› High Efficiency Drives

REEL

A KSB Company • KSB

# KSB 202 / FlexiMova® cm – Speed control system for wall or cabinet mounting

# Efficient and flexible motor control

KSB 202/FlexiMova® cm is the latest drive system produced by REEL for efficient and flexible control of synchronous reluctance motors (REEL SuPremE®), asynchronous motors and permanent magnet synchronous motors. The unit can be cabinet- or wall-mounted.
Its ease of use enables the user to achieve the highest performance from the system in which it is installed as well as reaping immediate energy efficiency benefits. Energy savings are even further enhanced when used in combination with the highly-efficient REEL SuPremE® motor.

# Benefits of KSB 202 / FlexiMova® cm

A number of immediate benefits for the user make this drive the ideal product both for new and existing installations requiring optimization of energy consumption and machine performance.

## Efficient

- Typical drive efficiency: 98%
- Highly efficient when used with the REEL SuPremE® motor

## Compact

- Compact design with small footprint
- Built-in RFI filter on all sizes (Cat. C3/A2 according to EN 61800-3)
- Built-in DC choke suppresses harmonics thereby eliminating the need for external chokes

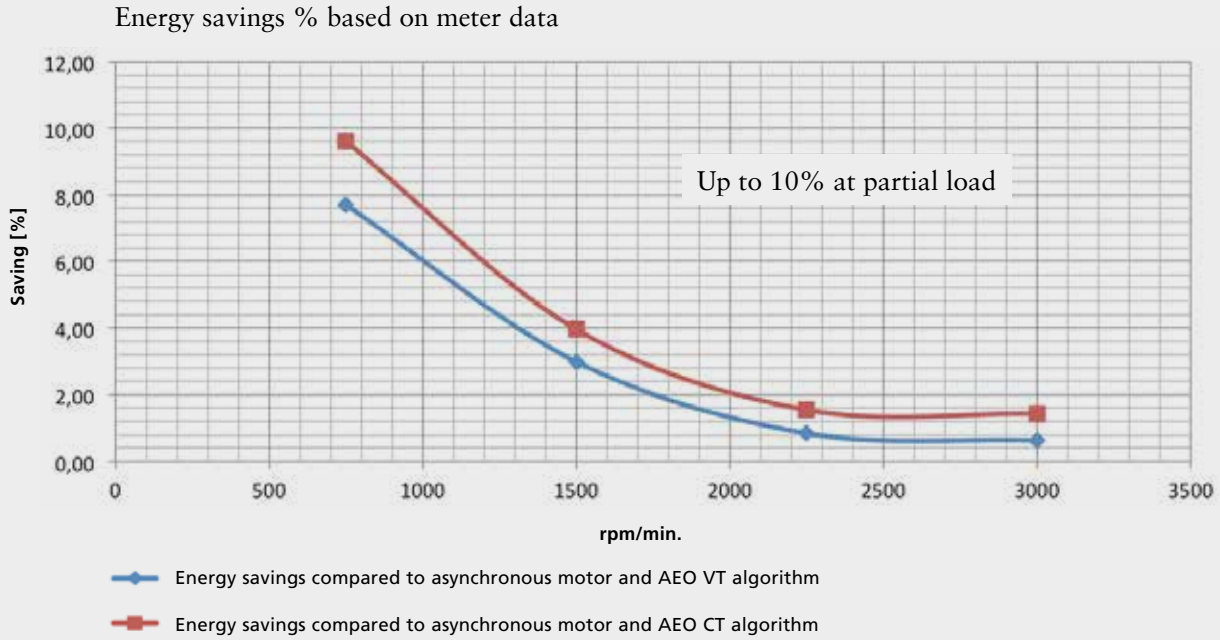
## Easy to use

- Intuitive graphical interface
- Removable keypad for programming and cloning the drives
- Programming tool via PC
- RTU Modbus is available as standard

## Flexible

- Optimal control of asynchronous, synchronous PM and synchronous reluctance motors (REEL SuPremE®)
- Large range of protection ratings: from IP00 to IP66 (depending on the size of the drive)
- Wide power range:  from 0.37 kW to 1400 kW, with voltage up to 690 Vac
- Suitable for many general purpose applications
- Wide range of standard functions which can be expanded with options

# Energy savings achieved with the REEL SuPremE® motor compared to an IE3 asynchronous motor




**AEO VT algorithm:** control algorithm with automatic flow reduction for squared torque systems (pumps, fans, etc...).

**AEO CT algorithm:** control algorithm for constant torque systems (compressors).

# Range of powers and protection ratings available

### Single-phase inverters 200V – 240V for wall or cabinet mounting

| kW | Model | A | IP20 | IP21 | IP55 | IP66 |
|---|---|---|---|---|---|---|
| 1,1 | P1K1 | 6,6 | ✓ | ✓ | ✓ | ✓ |
| 1,5 | P1K5 | 7,5 | X | ✓ | ✓ | ✓ |
| 2,2 | P2K2 | 10,6 | X | ✓ | ✓ | ✓ |
| 3 | P3K0 | 12,5 | X | ✓ | ✓ | ✓ |
| 3,7 | P3K7 | 16,7 | X | ✓ | ✓ | ✓ |
| 5,5 | P5K5 | 24,2 | X | ✓ | ✓ | ✓ |
| 7,5 | P7K5 | 30,8 | X | ✓ | ✓ | ✓ |
| 15 | P15K | 59,4 | X | ✓ | ✓ | ✓ |
| 22 | P22K | 88 | X | ✓ | ✓ | ✓ |

