ELECTRO ADDA SpA

THREE PHASE ASYCHRONOUS MOTORS

T SERIES 56 – 160 FRAME
POWER 0.06 – 18.5 KW

CATALOGUE

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General features

The T line motors frame size 56÷160 are totally enclosed, fan cooled, with squirrel cage rotor.

Standards and standardizations

The T line motors frame size 56÷132 also comply with the following Standards:

RATINGS AND PERFORMANCES IEC 60034-1
CEI EN 60034 - 1

METHODS FOR DETERMINING LOSSES AND EFFICIENCY IEC 60034 - 2 CEI EN 60034–2

CLASSIFICATION OF DEGREES OF PROTECTION (IP CODE) IEC 60034-5 CEI EN 60034–5

METHODS OF COOLING (IC CODE)
IEC 60034 - 6 CEI EN 60034–6

CLASSIFICATION OF TYPE OF CONSTRUCTION AND MOUNTING ARRANGEMENTS (IM CODE)
IEC 60034-7 CEI EN 60034–7

TERMINAL MARKINGS AND DIRECTION OF ROTATION
IEC 60034-8 CEI 2-8

NOISE LIMITS
IEC 60034-9 CEI EN 60034–9

BUILT-IN THERMAL PROTECTIONS
IEC 60034-11

STARTING PERFORMANCE OF ROTATING ELECTRICAL MACHINES
IEC 60034 – 12 CEI EN 60034 – 12

MECHANICAL VIBRATIONS
IEC 60034-14 CEI EN 60034–14

DIMENSIONS AND OUTPUTS FOR ELECTRICAL MACHINES
CEI EN50347
IEC 60072-1
UNEL 13116
UNEL 13119

The coupling dimensions are in compliance with the following standardizations:
UNEL 13113-71 for the B3 mounting and for other frame shapes
UNEL 13117–71 for the B5 mounting and for other frame shapes

The UNEL standardizations are in accordance with the IEC international standards publication 72 and relative Amendment Nr. 1.

Thermal protections

Upon request, the following thermal protections can be installed on the T line motors:

Positive temperature coefficient thermistors PTC
At the active temperature this device quickly changes its resistance value,standard

Bimetallic devices
Motoprotectors with contact normally closed. The contact opens when the winding temperature reaches limits dangerous to the insulation system of the motor.

Platinum resistance thermometers PT100
Variable linear resistance with the winding temperature. Device particularly suitable for a continuous winding temperature monitoring.

The protection is normally made by 3 sensitive elements, one for every phase, series connected and with two terminals in a specially provided terminal board located in the main terminal box or in a specially provided auxiliary terminal box.

Anticondensation heaters

Motors subject to atmospheric condensation, either through standing idle in damp environments or because of wide ambient temperature variations, may be fitted with anticondensation heaters.
They are of tape form and are normally mounted on the stator winding head.
Anticondensation heaters are normally switched on automatically when the supply to the motor is interrupted, heating the motor to avoid water condensation.
Normal supply voltage is 115 V or 220/240V.

Anticondensation heater terminals are led to a specially provided terminal board located in the main terminal box. Upon request they can be led to a terminal board located in an auxiliary terminal box.

The power values normally used are shown in the table 8.

Table.8

Frame size	*Power (W)*
56	upon request
63	
71-90	8
100-132	22

Insulation, winding

The T line motors frame size 56÷160 are made in F insulation class.
The soft copper electrolytic wire is insulated by using a special enamel (double enamel). Such enamel is classified as H insulation class.
All insulating materials used to produce motors are in F or H insulation class.

The winding undergoes a severe treatment as follows: it is impregnated by soaking it in oven-curing F class resins, it is tropicalized following a process including a spraying of anti-salty enamel and, finally, it is coated using a spray with heatproof, humidity-proof, chemical agent and sea-ambient corrosive action resistant characteristics.

The impregnation cycle is to make one vacuum.

Ratings and technical data

Power and data reported in the Technical Data Tables are for continuous duty (S1) at an ambient temperature of 40 C altitude up to 1000 a.s, with supply at 400 V - 50 Hz

The operating characteristics are guaranteed with the tolerances defined by the CEI EN 60034-1 Standards and the IEC 60034-1 Recommendations, reported in table

Table 3

Characteristics	*Tolerances*
Efficiency	Motor power ≤ 50 kW -15% of (1 - η) Motor power > 50 kW -10% of (1 - η)
Power factor	+1/6 (1- cosφ) Min 0.02 Max 0.07
Locked rotor current	+20% of guaranteed value
Locked rotor torque	-15% + 25% of guaranteed value
Pull out torque	-20% of guaranteed value
Slip	Power motor < 1 kW ± 30% of guaranteed value Power motor ≥ 1 kW ± 20% of guaranteed value

Protection

The T line motors frame size 56÷160 according to IEC 60034-5 Standards, have the following protection degrees

IP 55 (standard) totally enclosed motors, fan cooled, with protected against penetration of dust and water splashes coming from any direction

IP 56 (upon request) totally enclosed motors, protected against dust penetration and against sea waves, for use on deck
Normally IP56 motors are be supplied with external fan (IC 411 – IC 416 or IC 418).

Upon request they can be supplied without fan. (IC410). In this case the features, outputs and technical data will be supplied upon request.

The external fan is covered by a fan cover with IP 20 protection degree (accidental contact of fingers is avoided)
Upon request, motors for vertical mounting, can be supplied with rain cowl.
The terminal box has IP 55 or IP56 protection degree.

Construction

The T series motors frame size 56÷160 have been designed and manufactured to guarantee maximum operating reliability and safety.

The T series motors frame size 56÷160 have aluminium frame.
Shields are in aluminium for frame size 56÷160.

The terminal box is in aluminium and is positioned on the motor, and it can be rotated in step of 90°.

For frame 56÷63 the feet are removable, for frame 71÷132 the feet are removable and will be assemble for realize terminal box left or right.

The fan cover is in steel sheet.

Fans are in nylon.

Forme costruttive

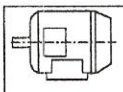
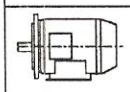
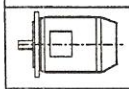
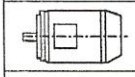
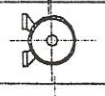
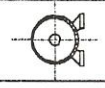
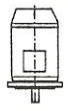
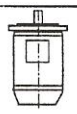
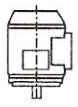
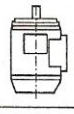
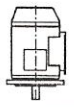
Le forme costruttive secondo IEC 60034-7 relative ai motori standard sono indicate nella seguente tabella con i codici

Mountings and positions

Mountings and positions for standard motors, according to IEC 60034-7, are defined by the codes mentioned in the following table

Tabella1

Table1

Figura	NORME DI RIFERIMENTO *STANDARDS*			ALTEZZE D'ASSE *FRAME SIZES*
	CEI 2-14	IEC 60034-7		56-160
		Code I	Code II	
	B 3	IM B 3	IM 1001	Di serie *Standard*
	B 3/B 5	IM B 35	IM 2001	Di serie *Standard*
	B 5	IM B 5	IM 3001	Di serie *Standard*
	B14	IM B14	IM 4001	Di serie *Standard*
	B 8	IM B 8	IM 1071	A richiesta *Upon request*
	B 6	IM B 6	IM 1051	A richiesta *Upon request*
	B 7	IM B 7	IM 1061	A richiesta Upon request
	V 1	IM V 1	IM 3011	Di serie *Standard*
	V 3	IM V 3	IM 3031	A richiesta *Upon request*
	V 5	IM V 5	IM 1011	A richiesta *Upon request*
	V 6	IM V 6	IM 1031	A richiesta *Upon request*
	V 1/V 5	IM V 15	IIM 2011	A richiesta *Upon request*

Raffreddamento

La definizione del metodo di raffreddamento è data dal codice IC (International Cooling), in accordo alla IEC 60034-6

Codice I (Semplificato) IC __ __ __

- Disposizione del circuito
- Metodi di circolazione del fluido di raffreddamento secondario.
- Metodi di circolazione del fluido di raffreddamento primario.

I motori in esecuzione standard di grandezza da 56 a 160 sono caratterizzati dal metodo di raffreddamento IC 411, con ventola radiale bidirezionale.
Tutti i motori possono essere forniti con sistema di raffreddamento IC 416 su richiesta.
In tal caso viene installato un opportuno ventilatore nel copriventola, opportunamente rinforzato, in modo da rendere la ventilazione indipendente dalla velocità di rotazione.

Cooling

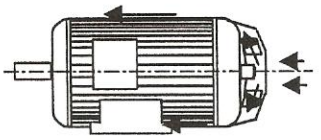
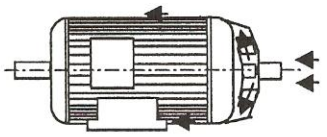
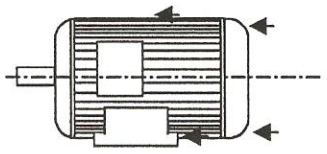
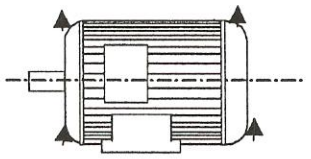
The designation of cooling method is given by the IC (International Cooling) code, according to IEC 60034-6

Code I (Simplified) IC __ __ __

- Circuit Arrangement
- Method of fluid circulation for the secondary cooling fluid.
- Method of fluid circulation for the primary cooling fluid.

