Delta High Performance / Standard Compact Drive
MH300 Series / MS300 Series

Version 1.1

Contents

Agenda

- **Product Features**
- **Applications**
- **Resources**

Contents

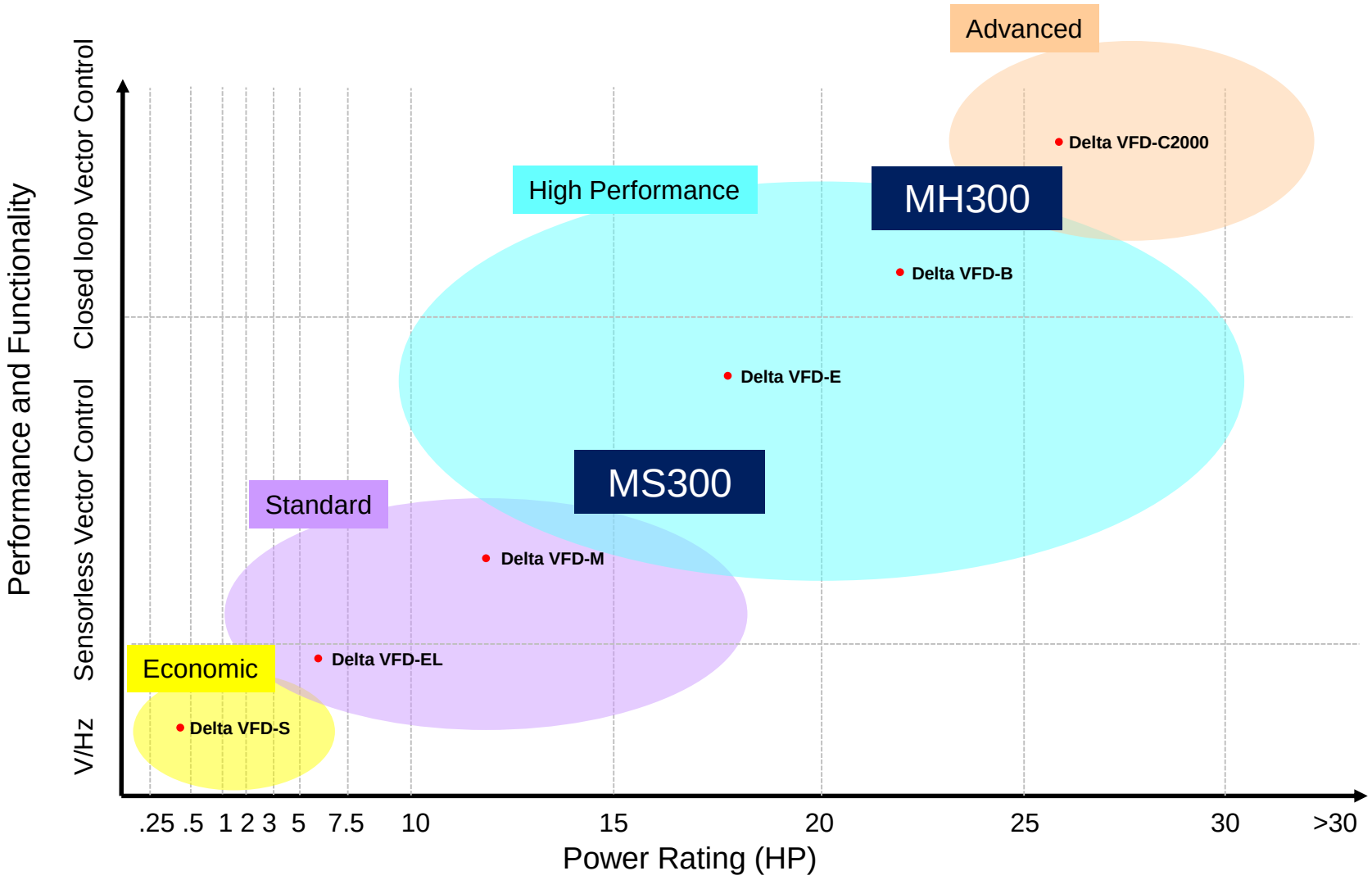
Introduction

- Delta Products was established in 1971 in Taiwan
- $8.5 Billion annual revenue for 2016
- 70,000 employees worldwide
- #1 Global Power Supply manufacturer
- Industrial Automation started in 1995 with Variable Frequency Drives
- Proven supplier in the industrial marketplace
- Large installed base of products around the globe

- New line of compact Drives extends VFD platform and technology
- Compact, Versatile, Reliable
- Capable - technology matches or exceeds competition
- Inventory in the U.S.

Product Features

Delta VFD positioning in Market



Key Features

Delta Compact Drive

Standard Compact Drive MS300 Series

High Performance Compact Drive MH300 Series

Power Range kW	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
HP	¼	1/2	1	2	3	5	7.5	10	15	20	25	30
Standard Model (0-599 Hz)	115 V 1 phase											
	230 V 1 phase											
	230 V 3 phase											
		460 V 3 phase										
High Speed (>599 Hz)				230 V 1 phase								
				230 V 3 phase								
				460 V 3 phase								

MS300 MH300 Product Plan

Performance / Functionality

VFD-VE (≦22kW)

C2000 (≦22kW)

VFD-B (≦22kW)

High Performance

MH300

Power: 0.2~22 kW

Applications:
Textiles、Machine tool、 Wood 、Rubber、Plastics、Hoist

VFD-M

VFD-E

Standard

VFD-S

MS300

Power: 0.2~22 kW

Applications:
Food and Beverage、packing、Electronics、Wood、Fan、Pump、Textiles、Machine tool

VFD-EL

VFD-L

Previous

2017

Key Features

MH300

- The smallest high performance compact drive, power range .25 HP to 30 HP
- Open and Closed loop control for Induction and Permanent Magnet motors
- Power Factor Correction integrated - single-phase (IEC 61000-3-12)
- Dual option card ports for I/O and Encoder cards for MH only
- EMC filter (Integrated /Option)
- Integrated Safe Torque Off (SIL2/PLd)
- Integrated PLC functionality (5000 steps)
- CANopen, DeviceNet, EtherNet/IP, Profibus DP, Modbus TCP, EtherCAT, PROFINET communications
- +24 V Back-up power supply option card
- USB port for drive programming, updating and real-time monitoring with drive power off
- Shuttle dial with LCD display

MH300

MS300

- The smallest compact drive, max. power .25 to 30 HP
- Open loop control of Induction and PM motors
- EMC filter (Integrated /Option)
- Integrated Safe Torque Off (SIL2/PLd)
- Integrated PLC functionality (2000 steps)
- CANopen, DeviceNet, EtherNet/IP, Profibus DP, Modbus TCP communications
- +24 V Back-up power supply option card
- USB port for drive programming, updating and real-time monitoring with drive power off

MS300

Feature - Flexibility Space Utilization

New Compact Design

Smaller and more powerful!
Higher space savings!

Compared to similar compact drives

Zero Stack Installation

Higher installation flexibility
Ambient temperature: -20°C to 50°C (-4° to 122°F)

Saving Installation Space!

Feature – Excellent Drive Capability

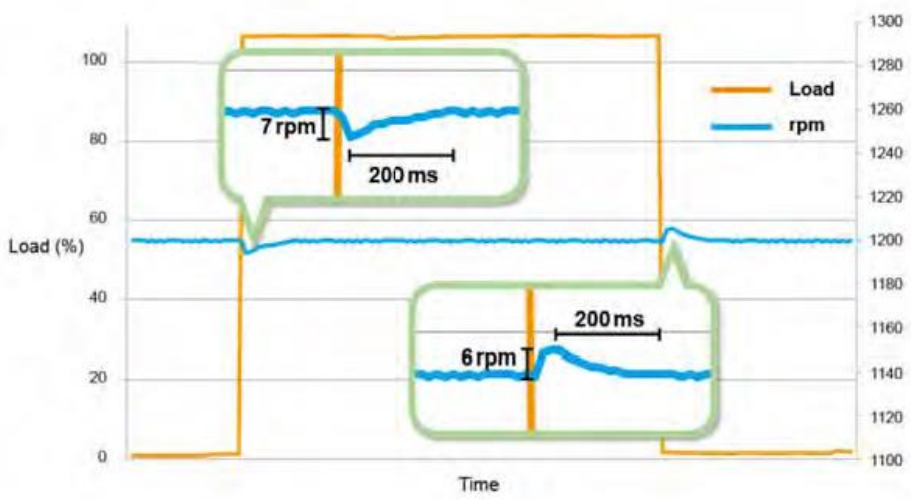
Support various motors

Supports Induction and Permanent Magnet Motors

Fast response to impact loading

Fast speed recovery from receiving impact loading:

