

KRF EMC Filters

Installation, Operation and Maintenance Manual

KRF EMC Filters limit high frequency noise, as well as:

- Reduce interference
- Protect sensitive equipment
- Eliminate drive cross-talk
- Meet FCC Regulation 15, Subpart J





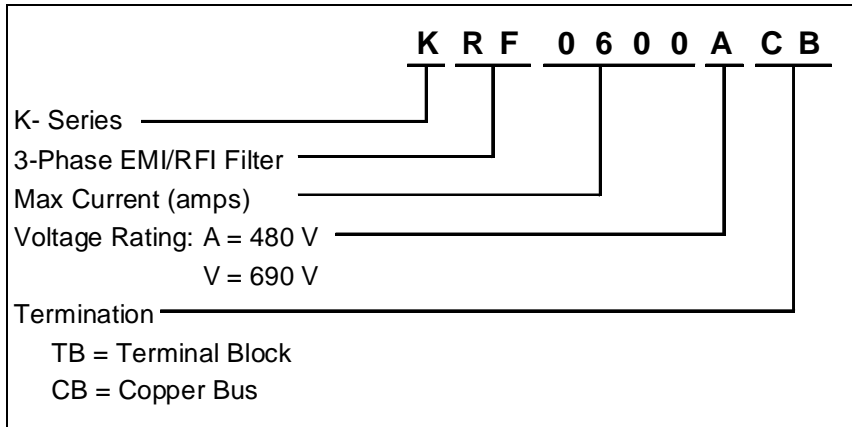
TCI, LLC
7878 N. 86th Street
Milwaukee, Wisconsin 53224
Phone: 414-357-4480
Fax: 414-357-4484
Helpline: 800-TCI-8282
Web Site:
<http://www.transcoil.com>
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Introduction

KRF EMC 3-Phase Filters are available:

- 520V or 760V
- Terminal Block (TB) or Copper Bus (CB) terminations
- 8 to 2500 amps

Part Number System:



This manual is split into sections depending on voltage, termination, and amp rating:

Section 1: 520V, TB, 8 – 150A

Part Numbers:

KRF0008ATB
KRF0016ATB
KRF0025ATB
KRF0036ATB
KRF0050ATB
KRF0066ATB
KRF0090ATB
KRF0120ATB
KRF0150ATB

Section 2: 520V, CB, 180 – 400A

Part Numbers:

KRF0180ACB
KRF0250ACB
KRF0320ACB
KRF0400ACB

Section 3: 520V, CB, 150A & 600 – 2500A

Part Numbers:

KRF0150ACB
KRF0600ACB
KRF1000ACB
KRF1600ACB
KRF2500ACB

Section 4: 760V, TB, 25 – 180A

Part Numbers:

KRF0025VTB
KRF0036VTB
KRF0050VTB
KRF0080VTB
KRF0120VTB
KRF0150VTB
KRF0180VTB

Section 5: 760V, CB, 150 – 2500A

Part Numbers:


KRF0150VCB
KRF0180VCB
KRF0250VCB
KRF0320VCB
KRF0400VCB
KRF0600VCB
KRF1000VCB
KRF1600VCB
KRF2500VCB

Table of Contents

Cautions and Warnings 1
Section 1: 520V, TB, 8 – 150A 3
Section 2: 520V, CB, 180 – 400A 13
Section 3: 520V, CB, 150A & 600 – 2500A 17
Section 4: 760V, TB, 25 – 180A 23
Section 5: 760V, CB, 150 – 2500A 31

Cautions and Warnings

Important Information

Please read all safety and warning notes carefully before installing the EMC filter and putting it into operation (see ). The same applies to the warning signs on the filter. Please ensure that the signs are not removed nor their legibility impaired by external influences.

Death, serious bodily injury and substantial material damage to equipment may occur if the appropriate safety measures are not carried out or the warnings in the text are not observed.

The EMC filters may be used only for their intended application within the specified values in low-voltage networks in compliance with the instructions given in the data sheets and the data book. The conditions at the place of application must comply with all specifications for the filter used.

Warnings

- It shall be ensured that only qualified persons (electricity specialists) engage on work such as planning, assembly, installation, operation, repair and maintenance. They must be provided with the corresponding documentation.
- Danger of electric shock. EMC filters contain components that store an electric charge. Dangerous voltages can continue to exist at the filter terminals for longer than five minutes even after the power has been switched off.
- The protective earth connections shall be the first to be made when the EMC filter is installed and the last to be disconnected. Depending on the magnitude of the leakage currents, the particular specifications for making the protective-earth connection must be observed.
- Impermissible overloading of the EMC filter, such as impermissible voltages at higher frequencies that may cause resonances etc. can lead to destruction of the filter housing.
- EMC filters must be protected in the application against impermissible exceeding of the rated currents by suitable overcurrent protective.

Important Notes

The following applies to all products named in the publication:

1. Some parts of this publication contain **statements about the sustainability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the sustainability of our products for a particular customer application**. As a rule, TCI is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a TCI product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as “hazardous”)**. Should you have any more detailed questions, please contact TCI Technical Support.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.

Section 1: 520V, TB, 8 – 150A

EMC Filters

Phase: 3

Current: 8 to 150 A

Voltage: 520/300 V AC, 50/60 Hz

Termination: Terminal Block

Part Numbers:

KRF0008ATB

KRF0016ATB

KRF0025ATB

KRF0036ATB

KRF0050ATB

KRF0066ATB

KRF0090ATB

KRF0120ATB

KRF0150ATB

Construction

- 3-line filter
- Metal case
- Book size

Features

- Excellent price/performance ratio
- Ultra-compact design
- Low weight
- Easy to install
- Optimized for long motor cables and operation under full load

- ENEC10, UL, and cUL approval 

Applications

- Frequency converters for motor drives, e.g.
 - elevators
 - pumps
 - traction systems
 - HVAC systems (heating, ventilation and air conditioning)
- Power supplies

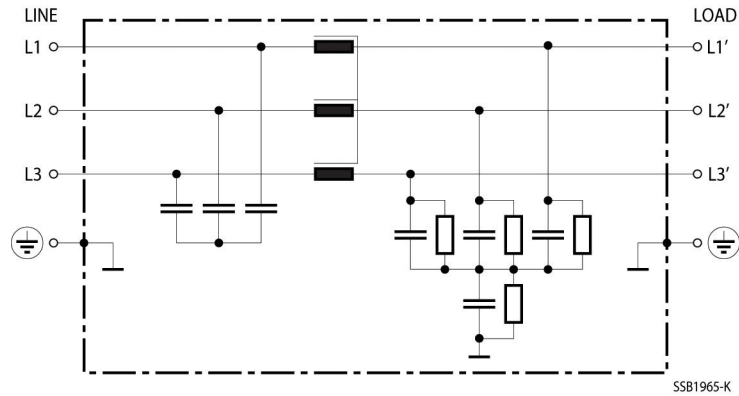
Terminals

- Finger-safe terminal blocks

Marking

Marking on component:
 Manufacturer's logo, ordering code,
 rated voltage, rated current, rated temperature,
 climatic category, date code




Typical Circuit diagram



Technical data and measuring conditions

| | |
|---------------------------------|--|
| Rated voltage V_R | 520/300 V AC, 50/60 Hz |
| Rated current I_R | Referred to 40°C ambient temperature |
| Test voltage V_{test} | 2236 V DC, 2 s (line/line) 2720 V DC, 2 s (lines/case) |
| Overload capability (thermal) | 1.5 · I_R for 3 min per hour or 2.5 · I_R for 30 s per hour |
| Leakage current I_{leak} | At 520 V AC, 50 Hz |
| Climatic category (IEC 60068-1) | 25/100/21 (-25°C/+100°C/21 days damp heat test) |
| Approvals | EN 133200, UL 1283, CSA C22.2 No.8) |

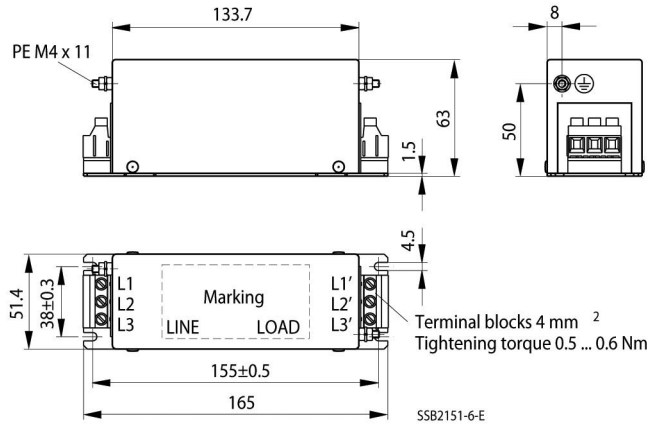
Characteristics and part numbers

| V _R AC V | I _R A | Terminal cross section mm ² | I _{leak} mA | R _{typ} μΩ | Approx weight kg | Part Number | Approvals | | |
|---------------------------|---------------------|---|-------------------------|------------------------|------------------------|-------------|---|---|---|
| | | | | | | |  |  |  |
| 520/300 | 8 | 4 | 13 | 16 | 0.58 | KRF0008ATB | X | X | X |
| | 16 | 4 | 15 | 9 | 0.90 | KRF0016ATB | X | X | X |
| | 25 | 4 | 15 | 5 | 1.10 | KRF0025ATB | X | X | X |
| | 36 | 10 | 15 | 4 | 1.75 | KRF0036ATB | X | X | X |
| | 50 | 10 | 15 | 2 | 1.75 | KRF0050ATB | X | X | X |
| | 66 | 16 | 16 | 1.5 | 2.7 | KRF0066ATB | X | X | X |
| | 90 | 35 | 18 | 1.1 | 4.2 | KRF0090ATB | X | X | X |
| | 120 | 35 | 18 | 0.90 | 4.9 | KRF0120ATB | X | X | X |
| | 150 | 50 | 18 | 0.55 | 5.3 | KRF0150ATB | X | X | X |

