

## Type RF EMI/RFI Filters

### Selection Table & Technical Specification Guide

**MTE TYPE RF FILTERS** are designed to help your system meet Electromagnetic Compatibility (EMC) requirements by providing sufficient attenuation of the conducted Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) associated with adjustable speed drive and inverter applications. In most cases, drive and inverter systems using MTE TYPE RF Filters will be able to meet the stringent requirements of the EMC Directives (Class A) and the FCC limits for conducted noise emissions.

**TYPE RF FILTERS SOLVE NOISE PROBLEMS** - The MTE TYPE RF Filters offer an economical solution to many facility interference problems caused by the RF emissions (typically 100kHz to 3Mz) of adjustable speed motor drives and inverters. MTE TYPE RF Filters can prevent drives and inverters from interfering with other sensitive electronic loads by reducing both common mode and differential mode noise emissions.

**PROTECT SENSITIVE LOADS FROM EMI/RFI** - Micro-processor based equipment can be sensitive to voltage distortion and electrical noise, even at low levels. TYPE RF Filters are intended for installation on equipment causing the electrical noise in order to protect other sensitive electronic loads, including:

- Laboratory measurement equipment
- Micro-processor based equipment
- Telecommunication equipment
- Computers
- Automated lighting controls
- Energy management systems
- Radio transmitters / receivers
- Television / CCTV
- Photo electric sensors



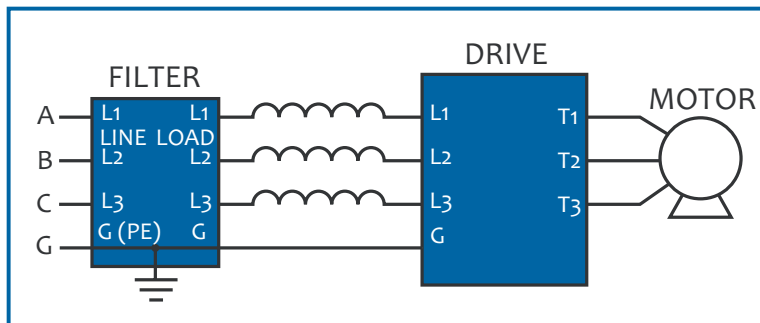
**PRODUCT SELECTION:** Please refer to the Selection Tables in this brochure or visit the MTE website at [www.mtecorp.com](http://www.mtecorp.com) and select the handy >> [EMI/RFI CLICK find](#) << for complete product selection, including pricing.

**TYPE RF FILTER CONNECTION** - MTE TYPE RF Filters are intended for use at the input (line side) of an adjustable speed drive or inverter. They are **NOT** designed to be used on the output (load side) of an inverter or drive. Connect the incoming power conductors to the “Line” side terminals of the RF filter. To reduce inverter or drive output (load side) EMI problems, use the [MTE Series A Sine Wave Filter](#).

**PRODUCT OPTIONS:** The MTE TYPE RF Filters are available for single phase applications (TYPE RF2, 240VAC rated) or three phase applications (TYPE RF3, either 480VAC rated or 600VAC rated), 50/60Hz line frequency, from 6A to 330A standard ratings.

#### Typical uses include:

- AC Motor Drives
- DC Motor Drives
- Uninterruptible Power Supplies
- Active Harmonic Filters
- Battery Chargers
- Electronic Welders



