AIR TECH SYSTEMS

Technical brochure

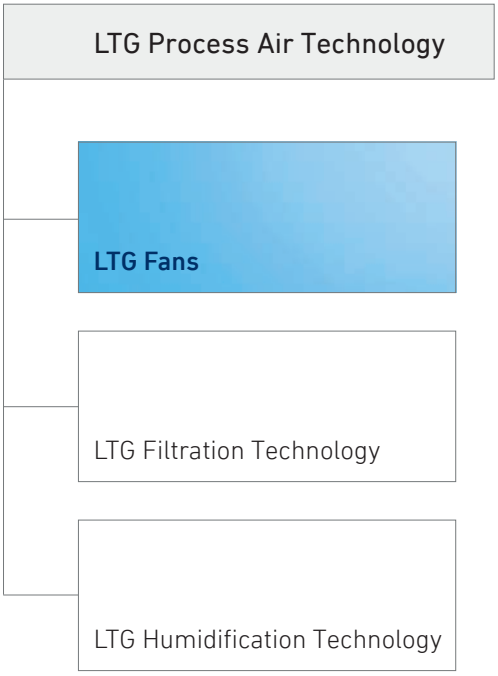
LTG Fans

Tangential fans

Type TA / TE 60

Impeller diameter 2.4 " (60 mm)

www.LTG-Inc.net



Content

	Page
General	**3**
Flow principle	3
Advantages	3
Application of LTG High Performance Tangential Fans	3
Position of the fan	3
Installation and start up	3
Motor arrangement	3
Type TA, Impeller diameter 2.4 " (60 mm)	**4**
Service conditions	4
Dimensions	4
Specification and design features	4
Type TA h with heating element, Impeller diameter 2.4 " (60 mm)	**5**
Service conditions	5
Dimensions	5
Specification and design features	5
Wiring diagram - heating element	6
Electrical wiring diagram 3 phase - heating element TA h 60 /.../ 3~..	7
Type TE t, Impeller Diameter 2.4 " (60 mm)	**8**
Service conditions	8
Dimensions	8
Specification and design features	8
Type TA and TE t, Impeller Diameter 2.4 " (60 mm)	**9**
Fan curves - Implementation N	9
Fan curves - Implementation 2-pole	11
Acoustical data	11
Fan curves - Implementation 24 V DC	13
Acoustical data	13
Fan curves - Implementation US	15
Acoustical data	15
Electrical connections A/C motor	17
Electrical connections D/C motor	17
Selection	**18**

Comment

Dimensions in this technical documentation are given in inches (mm).

General tolerances according to DIN ISO 2768-cl apply.

General

An advantage for best heating, cooling, drying, air sweeping

Many production processes require a linear extended and absolutely even distribution of air or other gases to the working area.

Because of their special design, tangential fans meet these requirements especially well.

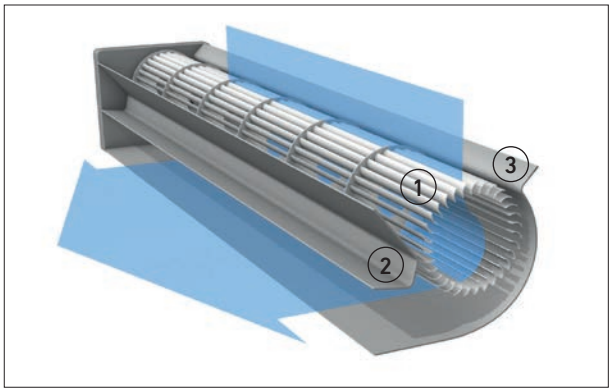
The rigid design and the use of high quality materials secure a long service life.

The working principle that does away with the need for additional baffles and vanes and the space saving design makes the use of tangential fans very economical.

Flow principle

The air intake of tangential fans takes place over the whole length of the outer impeller periphery. The air then flows into the impeller interior where it is reversed and accelerated by the vortex caused by the impeller rotation. Finally the air is distributed at the discharge side over the whole impeller length. In this way the air flows through the impeller first from outside to inside and then from inside to outside. The impeller is a cylindrical cage of forward curved impeller blades with two or more supporting discs

The vortex separates suction side and discharge side at the narrowest line between impeller ① and vortex inducer ② and causes the flow pattern together with the scroll ③.



① *Impeller*
② *Vortex inducer*
③ *Fan scroll*

Advantages

- Uniform air flow over the entire fan width. Additional baffles, plenums and guide vanes are not required.
- Space saving due to a 90° or 180° airflow deflection.
- The fan width can be exactly matched to the machine width. The air flow pattern does not change with wider machines (simplifies design and drawings of modular systems).
- Works equally well in any arrangement (right hand drive or left hand drive available).
- Low noise operation due to aerodynamic design of casing and impeller.
- Long life expectancy due to the robust design and location of impeller bearings out of the air flow.
- Many bolt-on options.

Application of LTG High Performance Tangential Fans

Agricultural technology, air conditioning technology, apparatus engineering, automotive industry, bakery technology, biomedical industry, building material industry, chemical industry, cleaning technology, control panel technology, dedusting technology, drying technology, electronic industry, environmental simulations, food industry, furnace technology, heat treatment technology, mechanical and plant engineering, medical technology, packaging industry, paper industry, pharmaceutical industry, power plant engineering, process engineering, railway technology, refrigeration technology, store design, surface technology, swimming pool technology, textile machinery design, tobacco industry, transportation cooling, wood industry...

Position of the fan

Standard arrangement is horizontal. With vertical arrangement the drive motor has to be at the bottom.

Installation and start up

Mount the fans to a plane base frame without any distortion. Utilize only the bolt holes in the side elements. Make sure to observe the applicable safety codes before starting the fans.

Motor arrangement

With the suction opening on top and viewing the discharge opening the driving motor is either on the right hand or the left hand side.

Type TA, Impeller diameter 2.4" (60 mm)

Fig.: Tangential fan Type TAR 60 (motor right hand side)

Service conditions

Gas temperatures:

-40 up to +160 °F (-40 up to +70 °C)

Ambient temperatures:

Drive side with motor: -13 up to +105 °F (-25 up to +40 °C)
Counter side: -40 up to/ +160 °F (-40 up to +70 °C)

Specification and design features

Tangential fan with close coupled, spray water protected drive motor.

Motor right hand side = TAR, motor left hand side = TAL

Corrosion proof impeller and rigid bolted casing. Impeller and casing in aluminum. Side elements of stainless steel.

On the drive side the impeller is supported by an elastic coupling on the motor shaft. On the counter side, the impeller is supported by vibration damped ball bearings. Bearing design life is 20 000 hours.

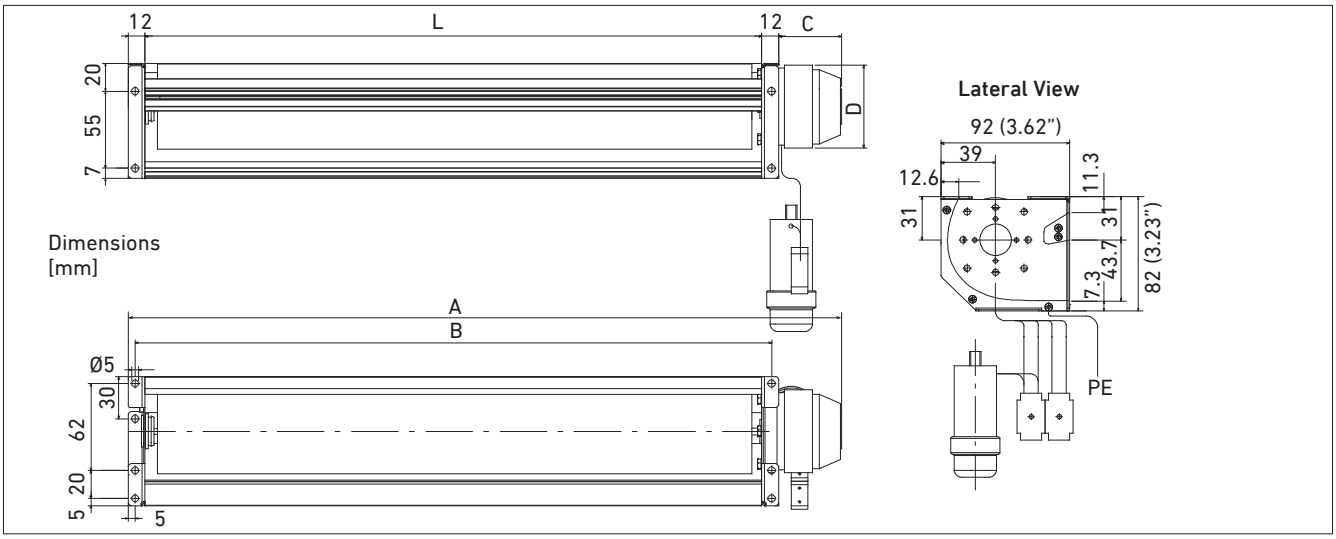
Low noise operation due to the aerodynamic design of the casing and impeller.

Motor connection according to the wiring diagram on page 15.