### Single-phase inverters 380V – 480V for wall or cabinet mounting

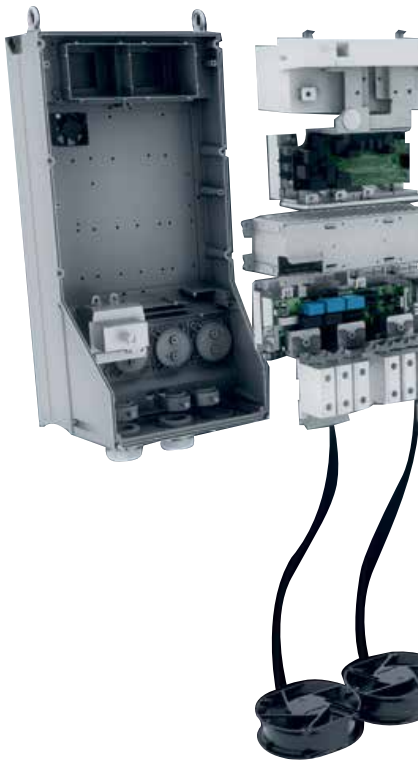
| kW | Model | A ≤ 440V | A > 440V | IP21 | IP55 | IP66 |
|---|---|---|---|---|---|---|
| 7,5 | P7K5 | 33 | 30 | ✓ | ✓ | ✓ |
| 11 | P11K | 48 | 41 | ✓ | ✓ | ✓ |
| 18,5 | P18K | 37,5 | 34 | ✓ | ✓ | ✓ |
| 37 | P37K | 151 | 135 | ✓ | ✓ | ✓ |

### Three-phase inverters 200V – 240V for wall or cabinet mounting

| kW | Model | A | IP20 | IP21 | IP55 | IP66 |
|---|---|---|---|---|---|---|
| 0,25 | PK25 | 1,8 | ✓ | ✓ | ✓ | ✓ |
| 0,37 | PK37 | 2,4 | ✓ | ✓ | ✓ | ✓ |
| 0,55 | PK55 | 3,5 | ✓ | ✓ | ✓ | ✓ |
| 0,75 | PK75 | 4,6 | ✓ | ✓ | ✓ | ✓ |
| 1,1 | P1K1 | 6,6 | ✓ | ✓ | ✓ | ✓ |
| 1,5 | P1K5 | 7,5 | ✓ | ✓ | ✓ | ✓ |
| 2,2 | P2K2 | 10,6 | ✓ | ✓ | ✓ | ✓ |
| 3 | P3K0 | 12,5 | ✓ | ✓ | ✓ | ✓ |
| 3,7 | P3K7 | 16,7 | ✓ | ✓ | ✓ | ✓ |
| 5,5 | P5K5 | 24,2 | ✓ | ✓ | ✓ | ✓ |
| 7,5 | P7K5 | 30,8 | ✓ | ✓ | ✓ | ✓ |
| 11 | P11K | 46,2 | ✓ | ✓ | ✓ | ✓ |
| 15 | P15K | 59,4 | ✓ | ✓ | ✓ | ✓ |
| 18,5 | P18K | 74,8 | ✓ | ✓ | ✓ | ✓ |
| 22 | P22K | 88 | ✓ | ✓ | ✓ | ✓ |
| 30 | P30K | 115 | ✓ | ✓ | ✓ | ✓ |
| 37 | P37K | 143 | ✓ | ✓ | ✓ | ✓ |
| 45 | P45K | 170 | ✓ | ✓ | ✓ | ✓ |

### Three-phase inverters 380V – 480V for wall or cabinet mounting

| kW | Model | A ≤ 440V | A > 440V | IP00 | IP20 | IP21 | IP54 | IP55 | IP66 |
|---|---|---|---|---|---|---|---|---|---|
| 0,37 | PK37 | 1,3 | 1,2 | X | ✓ | ✓ | X | ✓ | ✓ |
| 0,55 | PK55 | 1,8 | 1,6 | X | ✓ | ✓ | X | ✓ | ✓ |
| 0,75 | PK75 | 2,4 | 2,1 | X | ✓ | ✓ | X | ✓ | ✓ |
| 1,1 | P1K1 | 3 | 2,7 | X | ✓ | ✓ | X | ✓ | ✓ |
| 1,5 | P1K5 | 4,1 | 3,4 | X | ✓ | ✓ | X | ✓ | ✓ |
| 2,2 | P2K2 | 5,6 | 4,8 | X | ✓ | ✓ | X | ✓ | ✓ |
| 3 | P3K0 | 7,2 | 6,3 | X | ✓ | ✓ | X | ✓ | ✓ |
| 4 | P4K0 | 10 | 8,2 | X | ✓ | ✓ | X | ✓ | ✓ |
| 5,5 | P5K5 | 13 | 11 | X | ✓ | ✓ | X | ✓ | ✓ |
| 7,5 | P7K5 | 16 | 14,5 | X | ✓ | ✓ | X | ✓ | ✓ |
| 11 | P11K | 24 | 21 | X | ✓ | ✓ | X | ✓ | ✓ |
| 15 | P15K | 32 | 27 | X | ✓ | ✓ | X | ✓ | ✓ |
| 18,5 | P18K | 37,5 | 34 | X | ✓ | ✓ | X | ✓ | ✓ |
| 22 | P22K | 44 | 40 | X | ✓ | ✓ | X | ✓ | ✓ |
| 30 | P30K | 61 | 52 | X | ✓ | ✓ | X | ✓ | ✓ |
| 37 | P37K | 73 | 65 | X | ✓ | ✓ | X | ✓ | ✓ |
| 45 | P45K | 90 | 80 | X | ✓ | ✓ | X | ✓ | ✓ |
| 55 | P55K | 106 | 105 | X | ✓ | ✓ | X | ✓ | ✓ |
| 75 | P75K | 147 | 130 | X | ✓ | ✓ | X | ✓ | ✓ |
| 90 | P90K | 177 | 160 | X | ✓ | ✓ | X | ✓ | ✓ |
| 110 | N110 | 212 | 190 | X | ✓ | ✓ | ✓ | X | X |
| 132 | N132 | 260 | 240 | X | ✓ | ✓ | ✓ | X | X |
| 160 | N160 | 315 | 302 | X | ✓ | ✓ | ✓ | X | X |
| 200 | N200 | 395 | 361 | X | ✓ | ✓ | ✓ | X | X |
| 250 | N250 | 480 | 443 | X | ✓ | ✓ | ✓ | X | X |
| 315 | N315 | 600 | 540 | X | ✓ | ✓ | ✓ | X | X |
| 355 | P355 | 658 | 590 | ✓ | X | ✓ | ✓ | X | X |
| 400 | P400 | 745 | 678 | ✓ | X | ✓ | ✓ | X | X |
| 450 | P450 | 800 | 730 | ✓ | X | ✓ | ✓ | X | X |



