



Powerdrive MD Smart

**Ready-to-use variable speed drives
Solutions for High Power Process applications**

LEROY-SOMER™

Nidec
All for dreams

Innovative variable speed packages to reduce energy bill

Reduction of energy costs: a challenge for the industry

The need for energy has kept increasing and has now become a worldwide concern.

Within industry it now represents more or less 30 % of the worldwide energy used, mainly driven by applications linked to process typically including pumps, fans, compressors and crushers.

Currently these applications are mainly operated at fixed speed. Conversion to variable speed is a proven solution cutting electric energy costs by as much as 50%. The savings generated, combined with the reduction of maintenance costs and process improvements, contribute to increasing the companies' competitiveness and profitability.

Directives and regulations: variable speed contributes to making installations compliant

In addition to the economical challenge, the reduction of energy consumption is important to the growing concern about environmental sustainability. In order to achieve the objective of CO2 emissions reduction a series of energy efficiency regulations & standards are globally being tightened around the world.

- Motors, variable speed drives and drive systems are classified according to their energy efficiency. From July 2021, the minimum requirement for motor efficiency is IE3, and from July 2023, the minimum requirement for motors in the 75-200 kW range will be IE4. For variable speed drives, the minimum requirement from July 2021 is IE2. Standard IEC 61800-9-2 defines IE classes for variable speed drives and IES classes for drive systems (motor and variable speed drive combined).
- Other regulations are aimed at classifying the energy efficiency of complete systems based on their performance over the full operation range, rather than at nominal load. The first application where this already applies is for refrigeration compressors. It will shortly be followed by pumps, fans and air compressors.

In all cases, whatever the situation is, variable speed is a major solution allowing installations to be compliant while making significant cost savings.



Nidec Leroy-Somer: fully committed to high energy efficient solutions

In full awareness of the challenge, Nidec Leroy-Somer has built a complete offer of motors, drives and services, fully focused on energy savings:

- **IMfinity®**: a range of induction motors available in IE3 or IE4 efficiency levels.
- **Dyneo+**: synchronous motors combining reluctance and permanent magnets with drive packages exceeding IE5 efficiency level over a wide speed range
- **Powerdrive**: an extensive range of variable speed drives designed for process applications:
 - **Powerdrive F300**: IP20 drives ideal for integration into cubicles
 - **Powerdrive MD Smart**: complete IP21 or IP54 "Ready-to-use" solutions
- **Local services** for energy audits, support for selecting the most appropriate solution, installation, commissioning, maintenance servicing and 24/7 assistance for emergency situations



Much more than energy savings using variable speed in process applications

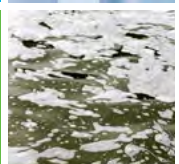
Pumping (distribution, irrigation, desalinization, treatment)

- Savings on maintenance costs when removing the flow regulation valves
- Full control of acceleration and deceleration preventing water hammers
- Leakage, pipe break or loss of prime detection
- Automatic cleaning cycle on pump clogging



Waste Water Treatment (agitation, bubbling, centrifugation)

- Better oxygenation in aeration basins
- Adaptation of installation to the variable load
- Limitation of wear mainly on mechanical aerators
- Better control of sludge dewatering



Refrigeration (industrial, leisure)

- Accurate temperature control independent of outside conditions
- Significant reduction of noise when operated at partial load
- Reduction of sliding valve wear as used for starting sequence only
- Reduction of start/stop sequences



Ventilation (industrial, tunnels, car parks)

- Reduction of maintenance costs on flow adjustment louvers
- Detection of transmission belt breakage
- Accurate speed adjustment to temperature, humidity and pollution
- Control of smoke stratification in tunnels and car parks during fires



Crushing (pet food, wood, quarrying)

- Controlled and faster deceleration
- Better crushing quality with less screen changes
- Possibility of high starting torque when replacing a slip ring motor
- Speed slaving of peripheral equipment to optimize complete process





The retrofit of an installation or the conversion from fixed speed to variable speed of a system requires various arrangements like fitting the drive in an existing environment, handling the power wiring or interfacing the controls with other equipment. The difficulty of addressing all of this is more important as the power is high, where the solution needs to be flexible enough so it contributes to keeping the investment costs down.

