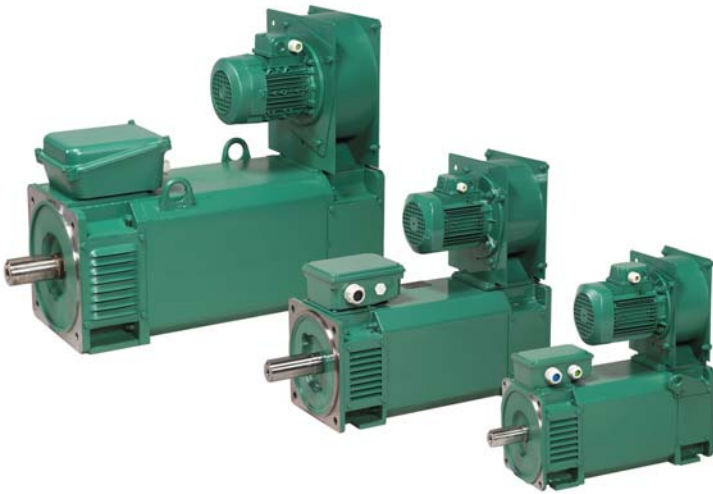


CPLS

Three-phase asynchronous motor

CPLS ASYNCHRONOUS MOTOR



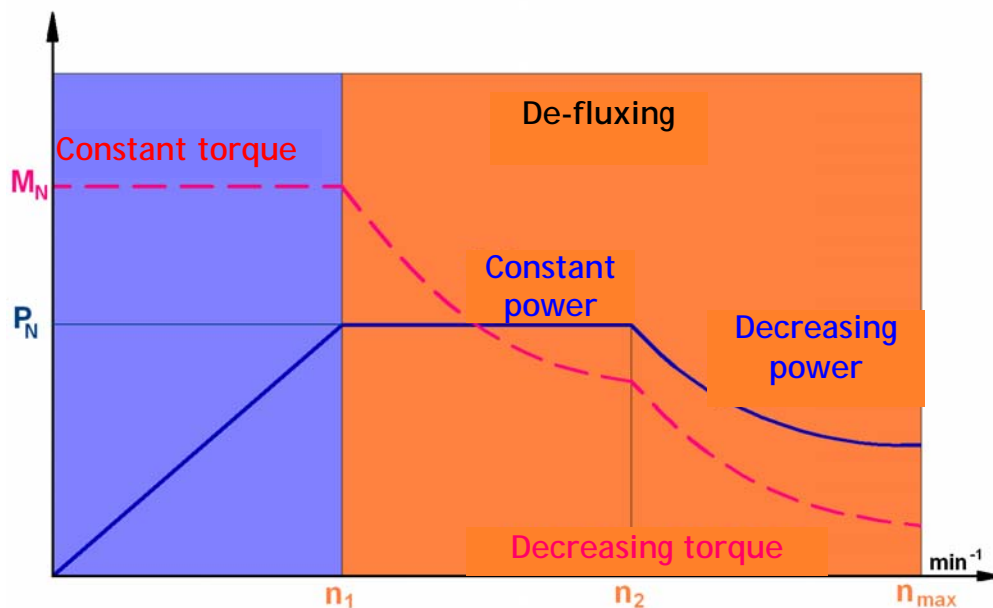
The **CPLS** asynchronous motor range with **IP23** protection has been developed for variable speed applications, or fixed applications when available space is reduced or (and) when the speed variation range is large.

Supplied by frequency inverters, the motors operate in open or closed loop. They deliver, as standard, their defined nominal torques (M_N) up to their designed speed (n_1) then supply a constant power P_N from the n_1 speed to the n_2 speed.

Squirrel cage asynchronous motors are well adapted for de-fluxed operating, and over a range as large as the mechanical structure will allow.

Each machine is defined by its **dimensioning torque**; this torque is available under **continuous service** below the design speed due to efficient radial ventilation.

The performances of these machines can be compared to those of DC machines and certain brushless motor characteristics. **The inertias are reduced**, hence offering good **dynamic performances**.



1 – General description:

CPLS ASYNCHRONOUS MOTOR

Asynchronous motors from the CPLS series, shaft height from 112 to 160 mm. For size above, please contact the factory.

Protection: IP23.

Supply: in standard 3 wire, supplied by a frequency inverter.

Windings: class F standard.

