

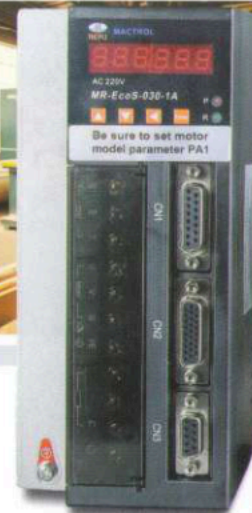
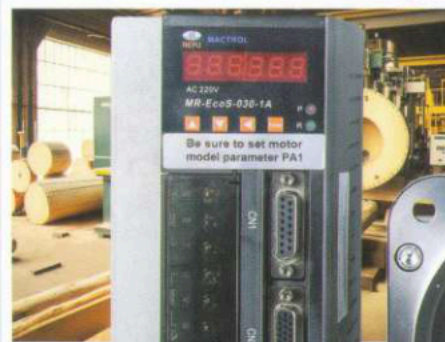
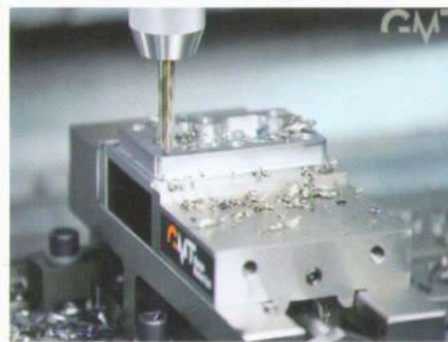
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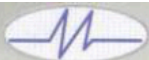


MACTROL-REFU



www.mactrol-refu.com

Channel Partners -
Arnivat Automation
Mo.: 98795 97099,
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Jamnagar (Gujarat)



REFU

MR-HPHD-01 SERIES

(High-Performance Heavy-Duty Frequency Converter)



Frequency Converter Model	Motor Adapted		Rated Input A	Rated Output A
	kW	HP		
1PH single phase input : AC 220V (±15%) 50/60Hz				
MR-HPHD-01-00D75CT1	0.75	1	37Kw	On Demand
3PH 3-phase input : AC 220V (±15%) 50/60Hz				
MR-HPHD-01-00D75CT2	0.75	to	200Kw	On Demand
3PH 3-phase input : AC 380V-440V (±10%), 50/60Hz				
MR-HPHD-01-00D75CT3	0.75	1	3.5	2.1
MR-HPHD-01-001D5CT3	1.5	2	5.0	3.8
MR-HPHD-01-002D2CT3	2.2	3	5.8	5.1
MR-HPHD-01-00400CT3	4.0	5	10.5	9.0
MR-HPHD-01-005D5CT3	5.5	7.5	14.6	13.0
MR-HPHD-01-007D5CT3	7.5	10	20.5	17.0
MR-HPHD-01-00110CT3	11.0	15	26.0	25.0
MR-HPHD-01-01500CT3	15.0	20	35.0	32.0
MR-HPHD-01-018D5CT3	18.5	25	42.0	37.0
MR-HPHD-01-02200CT3	22.0	30	50.0	45.0
MR-HPHD-01-03000CT3	30.0	40	68.0	60.0
MR-HPHD-01-03700CT3	37.0	50	83.0	75.0
MR-HPHD-01-04500CT3	45.0	60	102.0	91.0
MR-HPHD-01-05500CT3	55.0	70	124.0	112.0
MR-HPHD-01-07500CT3	75.0	100	169.0	150.0
MR-HPHD-01-09000CT3	90.0	125	203.0	176.0
MR-HPHD-01-01100CT3	110.0	150	248.0	210.0
MR-HPHD-01-01320CT3	132.0	175	256.0	253.0
MR-HPHD-01-01600CT3	160.0	210	307.0	304.0
MR-HPHD-01-01850CT3	185.0	245	350.0	340.0
MR-HPHD-01-02000CT3	200.0	260	385.0	377.0
MR-HPHD-01-02200CT3	220.0	300	430.0	426.0
MR-HPHD-01-02500CT3	250.0	350	468.0	465.0
MR-HPHD-01-02800CT3	280.0	370	525.0	520.0
MR-HPHD-01-03150CT3	315.0	420	590.0	585.0
MR-HPHD-01-03550CT3	355.0	480	665.0	650.0
MR-HPHD-01-04000CT3	400.0	530	785.0	725.0
MR-HPHD-01-04500CT3	450.0	600	883.0	820.0
MR-HPHD-01-00500CT3	500.0	670	954.0	920.0
MR-HPHD-01-00560CT3	560.0	750	1085.0	1030.0
MR-HPHD-01-00630CT3	630.0	840	1250.0	1200.0
3PH 3-phase input: AC 440V-460V (±10%), 50/60Hz				
MR-HPHD-01-00D75CT4	0.75Kw	to	630Kw	On Demand

