TRAMO

HARMONIZER

# SWR-M - Sine Wave Filter for frequency controlled motors

- **Protects the motor against voltage peaks**
- **Reduces the risk of insulation failure**
- **Reduces the risk of electromagnetic interference**
- **Reduces bearing currents in the motor**
- **Reduces magnetic noise caused by PWM signals**
- **Reduces semiconductor losses in applications with long motorlines**

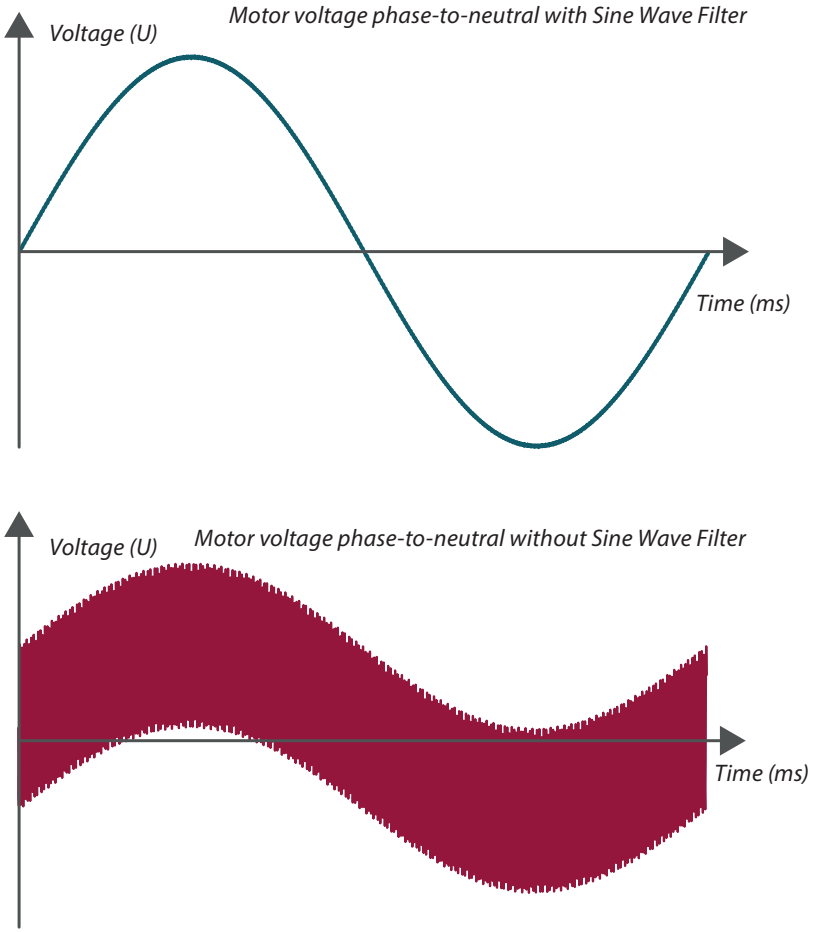


*fig 1. Motor Voltage with and without Sine Wave Filter*

## BACKGROUND

Frequency-controlled motors face issues such as bearing currents and voltage peaks, which result in significant maintence costs for millions of motors worldwide. The cause of the problem is built into the principle of converter operation where asynchronous engines are supplied with a frequency modulated voltage wave with a switching frequency of in the kHz range.

This voltage creates a high frequency magnetic field around the motor shaft, which causes inductive or capacitive bearing currents. SWR-M filters out high frequency components from the input voltage, which reduces the amplitude of the common-mode voltage responsible for creating the high frequency magnetic field around the motor shaft. Using a sine wave filter extends the motor's lifespan and prolong the service intervals.