Powerdrive MD Smart: THE all inclusive ready-to-use solution!

Thanks to our strong experience resulting from close partnerships with end users and OEMs, Nidec Leroy-Somer is offering Powerdrive MD Smart, in line with the expectations of the major players in the process market segment:

- **Ready-to-use:** everything needed is fitted, wired and tested
- **Compact and robust:** easy and flexible integration in an electrical room as well as in a machine environment
- **Protected:** outstanding level of protection against electrical disturbances
- **Simple:** commissioning and operation without any specific skills
- **Serviceable:** high level of reliability, preventive diagnostics and modularity for minimum downtime



A complete system engineered, wired and tested

Powerdrive MD Smart is ready-to-use !

The integration of a variable speed drive in a system requires engineering, component sourcing, fitting and wiring, as well as testing.

The Powerdrive MD Smart has been set-up so it provides a complete system including all equipment needed for protecting, controlling, interfacing and running the application with full safety.

Line interrupter with lockable front handle

Option fitted and wired, allowing motor isolation from the power supply for safe maintenance.

Safe Torque Off (STO) inputs

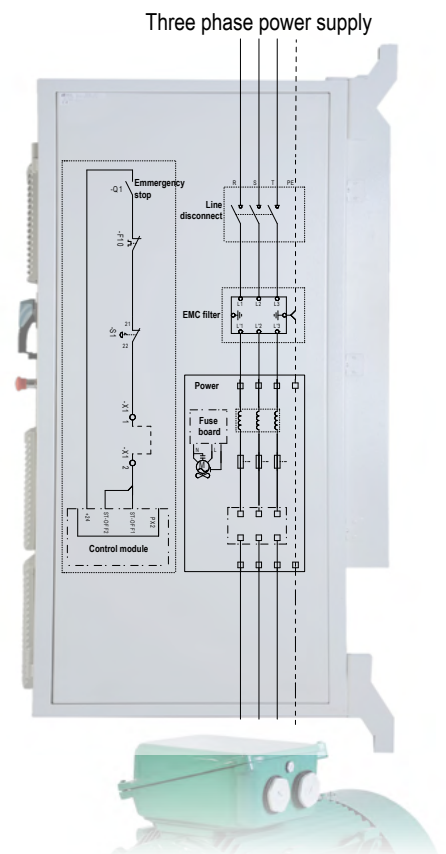
No need for a contactor between the drive and motor thanks to certified STO inputs. Complies with IEC/EN 62061:2005 and EN/ISO 13849-1:2006, using single channel disable (SIL1 or PLb) or double channel disable (SIL3 or Plc).

Emergency push button

Located on drive front cover the Emergency push button is wired on the STO input.

Line reactor

Fitted as a standard. Provides additional protection against line disturbances and reduces harmonic distortion levels by 25% compared to a design using a DC choke.





PLC function blocks

Available as standard, these function blocks allow saving automation components when application specific logic is required:

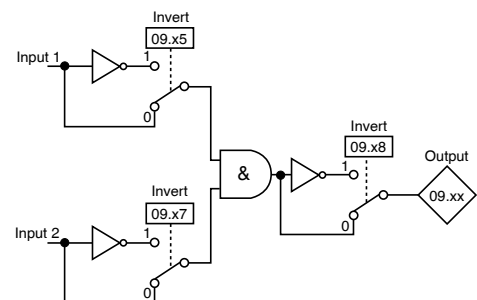
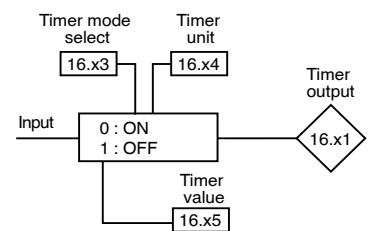
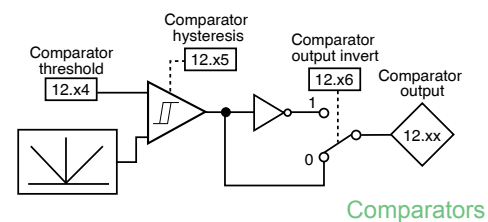
- Automatic pump cleaning sequence upon clogging detection
- Maximum speed reached alarm for launching fixed speed motor starting
- Initiate an emergency action upon detection of motor transmission break
- Delay one event from another
- Generate an alarm when a defined operating time is reached in order to plan the maintenance
- Load sharing between multiple machines on high temperature in order to prevent unexpected trips