Upto 820Kw on Order

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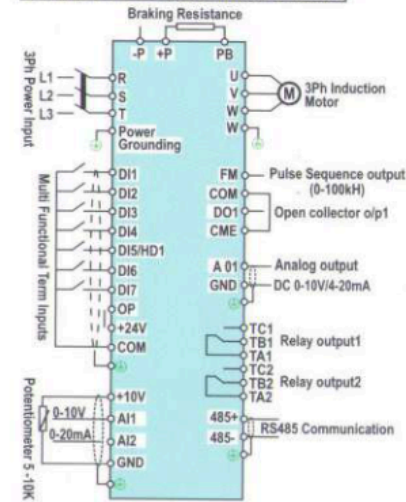
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MR-HPHD-01 is the newest AC frequency converter from MACTROL-REFU developed especially for heavy duty applications. Thanks to advanced current vector control algorithm and newest hardware, MR-HPHD-01 has high stability and perfect motor control performance developed after listening and understanding customer's requirements. With industry-leading drive performance and functionality control, using unique current vector control algorithm can efficiently drive the motor to achieve high accuracy, high torque and high-performance control. MR-HPHD-01 supports full range of input voltage (AC 120V / 220V / 380V / 460V and etc.) along with complete functions for different applications.

- Advanced motor control technology support both Open loop vector control (SVC), Closed loop vector control (FVC) and V/F control.
- Different input voltage (220V single Phase/220V 3 phase/380V 3 phase / 460V 3 Phase). High starting torque characteristics and precise speed control.
- Rich and flexible I/O accesses and field bus options. Suitable for all regions which have different grid and voltage.
- Upgraded I/O (NPN/PNP compatible) can meet more application requirement without controller (PLC) like elevator.

SCHEMATIC POWER & CONTROL DRAWING



MACTROL-REFU MR-XXXX-XX-7D5 CT 3

EcoHD-1B (Heavy Duty Low Cost Drive up to 4kW)	HPHD-01 (Ultra Heavy Duty Drive up to 630kW)
HPHDL-01 (Ultra Heavy Duty Lift Drive up to 75kW)	HPHD-1C (Heavy Duty Drive up to 37kW)
HPHD-1B (Heavy Duty Drive up to 160kW)	

Code	Adaptation	01/1C/1B/165
D75	0.75 kW	
705	7.5 kW	
011	11 kW	
18D5	18.5 kW	
110	110 kW	
630	630 kW	

Code	Voltage
1	Single-phase 220V
2	Three-phase 220V
3	Three-phase 415V
4	Three-phase 440V
5	Three phase 690V

Code	TYPE
CT	Constant Torque
VT	Variable Torque (Fan/Pump)



MR-HPHD-I65 SERIES

(High-Performance Heavy-Duty Frequency Converter)

- Washdown and Watertight
- For Indoor and Outdoor use
- Ideal for Wet, Chemically, Vapourised Environments
- Strong & Robust built
- Available from 0.75 kW-37 kW
- Solar and PMSM Control Card Option

