Single-Phase Motor Reversing and Capacitor Wiring

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Article address: https://drgmotor.com/en/blog/electric-motors/single-phase-motor-reversing-capacitor

Technical assumptions

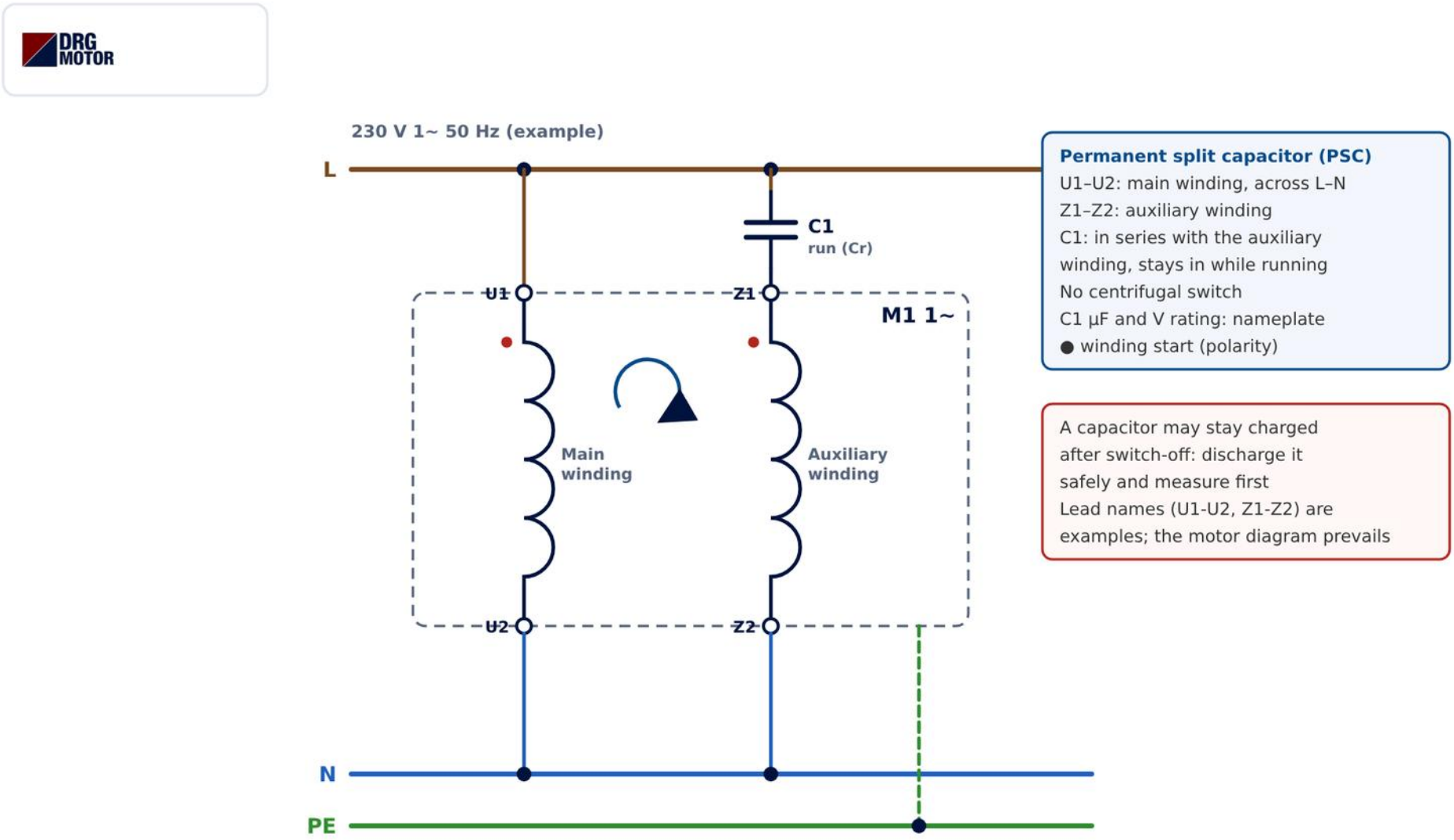
- 230 V 50 Hz single-phase supply; the 230 V AC control circuit is an example.
- Lead names (U1-U2 main winding, Z1-Z2 auxiliary winding) are representative; the motor’s own nameplate/terminal diagram prevails.
- Capacitor type, capacitance and voltage come from the motor nameplate; no values are given here.
- A capacitor can remain charged after switch-off: discharge it and verify zero voltage before touching.
- Reverse only from standstill. Single-phase motors are not in DRG’s standard range; three-phase alternative: 230 V input drive + 230/400 V motor in delta.

