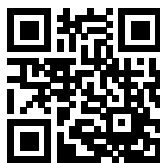


# Ecosine Flex, 200-480 VAC 60 Hz 10% THDi Passive Harmonic Filters



- Reduce THDi to 10% (15% if no DC-Link present in the drive)
- Filters for diode rectifier with and without DC-link choke and thyristor rectifier
- Help to comply with EN 61000-3-12, IEEE 519 and other PQ standards
- Increase the efficiency of energy utilization
- Most compact design
- Plug and play, ready to use



## Approvals & Compliances



## Features and Benefits

FN3458 (60 Hz) models of the Ecosine Flex product family represent the very compact economical series with a THDi performance of <10% for drives with 4% Ldc and <15% for drives without Ldc.

They are ideal for non-linear three-phase equipment with B6 rectifier front-end that do not require the industry leading <5% THDi performance provided by Schaffner Ecosine Evo filters.

The performance targets the requirement of EN 61000-3-12 and IEEE 519 for  $I_{sc}/I_L < 50$ . Schaffner Ecosine filters help to unburden the electrical infrastructure from excess loading and heat caused by current harmonics, and therefore support a better utilization of electric system capacity.

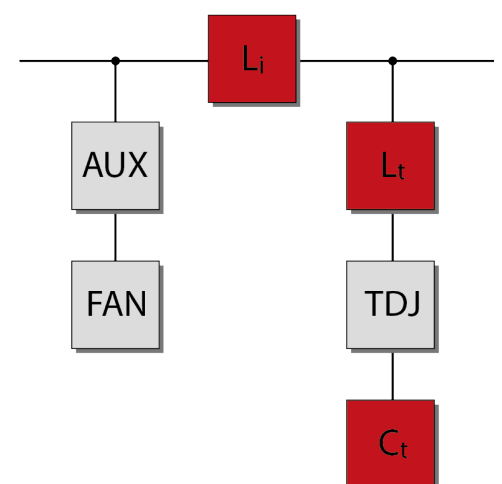
Lower harmonics also reduce the risk of system resonances and potential downtime of sensitive electronic equipment.

FN3458 filters upgrade standard motor drives to low-harmonic drives quickly and easily.

## Typical Applications

- Equipment with front-end six-pulse rectifier
- Motor drives
- Factory automation equipment
- Water/wastewater treatment facilities
- Fan and pump applications
- HVAC installations
- Mission-critical processes

Typical electrical schematic



## Technical Specifications

|                                                  |                                                                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>Nominal operating voltage</b>                 | 3x288 to 480 VAC ±10% for IP00<br>3x380 to 480 VAC ±10% for IP20                                                |
| <b>Overload capability</b>                       | 1.6x rated current for 1 minute, once per hour                                                                  |
| <b>Operating frequency</b>                       | 60 Hz ±1 Hz                                                                                                     |
| <b>Total harmonic current distortion THDi*</b>   | <10% @ rated power (with DC-Link choke 4%)<br><15% @ rated power (without DC-Link choke or <4%)                 |
| <b>Total demand distortion TDD</b>               | According to IEEE 519                                                                                           |
| <b>Nominal motor drive input power rating</b>    | 5 to 250 HP @ 480 VAC                                                                                           |
| <b>High potential test voltage</b>               | P -> E 2480 VAC for 1 s                                                                                         |
| <b>Earthing system</b>                           | TN, TT, IT                                                                                                      |
| <b>Efficiency</b>                                | ≥ 98% at rated voltage and power                                                                                |
| <b>Overvoltage category</b>                      | OV III (IEC 60664-1 / UL 61800-5-1)                                                                             |
| <b>Temperature range (operation and storage)</b> | -25°C to +45°C fully operational<br>+45°C to +70°C derated operation***<br>-25°C to +85°C transport and storage |
| <b>Cooling</b>                                   | Internal fan cooling or external fan cooling****                                                                |
| <b>Protection category</b>                       | IP 00, IP 20                                                                                                    |
| <b>Flammability corresponding to</b>             | UL 94V-2                                                                                                        |
| <b>Design corresponding to</b>                   | UL/IEC 61800-5-1, EN 61800-5-1, CE (LVD2006/95/EC)<br>Choke: IEC 61558-2-20                                     |
| <b>SCCR**</b>                                    | 100 kA                                                                                                          |
| <b>MTBF (Mil-HB-217F)</b>                        | >300,000 h @ 45°C/480 V                                                                                         |