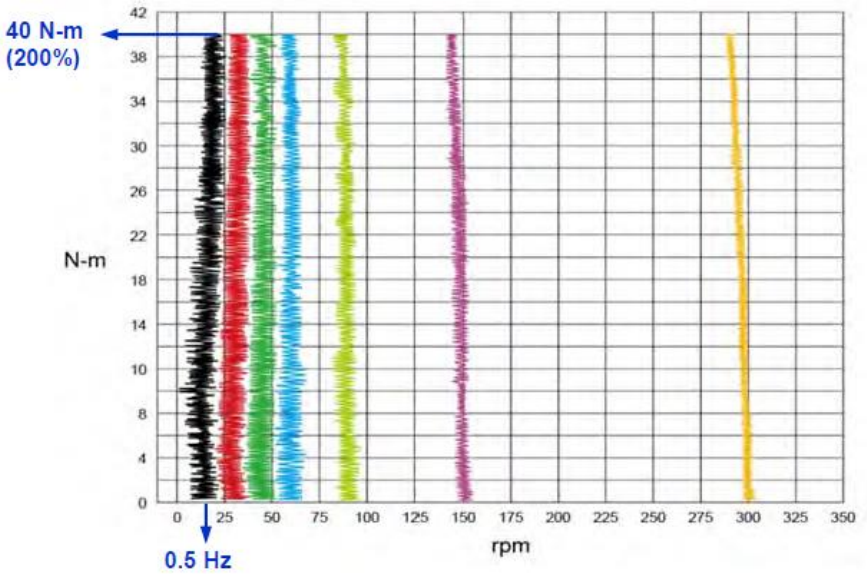
- High stability in production
- High quality product



Feature – Excellent Drive Capability

High Starting Torque Capability

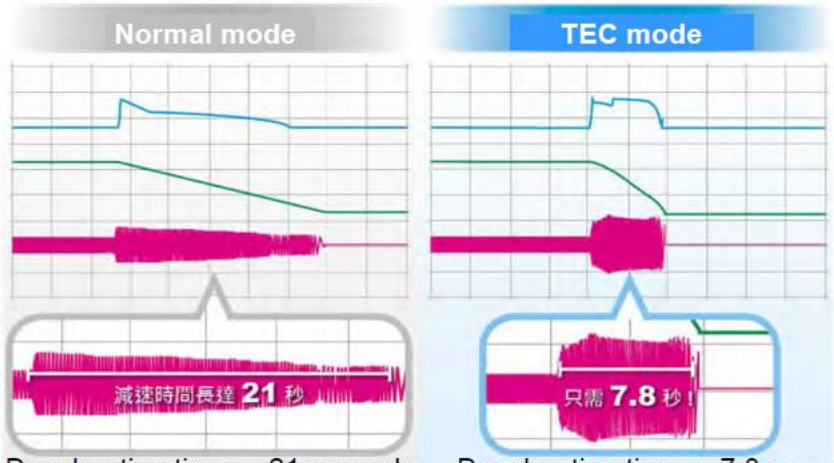
Up to 200% rated torque when starting at
0.5 Hz make sure the stability



Energy Traction Control

Energy Traction Control mode:

- Shortens deceleration time
- Reduces cost of braking resistor



Normal Duty: 120% for 60 seconds, 150% for 3 seconds
Heavy Duty: 150% for 60 seconds, 200% for 3 seconds

Feature – Powerful Capability

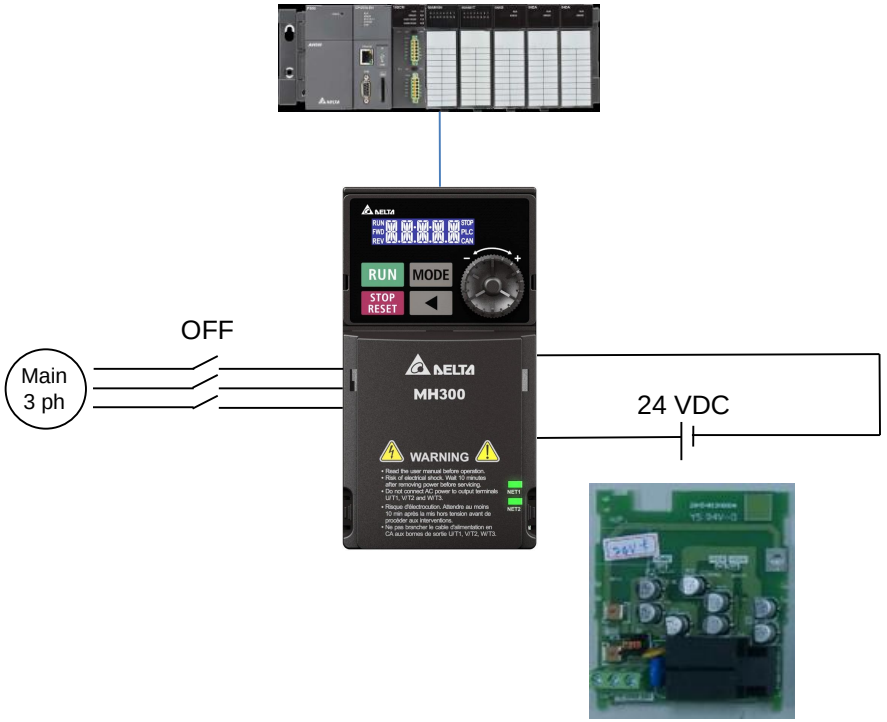
Communication Interface

Supports many communications protocols and high flexibility to many applications.

Protocol	MH300	MS300
MODBUS	Built-in	Built-in
CANopen	Built-in	Option
PROFIBUS DP	Option	Option
DeviceNet	Option	Option
MODBUS TCP	Option	Option
EtherNet/IP	Option	Option
EtherCAT	Option	Not Available
	Two option card slots	One option card slot

DC 24 V External Power

External Power supply is available to use when main power is shut down. Ensures uninterrupted communications and system safety.



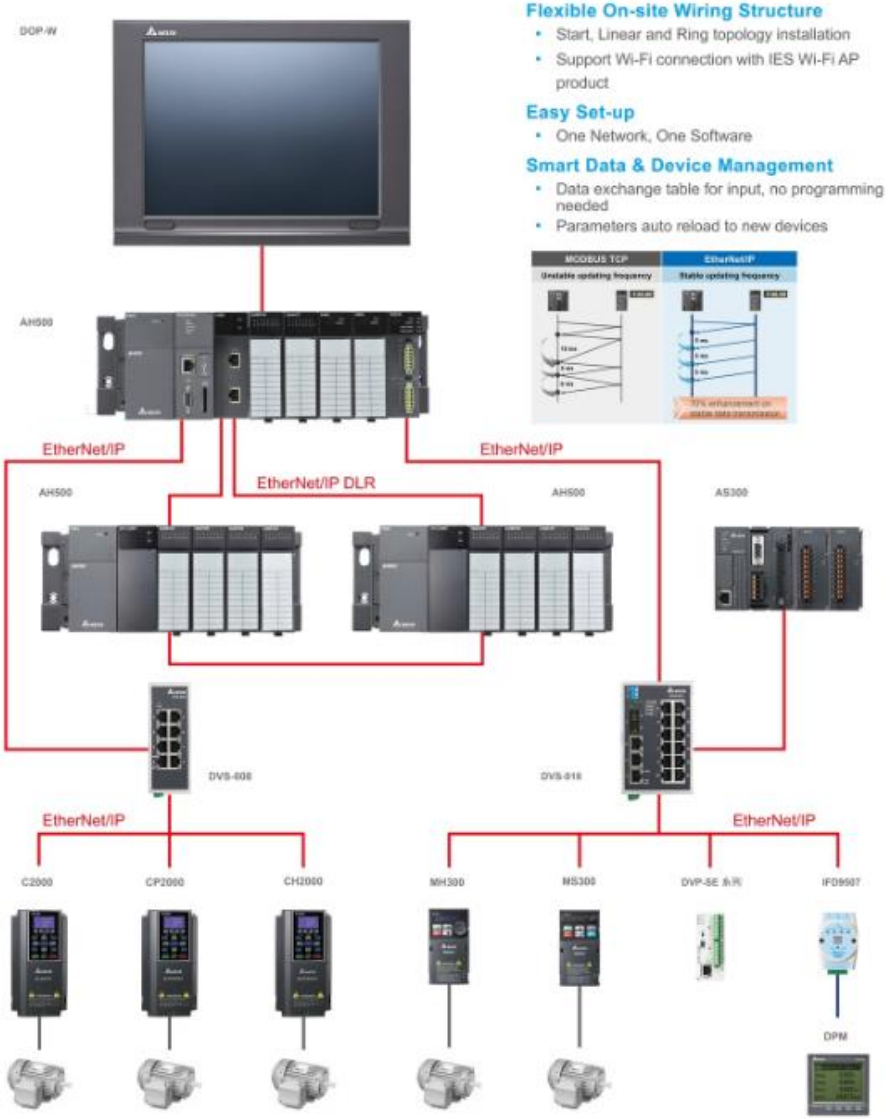
Backup Power Supply Option

Backup Power Supply

+24V power supply keeps communications available when power outage (Optional)

- The 24 V Power Supply Option maintains drive control circuit power when main power outage occurs.
- The control circuit keeps network communications and I/O data operational when power outage occurs.
- It is possible to read fault and parameter data in the drive via the Keypad or network communications when the drive switches to the 24V Power Supply Option as a back-up power supply.

