Sequential Start of Two Motors: Control Circuit

Date: 29.10.2026 · Rev. 1

Article address: https://drgmotor.com/en/blog/electric-motors/sequential-start-two-motors-circuit

Technical assumptions

- 400 V 50 Hz three-phase supply; control voltage 230 V AC (phase-neutral) protected by fuse F1.
- Each motor has its own motor protection breaker (Q1, Q2) and contactor (K1, K2); the Q1/Q2 auxiliary contact 13-14 is wired into the control circuit.
- The K1 23-24 auxiliary contact is in series with the K2 coil branch: M2 can only run while M1 is running.
- KT1 is an on-delay timer; its time is set to suit the process. Terminal names vary by device; the device's own wiring diagram prevails.
- Values are examples; protection and contactors are selected from the rated current on the motor nameplate. Emergency stop is designed separately according to the risk assessment.

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-90L-4 (1,5 kW, 1500 rpm): https://drgmotor.com/en/buy-electric-motors-online/1-5-kw-1500-rpm-three-phase-motor-aluminium-drg-90l-4
- DRG-100L2-4 (3 kW, 1500 rpm): https://drgmotor.com/en/buy-electric-motors-online/3-kw-1500-rpm-three-phase-motor-aluminium-drg-100l2-4
- DRG-112M-4 (4 kW, 1500 rpm): https://drgmotor.com/en/buy-electric-motors-online/4-kw-1500-rpm-three-phase-motor-aluminium-drg-112m-4
- DRG-132S-4 (5,5 kW, 1500 rpm): https://drgmotor.com/en/buy-electric-motors-online/5-5-kw-1500-rpm-three-phase-motor-aluminium-drg-132s-4
- https://drgmotor.com/en/buy-electric-motors-online

