Acknowledgment

Dear Customer,

The entire team at Toscano thanks you for purchasing this high-performance inverter and welcomes you to the Toscano family.

We have designed the operation of the TDS600PV series inverters to provide the best performance for solar pumping applications. This new version incorporates a new MPPT (Maximum Power Point Tracking) adjustment algorithm, which increases efficiency and performance in these installations. Additionally, it incorporates new protection functionalities specifically designed to adapt to most applications.

It can also be used for standard industrial applications as it includes all the necessary functions for applications such as industrial control, incorporating primary and auxiliary frequency programming, analog current and/or voltage inputs, PID regulation, simple PLC, reverse rotation, programmable inputs and outputs, pulse frequency input, Modbus communication via RS485, Can Bus, Profibus, free protocol, as well as other functions and platforms.

It is ideal for integrating into manufacturing and automation processes with functions such as phase failure on input and output, ground fault, and many other protection functions to increase system effectiveness and safety.

This manual provides the necessary information for correct installation and wiring, adjustment, fault checking, maintenance, and any other information related to the use of TDS600PV inverters. To ensure that the inverter operates as expected, read this manual carefully before installation, keep it for future reference, and provide it to the end customer.

If, after reading this manual, you still have questions about its operation or have a special application, you can contact us, and we will be at your complete disposal to help you with your application.

The content of this manual may change; we recommend consulting the most up-to-date information on our website.

Toscano

This manual may have been updated to a newer version. If you want to check the most recent version, you can do so through our website. Additionally, via the following link, you can consult the quick guide and the extended version of the manual.



toscano.es/producto/tds600/

Índice

1. Usage and Security Information 4

1.1. Safety warnings 4

1.2. Application 6

1.3. Avisos importantes de uso 6

1.4. Disposal 7

2. Models and Specifications 8

2.1. Receiving and Inspection 8

2.2. Model designation 8

2.3. Nameplate 8

2.4. Models and Characteristics 9

2.5. Identificación de las partes 9

2.6. Dimensions 10

2.7 Control panel and Machining dimensions (mm) 11

2.8. Technical Specifications 12

3. Installation and Wiring 14

3.1. Installation 14

3.1.1. Installation requirements 14

3.1.2. Installation 14

3.2. Installation of covers and control panel 15

3.2.1. Control panel, mount and unmount 15

3.2.2. Terminals cover, Mount and Unmount 15

3.2.2.1. Plastic cover 15

3.2.2.2. Metalic Cover Mount and Unmount 16

3.3. Wiring precautions 16

3.4. Power wiring 18

3.5. Connecting the AC drive to other equipment 19

3.6. Power terminals 20

3.7. General wiring schematics 22

3.8. Control board 23
3.8.1. Control board description 23
3.8.2. Description of the control terminals in the control board 25
3.8.3. Analog inputs wiring 27
3.8.4. Analog outputs wiring 28
3.8.5. Digital inputs wiring 28
3.8.6. Communication bus wiring 30

4. Electromagnetic Compatibility (EMC) 31
4.1. Reduction of Interferences 31
4.1.1. Types of Interferences 31
4.1.2. Basic measures to reduce interference 32
4.2. Wiring instructions 33
4.3. Leakage current 34
4.4. Connection of relays or contactors 34
4.5. Indications for the installation of filters 35

5. Run and Operation of the AC Drive 36
5.1. Operation modes 36
5.2. Control Panel 38
5.2.1. Control Panel Description 38
5.2.2. Buttons description 38
5.2.3. LED Indicators 40
5.2.4. Control panel operation 40
5.2.5. Functions display filter 43
5.2.6. Operating the keypad 43
5.3. First Powering Up 46

6. Functions and Parameters List 47
6.1. Description 47
6.2. Functions and Parameters List 47

7. Troubleshooting 97
7.1. Faults and possible solutions 97
7.2. Faults record 102
7.3. Fault reset 103
7.4. Alarms reset 103

8. Maintenance 104
8.1. Maintenance routine 104
8.2. Inspection and damaged parts substitution 105
8.3. Repairs 105
8.4. Storage 106

Apéndice A.
MODBUS Protocol communication 107
A.1. Introduction 107
A.2. Network three 107
A.3. Communication characteristics 107
A.4. Communication setup 108
A.5. Functions mapping 109
A.5.1. Functions list F00-F26 109
A.5.2. Control and status registers 111

1. Usage and Security Information

To guarantee the correct operation and security of people and equipment, please read carefully these security instructions before proceeding to the installation and operation of your new TDS600 AC drive.

1.1. Safety warnings

There are three symbols in this manual to indicate the importance of the warnings. The following symbols will be used for each kind of safety warnings:

Symbol	Description
	Severe damage to goods and persons, even death, can be caused if the AC drive is used incorrectly.
	Damage will be caused to the AC drive if these indications are not followed.
	Special precaution must be taken when this symbol appears.



It is totally forbidden to cut out the power of the VFD while it is running, accelerating or decelerating. The VFD power should be cutted off only when the output frequency is equal to 0Hz. Failed to respect this indication may cause an accident or damage the VFD irreversibly.

01. Do not connect any power wire to the output terminals U,V W, otherwise the VFD will be damaged irreversibly.

02. Do not allow to have any shortcircuit between the (+) and (-) bus terminals because it could lead to damages in the VFD and shorcircuit in the power supply.

03. Do not install the VFD in the proximity of flammable material or chemicals since it could lead to a fire.

04. Do not install the VFD in an environment with explosive gases. There are the possibility of spark that could cause an explosion.

05. It is recommended to use crimped ferrules or terminals to complete the power and motor wiring.

06. Do not operate your VFD with wet hands because it could give you and electric shock.

07. The grounding terminal of the VFD must be connected to a good grounding system.

08. Do not open the front lid to handle the wires or terminals while the VFD is powered. The power supply must be turned off and wait at least 10 minutes before touching the terminals.

09. All the wiring must be done by qualified personnel and should not introduce any metallic item inside the VFD or the terminals. There is a risk of malfunction, damages in the VFD and electric shock

10. If you VFD has been without operating for more than 6 month, it is recommended to power it and let sit for about one hour.

01. Do not connect and terminal of the control board to 220/380VAC, except the TA, TB and TC terminal. Not following this indication will damage irreversibly the VFD.

02. Do not install or operate if the VFD has any damaged part or if it need any reparation, otherwise it could lead to a fire or personal injuries.

03. The VFD must be installed correctly in order to not fall and get damaged nor damage the object around it.

04. Disconnect the power supply of the VFD if it has any damage.

1.2. Application

This AC drive must be used only with asynchronous motors. This AC drive can be used in multiple applications, in case you have any doubt, please contact our technical assistance department.

1.3. Avisos importantes de uso

01. The TDS600PV AC drives series emit a slight hum when they are working that varies with the frequency and is more audible with the increase in temperature. This is a normal feature of the AC drives.

02. In case of a long time working at constant torque and low speed, it is recommended to use a special motor for this kind of work and ensure that the cooling is enough to cool down the motor.

03. The mechanism that works for a long time at low speed and needs lubrication provided by the motor itself, it is mandatory to check that the lubrication system works correctly at that low speed.

04. It is very important to ensure that the machine being controlled, supports the variable speed of the motor controlled by the AC drive. Especially if it has complex and synchronized mechanisms.

05. When the AC drive is used to lift heavy loads or with big inertia, it could trigger an overcurrent or overvoltage fault. To avoid this a proper braking unit must be installed.

06. Use the correct control terminals to give a run or stop command to the AC drive.

07. The AC drive must be powered off before doing any modification in the wiring to avoid any damage to the AC drive or cause a short-circuit.

08. Vibration caused by the motor at a due frequency could cause a mechanical resonance with some parts, to avoid this, the AC drive can be programmed to skip these frequencies and so the resonance that could damage the motor or machine.

09. Make sure the supply voltage is correct before powering the AC drive.

10. When the AC drive is installed at an altitude of 1000m or above, the cooling ability of the fans are reduced, so the output capability of the AC drive should be also reduced at a rate of 10% each 1000m altitude.

11. It is recommended to check the motor wiring isolations before connecting it for the first time or if it were unused for a long time. Use a 500V leak meter and ensure that the isolation has a resistance greater than 5MΩ. W lower value could damage the AC drive. If the motor is connected to the AC drive,

disconnect the wires and join them together then measure the isolation resistance as in the Fig. 1-1

12. Do not connect any capacitor to the motor terminals, even the ones used to correct the power factor. Connecting capacitors to the motor terminals will damage the AC drive (Fig.1-2)

1.4. Disposal

Avisos en caso de manipulación con variadores y componentes desechados:

01. La unidad: desechar el variador como residuo industrial.

02. Condensador electrolítico: podría provocar una explosión.

03. Plástico: puede resultar un gas nocivo y venenoso cuando se quema. Se deben tomar precauciones antes de quemar el plástico y caucho.

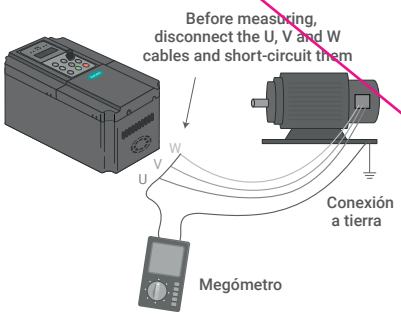


Fig.1-1 Medidas del aislamiento del motor

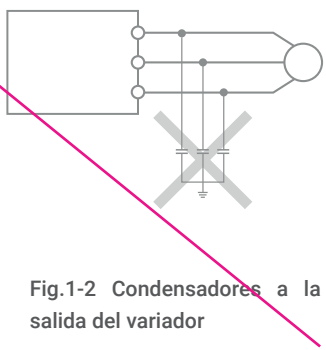


Fig.1-2 Condensadores a la salida del variador

2. Models and Specifications

2.1. Receiving and Inspection

01. Check that your inverter was not damaged during the shipping nor does it have any loose parts before installing and operating your inverter.

02. Check that you received all the parts included.

03. Check that the characteristics sticker of your inverter matches the model that is appropriate for your needs.

The TDS600 series VDFs are subjected to strict quality control during their fabrication, packaging and transportation to guarantee you receive a product of the maximum quality. However, if once you receive and check your VDF you detect any fault or problem, please contact us immediately, we will do our best to solve the problem as soon as possible.

2.2. Model designation

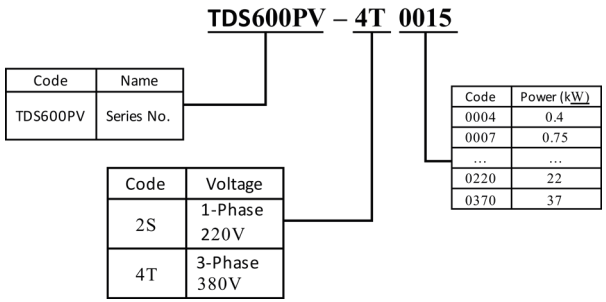


Fig.2-1 Models designations

2.3. Nameplate

Nameplate gives you all the important information about your AC drive. It contains details of the model, the input power, the output capacity and the serial number. It is stuck on the bottom of the right side of the AC drive and inside the terminals cover.

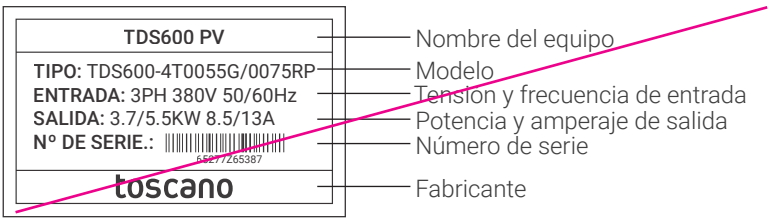


Fig.2-2 Nameplate

2.4. Models and Characteristics

Voltage	Model	Output current(A)	Output power (kW)	Recommended PV power installed (kW	Max. DC voltage(V)	Recommended PV voltage(V)
1-Phase 220V	TDS600-2S0007RPV	4	0,75	1,0	410	330 ~ 400
	TDS600-2S0015RPV	7	1,5	1,95	410	330 ~ 400
	TDS600-2S0022RPV	10	2,2	2,86	410	330 ~ 400
	TDS600-2S0037RPV	17	3,7	4,81	410	330 ~ 400
3-Phase 380V	TDS600-4T0015RPV	5 / 3,7*	2,2 / 1,5*	2,9	780	600 ~ 750
	TDS600-4T0022RPV	8,5 / 5*	3,7 / 2,2*	4,8	780	600 ~ 750
	TDS600-4T0037RPV	13 / 8,5*	5,5 / 3,7*	7,2	780	600 ~ 750
	TDS600-4T0055RPV	17 /13*	7,5 / 5,5*	10	780	600 ~ 750
	TDS600-4T0075RPV	25 / 17*	11 / 7,5*	14	780	600 ~ 750
	TDS600-4T0110RPV	33 / 25*	15 / 11*	20	780	600 ~ 750
	TDS600-4T0150RPV	39 / 33*	18,5 / 15*	24	780	600 ~ 750
	TDS600-4T0220RPV	60 / 45*	30 / 22*	39	780	600 ~ 750
	TDS600-4T0300RPV	75 / 60*	37 / 30*	48	780	600 ~ 750
	TDS600-4T0370RPV	91 / 75*	45 / 37*	59	780	600 ~ 750
	TDS600-4T0450RPV	112 /91*	55 / 45*	72	780	600 ~ 750
	TDS600-4T0550RPV	150 / 112*	75 / 55*	98	780	600 ~ 750
	TDS600-4T0750RPV	176 / 150*	90 / 75*	117	780	600 ~ 750
	TDS600-4T0900RPV	210 / 176*	110 / 90*	143	780	600 ~ 750
	TDS600-4T1100RPV	253 / 210*	132 / 110*	172	780	600 ~ 750
	TDS600-4T1320RPV	304 / 254*	160 / 132*	208	780	600 ~ 750

**Alta sobrecarga (Molinos, cintas transportadoras, trituradores, etc.)*

2.5. Identificación de las partes

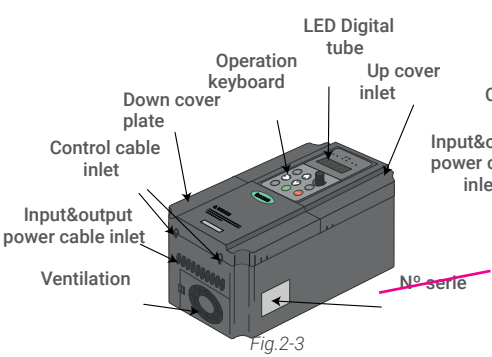


Fig.2-3

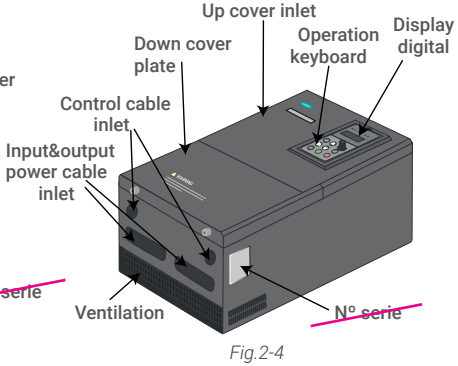


Fig.2-4

2.6. Dimensions

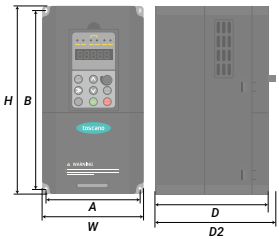


Fig.a

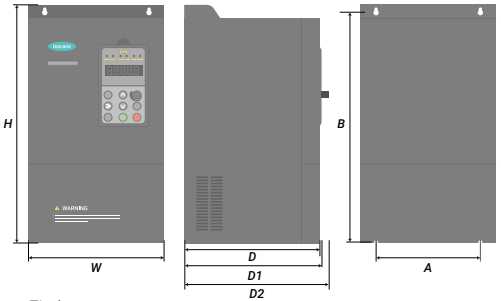


Fig.b

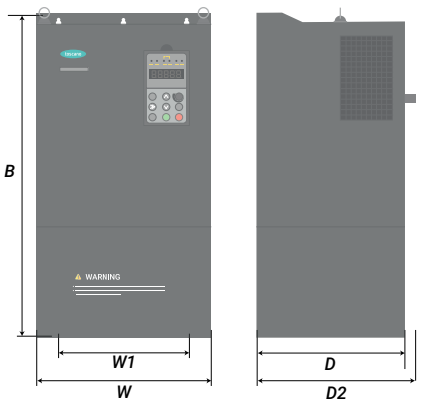


Fig.c

Fig.2-5 Dimensions

Models	A (mm)	B (mm)	W (mm)	H (mm)	D (mm)	D1 (mm)	D2 (mm)	Fijación (mm)	Fig. Nº.
TDS600-2S0007RPV	104	186	115	200	151	-	164	5	Fig.a
TDS600-2S0015RPV									
TDS600-2S0022RPV									
TDS600-2S0037RPV									
TDS600-4T0015RPV									
TDS600-4T0022RPV									
TDS600-4T0037RPV									
TDS600-4T0055RPV	129	227	140	240	175	-	188	5	Fig.a
TDS600-4T0075RPV									
TDS600-4T0110RPV									
TDS600-4T0150RPV	165	281	180	304	189	-	202	6	Fig.a
TDS600-4T0220RPV	180	382	250	398	210	214	227	9	Fig.b
TDS600-4T0300RPV									
TDS600-4T0370RPV	180	434	280	450	240	244	257	9	Fig.b
TDS600-4T0450RPV									
TDS600-4T0550RPV	190	504.5	290	530	250	254	267	9	Fig.b

Modelo Variador	H (mm)	H1 (mm)	W (mm)	W1 (mm)	W2 (mm)	D (mm)	D1 (mm)	D2 (mm)	Fig. Nº.
TDS600-4T0750RPV	570	546	340	237	-	320	-	333	Fig.c
TDS600-4T0900RPV	650	628	400	297	-	340	-	353	Fig.c
TDS600-4T1100RPV	650	628	400	297	-	340	-	353	Fig.c
TDS600-4T1320RPV	650	628	420	297	-	340	-	353	Fig.c

Tabla 2-2 TDS600 superficie de montaje

2.7 Control panel and Machining dimensions (mm)

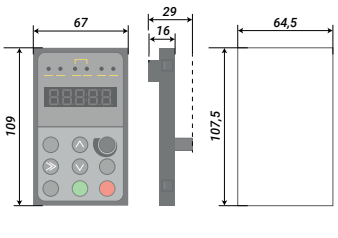


Fig.2-6 Control panel dimensions

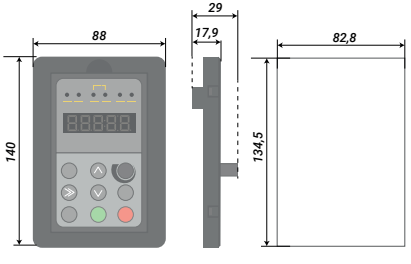


Fig.2-7 Machining dimensions

01. **Para instalar el panel de control de su variador de velocidad en la puerta, necesitará el Kit de montaje en puerta que se vende separadamente.**

2.8. Technical Specifications

Item		Description
Power Supply (AC)	Nominal voltage	Modelos 2S: Monofásica 220V, 50Hz/60Hz; Modelos 4T: Trifásica 380V, 50Hz/60Hz.
	Recommended voltage range	Modelos 2S: 200 ~ 260VAC. Modelos 4T: 320 ~ 460VAC.
Power supply (DC)	Recommended MPPT voltage	Modelos 2S: 220VAC: 330VDC. Modelos 4T: 380VAC: 550VDC.
	Recommended voltage range	Modelos 2S: 220VAC: 330 ~ 400VDC. Modelos 4T: 380VAC: 600 ~ 800VDC.
Output	Voltage	0 ~ 380V.
	Frequency	0 ~ 600Hz.
	Overload capacity	150% of the nominal current during 1 minute.
Run	Run command	Control panel, digital input or communications. The channel can be selected by parameters or by digital inputs.
	Función de enlace	Puede ejecutar la orden de marcha con el canal seleccionado y cambiar de forma síncrona a otro canal.
Inputs and Outputs	Digital inputs	8 digital inputs, maximum frequency 1kHz. One of the digital inputs can be used as high frequency input or PWM input (50kHz) Can be expanded to 14 digital inputs.
	Analog inputs	AI1 can be selected as 4 ~ 20mA o 0 ~ 10V. AI2 can be selected as 4 ~ 20mA o -10 ~ 10V. Can be expanded to 4 analog inputs.
	Frequency input	0.1 ~ 20KHz.
	Analog outputs	AO1 can be selected as 4 ~ 20mA o 0 ~ 10V. AO2 can be selected as 4 ~ 20mA o 0 ~ 10V. Can be expanded to 4 analog outputs.
Control panel	Display	Several parameters and setup functions can be displayed on the alphanumeric led display.
	Panel lock	All buttons or some of them can be locked.
Protections		Short Circuit. Input phase lost. Output phase lost. Overload. Overvoltage. Over temperature. Underload. Parameter conflict. External equipment fault.

Item		Description
Environmental	Requirements	Indoor, dust free, free of corrosive or inflammable gasses, without condensation and water splatters.
	Altitude	Below 1000m.- Output power must be derated by a 10% each 1000m altitude).
	Temperature	-10ºC ~ + 40ºC (Output power must be derated if environmental temperature is above 40ºC).
	Humidity	Less than 95% RH, without condensation.
	Vibrations	Less than 5.9 M/S²(0.6g).
	Storage temperature	-40ºC ~ +70ºC.
Housing	Water and Dust Protection	IP20.
	Cooling	Forced ventilation by fan.
Installation		Wall or panel mounted with screws.

Para conseguir un perfecto funcionamiento de su variador de velocidad, seleccione el modelo correcto de acuerdo a la tabla de modelos antes de proceder al cableado.

Es importante seleccionar el modelo correcto para su aplicación, de otro modo puede producirse funcionamiento anormal del motor y daños en el variador de velocidad.

3. Installation and Wiring

3.1. Installation

3.1.1. Installation requirements

01. Install the AC drive in a well ventilated place, with temperature range -10ºC to 40ºC, for temperatures higher than 40ºC increase the cooling of the drive.

02. Do not install the drive in a place subjected to the direct sunlight, dusty place or metallic particles in the air.

03. Do not install the drive in a place with corrosive or explosive gasses or liquids.

04. Do not install the drive in a place with high humidity. Humidity must be below 95% HR. non-condensing.

05. Fijar a una estructura con vibración inferior a 5.9m/s²(0.6g).

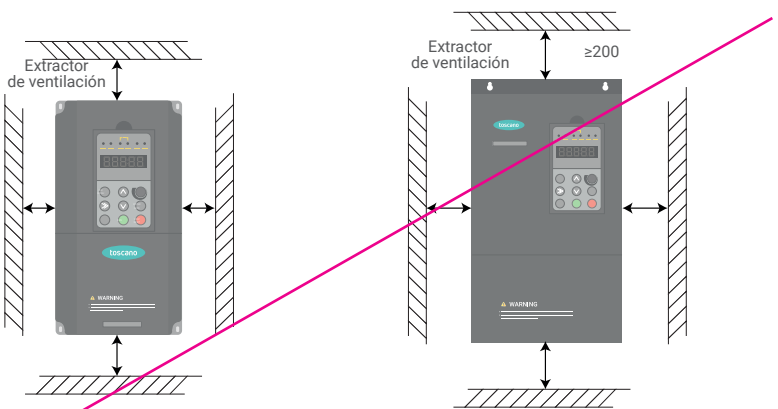
06. Keep the drive away from strong electric and magnetics fields and away from sensitive equipment.

3.1.2. Installation

01. The TDS600PV AC drives must be installed on a solid, flat and vertical surface. Do not install in a horizontal position, this will cause overheating issues.

02. The frame dimensions for each rating is detailed in Fig.3-1.

03. If more than one drive is installed one over the others, it is recommended to use an airflow divider, as detailed in Fig. 3-2.



a. Menos o igual a 15KW (Dimensiones en mm) *b. Igual o superior 18.5KW (Dimensiones en mm)*

Fig.3-1 Espacio de montaje

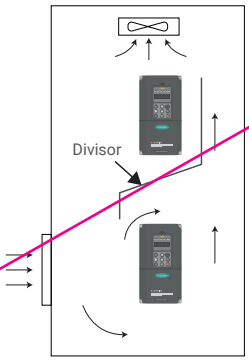


Fig.3-2 Instalación de variadores en vertical

3.2. Installation of covers and control panel

3.2.1. Control panel, mount and unmount

01. Unmount

Place your finger in the upper side of the control panel, you can fill a grooved surface, press it and pull at the same time to remove the control panel from the drive.

02. Mount

Place the bottom part of the control board in the opening of the drive, press the upper side of the control board against the drive until you hear a click as shown in Fig.3-3.

3.2.2. Terminals cover, Mount and Unmount

3.2.2.1. Plastic cover

01. Unmount

Put a finger in the opening of the bottom side of the terminal cover and pull it to remove from the drive.