High speed fuses

Fitted as a standard. Provide additional short circuit protection complementary to internal drive protections.

Automated fans

Option wired and set-up. Allows switching the drive fans off in order to save energy, reduce noise level and limit wear.



Compact and robust Powerdrive MD Smart can be fitted anywhere

Finding a suitable space to add the drive to an installation, especially when it is a high power, may not be so easy. The resistance to the environment, protection of personnel, mounting flexibility, EMC management, mechanical robustness are major considerations which have been taken into account while designing the Powerdrive MD Smart.

Powerdrive MD Smart: A complete solution in a compact size

Up to 315 kW, Powerdrive MD Smart, all inclusive, is available in a wall mount version. In addition to its compactness, it provides great flexibility in terms of mounting arrangements:

- Direct fit on a wall in the machine environment
- Mounting on a chassis in an electrical room
- Possibility to stand on the floor sitting on a 400 mm stainless steel base. This allows close fitting to the motor in a humid environment without any need for a trench in the floor.

Above 315 kW, Powerdrive MD Smart is available in a free standing cabinet limited to 600 mm width for 500 kW, or 1200 mm for 1000 kW.

No compromise on accessibility

Very often, compactness is achieved at the expense of accessibility. Powerdrive MD Smart has been designed with a focus on entering multiple large cables, and running them inside with easy connections. Once the drive has been wired up, all components remain easy to reach.





IP21 design for clean environments or IP54 for harsh conditions

Whatever the conditions are, Powerdrive MD Smart provides a panel of equipment and features aimed to fully protect the drive and its components.

- Filter clogging detection by internal temperature monitoring and analysis (programmable)
- Conformal coated circuit boards and tropicalized line reactor and transformers
- Tin plated copper power bus bars
- Thermally treated epoxy paint
- Optional thermostated heater for humid environments or seasonal use

Installation close to the motor: reducing EMC emissions at lowest cost

Powerdrive MD Smart's mechanical and electrical robustness allows close fitting to the motor, with drive-to-motor cable length reduction leading to cost-efficient and technical advantages like:

- Significant cost reduction of shielded cables
- Lower EMC emissions, current leakages and bearing currents
- Limitation of motor voltage drop

Outstanding thermal behavior

The robust design of Powerdrive MD Smart allows for operation in a range of ambient conditions and unusual temperatures:

- **Operation at 50°C ambient** permanently with adapted sizing
- **Operation at 70°C for 1 hour** in exceptional circumstances like smoke extraction in public buildings



Powerdrive MD Smart, the 100%-connected drive



Nidec Leroy-Somer presents **Powerdrive MD Smart**, the new generation of high power drives with a new large format Android user interface and secure Bluetooth connection.

They are connected and smarter thanks to the jointly-developed **Systemiz** app, offering a multitude of services and enhancing the user experience.

The interactivity of the package provides greater responsiveness, remote or on-site self-diagnostic capability, and easier integration within your systems.

The **Powerdrive MD Smart** is, among other things, perfectly suited to optimise the performance of the new Nidec Leroy-Somer **Dyneco+ IE5** Super Premium efficiency motor.

Systemiz: a unique all-in-one app!

Product library

- Enjoy immediate access to all product documentation (brochures, manuals, certificates, etc.)
- Find your nearest contact in just a few clicks
- Share the documentation or save the URL for later use

Motor data

- Identify the motor via the QR code on the nameplate
- Choose your motor configuration (coupling) and display the data required to quickly set up your drive
- Print, share or save all your data

Powerdrive MD Smart interface

- Set up interactively and intuitively using the start-up wizard
- Automatically load motor parameters (electrical characteristics and options) by scanning the QR code
- Fully configure your operator interface
- Benefit from innovative diagnostic tools

- The **Systemiz** app is available on all **iOS**, **Android** or **Windows PC** platforms, or on the new **7" HMI** installed on the front panel of the drive.