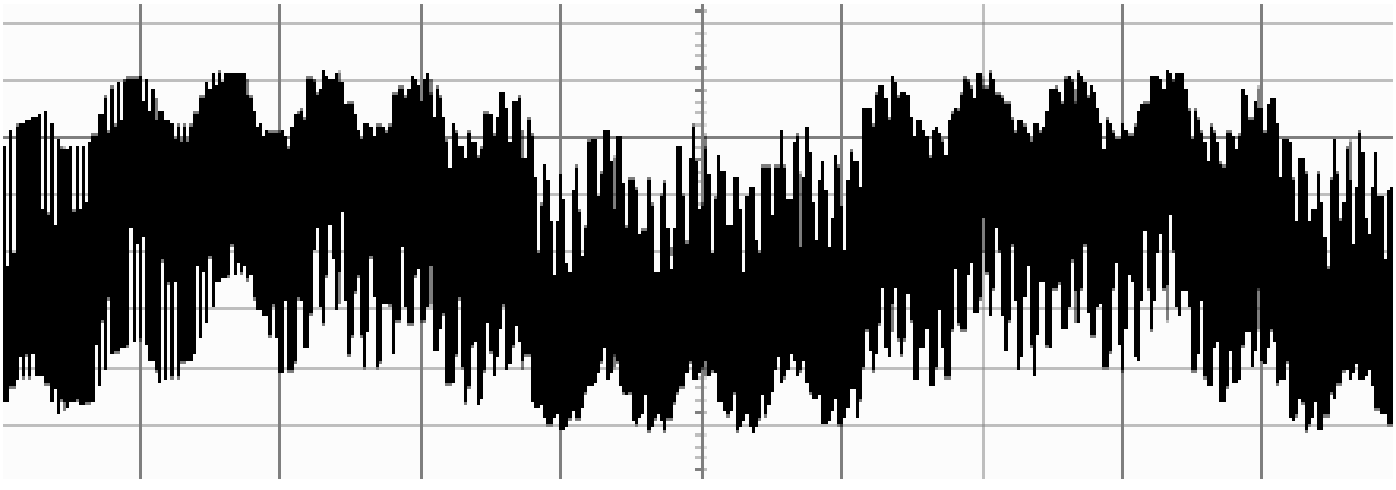

*fig 2. Motor Voltage Curve*

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## SINE WAVE FILTER (SWR-M)

SWR-M filters out high frequency components in the supply voltage. This reduces the amplitude of common mode voltage that give rise to high frequency magnetic fields around the motor shaft.

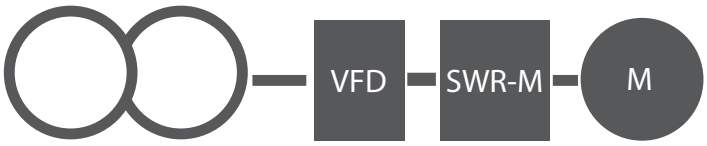


*fig 3. Filter configuration*

## APPLICATIONS

The sine wave filter can be applied to a variety of applications and requieres no modifications to the motor's design. We recommend following applications:

- Motors where magnetic noise caused by pulse-width modulated voltage needs to be eliminated
- Motors used in aggressive environments or at high temperatures
- Applications with motor cables between 150-300m and longer, both shielded & unshielded cables
- Applications where the service intervall needs to be extended
- General purpose motors with 690v
- Applications where the frequency converter is connected to a transformer

## OUR OFFER

TRAMO ETV provides assistance in all stages of a power quality project. From data collection and power quality measurements to system simulations, recommendations for corrective actions, filter and filter component design, preparation of technical specifications, and trough to commissioning and verification testing.

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# SWR-M, Sine Wave Filter

Electrical engineering table for our seven Sine Wave Filter in our standard range.

| | |
|---|---|
| Duty cycle | 100% |
| IP rating | IP00 |
| Ambient temperature | -10 to + 40 ° C |
| Class | B (130) ° C |
| Standard | IEC 61558-2-20 |
| Cooling | AN |

## TECHNICAL DATA

| Article number | Name Product name | Nominal Current kW | Nominal Voltage V | Rated Power A | Frequency Hz | PF | Switching Frequency kHz |
|---|---|---|---|---|---|---|---|
| 1000033 | SWR-M-400/10 | 6 | 400 | 10 | 50 | 0,85 | 3-6 |
| 1000034 | SWR-M-400/18 | 10 | 400 | 18 | 50 | 0,85 | 3-6 |
| 1000035 | SWR-M-400/34 | 19 | 400 | 34 | 50 | 0,85 | 3-6 |
| 1000036 | SWR-M-400/50 | 28 | 400 | 50 | 50 | 0,85 | 3-6 |
| 1000037 | SWR-M-400/80 | 44 | 400 | 80 | 50 | 0,85 | 3-6 |
| 1000038 | SWR-M-400/110 | 60 | 400 | 110 | 50 | 0,85 | 3-6 |
| 1000039 | SWR-M-400/150 | 85 | 400 | 150 | 50 | 0,85 | 3-6 |