- \* System requirements: THDv <2%, line voltage unbalance <1%  
Note: performance specifications in this datasheet refer to six-pulse diode rectifiers.  
SCR rectifier front-end will produce different results, depending upon the firing angle of the thyristors.
- \*\* External UL-rated fuses required.
- \*\*\*  $I_{derated} = I_{nominal} * \sqrt{((70^{\circ}\text{C} - T_{amb})/25^{\circ}\text{C})}$
- \*\*\*\* Please check the inlet air flow requirement for cooling, see below in this document and in the user and installation manual.

Filter Selection Table

| Filter                | Rated load power<br>@480 V /60 Hz |      | Rated load power<br>@380 V /60 Hz |      | Rated load power<br>@208 V /60 Hz |      | Motor drive input current<br>[Arms]* | Rated filter input current<br>[Arms] | Weight |       | Typical losses<br>[W]** | Input /output terminals<br>Type | TDJ terminals<br>Type | Frame size |
|-----------------------|-----------------------------------|------|-----------------------------------|------|-----------------------------------|------|--------------------------------------|--------------------------------------|--------|-------|-------------------------|---------------------------------|-----------------------|------------|
|                       | [kW]                              | [HP] | [kW]                              | [HP] | [kW]                              | [HP] |                                      |                                      | [kg]   | [lbs] |                         |                                 |                       |            |
| FN3458-5-44-E0XXJXX   | 3.7                               | 5    | 3                                 | 4    | 1.6                               | 2.2  | 6.7                                  | 4.6                                  | 9      | 20    | 60                      | -44                             | -44                   | A          |
| FN3458-8-44-E0XXJXX   | 5.6                               | 7.5  | 4.4                               | 6    | 2.4                               | 3.3  | 10                                   | 6.9                                  | 9      | 20    | 117                     | -44                             | -44                   | A          |
| FN3458-10-44-E0XXJXX  | 7.5                               | 10   | 5.9                               | 8    | 3.2                               | 4.3  | 13.4                                 | 9.2                                  | 13.3   | 29    | 99                      | -44                             | -44                   | A          |
| FN3458-15-33-E0XXJXX  | 11.2                              | 15   | 8.9                               | 12   | 4.8                               | 6.5  | 20                                   | 13.8                                 | 16.2   | 36    | 174                     | -33                             | -44                   | B          |
| FN3458-20-33-E0XXJXX  | 14.9                              | 20   | 12                                | 16   | 6.5                               | 8.7  | 27                                   | 18.5                                 | 18.3   | 40    | 253                     | -33                             | -44                   | B          |
| FN3458-25-33-E0XXJXX  | 19                                | 25   | 15                                | 20   | 8.1                               | 11   | 34                                   | 23.0                                 | 20.9   | 46    | 307                     | -33                             | -44                   | B          |
| FN3458-30-33-E0XXJXX  | 22                                | 30   | 18                                | 24   | 9.7                               | 13   | 41                                   | 27.7                                 | 25.6   | 56    | 380                     | -33                             | -44                   | B          |
| FN3458-40-34-E0XXJXX  | 30                                | 40   | 24                                | 32   | 13                                | 17   | 54                                   | 36.9                                 | 33.5   | 74    | 336                     | -34                             | -33                   | C          |
| FN3458-50-34-E0XXJXX  | 37                                | 50   | 30                                | 40   | 16                                | 22   | 67                                   | 46.2                                 | 40     | 88    | 412                     | -34                             | -33                   | C          |
| FN3458-60-35-E0XXJXX  | 45                                | 60   | 36                                | 48   | 19                                | 26   | 81                                   | 55.9                                 | 42.5   | 94    | 466                     | -35                             | -33                   | D          |
| FN3458-75-35-E0XXJXX  | 56                                | 75   | 45                                | 60   | 24                                | 33   | 99                                   | 69.0                                 | 45.2   | 99    | 490                     | -35                             | -33                   | D          |
| FN3458-100-40-E0XXJXX | 75                                | 100  | 60                                | 80   | 32                                | 43   | 131                                  | 92.2                                 | 78     | 172   | 634                     | -40                             | -34                   | E          |
| FN3458-125-40-E0XXJXX | 93                                | 125  | 75                                | 100  | 40                                | 54   | 162                                  | 115                                  | 83.5   | 184   | 805                     | -40                             | -34                   | E          |
| FN3458-150-40-E0XXJXX | 112                               | 150  | 89                                | 120  | 48                                | 65   | 191                                  | 139                                  | 91.5   | 201   | 615                     | -40                             | -34                   | E          |
| FN3458-200-99-E0XXJXX | 149                               | 200  | 119                               | 160  | 65                                | 87   | 253                                  | 185                                  | 101    | 222   | 843                     | -99                             | -35                   | F          |
| FN3458-250-99-E0XXJXX | 186                               | 250  | 149                               | 200  | 81                                | 108  | 311                                  | 231                                  | 112    | 246   | 910                     | -99                             | -35                   | F          |
| FN3458-300-99-E0XXJXX | 224                               | 300  | 179                               | 240  | 97                                | 130  | 368                                  | 280                                  | 134    | 295   | 1026                    | -99                             | -40                   | G          |

