

CONTROL 
TECHNIQUES



MODULAR POWER

FOR INDUSTRIAL AUTOMATION, PUMPING AND HVAC/R

DRIVE OBSESSED

HIGH POWER MODULAR DRIVES HIGHLY RELIABLE DRIVE MODULES

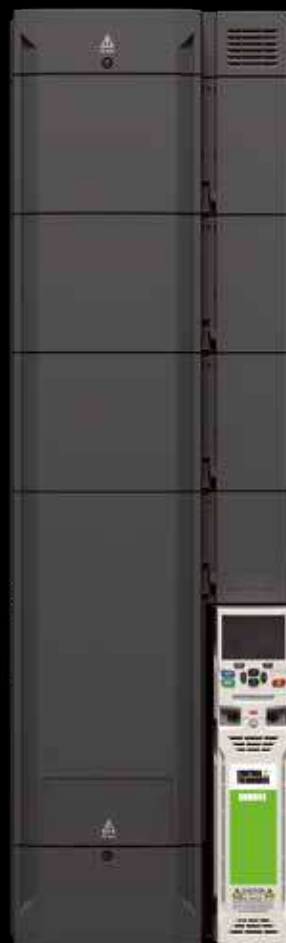
M700 | M701 | M702 | M600 | Pump Drive F600 | HVAC Drive H300

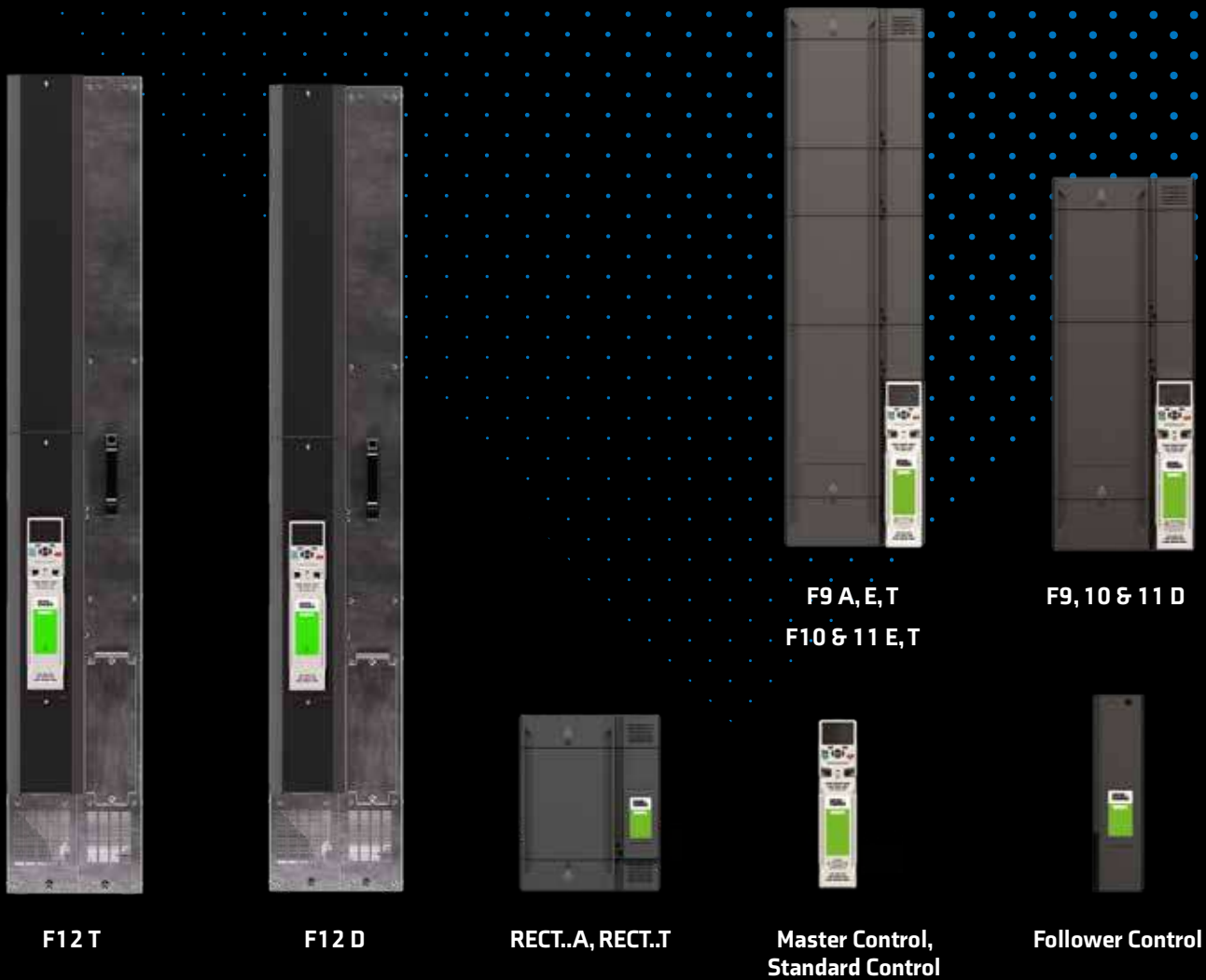
The modular offering provides a flexible method of building compact, reliable high-power solutions.

Paralleled together, they can control asynchronous and permanent magnet motors in systems up to 2.8 MW (4,200 hp). The frame 12 is a 500 kW (700 hp) module that allows system builders to create high power solutions with the smallest number of components, keeping both footprint and costs to a minimum.

Unidrive M differentiates itself on performance with extremely fast current control algorithms and high switching frequencies. Active Front End (AFE) solutions deliver unparalleled torque precision & power quality.

The Unidrive M modules can be paralleled into a wide range of flexible solutions to solve all system needs including Active Front End and multi-pulse rectifier configurations. They can be controlled by M700, M701, M702, M600, Pump Drive F600 or HVAC Drive H300 controllers.





