NEXPOWER
INFRA PVT. LTD.

TECHNICAL HANDBOOK 2026–27

Cooler motor technical handbook.

Ratings, sizes, lead colours, blade matching, installation, fault finding and care for single-phase air cooler motors. Prepared by the NEXPOWER technical team for cooler makers, dealers and mechanics.

ISO 9001:2015	Startup India	Manufacturer	Faridabad
Certified company	DPIIT recognised	OEM and dealer supply	Haryana, India

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1. Company and certifications

Company	NEXPOWER INFRA PRIVATE LIMITED
Quality system	ISO 9001:2015, Certificate No. BAIPL-11126IN26-Q, valid to 10.06.2029 (Bulgyo Assessment India Pvt. Ltd.)
Scope includes	Manufacturing of air cooler motors and aluminium end shields
Recognition	DPIIT Startup India
Works	Sanjay Colony, Sector 23, Faridabad, Haryana
Supply	Cooler makers, dealers, distributors. Minimum 50 pieces per model

2. How a cooler motor works

An air cooler motor is a single-phase, capacitor-run induction motor. The stator carries two windings, a main (running) winding and an auxiliary winding. The capacitor is connected in series with the auxiliary winding and stays in circuit all the time. It shifts the current in that winding so the two windings together make a rotating magnetic field, which pulls the die-cast aluminium rotor around.

Speed depends on the number of poles and the supply frequency: synchronous speed = 120 × frequency ÷ poles. On 50 Hz a 4-pole motor has a synchronous speed of 1500 RPM and runs a little below that (about 1300 to 1400 RPM); a 2-pole motor such as the 89 Dia runs near 2800 RPM. The three speeds of a cooler motor come from tappings in the winding: the switch selects high, medium or low.

The load on the motor is the fan blade. A bigger or steeper blade asks for more torque, the current rises and so does the heat in the winding. This is why blade and motor must be matched (section 8).

3. Parts of the motor

Part	What it does	What goes wrong
Stator stack (stamping)	Laminated steel core that carries the winding. Its height is the "stack" size in mm.	Rusted or loose laminations cause hum and heating.
Winding	Aluminium as standard, copper on order. Main and auxiliary coils with speed tappings.	Burns when overloaded, on low voltage or with a jammed rotor.
Rotor	Pressure die-cast aluminium squirrel cage on the shaft.	Rubbing on the stator if bearing seats are out of line.
Shaft	Carries the blade. Sizes 19, 22, 25 and 32 mm.	Bent shaft gives vibration and wobble.
End shields (end covers)	Die-cast aluminium covers, CNC machined, that hold the bearings or bushes and keep the rotor centred.	An off-centre bearing seat makes the rotor run untrue.
Bearing or bush	Ball bearings on H-Frame and E-Frame; oil-retaining bushes on most 110, 100 and 89 Dia motors.	Dry bush or worn bearing: noise, slow start, jamming.
Capacitor	Run capacitor, 440 V AC, value as on the nameplate.	Weak capacitor: motor hums, starts slowly or runs slow.

4. Frame, stack and shaft sizes

Frame is the outside size of the stamping: 89 mm, 100 mm, 110 mm, 120 mm (E-Frame) and 139 mm (H-Frame). **Stack** is the height of the stamping pile, for example 28 mm or 32 mm. For the same frame, more stack means more iron and winding, so more torque for a bigger blade.

A motor is named frame first, stack second: "110 Dia 28 mm" is a 110 mm frame with a 28 mm stack.

Shaft sizes in trade terms

6 sut	3/4 inch, about 19 mm
1 inch	about 25 mm
1¼ inch	about 32 mm

1 sut is one eighth of an inch (about 3.2 mm).

5. Nameplate ratings, all models

Supply for all models: 230 V, single phase, 50 Hz. RPM is at no load. Figures are as printed on the motor nameplate; where a figure is not listed here, ask us for the data sheet.

