

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

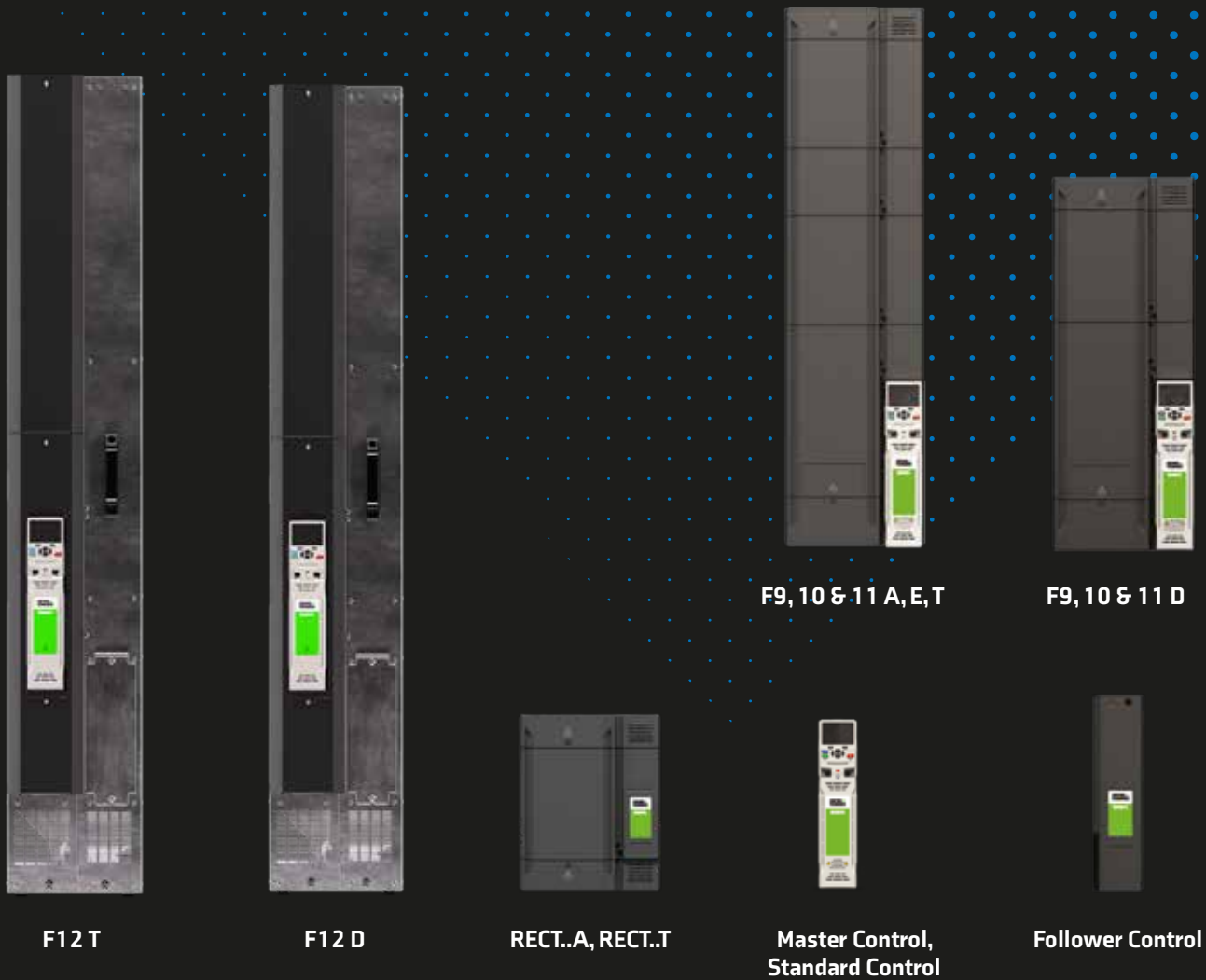
The modular offering provides a flexible method of building compact, reliable high-power solutions.