Magnetic shell: it has been designed to offer good characteristics within their utilisation range, including defluxing mode.

Following the machines utilisation speeds, using low loss shells enables the optimisation of the electrical characteristics of the motor/speed controller assembly.

Rotor: in aluminium or copper depending on frame size.
Half-key balancing.

Housing: steel.

End Shields: in cast iron secured by tie rods. The mounting feet are fitted to the front and rear end shields.

Terminal box: in aluminium. It can be rotated every 90 degrees, on either the front or rear end shields sides. Only three connecting cables are available in the terminal box.

CAUTION: the terminal box cover must be re-closed once the connecting of the cables is terminated.

Ball Bearings: set of C3 fit bearings, greased for life as standard.

Lifting rings:

Following the types, they are fixed with screws to the bearings of the machine, or welded to the housing.

Fan: a three-phase auxiliary fan, 230/400V 50Hz ensures good cooling for all speeds of the machine. The cooling method conforms to the IEC 34-6 standard is IC06.

Unless specified, the temperature of the cooling air should be between +5°C and +40°C with humidity less than 80% HR.

The power of the motor fan varies with the size of the machine.

CPLS 112:	0,25 kW
CPLS 132:	0,37 kW
CPLS 160:	1,10 kW

Finish: paint RAL 6000 (green)

Identification on the nameplate fixed on the housing.

Available options:

- Front roller bearings
- Greased bearings
- Special shaft ends
- Flanges different from standard by shaft height.
- Filter on radial VF
- Ventilation by duct
- Second shaft end
- Probes PTC, PTO, PTF
- Encoder, absolute encoder
- 6 terminal connection
- Increase of the operating range at constant power with our CONSTANT POWER SYSTEM device

Other options on requirements:

- VF axial
- Brake

The fan can be orientated in all directions, to either of the rear or front bearing sides.

CPLS ASYNCHRONOUS MOTOR

2 – Choice of machine:

In order to help you quickly determine your motor and inverter assembly, we have developed dimension information charts for speed variation. These can be found at the end of this document.

a – First of all, determine the nominal useful torque for your required application. The necessary torque (M_N) at the rated point (n_1) defines the size of the machine in the range.

The network of iso-power curves below will be a first step towards choosing the size of the machine.

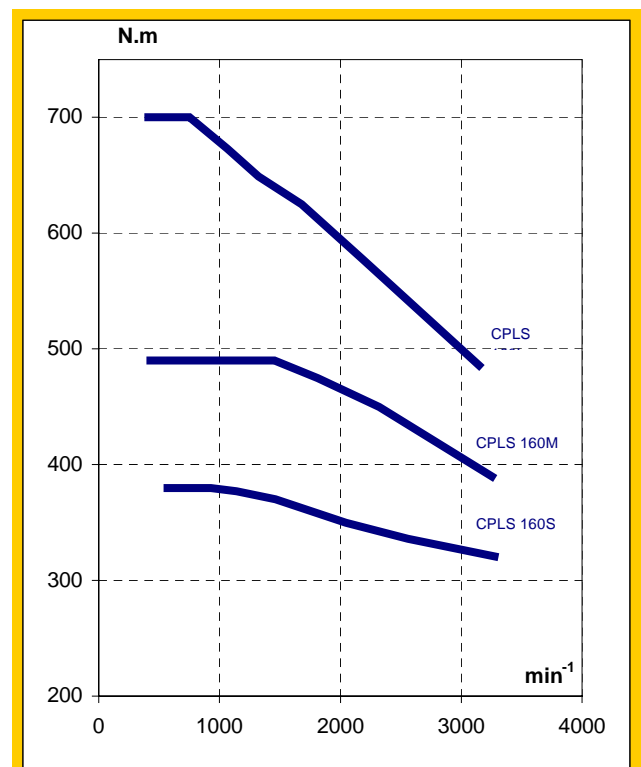
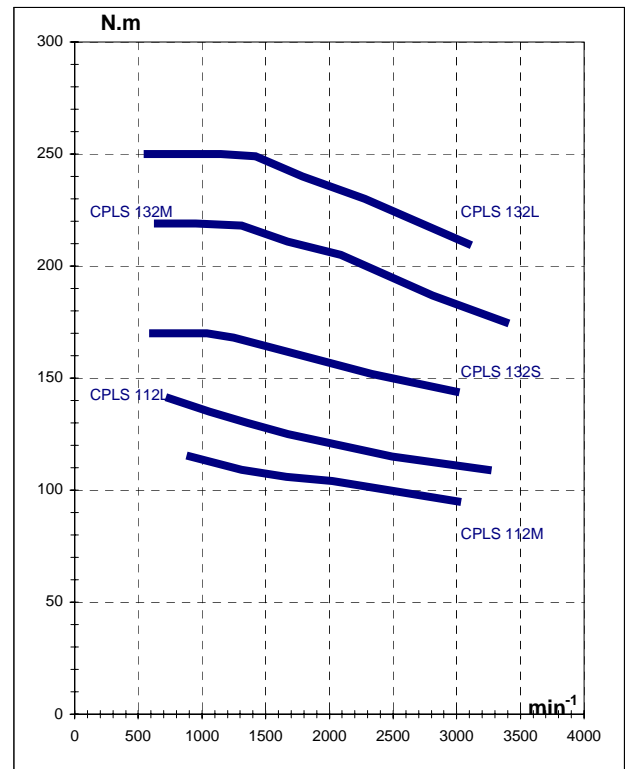
b – Choose the speed closest to the one desired, using the information chart corresponding to the retained motor torque, according to the available current on the inverters output.

