



CSLAB s.c.
ElectronicLaboratory

POWER MODULE 325VDC/2000VA

Power supply module for simDrive servo driven



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1. General

In a power circuit of motor drives it is often necessary to use a DC power supply, as drives designed to be as compact as possible do not provide it. Drives shouldn't be powered by pulse-powered systems, there should be linear power supplies with proper filters used, providing supply of suitable constant voltage to the system. The use of high-capacity capacitors significantly decreases ripples generated on the supply line, what actually influences on a system lifespan.

The Power Module 325VDC/2000VA is equipped with a number of functions which provide safe and stable work of motor drives. The functions are described in chapter 3.

Power Module 325VDC/2000VA is a complete power supply and it doesn't require any additional elements.

Signs used in this guide



Useful information, tips



WARNING! Failure to comply with these warnings may lead to inappropriate functioning or damage of the device



HIGH VOLTAGE ! Potential danger and/or possible injury risk

2. Product features

The Power Module 325VDC/2000VA has only one voltage version (input voltage) as for powering it there was used mains electricity of 230VAC or two 120VAC phases. The table below shows the module operation parameters.

Parameter		Value
UACIN		1 x 230VAC (+/-10%) or 2 x 120VAC (+/-10%)
UHVOUT		294VDC - 325VDC (depends on UACIN)
Continuous Output Current		7A (depends on UACIN)
Peak Output Current		14A (depends on UACIN)
Continuous power		2000VA
Peak power		4000VA
Operation temperature		0oC to +60oC
Relative humidity		10% to 95% (without condensation)
Weight		0,91 kg
Dimension	High	85 mm
	Width	105 mm
	Depth	205 mm

UACIN – Input (alternating) voltage of a Power Module 325VDC/2000VA.

UHVOUT – Output (constant) voltage of a Power Module 325VDC/2000VA.



ATTENTION!

The Power Module 325VDC/2000VA was designed for 230VAC UACIN and 325VDC output voltage.

$$230\text{VAC} * \sqrt{2} = 325\text{VDC}$$

Using two 120VAC phases is allowed. In this situation UHVOUT output voltage is 294VDC

$$120\text{VAC} * \sqrt{3} * \sqrt{2} = 294\text{VDC}$$

- $\sqrt{2}$ allows for calculating constant voltage
- $\sqrt{3}$ allows for calculating interfacial voltage

3. Functions of the Power Module

The power supply module is equipped with several functions needed for safe use and correct work of motor drives:

Soft-Start

It's a system that provides soft activation of high-capacity capacitors power. Thanks to it there will be no inrush current surge in mains electricity circuit what protects you against turning off or blowing mains fuse. Soft-Start system is fully automatic and it doesn't require any control of.

HV Relay

The relay activates or deactivates 230V AC mains electricity. Thanks to it a software that controls a machine (Mach3, Mach4) can switch on or off motor drives' power supply anytime it's needed. Pin terminals that control the HV relay were placed on a green 6 pin terminal connector and described as „PK+”and „PK-”.

If a Power Module 325VDC/2000VA works with a CSMIO/IP controller you can use „HV Enable output” signal to control the HV relay. „HV Enable output” signal settings are available in plugin (see the next page scheme). The function is hardware supported by CSMIO/IP and in case of alarm state the HV relay is switched off in 1ms and the same motor drives power supply is cut off.

HV power divider

For safety, aesthetics and mainly for easy install the power module is equipped with an HV power divider. The divider has separate connectors for four motor drives. The divider pins are described as „HV+” and „HV-”.

HV 16A fuse

It is a 16A fuse which task is to cut motor drives power supply off if the power module is overloaded or if there is a short in motor drives power supply circuit.

Filtering capacitors

The power module is equipped with six high-capacity capacitors which task is to reduce ripple of motor drives power voltage. Additionally the capacitors store energy recovered during motors braking.

PE divider

Besides the HV divider the Power Module 325VDC/2000VA has a divider for PE conductor. PE pins are placed with „HV+” and „HV-” pins. It's for easier electrical installation. If there are significant noises it's recommended to use PE dividers and to lead PE wiring directly to a main PE connector (look at the scheme).