Format	
A	AC in AC out module with integrated rectifier and line choke. Available in frame size 9 and can be paralleled up to 1.9 MW (2,100hp) (Unidrive SPMA replacement)
E	AC in AC out module with integrated rectifier. Available in frame sizes 9, 10 & 11 and can be paralleled up to 2.8 MW (4,200hp)
T	AC in AC out module with 12 pulse integrated rectifier. Available in frame size 9, 10, 11 & 12 and can be paralleled up to 2.8 MW (4,200hp)
D	DC in AC out module. Available in frame size 9, 10, 11 & 12 and can be paralleled up to 2.8 MW (4,200hp) (Unidrive SPMD replacement)
RECT..A	AC in DC out rectifier 6 pulse module (Unidrive SPMC replacement). Available in frame size 10 & 11
RECT..T	AC in DC out rectifier 12 pulse module (Unidrive SPMC2 replacement). Available in frame size 10 & 11
Standard Control	M700, M701, M702, M600, F600, H300 controller for single module systems
Master Control	M700, M701, M702, M600, F600, H300 master controller for systems with more than one module
Follower Control	Follower controller for all paralleled modules

UNIDRIVE M SERIES

HIGH PERFORMANCE SOLUTIONS



Create flexible systems easily

The modular approach to building high power systems provides machine builders with flexibility while keeping complexity low. Modules with integrated rectifiers and / or line chokes can be easily paralleled keeping installation time and component count to a minimum. Separate inverter and rectifier modules (D, RECT..A and RECT..T) can be paralleled into more flexible common DC bus and regenerative configurations where power management and system design efficiency are key.

Flexible and easy system design:

- Unidrive M high power modules are designed to fit in standard 600 mm deep x 400 mm wide (23.6 x 15.7 in) cubicles
- 6,12,18 and 24 pulse input and Active Front End configurations are easy to achieve
- Integrated cooling fan power supply means no additional power supplies are required
- Output current ratings have been increased for a wider range of global motors
- A common control interface ensures a consistent programming method and feature set across the whole range. Familiarity reduces the need for training:
 - i. Identical parameter structure with Smartcard and SD card cloning support
 - ii. Connect software for monitoring, diagnostics and parameter file management
 - iii. Machine Control Studio for application programming in IEC61131-3 environment
 - iv. SI-Option module support for additional I/O and fieldbus (e.g. Ethernet/IP, PROFINET RT, EtherCAT, POWERLINK or PROFIBUS)
 - v. MCi and SI-Applications modules for advanced application solutions



Minimize downtime for critical operations

We know how important reliability is to our customers and that every second of system downtime can be costly. Control Techniques high power modules have exceptional build quality based on over 45 years of drive knowledge, expertise and development.

Built using world leading manufacturing processes, the modules are packed with features proven to keep the drive running in the most testing of environments. Control Techniques Automation Centres are situated in many global regions to provide local design consultation and rapid specialist technical support wherever your business is located.



Reliability assured

- Every power module has been thoroughly tested in environmental chambers that cycle a wide range of load and thermal conditions
- PCBs have conformal coating to further increase resilience to harsh environmental conditions
- Trip avoidance features take intelligent action instead of interrupting critical processes.

For example:

- i. Active thermal monitoring reduces switching frequency as the drive approaches thermal limits
- ii. Load shedding reduces speed at current limits
- iii. Supply loss ride-through keeps the drive running during supply brown outs
- Protection alarms safeguard the wider system (e.g. over current, over temperature, over voltage and short circuit protection)
- Intelligent variable speed fans ensure operating temperature stays within limits. They are easily replaceable as part of routine maintenance
- Wide supply voltage tolerance keeps drive operation smooth in areas where supplies are variable



Make compact, easily maintainable systems

- Control Techniques high power modules are incredibly compact given the impressive amount of power they can deliver. For example, the powerful AC in AC out 500 kW (700 hp) module measures only 295 x 1750 x 526 mm (11.61 x 68.90 x 20.71 in) - a power density unrivalled in the market place and almost half the size of other leading suppliers.
- Overall system size and footprint is kept to a minimum
- Manageable small and light modules are maintained and replaced rapidly and easily



Reduce spares inventory

Control Techniques modular approach gives customers the opportunity to standardize their solutions in order to keep spares holding to a minimum as different systems can be serviced using one common spare. Additionally, large volumes of standard product modules are stocked at local distribution hubs in convenient locations around the world meaning that rapid delivery is always available to all customers.



Upgrade legacy modular systems painlessly

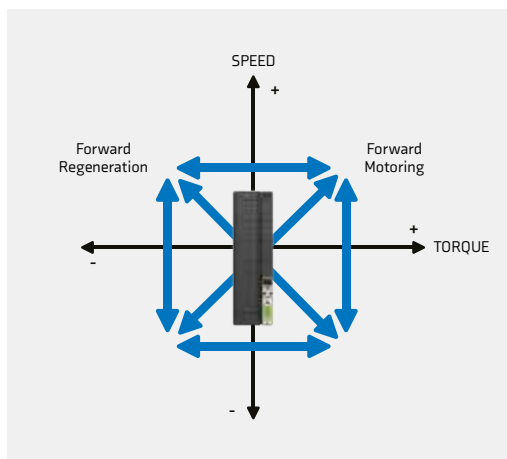
Migration of Unidrive SP modular systems is fast and easy with many conversion tools available:

- Parameter porting tools such as Connect and Smartcard are available SyptPro can recompile SM-Applications programs for SI-Applications and connect to existing CTNet networks
- Identical width and depth dimensions, along with retrofit kits, mean that Unidrive M modules frame sizes 9, 10, 11 can easily fit into SP modular locations using existing fittings

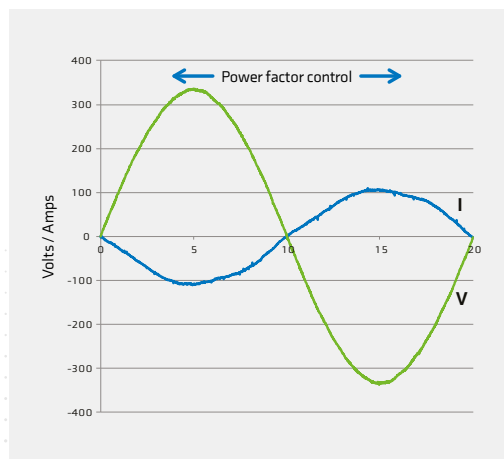


Environmental safety and electrical conformance

- UL and DNV listed
- Electromagnetic immunity complies with EN 61800-3 and EN 61000-6-2
- Electromagnetic emissions comply with EN 61800-3
 - On-board EMC filter, category C3
 - Optional external EMC filter, category C2 depending on power rating
 - Compliance with EN 61000-3-12 with external line reactor