Motors in standard execution of frame sizes from 56 to 160 are supplied with IC 411 cooling systems, incorporating a bi-directional fan.
All frame sizes can be supplied with cooling system IC 416 on request.
In this case a proper fan is fitted inside the fan cover, suitably reinforced, in order to make the ventilation independent of the rotation speed.

Tabella 2 / ***Table 2***

Codice IC *IC code*	Figura	Descrizione	*Description*
IC 411 Std		Motore autoventilato Macchina chiusa, alettata esternamente. Ventola esterna montata sull'albero del motore.	Self ventilating motor. Enclosed machine. Externally finned. External shaft-mounted fan.
IC 416 Su richiesta *Upon request*		Motore con ventilazione assistita. Macchina chiusa, alettata esternamente. Ventilatore indipendente montato sotto copriventola.	Motor with assisted ventilation. Enclosed machine. Externally finned. Independent external fan mounted inside the fan cover.
IC 418 Su richiesta *Upon request*		Motore con ventilazione esterna. Macchina chiusa, alettata esternamente. Raffreddamento assicurato da un dispositivo non montato sul motore.	Motor with external ventilation. Enclosed machine. Externally finned. Ventilation provided by air flowing from the driven system.
IC 410 Su richiesta *Upon request*		Motore con ventilazione naturale. Macchina chiusa,	Motor with natural ventilation Enclosed machine

Caratteristiche cuscinetti

I motori serie T hanno i cuscinetti a sfere. a gola profonda, lubrificati a grasso.
In tutti i motori vengono montate e molle di precarico. per compensare il gioco assiale dei cuscinetti e per assorbire le vibrazioni

Tutti i cuscinetti sono previsti per una durata di funzionamento (in base ai dati dei fabbricanti) di almeno 40.000 ore, con accoppiamento diretto

Nella tabella 3 sono riportate tutte le caratteristiche relative ai cuscinetti installati sui motori grandezze 56÷160serie T.

Bearing specifications

The T line motors frame size 56÷160 have deep groove, grease lubrificated ball bearings.
Motor with bearing axial constrained have arrangement with spring in order to soak up vibration

The lifetime of bearings (in accordance with supplier data) is in excess of 40.000 hours, for motors with direct coupling.

In the table 3 are mentioned all specifications concerning bearings installed on motors frame size 56÷160T series.

Tabella 3 — **Table 3**

Motore tipo *Motor Type*	Poli *Poles*	Forma costruttiva B3 *Frame B3*		Forma costruttiva B5,B14 *Frame B5,B14*	
		Cuscinetto lato accoppiamento *Bearing coupling side*	Cuscinetto lato opposto accoppiamento *Bearing opposite coupling side*	Cuscinetto lato accoppiamento. *Bearing coupling side*	Cuscinetto lato opposto accoppiamento *Bearing opposite coupling side*
56	2-4-6-8	6201-2Z	6201-2Z	6201-2Z	6201-2Z
63	2-4-6-8	6202-2Z	6202-2Z	6202-2Z	6202-2Z
71	2-4-6-8	6202-2Z	6202-2Z	6202-2Z	6202-2Z
80	2-4-6-8	6204-2Z	6204-2Z	6204-2Z	6204-2Z
90	2-4-6-8	6205-2Z	6205-2Z	6205-2Z	6205-2Z
100	2-4-6-8	6206-2Z	6206-2Z	6206-2Z	6206-2Z
112	2-4-6-8	6306-2Z	6206-2Z	6306-2Z	6206-2Z
132	2-4-6-8	6308-2Z C3	6208-2Z	6308-2Z C3	6208-2Z
160	2-4-6-8	6309-2Z	6309-2Z	6309-2Z	6309-2Z

Scatola e morsettiera

La morsettiera è normalmente a sei morsetti.
La basetta portamorsetti è di materiale antimuffa non igroscopico.
Come detto, la scatola morsettiera ha il grado di protezione IP 55 di serie o IP 56, purché il collegamento dei cavi di alimentazione sia realizzato in modo adeguato.

Terminal box and block

The terminal board is normally equipped with 6 terminal, and is made with nonhygroscopic and anti-mold material.
As just reported, the terminal box has IP 55 standard or IP56 protection degree, provided that the supply cable connections are properly made.

Collegamento

I motori sono generalmente collegati a triangolo in modo da consentire l'avviamento stella-triangolo.
A richiesta, e per applicazioni particolari, in funzione delle potenze e delle tensioni di alimentazione i motori possono essere collegati a stella.

Connection

Motors are usually delta connected to allow a star-delta starting.
Upon request and for particular applications, based on the powers and supply voltages, motors can be star connected.
, provided that the supply cable connections are properly made.

Dimensioni d'ingombro

Le dimensioni d'ingombro sono in accordo con le Norme IEC 60072.
L'uscita d'albero e le dimensioni delle flange di accoppiamento sono realizzate con le seguenti tolleranze

Tabella 10

Simbolo	Dimensione	Tolleranza
D	< 30	j6
	>30 to50	k6
	>50	m6
N	< 250	j6
	> 250	h6
F		h9

Le flange di accoppiamento e I fori delle pulegge per le cinghie devono avere il foro con tolleranza H7

Nella tabella 9 sono indicate le tolleranze ammesse per le diverse dimensioni.

Tabella 11

Simbolo	Dimensione	Scostamento ammissibile
A.B	> 500 to 750	± 1.5
	> 750 to 1000	± 2.0
	> 1000	± 2.5
M		±1.0
H		– 1.0
E		– 0.5

Overal dimensions

Overall dimension are in accordance with the IEC 60072. Standards
The shaft extensions and coupling flange dimensions are designed with the following fits:

Table 10

Symbol	Dimension	Tolerance
D	< 30	j6
	>30 to50	k6
	>50	m6
N	< 250	j6
	> 250	h6
F		h9

The bore holes in couplings and belt pulleys should have an ISO fit of at least H7.

The deviations specified below are permitted for the dimensions shown in table 9.

Table 11

Symbol	Dimension	Permitted deviation
A.B	> 500 to 750	± 1.5
	> 750 to 1000	± 2.0
	> 1000	± 2.5
M		±1.0
H		– 1.0
E		– 0.5

Tensione di alimentazione

I motori serie T sono progettati per essere utilizzati sulla rete Europea *230/400* Volt +/- 10% - 50 Hz e 400/600 +/-10% - 50 Hz.
Questo significa che lo stesso motore può funzionare sulle seguenti reti ancora esistenti:
- 220/380 Volt +/- 5 %
- *230/400* Volt +/-10%
- *240/415* Volt +/- 5%
- 380/660 Volt +/- 5%
- 400/600 Volt +/- 10%
- 415/720 Volt +/- 5%

rispondendo ai requisiti richiesti dalle normative di numerosi paesi.

Feeding voltage

The T line motors are made to be used on the European nel system Vott.230/400 +/-10% - HZ.50 and Volt.400/690+l-1 0% - Hz.50.
This means that the same motor can function on the following stili existing nets:
- 220/380 Volt +/- 5%
- 230/400 Volt +/- 10%
- 240/415 Vott +/- 5%
- 380/660 *Volt+/-* 5% .
- 4001690Volt+/-10%
- *415/720* Vott +/- 5%

corresponding to the requirements requested by the rules of numerous countries.

Oscillazioni di tensione e frequenza

I motori possono funzionare senza subire danni, se la tensione di alimentazione varia entro i limiti stabiliti dalle Norme di riferimento.
In particolare i motori possono funzionare con variazione di tensione del 10 % e di frequenza del 5% con una variazione combinata massima del 10% con sovratemperatura conformi a quanto previsto dalle norme di riferimento

Voltage and frequency variations

Motors can work without failures if the supply voltage variations are limited as stated in the Classification Society Standards.
In particular, motors can run with voltage variations of 10 % and frequency variations of 5 % with a maximum combined variation of 10 % with temperature rise in compliance with the provisions of the Classification Society Standards.