## DRIVING POWER QUALITY

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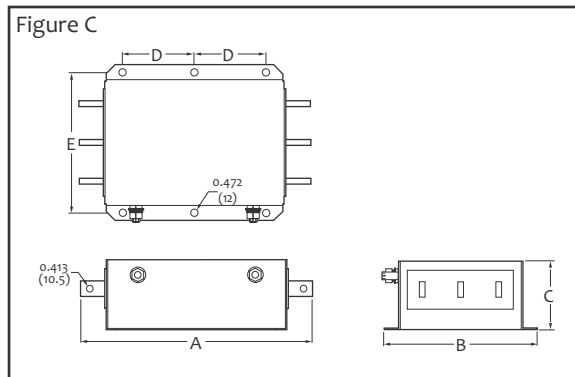
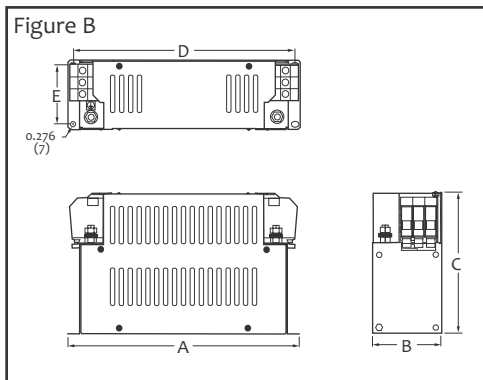
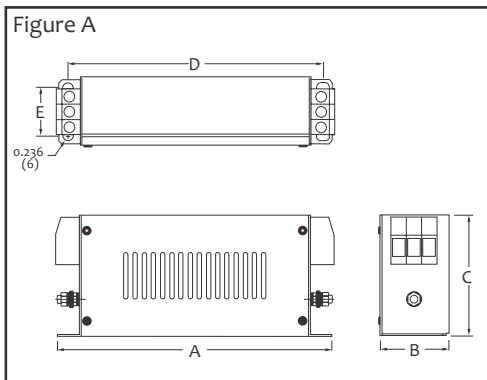
# Product Specifications - TYPE RF EMI-RFI Filters

Refer to the MTE website, [www.mtecorp.com](http://www.mtecorp.com), for Detailed Specifications & Pricing