Superb power quality management



Dynamic response across 4 quadrants

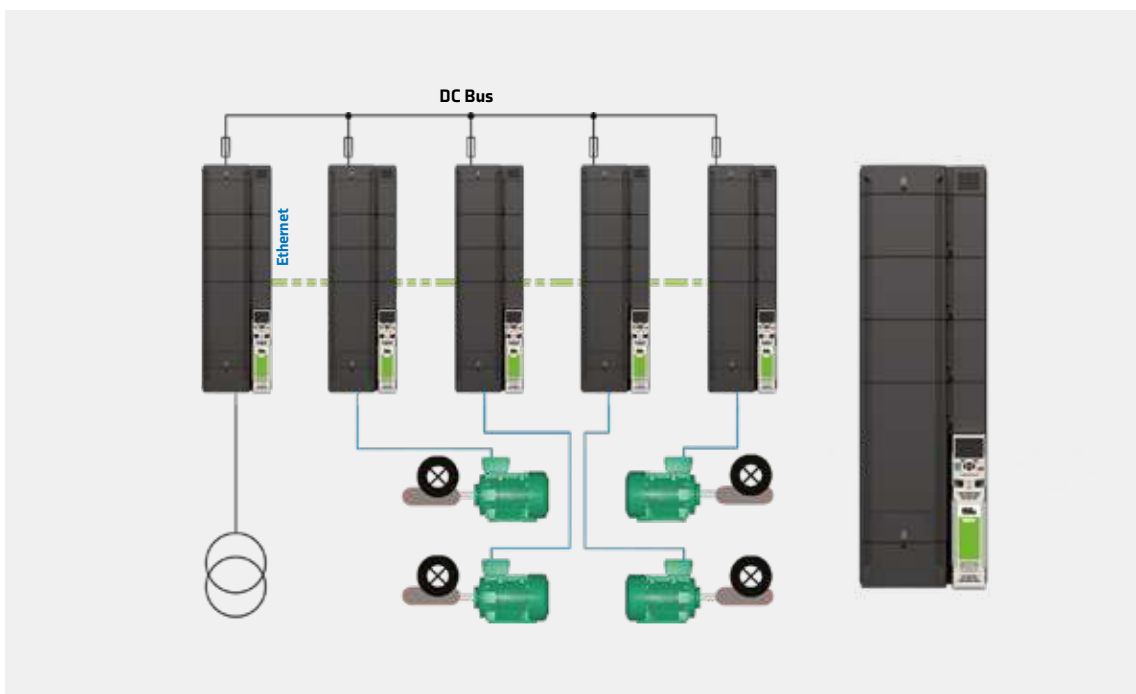


Create high performance solutions

Unidrive M delivers market leading control performance at high powers with extremely fast current control algorithms, advanced thermal monitoring and high switching frequencies. When Control Techniques power modules are configured with an Active Front End, dynamic torque response can be effectively demanded across all power quadrants.

- Switching frequencies of up to 16 kHz in systems up to 160 kW (250 hp) and 8 kHz in systems up to 500 kW (700 hp) allow Unidrive M to provide precision torque. This is effective in demanding applications such as test stands, where our ETPS solution (engine torque pulsation system) can precisely simulate dynamic engine torque profiles.
- Highly accurate thermal model ensures:
 - i. High overload capability – 150% Heavy Duty. (140 % with frame 12)
 - ii. Impressive low derating requirement in applications that demand high torque at low speeds. Power device temperature is intelligently managed meaning smaller lower priced systems can be specified and product life is extended.
- Dynamic Active Front End configurations provide:
 - i. Precision torque linearity across quadrants
 - ii. Corrective power factor operation (lagging, unity or leading) for high quality power
 - iii. Harmonic mitigation

Example of a highly demanding automotive test stand application



COMPACT WITH HIGH POWER

UNIDRIVE M SERIES

MODULE CONFIGURATIONS & ORDER INFORMATION

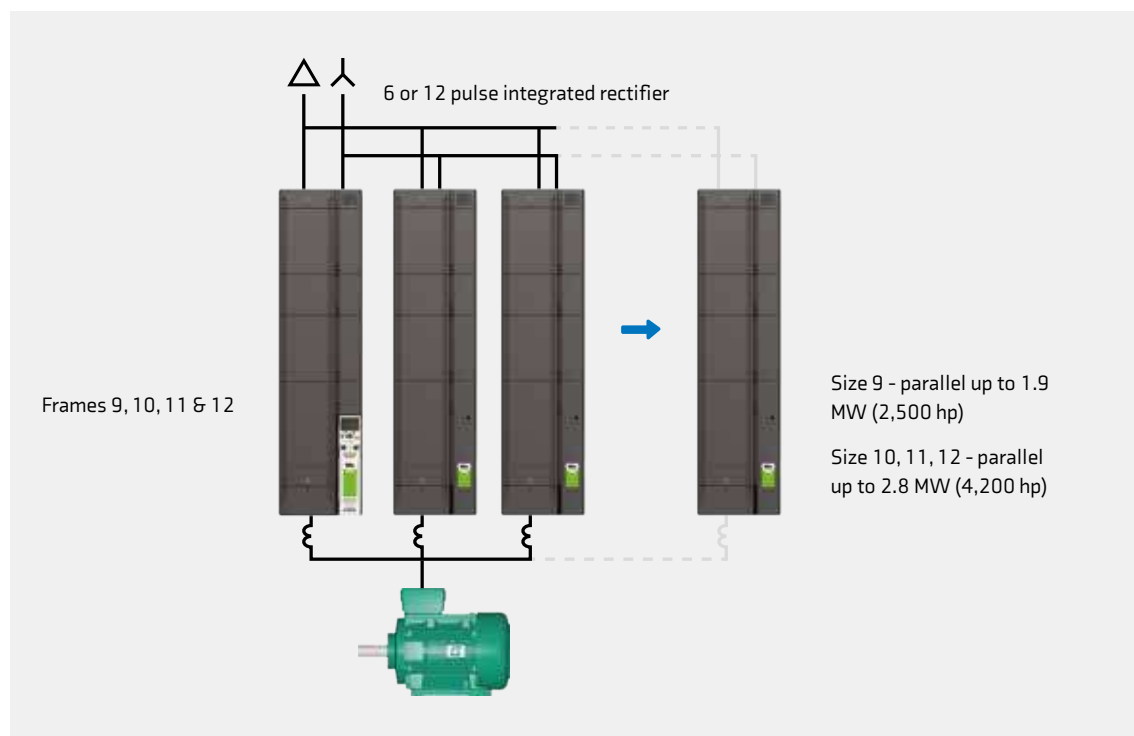


'A', 'E' & 'T' – AC in AC out modules

Unidrive M's AC in AC out modules are available in 4 frame sizes (9, 10, 11 & 12) and comprise an integrated 6 or 12 pulse rectifier with an inverter.

