

- ↘ Efficient Suppression
- ↘ Avoid Coil Short Circuits
- ↘ Reduce Voltage Peaks

# SUPPRESSOR MODULES

for Motors





## | MURRELEKTRONIK SUPPRESSOR MODULES

### Less Work, Big Impact

Voltage peaks create problems in machines and systems. Murrelektronik suppressors are reliable and help you avoid damage. With our motor suppression modules, coil short circuits will never happen again! These suppressors increase the lifetime of electronic and electrical components and with them, it's possible to design machines and systems so they are EMC-compatible. By installing suppressor modules close to the interference source, you will efficiently reduce voltage peaks.

### Increased System Availability

Murrelektronik supplies motor suppressors for motors up to 20 kW. Suppressors significantly reduce voltage levels and prevent parts from retaining high frequencies, both of which are caused by increasing voltage. Using a suppressor increases the lifetime of contacts and coil-windings, as well as reduces the operating and maintenance costs. For plant operators, increased operational reliability, system availability and higher productivity are a must!

### Save Money on Material and Maintenance Costs

By choosing Murrelektronik's suppressor modules, you benefit from our knowledge of over 35 years of experience in the EMC field. Our suppressor modules are extremely successful because Murrelektronik collaborates with motor, contactor and valve manufacturers when we develop them. The modules are created to respond to the voltage peak sources and they are assembled onto the machines so they achieve optimized suppression. The precise module placement ensures that interference is reduced and also saves material and maintenance costs.



- Reduce voltage peaks
- Avoid coil short circuits
- Increase lifetime
- Meet EMC Guidelines
- Avoid negative effects

## EFFICIENT SUPPRESSION

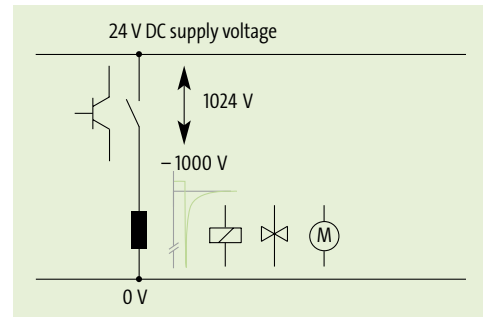
### The Problem

Even in today's extremely modern world, inductive loads are still governed by the rules of physics. Just like gravity, Ohm's law and Lenz's law will never change. They state that when an inductive load is switched off, current wants to keep flowing in the same direction and with the same strength as before. The voltage comes from the inductive load, and since the inductive loads can be much higher than the nominal voltage, voltage peaks can occur.

This causes the following problems:

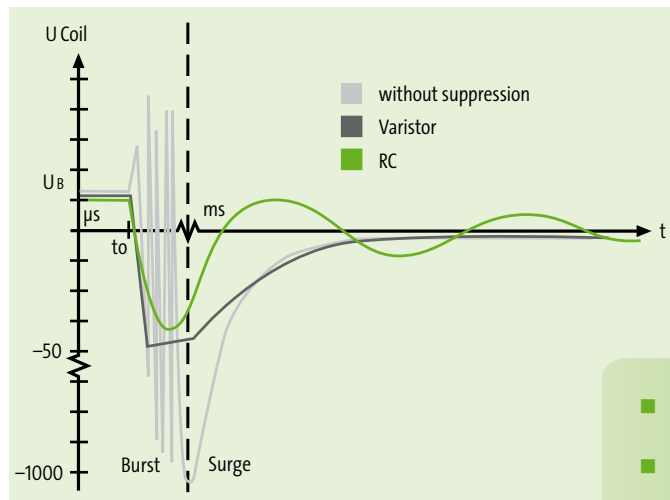
- Powering down can cause coil short circuits
- Coil lifespan is shortened
- Data transfer via the bus system is cut off
- Control sequence is interrupted

All of which result in expensive downtime.



### The Solution

Suppressors installed close to the interference source help reduce voltage peaks during shut down. Benefits:



Murrelektronik always provides the right solution, no matter what the requirements are: suitable for any load, lowest possible voltage peaks, high attenuation factor, DC or AC voltages, simple design or a short delay time.