EtherNet/IP Communications Architecture



Flexible On-site Wiring Structure

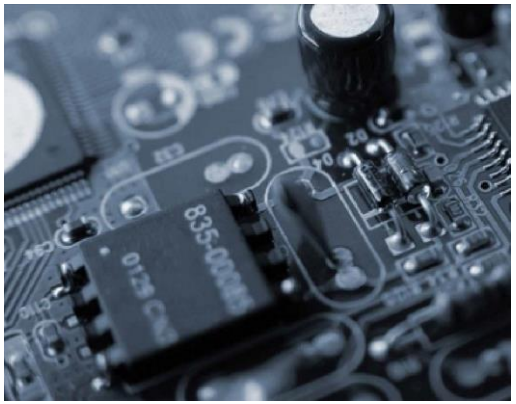
- Start, Linear and Ring topology installation
- Support Wi-Fi connection with IES Wi-Fi AP product

Easy Set-up

- One Network, One Software

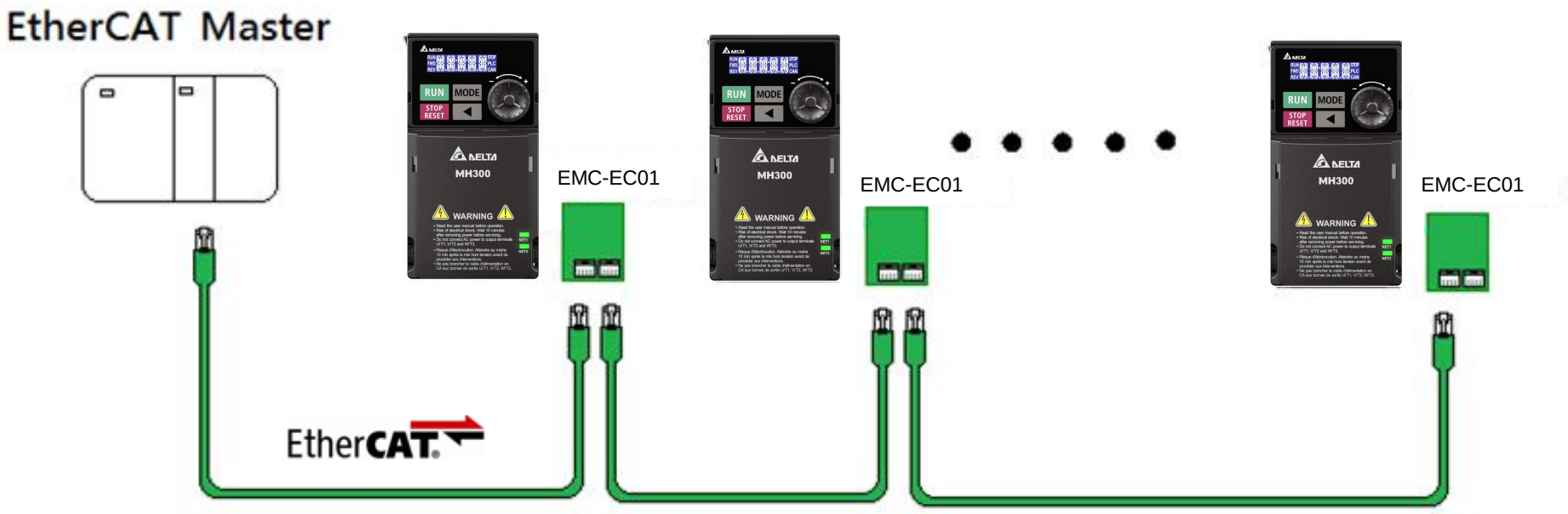
Smart Data & Device Management

- Data exchange table for input, no programming needed
- Parameters auto reload to new devices



EtherCAT Implementation Architecture

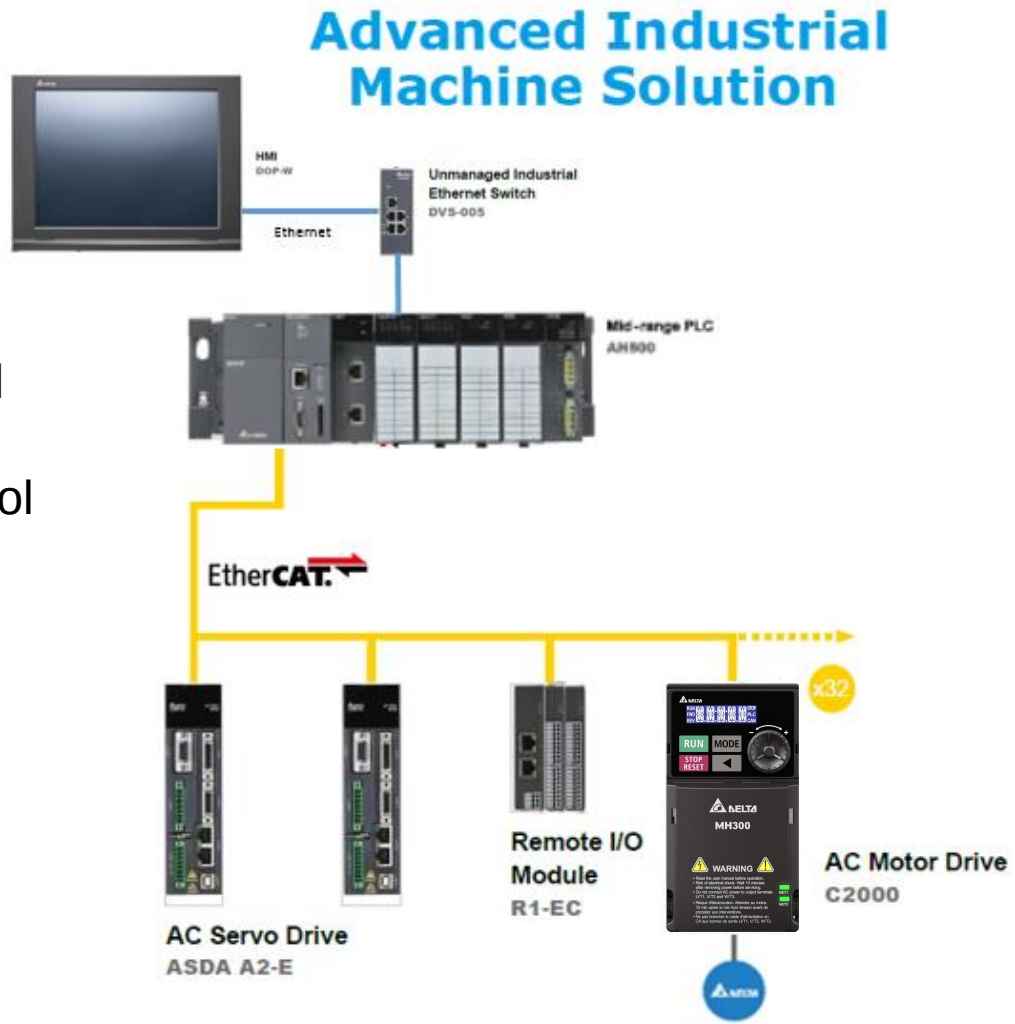
Features



EtherCAT master with Beckhoff, Trio, Omron, Standard PC with Intel chipset.

Feature – System Support

- EtherCAT for centralized control
- EtherNet/IP for distributed control

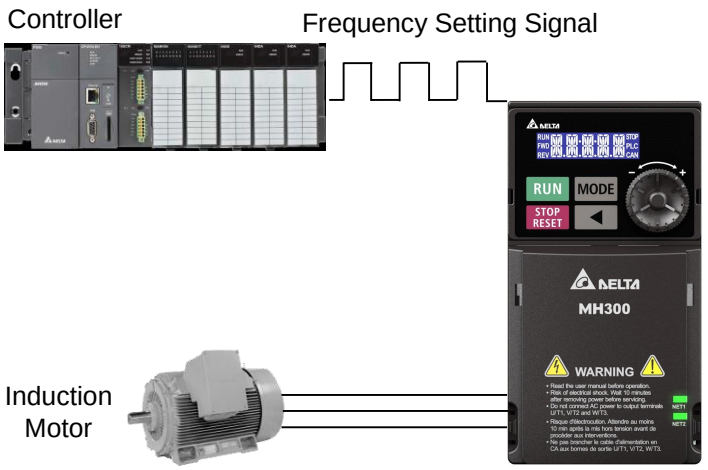


Feature – System Support

High Frequency Pulse Input

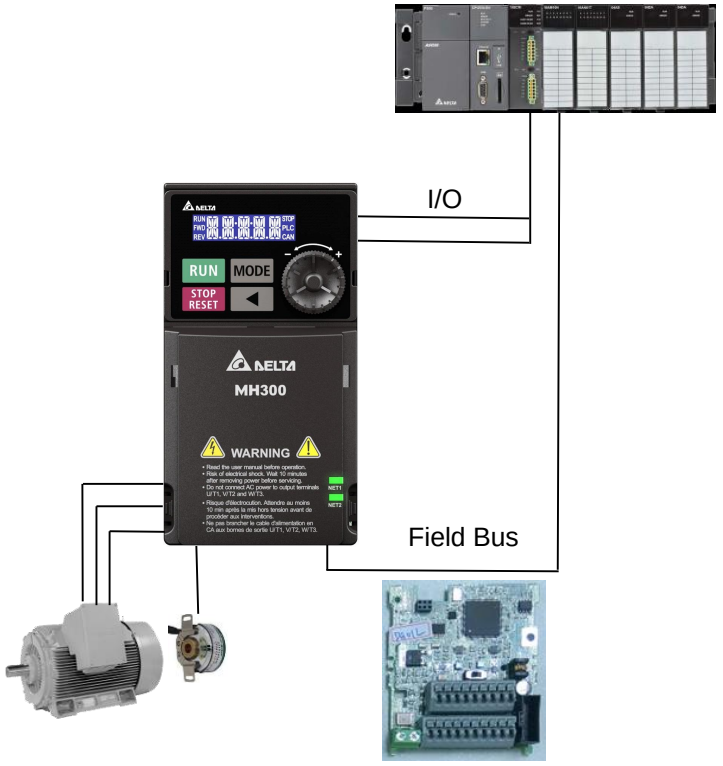
Accept pulse signal from controller or feedback signal from encoder without additional accessories to save system cost.