## Three-phase inverters 525V – 690V for wall or cabinet mounting

| kW | Model | A ≤ 550V | A 690V | IP00 | IP20 | IP21 | IP54 | IP55 | IP66 |
|---|---|---|---|---|---|---|---|---|---|
| 1,1 | P1K1 | 2,1 | 1,6 | X | ✓ | X | X | X | X |
| 1,5 | P1K5 | 2,7 | 2,2 | X | ✓ | X | X | X | X |
| 2,2 | P2K2 | 3,9 | 3,2 | X | ✓ | X | X | X | X |
| 3 | P3K0 | 4,9 | 4,5 | X | ✓ | X | X | X | X |
| 4 | P4K0 | 6,1 | 5,5 | X | ✓ | X | X | X | X |
| 5,5 | P5K5 | 9 | 7,5 | X | ✓ | X | X | X | X |
| 7,5 | P7K5 | 11 | 10 | X | ✓ | X | X | X | X |
| 11 | P11K | 14 | 13 | X | ✓ | ✓ | X | ✓ | X |
| 15 | P15K | 19 | 18 | X | ✓ | ✓ | X | ✓ | X |
| 18,5 | P18K | 23 | 22 | X | ✓ | ✓ | X | ✓ | X |
| 22 | P22K | 28 | 27 | X | ✓ | ✓ | X | ✓ | X |
| 30 | P30K | 36 | 34 | X | ✓ | ✓ | X | ✓ | X |
| 37 | P37K | 43 | 41 | X | ✓ | ✓ | X | ✓ | X |
| 45 | P45K | 54 | 52 | X | ✓ | ✓ | X | ✓ | X |
| 55 | P55K | 65 | 62 | X | ✓ | X | X | ✓ | X |
| 75 | N75K | 87 | 83 | X | ✓ | ✓ | ✓ | ✓ | X |
| 90 | N90K | 105 | 100 | X | ✓ | ✓ | ✓ | ✓ | X |
| 110 | N110 | 137 | 131 | X | ✓ | ✓ | ✓ | ✓ | X |
| 132 | N132 | 162 | 155 | X | ✓ | ✓ | ✓ | ✓ | X |
| 160 | N160 | 201 | 192 | X | ✓ | ✓ | ✓ | ✓ | X |
| 200 | N200 | 253 | 242 | X | ✓ | ✓ | ✓ | ✓ | X |
| 250 | N250 | 303 | 290 | X | ✓ | ✓ | ✓ | ✓ | X |
| 315 | N315 | 360 | 344 | X | ✓ | ✓ | ✓ | ✓ | X |
| 400 | N400 | 418 | 400 | X | ✓ | ✓ | ✓ | ✓ | X |
| 450 | P450 | 470 | 450 | ✓ | X | ✓ | ✓ | X | X |
| 500 | P500 | 523 | 500 | ✓ | X | ✓ | ✓ | X | X |
| 560 | P560 | 596 | 570 | ✓ | X | ✓ | ✓ | X | X |
| 630 | P630 | 630 | 630 | ✓ | X | ✓ | ✓ | X | X |

## Three-phase inverters 380V – 480V mounted in cabinet

| kW | Model | A ≤ 440V | A > 440V | IP21 | IP54 |
|---|---|---|---|---|---|
| 500 | P500 | 800 | 780 | ✓ | ✓ |
| 560 | P560 | 990 | 890 | ✓ | ✓ |
| 630 | P630 | 1120 | 1050 | ✓ | ✓ |
| 710 | P710 | 1260 | 1160 | ✓ | ✓ |
| 800 | P800 | 1460 | 1380 | ✓ | ✓ |
| 1000 | P1M0 | 1720 | 1530 | ✓ | ✓ |

## Three-phase inverters 525V– 690V mounted in cabinet

| kW | Model | A ≤ 550V | A 690V | IP21 | IP54 |
|---|---|---|---|---|---|
| 710 | P710 | 763 | 730 | ✓ | ✓ |
| 800 | P800 | 889 | 850 | ✓ | ✓ |
| 900 | P900 | 988 | 945 | ✓ | ✓ |
| 1.000 | P1M0 | 1108 | 1060 | ✓ | ✓ |
| 1.200 | P1M2 | 1317 | 1260 | ✓ | ✓ |
| 1.400 | P1M4 | 1479 | 1415 | ✓ | ✓ |

