

# Experience Efficiency in a New Way.

**PowerXL™**  
**variable frequency drives**  
**The new DC1 and DA1 series**



**EATON**

*Powering Business Worldwide*

# Eaton – the right drive for your technology.

In the field of plant and machinery construction Eaton is your single-source provider. Whether energy management, automation, signaling or solutions all around the motor – Eaton covers the entire machine. Variable frequency drives, soft starters, motor starters and hydraulics components provide solutions for all tasks involving drives.

### Motor-protective circuit-breaker PKZ

SmartWire-DT turns standard switchgear into intelligent automation devices.

### PKE motor-protective circuit-breakers

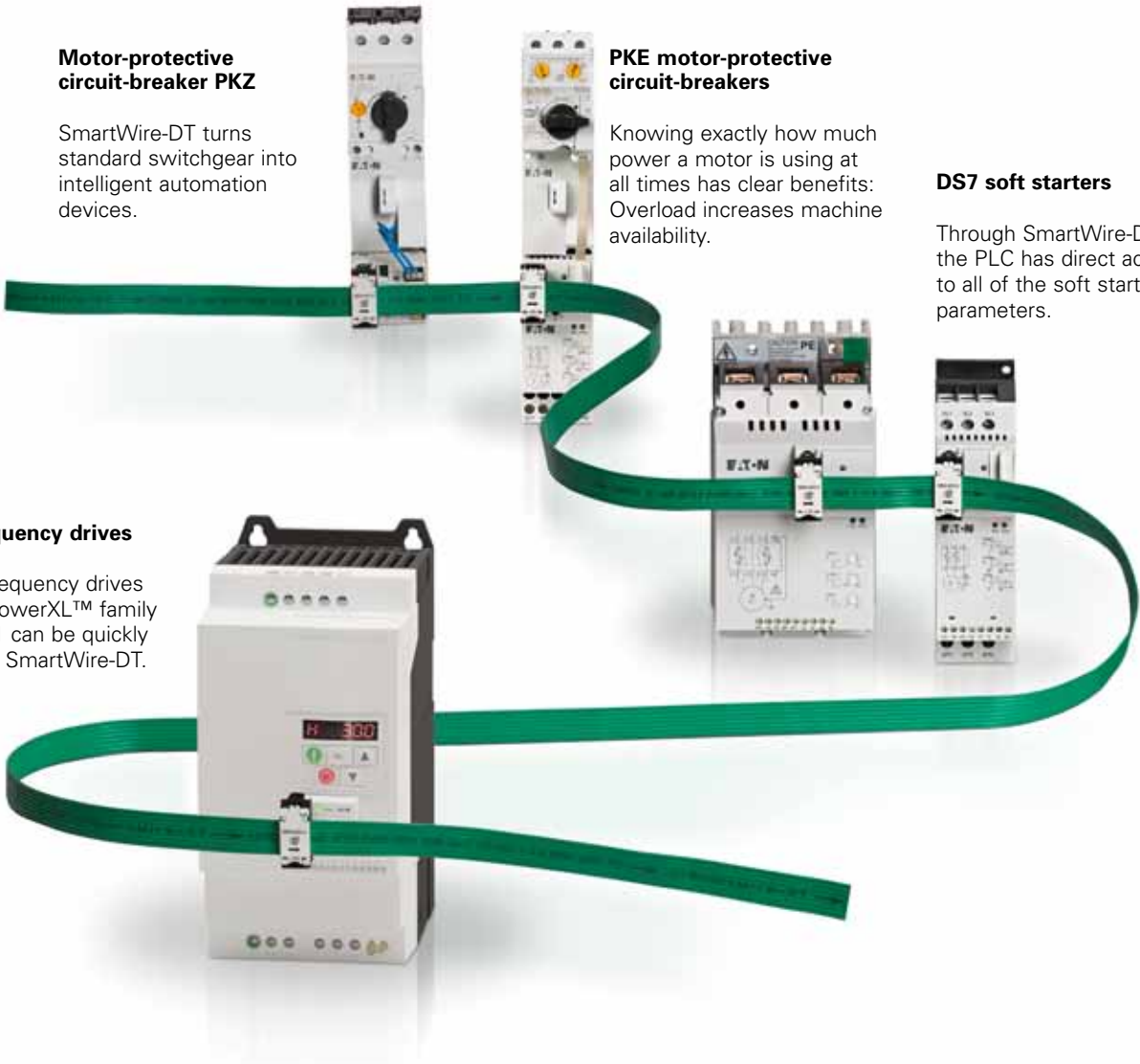
Knowing exactly how much power a motor is using at all times has clear benefits: Overload increases machine availability.

### DS7 soft starters

Through SmartWire-DT the PLC has direct access to all of the soft starter's parameters.