The following drive types are possible:

TA 60/.../US	Motor 115 V / 50 Hz / 60 Hz
TA 60/.../N	Motor 230 V / 50 Hz
TA 60/.../24 V DC	Motor 24 V (16 V - 28 V), speed control by control voltage, see wiring diagram.

Dimensions



Type	Dimensions [inch] [mm]									
	L	B	A		C		D		Weight [lb] [kg] abt.	
			N / US	24 V DC	N / US	24 V DC	N / US	24 V DC	N / US	24 V DC
TA 60/145	5.71 (145)	6.26 (159)	8.50 (216)	8.82 (224)	1.85 (47)	2.17 (55)	2.32 (59)	2.83 (72)	1.9 (0.9)	2.2 (1.0)
TA 60/195	7.68 (195)	8.23 (209)	10.47 (266)	10.79 (274)					2.1 (0.9)	2.3 (1.1)
TA 60/260	10.24 (260)	10.79 (274)	13.03 (331)	13.35 (339)					2.3 (1.0)	2.6 (1.2)
TA 60/315	12.4 (315)	12.95 (329)	15.20 (386)	15.51 (394)					2.5 (1.1)	2.8 (1.3)
TA 60/385	15.16 (385)	15.71 (399)	17.95 (456)	18.27 (464)					2.7 (1.2)	3.0 (1.4)
TA 60/440	17.32 (440)	17.87 (454)	20.12 (511)	20.43 (519)					2.9 (1.3)	3.2 (1.4)
TA 60/530	20.87 (530)	21.42 (544)	23.62 (600)	23.94 (608)					3.0 (1.4)	3.2 (1.5)
TA 60/615	24.21 (615)	24.76 (629)	26.97 (685)	27.28 (693)					3.3 (1.5)	3.6 (1.6)

Type TA h with heating element, Impeller diameter 2.4" (60 mm)

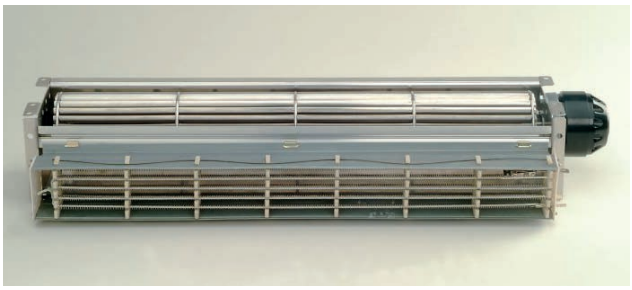


Fig.: Tangential fan Type TAR h 60 (motor right hand side)

Service conditions

Gas temperatures:

-40 up to +160 °F (-40 up to +70 °C)

Ambient temperatures:

Drive side with motor: -13 up to +105 °F (-25 up to +40 °C)
Counter side: -40 up to +160 °F -(40 °up to +70 °C)

Specification and design features

Tangential fan with close coupled, spray water protected drive motor.

Motor right hand side = TARh, motor left hand side = TALh

Corrosion proof impeller and rigid bolted casing. Impeller and casing in aluminum.

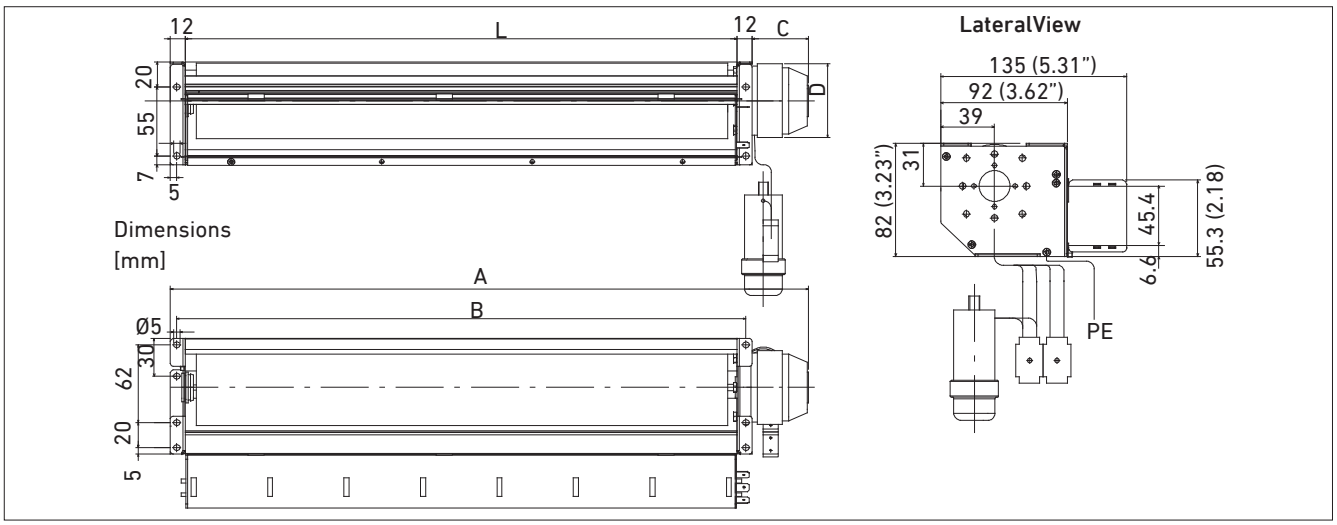
On the drive side the impeller is supported by an elastic coupling on the motor shaft. On the counter side the impeller is supported by vibration damped ball bearings. Bearing design life is 20 000 hours.

Low noise operation due to the aerodynamic design of the casing and impeller. The heating elements are provided with over-heat protection and may be connected as shown in the chart (see next page).Motor connection according to the wiring diagram on page 17.

The following drive types are possible:

TA h 60/.../US	Motor 115 V / 50 Hz / 60 Hz
TA h 60/.../N	Motor 230 V / 50 Hz
TA h 60/.../24 V DC	Motor 24 V (16 V - 28 V) speed control by control voltage see wiring diagram.

Dimensions



Type	Dimensions [inch] [mm]									
	L	B	A		C		D		Weight [lb] [kg] abt.	
			N / US	24 V DC	N / US	24 V DC	N / US	24 V DC	N / US	24 V DC
TA h 60/145	5.71 (145)	6.26 (159)	8.50 (216)	8.82 (224)					2.4 (1.1)	2.7 (1.2)
TA h 60/195	7.68 (195)	8.23 (209)	10.47 (266)	10.79 (274)					2.6 (1.2)	2.9 (1.3)
TA h 60/260	10.24 (260)	10.79 (274)	13.03 (331)	13.35 (339)					2.9 (1.3)	3.2 (1.5)
TA h 60/315	12.4 (315)	12.95 (329)	15.20 (386)	15.51 (394)	1.85 (47)	2.17 (55)	2.32 (59)	2.83 (72)	3.2 (1.4)	3.4 (1.6)
TA h 60/385	15.16 (385)	15.71 (399)	17.95 (456)	18.27 (464)					3.5 (1.6)	3.7 (1.7)
TA h 60/440	17.32 (440)	17.87 (454)	20.12 (511)	20.43 (519)					3.7 (1.7)	4.0 (1.8)
TA h 60/530	20.87 (530)	21.42 (544)	23.62 (600)	23.94 (608)					4.0 (1.8)	4.4 (2.0)
TA h 60/615	24.21 (615)	24.76 (629)	26.97 (685)	27.28 (693)					4.4 (2.0)	4.7 (2.1)

Type TA h with heating element, Impeller diameter 2.4" (60 mm)

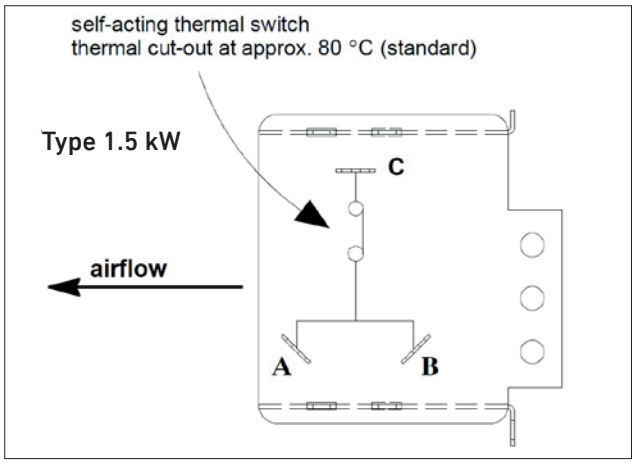
Wiring diagram – heating element

The thermostat will switch off the heating element whenever the standard limit is exceeded and resume operation when dropping below.

Attention: The thermostat is for self protection of heating. Do not use it for control and safety purposes! They must be ensured through external measures on site by the customer.

