Drive Potentiometer Wiring and Speed Control

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Article address: https://drgmotor.com/en/blog/electric-motors/drive-potentiometer-wiring-speed-control

Technical assumptions

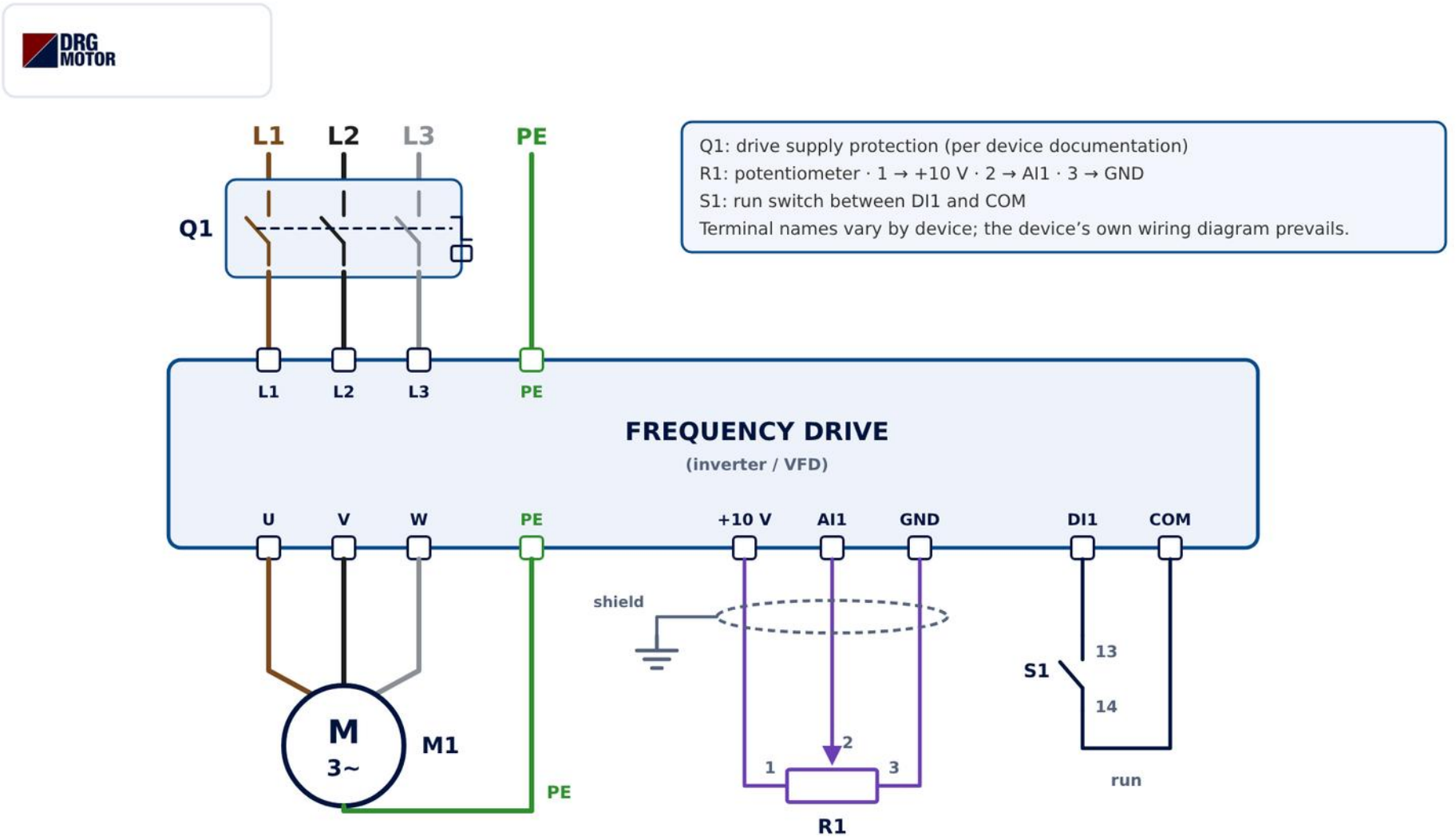
- 400 V 50 Hz three-phase supply; 400 V drive output, motor in star or delta per nameplate.
- The potentiometer is supplied from the drive’s +10 V reference; AI1 is set as a voltage (0–10 V) input.
- 3-core shielded signal cable; shield earthed at the drive end only.
- Terminal names vary by device; the device’s own wiring diagram prevails.
- No parameter values are given; values follow the device documentation and the motor nameplate.