- MS300 - 1 pulse input, 1 pulse output (33 kHz)
- MH300 - 2 pulse Input, 1 pulse output (33 kHz)
  0 - +10 V, 4 - 20 mA



MH300 Closed-loop Control

- Basic closed-loop: Receiving dual pulse or feedback signal from encoder directly.
- Advanced closed-loop: More accurate speed control with Pulse Generator Card

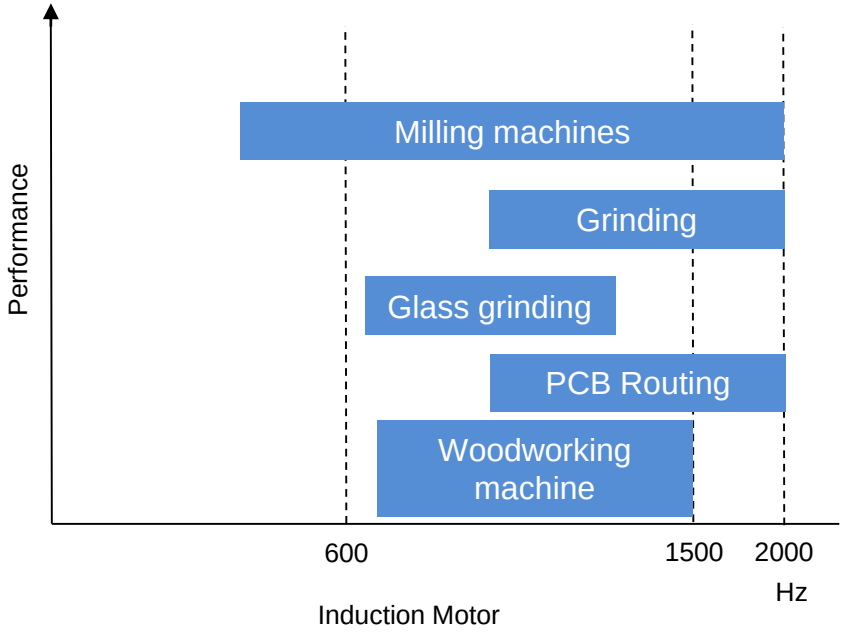


Feature – System Support

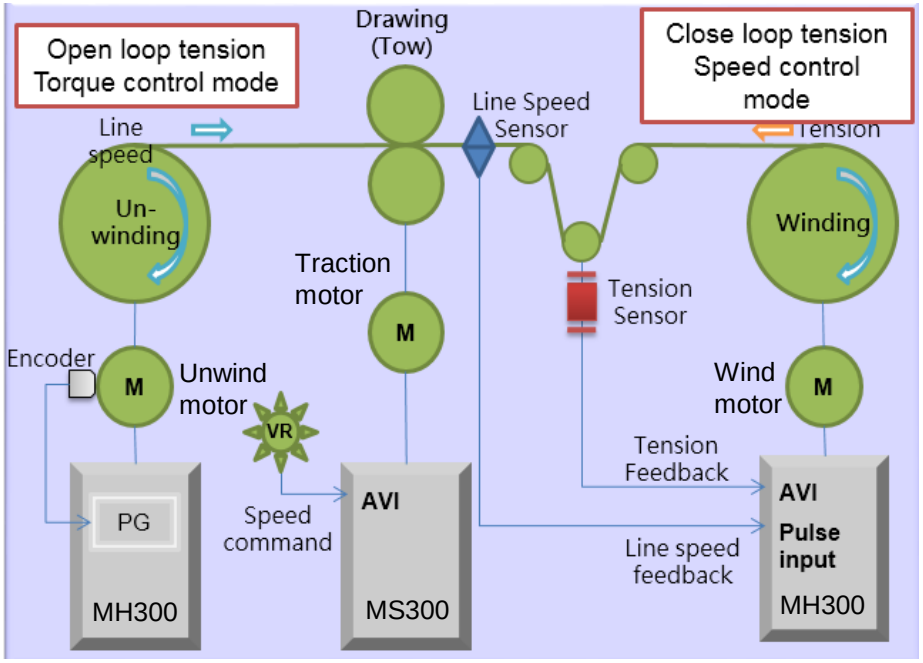
High Speed Application

High speed models are available for high speed processing.

- MH300 – 2000 Hz
- MS300 – 1500 Hz



Tension Control



Feature – System Support

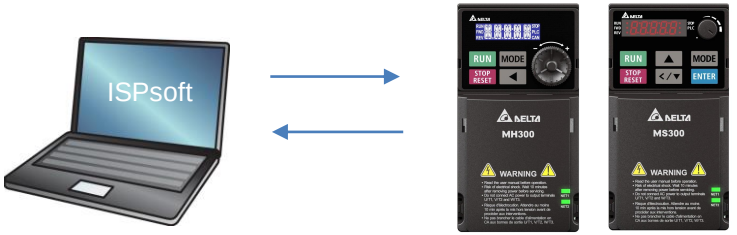
Multiple motors Control

- MH300 – Up to 8 Induction motors simultaneous
- MS300 – Up to 4 Induction motors simultaneous

Built-in Delta PLC

Basic programming is available by built-in PLC for individual requirement and decentralized control.

- MH300 – 5000 Steps
- MS300 – 2000 Steps



MH300 and MS300 Keypad

5-digit
LCD display

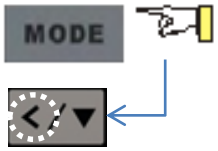
Jog Dial
(Quick setting)

Rotary:
Increase or decrease value of setting, turn to next parameter,\
Enter:
Saves current setting value

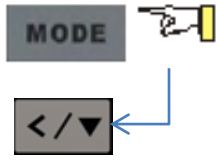
Left Digit Shift
Function key

5-digit
LED display

Digit Shift/up
Function key



Press “MODE” for more than 2 seconds will start shift function



Normal press
(less than 2 sec.)

Key Features

	MH300	MS300
Power Rating (kW)	0.2 to 22	0.2 to 22
Controllable Motor	IM/ PMM	IM/ PMM
Control Method	V/f, SVC, FOC, TQC (close-loop/position control)	V/f, SVC
Spring type terminal	✓	✓
MODBUS	✓	✓
Built-in Brake Chopper	✓	✓
Built-in EMI filter	C2(20m), C3 (30m)	C2(20m), C3 (30m)
Safe Torque Off	SIL2	SIL2
Built-in PLC	5000 steps	1000 steps
USB FW update/ Para. Copy (Power off)	✓	✓
Hardware Vout feedback (Stable output at Low frequency)	✓	✗
High speed output*	2000 Hz (derating)	1500 Hz(derating)
EtherCAT	✓	✗

* Two version: 1. standard(599Hz), 2. High speed(1500/2000Hz)

Order Number Key

MH: High performance
MS: Standard compact drive

Series name (Variable Frequency Drive)

VFD | 1A6 | MH | 43 | A | N | S | A | A — Version type

Code	Enclosure
A	IP20
B	IP21/NEMA 1
M	IP66 (MS only)

Code	Safety
S	Built-in

Code	Output current

Output current code:

1. Letter A=point, while place in the middle of number:
Ex: 1A6=1.6A, 5A0=5.0A, and so on.
2. Letter A=Amp, while place in the last of number:
11A=11A, 45A=45A, and so on
3. Letter K=point/thousand units · for ex.
1K0=1.0*1000=1000A, 1K1=1.1*1000=1100A, and so on

Code	Input voltage
11	115V 1-phase
21	230V 1-phase
23	230V 3-phase
43	460V 3-phase

Code	Customize
A	Standard
N	No Fan
H	High Speed

Code	EMC Filter
N	None
F	Internal filter
P	Built-in PFC

Power Rating and Frame Sizes

110V/1φ	Frame	Width	Height	Depth (mm)	
				MH300	MS300
HP		mm	mm	W/O Filter	W/O Filter
1/4	A0	68	128		96
	A	68	128	115	
1/2	A	68	128	129	125
1	C	87	157	152	152

230V/1φ	Frame	Width	Height	Depth (mm)			
				MH300		MS300	
HP		mm	mm	W/O Filter	W/I filter	W/O Filter	W/I filter
1/4	A0	68	128			96	
	A	68	128	115			
	B	72	142		159		159
1/2	A	68	128	129		125	
	B	72	142		159		159
1	B	72	142	147	159	143	159
2	C	87	157	152	179	152	179
3	C	87	157	152	179	152	179

