# TRIVAC NT, Two-Stage Rotary Vane Vacuum Pumps TRIVAC NT 5 to NT 25



The TRIVAC NT is the latest generation ges and frequencies of well-proven rotary vane pumps. The performance and handling characteri-Low power consumption stics of the TRIVAC NT-series have been optimized and adapted to the

Beyond the accustomed quality and reliability of the previous TRIVAC B pumps, the TRIVAC NT has improved features regarding lower temperature, low noise operation.

increasing market requirements.

The lower pump temperature of the TRIVAC NT ensures a longer service life for the oil and longer service intervals. The NT pumps have been designed for reduced oil backstreaming and also low oil discharge levels on the exhaust side. The proven intake port valve of the TRIVAC B series has been optimised protecting the vacuum application against venting in the event of a power breakdown.

All pumps from the TRIVAC NT 5 to the TRIVAC NT 25 model are equipped either with a single-phase or three-phase motor. In the TRIVAC NT, the pump unit and the motor are linked by an elastic coupling.

#### **Advantages to the User**

TRIVAC NT 5/10

- High pumping speed
- Low noise operation
- Compact Design
- Plug & Play (oil-filled and with ISO-KF connection at delivery)
- Process Quality (low oil back streaming)
- Continuous operation at 1000 mbar

- Motors for all standard supply volta-
- High water vapour tolerance
- Simplified customizing ability
- Service-friendly

TRIVAC NT 16/25

- High pumping speed
- Low working temperature for longer
- Low noise operation
- Plug & Play (oil-filled and with ISO-KF connection at delivery)
- Continuous operation at 1000 mbar
- Anti-suck back valve controlled via the oil pressure
- Reduced oil consumption
- Low oil back streaming
- High water vapor tolerance
- Service-friendly

#### **Typical Applications**

- Research & Development
- Lamps and tubes manufacture
- Cooling and air-conditioning
- Freeze-drying systems
- Coating
- Electron beam microscopes
- Metallurgy
- Leak detection
- Gas analysis
- Vacuum degassing

For further typical applications refer to the section "General, Applications and Accessories".



#### **Supplied Equipment**

TRIVAC NT 5/10

- Small flanges
- Centering and clamping rings
- Dirt trap
- Oil filling
- For single phase regional motor: Mains cord with the specific plug for EURO, US and Japan motors
- Optional: Mains cord with country specific plug for the dual voltage
- Optional: Horizontal inlet and exhaust flange

TRIVAC NT 16/25

- Small flanges
- Centering and clamping rings
- Dirt trap
- Oil filling
- Attachment port for oil filter
- Optional: Mains cord with country specific plug for single phase
- Optional: Horizontal inlet and exhaust flange

Standard TRIVAC NT pumps come with a filling of oil N 62.

Special oil fillings can be specified.

All pumps are 100% subjected to a vacuum test before delivery!

#### **Custom Models**

- Brake fluid
- Oils for refrigerating machines, e.g. ester oils for refrigerant circuits with R 134 a
- Special motors

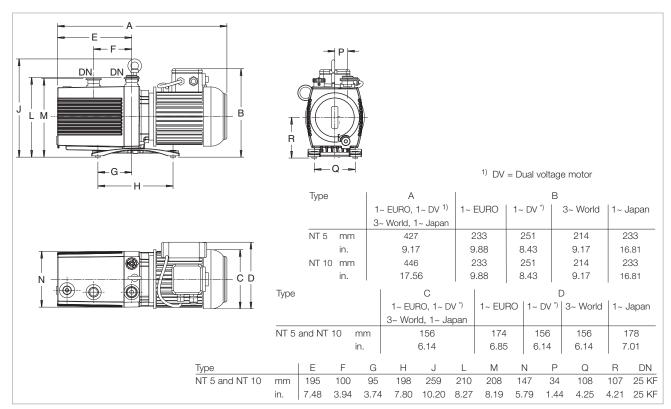
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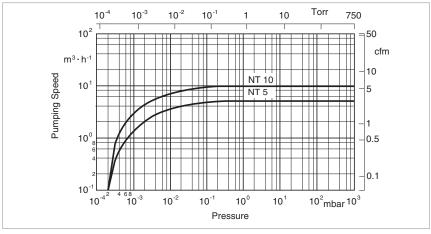
## TRIVAC NT 5 and NT 10



