

Mechanical features

- Modular design
- Operating temperature
0.12 kW to 75 kW:
-10 °C to +50 °C
(+14 °F to +122 °F)
90 kW to 200 kW:
0 °C to +40 °C
(+32 °F to +104 °F)
- Compact housing as a result of high power density
- Easy cable connection, mains and motor connections are separated for optimum electromagnetic compatibility
- Detachable operator panels
- Screwless control terminals on detachable I/O board.

Performance features

- Latest IGBT technology
- Digital microprocessor control
- High-quality Vector Control system
- Flux Current Control (FCC) for improved dynamic response and optimized motor control
- Linear V/f characteristic
- Quadratic V/f characteristic
- Multipoint characteristic (programmable V/f characteristic)
- Torque control
- Flying restart
- Slip compensation
- Automatic restart following mains failure or fault
- User-definable function blocks for logic and arithmetic operations
- Kinetic buffering
- Positioning ramp down
- High-grade PID controller for simple internal process control (autotuning)
- Programmable acceleration/deceleration, 0 s to 650 s
- Ramp smoothing
- Fast Current Limit (FCL) for trip-free operation
- Fast, repeatable digital input response time
- Fine adjustment using two high-resolution 10-bit analog inputs
- Compound braking for controlled rapid braking
- Integrated brake chopper (for 0.12 kW to 75 kW inverters)
- Four skip frequencies
- Removable "Y" capacitor for use on IT systems (with non-grounded mains supplies, the "Y" capacitor must be removed and an output choke installed).