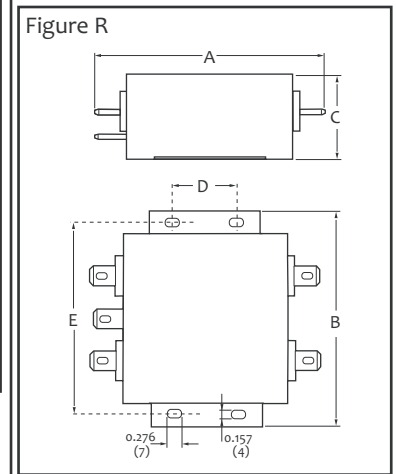
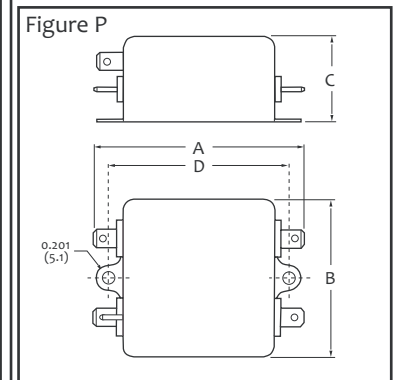
Part No.	Figure	Circuit	Rated Amps	A (in.)	A (mm)	B (in.)	B (mm)	C (in.)	C (mm)	D (in.)	D (mm)	E (in.)	E (mm)	Weight (lb.)	Mass (kg)	Diss. Watts	Max Wire Size AWG (mm <sup>2</sup> )	Leakage Current (mA)
<b>480 Volts THREE PHASE (50/60 Hz)</b>																		
RF3-0006-4	A	D	6	7.0	179	1.8	45	3.1	79	6.57	167	1.26	32	1.4	0.65	3.5	11 (4)	3.3
RF3-0010-4	A	D	10	7.0	179	1.8	45	3.1	79	6.57	167	1.26	32	1.5	0.7	4.2	11 (4)	3.1
RF3-0018-4	A	D	18	9.0	229	2.2	55	4.5	114	8.54	217	1.65	42	2.4	1.1	11	7 (10)	3.3
RF3-0025-4	A	E	25	9.0	229	2.2	55	4.5	114	8.54	217	1.65	42	2.9	1.3	11	7 (10)	6.3
RF3-0033-4	B	F	33	10.7	272	2.9	74	6.3	161	10.16	258	2.36	60	6.0	2.7	16	7 (10)	8.1
RF3-0050-4	B	F	50	12.3	312	3.7	93	7.5	190	11.73	298	3.11	79	8.2	3.7	16	1 (35)	10.5
RF3-0070-4	B	F	70	12.3	312	3.7	93	7.5	190	11.73	298	3.11	79	9.3	4.2	19	1 (35)	9.8
RF3-0090-4	B	G	90	12.6	319	5.0	126	8.8	224	11.73	298	3.11	79	13.5	6.1	18	1 (35)	19.7
RF3-0130-4	B	H	130	12.6	319	5.0	126	8.8	224	11.73	298	4.41	112	13.5	6.1	25	000 (70)	21.7
RF3-0150-4	B	J	150	13.1	334	5.0	126	8.8	224	11.73	298	4.41	112	19.6	8.9	28	0000 (95)	27.6
RF3-0330-4	C	K	330	15.2	386	10.2	260	4.6	116	4.72	120	9.25	235	24.3	11	40	N/A	7.2
<b>600 Volts THREE PHASE (50/60 Hz)</b>																		
RF3-0006-6	A	L	6	7.2	183	1.8	45	3.1	79	6.57	167	1.26	32	1.4	0.65	3.5	9 (6)	2.9
RF3-0010-6	A	L	10	7.2	183	1.8	45	3.1	79	6.57	167	1.26	32	1.5	0.7	4.2	9 (6)	2.9
RF3-0018-6	A	L	18	9.2	233	2.2	55	4.5	114	8.54	217	1.65	42	2.4	1.1	11	9 (6)	9.6
RF3-0025-6	A	M	25	9.2	233	2.2	55	4.5	114	8.54	217	1.65	42	2.9	1.3	11	9 (6)	9.6
RF3-0033-6	B	F	33	10.7	272	2.9	74	6.3	161	10.16	258	2.36	60	6.0	2.7	16	7 (10)	12.6
RF3-0050-6	B	F	50	12.3	312	3.7	93	7.5	190	11.73	298	3.11	79	8.2	3.7	16	1 (35)	13.2
RF3-0070-6	B	F	70	12.3	312	3.7	93	7.5	190	11.73	298	3.11	79	9.3	4.2	19	1 (35)	19.2
RF3-0090-6	B	G	90	12.3	312	3.7	93	7.5	190	11.73	298	3.11	79	9.3	4.2	19	1 (35)	27.5
RF3-0130-6	B	N	130	13.11	334	5.0	126	8.8	224	11.73	298	4.41	112	19.3	8.9	28	000 (70)	27.5
RF3-0150-6	B	N	150	13.1	334	5.0	126	8.8	224	11.73	298	4.41	112	19.6	8.9	28	0000 (95)	27.5
RF3-0330-6	C	K	330	15.2	386	10.2	260	4.6	116	4.72	120	9.25	235	24.3	11	40	N/A	19.2
<b>240 Volts SINGLE PHASE (50/60 Hz)</b>																		
RF2-0010-2	P	U	10	3.7	93	2.1	53	1.6	40	2.95	75	N/A	N/A	0.5	0.23	2.8	N/A	2 x 0.21
RF2-0016-2	P	U	16	3.7	93	2.1	53	1.6	40	2.95	75	N/A	N/A	0.6	0.26	9	N/A	2 x 0.21
RF2-0020-2	R	U	20	4.9	125	4.1	105	1.6	40	2.01	51	3.74	95	1.3	0.59	12	N/A	2 x 0.21

Data subject to change without notice.

