD 1603	1	2	1 x SPMC 2602 + 1 x SPMC 1601	3 x OTL603	1 x INL612 + 1 x INL602	480	500	450	411	450	400
	12 SPMD 1603-4L	4 x SPMD 1603	1	3	2 x SPMC 2601	4 x OTL603	2 x INL612	640	700	630	548	600	500
	12 SPMD 1603-10L	10 x SPMD 1603	1	9	5 x SPMC 2601	10 x OTL603	5 x INL612	1596	1435	1925	1368	1650	1230

For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:

See notes on page 18

SPMD 12 Pulse - Reduced Harmonics

This principle may be extrapolated to 18- and 24-pulse configurations.

Fig 13. SPMD x 1



Fig 14. SPMD x 2



Fig 15. SPMD x 4, 6, 8, 10

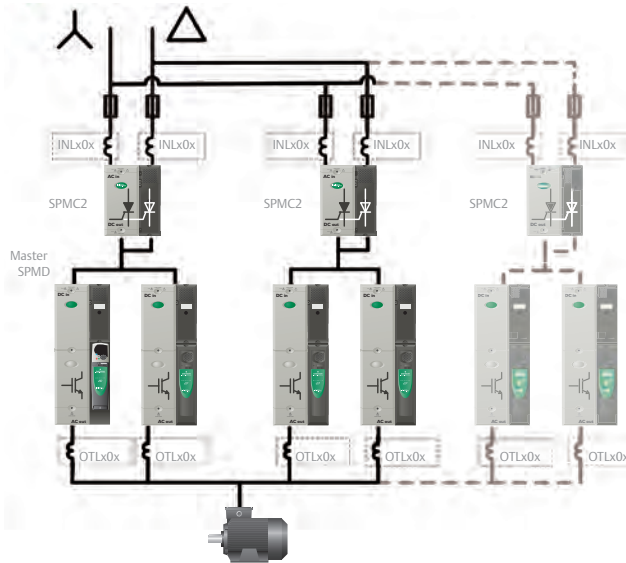


Fig.	Top Level Drive Order Code	Drive Order Code Items					Normal Duty			Heavy Duty			
		Modules			Inductors		Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output		
		Drive	Master	Follower	Rectifier	Output		Input	@ 460V (hp)		@ 400V (kW)	@ 460V (hp)	@ 400V (kW)
400V	13 SPMD 1401-1T	1 x SPMD1401	1		1 x SPMC2402		2 x INL401 ^[6]	205	150	110	180	150	90
	13 SPMD 1402-1T	1 x SPMD1402	1		1 x SPMC2402		2 x INL401 ^[6]	246	200	132	210	150	110
	13 SPMD 1403-1T	1 x SPMD1403	1		1 x SPMC2402		2 x INL402 ^[6]	290	250	160	246	200	132
	13 SPMD 1404-1T	1 x SPMD1404	1		1 x SPMC2402		2 x INL402 ^[6]	350 ^[1]	300 ^[1]	200 ^[1]	290	250	160
	14 SPMD 1401-2T	2 x SPMD1401	1	1	1 x SPMC2402	1 x OTL411	2 x INL401 ^[6]	390	300	225	342	300	185
	14 SPMD 1402-2T	2 x SPMD1402	1	1	1 x SPMC2402	1 x OTL412	2 x INL401 ^[6]	468	400	280	400	300	225
	14 SPMD 1403-2T	2 x SPMD1403	1	1	1 x SPMC2402	1 x OTL413	2 x INL401 ^[6]	552	450	315	468	400	280
	14 SPMD 1404-2T	2 x SPMD1404	1	1	1 x SPMC2402	1 x OTL414	2 x INL401 ^[6]	666 ^[1]	550 ^[1]	350 ^[1]	552	450	315
	15 SPMD 1401-4T	4 x SPMD1401	1	3	2 x SPMC2402	4 x OTL401	4 x INL401 ^[6]	780	650	450	685	600	355
	15 SPMD 1402-4T	4 x SPMD1402	1	3	2 x SPMC2402	4 x OTL402	4 x INL401 ^[6]	937	800	500	800	700	450
15 SPMD 1403-4T	4 x SPMD1403	1	3	2 x SPMC2402	4 x OTL403	4 x INL402 ^[6]	1104	900	630	937	800	550	
15 SPMD 1404-4T	4 x SPMD1404	1	3	2 x SPMC2402	4 x OTL404	4 x INL402 ^[6]	1333 ^[1]	1100 ^[1]	750 ^[1]	1104	950	630	
For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:													
15	SPMD 1404-10T	10 x SPMD1404	1	9	5 x SPMC2402	10 x OTL404	10 x INL402 ^[6]	3333 ^[1]	2900 ^[1]	1900 ^[1]	2761	2400	1500
575V / 690V	13 SPMD 1601-1T	1 x SPMD1601	1		1 x SPMC2601		2 x INL601 ^[6]	125	125	110	100	100	90
	13 SPMD 1602-1T	1 x SPMD1602	1		1 x SPMC2601		2 x INL601 ^[6]	144	150	132	125	125	110
	13 SPMD 1603-1T	1 x SPMD1603	1		1 x SPMC2601		2 x INL602 ^[6]	168	150	160	144	150	132
	13 SPMD 1604-1T	1 x SPMD1604	1		1 x SPMC2601		2 x INL602 ^[6]	192	200	185	168	150	160
	14 SPMD 1601-2T	2 x SPMD1601	1	1	1 x SPMC2601	1 x OTL611	2 x INL601 ^[6]	238	250	200	190	200	185
	14 SPMD 1602-2T	2 x SPMD1602	1	1	1 x SPMC2601	1 x OTL612	2 x INL601 ^[6]	274	300	250	238	250	200
	14 SPMD 1603-2T	2 x SPMD1603	1	1	1 x SPMC2601	1 x OTL613	2 x INL602 ^[6]	320	350	300	274	300	250
	14 SPMD 1604-2T	2 x SPMD1604	1	1	2 x SPMC1601	1 x OTL614	2 x INL602 ^[6]	365	400	350	320	350	300
	15 SPMD 1601-4T	4 x SPMD1601	1	3	2 x SPMC2601	4 x OTL601	4 x INL601 ^[6]	476	500	470	380	400	350
	15 SPMD 1602-4T	4 x SPMD1602	1	3	2 x SPMC2601	4 x OTL602	4 x INL601 ^[6]	548	600	500	476	500	450
15 SPMD 1603-4T	4 x SPMD1603	1	3	2 x SPMC2601	4 x OTL603	4 x INL602 ^[6]	640	700	630	548	600	500	
15 SPMD 1604-4T	4 x SPMD1604	1	3	4 x SPMC1601	4 x OTL604	4 x INL602 ^[6]	731	800	700	640	700	630	
For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:													
15	SPMD 1604-10T	10 x SPMD1604	1	9	10 x SPMC1601	10 x OTL604	10 x INL602 ^[6]	1828	2000	1800	1600	1750	1550

