DELTA Newsletter

Industrial Automation Products

Edition 2017-04 MS300

Contents

1 News

1.1 ftp-site link

Just to let you know (again), you can find the latest info about our products (manuals, pictures, catalogues, application notes, presentations, software, etc) on our ftp-site.

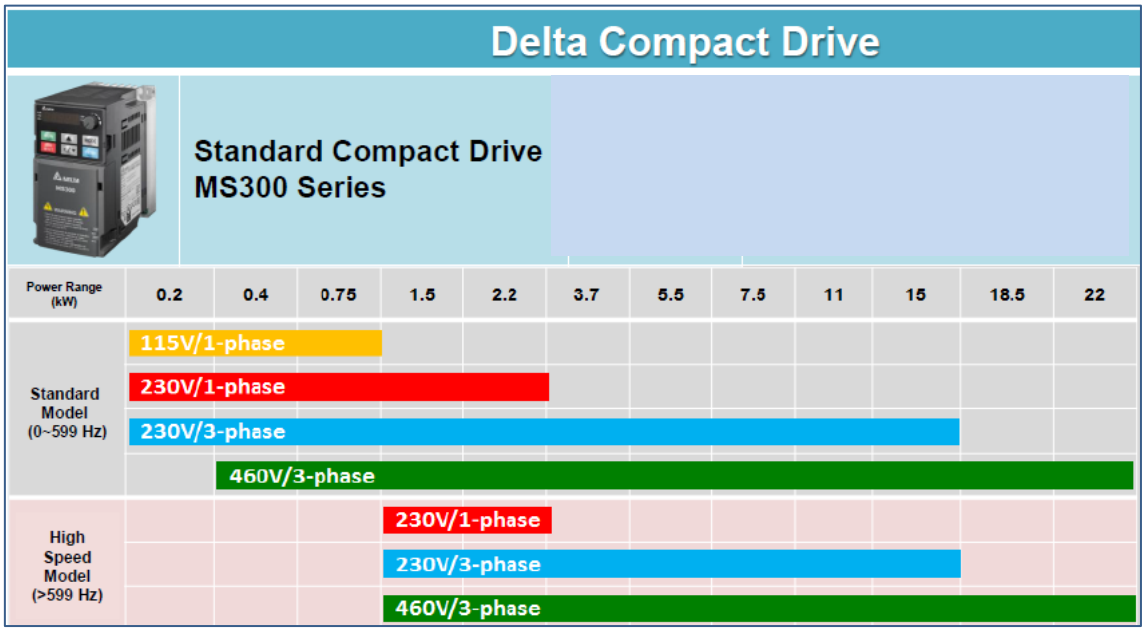
ftp://den-eindhoven:BuPd2175@ftp2.delta-europe.com/deltronics-eindhoven/customer-service

Name and password are included in the link.
Name: den-eindhoven
Password: BuPd2175