- Save on material and maintenance costs
- Increase interference protection
- Improve system availability
- Ensure reliable run-time

### The Implementation

- Suppression module inside the motor terminal box, directly next to the interference source
- 10-pole motor connector with integrated suppressor module and pre-wired cable
- Ready for world wide use: suppressors that snap onto a DIN rail or mount onto/under the motor contactor

### The Approvals

The standard modules are listed in UL-File E140415, category NKCR2. Some suppressors are also listed in UL File E338196 Vol. 1, sec. 1, categories NLDX2 and NLDX8 as "Motor Controllers, Magnetic Component" acc. to UL508 and CSA C22.2 No. 14-10 and can be used in the branch circuit.

## | SAFETY REVIEW ACCORDING TO ISO EN-13849

When installing a machine or a system according to category 2 of ISO EN-13849, you have to respect CCF (chapter 6.2.5). CCF means "Common Cause Failure" and describes errors with a common cause.

This means, several errors, resulting from the same source cause dangerous failures.

Appendix F of the standard 13849 describes a simple method how to evaluate common cause failures. It includes a table for the evaluation process.

If you implement measures to reduce common cause failures, you score points. If you can prove that your

machines and systems are installed safely according to the measures, you get 40 points. In order to have adequate machines and systems, you should have at least 65 points out of 100.

Measure	Points
Separation	15
Diversity	20
→ Design/application/experience – protection against over-voltage, over-loads, over-pressure, etc.	15
Design/application/experience – use of proven components	5
Assessment/analysis	5
Competency/training	5
→ Environment – protection from dirt and electromagnetic interference (EMC)	25
Other impacts	10
<b>Total</b>	<b>100</b>

## EMC SUPPRESSORS

### Suppressors for motors

#### Mounting methods:

- on the motor terminal box
- inside the motor terminal box
- inside the distribution box
- on 35 mm DIN-rail  
acc. to EN 60715

#### Approvals:



#### RC 3 U

With M16 x 1,5



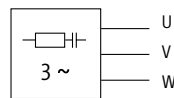
#### RC 3 BU



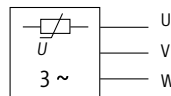
#### RC 3 BUG



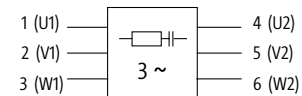
#### Circuit diagram



RC



VDR

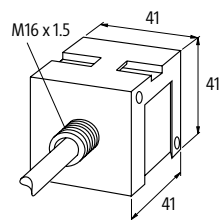


RC(-1) per phase

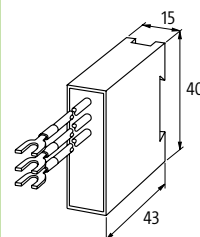
Ordering data		Art.-No.	Art.-No.	Art.-No.
Voltage	Motor rating	Suppression/Approval	Suppression/Approval	Suppression/Approval
3 x 400 V AC	4 kW	RC	<b>23022</b>	RC/cURus <b>23050</b>
	4 kW			VDR <b>23100</b>
	4 kW			VDR/cURus <b>23115</b>
	7,5 kW			VDR/cURus <b>23115</b>
	10 kW	RC	<b>23011</b>	VDR/cURus <b>23118</b>
	10 kW	RC-per phase	<b>23043</b>	
3 x 575 V AC	20 kW			VDR/cURus <b>23118</b>
	4 kW			RC/cURus <b>23050</b>
	7,5 kW	RC/cURus	<b>23035</b>	RC <b>23104</b>
	20 kW			VDR <b>23102</b>
3 x 690 V AC	45 kW			RC-per phase <b>23103</b>
	4 kW			RC/v <b>23056</b>
	7,5 kW			RC <b>23104</b>
	20 kW			RC <b>23104</b>