02. Mount

1º Insert the two tabs in the bottom side of the terminals cover in the two holes in the upper cover.

2º Press the bottom side of the terminal cover against the drive until you hear the click and the cover is held in its place. See Fig. 3-4.

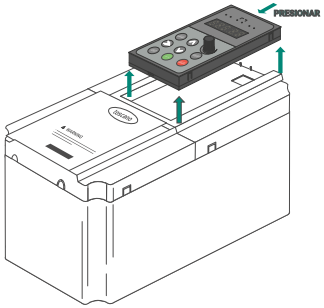


Fig.3-3 Extracción del Teclado

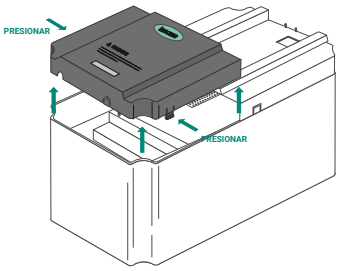


Fig.3-4 Montaje/desmontaje de la tapa de plástico

3.2.2.2. Metalic Cover Mount and Unmount

01. Unmount

Lose the two screws on the bottom side of the cover , slide it to the bottom and then pull it away from the drive and remove it completely.

02. Mount

Coloque primero la tapa en paralelo con el cuerpo de la unidad y haga que se bloquee a dos lados del variador, en segundo lugar, fuerce la tapa hacia delante y haga que la pieza de fijación en su parte superior se inserte en la ranura de fijación del cuerpo de la unidad, atornille finalmente la tapa y el conjunto de acabado para la cubierta.

3.3. Wiring precautions

01. Before performing any wiring task, disconnect the input power completely and wait for about 10 minutes and all the led indicators are off.

02. Measure the voltage on the DC bus between the DC bus terminals using a properly rated voltmeter to verify that the voltage is <42Vdc.

03. Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system.

01. CMake sure the input source has been disconnected completely during 10m before servicing or wiring the AC drive, otherwise may get an electric shock.

02. Do never connect any power source to the output terminals U, V, W of the AC drive.

03. AC drive and motor must be connected to a good ground connection. The impedance of the ground must be lower than 10Ω.

04. The AC drive was subjected to a resistance leak test at the factory. It is not needed to test again before installing it.

05. Do not connect any capacitor to the output of the AC drive. Do not install any surge arrest to the output of the AC drive. Do not install any circuit breaker to the output of the AC drive. If a contactor or any other disconnection device is installed at the output of the AC drive, make sure that the drive is stopped before opening the circuit as shown in the figura 3-6.

06. To ease the servicing tasks in the AC drive, it is recommended to install a circuit breaker at the input source.

07. It is recommended to use 0.75mm² wire for the control terminals (X1..., OC1..., FWD, REV). Shielded cable is not needed but in case of using it, ground must be connected to only one end. Avoid the control cable to be longer than 20m.

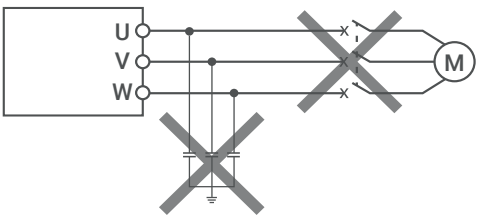


Fig.3-5 No instalar contactor ni condensadores correctores del factor de potencia entre el variador y el motor

3.4. Power wiring

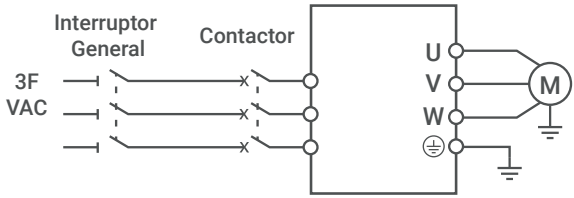


Fig.3-6 Power wiring schematics

To maintain the security of the electrical installation, a circuit breaker must be installed at the input of the AC drive as indicated in the Fig 3-7. The table 3-1 gathers the characteristics of this protection device and the minimum gauge for the input, output and control wires.
NOTE: All the wires must be made with copper core and PVC insulation

Model	Protection rating (A)	Contactor (A)	Input wire gauge (mm^2)	Output wire gauge (mm^2)	Control wire gauge (mm^2)
TDS600-2S0007RPV	10	12	0.75	0.75	0.5
TDS600-2S0015RPV	16	18	1.5	1.5	0.5
TDS600-2S0022RPV	16	18	1.5	1.5	0.5
TDS600-2S0037RPV	20	25	2.5	2.5	0.75
TDS600-4T0015RPV	6	9	0.75	0.75	0.5
TDS600-4T0022RPV	10	12	0.75	0.75	0.5
TDS600-4T0037RPV	16	18	1.5	1.5	0.5
TDS600-4T0055RPV	20	25	2.5	2.5	0.75
TDS600-4T0075RPV	25	25	4.0	4.0	0.75
TDS600-4T0110RPV	32	32	6.0	6.0	0.75
TDS600-4T0150RPV	40	40	6.0	6.0	0.75
TDS600-4T0220RPV	50	50	10	10	1.0
TDS600-4T0300RPV	63	63	16	16	1.0
TDS600-4T0370RPV	80	80	25	25	1.0
TDS600-4T0450RPV	100	115	35	35	1.0
TDS600-4T0550RPV	125	125	50	50	1.0
TDS600-4T0750RPV	170	170	70	70	1.0
TDS600-4T0900RPV	200	205	70	70	1.0
TDS600-4T1100RPV	250	250	95	95	1.0
TDS600-4T1320RPV	310	310	105	105	1.0

Tabla 3-1 Características mínimas recomendadas

3.5. Connecting the AC drive to other equipment

Protection devices:

01. A switch must be installed at the input supply of the AC drive in order to maintain the security of the installation. During the maintenance and reparation tasks it is necessary to disconnect the power supply of the AC drive.

02. It is recommended to install a circuit breaker or fuses in the input of the AD drive to avoid that a fault in the AC drive could affect the rest of the installation.

03. If the presence of harmonics in the input supply is high, it is recommended to install an EMI filter at the input of the AC drive.

04. A contactor can be used to give power to the AC drive, but it cannot control the run/stop of the AC drive.

05. The EMI filter avoids that the high frequency noise generated by the normal operation of the AC drive can be introduced to the power supply lines.

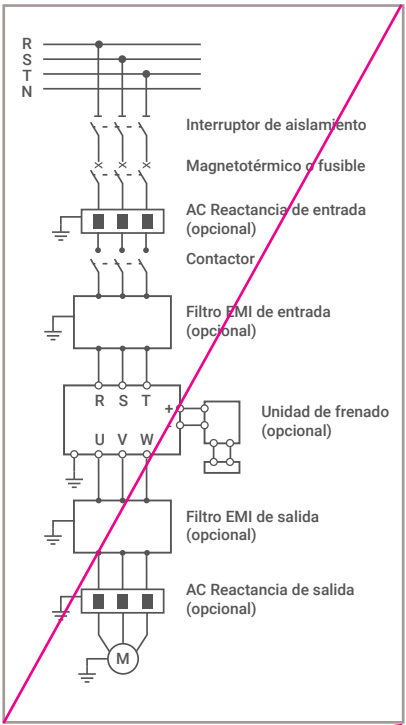


Fig.3-7 Conexionado del variador a los distintos elementos

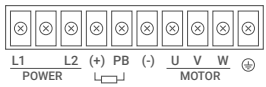
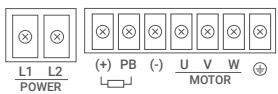
06. The EMI filter at the output of the inverter avoids the switching pulses affecting other devices.

07. If the distance between the AC drive and the motor is greater than 50m, it is recommended to install a reactor at the output of the AC drive to avoid the switching pulses to damage the winding insulation.

08. AC drive and motor must be connected to a ground connection with less than 10Ω impedance. This connection must be as short as possible.

3.6. Power terminals

Table 3-2 gathers the information of the power terminals for all the models of TDS600PV AC drives. Please, wire your AC drive accordingly to this table.

Models	Power terminals	Name	Description
TDS600-2S0004RPV ~ TDS600-2S0022RPV		L1,L2	220V Input power source terminals.
		(+)	CC bus positive terminal.
		PB	Breaking resistance terminal.
		(-)	CC bus negative terminal.
		U,V,W	3-Phase motor output terminals.
		⏚	Grounding terminal.
TDS600-2S0037RPV		L1,L2	220V Input power source terminals.
		(+)	CC bus positive terminal.
		PB	Breaking resistance terminal
		(-)	CC bus negative terminal.
		U,V,W	3-Phase motor output terminals.
		⏚	Grounding terminal.
TDS600-4T0007RPV ~ TDS600-4T0150RPV		R, S, T	Terminales de alimentación trifásica 400V.
		(+)	CC bus positive terminal.
		PB	Breaking resistance terminal.
		(-)	CC bus negative terminal.
		U,V,W	3-Phase motor output terminals.
		⏚	Grounding terminal.
TDS600-4T0185RPV TDS600-4T0220RPV		R, S, T	Terminales de alimentación trifásica 400V.
		(+)	CC bus positive terminal.
		P	Breaking resistance terminal.
		(-)	CC bus negative terminal.
		U,V,W	3-Phase motor output terminals.
		⏚	Grounding terminal.

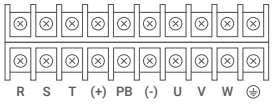
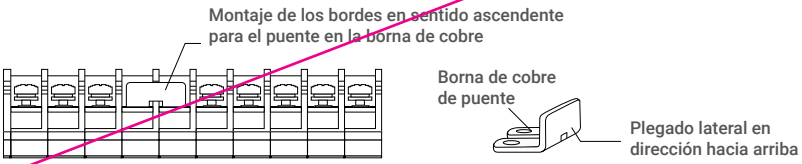
TDS600-4T0300PV ~ TDS600-4T1320PV		R, S, T	Terminales de alimentación trifásica 400V.
		P	Breaking resistance terminal.
		(+)	CC bus positive terminal.
		(-)	CC bus negative terminal.
		U,V,W	3-Phase motor output terminals.
		⏚	Grounding terminal.

Tabla 3-2 Power terminals description

TDS600-4T0220RPV~TDS600-4T0550RPV, diagrama de puente del conjunto de bornas de cobre en el terminal de potencia.



01. El cableado de potencia debe realizarse cuidadosamente y de acuerdo a la descripción de la tabla. Un cableado incorrecto puede producir daños personales y materiales.

02. El puente de cobre para el modelo TDS600-4T0185RPV, debe instalarse de forma que la placa quede hacia arriba o causará daños al dispositivo y daños personales.

3.7. General wiring schematics

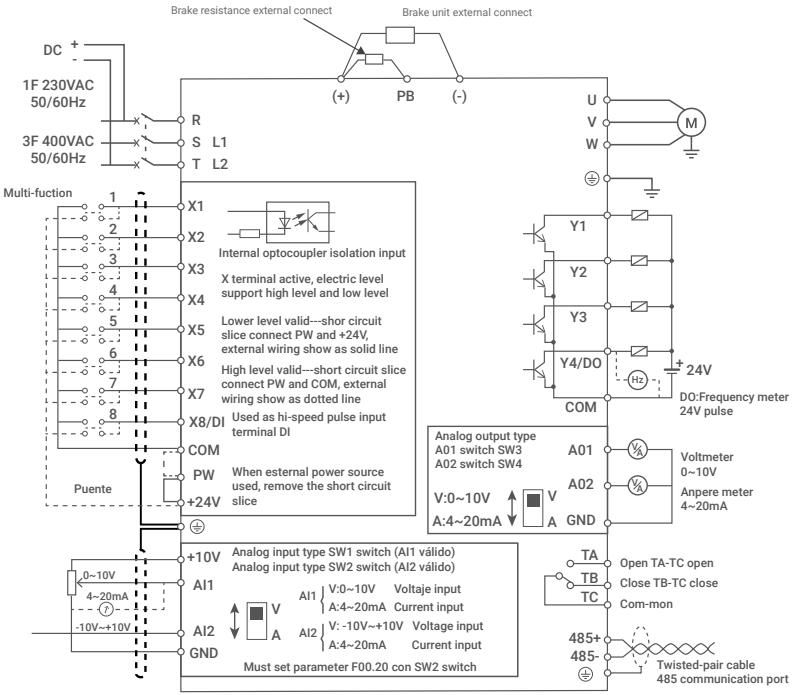


Fig.3-8 General wiring schematics

3.8. Control board

3.8.1. Control board description

Control board is in charge of saving all the setups and configuration made by the user, as well as management of the operating parameters. In the figure 3-10 it is shown a description of the connectors and microswitches of the control board. The description of each connector and microswitches can be found in the tables 3-3 and 3-4 respectively.

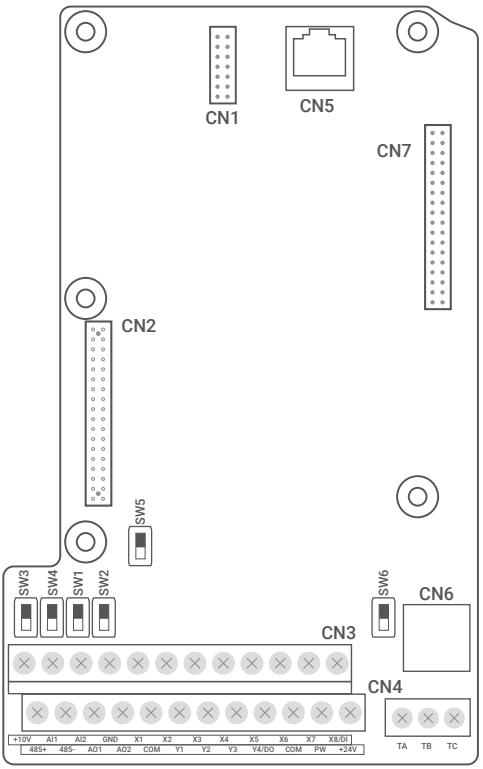


Fig 3-9 Control board diagram

Name.	Function	Description
CN1	Reserved	Reserved
CN2	Expansion port	Port reserved for the installation of expansion cards.
CN3	I/O terminals	Input and output digital control terminals and analog terminals with programmable functions (see F07, F08 and F09 functions groups)
CN4	Relay	Programmable functions relay (see F09.04) TA: Normally open contact TB: Normally closed contact TC: Common contact
CN5	Panel de control	Control panel connector
CN6	RS-485 Interface	RJ45 connector for the RS-485 port to communication with other devices by mean of Modbus protocol
CN7	Reserved	Reserved

Tabla 3-3 Description of the connector of the control board

Name.	Function	Adjust	Default
SW1	AI1 analog input mode selection	 F00.20=XXX0: 0..10V	F00.20=0000
		 F00.20=XXX1: 4..20mA	
SW2	AI2 analog input mode selection	 F00.20=XX0X: -10..10V	F00.20=0000
		 F00.20=XX1X: 4..20mA	
SW3	AO1 analog output mode selection	 F00.21=XXX0: 0..10V	F0021=0000
		 F00.21=XXX1: 4..20mA	
SW4	AO2 analog output mode selection	 F00.21=XX0X: 0..10V	F00.21=0000
		 F00.21=XX1X: 4..20mA	
SW5 SW6	EMI reduction	 Conectado a Tierra	Desactivado
		 Desactivado	

Tabla 3-4 Description of the functions of the microswitches of the control board

01. **Sólo cuando existen interferencias en la instalación, se recomienda poner el interruptor del dial EMI a tierra.**

3.8.2. Description of the control terminals in the control board

In the following figures are shown the description of the terminals blocks CN3 and CN4 in the control board.



La siguiente tabla reúne la descripción y características de los terminales de los borneros CN3 y CN4 de entrada, salida y alimentación de la tarjeta de control.

Type	Simbol	Description	Function and Specifications
Digital inputs	X1	Multifunction input 1	Input voltage range: 15 ~ 30V; Optocoupled, bipolar compatible Input impedance: 4.7KΩ Maximum frecuency: 1KHz
	X2	Multifunction input 2	
	X3	Multifunction input 3	
	X4	Multifunction input 4	
	X5	Multifunction input 5	
	X6	Multifunction input 6	
	X7	Multifunction input 7	
	X8/DI	Multifunction input 8 Frequency input or PWM input	Input impedance: 2.2KΩ Maximum frequency: 50KHz
Power	+24V	+24V output	Voltage: 24±4V Maximum current: 200mA
	PW	Entrada de alimentación externa	Input terminal for the power of the digital inputs circuit. Connected to +24V by default.
	+10V	Salida de +10V	Voltage: 10±0.5V Maximum current: 50mA
	COM	Señal de referencia	Reference signal for the +24V power supply output and the digital inputs and outputs.
	GND	Señal de referencia	Reference signal for the +10V power supply and the analog inputs and output.

Analog inputs	AI1	Analog input 1	Input range: DC 0V ~ 10V/4 ~ 20mA Input mode can be selected with SW1 microswitch in the control board Input impedance: • Voltage input mode: 20KΩ • Current input mode: 250Ω Resolution: 1/4000
	AI2	Analog input 2	Input range: DC -10V ~ 10V/4 ~ 20mA Input mode can be selected with SW2 microswitch in the control board Input impedance: • Voltage input mode: 20KΩ • Current input mode: 250Ω Resolution: 1/2000
Analog outputs	AO1	Analog output 1	The output mode can be selected with the SW3 and SW4 microswitches in the control board. Voltage input: 0 ~ 10V ICurrent input: 4 ~ 20mA
	AO2	Analog output 2	
Digital outputs	Y1	Open collector output 1	Optocoupled open collector output. Maximum voltage: 30V Maximum current: 50mA
	Y2	Open collector output 2	
	Y3	Open collector output 3	
	Y4/DO	Open collector output 4 / Frequency output	Maximum voltage: 30V Maximum current: 50mA Maximum frequency: 20kHz
Relay	TB—TC	Normally closed contact	Contact ratings: AC250V/2A (cosφ=1) AC250V/1A (cosφ=0.4) DC30V/1A
	TA—TC	Normally open contact	
Communication	485+	RS-485 interface	Positive RS-485 signal (A)
	485-		Negative RS-485 signal (B)
Aux	CN2	Expansion port	
	CN6	RJ-45 for RS-485 communication	Cable de par trenzado o cable blindado para conectar RJ45

Tabla 3-5 Description of the terminals of the CN3 and CN4 connectors

In addition to the communication terminals in the CN3 terminals block, the TDS600PV AC drives include an RJ45 socket to make use of the MODBUS communication over RS-485. This connector is called CN6 and is placed on the right side of the AC drive. It is protected by a plastic cover that must be torn out in case you want to use it. The pinout is as described in the table below:



RS485 terminal CN6 layout								
No.	1	2	3	4	5	6	7	8
Nombre	RS485+	RS485-	-	-	-	-	-	-

Tabla 3-6 CN6 RJ45 terminals description

3.8.3. Analog inputs wiring

Analog inputs AI1 and AI2 can be configured as 0-10V voltage inputs or as 4-20mA current inputs independently. The input mode selection can be done by changing the position of the corresponding microswitches in the control board. Wire the inputs as shown in the following figure:

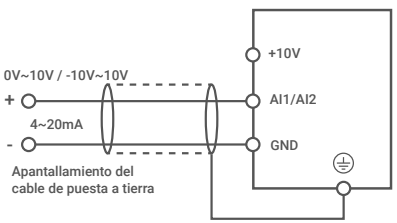


Fig 3-10 AI1 diagrama de cableado

	AI1			AI2	
0..10V	↑	SW1	-10..10V	↑	SW2
4-20mA	↓	SW1	4-20mA	↓	SW2

Tabla 3-7 Analog input mode selection

3.8.4. Analog outputs wiring

Analog output AO1 and AO2 can be configured as 0-10V voltage outputs or as 4-20mA current outputs independently. The output mode selection can be done by changing the position of the corresponding microswitches in the control board. Wire the inputs as shown in the following figure:

	AO1	AO2
0-10V	SW3	SW4
4-20mA	SW3	SW4

Tabla 3-8 Analog outputs mode selection.

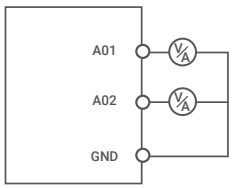


Fig.3-11 AO1, AO2 diagrama de cableado

3.8.5. Digital inputs wiring

Digital inputs of the TDS600PV AC drives can be used in several configurations to allow the AC drive to adapt to multiple situations and control devices. In the following figures are shown different examples of the possibilities for the configuration of the inputs, depending on the power used and type of outputs of the control device. Pay special attention to the jumper between +24V and PW and to the polarity of the signals.

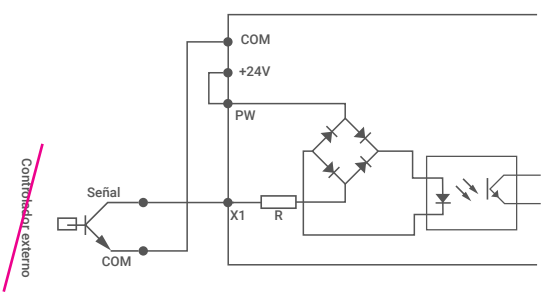


Fig 3-12 Wiring to use the internal +24V power output and an NPN type output or ground connection.

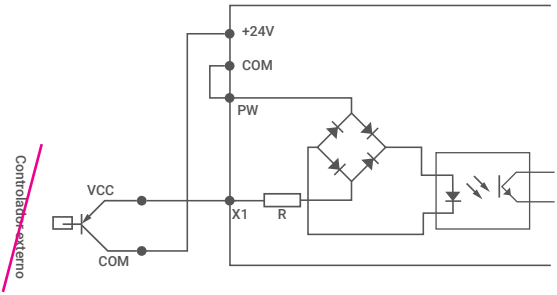


Fig 3-13 Wiring to use the internal +24V power output and a PNP type output or signal connection.

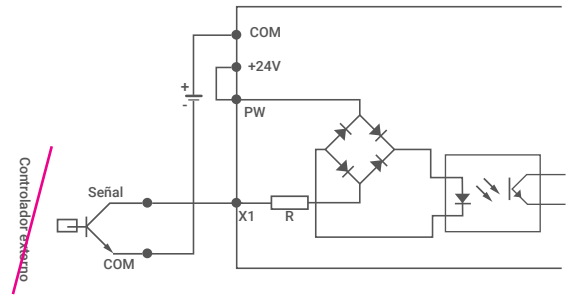


Fig 3-14 Wiring to use an external power and an NPN type output or ground connection.

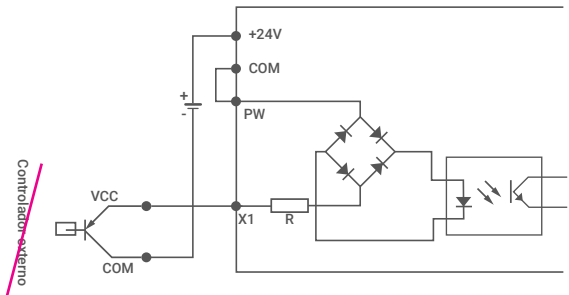


Fig 3-15 Wiring to use an external power and a PNP type output or signal connection.

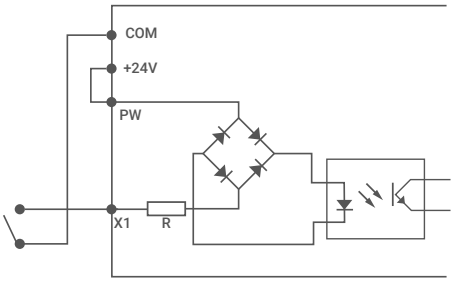


Fig 3-16 Esquema de conexión con la fuente interna y salida tipo contacto seco

3.8.6. Communication bus wiring

The TDS600PV AC drives include an RS-485 communication interface. This allows your Ac drive to be part of a control system established by several AC drives, PLCs, HMIs, PCs… and can be controlled and monitored remotely and in real time. In addition, the configuration parameters can be modified and this allows to build complex systems with a high degree of automatization. The figure 3-? shows the wiring schematics of the connection between the AC drive and other devices. It is recommended to use shielded cable.

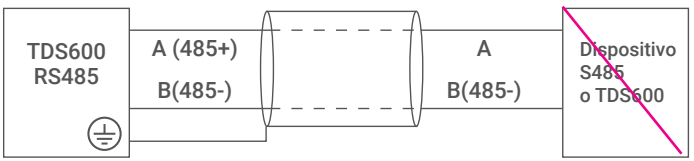


Fig 3-17 RS485 wiring

4. Electromagnetic Compatibility (EMC)

Due to the operating principle of the AC drives, electromagnetic noise is produced during its operation. This chapter provides an introduction on how this noise is generated and the measures that can be used to reduce them as much as possible. To avoid interference with other devices near the AC drive and reduce the possibility of malfunction in the installation, we recommend you to carefully read this chapter and follow its instructions.

