

3-phase Delta External Power Line Filter for Frequency Converters

FCD Series



UL Recognized



6FCD10

FCD Series

- Suitable to meet the latest EMC standards
- Insulated safety terminals
- Suitable for EMC troubleshooting in the field
- Very high attenuation
- High insertion loss
- BS models optimized for very high insertion loss
- BS models suitable for infeed/regenerative (ER) applications
- Touch safe terminals provide easy connections and prevent inadvertent contact for safety in the most demanding applications

Ordering Information



Specifications

Maximum leakage current

voltage drop to virtual N to PE/V:

| | |
|-------------------|-----------|
| 6FCD10: | .26 mA/V |
| 12 & 16FCD10: | .45 mA/V |
| 25, 36 & 50FCD10: | .52 mA/V |
| 12 & 16FCD10B: | .46 mA/V |
| 25 & 36FCD10B: | .52 mA/V |
| 50FCD10B: | .57 mA/V |
| 80 & 110FCD10B: | .62 mA/V |
| 150FCD10B: | .63 mA/V |
| 180 & 230FCD10B: | .92 mA/V |
| FCD10BS: | 3.25 mA/V |

Hipot rating (one minute):

| | |
|-----------------|----------|
| Line to Ground: | 2250 VDC |
| Line to Line: | 1450 VDC |

Rated Voltage (max):

| | |
|----------------------------|---------|
| Phase to Phase: | 480 VAC |
| Phase to Neutral / Ground: | 277 VAC |

Operating Frequency:

50/60 Hz

Rated Current:

6 to 230A

Operating Ambient Temperature Range

(at rated current I_r): -10°C to +40°C

In an ambient temperature (T_a) higher than +40°C the maximum operating current (I_o) is calculated as follows: $I_o = I_r \sqrt{(85 - T_a) / 45}$

Electrical Schematics

6FCD10



3-phase Delta External Filter for Frequency Converters *(continued)*

FCD Series

Electrical Schematics *(continued)*

12 to 50A FCD10



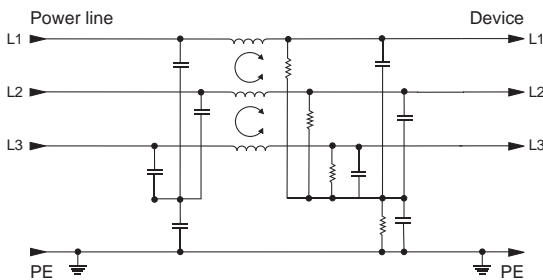
12 to 50A FCD10B



80 to 230A FCD10B



FCD10BS

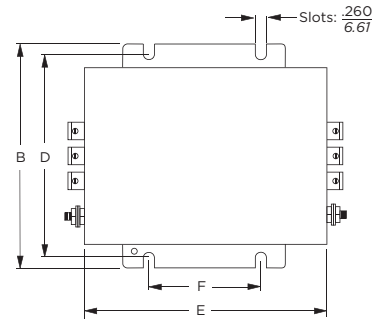


Available Part Numbers

| | | |
|---------|--------------|---------------|
| 6FCD10 | 12FCD10B | 50FCD10BS |
| 12FCD10 | 16FCD10B | 80FCD10BS |
| 16FCD10 | 25FCD10B | 110FCD10BS |
| 25FCD10 | 36FCD10B | 150FCD10BS |
| 36FCD10 | 50FCD10B | 150FCD10BS-95 |
| 50FCD10 | 80FCD10B | 180FCD10BS |
| | 110FCD10B | 230FCD10BS |
| | 150FCD10B | |
| | 150FCD10B-95 | |
| | 180FCD10B | |
| | 230FCD10B | |