## Three Phase RF Filters



## Single Phase RF Filters



# DRIVING POWER QUALITY

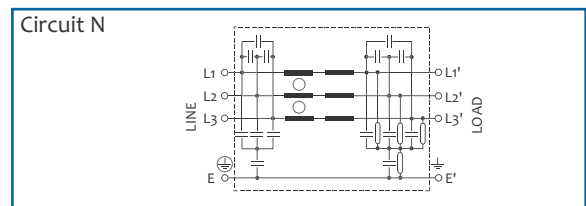
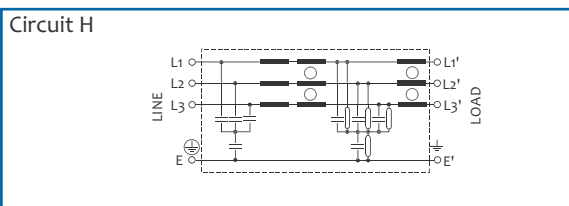
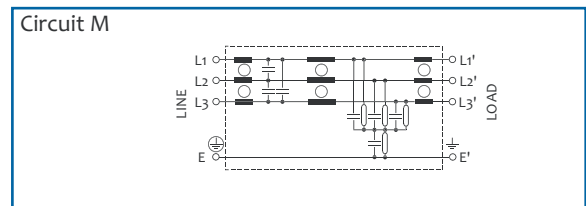
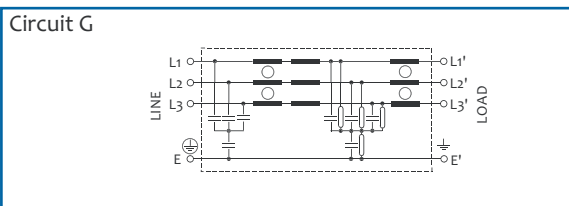
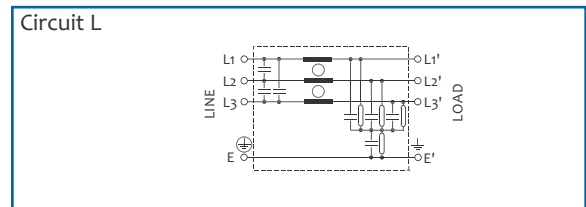
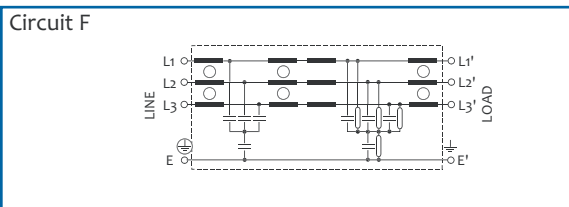
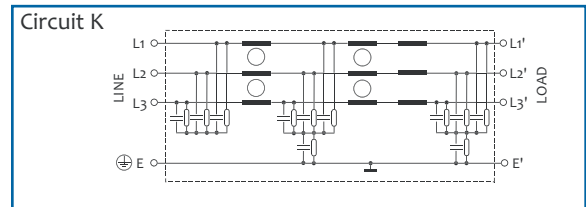
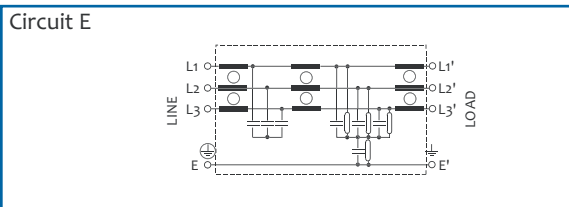
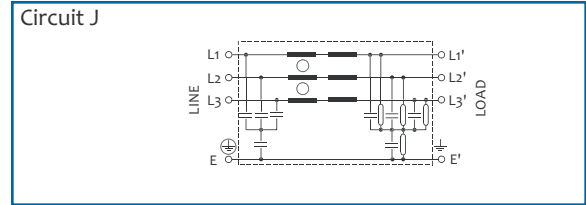
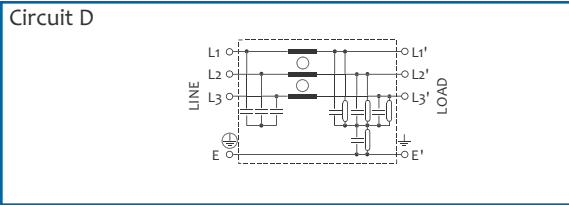
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# Circuit Diagrams - TYPE RF EMI-RFI Filters

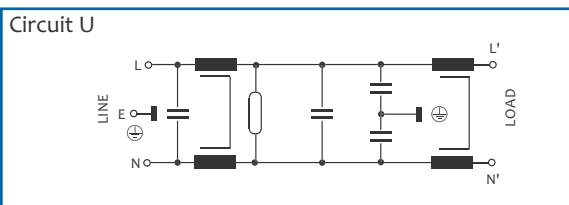
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## TYPE RF Filter Circuit Diagrams (refer to Product Specification Table)

### Three Phase Filters



### Single Phase Filters



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# Selection Tables - TYPE RF EMI-RFI Filters

Refer to the MTE website, [www.mtecorp.com](http://www.mtecorp.com), for Detailed Specifications & Pricing

## SELECTION TABLES

Note: Higher ratings may be accomplished by connecting two or more filters in parallel – consult factory for assistance.