4.1. Reduction of Interferences

The electromagnetic noise produced by the AC drives during its operation can have adverse effects on the rest of the electronic devices surrounding the AC drive, and its effects depend on the installation, the electromagnetic environment profile, and the immunity of the other devices.

4.1.1. Types of Interferences

Due to the operating principle of the AC drive, there are mainly three types of electromagnetic interference:

01. Conductive interference
02. Emission interference
03. Electromagnetic induction interference

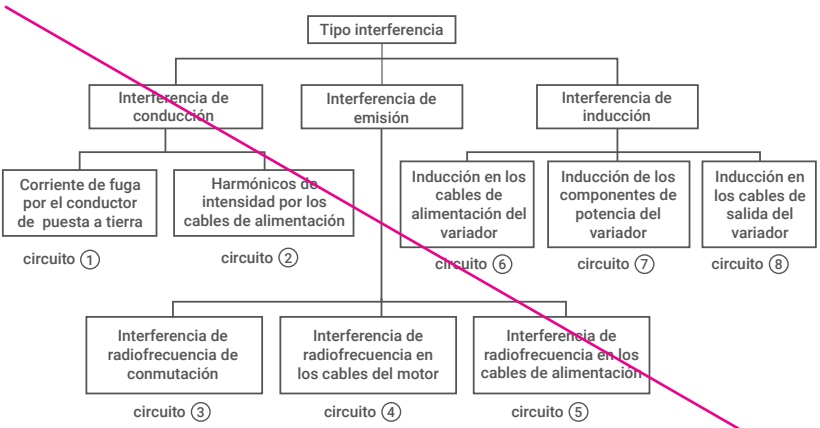


Fig.4-1 Tipo de interferencias

4.1.2. Basic measures to reduce interference

Type	Way to reduce interference
①	The grounding cables of the other devices and the AC drive can form a closed circuit and the current leak of the AC drive through the grounding cable can cause the other devices to operate incorrectly. The effect can be reduced when the other devices are not connected to the same grounding.
②	When the power supply of the nearby devices is the same as that of the AC drive, the high-frequency harmonics generated by the AC drive will be transmitted through the power cables, which can interfere with the devices connected to the same power supply. The measures that can be used to reduce this effect are: • Install an anti-harmonic filter at the AC drive's input. • Use an isolation transformer to power the other equipment. • Connect the other equipment to a power supply different from the AC drive's. • Install ferrite rings on the AC drive's power cables.
③ ④ ⑤	• Keep the other devices and control signal cables away from the AC drive. Shielded cables should be used for the control signals as well as the motor cables and only one end of the shielding should be connected to the grounding. • Keep the AC drive's input and output cables as far apart as possible and when they have to cross, do so at a perpendicular angle, so as to minimize interference. • Install high-frequency filters in the AC drive's power input and motor output cables to reduce radio frequency interference. • The motor output cables must be installed isolated from the rest of the installation cables and should be placed inside a metal tube connected to the grounding. • For the motor output, a 4-wire cable must be used with one of them connected to the grounding at one end and to the motor casing at the other end.
⑥ ⑦ ⑧	Para prevenir el efecto de las interferencias electromagnéticas, los cables de potencia y los cables de control no deben conducirse de forma conjunta. Es recomendable separar lo máximo posible ambos tipos de cables y conducir los cables de potencia también lo más separadamente posible del variador. Si los cables de potencia y de control tienen que cruzarse, deberán hacerlo en ángulo recto.

4.2. Wiring instructions

01. Keep the power and motor output cables as far apart as possible.

02. The motor cables should be installed inside a metal tube or with a shielded cable.

03. Control signals must be wired with a shielded cable and said shield must be connected only to the grounding on the AC drive side.

04. The grounding conductor must be directly connected as short as possible to the terminal (GROUND SYMBOL) of the AC drive. It should not pass through other devices.

05. Power and signal cables must not be grouped or run in parallel. You should keep the greatest possible distance, and if they have to cross, do so perpendicular to each other, as indicated in figure 4-X.

06. Two separate cables connected to the ground should be used, one for high power devices and the other for low power devices.

07. The power terminals of the inverter should only be connected to the inverter's power, not to the power of other devices.

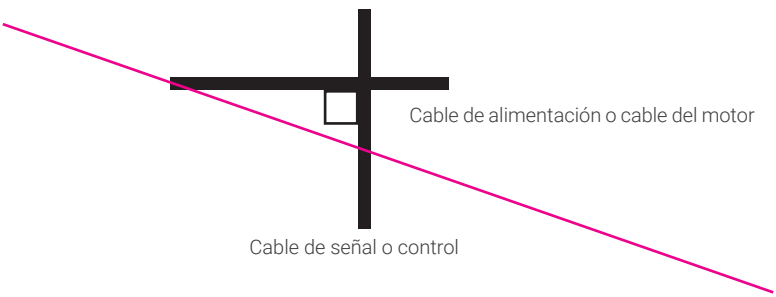


Fig.4-2 Correct way to cross high intensity cables with control signals cables

4.3. Leakage current

The leakage current through the input and output terminals of the inverter is due to the residual capacity generated between the control cables and the high-intensity cables, and the main responsible is the geometry and distribution of the cables and the frequency of the carrier signal. There are two types of leakage current, ground leakage and conductor leakage.

The possible measures to reduce its effect are:

01. The output cable from the inverter to the motor should be as short as possible.

02. Install ferrite rings, sinusoidal filters or inductors at the output of the inverter.

03. Use the lowest possible carrier frequency.

Note: if you install a sinusoidal filter or inductor at the inverter output whose nominal voltage drop exceeds 5% and the output cables to the motor are long, the voltage that will reach the motor will have been decreased, so when operating under full load conditions, performance may be lost in the motor. To counteract this, you must increase the output voltage of the inverter.

4.4. Connection of relays or contactors

Relays and contactors work by energizing a coil that generates a magnetic field that attracts a support that connects some contacts. The coil of the relays or contactors generates a high voltage peak when the voltage that energized it is removed. This peak can generate electromagnetic noise and even damage other equipment. To avoid it, it is recommended to use devices to protect against overvoltage as shown in figure 4-3.

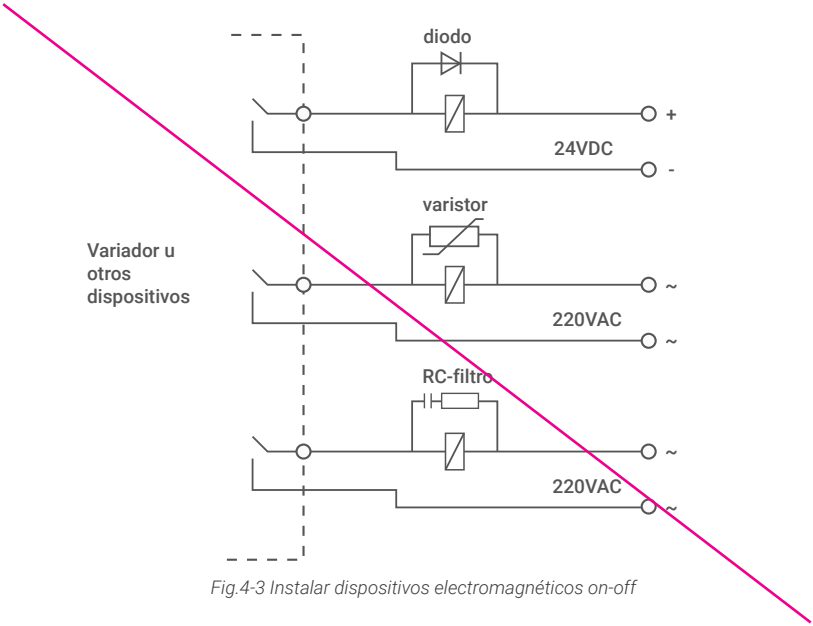


Fig.4-3 Instalar dispositivos electromagnéticos on-off

4.5. Indications for the installation of filters

01. Do not exceed the filter's operating conditions.

02. Connect the metal casing to the ground to prevent the risk of electrocution and improve electromagnetic compatibility.

03. Connect the ground of the filter and the inverter to the same ground.

04. Install the filter as close as possible to the inverter.

5. Run and Operation of the AC Drive

There are three forms of control the operation of the AC drive:

01. Control panel. By using the control panel buttons, start and stop commands, speed control and set up for every function can be achieved.

02. TInput terminals. By using the properly configured digital input terminals, run and stop commands, frequency change and other functions can be carried out.

03. Communications. By means of the MODBUS communications protocol over the RS-485 port, each detail referring to the operation of the AC drive can be controlled.

5.1. Operation modes

The TDS600PV AC drives have several operating modes. The priority of each mode is represented in the Figure 5-1.

0:Jog. The jog run can only be used while the AC drive is in idle status. By pushing the REV/JOG key, the AC drive will run at the Jog frequency set in the corresponding functions (see F01.25 a F01.29).

1: Solar operation. If solar mode is enabled (F12.15 > 0) and there is not any active digital input terminal to override it, the AC drive will run in the solar mode selected (MPPT or CVT).

2: PID. When the PID mode is selected and there is not any active digital input terminal to override it, the AC drive will run in the proportional, integral and differential mode in what you can keep a physical magnitude controlled by the AC drive at a constant value like the water level in a water tank or the water pressure in a supply network or irrigation system.

3:PLC. If the PLC mode is enabled and (least significant bit of F10.00 is set) and there is not any active digital input terminal to override it, the AC drive will operate in the PLC mode and obey the instructions given in the F10 functions group.

4: Multifrequency. By means of a combination of active digital input terminals, you can easily select a fixed output frequency operation given in the F10.31 -F10.45 functions.

5: Sweep. In the sweep mode control active (F13.00=1) the AC drive will operate making sweep in the output frequency as given in the F13 functions group.

6: Ordinary Run. In case none of the previous modes is enabled, the AC drive will operate in ordinary run mode , where you can control the output

frequency, according to the configuration parameters, by the control panel, digital input terminals, analog inputs, communication...

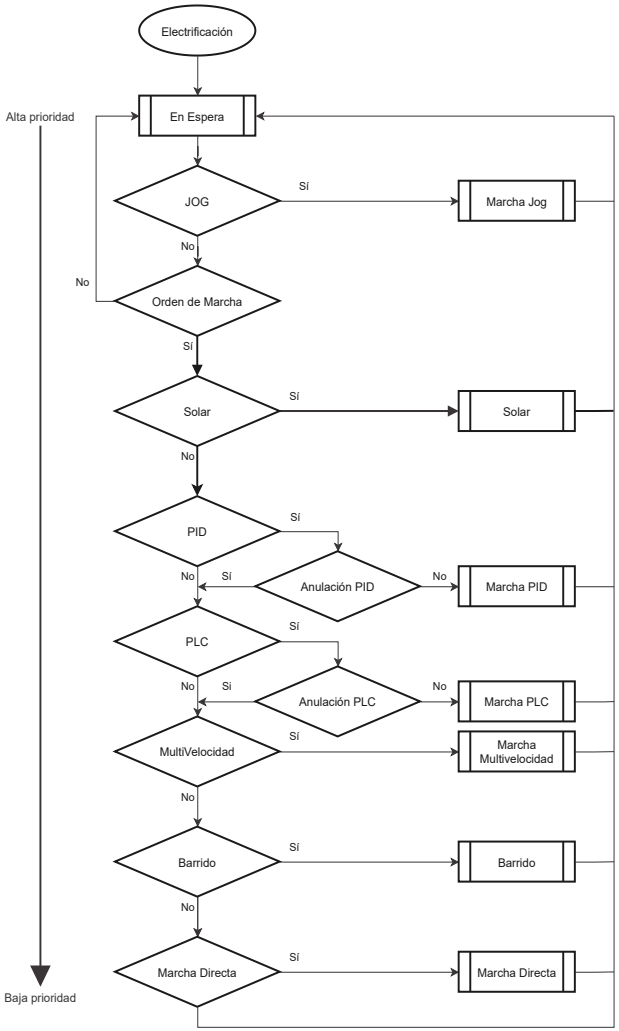


Fig.5-1 Diagrama Lógico de Funcionamiento

5.2. Control Panel

5.2.1. Control Panel Description

The control panel will allow you to start, stop, display several status details and different configuration parameters of your AC drive. The detailed description of each part of the control panel is shown in the Figure 5-2.

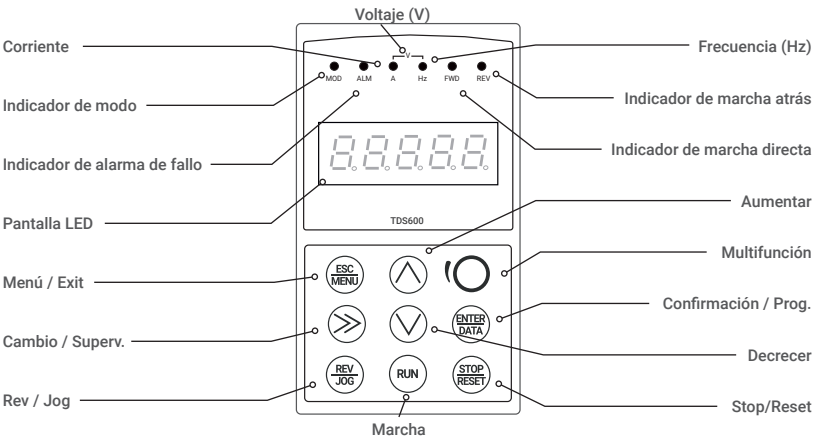


Fig.5-2 Control Panel Description

5.2.2. Buttons description

El panel de control cuenta con nueve teclas táctiles. La función que realiza cada una de ellas está explicada en la tabla siguiente.

Buttons	Name	Description
ESC MENU	Menu	Enter or exit the menu or cancel the current function value change action.
≫	Double arrow	Cyclic toggle the display of the status parameters or the digit to modify.
ENTER DATA	Function/Data	Save the modified function value.

REV JOG	Jog	if pressed while the AC drive is in idle status, a jog run command is given or reverse run mode (See the most significant bit of F00.15 function)
RUN	Run	Control panel run command
STOP RESET	Stop	Stop command, stop the AC drive according to the stop mode selected in the related functions. If the AC drive is in fault mode, pressing this button will clear the fault and the inverter will return to the idle mode.
	Encoder	Same action as the up and down buttons. Turning it to the right will increase while turning it to the left will decrease.
	Up	Increase the value of the selected digit or the function code selected. Hold it pressed for fast increase.
	Down	Decrease the value of the selected digit or the function code selected. Hold it pressed for fast decrease

Tabla 5-3 Descripción de la función de las teclas

5.2.3. LED Indicators

The control panel has six led indicators. These indicators are in the upper side of the control panel and they are labeled with the words: MOD (mode), ALM (alarm), A (current), HZ (frequency), FWD (forward) and REV (reverse). In the table 4-2 is shown the meaning of each of the indicator:

<table>
<tr><th colspan="3">Item</th><th colspan="2">Descripción</th></tr>
<tr><td rowspan="7">Display fuctions</td><td colspan="2">Display digital</td><td colspan="2">Display the current status of the AC drive and the configuration function and values.</td></tr>
<tr><td rowspan="6">LED indication</td><td>A, V, Hz</td><td colspan="2">Unit of the current displayed parameters in the digital display, Amps for current, Volts for voltage and Hertz for frequency).</td></tr>
<tr><td>MOD</td><td colspan="2">Menu indicator: it indicates that you entered the configuration menu where you can check and modify every configuration function. After 20 seconds without operating none of the buttons it will exit the menu automatically.</td></tr>
<tr><td>ALM</td><td colspan="2">Alarm indicator: it indicates that the AC drives has detected an alarm or fault situation and it is stopped or awaiting for automatic reset of fault.</td></tr>
<tr><td rowspan="2">FWD</td><td>Forward run: it indicates that the AC drive has a valid forwards running command and is running in forward direction or waiting to run in the forward direction.</td><td rowspan="2">When both indicators are lit at the same time, it indicates that a DC braking operation is taking place.</td></tr>
<tr><td rowspan="2">REV</td><td>Reverse run: it indicates that the AC drive has a valid reverse running command and is running in reverse direction or waiting to run in the reverse direction.</td></tr>
</table>

Tabla 5-4 Led indicators description and explanation

5.2.4. Control panel operation

The operation of the control panel is divided into five visualization modes: idle, run, fault, menu and alarm. All the status indicator and segments in the display will turn on after powering up de drive as indicated in the Figure 5-3a

01. Idle

The AC drive is stopped and waiting for receiving a command to carry out any operation. The display shows the status parameters of the AC drive. The default status parameter displayed after powering up the AC drive can be configured in the F00.13 function. Press ≫ to switch cyclically among the status parameters of the drive at stop (see F00.07 to F00.12).

02. Run

When the inverter receives a run command, the display switches to the status parameters at run (see F00.01 to F00.06). Press ≫ to switch cyclically among the status parameters of the drive at run. The Leds indicator on the upper side of the control panel indicates the physical unit of the status parameter currently being displayed.

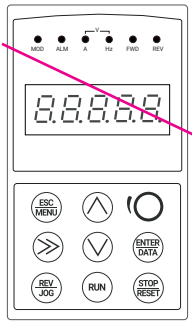


Fig.a Electrificación, muestra 8.8.8.8.8.

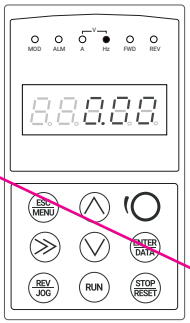


Fig.b Espera

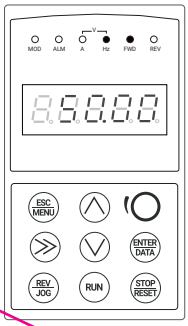


Fig.c Marcha

Fig.5-3 Control panel: Power up, Idle and Run

03. Fault

The visualization will enter the fault mode when a fault in the operation or run of the drive is detected. The display will blink with the detected fault code (Fig 4-4) Press the double arrow key to display the other status parameters related to the fault detected. After each press ≫ the value corresponding to the functions F26.04 to F26.10 will be displayed cyclically.

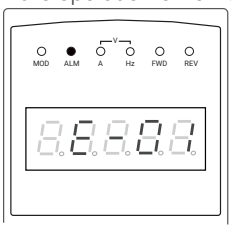


Fig.5-4

Depending on the configuration of the drive, the fault can be cleared by the control panel, by a digital input terminal or by communications.

Make sure to check the origin of the fault and solve it before clearing the fault condition in the drive.

> Para algunos de los fallos más graves, como cortocircuito a tierra, protección del módulo inversor, sobrecarga, sobretensión... No debe realizarse un reset del fallo hasta estar completamente seguro de que se ha eliminado la causa del fallo. De no hacerlo se corre el riesgo de dañar su variador irreversiblemente.

04. Menu

From all of the visualization modes you can enter in the configuration menu. To do that, press (ESC MENU). If a password has been configured (see F27.00), then you have to insert it to enter the configuration menu. Once the password has been entered, the control panel changes to the configuration menu visualization. If no password has been configured, the configuration menu visualization will be displayed automatically after pressing (ESC MENU).

The display will show the F symbol, this indicates that the control panel is in the configuration menu mode. Using the (≫), (∧) and (∨) you can move among the digits and select the function you want to check or modify. Once the display shows the right function, press (ENTER DATA) to enter to its value. In the same way you selected the right functions, you can modify the value of the function with (≫), (∧) and (∨). If you do not want to save the changes made to the value, press (ENTER DATA) key, you will be back to the configuration menu. If you want to save the modified value, press (ESC MENU) and the control panel will go back to the configuration menu visualization. To exit the configuration menu, press (ESC MENU) until the MOD led indicator turns off. If none of the keys is pressed for 20 seconds, the control panel will exit the menu automatically.

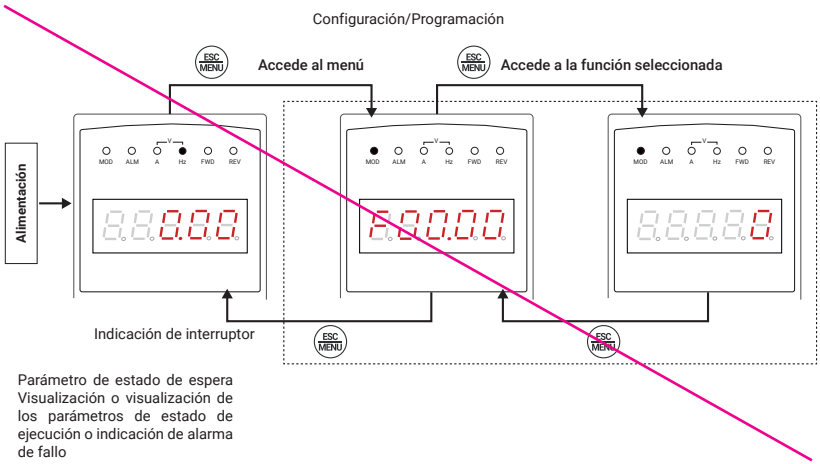


Fig.5-5 Entering and exiting the configuration menu

05. Alarm

In case of an alarm situation, the AC drive will switch to the alarm mode. The AC drive will blink the alarm code in the display. The AC drive will still be running, if it was running previously to the alarm detection, but the display will blink the alarm code while the alarm origin is still present. Alarms cannot be cleared as the fault codes, but only if its origin is solved.

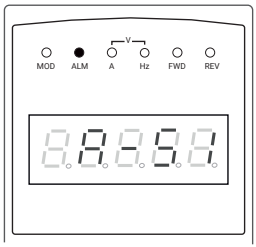


Fig.5-6

5.2.5. Functions display filter

With the aim of ease the operation and configuration of the TDS600PV AC drives, it is featured with a filter to access only to the selected function groups. The filtered function groups can be chosen with the F00.00 functions value. The valid values are 0, 1, 2 and 3, to select among the Basic, intermediate, advanced and user lists respectively.

F00.00	Menú	Grupos
0	Básico	F00, F01, F02, F03, F08, F09, F11, F12, F15, F19, F20, F26 y F27
1	Intermedio	F00, F01, F02, F03, F04, F05, F06, F07, F08, F09, F10, F11, F12, F13, F15, F18, F19 y F26
2	Avanzado	F00, F01, F02, F03, F04, F05, F06, F07, F08, F09, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26 y F27
3	Usuario	F00.00 y grupo F25

Tabla 5-5 Display functions filter selection.

5.2.6. Operating the keypad

Using the keypad of the control board you can perform several tasks on the AC drive. Here are these task detailed:

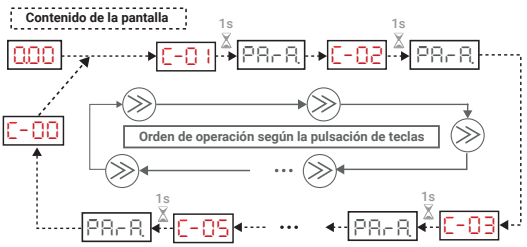


Fig.5-6 Cambio de parámetro de visualización

01. Cambio de visualización de parámetros de estado:

While the inverter is in ,press ≫ to cyclically switch among the status C-parameters. After pressing the key the display will show briefly the C value selected and after one second it will display the corresponding value. In the 5-6 is explained the operation on the keys and display to visualize all the C values:

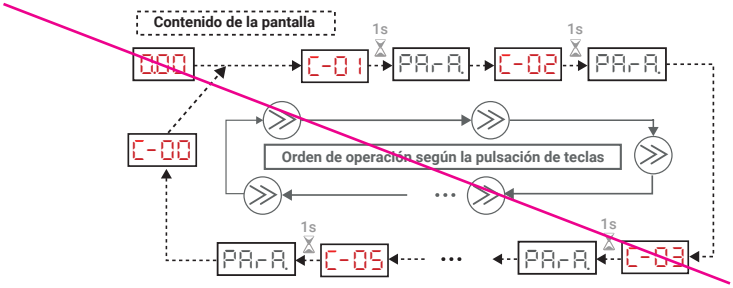


Fig.5-7 Status parameters change

02. Display and function modification:

To enter the configuration menu, press ESC MENU. If a password has been configured (see F27.00), then you have to insert it to enter the configuration menu. Once the password has been entered, the control panel changes to the configuration menu visualization. If no password has been configured, the configuration menu visualization will be displayed automatically after pressing ESC MENU.

The display will show the F symbol, this indicates that the control panel is in the configuration menu mode. Using ≫, ∧ and ∨ you can move among the digits and select the function you want to check or modify. Once the display shows the right function, press the ENTER DATA to enter to its value. In the same way you selected the right functions, you can modify the value of the function with ≫, ∧ and ∨. If you do not want to save the changes made to the value, press ESC MENU, you will be back to the configuration menu. If you want to save the modified value, press ENTER DATA and the control panel will go back to the configuration menu visualization. To exit the configuration menu, press ESC MENU until the MOD led indicator turns off. If none of the keys is pressed for 20 seconds, the control panel will exit the menu automatically.