Item	Specifications
Control system	High performance of current vector control technology to realize a synchronous motor and synchronous motor control for Induction & Synchronous motors.
Maximum frequency	Vector control: 0~300Hz, V/F control: 0~500Hz
Carrier frequency	0.5k~16kHz; the carrier frequency will be automatically adjusted according to the load characteristics
Input frequency resolution	Digital setting: 0.01Hz Analog setting : maximum frequency ×0.025%
Control mode	Open loop vector control (SVC), Closed loop vector control (FVC), V/F control
Startup torque	Type G: 0.5Hz/200%(SVC) :0Hz/300%(FVC)
Speed stabilizing precision	±0.5% (SVC) Speed stabilizing precision
Torque control precision	±5% (FVC)
Over load capability	G type: rated current 150% -1 minute, rated current % -200% seconds;
Torque boost	Auto torque boost function Manual torque boost 0.1%~ 30.0%
V/F curve	Linear V/F, Multi point V/F and Square V/F curve (power of 1.2, 1.4, 1.6, 1.8, 2)
V/F separation	In 2 ways separation, semi separation
Acc. /dec. curve	Straight line or S curve acceleration and deceleration mode Four kinds of acceleration and deceleration time. Acceleration and deceleration time range between 0.0s to 6500.0s
DC brake	DC brake frequency: 0.00Hz to maximum frequency, brake time: 0.0s to 36.0s, and brake current value :0.0% to 100.0%.
Simple PLC & MS speed running	It can realize at maximum of 16 segments speed running via the built-in PLC or control terminal.
Built-in PID	It is easy to realize process-controlled close loop control system.
Auto voltage regulation (AVR)	It can keep constant output voltage automatically in case of change of network voltage.
Instantaneous stop non-stop	When instantaneous power off, voltage reduction is compensated through load feedback energy, which could make inverter keep running in a short period of time.
Timing control	Timing control function : set time range 0 Min~6500.0Min
Multiple motor switch	4 groups of motor parameter, which can realize 4-motor switch control
Multi-threaded bus support	Support 3 kinds of field bus: RS485, Profibus-DP, CAN open
Motor overheat protection	Select optional H5PC1 analog input AI3x can accept the motor temperature sensor input (PT100)PT1000)
Multi-encoder support	Support difference, open collector, UVW, rotary transformer, sine cosine encoder etc.
Programmable PLC	Select optional user programmable card which can realize secondary development, programming mode compatible with Drino PLC.
LED display	Realize parameter setting, status monitoring function
Keyboard potentiometer	Equipped with keyboard potentiometer or coding potentiometer
Key lock & function selection	Realize button locking, define operation range for part of buttons to prevent operation fault.
Protection function	It can implement power-on motor short circuit detection, input/output phase loss protection, over current protection over voltage protection under voltage protection., over heating protection and overload protection.
Optional parts	Liquid crystal display operation panel, brake component, multi-function extended card (1.IO extended card 2.user programmable card), RS485 communication card, Profibus-DP communication card, CAN open communication card, differential input PG card, UVW differential input PG card, rotating inverter PG card, OC input PG card.
Using place	Indoor and be free from direct sunlight, dust, corrosive gas, combustible gas, oil smoke, vapour, drip or salt for IP20 & for IP65 as per IP chart.
Altitude	Below 1000m
Ambient temperature	-10 °C to +50 °C (De-rating use when under ambient temperature of 50°C to 60°C)
Humidity	Less than 95% RH, without condensing
Vibration	Less than 5.9 m/s ² (0.6g)
Storage temperature	-20 degree Celsius +60 degree Celsius

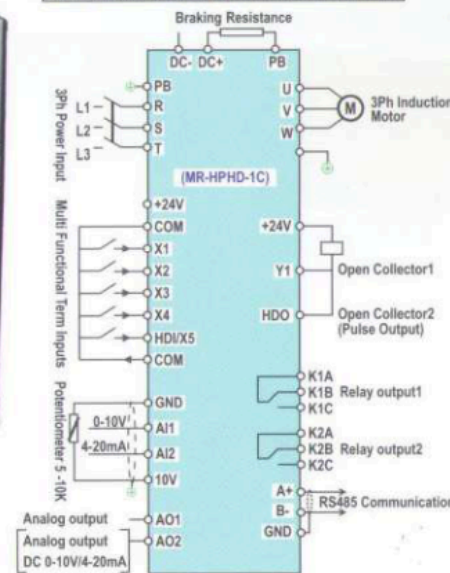
MR-HPHD-1B/1C SERIES

(Open/Close Loop High Performance)