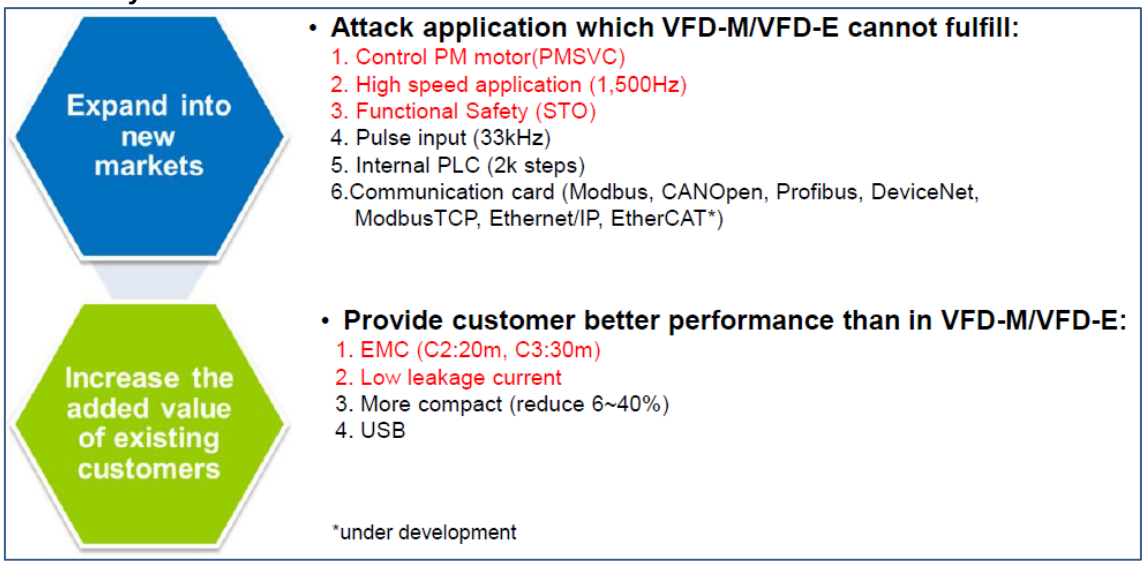
2 MS300 released

2.1 NEW – MS300 released

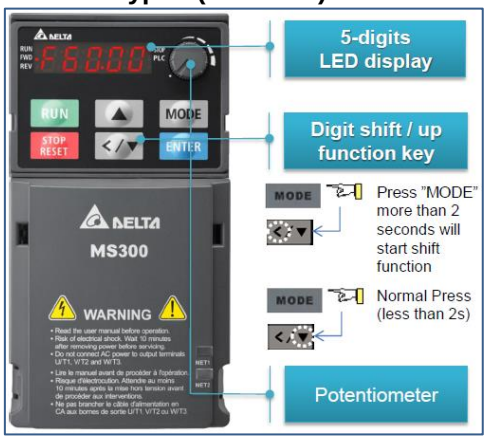
We're happy to announce the release of MS300 for sales in EMEA.
Initial stock is available.
Prices are available. Ask your sales.



MS300 Key features



MS300 Keypad (standard)



Flexible Space Utilization

New Compact Design

Smaller but more powerful!
High space utilizing rate !

Zero-stack installation

High installation flexibility
Ambient Temperature： -20 °C ~ 40 °C

Excellent Drive Capability

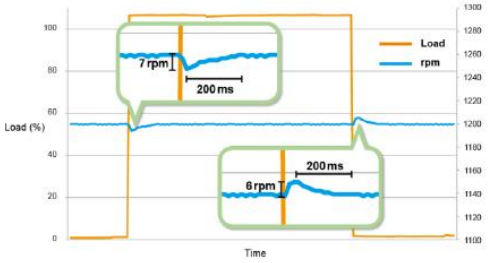
Support various motors

Supports IM& PM motors

Fast response to impact loading

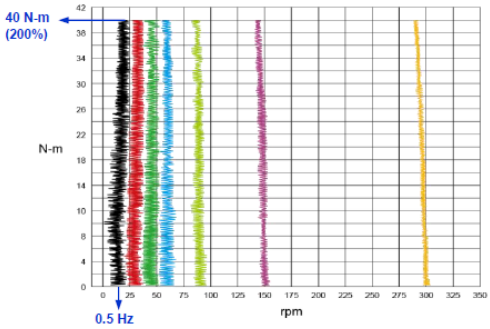
Fast speed recovery from receiving impact loading ：

- High stability in production
- High quality product



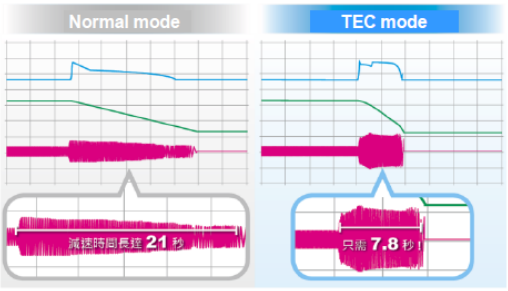
Realize High Starting Torque

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



Energy Traction Control

Energy Traction Control mode shorten deceleration time and make the cost of braking resistor down.



Deceleration time = 21 seconds Deceleration time = 7.8 seconds

- Actual effect depends on the loading conditions

Powerful Compatibility

Various Communication Interface

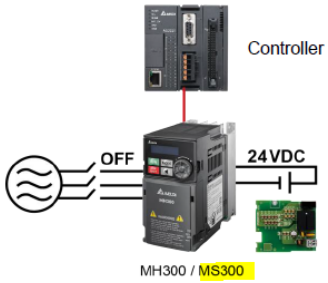
Supports many communication protocols and high flexibility to many applications.