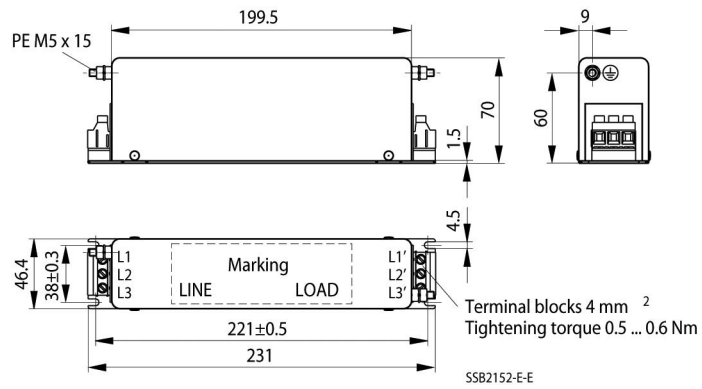
X = approval granted

Dimensional drawings

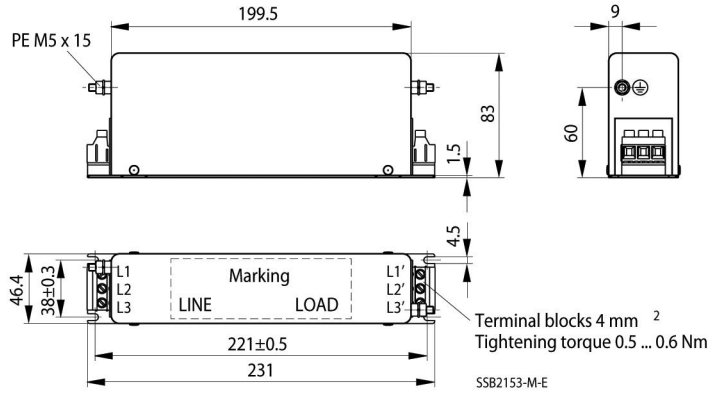
(8 A) KRF0008ATB



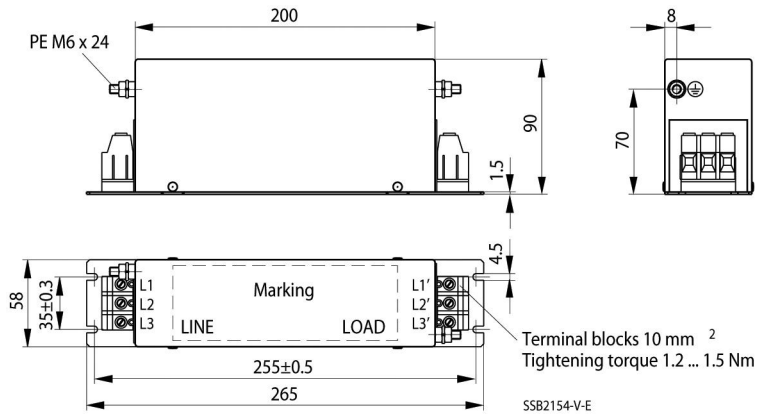
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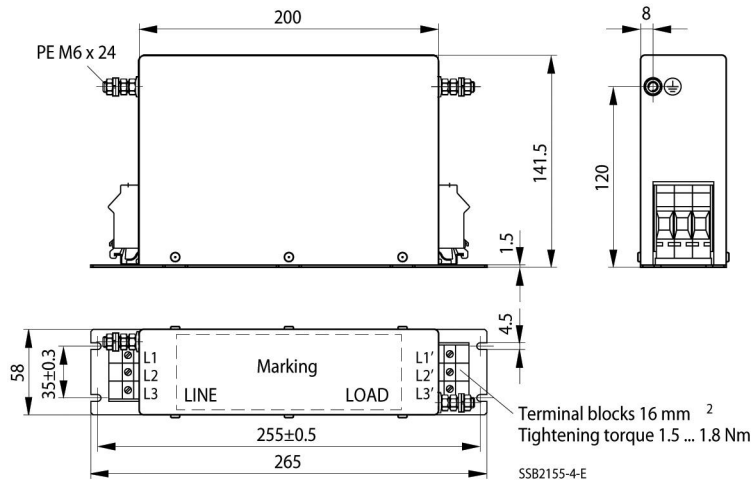
(25 A) KRF0025ATB



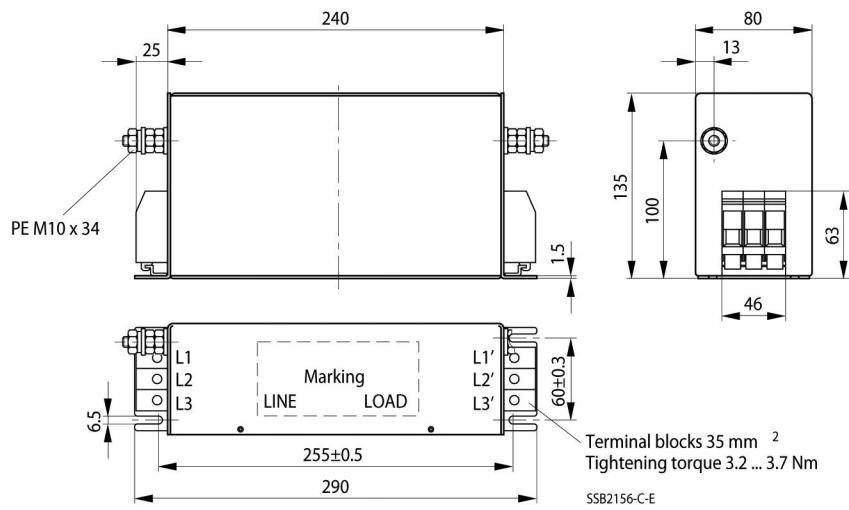
(600 A) KRF0036ATB, KRF0050ATB



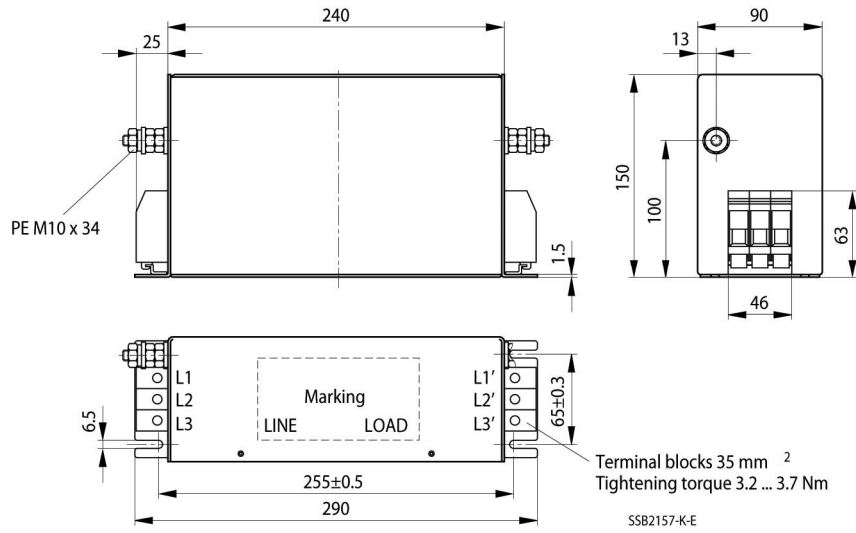
(66 A) KRF0066ATB



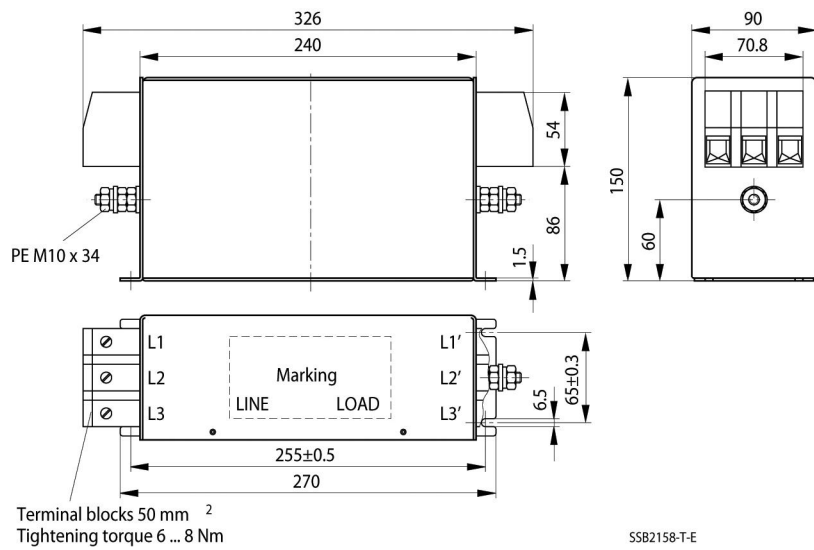
(90 A) KRF0090ATB



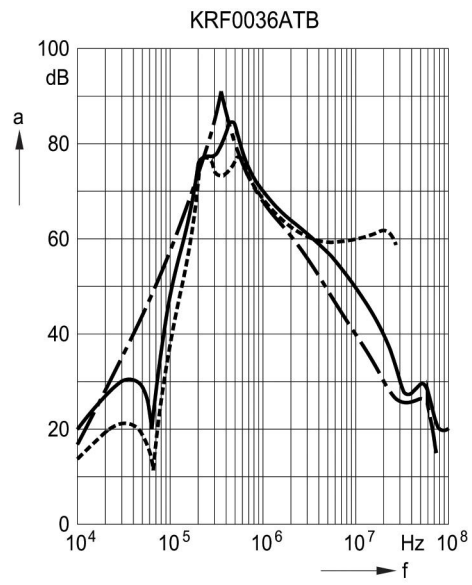
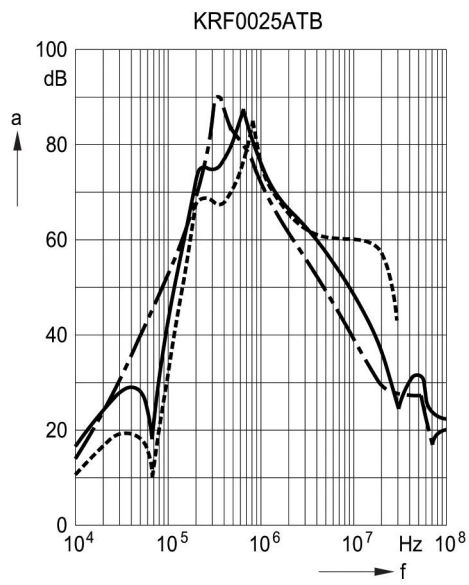
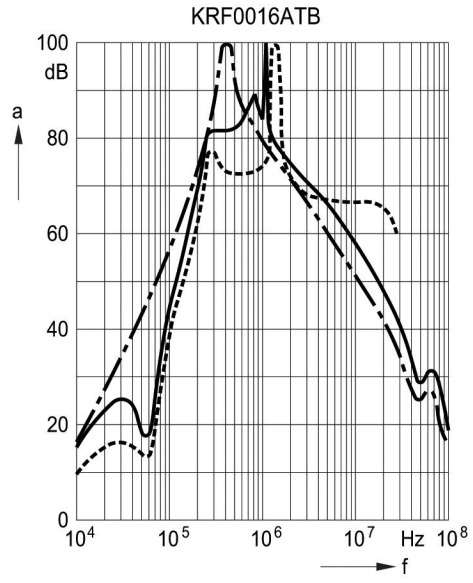
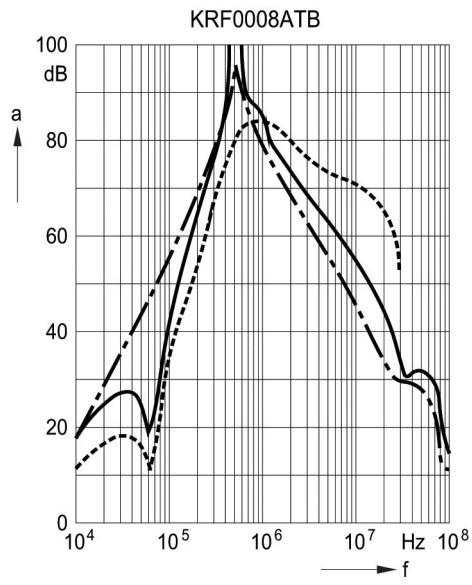
(120 A) KRF0120ATB