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 9, 10 & 11
RECT..T	AC in DC out rectifier 12 pulse module (Unidrive SPMC2 replacement). Available in frame size 9, 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

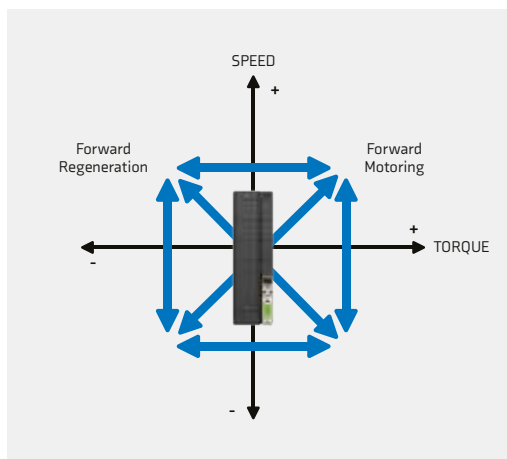
Migration of Unidrive SP modular systems is fast and easy with many conversion tools available:

- 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

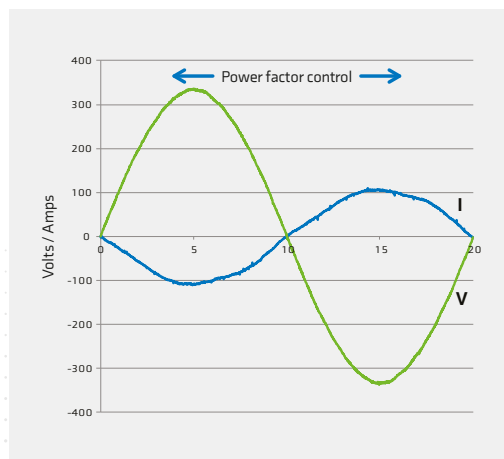


Environmental safety and electrical conformance

- 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

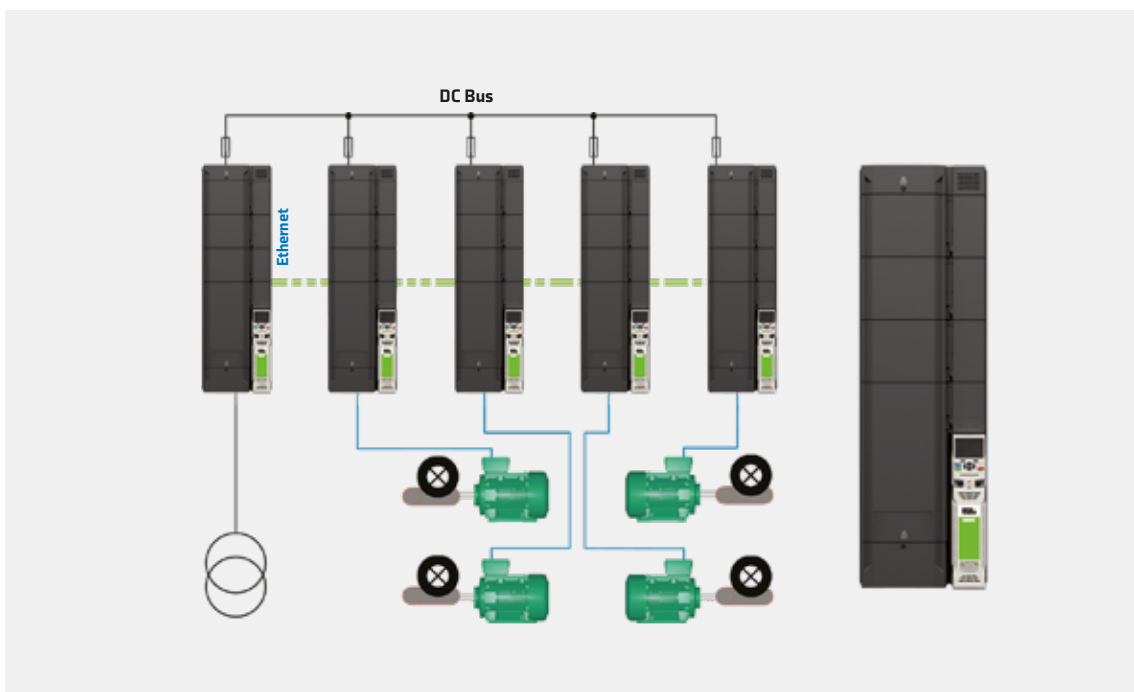


Create high performance solutions

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

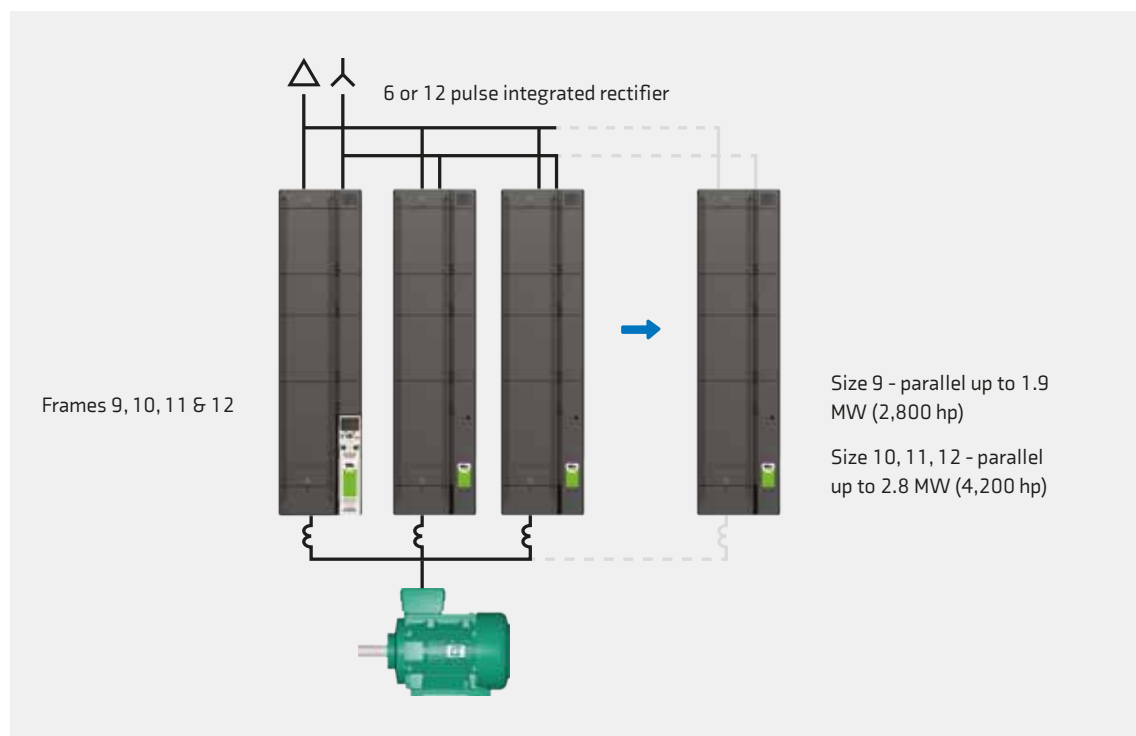


'A', 'E' & 'T' – AC in AC out modules

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 (2,100 hp) (6 pulse only).

Example using 'T' format with 12 pulse rectifier.



The above system is simply configured by ordering:

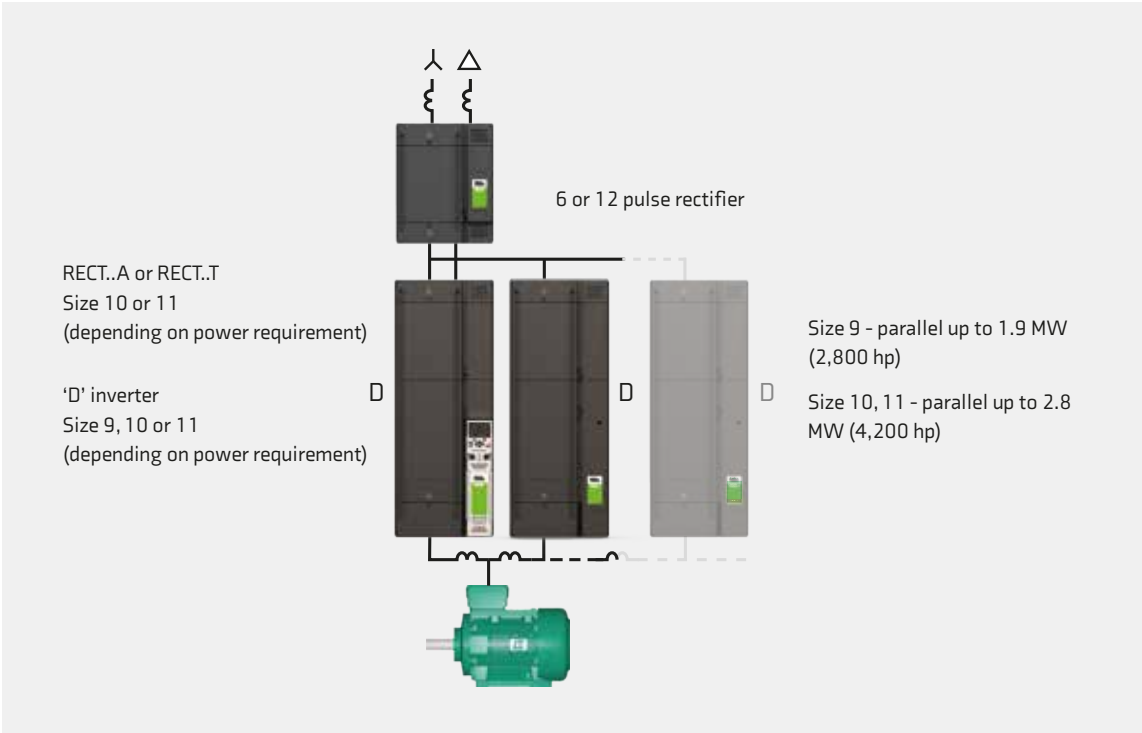
Component	Quantity	Part number
'T' format power module (integrated 12 pulse rectifier with inverter)	Quantity of frame 12 modules required is: total power required / 500 kW – derating (see technical manual)	M000-12407200TU0100AB100
Control standard	In systems with only 1 'A' 'E' or 'T' module, use 1 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).