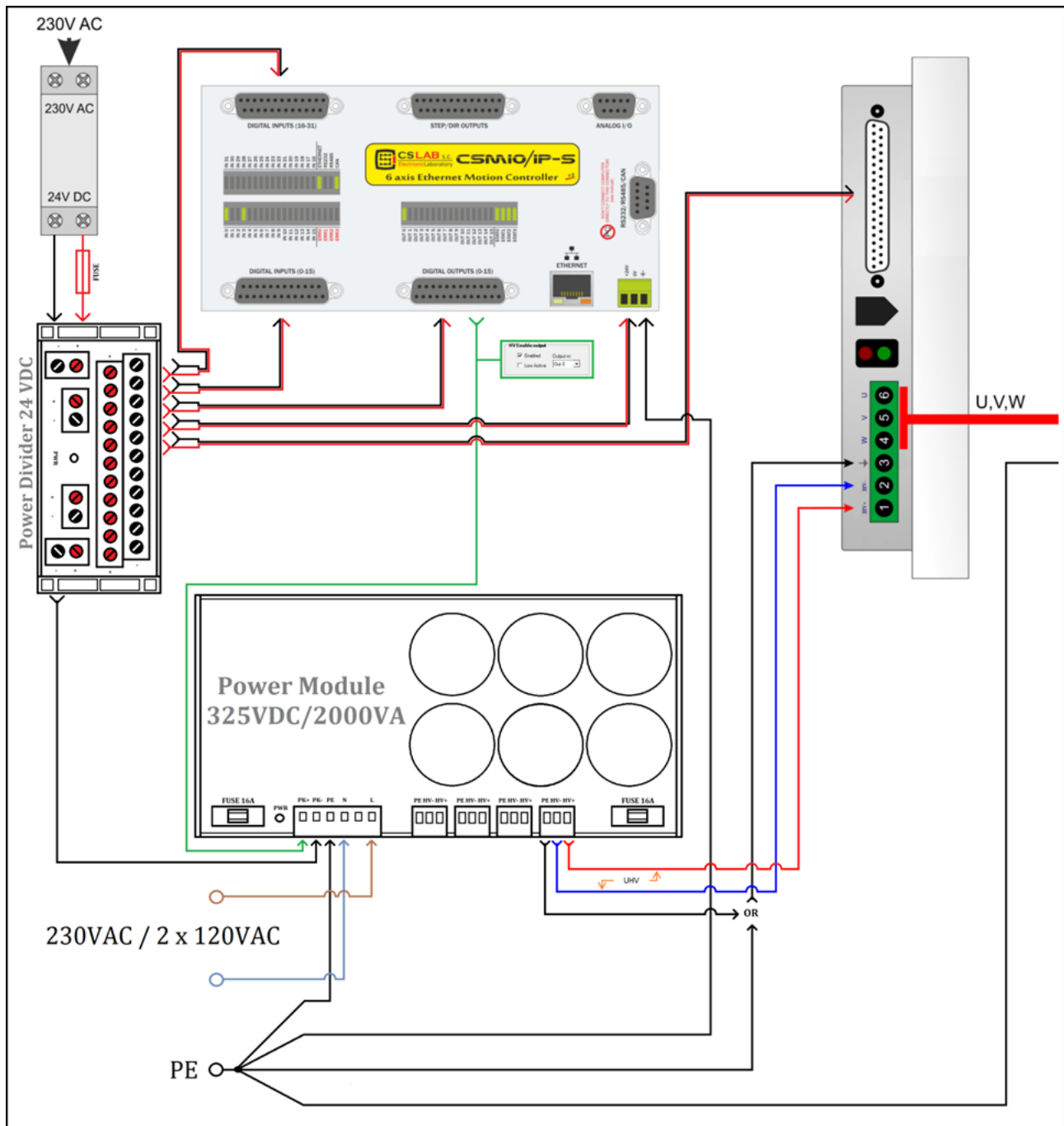
Capacitors discharge system


High-capacity capacitors used in the Power Module 325VDC/2000VA can store significant amounts of electrical energy for a very long time. This creates a risk of electric shock or short circuit during servicing operations. For this purpose the Power Module 325VDC/2000VA is equipped with a capacitors discharge system which is switched on after control signal on PK+ and PK- is off.

A Power Module 325VDC/2000VA has another one function, namely - using a common power supply for many motor drives allows for recovering significant amounts of electrical energy and also the power supply is not that loaded. It's because braking servo motor works like electric generator. The electric energy generated during braking is immediately used by other servo motors. If the energy wasn't used at once is stored in capacitors for later use.

4. Connection scheme

Here is a sample scheme of the power supply module connection including 24VDC Power Divider.



 If you do not have on phase 230VAC voltage and you want to use two 120VAC phases - one of the phases connect to N terminal and the second one to L.

5. Connection



The power module connection was limited to only few easy activities but there can be no mistake during the connection and you have to remember to not perform the connection under voltage and exercise extreme caution during the first run.

Motor drives power circuit connection way – HV power supply

- 1) Connect 230VAC power voltage to „N” terminals (0V – neutral) and „L” (230V AC – phase).
If you not have one phase voltage 230VAC and you want to use two 120VAC phases - connect one of the phases to N terminal and the second one to L.
- 2) Connect the PE to „PE” terminal.
- 3) Motor drives should be connected to „HV+” terminals (positive pole), „HV-” (negative pole) and „PE” (protective conductor).
- 4) It's necessary to supply the HV relay (PK+ and PK- terminals). The relays should be controlled by safety circuit of a control system or special-purpose signal. In CSMIO/IP controllers it's „HV Enable output” signal.



Before the first run!
During connection pay attention to cross section of connection cables you use.

„PK+” and „PK-” are separated from other terminals of a Power Module 325VDC/2000VA.

It's not allowed to connect „HV+” and „HV-” with „N”, „L” and „PE” - this would cause short circuit and potential damage of a Power Module 325VDC/2000VA.

The Power Module 325VDC/2000VA” is a transformerless power supply and output voltage UHVOUT is not separated from input voltage UACIN.

6. Power Module 325VDC/2000VA efficiency

The Power Module 325VDC/2000VA is adapted to supply:

- max. 4 x 750W servo drives: [simDrive™AC Servo 750W 325V **Model M4-H075K](#)
- max. 6 x 400W servo drives: [simDrive™AC Servo 400W 325V **Model M4-H040K](#)



HIGH VOLTAGE !

When AC input supply is connected there is a high voltage on the power supply system. Installation, launching and conservation should be done by qualified staff. Installation, launching and conservation done by unqualified persons may lead to serious injuries or death.



WARNING !

The power module contains high-capacity capacitors, which remain charged after AC power disconnection even for 5 minutes.