

INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS
MIXED FLOW FANS
MODEL VMBL — BELT DRIVE

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CAUTION!

DO NOT INSTALL, USE OR OPERATE THIS EQUIPMENT UNTIL THIS MANUAL HAS BEEN READ AND UNDERSTOOD. READ AND SAVE THESE SHEETS FOR FUTURE USE.

RECEIVING, HANDLING AND STORAGE

1. Handle the fan with care. Avoid severe jarring or dropping of the unit.
2. Carefully inspect the unit for damage upon delivery. If the unit has been damaged in transit it is the responsibility of the recipient to make all claims against the carrier.
3. Provide adequate, protected storage prior to installation.

INSTALLATION

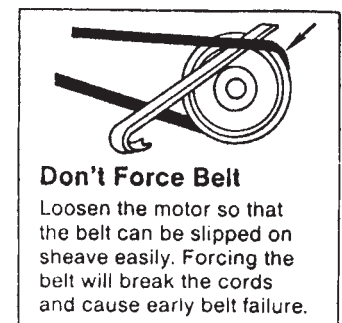
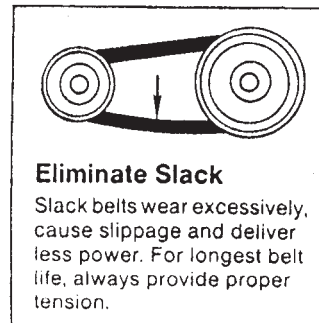
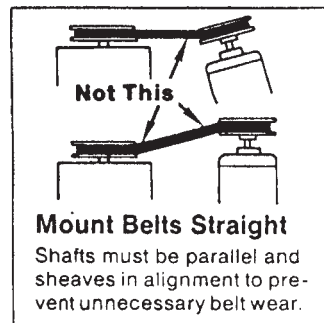
1. Upon unpacking, inspect the unit for any damage that may have occurred in transit. Check also for loose or missing parts.
2. **CAUTION!** This fan contains rotating parts and requires electrical service. Appropriate safety precautions should be taken during installation, operation and maintenance.
3. **WARNING!** Do not install or operate this fan in an environment or atmosphere where combustible or flammable materials, gasses or fumes are present, unless it has been specifically designed and manufactured for use in that environment. **Explosion** or **Fire** could result.
4. This ventilator is designed for floor or ceiling suspended mounting.
5. Attach the spring or R-I-S isolators to the mounting brackets. Be sure all fasteners are securely tightened.
6. Join the fan to the duct using any suitable flexible connector. Flexible connectors should overlap the fan and duct sufficiently to assure against leaks.
7. **CAUTION!** All electrical work must be done in accordance with local and/or national electrical code as applicable. If you are unfamiliar with methods of installing electrical wiring, secure the services of a qualified electrician.
8. **WARNING!** This product must be grounded.
9. **DANGER!** Make sure power is turned off and locked in **OFF** position at the service entrance before installing, wiring or servicing fan.
10. **CAUTION!** Before wiring the motor, check the supply voltage against the motor nameplate voltage. High or low voltage can damage the motor and void the warranty.
11. **WARNING!** Be sure to keep all wiring clear of rotating or moving parts.
12. **WARNING!** Before starting the fan, turn the wheel to assure it rotates freely. If needed, adjust the wheel/shaft bearing/motor position as required to achieve necessary clearances.
13. **CAUTION!** On belt drive units assure belts are tensioned and aligned properly. (See Maintenance section).
14. **WARNING!** Check all set screws and keys, tighten as necessary prior to fan start up. Anchor the fan securely using optional mounting brackets and suitable fasteners or other suitable means prior to operation.
15. Anchor the fan securely using optional mounting brackets and suitable fasteners or other suitable means prior to operation. (Refer to IO&M #1404).

OPERATION

1. **CAUTION!** Check that the fan inlet/ductwork/exhaust openings are clean and free of obstructions. Poor inlet conditions will result in seriously reduced fan performance.
2. **WARNING!** This fan contains rotating parts. Appropriate safety precautions should be taken during operation.
3. Operate under power and check for correct wheel rotation direction (clockwise when looking at top of the wheel).
4. **CAUTION!** Incorrect rotation can damage the fan motor and seriously impede fan operation.