\* Filter to be selected by system voltage and load (motor drive) power. Note: the harmonic filter will reduce RMS input current. Therefore, filter selection by current rating, as it is common for EMC/EMI filters, is not recommended.

\*\* Calculated power losses at 25°C, 400 V, 50 Hz and rated load power.

Mechanical Data IP00

Filter Terminals

| Terminal designation | LxWxH<br>[mm] | Stranded wire<br>[AWG] | Stranded wire<br>[mm²] | Solid wire<br>[mm²] | Rec. Torque<br>[Nm] | Ring cable shoe |
|----------------------|---------------|------------------------|------------------------|---------------------|---------------------|-----------------|
| -44                  | 21.9x10x28    | 20 - 8                 | 0.5 - 6                | 0.5 - 10            | 1.0 - 1.2           | -               |
| -33                  | 25x11x32      | 20 - 6                 | 0.5 - 10               | 0.5 - 16            | 1.5 - 1.8           | -               |
| -34                  | 39x18.5x50.5  | 10 - 2                 | 6 - 25                 | 6 - 35              | 4.0 - 4.5           | -               |
| -35                  | 45x20x55.5    | 6 - 1/0                | 16 - 50                | 10 - 50             | 7.0 - 8.0           | -               |
| -40                  | 51x25x72.5    | 1/0 - 4/0              | 50 -95                 | 50 - 95             | 17 - 20             | -               |
| -99                  | 79x6x25       | -                      | -                      | -                   | -                   | M10             |
| TS                   | 20.5x10x10.9  | 24 - 10                | 0.5 - 4                | 0.5 - 6             | 0.7 - 0.8           | -               |

Earth Terminal

| Frame size | Screw thread | Screw torque<br>[Nm] |
|------------|--------------|----------------------|
| A          | M6           | 4.0                  |
| B, C       | M8           | 9.0                  |
| D, E, F, G | M10          | 17.0                 |

Inlet Air Flow Required For Cooling

| Frame size              | Min air volume* |       |
|-------------------------|-----------------|-------|
|                         | [m³/h]          | [CFM] |
| A                       | 0               | 0     |
| B, C, D                 | 204             | 120   |
| E (100 and 150 HP only) | 408             | 240   |
| E (125 HP only)         | 612             | 360   |
| F, G                    | 612             | 360   |

\* External air flow required for filter configurations without embedded ventilation