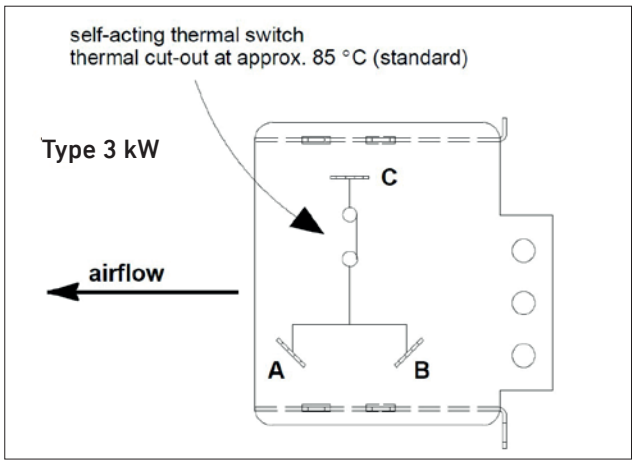
Supply voltage: 115 V AC or 230 V AC

All performance data apply to a supply voltage of 230 V AC.



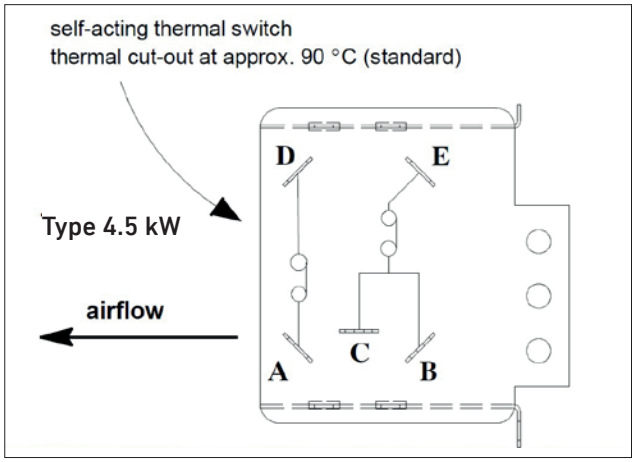
Heating element type 1.5 kW

Connection L	Connection N	Heating power
A	C	0.75 kW
B	C	0.75 kW
A + B	C	1.50 kW



Heating element type 3 kW

Connection L	Connection N	Heating power
A	C	1.50 kW
B	C	1.50 kW
A + B	C	3.00 kW

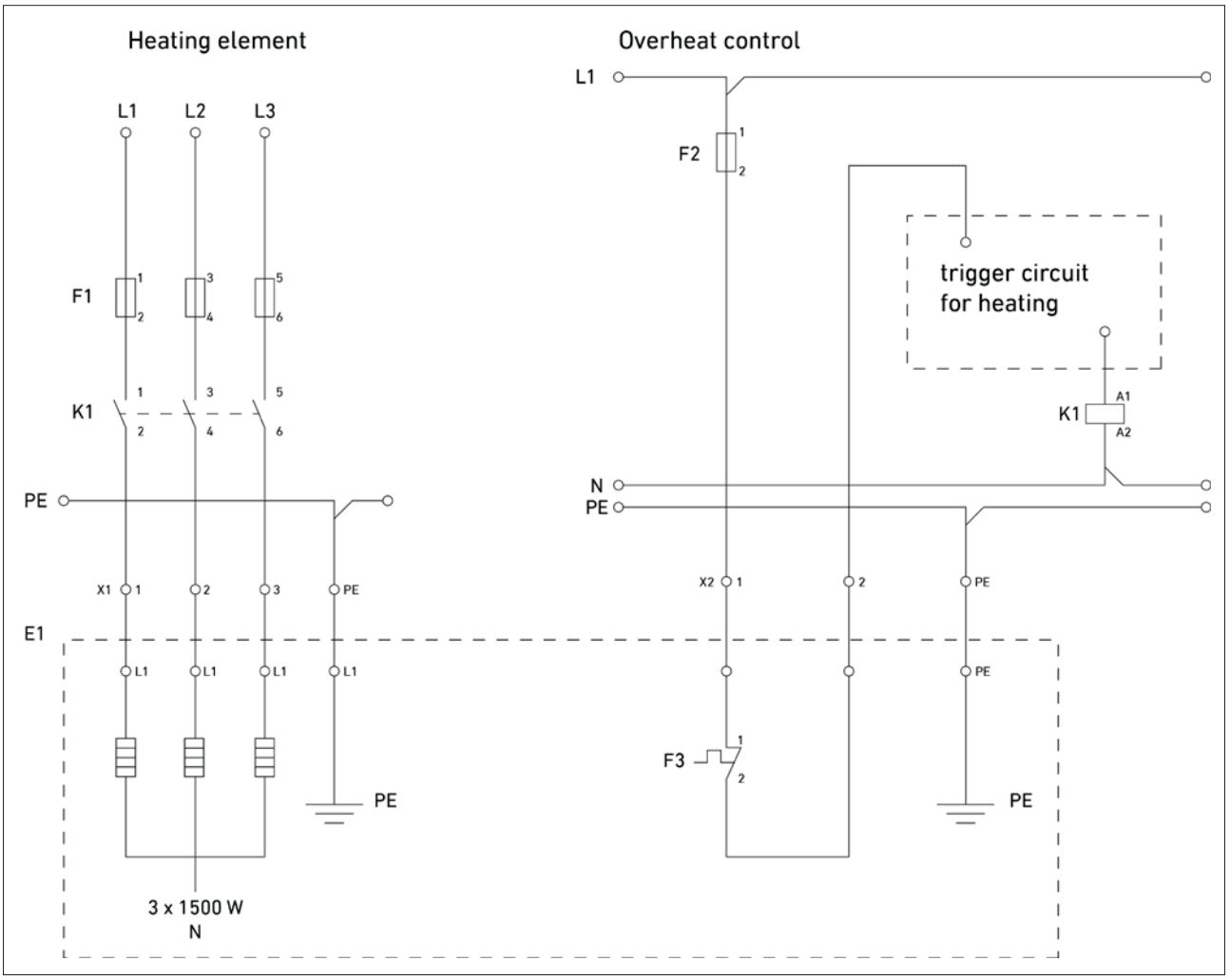


Heating element type 4.5 kW

Connection L	Connection N	Heating power
A	D	1.50 kW
A + B	D + E	3.00 kW
A + B + C	D + E	4.50 kW

Type TA h, with heating element, Impeller diameter 2.4" (60 mm)

Electrical wiring diagram 3 phase - heating element TA h 60 /.../ 3~..



Note: Thermoswitch listed separately

Type TE t, Impeller Diameter 2.4" (60 mm)

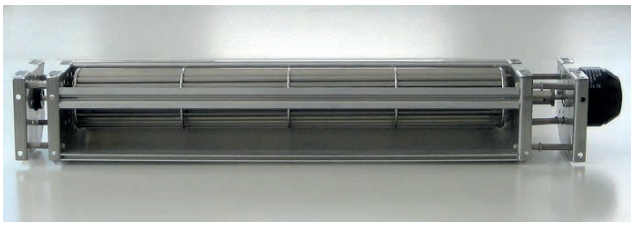


Fig.: Tangential fan type TEt 60 (motor right hand side)

Service conditions

Gas temperatures:
-40 up to +570 °F (-40 up to +300 °C)

Ambient temperatures:
Drive side with motor: -13 up to +105 °F (-25 up to +40 °C)
Counter side: -40 up to +160 °F (-40 up to +70 °C)

Caution! If necessary, additional convection cooling between the side elements is required!

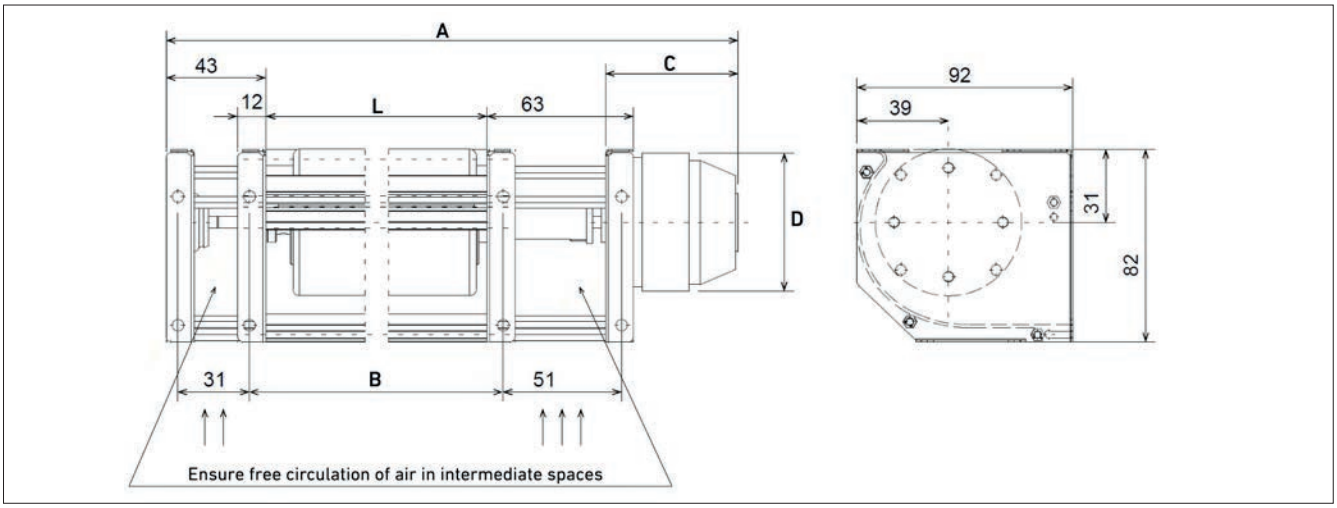
Specification and design features

Tangential fan with close coupled, spray water protected drive motor. Motor right hand side = TERt, motor left hand side = TELt Rigid bolted, corrosion proof casing of marine grade aluminum. Impeller, spacers, shaft flange and side elements of stainless steel. On the drive side the impeller is supported by an elastic coupling on the motor shaft. On the counter side, a ceramic shaft is used and it is mounted in the outer side portion. The motor and opposite side ball bearings have a minimum service life of 20 000 hours.
Discharge openings have sealing planes to connect exactly to ducts and appliances.
Low noise operation due to the aerodynamic design of the casing and impeller.
Motor connection according to the wiring diagram on page 17.