Dyneco+

Ultra-high energy efficiency synchronous motors designed for variable speed



Drive via Systemiz



Start-up wizard

- Intuitive and interactive set-up based on a questionnaire linked to the app
- Clear menu organization and browsing suited to drive non-specialists

Simplified motor-drive association

- Electrical data and motor options filled in automatically by QR code
- Where no QR code is available, set-up wizard adapted to each technology

Smart alarms generation

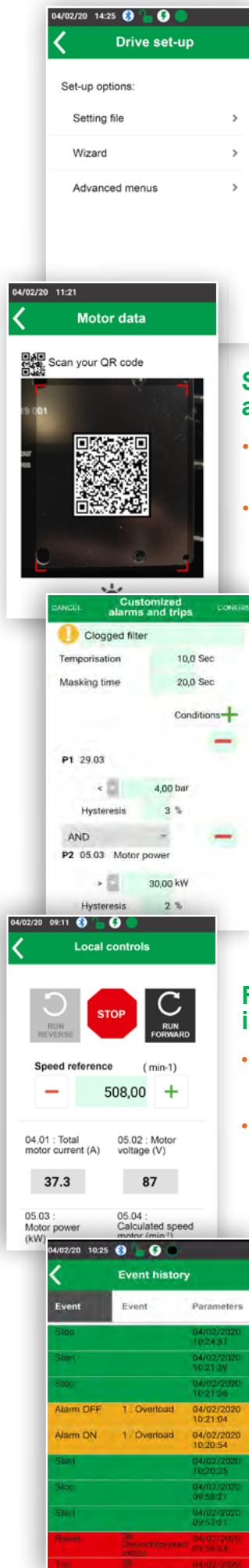
- Operating drift notification
- Setting alarms or trips that can combine up to 5 simultaneous conditions

Fully configurable operator interface

- Total flexibility in the choice of settings to display: number, size or format
- Creation of several interfaces selectable from drop-down list

Innovative cutting-edge diagnostic tools

- Time-stamped recording of the last 100 events (ON/OFF, alarms, trips)
- For each of the last 10 trips, indication of the cause of the most probable fault and graph of the main operating parameters recorded before tripping



High level of reliability and serviceability Essential for critical process applications

For process applications, the benefits of variable speed are greater as the power is high, generating significant energy savings. Consequently, the ideal applications are those located upstream in the process, very often critical for operations. In order to guarantee the level of availability requested, Powerdrive MD Smart offers outstanding innovative features aimed at minimizing potential downtimes.

Onboard data logger

The only way of catching events responsible for spurious installation trips generally consists in temporarily fitting expensive recording equipment. An option module, fitted on Powerdrive MD Smart, can log up to 10 parameters with a minimum sampling time of 20 ms on an SD card. The 4 Go SD card supplied with the option module allows recording over 2 weeks (10 parameters at 20 ms sampling time).

Data is time stamped and logged in a .csv file that can be retrieved by a PC.





Easy access to facilitate maintenance

Powerdrive MD Smart is the result of a combination of standard small and light components (rectifier module, inverter modules, electronic PCBs, forced ventilation, etc..) with all of them being accessible and interchangeable using basic tooling (heaviest component < 15 kg).

This outstanding modular design makes Powerdrive MD Smart extremely simple and quick to restart.

Reduced parts part inventory

As a result of the modular design, the full Powerdrive MD Smart range only requires a small number of individual replacement parts, reducing the diversity and cost of spare parts inventory.

For instance from 160 kW to 2,800 kW :

- 1 unique control board
- 2 parts for forced ventilation
- 4 parts for the rectifier module
- 7 parts for inverter modules

Whatever the installed base is, the limited requirement of spare parts helps to keep an inventory which leads to a quick restart of all installations.



