U N I D R I V E SP
Universal drive

LEROY SOMER

A NEW GENERATION DRIVE which meets all user expectations

Performance

• Manipulate, position, synchronise, cut, print and wind :
  - accurately
  - rapidly
  - with repeat accuracy
  - in complete safety

Flexibility

• Adapt your system to the various production constraints in a responsive yet inexpensive way

Simplicity

• Install and start using your system quickly and easily without any special training
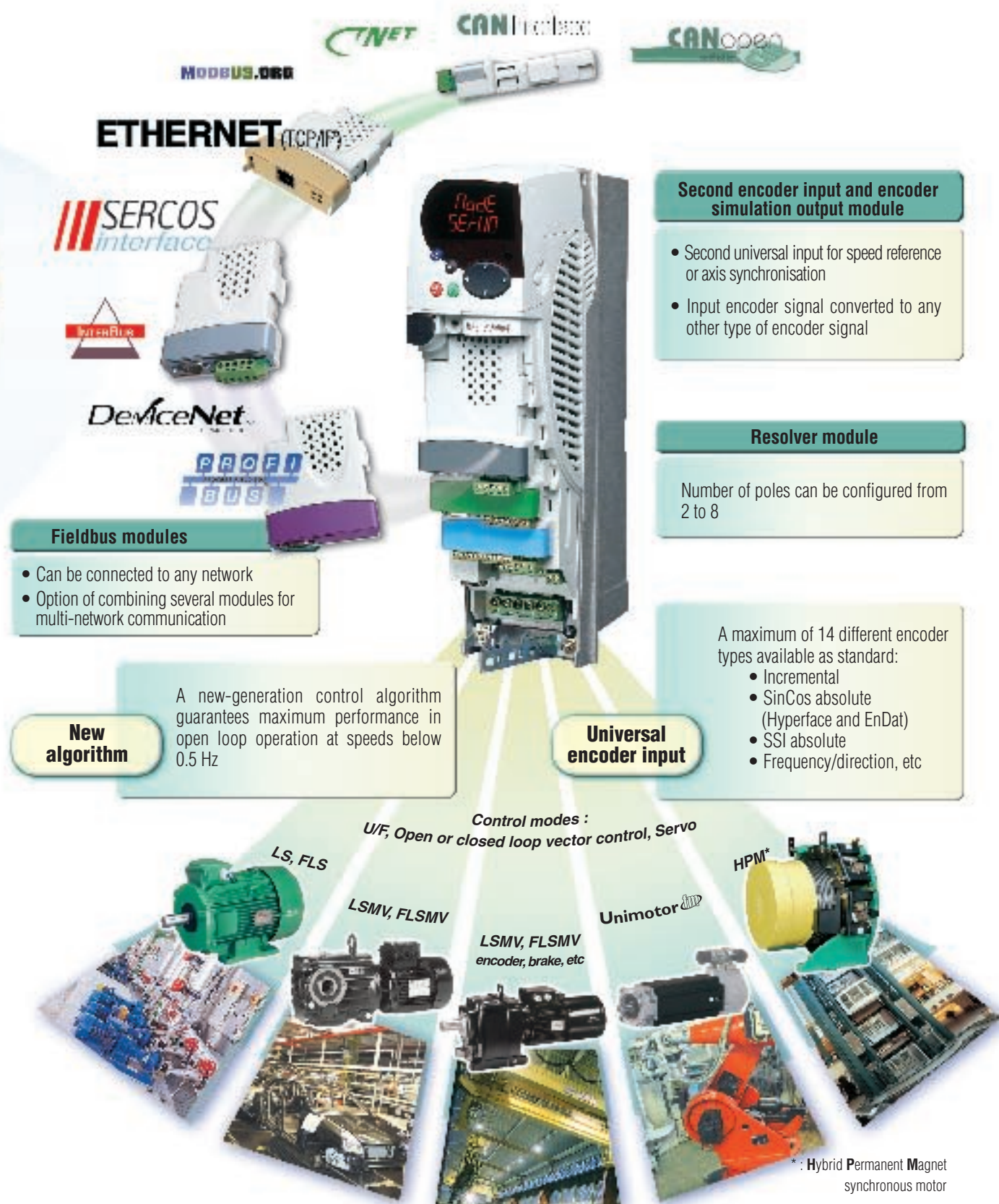
Reduced costs

• Integrate the control system functions relating to the application
• Reduce the number of components and associated wiring

THE UNIDRIVE SP SOLUTION
... unlimited options

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UNIVERSAL

U N I D R I V E SP, the only truly universal drive, can adapt to any system as standard or by means of add-on modules.