### Three-Phase by HP/KW

HP /kW	Installation <i>without</i> an Input Line Reactor					
	208V	240V	380V	400V/415V	480V	600V
1/0.75	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
1 1/2/1.12	RF3-0010-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
2/1.5	RF3-0018-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
3/2.2	RF3-0018-4	RF3-0018-4	RF3-0010-4	RF3-0010-4	RF3-0010-4	RF3-0006-6
5/3.7	RF3-0025-4	RF3-0025-4	RF3-0018-4	RF3-0018-4	RF3-0010-4	RF3-0010-6
7 1/2/5.5	RF3-0033-4	RF3-0033-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0018-6
10/7.5	RF3-0050-4	RF3-0050-4	RF3-0025-4	RF3-0025-4	RF3-0025-4	RF3-0018-6
15/11.25	RF3-0070-4	RF3-0070-4	RF3-0050-4	RF3-0033-4	RF3-0033-4	RF3-0025-6
20/15	RF3-0090-4	RF3-0090-4	RF3-0050-4	RF3-0050-4	RF3-0050-4	RF3-0033-6
25/18.5	RF3-0130-4	RF3-0130-4	RF3-0070-4	RF3-0050-4	RF3-0050-4	RF3-0050-6
30/22.5	RF3-0130-4	RF3-0130-4	RF3-0070-4	RF3-0070-4	RF3-0070-4	RF3-0050-6
40/30	RF3-0330-4	RF3-0150-4	RF3-0090-4	RF3-0090-4	RF3-0090-4	RF3-0070-6
50/37.5	RF3-0330-4	RF3-0330-4	RF3-0130-4	RF3-0130-4	RF3-0090-4	RF3-0070-6
60/45	RF3-0330-4	RF3-0330-4	RF3-0130-4	RF3-0130-4	RF3-0130-4	RF3-0090-6
75/56.3	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0150-4	RF3-0150-4	RF3-0130-6
100/75	----	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0130-6
125/93.8	----	----	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-6
150/112.5	----	----	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-6
200/150	----	----	----	----	RF3-0330-4	RF3-0330-6
250/187.5	----	----	----	----	----	----
300/225	----	----	----	----	----	----

HP /kW	Installation <i>with</i> an Input Line Reactor (≥3% Impedance)					
	208V	240V	380V	400V/415V	480V	600V
1/0.75	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
1 1/2/1.12	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
2/1.5	RF3-0010-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
3/2.2	RF3-0018-4	RF3-0010-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
5/3.7	RF3-0018-4	RF3-0018-4	RF3-0010-4	RF3-0010-4	RF3-0010-4	RF3-0006-6
7 1/2/5.5	RF3-0025-4	RF3-0025-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0010-6
10/7.5	RF3-0033-4	RF3-0033-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0018-6
15/11.25	RF3-0050-4	RF3-0050-4	RF3-0033-4	RF3-0025-4	RF3-0025-4	RF3-0018-6
20/15	RF3-0070-4	RF3-0070-4	RF3-0050-4	RF3-0033-4	RF3-0033-4	RF3-0025-6
25/18.5	RF3-0090-4	RF3-0090-4	RF3-0050-4	RF3-0050-4	RF3-0050-4	RF3-0033-6
30/22.5	RF3-0130-4	RF3-0090-4	RF3-0070-4	RF3-0050-4	RF3-0050-4	RF3-0033-6
40/30	RF3-0130-4	RF3-0130-4	RF3-0070-4	RF3-0070-4	RF3-0070-4	RF3-0050-6
50/37.5	RF3-0150-4	RF3-0150-4	RF3-0090-4	RF3-0090-4	RF3-0070-4	RF3-0070-6
60/45	RF3-0330-4	RF3-0330-4	RF3-0130-4	RF3-0090-4	RF3-0090-4	RF3-0070-6
75/56.3	RF3-0330-4	RF3-0330-4	RF3-0130-4	RF3-0130-4	RF3-0130-4	RF3-0090-6
100/75	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0150-4	RF3-0130-4	RF3-0130-6
125/93.8	----	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0130-6
150/112.5	----	----	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0150-6
200/150	----	----	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-6
250/187.5	----	----	----	----	RF3-0330-4	RF3-0330-6
300/225	----	----	----	----	----	RF3-0330-6

