



Asynchronous CPLS motors for variable frequency

95 Nm to 2,900 Nm

Technical catalogue

4119 en - 2012.10 / f

Introduction

The range of **IP23** protection **CPLS** asynchronous motors was designed for fixed and variable speed applications when there is little space available or (and) there is a wide speed variation range.

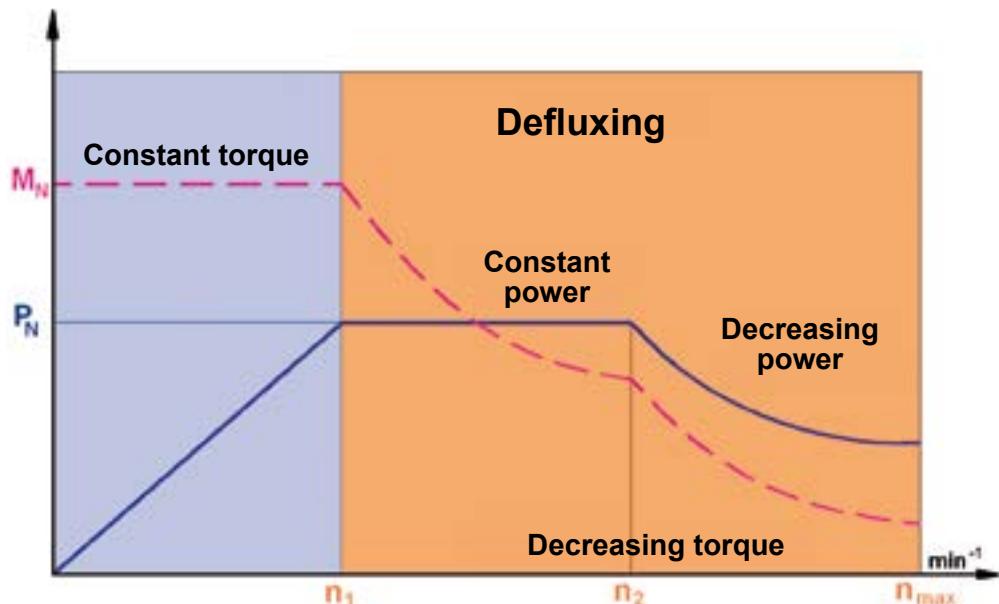
Supplied by frequency drives, these motors operate in an open or closed loop. They deliver their rated torques as standard (M_N) up to their base speeds (n_1) and then supply constant power P_N from speed n_1 to speed n_2 .

Squirrel cage motors are well suited to operation in de-fluxed mode and, thanks to adapted laminations, over a wide speed range.

of brushless motors. Inertia is reduced, they provide good dynamic performance.

Each machine is defined **by its design torque**, this torque being available in **continuous service** below the base speed thanks to efficient radial ventilation.

The performance of these motors are comparable to direct current machines and with some characteristics



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Leroy-Somer reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document is therefore liable to be changed without notice.

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Description

- CPLS series asynchronous motor**, frame height 112 to 250 mm.

- Protection:** IP23.

- Mounting type:** B3 or B35, all mounting positions.

- Power supply:** standard three-wire, power supply via frequency drive.

- Winding:** class F as standard. 150°C PTC sensor protection.

- Magnetic laminations:** designed to provide good characteristics in the usage range including in defluxed mode.

Depending on the speed of use of the machine, the use of low-loss laminations allows the electrical characteristics of the motor/drive assembly to be optimised.

- Rotor:** aluminium or copper, depending on the size. Class A balancing as standard, to ISO 8821, by half key (letter H).

- Housing:** steel.

- End shields:** cast iron fixed by tie rods. The fixing feet are joined to the DE and NDE shields.

- Terminal box:** aluminium. It can be orientated every 90°, on either side of the DE shield or NDE shield.

There are only three connection cables available in the terminal box.

WARNING: the terminal box cover must be closed again once the connection of the cables is complete.

- Ball bearings:** C3 play, greased for life as standard.

- Handling rings:** depending on the types, they are fixed by screws to the machine's end shields.

- Ventilation:** three-phase radial auxiliary fan provides good cooling, whatever the machine's speed. The standardised cooling mode as per IEC 34-6 is IC06.

Unless specified, cooling air must be between +5°C and +40°C with a humidity lower than 80% RH.

The fan can be orientated every 90°, on either side of the DE shield or NDE shield.

As standard the fan voltage is: 230/400V 50 Hz and 265/460V 60 Hz.

The fan motor power varies with the size of the machine: see page 9.

- Finish:** paint RAL 6000 (green).

Identification on the name plate fixed on the motor housing.

- Available options**

- Drive end roller bearings

- Special high-speed bearings

- Class B balancing

- Special shaft ends

- Flanges different from the standard ones by frame height.

- Filter on radial FV (standard or Miovyl)

- Cooling via pipe

- Offset axial fan

- Fan pressure switch

- Second shaft end

- PTO, PTF, KTY, PT100 sensors in the windings or end shields.

- Incremental encoder, absolute encoder

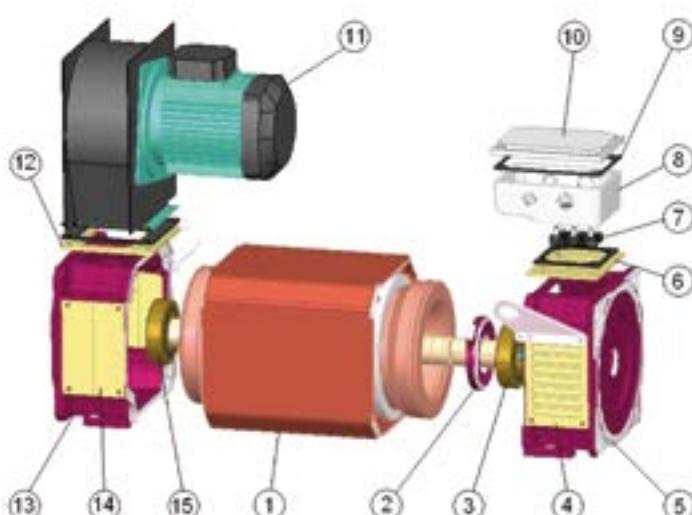
- Brake.

- Other options upon request**

- Increase in the constant power operating range with our CONSTANT POWER SYSTEM (patented system)

- UL CSA for the motor insulation system (file E68 554).

Components



Ref.	Name	Ref.	Name
1	Stator in its housing	9	Terminal box seal
2	Bearing flange (depending on fitting type)	10	Terminal box cover
3	Bearing	11	Forced ventilation
4	Fan grille	12	Fan seal
5	DE shield	13	NDE shield
6	Terminal box support plate	14	Closure plate
7	Terminal plate	15	NDE bearing
8	Terminal box body		

Normal conditions for use and correction factors

According to IEC 60034-1, standard motors can operate in the following normal conditions:

- ambient temperature between +5°C and +40°C.
- altitude less than 1,000m
- atmospheric pressure up to 1050 mbar.
- operating zone 2 (absolute humidity between 5 and 23 g/cm³).
- ambient air chemically neutral and dust-free.

Corrections in respect of altitude and ambient temperature

For different conditions of use, the

power correction coefficient indicated in the table below will be indicated.

P1/P	amb (°C) ≤ 40°C	amb (°C) ≤ 50°C	amb (°C) ≤ 60°C
Altitude ≤ 1000 m	1	0.93	0.85
Altitude ≤ 2000 m	0.93	0.85	0.75

The P1/P factor gives the correction coefficient

P1: corrected power

P: catalogue power.

A more detailed graph is available in the Leroy-Somer type LS three-phase asynchronous motor catalogue.

Corrections depending on service:

Service type	Running time		
	10 min	30 min	60 min
S2	1.6	1.3	1.1

Service type	Duty cycle		
	25%	40%	60%
S3	1.4	1.2	1.1
S6	1.4	1.3	1.2

Increased winding insulation

Standard motors in the CPLS range are compatible with power supplies with the following characteristics:

- U = 480 V max.
- Value of voltage peaks generated at the terminals: 1,500 V max. with 3.8 kV / μ s

However, they may be supplied under more severe conditions, using additional protection (miscellaneous filters, chokes, etc.).

The main effect associated with supplying power via an electronic drive is overheating of the motor due to the non-sinusoidal shape of the signal.

In addition, this can result in accelerated aging of the winding through the voltage peaks generated at each pulse in the power supply signal (see Figure 1).

Supplying motors via frequency drives generates significant voltage differences in the winding between the turns on the same phase.

For this reason, all the motors in the CPLS range benefit as standard from increased insulation which allows them to comply with the recommendations in standard IEC TS 60034-25 (curve A).

For example: 1.5 kV peak between phases with a rise time of 0.4 sec, i.e. 3.8 kV/sec.

For more severe conditions, additional protection is necessary (choke, dv/dt filter, sine wave filter).

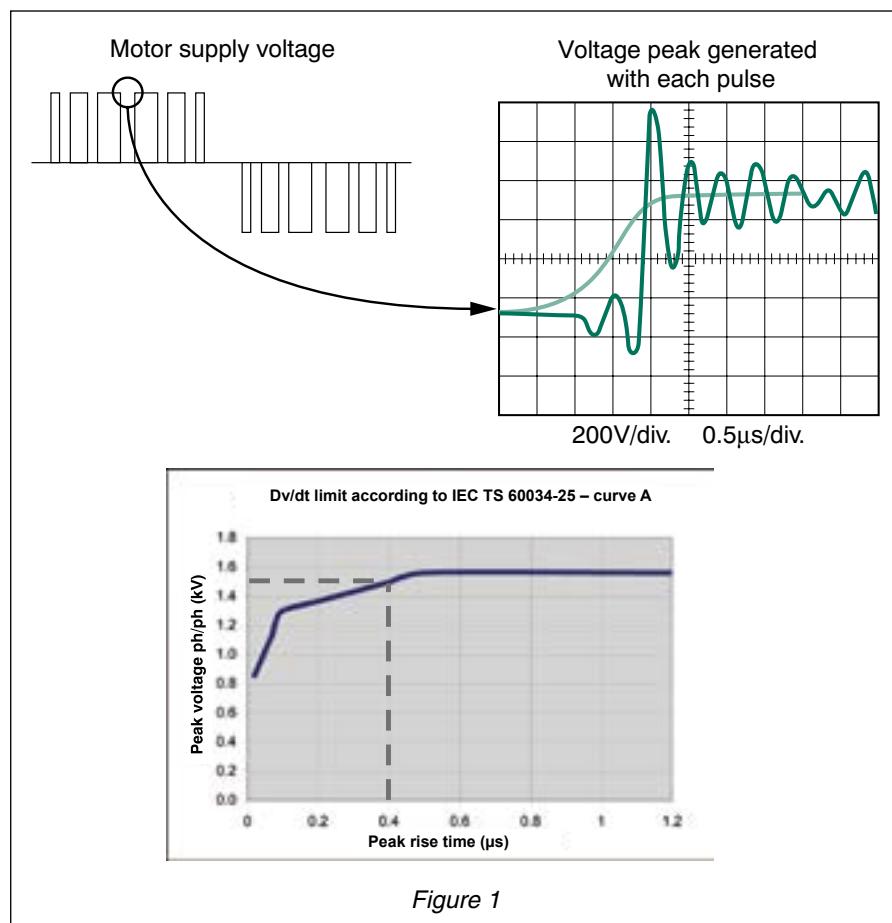
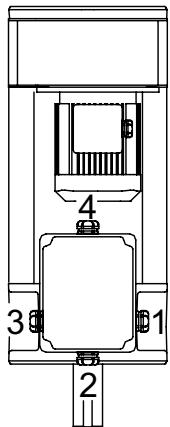
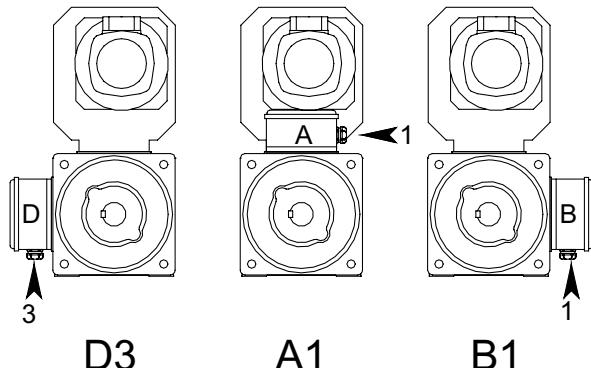


Figure 1

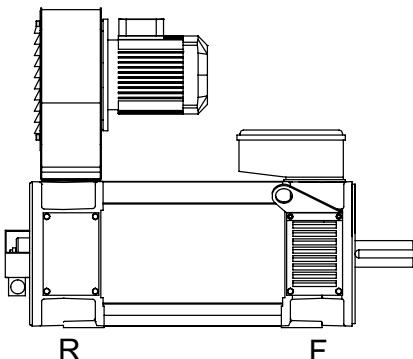
Position of the terminal box and the forced ventilation



Position of the exit from the glands in relation to the shaft end.

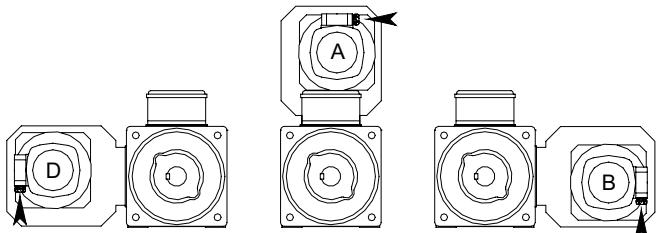


Position of the terminal box and cable glands
(For terminal box fitting possibilities, see page 52.)



Position of the terminal box and ventilation in relation to the motor end shield.

F: on DE shield
R: on NDE shield



Position of the forced ventilation
(viewed from shaft end)

Example:

Terminal box in position A1 on DE shield, ventilation in position B mounted on the NDE shield.

Designation: A1 F - B R

position of terminal box
and cable glands

position of FV

Characteristics of forced ventilation motors

CPLS motor Size		"2-pole" ventilation asynchronous motor						
Cooling	Rated power	Permissible voltage	Rated current	Frequency	Type LS*	Flange	Shaft	Mass
IC 06	kW	V	A	Hz		mm	mm	kg
CPLS 112 CPLS 132	0.37	220 to 240 Δ 80 to 415 Y	Δ 1.7 Y 1 (380 V)	50	LS 71 L	FF 130 (CPLS 112)	14 x 30 (CPLS 112)	6.4
	0.44	254 à 280 Δ 440 à 480 Y	Δ 1,7 (254 V) Y 0,95	60	LS 71 L	FF 165 (CPLS 132)	19 x 40 (CPLS 132)	
CPLS 160	1.1	230 Δ	Δ 4	50	LSES 80 L	FF 165	19 x 40	10.7
	1,3	265 Δ	Δ 3.8	60	LSES 90 L			16.1
CPLS 200	2.2	230 Δ	Δ 7.8	50	LSES 90 L	FT 130	24 x 50	16.1
	2,2	265 Δ	Δ 6.9	60	LSES 90 L			
CPLS 250	3	230 Δ	Δ 10.2	50	LSES 100 L	FT 130	28 x 60	22.2
	3.6	265 Δ	Δ 10.2	60	LSES 100 LU			26,5

* LS: Eff2

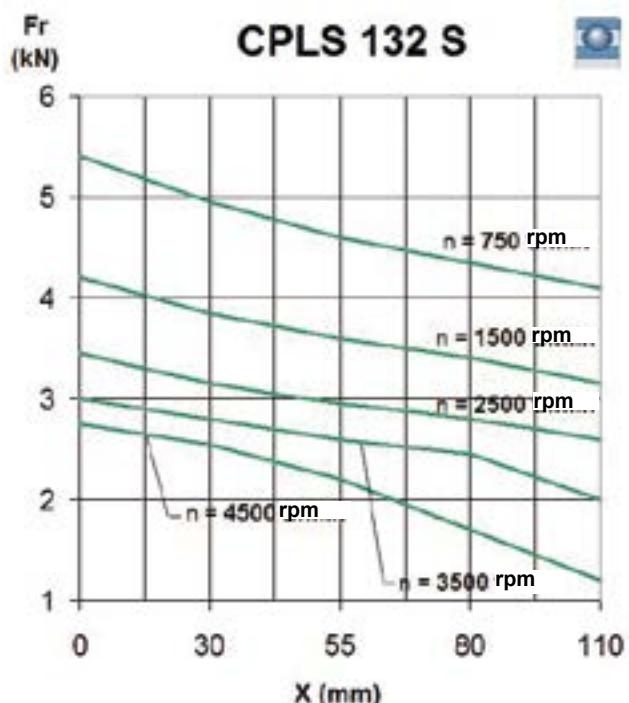
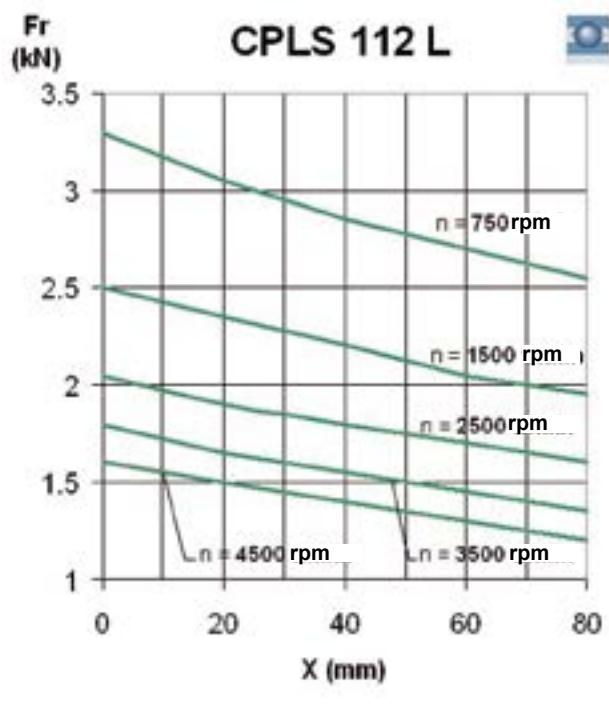
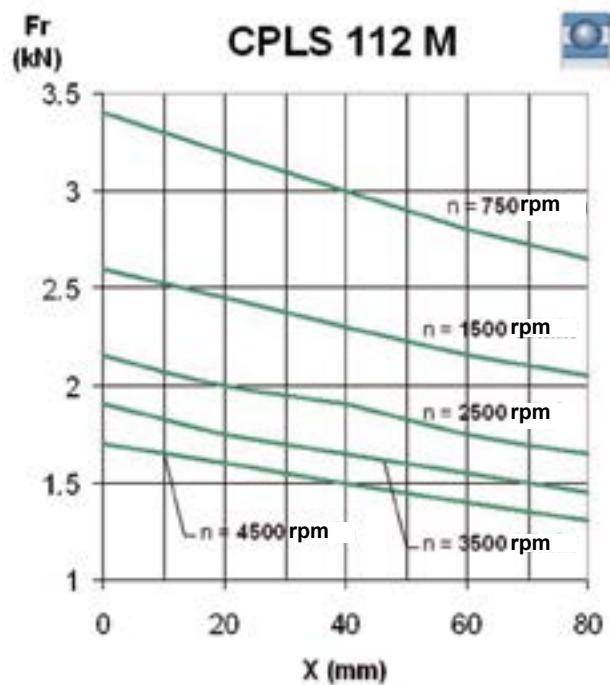
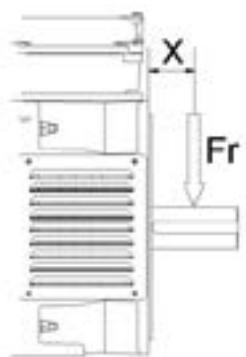
LSES: IE2

If the distribution grid is different, state the frequency and voltage on the order.