Second encoder input and encoder simulation output module

- Second universal input for speed reference or axis synchronisation
- Input encoder signal converted to any other type of encoder signal

Resolver module

Number of poles can be configured from 2 to 8

Fieldbus modules

- Can be connected to any network
- Option of combining several modules for multi-network communication

A maximum of 14 different encoder types available as standard:
- Incremental
- SinCos absolute (Hyperface and EnDat)
- SSI absolute
- Frequency/direction, etc

New algorithm

A new-generation control algorithm guarantees maximum performance in open loop operation at speeds below 0.5 Hz

Universal encoder input

Control modes :
U/F, Open or closed loop vector control, Servo

LS, FLS

LSMV, FLSMV

LSMV, FLSMV
encoder, brake, etc

Unimotor

HPM*

* : **H**ybrid **P**ermanent **M**agnet synchronous motor

SIMPLICITY ITSELF

From the simplest application to the most sophisticated system, UNIDRIVE SP offers numerous solutions to simplify installation and operation.

User menu

- Access to a user menu on power-up. Suitable for the majority of applications, it can be used to set up your installation quickly and easily.

LCD display

"HELP" key

- Can be mounted on the drive or remotely (IP 54)
- Hot-swappable
- Help button providing access to parameter explanations
- Configurable multilingual texts

SMARTCARD

- Saves all the parameters :
  - drive
  - application solutions
- Quick duplication of settings :
  - parameters transferred from one drive to another automatically

LsSoft

- Multilingual set up software including:
  - parameter-setting wizard
  - online help
  - motor database
  - calculation of gains
  - supervision in numeric or graphic form
- Oscilloscope function

AT MINIMUM COST

Automating a system, ensuring that a machine is both safe and compliant with applicable directives, as well as providing backup operation for a device, all incur significant extra costs.
By offering integrated solutions, UNIDRIVE SP helps reduce the overall cost of the installation.

Uninterruptible power supplies

- Control section supplied with 24 VDC to maintain system supervision and access to the drive during a mains failure

  Eliminates the system reboot phase after restoration of the mains supply

- Possibility of operation at limited speed on 48 VDC batteries

  Simplifies systems

Overrating

For applications with less likelihood of overload in which the speed range is limited to a ratio of 1 to 7, UNIDRIVE SP can be overrated to control a motor with a higher output power

  Optimises the drive rating

Secure disable input

- The secure disable input has been designed so that on opening of the circuit, UNIDRIVE SP guarantees the safety of people and equipment. Approved by independent European bodies, it conforms to safety standard EN 954-1 category 3.

  Eliminates the need for a line contactor or safety relay

EMC conformity

- As standard : conforming to drive standard EN 61200-3 second environment

  No extra cost for a filter

- Supplied with shielding connection kit

  Reduces the costs associated with wiring

Optimised cabinets

- IP 54 rear panel can be mounted outside the cabinet
- IP 54 braking resistor can be integrated in the heatsink (sizes 1 and 2)

  Cabinet size can be reduced due to evacuation of losses to the outside

Integrated control systems

As standard, UNIDRIVE SP offers users a number of control system functions, including AND, OR, comparators, PID, time delays, counters and math functions.

Accessible from the operator display in the form of parameters, or from the LsSoft program with a Ladder editor (IEC 61131-3), these functions can be used to perform the tasks of a PLC.

  Savings on automation components and wiring

UNIDRIVE SP

DECENTRALISED SYSTEMS

UNIDRIVE SP application solutions

For each of these applications, UNIDRIVE SP provides a complete solution which fulfils all the functional requirements. A configurable manual, parameter-setting wizard and diagnostic tools all simplify set up.