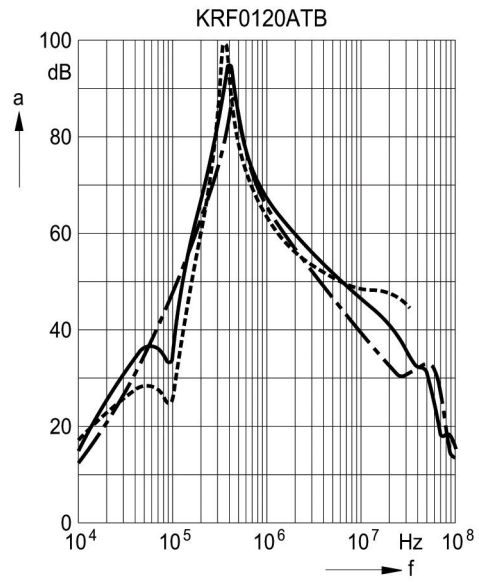
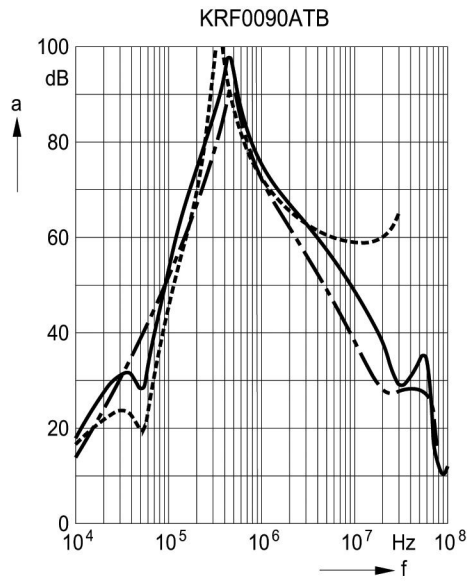
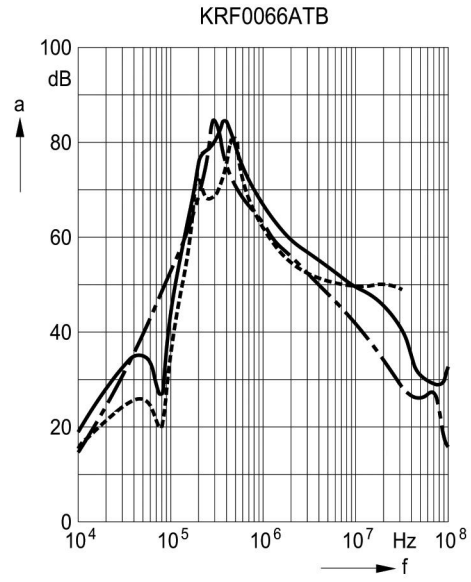
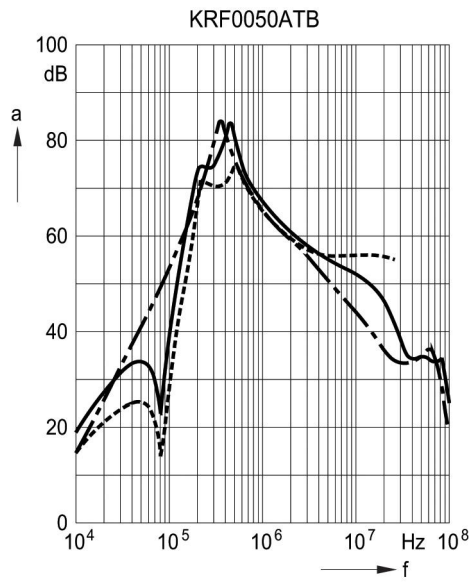
(150 A) KRF0150ATB



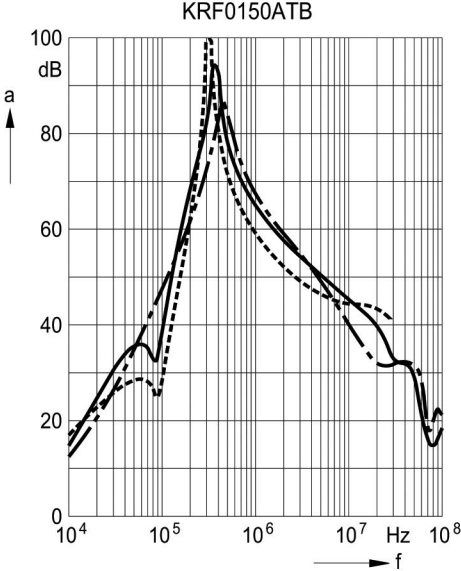
Insertion Loss (typical values at $Z = 50 \Omega$)



Insertion Loss (typical values at $Z = 50 \Omega$)



Insertion Loss (typical values at Z = 50 Ω)



Section 2: 520V, CB, 180 – 400A

EMC Filters

Phase: 3

Current: 180 to 400 A

Voltage: 520/300 V AC, 50/60 Hz

Termination: Copper Bus

Part Numbers:

KRF0180ACB

KRF0250ACB


KRF0320ACB

KRF0400ACB

Construction

- 3-line filter
- Metal case

Features

- Optimized leakage current
- Easy to install
- Very compact design
- Optimized for operation under full load
- Low weight
- Design complies with
EN 133200, UL 1283, CSA C22.2 No.8
- UL, cUL approval 

Applications

- Frequency converters for motor drives
- Wind farms
- Power supplies

Terminals

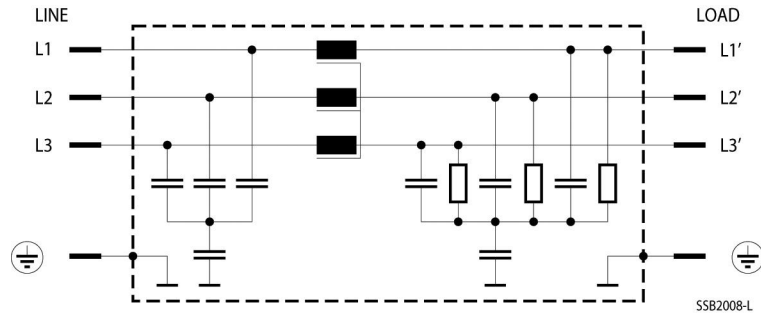
- Busbars

Marking

Marking on component:

Manufacturer's logo, ordering code,
rated voltage, rated current, rated temperature,
climatic category, date code

Typical circuit diagram



Technical data and measuring conditions

| | |
|---------------------------------|--|
| Rated voltage V_R | 520/300 V AC, 50/60 Hz |
| Read current I_R | Referred to 40°C ambient temperature (180 A filter at 60°C) |
| Test voltage V_{test} | 2240 V DC, 2 s (line/line) |
| | 2690 V DC, 2 s (lines, case) |
| | 3270 V DC, 2 s (line/line) |
| | 2890 V DC, 2 s (lines/case) |
| | 1.5 · I_R for 3 min per hour or 2.5 · I_R for 30 s per hour |
| Overload capability (thermal) | 520 V AC, 50 Hz |
| Leakage current I_{leak} | 25/100/21 (-25°C/+100°C/21 days damp heat test) |
| Climatic category (IEC 60068-1) | UL 1283; CSA C22.2 No.8 |

Characteristics and ordering codes

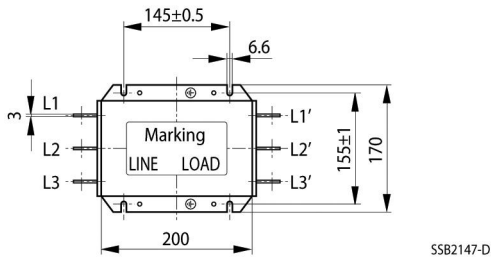
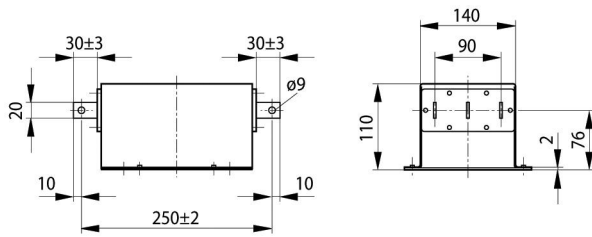
| V_R AC V | I_R A | I_{leak} mA | R_{typ} $\mu\Omega$ | Approx weight kg | TCI Number | Approvals | |
|------------------|------------------|------------------|--------------------------|------------------------|------------|---|---|
| | | | | | |  |  |
| 520/300 | 180 ¹ | < 21 | 110 | 5.0 | KRF0180ACB | X | X |
| | 250 | < 21 | 110 | 5.0 | KRF0250ACB | X | X |
| | 320 | < 21 | 51 | 7.2 | KRF0320ACB | X | X |
| | 400 | < 21 | 48 | 7.5 | KRF0400ACB | X | X |

X = approval granted

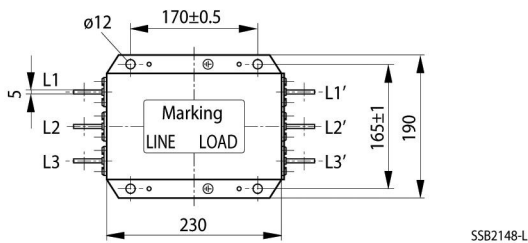
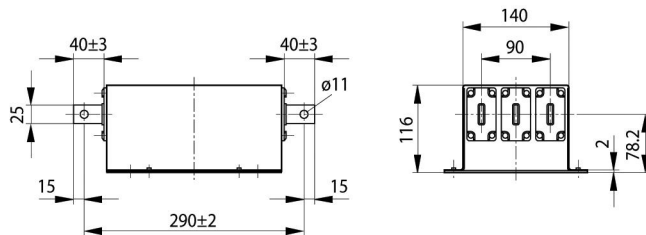
1) KRF0180ACB referred to 60°C ambient temperature