# Sizes and dimensions

| | | S2/T2 200 - 240V | | | | | | | | | S4/T4 380 - 480V | | | | | | | | | | T7 525 - 690V | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Single-phase | | | | | Three-phase | | | | Single-phase | | | Three-phase | | | | | | | | | | | | | | |
| | | Amp. | | | | | | | | | Amp. | | | Amp. | | | | | | | Amp. | | | | | | | | |
| KSB 202 | kW | Amp. | IP 20 | IP 21 | IP 55 | IP 66 | IP 20 | IP 21 | IP 55 | IP 66 | ≤440 V | >440 V | IP 21/ 55/ 66 | ≤440 V | >440 V | IP 00 | IP 20 | IP 21 | IP 54 | IP 55 | IP 66 | 550 V | 690 V | IP 00 | IP 20 | IP 21 | IP 54 | IP 55 | IP 66 |
| PK25 | 0,25 | 1,8 | | | | | A2 | A2 | A4/A5 | A4/A5 | | | | 1,3 | 1,2 | | | | | | | | | | | | | | |
| PK37 | 0,37 | 2,4 | | | | | | | | | | | | 1,8 | 1,6 | | A2 | A2 | | A4/A5 | A4/A5 | | | | | | | A5 | A5 |
| PK55 | 0,55 | 3,5 | | | | | | | | | | | | 2,4 | 2,1 | | | | | | | | | | | | | | |
| PK75 | 0,75 | 4,6 | | | | | | | | | | | | 3 | 2,7 | | | | | | | | | | | | | | |
| P1K1 | 1,1 | 6,6 | A3 | A3 | A5 | A5 | | | | | | | | 4,1 | 3,4 | | | | | | | 2,1 | 1,6 | | A3 | | | A5 | A5 |
| P1K5 | 1,5 | 7,5 | | | | | | | | | | | | 5,6 | 4,8 | | | | | | | 2,7 | 2,2 | | | | | | |
| P2K2 | 2,2 | 10,6 | | B1 | B1 | B1 | | | | | | | | 7,2 | 6,3 | | | | | | | 3,9 | 3,2 | | | | | | |
| P3K0 | 3 | 12,5 | | | | | A3 | A3 | A5 | A5 | | | | | | | | | | | | 4,9 | 4,5 | | | | | | |
| P3K7 | 3,7 | 16,7 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P4K0 | 4,0 | | | | | | | | | | | | | 10 | 8,2 | | A2 | A2 | | A4/A5 | | 6,1 | 5,5 | | | | | | |
| P5K5 | 5,5 | 24,2 | | B1 | B1 | B1 | | | | | | | | 13 | 11 | | A3 | A3 | | A5 | A5 | 9,0 | 7,5 | | A3 | | | A5 | A5 |
| P7K5 | 7,5 | 30,8 | | B2 | B2 | B2 | B3 | B1 | B1 | B1 | 33 | 30 | B1 | 16 | 14,5 | | | | | | | 11 | 10 | | | | | | |
| P11K | 11 | 46,2 | | | | | | | | | 48 | 41 | B2 | 24 | 21 | | B3 | B1 | | B1 | B1 | 14 | 13 | | | | | | |
| P15K | 15 | 59,4 | | C1 | C1 | C1 | B4 | B2 | B2 | B2 | | | | 32 | 27 | | | | | | | 19 | 18 | | | | | | |
| P18K | 18 | 74,8 | | | | | | | | | 37,5 | 34 | C1 | 37,5 | 34 | | | | | | | 23 | 22 | | | B2 | | B2 | |
| P22K | 22 | 88 | | C2 | C2 | C2 | C3 | C1 | C1 | C1 | | | | 44 | 40 | | B4 | B2 | | B2 | B2 | 28 | 27 | | | | | | |
| P30K | 30 | 115 | | | | | | | | | | | | 61 | 52 | | | | | | | 36 | 34 | | | | | | |
| P37K | 37 | 143 | | | | | C4 | C2 | C2 | C2 | 151 | 135 | C2 | 73 | 65 | | | | | | | 43 | 41 | | | | | | |
| P45K | 45 | 170 | | | | | | | | | | | | 90 | 80 | | C3 | C1 | | C1 | C1 | 54 | 52 | | C3 | C2 | | C2 | |
| P55K | 55 | | | | | | | | | | | | | 106 | 105 | | | | | | | 65 | 62 | | | | | | |
| P75K | 75 | | | | | | | | | | | | | 147 | 130 | | | | | | | 87 | 83 | | | | | | |
| P90K | 90 | | | | | | | | | | | | | 177 | 160 | | C4 | C2 | | C2 | C2 | 105 | 100 | | | | | | |
| N75K | 75 | | | | | | | | | | | | | | | | | | | | | 90 | 86 | | | | | | |
| N90K | 90 | | | | | | | | | | | | | | | | | | | | | 113 | 108 | | | | | | |
| N110 | 110 | | | | | | | | | | | | | 212 | 190 | | | | | | | 137 | 131 | | D3h | D1h/ D5h/ D6h | D1h/ D5h/ D6h | | |
| N132 | 132 | | | | | | | | | | | | | 260 | 240 | | D3h | D1h/ D5h/ D6h | D1h/ D5h/ D6h | | | 162 | 155 | | | | | | |
| N160 | 160 | | | | | | | | | | | | | 315 | 302 | | | | | | | 201 | 192 | | | | | | |
| N200 | 200 | | | | | | | | | | | | | 395 | 361 | | | | | | | 253 | 242 | | | | | | |
| N250 | 250 | | | | | | | | | | | | | 480 | 443 | | D4h | D2h/ D7h/ D8h | D2h/ D7h/ D8h | | | 303 | 290 | | D4h | D2h/ D7h/ D8h | D2h/ D7h/ D8h | | |
| N315 | 315 | | | | | | | | | | | | | 600 | 540 | | | | | | | 360 | 344 | | | | | | |
| N400 | 400 | | | | | | | | | | | | | | | | | | | | | 418 | 400 | | | | | | |
| P315 | 315 | | | | | | | | | | | | | 600 | 540 | E2 | | E1 | E1 | | | | | | | | | | |
| P355 | 355 | | | | | | | | | | | | | 658 | 590 | | | | | | | | | | | | | | |
| P400 | 400 | | | | | | | | | | | | | 745 | 678 | | | | | | | | | | | | | | |
| P450 | 450 | | | | | | | | | | | | | 800 | 730 | | | | | | | 470 | 450 | | | | | | |
| P500 | 500 | | | | | | | | | | | | | 880 | 780 | | | F1/F3 | F1/F3 | | | 523 | 500 | E2 | | E1 | | E1 | |
| P560 | 560 | | | | | | | | | | | | | 990 | 890 | | | | | | | 596 | 570 | | | | | | |
| P630 | 630 | | | | | | | | | | | | | 1120 | 1050 | | | | | | | 630 | 630 | | | | | | |
| P710 | 710 | | | | | | | | | | | | | 1260 | 1160 | | | | | | | 763 | 730 | | | | | | |
| P800 | 800 | | | | | | | | | | | | | 1460 | 1380 | | | F2/ | F4 | | | 889 | 850 | | | F1/F3 | | F1/F3 | |
| P900 | 900 | | | | | | | | | | | | | | | | | | | | | 988 | 945 | | | | | | |
| P1M0 | 1000 | | | | | | | | | | | | | 1720 | 1530 | | | F2/ | F4 | | | 1108 | 1060 | | | F2/F4 | | F2/F4 | |
| P1M2 | 1200 | | | | | | | | | | | | | | | | | | | | | 1317 | 1260 | | | | | | |
| P1M4 | 1400 | | | | | | | | | | | | | | | | | | | | | 1479 | 1415 | | | | | | |