Filter Selection Table

| Filter                | Rated load power<br>@480 V/60 Hz |      | Rated load power<br>@380 V/60 Hz |      | Motor drive<br>input current<br><br>[Arms]** | Rated filter<br>input current<br><br>[Arms] | Weight |       | Typical losses<br><br>[W]*** | Input /output<br>terminals<br><br>Type | TDJ terminals<br><br>Type | Frame<br>size |
|-----------------------|----------------------------------|------|----------------------------------|------|----------------------------------------------|---------------------------------------------|--------|-------|------------------------------|----------------------------------------|---------------------------|---------------|
|                       | [kW]                             | [HP] | [kW]                             | [HP] |                                              |                                             | [kg]   | [lbs] |                              |                                        |                           |               |
| FN3458-5-44-E2XXJXX*  | 3.7                              | 5    | 3                                | 4    | 6.7                                          | 4.6                                         | 10     | 22    | 60                           | -44                                    | -44                       | A             |
| FN3458-8-44-E2XXJXX*  | 5.6                              | 7.5  | 4.4                              | 6    | 10                                           | 6.9                                         | 10     | 22    | 117                          | -44                                    | -44                       | A             |
| FN3458-10-44-E2XXJXX* | 7.5                              | 10   | 5.9                              | 8    | 13.4                                         | 9.2                                         | 14.7   | 32    | 99                           | -44                                    | -44                       | A             |
| FN3458-15-33-E2FAJXX  | 11.2                             | 15   | 8.9                              | 12   | 20                                           | 13.8                                        | 18     | 40    | 174                          | -33                                    | -44                       | B             |
| FN3458-20-33-E2FAJXX  | 14.9                             | 20   | 12                               | 16   | 27                                           | 18.5                                        | 19.8   | 44    | 253                          | -33                                    | -44                       | B             |
| FN3458-25-33-E2FAJXX  | 19                               | 25   | 15                               | 20   | 34                                           | 23.0                                        | 23.4   | 51    | 307                          | -33                                    | -44                       | B             |
| FN3458-30-33-E2FAJXX  | 22                               | 30   | 18                               | 24   | 41                                           | 27.7                                        | 28.2   | 62    | 380                          | -33                                    | -44                       | B             |
| FN3458-40-34-E2FAJXX  | 30                               | 40   | 24                               | 32   | 54                                           | 36.9                                        | 37     | 81    | 336                          | -34                                    | -33                       | C             |
| FN3458-50-34-E2FAJXX  | 37                               | 50   | 30                               | 40   | 67                                           | 46.2                                        | 43     | 95    | 412                          | -34                                    | -33                       | C             |
| FN3458-60-35-E2FAJXX  | 45                               | 60   | 36                               | 48   | 81                                           | 55.9                                        | 46     | 101   | 466                          | -35                                    | -33                       | D             |
| FN3458-75-35-E2FAJXX  | 56                               | 75   | 45                               | 60   | 99                                           | 69.0                                        | 48.5   | 107   | 490                          | -35                                    | -33                       | D             |
| FN3458-100-40-E2FAJXX | 75                               | 100  | 60                               | 80   | 131                                          | 92.2                                        | 83     | 183   | 634                          | -40                                    | -34                       | E             |
| FN3458-125-40-E2FAJXX | 93                               | 125  | 75                               | 100  | 162                                          | 115                                         | 88.5   | 195   | 805                          | -40                                    | -34                       | E             |
| FN3458-150-40-E2FAJXX | 112                              | 150  | 89                               | 120  | 191                                          | 139                                         | 97.5   | 215   | 615                          | -40                                    | -34                       | E             |
| FN3458-200-99-E2FAJXX | 149                              | 200  | 119                              | 160  | 253                                          | 185                                         | 109    | 240   | 843                          | -99                                    | -35                       | F             |
| FN3458-250-99-E2FAJXX | 186                              | 250  | 149                              | 200  | 311                                          | 231                                         | 120    | 264   | 910                          | -99                                    | -35                       | F             |
| FN3458-300-99-E2FAJXX | 224                              | 300  | 179                              | 240  | 368                                          | 280                                         | 142    | 312   | 1026                         | -99                                    | -40                       | G             |

\* Filter rating which does not require forced cooling or fan module

\*\* Filter to be selected by system voltage and load (motor drive) power. Note: the harmonic filter will reduce RMS input current. Therefore, filter selection by current rating, as it is common for EMC/EMI filters, is not recommended.

\*\*\* Calculated power losses at 25°C, 400 V, 50 Hz and rated load power.