TRIVAC NT 5 and 10



Dimensional drawing for the TRIVAC NT 5 and NT 10



Pumping speed characteristics at 50 Hz

<b>Technical Data</b>	TRIVAC NT 5	TRIVAC NT 10		
	two-stage	two-stage		

		50 Hz	60 Hz	50 Hz	60 Hz
Nominal pumping speed 1)	m <sup>3</sup> /h (cfm)	6.0 (3.5)	7.3 (4.3)	12.0 (7.1)	14.6 (8.6)
Pumping speed 1)	m <sup>3</sup> /h (cfm)	5.2 (3.1)	6.0 (3.5)	9.9 (5.8)	11.3 (6.7)
Ultimate partial pressure without gas ballast <sup>2)</sup>	mbar (Torr)	$\leq 5 \times 10^{-4}$ ( $\leq 3.8 \times 10^{-4}$ )	$\leq 5 \times 10^{-4}$ $\leq (3.8 \times 10^{-4})$	$\leq 5 \times 10^{-4}$ ( $\leq 3.8 \times 10^{-4}$ )	$\leq 5 \times 10^{-4}$ ( $\leq 3.8 \times 10^{-4}$ )
Ultimate total pressure without gas ballast <sup>2)</sup> mbar (Torr)		$\leq 2 \times 10^{-3}$ ( $\leq 1.5 \times 10^{-3}$ )	$\leq 2 \times 10^{-3}$ ( $\leq 1.5 \times 10^{-3}$ )	$\leq 2 \times 10^{-3}$ ( $\leq 1.5 \times 10^{-3}$ )	$\leq 2 \times 10^{-3}$ ( $\leq 1.5 \times 10^{-3}$ )
Ultimate total pressure with gas ballast (stage 2) <sup>2)</sup>	mbar (Torr)	$\leq 3 \times 10^{-2}$ ( $\leq 2.25 \times 10^{-2}$ )	$\leq 3 \times 10^{-2}$ ( $\leq 2.25 \times 10^{-2}$ )	$\leq 3 \times 10^{-2}$ ( $\leq 2.25 \times 10^{-2}$ )	$\leq 3 \times 10^{-2}$ ( $\leq 2.25 \times 10^{-2}$ )
Water vapor tolerance stage 1 stage 2 stage 3	mbar (Torr) mbar (Torr) mbar (Torr)	10.0 (7.5) 30.0 (22.5) 40.0 (31.0)	10.0 (7.5) 20.0 (15.5) 30.0 (22.5)	10.0 (7.5) 20.0 (15.5) 40.0 (31.0)	10.0 (7.5) 20.0 (15.5) 30.0 (22.5)
Max. Water vapor capacity (stage	e 3) g/h	150	150	210	210
Oil filling, min. / max.	l (qt)	0.75 / 1.25 (0.79 / 1.32)			
Noise level <sup>1)</sup> to DIN 45 635 without / with gas ballast	dB(A)	≤ 49	≤ 49	≤ 49	≤ 49
Admissible ambient temperature EURO motor US/Japan motor	°C (°F) °C (°F)	+12 to +50 (+54 to +122) +12 to +40 (+54 to +104)	+12 to +50 (+54 to +122) +12 to +40 (+54 to +104)	+12 to +50 (+54 to +122) +12 to +40 (+54 to +104)	+12 to +50 (+54 to +122) +12 to +40 (+54 to +104)
Motor rating	W (HP)	450 (0.61)	550 (0.75)	450 (0.61)	550 (0.75)
Nominal speed	rpm	1350	1650	1350	1650
Type of protection	IP	54	54	54	54
Weight with oil filling	kg (lbs)	22.1 (48.8)	22.1 (48.8)	24.2 (53.4)	24.2 (53.4)
Connections, Intake and Exhaust	: DN	25 KF	25 KF	25 KF	25 KF

<sup>1)</sup> To DIN 28 426 T1

We can only guarantee that the pump will meet its specifications when using the type of lubricant which has been specified by us.