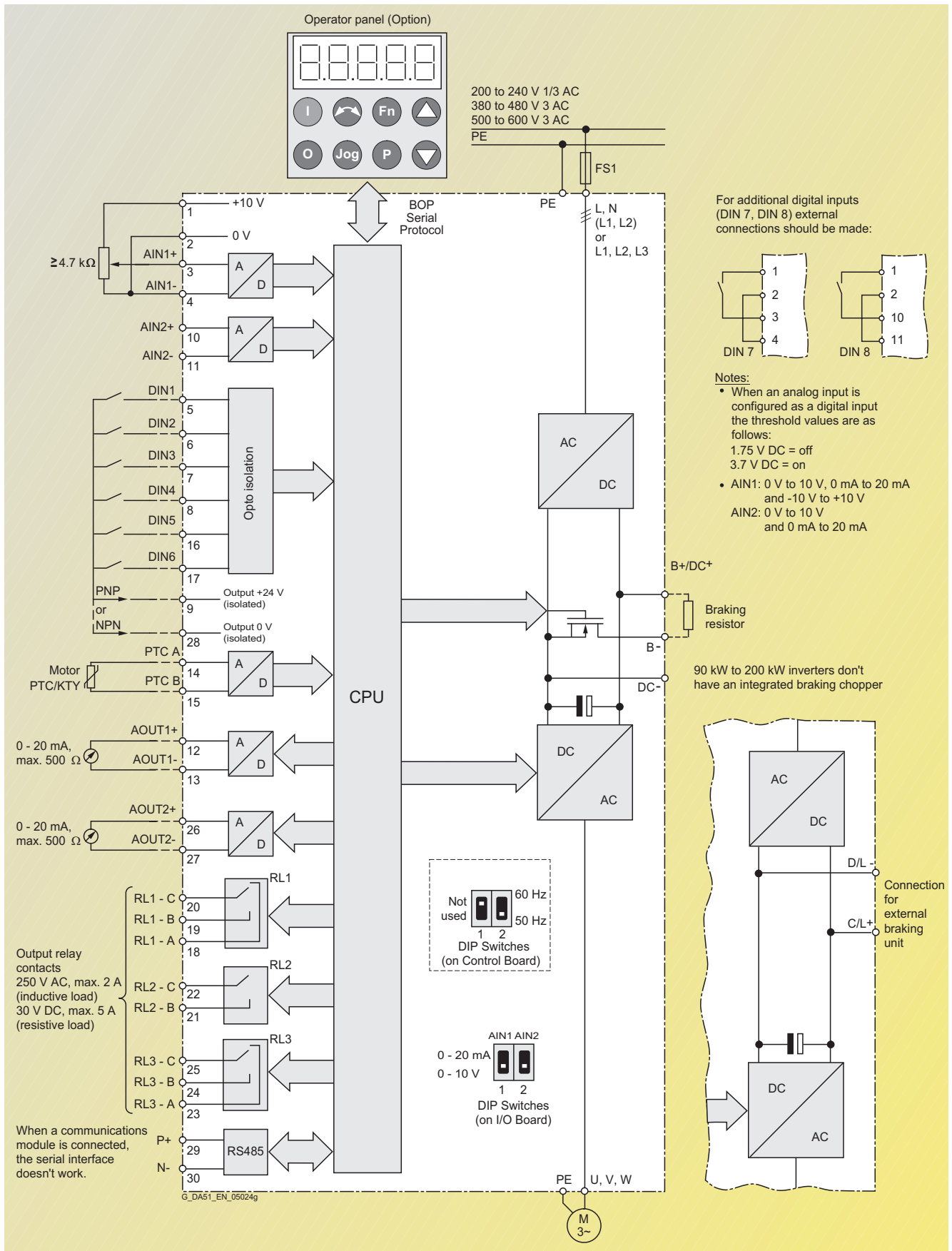
Protection features

- Overload capability
 - **CT mode**
0.12 kW to 75 kW:
Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s, and 2 x rated output current (i.e. 200 % overload capability) for 3 s, cycle time 300 s
90 kW to 200 kW:
Overload current 1.36 x rated output current (i.e. 136 % overload capability) for 57 s, cycle time 300 s, and 1.6 x rated output current (i.e. 160 % overload capability) for 3 s, cycle time 300 s
 - **VT mode**
5.5 kW to 90 kW:
Overload current 1.4 x rated output current (i.e. 140 % overload capability) for 3 s, and 1.1 x rated output current (i.e. 110 % overload capability) for 60 s, cycle time 300 s
110 kW to 250 kW:
Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 1 s, and 1.1 x rated output current (i.e. 110 % overload capability) for 59 s, cycle time 300 s
- Overvoltage/undervoltage protection
- Inverter overtemperature protection
- Special direct connection for PTC or KTY to protect the motor
- Earth fault protection
- Short-circuit protection
- f_t motor thermal protection
- Locked motor protection
- Stall prevention
- Parameter interlock.