'A', 'E' and 'T' formats can be paralleled together to reach powers of 2.8 MW (4,200 hp) Frame size 9, 10 & 11 can be supplied with an optional braking transistor. Frame size 12 has an internal 125 kW braking transistor as standard. Frame 9 has an internal choke version and can also be paralleled to 1.9 MW (2,500 hp) (6 pulse only).

Example using 'T' format with 12 pulse rectifier.



The above system is simply configured by ordering:

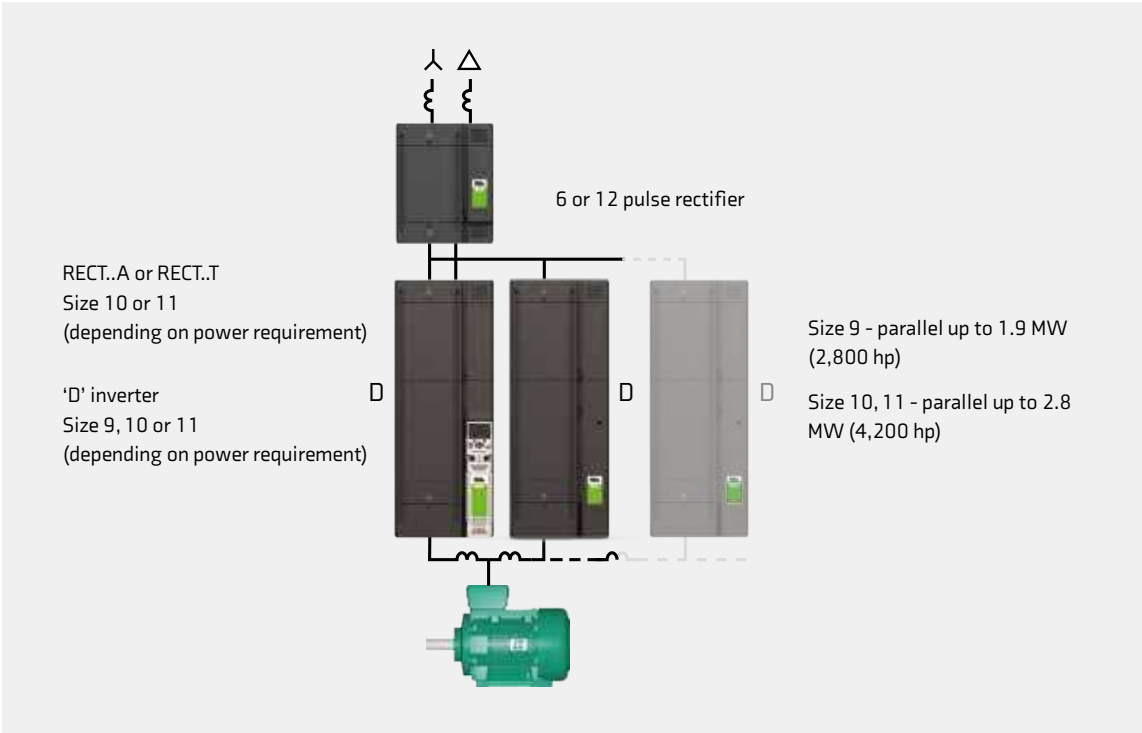
Component	Quantity	Part number
'T' format power module (integrated 12 pulse rectifier with inverter)	Quantity of frame 12 modules required is: total power required / 500 kW – derating (see technical manual)	M000-12407200TU0100AB100
Control standard	In systems with only 1 'A' 'E' or 'T' module, use 1 standard control	M700-STANDARD012100A0100
Control master	In systems with >1 'A' 'E' or 'T' module, use 1 master control	M700-MASTER00012100A0100
Control follower	1 for each paralleled module (1 less than the total number of modules)	M000-FOLLOWER011100A0100

‘D’ – DC in AC out modules with RECT..A and RECT..T Rectifiers

DC in AC out power modules are available in 4 frame sizes (9, 10, 11 & 12) and can be configured as either output or active input stages of a system.

‘D’ modules can be paralleled together using a common DC bus to reach powers of 2.8 MW (4,200 hp).

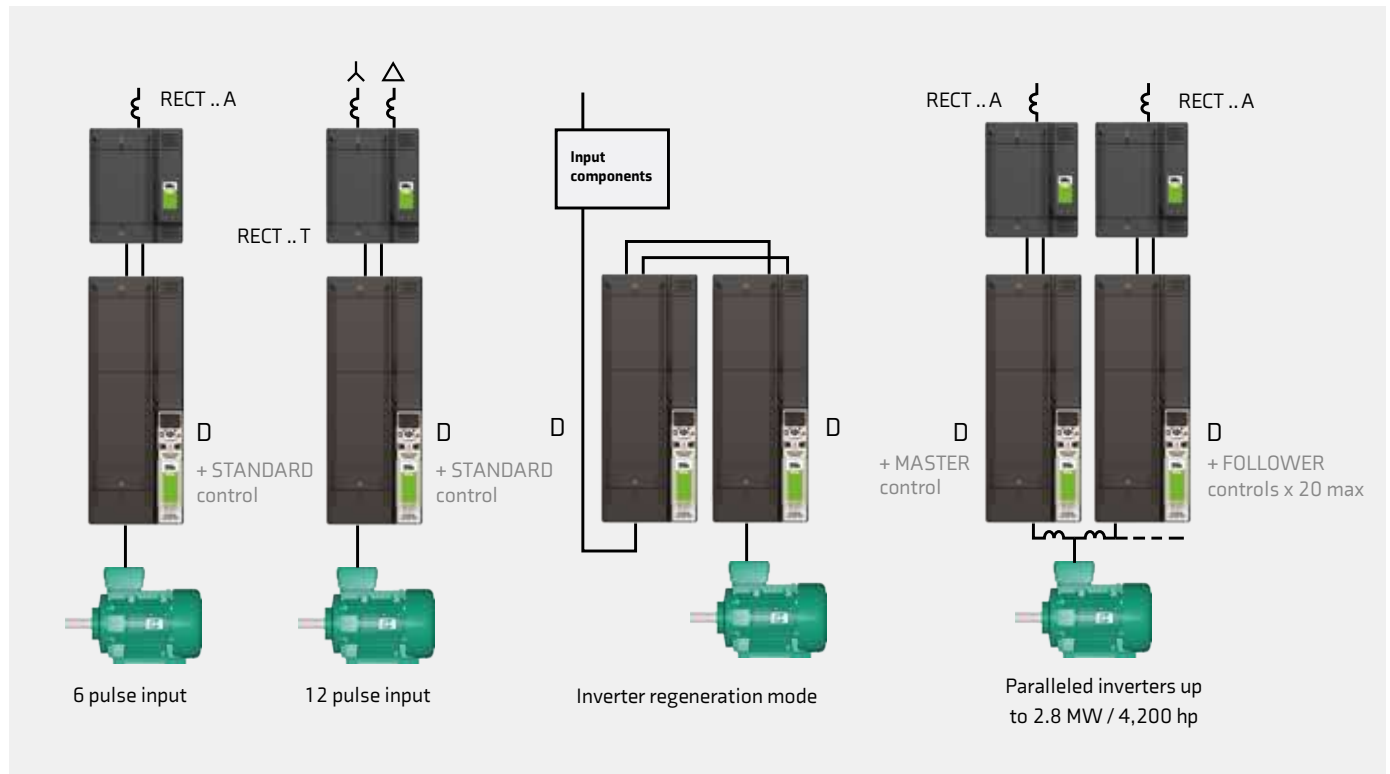
Example using ‘D’ format to parallel power