See notes on page 18

Active Input Single Drives - Regeneration & Harmonic Elimination

Fig 16. SPMA

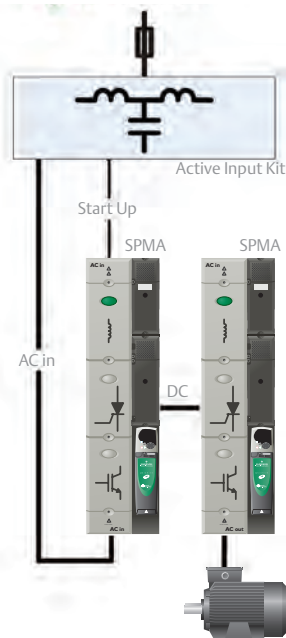


Fig 17. SPMA + SPMD

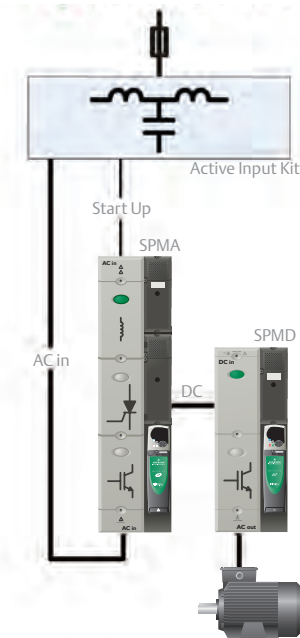


Fig 18. SPMD + SPMC

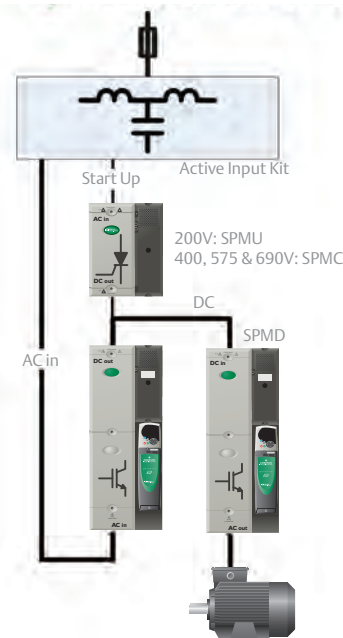


Fig.	Top Level Drive Order Code	Drive Order Code Items			Active Input Kits ^[7]				Normal Duty			Heavy Duty			
		Modules			Order Kit based on required voltage and duty				Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output		
		Drive	Master	Rectifier	Normal Duty	Heavy Duty	Normal Duty	Heavy Duty		@ 230V (hp)	@ 220V (kW)		@ 230V (hp)	@ 220V (kW)	
200V	18	SPMD 1221-1R	2 x SPMD 1221	2	1 x SPMU1402 ^[5]	200-2	200-1		192	75	55	156	60	45	
	18	SPMD 1222-1R	2 x SPMD 1222	2	1 x SPMU1402 ^[5]	200-3	200-2		248	100	75	192	75	55	
	18	SPMD 1223-1R	2 x SPMD 1223	2	1 x SPMU1402 ^[5]	200-4	200-3		312	125	90	250	100	75	
	18	SPMD 1224-1R	2 x SPMD 1224	2	1 x SPMU1402 ^[5]	200-5	200-4		350 ^[1]	150 ^[1]	110 ^[1]	290	125	90	
400V	16	SPMA1421-1R	2 X SPMA1421	2		400-2	400-1		205	150	110	180	150	90	
	17	SPMA/D1421-1R	1 X SPMA1421 + 1 X SPMD1421	2											
	18	SPMD1421-1R	2 X SPMD1421	2	1 X SPMC1402										
	16	SPMA1422-1R	2 X SPMD1422	2		400-3	400-2		236	200	132	210	150	110	
	17	SPMA/D1422-1R	1 X SPMA1422 + 1 X SPMD1422	2											
	18	SPMD1422-1R	2 X SPMD1422	2	1 X SPMC1402				246	200	132	210	150	110	
	18	SPMD1423-1R	2 X SPMD1423	2	1 X SPMC1402	400-3	400-3		290	250	160	246	200	132	
18	SPMD1424-1R	2 X SPMD1424	2	1 X SPMC1402	400-4	400-3		350 ^[1]	300 ^[1]	200 ^[1]	290	250	160		
575V / 690V	16	SPMA1621-1R	2 X SPMA1621	2		690-2	690-1	575-2	575-1	125	125	110	100	100	90
	17	SPMA/D1621-1R	1 X SPMA1621 + 1 X SPMD1621	2											
	18	SPMD1621-1R	2 X SPMD1621	2	1 X SPMC1601										
	16	SPMA1622-1R	2 X SPMA1622	2		690-3	690-2	575-3	575-2	144	150	132	125	125	110
	17	SPMA/D1622-1R	1 X SPMA1622 + 1 X SPMD1622	2											
	18	SPMD1622-1R	2 X SPMD1622	2	1 X SPMC1601										
	18	SPMD1623-1R	2 X SPMD1623	2	1 X SPMC1601	690-4	690-3	575-4	575-3	168	150	160	144	150	132
18	SPMD1624-1R	2 X SPMD1624	2	1 X SPMC1601	690-6	690-4	575-6	575-4	192	200	185	168	150	160	