The choice determines the type of machine, and indicates the most adapted winding enabling the use of the inverter size closest to your needs. This information can be found in the determination chart.

This selection method enables the dimensioning of the motor/inverter assembly to the real application requirements.

A determination example is given in paragraph 7.

Our machines are tested on test stands supplied by inverters from **LEROY-SOMER**. When available, the characteristics can be requested at the factory.



CPLS ASYNCHRONOUS MOTOR

3 – Choice of inverter frequency:

According to the desired utilisation, the choice of the machine and the rating of the machine's inverter will be different.

If it is desired to work from zero speed to its rated speed the inverter rating can be adapted corresponding to the nominal voltage of the machine.

If, on the contrary, you wish to use a machine above its designed speed, and benefit from a large work range, while conserving the constant power, you can sometimes:

- Choose the next inverter rating above.
- Adopt a torque reserve at the base point.
- Combine the two possibilities.

Our range of machines offer, as standard, a constant power range twice the rated speed, (n_1) without derating the **UNIDRIVE SP** or **POWERDRIVE** inverter size. Above this speed, the power available is reduced due to the rapid reduction in the maximum motor torque.

Full documentation on the electronic inverters of the **DIGIDRIVE-SK**, **UNIDRIVE-SP**, and **POWERDRIVE** ranges are available on request.

CONSTANT POWER SYSTEM:

A patented device, fitted in the terminal box, the **CONSTANT POWER SYSTEM** enables running over a wider speed range without derating the inverter.



4 – Normal running conditions and correction factors.

According to the IEC 34-1 standard, standard motors can operate under the following normal conditions:

- ambient temperature between +5°C and +40°C.
- altitude less than 1000m.
- atmospheric pressure 1050 mbar.
- Operating zone 2 (absolute humidity between 5 and 23 g/cm³).
- Ambient air free from chemicals and dust.

Corrections relative to altitude.

For different kinds of use, the power correcting coefficient indicated in the chart below will be applied.

P1/P	amb (°C) ≤ 40°C	amb (°C) ≤ 50°C	amb (°C) ≤ 60°C
Altitude ≤ 1000m	1	0,93	0,85
Altitude ≤ 2000m	0,93	0,85	0,75

The factor P1/P gives the correction coefficient.

- P1: corrected power.
P : catalogue power.

A more detailed abacus is available in the three-phase asynchronous motors catalogue in LS series of LEROY SOMER.

Corrections according to service.

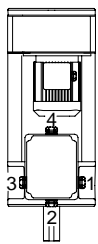
Service type	Operating time		
	10 min	30min	60min
S2	1,6	1,3	1,1
Service type	Operating factor		
	25%	40%	60%
S3	1,4	1,2	1,1
S6	1,4	1,3	1,2

CPLS ASYNCHRONOUS MOTOR

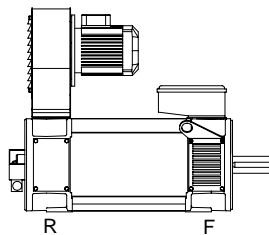
5 – Acceptable radial load on shaft end.

