



Type "RF" Filters Solve Noise Problems

MTE Corporation type "RF" filters offer an economical solution to many facility interference problems caused by the high frequency emissions of adjustable speed motor drives and inverters. 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.

Typical drive and inverter applications include:

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

Help Meet EMC Directive

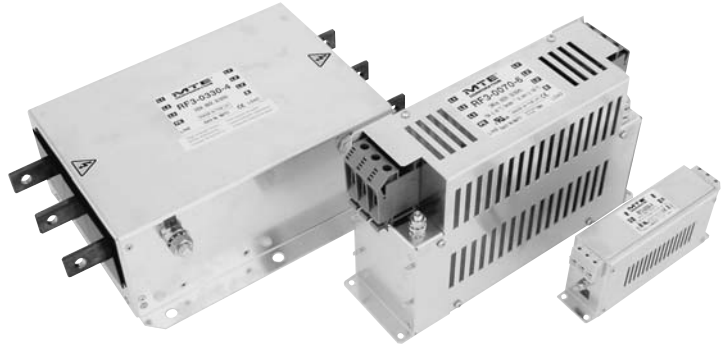
The "RF" series of filters are specially designed to provide sufficient attenuation of the conducted RFI and EMI associated with adjustable speed drive and inverter applications. Usually, drive and inverter systems using these filters will be able to meet the stringent requirements of the EMC Directives (Class A) and the FCC limits for conducted noise emissions. Actual testing may be necessary to verify system compliance.

Touch Safe Construction

In compliance with international safety standards, and in conformance with the CE low voltage directive, type "RF" filters are supplied as standard with touch safe terminations on all units rated through 150 amps. Units rated higher than 150 amps, provide tab terminals for customer addition of wiring devices.

Technical Support
www.mtecorp.com
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1-800-455-4MTE ext 218



RFI/EMI Filters

Single Phase & Three Phase
50/60 Hertz

Available in Ratings up to 600 Volts

Protect Sensitive Loads From RFI / EMI

Micro-processor based equipment can be sensitive to low levels of voltage distortion and electrical noise. The "RF" series of filters is intended for installation on equipment causing the electrical noise in order to protect other sensitive electronic loads. Sensitive electronic loads, which can be protected, when the "RF" filters are applied to offending drives / inverters include:

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



SELECTION TABLES

(Higher ratings may be accomplished by connecting two filters in parallel – consult factory for assistance.)

Three-Phase by HP/KW

HP/KW	Installation Without an Input Line Reactor						HP/KW	Installation With a Line Reactor (Minimum 3% Impedance)					
	208V	240V	380V	400V/415V	480V	600V		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	1/0.75	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
1.5/1.12	RF3-0010-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6	1.5/1.12	RF3-0006-4	RF3-0006-4	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	2/1.5	RF3-0010-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
3/2.25	RF3-0018-4	RF3-0018-4	RF3-0010-4	RF3-0010-4	RF3-0010-4	RF3-0006-6	3/2.25	RF3-0018-4	RF3-0010-4	RF3-0010-4	RF3-0006-4	RF3-0006-4	RF3-0006-6
5/3.75	RF3-0025-4	RF3-0025-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0010-6	5/3.75	RF3-0018-4	RF3-0018-4	RF3-0010-4	RF3-0010-4	RF3-0010-4	RF3-0006-6
7.5/5.5	RF3-0033-4	RF3-0033-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0018-6	7.5/5.5	RF3-0025-4	RF3-0025-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0010-6
10/7.5	RF3-0050-4	RF3-0050-4	RF3-0025-4	RF3-0025-4	RF3-0025-4	RF3-0018-6	10/7.5	RF3-0033-4	RF3-0033-4	RF3-0018-4	RF3-0018-4	RF3-0018-4	RF3-0018-6
15/11.25	RF3-0070-4	RF3-0070-4	RF3-0050-4	RF3-0033-4	RF3-0033-4	RF3-0025-6	15/11.25	RF3-0050-4	RF3-0050-4	RF3-0033-4	RF3-0025-4	RF3-0025-4	RF3-0018-6
20/15	RF3-0090-4	RF3-0090-4	RF3-0050-4	RF3-0050-4	RF3-0050-4	RF3-0033-6	20/15	RF3-0070-4	RF3-0070-4	RF3-0050-4	RF3-0033-4	RF3-0033-4	RF3-0025-6
25/18.5	RF3-0130-4	RF3-0130-4	RF3-0070-4	RF3-0050-4	RF3-0050-4	RF3-0050-6	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	RF3-0130-4	RF3-0070-4	RF3-0070-4	RF3-0070-4	RF3-0050-6	30/22.5	RF3-0130-4	RF3-0090-4	RF3-0070-4	RF3-0050-4	RF3-0050-4	RF3-0033-6
40/30	RF3-0330-4	RF3-0150-4	RF3-0090-4	RF3-0090-4	RF3-0090-4	RF3-0070-6	40/30	RF3-0130-4	RF3-0130-4	RF3-0070-4	RF3-0070-4	RF3-0070-4	RF3-0050-6
50/37.5	RF3-0330-4	RF3-0330-4	RF3-0130-4	RF3-0130-4	RF3-0090-4	RF3-0070-6	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	RF3-0130-4	RF3-0130-4	RF3-0090-6	60/45	RF3-0330-4	RF3-0330-4	RF3-0130-4	RF3-0090-4	RF3-0090-4	RF3-0070-6
75/56.25	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0150-4	RF3-0150-4	RF3-0130-6	75/56.25	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	RF3-0330-4	RF3-0130-6	100/75	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0150-4	RF3-0330-4	RF3-0130-6
125/93	—	—	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-6	125/93	—	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0130-6
150/200	—	—	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-6	150/200	—	—	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0150-6
200/150	—	—	—	—	RF3-0330-4	RF3-0330-6	200/150	—	—	RF3-0330-4	RF3-0330-4	RF3-0330-4	RF3-0330-6
250/186	—	—	—	—	—	—	250/186	—	—	—	—	RF3-0330-4	RF3-0330-6
300/224	—	—	—	—	—	—	300/224	—	—	—	—	—	RF3-0330-6