#### Technical data

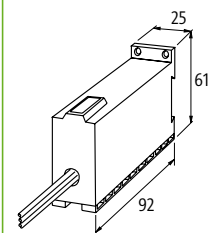
Frequency	for RC: 50...60 Hz      for VDR: 10...400 Hz		
Material	plastic, flame retardant (UL 94)		
Potting compound	2-component epoxy		
Temperature range	-20...+60 °C		
Connection method	approx. 500 mm PVC cable 3 x 0,75 mm <sup>2</sup> or 7 x 0,75 mm <sup>2</sup>	approx. 200 mm single core 0,35 mm <sup>2</sup> ; <b>Art.-No. 23056</b> 0,5 mm <sup>2</sup> with self-securing M4 cable forks M4	approx. 500 mm single core 1 mm <sup>2</sup>



For DIN-rail mounting use  
2 x **Art.-No. 20900** adapter feet



For DIN-rail mounting use  
1 x **Art.-No. 20900** adapter feet



For DIN-rail mounting use  
2 x **Art.-No. 20900** adapter feet

#### Notes

Do not use RC motor suppressors on variable frequency drives. 1 x **Art.-No. 23103, 23043** required per phase.

# EMC SUPPRESSION MODULES

## Suppressors for motors

### Mounting methods:

- with M16 x 1.5 and M20 x 1.5
- on the motor terminal box with plug connectors

### Approvals:



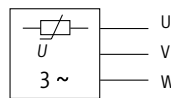
### RC 3 R

With M16 x 1.5 screw



### RC 3 R

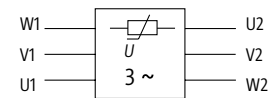
With M16 x 1.5 screw



RC

### RC 3 RG

With M20 x 1.5 screw



VDR-(1) per phase

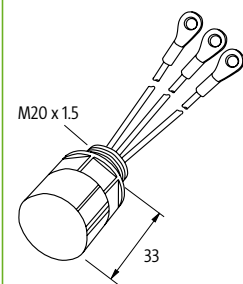
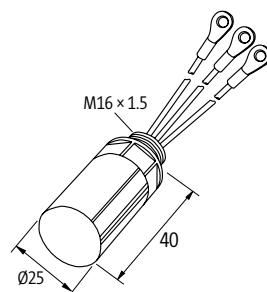
### Circuit diagram

Ordering data		Art.-No.	Art.-No.	Art.-No.
Voltage 3 x 400 V AC	Motor rating	Suppression/Approval	Suppression/Approval	Suppression/Approval
	4 kW	VDR/cURus	<b>23170</b>	RC/cURus
	4 kW			
	4 kW			
	7,5 kW	VDR	<b>23171</b>	
	10 kW			VDR
3 x 575 V AC	20 kW			VDR
	4 kW	VDR/cURus	<b>23172</b>	RC/cURus
	7,5 kW	VDR/cURus	<b>23173</b>	
	10 kW			VDR/cURus
	20 kW			VDR/cURus
	20 kW			VDR per phase
3 x 690 V AC	7,5 kW	VDR	<b>23174</b>	
	20 kW			VDR
				<b>23149</b>

### Technical data

Frequency	for RC: 50...60 Hz	for VDR: 10...400 Hz
Material	plastic, flame retardant (UL 94)	
Potting compound	2-component epoxy	
Temperature range	-20...+60 °C	
Connection method	approx. 100 mm single core 0,5 mm <sup>2</sup>	approx. 150 mm single core 1 mm <sup>2</sup>
Ring terminals	isolated M6	isolated M4

### Dimension drawing



### Notes

Do not use RC motor suppressors on variable frequency drives. **Art.-No. 23174** – wire diameter 1.5 mm<sup>2</sup>.