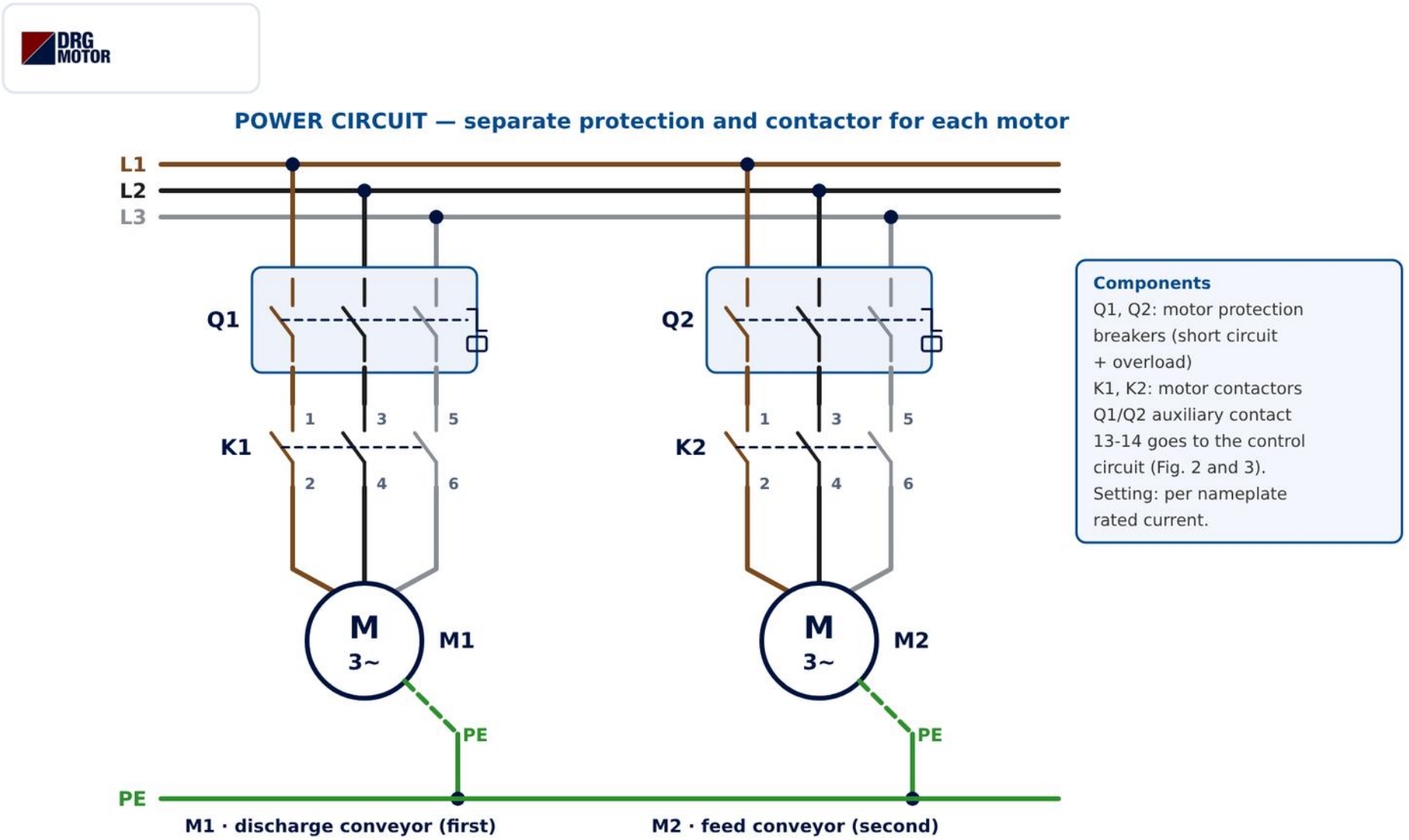