<sup>1)</sup> To DIN 28 400 ff

#### **Technical Data TRIVAC NT 5 TRIVAC NT 10** two-stage two-stage

two stage	two stage
Part No. 140 212 <sup>1)</sup>	Part No. 140 312 <sup>1)</sup>
Part No. 140 213	Part No. 140 313
Part No. 140 214	Part No. 140 314
Fait No. 140 214	Fait No. 140 314
Part No. 140 216	Part No. 140 316
Part No. 200 81 091	Part No. 200 81 091
Part No. 200 81 097	Part No. 200 81 097
Part No. 200 81 099	Part No. 200 81 099
Part No. 200 81 141	Part No. 200 81 141
Part No. 200 81 090	Part No. 200 81 090
upon request	upon request
Part No. 190 50 <sup>2)</sup>	_
-	Part No. 190 51 <sup>4)</sup>
Part No. 189 06 <sup>2)</sup>	Part No. 189 06 <sup>2)</sup>
Part No. 190 60 <sup>2)</sup>	_
-	Part No. 190 61 <sup>4)</sup>
Part No. 188 06 <sup>2)</sup>	Part No. 188 06 <sup>2)</sup>
1 4111111111111111111111111111111111111	1 200 1000 1000 100
Part No. 187 05 <sup>2)</sup>	Part No. 187 05 <sup>2)</sup>
	Part No. 190 93
1 411 101 100 00	1 411 1101 100 00
Part No. 190 92	Part No. 190 92
1 4111101 100 02	1 4.11.11.11.11.11.11.11.11.11.11.11.11.11
Part No. 186 05 2)	<u>_</u>
-	Part No. 186 10 <sup>4)</sup>
Part No. 190 95	Part No. 190 95
	Part No. 190 90
Part NO. 190 94	Part No. 190 94
Part No. 140 102 <sup>3)</sup>	Part No. 140 102
	Part No. 140 103
Part No. 884 62	Part No. 884 62
Part No. 184 37	Part No. 184 37
Part No. EK 110 002 816	Part No. EK 110 002 817
Part No. EK 110 002 815	Part No. EK 110 002 815
Part No. EK 110 002 814	Part No. EK 110 002 814
	Part No. 140 212 <sup>1)</sup> Part No. 140 213  Part No. 140 214  Part No. 140 216  Part No. 200 81 091  Part No. 200 81 097  Part No. 200 81 099  Part No. 200 81 090  upon request  Part No. 190 50 <sup>2)</sup> Part No. 189 06 <sup>2)</sup> Part No. 188 06 <sup>2)</sup> Part No. 187 05 <sup>2)</sup> Part No. 190 93  Part No. 190 92  Part No. 190 95  Part No. 190 90  Part No. 190 94  Part No. 140 102 <sup>3)</sup> Part No. 140 103 <sup>3)</sup> Part No. 184 37  Part No. EK 110 002 816  Part No. EK 110 002 816  Part No. EK 110 002 815

<sup>1)</sup> A mains cord needs to be ordered additionally

<sup>&</sup>lt;sup>2)</sup> Since a DN 25 KF connection is present, a horizontal flange must be used.

<sup>3)</sup> The horizontal connection flange has a DN 16 KF connection

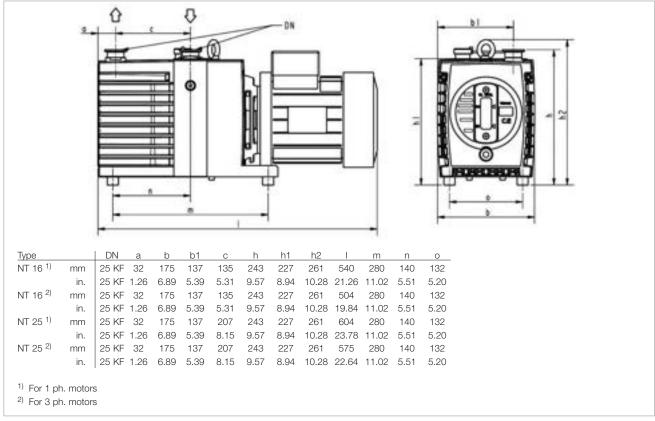
<sup>4)</sup> Use only together with a DN 25 KF elbow

<sup>5)</sup> For vertical installation, reducer 183 86 is necessary for changing from DN 25 KF to DN 16 KF