### Single-Phase by HP/KW - Note: Higher current Three-Phase Filters may be used for Single-Phase applications

HP /kW	Installation <i>without</i> an Input Line Reactor		
	120V	208V	240V
1/6/0.12	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/4/0.18	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/3/0.25	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/2/0.37	RF2-0016-2	RF2-0010-2	RF2-0010-2
3/4/0.55	RF2-0020-2	RF2-0016-2	RF2-0010-2
1/0.75	qty 2 RF2-0016-2	RF2-0016-2	RF2-0016-2
1 1/2/1.12	qty 2 RF2-0016-2	RF2-0016-2	RF2-0016-2
2/1.5	qty 2 RF2-0020-2	RF2-0020-2	RF2-0020-2
3/2.2	qty 3 RF2-0020-2	qty 2 RF2-0016-2	qty 2 RF2-0016-2
5/3.7	----	qty 3 RF2-0020-2	qty 3 RF2-0016-2
7 1/2/5.5	----	----	----

HP /kW	Installation <i>with</i> an Input Line Reactor (≥3% Impedance)		
	120V	208V	240V
1/6/0.12	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/4/0.18	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/3/0.25	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/2/0.37	RF2-0016-2	RF2-0010-2	RF2-0010-2
3/4/0.55	RF2-0020-2	RF2-0010-2	RF2-0010-2
1/0.75	RF2-0020-2	RF2-0016-2	RF2-0010-2
1 1/2/1.12	qty 2 RF2-0016-2	RF2-0016-2	RF2-0016-2
2/1.5	qty 2 RF2-0020-2	RF2-0020-2	RF2-0016-2
3/2.2	qty 3 RF2-0016-2	qty 2 RF2-0016-2	qty 2 RF2-0016-2
5/3.7	----	qty 3 RF2-0016-2	qty 3 RF2-0020-2
7 1/2/5.5	----	qty 3 RF2-0020-2	qty 3 RF2-0020-2

### Three-Phase by RMS Amperes

Load Current (True RMS)	Supply up to 480V	Supply up to 600V
6A or less	RF3-0006-4	RF3-0006-6
10A or less	RF3-0010-4	RF3-0010-6
18A or less	RF3-0018-4	RF3-0018-6
25A or less	RF3-0025-4	RF3-0025-6
33A or less	RF3-0033-4	RF3-0033-6
50A or less	RF3-0050-4	RF3-0050-6
70A or less	RF3-0070-4	RF3-0070-6
90A or less	RF3-0090-4	RF3-0090-6
130A or less	RF3-0130-4	RF3-0130-6
150A or less	RF3-0150-4	RF3-0150-6
330A or less	RF3-0330-4	RF3-0330-6

### Single-Phase by RMS Amperes

Load Current (True RMS)	Supply up to 240V
10A or less	RF2-0010-2
16A or less	RF2-0016-2
20A or less	RF2-0020-2