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

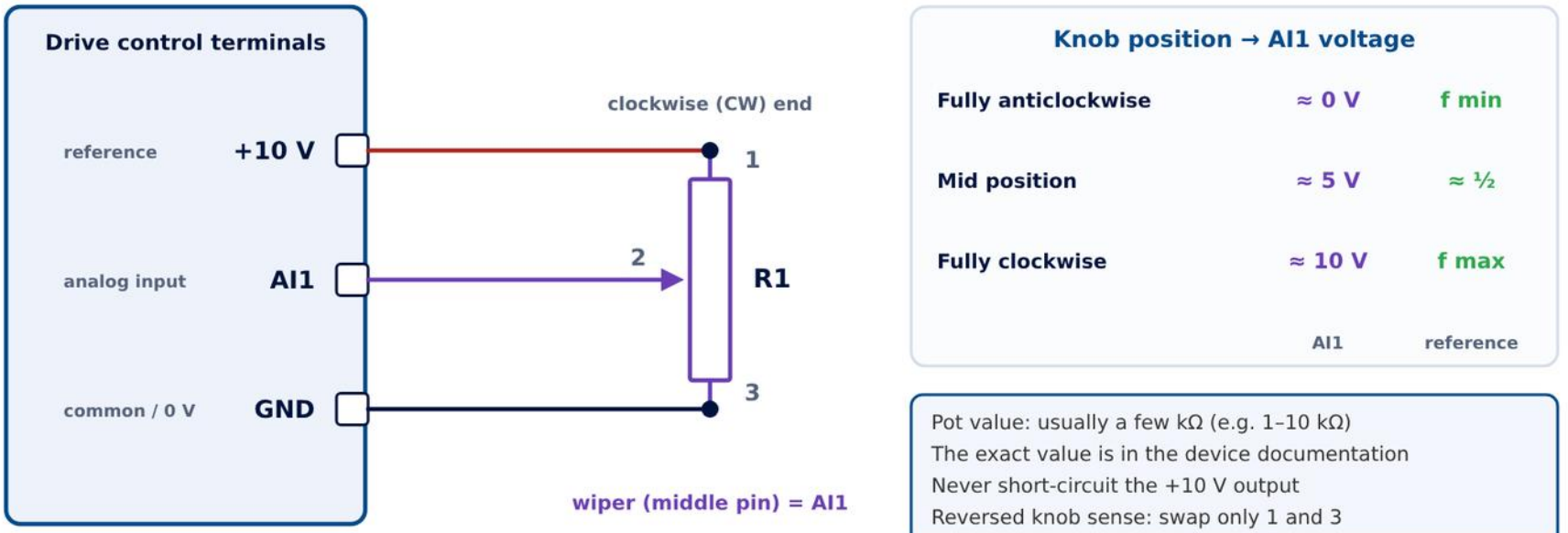
- DRG-90L-4 – 1.5 kW: https://drgmotor.com/en/buy-electric-motors-online/1-5-kw-1500-rpm-three-phase-motor-aluminium-drg-90l-4
- DRG-100L1-4 – 2.2 kW: https://drgmotor.com/en/buy-electric-motors-online/2-2-kw-1500-rpm-three-phase-motor-aluminium-drg-100l1-4
- DRG-112M-4 – 4 kW: https://drgmotor.com/en/buy-electric-motors-online/4-kw-1500-rpm-three-phase-motor-aluminium-drg-112m-4
- DRG-132S-4 – 5.5 kW: 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



Potentiometer on a drive: general wiring diagram

Power: L1-L2-L3 → drive → U-V-W → M1 3~ · Control: +10 V / AI1 / GND shielded · DI1–COM run