MICROMASTER 440

Circuit diagrams

General circuit diagram



4

Terminal connection diagram

Example, frame size FX



View A



*) PNP or NPN possible

MICROMASTER 440

Technical data

MICROMASTER 440 inverter

| | | | | |
|---|-------------------------------------|---|---|--|
| Mains voltage and power ranges | | 1 AC 200 V to 240 V ± 10 % 3 AC 200 V to 240 V ± 10 % 3 AC 380 V to 480 V ± 10 % 3 AC 500 V to 600 V ± 10 % | CT (constant torque) 0.12 kW to 3 kW 0.12 kW to 45 kW 0.37 kW to 200 kW 0.75 kW to 75 kW | VT (variable torque) – 5.5 kW to 45 kW 7.5 kW to 250 kW 1.5 kW to 90 kW |
| Input frequency | | 47 Hz to 63 Hz | | |
| Output frequency | 0.12 kW to 75 kW 90 kW to 200 kW | 0 Hz to 650 Hz (in <i>V/f</i> mode) 0 Hz to 267 Hz (in <i>V/f</i> mode) | 0 Hz to 200 Hz (in vector mode) 0 Hz to 200 Hz (in vector mode) | |
| Power factor | | ≥ 0.95 | | |
| Inverter efficiency | | 96 % to 97 % | | |
| Overload capability | 0.12 kW to 75 kW 90 kW to 200 kW | Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 60 s, cycle time 300 s and 2 x rated output current (i.e. 200 % overload capability) for 3 s, cycle time 300 s | | |
| – CT mode | | Overload current 1.36 x rated output current (i.e. 136 % overload capability) for 57 s, cycle time 300 s and 1.6 x rated output current (i.e. 160 % overload capability) for 3 s, cycle time 300 s | | |
| – VT mode | 5.5 kW to 90 kW 110 kW to 250 kW | Overload current 1.4 x rated output current (i.e. 140% overload capability) for 3 s, and 1.1 x rated output current (i.e. 110 % overload capability) for 60 s, cycle time 300 s | | |
| | | Overload current 1.5 x rated output current (i.e. 150 % overload capability) for 1 s, and 1.1 x rated output current (i.e. 110 % overload capability) for 59 s, cycle time 300 s | | |
| Inrush current | | not higher than rated input current | | |
| Control method | | Vector control, torque control, linear <i>V/f</i> characteristic; quadratic <i>V/f</i> characteristic; Multipoint characteristic (programmable <i>V/f</i> characteristic); flux current control (FCC) | | |
| Pulse frequency | 0.12 kW to 75 kW 90 kW to 200 kW | 4 kHz (standard); 16 kHz (standard with 230 V inverters 0.12 kW to 5.5 kW) 2 kHz to 16 kHz (in 2 kHz steps) 2 kHz (standard with VT mode); 4 kHz (standard with CT mode) 2 kHz to 4 kHz (in 2 kHz steps) | | |
| Fixed frequencies | | 15, programmable | | |
| Skip frequency ranges | | 4, programmable | | |