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	*

*under development

DC 24 V External Power

External Power supply is available to use when main power shut down. Ensure the uninterruptible communication and system safety.

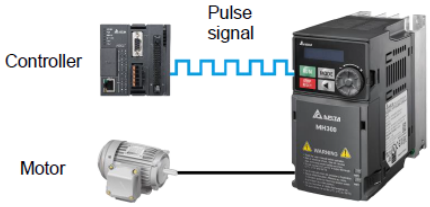


Powerful System Support

High Frequency Pulse Input

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

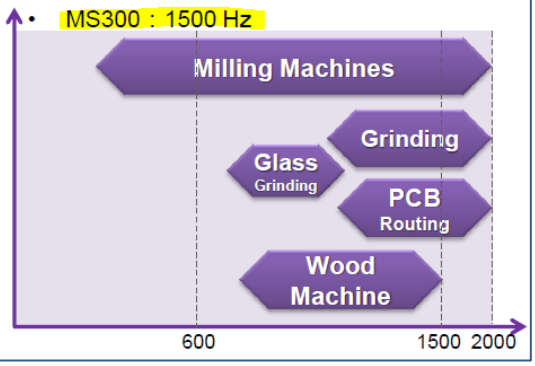
- MS300: Signal pulse
- MH300: Dual pulse



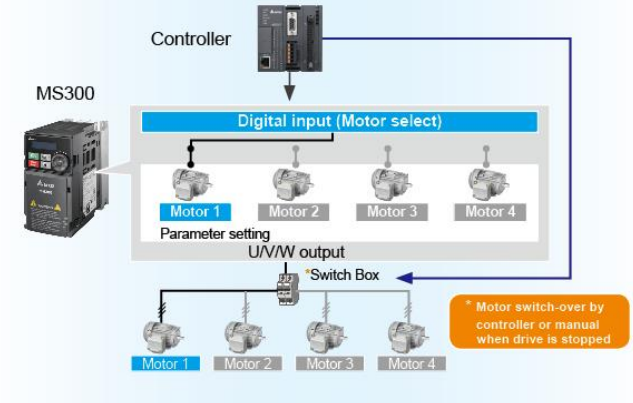
High Speed Application

High speed models are available for high speed processing

- MH300 : 2000 Hz
- MS300 : 1500 Hz



Multi-motor Control



Built-in Delta PLC

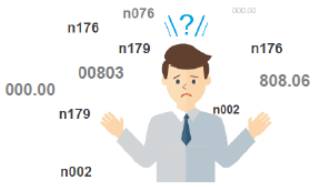
Basic Programming is available by built-in PLC for individual requirement and achieve decentralized control

- MH300 : 5k steps
- MS300 : 2k steps

Easy to Use

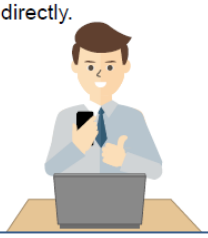
Parameter Group for Application

Too many parameters and too many steps to set in traditional way which takes time and effort…



Simplify the setting procedure by viewing and setting the parameter for selected application directly.

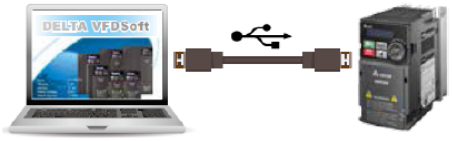
01 : User Defined
02 : Compressor
03 : Fan
04 : Pump
05 : Conveyor
06 : Machine tool
07 : Packaging



Built-in USB port

Fast and convenient tuning, monitoring and operating.

- No need to use USB / RS-485 converter
- Parameter edit& copy, software update could be done even main power is off.

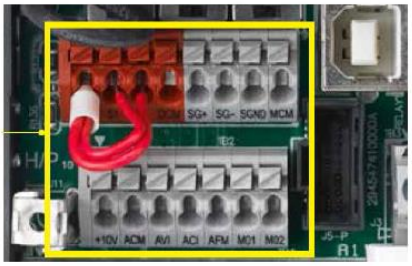


Digital dial and Keypad Outer Extension

Keypad outer extension in MH300/MS300 supports operating away from the drives or control panel.

Installation w/o screwdriver

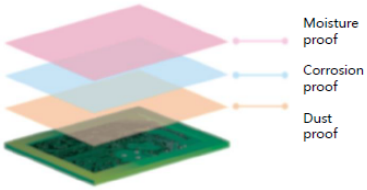
Spring type terminal makes fast wiring.