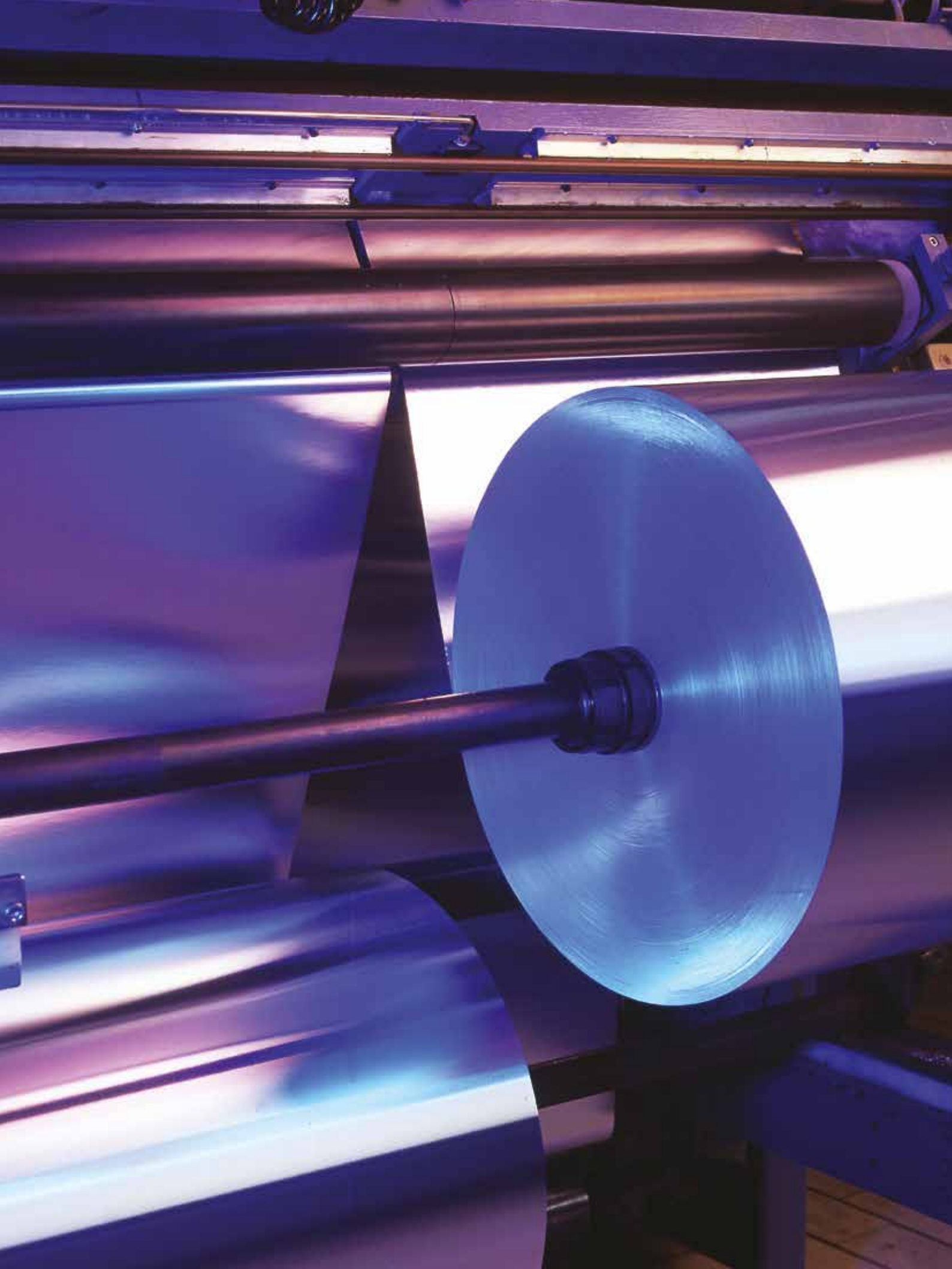
The above system is simply configured by ordering:

Component	Quantity	Part number
Rectifier RECT..A or RECT..T size 10 or 11 depending on power required	1 (add more as system power increases)	RECT-1142X400T10100A0100
'D' format inverter module size 9, 10 or 11 depending on power required	1 (add more as system power increases)	M000-11404640DU0100AB100
Control standard	In systems with only 1 'D' inverter, use 1 standard control	M700-STANDARD011100A0100
Control master	In systems with >1 'D' inverter, use 1 master control	M700-MASTER00011100A0100
Control follower	1 for each paralleled module (1 less than the total number of modules)	M000-FOLLOWER011100A0100

Other flexible configurations with 'D' modules



- Frame 9: 90 to 110 kW / 125 to 150 hp HD
- Frame 10: 132 to 160 kW / 200 to 250 hp HD
- Frame 11: 185 to 250 kW / 300 to 400 hp HD
- Frame 12: 250 to 400 kW / 400 to 600 hp HD,
Up to 500 kW / 700 hp ND



UNIDRIVE M OPTIONS INTEGRATE, AUTOMATE, COMMUNICATE

Unidrive M drives support a wide range of optional click-in System Integration (SI) modules that allow them to integrate seamlessly with existing automation systems and other vendor supplied equipment.