See notes on page 18

Active Input Multiple Drives - Regeneration & Harmonic Reduction

Fig 1. SPMD x 2 to x 10 + SPMC

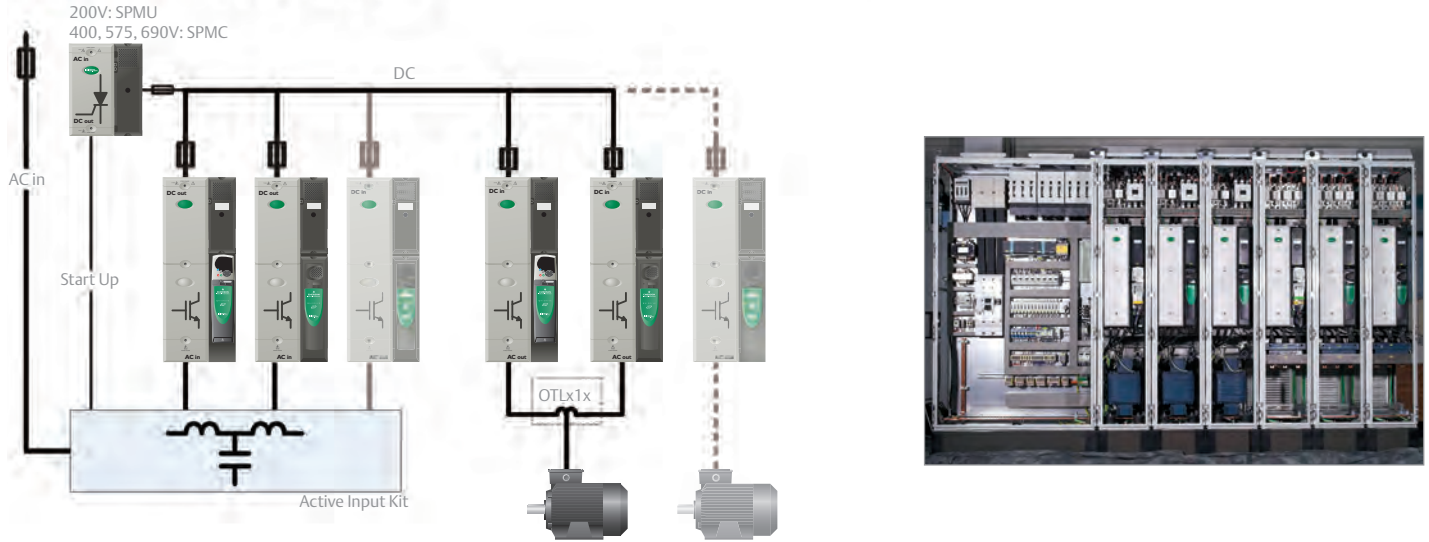


Fig.	Top Level Drive Order Code	Drive Order Code Items				Active Input Kits ^[7]				Normal Duty			Heavy Duty			
		Drive	Modules		Inductors	Order Kit based on required voltage and duty				Max Cont. Current (A)	Typical Motor Output		Max Cont. Current (A)	Typical Motor Output		
			Master	Follower		Rectifier	Output	Normal Duty	Heavy Duty		Normal Duty	Heavy Duty		@ 230V (hp)	@ 220V (kW)	@ 230V (hp)
200V	SPMD1221-2R	4 x SPMD1221	2	2	1 x SPMU1402 ^[5]	1 x OTL411	200-7	200-6			364	150	110	296	125	90
	SPMD1222-2R	4 x SPMD1222	2	2	1 x SPMU1402 ^[5]	1 x OTL412	200-8	200-7			471	200	132	364	150	110
	SPMD1223-2R	4 x SPMD1223	2	2	1 x SPMU1402 ^[5]	1 x OTL413	200-9	200-8			592	250	160	475	200	150
	SPMD1224-2R	4 x SPMD1224	2	2	1 x SPMU1402 ^[5]	1 x OTL414	200-11	200-9			665	250	200	551	200	160

For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:

Fig.	Top Level Drive Order Code	Drive	Master	Follower	Rectifier	Output	Normal Duty	Heavy Duty	Normal Duty	Heavy Duty	@ 460V (hp)	@ 400V (kW)	@ 460V (hp)	@ 400V (kW)		
											3333 ^[1]	2900 ^[1]	1900 ^[1]	2761	2400	1500
400V	SPMD1421-2R	4 x SPMD1421	2	2	1 x SPMC1402	1 x OTL411	400-6	400-5			390	300	225	342	300	185
	SPMD1422-2R	4 x SPMD1422	2	2	1 x SPMC1402	1 x OTL412	400-7	400-6			468	400	280	400	350	225
	SPMD1423-2R	4 x SPMD1423	2	2	1 x SPMC1402	1 x OTL413	400-7	400-7			552	450	315	468	400	280
	SPMD1424-2R	4 x SPMD1424	2	2	1 x SPMC1402	1 x OTL414	400-9	400-7			666 ^[1]	550 ^[1]	350 ^[1]	552	450	315
	SPMD1422-3R	6 x SPMD1422	2	4	1 x SPMC1402	3 x OTL402	400-10	400-8			702	600	400	600	500	315
	SPMD1423-3R	6 x SPMD1423	2	4	1 x SPMC1402	3 x OTL403	400-10	400-10			828	700	450	702	650	400
	SPMD1424-3R	6 x SPMD1424	2	4	1 x SPMC1402	3 x OTL404	400-11	400-10			1000 ^[1]	850 ^[1]	550 ^[1]	828	750	450
	SPMD1423-4R	8 x SPMD1423	2	6	1 x SPMC1402	4 x OTL403	400-12	400-12			1104	900	630	937	800	550
	SPMD1424-4R	8 x SPMD1424	2	6	1 x SPMC1402	4 x OTL404	400-12	400-12			1333 ^[1]	1100 ^[1]	750 ^[1]	1104	950	630

For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:

Fig.	Top Level Drive Order Code	Drive	Master	Follower	Rectifier	Output	Normal Duty	Heavy Duty	Normal Duty	Heavy Duty	@ 575V (hp)	@ 690V (kW)	@ 575V (hp)	@ 690V (kW)		
											1828	2000	1800	1600	1750	1550
575V / 690V	SPMD1621-2R	4 x SPMD1621	2	2	1 x SPMC1601	1 x OTL611	690-7	690-5	575-7	575-5	238	250	200	190	200	185
	SPMD1622-2R	4 x SPMD1622	2	2	1 x SPMC1601	1 x OTL612	690-8	690-7	575-8	575-7	274	300	250	238	250	200
	SPMD1623-2R	4 x SPMD1623	2	2	1 x SPMC1601	1 x OTL613	690-9	690-8	575-9	575-8	320	350	300	274	300	250
	SPMD1624-2R	4 x SPMD1624	2	2	1 x SPMC1601	1 x OTL614	690-11	690-9	575-11	575-9	365	400	350	320	350	300
	SPMD1622-3R	6 x SPMD1622	2	4	1 x SPMC1601	3 x OTL602	690-12	690-11	575-12	575-10	411	450	400	357	350	350
	SPMD1623-3R	6 x SPMD1623	2	4	1 x SPMC1601	3 x OTL603	690-13	690-12	575-13	575-12	480	500	450	411	450	400
	SPMD1624-3R	6 x SPMD1624	2	4	1 x SPMC1601	3 x OTL604	690-14	690-13	575-14	575-13	548	600	500	480	500	450
	SPMD1623-4R	8 x SPMD1623	2	6	1 x SPMC1601	4 x OTL603	690-16	690-15	575-16	575-15	640	700	630	548	600	500
	SPMD1624-4R	8 x SPMD1624	2	6	1 x SPMC1601	4 x OTL604	690-18	690-16	575-18	575-16	731	800	700	640	700	630

For higher currents, please contact your supplier. The maximum number of parallel output stages is 10, as on next line:

Fig.	Top Level Drive Order Code	Drive	Master	Follower	Rectifier	Output	Normal Duty	Heavy Duty	Normal Duty	Heavy Duty	@ 575V (hp)	@ 690V (kW)	@ 575V (hp)	@ 690V (kW)		
											1828	2000	1800	1600	1750	1550
19	SPMD1624-10R	20 x SPMD1624	2	18	1 x SPMC2601	10 x OTL604	690-30	690-28	575-30	575-28	1828	2000	1800	1600	1750	1550

See notes on page 18

SPM Power Selector Module



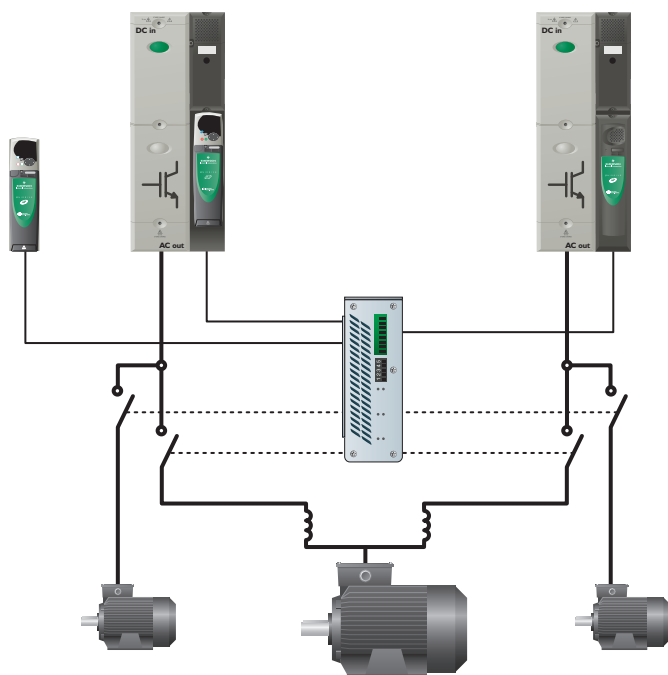
The SPM Power Selector offers enhanced flexibility in drive systems implemented with Unidrive SPM drives. The SPM Power Selector enables automatic connection and disconnection of Unidrive SPM modules in a parallel drive system.