Safety notice

- This content is for technical information only. Wiring, measurement and commissioning must be carried out by qualified electrical personnel, following lock-out and verification of de-energised state, and in line with the motor and device manufacturer's documentation.

Suitable DRG motors and store

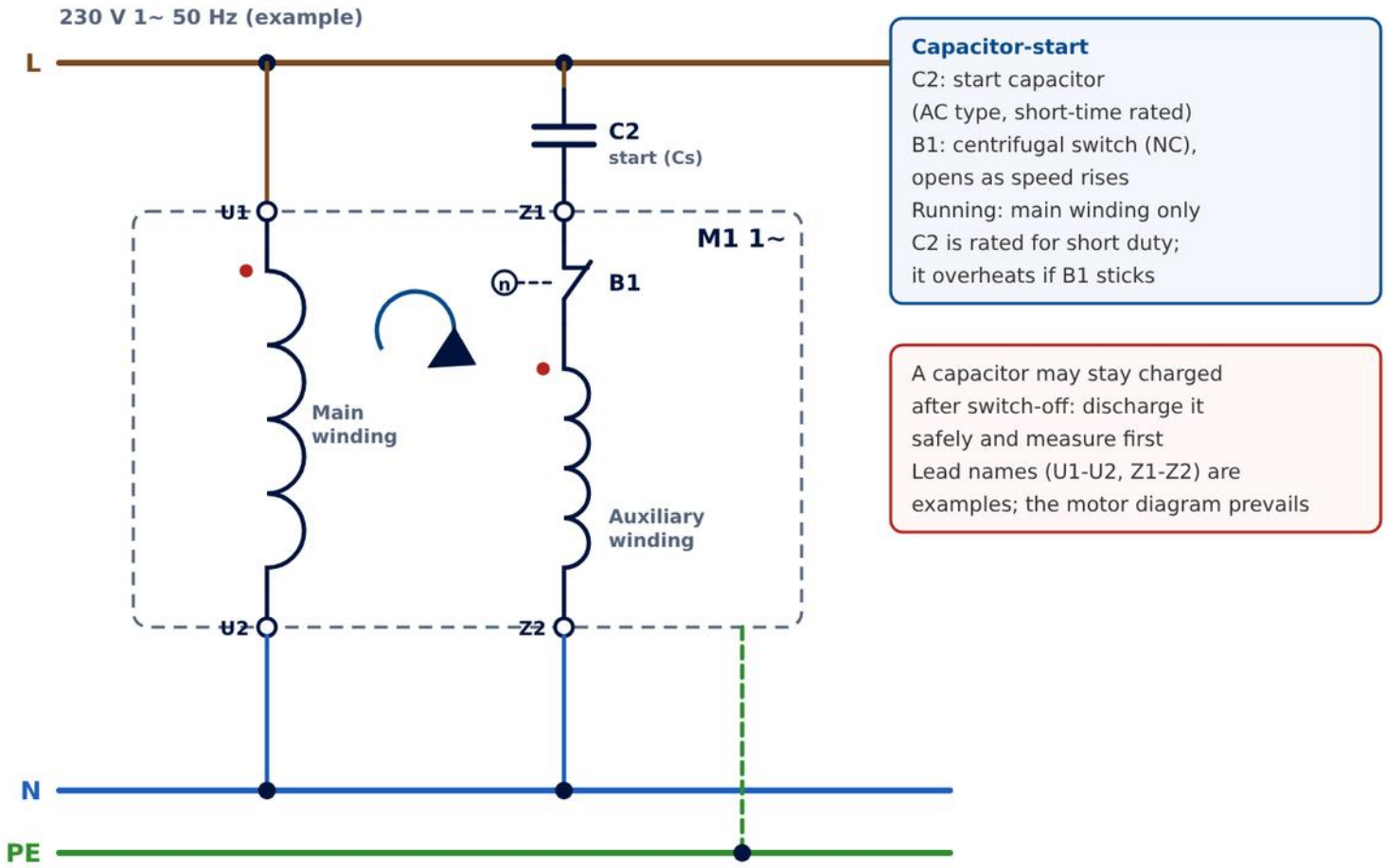
- DRG-802-4: https://drgmotor.com/en/buy-electric-motors-online/0-75-kw-1500-rpm-three-phase-motor-aluminium-drg-802-4
- DRG-90L-4: https://drgmotor.com/en/buy-electric-motors-online/1-5-kw-1500-rpm-three-phase-motor-aluminium-drg-90l-4
- DRG-100L1-4: https://drgmotor.com/en/buy-electric-motors-online/2-2-kw-1500-rpm-three-phase-motor-aluminium-drg-100l1-4
- DRG-100L2-4: https://drgmotor.com/en/buy-electric-motors-online/3-kw-1500-rpm-three-phase-motor-aluminium-drg-100l2-4
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Permanent split capacitor (PSC) single-phase motor wiring