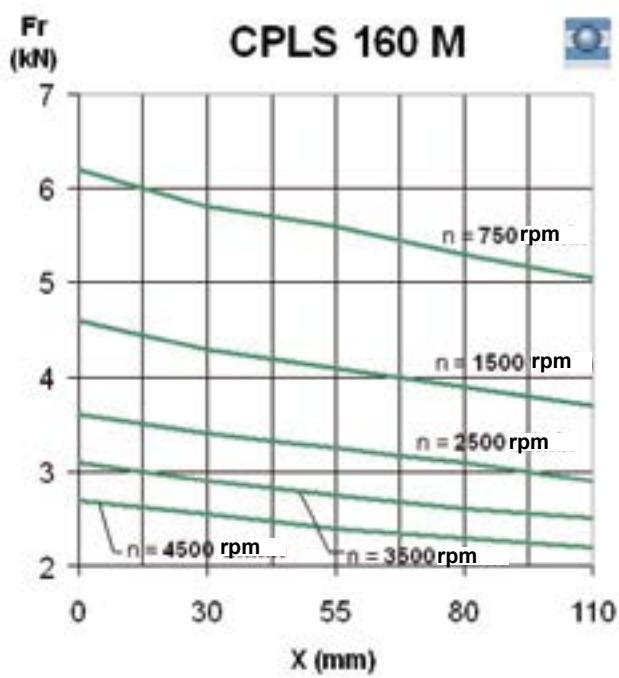
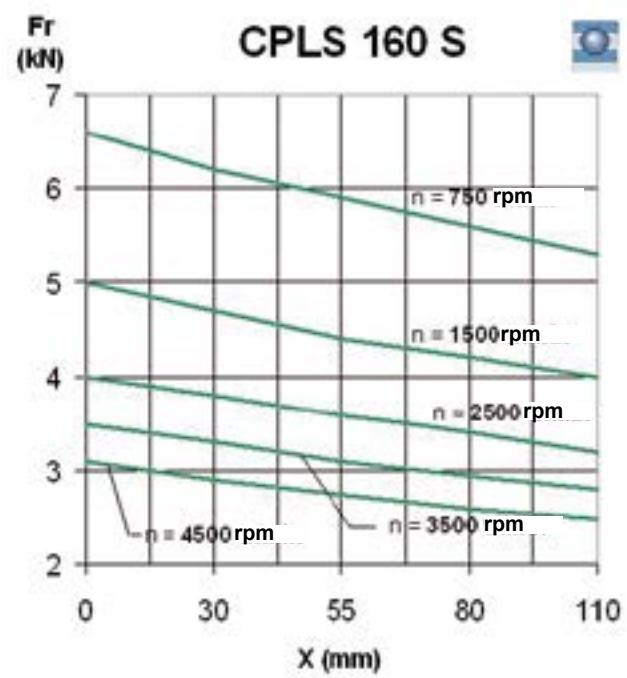
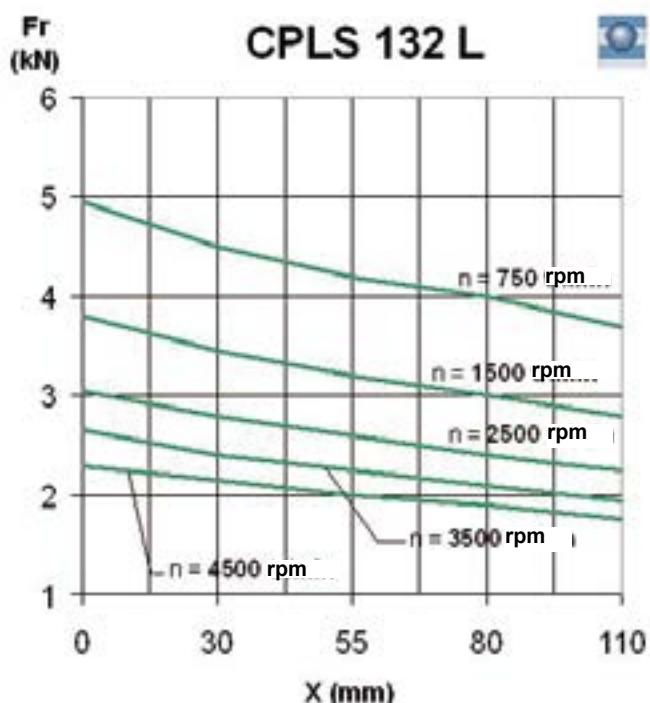
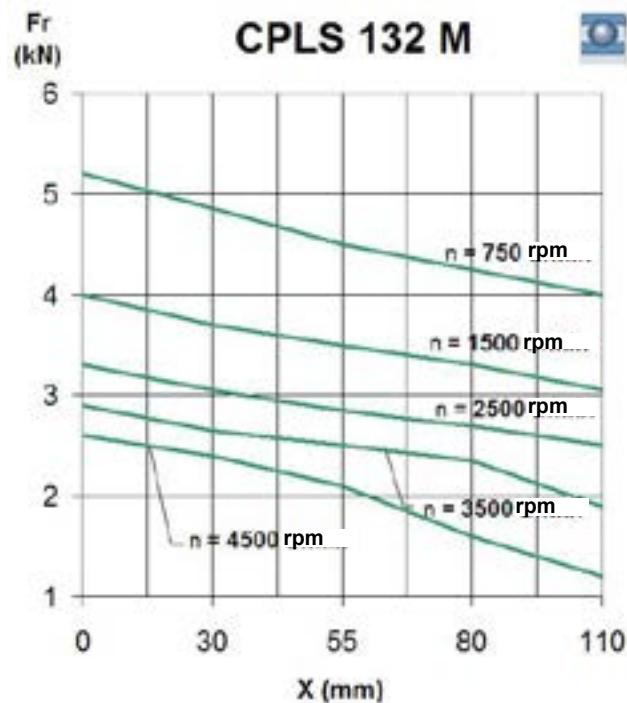
Permissible radial loads (ball bearings)

Maximum radial load permitted on the end of the main shaft, horizontal or vertical motor, shaft end up or down and ball bearing for a service life L_{10h} calculated at 20,000 hours.

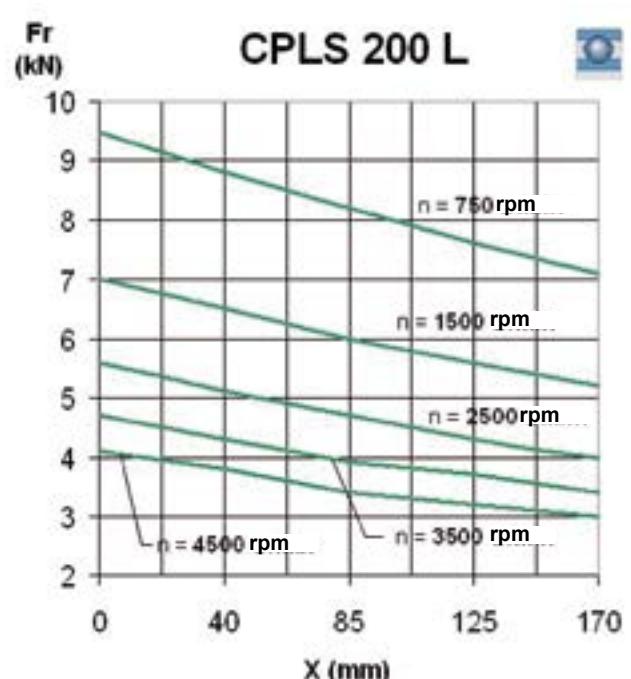
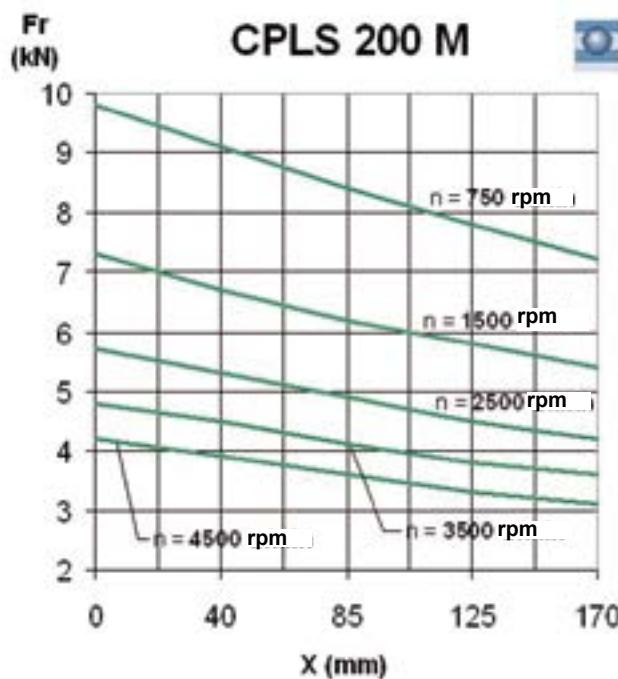
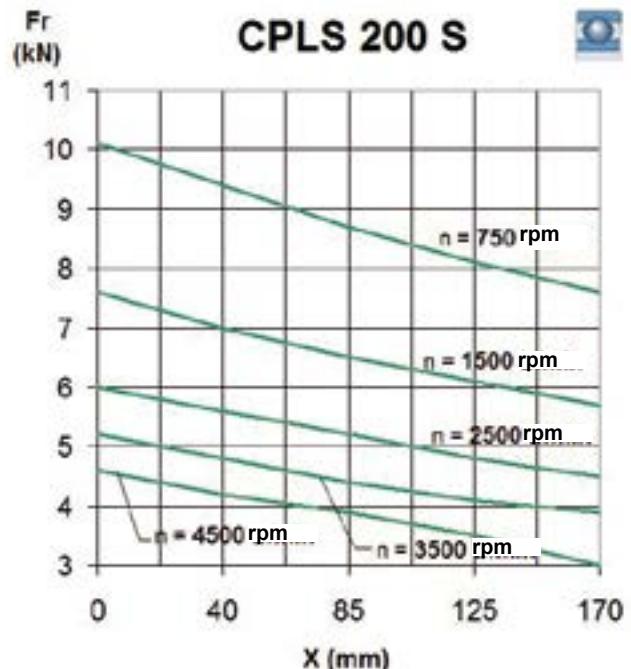
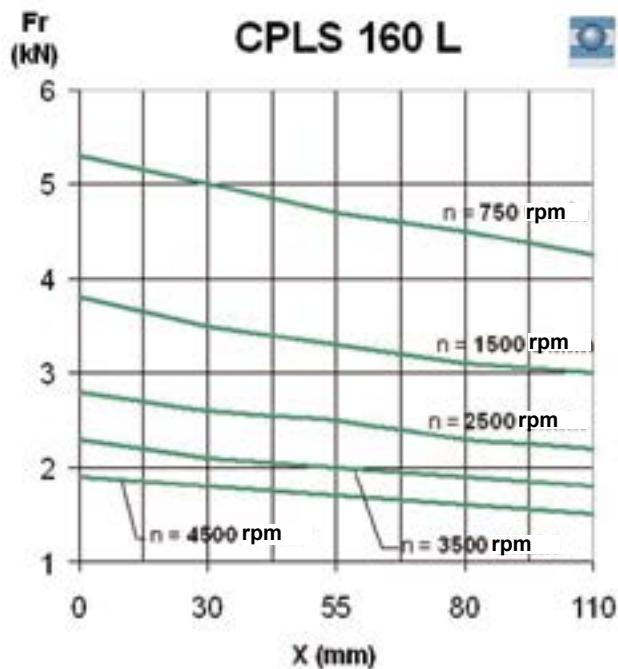
In pulley and belt couplings, the end of the drive shaft with the pulley is subjected to a radial force Fr applied at a distance X (mm) from the support at the end of a shaft of length E .



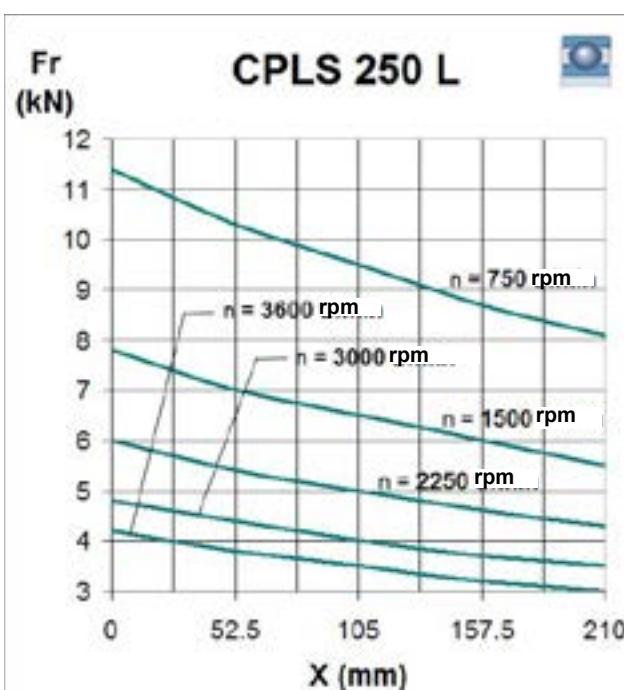
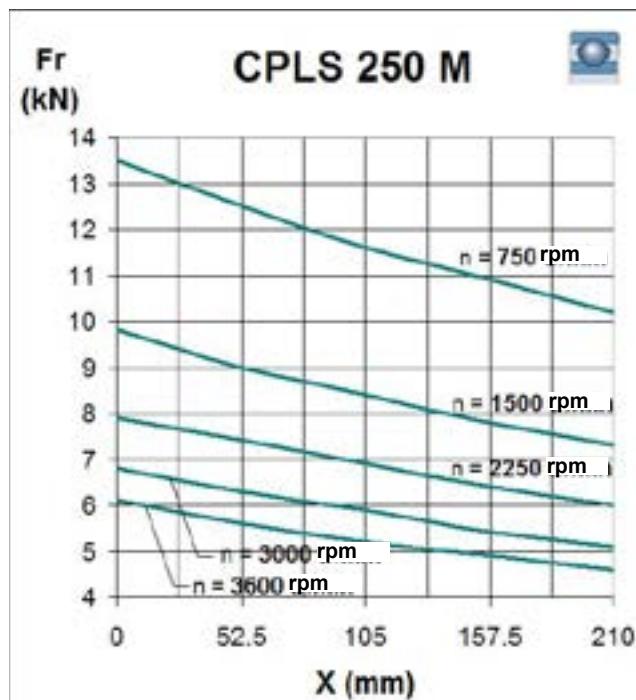
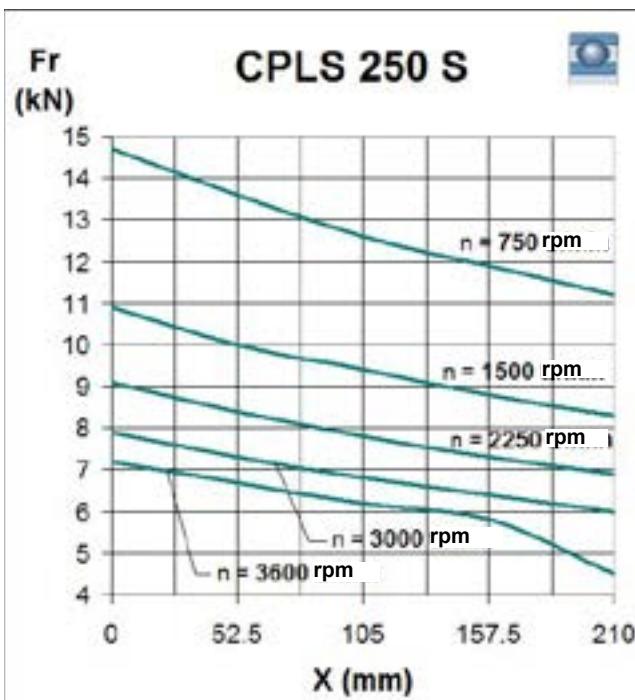
Permissible radial loads (ball bearings)



Permissible radial loads (ball bearings)



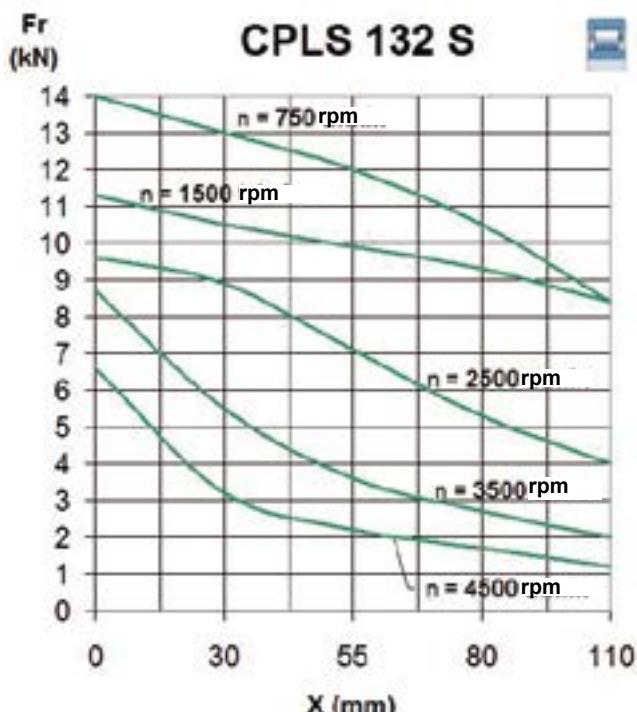
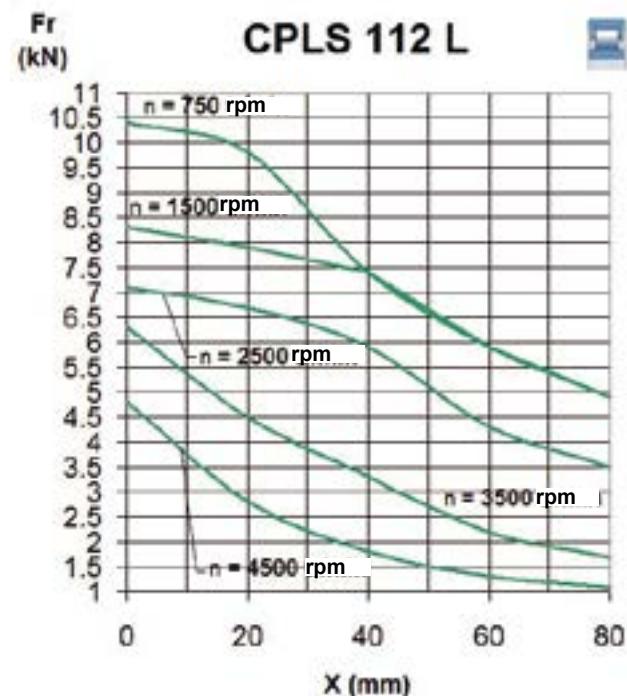
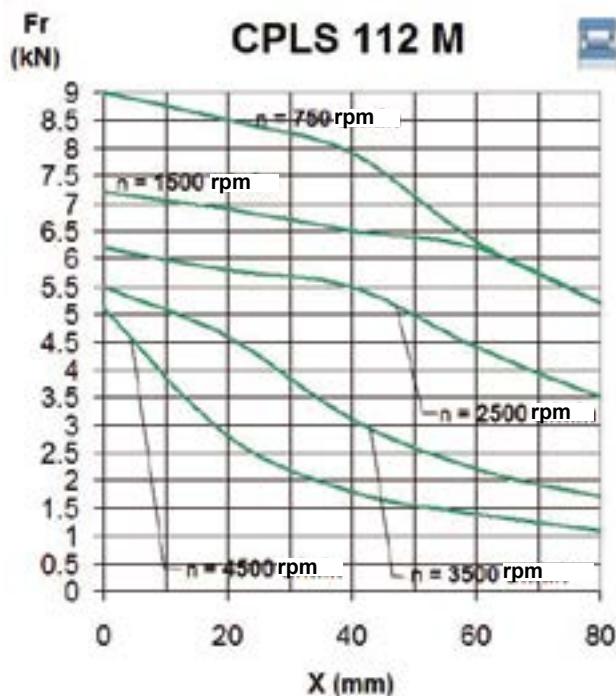
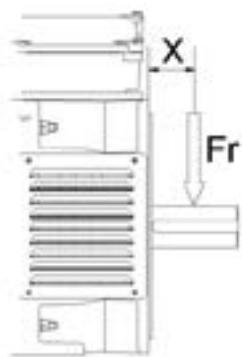
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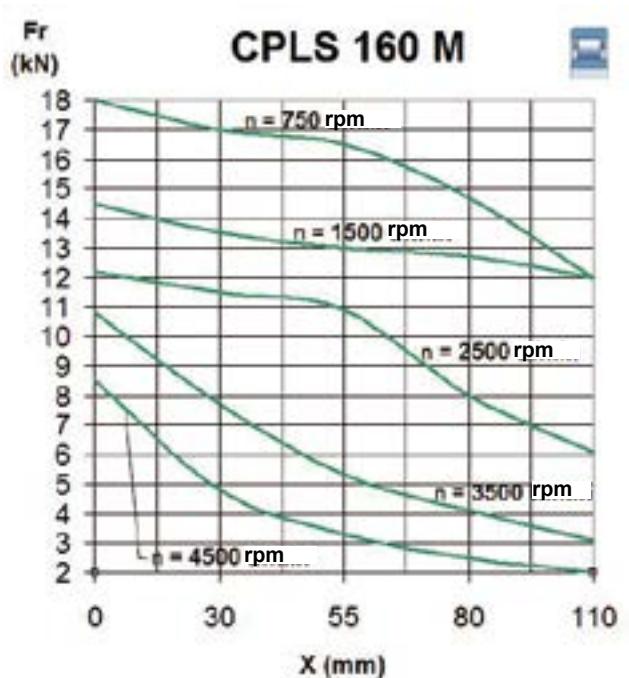
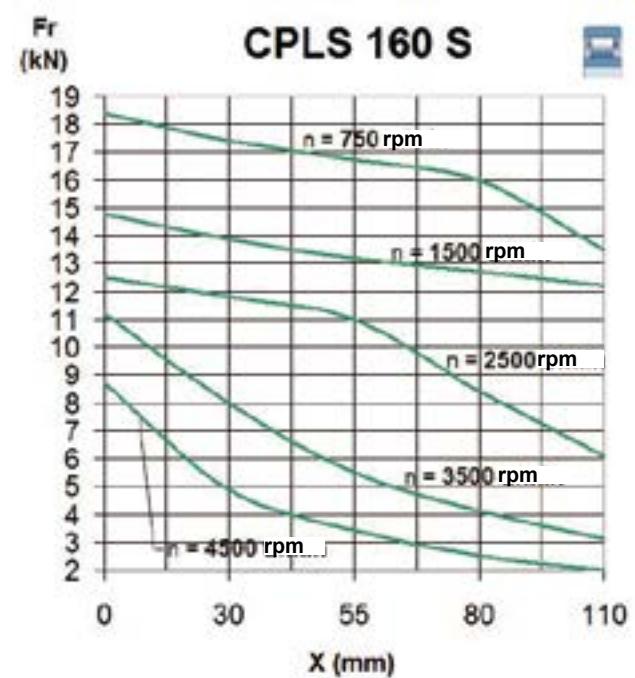
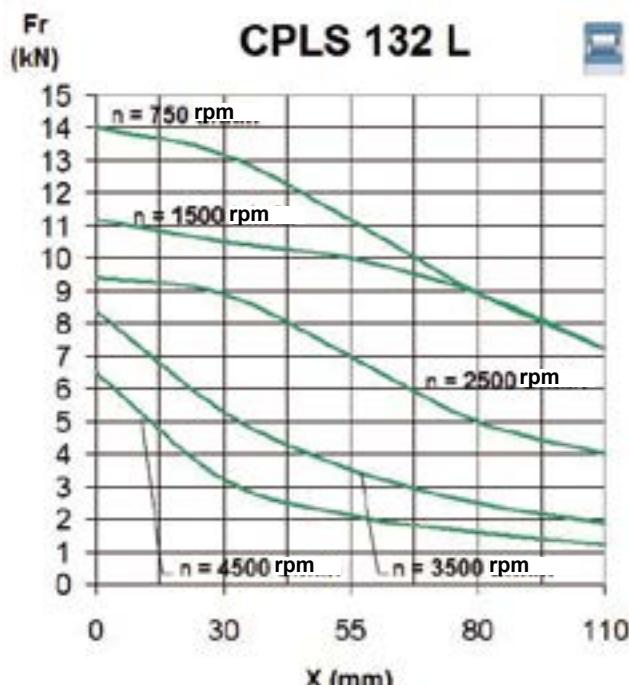
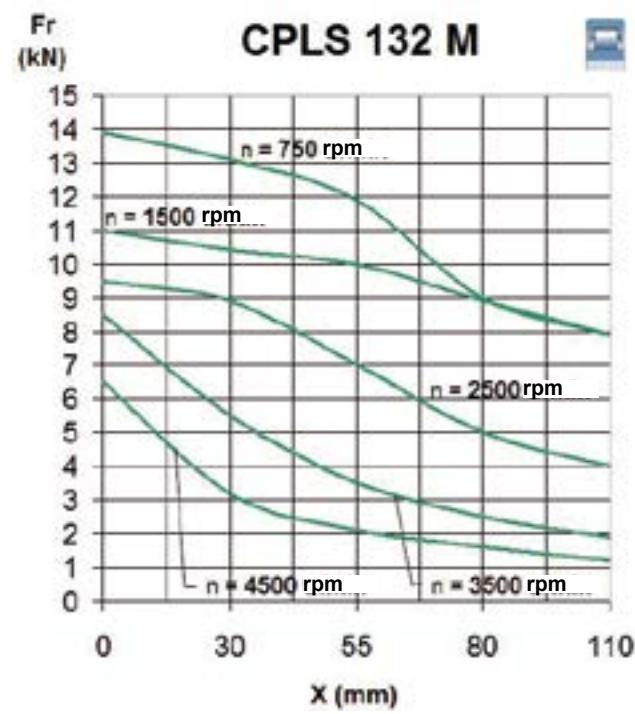
Permissible radial loads (roller bearings)

Maximum radial load permitted on the end of the main shaft, horizontal motor and roller bearing for a service life L_{10h} calculated at 20,000 hours.