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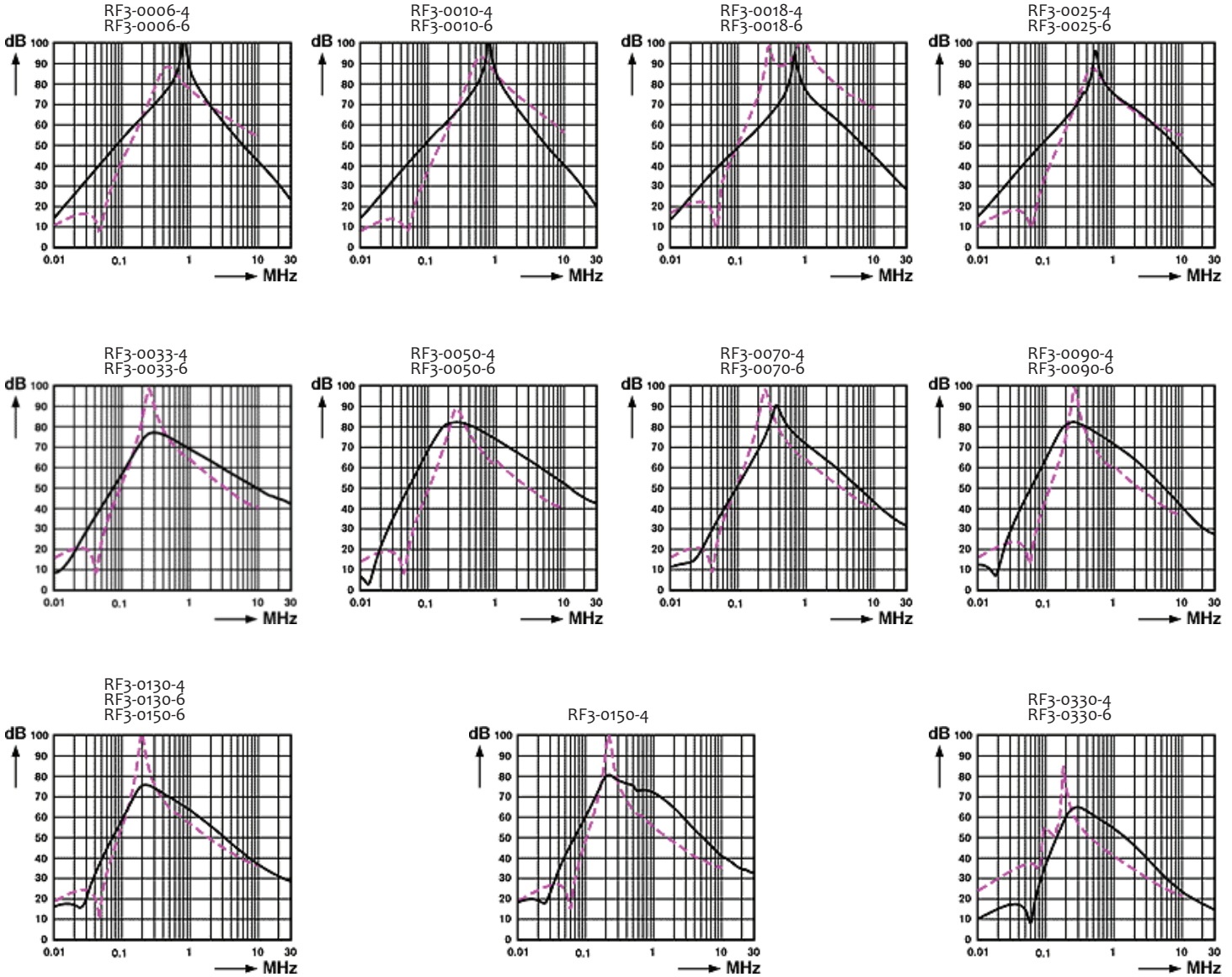
# Insertion Loss - TYPE RF EMI-RFI Filters

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**Insertion Loss** - Insertion loss data illustrates the typical reduction of both common mode and differential mode noise (based on the standard test circuit). Common mode noise occurs between a phase or neutral conductor and ground, while differential mode noise occurs between phase conductors or between phase and neutral conductors.