Main winding across L–N · auxiliary winding + C1 run capacitor in the parallel branch

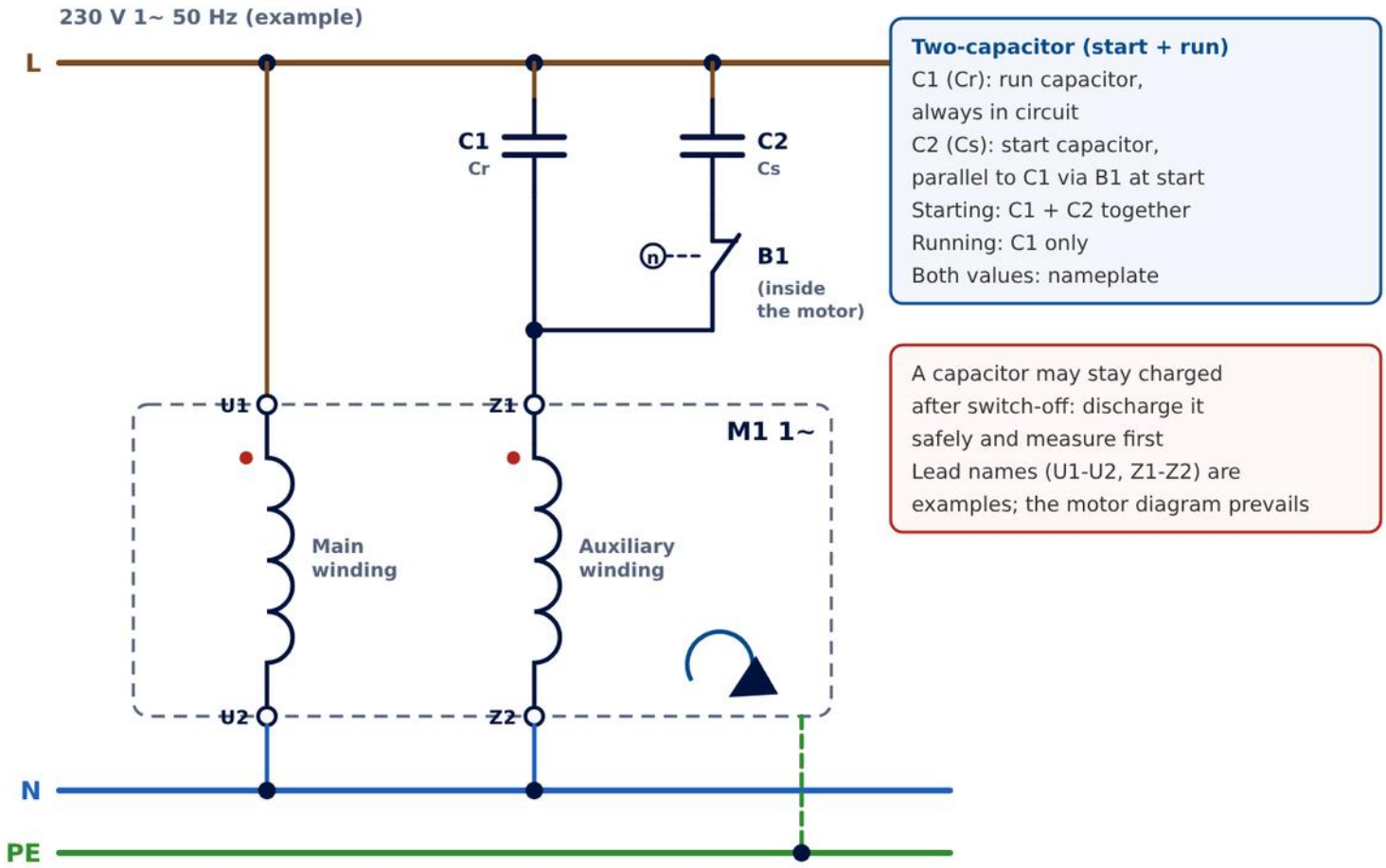
Figure 1



Capacitor-start single-phase motor with centrifugal switch

C2 and B1 act only during starting · B1 opens