## EMC SUPPRESSION MODULES

### Suppressors for motors

#### Mounting methods:

– on the motor terminal box  
with plug connectors

#### Approvals:



#### RC 3 ST

Connector with cable and integrated motor suppression  
Cable outlet in the back

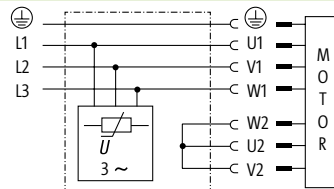


#### RC 3 ST

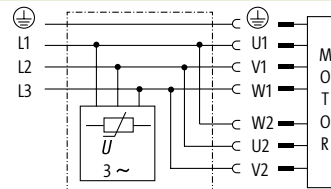
Connector with cable and integrated motor suppression  
Cable outlet (right angle)



#### Circuit diagram



Varistor-suppression (star)



Varistor-suppression (delta)

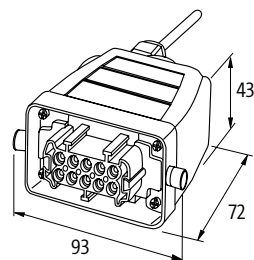
#### Ordering data

Voltage	Motor rating	Cable length	Suppression	Art.-No.	Suppression	Art.-No.
max.	5,5 kW	5 m	VDR/star	<b>236139</b>	VDR/star	<b>236148</b>
3 x 575 V AC	5,5 kW	8 m	VDR/star	<b>236141</b>		
	5,5 kW	10 m	VDR/star	<b>236142</b>	VDR/star	<b>236149</b>

#### Technical data

Frequency	10...400 Hz					
Plug connector	females, 10-pole + PE					
Housing	aluminium pressure diecasting					
Temperature range	-20...+60 °C					
Connection method	PUR cable black, 4 x 1.5 mm <sup>2</sup> ; numbered wires, halogen free			PUR cable black, 4 x 1.5 mm <sup>2</sup> ; numbered wires, DESINA® compliant		

#### Dimension drawing



(without compression gland)

#### Notes



# EMC SUPPRESSION MODULES

## Suppressors for motors

### Mounting methods:

- on 35 mm DIN-rail acc. to EN 60715
- bolted together, stacked
- DIN-rail mounting under the control gear

### Approvals:



### HRC 3



### HRC 3 K



### RC 3 BUR

Connects onto Siemens SIRIUS 3 RT 20 contactors, with screw terminal

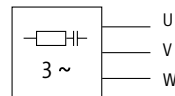


### RC 3 BUC

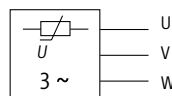
Connects onto Siemens SIRIUS 3 RT 20 contactors, with spring clamp terminal



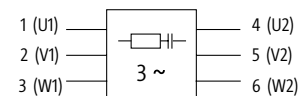
### Circuit diagram



RC



VDR



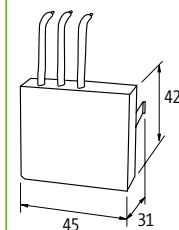
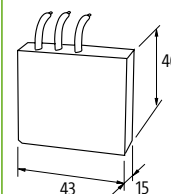
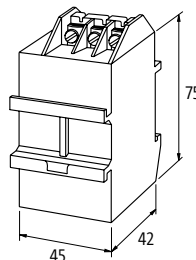
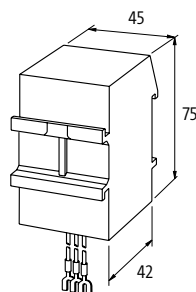
RC(-1) per phase

Ordering data		Art.-No.	Art.-No.	Art.-No.	Art.-No.
3 x 400 V AC	Motor rating	Suppression/Approval	Suppression/Approval	Suppression/Approval	Suppression/Approval
	4 kW	RC/cURus <b>23004</b>	RC <b>23005</b>		
	4 kW	RC/cURus <b>233463</b>			
	5,5 kW			RC/cURus <b>236082</b>	
	7,5 kW				RC/cURus <b>23220</b>
	10 kW	RC/cURus <b>23002</b>	RC <b>23003</b>		
3 x 500 V AC +10 %	20 kW	RC-per phase/cURus <b>23009</b>			
	20 kW	VDR/cURus <b>23015</b>			
	4 kW	RC/cURus <b>23000</b>	RC <b>23001</b>		
3 x 575 V AC	5,5 kW			RC/cURus <b>236082</b>	
	7,5 kW	RC/cURus <b>23006</b>	RC <b>23007</b>		
	7,5 kW	RC/cURus <b>230563</b>			RC/cURus <b>23220</b>
	10 kW	VDR/cURus <b>23016</b>			
	20 kW		RC <b>23018</b>		
3 x 690 V AC	10 kW	RC <b>23017</b>			