The following drive types are possible:

TE t 60/.../N	Motor 230 V / 50 Hz
TE t 60/.../24 V DC	Motor 24 V (16 V - 28 V) speed control by control voltage see wiring diagram.
TE t 60/.../US	Motor 115 V / 50 Hz / 60 Hz

Dimensions



Type	Dimensions [inch] [mm]									
	L	B	A		C		D		Weight [lb] [kg] abt.	
			N / US	24 V DC	N / US	24 V DC	N / US	24 V DC	N / US	24 V DC
TE t 60/145	5.71 (145)	6.26 (159)	11.22 (285)	11.54 (293)					2.6 (1.2)	2.9 (1.3)
TE t 60/195	7.68 (195)	8.23 (209)	13.19 (335)	13.50 (343)					2.8 (1.3)	3.0 (1.4)
TE t 60/260	10.24 (260)	10.79 (274)	15.75 (400)	16.06 (408)					3.0 (1.3)	3.3 (1.5)
TE t 60/315	12.4 (315)	12.95(329)	17.91 (455)	18.23 (463)	1.85 (47)	2.17 (55)	2.32 (59)	2.83 (72)	3.1 (1.4)	3.5 (1.6)
TE t 60/385	15.16 (385)	15.71 (399)	20.66 (525)	20.98 (533)					3.4 (1.5)	3.7 (1.7)
TE t 60/440	17.32 (440)	17.87 (454)	22.83 (580)	23.15 (588)					3.6 (1.6)	3.9 (1.7)
TE t 60/530	20.87 (530)	21.42 (544)	26.38 (670)	26.69 (678)					3.7 (1.7)	3.9 (1.8)
TE t 60/615	24.21 (615)	24.76 (629)	29.72 (755)	30.04 (763)					4.0 (1.8)	4.3 (2.0)

Type TA and TE t, Impeller Diameter 2.4" (60 mm)

Fan curves - Implementation N

The indicated curves are valid for an air density of ϱ = 1,2 kg/m³, if operated with standard motor 230 V / 50 Hz.

The rating tests were done as laboratory tests according to EN ISO 5801:2008 with unrestricted inlet and discharge.

Measuring tolerances for Δp:± 0.008 "wg (± 2 Pa);
Measuring tolerances for L_{WA}:± 2 dB(A)

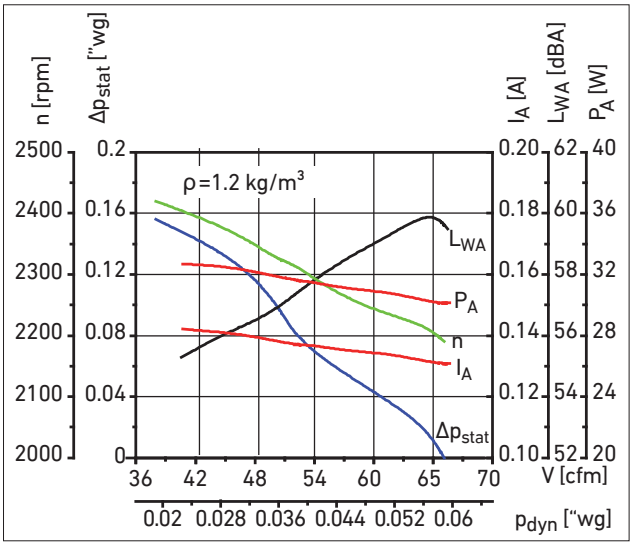
Acoustical data

The acoustical data are for discharge side, tested in a reverberant field.

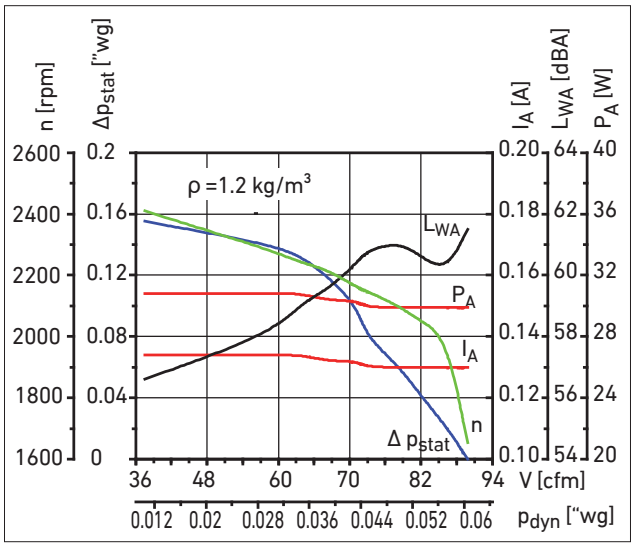
The A-weighted sound power level L_{WA} can be transformed into an A-weighted sound pressure level by the equation $L_{pA} = L_{WA}$ -10 lg S/1 m².
For this the exact total panel area S can be used.

The sound pressure level in the free field in 1 m distance (full spheric sound radiation) is abt. 11 dB less than the sound power level.

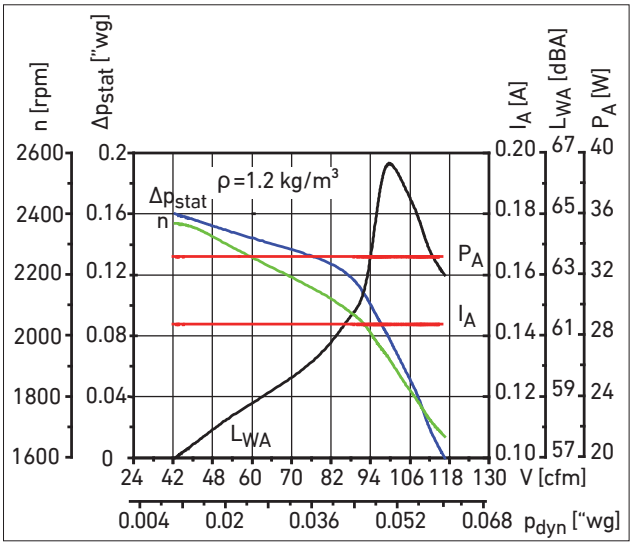
Fan curves for 230 V, 50 Hz



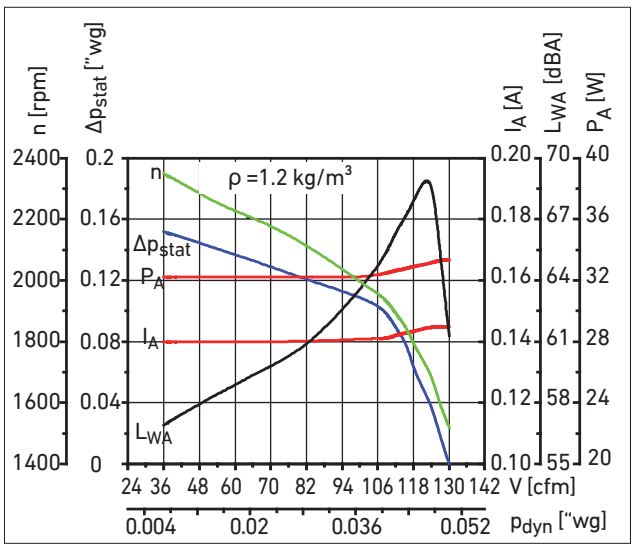
Fan curves for TA 60/145 N and TE t 60/145/N



Fan curves for TA 60/195 N and TE t 60/195/N



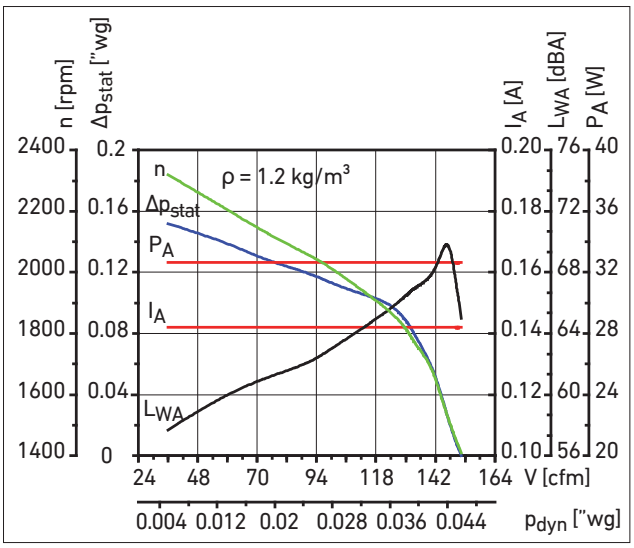
Fan curves for TA 60/260 N and TE t 60/260/N