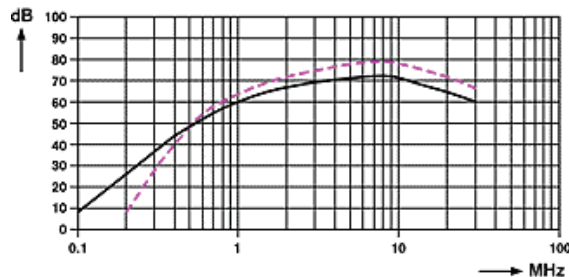
## Three Phase - 6A to 330A Rated

Common Mode ————  
Differential Mode - - - - -



## Single Phase - 10A to 20A Rated

RF2-0010-2  
RF2-0016-2  
RF2-0020-2



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# Additional Information - TYPE RF EMI-RFI Filters

Refer to the MTE website, [www.mtecorp.com](http://www.mtecorp.com), for Detailed Specifications & Pricing

## Touch Safe Construction

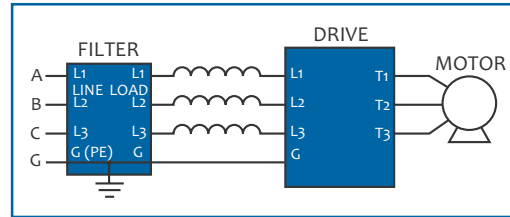
In compliance with international safety standards, and in conformance with the CE Low Voltage Directive, MTE TYPE RF Filters are supplied as standard with touch safe terminations on all units rated 150 Amps and below. Units rated higher than 150 Amps provide tab terminals for customer addition of wiring devices.

## Filter Connection

Our TYPE RF Filters are intended for use at the input side of an adjustable speed drive or inverter. **DO NOT** use RF Filters on the output (load side) of an inverter or drive.

Good wiring practices will minimize RFI problems, including:

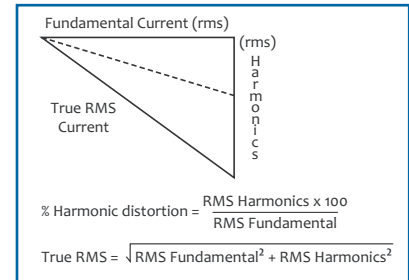
- Route all conductors as close to the panel as possible
- Physically separate the filter input and output conductors
- Keep drive input and output leads separated
- Always keep power and control wiring separated
- Use shielded wiring where possible
- Use single point grounding (connect system ground to filter)



Connect the incoming power conductors to the “Line” side terminals of the filter. Connect the “Load” side terminals to the line reactor or drive input terminals. Note that the ground termination “G” may also be designated by “PE” or “N”. Keep all wiring as close as possible to the grounded panel (ground plane).

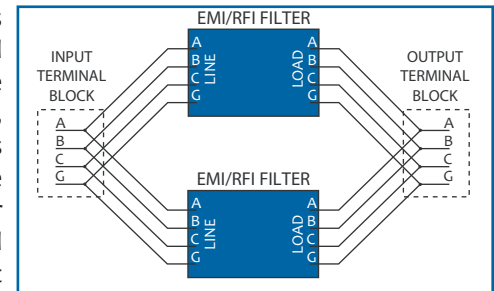
## Current Ratings

The MTE TYPE RF Filters are rated in True RMS (*trms*) amperes. Harmonic current distortion will increase the *trms* current of a system above the fundamental current (typically motor FLA) of the connected loads. Line reactors (3% or 5% impedance) are useful in reducing harmonic current distortion and the *trms* current. If minimum 3% impedance line reactors are included in the installation, then the *trms* amperes will be lower and the filter can be sized for the reduced load current. If you know the *trms* amperes of the load to be connected to the filter, then select the filter directly from the RMS amperes selection tables. If you are not sure of the *trms* amperes, you can select the filters based on the horsepower (or kW) rating of the load to be connected. Determine if a reactor (minimum 3% impedance) will be used in addition to the TYPE RF Filter and select accordingly.



## Parallel Connection for Higher Ratings

MTE TYPE RF Filters may be connected in parallel to achieve higher current ratings provided that identical models are used and the connection allows each individual filter to share current equally. The use of two separate terminal blocks will make this easier. Derate each filter by 10% when connecting in a parallel configuration, and always follow the NEC or local electrical codes. Make ground connections first, then for each filter to be parallel connected, pre-cut three leads of equal wire type and gauge to the same exact length. Using these leads, connect the filter input terminals L1, L2, and L3 to the respective terminal on a separate terminal block. Repeat this procedure for the output terminals. NOTE: For higher current single phase applications use an appropriately rated three phase filter. Connect the outer terminals of the three phase filter to the single phase connections.



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