In the case of coupling by pulleys and belts, the setting must conform to good practice, to avoid reducing the lifespan of the bearings. The data is available at the factory

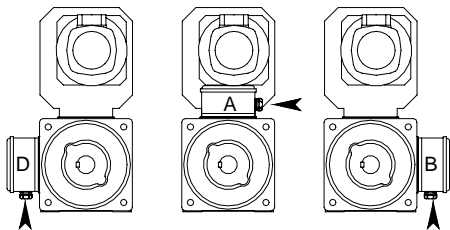
6 - Position of the terminal box and the forced ventilation:



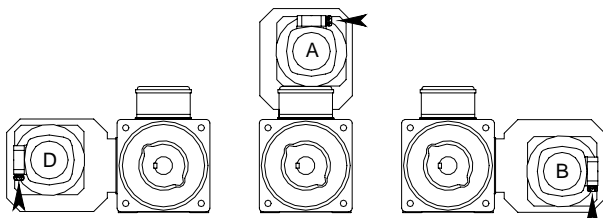
Position of the cable gland output, in relation to the shaft end.



Position of the terminal box and fan in relation to the motor bearing
F: on front bearing
R: on rear bearing



Position of the terminal box



Position of the fan

Example:

Terminal box in position A1 on the front bearing, fan in position B mounted on the rear bearing.

Designation: A1 F–B R.

7 – Selection example.

The determination method requires the torque demanded by the application. If the torque is available, go directly to step n°3.

Example: I want to motorise a drive which requires 16 kW at 1200 min⁻¹ in S1 service.

The ambient temperature will be 20°C when operating, altitude less than 1000m.

The terminal box needs to be on the right hand side, and the fan on the top when looking at the shaft end.

Step n°1: correction factors.

- Correction according to the temperature and altitude (paragraph 4).
- Correction according to service (paragraph 4).

Example: it is not necessary to de-rate to take into account service or environmental conditions.

Step n° 2: rated torque calculation.

You know the power and the speed; you can calculate the torque using the following formula:

$$C = P \times 9550/n$$

C: torque in N.m

P: power in kW

n: speed in min⁻¹

Example: the torque necessary for my application is: 127 N.m.

Step n° 3: determination of the shaft height.

The diagram in paragraph 2 enables rapid determination of the size of the machine in relation to torque and speed.

Example: on the abacus paragraph 4 I choose the machine CPLS112 L.

Step n° 4: determination of the machine.

On the chart for the machine you select the closest speed to your needs, or just above according to the available inverter output voltage.

On the retained line, you obtain the main mechanical and electrical parameters, which define your operating point, as well as the size of the inverter and product code for the machine.

CPLS ASYNCHRONOUS MOTOR

Example:

See chart for CPLS112L motor.

The output voltage of the inverter will be 360V.

The closest speed just above the one needed is 1215 min⁻¹.

Step n° 5: control.

The torque of the machine which figures on the line, is the one obtained in S1 service. I check to see if it is equal or higher than my needs.

If it is not the case, I pass to the size of machine immediately above.

Example:

The torque of the motor in S1 service is 130N.m for a requirement of 127N.m, the machine is well dimensioned.

Retained motorisation :

Machine: CPLS 112L 0606 B1F AR

Inverter: UNIDRIVE SP 27T.