Synchronisation SOLUTION

- Accurately adjusts the ratios between the axes
- Compensates for errors caused by the operating mechanism
- Can easily :
  - change ratios on the fly
  - create an angular offset and recalibrate itself at any time
  - anticipate transient phases to avoid position errors

Positionning SOLUTION

- Controls relative or absolute positions
- Manages a linear or rotary axis
- Handles different movement profiles
- Indicates the position on power-up
- Defines the positions by teaching or parameter setting

Hoisting SOLUTION

- Controls deceleration and braking
- Incorporates a backstop
- Controls the emergency brake
- Holds the load in position
- Monitors the speed and the various limit switches
- Automatically adjusts the maximum speed to the load
- Up to 8 preset speeds

Winding-unwinding SOLUTION

- Provides an axial or surface drive
- Controls the speed, with torque limiting, or traction with a force sensor, dancer, radius measurement or calculation
- Compensates for inertia and losses
- Manages the stopping traction
- Controls bobbin changing on the fly

Cutting to length SOLUTION

- Manages rotary or linear cutting
- Triggers acceleration of the cutting tool and its synchronisation on the line
- Controls the mechanism which holds the product in place
- Selects the cutting lengths
- Adapts the movement profile to the product

Lift SOLUTION

- Manages all the operating modes
- Controls the brake
- Generates the various profiles : ogive, approach, straight-line, starting, etc
- Adjusts the various ramps independently
- Up to 10 preset speeds

6

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FLEXIBILITY

Control and monitoring of increasingly complex systems requires control system resources which are ever more cumbersome to manage. PLCs are reaching critical sizes, and installation costs are shooting up.

Thanks to its flexibility and level of performance, UNIDRIVE SP can be used to decentralise all tasks relating to the application. It therefore results in optimised processors, improved processing and execution times, and reduced system costs.

SM Applications
A PLC contained in the drive!

Performance

- 32-bit RISC microcontroller
- Multitasking
- 384 kb flash memory, 80 kb of RAM
- Synchronised with the drive control loops and/or an external controller
- Task refresh time less than 250 μs
- Exchange with the drive via dual-port RAM
- 32-bit internal variables
- Cycle time can be configured between 1 and 200 ms
- 2 fast I/O with immediate refresh

I/O

- As standard :
  - 5 analogue I/O
  - 6 digital I/O
  - 1 secure disable input
  - 1 relay output
- Add-on SM I/O Lite module :
  - 2 analogue I/O
  - 3 digital inputs
  - 1 relay output
- Add-on SM I/O Timer module : same as SM-I/O Lite + real-time clock with built-in power supply
- Add-on SM I/O Plus module :
  - 3 analogue I/O
  - 6 digital I/O
  - 2 relay outputs
- Decentralised I/O which can be connected on RS 485 (Modbus RTU protocol) or CT Net

Programming

- Pro software workshop :
  - IEC 61131-3 language (Ladder, Structured Text and function blocks)
  - standard library of 100 function blocks
  - the user has the option of creating and saving his own blocks
  - creation of an inter-drive network by graphic positioning of network elements
  - setup wizard