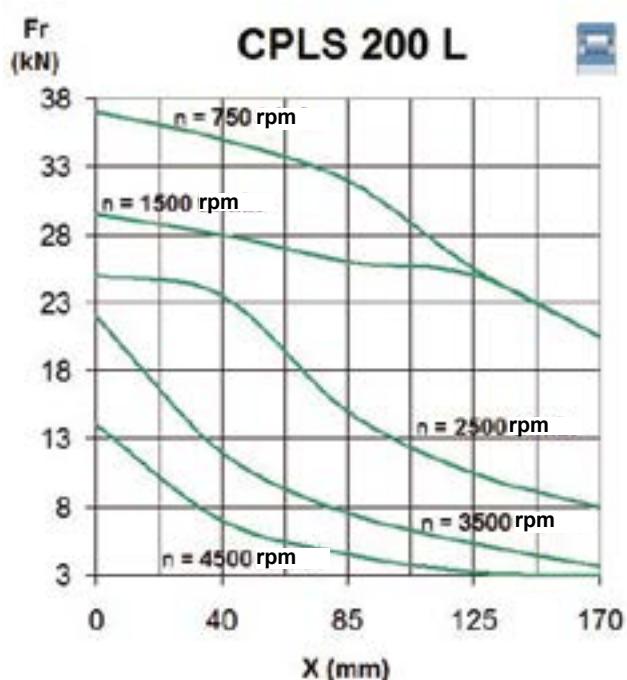
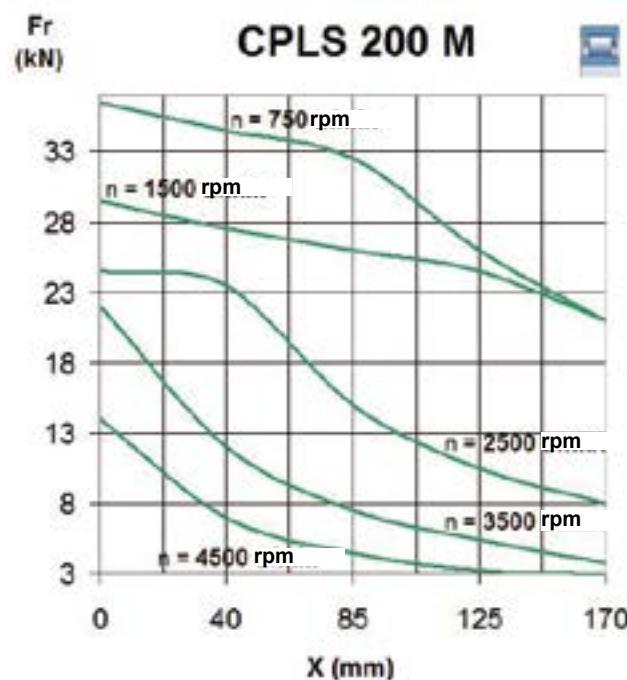
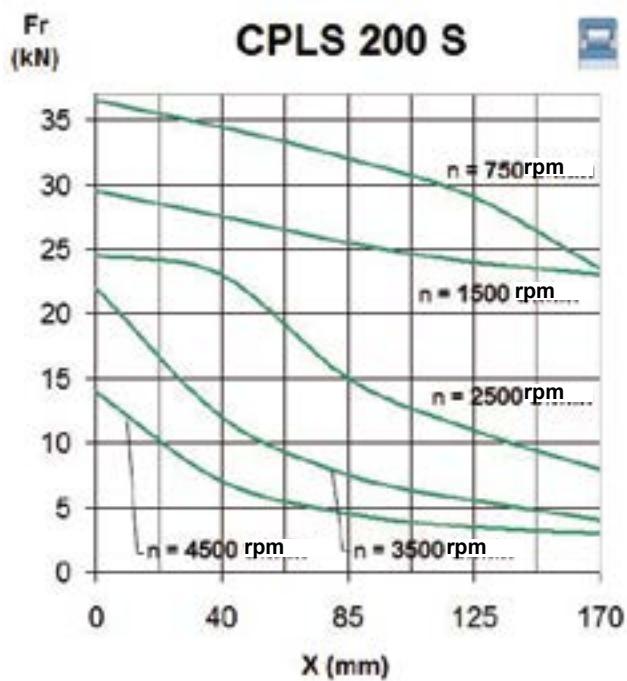
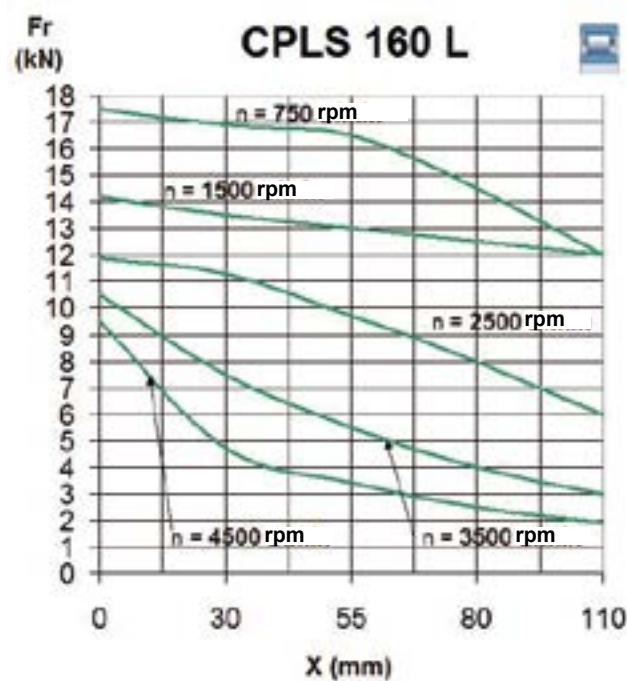
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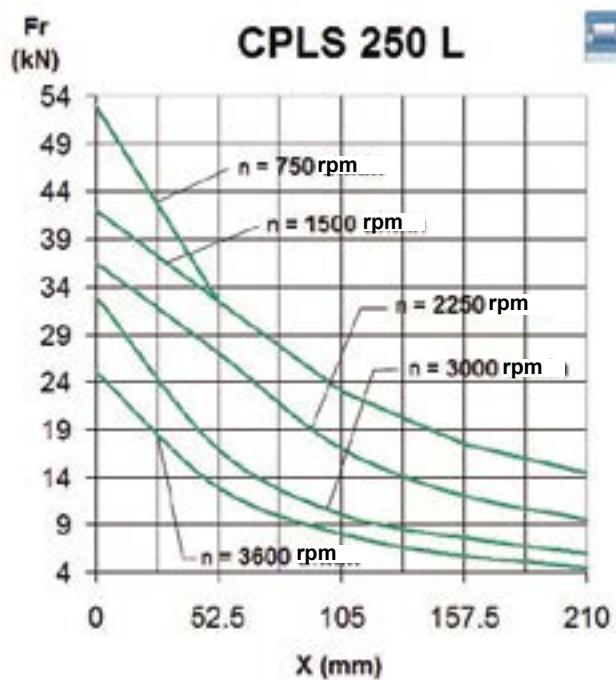
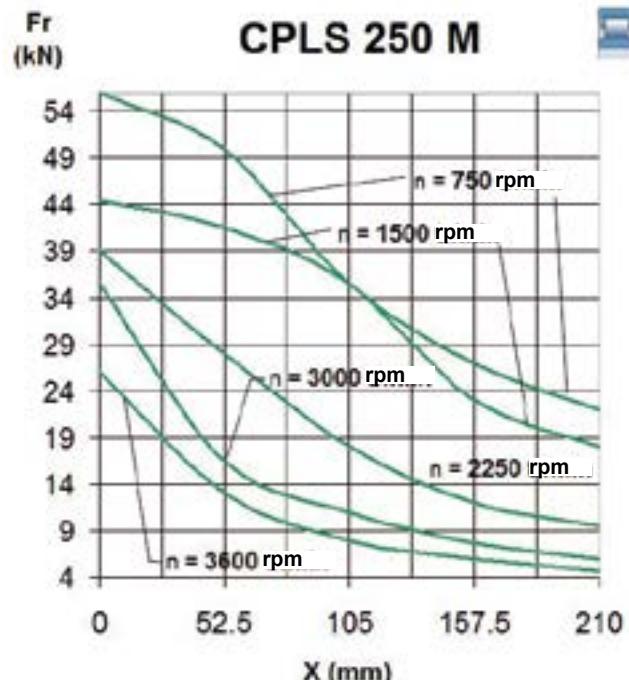
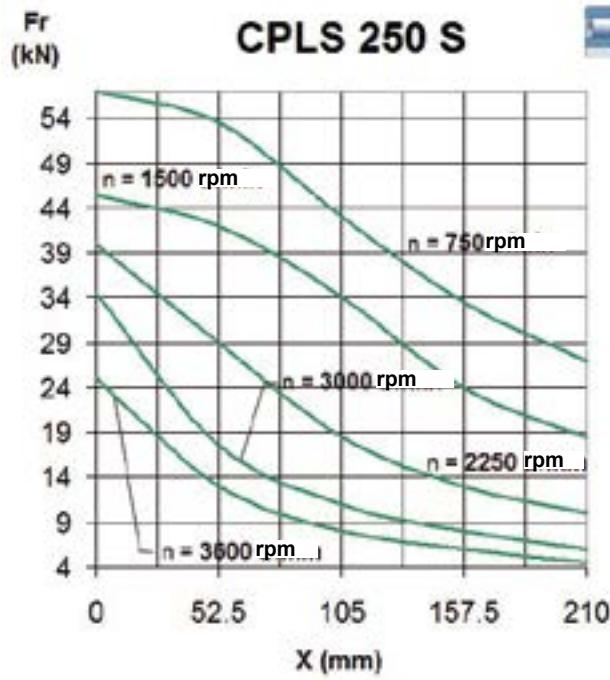
Permissible radial loads (roller bearings)



Permissible radial loads (roller bearings)



Permissible radial loads (roller bearings)



Noise and vibration

NOISE LEVEL

Standard IEC 6034-9 defines maximum noise levels for rotary electrical machinery. However, these values do not apply to ac machines supplied by frequency converters.

The values below are therefore given for indication purposes only.

**Noise level (indicative)
expressed as acoustic pressure
 $L_p(A)$**

Type	No load dbA	Under load dbA
CPLS 112	75	79
CPLS 132		
CPLS 160	80	84
CPLS 200	82	86
CPLS 250	84	88

Tolerance: 0 / + 3 dbA

Maximum frequency: 100 Hz

Noise level reduction

For instances requiring lower noise levels, cooling mode IC 37 can be chosen, allowing ventilation to be installed in a less sensitive area.

For duty cycles $\leq 60\%$, it is possible to fit 4-pole FV motors instead of 2-pole (please enquire).

Quotations can be issued for sound traps. Noise is reduced by 5 db(A) to 10 db(A) (depending on the type of CPLS).

MACHINE VIBRATION LEVELS

Maximum vibration magnitude limits in terms of displacement, speed and acceleration for a frame size H (IEC 60034-14)

Vibration level	Frame size H (mm)					
	CPLS 112 AND 132			CPLS 160 / 200 / 250		
	Displacement μm	Speed mm/s	Acceleration m/s^2	Displacement μm	Speed mm/s	Acceleration m/s^2
A	25	1.6	2.5	35	2.2	3.5
B	11	0.7	1.1	18	1.1	1.7

External finishing

CPLS motors comply with
System Ia requirements

LEROY-SOMER motors are protected with a range of surface finishes.
Surfaces receive appropriate special treatments, as shown below.

Preparation of surfaces

Surface	Parts	Surface treatment
Cast iron	Shields - Terminal box	Shot blasting + Primer
Steel	Accessories	Phosphate treatment + Primer
	Shields - Terminal boxes - Fan covers - Grilles	Electrophoresis or Hydrofour Flow coat
Aluminium alloy	FV motor housings - Terminal boxes	Shot blasting
	End shields	Phosphate treatment
Polymer	Fan covers - Terminal boxes Ventilation grilles (FV motor)	None, but must be free from grease, casting-mould coatings, and dust which would affect paint adhesion

Paint systems

Products	Environment	System	Applications
Moteurs Leroy-Somer	Low aggression or non-aggressive, temperate climate	Ia	1 polyurethane - vinyl top coat 25/30 µm
	Damp, tropical climate	IIa	1 Epoxy base coat 30-40 µm 1 polyurethane - vinyl top coat 25/30 µm
	Coastal	IIIa	1 Epoxy base coat 30-40 µm 1 Epoxy intermediate coat 30-40 µm 1 polyurethane - vinyl top coat 25/30 µm
	Chemical, aggressive or particular marine	Special systems (please consult Leroy-Somer)	Navy - Nuclear Significant contact with alkali or acid, etc.

System Ia is for moderate climates and System IIa is for general climates as defined in standard NFC 20 000 (or IEC 721.2.1).

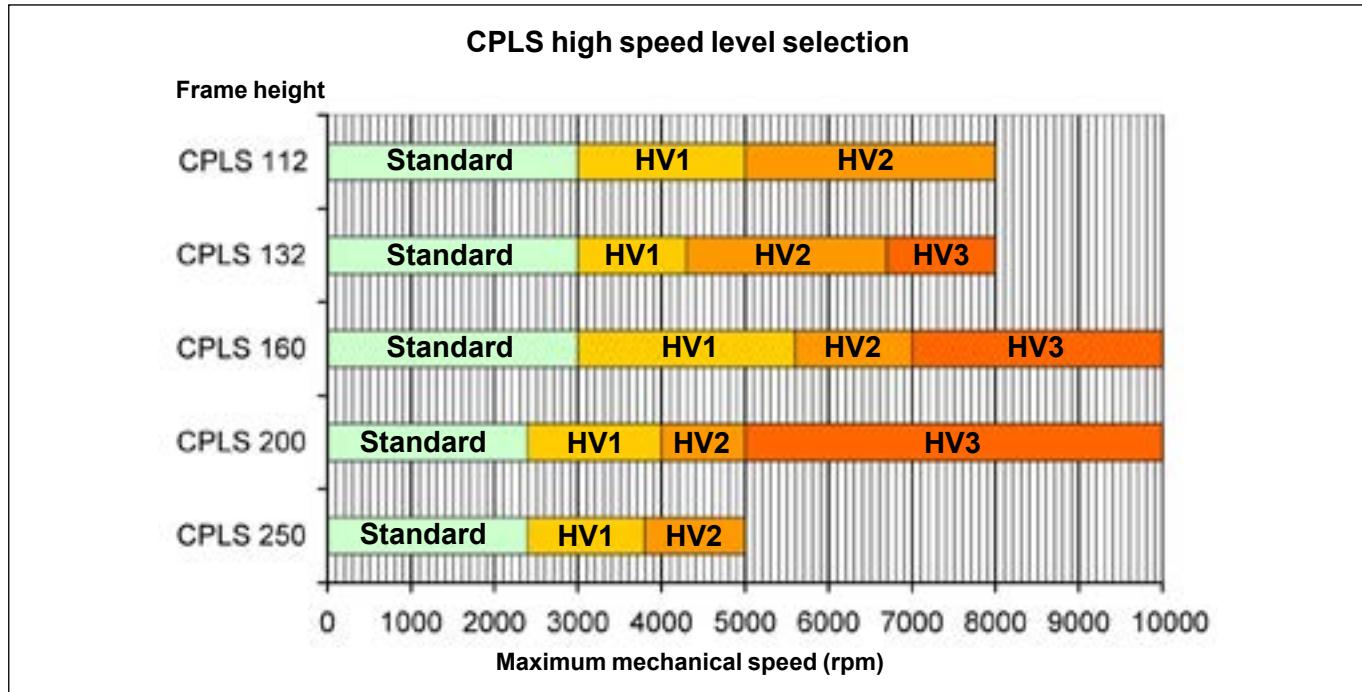
Leroy-Somer standard paint colour reference:

RAL 6000

High Speed Configuration

To satisfy applications running at high speeds, several configurations (HV1, HV2, HV3) were defined according to the size of the CPLS and the speeds achievable.

The graph below details the various maximum speeds achievable.



⚠️ CPLS 160 L, CPLS 200 L, CPLS 250 L, limited to 5,000, 4,500 and 3,800 min⁻¹ respectively.

The table below explains the detail of each configuration.

	CPLS 112		CPLS 132			CPLS 160 ¹			CPLS 200 ²			CPLS 250 ³	
	HV1	HV2	HV1	HV2	HV3	HV1	HV2	HV3	HV1	HV2	HV3	HV1	HV2
Maximum speed (rpm)	3000-5000	5000-8000	3000-4300	4300-6700	6700-8000	3000-5600	5600-7000	7000-10000	2400-4000	4000-5000	5000-10000	2400-3800	3800-5000
Sealed bearings (2RS)	●		●										
Protected bearings (2Z)		●		●	●	●			●				
Open bearings							●	●	●	●	●	●	●
High speed bearings					●				●		●	●	
DE insulated bearing	●	●	●	●	●	●	●	●	● ⁴	●	●	●	●
NDE insulated bearing	●	●	●	●	●	●	●	●	● ⁴	●	●	●	●
Re-greasing system							●	●		●	●	●	●
High performance grease					●		●	●		●	●	●	●
Bearing temperature sensor		●		●	●		●	●		●		●	
Enhanced balancing	●	●	●	●	●	●	●	●	●	●	●	●	●
Vibration control		●		●	●		●	●		●	●		●
Speed encoder adaptation > 6000 min ⁻¹		●		●	●		●	●		●		●	
Max shaft diameter (mm)	38	38	48	48	48	55	55	55	80	80	80	65	100

●: standard ●: option

1. CPLS 160 L limited to 5000 rpm

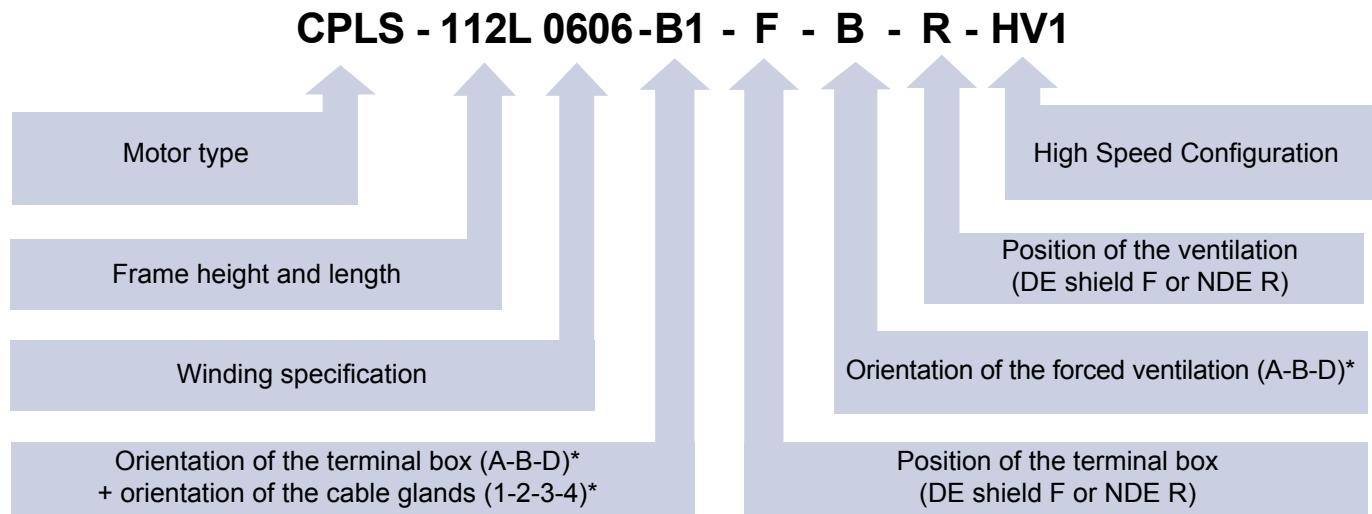
CPLS 200 L limited to 4500 rpm

3. CPLS 250 L limited to 3800 rpm

4. limited to 8500 rpm

In the standard configuration, the bearings are 2RS sealed type, except for the CPLS 250 which are open bearings.

Complete description



* For more information, see pages 52 and 53.

Choice of motor

To assist you in quickly determining your motor/drive assembly, we have produced sizing data sheets dedicated to variable speed.

a – Initially, you must determine the nominal usable torque required by your application. The necessary torque (M_N) at the nominal point (n_1) defines the size of the machine in the range.

The range of iso-power curves opposite allow you to make an initial approach to choose the size of the machine.

b – In the data sheet corresponding to the motor torque selected, the speed closest to that required is chosen, in accordance with the voltage available at the output from the drive.

This choice determines the type of

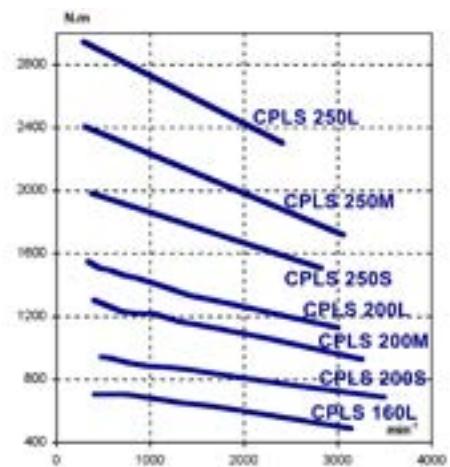
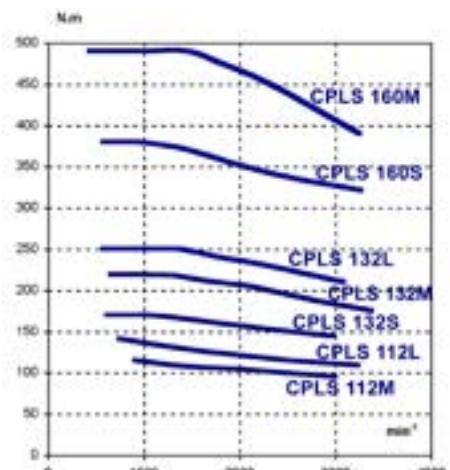
machine, i.e. the most suitable winding that will allow you to use the drive rating closest to your needs.