Dimensional drawings

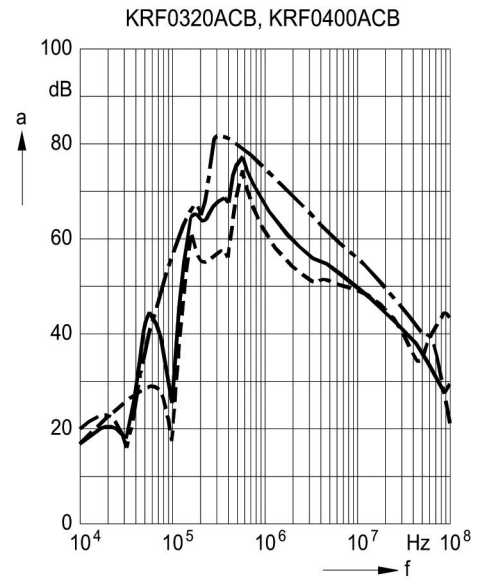
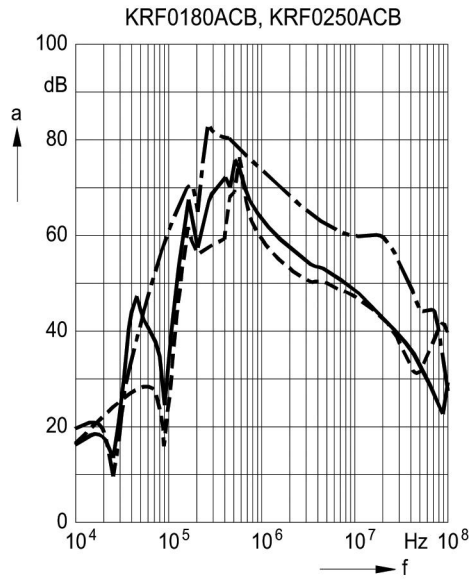
(180 A, 250 A) KRF0180ACB, KRF0250ACB



(320 A, 400 A) KRF0320ACB, KRF0400ACB



Insertion Loss (typical values at $Z = 50 \Omega$)



Section 3: 520V, CB, 150A & 600 – 2500A

EMC Filters

Phase: 3

Current: 150 A; 600 to 2500 A

Voltage: 520/300 V AC, 50/60 Hz

Termination: Copper Bus

Part Numbers:

KRF0150ACB

KRF0600ACB

KRF1000ACB


KRF1600ACB

KRF2500ACB

Construction

- 3-line filter
- Metal case

Features

- Optimized leakage current
- Easy to install
- Very compact design
- Optimized for operation under full load
- Low weight
- UL, cUL approval 

Applications

- Frequency converters for motor drives
- Wind farms
- Power supplies

Terminals

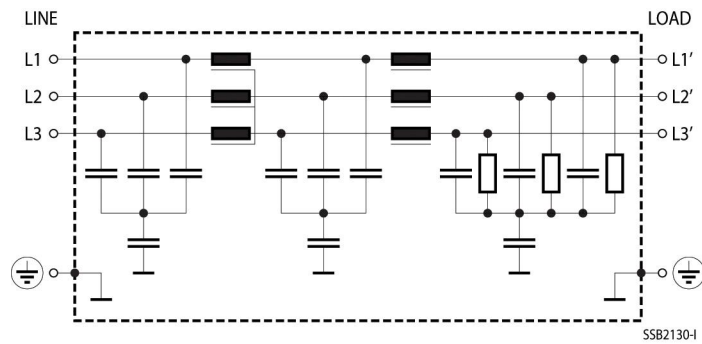
- Busbars

Marking

Marking on component:

Manufacturer's logo, ordering code,
rated voltage, rated current, rated temperature,
climatic category, date code



Typical circuit diagram



Technical data and measuring conditions

| | |
|---------------------------------|--|
| Rated voltage V_R | 530/310 V AC, 50/60 Hz |
| Read current I_R | Referred to 40°C ambient temperature |
| Test voltage V_{test} | 2280 V DC, 2 s (line/line) 2690 V DC, 2 s (lines, case) |
| | 1.5 · I_R for 3 min per hour or 2.5 · I_R for 30 s per hour |
| Overload capability (thermal) | At V_R , 50 Hz |
| Leakage current I_{leak} | 25/100/21 (-25°C/+100°C/21 days damp heat test) |
| Climatic category (IEC 60068-1) | UL 1283; CSA C22.2 No.8 (Type: 500/290 V) |

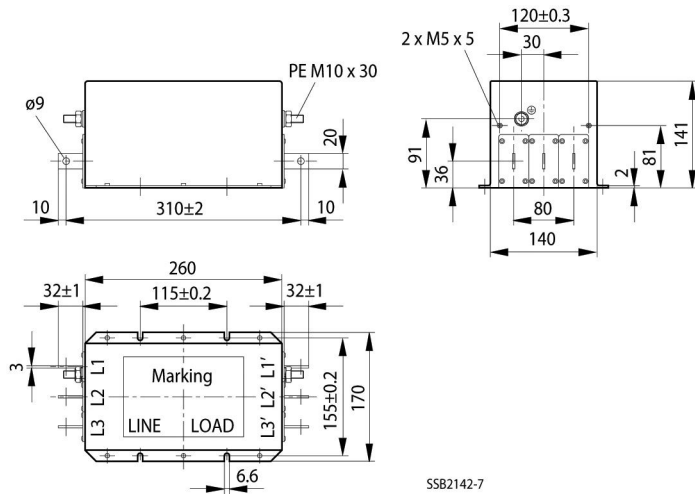
Characteristics and part numbers

| V_R AC V | I_R A | I_{leak} mA | R_{typ} $\mu\Omega$ | Approx weight kg | Part Number | Approvals | |
|------------------|------------|------------------|--------------------------|------------------------|-------------|---|---|
| | | | | | |  |  |
| 530/310 | 150 | < 20 | 140 | 13 | KRF0150ACB | X | X |
| | 600 | < 20 | 52 | 22 | KRF0600ACB | X | X |
| | 1000 | < 20 | 33 | 28 | KRF1000ACB | X | X |
| | 1600 | < 20 | 22 | 34 | KRF1600ACB | X | X |
| | 2500 | < 20 | 15 | 105 | KRF2500ACB | X | X |