Case Styles

6 to 50A FCD10 & FCD10B



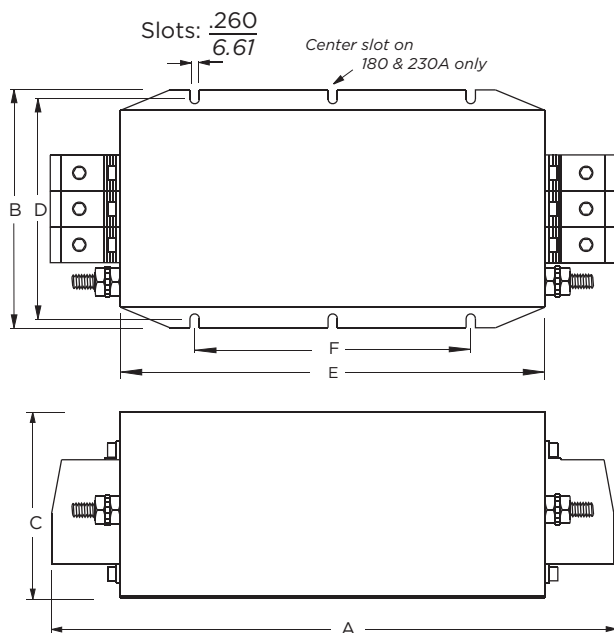
80 to 150A FCD10B 50 to 150A FCD10BS



3-phase Delta External Filter for Frequency Converters *(continued)*

FCD Series

Case Styles *(continued)* 180 to 230FCD10B\BS



Terminals

| Part No. | Terminal | Size | Torque max. lbf-in [N·m] |
|---|-----------|----------------------------------|--------------------------|
| 6FCD10 | Ground | 8-32 | 20.7 [2.34] |
| | Line/Load | 4mm ² terminal block | 7.08 [0.8] |
| 12FCD10/10B 16FCD10/10B | Ground | M5 | 26.58 [3.0] |
| | Line/Load | 4mm ² terminal block | 7.08 [0.8] |
| 25FCD10/10B 36FCD10/10B | Ground | M5 | 26.58 [3.0] |
| | Line/Load | 6mm ² terminal block | 15.93 [1.8] |
| 50FCD10/10B | Ground | M5 | 26.58 [3.0] |
| | Line/Load | 10mm ² terminal block | 15.93 [1.8] |
| 50FCD10BS | Ground | M10 | 88.5 [10.0] |
| | Line/Load | 16mm ² terminal block | 20.36 [2.3] |
| 80 to 150FCD10B 80 to 150FCD10BS | Ground | M10 | 88.5 [10.0] |
| | Line/Load | 50mm ² terminal block | 70.80 [8.0] |
| 150FCD10B/BS-95 180FCD10B/BS 230FCD10B/BS | Ground | M10 | 88.5 [10.0] |
| | Line/Load | 95mm ² terminal block | 177.0 [20.0] |

Case Dimensions

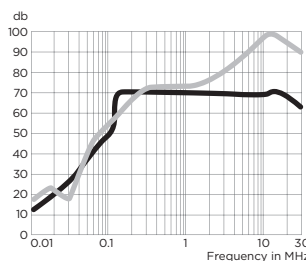
| Part No. | A (max.) | B (max.) | C (max.) | D $\pm .02$ / $\pm .5$ | E (max.) | F $\pm .02$ / $\pm .5$ |
|---|----------|----------|----------|------------------------|----------|------------------------|
| 6FCD10 | 6.18 | 4.33 | 2.32 | 3.74 | 5.16 | 2.76 |
| 12FCD10/10B 16FCD10/10B | 157.0 | 110.0 | 59.0 | 95.0 | 131.0 | 70.0 |
| 25FCD10/10B 36FCD10/10B 50FCD10/10B | 6.97 | 5.51 | 2.56 | 4.92 | 5.94 | 2.76 |
| 50FCD10BS | 177.0 | 140.0 | 65.0 | 125.0 | 151.0 | 70.0 |
| 50FCD10BS | 9.69 | 6.26 | 2.52 | 5.71 | 8.43 | 4.53 |
| 80FCD10B/BS 110FCD10B/BS 150FCD10B/BS | 246.0 | 159.0 | 64.0 | 145.0 | 214.0 | 115.0 |
| 150FCD10B-95 150FCD10BS-95 | 11.41 | 6.61 | 3.54 | 6.10 | 8.70 | 4.53 |
| 180FCD10B/BS 230FCD10B/BS | 290.0 | 168.0 | 90.0 | 155.0 | 221.0 | 115.0 |
| 150FCD10B-95 150FCD10BS-95 | 12.09 | 6.61 | 5.55 | 6.10 | 8.70 | 4.53 |
| 180FCD10B/BS 230FCD10B/BS | 307.0 | 168.0 | 141.0 | 155.0 | 221.0 | 115.0 |
| 150FCD10B-95 150FCD10BS-95 | 12.6 | 6.61 | 5.55 | 6.10 | 8.70 | 4.53 |
| 180FCD10B/BS 230FCD10B/BS | 320.0 | 168.0 | 141.0 | 155.0 | 221.0 | 115.0 |
| 180FCD10B/BS 230FCD10B/BS | 15.71 | 6.61 | 5.55 | 6.10 | 11.81 | 6.50 |
| 230FCD10B/BS | 399.0 | 168.0 | 141.0 | 155.0 | 300.0 | 165.0 |