- V/F mode, Open loop vector & Close loop vector
- 150% for 60s & 180% for 3S overload capacity
- 7*DI & 2*DO / 2*AI & 1*AO / 2*Relay
- Frequency range: Vector : 0~300Hz, V/F: 0~500Hz
- Detachable keyboard / Support keyboard extension
- 4 group ACC & DEC time
- 2 group motor parameters
- AVR function / Rapid current limit
- Solar & PMSM Control Card Option
- Triple Layer Conformal Coated
- Built in EMC Filter
- IP 20, 50 Degree Rated
- Output Fully Short Circuit Proof
- ROHS & CE Compliant



SCHEMATIC POWER & CONTROL DRAWING



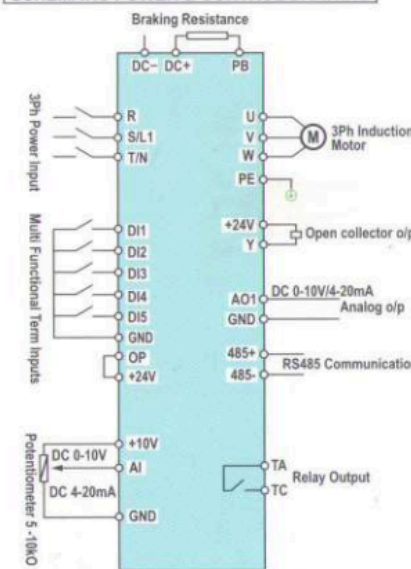
MR-HPHD-1C available up to 37 kW

MR-HPHD-1B available up to 160 kW

Frequency Converter Model	Rated Power (kW)	Rated Current (A)	Adapted Motor	
			kW	HP
Single phase power supply: 220V, 50Hz/60Hz				
MR-HPHD-1B/1C-D75G1	0.75	4.0	0.75	1
MR-HPHD-1B/1C-1D5G1	1.5	7.0	1.5	2
MR-HPHD-1B/1C-2D2G1	2.2	9.6	2.2	3
Three phase power supply: 380V, 50Hz/60Hz				
MR-HPHD-1B/1C-D75G3	0.75	2.1	0.75	1
MR-HPHD-1B/1C-1D5G3	1.5	3.8	1.5	2
MR-HPHD-1B/1C-2D2G3	2.2	5.1	2.2	3
MR-HPHD-1B/1C-004G3	4	9	4	5.5
MR-HPHD-1B/1C-5D5G3	5.5	13	5.5	7.5
MR-HPHD-1B/1C-7D5G3	7.5	17	7.5	10
MR-HPHD-1B/1C-011G3	11.0	25	11	15
MR-HPHD-1B/1C-015G3	15.0	32	15	20
MR-HPHD-1B/1C-018G3	18.0	37	18	25
MR-HPHD-1B/1C-022G3	22.0	45	22	30
MR-HPHD-1B/1C-030G3	30.0	60	30	40
MR-HPHD-1B/1C-037G3	37.0	75	37	50
MR-HPHD-1B-045G3	45.0	91	45	60
MR-HPHD-1B-055G3	55.0	112	55	70
MR-HPHD-1B-075G3	75.0	150	75	100
MR-HPHD-1B-090G3	90.0	176	90	125
MR-HPHD-1B-110G3	110.0	210	110	150
MR-HPHD-1B-132G3	132.0	253	132	175
MR-HPHD-1B-160G3	160.0	304	160	210

