

ZDM-2HA865

MANUAL SPECIFICATION



Before using this product, it is strongly recommended that you read the following safety precautions.

And after fully understanding all the contents of the manual, start using it again. This driver is suitable for various small and medium sized automation equipment and instruments such as:

Woodworking engraving machine, wire harness processing machine, laser cutting machine, high-speed plotter, small CNC machine tools, automatic assembly equipment, etc. Low noise required, smooth operation,

High speed response equipment is especially effective.

Safety precautions

- this product belongs to professional electrical equipment and should be installed by professional technicians.

Debug, operate, and maintain. Improper use will result in electric shock, fire and explosion dangerous....

- this product is powered by dc power supply. Please make sure that the positive and negative power supply is correct and then energize

- do not plug and unplug the connection cable, and no cable short circuit is allowed in the power supply

Will result in product damage;

- the drive is power equipment, which cannot be placed next to the heating equipment, so as to keep working as much as possible

For environmental ventilation;

- the driver is not sealed, so dust, oil mist, corrosive gas and humidity should be avoided

Large and strong vibration place, combustible gas and conductive dust;

Brief Introduction:

ZDM-2HA865 is a new generation DSP digital step closed - loop driver

Using advanced vector closed loop control technology, the traditional open loop stepper motor is completely overcome

The problem of step loss, and significantly improve the high-speed performance of stepper motor, reduce the motor

The heating degree and reduce the vibration of the motor, further improve the working speed of the equipment

Degree and precision, reduce equipment energy consumption. In addition, when the motor is continuously overloaded,

The driver will output an alarm signal with the same reliability as the ac servo system.

Suitable motor mounting dimensions with traditional (57/60) and 86 series stepper motors

Fully compatible, traditional open loop stepper drive scheme can achieve seamless upgrades, and

Compared with the traditional ac servo system, the cost is very high.

Technical characteristics

- New DSP chip for 32-bit motor control;
- Advanced vector closed loop control technology;
- LED digital tube display button operation is intuitive and easy to operate;
- Static current and dynamic current can be set arbitrarily (0--7.2A range);
- Adaptive drive (57/60) and 86 series hybrid closed loop stepper motors;
- Input/output of photoelectric isolation signal;
- Pulse response frequency up to 200KHz;
- 16 general subdivision options with a maximum of 256 subdivisions(51200 pulses/rotations);
- provide electronic gear matching to various pulse sources (any subdivided value);
- protection of over-current, over-heat, over-voltage and tracking error;