Funzionamento a 60 Hz

I motori serie T possono funzionare con frequenza a 60 Hz con differenze di prestazione e grandezze elettriche applicando i coefficienti moltiplicativi indicati nella tabella 4

Function with a frequency of 60

The T line motors can function with a frequency of 60 Hz. with differences in performances and electrical sizes as described on the table 4

Tabella 4 / ***Table 4***

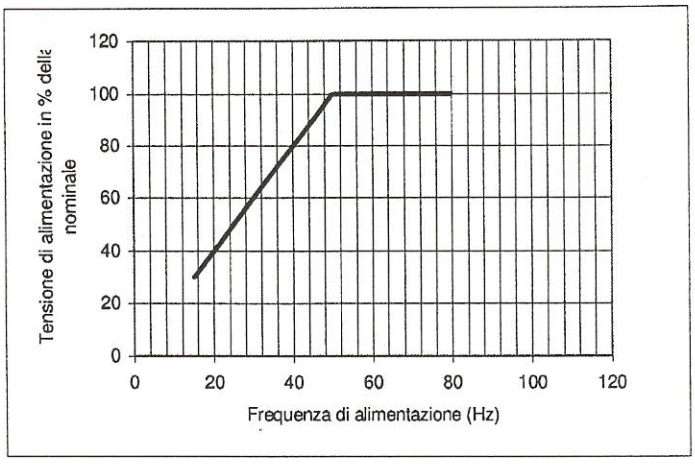
Tensione di targa Plate voltage 50 Hz	Tensione di targa Plate voltage 60Hz	Potenza nom Nominal power	Corrente nom Nominal current	Coppia nom. Nominal torque	Giri/min r.p.m.	Corrente di spunto Starting current	Coppia di spunto Starting torque	Coppia max Max torque
230 +/- 10%	220 +/- 5%	1	1	0,83	1.2	0.83	0.83	0.83
230 +/- 10%	230 +/-.10%	1	0.95	0.83	1.2	0.83	0.83	0.83
230 +/- 10%	254 +/- 5%	1.15	1.02	0.96	1.2	0.93	0.93	0.93
230 +/- 10%	277 +/- 5%	1.2	1	1	1.2	1	1	1
400 +/- 10%	380 +/- 5%	1	1	0.83	1.2	0.83	0.83	0.83
400 +/- 10%	400+/-10%	1	0.95	0.83	1.2	0.83	0.83	0.83
400 +/- 10%	440 +/- 5%	1.16	1.02	0.96	1.2	0.93	0.93	0.93
400 +/- 10%	460+/- 10%	1.15	1	0.96	1.2	0.96	0.96	0.96
400 +/- 10%	480 +/-. 5%	1.2	1	1	1.2	1	1	1

Alimentazione da inverter

I motori serie T grandezza 56÷160 sono previsti per alimentazione da inverter.
Tali motori possono essere azionati fino alla frequenza nominale (50Hz) con tensione di alimentazione proporzionale alla frequenza. (Vedere diagr.1), alle frequenze maggiori possono essere alimentati a tensione costante fino a 80Hz

Inverter supply

The T line motors frame size 56÷160 are designed to be supplied by inverter.
These motors can be driven up to the rated frequency (50Hz) with supply voltage proportional to the frequency. (See diagr.1), at higher frequencies they can be supplied at constant voltage up to the achievement of the 80Hz



Diagr. 1 - Diagramma tensione di alimentazione - frequenza.

Diagr. 1 - Supply voltage - frequency diagram.

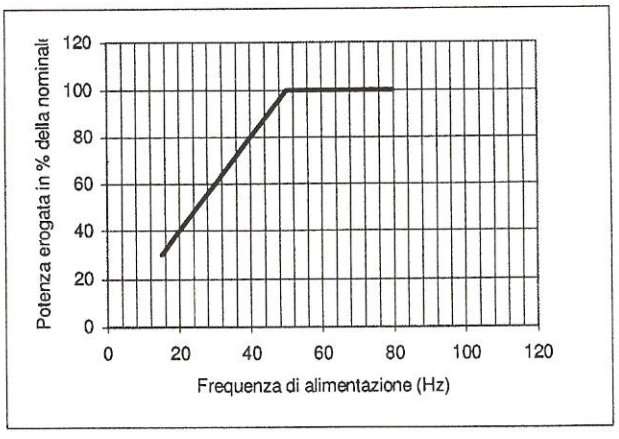
Con il tipo di alimentazione indicata nel diagr. 1, il flusso creato dagli avvolgimenti statorici risulterà costante da frequenza 15 alla frequenza di 50 Hz e conseguentemente, si potrà disporre di una coppia costante in tutto questo campo di regolazione della velocità.
Alle frequenze maggiori di 50 Hz il il flusso risulterà inferiore al valore massimo e il motore potrà funzionare a potenza costante e quindi a coppia decrescente con l'aumento della frequenza (vedere diagr.2).
L'andamento della potenza erogabile sarà pertanto quello riportato nel diagr. 3.

By the type of supply shown in diagr. 1, the flux created by the stator windings will be constant from 15 frequency to 50 Hz frequency and consequently a constant torque in all this speed control range is available.

At frequencies higher than 50 Hz, the flux will be lower than the maximum value and the motor can run at constant power and therefore at a power decreasing with the increase of frequency (see diagr.2).
Consequently the pattern of the deliverable power output will be as shown in diagr. 3.

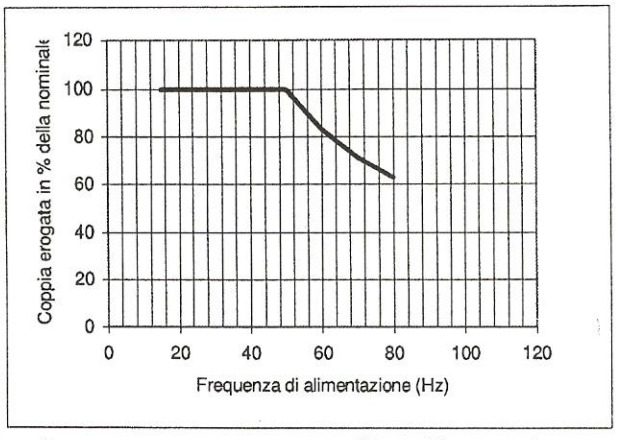
Nota: Alle basse frequenze (0 ÷ 10 Hz.) a causa delle cadute di tensione, per poter mantenere il flusso costante è necessario incrementare leggermente la tensione di alimentazione. Tale incremento di tensione dipende sia dal tipo di motore che dal tipo di inverter.

Note: At low frequencies (0 ÷ 10 Hz.) due to the voltage drops, in order to keep the flux constant, the supply voltage should be slightly increased. This voltage increase depends both on the motor type and on the inverter type.



Diag. 2 - Diagramma potenza resa - frequenza

Diag.. 2 - Power output - frequency diagram



Diag.. 3 - Diagramma coppia - frequenza

Diagr *Torque - frequency diagram* -

I motori asincroni trifasi serie T previsti per alimentazione da inverter sono progettati e costruiti operando delle scelte progettuali e costruttive che consentono un funzionamento ottimale ed affidabile.

Occorre infatti considerare che, generalmente, l' inverter alimenta il motore asincrono con una corrente non sinusoidale con un certo contenuto armonico. Che dipende in particolare : dal tipo di inverter, dal valore della frequenza di commutazione, dalla lunghezza dei cavi di alimentazione.
Inoltre i fronti ripidi di tensione ai morsetti del motore (dv/dt) determinati dai ridotti tempi di commutazione degli IGBT, producono delle notevoli sollecitazioni sui materiali isolanti.
Particolare attenzione richiede pertanto il sistema d'isolamento del motore che deve essere in grado di sopportare tali maggiori sollecitazioni.

The asynchronous three-phase T line motors to be used for inverter supply are designed and manufactured based on design and manufacturing choices that allow an optimum and reliable operation.
It has to e considered that generally the inverter supplies the asynchronous motor with a non sinusoidal current having a certain harmonic contents. This is due in particular: to the type of inverter, to the value of the swithc frequency, to the length of the supply cables.
Moreover steep voltage fronts to the motor terminals (dv/dt) originated by the short commutation times of the IGBT, generate considerable stresses on the insulating materials.
Consequently the motor insulation must be carried out with the utmost care because it has to be able to withstand such higher stresses.

Velocità massima

I motori alimentati da inverter possono funzionare a frequenza maggiore di quella nominale fornendo la potenza nominale fino alla frequenza massima indicata nella tabella 9.
In tali condizioni la coppia massima del motore alla velocità massima rimane superiore a 1.6 volte la coppia nominale.

Maximum speed

Motors supplied by inverter may run at a frequency higher than the rated one, delivering the rated power up to the maximum frequency shown in table 9.

In such conditions the motor pullout torque at the maximum speed remains higher than 1.6 times the rated torque.

Tabella 9 / ***Table 9***

Altezza d'asse Frame	Frequenza massima di alimentazione *Max alimentation frequency*			
	2 Poli *2 Poles*	4 Poli *4 Poles*	6 Poli *6 Poles*	8 Poli *8 Poles*
56 ÷ 90	75	75	60	60
100 ÷ 112	70	70	60	60
132 ÷ 160	65	65	60	60

E' altresì possibile alimentare i motori a frequenza superiore, in tal caso le potenze erogabili dal motori si ridurranno progressivamente.
In ogni caso le velocità massime dei motori, anche in funzionamento a vuoto o trascinato dalla macchina operatrice, non deve mai superare i limiti indicati nella tabella 10.

It is also possible to supply motors at a higher frequency, in this case the motor outputs will be progressively reduced.
In any case the maximum motor speeds, even in idle operation or pulled by the machine tool, must never exceed the limits shown in table 10.