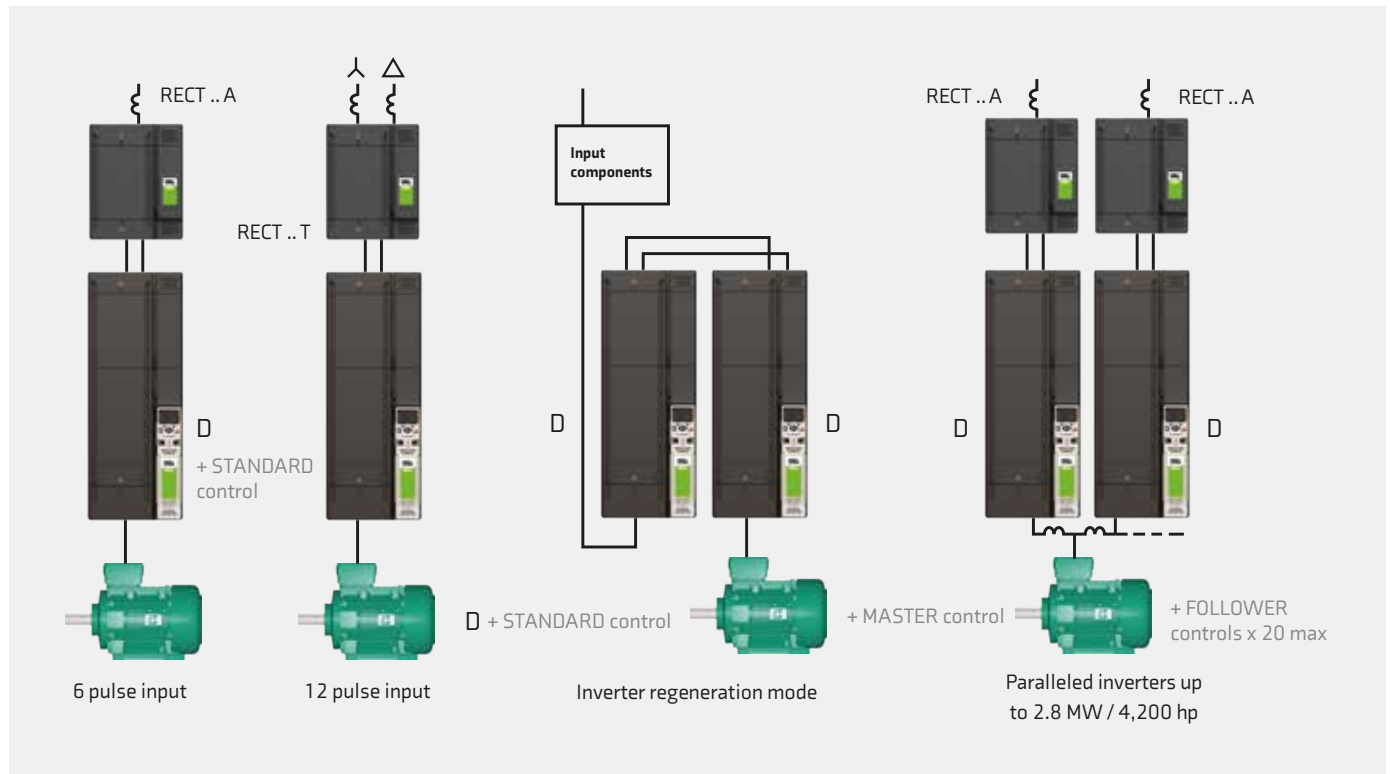
Example using ‘D’ format to parallel power