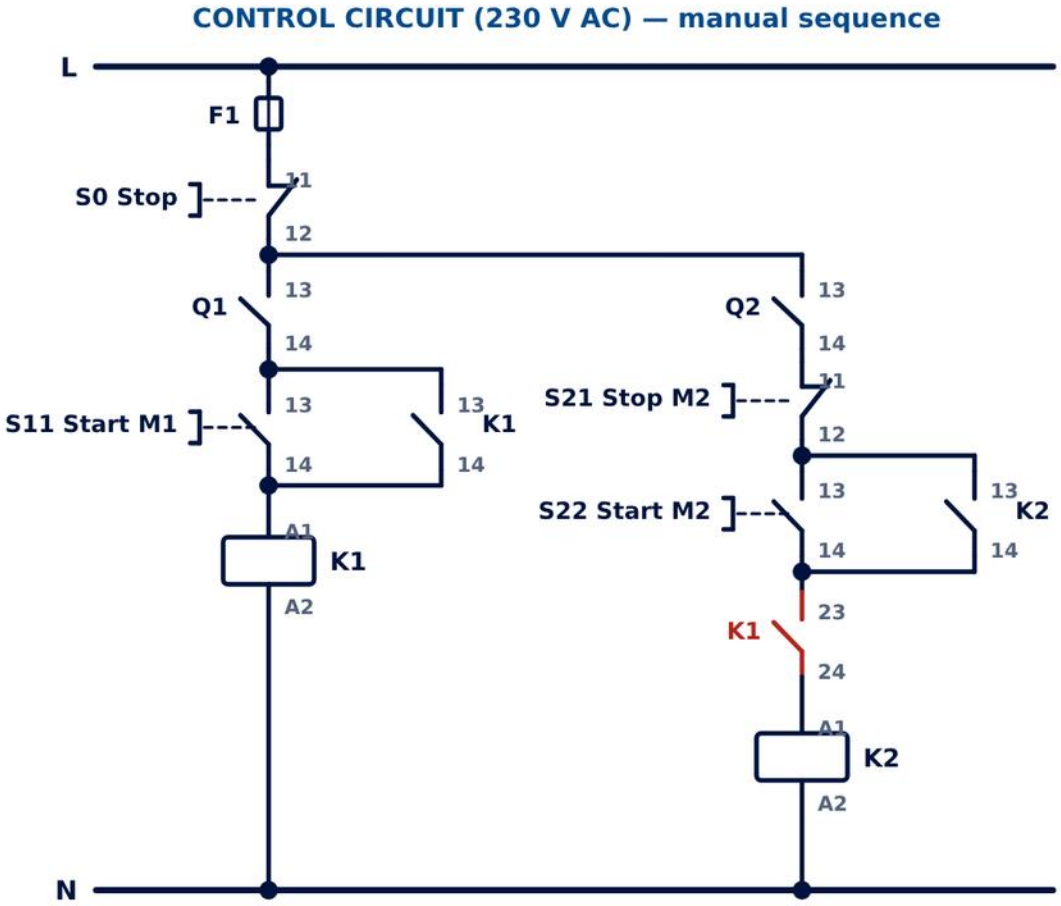