Tabella 10 / ***Table 10***

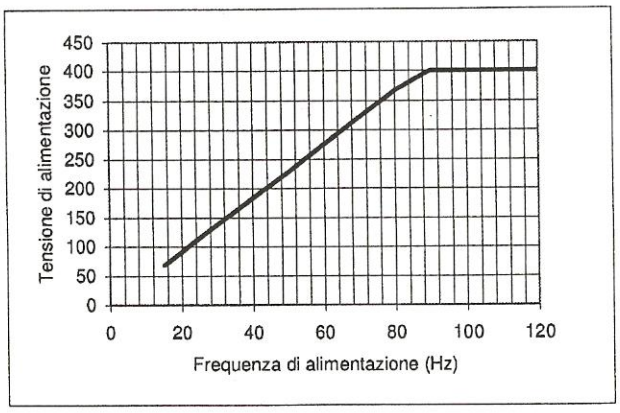
Motore tipo Motor type	Velocità massima ammessa Maximun allowable speed			
	2 Poli *2 Poles*	4 Poli *4 Poles*	6 Poli *6 Poles*	8 Poli *8 Poles*
63	7000	5000	4800	4800
71	7000	5000	4800	4800
80	7000	5000	4800	4800
90	7000	5000	4800	4800
100	7000	5000	4800	4800
112	7000	5000	4800	4800
132	6500	5000	4800	4800
160	6000	5000	4800	4800

Funzionamento a potenza aumentata

I motori serie T in esecuzione standard previsti per alimentazione a 230 V / 50 Hz con collegamento a triangolo, possono essere alimentati a frequenze maggiori di 50 Hz con tensione proporzionale alla frequenza fino a 100 Hz (2 volte la velocità nominale). In tal caso la potenza erogabile in servizio continuo (S1) può essere aumentata secondo quanto indicato nel diagr.5.
La corrente nel funzionamento a potenza nominale a 50 Hz aumenta di circa 1.73 volte il valore indicato nelle tabelle relativi ai dati tecnici a 400 Volt ; il valore di corrente assorbita alla potenza di 100 Hz varia in modo lineare.
Ovviamente anche in questo caso non devono mai essere superati i limiti di velocità indicati alla tab.10.

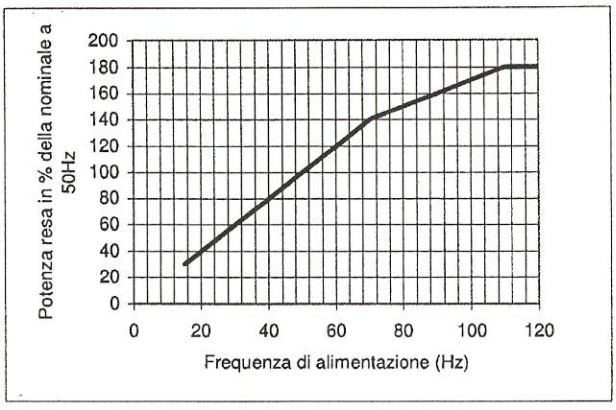
Increased power operating

The T line motors in standard execution designed to be supplied at 230 V / 50 Hz with delta connection, may be supplied at frequencies higher than 50 Hz with voltage proportional to the frequency up to 100 Hz (twice the rated speed). In such case the motor output in continuous duty (S1) may be increased as shown in diagr.5.
During operation at rated power at 50 Hz, current increases by approx. 1.73 times the value shown in the tables concerning the technical data at 400 Volt; the value of input current at the power of 100 Hz linearly changes.
Of course also in this case the speed limits shown in table 10 must never be exceeded.



Diag 4 - Diagramma tensione di alimentazione-frequenza previsto per i motori serie T (230V/50Hz) per il funzionamento a potenza aumentata .

Diagr. 4 – Supply voltage – frequency diagram intended for the T line motors (230V/50Hz) for operation at increased power.



Diag 5 - Diagramma potenza resa -frequenza per i motori serie T (220V/50Hz) per il funzionamento a potenza aumentata.

Diag 5 - Power output – frequency diagram intended for the T line motors (220V/50Hz) for operation at increased power.

Declassamenti

Le tabelle dei dati tecnici sono riferiti alle , temperatura ambiente max 40oC ed altitudine fino a 1000 metri s.l.m . Per condizioni ambientali diverse, le potenze variano e si ottengono applicando i fattori correttivi indicati nella tabella 5

DERATINGS

The tables of technical data are referred, an ambient temperature of 40 oC and an altitude up to 1000 a.s.l. In different environmental conditions output ratings vary, and are obtainable by applying the factors as indicated in the tables 5

Tabella 5

Table 5

Altitudine m s.l.m. *Altitude m a.s.l.*	Temperatura ambiente (oC) *Ambient temperature (oC)*					
	30	30-40	45	50	55	60
<= 1000	1.07	1	0.98	0.92	0.87	0.82
1500	1.04	0.97	0.93	0.89	0.84	0.79
2000	1	0.97	0.90	0.86	0.82	0.77
3000	0.92	0.86	0.82	0.79	0.75	0.70
4000	0.82	0.77	0.74	0.71	0.67	0.63

Servizi

I dati tecnici riportati nelle tabelle sono riferiti al servizio continuo (S1). A richiesta possono essere forniti motori per Servizio limitato S2 (30 o 60 minuti)

Duty

.All technical data reported in the tables are referred to continuous duty (S1). Upon request, motors for limited Duty S2 (30 or 60 minutes) can be supplied.

Sovraccarichi

I motori in servizio continuo possono sopportare i seguenti sovraccarichi

Tabella 6

Sovraccarico %	Durata minuti	Intervallo minuti
10	7	15
20	5	15
30	4	15
40	3	15
50	2	15

Overloads

Continuous duty motors can withstand the following overloads

Table 6.

Overload %	*Duration minutes*	*Time interval Minutes*
10	7	15
20	5	15
30	4	15
40	3	15
50	2	15

Avviamenti

I motori sono idonei per i seguenti tipi di avviamento

- Diretto
- Stella – triangolo
- con inverter (1)

1) Range di frequenza 15-80 Hz per frequenze al di sotto dei 30Hz e superiori ai 15 Hz si consiglia la servo ventilazione

Starting

Motors are suitable for the following types of starting

- Direct
- Star – delta
- by inverter (1)

1) Frequency range 15-80 Hz under 30Hz we suggest to external ventilation

Vibrazioni

I motori sono bilanciati dinamicamente con mezza linguetta applicata all'estremità d'albero secondo la norma IEC 60034-14 e hanno grado di vibrazione ridotto (R) in esecuzione standard.
La tabella seguente dà i limiti raccomandati dell'intensità di vibrazione per le varie altezze d'asse.

Vibrations

Motors are dynamically balanced with a half key applied to the shaft extension in accordance with standard IEC 60034-14 to vibration severity grade reduced (R) in standard execution.
The following table indicates the maximum vibration grades with respect to the different shaft heights.

Tabella 7

Grado Equilibratura	Giri motore	Altezza d'asse
		80÷132
		Vmm/sec
N (normale)	600÷1800	1.8
R (ridotta)	600÷1800	0.71
	1800÷3600	1.12
S (speciale)	600÷1800	0.45
	1800÷3600	0.71

L'equilibratura grado S può essere eseguita a richiesta.

Table 7

Vibration degree	*Rated speed*	*Frame size*
		80÷132
		Vmm/sec
N (normal)	600÷1800	1.8
R (reduced)	600÷1800	0.71
	1800÷3600	1.12
S (special)	600÷1800	0.45
	1800÷3600	0.71

S degree balancing could be made on request.

Rumorosità

Le tabelle dei dati tecnici riportano i valori di rumorosità (LpA) e in potenza (LwA) sonora misurati ad un metro di distanza espressi in dB(A).
I valori di rumorosità sono rilevati con motore funzionante a vuoto e con una tolleranza di 3 dB(A).

Noise

The technical features table contains the values of A–sound pressure level (LpA) and A sound power level (LwA), measured at a one meter distance.
Sound levels are measured in no-load conditions and have tolerances of 3 dB(A),

Tab 8

Tab .8

Grandezza *Frame size*	Pressione sonora A(Lpa) – Potenza sonora (LwA) in db(A) *A-sound pressure level (LpA) – A-sound power level (LwA) in dB(A)*							
	2poli/2poles		4poli/4poles		6poli/6poles		8poli/8poles	
	LpA	LwA	LpA	LwA	LpA	LwA	LpA	LwA
56	59	67	51	59	----	-------	----	------
63	62	70	52	60	----	------	----	------
71	65	74	57	66	54	63	50	59
80-1 80-2	67	76	58	67	56	65	52	61
80-3	70	79	60	69	58	67	----	-----
90 S	72	81	61	70	59	68	56	65
90 L	74	83	63	72	59	68	58	67
100 L	77	86	64	73	61	70	59	68
112	78	87	65	74	64	73	59	68
132 S	80	89	71	80	68	77	64	73
132 M - L	83	92	74	83	68	77	64	73
160 M	86	95	75	84	68	77	68	77
160 L	86	95	75	84	73	82	68	77

Ventilatori ausiliari

Tutti i motori serie T possono essere forniti con un sistema di ventilazione IC416.
In tal caso viene installato un opportuno ventilatore interno al copri ventola opportunamente rinforzato.
La ventilazione risulta pertanto indipendente dalla velocità di rotazione del motore stesso.
Tale soluzione è particolarmente idonea per i motori alimentati da inverter.