230V/3φ	Frame	Width	Height	Depth (mm)	
				MH300	MS300
HP		mm	mm	W/O Filter	W/O Filter
1/4	A0	68	128		96
	A	68	128	129	
1/2	A0	68	128		110
	A	68	128	129	
1	A	68	128	135 (Fan cooled)	
				147 (Self-cooled)	143
2	B	72	142	143	143
3	C	87	157	152	152
5	C	87	157	152	152
7.5	D	109	207	154	154
10	E	130	250	185	185
15	E	130	250	185	185
20	F	175	300	192	192

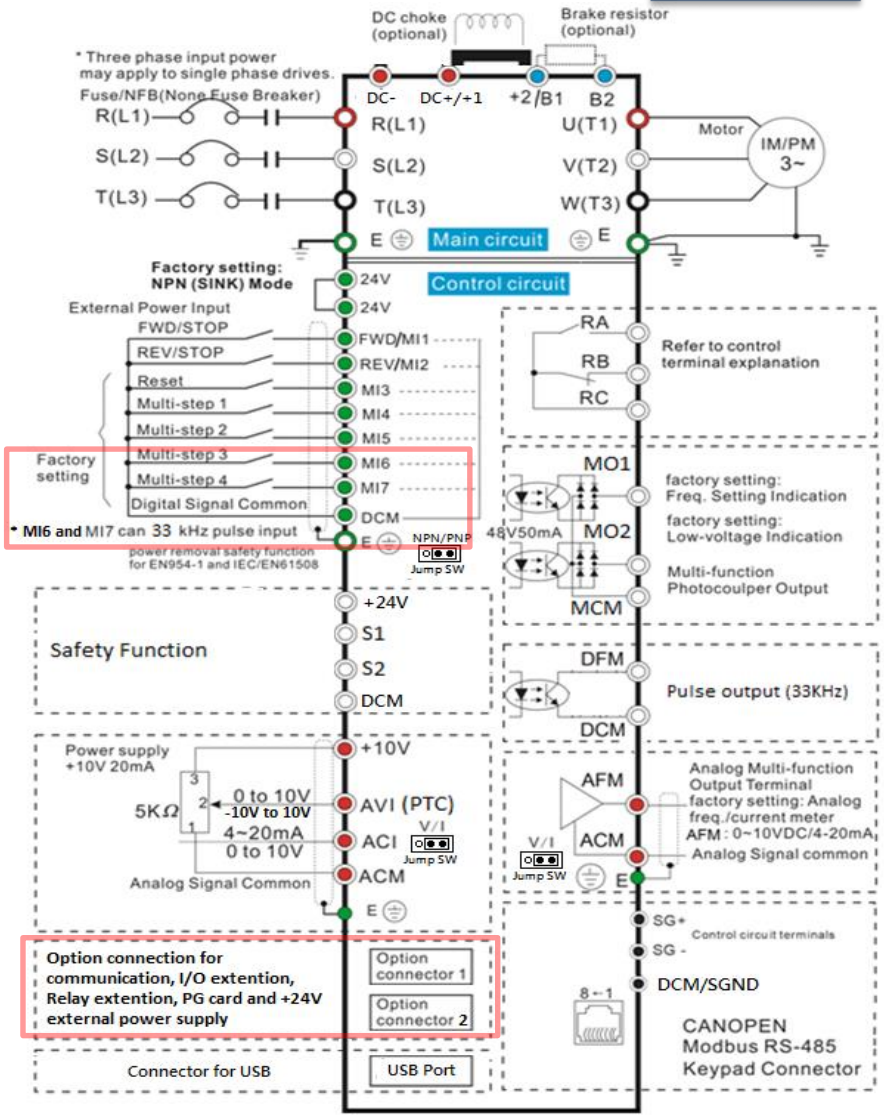
460V/3φ	Frame	Width	Height	Depth (mm)			
				MH300		MS300	
HP		mm	mm	W/O Filter	W/I filter	W/O Filter	W/I filter
1/2	A	68	128	129		129	
	B	72	142		159		159
1	A	68	128	135 (Fan cooled)			
				147 (Self-cooled)		143	
	B	72	142		159		159
2	B	72	142	143	159	143	159
3	C	87	157	152	179	152	179
5	C	87	157	152	179	152	179
7.5	D	109	207	154	187	154	187
10	D	109	207	154	187	154	187
15	E	130	250	185	219	185	219
20	E	130	250	185	219	185	219
25	F	175	300	192	244	192	244
30	F	175	300	192	244	192	244

Control Terminals

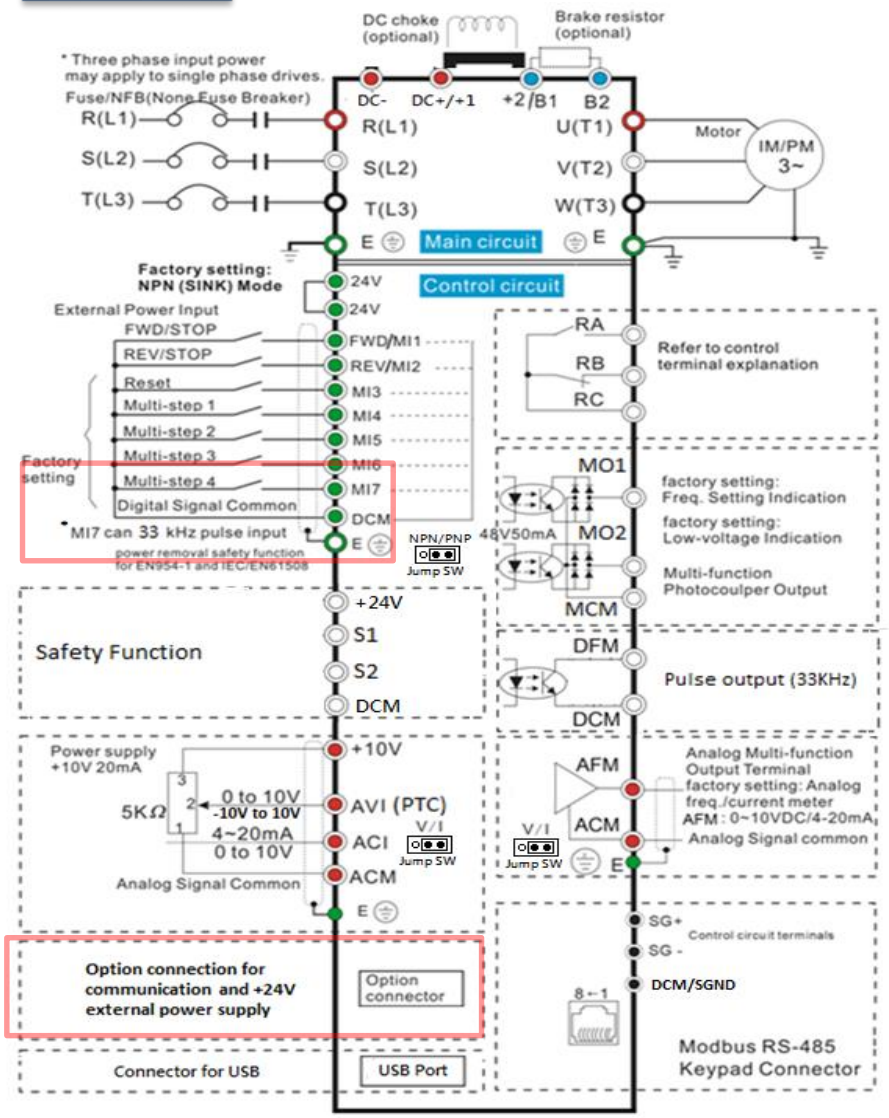
I/O function	MH300	MS300
Digital input	MI1~MI7	MI1~MI7
Digital input ground	2	2
Digital output	MO1, MO2	MO1, MO2
Digital output ground	1	1
Analog input	0~10V/-10V~+10V 0~10V/0(4)~20mA	0~10V/-10V~+10V 0~10V/0(4)~20mA
Analog output	0~10V/0(4)~20mA	0~10V/0(4)~20mA
Analog ground	1	1
Relay	1 form C relay	1 form C relay
PTC	via programmable AVI	via programmable AVI
Pulse input 1	via programmable MI(33KHz)	via programmable MI(33KHz)
Pulse input 2	via programmable MI(33KHz)	No
Pulse output	DFM (33KHz)	DFM (33KHz)

Wiring Diagram

MH300



MS300



Option Cards (MH300 only)

I/O extension

DIO (3-in/3-out)	AIO (2-in/2-out)	Relay1 (RA2/RB2/RC2,RA3/RB3/RC3)	Relay2 (RA2/RC2,RA3/RC3,RA4/RC4)
			
EMM-D33A	EMM-A22A	EMM-R2CA	EMM-R3AA

PG card

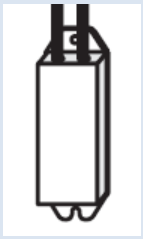
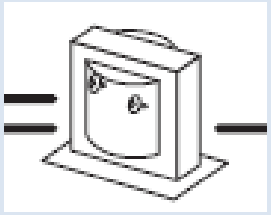
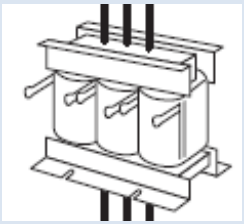
ABZ (EMM-PG01O, EMM-PG01L)	Resolver (EMM-PG01R)
	