Figure Fig5-8 shows the steps needed to change the F00.01 function from 05 to the 06 value and save the changes.

If while displaying a function value, the display does not blink, this means that the value of that function cannot be modified. This can be caused by:

1. This function value cannot be modified: It is an only read parameter for examplese...

2. This function value cannot be changed while the inverter is in running status. You will have to wait for the drive to completely stop to attempt to modify it.

3. This function value is protected. All configuration functions will be protected and cannot be modified if the F00.14 function has the 1 or 2 values. To allow to modify the configuration functions, you need to set F00.14= XX0.

03. Fault details display:

In case the AC drive detects a fault, it will enter automatically in the fault display mode. Inside this mode, press (≫) to cyclic toggle the display of the details of operation conditions when fault was detected. This mode is equivalent to visualizing the values of the functions F26.04 to F26.10. To exit this mode you must clear the fault.

04. Control panel lock:

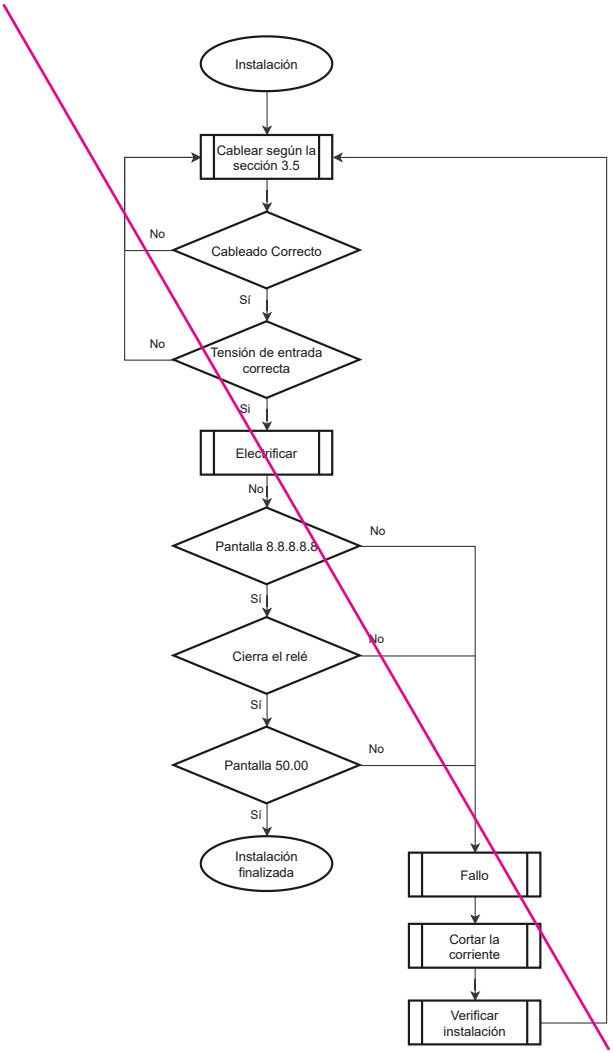
While in the monitoring status, keep pressing (ENTER DATA) for more than 5 seconds to lock the buttons in the control panel. It will appear the word “LoCh1” in the display when the beys are locked and when any of the keys is pressed. The behavior of the keys in the lock mode is controlled by the F00.14 function.

05. Control panel unlock:

Keep pressing (ESC MENU) for more than 5 seconds to unlock the buttons of the control panel.

5.3. First Powering Up

Once all the wiring is done and checked according to the instructions in this manual, follow the following flowchart to power up the installation. If there is any fault during the powering up of the AC drive, disconnect the power supply immediately and verify all the installation and wiring again.



6. Functions and Parameters List

6.1. Description

× ---- The value cannot be changed while running.

º ---- The value can be changed while running.

* ---- Read only value, cannot be changed.

6.2. Functions and Parameters List

F00-System Functions Group					
Function	**Name**	**Values**	**Unit**	**Default**	**Mod**
F00.00	Functions visualization control.	0: Basic. Display only the basic functions groups F00 to F03 and the fault records group F26. 1: Medium. Display all the functions except the expansion cards, virtual inputs and outputs and the reserved functions groups. 2: Complete. Display all the functions. 3: User: Display only the user defined functions group and the Functions visualization control F00.00.	1	2	o
F00.01	Visualization parameter C-00 while running.	0: Main frequency (0.01Hz). 1: Auxiliar frequency (0.01Hz). 2: Setting frequency (0.01Hz). 3: Output Frequency (0.01Hz). 4: Output current (0.1A)(<=11kW display 0.01A). 5: Output voltage (1V). 6: DC bus voltage (0.1V). 7: Motor speed (1 rpm). 8: Linear motor speed (1 rpm). 9: Inverter temperature (1ºC). 10: Current process running time(0.1min). 11: Accumulated power on time (1h). 12: Power on time(1h). 13: Inverter status. 14: Input terminals status. 15: Output terminals status. 16: Expansion input terminals status. 17: Expansion output terminals status. 18: Virtual communications input terminals status. 19: Virtual input terminals status. 20: Analog input AI1 (after process) (0.01V/0.01mA). 21: Analog input AI2 (after process) (0.01V/0.01mA). 22: Expansion analog input EAI1(after process) (0.01V/0.01mA).	1	51	o

		23: Expansion analog input EAI2(after process) (0.01V/0.01mA). 24: Analog output AO1(after process) (0.01V/0.01mA). 25: Analog output AO2(after process) (0.01V/0.01mA). 26: Expansion analog output EAO1 (0.01V/0.01mA). 27: Expansion analog output EAO2 (0.01V/0.01mA). 28: Input frequency, frequency input (before process) (1Hz). 29: Reserved. 30: PID set value(0.01V). 31: PID feedback signal (0.01V). 32: PID error signal (0.01V). 33: PID output frequency (0.01Hz). 34: PLC: current step. 35: Selected multispeed. 36-38: Reserved. 39: Current length (m/cm/mm). 40: Accumulated length(m/cm/mm). 41: Internal counter: current value. 42: Internal timer: current value(0.1s). 43: Run command channel. (0: Keypad 1: terminal 2: Communication). 44: Main frequency setting channel. 45: Auxiliar frequency settings channel. 46: Rated current (0.1A). 47: Rated voltage (1V). 48: Rated power (0.1KW). 49: Electric torque limit (0.1% of rated torque). 50: Braking torque limit (0.1% of rated torque). 51: Setup frequency(0.01Hz). 52: Rotor speed (0.01Hz). 53: Setting torque (% of rated torque with direction). 54: Output torque (% of rated torque with direction). 55: DC bus current (0.1A). 56: Instantaneous flow (0.3 m3/h). 57: Open circuit voltage (0.1V). 58: Output power (potencia activa)(0.1KW). 59: Total used energy (low)(1 kwh). 60: Total energy used (high) (10000 kwh). 61: Reserved. 62: Bus current (0.1A). 63: Output flow (0.1m3 / h). 64: Open circuit voltage (0.1V). 65: Daily generated energy (0.1kwh). 66: Daily total transferred water volume (0.1 m3). 67: Total transferred water volume (low) (1m3). 68: Total transferred water volume(high) (10000m3).			

F00.02	Visualization parameter C-01 while running.	Same as F00.01	1	2	o
F00.03	Visualization parameter C-02 while running.	Same as F00.01	1	4	o
F00.04	Visualization parameter C-03 while running.	Same as F00.01	1	5	o
F00.05	Visualization parameter C-04 while running.	Same as F00.01	1	6	o
F00.06	Visualization parameter C-05 while running.	Same as F00.01	1	9	o
F00.07	Visualization parameter C-00 while stop.	Same as F00.01	1	2	o
F00.08	Visualization parameter C-01 while stop.	Same as F00.01	1	6	o
F00.09	Visualization parameter C-02 while stop.	Same as F00.01	1	48	o
F00.10	Visualization parameter C-03 while stop.	Same as F00.01	1	14	o
F00.11	Visualization parameter C-04 while stop.	Same as F00.01	1	20	o
F00.12	Visualization parameter C-05 while stop.	Same as F00.01	1	9	o
F00.13	Default C-XX parameter displayed.	0~5	1	0	o

F00.14	General parameters and keypad control.	Unit: Functions lock 0: All the functions group are allowed to be modified. 1: Only F00.14 are allowed to be modified. 2: Only F00.14, F01.01 y F01.04 are allowed to be modified. Tens: Factory default restore function 0: Disabled. 1: All parameter get to the factory default values, except for the Fault Record Functions Group F26. 2: All parameter get to the factory default values, except for the Fault Record Functions Group F26 and the Motor Values Functions Group F15. 3: Only the Expansion Card Functions Group are restored to the factory default values F21 ~ F24. 4: Only the Virtual Inputs and Outputs Functions Group F20 are restored to the factory default values. 5: Only the Fault Record Functions Group F26 are restored the factory default values. Hundred: Keypad keys locking function. 0: All keys locked 1: All keys locked, except  2: All keys locked, except  3: All keys locked, except  4: All keys locked, except  	1	000	×
F00.15	Buttons functions selection.	Unit: User defined button function selection  0: Inverse run command. 1: Jog run command. Tens: Multifunction button function selection. 0: Disabled. 1: Jog run command. 2: Direct/reverse run command toggle. 3: Free stop. 4: Run command channel change according to F00.16. 5: Direct/reverse torque direction toggle 6~9: Reserved Hundred: Terminals run command 0:  button disabled. 1:  button enabled. Thousands: Communication run command. 0:  button disabled. 1:  button enabled.	1	0001	o
F00.16	Multifunction button run command channel change selection	0: Keypad → Terminals → Communications. 1: Reserved ←→ Terminals . 2: Reserved ←→ Communications. 3: Terminals ←→ Communications.	1	0	o

F00.17	Motor speed display correction factor.	0.1~999.9%	0.1%	100.0%	o
F00.18	Linear speed display correction factor.	0.1~999.9%	0.1%	1.0%	o
F00.19	Expansion card selection.	0: No expansion card installed. 1~3: Reserved. 4: Analog inputs expansion card. 5: Isolated RS485 expansion card. 6~10: Reserved.	1	0	×
F00.20	Analog inputs configuration.	Unit: AI1 analog input type selection. 0: 0~10V. 1: 4~20mA. Tens: AI2 analog input type selection. 0: -10~10V. 1: 4~20mA. Hundred: EAI1 analog input type selection. 0: 0~10V. 1: -10~10V. 2: 4~20mA. Thousands: EAI2 analog input type selection. 0: 0~10V. 1: -10~10V. 2: 4~20mA.	1	1100	×
F00.21	Analog outputs configuration.	Unit: AO1 analog output type selection. 0: 0~10V. 1: 4~20mA. Tens: AO2 analog output type selection. 0: 0~10V. 1: 4~20mA. Hundred: EAO1 analog output type selection 0: 0~10V 1: 4~20mA Thousands: EAO2 analog output type selection 0: 0~10V 1: 4~20mA 2: 0~20mA	1	0000	×
F00.22	Y Digital output configuration.	Unidad ~ Hundred: Reserved Thousands: Y4 configuration 0: Open collector output 1: High speed pulse output type DO	1	0000	×
F00.23	Reserved.	Reserved.			
F00.24	Modo de control del motor	0: Control V/F (Control de par) 1: Control vectorial sin sensor de velocidad 2, 3: Reservado	1	0	×
F00.25	Segundo parámetro de visualización	Ver F00.01	1	4	o
F00.26	DC bus voltage display correction factor	0.900~1.100	1	1.000	o

F00.27	Functions copy.	Unit: Reserved Tens: Functions copy 0: Disabled 1: Functions copy: VFD → Keypad 2: Functions copy:Keypad → VFD, excluded F15.XX 3: Functions copy:Keypad → VFD, included F15.XX	1	00	×

F01-Basic Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F01.00	Main frequency function channel selection.	0: Keypad. 1: AI1 analog input. 2: AI2 analog input. 3: Input terminal UP/DOWN. 4: Communication (Address: 1E01). 5: EAI1 analog input (Expansion Card). 6: EAI2 analog input (Expansion Card). 7: High speed pulse input X8 (Select adequate F08.25 function). 8: Pulse Width Modulation (PWM) input PWM X8 (Select adequate F08.25 function value). 9: Speed encoder (Terminals X1:X2). 10~14: Reserved.	1	0	o
F01.01	Main frequency digital setpoint.	0.00Hz ~ maximum frequency.	0.01Hz	50.00Hz	o
F01.02	Main frequency control.	Only valid for F01.00=0, 3 or 4 Unit: Keep main frequency after turn off 0: Enabled 1: Disabled Tens: Keep main frequency after stop 0: Keep main frequency after stop 1: Main frequency backs to F01.01 value after stop Hundred: Communication setup frequency mode selection 0: Absolute (5000 means 50.00Hz) 1: Relative (10000 means 100.00% of the maximum frequency, F01.11).	1	000	o

F01.03	Auxiliar frequency control channel selection.	0: Keypad. 1: AI1 analog input. 2: AI2 analog input. 3: Terminals UP/DOWN. 4: Communications (Address: 1E01). 5: EAI1 analog input (Expansion Card). 6: EAI2 analog input (Expansion Card). 7: High speed pulse input X8 (Select adequate F08.25 function). 8: Pulse Width Modulation (PWM) input PWM X8 (Select adequate F08.25 function value). 9: Speed encoder (Terminals X1:X2). 10: Reserved. 11: PID Setup. 12~20: Reserved.	1	20	o
F01.04	Auxiliar frequency setup value.	0.00Hz~maximum frequency.	0.01Hz	0.00Hz	o
F01.05	Auxiliary frequency control.	Unit: Keep auxiliar frequency after turn off. 0:Enabled. 1:Disabled. Tens: Keep auxiliar frequency after stop. 0: Keep auxiliar frequency after stop. 1: Auxiliar frequency backs to F01.04 value after stop.	1	11	o
F01.06	Output frequency according to the operation between main and auxiliary frequencies.	0: Main frequency. 1: Auxiliary frequency. 2: Addition (If result is negative, output frequency is zero). 3: Subtraction (If result is negative, output frequency is zero). 4: Multiplication (If result is negative, output frequency is zero). 5: Maximum value between main and auxiliary frequencies. 6: Minimum value between main and auxiliary frequencies. 7: Different from zero (If auxiliary frequency is different from zero, output frequency is main frequency. If auxiliary frequency is below zero, output frequency is zero). 8: main frequency × Auxiliary frequency / F01.11. (If result is negative, output frequency is zero).	1	0	o
F01.07	Auxiliary frequency gain factor.	0.00~10.00	0.01	1.00	o
F01.08	Main & auxiliary frequency operation gain.	0.00~10.00	0.01	1.00	o
F01.09	Auxiliary frequency range selection.	0: Relative to maximum frequency. 1: Relative to main frequency.	1	0	o
F01.10	Maximum auxiliary frequency coefficient.	0.00~1.00	0.01	1.00	o

F01.11	Maximum frequency.	Minimum frequency~600.00Hz	0.01Hz	50.00Hz	×
F01.12	Minimum frequency.	0.00Hz~maximum frequency.	0.01Hz	0.40Hz	×
F01.13	Minimum frequency mode.	0: : Minimum frequency (F01.12). 1: Setup frequency. 2: Zero frequency. 3: Deceleration to minimum frequency.	1	2	×
F01.14	Wake up frequency hysteresis.	0.01Hz~maximum frequency (This function can be used to avoid repeated starts when frequency is not stable enough).	0.01Hz	0.01Hz	o
F01.15	Run command channel selection.	0: By keypad. 1: By input terminals X1 ~ X8. 2: By communications.	1	0	o
F01.16	Motor direction of rotation selection.	Unit: Default keypad run direction. 0: Forward. 1: Reverse. Tens: Forward and reverse direction prohibition selection (except Jog run). 0: Forward and reverse direction availables 1: Reverse direction not available. 2: Forward direction not available. Hundred: Rotation direction inversion (only for keypad and communication run). 0: Disabled. 1: Enabled. Thousands: Acceleration and deceleration selection when multispeed is selected. 0: Matching acceleration and deceleration 1 - 15 according to selected 1- 15 multispeed. 1: According to F01.17 y F01.18.	1	1000	o
F01.17	Acceleration time 1.	1~60000 (Time interval from zero frequency to maximum frequency)	1	Depending on motor type	o
F01.18	Deceleration time 1.	1~60000 (Time interval from maximum frequency to zero frequency)	1	Depending on motor type	o
F01.19	Acceleration and deceleration time units.	0: 0.01s 1: 0.1s 2: 1s	1	1	×
F01.20	Acceleration and deceleration mode.	0: Lineal 1: Smooth S curve	1	0	×
F01.21	Smooth S curve: initial acceleration time.	10.0% ~ 50.0% (Note: F01.21 + F01.22 ≤ 90%)	0.1%	20.0%	o
F01.22	Smooth S curve: linear acceleration time.	10.0% ~ 70.0% (Note: F01.21 + F01.22 ≤ 90%)	0.1%	60.0%	o
F01.23	Smooth S curve: initial deceleration time.	10.0% ~ 50.0% (Note: F01.23 + F01.24 ≤ 90%)	0.1%	20.0%	o
F01.24	Smooth S curve: linear deceleration time.	10.0% ~ 70.0% (Note: F01.23 + F01.24 ≤ 90%)	0.1%	60.0%	o
F01.25	Keypad jog frequency.	0.00Hz ~ maximum frequency	0.01Hz	5.00Hz	o
F01.26	Input Terminals jog frequency.	0.00Hz ~ maximum frequency	0.01Hz	5.00Hz	o

F01.27	Jog run command rejection time.	0.0~100.0s	0.1s	0.0s	o
F01.28	Jog acceleration time	0.1~6000.0s	0.1s	20.0s	o
F01.29	Jog deceleration time.	0.1~6000.0s	0.1s	20.0s	o

F02 - Start, Stop, Direction and Braking Functions Group					
Function code	Name	Set range	Min. unit	Factory default	Modification
F02.00	Start mode.	0: From start-up frequency 1: PBrake, then start from start-up frequency	1	0	×
F02.01	Start delay.	0.0~60.0s	0.1s	0.0s	×
F02.02	Pause frequency during start.	0.0~10.00Hz	0.01Hz	0.00Hz	×
F02.03	Pause frequency during start duration.	0.0~60.0s	0.1s	0.0s	×
F02.04	DC braking current factor before start-up.	0.0~100.0% (G type variador rated corriente)	0.1%	30.0%	×
F02.05	DC braking time before start-up.	0.0~30.0s	0.1s	0.0s	×
F02.06	Reserved.	Reserved			
F02.07	Reserved.	Reserved			
F02.08	Reserved.	Reserved			
F02.09	Reserved.	Reserved			
F02.10	Reserved.	Reserved			
F02.11	Stop mode.	0: Ramp 1: Coast 2: Ramp + DC brake	1	0	o
F02.12	Pause frequency during stop.	0.00~maximum frequency (Only valid if stop mode is deceleration, see F02.11)	0.01Hz	0.00Hz	×
F02.13	Pause frequency during stop duration.	0.00 ~ 10.00s	0.01s	0.00s	×
F02.14	Frequency to start DC Braking.	0.00 ~ 15.00Hz	0.01Hz	0.50Hz	×
F02.15	Main DC braking delay.	0.00~30.00s	0.01s	0.00s	×
F02.16	Main DC braking current factor.	0.0 ~ 100.0%	0.1%	0.0%	×
F02.17	Main DC braking time at stop.	0.0~30.0s	0.1s	0.0s	×
F02.18	Auxiliary DC braking current factor.	0.0~100.0%	0.1%	0.0%	×
F02.19	Auxiliary DC braking time at stop.	0.0~100.0s	0.1s	0.0s	×
F02.20	Delay at change of direction.	0.0~3600.0s	0.1s	0.0s	×

F02.21	Change of direction mode selection.	0: at zero frequency 1: from current frequency	1	0	×
F02.22	Braking mode selection.	0: Disabled braking 1: Braking mode 1 (Without brake during free stop) 2: Braking mode 2 (Braking during free stop)	1	0	o
F02.23	Voltage threshold for braking.	100.0~145.0%(related to VFD nominal voltage)	0.1%	125.0%	o
F02.24	Braking duty cycle.	0.0 ~ 100.0%	0.1%	50.0%	o
F02.25	Obligatory maintenance time.	0 ~ 65535h	1	0	o
F02.26	Compensation factor.	95%~115% (Only valid if F00.24=1)	1%	100%	o

F03-V/F Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F03.00	V/F curve.	0: Constant torque curve 1: Torque curve 1 (exponent 2.0) 2: Torque curve 2 (exponent 1.7) 3: Torque curve 3 (exponent 1.2) 4: Defined by user (see F03.04~F03.11) 5: Independent V/F curve (Output voltage channel determined by F18.22)	1	0	×
F03.01	Torque increase mode.	0: Manual 1: Automatic	1	0	o
F03.02	Torque increase.	0.0 ~ 12.0%	0.1%	According to motor type	o
F03.03	Torque increase limit frequency.	0.0 ~ 100.0% (Nominal motor voltage)	0.1%	100.0%	o
F03.04	V/F curve: frequency 0.	0.00 ~ V/F curve: frequency 1	0.01Hz	10.00Hz	×
F03.05	V/F curve: voltage 0.	0.00~V/F curve: voltage 1	0.01%	20.00%	×
F03.06	V/F curve: frequency 1.	V/F curve: frequency 0~V/F curve: frequency 2	0.01Hz	20.00Hz	×
F03.07	V/F curve: voltage 1.	V/F curve: voltage 0~V/F curve: voltage 2	0.01%	40.00%	×
F03.08	V/F curve: frequency 2.	V/F curve: frequency 1~V/F curve: frequency 3	0.01Hz	25.00Hz	×
F03.09	V/F curve: voltage 2.	V/F curve: voltage 1~V/F curve: voltage 3	0.01%	50.00%	×
F03.10	V/F curve: frequency 3.	V/F curve: frequency 2~maximum frequency	0.01Hz	40.00Hz	×
F03.11	V/F curve: voltage 3.	V/F curve: voltage 2~100.00% (Nominal motor voltage)	0.01%	80.00%	×
F03.12	V/F oscillation suppression factor.	0~255	1	10	o

F04-Grupo de Funciones de Marcha Auxiliares					
Function code	Name	Set range	Min. unit	Factory default	Modification
F04.00	Jump frequency 1.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.01	Jump frequency 1 range.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.02	Jump frequency 2.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.03	Jump frequency 2 range..	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.04	Jump frequency 3.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.05	Jump frequency 3 range.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.06	Slip frequency gain.	0.0~300.0%	0.1%	0.0%	×
F04.07	Slip compensation limit.	0.0~250.0%	0.1%	100.0%	×
F04.08	Slip compensation limit sampling time.	0.1~25.0s	0.1s	2.0s	×
F04.09	Carrier frequency.	0.5~16.0kHz	0.1K	Según tipo de motor	o
F04.10	Selección de ajuste PWM optimizado.	Unit: Carries frequency automatic adjustment 0:Disabled 1:Enabled Tens: Carrier frequency limit at low frequency output 0:Disabled 1:Enabled Hundred: Carrier modulation mode 0: Modulación de la fase 3 1: Modulación de las fases 2 y 3 Thousands: Asynchronous modulation: synchronous mode (Only valid for V/F mode) 0: Asynchronous modulation 1: Synchronous modulation(below 85Hz: asynchronous modulation)	1	0110	×
F04.11	Automatic voltage regulation (AVR).	0:Disabled 1:Enabled 2:Disabled during deceleration	1	2	×
F04.12	Reserved.				
F04.13	Automatic energy saving.	0:Disabled 1:Enabled	1	0	×
F04.14	Acceleration time 2 to acceleration time 1 switching frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.15	Deceleration time 2 to deceleration time 1 switching frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	×
F04.16	Acceleration time 2.	1 ~ 60000	1	200	o
F04.17	Deceleration time 2.	1 ~ 60000	1	200	o
F04.18	Acceleration time 3.	1 ~ 60000	1	200	o
F04.19	Deceleration time 3.	1 ~ 60000	1	200	o
F04.20	Acceleration time 4.	1 ~ 60000	1	200	o