That is indicated in the selection sheet.

This selection method allows you to size the motor/drive assembly corresponding to the actual need of the application.

An example of selection is given on page 23.

Our machines are tested on test benches by **Leroy-Somer** range drives. Where available, these characteristics may be requested from the factory.



Choice of drive

Depending on the application, the nominal power of the machine and the rating of the machine drive may be different.

If you are working from zero speed to machine speed n_1 , you should choose the drive rating corresponding to the machine's rated current.

Our range of machines offers as standard a constant power range going up to twice the nominal speed (n_2) without having to de-rate the drive.

Thereafter, the operating power is reduced because of the rapid reduction in the maximum torque in asynchronous motors.

! TAKE CARE to check that the machine bearings are capable of operating at the high speeds you require (see page 20).

! TAKE CARE to select a drive switching frequency equal at least to 12 times the motor's supply frequency.

Full documentation on electronic drives in the DIGIDRIVE-SK, UNIDRIVE-SP and POWERDRIVE ranges is available from our representative on request.

If you wish to increase the speed ratio n_2/n_1 you can use our patented **CONSTANT POWER SYSTEM**. It can be integrated in the terminal box, and makes it possible to operate over a wider speed range without de-rating the drive.



Selection example

To make the selection you need to know the torque required by your application. If the torque is known, go directly to step no. 3.

Example: I have an application which requires 6kW at 1200 min⁻¹ in S1 service.

The ambient temperature will be +20°C in operation, altitude lower than 1000 m.

The terminal box must be on the right hand side and the fan on the top of the machine when looking at the end of the shaft.

Step 1: Correction factors

- Correction depending on the temperature and altitude (page 7).
- Correction depending on the service (page 7).

Example: there is no need to de-rate to take the service or environmental conditions into account.

Step 2: Calculation of rated torque

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

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

C: torque in N.m

P: power in kW

n: speed in min⁻¹

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

Step 3: Determining the frame size

The diagram on page 22 allows the size of the machine to be determined quickly from the torque and the speed.

Example: from the graph on page 22, I select machine CPLS 112 L

Step 4: Determining the machine

On the sheet for the machine you choose, depending on the voltage available on output from your drive, the closest speed or the next one above the one you need.

From the selected line, you obtain main mechanical and electrical parameters that define your operating point, as well as the size of the drive and the machine product code.

Example:

See the technical sheet for motor CPLS 112 L.

For a voltage at the output from the drive of 360V.

The next speed up from the one I need is 1215 min⁻¹.

Step 5: Verification

The machine torque that appears on the line is the one obtained in S1 service. I check that it is equal to or greater than the one I need.

If that is not the case, I move up to the next machine size.

Example: the motor torque in S1 service is 130 N.m for a need of 127 N.m; the machine size is correct.

Motor arrangement selected:

Motor: CPLS 112 L 0606 B1FAR

Drive: UNIDRIVE SP 27T

 **WARNING: you must specify the maximum operating speed, as the choice of bearings depends on this.**



UNIDRIVE SP

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 112M / 95 - 115 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 87 kg
Inertia: 0.030 kg.m² – Maximum mechanical speed: 8000 min⁻¹
0.37 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)	
											LS	CT
8.5	320	25.9	714	114	22.7	0.87	77	1.254	1365	112M0604	SP 16T (25A)	SP 2403 (25A)
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	0.754	2122	112M0605	SP 22T (32A)	SP 3401 (32A)
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	0.492	2851	112M0606	SP 27T (40A)	SP 3402 (40A)
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	0.35	3475	112M0607	SP 33T (46A)	SP 3403 (46A)
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	0.163	5940	112M0608	SP 40T (60A)	SP 4401 (60A)
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			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 112L / 110 - 140 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 97 kg

Inertia: 0.035 kg.m² - Maximum mechanical speed: 8,000 min⁻¹

0.37 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)	
											LS	CT
8.4	320	21.5	581	138	23.1	0.88	74	1.39	990	112L0604	SP 16T (25A)	SP 2403 (25A)
9.1	340	22.9	623	139	23.2	0.87	76		1130			
9.7	360	24.2	663	140	23.2	0.87	77		1245			
10.4	380	25.6	704	141	23.4	0.86	78		1385			
11.0	400	26.9	745	141	23.4	0.86	78		1480			
12.4	440	30	826	143	23.7	0.85	80		1680			
13.8	480	32.3	907	145	24.0	0.85	81		1905			
11.4	320	30.1	835	130	28.6	0.89	80	0.836	1562	112L0605	SP 22T (32A)	SP 3401 (32A)
12.2	340	32	893	130	28.5	0.89	81		1705			
13.1	360	33.8	947	132	28.7	0.89	82		1825			
14.0	380	35.7	1004	133	28.9	0.89	82		1970			
15.0	400	37.6	1060	135	29.2	0.88	83		2115			
16.6	440	41	1175	135	29.1	0.88	84		2330			
18.2	480	45.1	1287	135	29.1	0.88	85		2625			
14.5	320	37.9	1071	129	35.2	0.88	83	0.540	2132	112L0606	SP 27T (40A)	SP 3402 (40A)
15.6	340	40.3	1143	130	35.4	0.88	84		2302			
16.6	360	42.7	1215	130	35.4	0.88	85		2462			
17.5	380	45	1286	130	35.2	0.88	85		2606			
18.5	400	47.4	1358	130	35.1	0.88	86		2785			
20.4	440	52	1503	129	35.0	0.87	87		3147			
22.2	480	56.9	1645	129	34.8	0.87	88		3670			
17.3	320	46.4	1325	125	41.5	0.86	86	0.388	2715	112L0607	SP 33T (46A)	SP 3403 (46A)
18.5	340	49.3	1412	125	41.6	0.86	87		2978			
19.7	360	52.2	1499	125	41.6	0.86	87		3051			
20.8	380	55.1	1587	125	41.6	0.86	88		3507			
22.0	400	58	1674	125	41.6	0.86	88		3670			
24.2	440	64	1849	125	41.4	0.85	89		4027			
26.9	480	69.6	2022	127	41.9	0.85	90		4550			
23.8	320	68	1982	115	56.5	0.83	90	0.180	4917	112L0608	SP 40T (60A)	SP 4401 (60A)
25.3	340	72.2	2108	115	56.5	0.83	91		5220			
26.9	360	76.5	2237	115	56.5	0.83	91		5550			
28.4	380	80.7	2364	115	56.5	0.83	91		5820			
30.0	400	85	2493	115	56.6	0.83	92		6125			
33.1	440	94	2748	115	56.7	0.82	92		6814			
36.2	480	102	3003	115	56.7	0.82	92		7470			
29.5	320	88	2482	109	67.8	0.85	92	0.114	6415	112L0609	SP 50T (74A)	SP 4402 (74A)
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		8000			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 132S / 145 - 170 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 125 kg

Inertia: 0.065 kg.m² - Maximum mechanical speed: 6,700 min⁻¹ (8,000 min⁻¹ with HV3 configuration)

0.37 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)	
											LS	CT
8.6	320	18.2	480		171	24.2	0.87	74	1.358	671	132S0604	SP 16T (25A)
9.2	340	19.4	517		170	24.1	0.86	76		821		
9.8	360	20.5	552		170	24.1	0.85	77		932		
10.4	380	21.7	588		169	24.0	0.85	78		1050		
11.0	400	22.8	617		170	24.3	0.83	79		1159		
12.3	440	25.1	692		170	24.2	0.83	80		1363		
13.5	480	27.4	761		170	24.3	0.82	82		1507		
11.7	320	24.2	657		170	30.6	0.88	79	0.880	1050	132S0605	SP 22T (32A)
12.6	340	25.8	705		171	30.7	0.88	80		1190		
13.4	360	27.3	751		170	30.6	0.87	81		1333		
14.2	380	28.8	797		170	30.5	0.87	82		1419		
15.0	400	30.3	842		170	30.5	0.86	82		1568		
16.6	440	33.6	942		168	30.2	0.86	84		1777		
18.2	480	37.2	1050		165	29.8	0.86	85		1986		
14.6	320	29.5	816		171	36.8	0.87	82	0.59	1452	132S0606	SP 27T (40A)
15.6	340	31.4	873		170	36.8	0.87	83		1570		
16.5	360	33.2	929		170	36.6	0.86	84		1743		
17.6	380	35.1	985		170	36.7	0.86	84		1862		
18.5	400	36.9	1040		170	36.6	0.86	85		2058		
20.5	440	42.0	1192		164	35.7	0.87	87		2245		
22.4	480	46.7	1333		160	35.1	0.88	88		2491		
17.3	320	35.2	981		168	43.4	0.86	84	0.462	1658	132S0607	SP 33T (46A)
18.4	340	37.4	1048		168	43.2	0.85	85		1886		
19.6	360	39.6	1114		168	43.2	0.85	86		2008		
20.6	380	41.2	1165		169	43.4	0.84	86		2193		
22.0	400	44.0	1247		168	43.3	0.84	87		2358		
24.2	440	49.0	1398		165	42.6	0.85	88		2631		
26.7	480	54	1547		165	42.5	0.85	89		2900		
23.8	320	49.6	1416		160	57.1	0.85	88	0.240	2690	132S0608	SP 40T (60A)
25.3	340	52.7	1510		160	56.9	0.85	89		2982		
26.9	360	55.8	1603		160	57.0	0.84	90		3163		
28.4	380	58.9	1697		160	56.9	0.84	90		3373		
30.0	400	62.0	1790		160	56.9	0.84	90		3554		
33.1	440	68.2	1976		160	56.9	0.84	91		3945		
36.2	480	75.5	2195		157	56.1	0.84	92		4336		
29.5	320	64	1851		152	68.7	0.85	91	0.151	3675	132S0609	SP 50T (74A)
31.4	340	68.0	1971		152	68.6	0.85	91		3916		
33.3	360	72.0	2091		152	68.6	0.85	92		4353		
35.2	380	76.0	2211		152	68.6	0.85	92		4623		
37.0	400	80.0	2332		152	68.4	0.85	92		4866		
40.9	440	89.0	2601		150	67.9	0.85	93		5433		
44.7	480	99.0	2902		145	65.9	0.86	93		6063		
35.9	320	81.6	2378		144	80.6	0.87	92	0.101	4720	132S0610	SP 60T (96A)
38.2	340	86.7	2531		144	80.5	0.87	93		5021		
40.5	360	91.8	2684		144	80.5	0.87	93		5578		
42.8	380	96.9	2837		144	80.5	0.87	93		5908		
45.0	400	102	2991		144	80.3	0.86	94		6239		
49.7	440	118	3468		135	77.4	0.88	94		6903		
51.0	480	128	3773		129	74.0	0.88	95		7519		

* voltage on output from the drive

(¹): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 132M / 175 - 220 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 143 kg

Inertia: 0.082 kg.m² - Maximum mechanical speed: 6,700 min⁻¹ (8,000 min⁻¹ with HV3 configuration)

0.37 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Nominal / Heavy overload)	
											LS	CT
11.7	320	19.1	507	220	31.5	0.88	76	904	777	132M0605	SP 22T (32A)	SP 3401 (32A)
12.6	340	20.3	544	221	31.6	0.87	78		889			
13.4	360	21.5	581	220	31.5	0.87	79		1002			
14.2	380	22.7	618	219	31.4	0.86	80		1101			
15.0	400	23.9	654	219	31.3	0.86	81		1166			
16.7	440	26.3	727	219	31.4	0.85	82		1369			
18.4	480	28.7	800	219	31.5	0.84	83		1505			
14.5	320	23.1	630	220	38.0	0.86	80	610	1123	132M0606	SP 27T (40A)	SP 3402 (40A)
15.6	340	24.6	675	220	38.1	0.86	81		1266			
16.6	360	26.0	717	220	38.1	0.85	82		1417			
17.5	380	27.5	763	219	37.9	0.85	83		1509			
18.5	400	28.9	806	219	37.9	0.84	84		1596			
20.6	440	31.8	893	220	38.1	0.84	85		1771			
22.6	480	34.7	981	220	38.1	0.83	86		1947			
16.6	320	26.0	720	220	43.6	0.83	82	474	1424	132M0607	SP 33T (46A)	SP 3403 (46A)
18.4	340	28.7	796	221	43.6	0.86	83		1495			
19.6	360	30.4	848	221	43.6	0.86	84		1674			
20.8	380	32.1	899	221	43.6	0.86	85		1778			
22.0	400	33.8	950	221	43.6	0.85	85		1881			
24.3	440	37.2	1053	220	43.5	0.85	86		2088			
26.3	480	41.0	1168	215	42.6	0.85	87		2319			
22.6	320	36.8	1036	218	59.3	0.83	86	274	2050	132M0608	SP 40T (60A)	SP 4401 (60A)
25.2	340	39.1	1105	218	59.4	0.83	87		2189			
26.8	360	41.4	1175	218	59.4	0.83	87		2439			
28.4	380	43.7	1244	218	59.5	0.82	88		2587			
30.0	400	46.0	1313	218	59.5	0.82	89		2745			
33.1	440	50.6	1452	218	59.5	0.82	89		3045			
36.2	480	56.0	1614	214	58.6	0.82	90		3208			
29.3	320	46.4	1324	211	71.1	0.84	89	185	2632	132M0609	SP 50T (74A)	SP 4402 (74A)
31.2	340	49.3	1412	211	71.1	0.84	89		2813			
33.1	360	52.2	1499	211	71.0	0.83	90		3131			
35.0	380	55.1	1587	211	71.0	0.83	90		3313			
37.0	400	58.0	1673	211	71.1	0.83	91		3549			
40.8	440	65.0	1883	207	69.9	0.84	91		3744			
44.6	480	72.3	2101	203	68.7	0.85	92		4190			
35.6	320	57.6	1657	205	82.4	0.86	90	129	3280	132M0610	SP 60T (96A)	SP 4403 (96A)
37.9	340	61.2	1765	205	82.3	0.86	91		3503			
40.2	360	64.8	1874	205	82.2	0.86	91		3731			
42.5	380	68.4	1982	205	82.2	0.86	92		4109			
45.0	400	72.0	2090	205	82.5	0.86	92		4347			
49.5	440	81.7	2380	198	80.5	0.87	93		4745			
54.1	480	93.5	2730	189	78.6	0.89	93		5422			
43.8	320	76.8	2234	187	97.2	0.88	93	81	4449	132M0611	SP 75T (124A)	SP 5401 (124A)
46.6	340	81.6	2378	187	97.1	0.88	93		4749			
49.4	360	86.4	2522	187	97.1	0.87	93		5021			
52.2	380	91.2	2667	187	97.0	0.87	93		5577			
55.0	400	96.0	2811	187	97.0	0.87	94		5878			
60.7	440	114	3345	173	94.5	0.90	94		6650			
62.0	480	118	3475	171	89.9	0.88	95		6851			
49.3	320	92.0	2690	175	107.2	0.89	94	61	5349	132M0612	SP 75T (124A)	SP 5401 (124A)
52.5	340	97.8	2864	175	107.2	0.89	94		5964			
55.6	360	103.5	3036	175	107.1	0.89	94		6325			
58.8	380	109.3	3210	175	107.0	0.89	94		6715			
62.0	400	115	3380	175	107.0	0.88	94		7075			
64.0	440	131	3864	158	99.5	0.89	95		7700			
66.0	480	143	4228	149	94.1	0.89	95		8000			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 132L / 210 - 250 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 174 kg

Inertia: 0.107 kg.m² - Maximum mechanical speed: 6,700 min⁻¹ (8,000 min⁻¹ with HV3 configuration)

0.37 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)	
											LS	CT
11.5	320	16.7	445	247	30.9	0.87	76	912	712	132L0605	SP 22T (32A)	SP 3401 (32A)
12.4	340	17.8	478	248	31.0	0.87	78		797			
13.2	360	18.8	509	248	30.9	0.86	79		909			
14.1	380	19.9	542	248	31.0	0.86	80		1021			
15.0	400	20.9	572	250	31.2	0.86	80		1083			
16.6	440	23.0	636	249	31.0	0.85	82		1257			
18.3	480	25.1	700	250	31.1	0.85	83		1385			
14.4	320	20.2	551	250	37.6	0.86	80	634	1049	132L0606	SP 27T (40A)	SP 3402 (40A)
15.5	340	21.5	590	250	37.8	0.86	81		1163			
16.5	360	22.8	630	250	37.7	0.86	82		1253			
17.4	380	24.0	666	250	37.7	0.85	82		1380			
18.5	400	25.3	705	250	37.7	0.85	83		1462			
20.4	440	27.8	781	250	37.7	0.84	84		1548			
22.5	480	30.4	860	250	37.6	0.84	85		1706			
17.2	320	23.8	659	249	43.7	0.86	82	460	1311	132L0607	SP 33T (46A)	SP 3403 (46A)
18.4	340	25.2	702	250	43.8	0.85	83		1455			
19.6	360	26.7	745	250	43.8	0.85	84		1547			
20.7	380	28.2	792	250	43.9	0.85	85		1718			
22.0	400	29.7	837	250	43.8	0.84	85		1818			
24.3	440	32.7	928	250	43.7	0.84	86		2022			
26.6	480	35.6	1016	250	43.7	0.84	87		2205			
23.7	320	32.0	906	250	58.3	0.85	86	249	2040	132L0608	SP 40T (60A)	SP 4401 (60A)
25.3	340	34.0	967	250	58.4	0.84	87		2190			
26.9	360	36.0	1027	250	58.4	0.84	87		2340			
28.5	380	38.0	1087	250	58.5	0.84	88		2463			
30.0	400	40.0	1147	250	58.4	0.84	88		2613			
33.2	440	45.0	1297	244	57.4	0.85	89		2968			
35.8	480	51.0	1476	232	55.3	0.86	90		3466			
29.2	320	39.4	1126	247	72.6	0.82	88	175	2572	132L0609	SP 50T (74A)	SP 4402 (74A)
31.2	340	41.8	1199	248	72.7	0.81	89		2725			
33.3	360	44.3	1273	249	73.1	0.81	90		2959			
35.1	380	46.7	1346	249	73.2	0.81	90		3194			
37.0	400	49.2	1421	249	73.1	0.81	90		3376			
40.9	440	54.1	1568	249	73.2	0.80	91		3709			
44.7	480	59.0	1716	249	73.3	0.80	91		4070			
35.7	320	49.2	1419	240	85.6	0.83	90	123	3229	132L0610	SP 60T (96A)	SP 4403 (96A)
38.0	340	52.3	1513	240	85.5	0.83	91		3440			
40.3	360	55.3	1603	240	85.6	0.82	91		3652			
42.6	380	58.4	1696	240	85.5	0.82	91		3863			
45.0	400	61.5	1790	240	85.7	0.82	92		4073			
49.6	440	67.6	1973	240	85.7	0.82	92		4692			
53.0	480	75.0	2195	230	82.7	0.83	93		5235			
43.4	320	62.4	1810	229	98.1	0.86	92	86	3937	132L0611	SP 75T (124A)	SP 5401 (124A)
46.4	340	66.3	1927	230	98.5	0.86	92		4179			
49.2	360	70.2	2044	230	98.4	0.86	92		4448			
52.0	380	74.1	2161	230	98.5	0.86	93		4718			
55.0	400	78.0	2279	230	98.6	0.86	93		4959			
60.5	440	85.8	2513	230	98.3	0.86	93		5471			
64.0	480	95.0	2790	219	94.7	0.86	94		6363			
54.1	320	84.0	2458	210	119	0.87	93	53	5314	132L0612	SP 75T (124A)	SP 5401 (124A)
57.6	340	89.3	2617	210	119	0.87	93		5702			
61.0	360	94.5	2773	210	119	0.87	94		6062			
64.4	380	99.8	2932	210	119	0.87	94		6423			
68.0	400	105	3088	210	119	0.87	94		6754			
70.0	440	115.5	3408	196	111	0.87	94		7610			
72.0	480	126	3727	185	105	0.86	95		8000			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 160S / 325 - 380 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 230 kg

Inertia: 0.188 kg.m² - Maximum mechanical speed: 7,000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

1.1 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (In nominal / Heavy overload)	
											LS	CT
17.2	320	16.4	444	369	45	0.87	78	520	1000	160S0602	SP 33T (46A)	SP 3403 (46A)
18.3	340	17.4	475	367	45	0.86	80		1100			
19.6	360	18.5	509	368	45	0.86	80		1150			
20.8	380	19.5	539	368	45	0.86	81		1250			
22.0	400	20.5	572	367	45	0.86	82		1300			
24.3	440	22.6	633	367	45	0.85	84		1500			
26.7	480	24.6	694	366	45	0.84	85		1650			
23.7	320	22.0	613	368	59	0.87	83	303	1500	160S0603	SP 40T (60A)	SP 4401 (60A)
25.2	340	23.4	655	367	59	0.86	84		1600			
26.8	360	24.8	697	367	59	0.86	85		1700			
28.4	380	26.1	737	368	59	0.86	85		1800			
30.0	400	27.5	779	368	59	0.85	86		1900			
33.2	440	30.3	864	367	59	0.85	87		2100			
36.4	480	33.0	945	368	59	0.84	88		2350			
29.2	320	26.0	734	380	74	0.85	85	207	1900	160S0604	SP 50T (74A)	SP 4402 (74A)
31.2	340	27.6	782	381	74	0.84	86		2000			
33.1	360	29.0	825	383	74	0.83	86		2100			
35.1	380	30.9	881	380	74	0.84	87		2250			
37.0	400	32.5	930	380	74	0.83	87		2400			
40.8	440	35.8	1030	378	74	0.83	88		2650			
44.8	480	39.0	1125	380	74	0.82	89		2950			
35.6	320	31.6	903	377	88	0.84	87	141	2350	160S0605	SP 60T (96A)	SP 4403 (96A)
38.0	340	33.6	963	377	88	0.84	88		2500			
40.3	360	35.6	1024	376	88	0.83	88		2650			
42.7	380	37.5	1080	377	88	0.83	89		2810			
45.0	400	39.5	1140	377	88	0.82	89		3100			
49.7	440	43.5	1260	376	88	0.82	90		3450			
53.0	480	49.0	1426	355	83	0.85	90		4150			
43.7	320	40.2	1159	360	101	0.88	89	98	2850	160S0606	SP 75T (124A)	SP 5401 (124A)
46.6	340	42.8	1237	360	101	0.87	90		3050			
49.5	360	45.3	1312	360	101	0.87	90		3250			
52.3	380	47.8	1387	360	101	0.87	91		3450			
55.0	400	50.3	1462	360	101	0.87	91		3700			
57.9	440	55.4	1618	342	96	0.86	91		4200			
61.0	480	60.4	1770	329	94	0.86	92		5000			
59.6	320	55.8	1625	350	140	0.83	92	66	4500	160S0607	SP 100T (156A)	SP 5402 (156A)
63.4	340	59.3	1730	350	140	0.83	92		4800			
67.3	360	62.8	1835	350	140	0.83	92		5000			
71.1	380	66.3	1943	350	140	0.83	93		5200			
75.0	400	69.8	2045	350	140	0.83	93		5500			
80.5	440	76.8	2256	341	137	0.82	93		6700			
85.5	480	83.8	2468	331	134	0.82	94		7350			
73.3	320	69.6	2036	344	165	0.86	93	38	5050	160S0608	SP 120T (180A)	SP 6401 (180A)
77.9	340	74.0	2168	343	165	0.86	93		5400			
82.7	360	78.3	2297	344	165	0.86	94		5700			
85.5	380	82.7	2428	336	162	0.86	94		6050			
90.0	400	87.0	2560	336	162	0.85	94		6350			
94.0	440	95.7	2824	318	154	0.85	94		7360			
98.0	480	104	3087	303	148	0.84	95		8000			
88.8	320	88.8	2608	325	190	0.89	94	26	6450	160S0609	SP 150T (210A)	SP 6402 (210A)
94.3	340	94.3	2773	325	190	0.89	94		6850			
100	360	99.9	2941	325	190	0.89	94		7300			
105	380	105	3095	324	190	0.89	95		7600			
110	400	111	3275	321	188	0.89	95		8000			
115	440	122	3609	305	179	0.89	95		8000			
-	-	-	-	-	-	-	-		-			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 160M / 390 - 490 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 289 kg