The SPM Power Selector serves as a multi-switch for the parallel control cables and provides relay outputs to control the power contactors.

Notes:

1. SPM power and control modules along with the SPM Power Selector Module must be powered down when changing between the operating modes. “On-the-fly” switching between modes is not allowed.
2. The combined length of all paralleling cables between power modules and SPM Power Selector modules must be no more than 65.6ft (20m). The standard paralleling control cables are supplied with the products in the following lengths:
 - SPM Power Selector - 3.3ft (1m)
 - SM-Control Follower - 6.56ft (2m)
3. The number of SPM Power Selector modules required = $N - 1$, where N = number of SPM power modules.

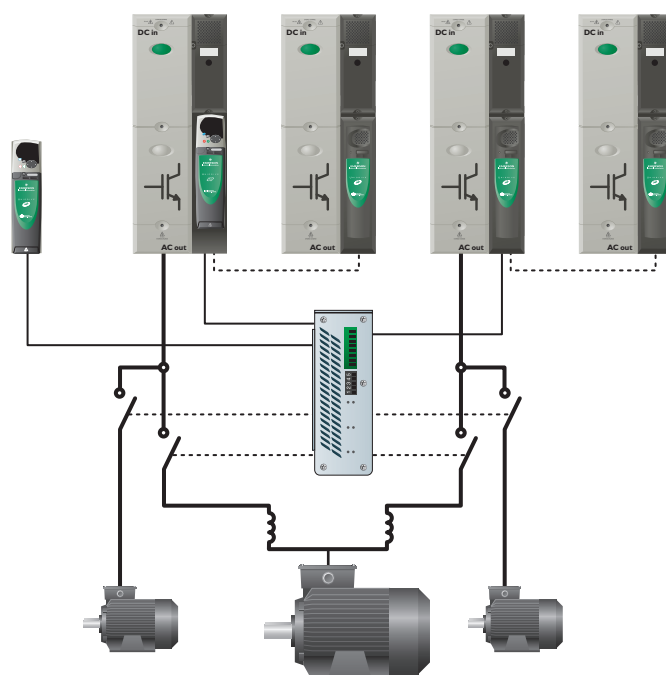
Configuration 1



Function: For two Unidrive SPM drives, the SPM Power Selector enables automatic selection between the control of two separate motors or one larger motor.

Example Application: A Gantry crane with exclusive operation of dual long-travel motors and main hoist. In this case, two drives could be used instead of three, eliminating the larger one and delivering a cost saving.

Configuration 2



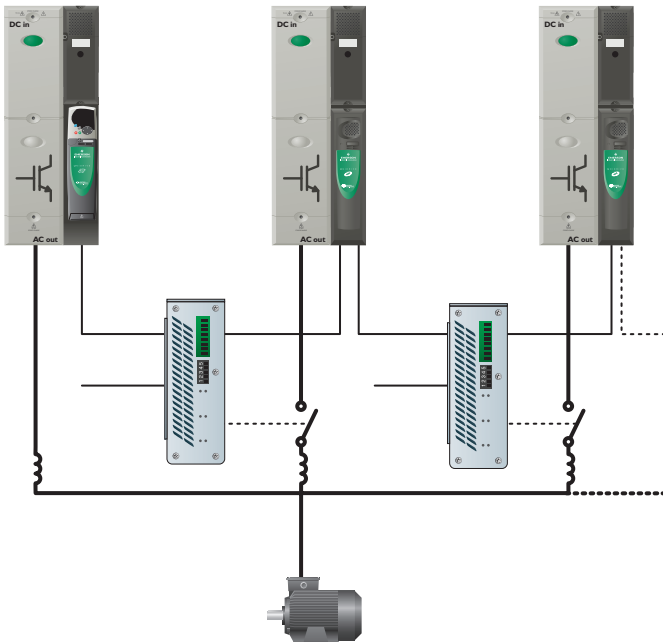
Function: Each of the drives on the Master 1 and Follower connections of the SPM Power Selector can be paralleled in the standard way. No further SPM Power Selectors are required.

Example Application: High-power gantry crane.

Note: The total number of drives that can be connected is 10, using the total current of both sides of the SPM Power Selector.

SPM Power Selector Module

Configuration 3



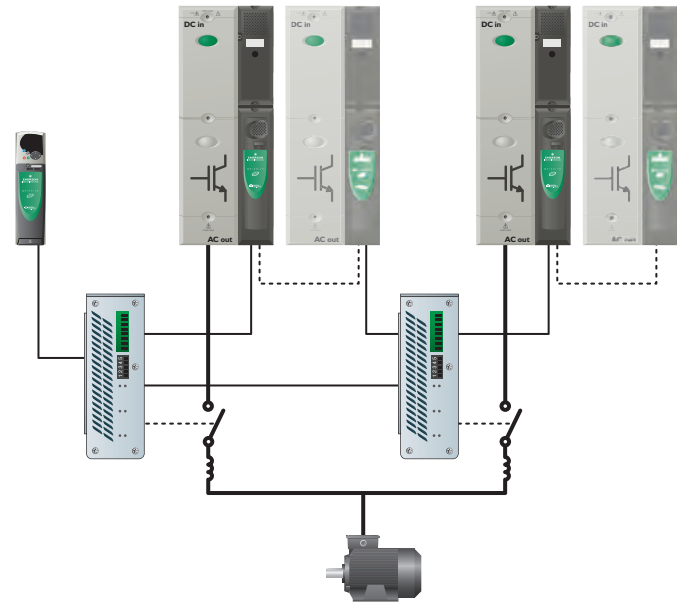
Function: This configuration allows the SPM power modules to be switched out of circuit when the output power demand is reduced and re-connected when output power demand increases. Modules are switched in and out of operation from the non-Master drive end, as this configuration has no control signal feed-through.