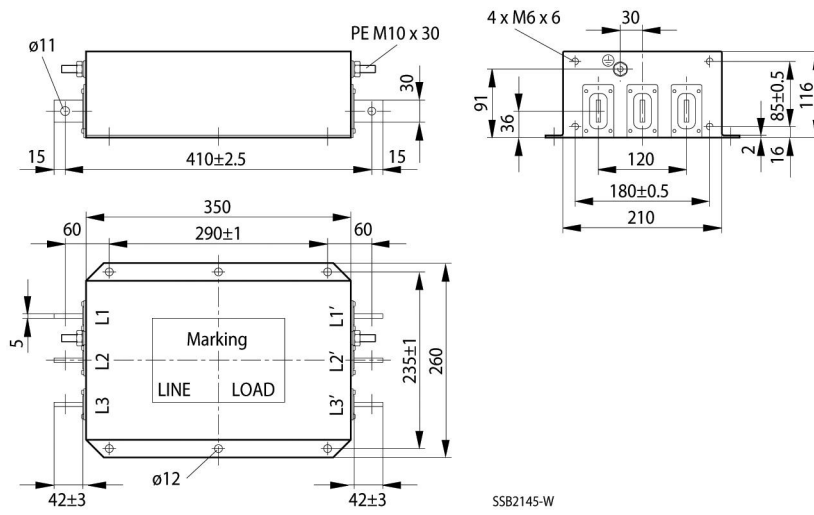
X = approval granted

Dimensional drawings

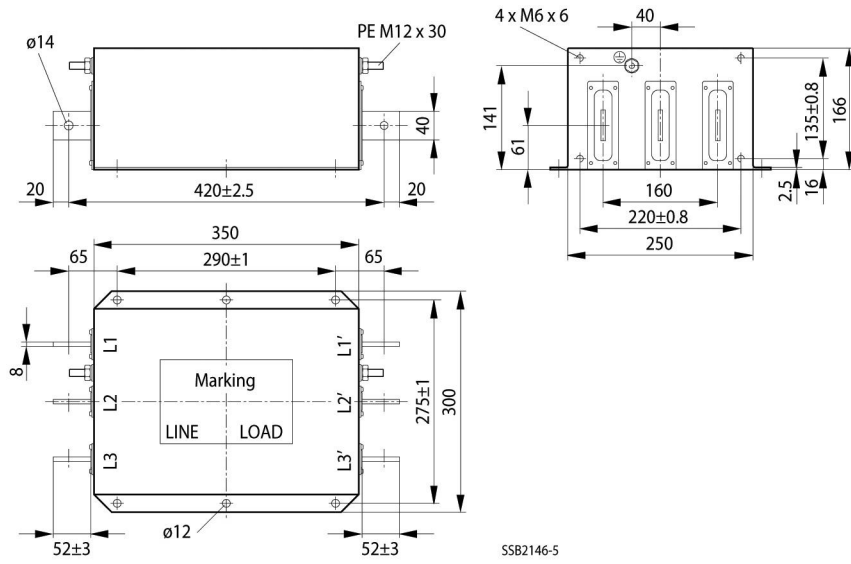
(150 A) KRF0150ACB



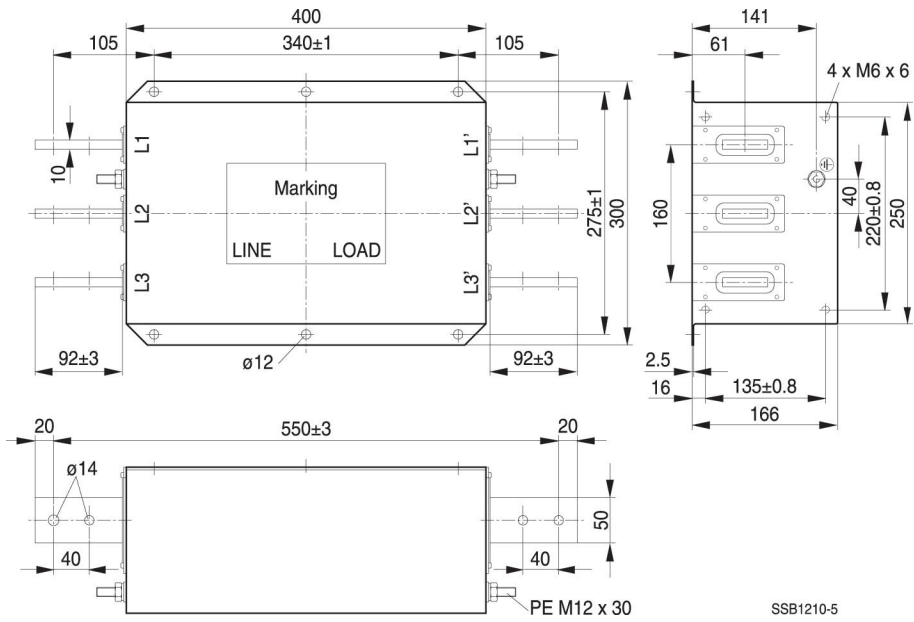
(600 A) KRF0600ACB



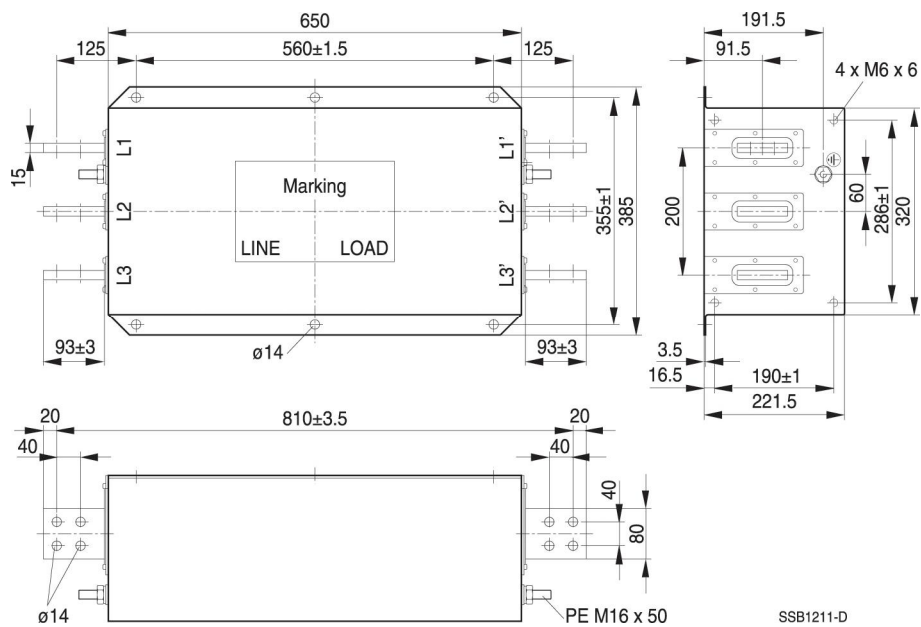
(1000 A) KRF1000ACB



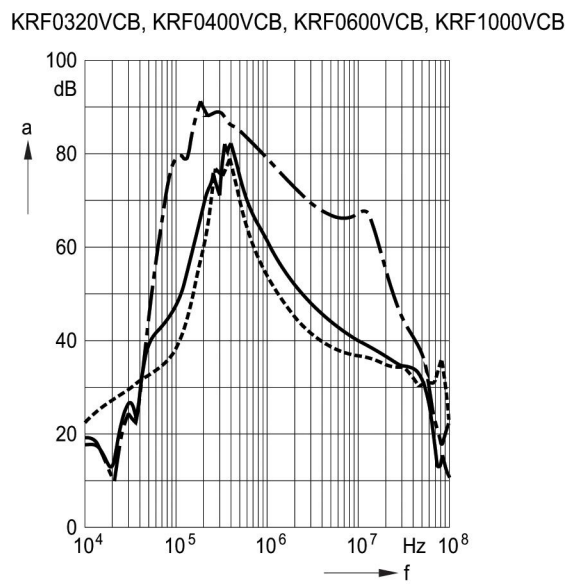
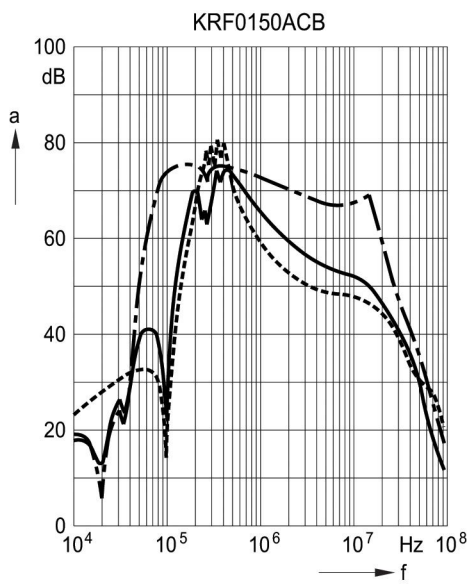
(1600 A) KRF1600ACB

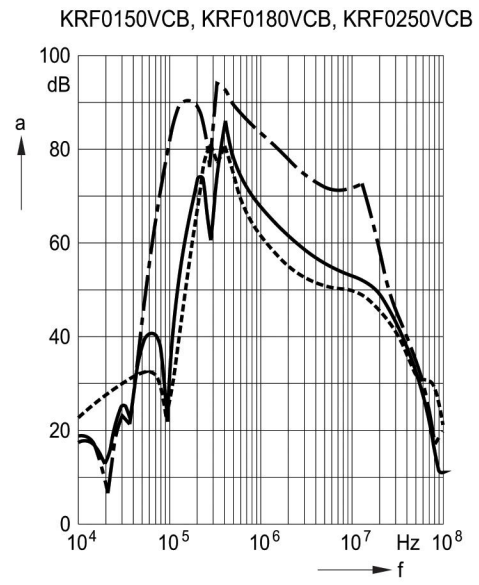
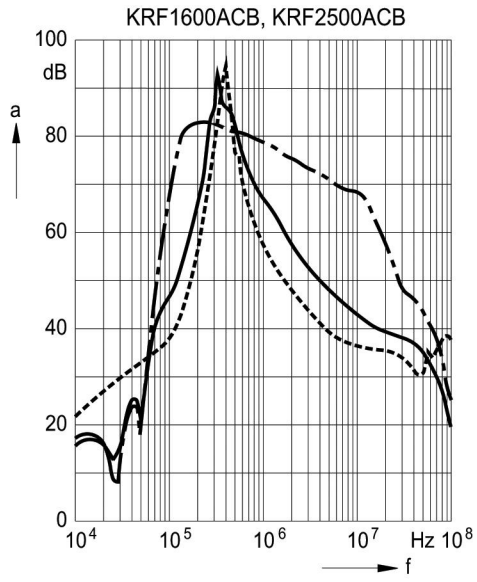


(2500 A) KRF2500ACB

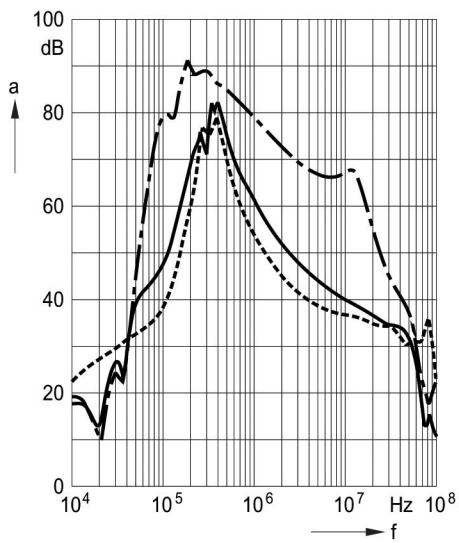


Insertion Loss (typical values at $Z = 50 \Omega$)

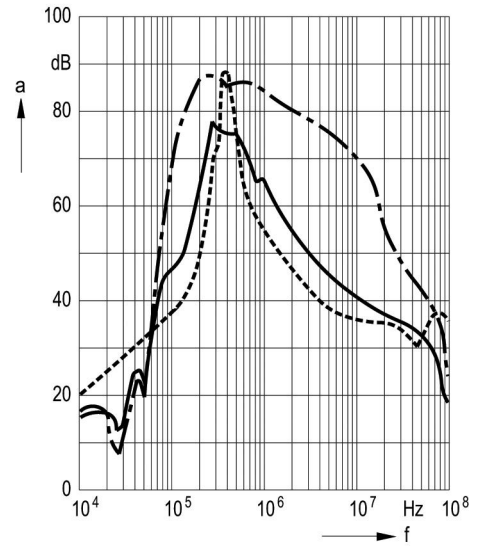




KRF0320VCB, KRF0400VCB, KRF0600VCB, KRF1000VCB



KRF1600VCB, KRF2500VCB



Section 4: 760V, TB, 25 – 180A

EMC Filters

Phase: 3

Current: 25 to 180 A

Voltage: 760/440 V AC, 50/60 Hz

Termination: Terminal Block

Part Numbers:

KRF0025VTB

KRF0036VTB

KRF0050VTB

KRF0080VTB

KRF0120VTB

KRF0150VTB

KRF0180VTB

Construction

- 3-line filter
- Metal case

Features

- High insertion loss
- Low leakage current
- Easy to install
- Degree of protection IP 20 (IEC 60529:2001)
- Space saving design
- Design complies with IEC/EN 60939, UL 1283, CSA 22.2 No. 8
- Optimized for long motor cables and operation under full load
- UL and cUL approval

Applications

- Frequency converters for motor drives, e.g.
 - elevators
 - pumps
 - traction systems
 - conveyor systems
 - HVAC systems (heating, ventilation and air conditioning)
- Wind farms
- Power supplies

Terminals

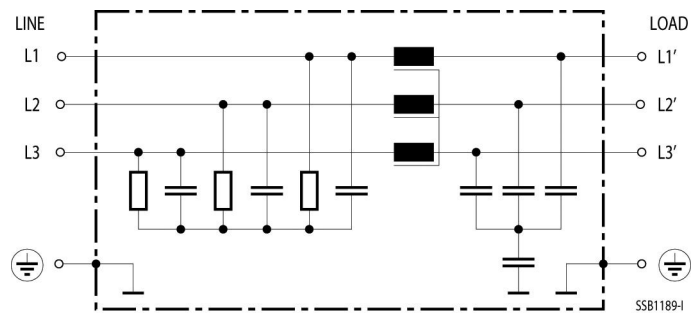
- Finger-safe terminal blocks

Marking

Marking on component:

Manufacturer's logo, ordering code, rated voltage, rated current, rated temperature, climatic category, date code




Typical Circuit diagram



Technical data and measuring conditions

| | | | |
|---|------------|--------------------------------------|-------------|
| Rated voltage | V_R | 760/440 | V AC |
| Rated frequency | f_R | 50/60 | Hz |
| Test voltage line to line for 2 s | V_{test} | 3270 | V DC |
| Test voltage line to case for 2 s | V_{test} | 3000 | V DC |
| Rated temperature | T_R | 40 | °C |
| Overload capability (thermal) for 3 min per hour or for 30 s per hour | | $1.5 \times I_R$ $2.5 \times I_R$ | |
| Leakage current I_{leak} | | At 690 | V AC, 50 Hz |
| Climatic category (IEC 60068-1) | | 25/100/21 | |

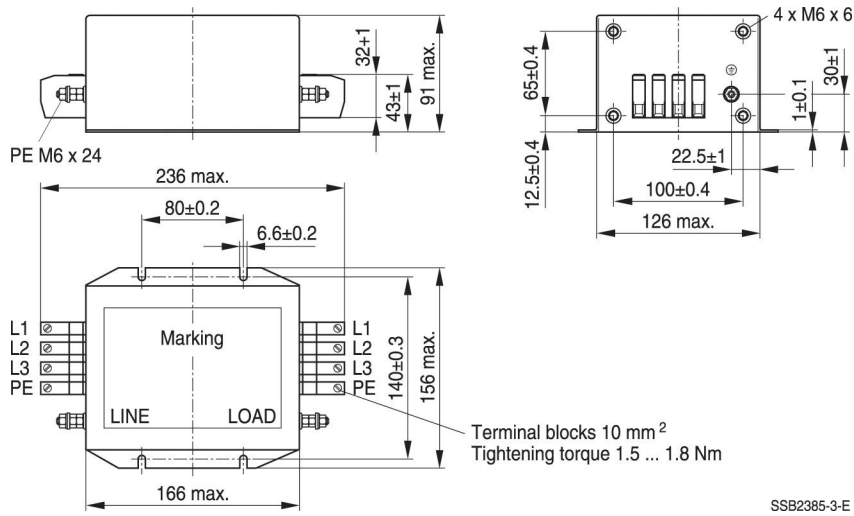
Characteristics and part numbers

| I _R A | Terminal cross section mm ² | I _{leak} mA | R _{typ} μΩ | Approx weight kg | Part Number | Approvals | | |
|---------------------|---|-------------------------|------------------------|------------------------|-------------|---|---|---|
| | | | | | |  |  |  |
| 25 | 10 | < 7 | 8.0 | 4 | KRF0025VTB | - | X | X |
| 36 | 10 | < 7 | 3.8 | 4 | KRF0036VTB | - | X | X |
| 50 | 10 | < 12 | 2.0 | 4 | KRF0050VTB | - | X | X |
| 80 | 25 | < 12 | 1.0 | 9.5 | KRF0080VTB | - | X | X |
| 120 | 50 | < 12 | 0.75 | 10 | KRF0120VTB | - | X | X |
| 150 | 50 | < 12 | 0.4 | 10 | KRF0150VTB | - | X | X |
| 180 | 95 | < 12 | 0.4 | 13 | KRF0180VTB | - | X | X |

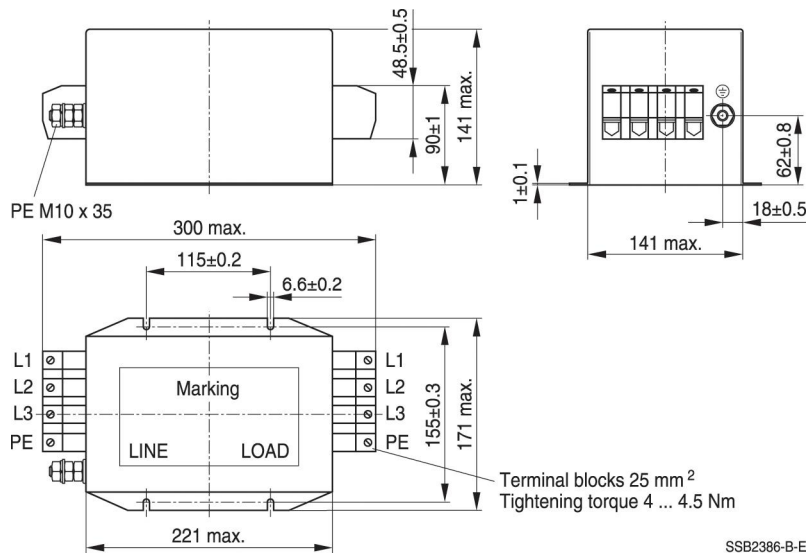
X = approval granted

Dimensional drawings

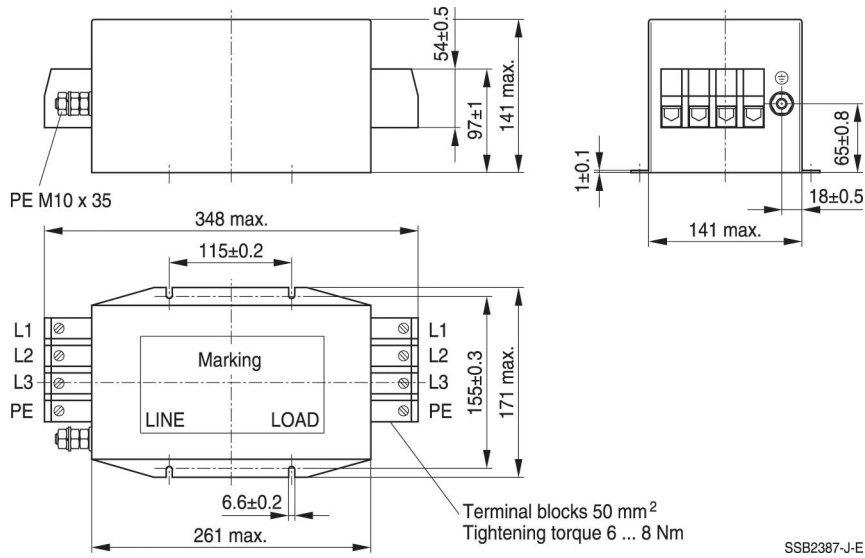
(25 A, 50 A) KRF0025VTB, KRF0050VTB



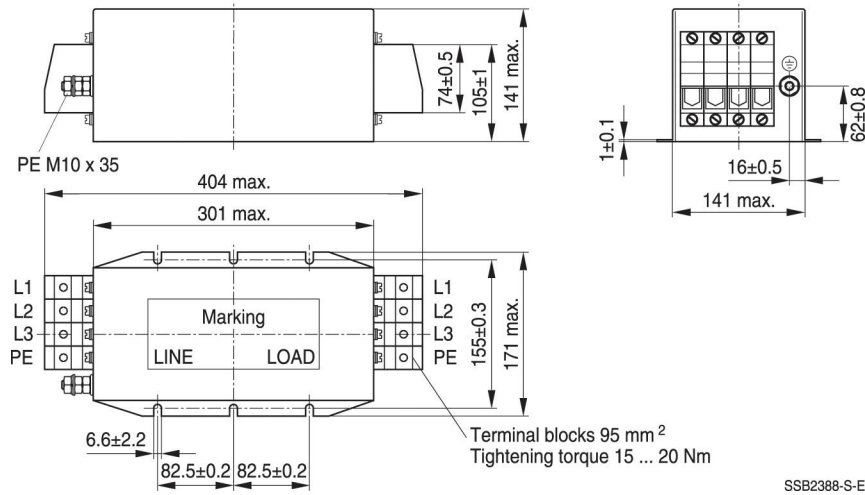
(80 A) KRF0080VTB



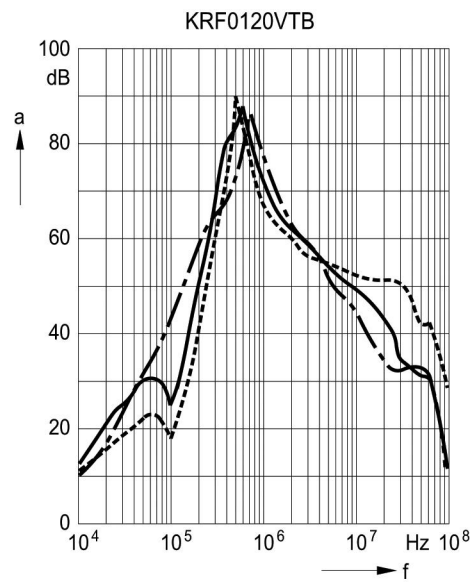
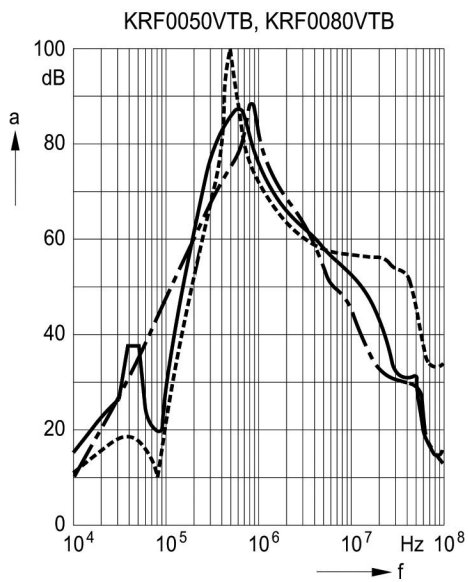
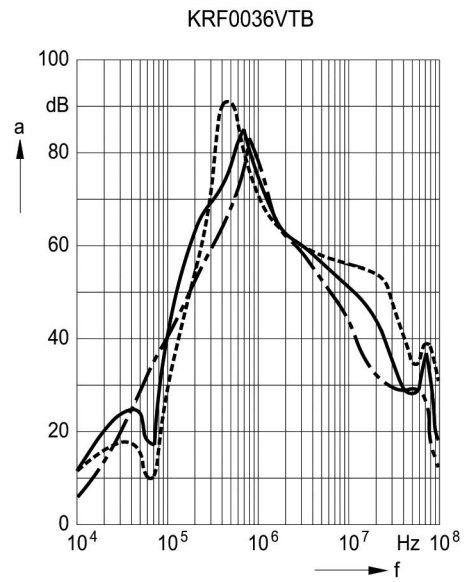
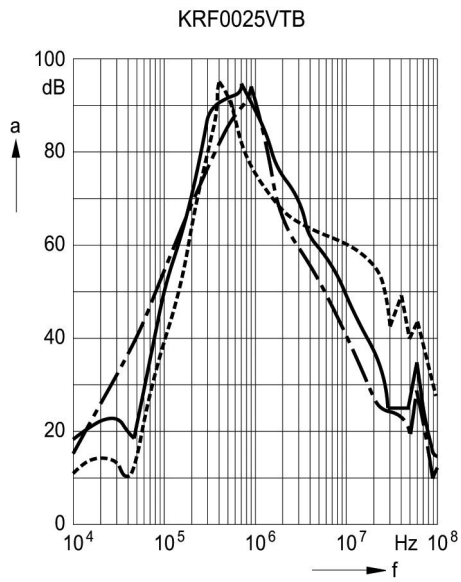
(120 A, 150 A) KRF0120VTB, KRF0150VTB