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

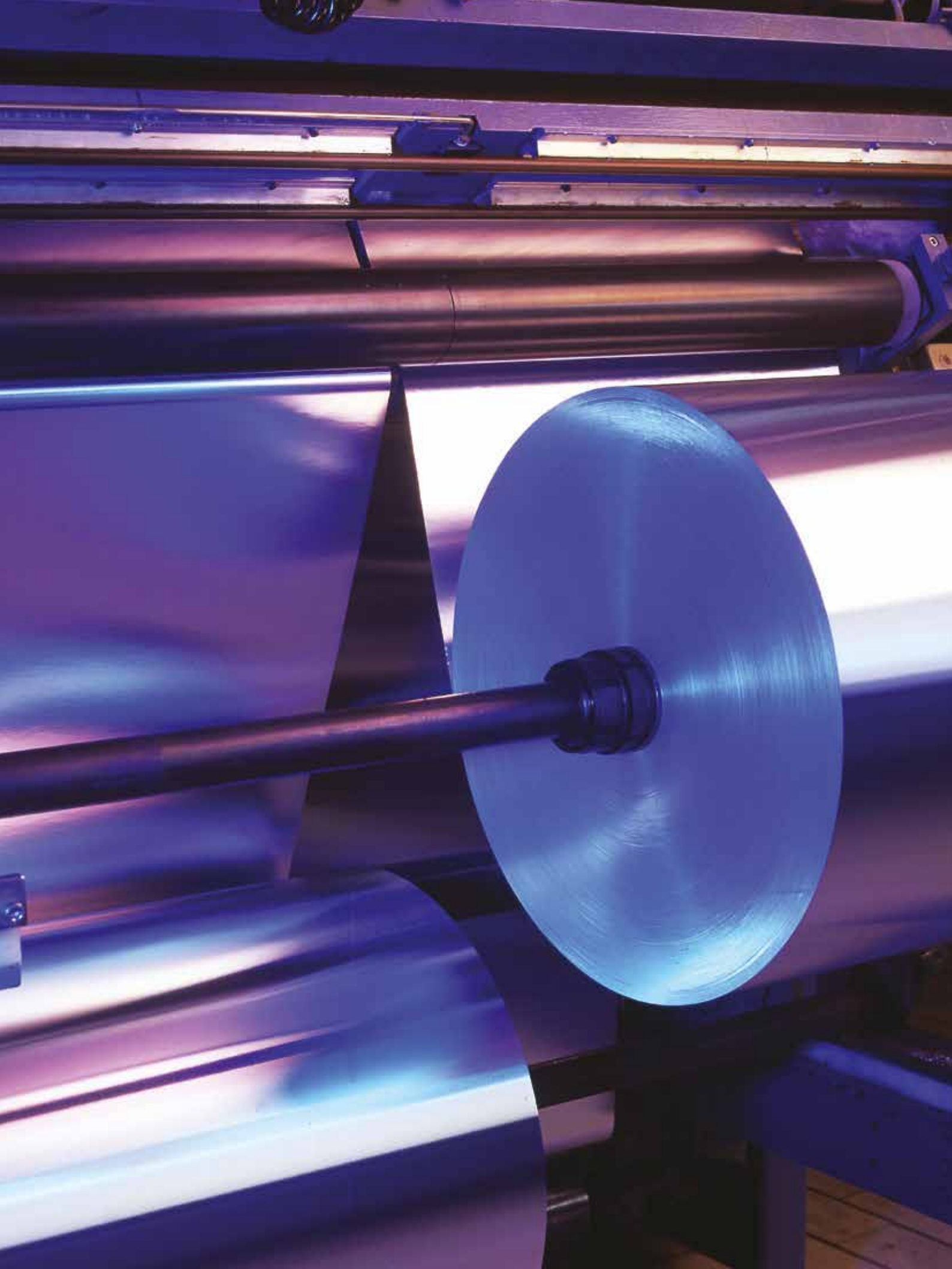


Frame 9: 90 to 110 kW / 125 to 150 hp HD

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 500 kW / 400 to 700 hp HD



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 M700.
SI-Safety		An intelligent, programmable module to meet the IEC 61800-5-2/ISO 13849-1 functional safety standard up to SIL3/PLe.
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	•	•	•	•	•
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 kW rating / A rating	@ 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)	130 (287)	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.

	Order Code		No Overload			Heavy Duty				Normal Duty									
	Control Identifier & Electrical Specification	Order Code -Format Identifiers	Motor Shaft Power		Max Cont. Output Current	Motor Shaft Power		Peak Output Current		Max Cont. Output Current	Motor Shaft Power		Peak Output Current	Rectifier for Modular '.D' Inverters	Input Choke		Output Choke		
	M000 **, M700, M701, M702, M600, F600, H300		kW	hp	A	kW	hp	Open Loop A	Rotor Flux Control A	A	kW	hp	A	RECT-..A/T	Single	Dual	Single	Dual	
200/240	-9201760	A/E/T/D	-	-	300	45	60	264	308	216	55	75	238	-10204100A	INL401	INL411	OTL401	OTL411	
	-9202190	A/E/T/D	-	-	200*	55	75	328	383	266	75	100	293				OTL402	OTL412	
	-10202830	E/T/D	-	-	224*	75	100	424	495	325	90	125	358			INL402	INL412	OTL403	OTL413
	-10203000	E/T/D	-	-	270	90	125	450	525	360	110	150	396				OTL404	OTL414	
380/480	-9402000	A/E/T/D	-	-	320*	90	150	300	350	221	110	150	243	-10404520A	INL401	INL411	OTL401	OTL411	
	-9402240	A/E/T/D	-	-	377*	110	150	336	392	266*	132	200	293				OTL402	OTL412	
