DEMAG

Cranes & Components

Demag Dedrive Pro frequency inverters

Smooth inverters for demanding requirements
– up to 560 kW motor output

Demag Dedrive Pro frequency inverters – the right solution for demanding drive applications

More and more drive applications feature increasingly demanding requirements: fast, but, gentle acceleration, gentle, but rapid and precise braking as well as the ability to accommodate even unpredictable loads with ease. In order to satisfy these primary requirements, but also to meet many other criteria reliably, not only the motors, but also the frequency inverters have to offer special characteristics.

When it comes to handling containers: gently pick up, quickly transport and deposit the load smoothly.

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The Dedrive Pro range meets these demands. With components for drive outputs from 1.5 to 560 kW and line voltages from 380 to 415 or 500 V, and 525 to 690 V, they feature decisive characteristics such as

- individual travel, lifting, turning and slewing motions thanks to infinitely variable speed control independent of the given load
- variable torques at constant speed or variable speeds at constant torque
- acceleration and braking characteristics exactly tailored to meet the needs of the loads to be transported

The Dedrive Pro is also available with increased enclosure type IP 55.

Protection against sun and rain: The roof sections can be gently turned into position, as needed.

Smooth lifting and gentle deposit operations are also decisive for paper rolls.

- particularly reliable and precise braking characteristics thanks to brake choppers
- efficient drive specification, since the rated output may be briefly exceeded when starting against heavy loads
- precise speed setting by means of switchable inputs
- multi-motor operation
- can be adapted to the specific application thanks to freely programmable inputs/outputs
- simple and rapid installation thanks to the compact design, also for even more performance
- already integrated line reactor reduces the need for cabling and wiring, an optional line filter can also be integrated

In addition, the Dedrive Pro frequency inverters also enable a much wider scope of applications to be covered thanks to a range of supplementary functions and options:

- IP 55 for operation in arduous environments (up to size R6)
- two different applications can be served by switching over parameter sets
- fibre optic technology for fast system communications with several inverters
- integrated speed and torque monitoring

Ideal for a wide variety of applications

The Dedrive Pro performs under even the most arduous conditions.

The load – positioned with millimetre accuracy – can be fed through the openings in the walls.

Suitable for any operating environment
"Direct Torque Control" enables the Dedrive Pro to implement a wide variety of highly dynamic operating sequences. The entire output capacity of the drive can be utilised. The drive control system ensures that process sequences remain smooth, precise and reliable, even under arduous operating conditions.

You can choose:
Variable speed at constant torque ...
The is the right solution if the application requires variable travel, lifting, turning and slewing motions, regardless of the given load.

Exact torque control provides a constant torque, even at low frequencies. This means that drives always start smoothly and offer unmatched precision controlled braking. This solution not only offers reliable protection for the loads to be transported, but also ensures the safety of the installation.

... or variable torque at constant speed
This control variant enables a constant speed to be maintained, even if the load fluctuates widely. The torque is exactly adapted to the given load for the specific speed setting. In this way, the required performance level of an installation is achieved at all times and under all operating conditions. This is decisive in the case of machinery when product quality depends on a constant speed.

In these applications, Dedrive Pro satisfies all requirements with the integrated speed and fast torque control. Thanks to its short drive control rise time, Dedrive Pro responds very quickly to changes in load or external factors such as wind forces acting on cranes outdoors, for example.

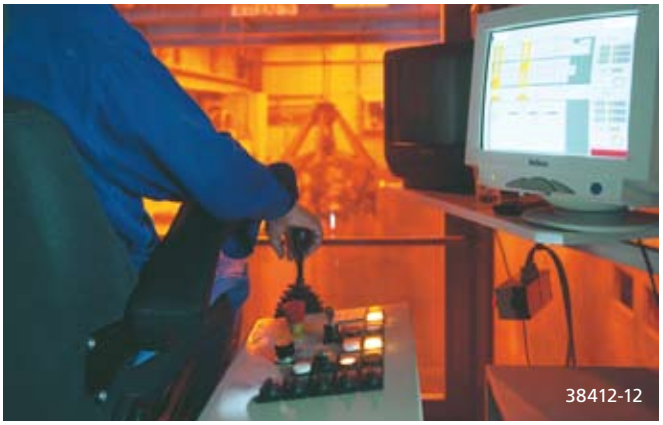
Decisive benefits: several motors, one inverter

Solution for two drive requirements
Dedrive Pro is easily able to perform two drive applications. Both the lifting and travel functions can be implemented by simply switching over between two sets of parameters. This makes it possible to achieve a significant financial benefit when the new Dedrive Pro is used for many investments.