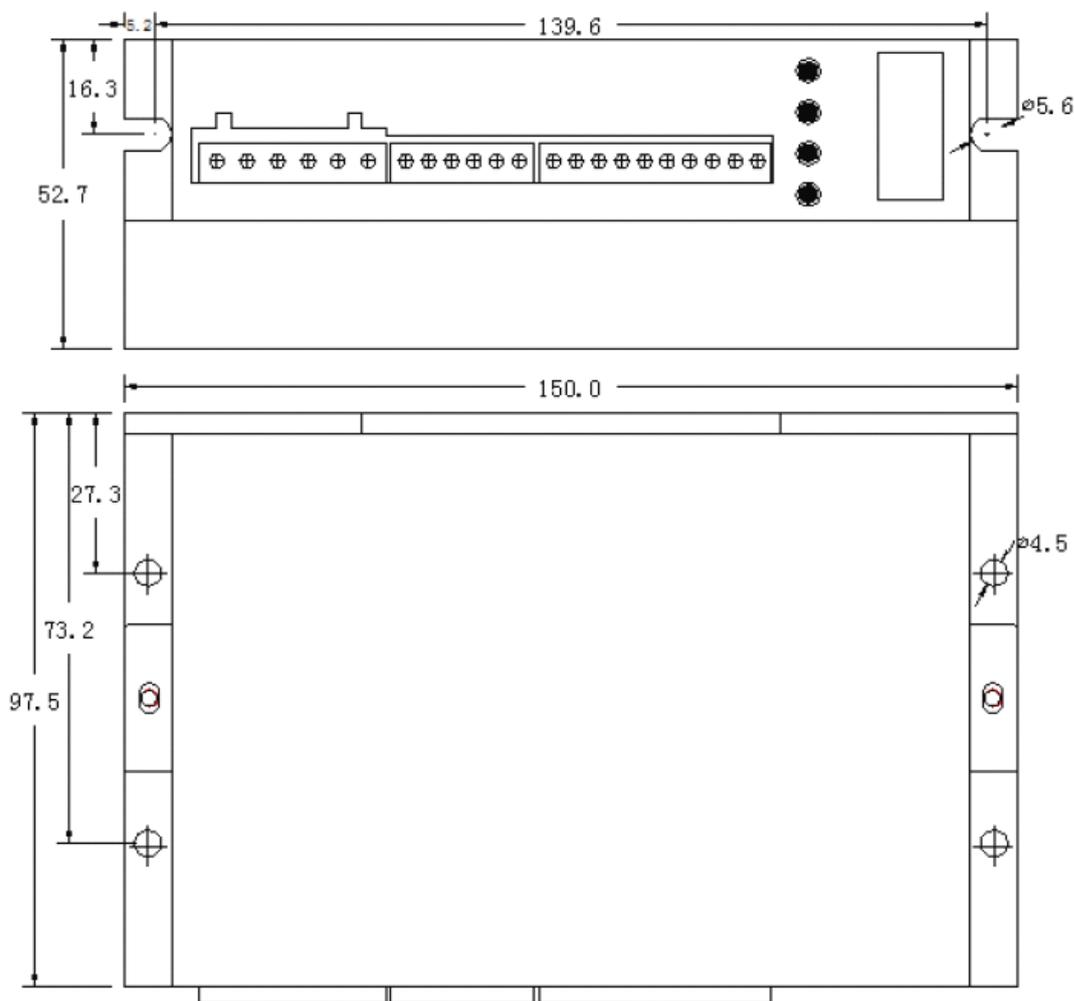
Electrical Specifications

Specification	Minimum	Typical case	Max	Unit
Continuous output	0	--	7.2	A
Input power supply voltage (dc)	24	--	110	V
Input power supply voltage (ac)	18	--	80	V
Logical input current	7	10	20	mA
Pulse frequency	0	--	200	KHz
insulation resistance	0.5	--	5.0	MΩ
Provide the encoder current	0	0	50	mA

Operational environment and parameters

Cooling way	Equipped with cooling fan for cooling (radiator temperature exceeding after 40 °C, fans began to work)	
Operational environment	Application	Try to avoid dust, oil mist and Corrosive gas
	Temperature	-10°C — 50°C
	humidity	40 — 90%RH
	shake	5.9 m/s ² Max
Keep temperature	-20°C — +80°C	
Weight	280g	

Mechanical installation dimension drawing



Note: keep the drive well cooled

, drive and reliable working temperature is usually within the 60 °C, temperature for motor work Within 80 °C;

· when installing the drive, please use vertical side mounting as far as possible, away from the heat source and cannot

Seal off the fan duct. Install dispersion on the electrical cabinet where necessary

Hot ventilation fan, make the air in and out of the electric tank convection, ensure the drive in reliable work

Work within the temperature range.