DRG MOTOR
POWER CIRCUIT — separate protection and contactor for each motor
L1
L2
L3
Q1
Q2
1
3
5
K1
K2
2
4
6
M
3~
M1
M2
PE
PE
M1 · discharge conveyor (first)
M2 · feed conveyor (second)
Components
Q1, Q2: motor protection breakers (short circuit + overload)
K1, K2: motor contactors
Q1/Q2 auxiliary contact 13-14 goes to the control circuit (Fig. 2 and 3).
Setting: per nameplate rated current.
Sequential start of two motors — power circuit
400 V 50 Hz · Q1/Q2 motor protection breakers · K1/K2 contactors · M1/M2 three-phase motors · PE conductor

Figure 1



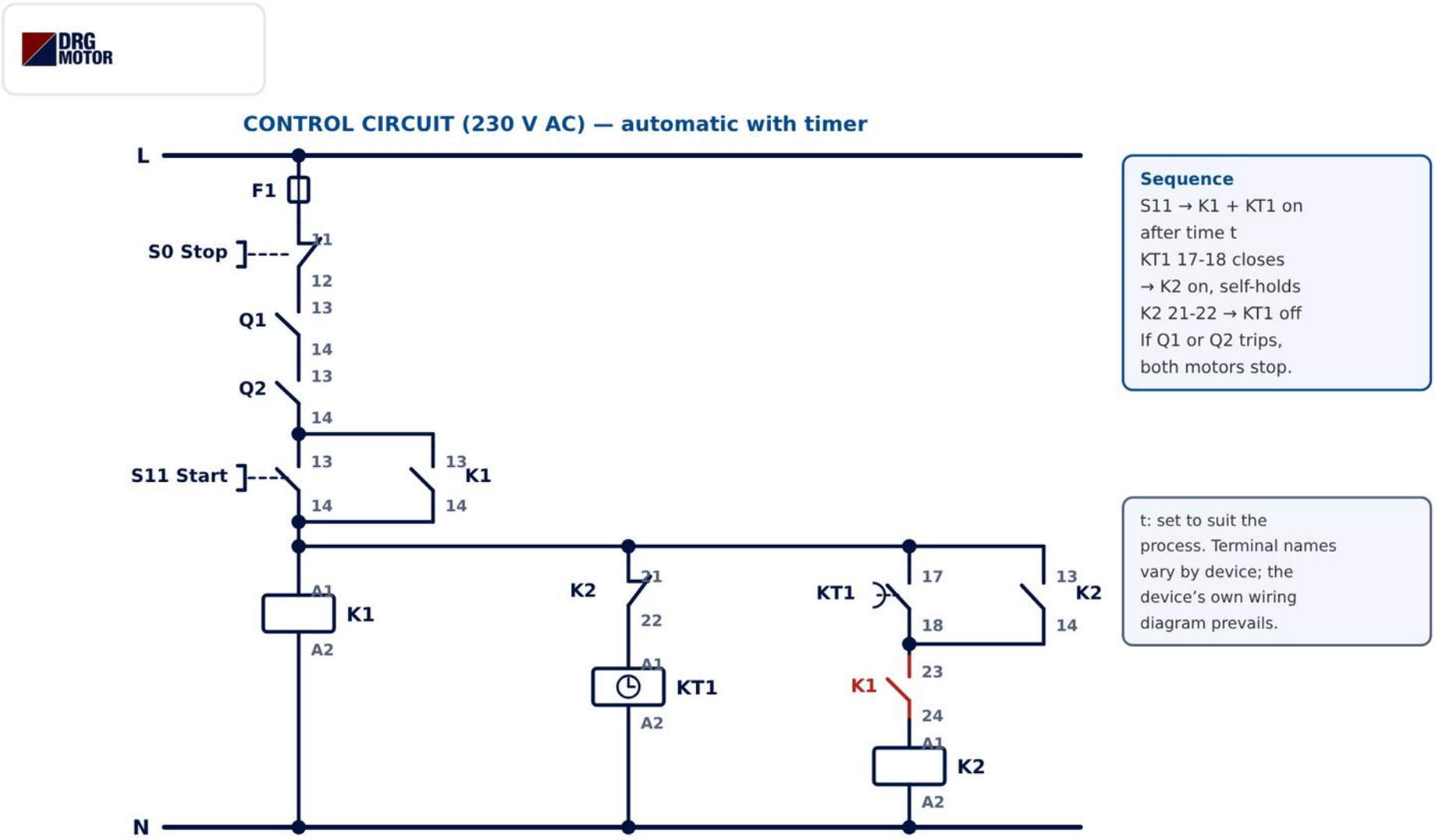
Sequence condition
K1 23-24 (red) is in series with K2:
S22 cannot start K2 unless K1 is on.
Q1 trips → K1 drops → 23-24 opens
→ K2 drops too (M2 stops).
If Q2 trips, only M2 stops.
S0 stops both, S21 stops M2 only.