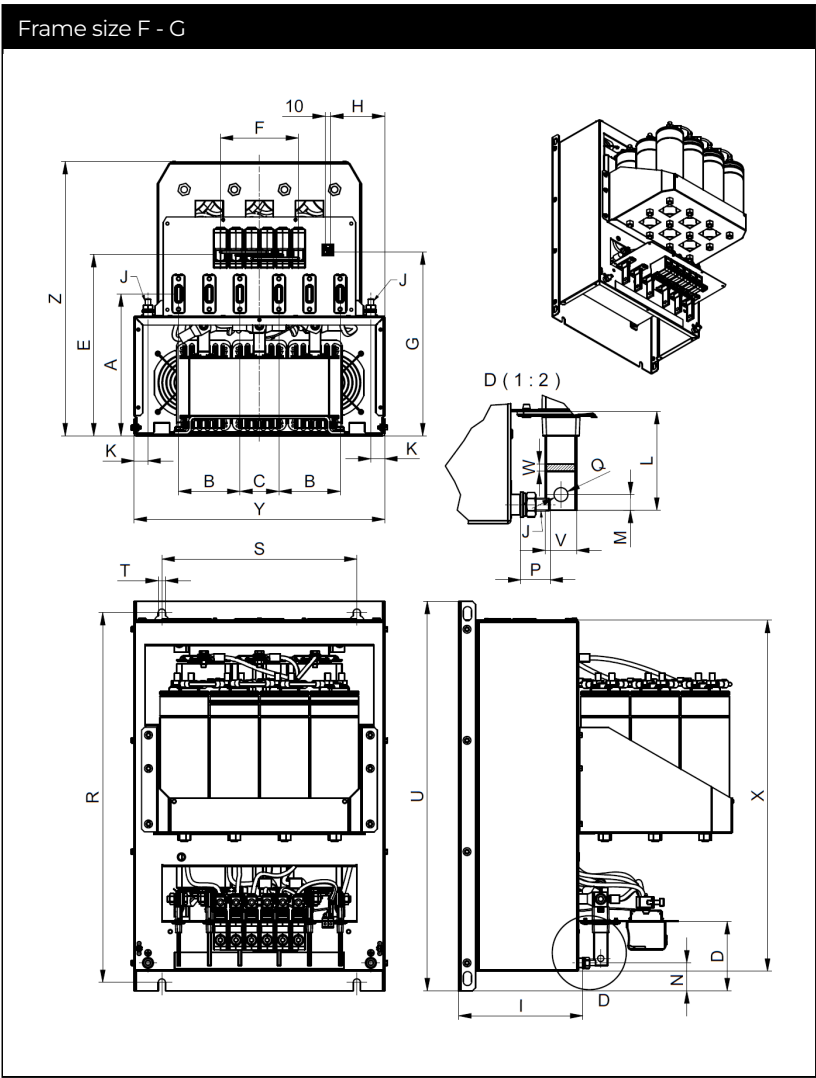
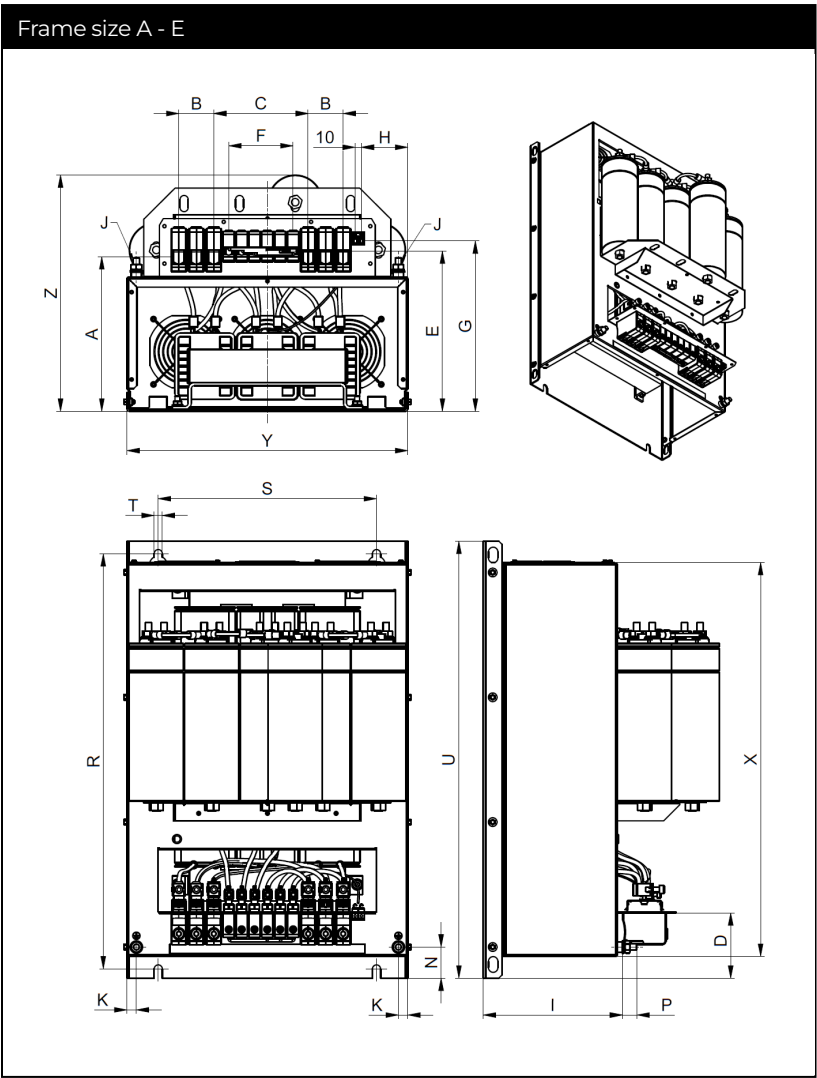
Filter Terminals