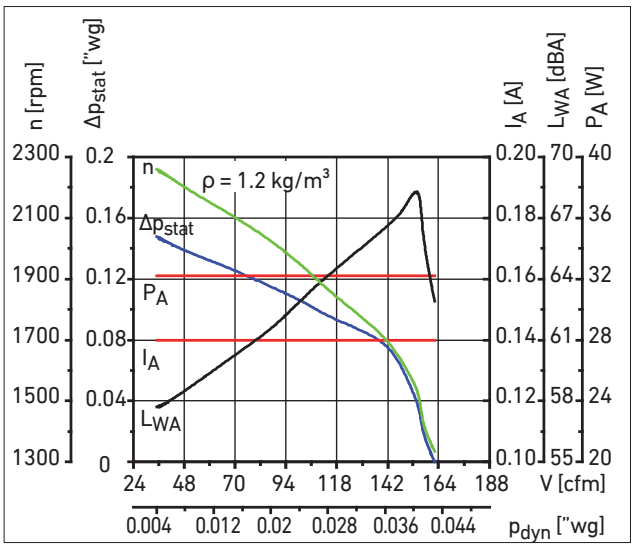
Fan curves for TA 60/315 N and TE t 60/315/N

Type TA and TE t, Impeller Diameter 2.4" (60 mm)

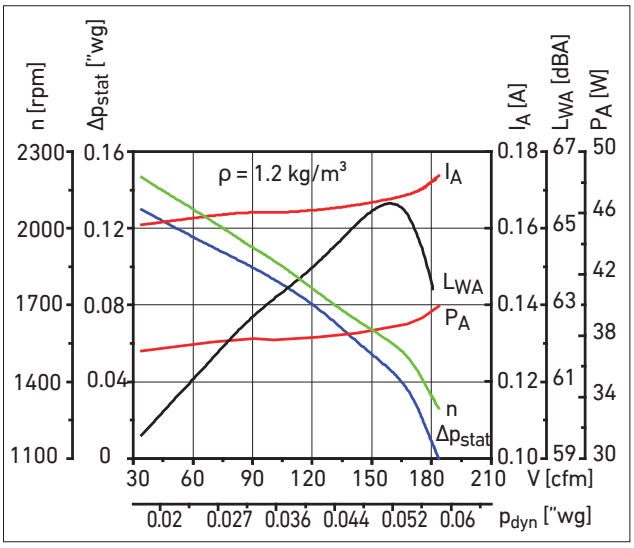
Measuring tolerances for Δp: ±0.008 "wg (± 2 Pa)
Measuring tolerances for L_{WA}: ± 2 dB(A)



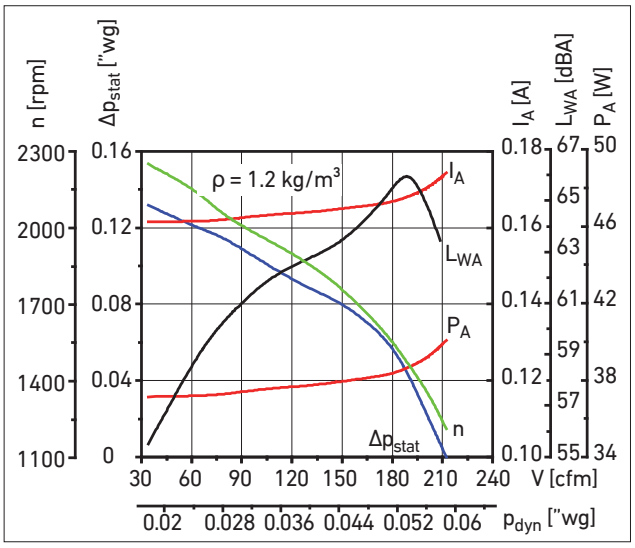
Fan curves for TA 60/385 N and TE t 60/385/N



Fan curves for TA 60/440 N and TE t 60/440/N



Fan curves for TA 60/530 N and TE t 60/530/N



Fan curves for TA 60/615 N and TE t 60/615/N

Description		
$\dot{V}$	[cfm]	flow rate
Δp_{stat}	["wg]	static pressure
Δp_{dyn}	["wg]	dynamic pressure at the discharge area
c	[m/s]	velocity at the discharge area
ϱ	[kg/m³]	specific gravity
Δp_{dyn}	= ϱ/2 • c²	dynamic pressure at the discharge area
I_A	= P_A / U	full load amps

n	[rpm]	speed
U	[V]	voltage
f	[Hz]	frequency
I_A	[A]	full load amps
P_A	[W]	power consumption
L_{WA}	[dB(A)]	A-weighted sound power level
L_{pA}	[dB(A)]	A-weighted sound power level
S	[m²]	panel area

Type TA and TE t, Impeller diameter 2.4" (60 mm)

Fan curves - Implementation 24 V DC

The indicated curves are valid for an air density of ϱ = 1,2 kg/m³ if operated with motor 24 V DC.

The rating tests were done as laboratory tests according to EN ISO 5801:2008 with unrestricted inlet and discharge.

Measuring tolerances for Δp: ± 0.008 "wg (± 2 Pa)
Measuring tolerances for L_{WA} : ± 2 dB(A)

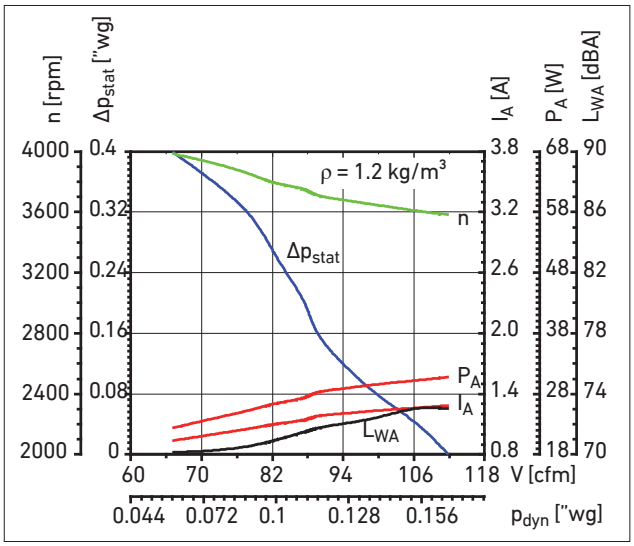
Acoustical data

The acoustical data are for discharge side, tested in a reverberant field.

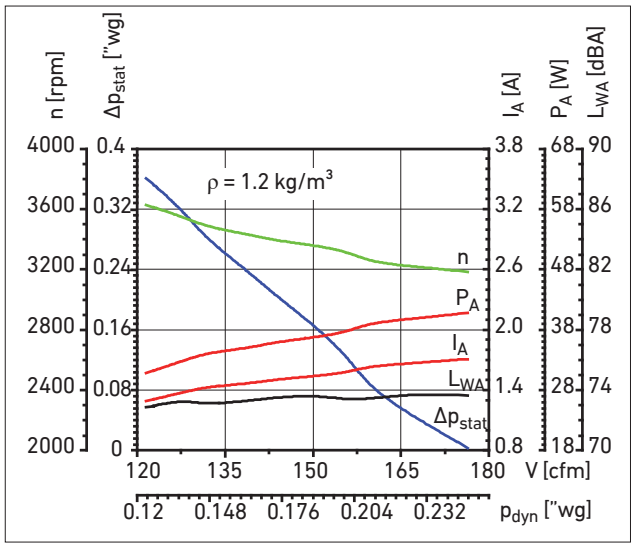
The A-weighted sound power level L_{WA} can be transformed into an A-weighted sound pressure level by the equation $L_{pA} = L_{WA}$ -10 lgS/1 m². For this the exact total panel area S can be used.

The sound pressure level in the free field in 1 m distance (full spheric sound radiation) is abt. 11 dB less than the sound power level.