as speed rises, the motor runs on the main winding

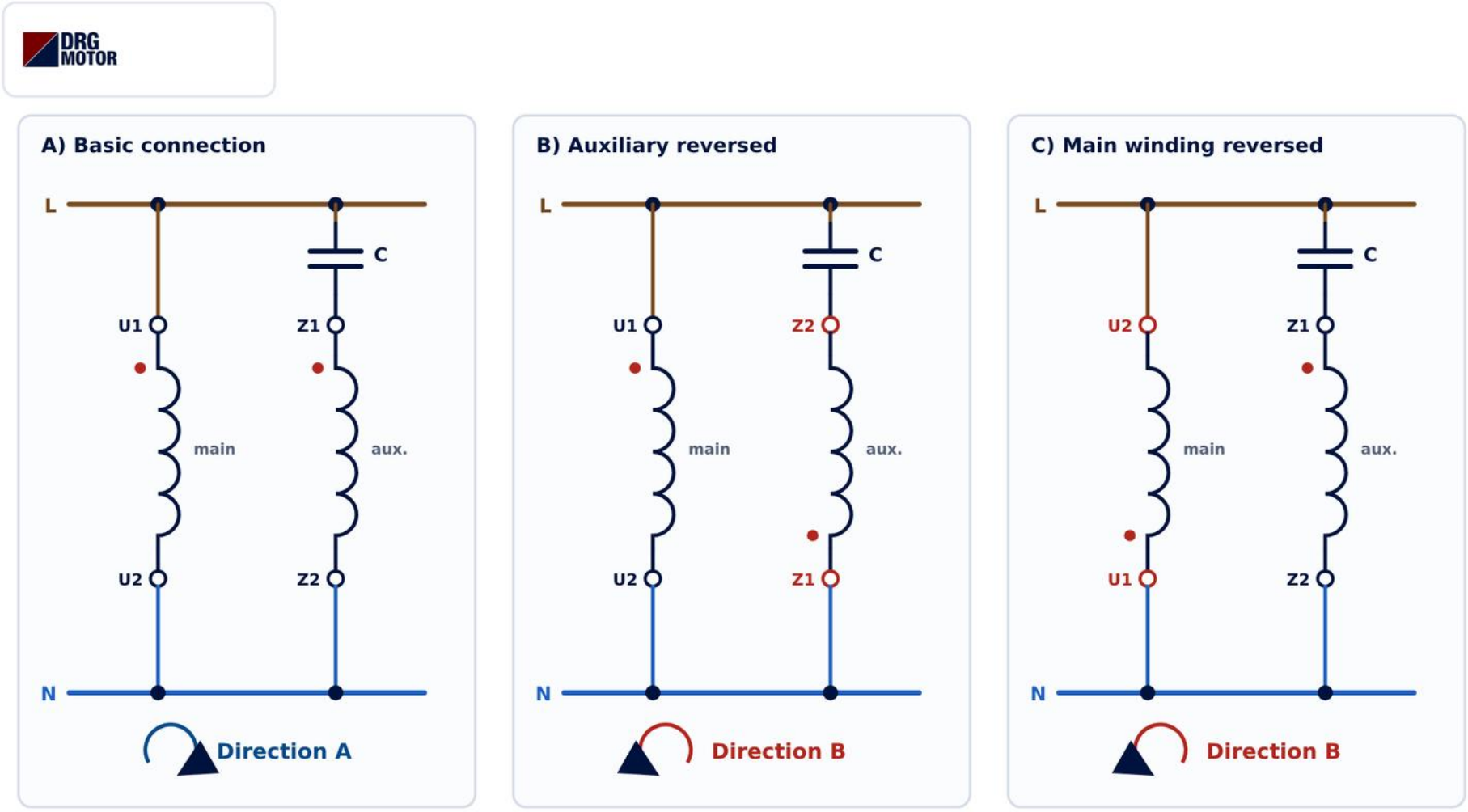
Figure 2



Two-capacitor (start + run) single-phase motor

C1 always in circuit · C2 + B1 only when starting · auxiliary winding fed in both states