Simultaneous control of several drives
A single component is often driven by many motors in order to achieve optimum performance and maximum functional reliability. Just one Dedrive Pro can be used for fully matching, simultaneous control of all the units in a multi-motor drive arrangement. In these applications, Dedrive Pro satisfies the technical as well as the financial requirements.

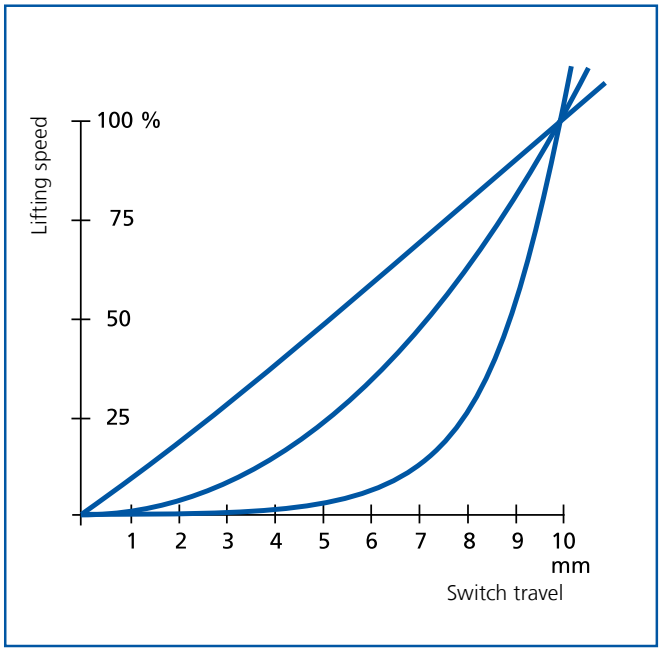
The roof sections of the dock can be opened smoothly.

For optimum crane operation



Crane operation can be precisely adapted to meet your specific needs using the Dedrive Pro.

Four-rope grabs can be controlled to perfection with the Dedrive Pro.



The characteristic curve to operate the joystick is freely programmable.

Special software functions

Many special software functions are available for optimum crane operations. These facilitate performance monitoring in field weakening operation (higher speed at partial load), load spectrum calculation or speed monitoring, for example. The Dedrive Pro can be connected to the existing joystick controller of cranes fitted with cab controls. Programmable characteristic curves make it possible to adapt operation perfectly to meet the specific requirements of the handling application.

An intelligent brake logic system enables the brake function to be monitored by evaluating the signals from the corresponding feedback contacts. Torque pre-control at start-up also enables heavy loads to be handled more precisely by hoist units. The system bus (fibre optic cable) for Master/Slave applications is suitable for implementing electronic gearboxes by synchronising two hoists for transporting long materials. Furthermore, the Master/Follower function makes it possible to share the load/torque between two mechanically connected geared motors on one hoist unit.

All information transparent and available – direct or indirect

Full control of the functions
The operator terminal offers a wide range of information. Operating status information and actual values such speed, current, frequency, torque, etc. can be read. Various internal monitoring functions and the error memory which can be read out from the operating terminal help to eliminate any malfunctions quickly and easily.

Remote monitoring
Several Dedrive Pro units can be networked within an installation using state-of-the-art fibre optic technology. This not only facilitates ease of commissioning from one service position, but also ensures that the installation can be monitored from a remote location by means of a communications module. This is the ideal solution for inverters that are difficult to access. The high-performance software makes any information that might be needed available at all times (e.g. actual values, operating statuses, process data, etc.).

The cause of malfunctions can be identified and eliminated quickly by means of remote diagnosis from the control centre.

The operating terminal can be used for full control of every Dedrive Pro unit.

Support for commissioning and diagnosis
DriveWindow software makes commissioning even easier. The clearly structured user interface provides rapid access to all necessary parameters and actual values. Parameter files can be saved and loaded into inverters with ease for similar applications. Extended diagnostics functions (numeric and graphic monitoring) also provide a better overview for maintenance purposes.

Comprehensive features – hardware and software overview

The Dedrive Pro facilitates precision operation of inter-floor lifts.

