AZ INSPIRED / SETUP GUIDE

NK105 + Kinco CV100

Water-cooled HQD spindle



Weihong NK105 G3



Kinco CV100

Match the CV100 model on the drive label. Ask your technician to verify coolant flow and the interlock before commissioning.

Electrical and motion checks are for qualified technicians.

Verify values against the equipment nameplate and the manufacturer manual for the exact model. Record existing settings before making changes.

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If your equipment differs, contact AZ Inspired with photos of the model labels.

Kinco CV100 VFD + NK105 — Water-Cooled Spindle Setup

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⚠️ **SAFETY FIRST — QUALIFIED PERSONS ONLY.** Mains voltage present. Isolate the VFD and wait 5 minutes for DC-bus capacitors to discharge before touching terminals. **Never run a water-cooled spindle dry** — confirm coolant flow first. AZ Inspired is not liable for injury or damage from incorrect or unqualified work.

1. Overview

The Kinco CV100 is a reliable VFD for larger water-cooled HQD spindles (3.0–5.5 kW). With a Weihong NK105 controller, the spindle runs in **multi-step terminal mode**: the NK105 sets speed via binary-coded relay outputs into the CV100's multi-reference inputs, so the operator selects gears S1–S8 from the handle. The water-cooled spindle adds one hard requirement: **coolant must flow before and during every run.**

2. Required Hardware

Item	Specification
VFD	Kinco CV100, sized to spindle (e.g. CV100-4T5R5G for 5.5 kW, 380 V)
Controller	Weihong NK105 (G2/G3) + terminal board
Spindle	HQD water-cooled, 2-pole, 400 Hz, 380 V (verify nameplate)
Coolant system	Pump + radiator/tank, flow switch recommended
Control cable	Shielded multi-core 0.5–1.0 mm^2
Power cable	4-core shielded (U/V/W + earth) 2.5–4.0 mm^2 for 5.5 kW

3. Wiring — Control (NK105 board → CV100 inputs)

Wire (typical colour)	NK105 output	Function	CV100 terminal
Red	SPIN-FWD	Run forward ON/OFF	DI1 (FWD)
Green	S1 / bit0	Multi-reference bit 0	DI3
Black	S2 / bit1	Multi-reference bit 1	DI4
Yellow	S3 / bit2	Multi-reference bit 2	DI5
Blue	COM	Digital common	COM/DCM

Wire colours vary by batch — confirm by terminal name. Set CV100 NPN/PNP jumper to match NK105 (NPN/sinking typical).

Coolant interlock (strongly recommended): wire a flow switch into a CV100 free digital input set as "external fault" so the spindle cannot run without coolant flow.

Power: Mains R/S/T (380 V) via breaker+filter → CV100; U/V/W → spindle (phase order = direction); heavy earth from spindle, VFD and frame to one point.

4. Kinco CV100 Parameters

Basic (P0):

Param	Set	Description
P0.01	1	Command source = terminal
P0.02	6	Frequency source = multi-reference
P0.04	400.00	Max frequency (300 if 18,000 RPM)
P0.05	400.00	Upper limit
P0.06	0.00	Lower limit
P0.08	12.0	Accel time (s)
P0.09	12.0	Decel time (s)

Motor (P1) — from nameplate. Wrong voltage destroys the spindle:

Param	Set	Notes
P1.01	Nameplate kW	e.g. 5.5
P1.02	Nameplate V	380 V (verify)
P1.03	Nameplate A	Rated current
P1.04	400.00	Rated frequency
P1.05	24000	Rated RPM (2-pole)

Inputs (P5):

Param	Set	Function
P5.00 (DI1)	1	Forward run
P5.02 (DI3)	12	Multi-reference terminal 1
P5.03 (DI4)	13	Multi-reference terminal 2
P5.04 (DI5)	14	Multi-reference terminal 3
P5.0x spare	10	(Optional) External fault — coolant switch

Multi-reference speeds (PC) — % of P0.04, must match NK105 handle:

Gear	Param	%	Hz	RPM
S1	PC.00	0	0	0 (Stop)

S2	PC.01	25	100	6,000
S3	PC.02	37.5	150	9,000
S4	PC.03	50	200	12,000
S5	PC.04	62.5	250	15,000
S6	PC.05	75	300	18,000
S7	PC.06	87.5	350	21,000
S8	PC.07	100	400	24,000

5. NK105 Controller Setup

Menu → Parameter → Spindle (manufacturer password may be needed).

- Spindle type: **Multi-step / gear (binary)**, not analog 0–10 V
- Number of gears: **8**
- Start/stop delay: **5000 ms** each
- Gear table S1–S8: 0 / 6,000 / 9,000 / 12,000 / 15,000 / 18,000 / 21,000 / 24,000 RPM (match Section 4)

6. Commissioning Sequence

1. **Coolant first** — fill, run pump, confirm flow and no leaks
2. Pre-power: wiring matches Section 3; pull-test; U/V/W + earth tight; breaker off
3. Power-up: CV100 shows 0.00; NK105 boots
4. Enter parameters (4.1–4.4), save, power-cycle, verify
5. NK105 setup (Section 5)
6. Functional test: coolant ON → spindle ON at S2 → 6,000 RPM; step gears up; OFF ramps down. Wrong direction → power off, swap two of U/V/W
7. Sign-off: run S8 5 min, coolant warm not hot, body <50 °C, test-cut, log values

7. Troubleshooting

Symptom	Likely cause	Action
Won't start	FWD not reaching DI1, or coolant interlock open	Check P5.00=1; confirm flow switch; meter DI1 to COM
Only 4 speeds	A multi-ref bit dead (usually bit0/DI3)	Cycle gears, meter DI3/DI4/DI5; check P5.02–04
Wrong RPM	PC values ≠ NK105 labels	Re-enter Section 4 to match Section 5
Overvoltage on stop	Decel too fast	Raise P0.09 to 15 s; brake resistor
Overload/overheat	Wrong P1.03, or no coolant	Verify rated current; confirm pump & flow
Hot spindle, cold coolant	Flow blocked/reversed	STOP; check pump direction, kinks, filter

8. Quick Reference

`P0.01=1 · P0.02=6 · P0.04=400 · P0.08=12 · P0.09=12` `P1.01..05 = nameplate (kW/V/A/Hz/RPM)` `P5.00=1 · P5.02=12 · P5.03=13 · P5.04=14` `PC.00=0 · PC.01=25 · PC.02=37.5 · PC.03=50 · PC.04=62.5 · PC.05=75 · PC.06=87.5 · PC.07=100`

Golden rule for water-cooled: coolant flows BEFORE the spindle spins, every time. Fit a flow interlock and this spindle will outlast the machine.

Need help? WhatsApp AZ Inspired: +91 98764 32933 · Setup guide for qualified technicians. Verify all values against your spindle nameplate and VFD manual.