### Technical data

Frequency	for RC: 50...60 Hz, for VDR: 10...400 Hz			
Material	plastic, flame retardant (UL 94)			
Potting compound	2-component epoxy			
Temperature range	-20...+60 °C			
Connection method	approx. 250 mm s. core	3-pole terminal	wire (solid core)	wire with ferrule ends
	(Art.-No. 23000: 300 mm)	2 x (0,75...2,5 mm <sup>2</sup> )	1,5 mm <sup>2</sup>	2,0 mm <sup>2</sup>
	0,5 mm <sup>2</sup> (Art.-No. 23000: 1,5 mm <sup>2</sup> )	M4		
	with self-securing M4 cable forks			

### Dimension drawing



### Notes

Do not use RC motor suppressors on variable frequency drives. **Art.-No. 233463** and **230563** – with ferrule ends.

## EMC SUPPRESSION MODULES

### Suppressors for motors

#### Mounting methods:

- DIN-rail mounting under the control gear
- fixes onto contactors
- available with integrated coil suppression

#### Approvals:



### HRC 3 AS

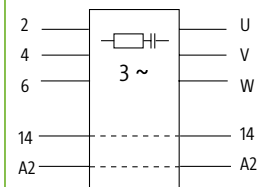
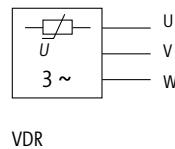
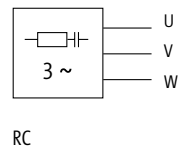


### RC 3 RT

Connects onto Siemens SIRIUS 3 RT 10 contactors with screw terminal



#### Circuit diagram



#### Appropriate contactors

Motor contactors up to 5.5 kW from Siemens, Moeller, Sprecher + Schuh etc.

Siemens 3 RT 10

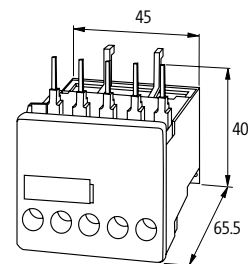
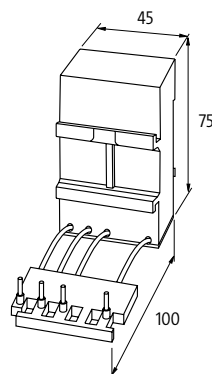
#### Ordering data

		Art.-No.	Art.-No.	Art.-No.
Voltage	Motor rating	Suppression motor + coil	Suppression motor + coil	Suppression /approval
3 x 400 V AC	5,5 kW	RC	23160	VDR
	5,5 kW	RC + Diode	23151	23163
3 x 575 V AC	5,5 kW	RC	23161	VDR
	5,5 kW			23164
			VDR + Diode	23157
				RC/cURus / CSA
				23180
				23181

#### Technical data

Suppression coil	for RC: 230 V AC/20 VA, for RC + Diode: 24...230 V DC/36 W
Frequency	for RC: 50...60 Hz, for VDR: 10...400 Hz
Material	plastic, flame retardant (UL 94)
Temperature range	-20...+60 °C
Connection method	ferrules, load side securely fixed
	fits directly into SIRIUS contactors, size 00

#### Dimension drawing



#### Notes

Do not use RC motor suppressors on variable frequency drives.

**You can find everything for suppression modules** including comprehensive information, data sheets, technical data and downloads, plus configure your own part according to your needs or order a ready-made part in our online shop:

➤ [www.murrelektronik.com](http://www.murrelektronik.com)

In addition to EMC suppressors for motors, contactors and valves, we have a wide range of EMC filters that protect your machines and systems to the highest degree.



EMC filters from Murrelektronik



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➔ [www.murrelektronik.com](http://www.murrelektronik.com)

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