PG01O	

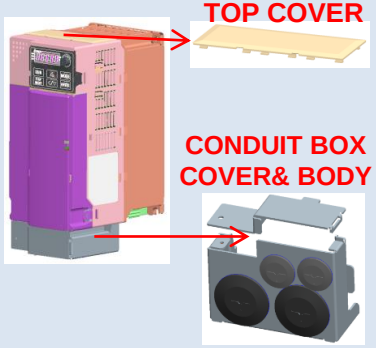
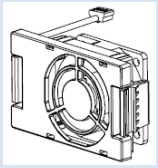
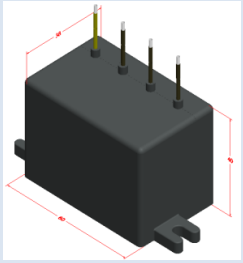
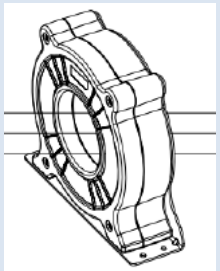
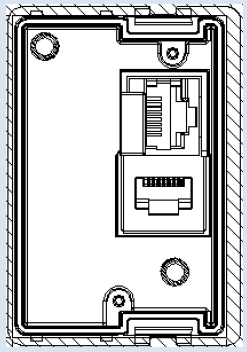
+24V Backup Power Supply

EMM-BPS01

MS300 also can support

Accessories and Kits

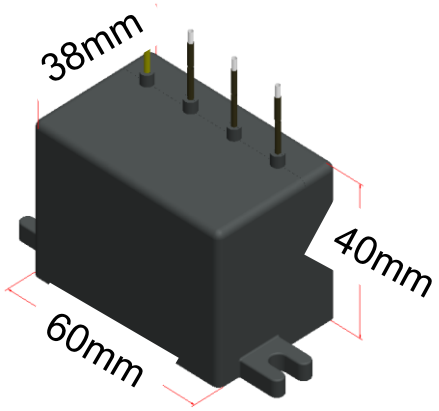
Braking Resistor	DC Choke Reactor	AC Input Reactor	EMC Filter	Keypad KPC-CC01
125% Braking Torque 				

NEMA 1 Conduit Kit MKM-CB_	Fan Kit MKM-FKM_	Din Rail Kit MKM-DR_	Y-capacitor CXY101-43A	Zero Phase Reactor RF008X00A	Keypad Mounting KPMH-LC01
		 (Up to 5HP)			

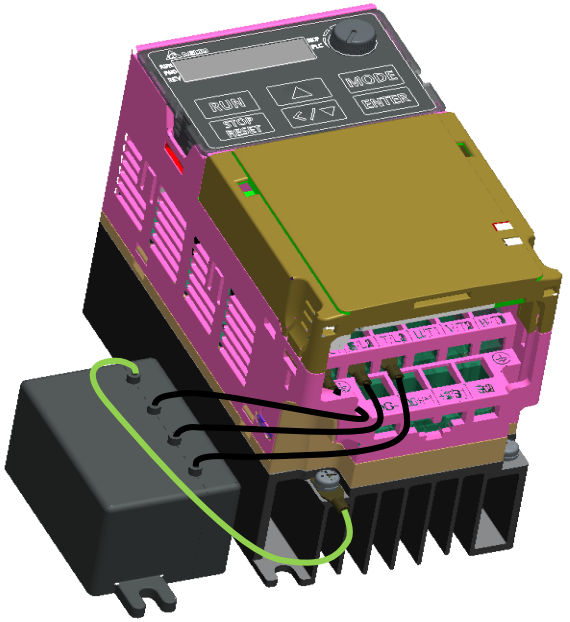
Y-Capacitor Option

(For models without built-in Filter, can improve the leakage voltage)

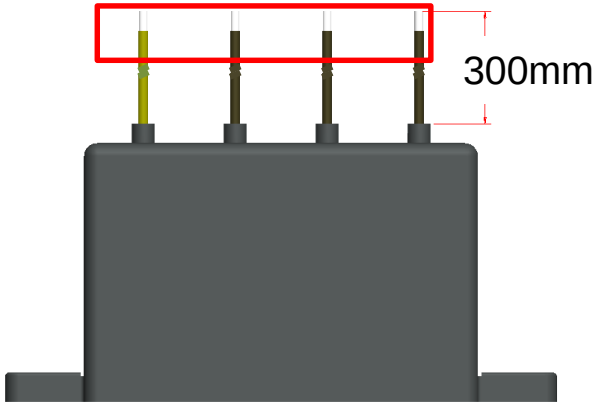
All Delta VFD, less than 30HP models are applicable



Unit:mm



- **16AWG, 75˚C Cu Wire, 5A**



- Lower leakage voltage under 10V
- Electromagnetic Interference (EMI) Suppression
- For non-grounded system is applicable

Applications

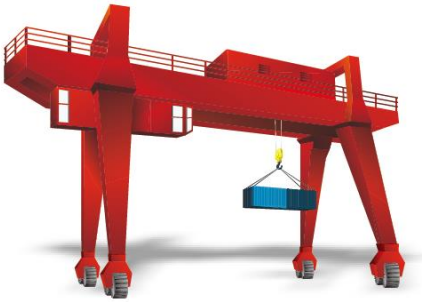
Applications

Complex function / fast response (MH300)

- Material Working Machine Automation
  - On the fly operations, cut, drill, press, form
  - Horizontal form/fill/seal packaging machine
- Spindle motor
  - Milling
  - Woodworking
- Textile machines
- Material handling
  - Pick and place
  - Conveyors
  - Palletizers
- Crane and hoist
- Rubber and plastic machines
- Packing / packaging machines
  - Filling, sealing, boxing, wrapping, labeling

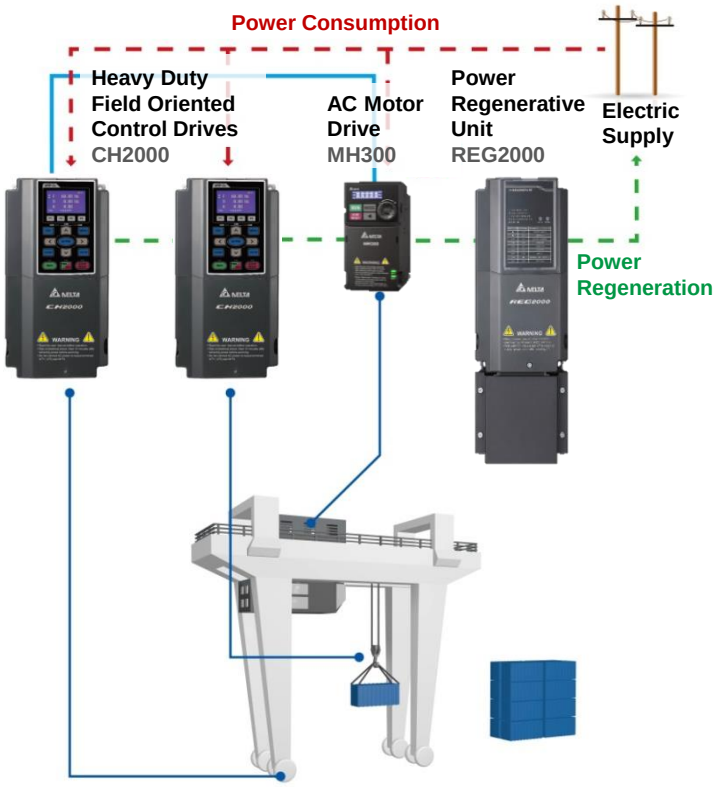
Simple function / slower response (MS300)

- Pumping applications
  - Centrifugal pumps, circulating pumps, multi-pump stations
- Machines equipped with fans
  - Air, lab fume hoods, smoke extraction, ovens, boilers, washing machines, plastic film machines
- Air Compressor OEM



Crane Solution

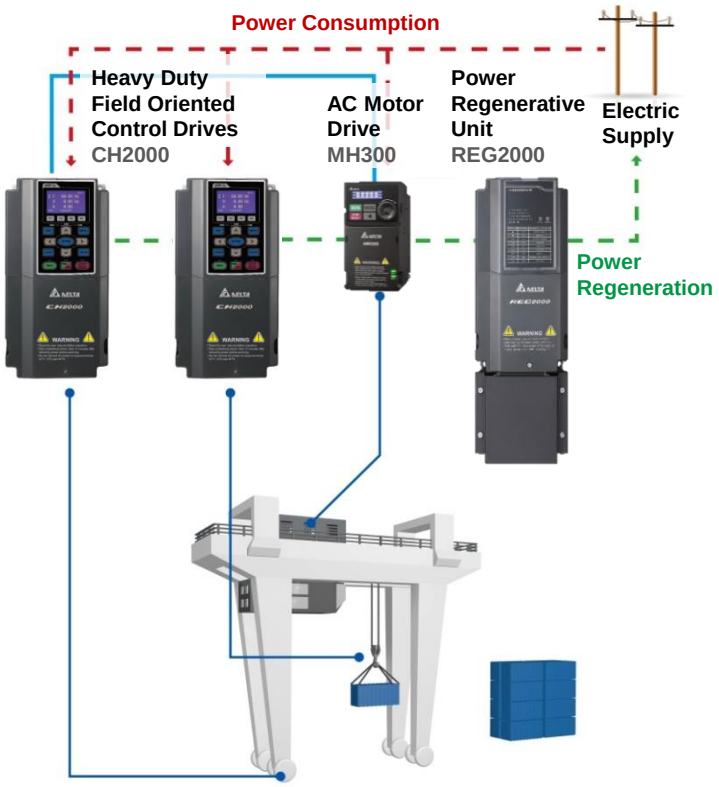
Crane Solution



Structure & Functions

- **Heavy Duty Field Oriented Control Drive CH2000 Series** for crane movement and main hoist control
- **High Performance Compact Drive MH300 Series (max. power up to 22kW)** for horizontal hoist movement control
- **Power Regenerative Unit REG2000 Series** for over 95% power regeneration efficiency