| IP 00/Chassis | IP 20/Chassis | IP 21/Type 1 | With Upgrade Kit only available in the USA | IP54/Type 12 | IP55/Type 12 | IP 66/NEMA 4X |
|---|---|---|---|---|---|---|

**Dimensions mm**

| | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 | D1h | D2h | D3h | D4h | D5h | D6h | D7h | D8h | E1 | E2 | F1 | F2 | F3 | F4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 268 | | 390 | 420 | 480 | 650 | 399 | 520 | 680 | 770 | 550 | 660 | 901 | 1107 | 909 | 1122 | 1324 | 1665 | 1978 | 2284 | 2000 | 1547 | 2280 | 2280 | 2280 | 2280 |
| L | 90 | 130 | 200 | 242 | | | 165 | 230 | 308 | 370 | 308 | 370 | 325 | 420 | 250 | 350 | 325 | | 420 | | 600 | 585 | 1400 | 1804 | 1997 | 2401 |
| P | 205 | | 175 | 200 | 260 | | 249 | 242 | 310 | 335 | 333 | | 378 | | 375 | | 381 | | 384 | 402 | 494 | 498 | 607 | 607 | 607 | 607 |
| A+ | 375 | | | | | | 475 | 670 | | | 755 | 950 | | | | | | | | | | | | | | |
| L+ | 90 | 130 | | | | | 165 | 255 | | | 329 | 391 | | | | | | | | | | | | | | |

***Note:*** *Dimensions A and L include the back plate . A+ and L+ with IP upgrade kit . Dimensions "P" are without the optional. A or B for A2 and A3.*


Status
50Hz 5.25A 2.44kW
3000 RPM
Auto Remote Running
Status
Quick Menu
Main Menu
Alarm Log
Back
Cancel
OK
Info
On
Warn.
Alarm
Hand On
Off
Auto On
Reset
KSB
READY FOR
FLUID FUTURE

# Slot A options: Fieldbuses

## PROFIBUS DP MCA 101

Operating the frequency converter via a fieldbus enables you to reduce the cost of your system, communicate faster and more efficiently, and benefit from an easier user interface.
PROFIBUS DP MCA 101 provides:

- Wide compatibility, support for major PLC vendors.
- Fast, efficient communication, diagnostics, advanced parameterisation and auto-configuration of process data via GDS file.
- Acyclic parameterisation using PROFIBUS DP-V1, PROFIdrive, Danfoss FC profile, Master Class 1 and 2.

## PROFINET MCA 120

PROFINET MCA 120 guarantees connectivity to the Ethernet network.
The option is designed so that many of the features from the PROFIBUS MCA 101 can be reused, minimising user effort to migrate to PROFINET and securing the investment in PLC program.
Other features:

- Built-in high performance switch enabling line and ring topology, and eliminating the need for external switches.
- Built-in web server for remote diagnosis and reading basic drive parameters.
- Support of DP-V1 Diagnostic allows easy, fast and standardized handling of warning and fault information into the PLC, improving bandwidth in the system

PROFINET encompasses a suite of messages and services for a variety of manufacturing automation applications, including control, configuration and information.

## DeviceNet MCA 104

DeviceNet MCA 104 offers robust, efficient data handling thanks to advanced Producer/Consumer technology.

- This modern communications model offers key capabilities that let you effectively determine what information is needed and when
- Benefit also from ODVA's strong conformance testing policies, which ensure that products are interoperable

## EtherNet/IP MCA 121

The EtherNet/IP MCA 121 is based on the newest technology available for industrial use and handles even the most demanding requirements. EtherNet/ IP extends commercial off-the-shelf Ethernet to the Common Industrial Protocol (CIP™) – the same upper-layer protocol and object model found in DeviceNet.
The MCA 121 offers advanced features as:

- Built-in high performance switch enabling line and ring topology, and eliminating the need for external switches
- Advanced switch and diagnosis functions
- Built-in web server
- E-mail client for service notification
- Unicast and Multicast communication

## Modbus TCP MCA 122

Modbus TCP is the first industrial Ethernet- based protocol for automation. The Mod- bus TCP MCA 122 connects to Modbus TCP based networks. It is able to handle connection interval down to 5 ms in both directions, positioning it among the fastest performing Modbus TCP devices in the market. For master redundancy it features hot swapping between two masters.
Other features:

- Built-in web-server for remote diagnosis and reading basic drive parameters
- Configure an email notification to send an email message to one or more recipients, when certain alarms or warnings occur, or are cleared.