Example Application: Test rigs that are required to operate over a wide torque / power range while maintaining current control and measurement accuracy throughout the range.

Notes:

- Maximum number of parallel power modules:
 - With standard paralleling control cables = 7
 - With 6.56ft (2m) SPM Power Selector connection cables (for extra distance between power modules - optional order) = 6
 - With 3.3ft (1m) paralleling control cables throughout (optional order) = 10
- If more than two motors are to be used with this configuration, SM-Applications Plus or SM-Application Lite V2 module will be required to store the mapped motor parameters.

Configuration 4



Function: This configuration enables continuous operation with a faulty or de-energized module. This is achieved by automatically taking the faulty module out of circuit and operating at a lower current.

This configuration feeds the control signal through the right-hand SPM Power Selector, allowing the left-hand drive to be de-energized. Each drive may be paralleled but follow a single control signal. This means that the range of current operation is limited to using the left drive, the right drive or both.

Example Application: Main drive on a production line that is critical to operation. The drive installation will be oversized to include redundant power modules.

Notes:

- Maximum number of parallel power modules:
 - With standard paralleling control cables = 8
 - With 3.3ft (1m) paralleling control cables throughout (optional order) = 10

Specifications and Dimensions

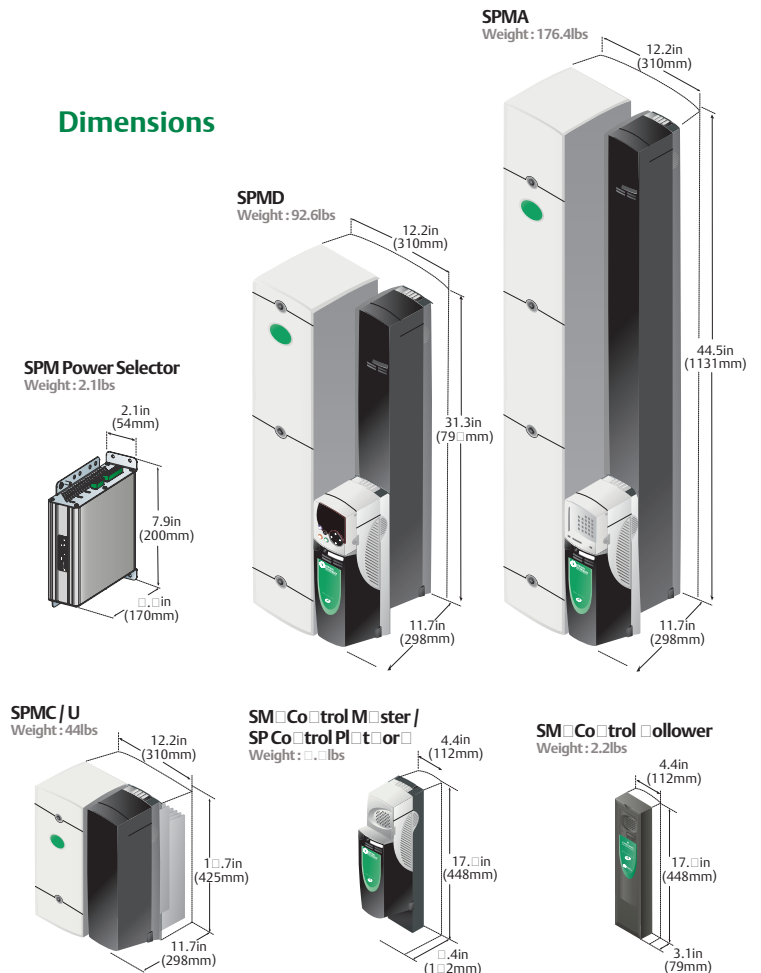
Specifications

Environment	
Ambient temperature	32 to 104 °F (0 to 40 °C) 32 to 122 °F (0 to 50 °C) with de-rating
Cooling method	Forced ventilation
Humidity	95% maximum (non-condensing) at 104 °F (40 °C)
Storage temperature	-40 to 122 °F (-40 to 50 °C)
Altitude	0 to 9,900ft (3000m), derate 1% per 328ft (100m) between 3,280ft (1000m) and 9,842ft (3000m)
Vibration	Tested in accordance with IEC 60068-2-2, 29 & 34
Mechanical shock	Tested in accordance with IEC 60068-2-27
Enclosure	NEMA 1 (IP20), optional NEMA12 (IP54) heat sink through panel mount
Electromagnetic immunity	In compliance with IEC 61000-4-2,3,4,5 & 11, IEC61000-6-1 & 2 and IEC 61800-3
Electromagnetic emissions	IEC 61800-3 with built-in filter, compliance category depends on installation conditions, external filters are available