Model	Frame	Power	Current	Capacitor	RPM	Rotation	Type
E-Frame 32 mm	120 mm	100 W	0.4 A	5 µF	1400	Anticlockwise	Ball bearing
H-Frame 32 mm	139 mm	125 W	0.7 A	8 µF	1400	Anticlockwise	Ball bearing
H-Frame 35 mm	139 mm	On request	On request	On request	1400	Anticlockwise	Ball bearing
H-Frame 38 mm	139 mm	On request	On request	On request	1400	Anticlockwise	Ball bearing
H-Frame 44 mm aluminium body (tent cooler motor)	139 mm	140 W	0.65 A	10 µF	1300	Anticlockwise	Ball bearing
H-Frame 51 mm aluminium body (tent cooler motor)	139 mm	On request	On request	On request	—	Anticlockwise	Ball bearing
H-Frame 70 mm aluminium body (tent cooler motor)	139 mm	On request	On request	On request	—	Anticlockwise	Ball bearing
H-Frame Blue 32 / 35 / 38 mm	139 mm	As per stack	As per stack	As per stack	1400	Anticlockwise	Ball bearing
110 Dia 18 / 19 mm (tower motor)	110 mm	On request	On request	On request	1400	Clockwise	Bush
110 Dia 28 mm	110 mm	110 W	0.5 A	4 µF	1400	Clockwise	Bush or bearing
110 Dia 32 mm	110 mm	On request	On request	On request	1400	Clockwise	Bush or bearing
110 Dia 41 mm	110 mm	On request	On request	On request	1400	Clockwise	Bush
100 Dia 25 mm	100 mm	On request	On request	On request	—	—	Bush
89 Dia Bachcha motor, single and 3-speed	89 mm	On request	On request	On request	2800	—	Bush
Type 200 (exhaust) 32 / 38 mm	—	On request	On request	On request	1400	—	Ball bearing

6. Lead colours and speed

On NEXPOWER 110 Dia motors the lead colour code is printed on the body:

Blue	Common
Black	High speed
White	Medium speed
Red	Low speed

Always follow the colour code and diagram printed on the motor you are fitting; other models and other makes can differ.

Good practice

- Connect only one speed lead at a time through the cooler switch. Never join two speed leads.
- Use the capacitor value printed on the nameplate, rated 440 V AC.
- Earth the cooler body.
- Switch off and unplug before opening the cooler.

7. Which motor for which cooler

Cooler	Motor	Notes
Personal and small room cooler	89 Dia Bachcha motor, 100 Dia 25 mm	Light 3-leaf blades from 9 to 12 inch. High speed, small air volume.
Tower cooler	110 Dia 18 / 19 mm tower motor	Slim motor for tower bodies.
Window and medium desert cooler	110 Dia 28 / 32 mm, E-Frame 32 mm	16 to 18 inch blades. Bush or bearing type.
Large desert cooler	H-Frame 32 / 35 / 38 mm	20 inch, 4-leaf commercial blades. Ball bearing, heavy duty.
Tent, jumbo and commercial cooler	H-Frame aluminium body 44 / 51 / 70 mm (tent cooler motor)	Finned aluminium body for long running hours and large blades.
Exhaust fan	Type 200, 32 / 38 mm	Bearing motor for continuous exhaust duty.

8. Blade matching chart

How to read a blade size

A cooler blade is written as **size × leaves**. 18×3 is an 18 inch blade with 3 leaves; 16×5 is 16 inch with 5 leaves. Sweep is the diameter of the turning blade: 16 inch is about 380 to 400 mm, 18 inch about 440 to 450 mm, 20 inch about 470 to 510 mm.

The **bore** must match the motor shaft, the **rotation** must match the motor, and the **blade angle** must suit the stack. A steeper angle moves more air and loads the motor more.

Short forms

- **C/W**: clockwise blade. **A/C**: anticlockwise blade
- **PP**: polypropylene. **PP glass-filled**: stiffer, holds shape in heat
- **ABS**: smooth finish, good balance
- **With bush / without bush**: metal bush in the hub, or plain hub
- **6 sut** = 19 mm shaft, **1 inch** = 25 mm, **1¼ inch** = 32 mm

Motor	Blade size	Suitable blades (reference code)
H-Frame 32 mm	18.5 / 20 inch	20 inch × 4 leaf Commercial 108° Angle ABS, anticlockwise (SP60); 20 inch × 4 leaf German PP, anticlockwise (SP62); 20 inch × 4 leaf German PP glass-filled, anticlockwise (SP62); 18.5 inch × 4 leaf Commercial German without Bush (SP84)
H-Frame 35 mm	20 inch	20 inch × 4 leaf Commercial 112° Angle PP glass-filled, anticlockwise (SP58)