MAINTENANCE

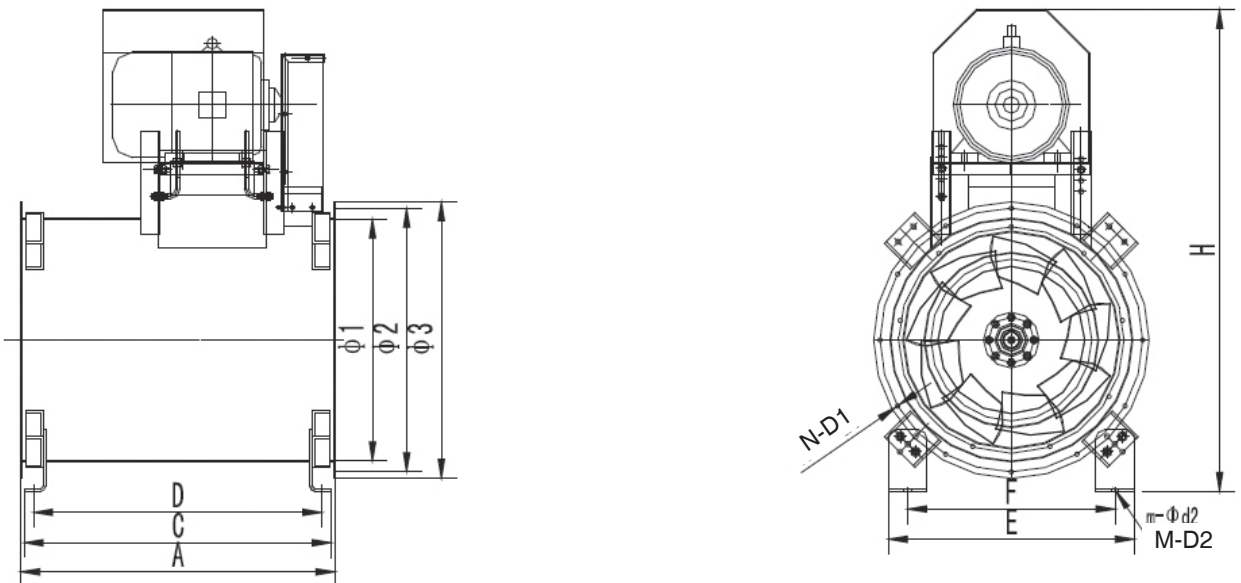
1. **DANGER!** Before performing and maintenance on the fan, be sure power is turned off and locked in the **OFF** position at the service entrance before servicing the fan.
2. Ventilators should be carefully checked at least once a year. For critical or rugged applications, a routine check every two or three months is suggested.
3. All motors supplied with CARNES ventilators carry a one year warranty from date of shipment. For repairs within the warranty period, the motor must be taken to the motor manufacturer's authorized service dealer. Contact your CARNES representative for additional warranty details.
4. Access to the motor compartment is possible by removing the motor cover or motor cover/motor tube assembly.
5. A periodic motor check should consist of spinning the motor shaft with the power off to be sure the motor turns freely and the bearings run smoothly. The belt on belt driven units should be removed from the motor sheave.
6. **CAUTION!** When removing or installing a belt, do not force the belt over the sheave. Loosen the motor mount so that the belt can be easily slipped over the sheave.
7. The belt on belt driven units should be removed and carefully checked for radial cracks, ply separation or irregular wear. A small irregularity in the contact surface of the belt will result in noisy operation. If any of these defects are apparent, the belt should be replaced. Check the sheave also for chipping, dents or rough surfaces which could damage the belt.
8. **CAUTION!** The correct belt tension is important. Too tight a belt will result in excess bearing pressure on the motor bearings and shaft pillow blocks, and may also overload the motor. Too loose a belt will result in slippage which will quickly "burn" out belts. A belt should feel "live" when thumped, approximately 1/4" belt deflection when subjected to finger pressure (3 to 5 lbs.) at midpoint between sheaves.
9. **CAUTION!** The belt alignment should also be checked to be sure the belt is running perpendicular to the rotating shafts. Motor and drive shafts must be parallel. Improper alignment will result in excessive belt wear.



10. **CAUTION!** Check sheave set screws to ensure tightness. Proper keys must be in keyways.
11. **CAUTION!** Do not readjust variable pitch sheave without checking motor amps. Do not readjust variable pitch sheaves above the maximum catalog RPM for unit and motor. If fixed sheaves are replaced, use only sheaves of identical size and type.
12. **CAUTION!** If adjustment of two groove variable pitch sheaves is required, each sheave must be opened or closed the same number of turns. Improper adjustment can cause excessive belt wear and premature failure.