# Slot B options: Functional extensions

## General Purpose I/O MCB 101

This I/O option offers an extended number of control inputs and outputs:

- 3 digital inputs 0-24 V: Logic '0' < 5 V; Logic '1' > 10V
- 2 analogue inputs 0-10 V: Resolution 10 bit plus sign
- 2 digital outputs NPN/PNP push pull
- 1 analogue output 0/4-20 mA
- Spring-loaded connection

## Relay Card MCB 105

Makes it possible to extend relay functions with 3 additional relay outputs.

- Max switch rate at rated load/min. load...6 min-1/20 sec-1
- Protects control cable connection
- Spring-loaded connection

Max. terminal load:
AC-1 Resistive load ..... 240 V AC 2 A
AC-15 Inductive load @cos fi 0.4 .....240 V AC 0.2 A
DC-1 Resistive load .....24 V DC 1 A
DC-13 Inductive load @cos fi 0.4 ..... 24 V DC 0.1 A
Min. terminal load:
DC 5 V .....10 mA

## PTC Thermistor Card MCB 112

Enables improved surveillance of the motor condition compared to the built-in ETR function and thermistor terminal.

- Protects the motor from overheating
- ATEX approved for use with Ex d, Ex e, Ex n, Ex tb and Ex tc motors (EX e and n only FC 302)
- Uses Safe Torque Off function, which is approved in accordance with SIL 2 IEC 61508
- Spring-loaded connection

## Analog I/O MCB 109

This analogue input/output option upgrades the frequency converter to advanced performance and control using the additional in/outputs. This option also provides battery back-up supply for the built-in clock to ensure reliable operation of all clock-based functionality, such as timed actions.

- 3 analogue inputs, each configurable as both voltage and temperature input
- Connection of 0-10 V analogue signals as well as PT1000 and NI1000 temperature inputs
- 3 analogue outputs each configurable as 0-10 V outputs
- Incl. back-up supply for the standard clock function in the frequency converter.
  The back-up battery typically lasts for 10 years, depending on environment.

## Sensor Input MCB 114

The option protects the motor from being overheated by monitoring the bearings and windings temperature in the motor.

- Protects the motor from overheating
- Three self-detecting sensor inputs for 2 or 3 wire PT100/ PT1000 sensors
- One additional analogue input 4-20 mA

## Safety Option MCB 140 and MCB 141

Safety Option MCB 140 and MCB 141 comprise safety options providing Safe Stop 1 (SS1), Safely Limited Speed (SLS) and Safe Speed Monitor (SSM) functionality.
The options can be used up to PL e according to ISO 13849-1.
MCB 140 is a standard B-Option while MCB 141 offers the same functionality in an external 45 mm housing. MCB 141 enables the user to use the MCB 140 functionality also if another B-Option is used.
Different operating modes can be easily configured by using the on board display and buttons. The options provide only a limited set of parameters for easy and fast parameterization.

- MCB 140 standard B-Option
- MCB 141 external option
- Single channel or dual channel operation possible
- Proximity switch as speed feedback
- SS1, SLS and SMS functionality
- Easy and fast parameterisation

## Extended Cascade Controller MCO 101

This option upgrades the built-in cascade controller to operate more pumps and more advanced pump control in master/follower mode.
MCO 101 supports the combination of multiple variable speed and fixed speed pumps, as well as configurations with pumps of differing capacity (mixed pump control).

- Up to 6 pumps in standard cascade setup
- Up to 6 pumps in master/follower or mixed pump setup
- Technical specifications: See Relay Option MCB 105

## Slot C options: Advanced cascade controller and extended relay card

### Advanced Cascade Controller MCO 102

Easy to fit, the Advanced Cascade Controller MCO 102 upgrades the built-in cascade controller to operate up to 8 pumps and more advanced pump control in master/follower mode. MCO 102 supports the combination of multiple variable speed and fixed speed pumps, as well as configurations with pumps of differing capacity (mixed pump control).
The additional 7 digital inputs and the 24 V DC connection to the drive enable flexible adaptation to the application. The same cascade controller hardware is compatible with for the entire power range.

- Up to 8 pumps in standard cascade setup
- Up to 8 pumps in master/follower or mixed pump setup

### Extended Relay Card MCB 113

The Extended Relay Card MCB 113 adds inputs/outputs for increased flexibility.

- 7 digital inputs
- 2 analogue outputs
- 4 SPDT relays
- Meets NAMUR recommendations
- Galvanic isolation capability

## Slot D option: 24 V back-up power supply

### 24 V DC Supply MCB 107

An external 24 V DC supply can be installed for low-voltage supply to the control card and any option card installed. This enables full operation of the LCP (including the parameter setting) and all installed options without connection to mains.

- Input voltage range.24 V DC +/- 15% (max. 37 V for 10 sec.)
- Max. input current..... 2.2 A
- Max. cable length..... 75 m
- Input capacitance load..... < 10 uF
- Power-up delay .....< 0.6 s

# Power options

## Brake Resistor MCE 101

The brake resistors are optimized for the use with frequency converters.
They can be combined only with the units equipped with braking chopper.

- Enclosure protection as IP20 and up to IP65
- Build-in thermo switch
- Versions for vertical and horizontal mounting
- UL-recognized: a selection of the vertical- mounted units is UL-recognized

## Advanced Harmonic Filter AHF 005 and AHF 010

Achieve easy, effective harmonic distortion reduction by connecting the AHF 005 and AHF 010 harmonic filters at the input to the frequency converter.