Single-Phase by HP/KW

HP/KW	Installation Without an Input Line Reactor			HP/KW	Installation With a Line Reactor (≥ 3% Impedance)		
	120V	208V	240V		120V	208V	240V
1/6/0.12	RF2-0010-2	RF2-0010-2	RF2-0010-2	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	1/4/0.18	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/3/0.25	RF2-0010-2	RF2-0010-2	RF2-0010-2	1/3/0.25	RF2-0010-2	RF2-0010-2	RF2-0010-2
1/2/0.37	RF2-0016-2	RF2-0010-2	RF2-0010-2	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	3/4/0.55	RF2-0020-2	RF2-0010-2	RF2-0010-2
1/0.75	qty 2 RF2-0016-2	RF2-0016-2	RF2-0016-2	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	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	2/1.5	qty 2 RF2-0020-2	RF2-0020-2	RF2-0016-2
3/2.2	qty 3 RF2-0020-2	qty 2 RF2-0016-2	qty 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 RF2-0020-2	qty 3 RF2-0016-2	5/3.7	—	qty 3 RF2-0016-2	qty 2 RF2-0020-2
7 1/2/5.5	—	—	—	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

The International Power Quality Resource

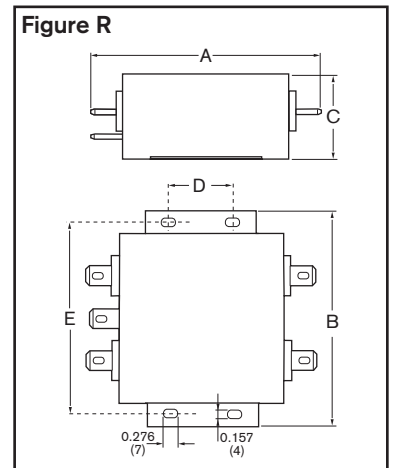
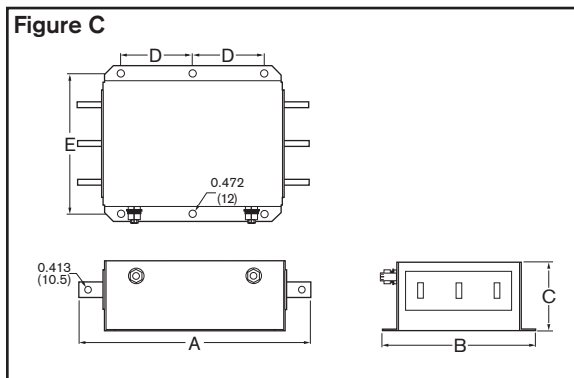