| Setpoint resolution | | 0.01 Hz digital 0.01 Hz serial 10 bit analog | | |
| Digital inputs | | 6 fully programmable isolated digital inputs; switchable PNP/NPN | | |
| Analog inputs | | 2 programmable analog inputs • 0 V to 10 V, 0 mA to 20 mA and –10 V to +10 V (AIN1) • 0 V to 10 V and 0 mA to 20 mA (AIN2) • both can be used as 7th/8th digital input | | |
| Relay outputs | | 3, programmable, 30 V DC/5 A (resistive load); 250 V AC/2A (inductive load) | | |
| Analog outputs | | 2, programmable (0/4 mA to 20 mA) | | |
| Serial interfaces | | RS-485, optional RS-232 | | |
| Motor cable lengths without output choke | 0.12 – 75 kW 90 – 250 kW | max. 50 m (shielded), max. 100 m (unshielded) max. 100 m (shielded), max. 150 m (unshielded) (see variant dependent options) | | |
| with output choke | | | | |
| Electromagnetic compatibility (see Selection and Ordering Data) | | EMC filter, Class A or Class B to EN 55 011 available as an option Inverter with internal filter Class A available | | |
| Braking | | Resistance braking with DC braking, compound braking, integrated brake chopper (integrated brake chopper only with 0.12 kW to 75 kW inverters) | | |
| Degree of protection | | IP20 | | |
| Operating temperature (without derating) | 0.12 kW to 75 kW 90 kW to 200 kW | CT: –10 °C to +122.00 °F (+14 °F to +122 °F) VT: –10 °C to +40 °C (+14 °F to +104 °F) 0 °C to +40 °C (+32 °F to +104 °F) | | |
| Storage temperature | | –40 °C to +70 °C (–40 °F to +158 °F) | | |
| Relative humidity | | 95 % (non-condensing) | | |
| Installation altitude | 0.12 kW to 75 kW 90 kW to 200 kW | up to 1000 m above sea level without derating up to 2000 m above sea level without derating | | |
| Protection features for | | Undervoltage, overvoltage, overload, earth faults, short-circuits, stall prevention, locked motor protection, motor over-temperature, inverter overtemperature, parameter change protection | | |
| Compliance with standards | | Ⓜ, cⓂ, CE, c-tick | | |
| CE marking | | Conformity with low-voltage directive 73/23/EEC | | |
| Dimensions and weights (without options) | | Frame size (FS) | H x W x D, max. (mm) | Weight, approx. (kg) |
| | | A | 173 x 73 x 149 | 1.3 |
| | | B | 202 x 149 x 172 | 3.4 |
| | | C | 245 x 185 x 195 | 5.7 |
| | | D | 520 x 275 x 245 | 17 |
| | | E | 650 x 275 x 245 | 22 |
| | | F without filter | 850 x 350 x 320 | 56 |
| | | F with filter | 1150 x 350 x 320 | 75 |
| | | FX | 1400 x 326 x 356 | 116 |
| | | GX | 1533 x 326 x 545 | 176 |