- AHF 005 reduces total harmonic current distortion to 5%
- AHF 010 reduces total harmonic current distortion to 10%
- Small compact housing that fits into a panel
- Easy to use in retrofit applications
- User-friendly start-up – no adjustment necessary
- No routine maintenance required

## Sine-wave Filter MCC 101

Position the Sine-wave Filter between the frequency converter and the motor to provide a sinusoidal phase-to-phase motor voltage. The filter reduces motor insulation stress, acoustic noise from the motor, and bearing currents (especially in large motors).

## dU/dt  Filter MCC 102

The dU/dt filters are placed between the frequency converter and the motor to eliminate very fast voltage changes.

- These filters reduce stress on the motor's insulation and are recommended in applications with older motors, aggressive environments or frequent braking which cause increased DC link voltage

## Common Mode Filter MCC 105

Common mode filters are placed between the frequency converter and the motor.
They are nano-crystalline cores that mitigate high frequency noise in the motor cable (shielded or unshielded) and reduce bearing currents in the motor.

- Extend motor bearing lifetime
- Can be combined with dU/dt and sine-wave filters
- Reduce radiated emissions from the motor cable
- Easy to install – no adjustments necessary
- Oval shaped – allows mounting inside the frequency converter enclosure or motor terminal box

# LCP

## Control Panel LCP 101

The numerical control panel offers a basic MMI to the drive.

- Status messages
- Quick menu for easy commissioning
- Parameter setting and adjusting
- Hand-operated start/stop function or Automatic mode select
- Reset function

## Control Panel LCP 102

The graphical control panel offers a highly user-friendly MMI to the drive.

- Multi-language display
- Status messages
- Quick menu for easy commissioning
- Parameter setting and explanation of parameter function
- Adjusting of parameters
- Full parameter backup and copy function
- Alarm logging
- Info button – explains the function of the selected item on display
- hand-operated start/stop, or Automatic mode selection
- Reset function
- Trend graph

## LCP Panel Mounting Kit

For IP55/66 and include fasteners and a gasket.

# Accessories

## For use with option A
## PROFIBUS Adapter Sub-D9 Connector

In some industries, the use of Sub-D9 connectors is used as standard. The PROFIBUS Adapter Sub-D9 Connector allows the use of these connectors throughout all installed devices. Use of Sub-D9 cabling allows easy access for diagnosis tools and programming devices.

## IP 21/Type 1 conversion kit

The IP21/Type 1 conversion kit is used for installation of drives in dry environments. The enclosure kits are available for enclosure sizes A2, A3, B3, B4, C3 and C4

- Supports drives from 1.1 to 90 kW
- Used on standard drive with or without mounted option modules
- IP 41 on top side
- PG 16 and PG 21 holes for glands

## Leakage Current Monitor Modules

The leakage current monitoring modules RCMB20-500-01 and RCMB35-500-01 are used for fault current monitoring in applications, where frequency converters are used, and direct and/or alternating fault currents are likely to occur. Each module has to be installed and connected in the cable connection compartment in front of the mains input of the frequency converter. Both variants of the modules provide an output signal 4...20 mA proportional to the high frequency leakage current.

- AC/DC sensitive measured value acquisition
- Frequency range 0-500 Hz
- Measuring current transformer, inside diameter 20 mm/35 mm
- Measuring range 500 mA
- Measuring time ≤ 180 ms
- Supply voltage 24 V DC
- Analogue output current 4-20 mA
- CT connection monitoring using cyclical test current
- LEDs: power On LED, alarm LED

## USB extension cable

The USB extension cable for IP55 and IP66 enclosures makes the USB connector available outside the drive. The USB extension is designed for mounting in a cable gland in the bottom of the drive, which makes PC communication very easy even in drives with high IP rating.

USB extension for A5-B1 enclosures, 350 mm cable
USB extension for B2-C enclosures, 650 mm cable

## Decoupling Plate for Fieldbus Cables*

For use with option A. Strengthens fieldbus mounting.

* To be used only for IP 20/NEMA type 1 units up to 7.5 kW

## Weather shield for outdoor installations

Designed to be mounted above the drive to protect from direct sun, snow and falling debris.

# A flexible and efficient solution

## Air treatment

Its guaranteed stability of efficiency when used with the REEL SuPremE® motor makes it easy to put into service as well as offering huge energy savings in ventilation control applications where it is important to modulate flow rates.

## General purpose applications

Available in sizes up to 1.4 MW @ 690V it is ideal for all general purpose automation applications. The fieldbus options guarantee fast and reliable connection with Profibus, Profinet, DeviceNet and Ethernet IP systems. Modbus supplied as standard on all sizes. Drive-motor cabling up to maximum 300 metres in length with standard cable and 150 metres with shielded cables (applies to all sizes).

## Refrigeration

Ideal for controlling chillers and in combination with the REEL SuPremE® motor it offers the winning alternative to magnet motors.
When combined with the motor, performance stability and efficiency are guaranteed for the entire lifespan of the product.

# for all applications

## Compressors

Also available in single-phase 220V version, it offers a comprehensive range of products for the compressor industry.

## Mixers and extruders

It guarantees precise speed control combined with higher energy efficiency. Combined with the REEL SuPremE® synchronous reluctance motor this product is ideal for achieving excellent energy efficiency levels and greater reliability compared to traditional solutions using asynchronous machines.

## Water treatment

It offers all the functions specific to the pump industry combined with REEL SuPremE® technology.
Guaranteed to function correctly even in critical installation conditions (IP66 versions available up to 90 kW).

