

# TRAMO

## SWR-M-400 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

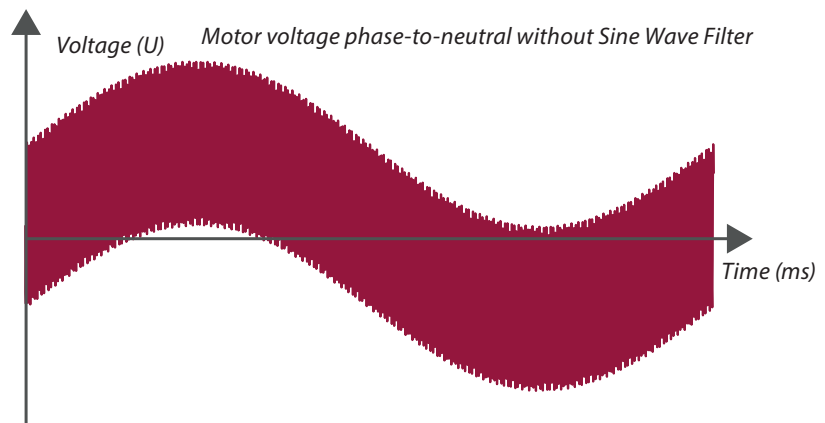
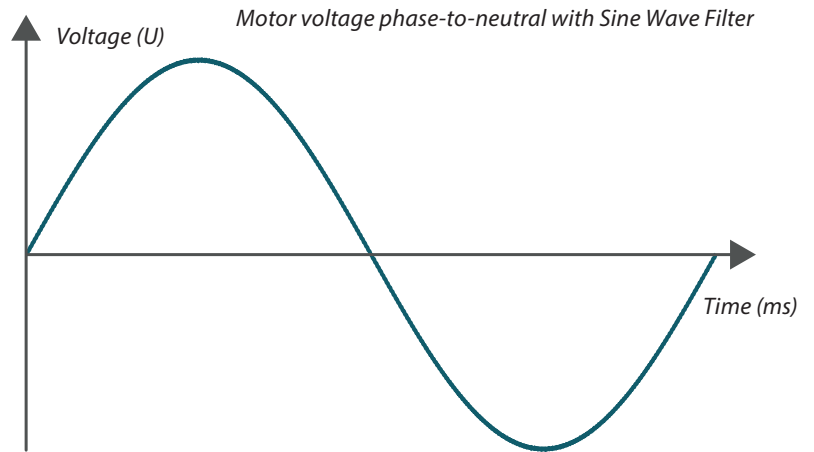


fig 1. Motor Voltage with and without Sine Wave Filter

### BACKGROUND

Frequency-controlled motors face issues such as bearing currents and voltage peaks, which result in significant maintenance 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.