POWERDRIVE



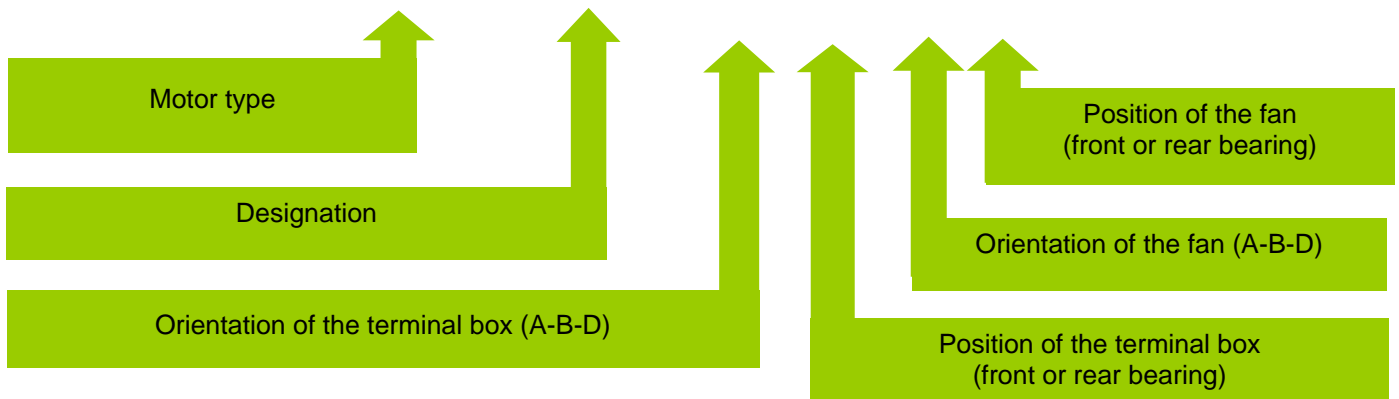
UNIDRIVE SP



DIGIDRIVE SK

8 – Full designation.

CPLS - 112L0606 - B1 - F - B - R

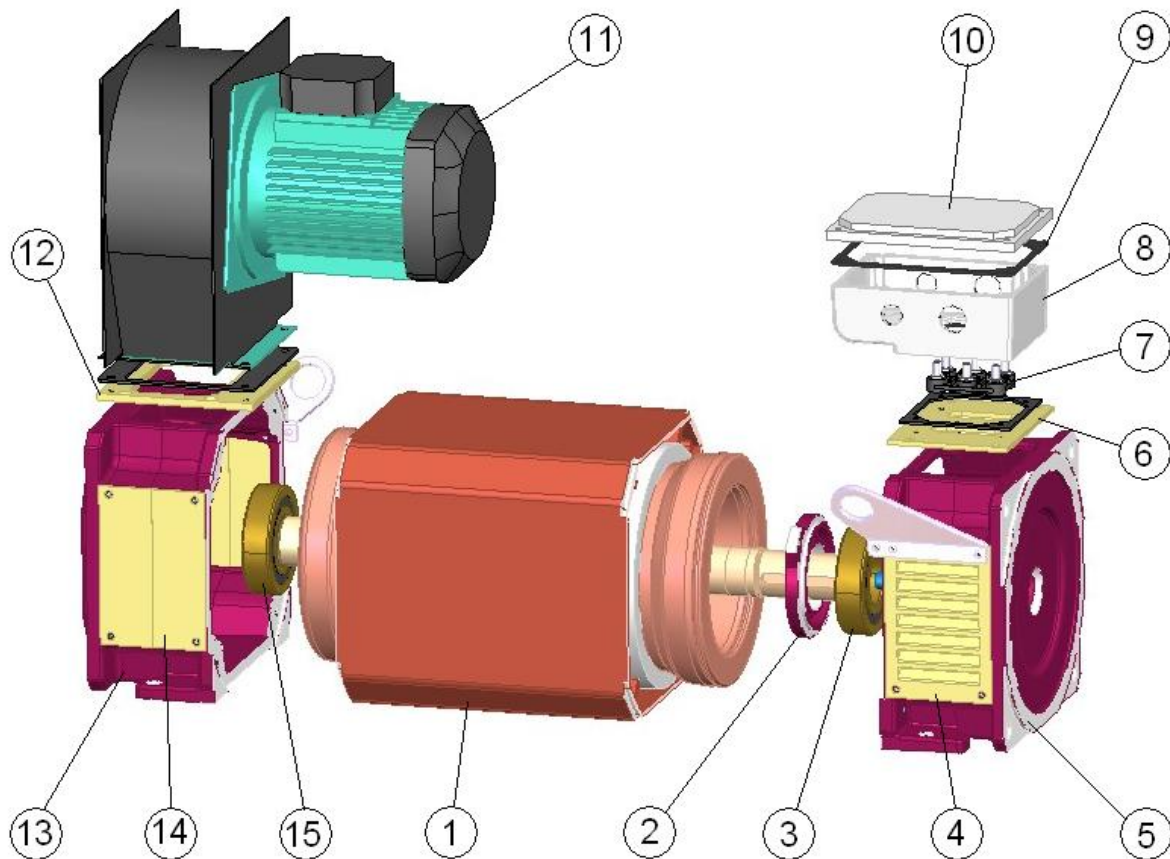


CPLS ASYNCHRONOUS MOTOR

9 - Constitution

Rep	Designation
1	Stator in its housing
2	Flange bearing (following mounting)
3	Bearing
4	Ventilation grill
5	Front bearing
6	Support plate for terminal box
7	Terminal plate
8	Terminal box body