Auxiliary fans

All frame sizes can be supplied with cooling system IC 416 on request.
In this case a proper fan is fitted inside the fan cover. suitably reinforced..
Consequently the ventilation is independent of the rotation speed of the motor itself.
This solution is particularly suitable for inverter supplied

Tabella 12

Grandezza	Ventilatore ausiliario monofase	Ventilatore ausiliario trifase
56	a richiesta	a richiesta
63	UF12AE	a richiesta
71	UF12AE	a richiesta
80	UF15PE	a richiesta
90	UF15PE	a richiesta
100	UF15PE	a richiesta
112	UF15PE	a richiesta
132	UF25GCE	a richiesta
160	a richiesta	

Table 12

Size	Singole phase auxiliary fans type	Three phase auxiliary fans type
56	upon request	upon request
63	UF12AE	upon request
71	UF12AE	upon request
80	UF15PE	upon request
90	UF15PE	upon request
100	UF15PE	upon request
112	UF15PE	upon request
132	UF25GCE	upon request
160	upon request	

Tabella 13

Table 13

Spec / Model	Rated voltage	Frequenzy	Input Power	Rated current	Locked Current	Speed	Maximun Air Flow		Maximun Pressure		Noise	Weight
	V	Hz	W	A	A	r.p.m	m^3/min	CFM	NnH_20	$InchH_2O$	dB	kG
UF12AE11	115	50 60	15 13	0.21 0.17	0.28 0.24	2700 3000	2.4 2.7	85 95	4 4.8	0.15 0.18	38 42	0.73
UF12AE23	230	50 60	16 14	0.11 0.09	0.14 0.12	2700 3000	2.4 2.7	85 95	4 4.8	0.15 0.18	38 42	0.73
UF15PE11	115	50 60	36 33	0.51 0.42	0.62 0.54	2650 2950	4.53 5.10	160 180	4.06 4.57	0.16 0.18	48 53	0.78
UF15PE23	230	50 60	36 33	0.24 0.20	0.29 0.25	2650 2950	4.53 5.10	160 180	4.06 4.57	0.16 0.18	48 53	0.78
UF25GCE11-H	115	50 60	36 39	0.31 0.30	0.54 0.53	1400 1600	13 15.5	460 550	8 10.8	0.32 0.40	52 55	1.4
UF25GCE23-H	230	50 60	36 39	0.170 0.160	0.31 0.30	1400 1600	13 15.5	460 550	8 10.8	0.32 0.40	52 55	1.4

Damage and repair

TROUBLE	CAUSE	WHAT TO DO
Motor fails to start	Blown fuses	Replace fuses with proper type and rating
	Overload trips	Check and reset overload in starter.
	Improper power supply	Check to see that power supplied agrees with motor rating plate and load factor.
	Improper line connections	Check connections with diagram supplied with motor.
	Open circuit in winding or control switch	Indicated by humming sound when switch is closed. Check for loose wiring connections. Also. ensure that all control contacts are closed.
	Mechanical failure	Check to see if motor and drive turn freely. Check bearings and lubrication.
	Short circuited stator	Indicated by blown fuses. Motor must be rewound.
	Motor may be overloaded	Reduce load.
Motor stalls and then dies down	One phase may be open	Check lines for open phase.
	Wrong application	Change type or size. Consult manufacturer.
	Overload	Reduce load.
	Low voltage	Ensure the rating plate voltage is maintained. Check connection.
	Open circuit	Fuses blown. check overload relay. stator and push buttons.
Motor runs and then dies down	Power failure	Check for loose connections to line. fuses and control.
Motor does not come up to speed	Voltage too low at motor terminals because of line drop	Use higher voltage or transformer terminals or reduce load. Check connections. Check conductors for proper size
	Starting load too high	Check load motor is supposes to carry at start.
Motor takes too long to accelerate and/or draws high amp	Excessive load	Reduce load.
	Low voltage during start	Check for high resistance. Adequate wire size.
	Defective squirrel cage rotor	Replace with new rotor.
	Applied voltage too low	Get power company to increase power tap.
Wrong rotation	Wrong sequence of phases	Reverse connections at motor or at switchboard.
Motor overheats while running underloaded	Overload	Reduce load.
	Frame or bracket vents may be clogged with dirt and prevent proper ventilation of motor	Open vent holes and check for a continuous stream of air from the motor.
	Motor may have one phase open	Check to make sure that all leads are well connected.
	Grounded coil	Locate and repair.
	Unbalanced terminal voltage	Check for faulty leads. connections and transformers.
Motor vibrates	Motor misaligned	Realign.
	Weak support	Strengthen base.
	Coupling out of balance	Balance coupling.
	Driven equipment unbalanced	Rebalance driven equipment.
	Defective bearings	Replace bearings.
	Bearings not in line	Line up properly.
	Balancing weights shifted	Rebalance motor.
	Contradiction between balancing of rotor and coupling(half key – full key)	Rebalance coupling or motor
	Polyphase motor running single phase	Check for open circuit
	Excessive end play	Replace bearing

TROUBLE	*CAUSE*	*WHAT TO DO*
Scraping noise	Fan rubbing fan cover	Remove interference.
	Fan striking insulation	Clear fan.
	Motor loose on bedplate	Tighten holding bolts.
Noisy operation	Airgap not uniform	Check and correct bracket fits or bearing.
	Rotor unbalance	Rebalance.
Hot bearings	Bent or sprung shaft	Straighten or replace shaft.
	Excessive belt pull	Decrease belt tension.
	Pulleys too far away	Move pulley closer to motor bearing.
	Pulley diameter too small	Use larger pulleys.
	Misalignment	Correct by realignment of drive
	Broken ball or rough races	Replace bearing. first clean housing thoroughly

Contact ELECTRO ADDA SpA in case of problems with motors supplied by inverter

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner

CISQ/IMQ-CSQ

hereby certify that the organization

ELECTRO ADDA SPA

VIA NAZIONALE 8 - 23883 BEVERATE (LC) Italy

SOCIETA' MACCHINE ELETTRICHE SRL

VIA S. ANNA 840 – 41100 MODENA (MO) Italy

for the following field of activities

Design, manufacturing and service of low voltage electric rotary machines for industrial, naval and civil field, in particular: asynchronous three-phase motors with squirrel cage rotor, brake motors with squirrel cage rotor, single-phase motors with squirrel cage rotor, explosion-proof motors with squirrel cage rotor with ATEX certificate, slip-ring motors, frequency converters, high frequency motors, motors for circular saws, motors for inverter duty

[illegible]

has implemented and maintains a

Quality Management System

which fulfils the requirements of the following standard

ISO 9001:2000

Issued on: 2005-04-08

Registration Number: IT - 34914

Ivano Roveri

President of IQNet

CISQ

Giovanni Pratl

President of CISQ

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General features

The T line motors frame size 56÷160 are totally enclosed, fan cooled, with squirrel cage rotor.

Standards and standardizations

The T line motors frame size 56÷132 also comply with the following Standards:

RATINGS AND PERFORMANCES IEC 60034-1
CEI EN 60034 - 1

METHODS FOR DETERMINING LOSSES AND EFFICIENCY IEC 60034 - 2 CEI EN 60034–2

CLASSIFICATION OF DEGREES OF PROTECTION (IP CODE) IEC 60034-5 CEI EN 60034–5

METHODS OF COOLING (IC CODE)
IEC 60034 - 6 CEI EN 60034–6

CLASSIFICATION OF TYPE OF CONSTRUCTION AND MOUNTING ARRANGEMENTS (IM CODE)
IEC 60034-7 CEI EN 60034–7

TERMINAL MARKINGS AND DIRECTION OF ROTATION
IEC 60034-8 CEI 2-8

NOISE LIMITS
IEC 60034-9 CEI EN 60034–9

BUILT-IN THERMAL PROTECTIONS
IEC 60034-11

STARTING PERFORMANCE OF ROTATING ELECTRICAL MACHINES
IEC 60034 – 12 CEI EN 60034 – 12

MECHANICAL VIBRATIONS
IEC 60034-14 CEI EN 60034–14

DIMENSIONS AND OUTPUTS FOR ELECTRICAL MACHINES
CEI EN50347
IEC 60072-1
UNEL 13116
UNEL 13119

The coupling dimensions are in compliance with the following standardizations:
UNEL 13113-71 for the B3 mounting and for other frame shapes
UNEL 13117–71 for the B5 mounting and for other frame shapes

The UNEL standardizations are in accordance with the IEC international standards publication 72 and relative Amendment Nr. 1.

Thermal protections

Upon request, the following thermal protections can be installed on the T line motors:

Positive temperature coefficient thermistors PTC
At the active temperature this device quickly changes its resistance value,standard

Bimetallic devices
Motoprotectors with contact normally closed. The contact opens when the winding temperature reaches limits dangerous to the insulation system of the motor.

Platinum resistance thermometers PT100
Variable linear resistance with the winding temperature. Device particularly suitable for a continuous winding temperature monitoring.

The protection is normally made by 3 sensitive elements, one for every phase, series connected and with two terminals in a specially provided terminal board located in the main terminal box or in a specially provided auxiliary terminal box.

Anticondensation heaters

Motors subject to atmospheric condensation, either through standing idle in damp environments or because of wide ambient temperature variations, may be fitted with anticondensation heaters.
They are of tape form and are normally mounted on the stator winding head.
Anticondensation heaters are normally switched on automatically when the supply to the motor is interrupted, heating the motor to avoid water condensation.
Normal supply voltage is 115 V or 220/240V.