Derating data

Pulse frequency

| Output kW | Rated output current in A for a pulse frequency of | | | | | | |
|---|--|-------|-------|--------|--------|--------|--------|
| | 4 kHz | 6 kHz | 8 kHz | 10 kHz | 12 kHz | 14 kHz | 16 kHz |
| Mains voltage 1/3 AC 200 V | | | | | | | |
| 0.12 to 5.5 | Values correspond to the 4 kHz standard values. No derating, since 16 kHz standard. | | | | | | |
| 7.5 | 28.0 | 26.6 | 25.2 | 22.4 | 19.6 | 16.8 | 14.0 |
| 11 | 42.0 | 37.8 | 33.6 | 29.4 | 25.2 | 21.0 | 16.8 |
| 15 | 54.0 | 48.6 | 43.2 | 37.8 | 32.4 | 27.0 | 21.6 |
| 18.5 | 68.0 | 64.6 | 61.2 | 54.4 | 47.6 | 40.8 | 34.0 |
| 22 | 80.0 | 72.0 | 64.0 | 56.0 | 48.0 | 40.0 | 32.0 |
| 30 | 104.0 | 91.0 | 78.0 | 70.2 | 62.4 | 57.2 | 52.0 |
| 37 | 130.0 | 113.8 | 97.5 | 87.8 | 78.0 | 71.5 | 65.0 |
| 45 | 154.0 | 134.8 | 115.5 | 104.0 | 92.4 | 84.7 | 77.0 |
| Mains operating voltage 3 AC 400 V | | | | | | | |
| 0.37 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.0 |
| 0.55 | 1.7 | 1.7 | 1.7 | 1.6 | 1.5 | 1.4 | 1.2 |
| 0.75 | 2.2 | 2.2 | 2.2 | 2.0 | 1.8 | 1.5 | 1.3 |
| 1.1 | 3.1 | 2.9 | 2.8 | 2.5 | 2.2 | 1.9 | 1.6 |
| 1.5 | 4.1 | 3.7 | 3.3 | 2.9 | 2.5 | 2.1 | 1.6 |
| 2.2 | 5.9 | 5.6 | 5.3 | 4.7 | 4.1 | 3.5 | 3.0 |
| 3.0 | 7.7 | 6.9 | 6.2 | 5.4 | 4.6 | 3.9 | 3.1 |
| 4.0 | 10.2 | 9.2 | 8.2 | 7.1 | 6.1 | 5.1 | 4.1 |
| 5.5 | 13.2 | 11.9 | 10.6 | 9.2 | 7.9 | 6.6 | 5.3 |
| 7.5 | 19.0 | 18.1 | 17.1 | 15.2 | 13.3 | 11.4 | 9.5 |
| 11.0 | 26.0 | 23.4 | 20.8 | 18.2 | 15.6 | 13.0 | 10.4 |
| 15.0 | 32.0 | 30.4 | 28.8 | 25.6 | 22.4 | 19.2 | 16.0 |
| 18.5 | 38.0 | 34.2 | 30.4 | 26.6 | 22.8 | 19.0 | 15.2 |
| 22 | 45.0 | 40.5 | 36.0 | 31.5 | 27.0 | 22.5 | 18.0 |
| 30 | 62.0 | 58.9 | 55.8 | 49.6 | 43.4 | 37.2 | 31.0 |
| 37 | 75.0 | 67.5 | 60.0 | 52.5 | 45.0 | 37.5 | 30.0 |
| 45 | 90.0 | 76.5 | 63.0 | 51.8 | 40.5 | 33.8 | 27.0 |
| 55 | 110.0 | 93.5 | 77.0 | 63.3 | 49.5 | 41.3 | 33.0 |
| 75 | 145.0 | 112.4 | 79.8 | 68.9 | 58.0 | 50.8 | 43.5 |
| 90 | 178.0 | – | – | – | – | – | – |
| 110 | 205.0 | – | – | – | – | – | – |
| 132 | 250.0 | – | – | – | – | – | – |
| 160 | 302.0 | – | – | – | – | – | – |
| 200 | 370.0 | – | – | – | – | – | – |
| Mains operating voltage 3 AC 500 V | | | | | | | |
| 0.75 | 1.4 | 1.2 | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 |
| 1.5 | 2.7 | 2.2 | 1.6 | 1.4 | 1.1 | 0.9 | 0.8 |
| 2.2 | 3.9 | 2.9 | 2.0 | 1.6 | 1.2 | 1.0 | 0.8 |
| 4.0 | 6.1 | 4.6 | 3.1 | 2.4 | 1.8 | 1.5 | 1.2 |
| 5.5 | 9.0 | 6.8 | 4.5 | 3.6 | 2.7 | 2.3 | 1.8 |
| 7.5 | 11.0 | 8.8 | 6.6 | 5.5 | 4.4 | 3.9 | 3.3 |
| 11.0 | 17.0 | 12.8 | 8.5 | 6.8 | 5.1 | 4.3 | 3.4 |
| 15.0 | 22.0 | 17.6 | 13.2 | 11.0 | 8.8 | 7.7 | 6.6 |
| 18.5 | 27.0 | 20.3 | 13.5 | 10.8 | 8.1 | 6.8 | 5.4 |
| 22 | 32.0 | 24.0 | 16.0 | 12.8 | 9.6 | 8.0 | 6.4 |
| 30 | 41.0 | 32.8 | 24.6 | 20.5 | 16.4 | 14.4 | 12.3 |
| 37 | 52.0 | 39.0 | 26.0 | 20.8 | 15.6 | 13.0 | 10.4 |
| 45 | 62.0 | 52.7 | 43.4 | 40.3 | 37.2 | 32.6 | 27.9 |
| 55 | 77.0 | 67.4 | 57.8 | 52.0 | 46.2 | 42.4 | 38.5 |
| 75 | 99.0 | 84.2 | 69.3 | 64.4 | 59.4 | 52.0 | 44.6 |