13. If unit is to be left idle for an extended period (especially over summer months), it is recommended that belts be removed and stored in a cool, dry place to avoid premature belt failure.
14. The standard pillow block bearings on CARNES belt driven ventilators are permanently lubricated and are supplied with an oil base corrosion preventive compound. These should not require any service except that during the first few months of operation it is recommended the set screws holding the shaft be checked to be sure they are tight. (Proper tightness will permanently deform Allen wrench.)
15. The centrifugal fan when should not require maintenance except for removing foreign materials that may accumulate on the blades. The balance weights should not be disturbed. If a wheel has to be removed from the shaft, **do not apply force** that will damage the bearings or warp the wheel. Use a wheel puller.
16. Access to the wheel for alignment purposes can be obtained by removing the motor lid and/or motor tube. Lateral adjustment is made with the motor mount. Vertical adjustment is made at the bearings.
17. Should it be necessary to remove the wheel, access is through the fan plate. Do not remove the motor/motor mount assembly. Carefully support the motor/motor mount assembly and remove all the fan plate fasteners. Carefully removed the entire assembly from the unit base. To rebuild, assemble in reverse order.

Safe installation and operation of fans is the responsibility of those who design, install, maintain and use the equipment. For general guidelines and safety recommendations, please refer to AMCA Publication 410-96. "Recommended Safety Practices for Users and Installers of Industrial and Commercial Fans." (Contact your local Carnes Representative for your free copy.)



DIMENSIONS LISTED IN INCHES

Model	Wheel	1	2	3	A	C	D	E	F	N	D1	M	D2	H (Max)	Weight (lb)
12	15.75	18	19	21	24	23	22	19	16	8	0	4	1	39	130
15	17.75	20	22	23	28	27	25	21	18	12	0	4	1	42	157
16	19.75	22	24	25	29	28	26	23	19	12	0	4	1	46	201
18	22.0	25	26	28	33	29	27	20	16	12	0.472	4	0.591	48	254
20	24.25	28	30	31	36	32	31	24	20	12	0.472	4	0.591	55	355
23	28.0	32	34	35	38	34	32	28	24	16	0.472	6	0.591	57	403
27	31.5	36	38	39	42	39	37	31	27	16	0.551	6	0.787	63	542
30	35.5	40	42	43	48	44	42	35	31	16	0.551	6	0.787	67	644
33	39.5	44	46	48	52	47	45	39	34	20	0.551	6	0.787	72	847
36	44.0	50	52	54	58	55	53	43	35	20	0.551	6	0.787	81	1164
40	49.25	56	58	60	64	60	58	48	40	20	0.551	6	0.787	87	1495

COMMON PARTS LIST VMBL 12-40

Unit Size	Purchased Fan	Motor Mount	Impeller	Shaft	Motor Cover	Rubber Floor Isolator	Spring Floor Isolator	Spring Hanging Isolator	Inlet Screen	Outlet Screen	Companion Flange
12	999-3601	386-0601	999-3621	999-3641	386-0621	999-3791	999-3771	999-3741	999-3701	999-3701	999-3661
15	999-3602	386-0602	999-3622	999-3642	386-0622	999-3791	999-3771	999-3741	999-3702	999-3702	999-3662
16	999-3603	386-0602	999-3623	999-3643	386-0623	999-3791	999-3771	999-3741	999-3703	999-3703	999-3663
18	999-3610	386-0602	999-3630	999-3650	386-0624	999-3791	999-3771	999-3741	999-3704	999-3704	999-3664
20	999-3604	386-0611	999-3624	999-3644	386-0625	999-3791	999-3771	999-3741	999-3705	999-3705	999-3665
23	999-3605	386-0611	999-3625	999-3645	386-0626	999-3791	999-3771	999-3741	999-3706	999-3706	999-3666
27	999-3606	386-0611	999-3626	999-3646	386-0627	999-3792	999-3772	999-3742	999-3707	999-3707	999-3667
30	999-3607	386-0611	999-3627	999-3647	386-0628	999-3793	999-3773	999-3743	999-3708	999-3708	999-3668
33	999-3608	386-0611	999-3628	999-3648	386-0629	999-3793	999-3774	999-3744	999-3709	999-3709	999-3669
36	999-3611	386-0612	999-3631	999-3651	386-0630	999-3794	999-3775	999-3745	999-3710	999-3710	999-3670
40	999-3609	386-0612	999-3629	999-3649	386-0631	999-3794	999-3775	999-3745	999-3711	999-3711	999-3671



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