Motor & drive packages

The guaranty of optimum performance

Whether it is to comply with new efficiency regulations or benefit from the highest energy efficiency solution, Nidec Leroy-Somer offers complete packages optimized and tested to work together providing the highest level of performance.

IMfinity®: high or premium efficiency induction motor range

Available in IE3 and IE4, the IMfinity® range has been designed and qualified for use at fixed speed on a multi-voltage/ multi-frequency power supply or at variable speed using a drive.

Performance of all motor and drive packages have been fully tested at different operating levels, allowing optimized sizing while guaranteeing safe operation.

Dyneo+: IE5 sensorless reluctance & permanent magnets motor

Fifteen years of experience in synchronous control motor and of a tight collaboration between our motor and drive design teams have led to the development of outstanding SynRPM* solutions, aimed at providing the full and safe control of the majority of process applications in sensorless mode including pumps, compressors, blowers, aerators, centrifuges and fans. This provides the highest level of performance with the same simplicity as operating induction motors.

Global manufacturer's warranty

The perfect match of a motor and drive package supplied by a single manufacturer is the insurance of getting the highest level of performance from components designed to work together with one single contact for support.



*SynRPM = Synchronous Reluctant Permanent Magnets Motors



Powerdrive MD Smart: ready-to-use drive solutions

■ Express Availability offer up to 500 kW/800 hp

- IP21 or IP54 drive
- 6 pulse rectifier
- 380 V to 460 V power supply

Standard options fitted and wired ready-to-use

- Line interrupter
- C2 EMC filter
- Heater
- Emergency push button
- Bases
- Option modules: fieldbus (Profibus DP V1, Modbus RTU, Ethernet TCP/IP and CANopen), I/O extension, encoder
- Automated fans



	Power rating				Powerdrive type	Dimensions (mm/in)		
	Normal duty		Heavy duty			H	W	D
	kW	hp	kW	hp				
Wall mount	75	100	55	75	MD3M2SA75TN	1203/47.4	480/18.9	516/20.3
	110	150	90	125	MD3M2SA120TN			
	132	200	110	150	MD3M2SA150TN			
	160	250	132	200	MD3M2SA180TN			
	200	300	160	250	MD3M2SA220TN	1703/67		
	250	400	200	300	MD3M2SA270TN			
Free standing	315	450	250	400	MD3M2SA340TN	IP21 2100/82.7	400/15.7	600/23.6
	400	600	355	500	MD3F2SA430TN		600/23.6	
	450	700	400	600	MD3F2SA470TN	IP54 2200/86.6		
	500	800	450	700	MD3F2SA570TN			

NB: the IP54 option is available by changing the second number by 5.

Example: MD3F5SA430TN

■ Standard expanded offer

- Free Standing solution below 250 kW/300 hp (alternative to wall mount)
- Paralleled IP21/IP54 chassis for powers up to 2,500 kW/3,500 hp
- 690 V power supplies, 132 to 2,500 kW/200 to 3,500 hp
- Liquid cooling, 132 to 2,500 kW/200 to 3,500 hp
- Active Front End, 132 to 2,500 kW/200 to 3,500 hp
- Wider choice of options: data logger, braking chopper, auxiliary motors control, temperature relays...



Power range

		45 kW 60 hp	75 kW 100 hp	132 kW 200 hp	200 kW 300 hp	250 kW 400 hp	1,300 kW 1,700 hp	1,400 kW 1,900 hp	2,500 kW 3,500 hp
6 pulses rectifier	400 V Power supply	Air cooled (MD3FxSAxxxTN)							
		Liquid cooled (MD3FxSLxxxTN)							
	690 V Power supply	Air cooled (MD3FxSAxxxTH)							
		Liquid cooled (MD3FxSLxxxTH)							
Active Front end (AFE)	400 V Power supply	Air cooled (MD3FxRAxxxTN)							
		Liquid cooled (MD3FxRLxxxTN)							
	690 V Power supply	Air cooled (MD3FxRAxxxTH)							
		Liquid cooled (MD3FxRLxxxTH)							

■ Customized solutions

- 45 to 2,800 kW
- Special cubicles (stainless steel, double skin, etc),
- Adapted mechanics (back-to-back cells instead of inline, limited height)
- 12, 18 or 24 pulse rectifiers
- Engineering, manufacturing and testing (possibility of certification by notified body) on specification
- Customized & certified for many applications such as Marine, Oil & Gas, etc.