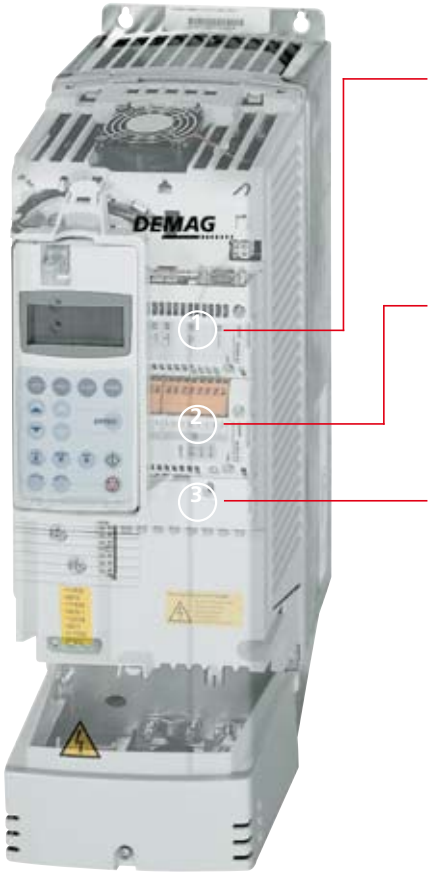
Hardware:

- Motor outputs from 1.5 to – 560 kW
- Rated voltage: 380–415 V, 380–500 V, 525–690 V (+/-10 %)
- 1.5 times overload ability for 60 seconds
- Short-circuit/earth-fault resistant motor circuit output
- CE, CSA and UL listed
- IP 55 enclosure up to size R6 (optional)
- Master/slave capable (fibre optic, optional)
- Integrated line filter (optional)
- Integrated line reactor
- Integrated brake chopper
- Evaluation of motor temperature detector
- Communications module for field bus network (optional)
- Supplementary modules to extend control inputs and outputs, as well as speed encoder evaluation (optional)
- External PTC thermistor evaluation (optional)
- Control unit for parameter programming and commissioning (optional)
- Motor potentiometer via operating terminal (optional)
- DriveWindow PC software for convenient parameter programming and diagnosis as well as visualisation (optional)

Software:

- Control of cylindrical and conical-rotor motors
- Automatic parameter identification
- Direct torque control with/without encoder for fast compensation when loads change
- Speed and torque monitoring
- Special function for smooth acceleration
- Two switchable data sets (e.g. control, ramp or motor switchover)
- Setpoint memory, setpoint steps (4-stage) and analogue bipolar/unipolar control modes
- Programmable joystick characteristics
- Load-dependent speed for hoist operation with field weakening (“optimised performance”)
- Load spectrum calculation (also independent of the speed)
- Speed or torque control freely selectable
- Master/slave function, electronic gearbox and closed-loop control
- Intelligent braking logic system for brake monitoring by evaluation of the corresponding feedback contacts
- Comprehensive diagnosis functions

Harbour cranes operate precisely and reliably even in high winds and poor weather with Dedrive Pro.



① Profibus adapter module

② Analogue and digital I/O extension/pulse generator evaluation

③ Communications card (fibre optic)

General Data			
Output Voltage	U	[V]	3 x 0 ... line voltage
Protection (motor-side output)	–	–	Short-circuit and earth-fault proof
Max. rotary field frequency	f	[Hz]	max. 300 Hz (in DTC process max. 3.2 x $f_{N,motor}$ x $U_{line,inverter}$ / $U_{N,motor}$)
Line frequency	f	[Hz]	48–63
Installation type	–	–	Vertical

The complete solution – application modules with Dedrive Pro frequency inverters

Ready to be connected

Extended to form complete pre-assembled application modules, Dedrive Pro frequency inverters offer you further benefits for a wide variety of travel and lifting requirements. All components are designed to match precisely. They are arranged on a mounting panel that can be supplied both with or without a high-quality switchgear cabinet. All that remains is to install the unit and connect it to the power supply, the motor and the control system. Demag specialists are pleased to advise you on operation in integrated systems comprising wheels, geared motors, frequency inverters and power supply systems.

Application modules with integrated Dedrive Pro frequency inverters are available as standard, extended standard and as customer-specific applications.

Standard applications

The basic application modules fitted with the Dedrive Pro inverter range feature the following controls

- Analogue bipolar/unipolar (evaluation of pulse width modulated control signals possible by means of additional PWM/analogue converter)
- SOST setpoint value steps
- SOSP setpoint value memory
- Profibus DP field bus control

We offer corresponding switch-over for the following control modes

- Analogue bipolar/unipolar – SOST
- Analogue bipolar/unipolar – SOSP
- SOST – SOSP
- Profibus DP – analogue bipolar/unipolar
- Profibus DP – SOST
- Profibus DP – SOSP

This crane installation is able to handle long materials thanks to synchronised hoist drives.