Performance Data

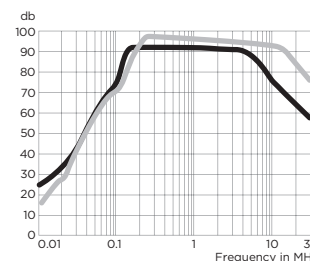
Typical Insertion Loss

Measured in closed 50 Ohm system

6FCD10



12FCD10



— Common Mode / Asymmetrical (L-G)
— Differential Mode / Symmetrical (L-L)

3-phase Delta External Filter for Frequency Converters *(continued)*

FCD Series

Performance Data *(continued)*

Typical Insertion Loss *(continued)*

Measured in closed 50 Ohm system

16FCD10



25FCD10



36FCD10



50FCD10



12FCD10B



16FCD10B



25FCD10B



36FCD10B



50FCD10B



80FCD10B



110FCD10B



150FCD10B



180FCD10B



230FCD10B



50/80/110FCD10BS



150FCD10BS



180FCD10BS



230FCD10BS



— Common Mode / Asymmetrical (L-G)
— Differential Mode / Symmetrical (L-L)

3-phase Delta External Filter for Frequency Converters *(continued)*

FCD Series

Performance Data *(continued)*

Minimum Insertion Loss

Measured in closed 50 Ohm system

Common Mode / Asymmetrical (Line to Ground)

| Part No. | Frequency –MHz | | | | | | | | |
|--------------|----------------|-----|-----|----|----|----|----|----|----|
| | .01 | .03 | .05 | .1 | .5 | 1 | 5 | 10 | 30 |
| 6FCD10 | 2 | 14 | 23 | 39 | 56 | 52 | 48 | 45 | 33 |
| 12 & 16FCD10 | 13 | 30 | 36 | 45 | 75 | 75 | 52 | 45 | 35 |
| 25FCD10 | 13 | 30 | 36 | 45 | 75 | 75 | 52 | 45 | 35 |
| 36FCD10 | 9 | 26 | 32 | 40 | 75 | 75 | 52 | 45 | 35 |
| 50FCD10 | 9 | 26 | 32 | 40 | 75 | 75 | 52 | 45 | 35 |
| 12FCD10B | 18 | 45 | 59 | 75 | 73 | 65 | 49 | 47 | 26 |
| 16FCD10B | 18 | 45 | 59 | 75 | 73 | 65 | 49 | 47 | 26 |
| 25FCD10B | 18 | 45 | 60 | 49 | 83 | 75 | 58 | 56 | 28 |
| 36FCD10B | 8 | 38 | 52 | 70 | 77 | 70 | 54 | 50 | 47 |
| 50FCD10B | 3 | 34 | 49 | 67 | 76 | 70 | 59 | 58 | 37 |
| 80FCD10B | 2 | 35 | 49 | 67 | 74 | 67 | 59 | 58 | 27 |
| 110FCD10B | 2 | 35 | 49 | 66 | 72 | 65 | 59 | 58 | 18 |
| 150FCD10B | 1 | 36 | 50 | 66 | 69 | 63 | 59 | 58 | 9 |
| 180FCD10B | - | 36 | 50 | 66 | 67 | 60 | 59 | 58 | - |
| 230FCD10B | - | 25 | 40 | 58 | 73 | 66 | 58 | 52 | 21 |
| 50FCD10BS | 40 | 66 | 70 | 69 | 65 | 60 | 53 | 51 | 24 |
| 80FCD10BS | 35 | 63 | 67 | 66 | 63 | 58 | 52 | 49 | 23 |
| 110FCD10BS | 30 | 61 | 69 | 69 | 66 | 60 | 53 | 53 | 25 |
| 150FCD10BS | 32 | 61 | 67 | 67 | 62 | 56 | 48 | 46 | 16 |
| 180FCD10BS | 30 | 60 | 65 | 65 | 61 | 55 | 47 | 46 | 16 |
| 230FCD10BS | 27 | 58 | 62 | 63 | 59 | 54 | 46 | 45 | 15 |