Emergency stop is not shown here;
the safety function is designed
according to the risk assessment.

Manual sequence: M2 runs only while M1 is running

F1 control fuse · S0 common stop · S11/S22 start · S21 M2 stop · K1/K2 13-14 self-holding · K1 23-24 sequence condition

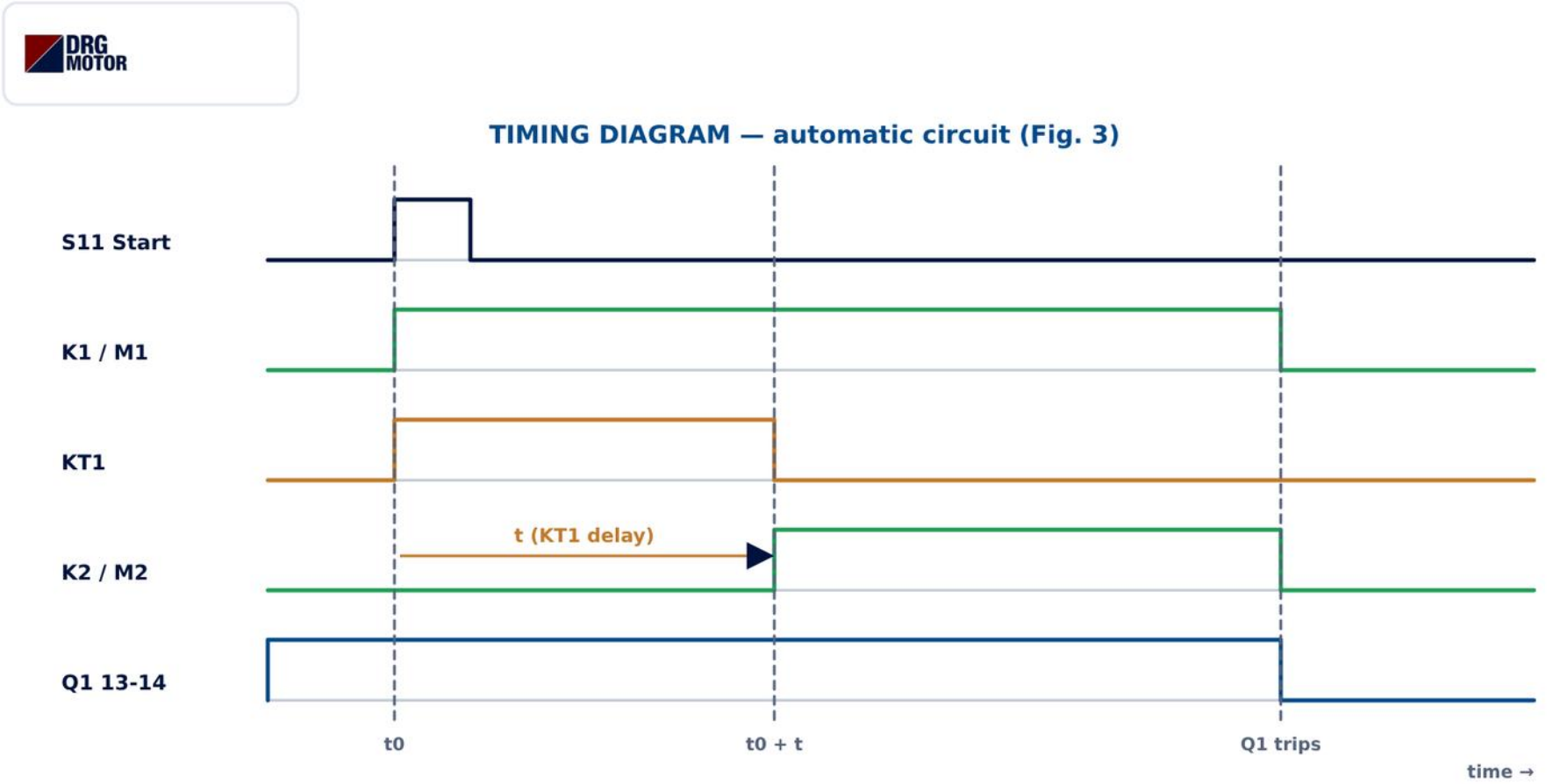
Figure 2



Automatic staggered start: M2 starts when KT1 times out

KT1 on-delay timer · K1 23-24 sequence condition · K2 21-22 releases the timer · Q1/Q2 13-14 in the common series path