Figure 3



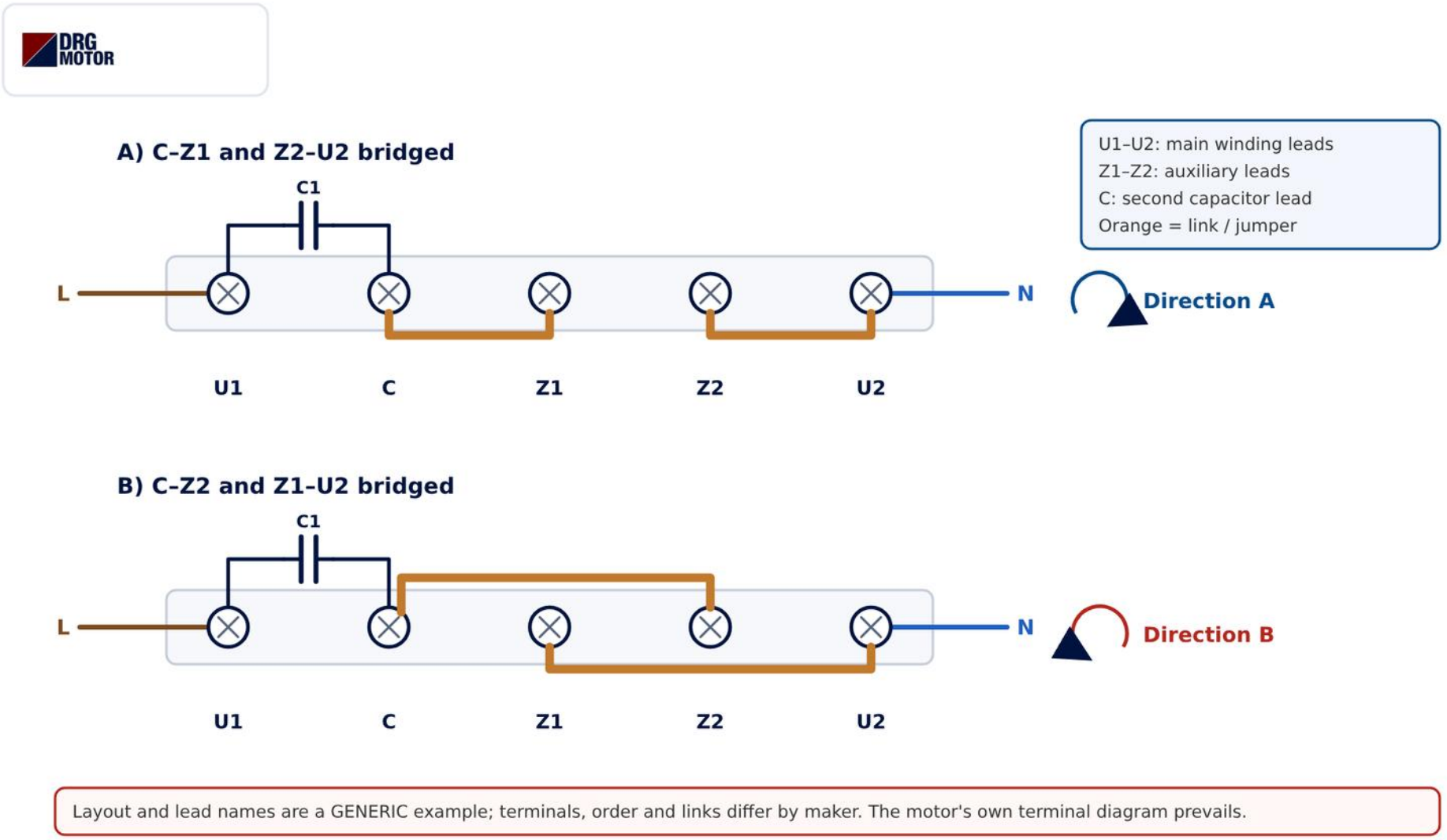
Swap the leads of ONE winding only. Reversing both windings, or swapping L and N, does NOT change direction.