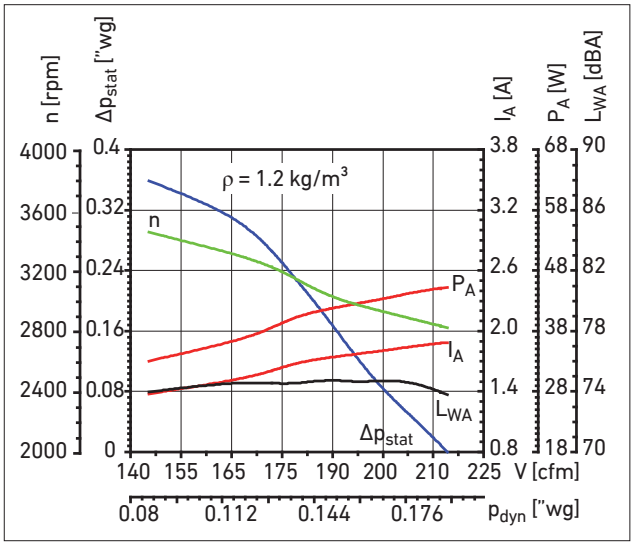
Fan curves for 24 V DC



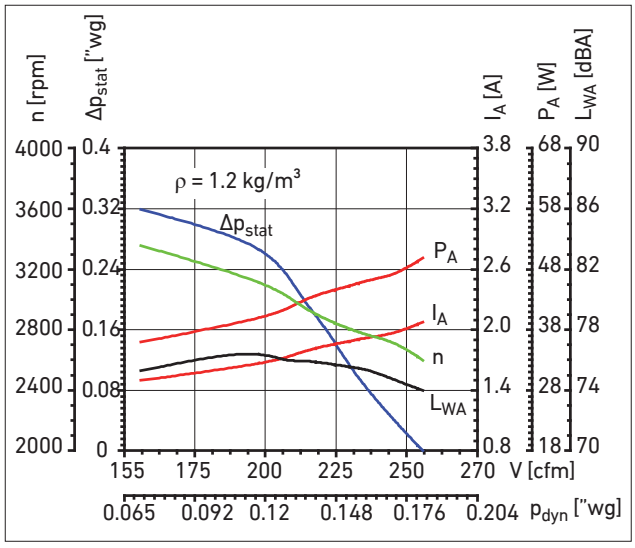
Fan curves for TA 60/145 24 V DC and TE t 60/145/24 V DC



Fan curves for TA 60/195 24 V DC and TE t 60/195/24 V DC



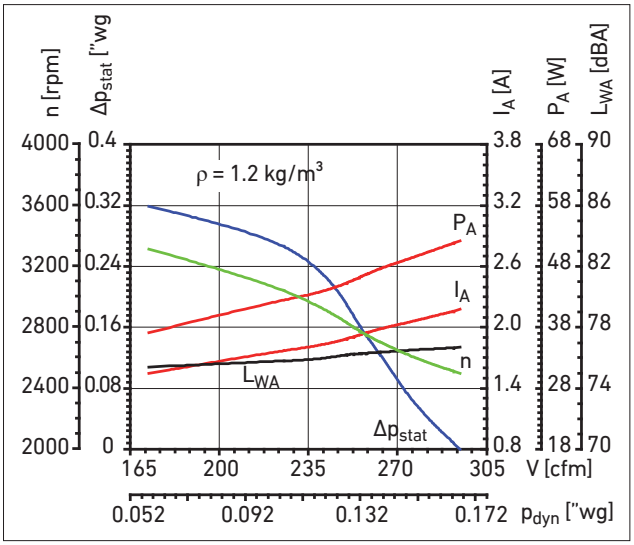
Fan curves for TA 60/260 24 V DC and TE t 60/260/24 V DC



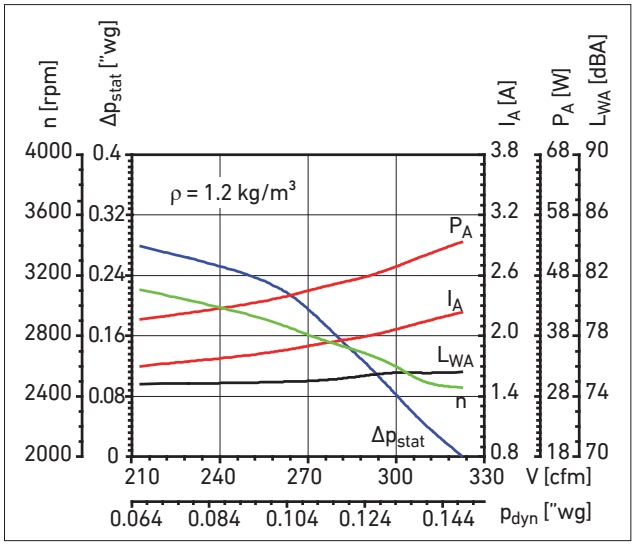
Fan curves for TA 60/315 24 V DC and TE t 60/315/24 V DC

Type TA and TE t, Impeller diameter 2.4" (60 mm)

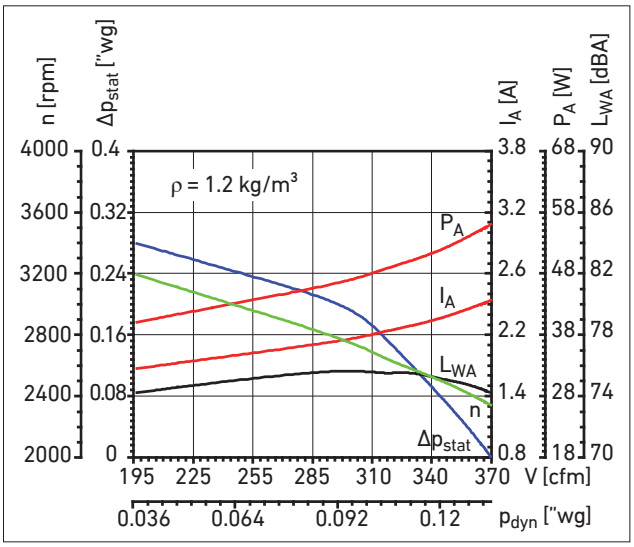
Measuring tolerances for Δp: ± 0.08 "wg (± 2 Pa)
Measuring tolerances for L_{WA}:± 2 dB(A)



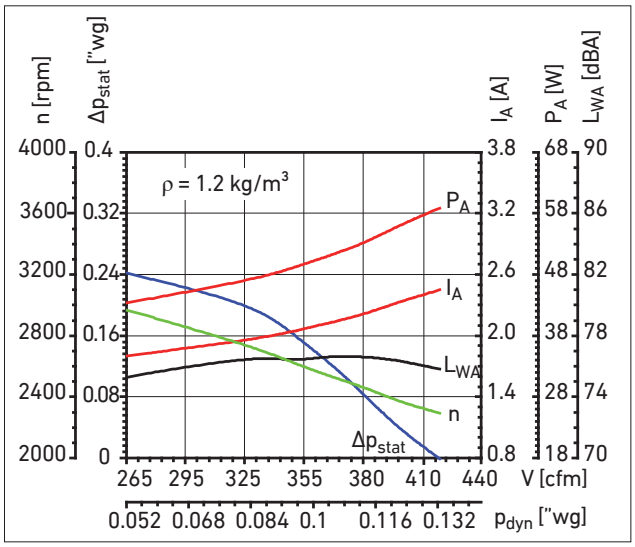
Fan curves for TA 60/385 24 V DC and TE t 60/385/24 V DC



Fan curves for TA 60/440 24 V DC and TE t 60/440/24 V DC



Fan curves for TA 60/530 24 V DC and TE t 60/530/24 V DC



Fan curves for TA 60/615 24 V DC and TE t 60/615/24 V DC

Description		
$\dot{V}$	[cfm]	flow rate
Δp_{stat}	["wg]	static pressure
Δp_{dyn}	["wg]	dynamic pressure at the discharge area
c	[m/s]	velocity at the discharge area
ϱ	[kg/m³]	specific gravity
Δp_{dyn}	= ϱ/2 • c²	dynamic pressure at the discharge area
I_A	= P_A / U	full load amps

n	[rpm]	speed
U	[V]	voltage
f	[Hz]	frequency
I_A	[A]	full load amps
P_A	[W]	power consumption
L_{WA}	[dB(A)]	A-weighted sound power level
L_{pA}	[dB(A)]	A-weighted sound power level
S	[m²]	panel area

Type TA and TE t, Impeller Diameter 2.4" (60 mm)

Fan curves - Implementation US

The indicated curves are valid for an air density of ϱ = 1,2 kg/m³ if operated with standard motor 115 V, 50/60 Hz.

The rating tests were done as laboratory tests according to EN ISO 5801:2008 with unrestricted inlet and discharge.

Measuring tolerances for Δp: ± 0.008 "wg (± 2 Pa)
Measuring tolerances for L_{WA}: ± 2 dB(A)

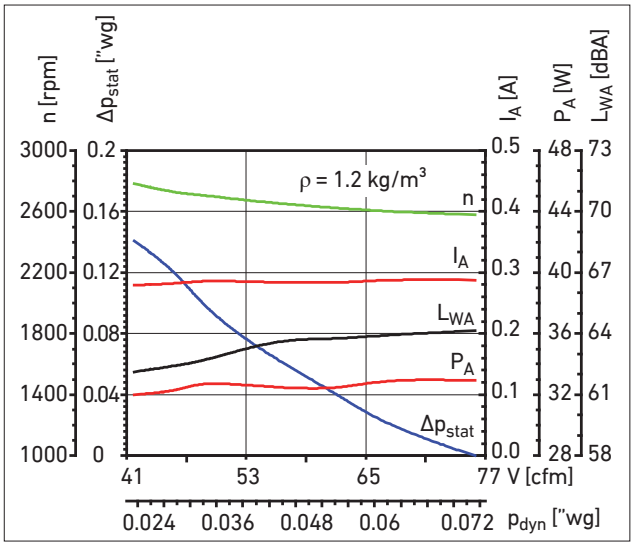
Acoustical data

The acoustical data are for discharge side, tested in a reverberant field.