# Technical data

| Main supply (L1, L2, L3) | |
|---|---|
| Supply voltage | 1 x 200 - 240 V AC..... 1.1 - 22 kW<br>1 x 380 - 480 V AC..... 7.5 - 37 kW<br>3 x 200 - 240 V AC..... 0.25 - 45 kW<br>3 x 380 - 480 V AC..... 0.37 - 1000 kW<br>3 x 525 - 690 V AC..... 11 - 1400 kW |
| Supply frequency | 50/60 Hz |
| Displacement power factor (cos ϕ) near unit | > 0.98 |
| True power factor (λ) | ≥ 0.9 |
| Switching on input supply L1, L2, L3 | 1–2 times/min. |
| Harmonic disturbance | Meets EN 61000-3-12 |
| **Output data (U, V, W)** | |
| Output voltage | 0 – 100% of supply voltage |
| Output frequency (dependent on power size) | 0-590 Hz |
| Ramp times | 0.1 – 3600 sec. |
| Note: The converter can provide 110%, 150% or 160% current for 1 minute, dependent on power size and parameter settings. Higher overload rating is achieved by oversizing the drive. | |
| **Digital inputs** | |
| Programmable digital inputs | 6* |
| Changeable to digital output | 2 (terminal 27, 29) |
| Logic | PNP or NPN |
| Voltage level | 0 – 24 V DC |
| Maximum voltage in input | 28 V DC |
| Input resistance, Ri | Approx. 4 kΩ |
| Scan interval | 5 ms |
| STO option: Safe Torque Off | SIL 2 (IEC6158 and EN61800-5-2) |
| * Two of the inputs can be used as digital outputs. | |
| **Analog inputs** | |
| Analog inputs | 2 |
| Modes | Voltage or current |
| Voltage level | 0 to +10 V (scaleable) |
| Current level | 0/4 to 20 mA (scaleable) |
| Accuracy of analog inputs | Max. error: 0.5% of full scale |
| **Pulse inputs** | |
| Programmable pulse inputs | 2* |
| Voltage level | 0 – 24 V DC (PNP positive logic) |
| Pulse input accuracy (0.1 – 1 kHz) | Max. error : 0.1% of full scale |
| * Two of the digital inputs can be used for pulse inputs. | |
| **Digital outputs** | |
| Programmable digital/pulse outputs | 2 |
| Voltage level at digital/frequency output | 0 – 24 V DC |
| Max. output current (sink or source) | 40 mA |
| Maximum output frequency at frequency output | da 0 a 32 kHz |
| Accuracy on frequency output | Max. error: 0.1% of full scale |
| **Analogue output** | |
| Programmable digital/pulse outputs | 1 |
| Current range at analogue output | 0/4 – 20 mA |
| Max. load to common at analogue output (clamp 30) | 500 Ω |
| Accuracy on analogue output | Max. error: 1% of full scale |
| **Control card** | |
| USB interface | 1.1 (Full Speed) |
| USB plug | Type "B" |
| RS485 interface | Up to 115 kBaud |
| Max. load (10 V) | 15 mA |
| Max. load (24 V) | 200 mA |

| Relay output | |
|---|---|
| Programmable relay outputs | 2 |
| Max. terminal load (AC) on 1-3 (break), 1-2 (make), 4-6 (break) power card | 240 V AC, 2 A |
| Max. terminal load (AC) on 4-5 (make) power card | 400 V AC, 2 A |
| Min. terminal load on 1-3 (break), 1-2 (make), 4-6 (break), 4-5 (make) power card | 24 V DC 10 mA, 24 V AC 20 mA |
| **Surroundings/external** | |
| Enclosure | IP: 00/20/21/54/55/66<br>UL: Chassis/1/12/4x Outdoor |
| Vibration test | 1.0 g (taglie D, E & F: 0.7 g) |
| Max. relative humidity | 5% – 95% (IEC 721-3-3; Class 3K3 (non-condensing) during operation |
| Ambient temperature | Up to 55° C (50°C without derating; D-frame 45°C) |
| Galvanic isolation of all | I/O supplies according to PELV |
| Aggressive environment | Designed for coated/uncoated 3C3/3C2 (IEC 60721-3-3) |
| **Fieldbus communication** | |
| Standard built-in:<br>FC Protocol<br>Modbus RTU | Optional:<br>PROFIBUS DP V1 MCA 101<br>DeviceNet MCA 104<br>PROFINET MCA 120<br>EtherNet/IP MCA 121<br>Modbus TCP MCA 122 |
| **Ambient temperature** | |
| • Electronic thermal motor protection against overload | |
| • Up to 55° C (50°C without derating; D-frame 45°C) | |
| • Temperature monitoring of the heatsink ensures that the frequency converter trips in case of overtemperature | |
| • The frequency converter is protected against short-circuits and earth faults on motor terminals U, V, W | |
| • Protection against mains phase loss | |
| **Application options** | |
| Extend the functionality of the drive with integrated options: | |
| • General Purpose I/O(MCB-101) | |
| • Extended Cascade Controller (MCO-101) | |
| • Advanced Cascade Controller (MCO-102) | |
| • Sensor Input (MCB-114) | |
| • PTC Thermistor Card (MCB-112) | |
| • Extended Relay Card (MCB-113) | |
| • 24 V External Supply (MCB-107) | |
| **Relay and analogue I/O option** | |
| • Relay Card MCB 105 | |
| • Analog I/O (MCB-109) | |
| **Power options** | |
| A wide range of external power options for use with our drive in critical networks or applications: | |
| • Low Harmonic Drive | |
| • Advanced Active Filter | |
| • Advanced Harmonic Filter | |
| • dU/dt filter | |
| • Sine wave filter (LC filter) | |

CE c UL us Global marine

# REEL
## High efficiency drive systems

**REEL S.r.l A Socio Unico**
Via Riviera Berica 40/42
36024 Ponte di Nanto (VI), Italy
www.reel.it
A KSB Company