Extended standard

These application modules provide you with further function solutions beyond those for standard applications.

- Simultaneous operation of hoist drives:
  This function enables two drives to be synchronised without a mechanical connection. The positions of the rotors are continuously monitored and matched. The drives of two hoists can be synchronised for handling long material, for example. The hoists can be used separately by switching the function off at any time.
- Load distribution:
  This ensures equal distribution of loads to two mechanically connected motors. The function can also be used for redundant applications.

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Customer-specific applications

In addition, we offer further application solutions that are specially designed to meet your needs. Application modules are also available with power recovery units. They enable the high energy generated when hoist units brake to be fed back into the line power supply (regenerative braking).

Benefit from our many years of experience and utilise our consultation service.

Decisive benefits of application modules

- Special requirements of travel and hoist drives are met
- Reduced planning requirement for the installation
- Greater certainty for cost calculation
- Wide range of applications
- Outstanding solutions based on the Demag standard
- Faster and more efficient connection of the complete solution (only power supply, motor and control lines)

Selection tables

Line voltage 380–415V

Size ACS800-Demag 01-...-3					R2					R3			R4		R5			
Apparent output code				[kVA]	0003	0004	0005	0006	0009	0011	0016	0020	0025	0030	0040	0050	0060	0075
Motor-side output	Cont. output current	at 150 % overload 1 min. every 5 min.	I_{sload}	[A]	4,2	5	6	8	9,8	15	19	25	36	44	57	70	83	113
Line-side input	Line voltage		U	[V]	3 x 380 V to 415 V ± 10 %													
	Line current	3 ph / PE	I	[A]	4,7	6,0	7,9	10	13	17	23	32	42	53	69	83	100	142
	Fuses	3 ph / PE	I	[A]	16			25		50		63		80	100	125	160	250
Mechanical	Dimensions		HxWxD	[mm]	405 x 165 x 226					471 x 173 x 265			607 x 240 x 274		739 x 265 x 286			
	Weight (approx.)		m	[kg]	9					14			26		34			
	Enclosure		–	–	IP 21 (IP 55 optional)													
	Connection terminals		A	[mm²]	16								25		70			

Size ACS800-Demag 01/04M-...-3					R6				R7	R8				
Apparent output code				[kVA]	0100	0120	0135	0165	0210	0260	0320	0400	0440	0490
Motor-side output	Cont. output current	at 150 % overload 1 min. every 5 min.	I_{sload}	[A]	122	159	182	208	220	340	390	477	530	544
Line-side input	Line voltage		U	[V]	3 x 380 V to 415 V ± 10 %									
	Line current	3 ph / PE	I	[A]	163	198	221	254	286	438	501	581	674	705
	Fuses	3 ph / PE	I	[A]	315		400	500	500	700	900	1000	2 x 700	
Mechanical	Dimensions		HxWxD	[mm]	880 x 300 x 399				1181 x 631 x 296	1596 x 779 x 436				
	Weight (approx.)		m	[kg]	67				100	200				
	Enclosure		–	–	IP 21 (IP 55 opt.)				IP00					
	Connection terminals		–	–	185 mm² connection terminals				M10/M12 cable lugs					

Line voltage 380–500V

Size ACS800-Demag 01-...-5					R2					R3			R4		R5			
Apparent output code				[kVA]	0004	0005	0006	0009	0011	0016	0020	0025	0030	0040	0050	0060	0070	0105
Motor-side output	Cont. output current	at 150 % overload 1 min. every 5 min.	I_{sload}	[A]	4,1	4,9	6	8	9,6	15	19	25	35	40	54	67	78	113
Line-side input	Line voltage		U	[V]	3 x 380 V to 500 V ± 10 %													
	Line current	3 ph / PE	I	[A]	4,7	5,9	7,7	10	12,5	17	23	31	41	47	64	78	95	142
	Fuses	3 ph / PE	I	[A]	16			25		50		63		80	100	125	160	250
Mechanical	Dimensions		HxWxD	[mm]	405 x 165 x 226					471 x 173 x 265			607 x 240 x 274		739 x 265 x 286			
	Weight (approx.)		m	[kg]	9					14			26		34			
	Enclosure		–	–	IP 21 (IP 55 optional)													
	Connection terminals		A	[mm²]	16								25		70			