Port definition, lead color

A. motor and power input port

Terminals no.	Symbol	Name	Color specification of leads
1	A+	A phase motor winding +	White
2	A-	A phase motor winding -	Green
3	B+	B phase motor winding +	Blue
4	B-	B phase motor winding -	Black
5	AC	Power Input	AC18 [~] 80V/DC24-110V
6	AC	Power Input	

B. Encoder signal input port

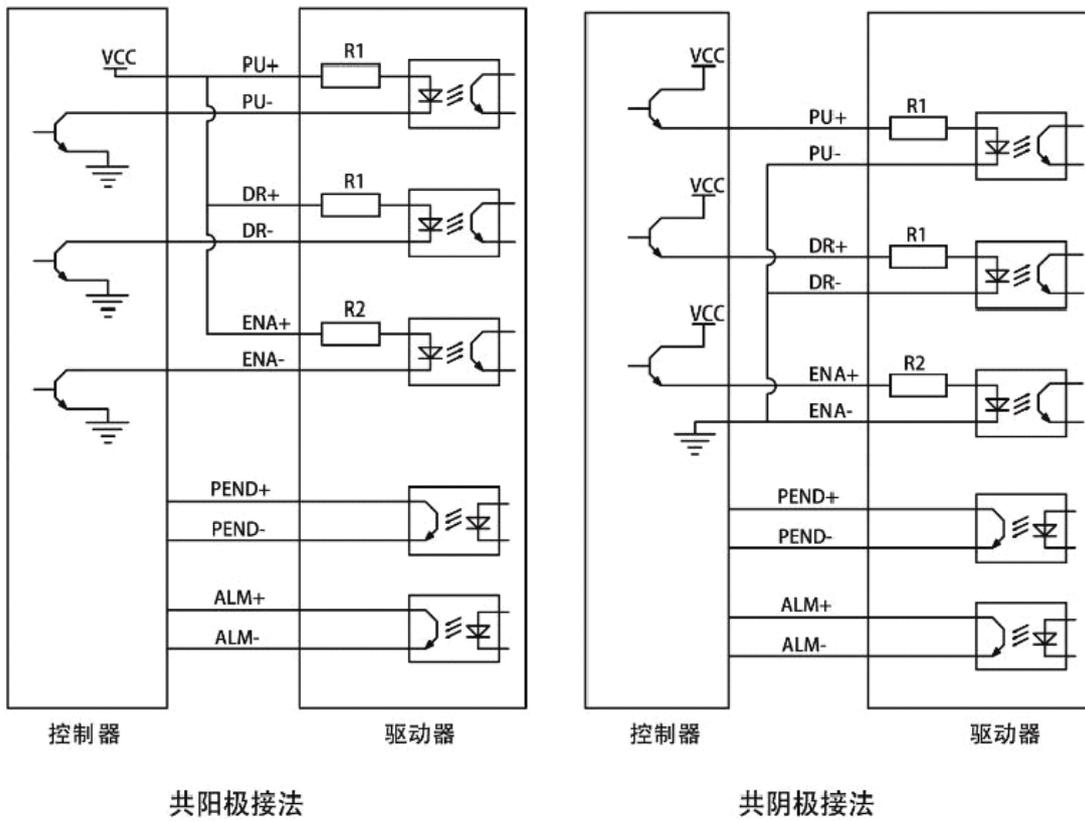
Terminals no.	Symbol	Name	Color specification of leads
1	EB+	Motor encoder B phase positive input	Yellow
2	EB-	Motor encoder B phase negative input	Green
3	EA+	Motor encoder A phase positive input	Black
4	EA-	Motor encoder A phase negative input	Blue
5	VCC	Encoder power supply + 5V input	Red
6	EGND	Encoder power source	White