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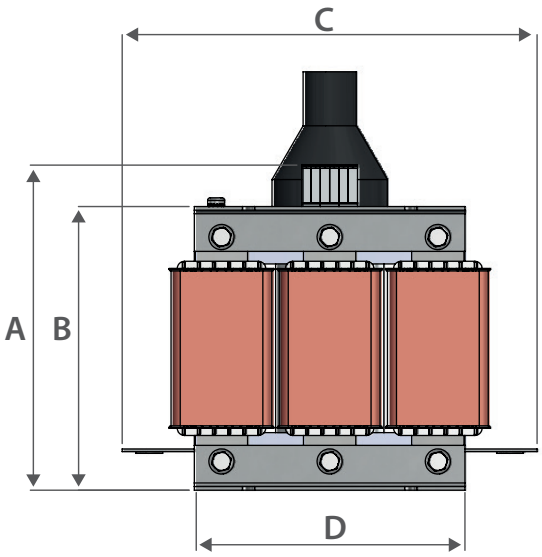
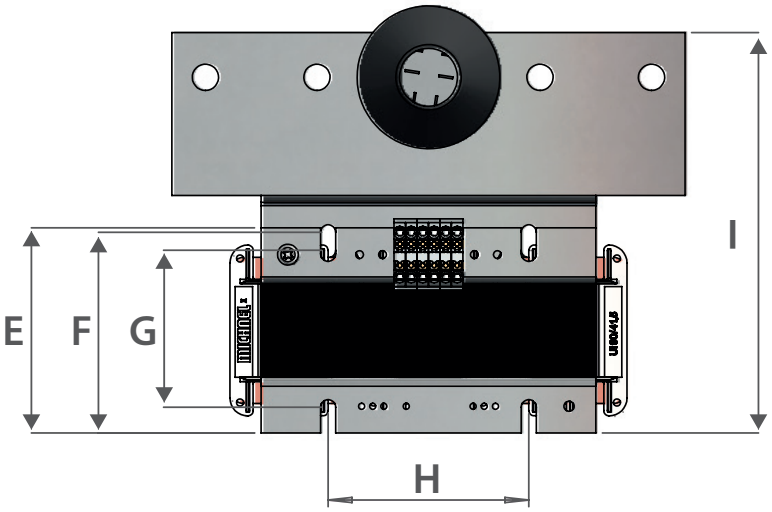
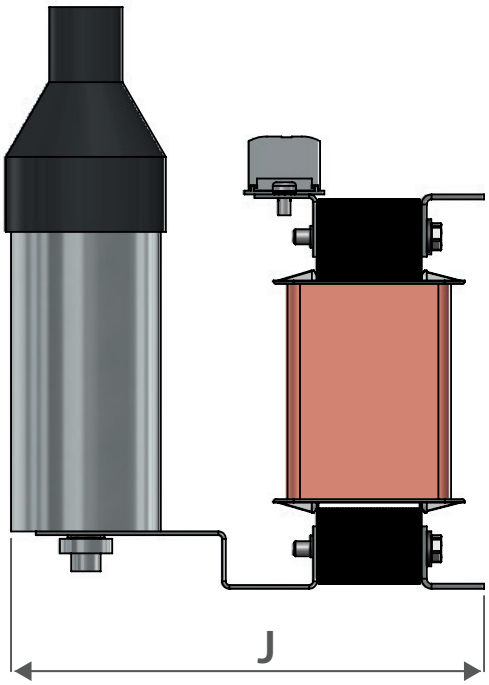
# SWR-M, Sine Wave Filter

Drawing and mechanical table for SWR-M-400/10

| | |
|---|---|
| Duty cycle | 100% |
| IP rating | IP20 |
| Ambient temperature | -10 till + 40 ° C |
| Class | B (130) ° C |
| Standard | IEC 61558-2-20 |
| Cooling | AN |




| Article number | Name<br>Product name | A<br>mm | B<br>mm | C<br>mm | D<br>mm | E<br>mm | F<br>mm | G<br>mm | H<br>mm | I<br>mm | J<br>mm | Weight<br>kg | Plinth area<br>*mm²* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000033 | SWR-M-400/10 | 181 | 158 | 230 | 150 | 92 | 90 | 70 | 90 | 179,5 | 189,5 | 9 | 4 |

