



CFM24 user manual

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Introduction

This user manual is an essential part of the dynoKRAFT CFM24 Mobile Cooling Fan.

All functions and settings described apply to the original YourDyno software accordingly.

This product and all its components are custom built device designed for professional use, and to be used solely at research and development facilities for such purposes.

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Original user manual for the dynoKRAFT CFM24 Mobile Cooling Fan.

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Manufacturer / Service / Warranty:

dynoKRAFT GmbH

Kolonnenstr. 8

D-10827 Berlin

Germany

info@dynokraft.de

Warranty and Disclaimer

This products is meant to be used by trained technicians and tuners only.

Owner/user assumes responsibility for his or her own actions when using these products. dynoKRAFT GmbH hereby expressly disclaims liability and shall not be responsible for incidental, consequential and contingent damages or any kind or nature, including, without limitation: damages to persons or property, whether a claim for such damages is based upon warranty, contract, tort or otherwise; damages due to or arising out of the loss of time; or loss of profits.

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Warnings

Conventions used in this manual

The conventions used in this manual are designed to protect both user and equipment and to assure a safe work environment.

Warning!

The warning indicates a serious hazard or risk of machine damage.

Caution.

Caution means that failure to perform or incorrectly perform the described procedure can damage the test bench.

Information.

Information gives the user additional useful advice.

Precautions and equipment safety

Your dynoKRAFT equipment is a safe and proven way to test the engines performance in a repeatable test conditions.

To assure problem free operations you should note these precautions and use common sense at all times!

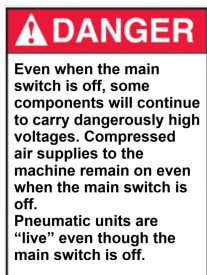
Machine warning labels and their meaning



Hazardous Voltage: This label warns that dangerous electrical voltages are present in the equipment. The machine may be supplied by more than one power source, including remote or auxiliary connections. To prevent electric shock, serious injury, or death, all electrical power sources must be completely disconnected before any servicing, maintenance, or inspection is performed.



Electrical Shock Hazard: This label warns that the equipment presents a risk of electrical shock. Before performing any service or maintenance, the main power switch must be turned off and locked out to prevent accidental re-energization. Failure to follow this instruction may result in serious injury or death.



Machine energized: This statement warns that turning the main switch off does not fully isolate all energy sources. Certain electrical components may remain energized at dangerously high voltages, and compressed air supplies continue to be active. As a result, pneumatic components remain operational even when the main switch is off. Additional electrical and pneumatic isolation steps must be taken before servicing to avoid serious injury.



Do not pull under load: This label warns that the electrical component must not be disconnected, unplugged, or withdrawn while electrical current is flowing. Pulling or disconnecting the component under load can cause arcing, equipment damage, or serious injury. Always shut off and isolate electrical power before pulling or removing the component.



High Voltage: This yellow triangle warning indicates that the equipment or area contains dangerously high electrical voltages. Contact with these voltages can cause severe injury or death. Only qualified personnel should access or service the area, and all power must be properly isolated before any work is performed.



Automatic Machine Start: This yellow triangle warning indicates that the machine may start automatically without warning. Contact with moving parts during automatic start can cause serious injury. Users should stay clear of the machine while it is energized and that all covers are installed, and ensure all safety measures are in place before performing any maintenance or adjustments.



Hot Surface: This yellow triangle warning indicates that parts of the machine may become hot during operation. Contact with these surfaces can cause burns. Allow the equipment to cool and use appropriate protective measures before touching or servicing these areas.



Wear Hearing Protection: This label indicates that noise levels in the area may be high enough to cause hearing damage. Approved hearing protection must be worn when operating or working near the machine.



Wear Eye Protection: This label indicates a risk of eye injury from flying particles, debris, or other hazards. Approved eye protection must be worn when operating or servicing the machine.



Read User Manual before use: This label indicates that the user must read and understand the user manual before operating or servicing the machine. The manual contains important safety, operating, and maintenance instructions that must be followed to prevent injury or equipment damage.