C. Control signal port

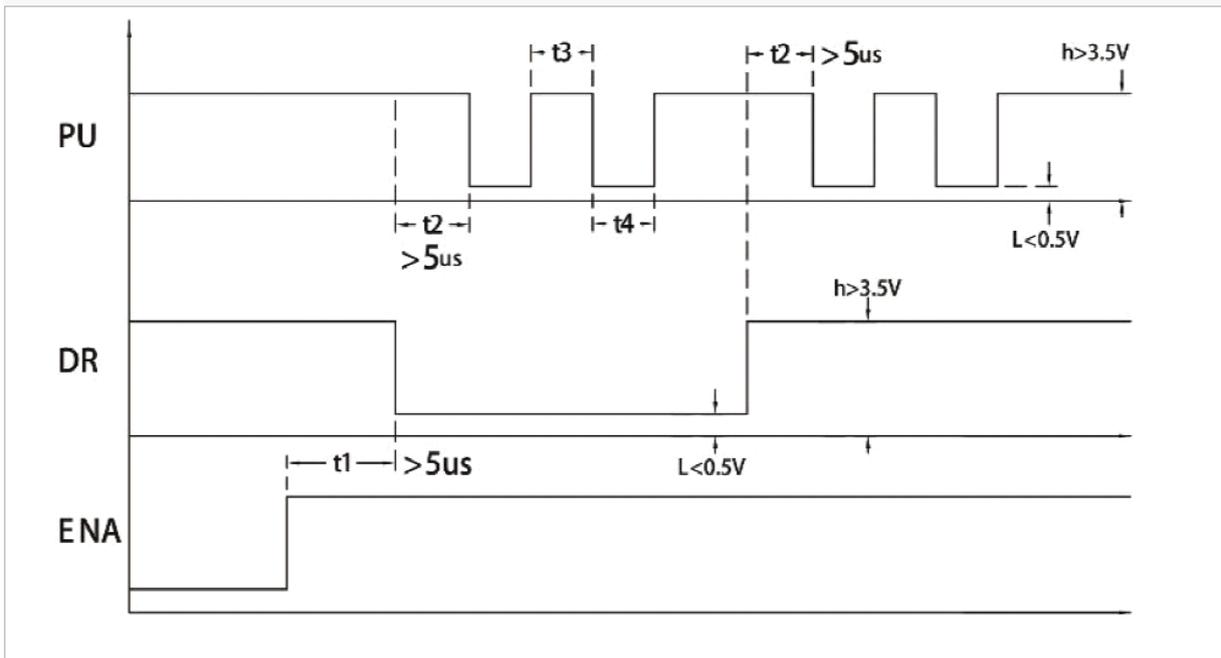
Terminals no.	Symbol	Name	Des.
1	PU+	Positive pulse input	Signal source + 5 ~ 24V All can drive
2	PU-	Negative pulse input	
3	DR+	Positive direction input	Signal source + 5 ~ 24V All can drive
4	DR-	Negative direction input	
5	ENA+	Motor enable positive input	The electrical machine is free when the signal is valid, Don't lock machine
6	ENA-	Motor enable Negative input	
7	Pend+	INPOS positive output	When the motor is in place, the driver output signal is sent to the upper computer
8	Pend-	INPOS Negative output	
9	ALM+	Alarm signal positive output	Driver fault protection after the output signal to the upper computer
10	ALM-	Alarm signal negative output	

Note: when the driver fails, the ENA signal is valid and the driver will clear all faults

Control signal interface circuit diagram

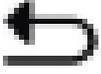


Input signal waveform timing diagram



Parameter setting:

The operation panel of the driver is composed of 4 LED digital displays and 4 keys, which is used to display various state and parameter Settings of the system.

Buttons	Functional Specification
	Exit, cancel operation; Used to return to the previous page, ending parameter input status
	Resizes the data size of the current bit when the page is rolled down and the value changes
	A shift operation for data bits when page up and value changes
	Enter parameter modification mode and parameter modification confirmation, long press 3s

Each time the drive is powered up, the version number used by the current drive will be displayed. 3 seconds later, the status of the current drive will be displayed (standby operating speed is 0, and the current fault code will be displayed when there is a fault). When the driver enters the normal operation mode, the revolution of the current motor (revolution/minute) is displayed in real time. When the motor is reversed, the leftmost (highest) of the digital tube display value flashes. When the driver has multiple fault alarms, the corresponding fault code is displayed in turn.