	-10402700	E/T/D	-	-	417*	132	200	405	472	320	160	250	352			INL402	INL412	OTL403	OTL413
	-10403200	E/T/D	-	-	464*	160	250	480	560	361	200	300	397					OTL414	
	-11403770	E/T/D	-	-	480 *	185	300	566	659	437*	225	350	480	-11406840A -1142X400T	INL403L		OTL405		
	-11404170	E/T/D	-	-	566 *	200	350	626	729	487*	250	400	535			INL403		OTL407	
	-11404640	E/T/D	-	-	660 *	250	400	696	812	507*	280	450	558				OTL407		
	-12404800	T/D	315	500	720 *	250	400	672	672	608 *	315	500	668		N/A	N/A	N/A	N/A	N/A
-12405660	T/D	355	550	104	315	450	792	792	660 *	355	550	726	N/A	N/A	N/A	N/A	N/A		
-12406600	T/D	450	650	131	355	550	924	924	755 *	400	650	831	N/A	N/A	N/A	N/A	N/A		
-12407200	T/D	500	700	152	400	600	1008	1008	865 *	500	700	952	N/A	N/A	N/A	N/A	N/A		
500/575	-9501040	A/E/T/D	-	-	190	75	100	156	182	125	110	125	138	-10502430A	INL601	INL611	OTL601	OTL611	
	-9501310	A/E/T/D	-	-	200*	90	125	196	229	150	110	150	165					OTL612	
	-10501520	E/T/D	-	-	254*	110	150	228	266	200	130	200	220			INL602	INL612	OTL603	OTL613
	-10501900	E/T/D	-	-	285*	132	200	285	332	200	150	200	220					OTL614	
	-11502000	E/T/D	-	-	315 *	150	200	300	350	248*	185	250	273	-11503840A 1162X380T	INL603			OTL605	
	-11502540	E/T/D	-	-	360 *	185	250	381	444	288*	225	300	317					OTL607	
	-11502850	E/T/D	-	-	410 *	225	300	428	498	315*	250	350	346					OTL607	
	-12503150	T/D	250	350	460 *	250	350	441	441	360 *	250	350	396			N/A	N/A	N/A	N/A
	-12503600	T/D	300	400	104	250	350	504	504	410 *	300	400	451	N/A	N/A	N/A	N/A	N/A	
	-12504100	T/D	330	450	131	300	400	574	574	460 *	330	450	506	N/A	N/A	N/A	N/A	N/A	
	-12504600	T/D	370	500	150	330	450	644	644	510 *	370	500	561	N/A	N/A	N/A	N/A	N/A	