| Terminal designation | LxWxH<br>[mm] | Stranded wire<br>[AWG] | Stranded wire<br>[mm²] | Solid wire<br>[mm²] | Rec. Torque<br>[Nm] | Ring cable shoe |
|----------------------|---------------|------------------------|------------------------|---------------------|---------------------|-----------------|
| -44                  | 21.9x10x28    | 20 - 8                 | 0.5 - 6                | 0.5 - 10            | 1.0 - 1.2           | -               |
| -33                  | 25x11x32      | 20 - 6                 | 0.5 - 10               | 0.5 - 16            | 1.5 - 1.8           | -               |
| -34                  | 39x18.5x50.5  | 10 - 2                 | 6 - 25                 | 6 - 35              | 4.0 - 4.5           | -               |
| -35                  | 45x20x55.5    | 6 - 1/0                | 16 - 50                | 10 - 50             | 7.0 - 8.0           | -               |
| -40                  | 51x25x72.5    | 1/0 - 4/0              | 50 - 95                | 50 - 95             | 17 - 20             | -               |
| -99                  | 79x6x25       | -                      | -                      | -                   | -                   | M10             |
| TS                   | 20.5x10x10.9  | 24 - 10                | 0.5 - 4                | 0.5 - 6             | 0.7 - 0.8           | -               |

Earth Terminal

| Frame size | Screw thread | Screw torque<br>[Nm] |
|------------|--------------|----------------------|
| A          | M6           | 4.0                  |
| B, C       | M8           | 9.0                  |
| D, E, F, G | M10          | 17.0                 |