## TRIVAC NT 16 and NT 25



TRIVAC NT 16



Dimensional drawing for the TRIVAC NT 16 and NT 25

#### **Technical Data**

### **TRIVAC NT 16** two-stage

## TRIVAC NT 25 two-stage

		50 Hz	60 Hz	50 Hz	60 Hz	
Nominal pumping speed 1)	m <sup>3</sup> /h (cfm)	18.9 (11.1)	22.7 (13.4)	29.9 (17.6)	29.9 (17.6)	
Pumping speed <sup>1)</sup> m <sup>3</sup> /h (cfm)		16.5 (9.7)	19.8 (11.7)	25.7 (15.1)	25.7 (15.1)	
Ultimate partial pressure without gas ballast <sup>2)</sup>						
with N 62 with PFPE	mbar (Torr) mbar (Torr)	10 <sup>-4</sup> (0.75 x 10 <sup>-4</sup> ) 8 x 10 <sup>-4</sup> (6 x 10 <sup>-4</sup> )	10 <sup>-4</sup> (0.75 x 10 <sup>-4</sup> ) 8 x 10 <sup>-4</sup> (6 x 10 <sup>-4</sup> )	10 <sup>-4</sup> (0.75 x 10 <sup>-4</sup> ) 8 x 10 <sup>-4</sup> (6 x 10 <sup>-4</sup> )	10 <sup>-4</sup> (0.75 x 10 <sup>-4</sup> ) 8 x 10 <sup>-4</sup> (6 x 10 <sup>-4</sup> )	
Ultimate total pressure without gas ballast <sup>2)</sup>						
with N 62	mbar (Torr)	< 2 x 10 <sup>-3</sup> (< 1.5 x 10 <sup>-3</sup> )	$< 2 \times 10^{-3}$ (< 1.5 x 10 <sup>-3</sup> )	< 2 x 10 <sup>-3</sup> (< 1.5 x 10 <sup>-3</sup> )	< 2 x 10 <sup>-3</sup> (< 1.5 x 10 <sup>-3</sup> )	
with DOT	mbar (Torr)	0.6 (0.5)	0.6 (0.5)	0.6 (0.5)	0.6 (0.5)	
Ultimate total pressure <sup>2)</sup> with N 62	mbar (Torr)	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> )	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> )	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> )	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> )	
with PFPE with DOT	mbar (Torr) mbar (Torr)	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> ) 0.9 (0.7)	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> ) 0.9 (0.7)	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> ) 0.9 (0.7)	< 5 x 10 <sup>-3</sup> (< 3.8 x 10 <sup>-3</sup> ) 0.9 (0.7)	
Water vapor tolerance <sup>2)</sup> mbar (Torr)		25 (18.8)	25 (18.8)	25 (18.8)	25 (18.8)	
Water vapor capacity g/h		305	305	476	476	
Oil filling, min. / max.	l (qt)	0.70 / 1.00 (0.74 / 1.10)	0.70 / 1.00 (0.74 / 1.10)	1.1 / 1.5 (1.16 / 1.59)	1.1 / 1.5 (1.16 / 1.59)	
Noise level to DIN 45 635 without gas ballast at 50 Hz	dB(A)	< 54	< 54	< 54	< 54	
Admissible ambient temperature	°C (°F)	+12 to +40 (+54 to +104)				
Motor rating	W (HP)	550 (0.75)	660 (0.9)	550 (0.75)	660 (0.9)	
Nominal speed	rpm	1500	1800	1500	1800	
Type of protection	IP	44	44	44	44	
Weight with oil filling 3 phase motor 1 phase motor	kg (lbs) kg (lbs)	35.0 (77.3) 40.0 (88.3)	35.0 (77.3) 40.0 (88.3)	41.0 (90.5) 46.0 (101.5)	41.0 (90.5) 46.0 (101.5)	
Connections, Intake and Exhaus	t DN	25 KF	25 KF	25 KF	25 KF	