**N.B. Dimensions and weights are preliminary and will be confirmed upon order**

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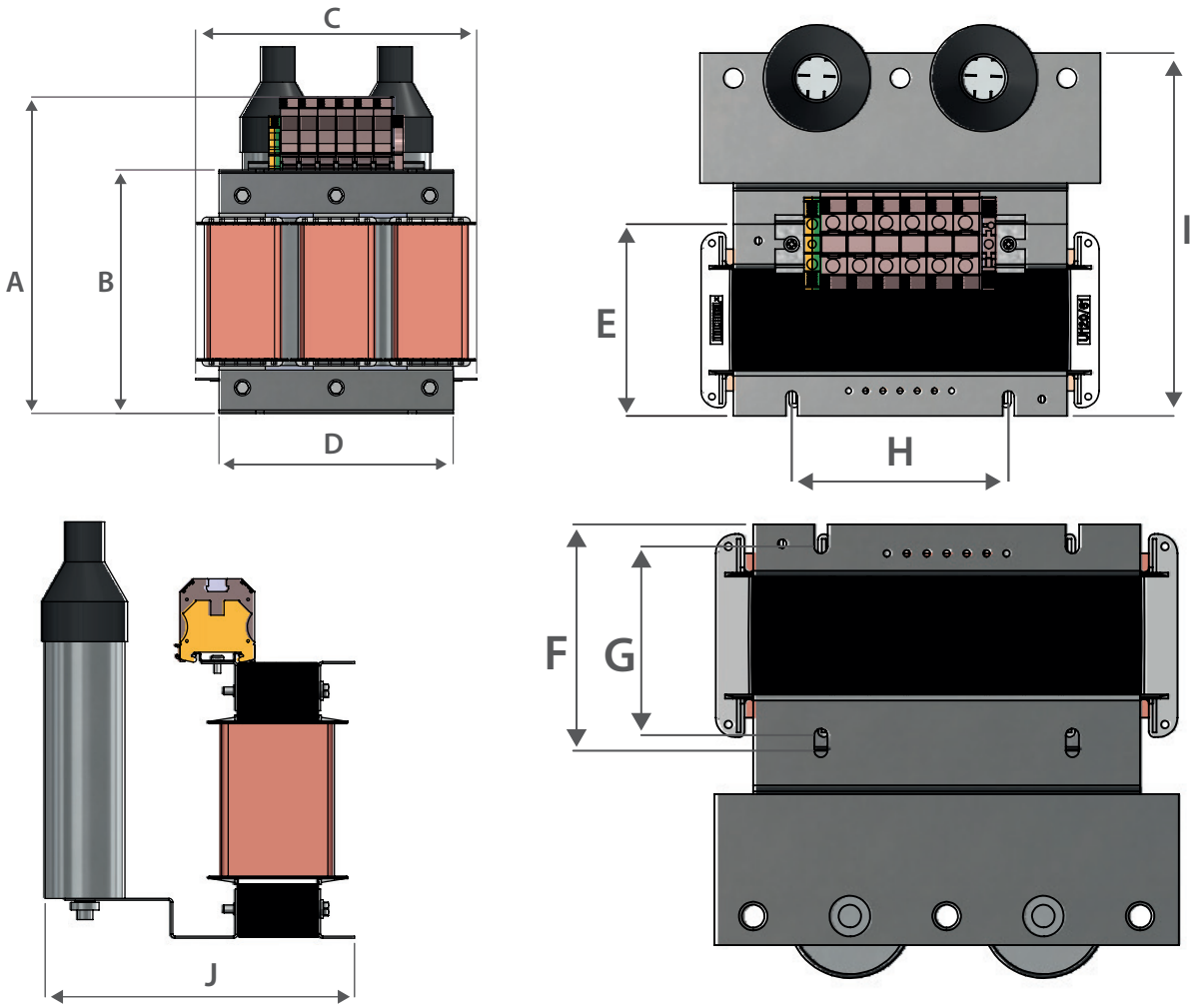
# SWR-M, Sine Wave Filter

Drawing and mechanical table for following Sine Wave Filters:

- SWR-M-400/18
- SWR-M-400/34
- SWR-M-400/50
- SWR-M-400/80
- SWR-M-400/110

| | |
|---|---|
| Duty cycle | 100% |
| IP rating | IP00 |
| Ambient temperature | -10 till + 40 ° C |
| Class | B (130) ° C |
| Standard | IEC 61558-2-20 |
| Cooling | AN |




| Article number | Name Product name | A mm | B mm | C mm | D mm | E mm | F mm | G mm | H mm | I mm | J mm | Weight kg | Plinth area mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000034 | SWR-M-400/18 | 227 | 181,5 | 235 | 175 | 105 | 106 | 86 | 110 | 213 | 224 | 15 | 10 |
| 1000035 | SWR-M-400/34 | 270 | 208 | 240 | 200 | 115 | 117 | 97,5 | 130 | 217,5 | 232,5 | 23 | 35 |
| 1000036 | SWR-M-400/50 | 328 | 266 | 250 | 250 | 109 | 117 | 94 | 160 | 228 | 250 | 31 | 35 |
| 1000037 | SWR-M-400/80 | 336 | 266 | 250 | 250 | 148 | 157 | 134 | 160 | 267 | 290 | 51,4 | 50 |
| 1000038 | SWR-M-400/110 | 402 | 316 | 300 | 300 | 134 | 139 | 116 | 200 | 250 | 272 | 55 | 70 |

**N.B. Dimensions and weights are preliminary and will be confirmed upon order**

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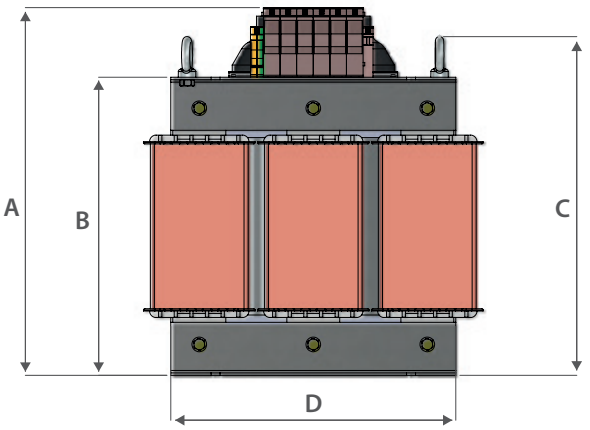
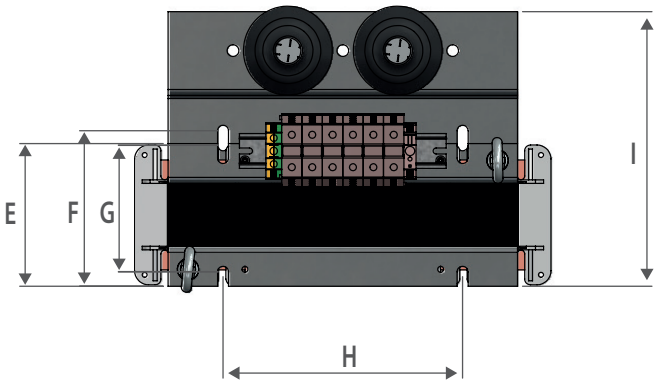
# SWR-M, Sine Wave Filter

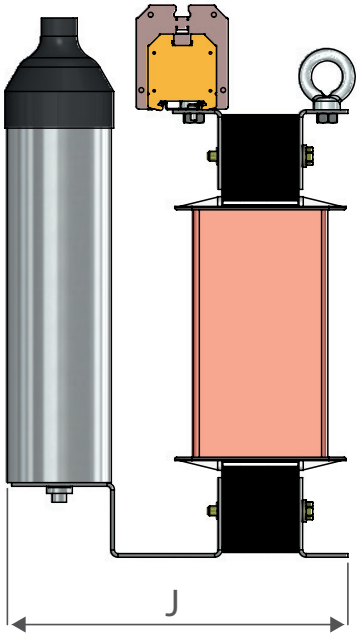
Drawing and mechanical table for SWR-M-400/150

| | |
|---|---|
| Duty cycle | 100% |
| IP rating | IP00 |
| Ambient temperature | -10 till + 40 ° C |
| Class | B (130) ° C |
| Standard | IEC 61558-2-20 |
| Cooling | AN |




*N.B. The C dimension varies for SWR-M-400/10 compared to other sine wave filters*




| Article number | Name Product name | A mm | B mm | C mm | D mm | E mm | F mm | G mm | H mm | I mm | J mm | Weight kg | Plinth area mm² |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000039 | SWR-M-400/150 | 452 | 366 | 416 | 350 | 143 | 156 | 127 | 240 | 275 | 279 | 72 | 70 |

**N.B. Dimensions and weights are preliminary and will be confirmed upon order**

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