Line voltage 380–500V

Size ACS800-Demag 01/04M-...-5					R6				R7	R8					
Apparent output code				[kVA]	0120	0140	0165	0205	0260	0320	0400	0440	0490	0550	0610
Motor-side output	Cont. output current	at 150 % overload 1 min. every 5 min.	I_{sload}	[A]	122	142	180	208	224	340	370	440	480	530	544
Line-side input	Line voltage		U	[V]	3 x 380 V to 500 V ± 10 %										
	Line current	3 ph / PE	I	[A]	155	180	222	256	291	424	498	543	590	669	702
	Fuses	3 ph / PE	I	[A]	315		400	500	500	700	900	1000		2x 700	
Mechanical	Dimensions		HxWxD	[mm]	880 x 300 x 399				1181 x 631 x 296	1596 x 779 x 436					
	Weight (approx.)		m	[kg]	67				100	200					
	Enclosure		–	–	IP 21 (IP 55 opt.)				IP 00						
	Cable connection		–	–	185 mm² connection terminals				M10/M12 cable lugs						

Line voltage 525–690V

Size ACS800-Demag 01-...-7					R4						R5		R6					
Apparent output code				[kVA]	0011	0016	0020	0025	0030	0040	0050	0060	0070	0100	0120	0145	0175	0205
Motor-side output	Cont. output current	at 150 % overload 1 min. every 5 min.	I_{sload}	[A]	9,2	12,5	18	20	26	28	38	44	59	70	86	106	134	152
Line-side input	Line voltage		U	[V]	3 x 525 V to 690 V ± 10 %													
	Line current	3 ph / PE	I	[A]	12	15	21	24	33	35	52	58	79	91	112	131	162	186
	Fuses	3 ph / PE	I	[A]	25		50	63		80	100		125	160	250	315		400
Mechanical	Dimensions		HxWxD	[mm]	607 x 240 x 274						739 x 265 x 286		880 x 300 x 399					
	Weight (approx.)		m	[kg]	26						34		67					
	Enclosure		–	–	IP 21 (IP 55 optional)													
	Connection terminals		A	[mm²]	25						70		185					

Size ACS800-Demag 04M-...-7					R7	R8					
Apparent output code				[kVA]	0260	0320	0400	0440	0490	0550	0610
Motor-side output	Cont. output current	at 150 % overload 1 min. every 5 min.	I_{sload}	[A]	172	233	274	328	387	426	482
Line-side input	Line voltage		U	[V]	3 x 525 V to 690 V ± 10 %						
	Line current	3 ph / PE	I	[A]	217	298	333	377	423	468	533
	Fuses	3 ph / PE	I	[A]	400	700		900			1000
Mechanical	Dimensions		HxWxD	[mm]	1181 x 631 x 296	1596 x 779 x 436					
	Weight (approx.)		m	[kg]	100	200					
	Enclosure		–	–	IP 00						
	Cable connection		–	–	M10/M12 cable lugs						

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Complete industrial drive solutions – from wheels to inverters

Demag geared motors
- as helical geared motors from 90 to 5800 Nm
- as angular geared motors from 120 to 12000 Nm
- as offset geared motors for 130 to 11500 Nm with cylindrical-rotor motors from 0.18 to 45 kW

Demag conical-rotor brake motors
for increased requirements such as extremely high switching frequencies and braking operation for outputs from 0.37 to 42 kW

Demag microspeed drives
with conical-rotor motors; for high speed stages and positioning with high stopping accuracy; speed ratios up to 500:1

Demag Dedrive Compact and Dedrive Pro frequency inverters
for AC drives with motor shaft outputs up to 560 kW; control of cylindrical and conical-rotor motors as single or groups of drives; current loads from 2.4 to 110 A or 4.2 to 544 A

Demag travel unit components
Modular systems for elements in materials handling installations and mechanical engineering applications without the need for any additional design work and production
- DRS wheel block system; many wheel variant and connection possibilities, high performance; from 2.75 t to 40 t
- RS wheel block system; with sheet-steel housing for special applications, also in high-temperature range up to 350 °C
- LRS travel wheel system; the simple system for the lower load range up to 6.5 t
- RAE/RNE wheel sets; for integration into hollw-profile sections or for corner-bearing arrangements; up to 60 t

Demag DCL Compact Line
Power feed system; designed for currents up to 200 A (60 % CDF); fitted with up to 7 conductors, as required; both for supplying mobile consumers with power as well as for transferring control signals

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