Frequency Converter Model	Input current (A)	Output current (A)	Adapted motor	
			kW	HP
G1 input voltage range: Single-phase AC120V±15%, 50 / 60 Hz				
MR-EcoHD-1B-00D40G1-1	9	2.3	0.4	0.5
MR-EcoHD-1B-00D75G1-1	15	4.0	0.75	1
MR-EcoHD-1B-001D5G1-1	24	7.0	1.5	2
MR-EcoHD-1B-002D2G1-1	31	9.6	2.2	3
G1 input voltage range: Single-phase AC220V±15%, 50 / 60 Hz				
MR-EcoHD-1B-00D40G1-2	5.4	2.3	0.4	0.5
MR-EcoHD-1B-00D75G1-2	8.2	4.0	0.75	1
MR-EcoHD-1B-001D5G1-2	14	7.0	1.5	2
MR-EcoHD-1B-002D2G1-2	23	9.6	2.2	3
G2 input voltage range: Three-phase AC220V±15%, 50 / 60 Hz				
MR-EcoHD-1B-00D40G2	3.4	2.1	0.4	0.5
MR-EcoHD-1B-00D75G2	5.0	3.8	0.75	1.0
MR-EcoHD-1B-001D5G2	5.8	5.1	1.5	2
MR-EcoHD-1B-002D2G2	10.5	9	2.2	3
MR-EcoHD-1B-00400G2	14.6	13	4	5
G3 input voltage range: Three-phase AC 380~440 (-15%~+10%), 50 / 60 Hz				
MR-EcoHD-1B-00D75G3	3.4	2.1	0.75	1
MR-EcoHD-1B-001D5G3	5.0	3.8	1.5	2
MR-EcoHD-1B-002D2G3	5.8	5.1	2.2	3
MR-EcoHD-1B-00400G3	10.5	9	4.0	5
G4 input voltage range: Three-phase AC 440~480 (-15%~+10%), 50 / 60 Hz				
MR-EcoHD-1B-00D75G4	4.1	2.5	0.75	1.0
MR-EcoHD-1B-001D5G4	4.9	3.7	1.5	2.0
MR-EcoHD-1B-002D2G4	5.7	5.0	2.2	3
MR-EcoHD-1B-00400G4	11	8.0	4	5

SCHEMATIC POWER & CONTROL DRAWING



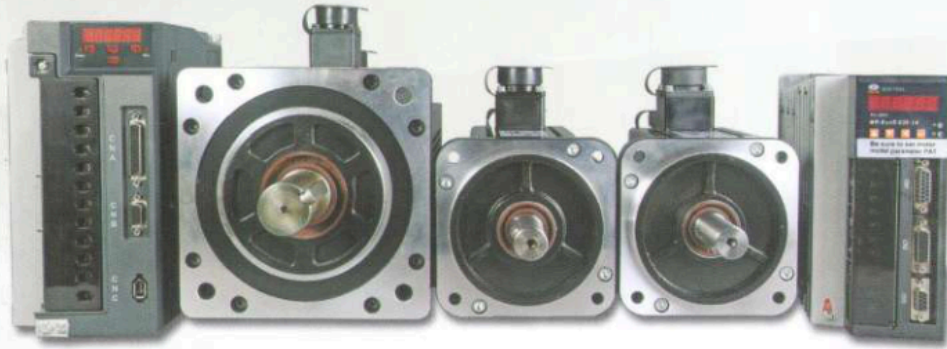
MR-EcoHD-1B

(High Performance Mini Frequency Converter)

- Complete functions and complete arithmetic
- Macro for Constant Pressure Water supply
- Perfect Motor control and Protection with motor short circuit protection
- Built-In C3 EMC filter
- Triple layer conformal coating
- Flexible Design, V/F & Vector Control Mode
- IP20, 50 Degree Ambient Rated with Fan cooling
- ROHS & CE Compliant