Approvals and Listings

UL, cUL	UL508C file # E171230
IEC	IEC 60146-1-1 general requirements IEC 61800-5-1 safety of power drive systems IEC 61131-2 I/O
EN	EN 60529 ingress protection Safe Torque Off (Secure Disable) meets EN 954-1-cat3
ISO	ISO 9001 quality management system ISO 14001 environment management

Dimensions



Ratings

Output Module Selection									DC Fuse Selection	Input Module Selection					AC Fuse Selection
Drive	Normal Duty			Heavy Duty			24Vdc Input [3]	Controlled		Uncontrolled		24Vdc Input [3]			
	Order Code	Max Continuous Current	Motor Power	Typical Output	Max Continuous Current	Motor Power		Typical Output		Single	Dual		Single [5]	Dual [5]	
	(A)	@230V (hp)	@220V (kW)	(A)	@230V (hp)	@220V (kW)	(A)	(A)		(A)	(A)	(A)	(A)		
200-240Vac +/- 10%	SPMD1201	192	75	55	156	60	45	3.3	400						
	SPMD1202	248	100	75	192	75	55	3.3	550						
	SPMD1203	312	125	90	250	100	75	5.0	550						
	SPMD1204	350 ^[1]	150 ^[1]	110 ^[1]	290	125	90	5.0	550						
	(A)	@460V (hp)	@400V (kW)	(A)	@460V (hp)	@400V (kW)	(A)	(A)	(A)						
380-480Vac +/- 10%	SPMA1401	205	150	110	180	150	90	3.3							315
	SPMA1402	236	200	132	210	150	110	3.3							350
	SPMD1401	205	150	110	180	150	90	3.3	400						
	SPMD1402	246	200	132	210	150	110	3.3	560	SPMC1402	SPMC2402	SPMU1402	SPMU2402	3.0	400
	SPMD1403	290	250	160	246	200	132	5.0	560						
	SPMD1404	350 ^[1]	300 ^[1]	200 ^[1]	290	250	160	5.0	560						
	(A)	@575V (hp)	@575V (kW)	(A)	@575V (hp)	@575V (kW)	(A)	(A)	(A)						
500-575Vac +/- 10%	SPMA1601 ^[2]	125	125	90	100	100	75	3.3							200
	SPMA1602 ^[2]	144	150	110	125	125	90	3.3							200
	SPMD1601 ^[2]	125	125	90	100	100	75	3.3	250						
	SPMD1602 ^[2]	144	150	110	125	125	90	3.3	315	SPMC1601	SPMC2601	SPMU1601	SPMU2601	3.0	250
	SPMD1603 ^[2]	168	150	110	144	150	110	5.0	350						
	SPMD1604 ^[2]	192	200	150	168	150	110	5.0	400						
	(A)	@690V (hp)	@690V (kW)	(A)	@690V (hp)	@690V (kW)	(A)	(A)	(A)						
500-690Vac +/- 10%	SPMA1601	125	150	110	100	125	90	3.3							200
	SPMA1602	144	175	132	125	150	110	3.3							200
	SPMD1601	125	150	110	100	125	90	3.3	250						
	SPMD1602	144	175	132	125	150	110	3.3	315	SPMC1601	SPMC2601	SPMU1601	SPMU2601	3.0	250
	SPMD1603	168	200	160	144	175	132	5.0	350						
	SPMD1604	192	250	185	168	200	160	5.0	400						

Option Reference	Order Code
SM-Control Master	SM-CONTROL-MASTER
SM-Control Follower	SM-CONTROL-FOLLOWER ^[4]
24Vdc Supply - 10A	8510-0000
SPM Docking Kit	3470-0012
LED Keypad	SM-KEYPAD
LCD Keypad	SM-KEYPAD-PLUS
SPM Power Selector	SPM-POWER-SELECTOR
SP Control Platform	SP-CONTROL-PLATFORM
Paralleling cable (2m)	3471-0013
Paralleling cable (1m)	3471-9842

Normal Duty	Heavy Duty (Rotor Flux Control and Closed-loop)
Suitable for most applications, current overload is set at 110% for 165 seconds. Where motor rated current is less than the drive continuous current, higher overloads are achieved.	Suitable for demanding applications, current overload is set at up to 150% for 60 seconds. Where motor rated current is less than the drive rated continuous current overloads (200% or greater) are achieved.

Notes:

- [1] The full rating is only possible when the SPMD is mounted separately to the SMPC. That is, a single module can deliver 350A with a separate airflow path for each module and ambient = <95 °F (35 °C). Otherwise the limit is 335A.
- [2] The same model can be used on a 575V or a 690V supply and has two different output ratings. e.g. At Normal Duty, SPMD1601 is suitable for a 90kW output motor on a 575V but is suitable for a 110kW output motor on 690V.
- [3] All SPM modules require a 24Vdc power supply for the cooling fans. The total 24Vdc current required can be assessed in the table and a 24Vdc supply chosen.
- [4] For paralleling, the necessary interface cable that connects a follower to a master or another follower is delivered with the slave module.
- [5] A separate soft start must be provided for the DC link. Please contact your supplier.
- [6] Input inductance may be incorporated in star-delta transformer.
- [7] Active input kits include loose power inductors, filter capacitors and varistors for customer mounting and wiring.
- [8] Top level order codes are used to order standard output modules and power components for implementation of a complete output configuration. These ordering suffixes will not appear on the rating label. The rating label is applicable only to the power output module.