High Reliability

Dirt-proof – PCB coating

100% PCB coating
Meet IEC 60721-3-3 class 3C2
Resistant to moisture, corrosion and dust.

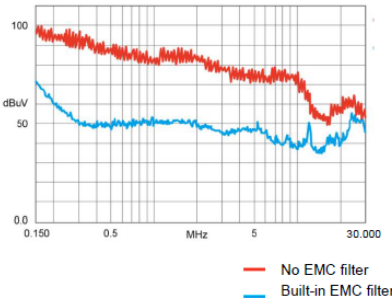


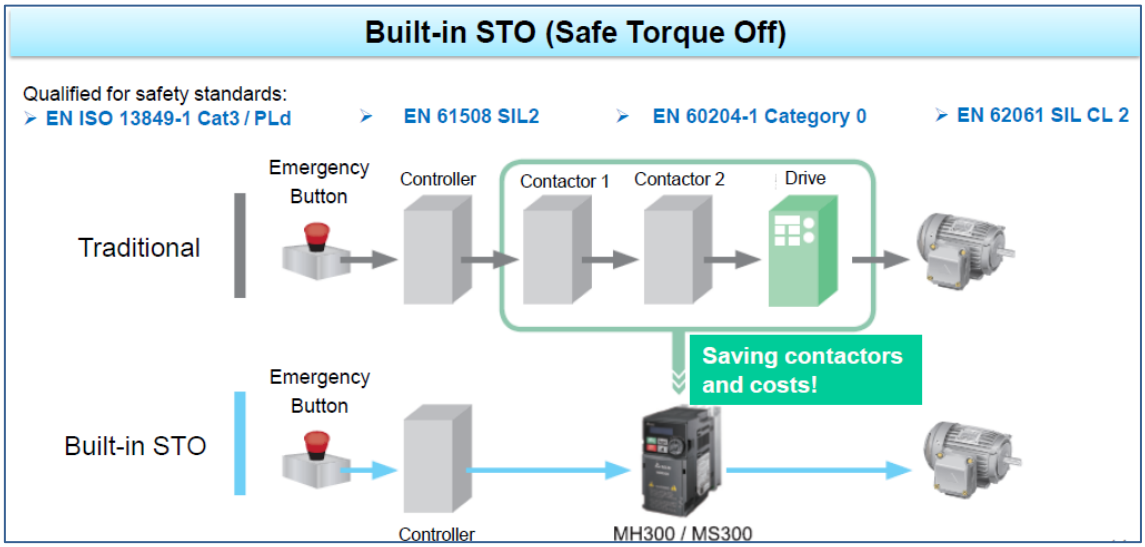
IP 40

Coating Fan+ Sealed ventilation
Protected against access to dust or other particles.
Suitable for harsh environment