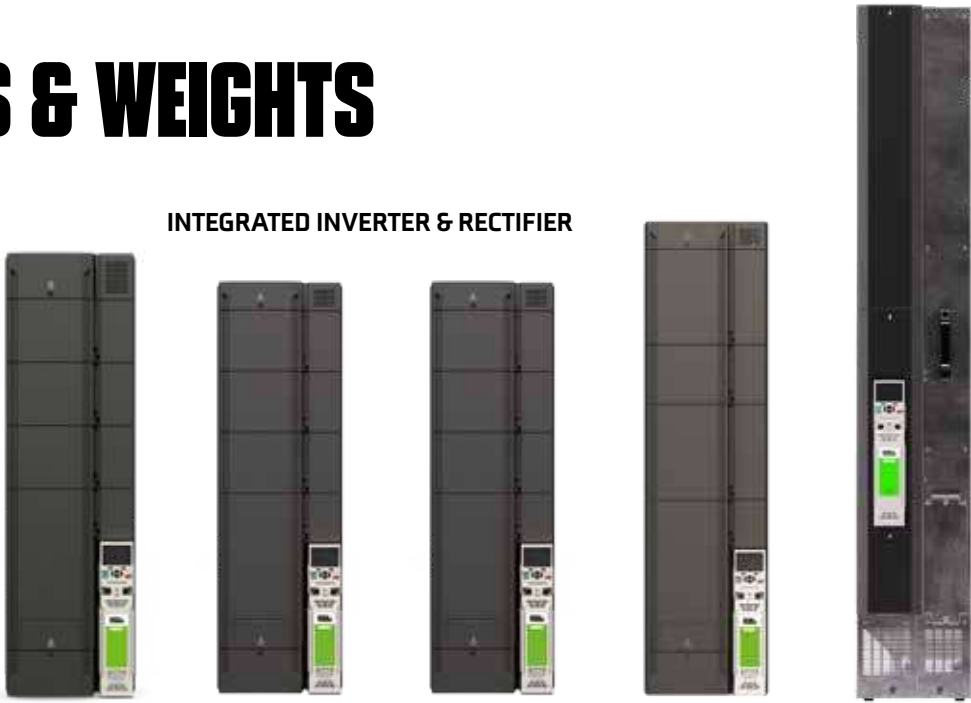
These include communications, I/O, feedback devices, enhanced safety features and onboard PLCs.



Option		Description
System Integration Modules		
MCi200		Second processor, providing advanced machine control using Machine Control Studio.
MCi210		Adds to the MCi200 with a dual port Ethernet interface directly on the processor and additional I/O.
SI-Applications		Second processor module, which allows SyPTPro application programs to be re-compiled for Unidrive M70x.
SI-Safety		An intelligent, programmable module to meet the IEC 61800-5-2/ISO 13849-1 functional safety standard up to SIL3/PLe.
MiS210		MiS210 safety option for Unidrive extends the built-in STO with motion safety capability and enables decentralised flexibility with the option of safety over Ethernet connectivity.
SI-Ethernet		Ethernet module supports EtherNet/IP and Modbus TCP/IP.
SI-EtherCAT		EtherCAT interface module.
SI-PROFINET RT		PROFINET RT interface module.
SI-PROFIBUS		PROFIBUS interface module.
SI-POWERLINK		POWERLINK interface module
SI-CANopen		CANopen interface module.
SI-DeviceNet		DeviceNet interface module.
SI-Universal Encoder		Encoder input and output interface supporting Quadrature, SinCos, HIPERFACE, EnDat and SSI encoders.
SI-Encoder		Quadrature encoder input interface module.
SI-I/O		Extended I/O interface module to increase the number of I/O analog and digital points on a drive.
Drive Interface Units		
Smartcard		Smartcard memory device to back-up and copy parameter sets and basic PLC programs.
SD Card Adaptor		Allows an SD card to be inserted into the Smartcard slot, for parameter back-up cloning and application programs.
KI-485 Adaptor		Allows the drive to communicate via RS485.
CT USB Comms cable		The USB Comms cable allows the drive's RS485 port to connect to a PC for use with Unidrive M's PC tools.
Keypads		
KI-Keypad		Plain text, multilingual LCD keypad with up to 4 lines of text for in depth parameter and data descriptions, for an enhanced user experience.
KI-Keypad RTC		All the features of the KI-Keypad, but with battery operated real-time clock. This allows accurate time stamping of events, aiding diagnostics.
Remote Keypad		Remote mountable, plain text, multi-language LCD keypad allows flexible mounting on the outside of a panel and meets IP66 (NEMA 4).
Remote keypad RTC		The keypad is remote mountable, allowing flexible mounting on the outside of a panel (meets IP54/ NEMA 12). Three line plain text, multi-language LCD keypad for rapid set-up and helpful diagnostics. Battery operated real-time clock allows accurate time stamping of events, aiding diagnostics.

DIMENSIONS & WEIGHTS

INTEGRATED INVERTER & RECTIFIER



Modular Drives

Frame size		9A	9E 9T	10E 10T	11E 11T	12T
Frame sizes available	M600 M700 F600 H300	•	•	•	•	•
Dimensions (H x W x D)	mm	1049 x 310 x 290	1010 x 310 x 290	1010 x 310 x 290	1190 x 310 x 312	1750 x 295 x 526
	in	41.3 x 12.2 x 11.4	39.7 x 12.2 x 11.4	39.7 x 12.2 x 11.4	46.9 x 12.2 x 12.3	68.90 x 11.61 x 20.71
Weight	kg (lb)	66.5 (146.6)	46 (101.4) 60 (132.3)	46 (101.4) 60 (132.3)	63 (138.9) 65 (143.3)	130 (287)
AC line choke	Internal	•				
	External		•	•	•	