Rep	Designation
9	Terminal box
10	Terminal box cover
11	Forced ventilation
12	Fan joint
13	Rear bearing
14	Blanking plate
15	Rear bearing



CPLS ASYNCHRONOUS MOTOR

CPLS 112M 95 – 110N.m

IP23 Motor– IC06 Fan– Class F
 S1 Service – Ambient temperature 40°C – Total weight : 87 Kg
 Inertia: 0,039 kg.m² - Maximum speed: 8000 min⁻¹
 Forced ventilation of 0,25 kW – 230/400V 50Hz.

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω)	n ₂ (min ⁻¹)	Product code	Unidrive SP rating
8,5	320	25,9	714	114	22,7	0,87	77	1,39	1365	112M0604	16T
9,1	340	27,5	762	114	22,7	0,86	78		1511		
9,7	360	29,1	812	114	22,8	0,86	79		1630		
10,3	380	30,7	860	114	22,8	0,85	80		1697		
11,0	400	32,3	908	115	23,0	0,85	81		1760		
12,0	440	35,5	1006	114	22,7	0,84	82		2083		
12,9	480	38,8	1107	111	22,3	0,83	83		2320		
11,7	320	36,1	1015	109	28,4	0,89	82		2000		
12,5	340	38,3	1081	110	28,7	0,89	83	2122			
13,4	360	40,6	1151	110	28,6	0,89	83	2245			
14,2	380	42,8	1217	111	28,8	0,88	84	2410			
15,0	400	45,1	1312	109	28,5	0,89	85	2600			
16,1	440	49,6	1424	108	27,8	0,87	86	2853			
17,3	480	54,2	1564	106	27,3	0,87	87	3157			
14,6	320	46,1	1316	106	35,6	0,86	85	2851	112M0606	27T	
15,6	340	49,0	1403	106	35,6	0,86	86	3061			
16,5	360	51,8	1488	106	35,5	0,85	87	3240			
17,5	380	54,7	1575	106	35,5	0,85	87	3428			
18,5	400	57,6	1663	106	35,6	0,85	88	3610			
20,4	440	63,4	1837	106	35,5	0,84	89	4170			
22,3	480	69,1	2009	106	35,5	0,84	89	4591			
17,5	320	55,7	1603	104	41,3	0,86	87	3475			112M0607
18,6	340	59,2	1708	104	41,2	0,86	88	3719			
19,7	360	62,6	1811	104	41,1	0,86	89	4016			
20,9	380	66,1	1916	104	41,2	0,86	89	4367			
22,0	400	69,6	2021	104	41,1	0,85	90	4610			
24,3	440	76,6	2232	104	41,1	0,85	90	5092			
26,5	480	83,5	2440	104	41,0	0,85	91	5575			
23,8	320	81,6	2390	95	55,9	0,83	91	5940	112M0608	40T	
25,3	340	86,7	2543	95	55,9	0,83	91	6330			
26,9	360	92,0	2702	95	56,0	0,83	92	6720			
28,4	380	97,0	2852	95	56,0	0,83	92	7110			
30,0	400	102	3002	95	56,2	0,83	92	7470			
32,9	440	117	3450	91	54,1	0,85	93	8000			
36,1	480	138	4075	84	52,3	0,88	93	8000			
29,5	320	88	2582	109	67,8	0,85	92	6415			112M0609
31,2	340	93	2732	109	67,7	0,84	92	6780			
33,3	360	99	2912	109	67,8	0,84	92	7230			
35,0	380	104	3063	109	67,7	0,84	93	7621			
37,0	400	110	3242	109	67,7	0,84	93	8000			
40,8	440	121	3573	109	67,7	0,84	93	8000			
44,6	480	140	4140	103	65,5	0,87	94	8000			

* voltage available at inverter output

Indicative & non contractual values that can be modified at any moment by the manufacturer



CPLS ASYNCHRONOUS MOTOR



MOTEURS LEROY SOMER 16015 ANGOULÊME CEDEX – FRA NCE



MOTEURS PATAY 69008 LYON CEDEX – FRA NCE