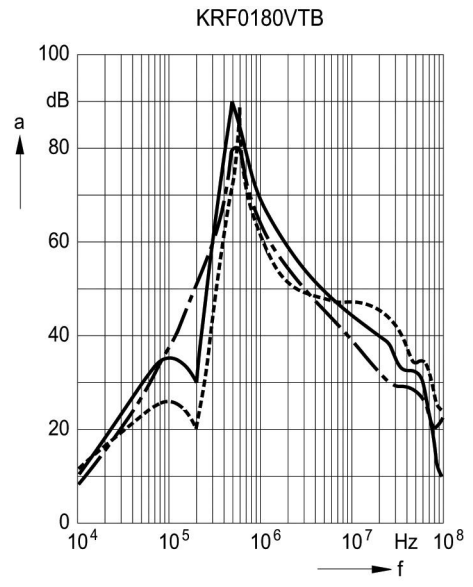
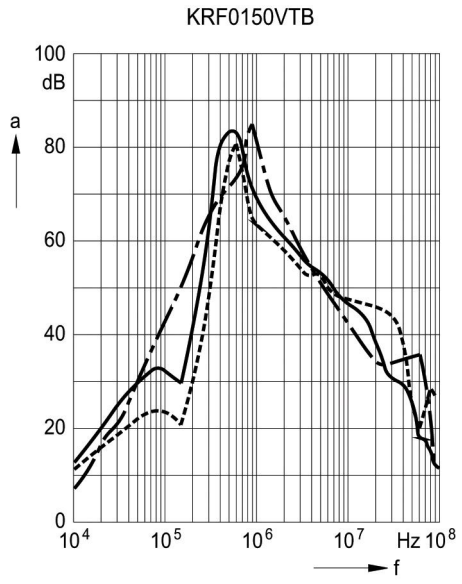


(180 A) KRF0180VTB



Insertion Loss (typical values at $Z = 50 \Omega$)





Section 5: 760V, CB, 150 – 2500A

EMC Filters

Phase: 3

Current: 150 to 2500 A

Voltage: 760/440 V AC, 50/60 Hz

Termination: Copper Bus

Part Numbers:

KRF0150VCB

KRF0180VCB

KRF0250VCB

KRF0320VCB

KRF0400VCB

KRF0600VCB

KRF1000VCB


KRF1600VCB

KRF2500VCB

Construction

- 3-line filter
- Metal case

Features

- Optimized leakage current
- Easy to install
- Very compact design
- Optimized for operation under full load
- Low weight
- UL, cUL approval 

Applications

- Frequency converters for motor drives
- Wind farms
- Power supplies

Terminals

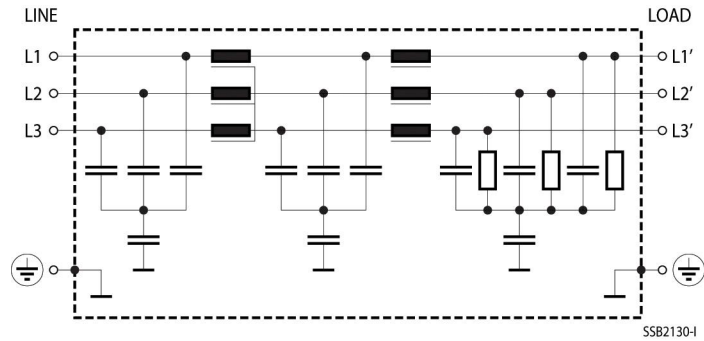
- Busbars

Marking

Marking on component:

Manufacturer's logo, ordering code,
rated voltage, rated current, rated temperature,
climatic category, date code



Typical circuit diagram



Technical data and measuring conditions

| | |
|---------------------------------|--|
| Rated voltage V_R | Type: 760/440 V AC, 50/60 Hz |
| Read current I_R | Referred to 40°C ambient temperature |
| | Type: 3270 V DC, 2 s (line/line) 2890 V DC, 2 s (lines/case) |
| | 1.5 · I_R for 3 min per hour or 2.5 · I_R for 30 s per hour |
| Overload capability (thermal) | At V_R , 50 Hz |
| Leakage current I_{leak} | 25/100/21 (-25°C/+100°C/21 days damp heat test) |
| Climatic category (IEC 60068-1) | UL 1283; CSA C22.2 No.8 |

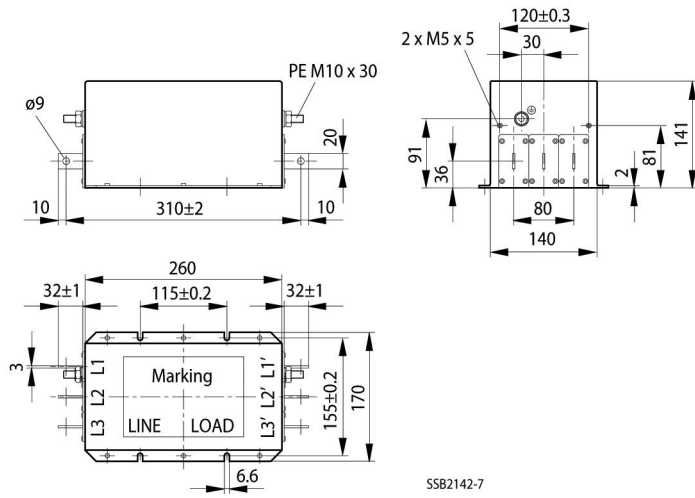
Characteristics and part numbers

| V_R AC V | I_R A | I_{leak} mA | R_{typ} $\mu\Omega$ | Approx weight kg | Part Number | Approvals | |
|------------------|------------|------------------|--------------------------|------------------------|-------------|---|---|
| | | | | | |  |  |
| 760/440 | 150 | < 28 | 140 | 13 | KRF0150VCB | X | X |
| | 180 | < 28 | 140 | 13 | KRF0180VCB | X | X |
| | 250 | < 28 | 63 | 15 | KRF0250VCB | X | X |
| | 320 | < 28 | 67 | 21 | KRF0320VCB | X | X |
| | 400 | < 28 | 67 | 21 | KRF0400VCB | X | X |
| | 600 | < 28 | 52 | 22 | KRF0600VCB | X | X |
| | 1000 | < 28 | 33 | 28 | KRF1000VCB | X | X |
| | 1600 | < 28 | 22 | 34 | KRF1600VCB | X | X |
| | 2500 | < 28 | 15 | 105 | KRF2500VCB | X | X |