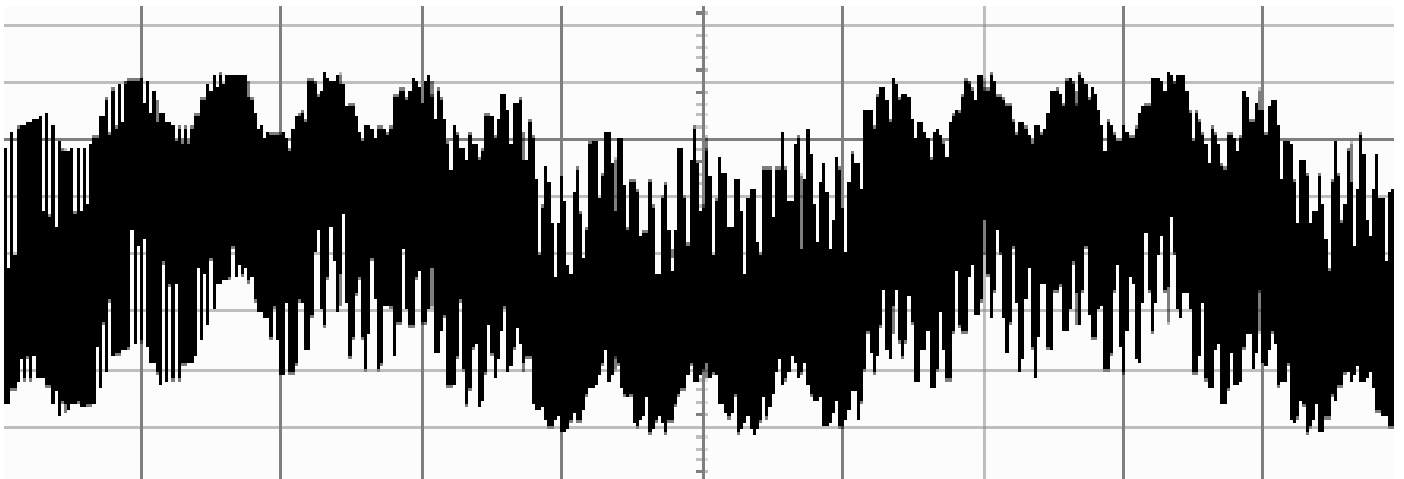


fig 2. Motor Voltage Curve

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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.

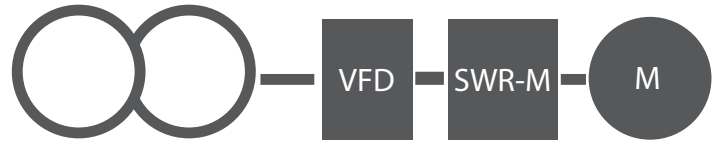


fig 3. Filter configuration

## APPLICATIONS

The sine wave filter can be applied to a variety of applications and requires 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 interval needs to be extended
- General purpose motors with 690v
- Applications where the frequency converter is connected to a transformer

## OUR OFFER

Tramo 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 filters in the 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

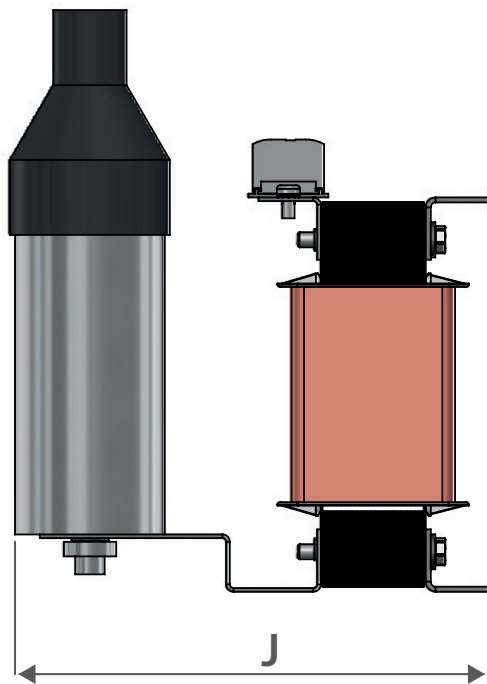
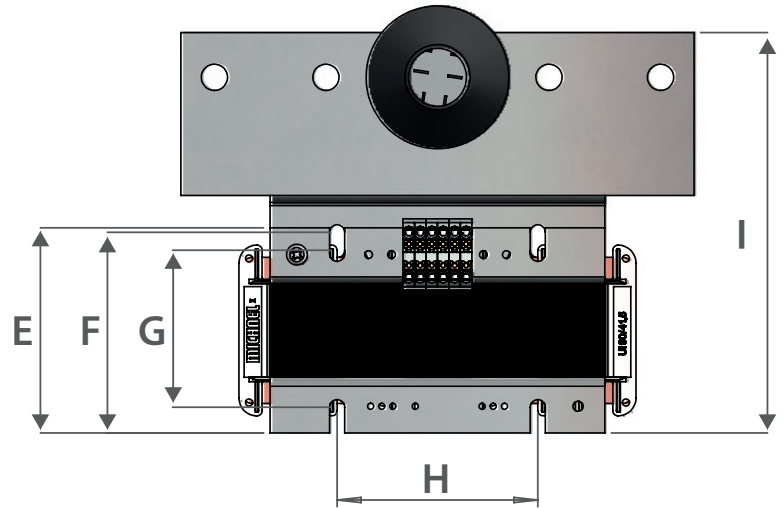
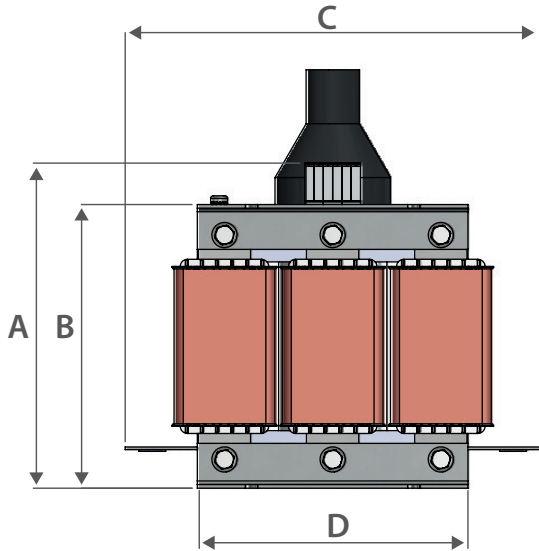
### TECHNICAL DATA