Differential Mode / Symmetrical (Line to Line)

| Part No. | Frequency –MHz | | | | | | | | |
|--------------|----------------|-----|-----|----|----|----|----|----|----|
| | .01 | .03 | .05 | .1 | .5 | 1 | 5 | 10 | 30 |
| 6FCD10 | 9 | 8 | 24 | 40 | 62 | 57 | 50 | 48 | 38 |
| 12 & 16FCD10 | 9 | 13 | 24 | 55 | 75 | 75 | 75 | 65 | 60 |
| 25FCD10 | 9 | 13 | 26 | 55 | 75 | 75 | 75 | 65 | 60 |
| 36FCD10 | 9 | 13 | 26 | 46 | 75 | 75 | 75 | 65 | 60 |
| 50FCD10 | 9 | 13 | 26 | 46 | 75 | 75 | 75 | 65 | 60 |
| 12FCD10B | 6 | 13 | 9 | 37 | 90 | 86 | 74 | 78 | 34 |
| 16FCD10B | 6 | 13 | 9 | 37 | 60 | 86 | 74 | 78 | 34 |
| 25FCD10B | 10 | 16 | 12 | 41 | 89 | 87 | 69 | 86 | 43 |
| 36FCD10B | 17 | 24 | 24 | 38 | 87 | 81 | 63 | 66 | 24 |
| 50FCD10B | 15 | 24 | 27 | 21 | 88 | 74 | 51 | 69 | 52 |
| 80FCD10B | 17 | 25 | 28 | 23 | 87 | 71 | 50 | 62 | 45 |
| 110FCD10B | 18 | 27 | 30 | 25 | 86 | 69 | 49 | 56 | 39 |
| 150FCD10B | 19 | 28 | 31 | 28 | 85 | 66 | 49 | 49 | 32 |
| 180FCD10B | 21 | 29 | 33 | 30 | 84 | 63 | 48 | 43 | 26 |
| 230FCD10B | 22 | 31 | 35 | 36 | 78 | 60 | 46 | 41 | 26 |
| 50FCD10BS | 25 | 31 | 26 | 59 | 73 | 64 | 50 | 45 | 19 |
| 80FCD10BS | 25 | 31 | 26 | 59 | 73 | 64 | 50 | 45 | 19 |
| 110FCD10BS | 24 | 31 | 24 | 55 | 72 | 65 | 51 | 46 | 26 |
| 150FCD10BS | 25 | 33 | 32 | 51 | 71 | 61 | 47 | 42 | 22 |
| 180FCD10BS | 25 | 33 | 32 | 51 | 71 | 61 | 47 | 42 | 22 |
| 230FCD10BS | 25 | 33 | 32 | 51 | 71 | 61 | 47 | 42 | 22 |