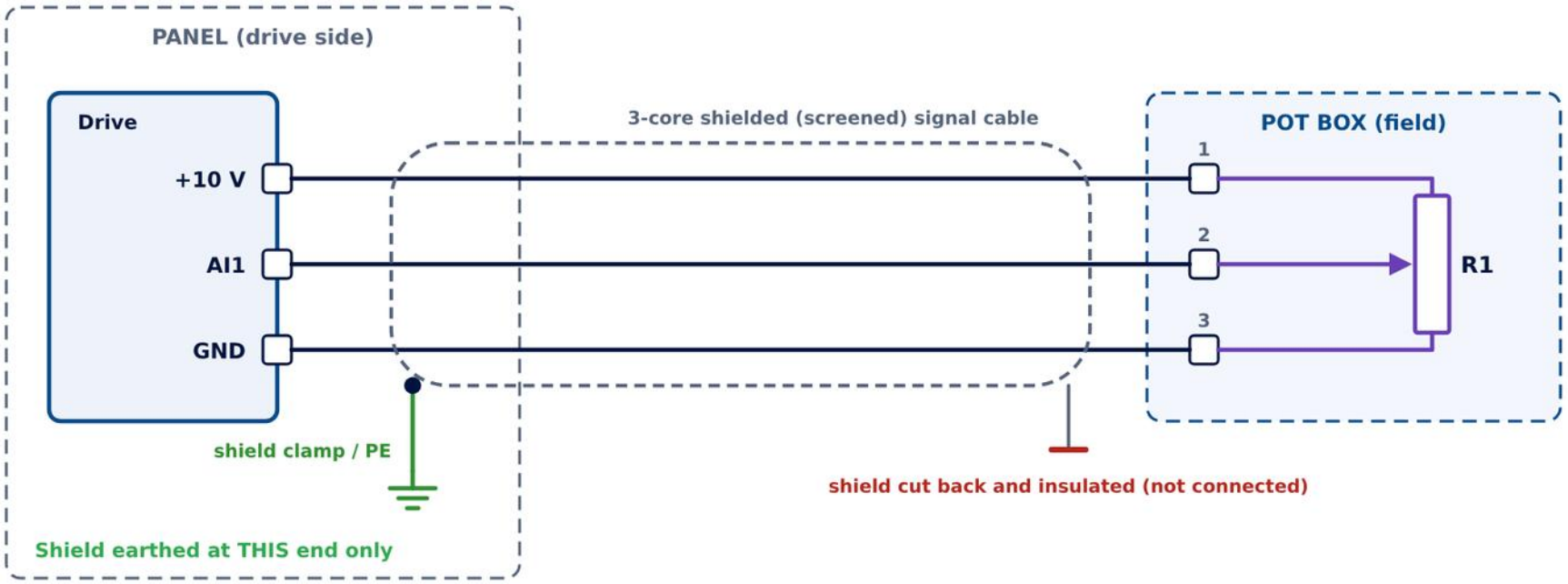
Figure 1



The three pot terminals: +10 V – wiper (AI1) – GND

Terminal names vary by device; the device's own wiring diagram prevails.

Figure 2



No long parallel runs; cross at right angles if needed. Connect the shield at the drive end, at the point shown in the device documentation.

Shielded signal cable: shield earthed at one end, on the drive side

+10 V / AI1 / GND in one cable · shield clamp in the panel · shield left open and insulated at the pot