Inertia: 0.246 kg.m² - Maximum mechanical speed: 7,000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

1.1 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (In nominal / Heavy overload)	
											LS	CT
17	320	12.6	332	475	44	0.89	76	590	620	160M0602	SP 33T (46A)	SP 3403 (46A)
18	340	13.3	350	480	44	0.88	77		680			
19	360	14.1	380	485	45	0.88	78		730			
21	380	14.9	400	495	45	0.88	79		750			
22	400	15.7	425	495	45	0.88	80		810			
25	440	17.3	470	495	45	0.87	81		950			
27	480	18.8	515	495	45	0.86	83		1100			
24	320	16.8	457	490	59	0.89	80	349	920	160M0603	SP 40T (60A)	SP 4401 (60A)
25	340	17.9	490	490	59	0.88	81		1005			
27	360	18.9	520	490	59	0.88	82		1070			
29	380	20.0	550	490	59	0.88	83		1120			
30	400	21.0	585	490	59	0.87	84		1240			
33	440	23.1	648	490	59	0.87	85		1405			
37	480	25.2	710	490	59	0.86	86		1552			
29	320	20.3	563	490	71	0.88	83	240	1240	160M0604	SP 50T (74A)	SP 4402 (74A)
31	340	21.6	602	490	71	0.87	84		1320			
33	360	22.9	641	490	71	0.87	85		1390			
35	380	24.1	576	490	71	0.87	85		1540			
37	400	25.4	715	490	71	0.87	86		1680			
41	440	27.9	790	490	71	0.86	87		1950			
45	480	30.5	871	490	71	0.86	88		2120			
35	320	24.4	685	490	85	0.86	86	167	1580	160M0605	SP 60T (96A)	SP 4403 (96A)
37	340	25.8	730	490	85	0.86	86		1750			
40	360	27.5	780	490	85	0.86	87		1920			
42	380	29.0	820	490	85	0.86	87		2090			
45	400	30.5	870	490	86	0.86	88		2270			
49	440	33.5	960	490	86	0.85	89		2460			
54	480	36.6	1050	490	86	0.84	89		2870			
43	320	29.6	840	490	103	0.86	88	115	2100	160M0606	SP 75T (124A)	SP 5401 (124A)
46	340	31.5	900	490	103	0.86	88		2270			
49	360	33.3	955	490	103	0.86	89		2480			
52	380	35.1	1010	490	102	0.86	89		2710			
55	400	37.0	1065	490	103	0.86	89		2970			
60	440	40.7	1175	480	101	0.85	90		3170			
62	480	44.4	1290	460	97	0.84	91		3750			
59	320	40.0	1155	490	145	0.81	90	65	3300	160M0607	SP 100T (156A)	SP 5402 (156A)
63	340	42.5	1230	490	145	0.81	91		3450			
67	360	45.0	1305	490	145	0.81	91		3610			
71	380	47.5	1380	490	145	0.81	92		3760			
75	400	50.0	1455	490	145	0.81	92		4060			
81	440	55.0	1605	480	143	0.80	92		4370			
85	480	60.0	1760	460	139	0.79	93		5500			
72	320	49.6	1442	475	167	0.83	92	45	4050	160M0608	SP 120T (180A)	SP 6401 (180A)
76	340	52.7	1535	475	167	0.83	92		4350			
81	360	55.8	1628	475	167	0.83	93		4650			
86	380	58.9	1720	475	167	0.83	93		4940			
90	400	62.0	1810	475	168	0.83	93		5100			
98	440	68.2	2000	465	164	0.82	94		5850			
103	480	74.4	2189	450	160	0.82	94		6600			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 160M / 390 - 490 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 289 kg

Inertia: 0.246 kg.m² - Maximum mechanical speed: 7,000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

1.1 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (⁽¹⁾)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Nominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
87	320	63.2	1845	450	191	0.88	93	31	4650	160M0609	SP 150T SP 6402 (210A)		
93	340	67.1	1960	450	191	0.88	93		4960				
98	360	71.1	2083	450	190	0.88	94		5250				
104	380	75.1	2204	450	190	0.88	94		5550				
110	400	79.0	2320	450	192	0.88	94		5800				
116	440	86.9	2560	430	183	0.87	94		6500				
122	480	98.0	2890	405	173	0.88	94		7000				
106	320	88.0	2590	390	224	0.90	95	18	6177	160M0610	SP 74X1 (238A)	SPMD 14X3-1S (246A)	
113	340	93.5	2755	390	224	0.90	95		6567				
119	360	99.0	2920	390	223	0.89	95		7000				
127	380	105	3100	390	223	0.90	95		7000				
132	400	110	3255	390	223	0.89	95		7000				
-	-	-	-	-	-	-	-		-				
-	-	-	-	-	-	-	-		-				

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 160L / 490 - 700 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 362 kg

Inertia: 0.455 kg.m² – Maximum mechanical speed: 5,000 min⁻¹

1.1 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (In nominal / Heavy overload)	
											LS	CT
24	320	11.7	320	702	60	0.91	78	540	500	160L0603	SP 40T (60A)	SP 4401 (60A)
25	340	12.4	341	702	60	0.90	79		600			
27	360	13.1	363	700	59	0.90	80		700			
28	380	13.9	387	700	59	0.90	81		750			
30	400	14.6	409	700	59	0.89	82		800			
33	440	16.1	454	698	59	0.88	83		900			
36	480	17.5	496	698	59	0.88	84		1000			
29	320	14.2	395	700	71	0.90	81	380	750	160L0604	SP 50T (74A)	SP 4402 (74A)
31	340	15.1	422	700	71	0.90	82		850			
33	360	16.0	450	700	71	0.90	83		900			
35	380	16.9	477	700	71	0.89	83		950			
37	400	17.8	504	700	71	0.89	84		1050			
41	440	19.6	558	700	71	0.89	85		1250			
45	480	21.4	613	700	71	0.88	86		1350			
36	320	17.1	485	698	85	0.90	84	268	1000	160L0605	SP 60T (96A)	SP 4403 (96A)
38	340	18.2	516	700	85	0.89	85		1100			
40	360	19.3	549	700	85	0.89	85		1200			
43	380	20.3	580	700	85	0.89	86		1300			
45	400	21.4	613	700	85	0.88	87		1400			
50	440	23.5	676	700	85	0.88	87		1500			
54	480	25.7	743	694	84	0.88	88		1650			
44	320	20.8	595	700	103	0.88	86	180	1350	160L0606	SP 75T (124A)	SP 5401 (124A)
47	340	22.1	634	700	102	0.88	87		1450			
49	360	23.4	673	700	102	0.88	88		1650			
52	380	24.7	712	700	102	0.88	88		1750			
55	400	26.0	751	699	102	0.88	88		1850			
60	440	28.6	830	685	100	0.87	89		2050			
64	480	31.2	909	672	99	0.86	90		2250			
60	320	29.2	844	679	139	0.87	89	103	2000	160L0607	SP 100T (156A)	SP 5402 (156A)
64	340	31.0	898	676	139	0.87	90		2100			
68	360	32.9	955	676	138	0.86	90		2250			
71	380	34.7	1010	675	138	0.86	90		2375			
75	400	36.5	1064	673	138	0.86	91		2500			
81	440	40.2	1175	661	136	0.85	92		2900			
88	480	43.8	1284	654	134	0.85	92		3200			
72	320	36.1	1053	650	165	0.86	91	69	2650	160L0608	SP 120T (180A)	SP 6401 (180A)
76	340	38.3	1119	650	165	0.85	92		2850			
81	360	40.6	1188	650	165	0.86	92		3000			
85	380	42.8	1254	650	165	0.85	92		3150			
90	400	45.1	1323	649	164	0.85	92		3350			
97	440	49.6	1459	635	161	0.85	93		3600			
104	480	54.1	1595	623	159	0.84	93		3950			
88	320	45.6	1338	625	197	0.86	93	44	3300	160L0609	SP 150T (210A)	SP 6402 (210A)
93	340	48.5	1425	625	197	0.86	93		3500			
99	360	51.3	1509	625	197	0.86	93		3700			
105	380	54.2	1596	625	197	0.86	93		3900			
110	400	57.0	1680	625	197	0.86	93		4150			
117	440	62.7	1853	603	191	0.85	94		4700			
125	480	68.4	2025	590	188	0.85	94		5000			

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 160L / 490 - 700 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 362 kg

Inertia: 0.455 kg.m² - Maximum mechanical speed: 5,000 min⁻¹

1.1 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (⁽¹⁾)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Nominal / Heavy overload)		
											SP	SPM	SPM Regen
110	320	59.2	1741	603	233	0.91	93	27	3700	160L0610	SP 74X1 (238A)	SPMD 14X3-1S (246A)	SPMD 1423-1R (246A)
116	340	62.9	1852	596	230	0.90	94		4000				
121	360	66.6	1964	591	228	0.90	94		4300				
126	380	70.3	2075	582	225	0.90	94		4600				
132	400	74.0	2187	577	223	0.90	94		5000				
139	440	81.4	2411	551	213	0.90	95		5000				
148	480	88.8	2634	537	208	0.90	95		5000				
138	320	84.8	2506	526	285	0.92	94	19	5000	160L0611	SP 74X2 (290A)	SPMD 14X4-1S (290A)	SPMD 1424-1R (290A)
144	340	90.1	2666	516	280	0.92	95		5000				
150	360	95.4	2826	507	275	0.92	95		5000				
155	380	100.7	2986	496	268	0.92	95		5000				
160	400	106.0	3146	486	263	0.91	95		5000				
166	440	116.6	3466	458	248	0.91	96		5000				
171	480	127.2	3786	432	234	0.91	96		5000				

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 200S / 680 - 940 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 505 kg

Inertia: 0.700 kg.m² – Maximum mechanical speed: 5000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

2.2 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
35	320	14.0	376	883	91.0	0.88	78.2	278	560	200S0604	SP 60T SP 4403 (96A)		
38	340	14.9	403	887	91.3	0.88	79.3		605				
40	360	15.8	431	886	91.0	0.88	80.4		676				
43	380	16.6	455	891	91.0	0.87	81.3		735				
45	400	17.5	482	890	90.7	0.87	82.2		846				
51	440	19.3	536	898	91.3	0.87	83.6		909				
56	480	21.0	588	900	91.1	0.86	84.8		1060				
43	320	16.0	440	937	113	0.85	81.3	187.8	816	200S0605	SP 75T SP5401 (124A)		
46	340	17.0	470	940	113	0.85	82.3		878				
50	360	18.0	500	944	113	0.85	83.1		950				
52	380	19.0	531	940	113	0.84	83.9		1051				
55	400	20.0	561	935	112	0.84	84.7		1165				
61	440	22.0	622	935	112	0.83	85.9		1261				
67	480	24.0	682	937	112	0.83	86.9		1355				
59	320	22.3	628	903	146	0.86	85.6	108.4	1171	200S0606	SP 100T SP 5402 (156A)		
63	340	23.7	670	900	145	0.86	86.4		1290				
67	360	25.1	712	900	145	0.86	87.0		1351				
71	380	26.5	755	900	145	0.85	87.6		1441				
75	400	27.9	796	900	144	0.85	88.2		1587				
83	440	30.7	881	893	143	0.85	89.1		1700				
90	480	33.5	966	890	143	0.85	89.9		1865				
72	320	27.0	767	890	172	0.86	87.6	77	1525	200S0607	SP 120T SP 6401 (180A)		
77	340	28.7	820	890	172	0.86	88.2		1614				
81	360	30.4	871	887	171	0.86	88.8		1734				
86	380	32.1	922	884	170	0.85	89.3		1826				
90	400	33.8	974	882	170	0.85	89.7		1974				
99	440	37.2	1076	875	168	0.85	90.6		2186				
108	480	40.6	1180	870	167	0.85	91.2		2369				
89	320	33.2	956	883	209	0.85	89.6	49.8	1917	200S0608	SP 150T SP 6402 (210A)		
94	340	35.3	1019	880	208	0.85	90.1		2100				
100	360	37.4	1083	877	208	0.85	90.6		2300				
104	380	39.4	1143	877	207	0.85	91.0		2460				
110	400	41.5	1200	875	206	0.84	91.4		2600				
121	440	45.7	1338	866	205	0.84	91.8		2758				
131	480	49.8	1457	858	202	0.84	92.5		2944				
105	320	40.4	1170	858	247	0.84	91.1	36.4	2430	200S0609	SP 74X2 (290A)	SPMD 14X4-1S (290A)	SPMD 1423-1R (246A)
112	340	42.9	1246	858	247	0.84	91.6		2600				
119	360	45.5	1324	856	246	0.84	91.9		2775				
125	380	48.0	1400	855	246	0.84	92.3		2930				
132	400	50.5	1474	855	245	0.84	92.6		3080				
146	440	55.6	1627	853	245	0.84	93.1		3380				
158	480	60.6	1778	848	244	0.83	93.6		3568				
128	320	49.6	1446	845	295	0.85	92.5	25	2930	200S0610	SP 84X1 (335A)	SPMA 14X1-2S (342A)	SPMD 1421-2R (342A)
136	340	52.7	1540	843	295	0.84	92.8		3125				
144	360	55.8	1633	841	294	0.84	93.1		3320				
152	380	58.9	1726	840	293	0.84	93.4		3450				
160	400	62.0	1816	840	293	0.84	93.7		3712				
174	440	68.2	2005	830	289	0.84	94.1		4100				
188	480	74.4	2192	820	286	0.84	94.5		4467				

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 200S / 680 - 940 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 505 kg

Inertia: 0.700 kg.m² - Maximum mechanical speed: 5000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

2.2 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) ⁽¹⁾	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP	SPM	SPM Regen
160	320	68,0	2000	760	358	0.86	93.7	16.3	3800	200S0611	SP 84X2 (389A)	SPMA 14X2-2S (400A)	SPMD 1422-2R (400A)
170	340	72,3	2125	760	357	0.86	93.9		4030				
180	360	76,5	2254	760	357	0.86	94.2		4257				
190	380	80,8	2383	760	357	0.86	94.4		4500				
200	400	85,0	2510	760	357	0.86	94.6		4750				
213	440	93,5		736	345	0.85	94.9		5000				
228	480	102,0		721	339	0.85	95.2		5000				
205	320	94,4	2790	702	451	0.87	94.9	9.13	5000	200S0612	SP 84X3 (450A)	SPMD 14X3-2L (468A)	SPMD 1423-2R (468A)
216	340	100,3	2967	696	447	0.86	95.1		5000				
227	360	106,2	3145	688	442	0.86	95.3		5000				
238	380	112,1	3322	685	440	0.86	95.4		5000				
250	400	118,0	3500	683	438	0.86	95.5		5000				
-	440	-	-	-	-	-	-		-				
-	480	-	-	-	-	-	-		-				

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 200M / 900 - 1300 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 615 kg

Inertia: 0.98 kg.m² - Maximum mechanical speed: 5000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

2.2 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Nominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
43	320	11.7	315	1296	115	0.86	78.7	220.4	534	200M0603	SP 75T SP 5401 (124A)		
46	340	12.4	337	1300	116	0.85	79.3		590				
49	360	13.1	358	1300	115	0.85	80.4		650				
52	380	13.9	382	1300	115	0.84	82.2		766				
55	400	14.6	404	1300	115	0.84	82.2		766				
61	440	16.1	450	1300	115	0.84	83.6		897				
67	480	17.5	491	1305	115	0.83	84.8		1028				
59	320	16.2	449	1255	148	0.86	83.0		821				
63	340	17.2	479	1260	148	0.86	83.4	130.4	895	200M0604	SP 100T SP 5402 (156A)		
67	360	18.2	509	1260	148	0.86	84.7		967				
71	380	19.2	540	1260	148	0.86	85.5		1056				
75	400	20.2	568	1260	147	0.85	86.1		1115				
83	440	22.2	630	1254	147	0.85	87.3		1240				
91	480	24.2	391	1254	146	0.85	88.2		1374				
71	320	19.6	552	1230	174	0.86	85.8	91	1058	200M0605	SP 120T SP 6401 (180A)		
77	340	20.8	589	1230	173	0.86	86.5		1148				
81	360	22.1	630	1228	173	0.86	87.2		1250				
86	380	23.3	663	1228	173	0.85	87.8		1326				
90	400	24.5	700	1228	173	0.85	88.3		1390				
99	440	27.0	775	1228	172	0.85	89.2		1540				
108	480	29.4	847	1228	172	0.85	89.9		1770				
88	320	24.0	683	1225	209	0.86	87.8	62.8	1340	200M0606	SP 150T SP 6402 (210A)		
93	340	25.5	728	1222	209	0.86	88.5		1445				
99	360	27.0	774	1221	208	0.86	89.1		1535				
105	380	28.5	819	1217	207	0.85	89.6		1626				
110	400	30.0	864	1215	207	0.85	90.0		1717				
122	440	33.0	954	1215	206	0.85	90.8		1900				
133	480	36.0	1045	1215	206	0.85	91.4		2080				
105	320	28.6	823	1222	251	0.85	89.7	42.6	1562	200M0607	SP 74X2 (290A)	SPMD 14X4-1S (290A)	SPMD 1424-1R (246A)
112	340	30.3	875	1222	250	0.84	90.2		1632				
119	360	32.1	929	1220	250	0.84	90.6		1820				
125	380	33.9	983	1217	249	0.84	91.1		1963				
132	400	35.7	1037	1214	248	0.84	91.4		2090				
146	440	39.3	1145	1212	248	0.84	92.0		2320				
159	480	42.8	1252	1212	248	0.83	92.7		2560				
128	320	36.0	1041	1173	297	0.85	91.2	31	2012	200M0608	SP 84X1 (335A)	SPMA 14X1-2S (342A)	SPMD 1421-2R (342A)
136	340	38.3	1110	1168	295	0.85	91.5		2148				
144	360	40.5	1177	1168	295	0.85	91.9		2311				
152	380	42.8	1246	1164	294	0.85	92.3		2475				
160	400	45.0	1312	1164	293	0.85	92.6		2640				
176	440	49.5	1448	1157	291	0.85	93.2		2825				
192	480	54.0	158	1145	288	0.85	93.7		3040				
160	320	46.3	1355	1127	375	0.83	93.0	17.8	3087	200M0609	SP 84X2 (389A)	SPMA 14X2-2S (400A)	SPMD 1422-2R (400A)
170	340	49.2	1442	1125	375	0.83	93.3		3354				
180	360	52.2	1532	1120	374	0.83	93.6		3593				
190	380	55.1	1620	1120	373	0.83	93.9		3803				
200	400	58.0	1706	1119	373	0.82	94.1		4042				
217	440	63.7	1878	1104	368	0.82	94.5		4494				
234	480	69.5	2053	1090	363	0.82	94.8		5000				

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 200M / 900 - 1300 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 615 kg

Inertia: 0.98 kg.m² - Maximum mechanical speed: 5000 min⁻¹ (10000 min⁻¹ with HV3 configuration)

2.2 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Nominal / Heavy overload)				
											SP	SPM	SPM Regen		
204	320	61.0	1794	1086	461	0.85	93.9	12.1	3604	200M0610	SP 84X4 (545A)	SPMD 14X3-2L (468A)	SPMD 1423-2R (468A)		
217	340	64.9	1910	1082	460	0.85	94.1		3920						
227	360	68.7	2026	1068	454	0.85	94.4		4115						
238	380	72.5	2140	1061	451	0.85	94.6		4298						
250	400	76.3	2260	1057	450	0.85	94.8		4450						
275	440	83.9	2483	1032	438	0.84	95.2		5000		SP 84X3 (450A)				
300	480	91.6	2715	1010	430	0.84	95.4		5000						
256	320	87.9	2604	939	569	0.85	95.3		5000	200M0611	SP 94X1 (620A)	SPMD 14X2-3S (600A)	SPMD 1422-3R (600A)		
272	340	93.4	2768	939	569	0.85	95.5		5000						
287	360	98.9	2933	935	566	0.85	95.6		5000						
300	380	104	3098	925	560	0.85	95.7		5000						
315	400	110	3264	922	559	0.85	95.8		5000						
330	440	121	3596	877	533	0.85	96.0		5000						
350	480	132		3927	852	0.84	96.1		5000						

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 200L / 1100 - 1550 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 740 kg