Motor	Blade size	Suitable blades (reference code)
H-Frame 38 mm	20 inch	20 inch × 4 leaf Commercial 120° Angle PP glass-filled, anticlockwise (SP59); 20 inch × 4 leaf Commercial German without Bush (SP85)
H-Frame 41 mm	22 inch	22 inch × 4 leaf German PP glass-filled, anticlockwise (SP65); 22 inch × 4 leaf German ABS, anticlockwise (SP65)
H-Frame 44 mm	23 inch	23 inch × 4 leaf German PP glass-filled, anticlockwise (SP69)
H-Frame 51 mm	24 inch	24 inch × 4 leaf German PP glass-filled, anticlockwise (SP68)
H-Frame 61 mm	26 inch	26 inch × 4 leaf Commercial German without Bush (SP86)
H-Frame 65 mm	30 inch	30 inch × 3 leaf Commercial PP glass-filled, anticlockwise (SP57); 30 inch × 4 leaf Commercial PP glass-filled, anticlockwise (SP70); 30 inch × 5 leaf Commercial PP glass-filled, anticlockwise (SP79)
E-Frame 32 mm	17 / 17.5 inch	17 inch × 4 leaf Commercial 102° Angle ABS, anticlockwise (SP63); 17.5 inch × 4 leaf German PP glass-filled, anticlockwise (SP74)
E-Frame 35 mm	17 / 18.5 inch	17 inch × 4 leaf Commercial 115° Angle PP glass-filled, anticlockwise (SP61); 18.5 inch × 4 leaf Commercial Low Angle ABS, anticlockwise (SP73)
110 Dia 19 mm	16 / 18 inch	16 inch × 5 leaf ND (SP04); 18 inch × 3 leaf (SP11)
110 Dia 19 mm (low speed)	12 inch	12 inch × 4 leaf Commercial PP glass-filled, anticlockwise (SP71)
110 Dia 25 mm	15 / 16 / 18 / 20 inch	18 inch × 5 leaf ND (SP06); 20 inch × 5 leaf HV (SP07); 18 inch × 3 leaf Normal (SP12); 16 inch × 5 leaf FLAT Blade (SP22); 15 inch × 6 leaf Tower (SP30); 15 inch × 6 leaf Tower, anticlockwise (SP47)
110 Dia 28 mm	15 / 16 / 18 inch	18 inch × 5 leaf HV (SP05); 16 inch × 4 leaf Climatizer, clockwise (SP18); 16 inch × 4 leaf Climatizer, anticlockwise (SP19); 16 inch × 4 leaf H.S. (SP21); 18 inch × 5 leaf FLAT Blade (SP23); 16 inch × 6 leaf Tower (SP31); 18 inch × 3 leaf wide leaf (SP36); 15 inch × 4 leaf Curve Model, clockwise (SP49); 15 inch × 4 leaf Curve Model, anticlockwise (SP49B); 16 inch × 5 leaf Advance Model ABS (SP51); 16 inch × 5 leaf Advance Model glass-filled (SP51); 15 inch × 4 leaf Commercial German without Bush (SP81)
110 Dia 32 mm	15 / 16 / 17 / 18 / 20 inch	18 inch × 3 leaf Silencer (SP17); 18 inch × 4 leaf Climatizer, clockwise (SP20); 18 inch × 4 leaf Climatizer, anticlockwise (SP20B); 16 inch × 4 leaf THUNDER (36mm) (SP25); 18 inch × 4 leaf THUNDER (SP26); 18 inch × 6 leaf Tower (SP32); 20 inch × 3 leaf wide leaf (SP48); 17 inch × 4 leaf Curve Model, clockwise (SP50); 18 inch × 5 leaf Advance Model ABS (SP52); 15 inch × 4 leaf Exhaust, anticlockwise (SP55); 15 inch × 4 leaf Exhaust, clockwise (SP56); 16 inch × 4 leaf Exhaust PP, clockwise (SP64); 16 inch × 4 leaf German ABS, anticlockwise (SP66); 16 inch × 4 leaf German ABS, clockwise (SP67); 16 inch × 4 leaf Commercial German without Bush (SP82)
110 Dia 38 mm	17 / 17.5 / 18 inch	18 inch × 4 leaf Exhaust PP, anticlockwise (SP53); 18 inch × 4 leaf Exhaust PP glass-filled, anticlockwise (SP54); 17 inch × 4 leaf Commercial 102° Angle ABS, anticlockwise (SP63); 17.5 inch × 4 leaf German PP glass-filled, anticlockwise (SP74)
110 Dia 41 mm	17 inch	17 inch × 4 leaf Commercial 115° Angle PP glass-filled, anticlockwise (SP61)
100 Dia 22 mm	12 / 13 inch	12 inch × 3 leaf PP (SP10); 13 inch × 3 leaf Commercial ABS, clockwise (SP72)
89 Dia (all stacks)	9 inch	9 inch × 3 leaf High Speed Blade (SP27)
89 Dia 19 mm	11 inch	11 inch × 3 leaf High Speed Blade (SP29)
89 Dia 22 mm	12 / 16 inch	12 inch × 3 leaf High Speed Blade (SP28); 16 inch × 3 leaf H.S.F with bush (SP38); 16 inch × 3 leaf H.S.F without Bush (SP39)