Figure 3

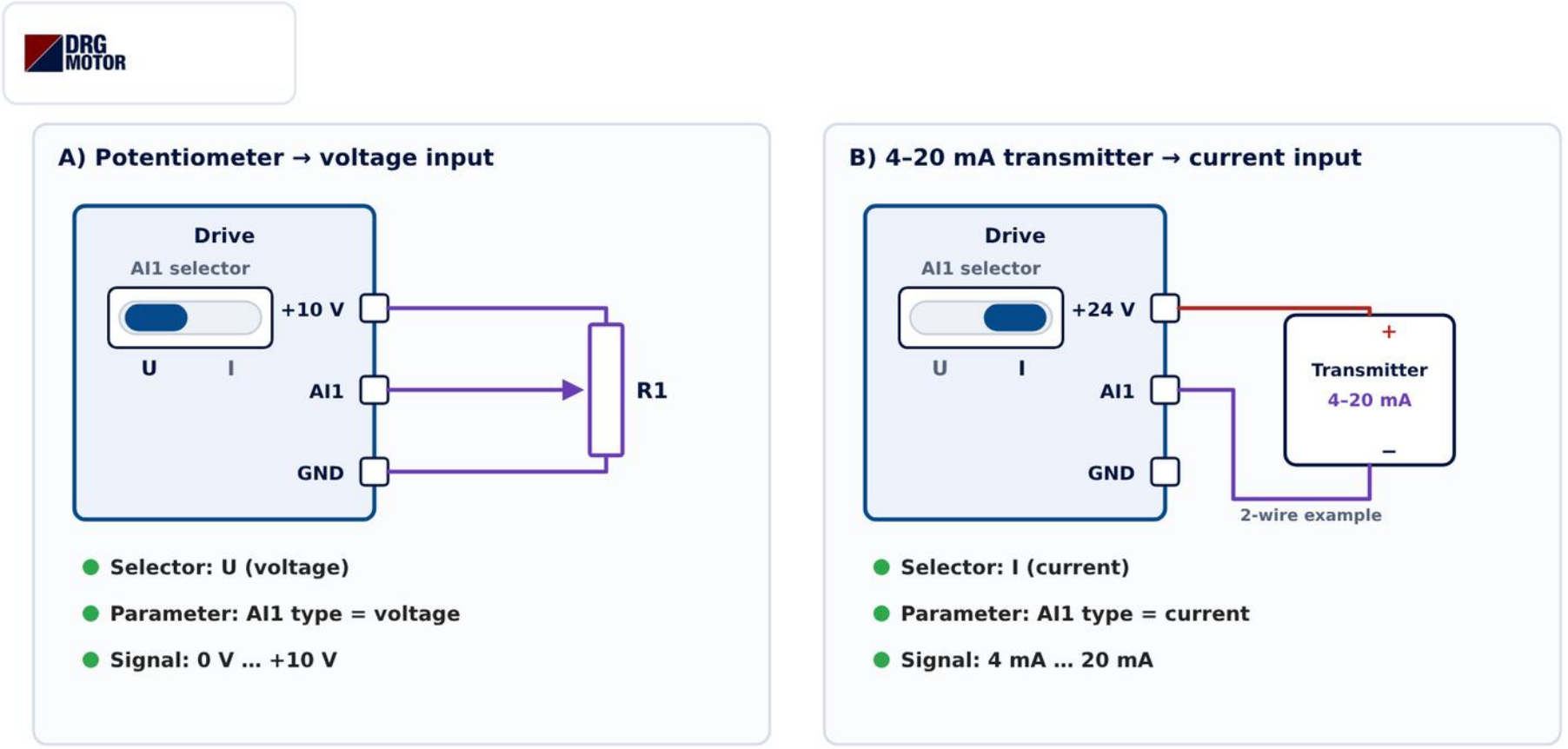
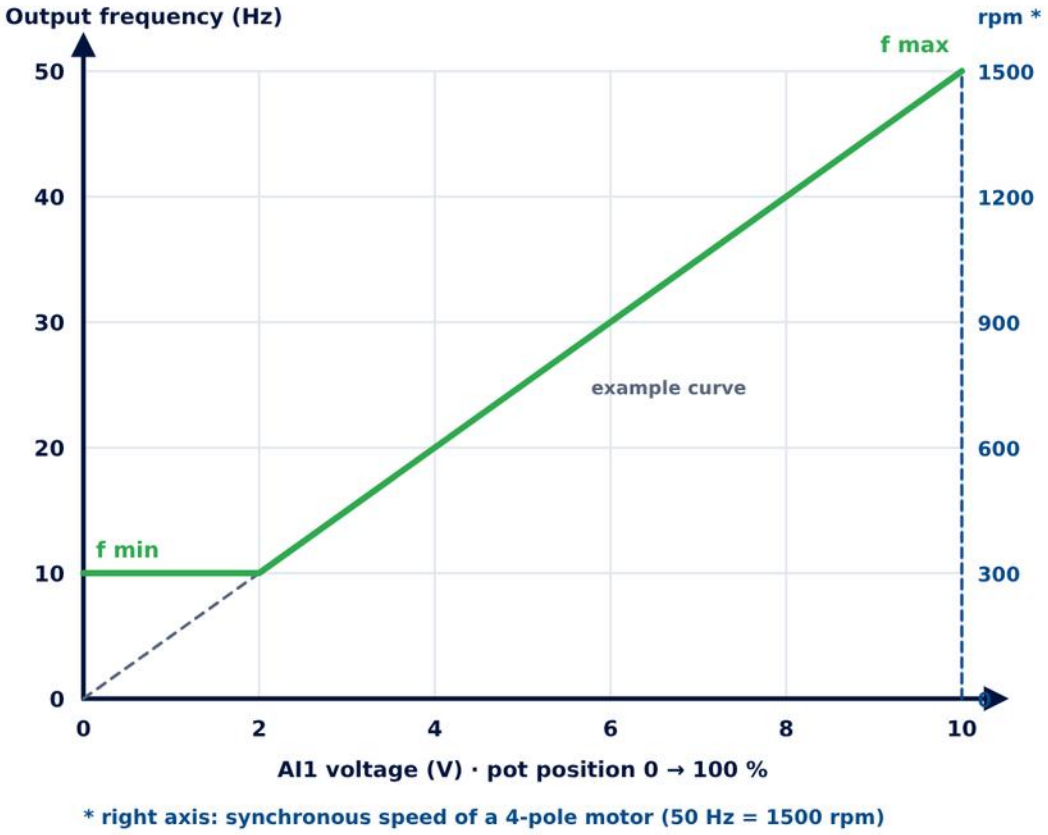