Inertia: 1.579 kg.m² - Maximum mechanical speed: 4,500 min⁻¹

2.2 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
43	320	9.5	267	1537	108	0.88	81.5	248	585	200L0603	SP 75T SP 5401 (124A)		
46	340	10.1	285	1540	108	0.87	82.5		630				
49	360	10.7	305	1540	108	0.87	83.3		688				
52	380	11.3	321	1538	108	0.87	84.1		734				
55	400	11.9	340	1545	109	0.86	84.7		765				
61	440	13.1	376	1536	108	0.86	86.0		855				
66	480	14.3	412	1534	108	0.85	87.0		943				
60	320	13.2	378	1506	143	0.88	85.7	139	837	200L0604	SP 100T SP 5402 (156A)		
63	340	14.0	402	1505	142	0.88	86.5		897				
67	360	14.9	429	1500	142	0.88	87.1		963				
71	380	15.7	453	1500	142	0.87	87.7		1018				
75	400	16.5	477	1500	141	0.87	88.2		1090				
83	440	18.2	528	1500	141	0.87	89.1		1167				
90	480	19.8	576	1500	141	0.86	89.9		1293				
72	320	15.8	456	1494	169	0.87	87.7	97	1150	200L0605	SP 120T SP 6401 (180A)		
76	340	16.8	486	1496	169	0.87	88.3		1117				
81	360	17.8	516	1494	169	0.86	88.9		1184				
86	380	18.8	546	1493	169	0.86	89.3		1259				
90	400	19.8	576	1490	169	0.86	89.5		1305				
99	440	21.8	636	1485	168	0.85	90.6		1455				
108	480	23.8	697	1480	167	0.85	91.2		1605				
88	320	19.4	564	1482	204	0.87	89.6	64.5	1291	200L0606	SP 150T SP 6402 (210A)		
93	340	20.6	600	1479	203	0.86	90.2		1370				
99	360	21.8	636	1480	203	0.86	90.6		1490				
105	380	23.0	673	1482	203	0.86	91.0		1575				
110	400	24.2	708	1480	203	0.86	91.3		1660				
121	440	26.6	781	1477	203	0.85	91.9		1815				
132	480	29.0	853	1460	201	0.85	92.5		2083				
106	320	23.8	696	1441	236	0.88	91.0	47.6	1560	200L0607	SP 74X1 (238A)	SPMD 14X3-1S (246A)	SPMD 1423-1R (246A)
112	340	25.3	740	1443	237	0.88	91.4		1691				
119	360	26.8	786	1440	236	0.88	91.8		1802				
125	380	28.3	831	1440	236	0.88	92.1		1867				
132	400	29.8	876	1439	236	0.88	92.5		1955				
145	440	32.8	966	1434	235	0.87	92.9		2168				
155	480	35.8	1057	1397	229	0.87	93.5		2474				
128	320	29.6	871	1409	293	0.86	92.5	29.2	2185	200L0608	SP 84X1 (335A)	SPMD 14X1-2L (342A)	SPMD 1421-2R (342A)
136	340	31.5	928	1400	291	0.86	92.9		2315				
144	360	33.3	982	1397	290	0.85	93.2		2442				
152	380	35.2	1040	1396	290	0.85	93.4		2540				
160	400	37.0	1094	1397	290	0.85	93.6		2680				
176	440	40.7	1204	1392	289	0.85	94.0		3010				
192	480	44.4	1316	1350	282	0.84	94.4		3400				
161	320	38.8	1146	1342	359	0.86	93.4	19.6	2723	200L0609	SP 84X2 (389A)	SPMA 14X2-2S (400A)	SPMA 1422-2R (400A)
171	340	41.2	1218	1337	357	0.86	94.1		2890				
181	360	43.7	1293	1334	356	0.86	94.4		3100				
190	380	46.1	1365	1330	355	0.86	94.6		3250				
200	400	48.5	1422	1330	355	0.86	94.8		3450				
218	440	53.4	1584	1314	352	0.86	95.1		3750				
240	480	58.2	1728	1298	348	0.85	85.4		4090				

* voltage available on output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 200L / 1100 - 1550 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 740 kg

Inertia: 1.579 kg.m² - Maximum mechanical speed: 4,500 min⁻¹

2.2 kW forced ventilation – 230/400V 50Hz

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Nominal / Heavy overload)		
											SP	SPM	SPM Regen
206	320	50.4	1494	1317	454	0.86	94.9	12.6	3608	200L0610	SP 84X4 (545A)	SPMD 14X3-2L (468A)	SPMD 1423-2R (468A)
219	340	53.6	1590	1315	454	0.86	95.1		3905				
226	360	56.7	1683	1293	447	0.86	95.3		4150				
238	380	59.9	1800	1276	441	0.86	95.5		4360				
250	400	63.0	1872	1275	441	0.86	95.5		4500				
272	440	69.3	2062	1260	436	0.85	95.9		4500				
288	480	75.6	2251	1222	424	0.85	96.0		4500				
257	320	68.0	2023	1214	554	0.88	95.5	7	4500	200L0611	SP 94X1 (620A)	SPMA 14X2-3S	SPMA 1422-3R
268	340	72.3	2152	1216	555	0.88	95.6		4500				
284	360	76.5	2278	1203	549	0.88	95.8		4500				
303	380	80.8	2408	1190	549	0.88	95.9		4500				
315	400	85.0	2533	1187	543	0.87	96.0		4500				
345	440	93.5	2788	1182	540	0.87	96.2		4500				
378	480	102	3043	1170	535	0.87	96.3		4500				
284	320	80.8	2406	1167	627	0.89	95.6	5.53	4500	200L0612	SP 94X3 (790A)	SPMA 14X3-3S (702A)	SPMA 1423-3R (702A)
309	340	85.9	2560	1153	620	0.89	95.7		4500				
324	360	90.9	2710	1142	614	0.88	95.8		4500				
340	380	96.0	2863	1134	610	0.88	95.9		4500				
355	400	101.0	3013	1125	605	0.88	96.0		4500				
391	440	111.1	3313	1095	590	0.88	96.2		4500				
-	-	-	-	-	-	-	-		-				

* voltage available on output from the drive

(¹): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 250S / 1950 - 1570 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 1050 kg

Inertia: 2.65 kg.m² - Maximum mechanical speed: 5,000 min⁻¹

3kW forced ventilation – 230/400V 50Hz

Re-greasable bearings (Insulated NDE as standard)

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
58	320	10.6	297	1862	144	0.88	82.0	136	665	250S0603	SP 100T SP 5402 (156A)		
62	340	11.2	316	1875	144	0.88	82.9		725				
66	360	11.8	334	1886	144	0.87	83.7		770				
71	380	12.7	360	1880	144	0.88	84.5		788				
75	400	13.4	381	1876	144	0.88	85.2		847				
83	440	14.7	421	1880	144	0.87	86.4		993				
91	480	16.0	460	1888	144	0.87	87.3		1111				
71	320	12.3	348	1947	174	0.88	84.0	99.8	757	250S0604	SP 120T SP 6401 (180A)		
76	340	13.1	372	1950	174	0.87	84.8		844				
81	360	13.9	396	1951	174	0.87	85.5		903				
86	380	14.7	420	1953	174	0.87	86.2		963				
90	400	15.3	439	1957	174	0.86	86.8		1050				
100	440	16.9	486	1961	174	0.86	87.8		1200				
110	480	18.5	535	1963	174	0.86	88.6		1292				
86	320	14.6	418	1965	204	0.86	86.2	69.6	1020	250S0605	SP 150T SP 6402 (210A)		
92	340	15.6	448	1961	209	0.86	87.0		1080				
98	360	16.5	475	1970	209	0.86	87.6		1142				
104	380	17.5	505	1966	209	0.86	88.1		1203				
110	400	18.4	531	1973	209	0.86	88.6		1292				
122	440	20.4	592	1968	208	0.86	89.5		1413				
134	480	22.4	652	1963	208	0.86	90.2		1590				
104	320	17.6	507	1957	245	0.87	88.1	49.8	1173	250S0606	SP 74X2 (290A)	SPMD 14X3-1S (246A)	
111	340	18.7	540	1961	245	0.87	88.7		1263				
118	360	19.8	574	1964	245	0.87	89.2		1352				
125	380	20.9	606	1967	245	0.86	89.7		1442				
132	400	22.0	640	1970	245	0.86	90.1		1530				
145	440	24.1	703	1969	245	0.86	90.8		1740				
159	480	26.5	775	1958	244	0.86	91.5		1920				
127	320	22.1	642	1887	289	0.88	90.1	33.8	1440	250S0607	SP 74X2 (290A)	SPMD 14X4-1S (290A)	
135	340	23.4	681	1891	289	0.88	90.6		1565				
144	360	24.9	726	1893	289	0.88	91.0		1645				
152	380	26.2	765	1896	289	0.87	91.4		1775				
160	400	27.5	805	1898	289	0.87	91.7		1907				
177	440	30.3	889	1901	289	0.87	92.3		2074				
193	480	33.1	973	1894	288	0.87	92.8		2340				
147	320	25.6	748	1876	334	0.87	91.2	25.0	1773	250S0608	SP 84X1 (335A)	SPMD 14X1-2L (342A)	
157	340	27.3	799	1876	334	0.87	91.7		1893				
167	360	28.9	847	1883	334	0.87	92.0		2024				
176	380	30.4	892	1883	334	0.87	92.3		2185				
185	400	31.9	937	1885	334	0.86	92.6		2311				
204	440	35.5	1045	1864	331	0.87	93.1		2580				
223	480	39.6	1168	1825	327	0.88	93.6		2646				
180	320	31.5	925	1859	399	0.88	92.5	17.4	2058	250S0609	SP 84X3 (450A)	SPMA 14X2-2S (400A)	
192	340	33.6	987	1857	399	0.88	92.8		2185				
203	360	35.4	1040	1861	399	0.88	93.1		2375				
212	380	37.3	1099	1844	395	0.87	93.3		2525				
225	400	40.2	1185	1814	393	0.88	93.6		2580				
244	440	44.8	1323	1762	384	0.89	94.1		2830				
262	480	49.8	1473	1700	375	0.89	94.5		2980				

* voltage available at the output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 250S / 1950 - 1570 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 1050 kg

Inertia: 2.65 kg.m² - Maximum mechanical speed: 5,000 min⁻¹

3kW forced ventilation – 230/400V 50Hz

Re-greasable bearings (Insulated NDE as standard)

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹) (1)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP	SPM	SPM Regen
200	320	35.2	1035	1845	449	0.86	93.2	14	2490	250S0610	SP 84X3 (450A)	SPMD 14X3-2L (468A)	SPMD 1423-2R (468A)
214	340	37.7	1110	1842	449	0.86	93.5		2611				
226	360	39.7	1170	1846	449	0.86	93.8		2843				
238	380	41.7	1230	1849	449	0.86	94.0		3049				
250	400	43.7	1290	1850	449	0.85	94.2		3238				
273	440	48.0	1420	1837	446	0.85	94.6		3626				
298	480	55.2	1634	1800	445	0.88	95.0		3480				
258	320	46.2	1365	1806	569	0.87	94.4	8.4	3182	250S0611	SP 94X1 (620A)	SPMD 14X2-3L (600A)	SPMD 1422-3R (600A)
274	340	49.0	1450	1807	569	0.87	94.7		3420				
290	360	52.0	1539	1800	567	0.87	94.9		3631				
303	380	55.5	1644	1761	558	0.87	95.1		3840				
315	400	58.0	1720	1750	553	0.86	95.2		4150				
343	440	66.0	1960	1673	537	0.88	95.6		4387				
360	480	70.0	2080	1653	526	0.86	95.8		5000				
294	320	54.0	1600	1756	647	0.86	95.0	6.2	3840	250S0612	SP 94X3 (790A)	SPMD 14X3-3L (702A)	SPMD 1423-3R (702A)
314	340	58.0	1719	1745	645	0.87	95.2		4020				
325	360	60.7	1801	1724	636	0.86	95.4		4470				
338	380	64.0	1900	1700	627	0.86	95.5		4890				
355	400	68.0	2020	1680	622	0.86	95.7		5000				
388	440	79.2	2355	1575	600	0.88	96.0		5000				
410	480	87.0	2590	1512	580	0.88	96.2		5000				
360	320	71.0	2111	1630	788	0.86	95.8	3.7	5000	250S0613	SP 94X3 (790A)	SPMD 14X4-3L (828A)	SPMD 1424-3R (828A)
375	340	76.0	2261	1584	770	0.86	96.0		5000				
391	360	80.0	2382	1568	762	0.86	96.1		5000				
409	380	86.0	2562	1525	747	0.87	96.2		5000				
430	400	95.0	2831	1450	728	0.88	96.4		-				
-	-	-	-	-	-	-	-		-				
-	-	-	-	-	-	-	-		-				

* voltage available at the output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 250M / 2360 - 1710 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 1200 kg

Inertia: 3.14 kg.m² - Maximum mechanical speed: 5,000 min⁻¹

3kW forced ventilation – 230/400V 50Hz

Re-greasable bearings (Insulated NDE as standard)

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (⁽¹⁾)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
58	320	8.7	241	2298	144	0.90	81.4	142	475	250M0603	SP 100T SP 5402 (156A)		
62	340	9.2	256	2310	143	0.89	82.3		537				
67	360	9.9	277	2311	144	0.90	83.2		560				
71	380	10.4	292	2321	144	0.89	84.0		600				
75	400	11.0	310	2309	143	0.89	84.8		650				
83	440	12.0	340	2327	143	0.88	85.9		730				
90	480	12.8	365	2350	143	0.87	86.9		875				
71	320	10.4	291	2330	170	0.90	83.5	112	554	250M0604	SP 120T SP 6401 (180A)		
76	340	11.0	309	2347	171	0.90	84.4		601				
81	360	11.6	327	2362	171	0.89	85.1		649				
86	380	12.2	346	2376	171	0.89	85.8		729				
90	400	12.7	361	2380	170	0.88	86.4		815				
99	440	13.8	395	2395	170	0.87	87.5		934				
108	480	14.9	428	2408	170	0.86	88.3		1053				
86	320	12.3	350	2352	203	0.89	86.0	78.2	735	250M0605	SP 150T SP 6402 (210A)		
92	340	13.1	373	2354	203	0.88	86.7		750				
98	360	13.9	397	2356	203	0.88	87.3		800				
104	380	14.7	421	2357	203	0.88	87.9		853				
110	400	15.5	445	2359	203	0.88	88.4		925				
121	440	17.1	493	2341	201	0.88	89.4		1060				
133	480	18.7	541	2345	202	0.88	90.1		1151				
104	320	15.1	432	2297	237	0.90	88.0	56.0	794	250M0606	SP 74X1 (238A)	SPMD 14X3-1S (246A)	SPMD 1423-1R (246A)
111	340	16.1	462	2292	237	0.89	88.6		857				
118	360	17.0	489	2301	237	0.89	89.1		917				
125	380	18.0	519	2297	237	0.89	89.6		988				
132	400	18.9	547	2305	237	0.89	90.0		1065				
145	440	20.6	598	2314	236	0.89	90.8		1228				
159	480	22.5	655	2317	236	0.88	91.4		1359				
128	320	18.3	529	2311	288	0.89	89.8	38.0	1034	250M0607	SP 74X2 (290A)	SPMD 1404-1S (290A)	SPMD 1424-1R (290A)
136	340	19.4	562	2311	287	0.89	90.3		1124				
144	360	20.4	592	2321	287	0.88	90.7		1227				
152	380	21.4	622	2330	287	0.88	91.1		1330				
160	400	22.4	652	2340	287	0.88	91.5		1449				
176	440	24.6	719	2337	286	0.88	92.1		1640				
192	480	27.0	791	2318	284	0.88	92.6		1807				
147	320	20.8	605	2320	332	0.88	91.0	28.0	1359	250M0608	SP 84X1 (335A)	SPMD 14X1-2L (342A)	SPMD 1421-2R (342A)
157	340	22.2	647	2317	332	0.88	91.4		1449				
167	360	23.6	689	2314	331	0.88	91.8		1533				
176	380	24.9	728	2308	330	0.88	92.2		1666				
185	400	26.1	764	2311	330	0.88	92.4		1791				
204	440	28.7	842	2312	330	0.87	93.0		1986				
223	480	31.5	926	2298	328	0.87	93.4		2195				
180	320	25.9	757	2270	395	0.89	92.3	19.6	1543	250M0609	SP 84X3 (450A)	SPMD 14X2-2L (400A)	SPMD 1422-2R (400A)
192	340	27.5	805	2276	396	0.89	92.6		1648				
203	360	29.1	853	2270	394	0.89	93.0		1811				
212	380	30.4	892	2266	392	0.88	93.2		1960				
225	400	32.5	955	2248	391	0.88	93.5		2079				
244	440	35.8	1054	2211	385	0.88	93.9		2407				
260	480	38.2	1127	2204	380	0.87	94.3		2707				

* voltage available at the output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Selection tables

CPLS 250M / 2360 - 1710 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 1200 kg

Inertia: 3.14 kg.m² - Maximum mechanical speed: 5,000 min⁻¹

3kW forced ventilation – 230/400V 50Hz

Re-greasable bearings (Insulated NDE as standard)

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹) (¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP	SPM	SPM Regen
200	320	29.1	853	2238	442	0.88	93.1	15.6	1898	250M06010	SP 84X3 (450A)	SPMD 14X3-2L (468A)	SPMD 1423-2R (468A)
214	340	31.1	913	2237	443	0.88	93.4		2016				
226	360	32.7	961	2245	443	0.87	93.7		2195				
238	380	34.4	1012	2245	442	0.87	93.9		2359				
250	400	36.0	1060	2252	442	0.87	94.1		2522				
273	440	39.6	1168	2233	438	0.86	94.6		2816				
298	480	43.5	1285	2216	435	0.87	94.9		3122				
255	320	36.4	1072	2270	569	0.86	94.2	9.6	2657	250M06011	SP 94X1 (620A)	SPMA 14X2-3S (600A)	SPMD 1422-3R (600A)
270	340	38.8	1144	2253	565	0.86	94.5		2880				
283	360	41.0	1211	2233	561	0.86	94.7		3090				
300	380	43.5	1286	2229	561	0.86	94.9		3152				
315	400	46.2	1367	2200	555	0.86	95.1		3422				
345	440	52.5	1556	2120	543	0.87	95.5		3607				
370	480	57.3	1700	2080	533	0.87	95.8		4000				
290	320	42.6	1260	2200	646	0.85	94.9	7.0	3300	250M06012	SP 94X3 (790A)	SPMD 14X3-3L (702A)	SPMD 1423-3R (702A)
309	340	45.2	1337	2208	647	0.85	95.1		3510				
324	360	47.7	1413	2191	643	0.85	95.2		3810				
338	380	50.5	1497	2157	634	0.85	95.4		4080				
355	400	54.0	1600	2117	626	0.86	95.7		4230				
387	440	60.0	1782	2075	616	0.86	95.9		4623				
420	480	67.0	1992	2015	605	0.85	96.1		4867				
360	320	57.0	1692	2032	787	0.86	95.8	4.1	4384	250M06013	SP 94X3 (790A)	SPMD 14X4-3L (828A)	SPMD 1424-3R (828A)
380	340	60.0	1782	2037	786	0.86	95.9		4802				
400	360	63.0	1873	2040	786	0.85	96.0		5000				
420	380	66.2	1969	2038	784	0.85	96.2		5000				
450	400	72.3	2150	2000	778	0.87	96.3		5000				
480	440	80.8	2406	1905	750	0.87	96.5		5000				
500	480	90.0	2682	1781	711	0.87	96.6		5000				
434	320	81.6	2424	1711	890	0.92	96.3	3.2	3200	250M06014	SP 94X4 (900A)	SPMD 14X3-4L (937A)	SPMD 1423-4R (937A)
461	340	86.7	2577	1710	889	0.91	96.4		3536				
480	360	90.0	2677	1713	874	0.91	96.5		3865				
510	380	98.7	2937	1659	876	0.92	96.6		3860				
520	400	103	3067	1620	849	0.92	96.7		4286				

* voltage available at the output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 250L / 2900 - 2300 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 1500 kg

Inertia: 4.92 kg.m² - Maximum mechanical speed: 3,800 min⁻¹

3kW forced ventilation – 230/400V 50Hz

Re-greasable bearings (Insulated NDE as standard)

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (¹)	n ₂ (min ⁻¹)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP LS / CT	SPM	SPM Regen
70	320	8.2	233	2873	174	0.88	81.4	132	345	250L0603	SP 120T SP 6401 (180A)		
75	340	8.7	248	2891	174	0.88	82.4		380				
80	360	9.2	263	2906	174	0.88	83.3		409				
85	380	9.7	278	2920	174	0.88	84.0		441				
90	400	10.2	293	2932	174	0.88	84.8		471				
100	440	11.2	323	2954	174	0.87	86.0		531				
110	480	12.3	356	2948	174	0.87	87.0		600				
86	320	9.9	284	2893	209	0.88	84.2	93.2	445	250L0604	SP 150T SP 6402 (210A)		
92	340	10.5	302	2909	209	0.88	85.0		483				
98	360	11.1	320	2924	209	0.88	85.8		522				
104	380	11.7	338	2937	209	0.87	86.4		558				
110	400	12.3	356	2948	209	0.87	87.0		596				
122	440	13.7	398	2926	209	0.87	88.0		665				
133	480	14.8	431	2943	208	0.87	88.9		754				
103	320	11.7	338	2910	245	0.88	86.4	66.6	538	250L0605	SP 74X2 (290A)	SPMD 14X3-1S (246A)	
110	340	12.5	360	2910	245	0.88	87.1		585				
117	360	13.2	383	2915	245	0.87	87.7		621				
124	380	14.0	407	2908	245	0.87	88.3		663				
132	400	14.9	434	2904	245	0.88	88.8		682				
145	440	16.1	470	2943	245	0.87	89.6		808				
158	480	17.6	515	2927	243	0.87	90.4		875				
125	320	14.6	425	2807	289	0.88	88.7	45.4	653	250L0606	SP 74X2 (290A)	SPMD 1404-1S (290A)	
132	340	15.3	446	2820	289	0.87	89.2		750				
141	360	16.3	476	2825	289	0.87	89.7		786				
150	380	17.3	506	2828	289	0.87	90.2		817				
160	400	18.7	548	2788	289	0.88	90.6		804				
175	440	19.9	584	2858	289	0.87	91.3		966				
192	480	21.8	641	2859	289	0.87	91.9		1056				
145	320	16.7	489	2833	334	0.87	90.0	33.4	831	250L0607	SP 84X1 (335A)	SPMD 14X1-2L (342A)	
154	340	17.7	519	2833	334	0.86	90.5		905				
164	360	18.8	552	2837	334	0.86	90.9		965				
174	380	19.9	585	2841	334	0.86	91.3		1010				
185	400	21.3	626	2820	334	0.87	91.7		1027				
203	440	23.1	681	2850	334	0.86	92.3		1175				
222	480	25.3	747	2841	334	0.86	92.8		1300				
176	320	20.4	600	2802	400	0.87	91.4	23.2	1000	250L0608	SP 84X3 (450A)	SPMD 14X2-2L (400A)	
188	340	21.8	641	2800	400	0.87	91.9		1050				
200	360	23.2	683	2797	400	0.87	92.2		1110				
211	380	24.4	720	2803	400	0.87	92.5		1177				
225	400	26.4	780	2760	400	0.87	92.8		1178				
242	440	27.8	822	2813	396	0.86	93.3		1500				
260	480	30.0	888	2796	391	0.85	93.7		1772				
193	320	22.4	659	2801	450	0.84	96.2	18.6	1315	250L0609	SP 84X3 (450A)	SPMD 14X3-2L (468A)	
206	340	23.9	703	2800	450	0.84	92.6		1400				
220	360	25.4	750	2803	450	0.84	92.9		1448				
233	380	26.9	795	2801	450	0.85	96.2		1531				
250	400	29.2	863	2768	450	0.86	93.6		1489				
270	440	31.0	918	2810	450	0.84	94.0		1831				
297	480	34.2	1014	2789	447	0.84	94.4		1950				

* voltage available at output from the drive

(1): Phase-to-phase resistance value

These indicative values are non-contractual and may be modified at any time by the manufacturer.