	Order Code		No Overload			Heavy Duty				Normal Duty								
	Control Identifier & Electrical Specification	Order Code -Format Identifiers	Motor Shaft Power		Max Cont. Output Current	Motor Shaft Power		Peak Output Current		Max Cont. Output Current	Motor Shaft Power		Peak Output Current	Rectifier for Modular 'A.D' Inverters	Input Choke		Output Choke	
	M000 **, M700, M701, M702, M600, F600, H300		kW	hp	A	kW	hp	A	A	A	kW	hp	A	RECT-A/T	Single	Dual	Single	Dual
500/690	-9601040	A/E/T/D	-	-	178	90	125	156	182	125	110	150	138	-10602480A	INL601	INL611	OTL601	OTL611
	-9601310	A/E/T/D	-	-	210*	110	150	196	229	155	132	175	171					OTL612
	-10601500	E/T/D	-	-	238*	132	175	225	262	172	160	200	189		INL602	INL612	OTL603	OTL613
	-10601780	E/T/D	-	-	263*	160	200	267	311	197	185	250	217					OTL614
	-11602100	E/T/D	-	-	315 *	185	250	315	367	225*	200	250	248	-11604060A -1162X380T	INL603			OTL605
	-11602380	E/T/D	-	-	360 *	200	250	357	416	275*	250	300	303					OTL607
	-11602630	E/T/D	-	-	410 *	250	300	394	460	305*	280	400	335					OTL607
	-12603150	T/D	355	550	460 *	280	500	441	441	360 *	355	550	396	N/A	N/A	N/A	N/A	N/A
	-12603600	T/D	400	600		355	550	504	504	410 *	400	600	451	N/A	N/A	N/A	N/A	N/A
	-12604100	T/D	450	650		400	600	574	574	460 *	450	650	506	N/A	N/A	N/A	N/A	N/A
	-12604600	T/D	500	700		450	650	644	644	510 *	500	700	561	N/A	N/A	N/A	N/A	N/A

Notes:

* At 2 kHz Switching Frequency

** ' -12..T/D only available as M000

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

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
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	w"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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