Crane Solution



Benefits

- **Save over 30% energy:** with over 95% power regeneration efficiency provided by the REG2000 Series
- **Save maintenance time and cost:** simple architecture, easy wiring, installation and setup
- **Stable system operation** with the CH2000 Series
  - High overload capacity (150% of rated current for 60 sec and 200% of rated current for 3 sec)
  - Stable DC BUS voltage under impact loads

Crane Solution
Product Mix

Heavy Duty Field Oriented Control Drive

CH2000

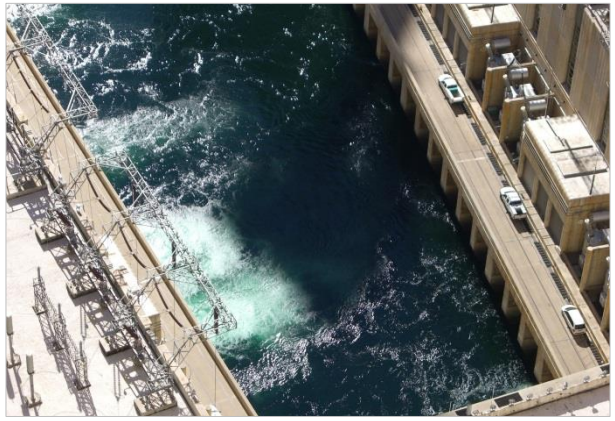
High Performance Compact Drive

MH300

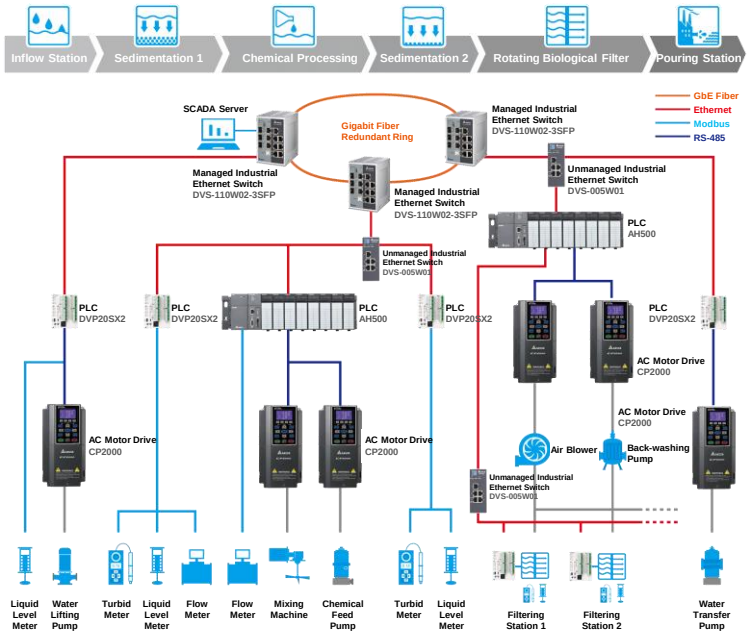
Power Regenerative Unit

REG2000

Water Treatment Solution



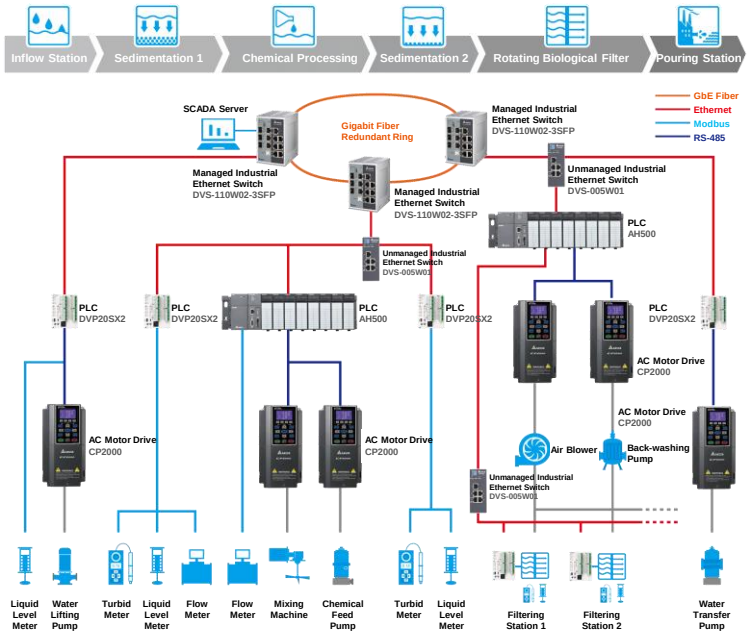
Water Treatment Solution



Structure & Functions

- **Small PLC DVP Series for field device control** and **Mid-range PLC AH500 Series** for process station control, and building a reliable operation control system
- **MS300 Compact Drive** for variable frequency control of pumps, fans and other equipment to save energy
- **Industrial Ethernet Switch DVS Series** to construct fiber redundant rings for high-speed communication between process stations and monitoring systems

Water Treatment Solution



Benefits

- **High performance**, **stable control system**
- **Enhances power efficiency**, **saves energy:** variable frequency control
- **Stable facility operation:** modular design and hot-swapping function
- **High-speed communication**, **high extension capability**

Water Treatment Solution
Product Mix

Compact Drive

Fan and Pump

MS300

High Performance

Mid-range PLCs

AH500

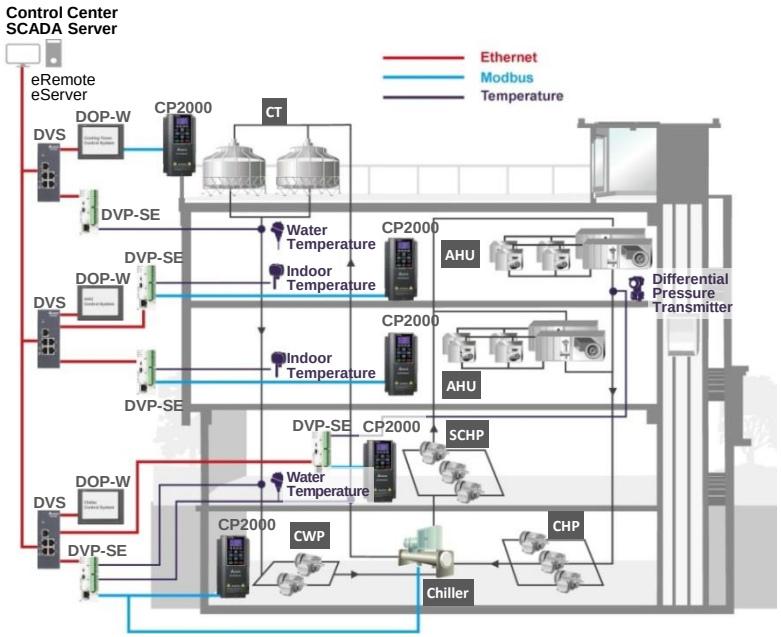
Industrial Ethernet

Switches

DVS-110

HVAC Solution

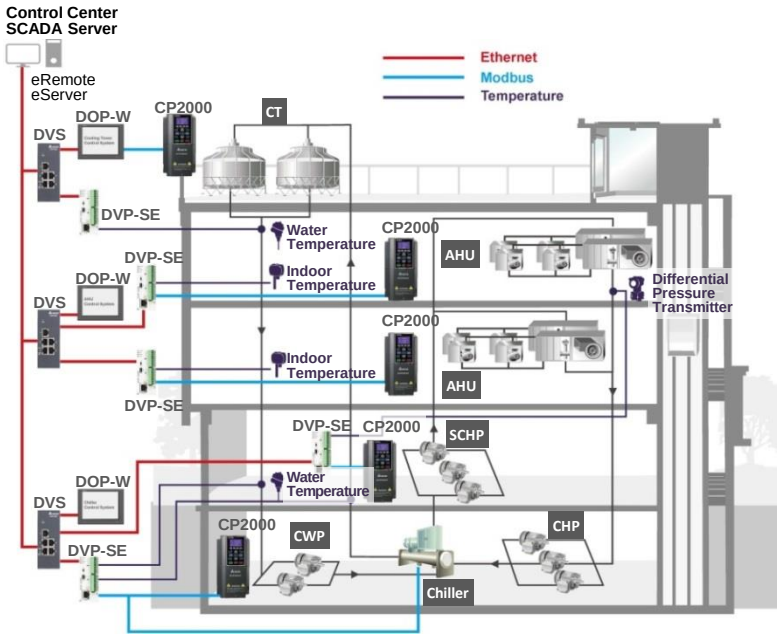
HVAC Solution



Structure & Functions

- **Large-Size HMI DOP-W Series** provides large display screen and user-friendly, simple editing control panel
- **Ethernet based Slim PLC DVP-SE Series** for field device and drive control, and system monitoring
- **MS300 Series Compact Drive** for variable frequency control of pumps, fans and other equipment to save energy
- **Industrial Ethernet Switch DVS Series** transmits facility operation data and exchange information between field devices and monitoring systems