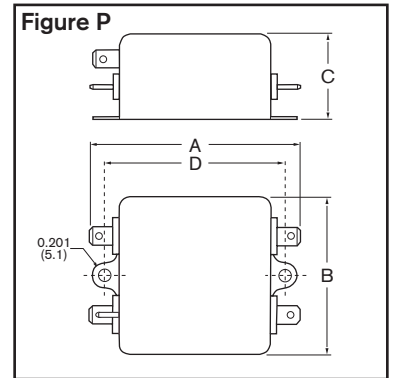
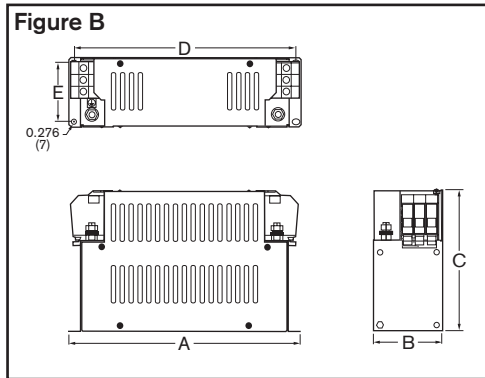
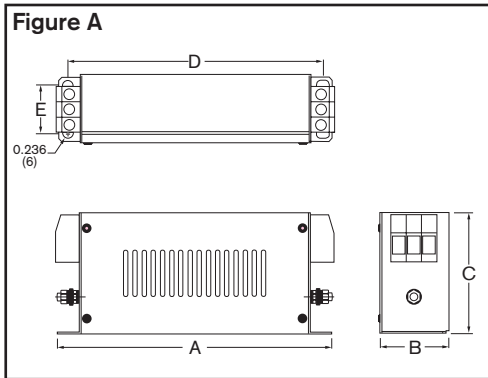


SPECIFICATIONS

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 ²)	Leakage Current (mA)
480 Volts THREE PHASE (50/60 HZ) - c CE																		
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	4.41	112	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
600 Volts THREE PHASE (50/60 HZ) - c CE																		
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	13.1	334	5.0	126	8.8	224	11.73	298	4.41	112	19.6	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
240 Volts SINGLE PHASE (50/60 HZ) - c CE																		
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

Three Phase Filters

Single Phase Filters



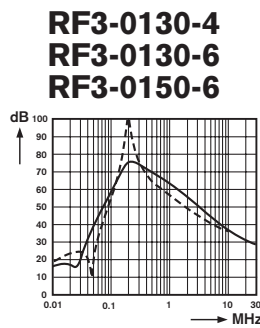
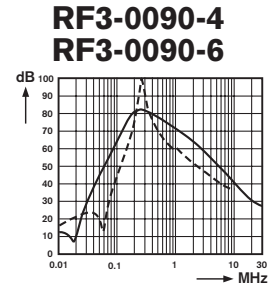
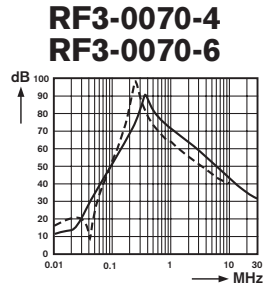
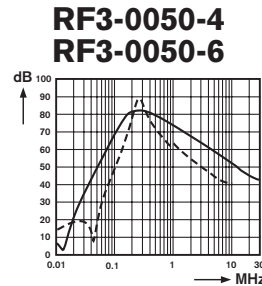
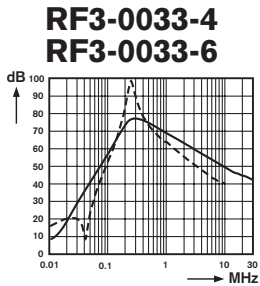
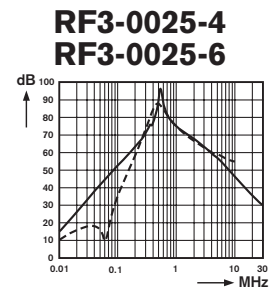
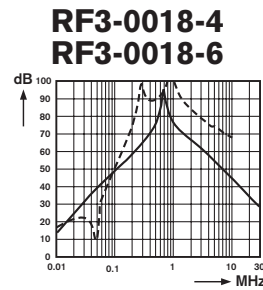
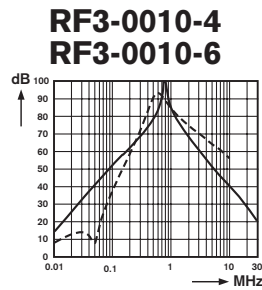
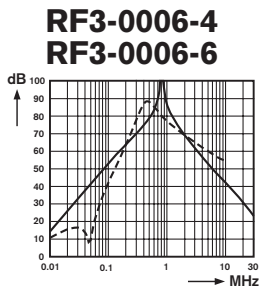