Parameter function description:

The driver provides two sets of parameters for user operation, among which P0 sets of parameters are used to set several general parameter values of the driver (such as subdivision, lock electromechanical flow, motor type, etc.), and P1 sets of parameters are used to set the performance parameter index values of the driver, as shown in the table below

parameter	designation	parameter scope	Introductions
PN000	The password of parameter value of P1 group	1	Used to modify system performance parameters
PN001	Subdivision choice	SEt 2--256	16 file universal subdivision, 1 file arbitrary subdivision
PN002	Motor running direction selection	0 or 1	Setting of motor CW or CCW
PN003	Motor type selection	Nema 23/34	Nema 23/34 motor
PN004	Limit value of position error	1--9999	System default 4000
PN005	Percentage of lock current	0--100%	System default 50%
PN006	Electronic gear frequency division molecule		The value cannot be set to 0, and defaults to 1
PN007	Electronic gear frequency divider		The value cannot be set to 0, and defaults to 1
P020	Input pulse count low 4 bit		Used to display the total number of external input pulses, and view the height and height of eight bits separately.
P021	input pulse count high 4 bit		
P100	Percentage of running current	10--120%	----
P101	Ratio coefficient of current loop	1--1000	
P102	Integral coefficient of current loop	1--1000	
P103	Damping coefficient of current loop	1--1000	
P104	Ratio coefficient of velocity loop	1--1000	
P105	Integral coefficient of velocity loop	1--1000	
P106	Position ring scale factor	1--1000	

P107	Speed loop feedforward coefficient	1--1000	
P108	Internal drive enable	0 or 1	
P109	Velocity loop damping coefficient	1--1000	
P110	Input/output level setting	Corresponding to a 0/1	See setting table for details.
P200	Run mode selection	0 or 1	The position mode is 0 and the speed mode is 1
P201	Speed setting machine	The default 60	Speed mode, drive rotation speed/min
P202	acceleration and deceleration time	100ms	Speed mode, acceleration and deceleration time, ms

Note: the default current loop parameters, speed loop parameters and position loop parameters of the driver are the best parameters of the matching motor. Generally, customers do not need to modify them. If the customer application environment is special, the parameters with * can be modified under professional guidance to achieve the best effect. Part of parameter modification instructions are as follows:

parameter	designation	Introductions
P104	Ratio coefficient of velocity loop	The larger the set value, the higher the gain and the greater the rigidity.
P105	Integral coefficient of velocity loop	The smaller the set value is, the faster the integral velocity is, the stronger the system resistance deviation is, the greater the rigidity is, too small is easy to produce overshoot.
P106	Position ring scale factor	The smaller the set value, the higher the gain, the greater the rigidity, the faster the position tracking. But too small a value may cause the motor to oscillate or overshoot.
P107	Speed loop feedforward coefficient	The larger the set value, the faster the tracking speed and the greater the rigidity, the maximum value is 100.

Internal driver subdivision table (internal value of P001)

Subdivision no.	SET	2	4	5	8	10	16	20	25
Subdivision no.	32	40	50	64	100	128	200	256	

Note:

· when calculating pulse equivalent, please use the detailed fraction in table 4.1.2 (x 200). The subdivision value with unit of pulse/turn is obtained.

· the closed-loop drive system cannot simply change the direction of the motor by replacing the motor line. If the motor runs in an inconsistent direction with the given direction, please change the value in parameter P002 to change the direction.

· when the subdivision value selected in P001 is SET, driver subdivision is defined by the electronic gear variable. The unit pulse command input to the driver can be defined by the electronic gear to move the transmission device any distance. The pulse command generated by the upper controller does not need to consider the gear ratio, reduction ratio or the number of motor encoder lines of the transmission system. It can be easily matched with various pulse sources to achieve the user's ideal control resolution (Angle/pulse).

computational formula:

$$P \times G = N \times C \times 4$$

P: number of pulses for input instruction

G: electronic gear ratio

G= Frequency division of molecular / Dividing the denominator

N: motor rotation number

C: number of encoder lines/r this system C=1000

For example, when the output pulse of the upper controller is 6000, the motor rotates for 1 turn.