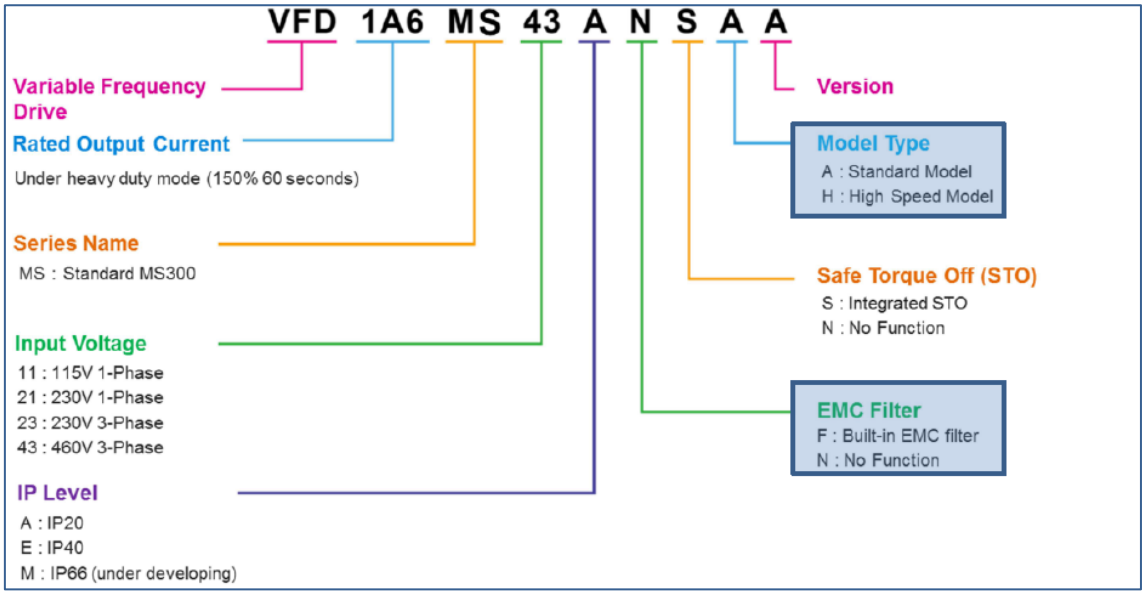
Built-in EMC filter

Built-in Class A (C2) EMC filter to save space, installation time and system cost.





2.2 MS300 Model Name



2.3 MS300 vs. VFD-E/VFD-M

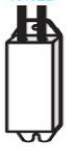
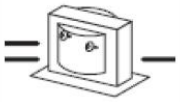
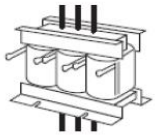
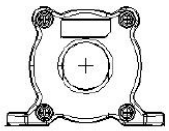
VFD Series	MS300	E	M
			
Motor	IM、SPM、IPM	IM	IM
Control	V/F、SVC	V/F, SVC	V/F, SVC
PG card	x	AB	x
Option card	Communication	I/O, Relay, Comm.	x
Keypad	LED 5-digits (removable)	LED 4-digits (removable)	LED 4-digits (removable)
Pulse input	1 (33KHz)	x	x
Pulse output (DFM)	1 (33KHz)	x	x
Safe Torque Off (STO)	EN ISO 13849-1 Cat3 / PLd EN 61508 SIL2 EN 60204-1 Category 0 EN 62061 SIL CL 2	x	x
Built-in EMC filter	C2	C3	x
Built-in USB port	Yes	x	x
Integrated PLC	Yes (2000 steps)	Yes (500 steps)	x

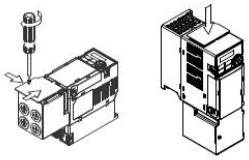
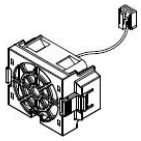
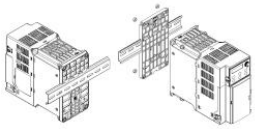
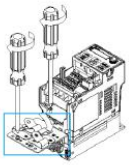
460V/kW	MS300			VFD - E			MS300 vs E	VFD - M			MS300 vs M
	W	H	D	W	H	D		W	H	D	
0.4	68	128	129	72	142	152	-11%	-	-	-	-
0.75	68	128	143	72	142	152	-11%	100	151	116.5	-29%
1.5	72	142	143	72	142	152	5%	100	151	116.5	-17%
2.2	87	157	152	100	174	152	-8%	100	151	116.5	18%
3.7	87	157	152	100	174	152	-8%	125	220	166.3	-55%
5.5	109	207	154	130	260	169.2	-26%	125	220	166.3	-24%
7.5	109	207	154	130	260	169.2	-26%	125	220	166.3	-24%
11	130	250	185	130	260	169.2	24%	-	-	-	-
15	130	250	185	200	310	190	-40%	-	-	-	-
18.5	175	300	192	200	310	190	9%	-	-	-	-
22	175	300	192	200	310	190	9%	-	-	-	-

2.4 MS300 Option Cards

Option cards	Model	Function	Available Series
			MS300
Communication card	CMM-DN01	DeviceNet	√
	CMM-EIP01	EtherNet/IP	√
	CMM-PD01	Profibus DP	√
	CMM-MOD01	Modbus TCP	√
	CMM-EC01	EtherCAT	-
	CMM-COP01	CANopen	√
External DC power supply	EMM-BPS01	DC 24V power supply card	√