Powerdrive F300: IP20 AC drives for integration in cabinets

Flexible drive, easily adaptable to your particular application requirements

- 1,1 to 2,800 kW
- 6, 12, 18 pulses and AFE
- PLC functionality
- Easy and flexible panel mounting



Dyneo+ range: general purpose magnet-assisted synchronous reluctance motors

Premium efficiency PM synchronous motor with drive

- 11 to 500 kW
- 1,500 to 6,000 rpm
- IP55 or IP23
- Efficiency exceeding IE5 level



IMfinity® range: general purpose induction motors

High and premium efficiency motors for fixed and variable speed

- 0.08 to 1,500 kW
- IP55 or IP23
- Cast iron or cast aluminium housing
- Non IE, IE3, IE4 derivative ranges (Atex, Nuclear, High temperature, Liquid cooled, and Customized versions)



Comprehensive and customized local services with round-the-clock support



Along with comprehensive training, our global Service Centers provide a range of local services tailored to meet your expanding productivity, performance and process safety needs. This includes:

- Analysis of current installations to detect areas for improving processes and reducing energy consumption
- Highly skilled system design to create innovative and energy saving solutions
- Dedicated all hours technical support
- Maintenance servicing to ensure maximum performance and trouble-free operation for the lifetime of the system
- Guaranteed rapid response to emergency situations

Audit and consultation

Our auditing services are designed to analyse your existing application and processes to identify opportunities for improving performance, energy efficiency and the lifetime of equipment. This could result in retrofitting equipment or an entire system upgrade. We provide an evaluation of return on investment (ROI), helping to justify initial outlay.

Optimizing energy savings and payback

Once potential energy savings have been identified, we commit to calculated payback periods, while helping you obtaining the government incentives for decarbonation offered in many countries. We will also provide a high yield installation and maintenance schedule to ensure optimum performance is maintained through the lifetime of your equipment.



Retrofit and system upgrades

Where required, existing hardware is retrofitted quickly and easily, reducing downtime and investment. Alternatively we can produce high performance solutions to upgrade your production processes, improving productivity. A dedicated team takes care of the whole project implementation, along with training and maintenance schedules.

Installation and commissioning

Our objective is to ensure the reliability and safety of your equipment for optimum longevity:

- Our accredited personnel ensure systems are installed in compliance with local technical regulations and safety standards
- Our world class onsite commissioning ensures systems are set-up thoroughly and rapidly
- Extended system guarantees of up to 48 months are available

Maintenance

All our maintenance policies, whether emergency or scheduled, are designed to meet your specific requirements, minimizing disruption and downtime to your operation.

- Emergency services include 24/7 telephone and web support, onsite technical assistance, express round-the-clock delivery of products & spare parts and urgent repairs.
- For ongoing maintenance work, we can manage product replacements, retrofits and upgrades rapidly through our assembly centres
- Maintenance contracts are available to ensure the proper running of your equipment

Services are optimized on a country-by-country basis, so please contact your local sales person for full details of our local offering.

LEROY-SOMER[™]

www.eroy-somer.com

Connect with us at:

twitter.com/Leroy_Somer_en

facebook.com/leroy-somer.nidec

youtube.com/user/LeroySomerOfficiel

linkedin.com/company/leroy-somer



Nidec
All for dreams

© 2021 Moteurs Leroy-Somer SAS. The information contained in this brochure is for guidance only and does not form part of any contract. The accuracy cannot be guaranteed as Moteurs Leroy-Somer SAS have an ongoing process of development and reserve the right to change the specification of their products without notice.

Moteurs Leroy-Somer SAS. Headquarters: Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France. Share Capital: 38 679 664 €, RCS Angoulême 338 567 258.