MODEL RATINGS

Frame size		9A	9E 9T	10E 10T	11E 11T	12T
Max continuous heavy duty rating (kW, hp A)	@ 200 V	45 kW – 55 kW (60 hp – 75 hp)	45 kW – 55 kW (60 hp – 75 hp)	75 kW – 90 kW (100 hp – 125 hp)	N/A	N/A
	@ 400 V	90 kW – 110 kW (125 hp – 150 hp)	90 kW – 110 kW (150hp)	132 kW – 160 kW (200 hp – 250 hp)	185 kW – 250 kW (300 hp – 400 hp)	250 kW – 400 kW (400 to 600 hp)
	@ 575 V	75 kW – 90 kW (100 hp – 125 hp)	75 kW – 90 kW (100 hp – 125 hp)	110 kW – 132 kW (150 hp – 200 hp)	150 kW – 225 kW (200 hp – 300 hp)	250 kW – 330 kW (350 hp – 450 hp)
	@ 690 V	90 kW – 110 kW (125 hp – 150 hp)	90 kW – 110 kW (125 hp – 150 hp)	132 kW – 160 kW (175 hp – 200 hp)	185 kW – 250 kW (250 hp – 300 hp)	280 kW – 450 kW (500 hp – 650 hp)

Modular ratings up to 2.8 MW (4,200 hp) through parallel connected inverters.

DC-AC INVERTER

RECTIFIER



9D	10D	11D	12D	10A	11A	11T
•	•	•	•			
714 x 310 x 290	714 x 310 x 290	804 x 310 x 312	1750 x 295 x 526	296 x 310 x 290	383 x 310 x 290	383 x 310 x 290
28.11 x 12.2 x 11.4	28.11 x 12.2 x 11.4	31.7 x 12.2 x 12.3	68.90 x 11.61 x 20.71	11.7 x 12.2 x 11.4	15.1 x 12.2 x 11.4	15.1 x 12.2 x 11.4
34 (75)	34 (75)	42 (92.6)	113 (249)	12 (26.5)	21 (46.3)	23 (50.7)
				•	•	•

9D	10D	11D	12D	10A	11A	11T
45 kW - 55 kW (60 hp - 75 hp)	75 kW - 90 kW (100 hp - 125 hp)	N/A	N/A	413 A*	N/A	N/A
90 kW - 110 kW (150 hp)	132 kW - 160 kW (200 hp - 250 hp)	185 kW - 250 kW (300 hp - 400 hp)	250 kW - 400 kW (400 to 600 hp)	455 A*	689 A*	2 x 400 A*
75 kW - 90 kW (100 hp - 125 hp)	110 kW - 132 kW (150 hp - 200 hp)	150 kW - 225 kW (200 hp - 300 hp)	250 kW - 330 kW (350 hp - 450 hp)	246 A*	387 A*	2 x 380 A*
90 kW - 110 kW (125 hp - 150 hp)	132 kW - 160 kW (175 hp - 200 hp)	185 kW - 250 kW (250 hp - 300 hp)	280 kW - 450 kW (500 hp - 650 hp)	251 A*	411 A*	

* Maximum DC output current

HARDWARE SELECTION

90 to 400 kW / 150 to 600 hp Heavy Duty

Unidrive M's modular offering provides a flexible method of building compact, reliable high-power solutions.

AC Voltage rating ± 10 %	Order Code		No Overload			Normal Duty				Heavy Duty					Rectifier for Modular 'D' Inverters	Input Choke		Output Choke	
	Control Identifier & Electrical Specification M000, M700, M701, M702, M600, F600, H300	Order Code -Format Identifiers	Motor Shaft Power		Max Cont. Output Current	Motor Shaft Power		Maximum Continuous Output Current	Peak Output Current	Motor Shaft Power		Max Cont. Output Current	Open loop Peak Output Current	RFC Peak Output Current		Single	Single	Single	Dual
			kW	hp	A	kW	hp	A	A	kW	hp	A	A	A					
200/240	-9201760	A/E/T/D	55	75	216	55	75	216	238	45	60	176	239	308	-10204100A	INL401	OTL401	OTL411	OTL412
	-9202190	A/E/T/D	75	100	266	75	100	266	293	55	75	219	298	383					
	-10202830	E/T/D	90	125	325	90	125	325	358	75	100	283	385	495		INL402	OTL403	OTL413	OTL414
	-10203000	E/T/D	110	150	360	110	150	360	396	90	125	300	408	525					
380/480	-9402000	A/E/T/D	110	150	221	110	150	221	243	90	150	200	272	350	-10404520A	INL401	OTL401	OTL411	OTL412
	-9402240	A/E/T/D	132	200	266*	132	200	266*	293	110	150	224	305	392					
	-10402700	E/T/D	160	250	320	160	250	320	352	132	200	270	368	472		INL402	OTL403	OTL413	OTL414
	-10403200	E/T/D	200	300	361	200	300	361	397	160	250	320	436	560					
	-11403770	E/T/D	225	350	437*	225	350	437*	480	185	300	377	513	660	-11406840A -1142X400T	INL403L	OTL405	OTL415	OTL416
	-11404170	E/T/D	250	400	487*	250	400	487*	535	200	350	417	568	730		INL403	OTL407	OTL415	OTL416
	-11404640	E/T/D	280	450	507*	280	450	507*	558	250	400	464	632	812					
	-12404800	T/D	315	500	635	315	500	608 *	668	250	400	480	672	864	N/A	Input choke not required. For further information contact the drive supplier	Output choke not required. For further information contact the drive supplier	OTL407	OTL416
	-12405660	T/D	355	550	689	355	550	660 *	726	315	450	566	792	1019					
	-12406600	T/D	450	650	788	400	650	755 *	831	355	550	660	924	1188					
	-12407200	T/D	500	700	903	500	700	865 *	952	400	600	720	1008	1296					
500/575	-9501040	A/E/T/D	110	125	125	110	125	125	138	75	100	104	142	182	-10502430A	INL601	OTL601	OTL611	OTL612
	-9501310	A/E/T/D	110	150	150	110	150	150	165	90	125	131	178	229					
	-10501520	E/T/D	130	200	200	130	200	200	220	110	150	152	207	266		INL602	OTL603	OTL613	OTL614
	-10501900	E/T/D	150	200	200	150	200	200	220	132	200	190	259	332					
	-11502000	E/T/D	185	250	248*	185	250	248*	273	150	200	200	272	350	-11503840A -1162X380T	INL603	OTL605	OTL616	OTL617
	-11502540	E/T/D	225	300	288*	225	300	288*	317	185	250	254	346	444					
	-11502850	E/T/D	250	350	315*	250	350	315*	346	225	300	285	388	499					
	-12503150	T/D	250	350	375	250	350	360 *	396	250	350	315	441	567	N/A	Input choke not required. For further information contact the drive supplier	Output choke not required. For further information contact the drive supplier	OTL607	OTL617
	-12503600	T/D	300	400	426	300	400	410 *	451	250	350	360	504	648					
	-12504100	T/D	330	450	479	330	450	460 *	506	300	400	410	574	738					
	-12504600	T/D	370	500	530	370	500	510 *	561	350	450	460	644	828					