PERFORMANCE

- Up to 200% of drive overload capacity
- Switching frequency up to 16 kHz (depending on rating)
- Synchronisation of internal control loops at 250 μs
- Automatic adjustment of gains by autocalibration of motor and load characteristics
- Synchronisation between drives
- Automatic loading of motor characteristics on power-up (servo motor with encoder equipped with serial link)
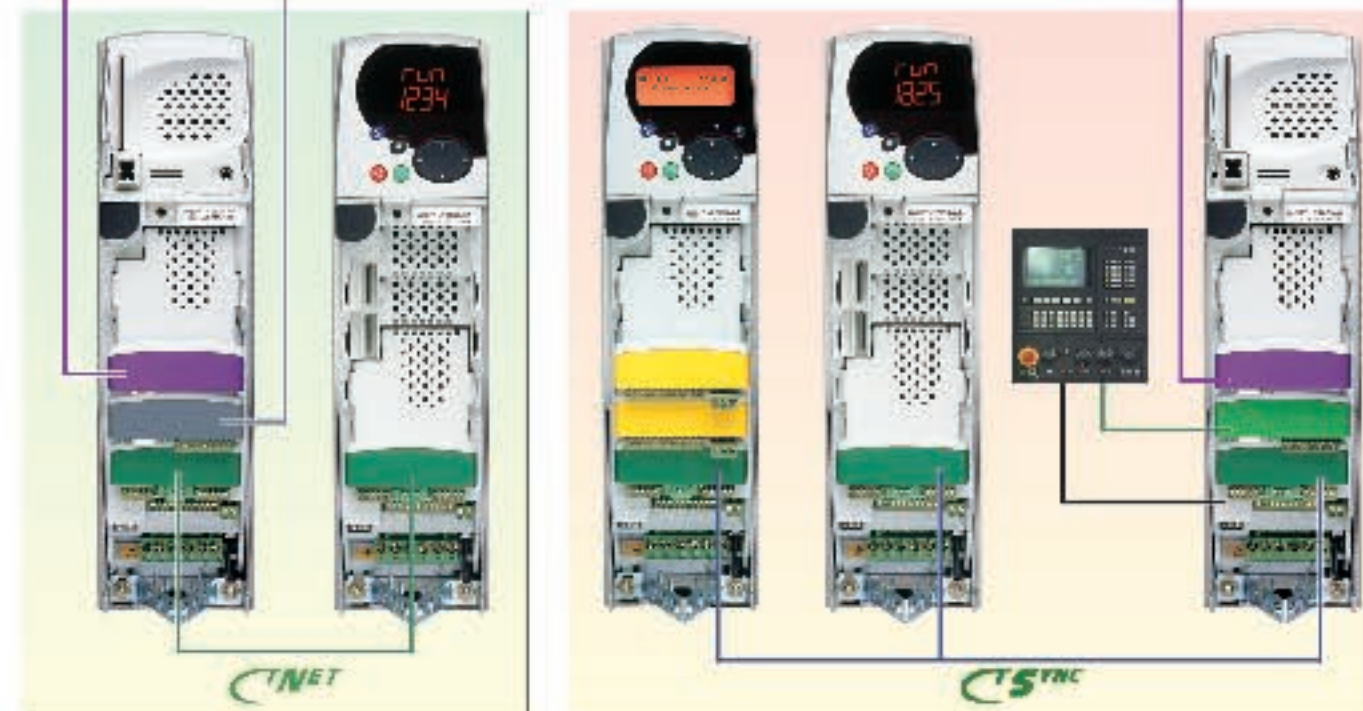
CTNET

CTSYNC

CT Net

- Data exchanged between drives via integral CTNet network :
  - multi-master network
  - 0.5 to 5 Mbauds
  - deterministic system
  - cyclical or acyclical transmission (16 or 32-bit)
  - 100 input words, 100 output words
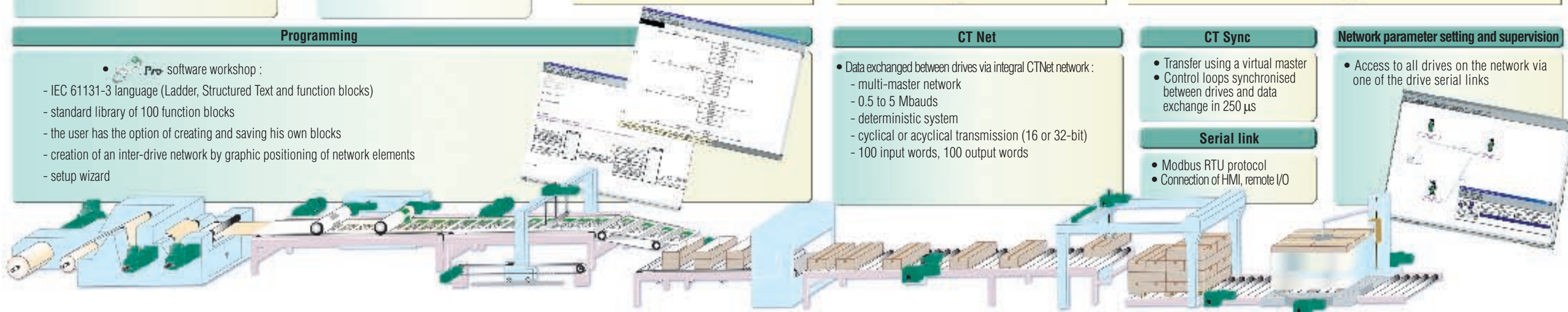
CT Sync