MICROMASTER 440

Technical data

Derating data (continued)

Operating temperature



Installation height above sea level



4

MICROMASTER 440 inverter without filter²⁾

| CT (constant torque) | | | | VT (variable torque) | | | | MICROMASTER 440 without filter ²⁾ | | |
|--|------|-----------------------------------|----------------------|----------------------|-----|-----------------------------------|----------------------|--|-----------------|--------------------|
| Output | | Rated input current ¹⁾ | Rated output current | Output | | Rated input current ¹⁾ | Rated output current | Frame size | Weight, approx. | Order No. |
| kW | hp | A | A | kW | hp | A | A | (FS) | kg | |
| Mains voltage 1 AC 200 V to 240 V | | | | | | | | | | |
| 0.12 | 0.16 | 2.3 | 0.9 | – | – | – | – | A | 1.3 | 6SE6440-2UC11-2AA1 |
| 0.25 | 0.33 | 4.3 | 1.7 | – | – | – | – | A | 1.3 | 6SE6440-2UC12-5AA1 |
| 0.37 | 0.50 | 5.9 | 2.3 | – | – | – | – | A | 1.3 | 6SE6440-2UC13-7AA1 |
| 0.55 | 0.75 | 7.7 | 3.0 | – | – | – | – | A | 1.3 | 6SE6440-2UC15-5AA1 |
| 0.75 | 1.0 | 10.1 | 3.9 | – | – | – | – | A | 1.3 | 6SE6440-2UC17-5AA1 |
| 1.1 | 1.5 | 15.0 | 5.5 | – | – | – | – | B | 3.3 | 6SE6440-2UC21-1BA1 |
| 1.5 | 2 | 18.6 | 7.4 | – | – | – | – | B | 3.3 | 6SE6440-2UC21-5BA1 |
| 2.2 | 3 | 26.8 | 10.4 | – | – | – | – | B | 3.3 | 6SE6440-2UC22-2BA1 |
| 3.0 | 4 | 35.9 | 13.6 | – | – | – | – | C | 5.5 | 6SE6440-2UC23-0CA1 |
| Mains operating voltage 3 AC 200 V to 240 V | | | | | | | | | | |
| 0.12 | 0.16 | 1.1 | 0.9 | – | – | – | – | A | 1.3 | 6SE6440-2UC11-2AA1 |
| 0.25 | 0.33 | 2.2 | 1.7 | – | – | – | – | A | 1.3 | 6SE6440-2UC12-5AA1 |
| 0.37 | 0.50 | 3.0 | 2.3 | – | – | – | – | A | 1.3 | 6SE6440-2UC13-7AA1 |
| 0.55 | 0.75 | 3.9 | 3.0 | – | – | – | – | A | 1.3 | 6SE6440-2UC15-5AA1 |
| 0.75 | 1.0 | 5.2 | 3.9 | – | – | – | – | A | 1.3 | 6SE6440-2UC17-5AA1 |
| 1.1 | 1.5 | 7.6 | 5.5 | – | – | – | – | B | 3.3 | 6SE6440-2UC21-1BA1 |
| 1.5 | 2.0 | 10.2 | 7.4 | – | – | – | – | B | 3.3 | 6SE6440-2UC21-5BA1 |
| 2.2 | 3.0 | 14.1 | 10.4 | – | – | – | – | B | 3.3 | 6SE6440-2UC22-2BA1 |
| 3.0 | 4.0 | 18.4 | 13.6 | – | – | – | – | C | 5.5 | 6SE6440-2UC23-0CA1 |
| 4.0 | 5.0 | 23.3 | 17.5 | 5.5 | 7.5 | 28.3 | 22 | C | 5.5 | 6SE6440-2UC24-0CA1 |
| 5.5 | 7.5 | 28.0 | 22 | 7.5 | 10 | 34.2 | 28 | C | 5.5 | 6SE6440-2UC25-5CA1 |
| 7.5 | 10 | 34.0 | 28 | 11.0 | 15 | 48.7 | 42 | D | 16 | 6SE6440-2UC27-5DA1 |
| 11.0 | 15 | 50.6 | 42 | 15.0 | 20 | 63.1 | 54 | D | 16 | 6SE6440-2UC31-1DA1 |