F04.21	Deceleration time 4.	1 ~ 60000	1	200	o
F04.22	Acceleration time 5.	1 ~ 60000	1	200	o
F04.23	Deceleration time 5	1 ~ 60000	1	200	o
F04.24	Tiempo de aceleración 6.	1 ~ 60000	1	200	o
F04.25	Deceleration time 6.	1 ~ 60000	1	200	o
F04.26	Acceleration time 7.	1 ~ 60000	1	200	o
F04.27	Deceleration time 7.	1 ~ 60000	1	200	o
F04.28	Acceleration time 8.	1 ~ 60000	1	200	o
F04.29	Deceleration time 8.	1 ~ 60000	1	200	o
F04.30	Acceleration time 9.	1 ~ 60000	1	200	o
F04.31	Deceleration time 9.	1 ~ 60000	1	200	o
F04.32	Acceleration time 10.	1 ~ 60000	1	200	o
F04.33	Deceleration time 10.	1 ~ 60000	1	200	o
F04.34	Acceleration time 11.	1 ~ 60000	1	200	o
F04.35	Deceleration time 11.	1 ~ 60000	1	200	o
F04.36	Acceleration time 12.	1 ~ 60000	1	200	o
F04.37	Deceleration time 12.	1 ~ 60000	1	200	o
F04.38	Acceleration time 13.	1 ~ 60000	1	200	o
F04.39	Deceleration time 13.	1 ~ 60000	1	200	o
F04.40	Acceleration time 14.	1 ~ 60000	1	200	o
F04.41	Deceleration time 14.	1 ~ 60000	1	200	o
F04.42	Acceleration time 15.	1 ~ 60000	1	200	o
F04.43	Deceleration time 15.	1 ~ 60000	1	200	o

F05-Communication Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F05.00	Protocol selection.	0: Modbus 1: Reserved 2: Profibus (Expansion card) 3: CANlink (Expansion card) 4: CANopen (Expansion card) 5: Reserved 6: Reserved	1	0	×
F05.01	Baudrate.	Unit: Modbus a proprietary protocol baudrate 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9:115200BPS Tens: Profibus_DP baudrate 0: 115200BPS 1: 208300BPS 2: 256000BPS 3: 512000BPS Hundred: CANLink & CANopen baudrate 0: 20K 1: 50K 2: 100K 3: 125K 4: 250K 5: 500K 6: 1M	1	005	×

F05.02	Format.	Unit: Modbus format 0: 1-8-1 RTU No parity 1: 1-8-1 RTU paridad impar 2: 1-8-1 RTU paridad par 3: 1-7-1 ASCII No parity 4: 1-7-1 ASCII paridad impar 5: 1-7-1 ASCII paridad par Tens: Profibus_DP format 0: PPO1 1: PPO2 2: PPO3 3: PPO5 Hundred: Send confirmation message to write command: 0: Enabled 1: Reserved 2: Disabled Thousands: Keep communications values after power off 0:Disabled 1:Enabled	1	0000	×
F05.03	Local address.	1~247, VFD does not reply to 0 address	1	1	×
F05.04	Communication fault timeout.	0.0 ~ 1000.0s	0.1s	0.0s	o
F05.05	Tiempo de respuesta de error.	0.0 ~ 1000.0s	0.1s	0.0s	o
F05.06	Reply timeout.	0	×	2ms	o
F05.07	Frequency percentage of the main inverter frequency.	0 ~ 500%	1%	100%	o

F05.08	Communication virtual terminals activation mask.	00~FFH Bit0: Communication virtual terminal CX1 0:Disabled 1:Enabled Bit1: Communication virtual terminal CX2 0:Disabled 1:Enabled Bit2: Communication virtual terminal CX3 0:Disabled 1:Enabled Bit3: Communication virtual terminal CX4 0:Disabled 1:Enabled Bit4: Communication virtual terminal CX5 0:Disabled 1:Enabled Bit5: Communication virtual terminal CX6 0:Disabled 1:Enabled Bit6: Communication virtual terminal CX7 0:Disabled 1:Enabled Bit7: Communication virtual terminal CX8 0:Disabled 1:Enabled	1	00H	o
F05.09	Communication virtual terminals function mode.	0: Independent (ver F05.10 ~F05.17) 1: Same as the input terminals (ver F08.18 ~ F08.25)	1	0	o
F05.10	Virtual communications terminal CX1 function.	Same as F08.18	1	0	o
F05.11	Virtual communications terminal CX2 function.	Same as F08.18	1	0	o
F05.12	Virtual communications terminal CX3 function.	Same as F08.18	1	0	o
F05.13	Virtual communications terminal CX4 function.	Same as F08.18	1	0	o
F05.14	Virtual communications terminal CX5 function.	Same as F08.18	1	0	o
F05.15	Virtual communications terminal CX6 function.	Same as F08.18	1	0	o
F05.16	Virtual communications terminal CX7 function.	Same as F08.18	1	0	o
F05.17	Virtual communications terminal CX8 function.	Same as F08.18	1	0	o
F05.18	Redirected function 1.	F00.00 ~ F26.xx	0.01	25.00	o
F05.19	Redirected function 2.	F00.00 ~ F26.xx	0.01	25.00	o

F05.20	Redirected function 3.	F00.00 ~ F26.xx	0.01	25.00	o
F05.21	Redirected function 4.	F00.00 ~ F26.xx	0.01	25.00	o
F05.22	Redirected function 5.	F00.00 ~ F26.xx	0.01	25.00	o
F05.23	Redirected function 6.	F00.00 ~ F26.xx	0.01	25.00	o
F05.24	Redirected function 7.	F00.00 ~ F26.xx	0.01	25.00	o
F05.25	Redirected function 8.	F00.00 ~ F26.xx	0.01	25.00	o
F05.26	Redirected function 9.	F00.00 ~ F26.xx	0.01	25.00	o
F05.27	Redirected function 10.	F00.00 ~ F26.xx	0.01	25.00	o
F05.28	Setup frequency.	Current Setup frequency	0.01Hz		o
F05.29	Output frequency.	Current Output frequency	0.01Hz		o
F05.30	Output frequency.	Current Output frequency	0.01Hz		o
F05.31	Output current.	Current Output current	0.1A		o
F05.32	Output voltage.	Current Output voltage	1V		o
F05.33	DC bus voltage.	Current DC bus voltage	0.1V		o
F05.34	Motor speed.	Current Motor speed	1 rpm		o
F05.35	Setup torque.	Current setup torque (value greater than 37367 means negative)	0.1%		o
F05.36	Output torque.	Current setup torque (value greater than 37367 means negative)	0.1%		o
F05.37	Torque intensity.	Visualiza la intensidad de par actual	0.1A		o
F05.38	Power on time.	Current Power on time	1 hour		o
F05.39	Running time.	Current Running time	1 hour		o

F06 - Curve Selection Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F06.00	Curve selection	Unit: AI1 curve selection 0: Curve 1 1: Curve 2 2: Curve 3 Tens: AI2 curve selection: same as Unit Hundred: Curve selection for the frequency input: Same as Unit Thousands: Curve selection for the PWM input: Same as Unit	1	0000	o
F06.01	Curve 1: minimum value: V/I.	0.0% ~ Curve 1: inflexion point (F06.03)	0.1%	0.0%	o
F06.02	Curve 1: minimum value: frequency.	0.0 ~ 100.0%	0.1%	0.0%	o
F06.03	Curve 1: inflexion point: V/I.	Curve 1: minimum value (F06.01) ~ Curve 1: Maximum value (F06.05)	0.1%	50.0%	o
F06.04	Curve 1: inflexion point: frequency.	0.0 ~ 100.0%	0.1%	50.0%	o
F06.05	Curve 1: Maximum value: V/I.	Curve 1: inflexion point (F06.03) ~ 100.0%, (100.0% correspond to 10V or 20mA in the analog input)	0.1%	100.0%	o

F06.06	Curve 1: Maximum value: frequency.	0.0 ~ 100.0%	0.1%	100.0%	o
F06.07	Curve 2: Minimum value: V/I.	0.0% ~ Curve 2: Minimum value	0.1%	0.0%	o
F06.08	Curve 2: Minimum value: frequency.	0.0 ~ 100.0%	0.1%	0.0%	o
F06.09	Curve 2: Inflexion point: V/I.	Curve 2: Minimum value (F06.07) ~ Curve 2: Maximum value (F06.11)	0.1%	50.0%	o
F06.10	Curve 2: Inflexion point: V/I.	0.0 ~ 100.0%	0.1%	50.0%	o
F06.11	Curva 2: Valor máximo: V/I.	Curve 2: Inflexion point ~ 100.0%	0.1%	100.0%	o
F06.12	Curve 2: Maximum value: V/I.	0.0 ~ 100.0%	0.1%	100.0%	o
F06.13	Curve 3: Minimum value: V/I.	Curve 3: Minimum value ~ Curve 3: Inflexion point 2	0.1%	0.0%	o
F06.14	Curve 3: Minimum value: frequency.	0.0 ~ 100.0%	0.1%	0.0%	o
F06.15	Curve 3: Inflexion point 1: V/I.	Curva 3: valor mínimo ~ Curva 3: punto de inflexión 2	0.1%	30.0%	o
F06.16	Curve 3: Inflexion point 1: frecuencia.	0.0 ~ 100.0%	0.1%	30.0%	o
F06.17	Curve 3: Inflexion point 2: V/I.	Curve 3: Inflexion point 1 ~ Curve 3: Maximum value	0.1%	60.0%	o
F06.18	Curve 3: Inflexion point 2: frequency.	0.0 ~ 100.0%	0.1%	60.0%	o
F06.19	Curve 3: Maximum value: V/I.	Curve 3: Inflexion point 2 ~ 100.0%	0.1%	100.0%	o
F06.20	Curve 3: Maximum value: frequency.	0.0 ~ 100.0%	0.1%	100.0%	o
F06.21	Below curve minimum value input action selection.	Unit: Curve 1 0: Minimum frequency 1: Zero frequency. Hundred: Curve 2 Same as Unit Hundred: Curve 3 Same as Unit Thousands: Extended curve 1 Same as Unit Decenas de Thousands: Extended curve 2 Same as Unit	1	11111	o

F07-Analog and Pulse Inputs Functions Group					
Function code	Name	Set range	Min. unit	Factory default	Modification
F07.00	AI1: filtering time.	0.000 ~ 9.999s	0.001s	0.050s	×
F07.01	AI1: Gain.	0.000 ~ 9.999	1	1.006	o
F07.02	AI1: Bias.	0.0 ~ 100.0%	0.1%	0.5%	o
F07.03	AI2: Filtering time.	0.000 ~ 9.999s	1	0.050s	×
F07.04	AI2: Gain.	0.000 ~ 9.999	1	1.003	o
F07.05	AI2: Bias.	0.0 ~ 100.0%	0.1%	0.1%	o
F07.06	Analog inputs bias polarity.	Unit: AI1 bias polarity 0: Positive 1: Negative Tens: AI2 bias polarity 0: Positive 1: Negative	1	1	o
F07.07	Frequency input filtering time.	0.000 ~ 9.999s	1	0.000s	×
F07.08	Frequency input gain.	0.000 ~ 9.999	1	1.000	o
F07.09	Frequency input: maximum frequency.	0.01 ~ 50.00KHz	0.01KHz	10.00KHz	o
F07.10	PWM input: Filtering time.	0.000 ~ 9.999s	0.001s	0.000s	×
F07.11	PWM input: Gain.	0.000 ~ 9.999	1	1.000	o
F07.12	Pulse input: logic selection.	0: Lógica positiva 1: Lógica negativa	1	0	o
F07.13	PWM input: maximum pulse width.	0.1 ~ 999.9ms	0.1ms	100.0ms	o
F07.14	Analog disconnection detection threshold.	0.0% ~ 100.0%	0.1%	10.0%	o
F07.15	Analog disconnection detection time.	0.0 ~ 500.0s	0.1s	3.0s	o
F07.16	Analog input disconnection detection and protection action.	Unit: analog input selection 0: None 1: AI1 analog input 2: AI2 analog input Tens: Protection action 0: Stop, according to stop mode 1: Fault, free halt 2: Keep running	1	10	o
F07.17	Reserved				

F08-Input Terminals Functions Group					
Function code	Name	Set range	Min. unit	Factory default	Modification
F08.00	Terminal inputs inversion mask.	0000 ~ FFFF (Expansion inputs included)	1	0	o
F08.01	Terminal inputs filtering time.	0.000 ~ 1.000s (Expansion inputs included)	0.001s	0.010s	o
F08.02	X1 activation delay.	0.00 ~ 99.99s	0.01s	0.00s	o
F08.03	X1 deactivation delay.	0.00 ~ 99.99s	0.01s	0.00s	o
F08.04	X2 activation delay.	0.00 ~ 99.99s	0.01s	0.00s	o
F08.05	X2 deactivation delay.	0.00 ~ 99.99s	0.01s	0.00s	o
F08.06	X3 activation delay	0.00~ 99.99s	0.01s	0.00s	o
F08.07	X3 deactivation delay	0.00~ 99.99s	0.01s	0.00s	o
F08.08	X4 activation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.09	X4 deactivation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.10	X5 activation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.11	X5 deactivation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.12	X6 activation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.13	X6 deactivation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.14	X7 activation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.15	X7 deactivation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.16	X8 activation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.17	X8 deactivation delay.	0.00~ 99.99s	0.01s	0.00s	o
F08.18	X1 terminal input function selection.	0: Disabled 1: Direct run command 2: Reverse run command 3: Direct Jog run command 4: Reverse Jog run command 5: Multispeed: terminal 1 6: Multispeed: terminal 2 7: Multispeed: terminal 3 8: Multispeed: terminal 4 9: Acceleration and deceleration time selection terminal 1 10: Acceleration and deceleration time selection terminal 2 11: Acceleration and deceleration time selection terminal 3 12: Acceleration and deceleration time selection terminal 4 13: Main & auxiliary frequencies operation selection terminal 1 14: Main & auxiliary frequencies operation selection terminal 2 15: Main & auxiliary frequencies operation selection terminal 3	1	1	×

		16: Increase frequency (UP) 17: Decrease frequency (DOWN) 18: Frequency reset 19: Multisetpoint terminal 1 20: Multisetpoint terminal 2 21: Multisetpoint terminal 3 22: External fault 23: Reset reference frequency 24: Fault reset 25: Free stop command 26: External stop command- According to stop mode 27: DC braking disabled 28: Prohibición de marcha - Paro según el modo de parada 29: Prohibición de aceleración y deceleración 30: Three wires control mode 31: PID disable 32: PID stop command 33: Hold PID integral value 34: Reset PID integral value 35: PID direction reversion 36: PLC disable 37: PLC stop 38: PLC stop state resetting 39: Main frequency channel switch to keypad 40: Main frequency channel switch to AI1 41: Main frequency channel switch to AI2 42: Main frequency channel switch to EAI1 43: Main frequency channel switch to EAI2 44: Main frequency channel selection, terminal 1 45: Main frequency channel selection, terminal 2 46: Main frequency channel selection, terminal 3 47: Main frequency channel selection, terminal 4 48: Auxiliar frequency reset 49: Switch VFD control to keypad 50: Switch VFD control to terminals 51: Switch VFD control to communications 52: Run command channel selection terminal 1 53:Run command channel selection terminal 2 54: Marcha directa prohibida (Paro según modo de parada. No válido para marcha jog) 55: Marcha reversa prohibida (Paro según modo de parada. No válido para marcha jog) 56: Entrada del barrido de frecuencia 57: Reset del estado del barrido de frecuencia 58: Internal counter: reset 59: Internal counter: input 60: Internal timer: reset 61: Internal timer: input 62: Length counter: input 63: Length counter: reset 64: Reset del tiempo de la fase actual 65: Selección del modo control de velocidad or control de par			

		66-69: Reserved 70:Alarm del temporizador asimétrico / Nivel máximo de agua (A-46) 71: Reset de la alarma del temporizador asimétrico / Nivel máximo de agua 72: Disable solar modes (MPPT/CVT) 73~90: Reserved 91: Frequency input (Only for X8) 92: PWM input (Only for X8) 93~96: Reserved			
F08.19	X2 terminal input function selection.	Same as F08.18	1	2	×
F08.20	X3 terminal input function selection.	Same as F08.18	1	0	×
F08.21	X4 terminal input function selection.	Same as F08.18	1	0	×
F08.22	X5 terminal input function selection.	Same as F08.18	1	0	×
F08.23	X6 terminal input function selection.	Same as F08.18	1	0	×
F08.24	X7 terminal input function selection.	Same as F08.18	1	0	×
F08.25	X8 terminal input function selection.	Same as F08.18	1	0	×
F08.26	Two or three wires run command function selection.	0: Two wires: Mode 1 1: Two wires: Mode 2 2: Two wires: Mode 3 (Pulse control) 3: Three wires: Mode 1 4: Three wires: Mode 2	1	0	×
F08.27	Internal counter: activation value.	0 ~ 65535	1	0	o
F08.28	Internal counter: reset value.	0 ~ 65535	1	0	o
F08.29	Internal timer: timeout.	0.1 ~ 6000.0s	0.1s	60.0s	o
F08.30	Speed encoder frequency.	0.01~10.00Hz (Valid only with speed encoder on terminals X1:X2)	0.01Hz	1.00Hz	o
F08.31	Special functions selection	Unit: Jog run command priority 0: Highest 1: Lowest Tens: Keypad display selection value 0: Display setup frequency 1: Display setup rotational speed	1	0	o

F09-Digital Terminal and Analog Outputs Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F09.00	Selección de la función de la salida Y1	0: None 1: Run command 2: Forward 3: Reverse 4: DC braking 5: Ready (Correct voltage, no fault detected, no run lock) 6: Stop command 7: Null output current 8: Current over limit 9: Current value 1 detected 10: Current value 2 detected 11: Null output frequency 12: Indicador de frecuencia alcanzada(FAR) 13: Nivel de detección de frecuencia 1(FDT1) 14: Nivel de detección de frecuencia 2(FDT2) 15: Límite superior de la frecuencia de salida (FHL) alcanzado 16: Límite inferior de la frecuencia de salida (FLL) alcanzado 17: Frequency level 1 reached 18: Frequency level 2 reached 19: Overload prealarm (OL) 20: Undervoltage stop (LU) 21: External device fault (EXT) 22: Fault 23:Alarm 24: PLC function: Enabled 25: PLC function: End of current step (active 0.5s) 26: PLC function: End of cycle (active 0.5s) 27: PLC function: Paused 28: Barrido: frecuencias máxima or mínima alcanzada 29: Setup length reached 30: Internal counter: restart value reached 31: Internal counter: activation value reached 32: Internal timer: timeout (se da un pulso de 0.5s cuando se alcanza el valor establecido) 33: Tiempo de marcha 1 alcanzado (F18.12) 34: Tiempo de marcha 2 alcanzado (F18.13) 35: Tiempo de marcha acumulada establecido 36: Tiempo de encendido acumulado establecido alcanzado (F18.09) 37-40: Reserved 41: Salida establecida por comunicaciones 42: Exceso de frecuencia en el modo de control de par 43: Setup output torque reached signal 44: Reserved 45: Lógica del freno DC: establecido frenado DC para el cambio de dirección de la marcha	1	0	×

		46: Lógica del freno DC: no está establecido frenado DC para el cambio de dirección de la marcha. 47: Run, except jog run 48: Analog disconnection fault signal 49: X1 input terminal active 50: X2 input terminal active 51~60: Reserved			
F09.01	Y2 digital output function selection.	Same as F09.00	1	0	×
F09.02	Y3 digital output function selection.	Same as F09.00	1	0	×
F09.03	Y4 digital output function selection.	Same as F09.00	1	0	×
F09.04	Relay output function selection.	Same as F09.00	1	22	×
F09.05	Anchura de detección de la frecuencia(FAR)	0.00 ~ 50.00Hz	0.01Hz	5.00Hz	o
F09.06	Valor del nivel de detección de frecuencia 1(FDT1)	0.00Hz ~ maximum frequency	0.01Hz	10.00Hz	o
F09.07	Histéresis del nivel de detección de frecuencia 1(FDT1)	0.00 ~ 50.00Hz	0.01Hz	1.00Hz	o
F09.08	Valor del nivel de detección de frecuencia 2 (FDT2)	0.00Hz ~ maximum frequency	0.01Hz	10.00Hz	o
F09.09	Histéresis del nivel de detección de frecuencia 2 (FDT2)	0.00 ~ 50.00Hz	0.01Hz	1.00Hz	o
F09.10	Nivel de detección de frecuencia nula	0.00Hz ~ maximum frequency	0.01Hz	0.40Hz	o
F09.11	Valor de histéresis de la detección de frecuencia nula	0.00Hz ~ maximum frequency	0.01Hz	0.10Hz	o
F09.12	Nivel de detección de intensidad de salida nula	0.0 ~ 50.0%	0.1%	0.0%	o
F09.13	Tiempo de detección de intensidad de salida nula	0.00 ~ 60.00s	0.01s	0.1s	o
F09.14	Nivel de detección de exceso de intensidad de salida	0.0 ~ 250.0%	0.1%	160.0%	o
F09.15	Tiempo de detección del exceso de intensidad de salida	0.00 ~ 60.00s	0.01s	0.00s	o
F09.16	Valor de intensidad de detección 1	0.0 ~ 250.0%	0.1%	100.0%	o
F09.17	Rango de detección del valor de intensidad 1	0.0 ~ 100.0%	0.1%	0.0%	o

F09.18	Valor de intensidad de detección 2	0.0 ~ 250.0%	0.1%	100.0%	o
F09.19	Rango de detección del valor de intensidad 2	0.0 ~ 100.0%	0.1%	0.0%	o
F09.20	Valor de detección de frecuencia 1	0.00Hz ~ maximum frequency	0.01Hz	50.00Hz	o
F09.21	Rango de detección del valor de frecuencia 1	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	o
F09.22	Valor de detección de frecuencia 2	0.00Hz ~ maximum frequency	0.01Hz	50.00Hz	o
F09.23	Rango de detección del valor de frecuencia 2	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	o
F09.24	Máscara de inversión de la lógica de las salidas	0000 ~ FFFF	1	0	o
F09.25	Y1 activation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.26	Y1 deactivation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.27	Y2 activation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.28	Y2 deactivation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.29	Y3 activation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.30	Y3 deactivation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.31	Y4 activation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.32	Y4 deactivation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.33	Relay activation delay.	0.000 ~ 50.000s	0.001s	0.000s	o
F09.34	Relay deactivation delay.	0.000 ~ 50.000s	0.001s	0.000s	o

F09.35	AO1 analog output function selection.	0: Frecuencia de salida antes de compensar el deslizamiento (0.00Hz ~ Frecuencia máxima) 1: Frecuencia de salida tras compensar el deslizamiento (0.00Hz ~ Frecuencia máxima) 2: Frecuencia de referencia (0.00Hz ~ frecuencia máxima) 3: Frecuencia principal (0.00Hz ~ Frecuencia máxima) 4: Frecuencia auxiliar(0.00Hz ~ Frecuencia máxima) 5: Intensidad de salida 1 (0 ~ 2×Intensidad nominal del variador) 6: Intensidad de salida 2 (0 ~ 3×Intensidad nominal del motor) 7: Tensión de salida (0 ~ 1.2×load motor rated voltage) 8: Tensión de bus (0 ~1.5×rated busbar voltage) 9: Velocidad del motor(0 ~ 3×Velocidad nominal) 10: PID consigna(0.00 ~ 10.00V) 11: PID realimentación(0.00 ~ 10.00V) 12: AI1 (0.00 ~ 10.00V o 4 ~ 20mA) 13: AI2 (-10.00 ~ 10.00V o 4 ~ 20mA) 14: Consigna comunicación 15: Velocidad del rotor del motor 0.00Hz ~ frecuencia máxima) 16: Referencia de Par (0 ~ 2×Par nominal) 17: Par de salida (0 ~ 2×Par nominal) 18: Intensidad del par de salida (0 ~ 2×Intensidad nominal del motor) 19: Intensidad del flujo de salida (0 ~ 1×Intensidad de flujo nominal del motor) 20 ~ 25: Reservado	1	0	o
F09.36	AO2 analog output function selection.	Same as F09.35	1	0	o
F09.37	DO output function selection.	Same as F09.35	1	0	o
F09.39	AO1 analog output filtering time.	0.0 ~ 20.0s	0.1s	0.0s	o
F09.40	AO1 analog output gain.	0.00 ~ 2.00	0.01	1.00	o
F09.41	AO1 analog output polarization.	0.0 ~ 100.0%	0.1%	0.0%	o
F09.42	AO2 analog output filtering time analógica AO2.	0.0 ~ 20.0s	0.1s	0.0s	o
F09.43	AO2 analog output gain.	0.00 ~ 2.00	0.01	1.00	o
F09.44	AO2 analog output polarization.	0.0 ~ 100.0%	0.1%	0.0%	o

F09.45	DO output filtering time.	0.0 ~ 20.0s	0.1s	0.0s	o
F09.46	DO output gain.	0.00 ~ 2.00	0.01	1.00	o
F09.47	Do output maximum frequency.	0.1 ~ 20.0KHz	0.1KHz	10.0KHz	o
F09.48	Tiempo de deteccion del nivel de par.	0.02 ~ 200.00s	0.01s	1.00s	o
F09.49	Reserved.				
F09.50	Reserved.				