Anticondensation heater terminals are led to a specially provided terminal board located in the main terminal box. Upon request they can be led to a terminal board located in an auxiliary terminal box.

The power values normally used are shown in the table 8.

Table.8

Frame size	*Power (W)*
56	upon request
63	
71-90	8
100-132	22

Insulation, winding

The T line motors frame size 56÷160 are made in F insulation class.
The soft copper electrolytic wire is insulated by using a special enamel (double enamel). Such enamel is classified as H insulation class.
All insulating materials used to produce motors are in F or H insulation class.

The winding undergoes a severe treatment as follows: it is impregnated by soaking it in oven-curing F class resins, it is tropicalized following a process including a spraying of anti-salty enamel and, finally, it is coated using a spray with heatproof, humidity-proof, chemical agent and sea-ambient corrosive action resistant characteristics.

The impregnation cycle is to make one vacuum.

Ratings and technical data

Power and data reported in the Technical Data Tables are for continuous duty (S1) at an ambient temperature of 40 C altitude up to 1000 a.s, with supply at 400 V - 50 Hz

The operating characteristics are guaranteed with the tolerances defined by the CEI EN 60034-1 Standards and the IEC 60034-1 Recommendations, reported in table

Table 3

Characteristics	*Tolerances*
Efficiency	Motor power ≤ 50 kW -15% of (1 - η) Motor power > 50 kW -10% of (1 - η)
Power factor	+1/6 (1- cosφ) Min 0.02 Max 0.07
Locked rotor current	+20% of guaranteed value
Locked rotor torque	-15% + 25% of guaranteed value
Pull out torque	-20% of guaranteed value
Slip	Power motor < 1 kW ± 30% of guaranteed value Power motor ≥ 1 kW ± 20% of guaranteed value

Protection

The T line motors frame size 56÷160 according to IEC 60034-5 Standards, have the following protection degrees

IP 55 (standard) totally enclosed motors, fan cooled, with protected against penetration of dust and water splashes coming from any direction

IP 56 (upon request) totally enclosed motors, protected against dust penetration and against sea waves, for use on deck
Normally IP56 motors are be supplied with external fan (IC 411 – IC 416 or IC 418).

Upon request they can be supplied without fan. (IC410). In this case the features, outputs and technical data will be supplied upon request.

The external fan is covered by a fan cover with IP 20 protection degree (accidental contact of fingers is avoided)
Upon request, motors for vertical mounting, can be supplied with rain cowl.
The terminal box has IP 55 or IP56 protection degree.

Construction

The T series motors frame size 56÷160 have been designed and manufactured to guarantee maximum operating reliability and safety.

The T series motors frame size 56÷160 have aluminium frame.
Shields are in aluminium for frame size 56÷160.

The terminal box is in aluminium and is positioned on the motor, and it can be rotated in step of 90°.

For frame 56÷63 the feet are removable, for frame 71÷132 the feet are removable and will be assemble for realize terminal box left or right.

The fan cover is in steel sheet.

Fans are in nylon.

Caratteristiche tecniche
Servizio S1 - 400V - 50 Hz

Technical features
Duty S1 - 400V - 50 Hz

TIPO *Type*	Potenza *Power*	Velocità *Speed*	J	Rend *Eff*	Fattore di potenza *Power factor*	Corrente *Current* In a 400 V	Coppia Nominale *Nominal Torque*	Coppia di Spunto *Start Torque*	Corrente di spunto *Start Current*	Coppia Massima *Max torque*	Forma B3 *Frame B3* Peso *Weight*
	Kw	Giri/min	Kgm2	%	Cosfi	A	Nm	Ca/Cn	Ia/In	Cmax/Cn	Kg

2 poli - 3000 giri/min

2 poles - 3000 r.p.m.

561	0.09	2670	0.000099	57	0.65	0.35	0.32	2.2	2.4	6	2.8
562	0.12	2730	0.000099	62	0.69	0.40	0.42	2.2	2.4	6	3.2
563	0.18	2750	0.000099	65	0.72	0.56	0.63	2.2	2.4	6	3.5
631	0.18	2710	0.000241	63	0.75	0.55	0.63	2.2	2.4	6	4
632	0.25	2710	0.00024	65	0.78	0.71	0.88	2.2	2.4	6	4.4
633	0.37	2710	0.00024	65	0.78	1.05	1.30	2.2	2.4	6	4.9
711	0.37	2730	0.00035	70	0.79	0.97	1.29	2.2	2.4	6	5.6
712	0.55	2760	0.00052	71	0.79	1.42	1.90	2.2	2.4	6	6.1
713	0.75	2730	0.00059	72	0.82	1.83	2.62	2.2	2.4	6	7
801	0.75	2770	0.00122	73	0.84	1.77	2.59	2.2	2.4	6	9.1
802	1.1	2770	0.0017	76.2	0.83	2.51	3.79	2.2	2.4	6	10.2
803	1.5	2800	0.0018	78.5	0.83	3.32	5.12	2.2	2.4	6	11.7
90S	1.5	2840	0.0012	78.5	0.84	3.28	5.0	2.2	2.4	6	12
90L1	2.2	2840	0.0019	81	0.85	4.61	7.4	2.2	2.4	6	15
90L2	3	2840	0.0026	82.6	0.86	6.10	10.1	2.2	2.4	6	18.5
100L1	3	2840	0.0032	82.6	0.87	6.03	10.1	2.2	2.3	7	22.3
100L2	4	2850	0.0042	84.2	0.87	7.9	13.4	2.2	2.3	7.5	25.2
112M	4	2880	0.0049	84.2	0.87	7.9	13.3	2.2	2.3	7.5	26.7
112L	5.5	2880	0.0055	85.7	0.88	10.5	18.2	2.2	2.3	7.5	30.2
132S1	5.5	2900	0.009	85.7	0.88	10.5	18.1	2	2.2	7.5	38.5
132S2	7.5	2920	0.0113	87	0.88	14.1	24.5	2	2.2	7.5	42.2
132M1	9.2	2930	0.015	88	0.89	17.0	30.0	2	2.2	7.5	51.4
132M2	11	2930	0.017	88.4	0.9	20.0	35.8	2	2.2	7.5	58.8
160M1	11	2940	0.017	88.4	0.9	20.0	35.7	2	2.2	7.5	75
160M2	15	2940	0.023	89.4	0.91	26.6	48.7	2	2.2	7.5	88
160L	18.5	2940	0.032	90	0.91	32.6	60.1	2	2.2	7.5	99

4 poli - 1500 giri/min

4 poles - 1500 r.p.m.

561	0.06	1320	0.00016	48.5	0.59	0.30	0.43	2.3	2.4	6	3
562	0.09	1320	0.00016	50	0.61	0.43	0.65	2.3	2.4	6	3.3
563	0.12	1320	0.00016	52	0.63	0.53	0.87	2.2	2.4	6	3.5
631	0.12	1350	0.00024	57	0.64	0.47	0.85	2.2	2.4	6	3.9
632	0.18	1350	0.00029	59	0.65	0.68	1.27	2.2	2.4	6	4.3
633	0.25	1350	0.00031	60	0.66	0.91	1.77	2.2	2.4	6	4.8
711	0.25	1350	0.00035	60	0.72	0.84	1.77	2.2	2.4	6	5.4
712	0.37	1370	0.00052	65	0.74	1.11	2.58	2.2	2.4	6	6.2
713	0.55	1380	0.00101	66	0.75	1.60	3.81	2.2	2.4	6	7.3
801	0.55	1370	0.00122	67	0.75	1.58	3.83	2.2	2.4	6	9
802	0.75	1380	0.0017	72	0.78	1.93	5.2	2.2	2.4	6	10
803	1.1	1390	0.0019	76.2	0.78	2.67	7.6	2.2	2.4	6	12.3
90S	1.1	1400	0.0022	76.2	0.79	2.64	7.5	2.2	2.4	6	12.1
90L	1.5	1400	0.0028	78.5	0.8	3.45	10.2	2.2	2.4	6	14.6
90L2	2.2	1400	0.0043	81	0.8	4.9	15.0	2.2	2.4	7	18.3
100L1	2.2	1420	0.005	81	0.81	4.8	14.8	2.2	2.3	7	21
100L2	3	1420	0.006	82.6	0.81	6.5	20.2	2.2	2.3	7	24.7
100L3	4	1430	0.008	84.2	0.82	8.4	26.7	2.2	2.3	7	29
112M	4	1430	0.009	84.2	0.83	8.3	26.7	2.2	2.2	7	30.5
112L	5.5	1440	0.0195	85.7	0.83	11.2	36.5	2.2	2.2	7	34.8
132S	5.5	1450	0.021	85.7	0.84	11.0	36.2	2.2	2.2	7	40.4
132M	7.5	1450	0.028	87	0.85	14.6	49.4	2.2	2.2	7	49.6
132L1	9.2	1460	0.034	87.5	0.85	17.9	60.2	2.2	2.2	7.5	56.5
132L2	10	1460	0.035	88	0.85	19.3	65.4	2.2	2.2	7.5	58.5
132L2	11	1460	0.038	88.4	0.86	20.9	71.9	2.2	2.2	7.5	64
160M	11	1460	0.042	88.4	0.87	20.6	71.9	2.2	2.2	7	78