Engines exhaust gasses

Always assure proper dyno room ventilation and use engine exhaust extraction system which is adequately scaled to remove all exhaust gasses from the room in which people are working in.

Fail to do so may result in serious hazard to dyno room operators and will impact engine's performance.

Warning! Carbon monoxide / Toxic gasses !

Combustion engine exhaust gasses contain toxic carbon monoxide. Breathing it can cause death.

Always operate the dynamometer in well ventilated area. Always use exhaust gasses extraction system during test runs.

Noise and debris

Keep in mind that running an engine test at high RPM and Load will create a noisy work environment which may affect one's ability concentrate on task he's performing. Prolonged exposure to noise may result in head ache or nausea.

Always use eye protection to avoid eye damage from any debris or dirt which may be found in the air either because of extensive room ventilation or due to equipment damage.

Warning! Excessive noise / Eye damage.

Always use eye and ear protection while working with dynamometer. Fail to do so may result in serious health issues, hearing loss or visual impairment.

Rotating parts

All rotating parts are potential source of serious accident. Therefore always operate your equipment with all coverings properly installed. Use additional covering or protection to secure any visible parts of the engine or test equipment. Always wear tight sleeves to avoid getting dragged by any rotating parts.

Warning! Rotating parts.

Never operate an dynamometer without properly installed coverings. Always use cloths with tight sleeves.
Fail to do so may result in getting dragged by rotating parts or components.

Heat

During an dynamometer test-run and substantial amount of heat will be generated by both the engine and dynamometer equipment. The air temperature in the dyno room will rise gradually. Additionally some surfaces of the combustion or electric motors may get very hot.

dynoKRAFT is encouraging dynamometer operators to use an infrared thermometer to check if the surface temperatures are in safe range. Temperature above 55°C is considered harmful.

Warning! Hot surfaces.

Avoid touching of hot surfaces during and after the dynamometer tests.
Some areas of combustion engines such as exhaust system can get extremely hot and touching them may cause severe tissue burn.

Electric power.

The dynoKRAFT cooling fan is operated using electric power. The electric motor is driven by EATON DE1 Variable Frequency Drive.
Do not remove any covering panels, perform any service or repairs or open any electric cabinets under power.

Any repairs or service which requires accessing the equipment's electrical system must be performed by qualified electrician.

Warning! Potentially lethal voltages.

Never perform any service or remove any protective panels or open electric cabinets without previously disconnecting the main AC power cord.
Always wait min. 5 minutes after turning off the cooling fan main switch to allow for complete discharge of electromagnetic coils of the Eddy Current Brakes or capacitors in Variable Frequency Drives.
In most cases the capacitors in VFD will carry lethal voltage even after this time (meaning: they will never discharge)
Fail to obey this rule may result in lethal electric shock.

General precautions

Always keep minimum safe distance while working with dynamometers and other equipment so that in case of equipment or engine/vehicle failure, fire or other hazard the risk of accident is minimized.

Excessive noise or vibration of any equipment usually indicates serious fault and should be directly solved.

Always verify emergency STOP operation before using your equipment.

Before powering the cooling fan verify that min. two castor locks/brakes are properly engaged.