Mechanical Data IP00



Dimensions

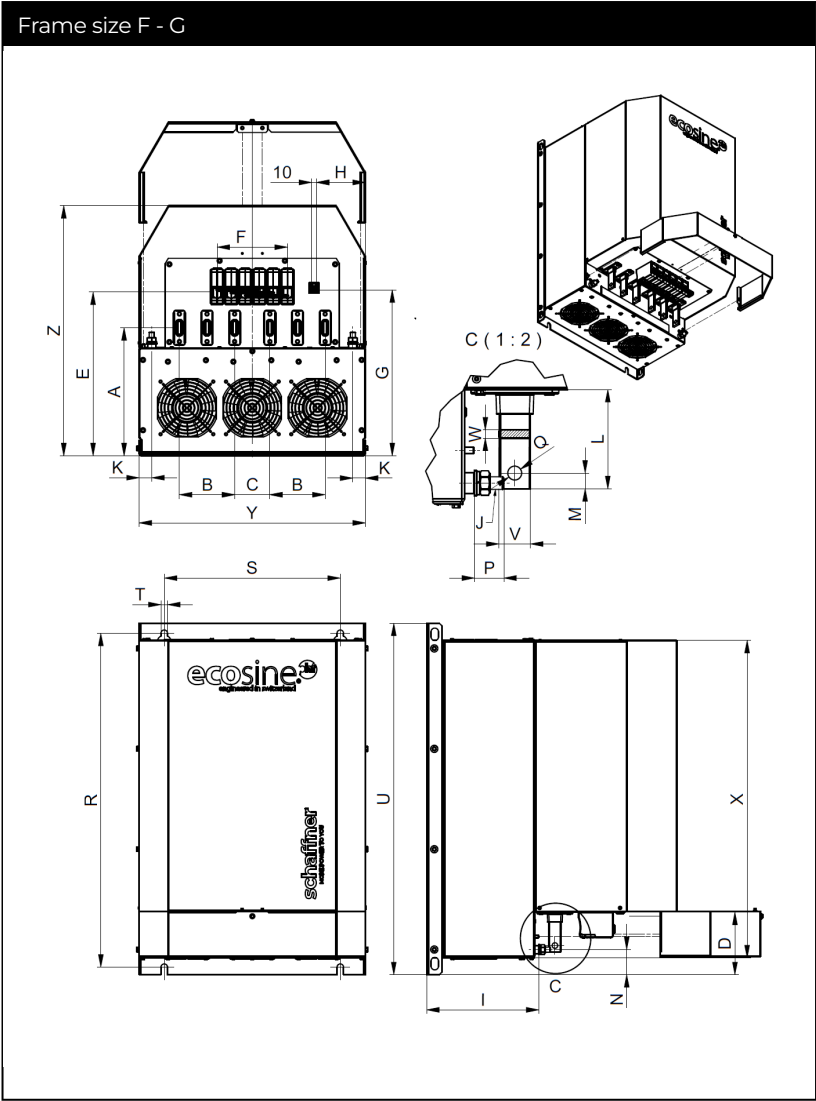
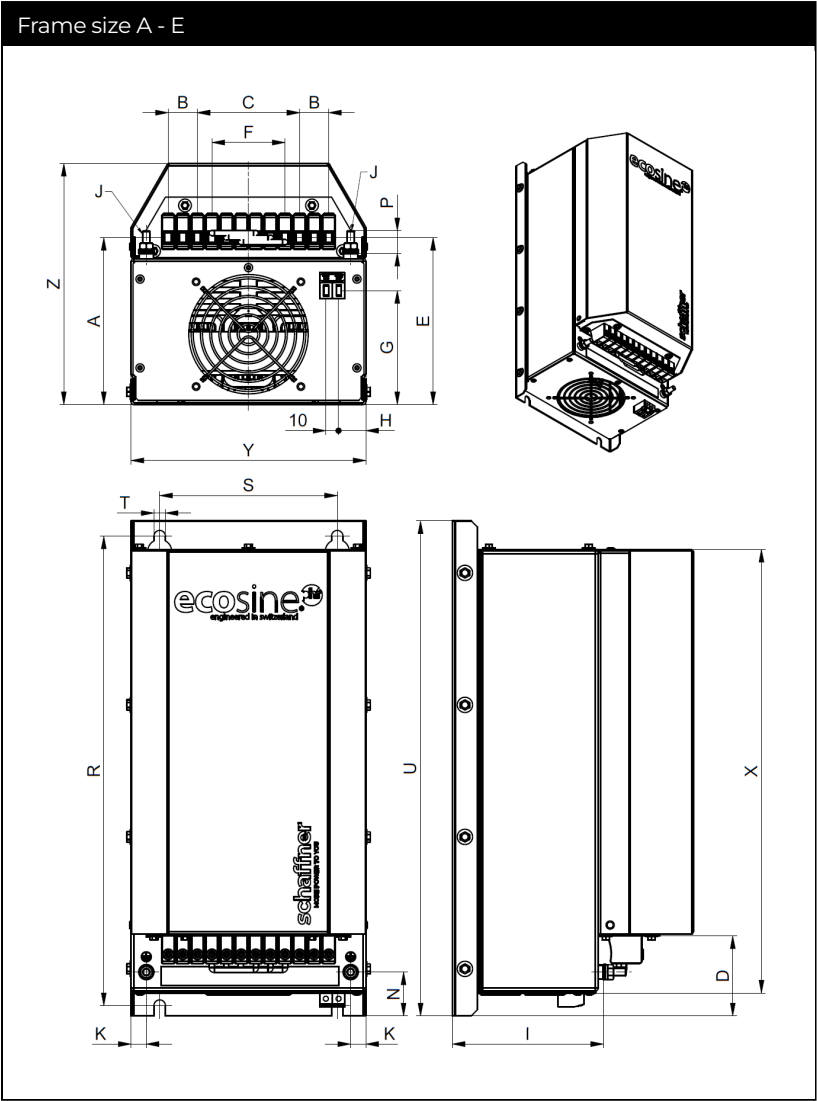
| Frame size | A   | B   | C   | D   | E   | F   | G   | H   | I   | K  | L  | M  | N  | P  | Q  | R   | S   | T  | U   | V  | W | X   | Y   | Z   |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|-----|----|-----|----|---|-----|-----|-----|
| A          | 132 | 23  | 81  | 63  | 132 | 58  | 90  | 22  | 119 | 12 |    |    | 35 | 18 |    | 370 | 140 | 9  | 390 |    |   | 349 | 185 | 170 |
| B          | 161 | 24  | 82  | 68  | 161 | 58  | 165 | 49  | 146 | 15 |    |    | 39 | 21 |    | 435 | 200 | 11 | 455 |    |   | 402 | 250 | 220 |
| C          | 176 | 38  | 89  | 78  | 179 | 58  | 188 | 43  | 154 | 15 |    |    | 40 | 21 |    | 500 | 225 | 11 | 520 |    |   | 467 | 280 | 238 |
| D          | 178 | 42  | 98  | 93  | 165 | 64  | 198 | 115 | 156 | 15 |    |    | 44 | 23 |    | 555 | 225 | 11 | 580 |    |   | 522 | 280 | 238 |
| E          | 247 | 56  | 151 | 105 | 257 | 103 | 273 | 74  | 223 | 15 |    |    | 50 | 23 |    | 665 | 350 | 13 | 700 |    |   | 631 | 450 | 380 |
| F          | 255 | 110 | 70  | 125 | 313 | 140 | 325 | 97  | 223 | 25 | 79 | 13 | 50 | 23 | 11 | 665 | 350 | 13 | 700 | 25 | 6 | 631 | 450 | 380 |
| G          | 255 | 110 | 70  | 125 | 326 | 140 | 325 | 97  | 223 | 25 | 79 | 13 | 50 | 23 | 11 | 665 | 350 | 13 | 700 | 25 | 6 | 631 | 450 | 495 |