<sup>&</sup>lt;sup>1)</sup> To DIN 28 426 T1 <sup>2)</sup> To DIN 28 400 ff

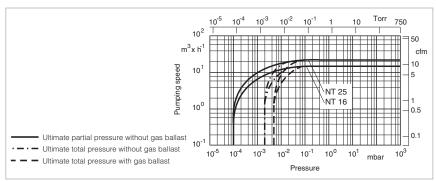
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Ordering Information	TRIVAC NT 16 two-stage	TRIVAC NT 25 two-stage
TRIVAC NT 16		
1-phase world motor		
filling with N 62 1)	Part No. 140 220	Part No. 140 330
1-phase EU motor		
filling with N 62 1)	Part No. 140 231	Part No. 140 336
filling with ANDEROL 555 1)	Part No. 140 232	Part No. 140 337
filling with PFPE 1)	Part No. 140 233	Part No. 140 338
filling with DOT 4 1)	Part No. 140 234	Part No. 140 339
filling with RCF E 68N 1)	Part No. 140 235	Part No. 140 340
1-phase US/Japan motor		
filling with N 62 1)	Part No. 140 241	Part No. 140 341
3-phase world motor		
filling with N 62	Part No. 140 221	Part No. 140 331
filling with ANDEROL 555	Part No. 140 222	Part No. 140 332
filling with PFPE	Part No. 140 223	Part No. 140 333
filling with DOT 4	Part No. 140 224	Part No. 140 334
filling with RCF E 68N	Part No. 140 225	Part No. 140 335
Power supply cable for 1-phase motor		
100-120 V, 50/60 Hz; NEMA plug, US plug	Part No. 140 304	Part No. 140 304
200-240 V, 50/60 Hz; NEMA plug	Part No. 140 305	Part No. 140 305
200-240 V, 50/60 Hz; Schuko plug	Part No. 140 306	Part No. 140 306
200-240 V, 50/60 Hz; UK plug	Part No. 140 307	Part No. 140 307

Part No. 140 304V

Part No. 140 304V

<sup>1)</sup> Pumps with a single phase motor are equipped with a connector for connecting the mains cord. Optionally fully pre-assembled regional mains cords can be used.



Pumping speed characteristics for the TRIVAC NT 16 and NT 25 at 50 Hz

100 V, 50/60 Hz; Japan plug

#### **Ordering Information TRIVAC NT 16 TRIVAC NT 25** two-stage two-stage

	_	_
Accessories		
Exhaust filter		
AF 25	Part No. 190 53 <sup>1)</sup>	Part No. 190 53 <sup>1)</sup>
Exhaust filter		
AF 16-25	Part No. 189 11 1)	Part No. 189 11 1)
AF 16-25 DOT	Part No. 124 16 <sup>1)</sup>	Part No. 124 16 <sup>1)</sup>
Exhaust filter		
with lubricant return AR 16-25	Part No. 189 21 1), 5)	Part No. 189 21 1), 5)
Exhaust filter	4) 5)	4) 5)
with lubricant return ARS 16-25	Part No. 189 56 <sup>1), 5)</sup>	Part No. 189 56 <sup>1), 5)</sup>
Condensate trap	<b>5</b> . W	<b>5</b> . W . 400.00
AK 25	Part No. 190 63	Part No. 190 63
Condensate trap AK 16-25	Part No. 188 11 <sup>2)</sup>	Part No. 188 11 <sup>2)</sup>
Fine vacuum adsorption trap FA 8-16	Part No. 187 10	Part No. 187 10
Adsorption trap with aluminum oxide insert	Part No. 854 15	Part No. 854 15
Manually operated oil suction facility AR-M	Part No. 190 93 <sup>4)</sup>	Part No. 190 93 <sup>4)</sup>
Oil suction facility AR-V		
controlled by solenoid valve	Part No. 190 92 <sup>4)</sup>	Part No. 190 92 <sup>4)</sup>
Oust filter FS 8-16	Part No. 186 10	Part No. 186 10
Oust separators AS 8-16	Part No. 186 11	Part No. 186 11
Mechanical oil filter OF 4-25	Part No. 101 91 <sup>3)</sup>	Part No. 101 91 <sup>3)</sup>
Chemical oil filter CF 4-25	Part No. 101 96 <sup>3)</sup>	Part No. 101 96 <sup>3)</sup>
Chemical oil filter with		
safety isolation valve CFS 16-25	Part No. 101 76 <sup>3)</sup>	Part No. 101 76 <sup>3)</sup>
Exhaust filter drain tap	Part No. 190 95	Part No. 190 95
Oil drain tap M 16 x 1.5		
vacuum-tight	Part No. 190 90	Part No. 190 90
Oil drain kit	Part No. 190 94	Part No. 190 94
nlet flange, horizontal, DN 25 KF	Part No. 140 300	Part No. 140 300
Exhaust flange, horizontal, DN 25 KF	Part No. 140 301	Part No. 140 301
Oil pressure switch	Part No. 140 302	Part No. 140 302
Dil level switch	Part No. 140 303	Part No. 140 303
Adapter set for oil suction	Part No. 140 298	Part No. 140 298
Adapter set for oil filter	Part No. 140 299	Part No. 140 299
Major maintenance kit	Part No. EK 110 002 702	upon request
PFPE	Part No. EK 110 002 745	upon request
DOT 4	Part No. EK 110 002 739	upon request
Minor maintenance kit	Part No. EK 110 002 701	upon request
PFPE	Part No. EK 110 002 744	upon request
DOT 4	Part No. EK 110 002 740	upon request
Small parts kit PFPE	Part No. EK 110 002 703	upon request
DOT 4	Part No. EK 110 002 746 Part No. EK 110 002 738	upon request upon request
Replacement pump module	Part No. EK 110 002 703	upon request
PFPE	Part No. EK 110 002 704	upon request
DOT 4	Part No. EK 110 002 737	upon request
Shaft sealing replacement kit	Part No. EK 110 002 700	upon request
PFPE	Part No. EK 110 002 743	upon request
DOT 4	Part No. EK 110 002 741	upon request