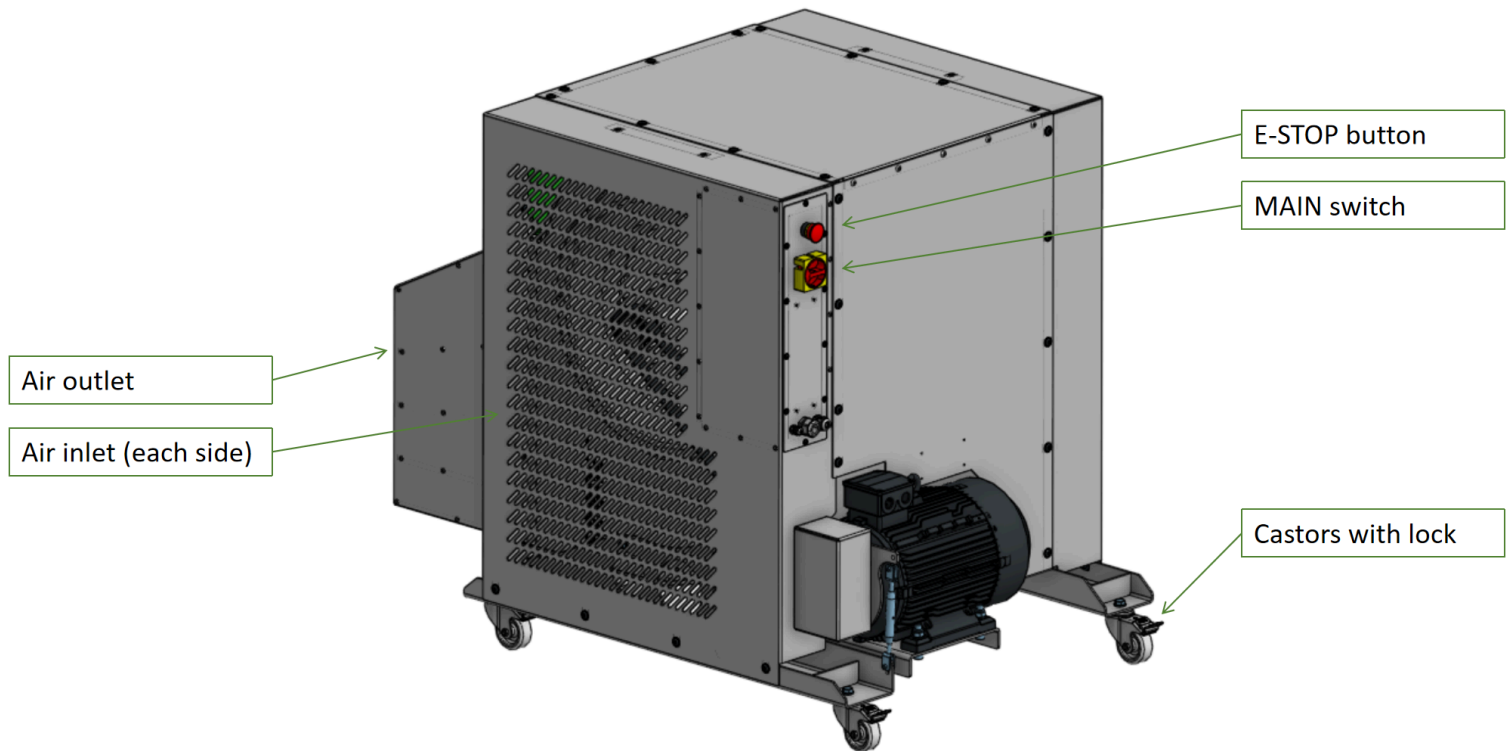
Never perform any servicing of the dynamometer or other equipment unless explicitly recommended in manual.

Caution. Risk of equipment damage. Potential safety hazard.

Not obeying to these rules may result in equipment damage, potential safety hazard to dynamometer operators and can result in loss of warranty.

Specifications and requirements

Component definition and location



Permissible operating limits and requirements

Characteristic	Value	Comments
Max. motor RPM	1450 1/min	
Control signal INPUT	0-5V DC = 0-100% output	White - SIG Brown - GND

Power and Air supply	Value	Comments
Electric power supply	400V AC / 16A / 50Hz	see nameplate

Environmental and workshop requirements	Value	Comments
Room temperature	+10°C to +50°C	
Relative humidity	10 - 65%	no condensation allowed
PC-System	Windows 11 64-Bit	
Internet- and Phone		Required for software and firmware updates and technical support.

Mobile Cooling Fan installation and commissioning

Installation and commissioning

1. Unpack/Unwrap the cooling fan. Dispose the protective material per local garbage disposal rules.
2. Remove four (4) bolts that hold the fan to the wooden pallet. Do not throw these bolt away.
3. Slightly slide the cooling fan off the pallet and install the two front castors using supplied bolts.
4. Slide the cooling fan off the pallet so that the third castor directly below the electric motor can be installed
5. Remove the pallet and install the last castor.
6. Connect the power cord and signal cable accordingly.