- Transfer using a virtual master
- Control loops synchronised between drives and data exchange in 250 μs

Serial link

- Modbus RTU protocol
- Connection of HMI, remote I/O

Network parameter setting and supervision

- Access to all drives on the network via one of the drive serial links

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The LEROY-SOMER offer

UNIDRIVE SP

Sizes 1   2   3   4   5   6

Motors

- Standard induction LS - FLS
- Induction suitable for variable speed LSMV - FLSMV
- Servo Unimotor
- HPM* synchronous

* : Hybrid Permanent Magnet

Gearboxes

Standard backlash
- Axial output
- Orthogonal output

Low backlash
- Axial output
- Orthogonal output

Characteristics

		Mains supplies																Dimensions and weights				
P_{mot} (kW)		3-phase 230 V				3-phase 400 V				3-phase 575 V				3-phase 690 V								
Overload I_N		I_{CO} (A) Overload I_N		Rating	Size	I_{CO} (A) Overload I_N		Rating	Size	I_{CO} (A) Overload I_N		Rating	Size	I_{CO} (A) Overload I_N		Rating	Size	Size	H mm	W mm	D mm	Weight kg
150%	110%	150%	110%			150%	110%			150%	110%			150%	110%							
0.75	1.1	4.3	5.2	1.5 TL	1	2.1	2.8	1.5 T	1									1	368	100	219	5
1.1	1.5	5.8	6.8	2 TL	1	3	3.8	2 T	1									2	368	155	219	7
1.5	2.2	7.5	9.6	2.5 TL	1	4.2	5	2.5 T	1									3	368	250	260	15
2.2	3	10.6	11	3.5 TL	2	5.8	6.9	3.5 T	1									4	510	310	298	30
3	4	12.6	15.5	4.5 TL	2	7.6	8.8	4.5 T	1	4.1	5.4	3.5 TM	3					5	820	310	298	55
4	5.5	17	22	5.5 TL	2	9.5	11	5.5 T	1	5.4	6.1	4.5 TM	3					6	1131	310	298	75
5.5	7.5	25	28	8 TL	3	13	15.3	8 T	2	6.1	8.4	5.5 TM	3									
7.5	11	31	42	11 TL	3	16.5	21	11 T	2	9.5	11	8 TM	3									
11	15	42	54	16 TL	3	25	29	16 T	2	12	16	11 TM	3									
15	18.5	56	68	22 TL	4	32	35	22 T	3	18	22	16 TM	3	19	22	22 TH	4					
18.5	22	68	80	27 TL	4	40	43	27 T	3	22	27	22 TM	3	22	27	27 TH	4					
22	30	80	104	33 TL	4	46	56	33 T	3	27	36	33 TH	4	27	36	33 TH	4					
30	37					60	68	40 T	4	36	43	40 TH	4	36	43	40 TH	4					
37	45					74	83	50 T	4	43	52	50 TH	4	43	52	50 TH	4					
45	55					96	104	60 T	4	52	62	60 TH	4	52	62	60 TH	4					
55	75					124	138	75 T	5	62	84	75 TH	5	62	84	75 TH	5					
75	90					156	168	100 T	5	84	99	100 TH	5	84	99	100 TH	5					
90	110					180	202	120 T	6	100	125	120 TH	6	100	125	120 TH	6					
110	132					210	236	150 T	6	125	144	150 TH	6	125	144	150 TH	6					

P_{mot} : motor output power for the mains voltages shown above

I_{sp} : continuous output current
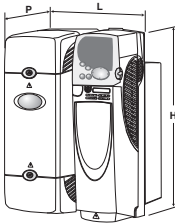
High-power solutions

above 132 kW, LEROY-SOMER offers customised assemblies by connecting modules in parallel