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

## 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 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 mm <sup>2</sup>
1000033	SWR-M-400/10	181	158	230	150	92	90	70	90	179,5	189,5	9	4

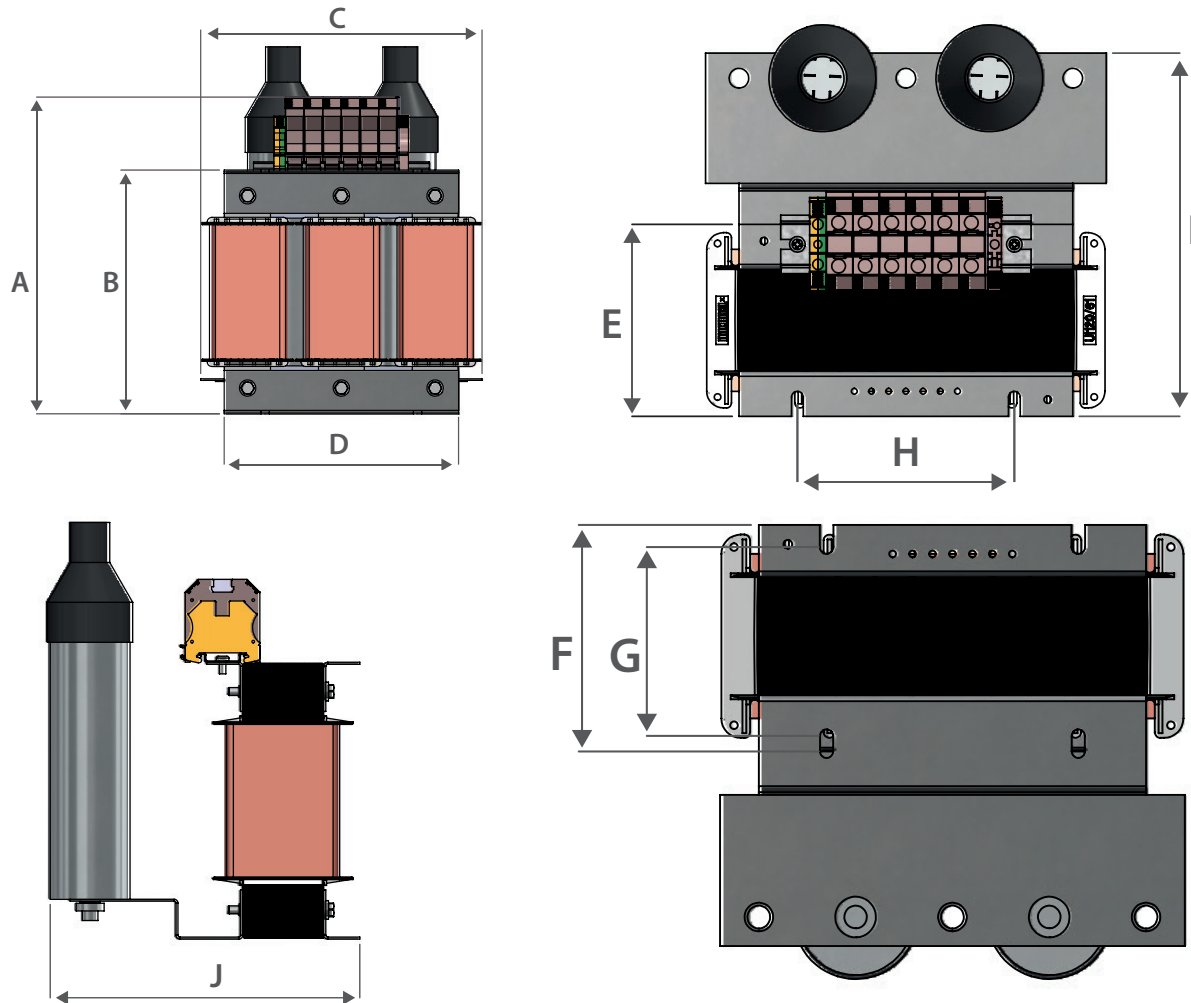
N.B. Dimensions and weights are preliminary and will be confirmed upon order