F10-PLC and Multispeed Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F10.00	PLC operation mode selection.	Unit: operation mode selection 0:Disabled 1: Stop at the end of cycle 2: Keep output frequency at the end of cycle 3: Continuous cycle Tens: Modo de reinicio tras una parada: 0: Restart cycle 1: Continue from step before stop 2: Continue from frequency before stop Hundred: PLC mode time units selection 0: Seconds 1: Minutes Thousands: PLC mode, keep current step after power off: 0:Disabled 1:Enabled	1	0	×
F10.01	Step 1 adjustment	000H~E22H Unit: Setup frequency 0: Multispeed i (i=1~15) 1: Mathematical operation between main and auxiliary frequencies 2: Reserved Hundred: PLC and Multispeed direction selection 0: Forward run 1: Reverse run 2: Determined by run command Hundred: ACC/DEC time selection 0: ACC/DEC 1 time 1: ACC/DEC 2 time 2: ACC/DEC 3 time 3: ACC/DEC 4 time 4: ACC/DEC 5 time 5: ACC/DEC 6 time 6: ACC/DEC 7 time 7: ACC/DEC 8 time 8: ACC/DEC 9 time 9: ACC/DEC 10 time	1	20	o

		A: ACC/DEC 11 time B: ACC/DEC 12 time C: ACC/DEC 13 time D: ACC/DEC 14 time E: ACC/DEC 15 time			
F10.02	Step 2 adjustment	Same as F10.01	1	020	o
F10.03	Step 3 adjustment	Same as F10.01	1	020	o
F10.04	Step 4 adjustment	Same as F10.01	1	020	o
F10.05	Step 5 adjustment	Same as F10.01	1	020	o
F10.06	Step 6 adjustment	Same as F10.01	1	020	o
F10.07	Step 7 adjustment	Same as F10.01	1	020	o
F10.08	Step 8 adjustment	Same as F10.01	1	020	o
F10.09	Step 9 adjustment	Same as F10.01	1	020	o
F10.10	Step 10 adjustment	Same as F10.01	1	020	o
F10.11	Step 11 adjustment	Same as F10.01	1	020	o
F10.12	Step 12 adjustment	Same as F10.01	1	020	o
F10.13	Step 13 adjustment	Same as F10.01	1	020	o
F10.14	Step 14 adjustment	Same as F10.01	1	020	o
F10.15	Step 15 adjustment	Same as F10.01	1	020	o
F10.16	Step 1 duration	0~6000.0	0.1	10.0	o
F10.17	Step 2 duration	0~6000.0	0.1	10.0	o
F10.18	Step 3 duration	0~6000.0	0.1	10.0	o
F10.19	Step 4 duration	0~6000.0	0.1	10.0	o
F10.20	Step 5 duration	0~6000.0	0.1	10.0	o
F10.21	Step 6 duration	0~6000.0	0.1	10.0	o
F10.22	Step 7 duration	0~6000.0	0.1	10.0	o
F10.23	Step 8 duration	0~6000.0	0.1	10.0	o
F10.24	Step 9 duration	0~6000.0	0.1	10.0	o
F10.25	Step 10 duration	0~6000.0	0.1	10.0	o
F10.26	Step 11 duration	0~6000.0	0.1	10.0	o
F10.27	Step 12 duration	0~6000.0	0.1	10.0	o
F10.28	Step 13 duration	0~6000.0	0.1	10.0	o
F10.29	Step 14 duration	0~6000.0	0.1	10.0	o
F10.30	Step 15 duration	0~6000.0	0.1	10.0	o
F10.31	Multispeed 1	0.00Hz~maximum frequency	0.01Hz	5.00Hz	o
F10.32	Multispeed 2	0.00Hz~maximum frequency	0.01Hz	10.00Hz	o
F10.33	Multispeed 3	0.00Hz~maximum frequency	0.01Hz	20.00Hz	o
F10.34	Multispeed 4	0.00Hz~maximum frequency	0.01Hz	30.00Hz	o
F10.35	Multispeed 5	0.00Hz~maximum frequency	0.01Hz	40.00Hz	o
F10.36	Multispeed 6	0.00Hz~maximum frequency	0.01Hz	45.00Hz	o
F10.37	Multispeed 7	0.00Hz~maximum frequency	0.01Hz	50.00Hz	o
F10.38	Multispeed 8	0.00Hz~maximum frequency	0.01Hz	5.00Hz	o
F10.39	Multispeed 9	0.00Hz~maximum frequency	0.01Hz	10.00Hz	o
F10.40	Multispeed 10	0.00Hz~maximum frequency	0.01Hz	20.00Hz	o
F10.41	Multispeed 11	0.00Hz~maximum frequency	0.01Hz	30.00Hz	o
F10.42	Multispeed 12	0.00Hz~maximum frequency	0.01Hz	40.00Hz	o

F10.43	Multispeed 13	0.00Hz~maximum frequency	0.01Hz	45.00Hz	o
F10.44	Multispeed 14	0.00Hz~maximum frequency	0.01Hz	50.00Hz	o
F10.45	Multispeed 15	0.00Hz~maximum frequency	0.01Hz	50.00Hz	o

F11-PID Mode Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F11.00	PID mode.	0:Disabled 1:Enabled	1	0	×
F11.01	Setpoint source channel selection.	0: Keypad setpoint (ver F11.06) 1: AI1 analog input 2: AI2 analog input 3: EAI1 expansion analog input 4: EAI2 expansion analog input 5: Frequency input 6: Communication (address: 1D00H). 7: Reserved	1	0	o
F11.02	Feedback source channel selection.	0: AI1 analog input 1: AI2 analog input 2: EAI1 expansion analog input 3: EAI2 expansion analog input 4: AI1+AI2 5: AI1-AI2 6: Minimum value between AI1 & AI2 7: Maximum value between AI1 & AI2 8: Frequency input 9: Communication (address 1D0CH, 4000 means 10.00V)	1	0	o
F11.03	Setpoint source filtering time	0.00 ~ 50.00s	0.00s	0.00s	×
F11.04	Feedback source channel filtering time	0.00 ~ 50.00s	0.00s	0.00s	×
F11.05	PID output filtering time	0.00 ~ 50.00s	0.01s	0.00s	o
F11.06	Keypad Setpoint	0.00 ~ 10.00V	0.01V	1.00V	o
F11.07	PID gain.	0.000 ~ 6.5535	1	500	o
F11.08	PID integration time.	0.000 ~ 6.5535	1	500	o
F11.09	PID derivation time.	0.000 ~ 9.999	1	0	o
F11.10	Sampling time.	0.01 ~ 1.00s	0.01s	0.01s	o
F11.11	Detection threshold.	0.0 ~ 20.0% (respeto to Keypad setpoint)	0.1%	1.0%	o
F11.12	PID differential term limit.	0.00 ~ 100.00%	0.01%	0.10%	o
F11.13	Output signal polarity.	0: Positiva 1: Negativa	1	0	o
F11.14	Feedback signal polarity.	0: Positiva 1: Negativa	1	0	o
F11.15	Maximum frequency PID.	0.00Hz ~ maximum frequency	0.01Hz	50.00Hz	o
F11.16	Maximum frequency PID.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	o

F11.17	PID integral term regulation mode selection.	0: Stop regulation if feedback signal exceeds PID integral term deviation threshold. 1: Continue regulation even if feedback signal exceeds PID integral term deviation threshold.	1	0	o
F11.18	PID integral term deviation threshold.	0.0 ~ 100.0%	0.1%	100.0%	o
F11.19	Filling pipe frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	o
F11.20	Filling pipe time.	0.0 ~ 6000.0s	0.1s	0.0s	o
F11.21	Negative PID output signal mode selection.	0: If the PID output signal is negative, output frequency is minimum frequency. 1: If the PID output signal is negative, output direction is opposed to run direction. 2: Determined by demand direction.	1	2	o
F11.22	Límite de frecuencia PID	0.00 ~ maximum frequency	0.01Hz	50.00Hz	o
F11.23	Multisetpoint 1	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o
F11.24	Multisetpoint 2	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o
F11.25	Multisetpoint 3	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o
F11.26	Multisetpoint 4	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o
F11.27	Multisetpoint 5	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o
F11.28	Multisetpoint 6	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o
F11.29	Multisetpoint 7	0.00~F12.06 (Pressure sensor range)	0.001 Mpa	0.000 Mpa	o

F12-Water Supply and Solar Modes Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F12.00	Selección del modo de suministro de agua	0: Desactivado 1: Activado 2: Tarjeta de expansión 1-2 3: Tarjeta de expansión 1-3 4: Tarjeta de expansión 1-4 5: Rotación de bombas con las salidas del variador	1	0	×
F12.01	Consigna de presión	0.000 ~ F12.06 (Rango del sensor de presión)	0.001Mpa	0.200Mpa	o
F12.02	Frecuencia de dormir	0.00Hz ~ frecuencia máxima	0.01Hz	30.00Hz	o
F12.03	Presión de despertar	0.000 ~ F12.06 (Rango del sensor de presión)	0.001Mpa	0.150Mpa	o
F12.04	Retraso de dormir	0.0 ~ 6000.0s	0.1s	0.0s	o
F12.05	Retraso de despertar	0.0 ~ 6000.0s	0.1s	0.0s	o
F12.06	Rango del sensor de presión	0.001 ~ 9.999Mpa	0.001Mpa	1.000Mpa	o

F12.07	Desviación máxima de la frecuencia para añadir o retirar la bomba de apoyo	0.1 ~ 100.0%	0.1%	1.0%	o
F12.08	Tiempo de espera para añadir la bomba de apoyo	0.2 ~ 999.9s	0.1s	5.0s	o
F12.09	Tiempo de conmutación del contactor	0.1 ~ 10.0s	0.1s	0.5s	o
F12.10	Tiempo de rotación de las bombas	0000 ~ 65535 minutos	1	0	×
F12.11	Modo de despertar	0: Despertar según el valor de F12.03 1: Despertar según F12.12*F12.01	1	0	o
F12.12	Coeficiente de presión para despertar	0.01 ~ 0.99	0.01	0.75	o
F12.13	Tiempo de espera para retirar la bomba de apoyo	0.2 ~ 999.9s	0.1s	5.0	o
F12.14	Reservado				
F12.15	Selección del modo solar	0: Desactivado 1: Modo MPPT 2: Modo CVT 3: Reservado 4: Modo MPPT+PID	1	1	×
F12.16	Valor máximo de tensión MPPT	80.0 ~ 100.0%	0.1%	90.0%	o
F12.17	Valor mínimo de tensión MPPT	50.0 ~ 80.0%	0.1%	50.0%	o
F12.18	Intervalo de muestreo	0 ~ 100.0s	0.1s	1.0s	o
F12.19	Umbral mínimo de variación de tensión	0.5 ~ 30.0%	0.1%	0.5%	o
F12.20	Término proporcional	0.00 ~ 100.00	0.01	Según tipo de motor	o
F12.21	Término integral	0.01 ~ 10.00	0.01	Según tipo de motor	o
F12.22	Término diferencial	0.00 ~ 10.00	0.01	Según tipo de motor	o
F12.23	Tensión objetivo del modo CVT	50.0 ~ 100.0%	0.1%	80.0%	o

F12.24	Máscara de modo de parada de las protecciones del modo solar	00 ~ 1F BIT0: Protección de baja frecuencia (A-42) BIT1: Protección de bajacarga (A-43) BIT2: Protección de sobrecarga (A-44) BIT3: Protección de potencia mínima (A-45) BIT4: Temporizador asimétrico (A-46) 0: Parada libre 1: Deceleración	1	0	o
F12.25	Constante de tiempo fotovoltaica	1 ~ 10.00s	0.01s	0.10s	o
F12.26	Tensión de dormir	0 ~ 600.0V	0.1V	200.0V	o
F12.27	Reservado				
F12.28	Tensión de despertar	0 ~ 600.0V	0.1V	200.0V	o
F12.29	Retraso de despertar	0 ~ 6000.0s	0.1s	10.0s	o
F12.30	Frecuencia de la protección por baja frecuencia	0 ~ 50.00Hz	0.01Hz	10.00Hz	o
F12.31	Tiempo de detección de la protección por baja frecuencia	0 ~ 6000.0s	0.1s	10.0s	o
F12.32	Tiempo de recuperación de la protección por baja frecuencia	0 ~ 6000.0s	0.1s	10.0s	o
F12.33	Potencia de la protección por potencia mínima	0 ~ 100.00kw	0.01KW	0.00KW	o
F12.34	Tiempo de detección de la protección por potencia mínima	0 ~ 6000.0s	0.1s	10.0s	o
F12.35	Tiempo de recuperación de la protección por potencia mínima	0 ~ 6000.0s	0.1s	10.0s	o
F12.36	Intensidad de la protección por sobreconsumo	0.0A ~ 199.9A	0.1A	0.0A	o
F12.37	Tiempo de detección de la protección por sobreconsumo	0.0s ~ 6000.0s	0.1s	10.0s	o
F12.38	Tiempo de recuperación de la protección por sobreconsumo	0.0s ~ 6000.0s	0.1s	10.0s	o

F12.39	Modo de recuperación de las alarmas	Unidad: Protección por baja frecuencia (A-42) 0: Recuperación automática 1: Recuperación manual Decenas: Protección por bajacarga (A-43) 0: Recuperación automática 1: Recuperación manual Centenas: Protección por sobrecarga (A-44) 0: Recuperación automática 1: Recuperación manual Miles: Protección por potencia mínima (A-45) 0: Recuperación automática 1: Recuperación manual	1	0000	o
F12.40	Coeficiente de la protección por baja carga	0.0% ~ 200.00%	0.1%	0.0%	o
F12.41	Tiempo de detección de la protección por baja carga	0.0s ~ 6000.0s	0.1s	10.0s	o
F12.42	Tiempo de recuperación de la protección por baja carga	0.0s ~ 6000.0s	0.1s	10.0s	o
F12.43	Temporizador asimétrico: tiempo de activación	0.0s ~ 6000.0s	0.1s	10.0s	o
F12.44	Temporizados asimétrico: tiempo de desactivación	0.0s ~ 6000.0s	0.1s	10.0s	o
F12.45	Offset de corrección de visualización de la tensión DC	0.0A ~ 999.9A	0.1A	0.0A	o
F12.46	Factor de corrección de visualización de la tensión DC	0.0% ~ 500.0%	0.1%	100.0%	o
F12.47	Curva caudal/potencia, potencia 0	0.0kw ~ 999.9kw	0.1Kw	0.5kw	o
F12.48	Curva caudal/potencia, potencia 1	0.0kw ~ 999.9kw	0.1Kw	1.0kw	o
F12.49	Curva caudal/potencia, potencia 2	0.0kw ~ 999.9kw	0.1Kw	1.5kw	o
F12.50	Curva caudal/potencia, potencia 3	0.0kw ~ 999.9kw	0.1Kw	2.0Kw	o
F12.51	Curva caudal/potencia, potencia 4	0.0kw ~ 999.9kw	0.1Kw	2.5Kw	o
F12.52	Curva caudal/potencia, caudal 0	0.0m3/h ~ 999.9m3/h	0.1m3/h	0.0m3/h	o
F12.53	Curva caudal/potencia, caudal 1	0.0m3/h ~ 999.9m3/h	0.1m3/h	5.0m3/h	o

F12.54	Curva caudal/potencia, caudal 2	0.0m3/h ~ 999.9m3/h	0.1m3/h	10.0m3/h	o
F12.55	Curva caudal/potencia, caudal 3	0.0m3/h ~ 999.9m3/h	0.1m3/h	15.0m3/h	o
F12.56	Curva caudal/potencia, caudal 4	0.0m3/h ~ 999.9m3/h	0.1m3/h	20.0m3/h	o
F12.57	Término de corrección de la medida de caudal	0.0 ~ 999.9m3/h	0.1m3/h	0.0m3/h	o
F12.58	Factor de corrección de la medida del caudal	0.0% ~ 999.9%	0.1%	100.0%	o
F12.59	Intervalo de tiempo de reseteo de la medida de caudal total diario	0h ~ 24h	1h	7h	o
F12.60 ~ F12.63	Reservado				
F12.64	Tiempo de espera tras DC-off	0 ~ 20.0s	0.1s	2.0s	×
F12.65	Curva de protección por bajacarga, frecuencia 0	0 ~ Curva de protección por bajacarga, frecuencia 1	0.01Hz	5.00Hz	×
F12.66	Curva de protección por bajacarga, frecuencia 1	Curva de protección por bajacarga, frecuencia 0 ~ Curva de protección por bajacarga, frecuencia 2	0.01Hz	10.00Hz	×
F12.67	Curva de protección por bajacarga, frecuencia 2	Curva de protección por bajacarga, frecuencia 0 ~ Curva de protección por bajacarga, frecuencia 3	0.01Hz	20.00Hz	×
F12.68	Curva de protección por bajacarga, frecuencia 3	Curva de protección por bajacarga, frecuencia 2 ~ frecuencia máxima	0.01Hz	40.00Hz	×
F12.69	Curva de protección por bajacarga, intensidad 0	0 ~ Curva de protección por bajacarga, intensidad 1	0.1A	0.0A	×
F12.70	Curva de protección por bajacarga, intensidad 1	Curva de protección por bajacarga, intensidad 0 ~ Curva de protección por bajacarga, intensidad 2	0.1A	0.0A	×
F12.71	Curva de protección por bajacarga, intensidad 2	Curva de protección por bajacarga, intensidad 1 ~ Curva de protección por bajacarga, intensidad 3	0.1A	0.0A	×
F12.72	Curva de protección por bajacarga, intensidad 3	Curva de protección por bajacarga, intensidad 2 ~ intensidad nominal del motor	0.1A	0.0A	×
F12.73	Reservado				
F12.74	Reservado				

F13-Grupo de Funciones de Barridos y Longitudes Fija					
Function code	Name	Set range	Min. unit	Factory default	Modification
F13.00	Función de barrido	0: Desactivada 1: Activada	1	0	×
F13.01	Control de la función de barrido	Unidad: Modo de inicio 0: Automático 1: Manualmente según las entradas Decenas: Tipo de barrido 0: Barrido variable 1: Barrido fijo Centenas: Modo de reinício 0: Desde el estado inicial 1: Desde el estado en que se interrumpió Miles: Guardar el estado al apagado 0: Desactivado 1: Activado	1	0000	×
F13.02	Amplitud de barrido	0.0 ~ 50.0%	0.1%	10.0%	o
F13.03	Salto de frecuencia de barrido	0.0 ~ 50.0%	0.1%	2.0%	o
F13.04	Tiempo de barrido	0.1 ~ 999.9s	0.1s	10.0s	o
F13.05	Tiempo en aceleración del barrido	0.0 ~ 98.0% (Tiempo de barrido F13.04)	0.1%	50.0%	o
F13.06	Frecuencia central de barrido	0.00 ~ 400.00Hz	0.01Hz	0.00Hz	o
F13.07	Tiempo de espera antes de barrido	0.0 ~ 6000.0s	0.1s	0.0s	o
F13.08	Longitud establecida	0 ~ 65535(m\cm\mm)	1	0	o
F13.09	Número de pulsos por vuelta del rodillo	1 ~ 10000	1	1	o
F13.10	Perímetro del rodillo	0.01 ~ 655.35cm	0.01cm	10.00cm	o
F13.11	Porcentaje de longitud restante	0.00% ~ 100.00%	0.01%	0.00%	o
F13.12	Coeficiente de corrección de longitud	0.001 ~ 10.000	1	1.000	o

F13.13	Selección de la acción al llegar a la longitud establecida	Unidad: Reservado Decenas: Unidad de longitud 0: Metros (m) 1: Centimetros (cm) 2: Milímetros (mm) Centenas: Acción cuando se alcanza la longitud establecida 0: Continúa la marcha 1: Parada, según modo de parada 2: Repite la operación Miles: Reset de la longitud (Puede borrarse por comunicaciones) 0: Desactivado 1: La longitud actual se resetea 2: La longitud actual y la acumulada se resetean	1	0000	o
F13.14	Selección del guardado de la longitud al apagado	Unidad: longitud actual 0: Borra el valor de la longitud actual 1: Guarda el valor de la longitud actual Decenas: longitud acumulada 0: Borra el valor de la longitud acumulada 1: Guarda el valor de la longitud acumulada Centenas: Cálculo de la longitud 0: La longitud no se calcula 1: La longitud se calcula	0	011	o

F14-Vectorial Control Function Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F14.00	Control mode selection.	0: Speed control 1: Torque control (Only valid for F00.24=1 or 2)	1	0	o
F14.01	Ganancia del término proporcional a alta velocidad	0.1 ~ 40.0 (Only valid for F00.24=1 o 2)	0.1	20.0	o
F14.02	Tiempo de integración a alta velocidad	0.001 ~ 10.000s (Only valid for F00.24=1 o 2)	0.001s	0.040s	o
F14.03	Ganancia del término proporcional a baja velocidad	0.1 ~ 80.0 (Only valid for F00.24=1 or 2)	0.1	20.0	o
F14.04	Tiempo de integración a baja velocidad	0.001 ~ 10.000s (Only valid for F00.24=1 o 2)	0.001s	0.020s	o
F14.05	Frecuencia de cambio del modo de control de velocidad	0.00Hz ~ 20.00Hz (Only valid for F00.24=1 o 2)	0.01Hz	5.00Hz	o
F14.06	Coeficiente de estabilidad a baja frecuencia	0 ~ 50 (Only valid for F00.24=1)	1	25	o

F14.07	Ganancia del término proporcional de la intensidad	1 ~ 500 (Only valid for F00.24=1 o 2)	1	70	o
F14.08	Tiempo de integración de la intensidad	0.1 ~ 100.0ms (Only valid for F00.24=1 o 2)	0.1ms	4.0ms	o
F14.09	Valor límite del par del motor	0.0 ~ 250.0% (Only valid for F00.24=1, 2 o 3)	0.1%	160.0%	o
F14.10	Valor límite del par de frenado	0.0 ~ 250.0% (Only valid for F00.24=1 o 2)	0.1%	160.0%	o
F14.11	Coeficiente del control del flujo debilitado	20.0 ~ 100.0% (Only valid for F00.24=1 o 2)	0.1%	80.0%	o

F14.13	Selección del canal de referencia y limitación de par	Unidad: Selección del canal de referencia de par 0: Ajuste digital 1: Entrada analógica AI1 2: Entrada analógica AI2 3: Terminal de entrada digital UP/DOWN 4: Comunicación (Dirección: 1D01) 5: Entrada analógica EAI1 (Con tarjeta de expansión) 6: Entrada analógica EAI2 (Con tarjeta de expansión) 7: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 8: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) Nota: el valor máximo de las opciones 1 ~ 8 corresponde a F14.10 Decenas: Selección del canal de limitación de par 0: Ajuste digital (Determinado por F14.09) 1: Entrada analógica AI1 2: Entrada analógica AI2 3: Terminal de entrada digital UP/DOWN 4: Reservado 5: Entrada analógica EAI1 (Con tarjeta de expansión) 6: Entrada analógica EAI2 (Con tarjeta de expansión) 7: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 8: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) Nota: el valor máximo de las opciones 1 ~ 8 corresponde a F14.09 Centenas: Selección del canal de limitación de par 0: Ajuste digital (Determinado por F14.10) 1: Entrada analógica AI1 2: Entrada analógica AI2 3: Terminal de entrada digital UP/DOWN 4: Reservado 5: Entrada analógica EAI1 (Con tarjeta de expansión) 6: Entrada analógica EAI2 (Con tarjeta de expansión) 7: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 8: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) Nota: el valor máximo de las opciones 1 ~ 8 corresponde a F14.10	1	000	o

F14.14	Selección de la dirección del par	0000 ~ 2112 Unidad: Polaridad de la referencia de par 0: Positive 1: Negative 2: Definido por la orden de marcha Decenas: Polaridad de la compensación de par 0: La misma que la referencia de par 1: Opuesta a la referencia de par Centenas: Disminución del par si el rotor está bloqueado (ver F14.21) 0: Desactivado 1: Activado. Miles: Función anti-inversión de par 0: Desactivado 1: Activo permanentemente 2: Activo durante el arranque	1	2000	o
F14.15	Valor digital de la referencia de par	0.0 ~ 200.0% (Only valid for F00.24=1 o 2)	0.1%	0.0%	o
F14.16	Selección del canal de limitación de la marcha directa en el modo de control de par	0: Ajuste digital (Ver F14.15) 1: Entrada analógica AI1 2: Entrada analógica AI2 3: Terminal de entrada digital UP/DOWN 4:Comunicación (Dirección: 1D0A) 5: Entrada analógica EAI1 (Con tarjeta de expansión) 6: Entrada analógica EAI2 (Con tarjeta de expansión) 7: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 8: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) Nota: Only valid for F00.24=1.	1	0	×
F14.17	Selección del canal de limitación de la marcha inversa en el modo de control de par	0: Ajuste digital 1: Entrada analógica AI1 2: Entrada analógica AI2 3: Terminal de entrada digital UP/DOWN 4:Comunicación (Dirección: 1D0B) 5: Entrada analógica EAI1 (Con tarjeta de expansión) 6: Entrada analógica EAI2 (Con tarjeta de expansión) 7: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 8: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) Nota: Only valid for F00.24=1.	1	0	×
F14.18	Valor de velocidad directa límite en el modo de control de par	0.00Hz ~ frecuencia máxima (Válido sólo cuando F00.24=1.)	0.01Hz	50.00Hz	o