HVAC Solution



Benefits

- **Energy savings up to 50%:** variable frequency control on fans and pumps
- **Simple and intuitive operation:** HVAC Function Blocks
- **Energy-efficient** and **smart facility operation** for time scheduling control and group sequence control
- **Lower installation and operation costs:** efficient operation management
- **Comfortable indoor environments**

HVAC Solution
Product Mix

Industrial Ethernet Switch

DVS-005

Ethernet based Slim PLC

DVP-SE

Large-Size HMI

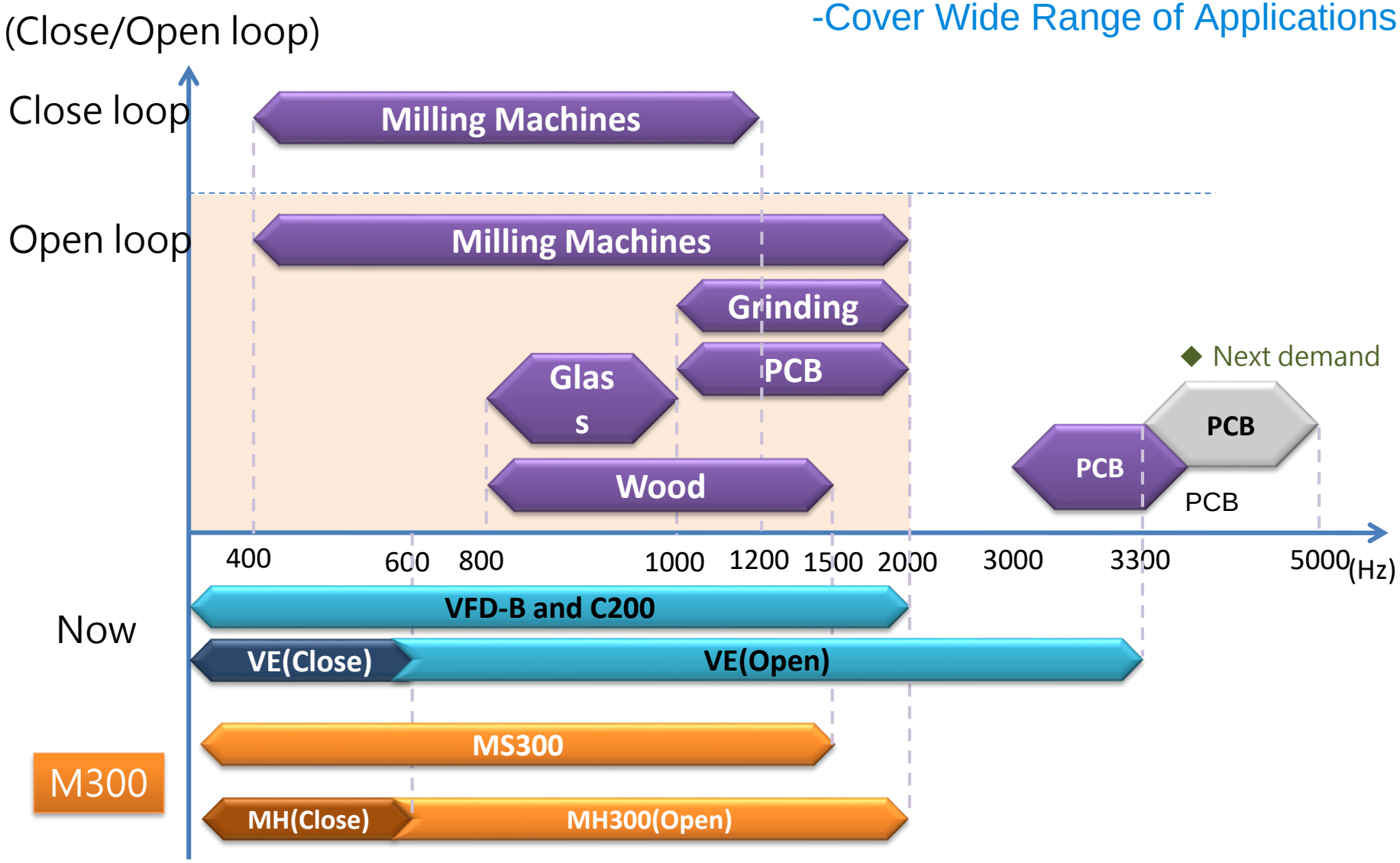
DOP-W

Compact Drive Fan and Pump

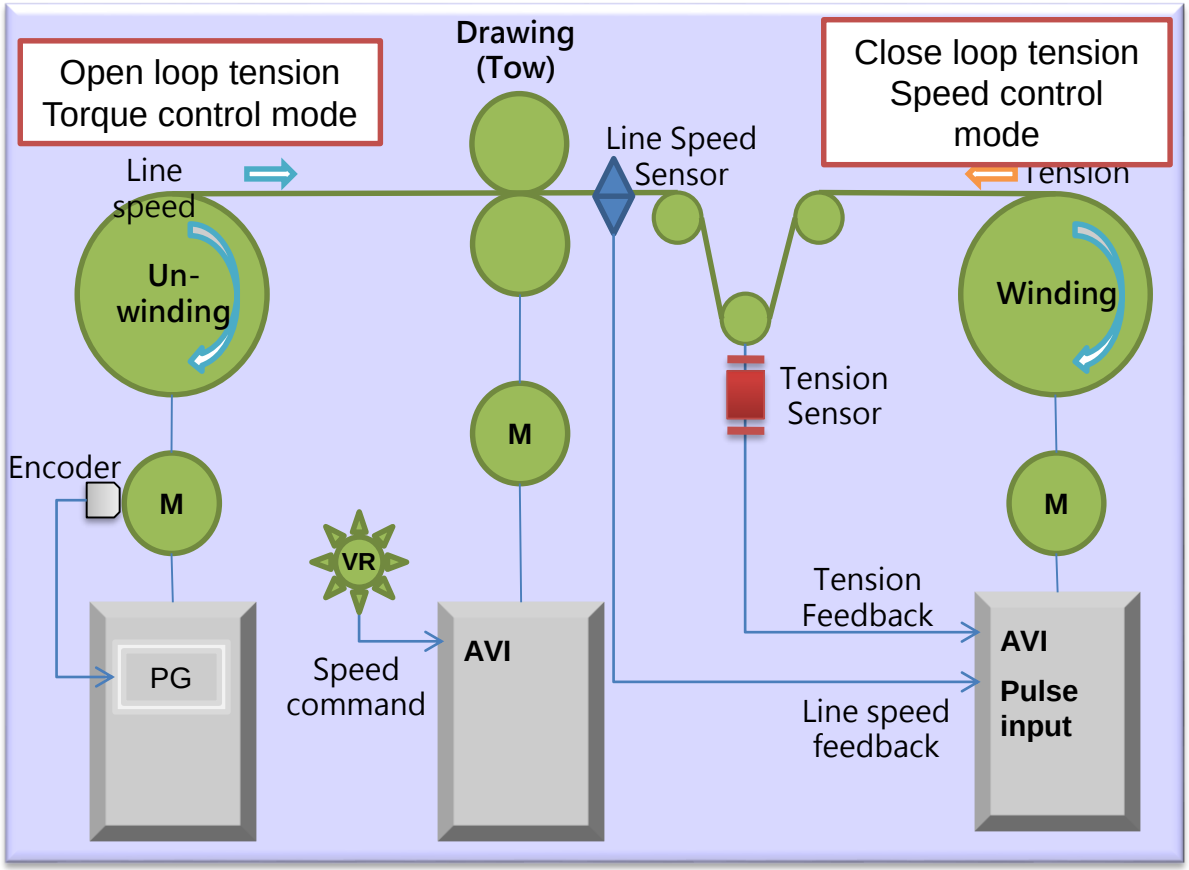
MS300

High Speed Applications

-Cover Wide Range of Applications



Tension Control



Unwinding needs	The advantage of using the MH300
• Without tension feedback • Smooth low speed	- Torque control (Torque change with the roll diameter) - output voltage feedback - can support PG card

Winding needs	The advantage of using the MS300
• Tension control • Roll diameter calculate	- PID control - AVI (tension feedback) - Pulse input (line speed feedback)

Drawing needs	The advantage of using the MS300
• Basic speed control	- V/f 、SVC control

Industry Equipment:
Such as paper, printing and dyeing, packaging, wire and cable, fiber optic cable, textile, leather, metal foil processing, fiber, rubber, metallurgy sheet, wire processing and manufacturing, are required for precise tension control, to maintain constant tension to improve product quality.


Cutting machine


Printing machine


Drawing machine


Film Blowing machine

Resources

Design Tools

Resources

- MS300 MH300 Brochure Here
- MS300 MH300 Users Manual Here
- Technical Sheet

Summary

Summary

- **Product Features**
- **Applications**
- **Resources**

Smarter. Greener. Together.

Questions?

To learn more about Delta, please visit www.deltaww-americas.com/ia.

or scan the QR code