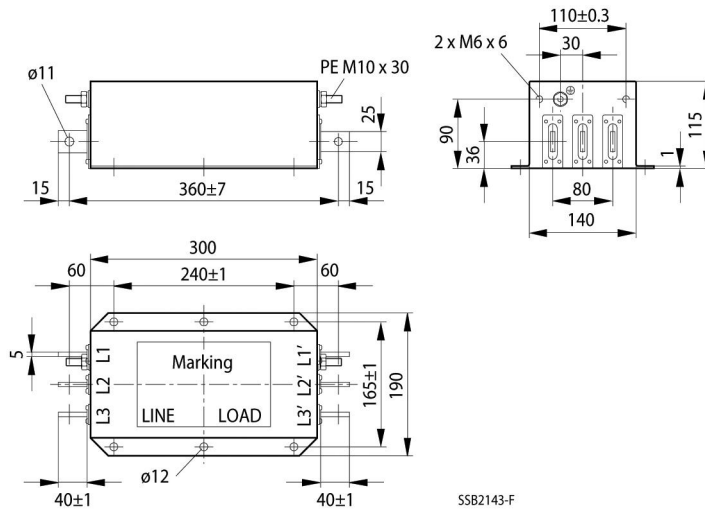
X = approval granted

Dimensional drawings

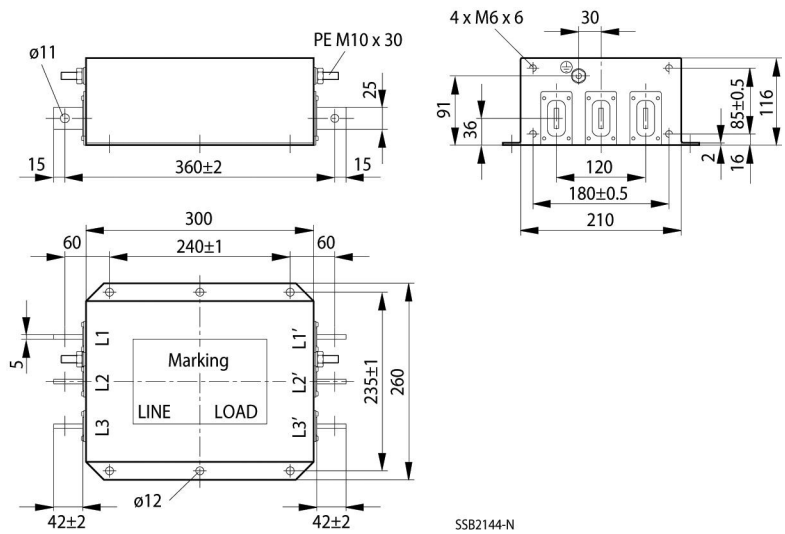
(150 A, 180 A) KRF0150VCB, KRF0180VCB



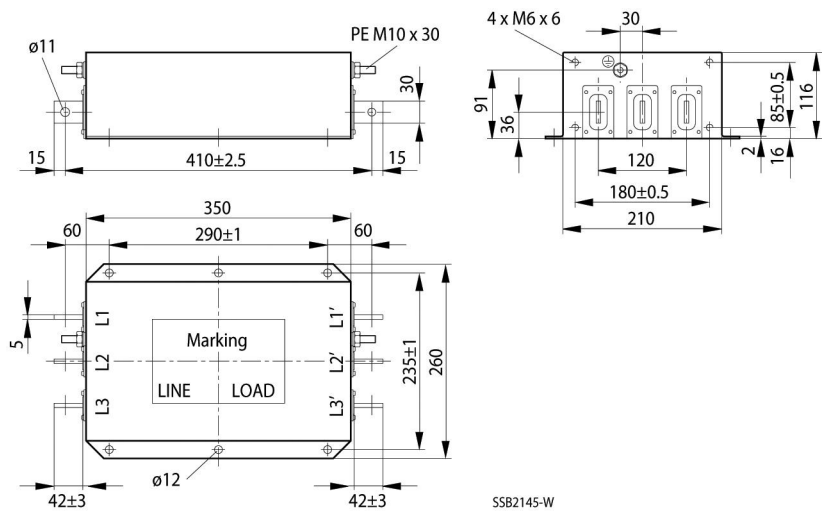
(250 A) KRF0250VCB



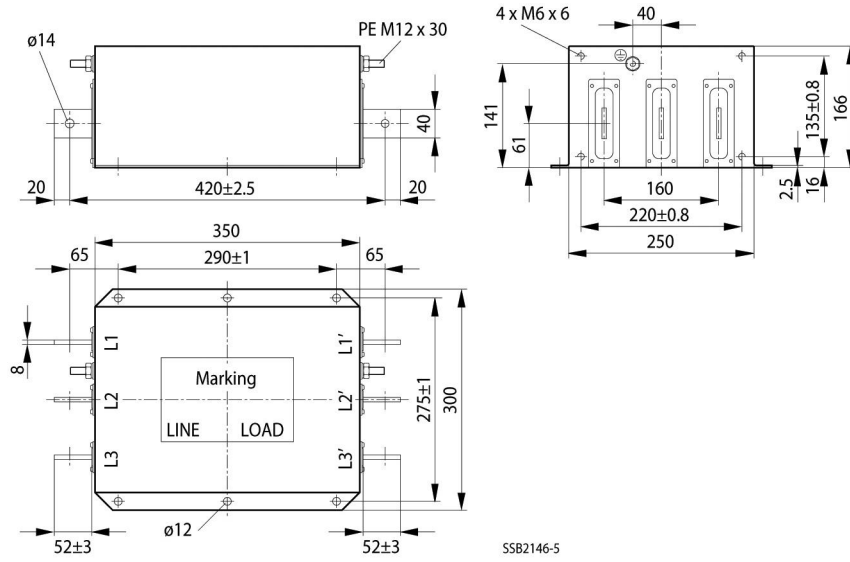
(320 A, 400 A) KRF0320VCB, KRF0400VCB



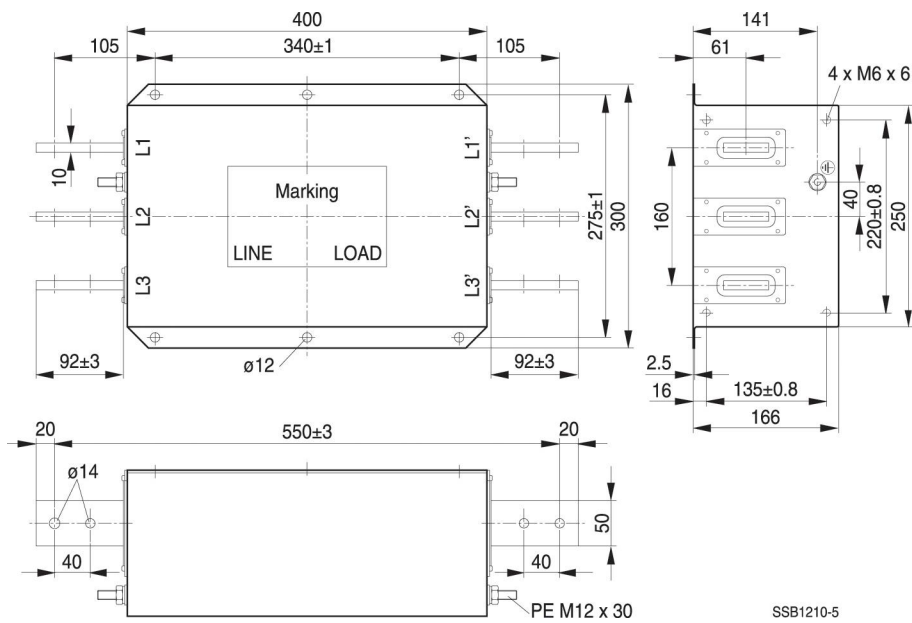
(600 A) KRF0600VCB



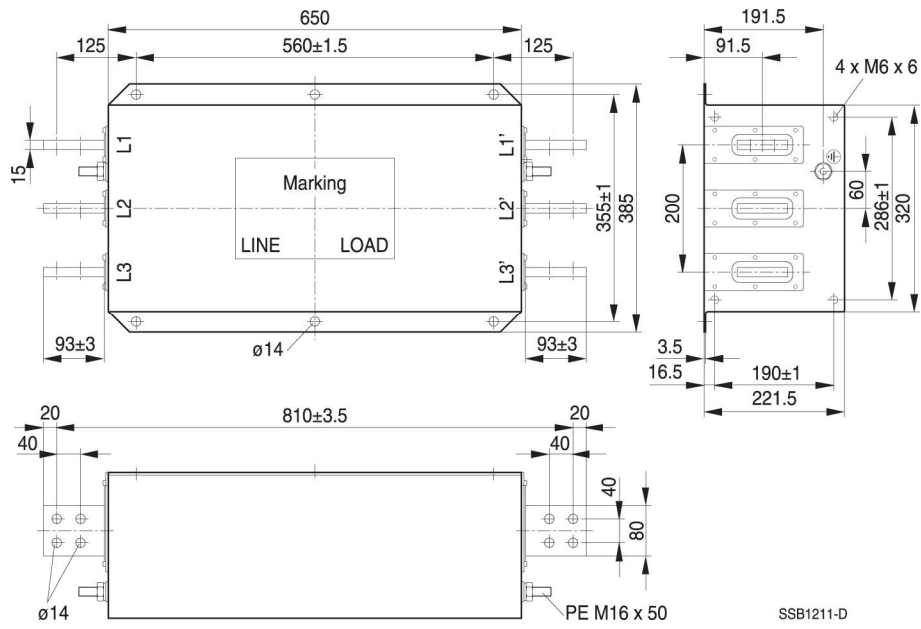
(1000 A) KRF1000VCB



(1600 A) KRF1600VCB



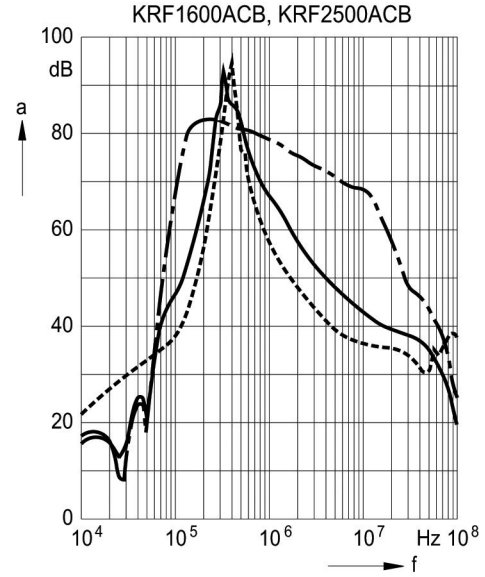
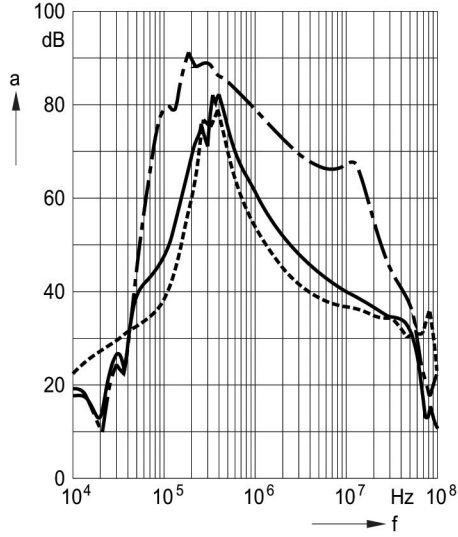
(2500 A) KRF2500VCB



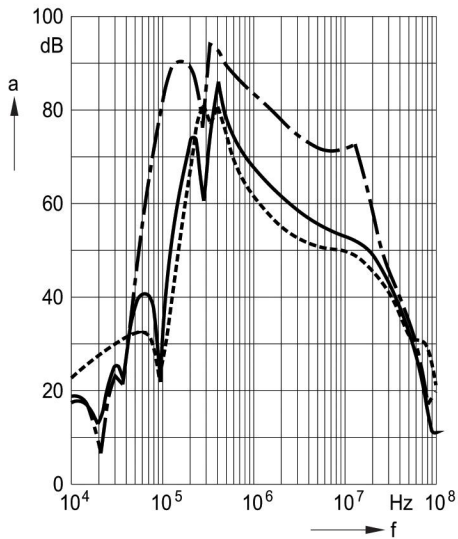
SSB1211-D

Insertion Loss (typical values at $Z = 50 \Omega$)

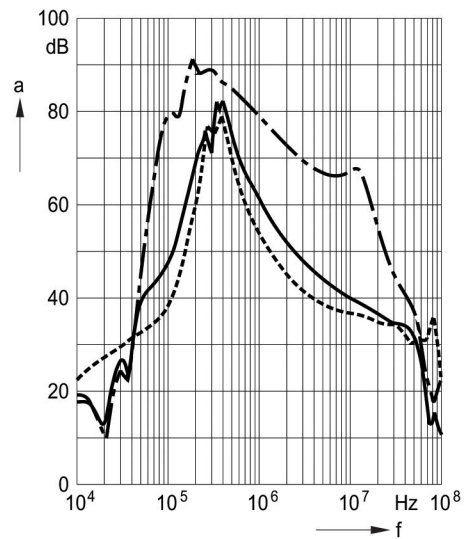
KRF0320VCB, KRF0400VCB, KRF0600VCB, KRF1000VCB



KRF0150VCB, KRF0180VCB, KRF0250VCB



KRF0320VCB, KRF0400VCB, KRF0600VCB, KRF1000VCB







TCI, LLC
7878 N. 86th Street
Milwaukee, Wisconsin 53224
Phone: 414-357-4480
Fax: 414-357-4484
Helpline: 800-TCI-8282
Web Site:
<http://www.transcoil.com>
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