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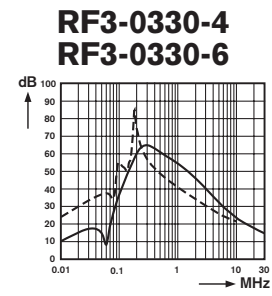
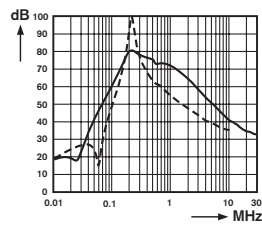
Insertion loss data illustrates the typical reduction of both common mode and differential mode noise based on the standard test circuit. Common mode noise occurs between a phase or neutral conductor and ground, while differential mode noise occurs between phase conductors or between phase and neutral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

COMMON MODE ———
DIFFERENTIAL MODE - - - - -

Three Phase Filters

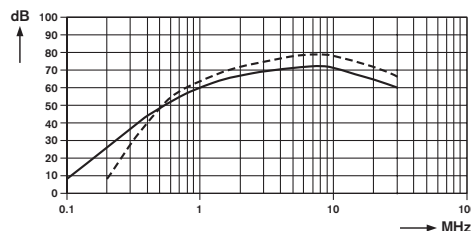


RF3-0150-4



Single Phase Filters

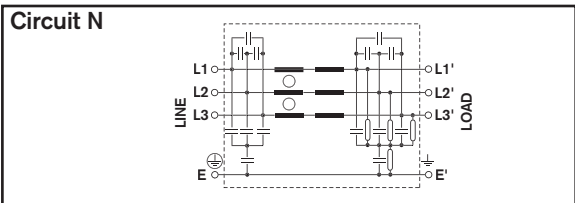
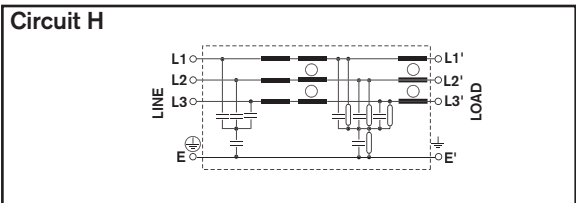
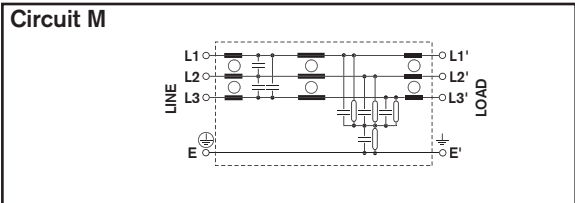
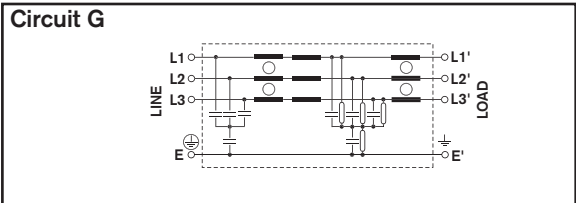
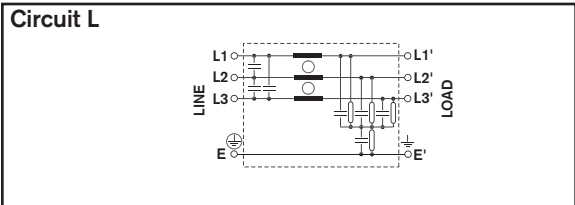
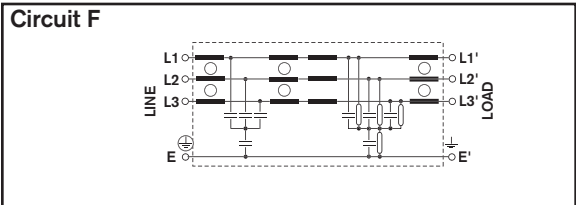
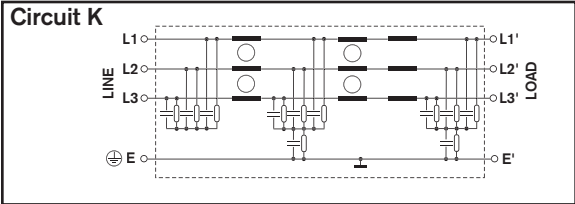
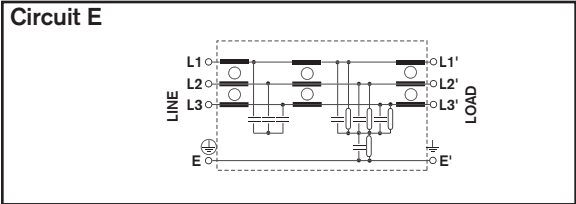
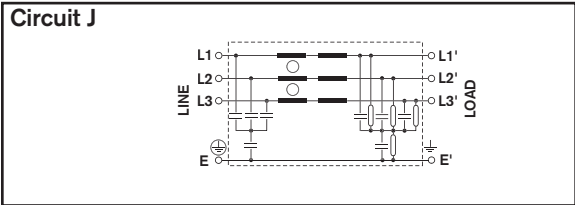
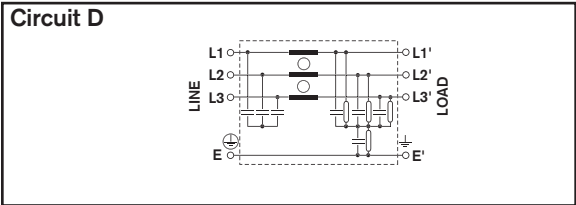
RF2-0010-2
RF2-0016-2
RF2-0020-2