All dimensions in mm; 1 inch = 25.4 mm  
Tolerances according to: ISO 2768-m/EN 22768-m

Installation

For more detailed information and step by step installation guidelines, please consult the user manual at [www.schaffner.com](http://www.schaffner.com).

Mechanical Data IP20



Dimensions

| Frame size | A   | B   | C   | D   | E   | F   | G   | H   | I   | K  | L  | M  | N  | P  | Q  | R   | S   | T  | U   | V  | W | X   | Y   | Z   |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|-----|----|-----|----|---|-----|-----|-----|
| A          | 132 | 23  | 81  | 63  | 132 | 58  | 90  | 22  | 119 | 12 |    |    | 35 | 18 |    | 370 | 140 | 9  | 390 |    |   | 350 | 185 | 190 |
| B          | 161 | 24  | 82  | 68  | 161 | 58  | 165 | 49  | 146 | 15 |    |    | 39 | 21 |    | 435 | 200 | 11 | 455 |    |   | 403 | 250 | 230 |
| C          | 176 | 38  | 89  | 78  | 179 | 58  | 188 | 43  | 154 | 15 |    |    | 40 | 21 |    | 500 | 225 | 11 | 520 |    |   | 468 | 280 | 248 |
| D          | 178 | 42  | 98  | 93  | 165 | 64  | 198 | 115 | 156 | 15 |    |    | 44 | 23 |    | 555 | 225 | 11 | 580 |    |   | 523 | 280 | 248 |
| E          | 247 | 56  | 151 | 105 | 257 | 103 | 273 | 74  | 223 | 15 |    |    | 50 | 23 |    | 665 | 350 | 13 | 700 |    |   | 633 | 450 | 385 |
| F          | 255 | 110 | 70  | 125 | 313 | 140 | 325 | 97  | 223 | 25 | 79 | 13 | 50 | 23 | 11 | 665 | 350 | 13 | 700 | 25 | 6 | 633 | 450 | 385 |
| G          | 255 | 110 | 70  | 125 | 326 | 140 | 325 | 97  | 223 | 25 | 79 | 13 | 50 | 23 | 11 | 665 | 350 | 13 | 700 | 25 | 6 | 633 | 450 | 498 |

All dimensions in mm; 1 inch = 25.4 mm  
Tolerances according to: ISO 2768-m/EN 22768-m

Installation

For more detailed information and step by step installation guidelines, please consult the user manual at [www.schaffner.com](http://www.schaffner.com).

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