The CFM24 cooling fan must be installed on a solid concrete floor with sufficient load-bearing capacity (min. 0,5 T / m²).
The floor should have a flatness of 5 mm per 1 m (or better).

i Installation and commissioning can only be carried out by a trained technician / electrician.

i **EMC noise.** To avoid excessive noise during data transfer, please keep the USB connection / cable between ADAQbase and the computer as short as possible.

Setting up your workspace

Please setup your workspace so that at least one emergency stop button is within your range at all times while working next to your equipment.

Connecting to Electric Power Supply and Compressed Air Supply

Please connect a power cable to cooling fan main power inlet “MAINS” using adequate extension cable.
Please make sure to use proper electric power source matched to the electric system of the equipment.
If in doubt please check the machine label for information on power system used and consult licensed electrician.

The test bench must be connected to a suitable Type-B residual current circuit breaker, followed by a three-pole 16A fuse, to the mains.

⚠ Warning! Obligatory use of residual current circuit breaker.

A residual current circuit breaker Type-B is an obligatory part of the electrical connection of the dynamometer. Failure to comply with this rule can result in severe electric shock or death, e.g. if the insulation is damaged! If the test stand is operated without a residual current circuit breaker, the guarantee expires!

To switch the cooling fan on, please turn the main switch on the rear of the CFM24 to the ON position.

Dyno room

Noise control. Dynamometer room requirements

dynoKRAFT is recommending to setup your dynamometer in noise control room. It is not uncommon, that during combustion engine testing under full load and high RPM the generated noise level is in excess of 110dB, even if the CFM24 cooling fan itself does not generate such noise levels.

Another important requirement is flammability resistance of your dynamometer room and any equipment you will install inside the room.
The room must also consist of emergency exit wired to the e-stop circuit of your dynamometer. Please consult your local health and safety requirements.

Ensure minimum work space around the dynamometer-test engine setup. dynoKRAFT is recommending a minimum of 2 meters around the dynamometer and engine to allow easy access to all controls and equipment.

Fire hazard

Please ensure that there are a sufficient number of suitable fire extinguishers in the dyno room.
If in doubt, speak to your local health and safety requirements authorities or fire department.

Basic operation

Controls

The dynoKRAFT CFM24 Mobile Cooling Fan is equipped with various external indicators and controls.
Please refer to table below for their meaning and operation.

Control	Function	Comments
Emergency stop button (yellow-red)	Emergency STOP or emergency OFF button.	By pressing this button the cooling fan will be switched off. The run-out phase of cooling fan due to it's inertia is approx. 30 seconds! The emergency stop button is released by pulling it out.
Automatic "Reset"	The CFM24 Mobile Cooling Fan features "Automatic Start-up" No manual Reset function available!	The cooling fan will start automatically whenever the E-STOP button is released and control signal is present!

E-Stop procedure and reset

The following steps / functions are carried out while the emergency stop button (emergency OFF button) is pressed:

- the electric power to motor is cut off
- the cooling fan will slow-down until full stop in approx. 30 seconds

To reset the dynamometer after emergency stop event into normal operation mode please follow these steps:

- Examine the engine and dynamometer and fix any issues with the setup
- Investigate the room for potential hazard
- Verify in your dynamometer software or any external controller, that no Control Signal (0-5V) is supplied to cooling fan
- only when no control signal is supplied and if you're not able to identify any potential hazard please reset the E-stop button to power on the fan

Controlling the fan speed

The CFM24 Mobile Cooling Fan features built-in EATON DE1 VFD (Variable Frequency Drive).

As such the fan output (speed) can be controlled by supplying 0-5V DC signal.

Control logic is 0-5V => 0-1450 RPM (0-100% output)

(Signal input voltage limit is 10V DC, but exceeding 5V DC will not result in increased fan output)

This signal can be generated either by any voltage controller or can be supplied by most dynamometer controllers in relation to driving speed.