Red lead names = swapped leads · ● winding start · lead names are examples; the motor diagram prevails

How the rotation of a single-phase motor is reversed

B: auxiliary leads swapped · C: main leads swapped · both give the same result

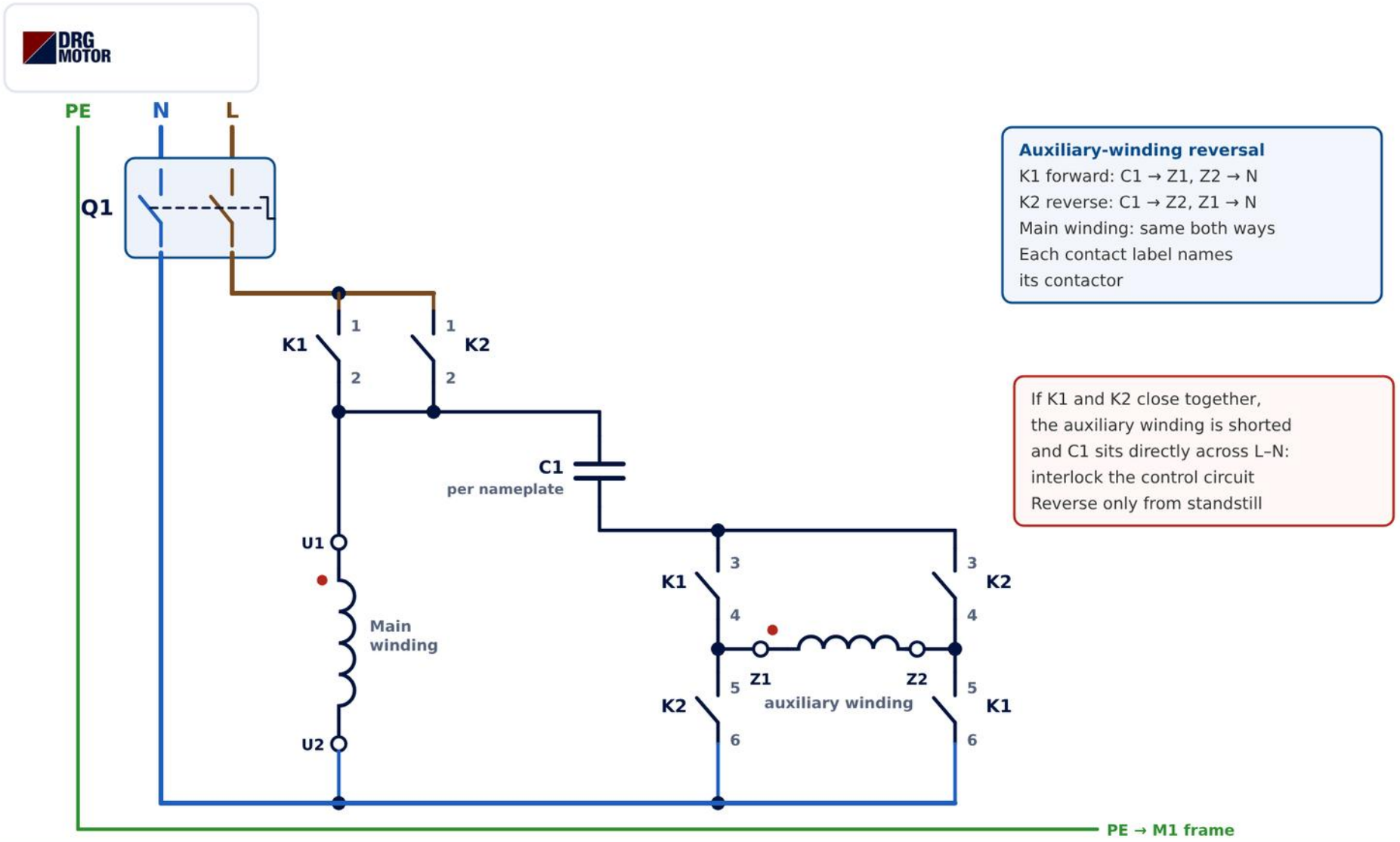
Figure 4



Reversing with terminal links (representative example)

Between A and B only the Z1/Z2 positions change; L, N and the main winding stay the same