2.5 MS300 Accessories

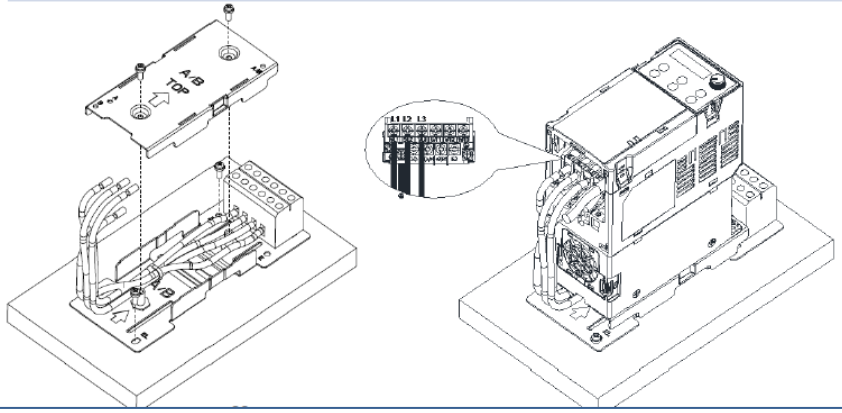
Brake Resistor	DC Reactor	AC Reactor	Zero Phase Reactor	EMC Filter	KPC-CC01
125% braking torque / 10%ED 					

Conduit Box	Fan Kit	DIN Rail	Capacitor-type Noise Filter	Earthing Plate
				

MS300 Mounting Adapter Plate

Use	The wiring can fit to VFD-M、VFD-E

[PS]: Currently available in less than 5HP (Frame C) models.



Keypad cable EGx010C

Part No.	L	
	mm	[inch]
EG1010C	1000	39.4
EG3010C	3000	118.1
EG5010C	5000	196.8

For MS300 these keypad cables are released.
The difference with the present EGx010A series is that these had clips included. These clips were for our first drive VFD-A and VFD-H and have never been used since.
So we will phase out EGx010A and replace it by EGx010C.
EGx010A and EGx010C are compatible for VFD-B, VFD-E, C200 and MS300.

2.6 UPDATE – MS300 firmware 1.04

Function correction

	Version 1.03 problems	Version V1.04
1	The calculation Method of current control loop under SVC control mode uses Peak current to calculation output voltage, causing a reduction in output torque when drive operates at a very low frequency.	Use RMS current to control output voltage to enhance output torque when drive operates at a very low frequency.
2	When using multi-function input terminal to do pulse input, if input pulse frequency is too high, it will cause frequent CPU interruption which increases CPU loading	In order to reduce CPU loading, if the input pulse frequency is over 66.6kHz, the CPU will not process. This limit does not affect the pulse input function. Because the hardware specification of multi-function input terminal is 33kHz and the software biphasic pulse input upper limit is 37.5kHz.
3	When the Y-Δ switching function of the induction motor is enabled (Pr05-24), the delay time doesn' t follow Pr5-25 setting and stops motor drive' s output immediately, it will leads to motor free-run.	Correct the programming of the Y-Δ switching function, so that the Y-Δ switching function of the induction motor can operates correctly. The same issue is corrected in VFD-C2000
4	When set to Normal Duty, Pr06-03 and Pr06-04 OC stall function, the maximum OC stall level can be set to 180% of the rated current, but the actual limit is 165% of the rated current.	When set to Normal Duty, the maximum value of Pr06-03 and Pr06-04 OC stall level is changed to 150%. (Overload Tolerance of MS300 is 150% of rated current for 3sec)
5	When setting Pr08-01 <P Gain>, the two values 0.2 and 0.3 can' t be set.	The setting range of Pr08-01 is from 0 to 500 within one decimal value, and can be switched to two decimal values by Pr08-23.
6	When source of the master frequency command is communication card, the program does not process the command, which makes users unable to set frequency command on the motor drive via the communication card (protocol address 20XX)	The frequency command via communication card be synchronized with the RS485, the user can set frequency command via the communication card (protocol address 20XX).
7.	When Pr02-18 MO direction is set to N.C and the MO is set to 29. (Higher than the setting at Pr.02-34)<Output frequency setting for Multi-function Output Terminals>, the MO doesn't work.	Pr02-18 MO direction is set to N.C and the MO is set to 29. (Higher than the setting at Pr.02-34).the MO can work correctly.