Asynchronous CPLS motors for variable frequency

Electrical characteristics

Selection tables

CPLS 250L / 2900 - 2300 N.m

Motor IP23 – Ventilation IC06 – Class F

Service S1 – Ambient temperature 40°C – Total mass: 1500 kg

Inertia: 4.92 kg.m² - Maximum mechanical speed: 3,800 min⁻¹

3kW forced ventilation – 230/400V 50Hz

Re-greasable bearings (Insulated NDE as standard)

P (kW)	U (V)*	F(Hz)	n ₁ (min ⁻¹)	T (N.m)	I (A)	cos φ	η (%)	R (Ω) (1)	n ₂ (min ⁻¹) (1)	CPLS	UNIDRIVE SP (Inominal / Heavy overload)		
											SP	SPM	SPM Regen
250	320	29.3	867	2755	569	0.85	93.6	11.4	1658	250L0610	SP 94X1 (620A)	SPMA 14X2-3S (600A)	SPMA 1422-3R (600A)
267	340	31.3	927	2753	569	0.85	93.9		1751				
282	360	33.0	978	2755	569	0.84	94.2		1892				
299	380	35.0	1038	2752	569	0.85	94.4		1982				
315	400	36.9	1095	2750	569	0.85	94.6		2102				
345	440	41.0	1217	2706	562	0.85	95.0		2371				
358	480	42.0	1249	2738	563	0.81	95.2		2966				
294	320	34.0	1008	2786	670	0.84	94.3	8.4	2000	250L0611	SP 94X3 (790A)	SPMD 14X3-3L (702A)	SPMD 1423-3R (702A)
308	340	36.0	1068	2755	661	0.84	94.6		2161				
325	360	38.3	1137	2730	657	0.84	94.8		2310				
342	380	40.5	1203	2715	653	0.84	95.0		2430				
355	400	41.6	1249	2715	652	0.83	95.2		2700				
393	440	47.0	1399	2684	647	0.84	95.5		2851				
426	480	52.0	1548	2628	637	0.84	95.8		3050				
360	320	44.3	1318	2610	819	0.83	95.4	4.9	2791	250L0612	SP 94X4 (900A)	SPMD 14X4-3L (828A)	SPMD 1424-3R (828A)
383	340	47.1	1402	2610	819	0.83	95.5		2971				
407	360	50.0	1489	2611	819	0.83	95.7		3121				
428	380	52.6	1567	2610	819	0.83	95.8		3360				
450	400	55.2	1645	2613	819	0.83	96.0		3570				
490	440	62.3	1837	2520	797	0.84	96.2		3800				
508	480	68.0	2030	2391	761	0.83	96.4		3800				
410	320	50.3	1500	2615	936	0.83	95.7	3.8	3270	250L0613	SP 94X5 (1010A)	SPMD 14X3-4L (937A)	SPMD 1423-4R (937A)
440	340	55.0	1639	2565	926	0.84	96.0		3272				
465	360	59.5	1773	2500	913	0.85	96.1		3334				
490	380	62.9	1875	2496	911	0.85	96.2		3545				
510	400	67.1	2000	2434	895	0.85	96.4		3665				
540	440	75.2	2245	2300	857	0.86	96.5		3800				
560	480	84.0	2509	2132	807	0.86	96.7		3800				
445	320	61.9	1846	2300	989	0.85	96.2	2.8	3724	250L0614	SP 94X5 (1010A)	SPMD 14X4-4L (1104A)	SPMD 1424-4R (1104A)
476	340	66.3	1978	2300	989	0.85	96.3		3800				
503	360	70.0	2089	2300	989	0.85	96.4		3800				
532	380	74.0	2209	2300	989	0.85	96.5		3800				
560	400	81.0	2419	2212	973	0.86	96.6		3800				

* voltage available at output from the drive

(1): Phase-to-phase resistance value

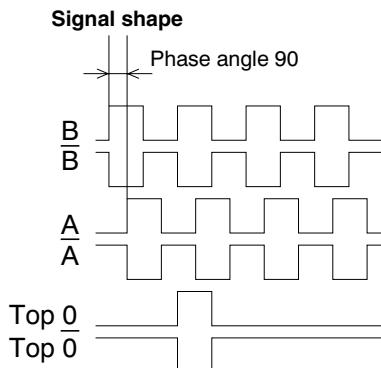
These indicative values are non-contractual and can be modified at any time by the manufacturer.

Encoder

INCREMENTAL ENCODER

This pulse generator supplies a pulse frequency proportional to the motor speed. Of a traversing hollow shaft type, with two channels at the output + Top = + complements, it may be supplied in a voltage range 5 V ±10% or 11-30 V regulated.

For connections longer than 20 m, cables will be twisted pairs. The maximum length of (screened) cables should not exceed 150 m at the opto-coupler input.



SINGLE-TURN ABSOLUTE ENCODER

The single-turn absolute encoder converts the rotation of the drive shaft into a series of "encoded electrical steps". The number of steps per revolution is determined by an optical disk. In general, one shaft rotation consists of 8,192 steps, which corresponds to 13 bits. At the end of a complete encoder shaft revolution, the same values are repeated.



MULTI-TURN ABSOLUTE ENCODER

The multi-turn absolute encoder saves the position in the revolution and also over several revolutions, with a maximum of 4096 revolutions.



	Incremental encoders			Absolute encoders		Strengthened Patay incremental encoder	
	TTL	HTL	~ 1 Vpp	Single-turn	Multi-turn	TTL	HTL
Output signals	TTL	HTL	~ 1 Vpp		~ 1 Vpp	TTL	HTL
Number of points per turn	1024 std / 10,000 max		1024 std / 5,000 max		8192 std (13 bits)	1024	1024
Number of absolute rotations		-			4096 max (12 bits)	-	-
Data interface				SSI / EnDat® / Hiperface® / Profibus® / CanOpen			
Supply voltage	5 Vdc ±10%	11-30 Vdc	5 Vdc ±10%	According to data interface		5 Vdc ±10%	11-30 Vdc
Coupling				14 mm traversing hollow shaft			
Protection				IP 65 minimum			
Continuous maximum speed			6,000 rpm as standard Option 10,000 rpm with 12 mm hollow shaft			6,000 rpm	6,000 rpm
Temperature range for use			-20°C to +100°C			-30°C to +120°C	-30°C to +100°C

Encoder

ENCODER CONNECTION

The use of incremental encoders in industrial environments comprising high current installations or control by electronic drives, requires industry standard, well-known basic rules to be followed.

Basic rules

1- Use screened cables. For connections longer than 20 metres, use cables with several screened twisted pairs, reinforced with an overall outer screen. The conductors in a single part are reserved for the channel and its complement: example A and \bar{A} , B and \bar{B} etc.

It is recommended that conductors with a minimum standard 0.14m^2 are used (recommended cable types: LIYCY 0.14 mm²).

2 - Keep the encoder connection cables as far away as possible from the power cables and avoid parallel routing.

3 - Distribute and connect the 0V and the screens in "star".

4 - Earth the screens using minimum 4 mm² section cables.

5 - Under no circumstances connect a screen to earth at both ends. Preferably, earth a screened cable on the "user" side from the encoder signals (cabinet, PLC, meter). On the armature side, the screen must be connected to a single point, itself connected to earth generally in conformity with safety standards. On the encoder side, each screen must be perfectly isolated, both in relation to all other screens and in relation to earth or any potential.

Ensure the continuity of the screen when using connectors or connection boxes.

Precautions when making connections

1 - Under no circumstances make the connection or disconnection on the encoder side or cabinet side without first cutting the supply.

2 - For the supply, used stabilised, regulated and filtered, power supplies. Providing supply via transformers delivering an effective 5V (or 24V) at their secondary, followed by filtering rectifiers and capacitors, is prohibited, since, in reality, the continuous voltages obtained thus are:

- for the 5 V: $5\sqrt{2} = 7.07$ V
- for the 24 V: $24\sqrt{2} = 33.936$ V

3 - Comply with the international standards in force.

Incremental encoders (standard Leroy-Somer wiring)												
12 pins	1	2	3	4	5	6	7	8	9	10	11	12
M23 connector	-	+	A	B	O	\bar{A}	B	\bar{O}		\perp	\perp	\perp
Screened cable	White	Brown	Green	Yellow	Grey	Pink	Blue	Red		Braid	Braid	Braid



Male connector on the incremental encoder side

Insulated bearings

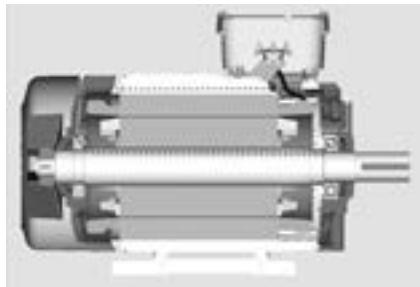
The use of variable speed drives with switching (PWM) can result in premature wear of the bearings.

This phenomenon is explained first of all by the presence of a shaft voltage in relation to earth: the latter, inherent in any asynchronous motor, is due to the lack of symmetry of the rotor in the rotating magnetic field and generates a circulating current in the rotor, looping via the stator through the end shields and bearings. This current can produce electrical discharges between balls and rings, thus reducing their service life.

A second source of currents may be added to the first: this concerns the high-frequency currents generated by the IGBT bridges at the output from the drive. These currents "try" to go back to their source (the drive) and take the path of least resistance: either via the housing/machine chassis/earth link, if it is correctly made; or through the coupled machine via the motor end shields and bearings in the contrary case.

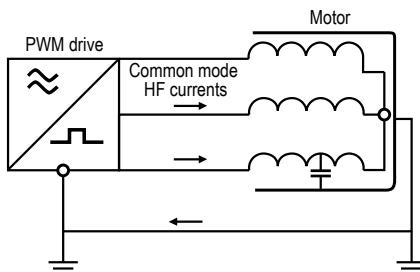
The CPLS may be equipped with insulated bearings at the back (standard on CPLS 250) and on the front when the coupling on the driven machine is not sufficiently insulating. These bearings are fitted instead of the standard bearings.

INSULATED BEARING CHARACTERISTICS:



The outer bearing rings are coated with a layer of electrically insulating ceramic.

The dimensions and tolerances of these bearings are identical to the standard ones used and can therefore be fitted instead, with no modifications to the motors. The breakdown voltage is 500 V.



EMC CABLE GLANDS

CPLS motors are fitted as standard with pre-drilled and tapped terminal boxes with the holes plugged.

EMC glands with 360° earth connection are available as an option to ensure earth continuity between the cable and the motor in accordance with the EMC directive 89/336/EEC.

Thermal protection

The motors are protected by the variable speed drive, placed between the isolating switch and the motor.

The drive provides total protection of the motor against overloads.

The motors are fitted with PTC sensors in the winding. As an option, specific thermal protection sensors can be selected from the table below.

It must be emphasised that sensors cannot be used to carry out direct adjustments to the motor operating cycles.

CPLS motors are equipped with PTC as standard

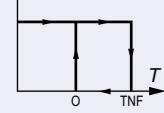
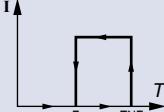
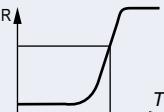
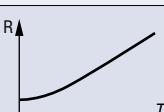
FITTING THERMAL PROTECTION

- PTO or PTF, in the control circuits
- PTC, with relay, in the control circuits
- PT 100 or thermocouples, with reading equipment or recorder, in the installation's control panel for continuous surveillance

ALARM AND EARLY WARNING

All protective equipment can be backed up by another type of protection (with different NRTs): the first device will then act as an early warning (light or sound signals given without shutting down the power circuits), and the second device will be the alarm (shutting down the power circuits).

Built-in indirect thermal protection

Type	Operating principle	Operating curve	Breaking capacity (A)	Protection provided	Mounting Number of devices*
Normally closed thermal protection PTO	Bimetallic strip, indirectly heated, with normally closed (NC) contact		2.5 A at 250 V with cos φ 0.4	General surveillance for non-transient overloads	Mounted in control circuit 2 or 3 in series
Normally open thermal protection PTF	Bimetallic strip, indirectly heated, with normally open (NO) contact		2.5 A at 250 V with cos φ 0.4	General surveillance for non-transient overloads	Mounted in control circuit 2 or 3 in parallel
Positive temperature coefficient thermistor PTC	Non-linear variable resistor, indirectly heated		0	General surveillance for transient overloads	Mounted with associated relay in control circuit 3 in series
Temperature sensor KTY	Resistance depends on the winding temperature		0	High accuracy continuous surveillance of key hot spots	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot
Thermocouples T (T < 150°C) Constantan Copper K (T < 1000°C) Copper Cupro-nickel	Peltier effect		0	Continuous surveillance of hot spots at regular intervals	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot
Platinum temperature sensor PT 100	Linear variable resistor, indirectly heated		0	High accuracy continuous surveillance of key hot spots	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot

- NRT: nominal running temperature.

- The NRTs are chosen according to the position of the sensor in the motor and the temperature rise class.

* The number of devices relates to the winding protection.

Ventilation

DETECTION OF AIR FLOWS

A pressure switch relay detects when the motor's ventilation shuts down. This is an air flow monitoring pressure switch; it may therefore provide sufficient protection against reduced air flow (clogged filter, partial obstruction of the air intake or outlet). Factory adjusted, it's a uni-pole switch rated 1A at 250V. A "Faston" type connector is used. This detector is fitted on the forced ventilation.



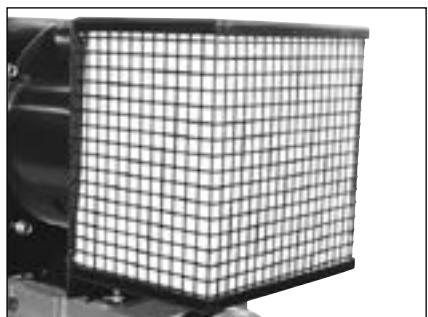
AIR FILTER

The forced ventilation unit can be fitted with a suction filter for use in a relatively dusty environment. There are two types of filter available.

Standard filter

This filter, made up of polyester filter elements with an average Ashrae 52/76 gravimetric efficiency of 88% is flame retardant (class F1 to DIN 53438).

It may be regenerated by quickly cleaning it (shaking it or blowing compressed air through it) or cleaning it thoroughly (soaking for a few hours in a non-aggressive detergent bath, then rinsing with clean water and drying. Washing it a maximum of two or three times is recommended.



Standard filter

"Miovy" filter

This "long lasting" filter, made of PVC filter elements, provides optimum filtering performance for industrial applications:

- average gravimetric stopping rate of 85%,
- high retention capacity,
- low pressure drop
- can be changed in a few seconds,
- integral and permanent regeneration capability (soaking, rinsing, drying).



"Miovy" filter

Space requirements for the "Miovy" filter option

CPLS motor Size	Filter	
	diameter AJ	length RB
CPLS 112	Ø 211	155
CPLS 132	Ø 272	286
CPLS 160	Ø 272	340
CPLS 200/250	request a quotation	

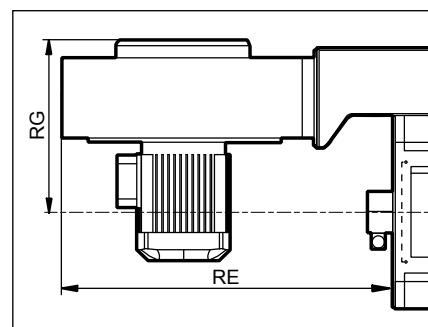
AXIAL VENTILATION

In the case where only limited height is available for installation of the motor, a connection kit allows the standard forced ventilation kit to be fitted in an axial position (option not compatible with a brake).



Space requirements for forced axial ventilation

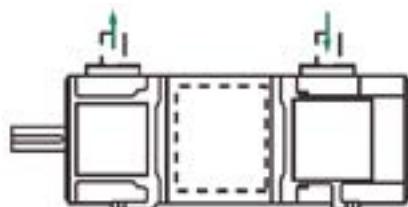
CPLS motor Size	Axial forced ventilation		
	AG width	RE	RG
CPLS 112			request a quotation
CPLS 132			request a quotation
CPLS 160	318	570	284
CPLS 200	497	678	351
CPLS 250			request a quotation



EXTERNAL VENTILATION IP55 / IC37

Compliance with flow rates

CPLS motor Size	Flow rate m³/h	Pressure Pa
CPLS 112	300	600
CPLS 132	550	750
CPLS 160	1200	1500
CPLS 200	2400	1600
CPLS 250	2850	1650



Heating

HEATING USING ADDITIONAL HEATERS (OPTION)

An environment with high levels of humidity and wide variations in temperature requires space heaters to be used to prevent condensation.

Made of strips insulated with glass fibre on the heads of the coil, they allow the motor's average temperature to be maintained, enabling trouble-free starting and eliminating inconvenience due to condensation (loss of insulation of the machine).

These heaters must be switched on when the machine is shut down and switched off during operation.

The supply wires to the heaters are brought to the motor terminal box.

CPLS motor Size	Number and power (W)
CPLS 112	2 x 25
CPLS 132	2 x 25
CPLS 160	2 x 25
CPLS 200	2 x 50
CPLS 250	4 x 50

Space heaters are supplied with 220/240V, single phase.

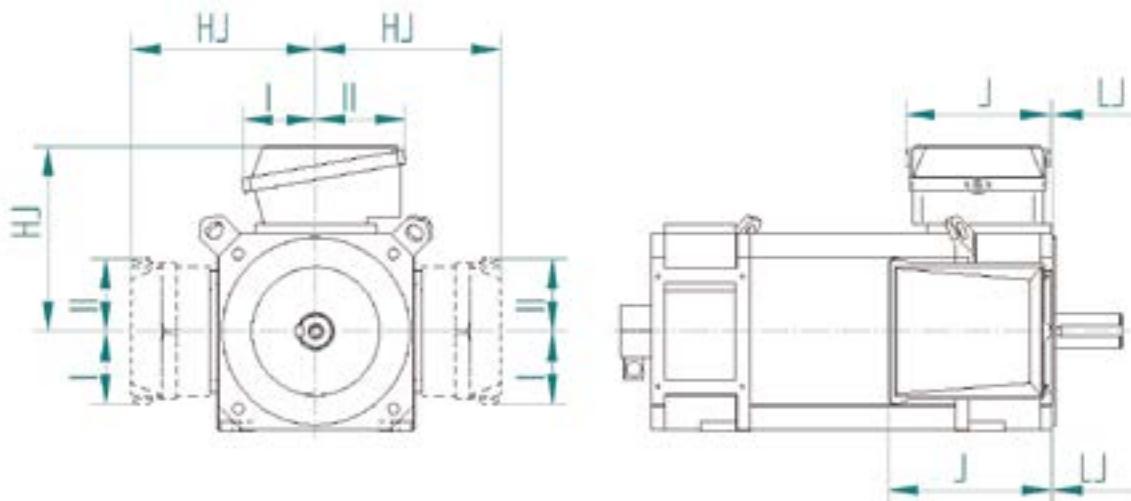
D.C. SUPPLY INJECTION HEATING

An alternative solution to the space heater is supply under reduced ac or dc voltage (10 to 15% of the nominal value) from two phases coupled in series.

This is often sufficient and avoids having to install space heaters.

Terminal boxes and cable glands

Dimensions in millimetres



Terminal box

Depending on the motor's maximum nominal current (I_{nom}), there are two types of terminal box fitted on the CPLS range:

Motor type	Standard terminal box ($I_{\text{N}} \leq I_{\text{LIM}}$)							
	I_{LIM} (A)	Fitting position	I	II	HJ	J	LJ	Terminals
CPLS 112	40		55	55	185	160	2	6 x M6
CPLS 132	74		78.5	78.5	222	194	12.5	6 x M8
CPLS 160	139		118	142	295	231	4	6 x M10
CPLS 200	139		148	180	371	292	19	6 x M10
CPLS 200	380		148	180	371	292	19	6 x M14
CPLS 250	380		148	180	420.5	292	48	6 x M14

* not possible for a CPLS 160 S with 60Hz forced ventilation.

Motor type	Large terminal box ($I_{\text{N}} > I_{\text{LIM}}$)							
	I_{LIM} (A)	Fitting position	I	II	HJ	J	LJ	Terminals
CPLS 112 M / L	40		63.5	122.5	211	209	0.5	6 x M8
CPLS 132 L	74		118	142	397	231	9.5	6 x M8
CPLS 132 S / M / L	74		80.5	150.5	266	260	7	6 x M8
CPLS 160 L	139		148	180	327	292	6	6 x M12
CPLS 160 S / M / L	139		86	206	330	328	4	6 x M12
CPLS 200 M / L	380		180	235	461	420	-45	6 x M16
CPLS 200 S / M / L	380		150	270	461	415	-15	6 x M16
CPLS 250 S / M / L	380		210	210	510.5	415	16	6 x M16

Cable glands

I_{LIM} (A)	≤ 32	≤ 40	≤ 74	≤ 139	≤ 380	Pour $I_{\text{LIM}} > 380$ A, terminal boxes supplied have a removable undrilled, gland support plate.
Size of glands for power	1 x M25	1 x M32	1 x M40	1 x M50	2 x M50	
Size of glands for accessories / options*	M16	M16	M16	M16	M16	

* the number of cable glands for accessories may vary according to the options chosen.