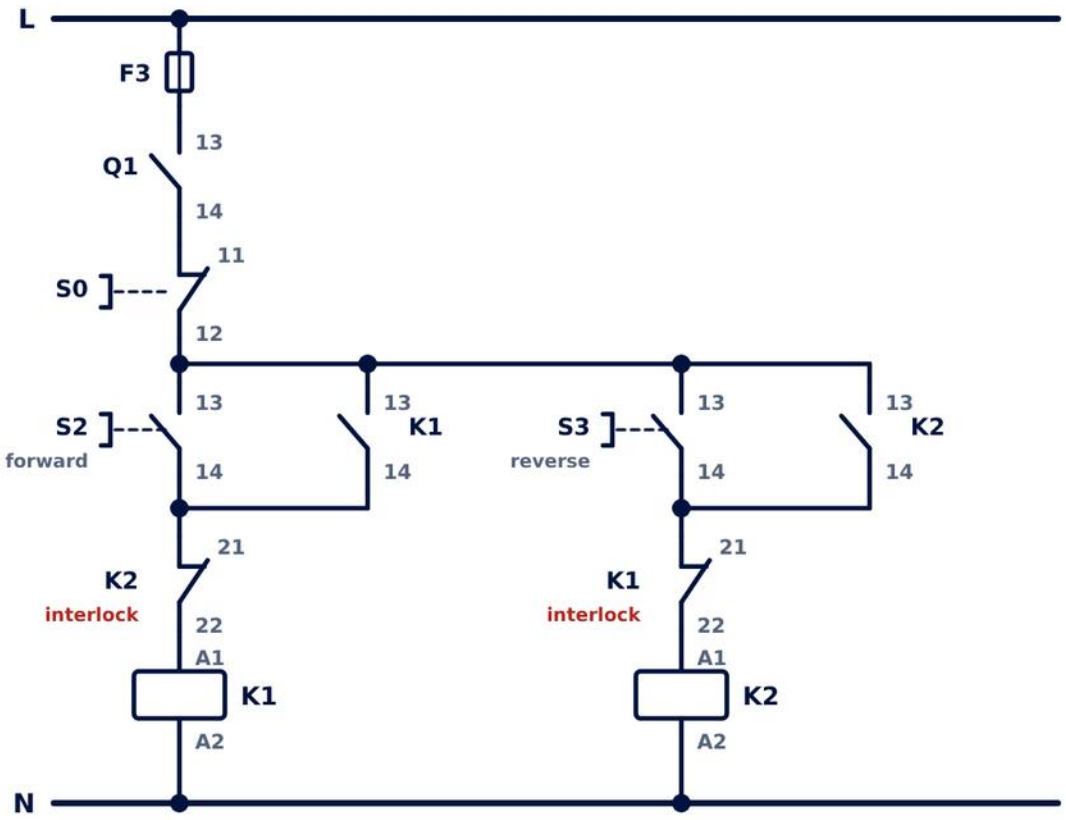
Figure 5



Single-phase motor forward/reverse: power circuit (K1 / K2)

K1 and K2 swap the auxiliary winding connection · Q1 two-pole protection · lead names are examples

Figure 6



Components
Q1 13-14: closed when Q1 is switched on (auxiliary)
S0 stop (NC)
S2 forward · S3 reverse (NO)
K1/K2 13-14: self-holding
K2 21-22 in the K1 rung
K1 21-22 in the K2 rung

To reverse: stop, wait for standstill, then press the other direction button
Terminal names vary by device

Single-phase motor forward/reverse: interlocked control circuit

Separate self-holding for each direction · electrical interlock via the other contactor's 21-22 NC contact