Connection to ext. voltage controller

Connect your DC voltage source to supplied 2-wire cable as follows:

WHITE - signal 0-5V DV

BROWN - ground

Adjust the fan output by alerting the signal voltage by adequate means (ex. potentiometer)

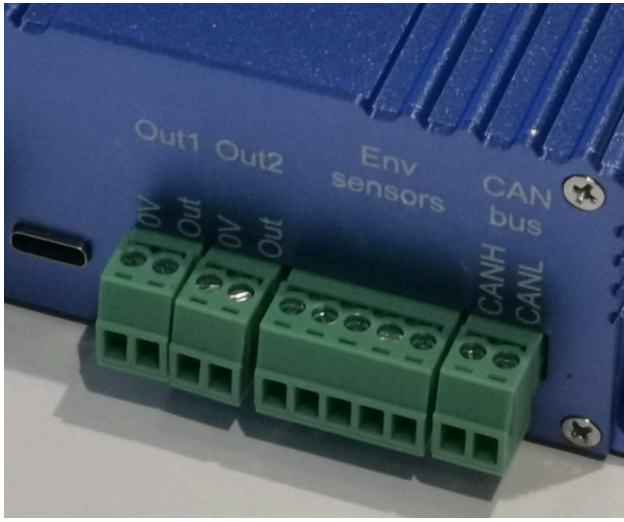
Connection to dynamometer controller (YourDyno / ADAQbase / ADAQexiom)

Connect the supplied 2-wire cable to any free OUTPUT on your dyno controller, as follows:

ADAQbase / YourDyno

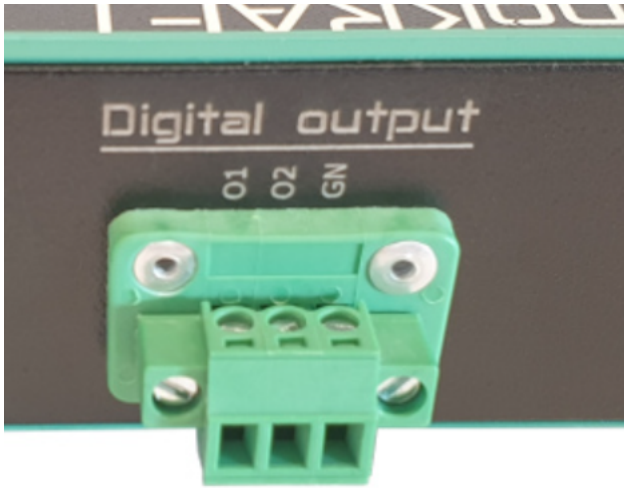
WHITE ---> Out 1: Out

BROWN ---> Out 1: 0V



ADAQxiom

WHITE ---> Digital Output: O1
 BROWN ---> Digital Output: GN



Adjust the fan output/speed in YourDyno software and/or ADAQxiom plugin.
 Please refer to corresponding User Manual for details.

Maintenance

Periodic maintenance by the operator

All dynoKRAFT equipment have been developed with a minimum of maintenance to enable problem-free operation for years. However, as with any high-performance equipment a basic, periodic maintenance is required to ensure problem-free operation.

Warning! Lethal hazard.

Before carrying out maintenance or repair work, always switch off the main power supply of the test bench and unplug the power cord. Please follow the warnings listed in the "Warnings" chapter!

What to do	OK condition	When to do
Check the function of the emergency stop system by pressing the emergency stop button.	OK condition: - Cooling Fan cannot be started by alerting Control Signal voltage	daily

Check whether all covering panels are correctly fixed.	OK condition: - all bolts are hand-tightened	daily
Check that the castors are locked down.	OK condition: - Castors can't be turned freely	daily

Yearly maintenance

ⓘ The annual maintenance may only be carried out by a qualified technician in accordance with the maintenance plan and reported to dynoKRAFT GmbH by E-mail with date, time and technician name. Any unauthorized maintenance of the dynoKRAFT test stand or failure to perform it will result in the immediate loss of the guarantee.

An initial maintenance must be carried out after 20 tests, then after 500 operating hours after commissioning.
The maintenance interval is 2000 operating hours or once per year.

Yearly maintenance scope includes:

- all daily and monthly check routines (as described above)
- torque-check of all bolts
- re-tighten the drive belt
- re-tighten all covering bolts

It is the customer's responsibility to ensure that annual maintenance is carried out as planned.