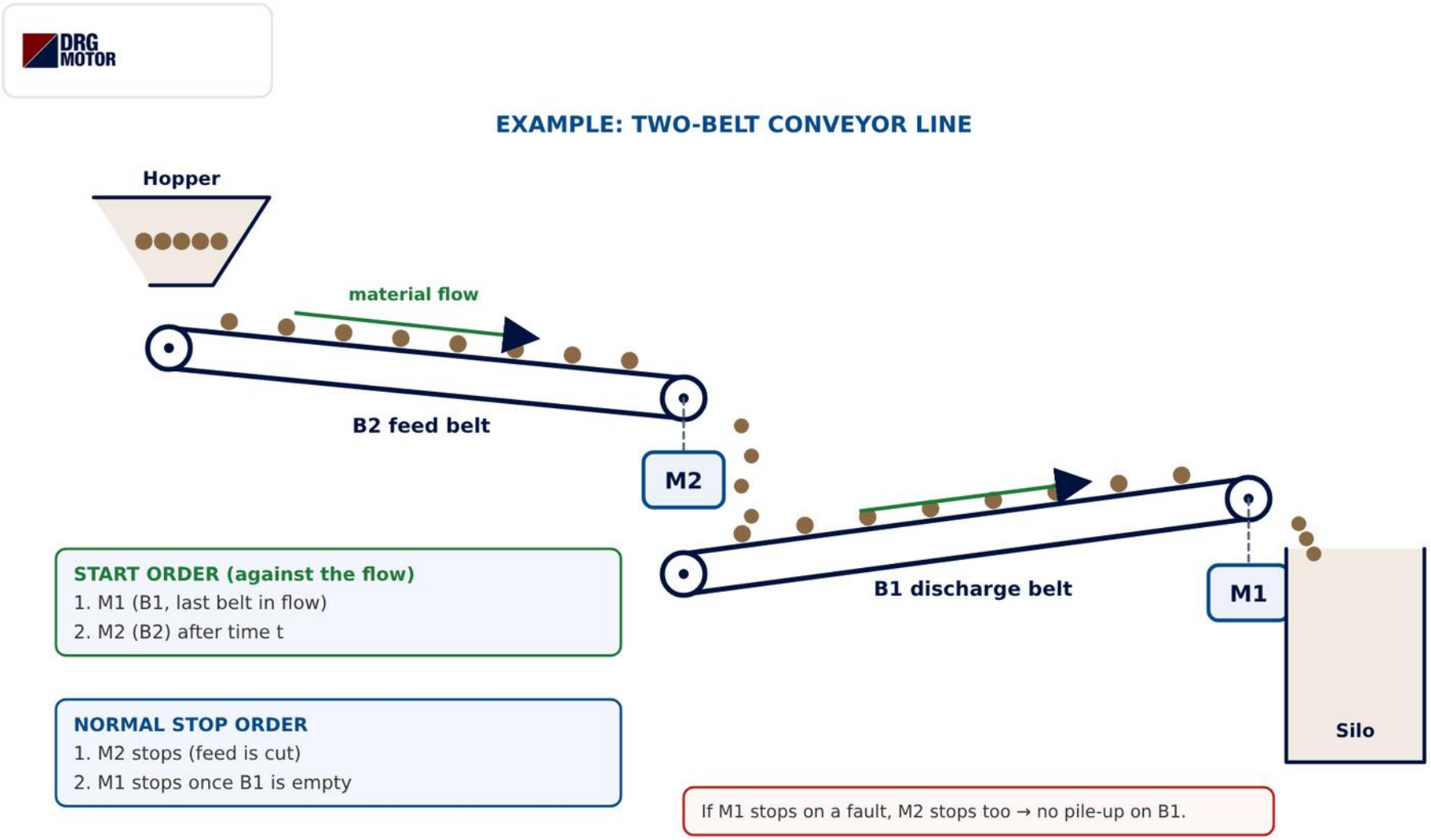
Figure 3



Sequential start timing: M1 → t → M2, both stop when Q1 trips

t0: S11 pressed · t0 + t: KT1 timed out, K2 on · Q1 trips: K1 and K2 drop out

Figure 4



Sequential operation on a conveyor line: discharge belt starts first

B1 = M1 (last belt in the flow) · B2 = M2 (feeding belt) · start against the flow, stop with the flow

Figure 5

DRG MOTOR

STATE TABLE — automatic circuit (Fig. 3)

Condition	K1	KT1	K2	M1	M2
1. Ready: Q1, Q2 closed, S11 not pressed	○	○	○	○	○
2. S11 pressed (time t running)	●	●	○	●	○
3. Time t elapsed	●	○	●	●	●
4. Q1 or Q2 tripped (overload)	○	○	○	○	○
5. S11 held but K1 does not pull in	○	●	○	○	○
6. S0 pressed	○	○	○	○	○

● energised / running ○ de-energised / stopped **Row 5: K1 23-24 is open, so K2 cannot pull in.**

Sequential start state table: which contactor is on in each condition

K1 / K2 contactors · KT1 timer coil · M1 / M2 motors

Figure 6