Figure 7

DRG MOTOR

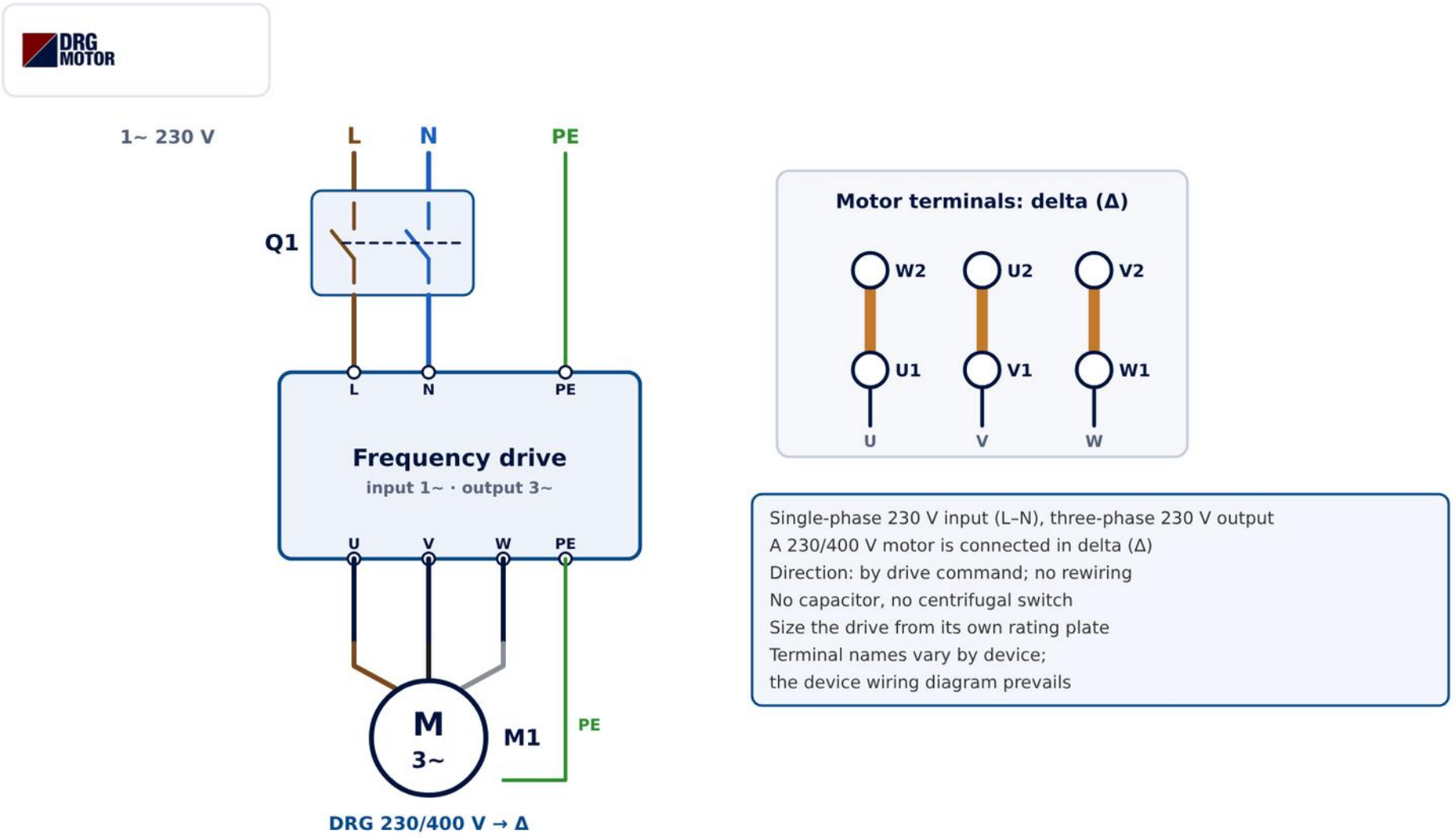
Step	K1	K2	C1 lead to	B1 (cap-start)	Motor
1 Standby (motor at rest)	off	off	—	closed	stopped
2 Forward button: starting	on	off	Z1	closed	Dir. A, speeds up
3 Speed has risen	on	off	Z1	open	Dir. A runs
4 Reverse pressed while running	on	off	Z1	open	Dir. A (interlock)
5 Stop button	off	off	—	open	coasts down
6 Standstill	off	off	—	closed	stopped
7 Reverse button: starting	off	on	Z2	closed	Dir. B, speeds up
8 Q1 protection trips	off	off	—	open	coasts to rest

Step 4: K1 21-22 is open, so K2 cannot pick up. The B1 column applies only to capacitor-start and two-capacitor motors. B1 recloses only when the motor slows down; switching direction while running does not re-engage the starting circuit.

Forward/reverse single-phase motor state table

K1, K2, capacitor connection, centrifugal switch B1 and motor at each step

Figure 8



Alternative: 1~ 230 V input drive + 230/400 V three-phase motor

Three-phase motor on a single-phase supply · motor in delta (Δ) · direction from the drive

Figure 9