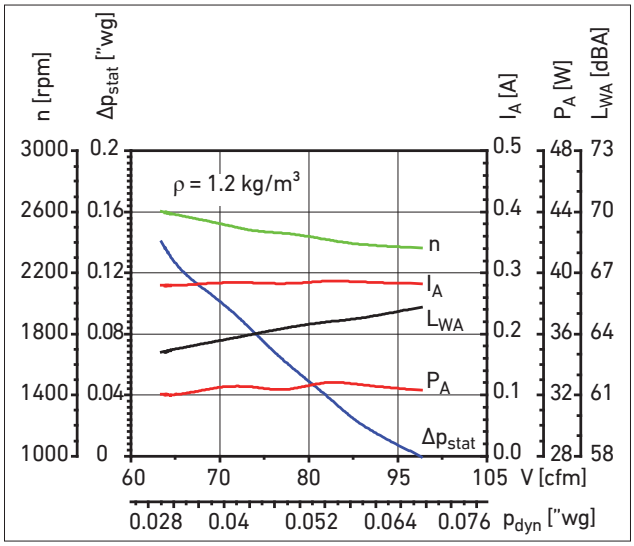
The A-weighted sound power level L_{WA} can be transformed into an A-weighted sound pressure level by the equation $L_{pA} = L_{WA}$ - 10 log S/1 m². For this the exact total panel area S can be used.

The sound pressure level in the free field in 1 m distance (full spheric sound radiation) is abt. 11 dB less than the sound power level.

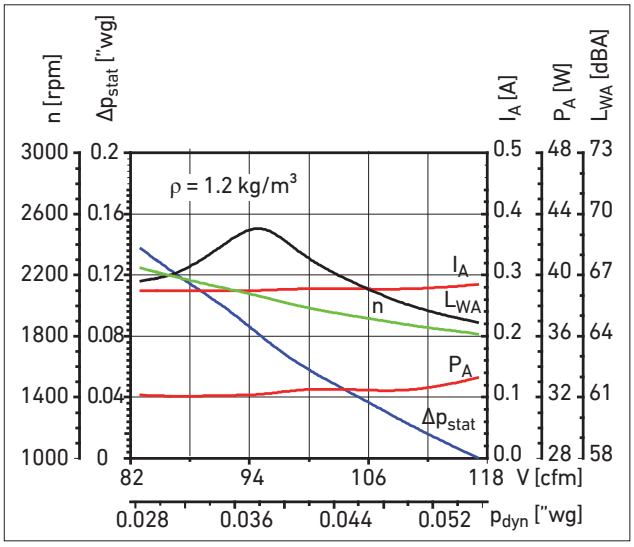
Fan curves for 115 V, 60 Hz



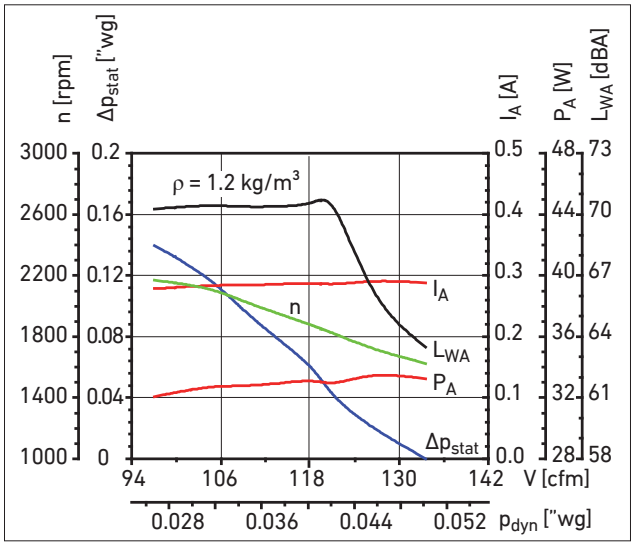
Fan curves for TA 60/145 US and TE t 60/145/US



Fan curves for TA 60/195 US and TE t 60/195/US



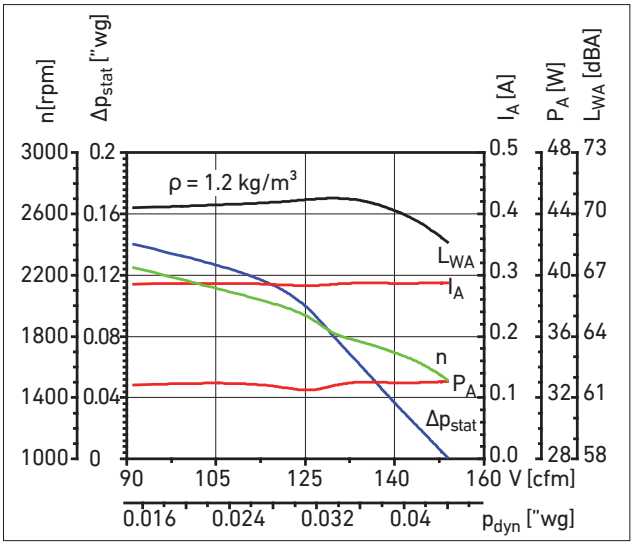
Fan curves for TA 60/260 US and TE t 60/260/US



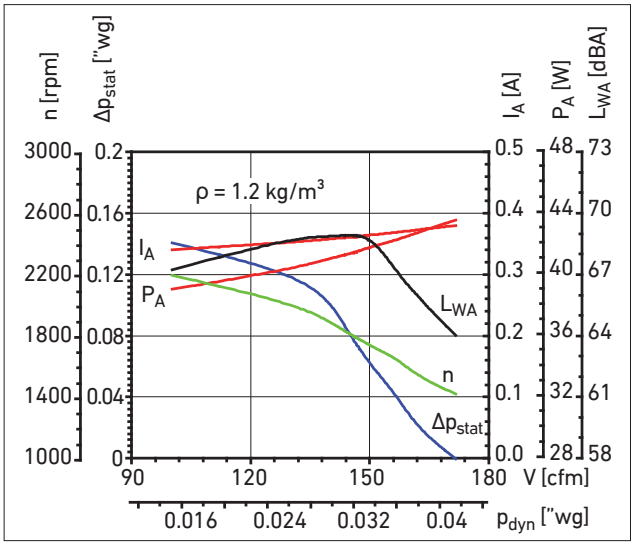
Fan curves for TA 60/315 US and TE t 60/315/US

Type TA and TE t, Impeller diameter 2.4" (60 mm)

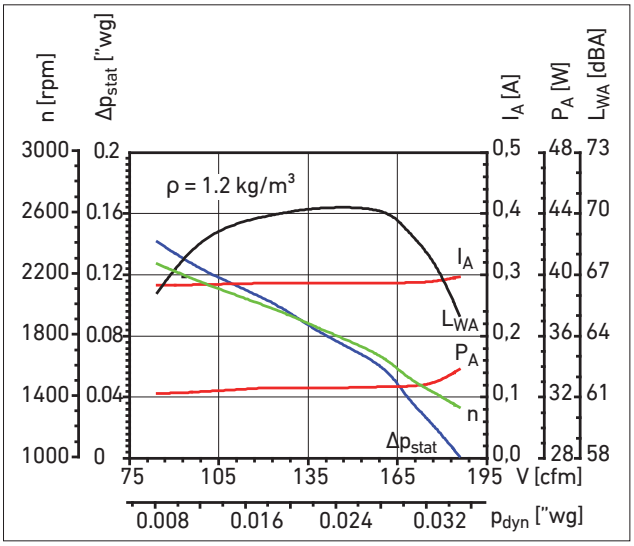
Measuring tolerances for Δp: ± 0.08 "wg (± 2 Pa)
Measuring tolerances for L_{WA}: ± 2 dB(A)



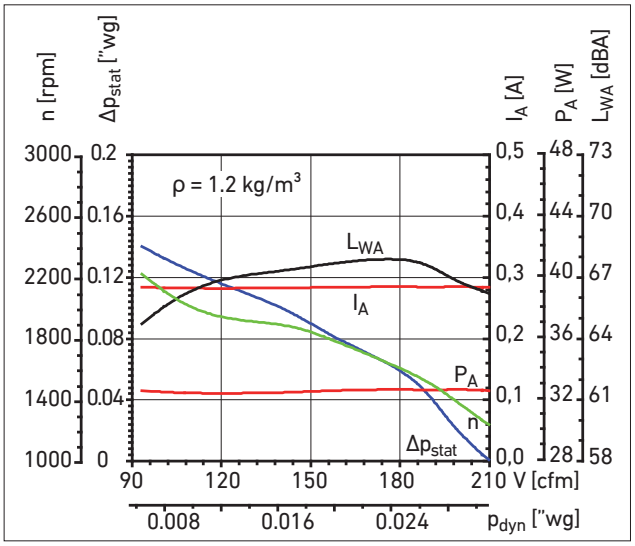
Fan curves for TA 60/385 US and TE t 60/385/US