AC Voltage rating ± 10 %	Order Code		No Overload			Normal Duty				Heavy Duty								
	Control Identifier & Electrical Specification	Order Code -Format Identifiers	Motor Shaft Power		Max Cont. Output Current	Motor Shaft Power		Maximum Continuous Output Current	Peak Output Current	Motor Shaft Power		Max Cont. Output Current	Open loop Peak Output Current	RFC Peak Output Current				
			kW	hp	A	kW	hp	A	A	kW	hp	A	A	A	RECT A/T	Single	Single	Dual
500/690	M000 , M700, M701, M702, M600, F600, H300																	
	-9601040	A/E/T/D	110	150	125	110	150	125	138	90	125	104	138	142	-10602480A	INL601	OTL601	OTL611
	-9601310	A/E/T/D	132	175	155	132	175	155	171	110	150	131	171	178				OTL612
	-10601500	E/T/D	160	200	172	160	200	172	189	132	175	150	189	204		INL602	OTL603	OTL613
	-10601780	E/T/D	185	250	197	185	250	197	217	160	200	178	217	242				OTL614
	-11602100	E/T/D	200	250	225*	200	250	225*	248	185	250	210	248	286	-11604060A -11604060A	INL603	OTL605	OTL615
	-11602380	E/T/D	250	300	275*	250	300	275*	303	200	250	238	303	324			OTL607	OTL616
	-11602630	E/T/D	280	400	305*	280	400	305*	335	250	300	263	335	358			OTL607	
	-12603150	T/D	355	550	375	355	550	360 *	396	280	500	315	396	441			N/A	Input choke not required. For further information contact the drive supplier
	-12603600	T/D	400	600	426	400	600	410 *	451	355	550	360	451	504				
	-12604100	T/D	450	650	479	450	650	460 *	506	400	600	410	506	574				
	-12604600	T/D	500	700	530	500	700	510 *	561	450	650	460	561	644				

Notes:

* At 2 kHz Switching Frequency

Certain frame sizes are only available as unassigned M000 power stages that require separate STANDARD, MASTER or FOLLOWER control modules

For ratings at 'switching frequency' > 3 kHz (or 2 kHz for F11 & F12) refer to User Guide

For paralleling, a 5% derating should be applied

PART NUMBERS

Control Identifier	Electrical Specification	Drive Format	Factory Use	Customer Code	Configure to Order Optional Build
Digit 1 2 3 4 5 Mxxx-	Frame & Volts & Current 6 7 8 9 10 11 12 13 10 4 03200	Power Control Spare 14 15 16 A 1 0	17 1	18 19 00	20 21 22 23 24 A B 1 0 0
	Frame Volts: 2 = 200 V 4 = 400 V 5 = 575 V 6 = 690 V Current Rating: Heavy Duty rating x 10 RECT..T (twin rectifier): 2 x Heavy Duty rating	Control (Inverter only): 1 = Included U = Not included; add separately	Factory Use: 1 = Standard 2 to 9 = Reserved	Brake Transistor: B = Brake N = No Brake (only Frames 9,10 & 11) IP / NEMA Rating: 1 = IP20 / NEMA 1 Keypad: 0 = No Keypad 3 = KI-HOA Keypad RTC included as standard	

Drive Range	Derivative Description
M700-	Ethernet and 1 x ST0
M701-	Modbus and 1 x ST0
M702-	Ethernet and 2 x ST0
M600-	Modbus and 1 x ST0
F600-	Pump Drive
H300-	HVAC Drive
M000-	Unassigned power – user fit control
RECT-	Rectifier for modular range
HS70-	High speed version of M700
HS71-	High speed version of M701
HS72-	High speed version of M702

Control Module Range for Unassigned Modular Drives

Mxxx-STANDARD011100A0100

Mxxx-MASTER00011100A0100

M000-FOLLOWER011100A0100

Format Identifier	Description	Frame	Power Range (Heavy Duty)	Access to DC bus
A	Integrated Rectifier and Inverter Internal Line Choke	9	90 to 110 kW 125 to 150 hp Up to 1.9 MW / 2,800hp in Parallel	Yes
E	Integrated Single Rectifier and Inverter External Line Choke	9, 10, 11	90 to 250 kW 125 to 400 hp Up to 2.8 MW / 4,200 hp in Parallel	No
T	Integrated Twin Rectifier and Inverter External Line Choke			
T	Integrated Twin Rectifier and Inverter No External Line Choke	12	250 to 400 kW / 400 to 600 hp Up to 2.8 MW / 4,200 hp in Parallel	Yes
D	DC to AC Inverter	9, 10, 11	90 to 250 kW 125 to 400 hp Up to 2.8 MW / 4,200 hp in Parallel	Yes
D	DC to AC Inverter	12	250 to 400 kW / 400 to 600 hp Up to 2.8 MW / 4,200 hp in Parallel	
A	AC to DC Single Rectifier	10, 11		
T	AC to DC Twin Rectifier	10, 11	90 to 250 kW / 125 to 400 hp	Yes



DRIVE OBSESSED



Control Techniques has been designing and manufacturing the best variable speed drives in the world since 1973.

Our customers reward our commitment to building drives that outperform the market. They trust us to deliver on time every time with our trademark outstanding service.

More than 45 years later, we're still in pursuit of the best motor control, reliability and energy efficiency you can build into a drive. That's what we promise to deliver, today and always.

1.5K+

Employees

70

Countries

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Nidec was set up in 1973. The company made small precision AC motors and had four employees. Today, it's a global corporation that develops, builds and installs cutting-edge drives, motors and control systems in over 70 countries with a workforce of more than 110,000.

You'll find its innovations in thousands of industrial plants, IoT products, home appliances, cars, robotics, mobile phones, haptic devices, medical apparatus and IT equipment all over the world.

112K

Employees

\$14.2B

Group Turnover

44+

Countries

337+

Companies



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