TIPO *Type*	Potenza *Power* Kw	Velocità *Speed* Giri/min	J Kgm2	Rend *Eff* %	Fattore di potenza *Power factor* Cosfi	Corrente *Current* In a 400 V A	Coppia Nominale *Nominal Torque* Nm	Coppia di Spunto *Start Torque* Ca/Cn	Corrente di spunto *Start Current* Ia/In	Coppia Massima *Max torque* Cmax/Cn	Forma B3 *Frame B3* Peso *Weight* Kg

6 poli - 1000 giri/min ***6 poles - 1000 r.p.m.***

631	0.09	840	0.00040	42	0.61	0.51	1.02	2	2	3.5	4.2
632	0.12	850	0.00050	45	0.62	0.62	1.35	2	2	3.5	4.8
711	0.18	880	0.00105	56	0.66	0.70	1.95	1.6	1.7	4	6
712	0.25	900	0.00129	59	0.7	0.87	2.65	2.1	2.2	4	6.5
713	0.37	890	0.00145	61	0.69	1.27	3.97	2	2.1	4	7.2
801	0.37	900	0.00164	62	0.7	1.23	3.93	1.9	1.9	4	8.2
802	0.55	900	0.00256	67	0.72	1.65	5.8	2	2.3	4	9.9
803	0.75	900	0.0031	68	0.72	2.21	8.0	2	2.3	4	11.3
90S	0.75	920	0.00354	69	0.72	2.18	7.8	2.2	2.2	5.5	11.7
90L	1.1	925	0.0051	72	0.73	3.02	11.4	2.2	2.2	5.5	15.1
100L	1.5	945	0.0079	74	0.76	3.85	15.2	2.2	2.2	6	19.1
112M	2.2	955	0.014	78	0.76	5.36	22.0	2.2	2.2	6	25.4
132S	3	960	0.023	79	0.76	7.2	29.8	2	2	6.5	36.1
132M1	4	960	0.031	80.5	0.76	9.4	39.8	2	2	6.5	45
132M2	5.5	960	0.041	83	0.77	12.4	54.7	2	2	6.5	55.5
132L	7.5	960	0.053	85	0.77	16.5	74.6	2	2	6.5	60
160M	7.5	960	0.075	86	0.8	15.7	74.6	2	2.2	6.5	72
160L	11	960	0.109	87.5	0.79	23.0	109.4	2	2.2	6.5	92

8 poli - 750 giri/min ***8 poles - 750 r.p.m.***

711	0.09	680	0.00105	48	0.56	0.48	1.26	1.5	1.7	3	6
712	0.12	690	0.00119	51	0.59	0.58	1.66	1.6	1.7	2.7	6.8
801	0.18	680	0.00164	51	0.61	0.84	2.53	1.5	1.7	2.8	9.9
802	0.25	680	0.0029	56	0.61	1.06	3.51	1.6	2	2.7	10.9
90S	0.37	680	0.0049	63	0.63	1.35	5.20	1.6	1.8	2.8	14.8
90L	0.55	680	0.0057	66	0.65	1.85	7.7	1.6	1.8	3	17.2
100L1	0.75	710	0.075	66	0.67	2.45	10.1	1.7	2.1	3.5	17.5
100L2	1.1	710	0.084	72	0.69	3.20	14.8	1.7	2.1	3.5	19.7
112M	1.5	710	0.015	74	0.68	4.30	20.2	1.8	2.1	4.2	25.6
132S	2.2	720	0.022	75	0.71	6.0	29.2	2	2	5.5	35.5
132M	3	720	0.031	77	0.73	7.7	39.8	2	2	5.5	45
160M1	4	730	0.053	80	0.73	9.9	52.3	1.9	2.1	6	60
160M2	5.5	720	0.075	83.5	0.74	12.8	72.9	2	2.2	6	72
160L	7.5	720	0.109	85	0.75	17.0	99.5	1.9	2.2	6	92

TIPO *Type*	Potenza *Power* Kw	Velocità *Speed* Giri/min	J Kgm2	Rend *Eff* %	Fattore di potenza *Power factor* Cosfi	Corrente *Current* In a 400 V A	Coppia Nominale *Nominal Torque* Cn Nm	Coppia di Spunto *Start Torque* Ca/Cn	Corrente di spunto *Start Current* Ia/In	Coppia Massima *Max torque* Cmax/Cn	Forma *Frame* B3 Peso *Weight* Kg

2/4 poli - 3000/1500 giri/min

2/4 poles - 3000/1500 r.p.m.

56	0.11/0.07	2660/1330	0.00016	50/42	0.82/0.66	0.39/0.36	0.4/0.5	1.6/1.4	4/3	1.7/1.5	3.4
63	0.15/0.11	2680/1340	0.00024	54/53	0.82/0.67	0.49/0.45	0.53/0.58	1.7/1.5	4/3	1.8/1.6	4
63	0.22/0.15	2690/1340	0.00029	61/59	0.86/0.67	0.61/0.55	1.7/1.4	1.7/1.5	4/3	1.8/1.6	4.6
71	0.3/0.22	2760/1330	0.00035	60/55	0.8/0.73	0.9/0.79	1.04/1.56	1.7/1.5	3.5/3.5	1.9/1.6	6.4
71	0.45/0.3	2790/1370	0.00052	63/58	0.8/0.73	1.29/1.02	1.54/2.08	2/1.8	4/4	2/1.7	7.5
80	0.55/0.45	2820/1380	0.00120	65/64	0.84/0.75	1.45/1.35	1.88/3.11	2/1.8	4.5/4.5	2.1/1.8	8.9
80	0.75/0.6	2830/1410	0.00170	67/68	0.86/0.77	1.9/1.65	2.56/4.1	1.8/1.7	4./4.55	2/1.8	10.9
90S	1.25/0.95	2830/1380	0.00220	72/68	0.86/0.82	2.9/2.5	4.2/6.5	2/1.8	5/5	2/1.8	12.5
90L	1.7/1.32	2840/1400	0.00280	73/70	0.86/0.83	3.9/3.3	5.74/9	2/1.8	5/5	2/1.8	15.7
100L	2.4/1.84	2840/1400	0.00570	73/76	0.86/0.83	5.5/4.2	8.1/12.5	2/1.8	5.5/5	2/1.6	22
100L	3.2/2.6	2850/1420	0.00780	74/78	0.86/0.85	7.5/5.7	11.1/17.8	2/1.9	5.5/5	2/1.9	23.5
112M	4.5/4	2870/1420	0.00920	77/79	0.85/0.86	9.9/8.5	15/26.7	2/1.8	5.5/5	2.2/2	28.9
132S	6/5	2870/1440	0.02100	79/82	0.84/0.86	13.05/10.2	20/33.2	2/1.5	5./55	2.2/1.9	45
132M	8/6.6	2875/1440	0.02800	82/84	0.84/0.86	16.8/13.1	26.6/43.8	2/1.9	6/6	2.2/1.9	54

4/6 poli - 1500/1000 giri/min

4/6 poles - 1500/1000 r.p.m.

71	0.22/0.15	1400/900	0.00129	52/45	0.70/0.68	0.87/0.71	1.5/1.59	1.8/1.9	3/2.7	1.9/1.8	6.9
80	0.3/0.22	1400/910	0.00164	60/65	0.74/0.69	0.98/0.84	2.05/2.31	1.8/1.7	4.5/4	2/1.8	7.8
80	0.45/0.3	1410/920	0.00256	63/58	0.75/0.7	1.37/1.07	3.05/3.11	1.8/1.7	4.5/4	2/1.8	11
90S	0.66/0.45	1410/920	0.00354	66/61	0.76/0.65	1.9/1.64	4.47/4.67	1.7/1.6	5/4.5	2/1.7	14.7
90L	0.88/0.6	1420/930	0.00505	70/64	0.77/0.67	2.36/2.02	5.92/6.16	1.7/1.6	5/4.5	2/1.9	15.9
100L	1.32/0.88	1420/940	0.00870	72/67	0.85/0.75	3.11/2.3	8.88/8.94	1.8/1.7	6/5	2/1.8	21
100L	1.76/1.2	1430/950	0.01200	74/70	0.85/0.75	4.04/3.3	11.75/12.06	1.8/1.7	6/5	2/1.8	24
112M	2.2/1.5	1430/950	0.01400	76/70	0.8/0.7	5.22/4.42	14.69/15	2/1.8	6/5	2.2/2	27.3
132S	3.3/2.2	1440/960	0.03100	82/78	0.81/0.72	7.17/5.65	21.9/22.0	2/1.8	7/6	2.2/2.1	48
132M	4.5/3	1450/970	0.04100	83/80	0.82/0.74	9.45/7.31	29.6/29.5	2/1.8	7/6	2.3/2.1	56

6/8 poli - 1000/750 giri/min

6/8 poles - 1000/750 r.p.m.