F14.19	Valor de velocidad inversa límite en el modo de control de par	0.00Hz ~ frecuencia máxima (Válido sólo cuando F00.24=1)	0.01Hz	50.00Hz	o
F14.20	Tiempo de aceleración y deceleración de par	0.000 ~ 60.000s (Válido sólo cuando F00.24=1)	0.001s	0.100s	o
F14.21	Factor de compensación de par	0.0 ~ 100.0% (Válido sólo cuando F00.24=1)	0.1%	0.0%	o
F14.22	Ganancia de la regulación de par directo	50.0 ~ 150.0% (Válido sólo cuando F00.24=1)	0.1%	100.0%	o
F14.23	Ganancia de la regulación de par inverso	50.0 ~ 150.0% (Válido sólo cuando F00.24=1)	0.1%	100.0%	o
F14.24	Coeficiente de flujo de frenado	0.0 ~ 300.0% (Válido sólo cuando F00.24=1)	0.1%	0.0%	o
F14.25	Constante de tiempo de la pre-excitación del arranque	0.1 ~ 3.0 (Válido sólo cuando F00.24=1)	0.1	0.5	×
F14.30	Frecuencia máxima de la compensación de par	0.00Hz ~ frecuencia máxima (Válido sólo cuando F00.24=1)	0.01Hz	20.00 Hz	o

F15-Motor Parameters Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modifi-cation**
F15.01	Rated power.	0.1 ~ 6553.5KW	0.1KW	Según tipo de motor	×
F15.02	Rated voltage.	1 ~ 690V	1V	Según tipo de motor	×
F15.03	Rated current.	0.1 ~ 6553.5A	0.1A	Según tipo de motor	×
F15.04	Rated frequency.	0.00 ~ 600.00Hz	0.01Hz	Según tipo de motor	×
F15.05	Rated speed.	0 ~ 60000r/min	1r/min	Según tipo de motor	×
F15.06	Pairs of poles.	1 ~ 7	1	2	×
F15.07	Stator resistance.	0.001 ~ 65.535Ω (potencia < 7.5KW)	0.001Ω	Según tipo de motor	×
		0.0001 ~ 6.5535Ω(potencia ≥7.5KW)	0.0001Ω		

F15.08	Rotor resistance.	0.001 ~ 65.535Ω (potencia < 7.5KW)	0.001Ω	Según tipo de motor	×
		0.0001 ~ 6.5535Ω(potencia ≥7.5KW)	0.0001Ω		
F15.09	Leak inductance.	0.01 ~ 655.35mH (potencia < 7.5KW)	0.01mH	Según tipo de motor	×
		0.001 ~ 65.535mH (potencia ≥7.5KW)	0.001mH		
F15.10	Mutual inductance.	0.1 ~ 6553.5mH (potencia < 7.5KW)	0.1mH	Según tipo de motor	×
		0.01 ~ 655.35mH (potencia ≥7.5KW)	0.01mH		
F15.11	No load motor current.	0.01~ 655.35A	0.01A	Según tipo de motor	×
F15.12 ~ F15.18	Reserved				
F15.19	Auto-Tune motor selection.	0: :Disabled 1: Motor is connected to load 2: Motor is disconnected from load 3: Reserved Nota: 1. Antes de ejecutar auto-tuning deberá introducir correctamente los parámetros de la placa del motor 2. Los parámetros del motor pueden tener valores por defecto especiales, pueden modificarse por el usuario o por la función Auto-Tune. 3. Every time F15.01 is modified, all the motor values get to their factory default values.	1	0	×
F15.20 ~ F.15.22	Reserved				

F18-Advanced Control Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modifi-cation**
F18.00	Control del enlace de frecuencia con el panel de control	0: Sin enlace 1: Panel de control 2: Entrada analógica AI1 3: Entrada analógica AI2 4: Terminal de entrada digital UP/DOWN 5: Comunicación (Modbus y Fieldbus usan la misma dirección) 6: Entrada analógica EAI1 (Con tarjeta de expansión) 7: Entrada analógica EAI2 (Con tarjeta de expansión) 8: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 9: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) 10: Entradas del codificador de velocidad (entradas digitales X1:X2) 11 ~ 15: Reservado	1	0	o

F18.01	Control del enlace de frecuencia con entradas digitales	Same as F18.00	1	0	o
F18.02	Control del enlace de frecuencia con comunicaciones	Same as F18.00	1	0	o
F18.03	Selección de la aceleración del ajuste de la frecuencia	Unidad: Aceleración del ajuste de las teclas UP/DOWN 0: Activada 1: Desactivada Decenas: Aceleración del ajuste de los terminales UP/DOWN 0: Activada 1: Desactivada Centenas: Ajuste funcionamiento del potenciómetro 0: El potenciómetro está activado durante la monitorización 1: El potenciómetro está desactivado durante la monitorización Miles: Modo de selección clásico del ajuste de frecuencia por el panel de control 0: Desactivado 1: Activado, paso de ajuste dado por F18.05	1	0000	o
F18.04	Acceleration rate adjustment of the UP/DOWN keys.	0.01 ~ 50.00Hz	0.01Hz	0.10Hz	o
F18.05	Initial adjustment step of the UP/DOWN keys.	0.01 ~ 10.00Hz	0.01Hz	0.01Hz	o
F18.06	Acceleration rate adjustment of the UP/DOWN input terminals.	0.01 ~ 50.00Hz	0.01Hz	0.20Hz	o
F18.07	Initial adjustment step of the UP/DOWN terminals.	0.01 ~ 10.00Hz	0.01Hz	0.10Hz	o
F18.08	Descenso máximo de la frecuencia al compartir la carga con otro variador	0.00 ~ 10.00Hz	0.01Hz	0.00Hz	o
F18.09	Temporizador de encendido acumulado	0 ~ 65535 Hours	1	0	o
F18.10	Temporizador de marcha acumulada	0 ~ 65535 Hours	1	0	o
F18.11	Control del temporizador de funcionamiento	0:Disabled 1:Enabled	1	0	o
F18.12	Temporizador de funcionamiento	0.1 ~ 6500.0Min	0.1Min	2.0Min	o
F18.13	Valor del temporizador de marcha	0.0 ~ 6500.0Min	0.1Min	1.0Min	o
F18.14	UP/DOWN keys function selection while monitor mode.	0: Setup frequency 1: PID set point 2 ~ 6: Reserved	1	0	o

F18.15	Frecuencia máximo de la supresión de la oscilación V/F.	0.00Hz ~ Maximum frequency	0.01Hz	50.00Hz	o
F18.16	Advanced control functions.	Unidad: Control de par con detector de velocidad 0:Disabled 1:Enabled Tens: Torque limit mode: 0: Torque limit according to inverter nominal current 1: Torque limit according to nominal torque current Centenas: Pulso rápido cuando la frecuencia es menor que la frecuencia mínima 0:Disabled 1:Enabled Miles: Bloqueo de la función incremento de bajo par establecido (sólo válido en modo de control de par) 0:Disabled 1:Enabled	1	0000	o
F18.17	Fan operation control.	Unit: Fan operation mode selection: 0: Intelligent mode 1: Always on 2: Only when the temperature is over 75ºC. Décimas: Fans speed control selection: 0: Intelligent speed control 1: Maximum speed.	1	0	o
F18.18	Ganancia del deslizamiento en el modo control de velocidad sin sensor.	50% ~ 200% (Only valid for F 00.24=1)	1%	100%	o
F18.19	Total energy consumption (low).	0 ~ 9999	1kwh	0	o
F18.20	Total energy consumption (high).	0 ~ 65535 (1 means 10000kwh)	10000 kwh	0	o
F18.21	Energy consumption correction factor.	50.0% ~ 200.0%	0.1%	100.0%	o
F18.22	Selección del canal de ajuste de la tensión en el control V/F independiente	0: Digital (Determined by F18.23) 1: AI1 analog input 2: AI2 analog input 3: Terminal de entrada digital UP/DOWN 4: Reserved 5: EAI1 analog input (Con tarjeta de expansión) 6: EAI2 analog input (Con tarjeta de expansión) 7: Entrada de frecuencia X8 (seleccionar el parámetro correcto de F08.25) 8: Entrada de anchura de pulsos PWM X8 (seleccionar el parámetro correcto de F08.25) Nota: el valor máximo de cada canal corresponde a la tensión nominal del motor	1	1	o
F18.23	Referencia digital del control V/F independiente	0.0% ~ 100.0%	0.1%	0.0%	o
F18.24	Ganancia del deslizamiento a baja frecuencia	30 ~ 300%	1%	100%	o

F19-Protection Functions Group					
Function code	Name	Set range	Min. unit	Factory default	Modification
F19.00	Turn on waiting time.	0.0 ~ 20.0s (set to 0 to disable this function)	0.1s	0.0s	×
F19.01	Number of self recovery trials.	0 ~ 10 (set to 0 to disable this function)	1	0	×
F19.02	Tiempo entre autorecuperaciones.	0.5 ~ 20.0s	0.1s	5.0s	×
F19.03	Motor overload protection action selection.	0:Alarm, continuous run 1:Alarm, stop according to stop function 2: Fault , free stop	1	2	o
F19.04	Motor overload detection coefficient.	10.0 ~ 2000.0%(related to motor nominal power)	0.1%	100.0%	o
F19.05	Prealarma de sobrecarga del variador	0: Detección durante todo el funcionamiento 1: Detección sólo con velocidad constante	1	0	o
F19.06	Nivel de detección de la prealarma de sobrecarga del variador	20 ~ 180% (de la intensidad nominal del variador)	1%	130%	o
F19.07	Tiempo de detección de la prealarma de sobrecarga del variador	0.0 ~ 20.0s	0.1s	5.0s	o
F19.08	Underload current factor.	0.0 ~ 120.0% (related to motor nominal power))	0.1%	50.0%	o
F19.09	Tiempo de detección de la bajacarga	0.1 ~ 60.0s	0.1s	2.0s	o
F19.10	Acción a la detección de la bajacarga	Unidad: Modo de detección 0: Desactivado 1: Siempre que haya orden de marcha 2: Sólo a velocidad constante Decenas: Acción a la detección de la bajacarga 0: Alarma, continúa la marcha 1: Alarma, paro según el modo de parada 2: Fallo, parada libre	1	0	o
F19.11	Protecciones de pérdida de fase de entrada, de salida y cortocircuito	Unidad: Protección de pérdida de fase de entrada 0: Desactivada 1: Paro, parada libre Decenas: Protección de pérdida de fase de salida 0: Desactivada 1: Paro, Parada libre Centenas: Protección de cortocircuito a tierra durante la electrificación. 0: Desactivada 1: Paro, Parada libre Miles: Protección de cortocircuito a tierra 0: Desactivada 1: Paro, Parada libre	1	1111	o

F19.12	Protección por sobretensión en la deceleración	0: Desactivada 1: Activada	1	1	×
F19.13	Coeficiente de detección de la protección por sobretensión en la deceleración	100 ~ 150% (de la tensión nominal del bus)	1%	125%	×
F19.14	Nivel de limitación automática del intensidad	50 ~ 230% (de la intensidad nominal del variador)	1%	170%	×
F19.15	Tasa de descenso de la frecuencia durante la limitación automática	0.00 ~ 99.99Hz/s	0.01 Hz/s	10.00 Hz/s	×
F19.16	Detección de la limitación automática de intensidad	0: Detección sólo a velocidad constante 1: Detección siempre que está en marcha	1	0	×
F19.17	Coeficiente de limitación rápida de la intensidad	150% ~ 250% (de la intensidad nominal del motor, seleccionar 250% para desactivar)	1%	230%	×
F19.18	Reducción de la frecuencia tras corte de alimentación	0: Desactivado 1: Activado	1	0	×
F19.19	Tasa de descenso de la frecuencia tras corte de alimentación	0.00 ~ 99.99Hz/s	0.01 Hz/s	10.00 Hz/s	×
F19.20	Tiempo de espera de restablecimiento de alimentación	0.00 ~ 10.00s	0.01s	0.10s	×
F19.21	Coeficiente de detección de corte de alimentación	60 ~ 100% (de la tensión nominal del variador)	1%	80%	×
F19.22	Tiempo máximo de reducción de frecuencia tras corte de alimentación	0.30 ~ 5.00s	0.01s	2.00s	×
F19.23	Acción a la activación del terminal de fallo externo	0: Alarma, continúa la marcha 1: Alarma, paro según el modo de parada 2: Fallo, parada libre	1	2	×
F19.24	Protección de orden de marcha por terminal tras la electrificación	0: Desactivada 1: Activada	1	0	×
F19.25	Nivel de detección de la señal de consigna del PID	0 ~ 100%	1%	0%	o
F19.26	Tiempo de detección de la pérdida de la señal de consigna del PID	0.0 ~ 500.0s	0.1s	0.5s	o
F19.27	Nivel de detección de la señal de realimentación del PID	0 ~ 100%	1%	12%	o
F19.28	Tiempo de detección de la pérdida de la señal de realimentación del PID	0.0 ~ 500.0s	0.1s	0.5s	o

F19.29	Nivel de detección de valor anormal de la señal de error del PID	0 ~ 100%	1%	50%	o
F19.30	Tiempo de detección de valor anormal de la señal de error del PID	0.0 ~ 500.0s	0.1s	0.5s	o
F19.31	Acciones de protección 1	Unidad: Acción ante la pérdida de la señal de consigna del PID 0: Desactivado 1: Alarma, continúa la marcha 2: Alarma, paro según modo de parada 3: Fallo, parada libre Decenas: Acción ante la pérdida de la señal de realimentación del PID 0: Desactivado 1: Alarma, continúa la marcha 2: Alarma, paro según modo de parada 3: Fallo, parada libre Centenas: Acción ante la detección de un valor anormal de la señal de error del PID 0: Desactivado 1: Alarma, continúa la marcha 2: Alarma, paro según modo de parada 3: Fallo, parada libre	1	000	o
F19.32	Acciones de protección 2	Unidad: Acción al detectar un error de comunicaciones 0: Alarma, continúa la marcha 1: Alarma, paro según modo de parada 2: Fallo, parada libre Decenas: Acción al detectar un error de memoria EEPROM 0: Alarma, continúa la marcha 1: Alarma, paro según modo de parada 2: Fallo, parada libre Centenas: Acción al detectar fallo del contactor. 0: Alarma, continúa la marcha 1: Alarma, paro según modo de parada 2: Fallo, parada libre Miles: Acción al detectar baja tensión de alimentación 0: Ninguna 1: Fallo, parada libre	1	0000	×
F19.33 - F19.34	Reservado				
F19.35	Reset de fallos durante el apagado y bloqueo durante el tiempo de recuperación.	Unidad: Indicación de fallo en el display durante el tiempo de recuperación 0: Activado 1: Desactivado Decenas: Reset de fallos durante el apagado: 0: Activado 1: Desactivado	1	00	×
F19.36	Selección de la frecuencia de funcionamiento tras la detección de una alarma	0: Continúa a la frecuencia a la que se detectó la alarma 1: Frecuencia máxima 2: Frecuencia mínima 3: Frecuencia de alarma	1	0	×

F19.37	Frecuencia de alarma	0.00Hz ~ frecuencia máxima	0.01Hz	10.00Hz	×
F19.38	Reservado				
F19.39	Porcentaje de detección del exceso de velocidad rotacional del motor	0.0 ~ 120.0% (de la frecuencia máxima)	0.1%	120.0%	o
F19.40	Tiempo de detección de exceso de velocidad rotacional del motor	0.00 ~ 20.00s (Selecccionar 0 para desactivar)	0.01s	0.00s	o
F19.41	Porcentaje de detección de desviación de la velocidad rotacional del motor	0.0 ~ 50.0% (de la frecuencia máxima)	0.1%	10.0%	o
F19.42	Tiempo de detección de desviación de la velocidad rotacional del motor	0.00 ~ 20.00s (Selecccionar 0 para desactivar)	0.01s	0.00s	o
F19.43	Coeficiente de supresión de sobretensión	0.0 ~ 100.0%	0.1%	90.0%	o
F19.44	Temperatura de funcionamiento continuo del ventilador	0 ~ 100ºC	1	45ºC	o

F20-Virtual Inputs and Outputs Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F20.00	VD1 virtual input terminal function selection.	Same as F08.18	1	0	o
F20.01	VD2 virtual input terminal function selection.	Same as F08.18	1	0	o
F20.02	VD3 virtual input terminal function selection.	Same as F08.18	1	0	o
F20.03	VD4 virtual input terminal function selection.	Same as F08.18	1	0	o
F20.04	VD5 virtual input terminal function selection.	Same as F08.18	1	0	o
F20.05	VI1 virtual output function selection.	Same as F09.00	1	0	o
F20.06	VI2 virtual output function selection.	Same as F09.00	1	0	o
F20.07	VI3 virtual output function selection.	Same as F09.00	1	0	o
F20.08	VI4 virtual output function selection.	Same as F09.00	1	0	o
F20.09	VI5 virtual output function selection.	Same as F09.00	1	0	o
F20.10	VD1 virtual output deactivation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.11	VD2 virtual output deactivation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o

F20.12	VD3 virtual output deactivation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.13	VD4 virtual output deactivation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.14	VD5 virtual output deactivation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.15	VD1 virtual output activation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.16	VD2 virtual output activation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.17	VD3 virtual output activation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.18	VD4 virtual output activation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.19	VD5 virtual output activation delay.	0.00 ~ 6000.00s	0.01s	0.00s	o
F20.20	Virtual digital inputs VDI activation mask.	00 ~ FF	1	0	o
F20.21	Virtual digital inputs VDI manual activation mask.	00 ~ FF	1	0	o
F20.22	Connection logic between virtual digital inputs and virtual digital outputs.	00~FF Bit0: Connection logic between VDI1 & VDO1 0: Positive 1: Negative Bit1: Connection logic between VDI2 & VDO2 0: Positive 1: Negative Bit2: Connection logic between VDI3 & VDO3 0: Positive 1: Negative Bit3: Connection logic between VDI4 & VDO4 0: Positive 1: Negative Bit4: Connection logic between VDI5 & VDO5 y VDO5 0: Positive 1: Negative	1	00	o

F21-Extended Card Analog Inputs EAI Functions Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F21.00	EAI1 Filtering time.	0 ~ 9.999s	0.001s	0.050s	o
F21.01	EAI1 Gain.	0 ~ 9.999	0.001s	1.003	o
F21.02	EAI1 Bias.	0.0 ~ 100.0%	0.10%	0.00%	o
F21.03	EAI2 Filtering time.	0 ~ 9.999s	0.001s	0.050s	o
F21.04	EAI2 Gain.	0 ~ 9.999	1	1.003	o
F21.05	EAI2 Bias.	0.0 ~ 100.0%	0.10%	0.00%	o

F21.06	Extended card analog inputs EAI bias polarization.	Unit: EAI1 bias polarization 0: Positive 1: Negative Hundred: EAI2 bias polarization 0: Positive 1: Negative	1	00	o

F24-Extended Card Analog Outputs EAO Functions Group					
Function code	Name	Set range	Min. unit	Factory default	Modification
F24.00	EAO1 function selection.	0 ~ 25	1	0	o
F24.01	EAO2 function selection.	0 ~ 25	1	0	o
F24.02	EDO1 function selection.	0 ~ 25	1	0	o
F24.03	EAO1 filtering time.	0 ~ 20.0s	0.1s	0.0s	o
F24.04	EAO2 polarization	0 ~ 2.00	0.01	1.00	o
F24.05	EAO2 bias	0 ~ 100.0%	0.10%	0.00%	o
F24.06	EAO1 filtering time.	0 ~ 20.0s	0.1s	0.0s	o
F24.07	EAO1 polarization	0 ~ 2.00	0.01	1.00	o
F24.08	EAO1 bias	0 ~ 100.0%	0.10%	0.00%	o
F24.09 ~ F24.13	Reserved				

F25-User Defined Functions Group					
Function code	Name	Set range	Min. unit	Factory default	Modification
F25.00	User defined function 1	F00.00 ~ F25.xx	0.01	25.00	o
F25.01	User defined function 2	F00.00 ~ F25.xx	0.01	25.00	o
F25.02	User defined function 3	F00.00 ~ F25.xx	0.01	25.00	o
F25.03	User defined function 4	F00.00 ~ F25.xx	0.01	25.00	o
F25.04	User defined function 5	F00.00 ~ F25.xx	0.01	25.00	o
F25.05	User defined function 6	F00.00 ~ F25.xx	0.01	25.00	o
F25.06	User defined function 7	F00.00 ~ F25.xx	0.01	25.00	o
F25.07	User defined function 8	F00.00 ~ F25.xx	0.01	25.00	o
F25.08	User defined function 9	F00.00 ~ F25.xx	0.01	25.00	o
F25.09	User defined function 10	F00.00 ~ F25.xx	0.01	25.00	o
F25.10	User defined function 11	F00.00 ~ F25.xx	0.01	25.00	o
F25.11	User defined function 12	F00.00 ~ F25.xx	0.01	25.00	o
F25.12	User defined function 13	F00.00 ~ F25.xx	0.01	25.00	o
F25.13	User defined function 14	F00.00 ~ F25.xx	0.01	25.00	o
F25.14	User defined function 15	F00.00 ~ F25.xx	0.01	25.00	o
F25.15	User defined function 16	F00.00 ~ F25.xx	0.01	25.00	o
F25.16	User defined function 17	F00.00 ~ F25.xx	0.01	25.00	o
F25.17	User defined function 18	F00.00 ~ F25.xx	0.01	25.00	o
F25.18	User defined function 19	F00.00 ~ F25.xx	0.01	25.00	o
F25.19	User defined function 20	F00.00 ~ F25.xx	0.01	25.00	o
F25.20	User defined function 21	F00.00 ~ F25.xx	0.01	25.00	o
F25.21	User defined function 22	F00.00 ~ F25.xx	0.01	25.00	o
F25.22	User defined function 23	F00.00 ~ F25.xx	0.01	25.00	o

F25.23	User defined function 24	F00.00 ~ F25.xx	0.01	25.00	o
F25.24	User defined function 25	F00.00 ~ F25.xx	0.01	25.00	o
F25.25	User defined function 26	F00.00 ~ F25.xx	0.01	25.00	o
F25.26	User defined function 27	F00.00 ~ F25.xx	0.01	25.00	o
F25.27	User defined function 28	F00.00 ~ F25.xx	0.01	25.00	o
F25.28	User defined function 29	F00.00 ~ F25.xx	0.01	25.00	o
F25.29	User defined function 30	F00.00 ~ F25.xx	0.01	25.00	o

F26-Grupo de Funciones de Registro de Fallos

Function code	Name	Set range	Min. unit	Factory default	Modification
F26.00	Last registered fault.	0: No fault registered 1: Overload during acceleration 2: Overload during deceleration 3: Overload at constant speed 4: Overvoltage during acceleration 5: Overvoltage during deceleration 6: Overvoltage at constant speed 7: Overvoltage while stop 8: Voltage lost while running 9: Inverter overload 10: Motor overload 11: Motor underload 12: Input phase lost 13: Motor phase lost 14: Internal inverted protection 15: Shortcircuit to ground during running 16: Shortcircuit to ground after power on 17: Inverter overheating 18: External fault 19: Current detection circuit fault 20: External interference 21: Internal interference 22: PID provision signal lost 23: PID feedback signal lost 24: PID abnormal signal value 25: Running terminal active during power on protection 26: Communication fault 27~29: Reserved 30: EEPROM read/write fault 31: Temperature sensor fault 32: Motor autotune fault 33: Contator fault 34: Factory fault 1 35: Factory fault 2 36: Capacitors overheating (models with this protection) 37: Reserved 38: Overspeed protection 39: Speed out of allowed range protection 40: Reserved 41: Analog input disconnection detection 42~50: Reserved	1	0	*

F26.01	Penultimate registered fault.	Same as F26.00	1	0	*
F26.02	Third to last registered fault.	Same as F26.00	1	0	*
F26.03	Fourth to last registered fault.	Same as F26.00	1	0	*
F26.04	Last fault setup frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	*
F26.05	Last fault output frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	*
F26.06	Last fault output current.	0.0 ~ 6553.5A	0.1A	0.0A	*
F26.07	Last fault DC bus voltage.	0.0 ~ 6553.5V	0.1V	0.0V	*
F26.08	Last fault VFD temperature.	0 ~ 125ºC	1ºC	0ºC	*
F26.09	Last fault terminal inputs.			0	*
F26.10	Last fault working time.	0 ~ 65535min	1min	0min	*
F26.11	Penultimate fault setup frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	*
F26.12	Penultimate fault output frequency.	0.00Hz ~ maximum frequency	0.01Hz	0.00Hz	*
F26.13	Penultimate fault output current.	0.0 ~ 6553.5A	0.1A	0.0A	*
F26.14	Penultimate DC Bus voltage.	0.0 ~ 6553.5V	0.1V	0.0V	*
F26.15	Penultimate fault VFD temperature.	0 ~ 125ºC	1ºC	0ºC	*
F26.16	Penultimate fault digital inputs status.			0	*
F26.17	Penultimate fault working time.	0 ~ 65535min	1min	0min	*

F27-Passwords Function Group					
Function code	**Name**	**Set range**	**Min. unit**	**Factory default**	**Modification**
F27.00	User password.	00000 ~ 65535	1	0	o
F27.01	Manufacturer password.	00000 ~ 65535	1	0	o

C-Visualization Parameter Group			
Función	Nombre	Valores	Valor de Fábrica
C-00	Visualization parameter F00.01	Frecuencia de salida	51
C-01	Visualization parameter F00.02	Referencia de frecuencia	2
C-02	Visualization parameter F00.03	Intensidad de salida	4
C-03	Visualization parameter F00.04	Tensión de salida	5
C-04	Visualization parameter F00.05	Tensión del BUS DC	6
C-05	Visualization parameter F00.06	Temperatura del inversor	9

C-Grupo de Parámetros de Visualización Durante la Parada			
Función	Nombre	Valores	Valor de Fábrica
C-00	Visualization parameter F00.07	Referencia de frencuencia	2
C-01	Visualization parameter F00.08	Tensión del BUS DC	6
C-02	Visualization parameter F00.09	Potencia nominal	48
C-03	Visualization parameter F00.10	Estado de los terminales de entrada	14
C-04	Visualization parameter F00.11	Entrada analógica AI1	20
C-05	Visualization parameter F00.12	Temperatura del inversor	9

7. Troubleshooting

7.1. Faults and possible solutions

The TDS600PV AC inverters have been implemented with several protection and security functions. When these protection functions detect a potential fault situation, the AC drive will enter the fault mode and it will display the fault or alarm code in the display. In case an alarm is detected, the display will show A-XX, on the other hand, when a fault is detected, the display will show E-XX, where XX is a numeric code that indicates the alarm or fault detected. In the table 7-1 are shown all the possible fault and alarms codes, the most probable causes of each of them and possible solutions. It has also implemented a record of the last four faults detected and a detailed record of the status of the AC drive for the two last faults. These records do not save the alarm codes. The alarms can only be cleared if its root cause is solved. When an alarm of fault is detected, you must look for the root cause and find an adequate solution. If you have any difficulties during the troubleshooting of the alarm or fault or to find the correct solution, do contact our customer service, where we will give you all the information and advices to solve the problem.