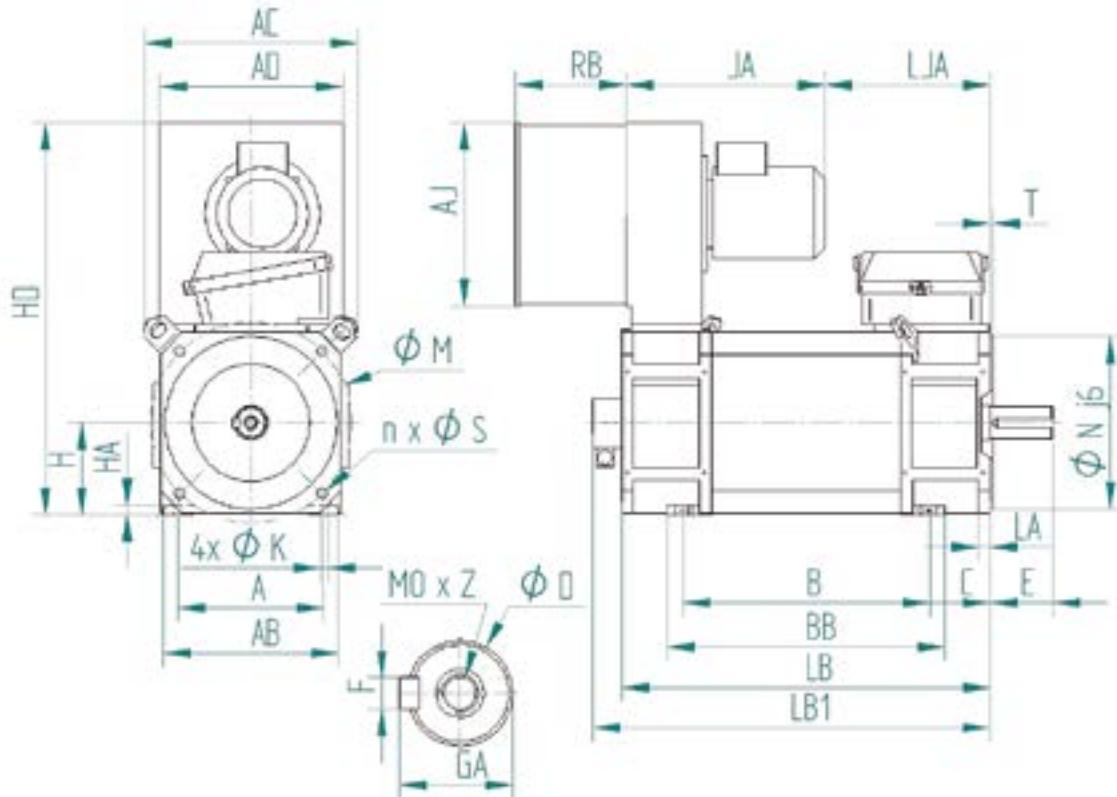
If your needs are different, please state on the order (within the limit of the terminal box's capacity).

Asynchronous CPLS motors for variable frequency

Dimensions

Fixing by feet, feet and flange

Dimensions in millimetres



Type	Main dimensions															
	H	HA	HD	A	AB	AC	AD ¹	AD ²	B	BB	LB	LB1	C	JA	LJA	K
CPLS 112 M	112	11	482	190	216	288	110	110	290	338	416	472	70	295	110	12
CPLS 112 L	112	11	482	190	216	288	110	110	330	378	456	512	70	295	150	12
CPLS 132 S	132	11	573	216	254	330	130	130	283	329	444	488	89	310	125	12
CPLS 132 M	132	11	573	216	254	330	130	130	338	384	499	543	89	310	180	12
CPLS 132 L	132	11	573	216	254	330	130	130	418	464	579	623	89	310	260	12
CPLS 160 S	160	16	695	254	305	370	159	159	355	403	563	622	103-108 ⁽¹⁾	355 ⁽²⁾ / 400 ⁽³⁾	199 ⁽²⁾ / 154 ⁽³⁾	14
CPLS 160 M	160	16	680	254	305	370	159	159	435	483	643	702	103-108 ⁽¹⁾	355 ⁽²⁾ / 400 ⁽³⁾	280 ⁽²⁾ / 235 ⁽³⁾	14
CPLS 160 L	160	16	680	254	305	370	159	159	565	613	773	832	103-108 ⁽¹⁾	355 ⁽²⁾ / 400 ⁽³⁾	410 ⁽²⁾ / 365 ⁽³⁾	14
CPLS 200 S	200	18	920	318	390	444	198	299	480	542	755	880	133-137 ⁽¹⁾	453	309	18
CPLS 200 M	200	18	920	318	390	444	198	299	610	672	885	1010	133-137 ⁽¹⁾	453	439	18
CPLS 200 L	200	18	920	318	390	444	198	299	730	792	1005	1130	133-137 ⁽¹⁾	453	559	18
CPLS 250 S	250	20	1040	406	495	571	207	341	618	828	967	1084	168	493 ⁽²⁾ / 512 ⁽³⁾	447 ⁽²⁾ / 428 ⁽³⁾	22
CPLS 250 M	250	20	1040	406	495	571	207	341	728	938	1077	1194	168	493 ⁽²⁾ / 512 ⁽³⁾	557 ⁽²⁾ / 538 ⁽³⁾	22
CPLS 250 L	250	20	1040	406	495	571	207	341	908	1118	1257	1374	168	493 ⁽²⁾ / 512 ⁽³⁾	737 ⁽²⁾ / 718 ⁽³⁾	22

(1) rectangular hole - (2) FV IE2 50Hz - (3) FV IE2 60Hz

Type	Shaft ends						Flanges					
	D	E	F	GA	O	Z	LA	M	Nj6	n	S	T
CPLS 112	38k6	80	10	41	12	28	11	265	230	4	14	4
CPLS 132	48k6	110	14	51.5	16	36	15	300	250	4	18	5
CPLS 160	55m6	110	16	59	20	42	20	350	300	4	18	5
CPLS 200 HV3 ⁽⁴⁾	65m6	140	18	69	20	42	20	400	350	4	18	5
CPLS 200	80m6	170	22	85	20	42	23	400	350	8	18	5
CPLS 250 HV2 ⁽⁴⁾	80m6	170	33	85	20	42						
CPLS 250	100m6	210	28	106	24	50						

(4) Incompatible with fitting roller bearings

Notes

I - SPHERE OF APPLICATION

These General Conditions of Sale (GCS) apply to the sale of all products, components, software and provision of services (referred to as "Equipment") offered or supplied by the Vendor to the Customer. They also apply to all quotations or offers made by the Vendor, and form an integral part of any order. "Vendor" means any company controlled directly or indirectly by Leroy-Somer. In addition, the order is also subject to the Inter Trades Union General Conditions of Sale for France for the F.I.E.C. (Federation of Electrical, Electronic and Communication Industries), latest edition, to the extent that they do not conflict with the GCS.

Acceptance of the Vendor's offers and quotations, or any order, implies unqualified acceptance of these GCS and excludes any stipulations to the contrary appearing in any other documents, especially on the Customer's purchase orders and its General Conditions of Purchase. A dispensation from Paragraph 1 above applies to sales concerning foundry parts, which are subject to the General Contractual Conditions of European Foundries, latest edition.

Equipment and services sold under these GCS may under no circumstances be intended for applications in the nuclear field, these sales being expressly subject to special technical specifications and contracts which the Vendor reserves the right to refuse.

II - ORDERS

All orders, including those taken by the Vendor's agents and representatives, by whatever mode of transmission, become valid only after they have been accepted in writing by the Vendor or work on the order has begun.

The Vendor reserves the right to modify the characteristics of its Equipment without prior notice. However, the Customer may still specify particular characteristics required for a contract. In the absence of such an express specification, the Customer will not be able to refuse delivery of the new modified Equipment.

The Vendor will not accept responsibility for an incorrect choice of Equipment, if this incorrect choice results from incomplete and/or erroneous conditions of use, or where these have not been conveyed to the Vendor by the Customer.

Unless otherwise specified, offers and quotations submitted by the Vendor are only valid for thirty days from the date of issue.

When the Equipment has to meet particular standards or regulations and/or be inspected by standards or inspection organisations, the request for quotation must be accompanied by a full specification, to which the Vendor must agree. This will be stated in the quotation or bid. All test and inspection fees are the Customer's responsibility.

III - PRICES

Prices are shown exclusive of tax, and may be revised without prior notice.

Prices are either fixed for the duration specified in the quotation, or subject to revision according to a formula accompanying the tender which, depending on regulations, covers changes in raw materials, products, miscellaneous services and salaries, the indices for which are published in the B.O.C.C.R.F. (Official Bulletin for Competition, Consumption and the Prevention of Fraud).

All related costs, such as customs clearance and special inspections etc. will be additional.

IV - DELIVERY

Sales are governed by the INCOTERMS published by the International Chamber of Commerce ("I.C.C. INCOTERMS"), latest edition.

The Equipment is dispatched in accordance with the conditions indicated on the order acknowledgement, sent by the Vendor in response to any order for Equipment.

Unless otherwise specified, prices refer to Equipment made available in the Vendor's factories, and include standard packing.

Unless otherwise specified, Equipment is always transported at the purchaser's risk. Without exception, it is the purchaser's responsibility to raise with the transport company, in the legal form and within time limits, any claim concerning the condition or number of packages received and also to send the Vendor a copy of that declaration. Failure to comply with this procedure will relieve the Vendor of all liability. In any case, the Vendor's liability cannot exceed the amount of compensation received from its insurers.

If the arrangements for dispatch are modified by the Customer after acceptance of the order, the Vendor reserves the right to invoice any additional costs arising from such changes.

Unless stipulated in the contract or due to a legal obligation to the contrary, packages are non-returnable.

Should delivery of the Equipment be delayed, for a reason not attributable to the Vendor, Equipment stored on its premises will be insured at the sole risk of the Customer with a charge for storage costs at a rate of 1% (one per cent) of the total amount of the order, per week or part thereof (with no leeway) from the availability date as indicated in the contract. Thirty days after this date, the Vendor will be able, as it chooses, either to dispose of the Equipment and/or arrange a new delivery date for said Equipment with the Customer, or to invoice the Customer in full in accordance with the delivery schedule and amount specified in the contract. In all instances, all deposits received remain the property of the Vendor by way of indemnity, without prejudice to other actions that the Vendor may institute.

V - DELIVERY DATES

The Vendor is bound only by the delivery dates stated on its order acknowledgement. These dates run from the date of the order acknowledgement sent by the Vendor, subject to compliance with the conditions stated on the order acknowledgement, notably receipt of the deposit for the order, notification of the establishment of an irrevocable letter of credit, meeting to all the Vendor's requirements (especially as regards the amount, currency, validity, licence, etc.), and acceptance of the various terms of payment as regards setting up any guarantees which may be required, etc.

Late delivery does not automatically entitle the Customer to damages and/or penalties.

Unless otherwise specified, the Vendor reserves the right to make partial deliveries.

Delivery dates are suspended automatically and without legal formality, for any breach of its obligations by the Customer.

VI - TESTS - APPROVAL

Equipment manufactured by the Vendor is inspected and tested prior to dispatch from the factory. Customers may attend these tests; they need only state their intention to do so when placing the order.

Specific tests and acceptance tests required by the Customer, whether conducted on the Customer's premises, in the Vendor's factories, on site, or by inspection organisations, must be noted on the order and are to be paid for by the Customer.

Prototypes of Equipment specially developed or adapted for a Customer must be approved by the Customer before any delivery of production Equipment, in order to make sure they are compatible with the other constituent parts of its equipment, and that they are suitable for the Customer's intended use of them. This approval will also enable the Customer to make sure that the Equipment complies with the technical specification. To that end, the Customer and the Vendor will sign two copies of a Product Approval Form, one copy to be kept by each party. In the event of the Customer requiring delivery without having previously approved the Equipment, these will then be delivered in their current condition and still considered as prototypes; the Customer will then assume sole responsibility for using them or supplying them to its own Customers. However, the Vendor may also decide not to deliver the Equipment, until it has been previously approved by the Customer.

VII - TERMS OF PAYMENT

All sales are deemed to be undertaken and payable at the Vendor's registered office, without exception, whatever the method of payment or the place of conclusion of the contract and delivery. When the Customer is based in France, invoices are payable on receipt in cash, by banker's draft or by Letter of Exchange, within 30 (thirty) days of the end of the month following the invoice date.

Any payment made in advance of the fixed payment date will result in a discount of 0.2% (zero point two per cent) per month on the invoice amount.

Except as otherwise provided, when the Customer is based outside France, invoices are payable upon issue of the dispatch documents in cash, or by irrevocable letter of credit confirmed by a major French bank, all charges paid by the Customer.

Payments mean making funds available in the Vendor's bank account and must be made in the currency of the invoice.

Under French Law 2008-776 of 04/08/2008, non-payment of an invoice by its due date, after no response to formal notice, will result in a flat-rate penalty on the date the debt is due, applied to the amount inclusive of tax on the sums due if the invoice is liable to VAT (Value Added Tax), and suspension of orders in progress. This penalty is equal to the rate applied by the European Central Bank to its most recent refinancing operation plus 10 percentage points.

Should steps have to be taken to recover the said amount, a surcharge of 15% (fifteen per cent) of the sum demanded will be payable, with a minimum of €500 excl. tax (five hundred euros excluding tax) with taxes in addition, where applicable.

Moreover, subject to compliance with any legal measures in force, in the event of non-payment (total or partial) of an invoice or any amount due, whatever the method of payment envisaged, the Customer will be immediately liable for the whole of the outstanding amount owed to the Vendor (*including its subsidiaries, sister or parent companies, whether in France or overseas*) for all deliveries or services, whatever their initial due date.

Notwithstanding any particular settlement conditions arranged between the parties, the Vendor reserves the right, in the event of deterioration of the Customer's credit, a payment incident or compulsory administration of the Customer, to demand as it chooses:

- payment in cash, before the Equipment leaves the factory, for all orders in progress
- payment of a deposit for the order
- additional or different payment guarantees

VIII - COMPENSATION CLAUSE

Unless prohibited by law, the Vendor and the Customer will expressly agree with each other the balance of compensation in respect of their receivables and payables arising from their commercial relationship, even if the conditions defined in law for legal compensation are not all satisfied.

In applying this clause, Vendor means any company in the Leroy-Somer group.

IX - TRANSFER OF RISKS/RESERVATION OF TITLE

Risk is transferred upon the handing over of the Equipment, according to the delivery conditions agreed at the time of ordering. Transfer to the Customer of ownership of the Equipment sold occurs upon payment of the whole principal sum, including accessories. In the event of an action to establish title in the delivered Equipment, deposits paid will remain the property of the Vendor by way of indemnity.

The provision of a document creating an obligation to pay (*letter of exchange or similar*) does not constitute payment in full.

For as long as the price has not been paid in full, the Customer is obliged to inform the Vendor, within twenty-four hours, of the seizure, requisition or confiscation of the Equipment to the benefit of a third party, and to take all protective measures to make known and comply with the Vendor's right of title in the event of intervention by creditors.

X - CONFIDENTIALITY

Each party undertakes to maintain confidentiality of information of a technical, commercial, financial or other nature, received from the other party, orally, in writing, or by any other communication method during negotiations and/or execution of any order.

This confidentiality obligation will apply throughout the period of execution of the order and for 5 (five) years after its completion or cancellation, whatever the reason for this.

XI - INDUSTRIAL AND INTELLECTUAL PROPERTY

Results, whether patentable or not, data, studies, information or software obtained by the Vendor during execution of any order are the exclusive property of the Vendor.

Apart from instructions for use, servicing and maintenance, reports and documents of any type delivered to Customers remain the exclusive property of the Vendor and must be returned to it on request, even when part of the design fees have been charged to them, and they may not be communicated to third parties or used without the prior written consent of the Vendor.

XII - CANCELLATION/TERMINATION OF THE SALE

The Vendor reserves the right to cancel or terminate immediately, as wished, as of right and without legal formalities, the sale of its Equipment in the event of non-payment of any part of the price by the settlement date, or in the event of any breach of any of the contractual obligations to be met by the Customer. Deposits and stage payments already paid will remain the Vendor's property by way of indemnity, without prejudice to its right to claim damages. In the event of cancellation of the sale, the Equipment must be returned to the Vendor immediately, irrespective of its location, at the Customer's expense and risk, subject to a penalty of 10% (*ten per cent*) of its value per week of delay.

XIII - WARRANTIES

The Vendor warrants the Equipment against any operational defect, arising from a material or manufacturing defect, for twelve months from the date on which it was made available, unless any other legal measure effected at a later date might apply, according to the conditions defined below.

The warranty will only apply insofar as the Equipment has been stored, used and serviced in accordance with the Vendor's instructions and documentation. It cannot be invoked when the fault results from:

- failure to monitor, maintain or store the Equipment correctly
- normal wear and tear on the Equipment
- intervention on or modification to the Equipment without the Vendor's prior authorisation in writing
- abnormal use or use not conforming to the intended purpose of the Equipment
- defective installation at the Customer's premises and/or the end user's premises
- non-communication, by the Customer, of the intended purpose or conditions of use of the Equipment
- failure to use original spare parts
- in the event of Force Majeure or any event beyond the control of the Vendor.

In all cases, the warranty is limited to the replacement or repair of parts or Equipment acknowledged as defective by the Vendor's technical departments. If the repair is assigned to a third party, it should be carried out only after acceptance by the Vendor of the quotation for repair.

No Equipment should be returned without the Vendor's prior authorisation in writing. Equipment to be repaired should be sent prepaid to the address indicated by the Vendor. If the Equipment is not repaired under warranty, the cost

of returning it will be invoiced to the Customer or the end purchaser. This warranty applies to the Vendor's Equipment made accessible and therefore does not cover the cost of removal and reinstallation of said Equipment into the assembly of which it is part.

Repair, modification or replacement of parts or Equipment during the warranty period will not have the effect of extending the length of the warranty.

The provisions of this article constitute the only obligation on the part of the Vendor concerning the warranty for the Equipment supplied.

XIV - LIABILITY

The Vendor's liability is strictly limited to the obligations stipulated in these General Conditions of Sale and those expressly agreed to by the Vendor. All penalties and payments specified therein are deemed to be all-inclusive damages, in full discharge and exclusive of any other sanction or compensation.

With the exclusion of serious fault on the Vendor's part and compensation for bodily injury, the Vendor's liability will be limited, for any cause whatsoever, to a maximum of the contractual amount excluding tax of the supply or service giving rise to the compensation.

Under no circumstances will the Vendor be liable to pay for consequential and/or indirect loss which the Customer might claim; it therefore cannot be held liable in particular for any production or operating losses, loss of profit or more generally any indemnifiable prejudice other than physical or material.

The Customer undertakes not to pursue recourse through its insurers or third parties in a contractual situation with it, against the Vendor or his insurers, over and above the limits and for the exclusions set out above.

XV - SPARE PARTS AND ACCESSORIES

Spare parts and accessories are provided on request insofar as they are available. Related costs (*carriage and any other costs*) are always added to the invoice.

The Vendor reserves the right to demand a minimum quantity or invoice amount per order.

XVI - WASTE MANAGEMENT

The Equipment covered by the sale does not fall within the scope of European Directive 2002/96/EC (WEEE) of 27 January 2003, and all resulting laws and decrees of the Member States of the EU, relating to the composition of electrical and electronic equipment and the disposal of waste originating from this equipment.

In accordance with Article L 541-2 of the Environmental Code, it is the responsibility of the entity in possession of the waste to dispose of it, or have it disposed of, at its expense.

XVII - FORCE MAJEURE

Apart from the Customer's obligation to pay the sums due to the Vendor under the order, neither the Customer nor the Vendor can be held responsible for the total or partial non-fulfilment of their contractual obligations if this non-fulfilment results from the occurrence of a force majeure situation. The following in particular are considered to be force majeure situations: production delays or disruptions resulting wholly or partially from war (declared or not), an act of terrorism or strikes, riots, accidents, fires, floods, natural disasters, transport delay, shortage of components or materials, or a governmental decision or act (including an export ban or revocation of an export licence).

If one of the parties is delayed or prevented from fulfilling its obligations under this Article for more than 180 consecutive days, either party may then cancel, as of right and without legal formality, the non-executed part of the order by written notification to the other party, without being held liable. However, the Customer will be obliged to pay the agreed price relating to Equipment already delivered at the cancellation date.

XVIII - BAN ON ILLICIT PAYMENTS

The Customer agrees not to undertake any initiative which would expose the Vendor, or any related company, to a risk of sanctions by virtue of the legislation of a state banning illicit payments, in particular bribes and gifts of an obviously unreasonable amount, to the employees of an administration or public body, to political parties or their members, to those standing for an elected position, or to employees of customers or suppliers.

XIX - CONFORMITY OF SALES TO INTERNATIONAL LEGISLATION

The Customer agrees that the applicable legislation as regards import and export control, that is to say, that applicable in France, the European Union, the United States of America, in the country where the Customer is based, if this country does not come under the legislation mentioned previously, and in the countries from which the Equipment may be delivered, as well as the provisions contained in the licences and permits relating thereto, of general or dispensatory scope (referred to as "conformity of sales to international regulations"), apply to the acceptance and use by the Customer of the Equipment and its technology. Under no circumstances may the Customer use, transfer, dispose of, export or re-export the Equipment and/or its technology in violation of the provisions on conformity of sales with international regulations.

The Vendor will be under no obligation to deliver the Equipment until the licences or permits necessary under the conformity of sales to international regulations have been obtained.

If, for any reason whatsoever, said licences or permits were to be refused or withdrawn, or in the event of amendment to the international regulations applicable to the conformity of sales which would prevent the Vendor from fulfilling its contractual obligations or which, according to the Vendor, would expose its liability or that of its associated companies, by virtue of the international regulations relating to the conformity of sales, the Vendor would then be released from its contractual obligations without its liability being called into question.

XX - PARTIAL INVALIDITY

Any clause and/or provision in these General Conditions deemed to be and/or which has become null and void does not render the contract null and void, only the actual clause and/or provision concerned.

XXI - DISPUTES

THIS CONTRACT IS SUBJECT TO FRENCH LAW.

IN THE ABSENCE OF AMICABLE AGREEMENT BETWEEN THE PARTIES, AND NOTWITHSTANDING ANY CLAUSE TO THE CONTRARY, ANY DISPUTE RELATING TO THE INTERPRETATION AND/OR EXECUTION OF AN ORDER MUST BE RESOLVED BY THE COMPETENT COURTS OF ANGOULEME (FRANCE), EVEN IN THE CASE OF THE INTRODUCTION OF THIRD PARTIES OR MULTIPLE DEFENDANTS. HOWEVER, THE VENDOR RESERVES THE EXCLUSIVE RIGHT TO BRING ANY DISPUTE INVOLVING THE CUSTOMER BEFORE COURTS COVERING THE VENDOR'S REGISTERED OFFICE ADDRESS OR THOSE WITHIN WHOSE JURISDICTION THE CUSTOMER'S REGISTERED OFFICE IS LOCATED.

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