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ABB DRIVES

# **ACS580-01, ACQ580-01, ACH580-01 drives**

## Product note on all-pole sine filters



# ACS580-01, ACQ580-01, ACH580-01 drives

Product note on all-pole sine filters

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## **ACS580-01, ACQ580-01 and ACH580-01 drives with all-pole sine filters**

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### **Introduction to this product note**

This product note provides information on the capabilities and restrictions of ACS580-01, ACQ580-01 and ACH580-01 drives when they operate with all-pole sine filters. Functionality and installation of all-pole sine filters are described.

### **Description**

All-pole sine filters are normally used in applications, where the insulation of the motor requires extra protection or long unscreened motor cables are required. This kind of applications are typically submersible pumps and certain fans. With the all-pole sine filters it is possible to:

- reduce bearing currents to minimum
- have less motor noise
- use longer motor cables than stated in ABB drive hardware manual
- use unshielded motor cables
- extend the motor service life.

All-pole sine filter is able to minimize common mode disturbances, which is not possible with regular sine filter.

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## General properties

All-pole sine filter is the output filter between frequency inverter and motor. All-pole sine filters can be used together with ACS580-01, ACQ580-01 and ACH580-01 drives when these parameter restrictions, set by the filters, are taken into account:

- Minimum switching frequency
- Maximum cable length
- Installation-related limitations (for example, cable terminals, cable type and length, orientation, ...)

This product notice is applicable only for applications with induction motors. In case of other motor types, contact ABB.

Note that torque production weakens due to voltage drop created by filter.

Scalar control mode must be selected. ABB cannot guarantee a proper operation of a drive with all-pole sine filters in vector control mode.

Earth fault detection must be disabled.

Flying start cannot be used.

## Motor control related parameter adjustments

ABB drives can run motors with all-pole sine filters with these parameter adjustments:

- 99.03 Motor type = Induction motor
- 99.04 Motor control mode = Scalar
- 28.72 Freq acceleration time 1
  - Use longer ramp if possible.
  - If the submersible pump requires fast ramps to start running, use short ramp times.
  - You may need to test different values to find the best ramp time.

## All-pole sine filter related parameter adjustments

Obey the minimum switching frequency requirements of the filter manufacturer to avoid filter damage. For example, the minimum switching frequency for Block SF4-series filters is 4kHz.

- 97.01 Switching frequency reference = 4kHz
- 97.02 Minimum switching frequency = 4kHz

**Note:** If thermal limit is reached, the drive will not lower switching frequency below the minimum frequency set in parameter 97.02. Instead, the drive will automatically limit output current to keep the drive temperature below the thermal limit.

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## Other parameter adjustments

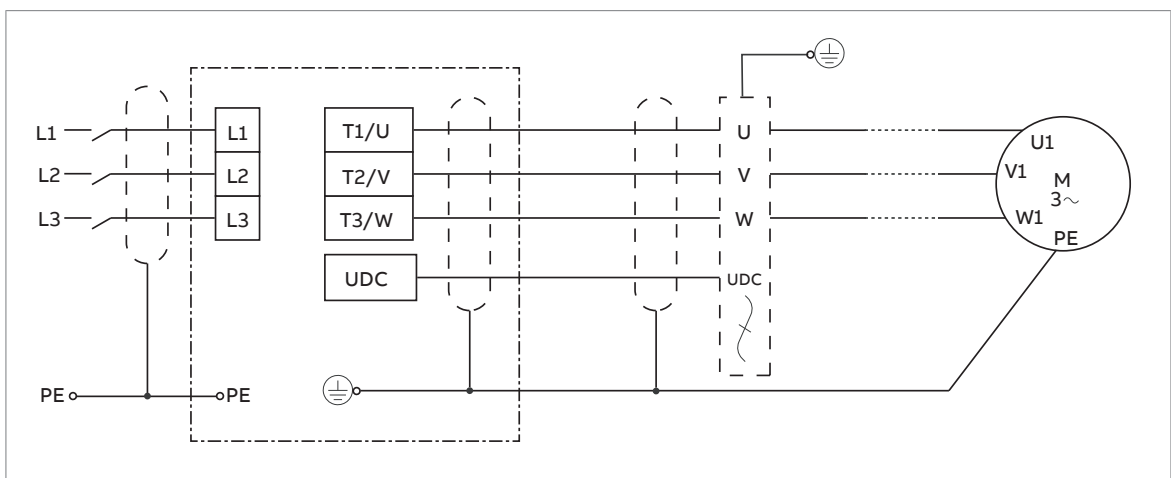
Filter will cause drive to give earth leakage fault. Disable the earth fault detection.

- 31.20 Earth fault detection = No Action

Do not activate parameter 95.15 bit 1 for ABB Sine filter support. This parameter is applicable only for standard ABB sine filter listed in the drive hardware manual. It is not applicable for all-pole sine filters.

## Drive, filter and motor connection

Connect the filter UDC directly to either UDC+ or UDC- of the drive. Drive frames R1..R5 have only UDC+ available. Drive frames R6..R9 have both UDC+ and UDC- available for filter UDC connection.



Always obey filter manufacturer instructions for filter installation and connection guidelines, refer to <https://www.block.eu/>.

The all-pole sinusoidal filter permits the use of an unshielded motor cable between the filter output and the motor. The cable between the inverter output (U1, V1, W1, UDC, PE) and the filter input must be shielded. Ground the shield at both ends with an area as large as possible. Maximum cable length is 1 meter. Shielded cables can be used only between the inverter output and the filter input.

The maximum permitted cable length between filter and motor is 1000 meters. Contact ABB if longer cables are required.

**Note:** There is a voltage drop on the filter itself and also on long motor cables.

## Filter technical data

Use scalar mode with all-pole sine filters.

Maximum output frequency is 120 Hz.

Recommended all-pole sine filters for installation with ACS580-01, ACQ580-01 and ACH580-01 drives. Refer to the filter manufacturer instructions for more detailed product information (<https://www.block.eu/>).

Filter type	Rated current @ 400V	Rated current @ 500V	Filter IP class
	( A )	( A )	
SF4-CD006-500-0	6.0	5.5	IP00
SF4-CD006-500-2	6.0	5.5	IP20
SF4-CD013-500-0	13.0	12.0	IP00
SF4-CD013-500-2	13.0	12.0	IP20
SF4-CD024-500-0	24.0	23.0	IP00
SF4-CD024-500-2	24.0	23.0	IP20
SF4-CE046-500-0	46.0	43.5	IP00
SF4-CE046-500-2	46.0	43.5	IP20
SF4-CE065-500-0	65.0	62.0	IP00
SF4-CE065-500-2	65.0	62.0	IP20
SF4-CE110-500-0	110.0	105.0	IP00
SF4-CE165-500-0	165.0	160.0	IP00

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# Further information

## Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to [www.abb.com/contact-centers](http://www.abb.com/contact-centers).

## Product training

For information on ABB product training, navigate to [new.abb.com/service/training](http://new.abb.com/service/training).

## Providing feedback on ABB manuals

Your comments on our manuals are welcome. Navigate to [forms.abb.com/form-26567](http://forms.abb.com/form-26567).

## Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at [www.abb.com/drives/documents](http://www.abb.com/drives/documents).



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