AC SERVO MOTOR & DRIVE

MAC-EcoSM-220 AC Servo Motors & Drives /
MAC-EcoSM-400 AC Servo Motors & Drives



- Wide Speed Range: 0.1 to 5000rpm
- Rated Voltage: 220V
- Strong Overload feature: three times of rated torque.
- Insulation Class: Class B
- Ambient operating Temperature: - 20°~ +50°C
- Ambient operating Humidity: Below 90% RH No dewing
- High dynamic feature: Velocity loop bandwidth up to 300Hz, small speed.
- Various I/O functions: Opto-coupler isolation and programmable functions.
- Three control mode: position / speed / torque
- 0.2 to 22 KW power range
- 2500 PPR encoder, best cost- performance in market.
- Compact architecture and high-power density High Response & Accuracy.
- Super high coercivity rare earth permanent magnet Low Noise & Low Temperature Rise.
- Overheat protection capability (temperature sensor integrated) Strong anti-demagnetization capability.
- Various frame installation size
- Full-closed design in IP65 Enclosure for Motor
- Compact size, high speed & high torque with high dynamic response feature.
- 2500 PPR encoder/ resolver, 17bit encoder are available to adapt different applications.
- Employed shift current of D-P axis control, improved torque control accuracy up to 2%.
- Flexible customization is available.
- Thermal Protection: Optional
- Cooling Method: Air cooling

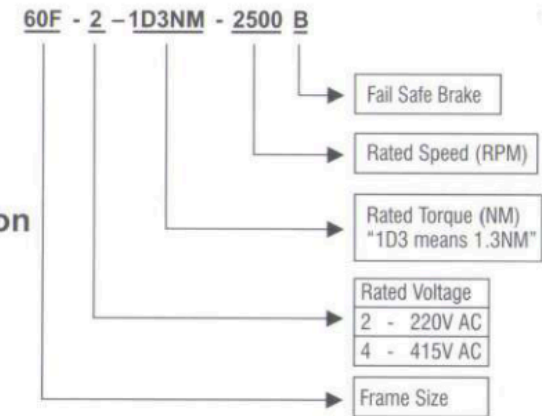
Mactrol-Refu 415V range of AC Servo Drives & motors available up to 7.5kw as standard & up to 22kW, Customized upto 600Kw

Arnivat Automation

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Model	Rated torque N.m	Max. torque N.m	Rated Speed rpm	Max Speed rpm	Rated Power Kw	Rated Voltage Vac	Rated current A	Rotor inertia kg./cm ²	Pole Pair	Weight kg	Length mm
Frame Size 60											
60F-2-1D3NM-3000	1.27	3.8	3000		0.4	220	2.8	0.302*10 ⁻⁴	4	1.9	131
60F-2-1D9NM-3000	1.91	5.73	3000		0.6	220	3.5	0.438*10 ⁻⁴	4	2.2	154
Frame Size 80											
80F-2-2D4NM-3000	2.4	7.2	3000		0.75	220	4.2	1.2*10 ⁻⁴	4	3.2	160
80F-2-3D3NM-3000	3.3	9.9	3000		1	220	4.5	1.58*10 ⁻⁴	4	3.9	181
Frame Size 130											
130F-2-05NM-2500	5	15	2500		1.3	220	5	1.333*10 ⁻³	4	7.3	173
130F-2-06NM-2500	6	18	2500		1.5	220	6	1.544*10 ⁻³	4	8	183
130F-2-7D7NM-2500	7.7	23.1	2500		1.6	220	6	2.017*10 ⁻³	4	9.2	197
130F-2-10NM-2500	10	30	2500		2.6	220	10	2.595*10 ⁻³	4	10.8	218
130F-2-15NM-1500	15	45	1500		2.3	220	9.5	3.24*10 ⁻³	4	14.4	263
Frame Size 150											
150F-2-18NM-2000	18	54	2000		3.6	220	16.5	6.33*10 ⁻³	4	21.2	250
150F-2-23NM-2000	23	69	2000		4.7	220	20.5	8.94*10 ⁻³	4	24.2	280
150F-2-27NM-2000	27	81	2000		5.5	220	20.5	11.19*10 ⁻³	4	27.2	306
Frame Size 180											
180F-2-19NM-1500	19	47	1500		3	220	12	3.8*10 ⁻³	4	20.5	232
180F-2-27NM-1500	27	67	1500		4.3	220	16	6.1*10 ⁻³	4	25.5	262
180F-2-35NM-1500	35	70	1500		5.5	220	24	8.6*10 ⁻³	4	30.5	292
180F-2-48NM-1500	48	96	1500		7.5	220	32	9.5*10 ⁻³	4	40	346

Model Definition



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