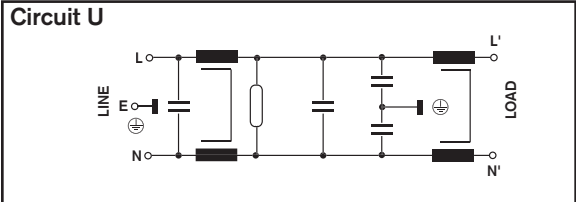


CIRCUIT DIAGRAMS

Three Phase Filters



Single Phase Filters



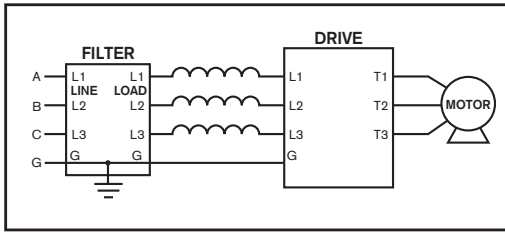


RECOMMENDED INSTALLATION PRACTICES

Filter Connection

Our type "RF2" and "RF3" filters are intended for use at the input side of an adjustable speed drive or inverter. Do not attempt to use these on the output (load side) of an inverter or drive. Good wiring practices will minimize RFI problems.

- **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 "E" or "N". Keep all wiring as close as possible to the grounded panel (ground plane).

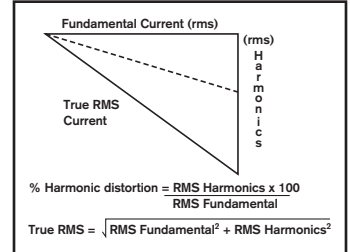
Filter Mounting

Connect the power system ground (earth connection) directly to the filter ground (earth) termination prior to connecting any other wires. Filter grounding is required to assure safety and desired filter performance. For the best ground connection, use a multi stranded copper conductor or copper strap. Mount the filter as close as possible to the RFI/EMI source (drive, inverter, UPS, etc.). For best performance, mount filter directly to a bare metal grounded panel. Use shielded conductors to minimize radiated high frequency noise levels.

Current Ratings

The "RF" series 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.



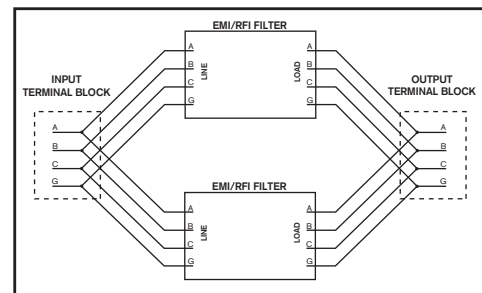
If you know the trms amperes of the load to be connected to the filter, then select the filter directly from the RMS amperes selection tables. If you are not sure of the trms amperes, you can select the filters based on the horsepower (or KW) rating of the load to be connected. Determine if a reactor (minimum 3% impedance) will be used in addition to the RFI filter and select accordingly.

Parallel Connection for Higher Ratings

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 distribution (terminal) blocks will make this easier. Derate each filter by 10% when ever 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 distribution block. Repeat this procedure for the output terminals.



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