71	0.11/0.075	900/680	0.00129	41/33	0.67/0.60	0.58/0.55	1.19/1.07	1.3/1.3	2/1.9	1.5/1.5	7
80	0.18/0.11	900/680	0.00164	50/42	0.69/0.65	0.75/0.58	1.91/1.54	1.5/1.3	3.5/3	1.5/1.5	8.6
80	0.25/0.18	920/700	0.00256	54/46	0.7/0.66	0.95/0.86	2.6/2.46	1.7/1.5	3.5/3	1.5/1.7	10.7
90S	0.37/0.25	930/680	0.00354	58/50	0.72/0.68	1.28/1.06	3.8/3.51	1.5/1.4	4/3	1.8/1.8	11.8
90L	0.55/0.37	940/685	0.00505	63/54	0.73/0.69	1.73/1.43	5.59/5.16	1.5/1.4	4/3	1.8/1.7	14.9
100L	0.75/0.55	950/700	0.00870	69/63	0.74/0.74	2.12/1.7	7.54/7.5	1.5/1.4	5/4	4/2	21
100L	1.03/0.75	955/705	0.01200	71/65	0.76/0.76	2.76/2.19	10.3/10.16	1.5/1.4	5/4	4/2	27
112M	1.25/0.95	960/710	0.01400	72/64	0.71/0.71	3.53/3.02	12.43/12.78	1.6/1.4	5/4	2/1.8	28.9
132S	2.2/1.5	970/720	0.03100	76/70	0.71/0.7	5.88/4.42	21.66/19.9	1.6/1.4	6/5.5	2.3/2	48.9
132M	3/1.85	970/720	0.04100	78/74	0.71/0.7	7.82/5.01	29.54/24.37	1.6/1.4	6/5.5	2.3/2	58.6

TIPO *Type*	Potenza *Power* Kw	Velocità *Speed* Giri/min	J Kgm2	Rend *Eff* %	Fattore di potenza *Power factor* Cosfi	Corrente *Current* In a 400 V A	Coppia Nominale *Nominal Torque* Cn Nm	Coppia di Spunto *Start Torque* Ca/Cn	Corrente di spunto *Start Current* Ia/In	Coppia Massima *Max torque* Cmax/Cn	Forma *Frame* B3 Peso *Weight* Kg

4/8 poli - 1500/750 giri/min — ***4/8 poles - 1500/750 r.p.m.***

71	0.18/0.11	1380/680	0.00129	53/42	0.68/0.53	0.76/0.75	1.29/1.59	2/1.8	3.6/2.2	1.9/1.7	6.5
80	0.25/0.15	1380/680	0.00164	58/40	0.77/0.6	0.81/0.9	1.73/2.11	2/2.1	4.5/3	2/1.8	8.4
80	0.45/0.25	1390/685	0.00256	68/48	0.8/0.6	1.19/1.25	3.09/3.49	1.8/2	4.5/3	2/1.8	11
90S	0.55/0.3	1400/690	0.00303	68/50	0.83/0.61	1.41/1.42	3.75/4.15	1.8/2	4.5/3.5	2/1.8	12.9
90L	0.8/0.45	1400/690	0.00450	68/53	0.83/0.63	2.05/1.95	5.46/6.23	1.8/1.6	4/3	1.9/1.8	14.9
100L	1.25/0.6	1400/700	0.00870	69/54	0.82/0.56	3.19/2.86	8.53/8.16	1.8/2	5/3.5	2/1.7	21.8
100L	1.76/0.88	1400/700	0.01090	71/58	0.84/0.56	4.26/3.91	12/12	1.8/2	5.5/4	2/1.8	24
112M	2.2/1.5	1420/700	0.01410	75/64	0.82/0.61	5.16/5.54	14.8/20.46	2/1.6	6/4	2/1.8	28.7
132S	3.3/2.2	1430/705	0.03070	78/70	0.84/0.64	7.27/7.09	22.04/29.8	2/1.5	6/5	2/1.9	48.3
132M	4.5/3	1430/705	0.0410	82/77	0.85/0.65	9.32/8.65	30.05/40.64	2/1.6	6/5	2/1.8	56.5

2/8 poli - 3000/750 giri/min — **2/8 poles - 3000/750 r.p.m.**

71	0.25/0.66	2690/650	0.00052	62/20	0.78/0.58	0.90/0.85	0.89/0.88	1.7/2	3/2	1.9/2	6.4
80	0.37/0.08	2760/660	0.00160	65/33	0.76/0.48	1.08/0.73	1.28/1.16	1.7/2	3.5/2.5	1.9/2.1	8.9
80	0.55/0.11	2780/670	0.00260	67/35	0.78/0.5	1.52/0.91	1.89/1.57	1.7/2	4/3	1.9/2.2	11
90S	0.75/0.18	2800/670	0.00350	67/43	0.79/0.52	2.05/1.16	2.56/2.57	1.8/2	4/3	2/2.3	13.2
90L	1.1/0.3	2810/680	0.00510	67/45	0.8/0.54	2.96/1.78	3.74/4.21	1.8/2	4/3.5	2/2.3	15.1
100L	1.5/0.37	2820/700	0.00870	67/50	0.84/0.56	3.85/1.91	5.08/5.05	1.7/2.1	5/3.5	2/2.6	22
100L	2.2/0.55	2820/710	0.01300	69/51	0.85/0.58	5.49/2.68	7.45/7.4	1.8/2.2	5/3.5	2/2.6	25.4
112M	2.6/0.75	2840/710	0.01400	71/58	0.86/0.6	6.15/3.11	8.74/10.09	1.8/2	5.5/4	1.9/2.1	28
112M	3/0.9	2850/710	0.01500	75/63	0.86/0.58	6.71/3.56	10.05/12.1	1.7/2	6.5/4.5	1.9/2.2	40
132S	3.7/1.1	2890/710	0.02400	81/65	0.83/0.57	7.94/4.29	12.22/14.8	1.7/1.6	7/5	1.9/1.9	49.8

Tensione di alimentazione

I motori serie T sono progettati per essere utilizzati sulla rete Europea *230/400* Volt +/- 10% - 50 Hz e 400/600 +/-10% - 50 Hz.
Questo significa che lo stesso motore può funzionare sulle seguenti reti ancora esistenti:
- 220/380 Volt +/- 5 %
- *230/400* Volt +/-10%
- *240/415* Volt +/- 5%
- 380/660 Volt +/- 5%
- 400/600 Volt +/- 10%
- 415/720 Volt +/- 5%

rispondendo ai requisiti richiesti dalle normative di numerosi paesi.

Feeding voltage

The T line motors are made to be used on the European nel system Vott.230/400 +/-10% - HZ.50 and Volt.400/690+l-1 0% - Hz.50.
This means that the same motor can function on the following stili existing nets:
- 220/380 Volt +/- 5%
- 230/400 Volt +/- 10%
- 240/415 Vott +/- 5%
- 380/660 *Volt+/-* 5% .
- 4001690Volt+/-10%
- *415/720* Vott +/- 5%

corresponding to the requirements requested by the rules of numerous countries.

Oscillazioni di tensione e frequenza

I motori possono funzionare senza subire danni, se la tensione di alimentazione varia entro i limiti stabiliti dalle Norme di riferimento.
In particolare i motori possono funzionare con variazione di tensione del 10 % e di frequenza del 5% con una variazione combinata massima del 10% con sovratemperatura conformi a quanto previsto dalle norme di riferimento

Voltage and frequency variations

Motors can work without failures if the supply voltage variations are limited as stated in the Classification Society Standards.
In particular, motors can run with voltage variations of 10 % and frequency variations of 5 % with a maximum combined variation of 10 % with temperature rise in compliance with the provisions of the Classification Society Standards.

Funzionamento a 60 Hz

I motori serie T possono funzionare con frequenza a 60 Hz con differenze di prestazione e grandezze elettriche applicando i coefficienti moltiplicativi indicati nella tabella 4

Function with a frequency of 60

The T line motors can function with a frequency of 60 Hz. with differences in performances and electrical sizes as described on the table 4

Tabella 4 — ***Table 4***

Tensione di targa Plate voltage 50 Hz	Tensione di targa Plate voltage 60Hz	Potenza nom Nominal power	Corrente nom Nominal current	Coppia nom. Nominal torque	Giri/min r.p.m.	Corrente di spunto Starting current	Coppia di spunto Starting torque	Coppia max Max torque
230 +/- 10%	220 +/- 5%	1	1	0,83	1.2	0.83	0.83	0.83
230 +/- 10%	230 +/-.10%	1	0.95	0.83	1.2	0.83	0.83	0.83
230 +/- 10%	254 +/- 5%	1.15	1.02	0.96	1.2	0.93	0.93	0.93
230 +/- 10%	277 +/- 5%	1.2	1	1	1.2	1	1	1
400 +/- 10%	380 +/- 5%	1	1	0.83	1.2	0.83	0.83	0.83
400 +/- 10%	400+/-10%	1	0.95	0.83	1.2	0.83	0.83	0.83
400 +/- 10%	440 +/- 5%	1.16	1.02	0.96	1.2	0.93	0.93	0.93
400 +/- 10%	460+/- 10%	1.15	1	0.96	1.2	0.96	0.96	0.96
400 +/- 10%	480 +/-. 5%	1.2	1	1	1.2	1	1	1