Motor	Blade size	Suitable blades (reference code)
89 Dia 1 inch (25 mm)	16 inch	16 inch × 3 leaf Wall (SP41)
89 Dia 1 inch (25 mm), CRC body	9 / 12 inch	9 inch × 3 leaf Silencer (SP13); 12 inch × 3 leaf High Speed Blade (SP28)
89 Dia 25 mm	11 inch	11 inch × 3 leaf Silencer (SP14)
89 Dia 1¼ inch (32 mm)	18 inch	18 inch × 3 leaf H.S.F with bush (SP40)
Kit motor 6 sut (19 mm)	9 / 12 inch	9 inch × 5 leaf (SP01); 12 inch × 5 leaf (SP02); 12 inch × 4 leaf A.P. (SP09)
Kit motor 1 inch (25 mm)	16 / 20 inch	16 inch × 4 leaf H.S. (SP21); 20 inch × 3 leaf wide leaf (SP48)
High-speed motor	9 / 12 inch	9 inch × 5 leaf (SP01); 12 inch × 5 leaf (SP02); 12 inch × 4 leaf A.P. (SP09)
Exhaust motor 1¼ inch (32 mm)	18 inch	18 inch × 4 leaf Exhaust PP, anticlockwise (SP53); 18 inch × 4 leaf Exhaust PP glass-filled, anticlockwise (SP54)

Reference codes are Speedo blade codes. The full list with photos is in the NEXPOWER Blade Selection Chart (separate PDF on www.nexpowerinfra.com).

9. Installation checklist

1. **Shaft and bore.** Measure the shaft: 19, 22, 25 or 32 mm. A loose bore wobbles and wears the bush.
2. **Rotation.** Check the arrow on the motor label. A clockwise blade on an anticlockwise motor gives almost no air.
3. **Stack for the size.** As the blade grows, the stack must grow: 110 Dia 19 mm for light 16 inch blades, 28 mm for 16 to 18 inch, 32 mm for heavy 18 inch, H-Frame for 20 inch and above.
4. **Current under load.** With pads wet and the cooler closed, the running current must stay within the nameplate amperes.
5. **Balance.** Spin the blade by hand. If it always stops at the same point it is out of balance and will damage the bearing or bush.

Also check

- Mounting bolts tight and the motor square to the fan opening.
- Blade clear of the body all round; tighten the grub screw on the flat of the shaft.
- Lead wires clipped away from the blade and from water.
- Water must not drip on the motor. Keep the drip cover in place.
- Run on each speed for a minute and listen for rubbing or hum.

10. Fault finding

Symptom	Likely cause	What to do
Motor hums, does not start	Weak or open capacitor; jammed bush or bearing; blade touching the body	Spin the shaft by hand. If free, replace the capacitor with the nameplate value. If tight, service the bush or bearing.
Starts slowly or runs slow	Low supply voltage; weak capacitor; wrong speed lead; dry bush	Measure voltage at the motor, check capacitor and connections, oil or replace the bush.
Runs hot, trips or burns	Blade too big or too steep; low voltage; blocked air path; two speed leads joined	Check running current against the nameplate. Fit the correct blade or a higher stack.
Noise or vibration	Unbalanced or cracked blade; loose mounting; worn bush or bearing; bent shaft	Check blade balance and mounting first, then the bearings.

Symptom	Likely cause	What to do
Runs but little air	Blade rotation does not match the motor; blade fitted back to front; choked pads	Match clockwise or anticlockwise blade to the motor. Clean or change pads.
Only one speed works	Faulty switch or open speed lead	Test the switch, then continuity of each speed lead to common.
Shock from the body	Moisture in the winding or damaged lead insulation; no earthing	Stop using the cooler. Dry and test insulation, repair the lead, earth the body.

11. Voltage, capacitor and care

Voltage

The motors are rated for 230 V. On low voltage the motor draws more current for the same blade and runs hotter; in low-voltage areas choose the next stack size or a lighter blade.

Capacitor

Use the value on the nameplate (for example 4 µF on 110 Dia 28 mm, 8 µF on H-Frame 32 mm, 10 µF on H-Frame 44 mm), rated 440 V AC. A larger value does not give more power; it raises winding current and heat.

Season start

- Clean dust from the motor body and vents.
- Spin the shaft by hand; it must turn freely.
- Put a few drops of oil in bush motors where an oil hole is provided.
- Check the blade for cracks and the grub screw for tightness.

Off season

- Dry the cooler fully before storing.
- Cover the motor to keep out dust and moisture.
- Do not store with water in the tank.

12. Ordering, warranty and contact

- Minimum order 50 pieces per model; dealer and OEM rates.
- Capacitor and lead wire fitted; every motor tested before packing.
- GST invoice with every dispatch; transport to buyer's account.
- Your own label on OEM quantities.
- Warranty as per our policy at www.nexpowerinfra.com/warranty.html. Damage from a wrong blade, low voltage or water is not covered.

Rates, live stock and free technical help

Dealer rate list and today's ready stock are on www.nexpowerinfra.com. For blade, motor or fitment questions talk to our Technical Head: +91 90154 04168.

मोटर, ब्लेड या फिटिंग की कोई भी टेक्निकल जानकारी के लिए फ्री में कॉल करें।

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