8	Error occurred at the setting of Pr06-03<Over-current stall prevention during acceleration>. During the acceleration, when the current is increased to the 95% of the OC stall level but yet to reach the OC stall level, the OC stall prevention will be enabled and start the deceleration.	Only when the current reaches the OC stall level during the acceleration, the OC stall prevention will be enabled.
9	Errors occurred when duplicating parameters: (1). When Pr00-02 is set to 1 <Parameter Write Protect>, parameters can still be copy-read and copy-write. (2). If communication is disconnected and then reconnected while duplicating parameters (copy-write), but SE1 warning code (Keypad COPY error1) didn't pop up. (3) Pr03-75 to Pr03-85 are reserved parameters, not open to the end users, and should not be duplicated (copy-read, copy-write).	Correction on parameters duplication: (1). Once Pr00-02 is set to 1, parameters cannot be duplicated (copy-read and copy-write). (2). If communication is disconnected and then disconnected while duplicating parameters (copy-write), SE1 warning code (keypad COPY error1) will pop up. (3). Reserved parameters Pr03-875 to Pr03-85 can no longer be duplicated (copy-read, copy-write).
10	If the motor drive trips due to enabled OC stall prevention, the motor drive will follow the setting at Pr06-05 <Accel. / Decel. time selection of stall prevention at constant speed> to accelerate after it resumes to run.	If the motor drive trips due to enabled OC stall prevention, the motor drive will follow the setting at Pr01-12 <Accel. Tim1> to accelerate after it resumes to run.
11	Sequences of CANopen error code addresses are wrong.	Sequences of CANopen error code addresses have been corrected.
12	The OL counting Information cannot be updated.	Information can now be updated because different programs are being used to do OL counting.

13	Master and auxiliary frequency command function issues: (1) When master frequency source is set to digital keypad (00-20 = 0), the auxiliary frequency source is set to AVI (00-35 = 3), Pr.00-36 = 1 (main frequency - auxiliary frequency), 03-00 = 12 (Analog Input Selection (AVI). The direction of forward/reverse rotation will be different from the setting logic. (2) When the PID function is executed, but the PID target value is not cleared after the motor drive has stopped. It will result in PID target value error when the motor drive restart running. (3) When the MI =70(Auxiliary frequency is forced to 0) is enabled, the master and auxiliary frequency will all be cleared. Even though the master frequency shouldn' t be cleared. (4) PID output frequency is not forced to 0 when MI =71 (PID function disabled, PID output forced to 0) is enabled. (5) When master frequency source is set to digital keypad (00-20 = 0), the auxiliary frequency source is set to RS485 (00-35 = 3), Pr.00-36 = 0(main frequency + auxiliary frequency), user cannot set frequency command via VFDsoft or KPC-CC01 .	Master and auxiliary frequency command function issues have been fixed: (1) When master frequency source is set to digital keypad (00-20 = 0), the auxiliary frequency source is set to AVI (00-35 = 3), Pr.00-36 = 1 (main frequency - auxiliary frequency), 03-00 = 12 (Analog Input Selection (AVI), the direction of forward/reverse rotation will follow the setting logic. (2) When the PID function is executed, the PID target value is cleared after the motor drive has stopped. (3) When the MI =70(Auxiliary frequency is forced to 0) is enabled, only auxiliary frequency will be cleared. (4) PID output frequency is forced to 0 when MI =71 (PID function disabled, PID output forced to 0) is enabled. (5) When master frequency source is set to digital keypad (00-20 = 0), the auxiliary frequency source is set to RS485 (00-35 = 3), Pr.00-36 = 0(main frequency + auxiliary frequency), user can set frequency command via VFDsoft or KPC-CC01
14	PID function issue: (1)When Pr08-21 is set to 1<Enable PID to change the operation direction>, the motor still doesn' t change operation direction. (2)When PID kp gain decimal place is changed to display 2 decimal places by Pr.08-23, the display value of 2 decimal places is different from 1 decimal place. (3)When the PID function is enabled, the drive output frequency sometime does not start from the minimum frequency (Pr01-07 and Pr01-09) during acceleration.	PID function issue have been fixed: (1)When Pr08-21 is set to 1(Enable PID to Change the Operation Direction), the motor changes operation direction. (2)When PID kp gain decimal place is changed to display 2 decimal places by Pr.08-23, display value of the 2 decimal places is the same as 1 decimal place. (3)When the PID function is enabled, the drive output frequency starts from the minimum frequency (Pr01-07 and Pr01-09) during acceleration.
15	When under V/F control mode and run at low frequency (0.05Hz), there might be a larger output voltage surge because the voltage compensation function follows the status of current.	It is no longer necessary to enable voltage compensation to solve the voltage surge issue. Because when under V/F control mode, the frequency-voltage rate is fixed, the voltage compensation function is not required.