Code	Description	Possible cause	Possible solution
E-01	Overload during acceleration.	Acceleration time too short	Increase acceleration time
		Wrong V/F curve	Choose the right V/F curve adjustment for your application. Check the torque boost functions.
		Motor rotating by load inertia at starting	Enable the starting speed detection function.
		Input voltage too low	Check power supply voltage.
		AC inverter output rating power too low	Install a greater power AC drive.
		Output phase loss during acceleration	Check the output wiring.
E-02	Overload during deceleration	Deceleration time too short	Increase deceleration time
		Load inertia too high	Check or reduce the load inertia
		AC inverter output rating power too low	Increase the acceleration or deceleration time
E-03	Overload at constant speed	Load changed too abruptly	Check the power supply
		Acceleration or deceleration time too short	Increase the acceleration or deceleration time
		Input power source inadequate	Check the power supply
		AC inverter output rating power too low	Choose a greater power AC drive

E-04	Overvoltage during acceleration.	Abnormal input voltage.	Check the power supply
		Acceleration time too short.	Increase acceleration time
		Motor rotating by load inertia at starting.	Enable the starting speed detection function
E-05	Overvoltage during deceleration.	Deceleration time too short.	Increase deceleration time
		Load inertia too high.	Increase the braking current or increase the braking time
E-06	Sobretensión a velocidad constante.	Abnormal input voltage.	Check the power supply
		Acceleration or deceleration time too short.	Increase acceleration time o deceleración
		Input voltage changed abnormally.	Install an input reactor
		Load inertia too high.	Enable the DC braking
E-07	Overvoltage in the supply.	Abnormal input voltage.	Check the power supply or Contact our customer service
E-08	Undervoltage in the supply.	Input voltage too low.	Check the power supply
E-09	Overload of the inverter.	Acceleration time too short.	Increase the acceleration time
		The breaking DC current is too high.	Decrease the DC braking current or increase the braking time
		Wrong V/F curve.	Choose the right V/F curve adjustment for your application. Check the torque boost functions.
		Motor rotating by load inertia at starting.	Enable the starting speed detection function.
		Insufficient power supply.	Check the power supply.
		Load inertia too high.	Choose a greater power AC drive.
E-10 (A-10)	Overload of the motor.	Wrong V/F curve.	Choose the right V/F curve adjustment for your application. Check the torque boost functions.
		Insufficient power supply.	Check the power supply
		Motor turning at low speed and big load.	Install a motor with greater mechanical reduction for long running times at low speed.
		Incorrect overload detection factor.	Check the torque boost functions.
		Locked motor or load increased abruptly.	Check the motor load.
E-11 (A-11)	Underload.	Output current is below the underload threshold.	Check F19.08 and F19.09 functions and the motor load.
		Motor has been disconnected from load.	Check the motor load.
E-12	Input phase lost.	Some of the input phases are faulty or missing.	Check the input source.
		Power board fault.	Contact our customer service.
		Control board fault.	Contact our customer service.

E-13	Output phase lost.	Some of the output wires has been disconnected.	Check the output wiring.
		Output current is not the same in the three phases.	Check that the output load is balanced.
		Power board fault.	Contact our customer service
		Control board fault.	Contact our customer service
E-14	Inverter module protection.	Transient overcurrent.	Vea las posibles soluciones referentes a sobrecarga
		Short-circuit between output phases or between output phases and ground.	Check the wiring
		Locked fan or ventilation slots.	Check ventilation slots and fan
		Environmental temperature too high.	Reduce environmental temperature
		Lose input or output terminal.	Check the wiring
		Abnormal current waveform detected.	Check the wiring
		Power board fault.	Contact our customer service
		Control board fault.	Contact our customer service
E-15	Short-circuit to ground while operating.	Short-circuit to ground in the output wiring or motor windings.	Replace output wiring.
		AC drive fault.	Contact our customer service.
E-16	Short-circuit to ground during power on.	Short-circuit to ground in the output wiring or motor windings.	Replace the motor wiring.
		Incorrect or faulty wiring.	Check the motor and input wiring.
		AC drive fault.	Contact our customer service.
E-17 (A-17)	Overheating.	A-17 alarm during more than 30 minutes.	Check ventilation slots and airflow.
		Locked ventilation slots.	Check ventilation slots and airflow.
		Environmental temperature is too high.	Improve cooling or lower the switching frequency.
		Faulty fan.	Replace fan.
E-18 (A-18)	External equipment fault.	External equipment signal detected.	Check the external devices.
E-19	Current measuring circuit fault.	Incorrect or lose wiring.	Check and rewire.
		AC drive fault.	Contacte con el servicio de postventa
E-20	External interference fault.	Abnormal fault.	Press "STOP/RESET" to clear the fault. If the fault persist, contact our customer service.
E-21	Internal interference fault.	Internal interference.	Turn off and on the AC drive. If the fault persists, contact our customer service.
E-22 (A-22)	PID reference signal lost.	Incorrect PID reference signal.	Check related functions.
		Lost PID reference signal	Check the wiring
		Control board fault	Contact our customer service

E-23 (A-23)	PID feedback signal lost.	Feedback PID signal out of the configured range.	Check related functions.
		External signal disconnected.	Check the wiring.
		Control board fault.	Contact our customer service.
E-24 (A-24)	Abnormal PID error signal.	Feedback PID signal out of the configured range.	Check related functions.
		Control board fault.	Contact our customer service.
E-25	Run command protection at power on.	Run command detected while powering the AC drive.	Check the run command signal.
E-26 (A-26)	Communication error.	Incorrect baud rate.	Check the baud rate.
		Communication error.	Press "STOP/RESET" to clear the fault. If the fault persist, contact our customer service.
		Incorrect parameters.	Check the F05.04 and F05.05 functions.
		Master device fault.	Check master device.
E-30 (A-30)	EEPROM fault.	Error reading or writing the EEPROM.	Press (STOP/RESET) to clear the fault and contact our customer service.
E-31	Temperature detection circuit fault.	Temperature detection circuit fault.	Contact our customer service.
		Temperature sensor fault	Contact our customer service.
E-32	AUTO-TUNE fault.	Motor parameters do not match the motor nameplate.	Check the motor parameters.
		Abnormal output current.	Install the right rated power AC drive for the application.
		Incorrect motor wiring.	Check the motor wiring.
E-33 (A-33)	Contactor fault.	Control board fault.	Contact our customer service.
		Faulty contactor.	Replace contactor.
E-34	Factory fault 1	Used during fabrication.	Used during fabrication.
E-35	Factory fault 2	Used during fabrication.	Used during fabrication.
E-36 (A-36)	Overheating of the input capacitors.	Poor ventilated environment.	Improve the ventilation of the environment.
		Rated power of the AC drive too low for the application.	Install the right rated power AC drive for the application.
		Faulty fan.	Replace fan.
E-38	Over speed.	Acceleration time too short.	Increase acceleration time.
		AC drive rated power too low.	Install a greater power AC drive.
		Overspeed detection functions F19.39 and F19.40, incorrectly adjusted.	Set the configurations functions accordingly to the application.
E-39	Desviación de la velocidad demasiado alta	Acceleration or deceleration time too short.	Increase the acceleration or deceleration time.
		AC drive rated power too low.	Install a greater power AC drive.
		Speed range detection functions F19.41 and F19.42, incorrectly adjusted.	Set the configurations functions accordingly to the application.

E-41	Analog signal lost fault.	AI1 or AI2 analog input signal out of range or lose terminals.	Check the wiring of analog inputs.
E-42 (A-42)	Low frequency protection.	Sun intensity too low or F12.15, F12.16 and F12.17 functions incorrectly adjusted.	Set the related function accordingly to the weather conditions.
E-43 (A-43)	Underload protection.	Motor load too low or F12.25, F12.26 and F12.27 functions incorrectly adjusted.	Set the related function accordingly to the weather conditions.
E-44 (A-44)	Overload protection.	Motor load too high or F12.21, F12.22 and F12.23 functions incorrectly adjusted.	Set the related function accordingly to the weather conditions.
E-45 (A-45)	Minimum power protection.	Motor load too low or F12.18 function incorrectly adjusted.	Set the related function accordingly to the weather conditions.
A-46	Full water function.	Digital input with 70 function is clear or digital input with 71 function is permanently set.	Check the status of the inputs configured as 70 and 71 input terminal functions.
A-47	Low voltage protection.	Sun intensity too low or F12.11, F12.13 y F12.14 functions incorrectly adjusted.	Set the related function accordingly to the weather conditions.
A-51	Main and auxiliary frequency channel selection conflict.	Configuration error.	F01.00 and F01.03 cannot have the same value, except digital input.
A-52	Digital input function conflict.	Digital inputs with the same function.	Check the digital inputs function configuration.
A-53	Runtime limit reached.	Accumulated runtime limit reached.	Contact our customer service.
LOCh1	Control panel lock protection.	Control panel lock protection.	Pressed ESC MENU during two seconds.

7.2. Faults record

The TDS600PV AC drives have a fault record that keeps the last 4 faults detected and it also saves detailed information of the operation of the AC drive when the last two faults were detected. Please use these registers to solve the cause of the faults. These registers are stored in the F26 functions as indicated in the table below:

Function	Description	Function	Description
F26.00	Last fault detected	F26.09	Digital input status of the last fault
F26.01	Second to last fault detected	F26.10	Runtime of the last fault
F26.02	Third to last fault detected	F26.11	Frequency reference of the second to last fault
F26.03	Fourth to last fault detected	F26.12	Output frequency of the second to last fault
F26.04	Frequency reference of the last fault	F26.13	Output current of the second to last fault
F26.05	Output frequency of the last fault	F26.14	DC bus voltage of the second to last fault
F26.06	Output current of the last fault	F26.15	AC Drive temperature of the second to last fault
F26.07	DC bus voltage of the last fault	F26.16	Digital input status of the second to last fault
F26.08	AC Drive temperature of the last fault	F26.17	Runtime of the second to last fault

Tabla 8-1 Mantenimiento periódico

7.3. Fault reset



01. **Antes del reinicio, debe buscar el motivo de la fallo y solucionarlo, de lo contrario, puede causar daños permanentes al variador.**

02. **Si no se puede restablecer o si el fallo y se produce nuevamente después del reinicio, se debe buscar la razón, ya que el reinicio continuo dañará el variador.**

03. **El reinicio debe realizarse 5 minutos después de la sobrecarga, para tener protección contra sobrecalentamiento.**

04. **Por el fallo E-14, no debe reiniciar, el cableado del motor debe ser verificado y después de esto, reinicie el variador.**

05. **Cuando hay un fallo E-16 después de la conexión, no reinicie el variador directamente. Necesita verificar si el cableado de entrada y salida está correcto.**

To continue with the normal operation of the AC drive after the cause of the fault has been solved, you can follow any of the following actions:

01. Set a digital input configured as fault reset function (see F08 functions group).

02. Press the (reset button) while the fault code is on the display.

03. By communication port (see Appendix A).

04. Disconnecting the input supply.

7.4. Alarms reset

The alarms can only be cleared if the origin of them is solved, so you must look for their cause and solve them. The alarms cannot be cleared as the faults.



1. **El fallo E-16 no puede resetearse sin apagar el variador.**

2. **Los fallos de sobrecarga, cortocircuito a tierra en marcha, sólo pueden resetearse pasados, al menos, 2 segundos de espera.**

8. Maintenance

8.1. Maintenance routine

The TDS600PV AC drives must be used as explained in this instruction manual to ensure a proper and prolonged operation. During the operation, the temperature, humidity, vibration and the aging of some components can affect the performance and cause a fault. To avoid this, it is recommended to have an inspection and maintenance routine.

Period		Check
Daily	Monthly	
√		(1) Keep your AC drive clean and dry. (2) Clean the housing of your AC drive from dust and avoid it entering through the ventilation slots, especially if it is metallic dust. (3) Clean any oil inside the fan and ventilation slots.
	√	Check that the ventilation slots are not blocked.
	√	Check that all terminals are tightened.
	√	Check for any corrosion, damage or overheating in the wiring.
√		Compruebe que no hay signos de.
√		Check that the fans operates correctly.
√		Check that the inverter does not overheat.
√		Check that the motor does not emit any abnormal sound.
√		Check that the motor does not have any abnormal vibration.
	√	Check that the terminals do not have sign of electric arc between them.
	√	Check that all the protection elements installed work correctly.

Tabla A-1 Ejemplo de diagrama de red

It is recommended the following equipment to carry out the routine maintenance:

AC voltmeter, DC voltmeter, Clamp meter

8.2. Inspection and damaged parts substitution

Some of the parts of your VDF wear away with time and usage, making the total performance degrade. To make sure that your VFD keeps working correctly for a long time, it is recommended to periodically check all these components and replace them if needed:

01. Fan

Abnormal noise or vibrations can be the first sign of wear and indication that it will need a replacement. Carefully clean the propeller and the ventilation slots. If the noise or vibrations is still present after the cleaning, replace the fan.

02. Electrolytic capacitors

If during the operation of the AC drive the load changes repeatedly, this generates in consequence variations in the current needed to maintain the operations and so an increase in the temperature of the input filter capacitors that make them age faster. Then a replacement is needed to get the optimum level of performance.

8.3. Repairs

01. Toscano offers free of charge repairs during the warranty reparations of your TDS600PV AC drive as long as it has been installed, operated and maintained according to the indications of this instruction manual.

02. However, some charges might be applied if during the troubleshooting some of these circumstances are detected:

a. When the AC drive damages has been caused by not using the drive according to the indications in this instruction manual.

b. Damages caused by operating the AC drive in functions not suitable for it.

c. Damages caused by unauthorized repairs, out of the official customer service.

d. Damages caused by storing the AC drive without the proper care, drops… after the purchase.

e. Damages caused by natural disasters or its consequences, like high magnitude transient overvoltage, lightning, floods, earthquakes, storms...

f. If the nameplate of the AC drive has been removed or damaged.

03. You can contact our customer service if you have any doubt or question

about the installation, operation, maintenance or you have a problem and need assistance.

8.4. Storage

Special care must be taken if the AC drive is going to be taken out of service temporally or for longs periods of time after it purchase:

01. Avoid storing the AC drive in places subjected to high temperatures, high humidity, dusty environments or with metal dust and ensure a good ventilation in the storage place.

02. Store the AC drive for long periods of time degrades the input filter electrolytic capacitors. To avoid this characteristic, ensure that the AC drive is powered at least once a year for at least one hour. It is recommended to increase the input voltage bit by bit continuously until the rated input voltage of the concrete AC drive model is reached. Do not connect the motor nor run the AC drive.



En este capítulo se hará un uso intensivo de la notación hexadecimal. Cuando un número es representado en notación hexadecimal se indicará con una H al final del número.

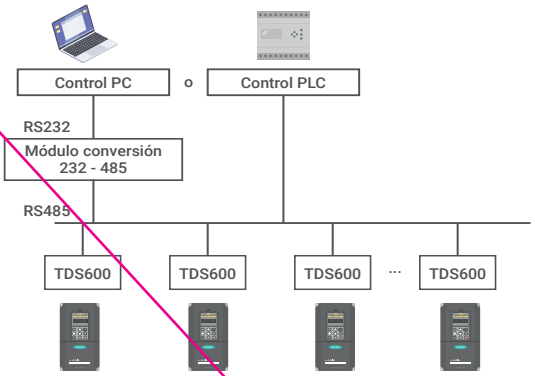
Apéndice A. MODBUS Protocol communication

A.1. Introduction

The TDS600PV VFD series are equipped with the MODBUS communication protocol over RS-485. By means of this protocol, the VFD can be integrated into industrial control processes that can be supervised and controlled externally and remotely using HMI, PCs, PLCs... a centralized monitoring of the entire installation can also be done using the communication port.

The standard MODBUS over RS-485 is very extended in the industry and this appendix explains how to implement the communication and mapping of the functions and parameters.

A.2. Network three



A.3. Communication characteristics

Los variadores TDS600 sólo pueden utilizarse como dispositivos RS-485 esclavos. Puede iniciar la comunicación desde un PC, un PLC o un HMI. Algunos detalles importantes de la comunicación son:

01. PC, un PLC o un HMI como dispositivo maestro y cada variador es un dispositivo esclavo de la red.

02. Los variadores TDS600 no responden cuando se envían comandos a la dirección 0.

03. La dirección local, la velocidad de transmisión y el formato de la comunicación pueden elegirse en el grupo de funciones F05.XX.

04. Los variadores TDS600 incorporan la interfaz RS-485 con conector RJ45 y con bornas.

05. El modo de comunicación es semidúplex asíncrono y por defecto viene configurado como Modbus RTU 8-N-1 a 9600bps.

06. Los únicos comandos Modbus válidos son 03 y 06.

A.4. Communication setup

The communication is asynchronous and semiduplex. The communication is set up as 8-N-1 by default. All the details referring the communication can be configured in the F05.XX functions group.

Function code	Name	Set range	Min. unit	Factory default	Modification
F05.00	Communication protocol selection	0: Modbus. 1: Reservado. 2: Profibus (Tarjeta de expansión opcional). 3: CANlink (Tarjeta de expansión opcional). 4: CANopen (Tarjeta de expansión opcional). 5: Reservado. 6: Reservado.	1	0	×
F05.01	Baudrate	Unidad: Velocidad del protocolo propio y de Modbus 0: 300BPS 1: 600BPS 2: 1200BPS 3: 2400BPS 4: 4800BPS 5: 9600BPS 6: 19200BPS 7: 38400BPS 8: 57600BPS 9:115200BPS	1	5	×
F05.02	Communication format	Unidad: Formato del protocolo Modbus 0: 1-8-1, RTU sin paridad 1: 1-8-1, RTU paridad impar 2: 1-8-1, RTU paridad par 3: 1-7-1, ASCII sin paridad 4: 1-7-1, ASCII paridad impar 5: 1-7-1, ASCII paridad par		0	×
F05.03	Local Address	1 ~ 247	1	1	×

The general structure for the messages from master device to the VFD is as in the table below:

Communication start	3.5 characters pause
Slave address	0..247
MODBUS function code	03H: Read
Data	Packet content: Function address Registers quantity Register value or registers values
CRC code, low byte	Check value 16 bits
CRC code, high byte	
Fin de la comunicación	Pausa de 3.5 caracteres

A.5. Functions mapping

A.5.1. Functions list F00-F26

Para realizar cualquier operación sobre las funciones de control del variador deberá enviar mensajes Modbus desde el dispositivo maestro. Los códigos de función Modbus válidos son 03H para leer hasta 10 registros consecutivos y 06H para escribir registros. Hay una relación directa entre el código de la funciones de configuración del variador y la dirección del registro Modbus, es decir para cada código de función hay un registro a consultar. La dirección del registro se construye conociendo la función que se desea consultar, de la siguiente forma: el código de la función FXX.YY se convierte en la dirección del registro XXYYH, por ejemplo, la dirección del registro correspondiente a la función F01.06 es 0106H, de la función F03.21 es 0315H, de esta forma puede consultar y escribir el valor del parámetro de cada función del variador.

A.5.1.1. Lectura de funciones

Puede leer el valor del parámetro de hasta diez funciones de su variador con un sólo mensaje Modbus. La estructura de de la trama de comunicación para leer valores del variador es la siguiente, junto con un ejemplo para leer dos registros contiguos del variador con dirección 1, desde el registro 0000H que corresponde a la función F00.00:

Estructura	Ejemplo
Dirección	01H
Función	03H
Registro byte alto	00H
Registro byte bajo	00H
Número de registros a leer byte alto	00H
Número de registros a leer byte bajo	02H
CRC byte bajo	C4H
CRC byte alto	OBH

La respuesta del variador es:

Estructura	Ejemplo
Dirección	01H
Función	03H
Número de bytes de respuesta	04H
Valor del registro 0000H byte alto	00H
Valor del registro 0000H byte bajo	00H
Valor del registro 0001H byte bajo	00H
Valor del registro 0001H byte alto	03H
CRC byte bajo	BAH
CRC byte alto	32H

La dirección de la referencia de frecuencia del canal de comunicaciones es 1E01H
La dirección de la consigna de par del canal de comunicaciones 1D01H
La dirección de la consigna del PID del canal de comunicaciones 1D00H

A.5.2.2. Escritura de funciones

Puede escribir el valor del parámetro de una única función de su variador por cada mensaje Modbus. La estructura de la trama de comunicación para escribir el valor de un parámetro del variador es la siguiente, junto con un ejemplo de comunicación en la que el máster le pide al variador con dirección 2 escribir el valor 1388H (5000 en notación decimal) en la dirección del registro 0101H que corresponde a la función F01.01:

Estructura	Ejemplo
Dirección	02H
Función	06H
Registro, byte alto	01H
Registro, byte bajo	01H
Valor a escribir, byte bajo	13H
Valor a escribir, byte alto	88H
CRC byte bajo	D4H
CRC byte alto	93H

La respuesta del variador es:

Estructura	Ejemplo
Dirección	02H
Función	06H
Registro, byte alto	01H
Registro, byte bajo	01H
Valor escrito, byte bajo	13H
Valor escrito, byte alto	88H
CRC byte bajo	BAH
CRC byte alto	32H

A.5.2. Control and status registers

Nombre	Dirección	Tipo	Descripción
Registro de control	1E00H	Lectura y escritura	1: Reservado
			2: Quitar orden de marcha Jog
			3: Orden de marcha Jog directa
			4: Orden de marcha Jog inversa
			5: Marcha
			6: Detenido
			7: Dirección directa de la marcha
			8: Dirección inversa de la marcha
			9: Reseto de fallos
			10: Reservado
Referencia de frecuencia de comunicaciones	1E01H	Lectura y escritura	F01.02 centenas=0: 5000 representa 50.00Hz F01.02 centenas=1: 10000 representa F01.11
Registro de estado del variador	1E02H	Lectura	BIT0: Alimentación activa BIT1: Orden de marcha activa BIT2: Orden de marcha Jog activa BIT3: Marcha BIT4: Dirección de rotación inversa BIT5: Orden de marcha inversa BIT6: Freno DC activo BIT7: Aceleración BIT8: Deceleración BIT9: Alarma BIT10: Fallo BIT11: Limitación de intensidad BIT12: Auto recuperación de fallos BIT13: Auto Tune BIT14: Parada libre BIT15: Seguimiento de la velocidad de rotación
Código de fallo	1E03H	Lectura	0: Sin alarma 1 ~ 50: Código de fallo o alarma (ver capítulo)

Consulte las normativas que cumplen nuestros productos y descargue su declaración de conformidad en:
toscano.es/standards