A) Potentiometer → voltage input
Drive
AI1 selector
U
I
+10 V
AI1
GND
R1
Selector: U (voltage)
Parameter: AI1 type = voltage
Signal: 0 V … +10 V
B) 4–20 mA transmitter → current input
Drive
AI1 selector
U
I
+24 V
AI1
GND
+
Transmitter
4–20 mA
–
2-wire example
Selector: I (current)
Parameter: AI1 type = current
Signal: 4 mA … 20 mA
The hardware selector (switch/jumper) and the parameter must show the SAME type. Some devices have only one of them.
Pot left on current mode: the frequency does not reach maximum even at full knob, or a signal fault appears.
Analog input selection: voltage (0–10 V) or current (4–20 mA)?
Selector position, parameter and connected source must match · terminal names vary by device

Figure 4



Synchronous speed ns = 120 · f / p

p = number of poles

Poles	25 Hz	50 Hz
2	1500	3000
4	750	1500
6	500	1000

rpm synchronous; actual speed slightly lower (slip — depends on load)

f min / f max / scaling: parameters
Values follow the application
and the motor nameplate
The f min shown is only an example

Frequency reference → motor speed relationship

0–10 V ≈ 0–50 Hz ≈ 0–synchronous speed (approx.) · actual speed lower by the slip