$$G = \frac{N * C * 4}{P} = \frac{1 * 1000 * 4}{6000} = 2/3$$

The parameter P006 is set to 2 and P007 is set to 3. The above results are calculated by mathematical deduction and the minimum common divisor is taken as far as possible. The recommended range of electronic gear ratio is $1/20 \leq G \leq 20$

parameter setting:

(1) setting of user parameter value P0 group

In standby mode, long press "" key for 3 seconds to enter the P parameter setting mode, and display the first parameter P001 (subdivided selection). Press "" and "" key to turn the page to select the type of P parameter that needs to be changed. For example, if the need to change the value segment, in display P001 state, press "" button to enter again, digital tube display the current used subdivisions, long press "" button for 3 seconds after enter a state of change, the current segmentation numerical flashing, by "", "" key pages to select the required breakdown value, long press "" button for 3 seconds to confirm, numerical stop flashing, segment changes. Complete, press "" to return.

P001 subdivision parameters, selection of operating direction of P002 motor and selection of type of P003 motor have been made for the corresponding values inside the drivers. Only the required values are selected by turning the page by the "" and "" keys. The user can set arbitrary values according to the requirements of the device. When entering the corresponding interface, the user can select the number of data that needs to be changed (ones, tens, hundreds and thousands) by pressing "", and then adjust the data size of the bit by pressing "" (changes from 0 to 9).

Note: in this mode, press "" and "" to only show P000 to P007 in sequence, the parameter is modified and saved, the power is reenergized, and the modified parameter value works!

(2) set the system parameter value of group P1

Standby mode, long press "" button for 3 seconds to enter the P parameter setting mode, according to the first parameter P001, then press the "" display P000, press "" button to enter, shows P000 the number 0, long press "" button for 3 seconds after (single digits flashing) entering the modified state, press "" change the value to 1 ("" key for shift operation), and then long press "" button for 3 seconds, P1 set of parameter values password is changed, the operating interface directly to jump back to show P001 interface, At this point, to modify the parameters of group P1, simply press the "" and "" keys and page to enter a certain parameter interface of P1 to be modified, and then modify. After the parameter modification, long press the "" key for 3 seconds to save.

(3) system restore default parameters

In standby mode, long press "" for 3 seconds to enter the P parameter setting mode and modify the value of P000 to "1111". After confirmation, the system will restore the factory default parameters and the system will recharge the default parameters

Driver alarm code

When the driver fails, the corresponding fault code will be displayed in a flash, and if more than one alarm occurs, it will be displayed in turn. The following is a list of alarm codes

Alarm code	Alarm DES	Alarm caused
Er 01	Current over	current of motor over
Er 02	over speed	Motor speed over maximum limit value (Max. 3000 RPM)
Er 03	Position error	The position deviation counter exceeds the set value
Er 04	Drive Over Heat	Drive the temperature exceeds the set value (maximum 80 °C)
Er 05	dc voltage orver	The input voltage of the main circuit exceeds the set value
Er 06	EPR0M Error	EPR0M Read-write error

Quality assurance regulations

This product provides free warranty for up to 24 months and maintenance for 2 years thereafter. The specific regulations are as follows:

- within 7 days after receiving the product, return or replace the product without any reason -- the product shall be kept intact and free of traces of use.
- free replacement of main parts (except the shell) within six months -- from the date of purchase or three months after the date of delivery (subject to the warranty)
- free maintenance within one year -- from the date of purchase or three months after the date of delivery (subject to the warranty)
- free maintenance within one year -- from the date of purchase or three months after the date of delivery (subject to the warranty)

If one of the following situations occurs, the above warranty is not available:

- failure to observe "safety precautions" or "product working conditions", resulting in product damage;
- the warranty is fragile, damaged or disassembled;
- product damage caused by force majeure factors such as lightning strike, earthquake, tsunami and war;
- other damages caused by man-made causes.