## 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 mm <sup>2</sup>
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

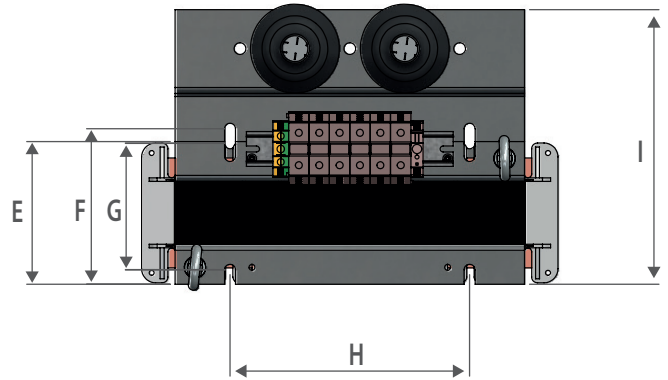
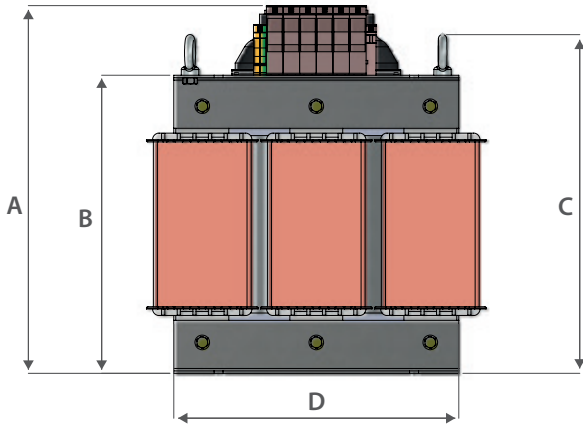
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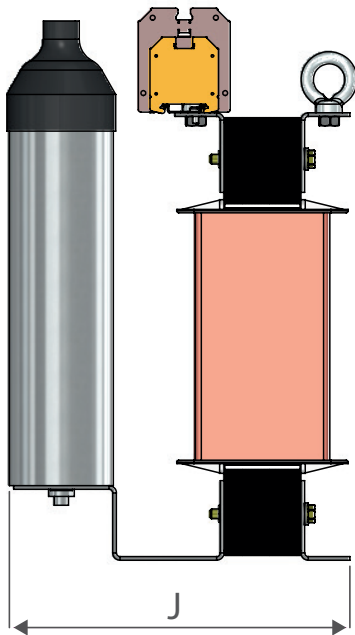
## SWR-M, Sine Wave Filter

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 mm <sup>2</sup>
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