Ratings

Drive	Input Inductor Selection (Required with each SPMC/U)				Output Inductor Selection (For Parallel Configurations)				External EMC Filter (To meet requirements of EN61800-3)		Suitable Braking Resistors [7]		
	Single		Dual		Single		Dual		Schaffner	Epcos	Minimum Resistance (Ω)	Instantaneous Power Rating (kW)	Average Power for 60s (kW)
	Model Number	Order Code	Model Number	Order Code	Model Number	Order Code	Model Number	Order Code	Order Code	Order Code			
SPMD1201	INL401	4401-0181-00	INL411	4401-0206-01	OTL401	4401-0197-00	OTL411	4401-0188-01	4200-6315	4200-6313	2.5	61	55
SPMD1202					OTL402	4401-0198-00	OTL412	4401-0189-01			2.5	61	61
SPMD1203	INL402	4401-0182-00	INL412	4401-0207-01	OTL403	4401-0199-00	OTL413	4401-0192-01			1.9	80	80
SPMD1204					OTL404	4401-0200-00	OTL414	4401-0186-01			1.9	80	80
SPMA1401	INL401	4401-0181-00	INL411	4401-0206-01	OTL401	4401-0197-00	OTL411	4401-0188-01	4200-6603	4200-6601	5	122	90
SPMA1402					OTL402	4401-0198-00	OTL412	4401-0189-01			5	122	110
SPMD1401	INL401	4401-0181-00	INL411	4401-0206-01	OTL401	4401-0197-00	OTL411	4401-0188-01	4200-6315	4200-6313	5	122	90
SPMD1402					OTL402	4401-0198-00	OTL412	4401-0189-01			5	122	110
SPMD1403	INL402	4401-0182-00	INL412	4401-0207-01	OTL403	4401-0199-00	OTL413	4401-0192-01			3.8	160	132
SPMD1404					OTL404	4401-0200-00	OTL414	4401-0186-01			3.8	160	160
SPMA1601 ^[2]	INL601	4401-0183-00	INL611	4401-0190-03	OTL601	4401-0201-00	OTL611	4401-0193-00	4200-6603	4200-6601	10	126	113
SPMA1602 ^[2]					OTL602	4401-0202-00	OTL612	4401-0194-00			10	126	113
SPMD1601 ^[2]	INL601	4401-0183-00	INL611	4401-0190-03	OTL601	4401-0201-00	OTL611	4401-0193-00	4200-6316	4200-6314	10	126	75
SPMD1602 ^[2]					OTL602	4401-0202-00	OTL612	4401-0194-00			10	126	90
SPMD1603 ^[2]	INL602	4401-0184-00	INL612	4401-0191-03	OTL603	4401-0203-00	OTL613	4401-0195-00			6.2	202	110
SPMD1604 ^[2]					OTL604	4401-0204-00	OTL614	4401-0196-00			6.2	202	132
SPMA1601	INL601	4401-0183-00	INL611	4401-0190-03	OTL601	4401-0201-00	OTL611	4401-0193-00	4200-6603	4200-6601	10	126	113
SPMA1602					OTL602	4401-0202-00	OTL612	4401-0194-00			10	126	113
SPMD1601	INL601	4401-0183-00	INL611	4401-0190-03	OTL601	4401-0201-00	OTL611	4401-0193-00	4200-6316	4200-6314	10	126	75
SPMD1602					OTL602	4401-0202-00	OTL612	4401-0194-00			10	126	90
SPMD1603	INL602	4401-0184-00	INL612	4401-0191-03	OTL603	4401-0203-00	OTL613	4401-0195-00			6.2	202	110
SPMD1604					OTL604	4401-0204-00	OTL614	4401-0196-00			6.2	202	132

AC Fuse Selection (Semiconductor IEC class aR)				
(A)	Bussman		Ferraz	
	Order Code	Manufacturer Part No.	Order Code	Manufacturer Part No.
200	[7]	170M3015	[7]	6,9URD31D08A0200
250	[7]	170M3016	[7]	6,9URD31D08A0250
315	[7]	170M3017	[7]	6,9URD31D08A0315
350	[7]	170M3018	[7]	6,9URD31D08A0350
400	3533-4069	170M3019	4300-0400	6,9URD31D08A0400

DC Fuse Selection (Semiconductor IEC class aR)				
(A)	Bussman		Ferraz	
	Order Code	Manufacturer Part No.	Order Code	Manufacturer Part No.
250	[7]	170M3016	[7]	6,9URD31D08A0250
315	[7]	170M3017	[7]	6,9URD31D08A0315
350	[7]	170M3018	[7]	6,9URD31D08A0350
400	3533-4069	170M3019	4300-0400	6,9URD31D08A0400
560	[7]	170M3022	[7]	6,9URD31D08A0550

External EMC Filter (To meet requirements of EN61800-3) For multiple drive configurations					
(V)	(A)	Epcos		Schaffner	
		Order Code	Manufacturer Part No.	Order Code	Manufacturer Part No.
500V	600	4200-6801	B84143-B600-S20	4200-6808	FN3359-600-99
	1000	4200-6802	B84143-B1000-S20	4200-6809	FN3359-1000-99
	1600	4200-6803	B84143-B1600-S20	4200-6810	FN3359-1600-99
690V	320	4200-6804	B84143-B320-S24	4200-6811	FN3359HV-320-99
	400	4200-6805	B84143-B400-S24	4200-6812	FN3359HV-400-99
	600	4200-6806	B84143-B600-S24	4200-6813	FN3359HV-600-99
	1000	4200-6807	B84143-B1000-S24	4200-6814	FN3359HV-1000-99

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