Figure 5

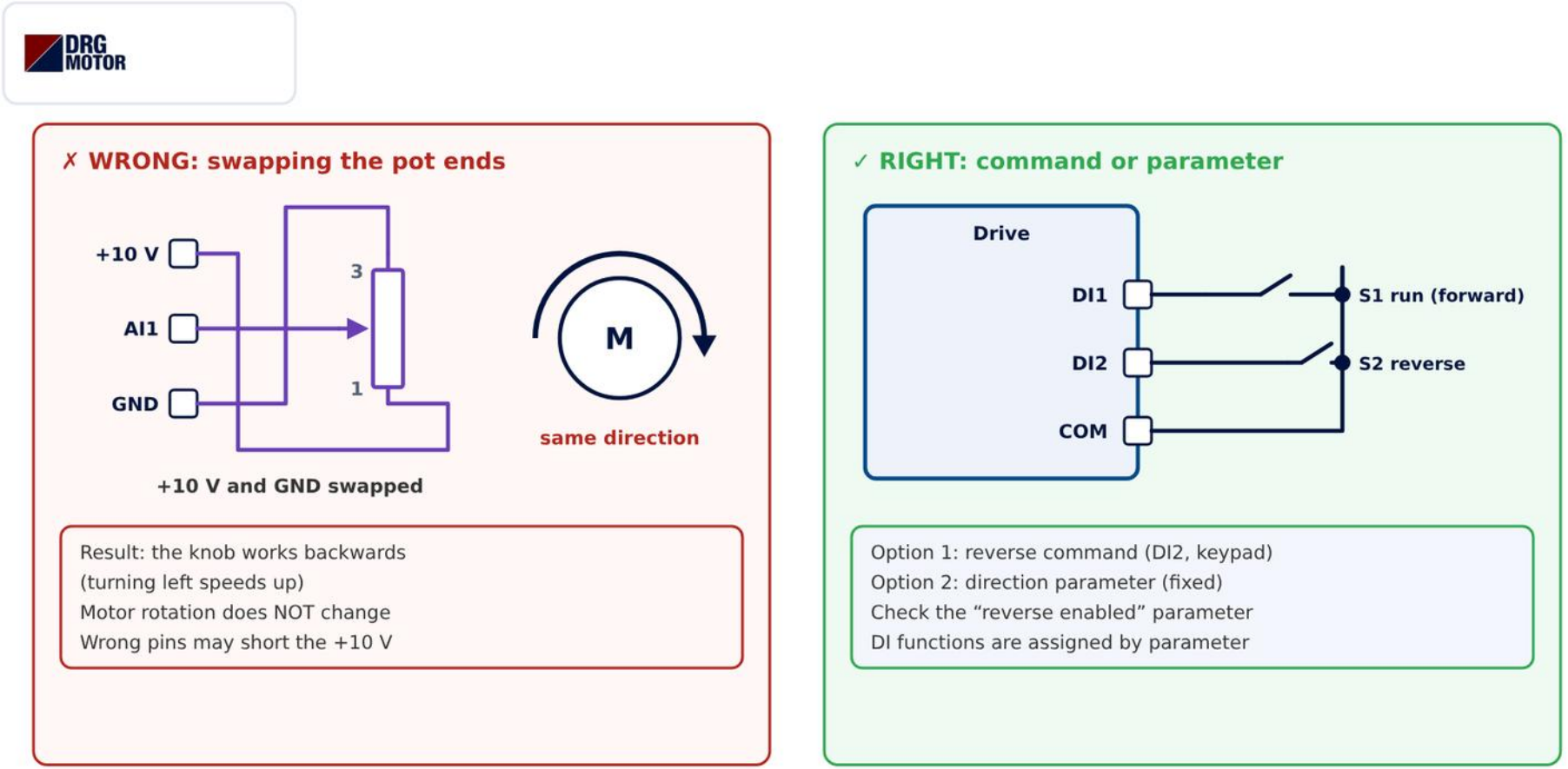

✗ WRONG: swapping the pot ends
+10 V
AI1
GND
3
1
+10 V and GND swapped
M
same direction
Result: the knob works backwards
(turning left speeds up)
Motor rotation does NOT change
Wrong pins may short the +10 V
✓ RIGHT: command or parameter
Drive
DI1
DI2
COM
S1 run (forward)
S2 reverse
Option 1: reverse command (DI2, keypad)
Option 2: direction parameter (fixed)
Check the “reverse enabled” parameter
DI functions are assigned by parameter
Motor runs backwards: use the command/parameter, not the pot ends
The pot sets only the speed magnitude; direction comes from a digital command or parameter

Figure 6

Parameter group	What is selected / entered	Based on
1 Motor nameplate data	voltage, current, frequency, speed, power	motor nameplate
2 Command source	terminals (DI1) / keypad	how it is started
3 Frequency reference source	AI1 (analog input)	input used by the pot
4 AI1 signal type	voltage (+ selector position)	pot = voltage
5 AI1 scaling	low / high point ↔ frequency	required speed range
6 Minimum frequency	lowest speed at pot zero	load, cooling, application
7 Maximum frequency	top speed at full pot	motor and machine limits
8 Acceleration / deceleration ramp	time (s)	inertia, current, braking
9 Direction / reverse enable	forward, reverse, both	what the machine allows

No values are given: each parameter is set from the device documentation, the motor nameplate and the machine's needs.



Figure 7