Function modify

Retry function of Serial Peripheral Interface (SPI) optimization

- After the expansion pin of the communication card is triggered, the estimation rule for the Count Idle Time calculation is different from that of the MS and is changed to the same judgment rule.
- Enable the SPI error interrupt function and remove the SPI Error Status Register in this function. This function is not used in the SPI interruption.
- When the packet CRC (Cyclic Redundancy Check) error occurs, the MCU Serial Peripheral Interface (SPI) is reinitialized.
- During the initialization of the MCU SPI, the SPI's error status register will be cleared.

New function

Pr.08-01 kp gain decimal place can be changed by Pr.08-23 setting bit 1 = 1 or 0 to display 1 or 2 decimal places, the explanation is as follows:

08-23 PID Control Flag

Factory Setting: 2

Settings bit 0 = 1, PID reverse running must follow the setting of Pr. 00-23
bit 0 = 0, PID reverse running refers to PID' s calculated value
bit 1 = 1, PID Kp gain has 2 decimal places
bit 1 = 0, PID Kp gain has 1 decimal place

When the setting of bit 1 changes, Kp gain will not change. For example: Kp = 6, when Pr. 08-23 bit 1 = 0, Kp = 6.0; when Pr. 08-23 bit 1 = 1, Kp = 6.00.

Release

Version	Series number	
V1.04	WJ	W1650

Version	Series number	
V1.04	Taiwan	T1650

2.7 UPDATE – MS300 firmware 1.05

Function correction

	Version 1.04 problem	Version V1.05
1	**Problem Description:** The error code LVS (DC-BUS voltage is less than Pr. 06-00 at stop.) pops up when power off the motor drive while the fan is turned on. Then error code F60 and CP30 (Internal communication processing time exceeded the limiting value) will then be displayed on the keypad. Under normal circumstances, only LVS is displayed after power off and then LVS will disappear. If the fan is turned off while powering off, the display process is correct. **Reason:** After the motor drive is powered off, CB2 (control board 2) will display LVS. The power supply voltage for MCU of CB1 (control board 1) will drop which resets MCU, turns off the fan and clear LVS error. Turning off the fan causes the CB1 power	**Modify items:** Modify LVS procedure and initialization procedure. 1. While the motor drive is being powered off and before CB1 is being reset, CB1 will notice CB2 to continue to show LVS to avoid the display of F60. 2. While the motor drive is being powered off and CB1 is being reset. CB1 does not communicate with CB2 until the power is restored to avoid CP30 error. 3. LVS' priority is greater than CP30. 4. Add CB1 initialization process after CB1 MCU be reset and the power restored, In the meantime, CB1 will notify CB2 to start initialization and retransmission parameters to ensure CB1 and CB2 have normal operation after power restoration.
	supply voltage to rise.CB2 will display F60, instead of LVS. While CB1 is being reset and unable to receive DC-bus voltage information. In addition, Because CB1 and CB2 use different voltage source, CB1 will go into reset state in advance after motor drive is powered off. CB2 cannot continue to communicate with CB1.The CP30 (Internal communication processing time exceeded the limiting value) will be displayed and recorded in the motor drive.	**Current situation:** Drive displays LVS only while power restoration after the drive is powered off or during power dropping.

Release

Version	Series number	
V1.05	WJ	W1709

Version	Series number	
V1.05	Taiwan	T1714

3 Application

3.1 NEW – MS300 Application Notes

New MS300 application notes have been published recently on our ftp-site:

- MS300 PTC.pdf
- MS300 Pt100.pdf
- Applications of common DC-BUS for M300 & C Family.pdf
- Material Handling Industry Notification-Variable Frequency Solution for Conveyor.pdf

3.2 MS300 Focus Applications

4 FAQ

4.1 VFD-series AC Motor drives

MS300 series

Q **What class and motor cable length for the MS300 built-in filter?**

A *Class C2 20m shielded motor cable.*
Class C3 30m shielded motor cable.

Carrier frequency can be over the whole setting range.