Fan curves for TA 60/440 US and TE t 60/440/US



Fan curves for TA 60/530 US and TE t 60/530/US



Fan curves for TA 60/615 US and TE t 60/615/US

Description		
$\dot{V}$	[cfm]	flow rate
Δp_{stat}	["wg]	static pressure
Δp_{dyn}	["wg]	dynamic pressure at the discharge area
c	[m/s]	velocity at the discharge area
ϱ	[kg/m³]	specific gravity
Δp_{dyn}	= ϱ/2 • c²	dynamic pressure at the discharge area
I_A	= P_A / U	full load amps

n	[rpm]	speed
U	[V]	voltage
f	[Hz]	frequency
I_A	[A]	full load amps
P_A	[W]	power consumption
L_{WA}	[dB(A)]	A-weighted sound power level
L_{pA}	[dB(A)]	A-weighted sound power level
S	[m²]	panel area

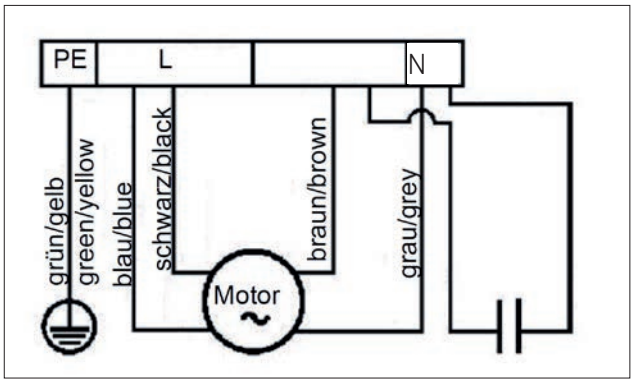
Type TA and TE t, Impeller Diameter 2.4" (60 mm)

Electrical connections A/C motor

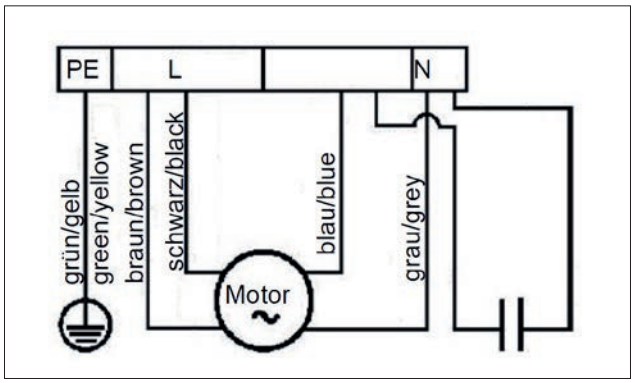
Driven by single-phase capacitor motor, 4-pole version, U = 115 V, f = 50 Hz / 60 Hz or U = 230 V, f = 50 Hz.

The motor is completely wired to the operating capacitor and provided with terminals (protection IP 10).

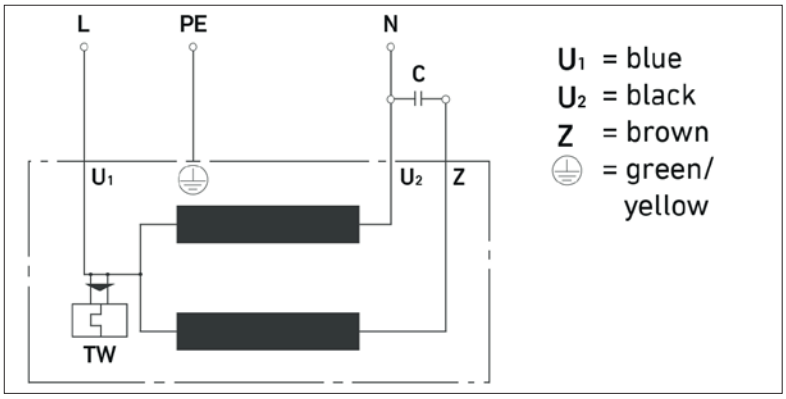
Wiring diagram



Wiring diagram TAR/TER ... N/US



Wiring diagram TAL/TEL ... N/US

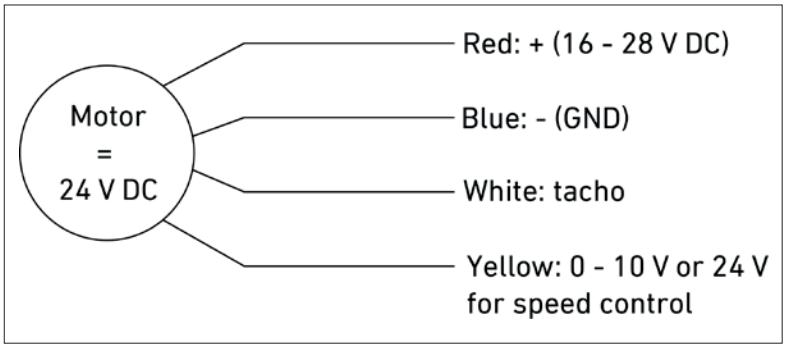


Wiring diagram TAR/TER ... 2p

Electrical connections D/C motor

For speed control, a control signal may be connected to the yellow cable. An applied DC voltage of 0 V DC results in a motor speed of 0 rpm and 10 V DC is rated speed. For continuous operation at rated speed, a voltage of 24 V AC should be applied.

Connecting lead when supplied with 4-pole connector housing (Stocko EH 716-004-003-960) with the following configuration: 1=red / 2=white / 3 =yellow / 4=blue.
Matching mating connector housing also included in supply.



Wiring diagram TA/TE ... 24 V DC

Selection

Application			Example	Your Data
Gas			cold air	
Gas temperature	t	[°F]	68	
ambient temperature drive side counter side	 t t	 [°F] [°F]	 77 77	
condensation			no	
located at			recirculating air fan	
drive side			right hand	
arrangement			horizontal	
Drive motor				
power supply			3-phase	
voltage	U	[V]	230	
frequency	f	[cps]	50	
Specified performance				
flow rate*	V	[cfm]	200	
static pressure*	Δp_{stat}	["wg]	25	
*at specific gravity	ϱ]	[kg/m³]	1.2	
active impeller length	min. L max. L	["] [mm] ["] [mm]	11.81 (300) 15.75 (400)	
total length	A	["] [mm]	19.69 (500)	
Procedure				
1. conditions of application fan type			cold air 68 °F TAR	
2. flow rate achievable with length	V	[cfm] ["] [mm]	120 12.4, 15.2, 17.3 (315, 385, 440)	
3. static pressure achievable with length	Δp_{stat}	["wg] ["]	1.2 (25 Pa) 12.4, 15.2, 17.3	
4. drive side			right hand	
Selected				
LTG Tangential fan type			TAR 60/385/N	
Performance data				
flow rate	V	[cfm]	120	
static pressure	Δp_{stat}	["wg]	1.2 (25 Pa)	
dynamic pressure	p_{dyn}	["wg]	0.034 (8,4 Pa)	
exhaust velocity	c [m/s]			
speed	n	[rpm]	1900	
Electrical data				
power input	P_A	[W]	33	
full load amps	I_A	[A]	0.143	
Acoustical data				
sound power level A-weighted	L_{WA}	[dB(A)]	29	
sound pressure level in the free field in 1 m distance (full spheric sound radiation)	L_{pA}	[dB(A)]	–	

Designations		
V	[cfm]	flow rate
Δp_{stat}	["wg]	static pressure
Δp_{dyn}	["wg]	dynamic pressure
c	[m/s]	velocity at the discharge area
ϱ	[kg/m³]	specific gravity
Δp_{dyn}	$= \varrho/2 \cdot c^2$	dynamic pressure
I_A	$= P_A / U$	full load amps
n	[rpm]	speed
U	[V]	voltage
f	[cps]	frequency
I_A	[A]	full load amps
P_A	[W]	power consumption
L_{WA}	[dB(A)]	A-weighted sound power
L_{pA}	[dB(A)]	A-weighted sound power level
S	[m²]	panel area

AIR TECH SYSTEMS

COMFORT AIR TECHNOLOGY

Air-Water Systems
Air Diffusers
Air Distribution

PROCESS AIR TECHNOLOGY

Fans
Filtration Technology
Humidification Technology

ENGINEERING SERVICES

Laboratory Test & Experiment
Field Measurement & Optimization
Simulation / Analysis
R&D & Start-up

LTG Aktiengesellschaft

Grenzstraße 7
70435 Stuttgart
Germany

Tel.: +49 711 8201-0
Fax: +49 711 8201-720

E-Mail: info@LTG.net
www.LTG.net

LTG Incorporated

105 Corporate Drive, Suite E
Spartanburg, SC 29303
USA

Tel.: +1 864 599-6340
Fax: +1 864 599-6344

E-Mail: info@LTG-INC.net
www.LTG-INC.net

TP_04.01.02(TA-TE60)_v5-0721_us
© LTG Aktiengesellschaft • Former editions are invalid • Subject to technical modifications.