| 15.0 | 20 | 64.9 | 54 | 18.5 | 25 | 80.2 | 68 | D | 16 | 6SE6440-2UC31-5DA1 |
| 18.5 | 25 | 83.0 | 68 | 22 | 30 | 96.0 | 80 | E | 20 | 6SE6440-2UC31-8EA1 |
| 22 | 30 | 100.0 | 80 | 30 | 40 | 127.0 | 104 | E | 20 | 6SE6440-2UC32-2EA1 |
| 30 | 40 | 140.0 | 104 | 37 | 50 | 171.0 | 130 | F | 55 | 6SE6440-2UC33-0FA1 |
| 37 | 50 | 177.0 | 130 | 45 | 60 | 206.0 | 154 | F | 55 | 6SE6440-2UC33-7FA1 |
| 45 | 60 | 204.0 | 154 | – | – | – | – | F | 55 | 6SE6440-2UC34-5FA1 |
| Mains operating voltage 3 AC 380 V to 480 V | | | | | | | | | | |
| 0.37 | 0.50 | 1.5 | 1.3 | – | – | – | – | A | 1.3 | 6SE6440-2UD13-7AA1 |
| 0.55 | 0.75 | 1.9 | 1.7 | – | – | – | – | A | 1.3 | 6SE6440-2UD15-5AA1 |
| 0.75 | 1.0 | 2.4 | 2.2 | – | – | – | – | A | 1.3 | 6SE6440-2UD17-5AA1 |
| 1.1 | 1.5 | 3.7 | 3.1 | – | – | – | – | A | 1.3 | 6SE6440-2UD21-1AA1 |
| 1.5 | 2.0 | 4.8 | 4.1 | – | – | – | – | A | 1.3 | 6SE6440-2UD21-5AA1 |
| 2.2 | 3.0 | 6.5 | 5.9 | – | – | – | – | B | 3.3 | 6SE6440-2UD22-2BA1 |
| 3.0 | 4.0 | 8.6 | 7.7 | – | – | – | – | B | 3.3 | 6SE6440-2UD23-0BA1 |
| 4.0 | 5.0 | 11.6 | 10.2 | – | – | – | – | B | 3.3 | 6SE6440-2UD24-0BA1 |
| 5.5 | 7.5 | 15.6 | 13.2 | 7.5 | 10 | 20.2 | 19 | C | 5.5 | 6SE6440-2UD25-5CA1 |
| 7.5 | 10 | 22.0 | 19 | 11.0 | 15 | 29.0 | 26 | C | 5.5 | 6SE6440-2UD27-5CA1 |
| 11.0 | 15 | 32.3 | 26 | 15.0 | 20 | 39.0 | 32 | C | 5.5 | 6SE6440-2UD31-1CA1 |
| 15.0 | 20 | 38.5 | 32 | 18.5 | 25 | 45.2 | 38 | D | 16 | 6SE6440-2UD31-5DA1 |
| 18.5 | 25 | 47.1 | 38 | 22 | 30 | 54.7 | 45 | D | 16 | 6SE6440-2UD31-8DA1 |
| 22 | 30 | 56.3 | 45 | 30 | 40 | 74.8 | 62 | D | 16 | 6SE6440-2UD32-2DA1 |
| 30 | 40 | 78.0 | 62 | 37 | 50 | 91.0 | 75 | E | 20 | 6SE6440-2UD33-0EA1 |
| 37 | 50 | 95.0 | 75 | 45 | 60 | 111.0 | 90 | E | 20 | 6SE6440-2UD33-7EA1 |
| 45 | 60 | 122.0 | 90 | 55 | 75 | 143.0 | 110 | F | 56 | 6SE6440-2UD34-5FA1 |
| 55 | 75 | 148.0 | 110 | 75 | 100 | 190.0 | 145 | F | 56 | 6SE6440-2UD35-5FA1 |
| 75 | 100 | 188.0 | 145 | 90 | 125 | 223.0 | 178 | F | 56 | 6SE6440-2UD37-5FA1 |

1) Supplementary conditions:
Input current at rated operating point, applicable at short-circuit voltage of the supply $U_{sc} = 1\%$ with reference to the inverter rated power and rated mains operating voltage of 240 V or 400 V without a line commutating choke.

When a line commutating choke is used, the specified values are reduced in the case of 200 V–240 V to between 55% to 70% and in the case of 380 V–480 V to between 70% and 80%.

2) Generally suited to heavy industrial applications. For details please refer to Appendix on page A/4.