 $<sup>^{1)}\,</sup>$  Use only together with the horizontal exhaust flange (Part No. 140 301) (FPM ((FKM)) O-ring) Caution: For DOT use 2x EPDM-rings (Part No. 971 471 362)

<sup>2)</sup> Use only together with the horizontal inlet flange (Part No. 140 300)

<sup>3)</sup> Can only be installed together with adapter 140 299

<sup>4)</sup> Can only be installed together with adapter 140 298

 $<sup>^{5)}\,</sup>$  Can only be installed together with adapter set for oil suction Part No. 140 308

# Motor Dependent Data for the TRIVAC NT

#### **Ordering Information**

#### NT 5

#### **NT 10**

Part No. 140 214	Part No. 140 314
Part No. 140 213	Part No. 140 313
Part No. 140 212	Part No. 140 312
Part No. 140 216	Part No. 140 316

#### **NT 16**

#### **NT 25**

TRIVAC NT 25

Part No. 140 220	Part No. 140 330
Part No. 140 231	Part No. 140 336
Part No. 140 232	Part No. 140 337
Part No. 140 233,	Part No. 140 338
Part No. 140 234,	Part No. 140 339
Part No. 140 235	Part No. 140 340
Part No. 140 241	Part No. 140 341
Part No. 140 221	Part No. 140 331
Part No. 140 222	Part No. 140 332
Part No. 140 223	Part No. 140 333,
Part No. 140 224	Part No. 140 334
Part No. 140 225	Part No. 140 335

Ref. No. 1- or 3-ph	Motor voltage (V)	Frequency (Hz) ± 5%	Voltage range (V)	Power ((kW) / (HP))	Nominal current (A)	Size	Region
200 15 418	220-240/230	50/60	± 5%	0.45/0.54	2.5/2.4	80	EURO
200 15 424 3 ~	Δ 200-240 / Y 346/415 Δ 200-266 / Y 346-460	50 60	± 5%	0.55	2.8 / 1.6 2.8 / 1.6	80 80	World
200 15 423 <sup>1)</sup> 1 ~	110-120 / 208-240	50/60	± 5%	0.49/0.55	6.8/5.6 3.4/2.8	80	Dual- Voltage
110 003 389 1 ~	100	50/60	± 5%	0.54/0.63	8.4/7.2	80	Japan

Ref. No. 1- or 3-ph	Motor voltage (V)	Frequency (Hz) ± 5%	Voltage range (V)	Power ((kW) / (HP))	Nominal current (A)	Size	Region
E 110 002 715 <sup>2)</sup>	95-120 / 190-252 95-120 / 190-242	50/60	± 5%	0.55 0.66	13.0 / 7.5 10.0 / 5.0	90	World
E 110 002 716 <sup>2)</sup> 1 ~	218-242	50/60	± 5%	0,45/0,55	5.0 / 5.5	90	EURO
E 110 002 717 <sup>2)</sup>	95-105 / 95-120	50 60	± 5% ± 5%	0.55 0.66	9.5 10.0	90	US/ Japan
E 110 002 712	200-240 / 380-415 200-240 / 380-460	50 60	± 10% ± 10%	0.55 0.66	3.1-4.0 /1.5-1.6 3.1 /1.6	90	World

A mains cord needs to be ordered additionally
 For single phase models of the TRIVAC NT 16/25 a connector for the connection line is included in the delivery. Power supply cables with regional plugs need to be ordered separately