### PowerXL™ variable frequency drives

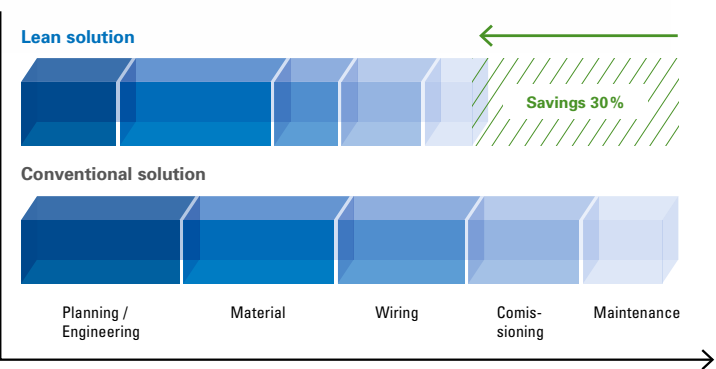
All variable frequency drives of the new PowerXL™ family DC1 and DA1 can be quickly connected to SmartWire-DT.



### Lean Solution powered by SmartWire-DT®

Machinery construction needs a technology that simplifies its processes. SmartWire-DT moves the I/O level to the devices, allowing simple, quickly engineered structures without an I/O level at the PLC. Data transparency simplifies diagnostics and maintenance, thereby reducing wiring, testing and commissioning time and costs by up to 85%.

### Example: Savings at every stage of the lifecycle



### Ahead of the future

Machinery construction is becoming increasingly demanding and competitiveness depends more and more on the technology and on the suppliers's capability to present themselves effectively on the market. Eaton is your right partner to help you achieve these aims. From effective detail solutions through overall efficiency to our comprehensive service we provide al-inclusive solutions on a national and global level.

### A focus on drives engineering

With its Moeller Series products Eaton has been a reliable partner in machinery engineering for many decades. Product brands such as PKZ and RMQ-Titan

prove the point. A further focus is on drives engineering, which is continually being expanded with innovative new products. The development focus here is on the efficiency of your processes and solutions.

### Lean Solution for drives engineering

Our intelligent connection and communications technology SmartWire-DT is gaining popularity and is successfully establishing in all segments. The core of the Lean Solutions strategy is the identification and optimization of the operating sequences in machinery and control panel construction. Our product portfolio – from motor starters through soft starters to variable frequency drives – has continued to expand to the present day.



Eaton produces world market products for machinery construction.



Eaton has a local presence for its customers in more than 150 countries. [www.eaton.eu/electrical/customersupport](http://www.eaton.eu/electrical/customersupport)



For CAD data for our products see on [www.moeller.net/cad](http://www.moeller.net/cad)



Get your new Drives Engineering catalog today: [Antriebstechnik@eaton.com](mailto:Antriebstechnik@eaton.com)



# PowerXL™ – rugged on the outside, efficient on the inside.

With its new PowerXL™ family Eaton introduces two rugged and simple variable frequency drives. From simple to highly complex applications, we always have the right product, also for series production in mechanical engineering and beyond.

Sufficient **performance** for any application:

**DA1:** 200% torque at 0 rpm

**DC1:** 150% torque at low speed

Concise overview  
of parameters:  
**information card**

**Easy commissioning**  
with only 14 basic  
parameters

**Clear navigation**  
through self-explanatory menu  
structure

**Series production** made  
easy, thanks to parameter  
copy function through  
communication stick



**Simple mounting**  
with DIN rail mounting

**Savings in the control panel**  
No derating even at 50 °C, allowing  
side-by-side mounting in compact control  
panels without fan



**Cohesiveness:**  
Connection to SmartWire-DT®

**Fast installation**  
through plug-in terminal strip

Rugged and well **protected:**  
Enclosures up to IP66 available soon

With their high degree of protection (IP66)  
the PowerXL™ variable frequency drives are  
perfectly protected against dust.

Thanks to the enhanced PCB protection the DA1  
devices are also suitable for use in environments  
with high air humidity.

The high protection type (IP66) allows the variable  
frequency drives to be used in areas in which  
they are exposed to moisture or spray water.



### Convincing technology

In machinery construction and in conveying and building services engineering motors often drive pumps, fans, conveyors, cranes, winding machines, compressors or elevators. This calls for simple, user-friendly and energy-efficient technology. The new PowerXL™ variable frequency drives DC1 and DA1 have been specially designed for this kind of application and excel with their rugged design, availability and universal functionality.

### Rugged design

All devices unfold their full performance at an ambient temperature of up to 50 °C (IP20) and feature a short-circuit proof output. Fans with rolling bearings and an exceptionally long service life increase reliability. The rugged design is

also reflected in the devices' degree of protection: Both device series are available for ratings up to 7.5 kW and with degree of protection IP66.

### Simplifying technology

With their self-explanatory keys to part numbers, auto-tune function, convenient parameterization (only 14 basic parameters) and fast engineering and commissioning these devices help minimize planning, installation and technical support costs.

The PowerXL™ variable frequency drives can be programmed with keypad and LED or OLED (multi-language display) and from a PC. With a Bluetooth PC stick parameter settings can be quickly transferred to other devices.

## Simple parameterization

The parameters can be easily set, for example with the variable frequency drive's 7-digit display assembly. With only 14 basic parameters you can quickly set the motor's rating (motor voltage, current, frequency etc.) to take your applications into operation almost straight away.



The information card in each device provides a quick overview of parameters and terminals



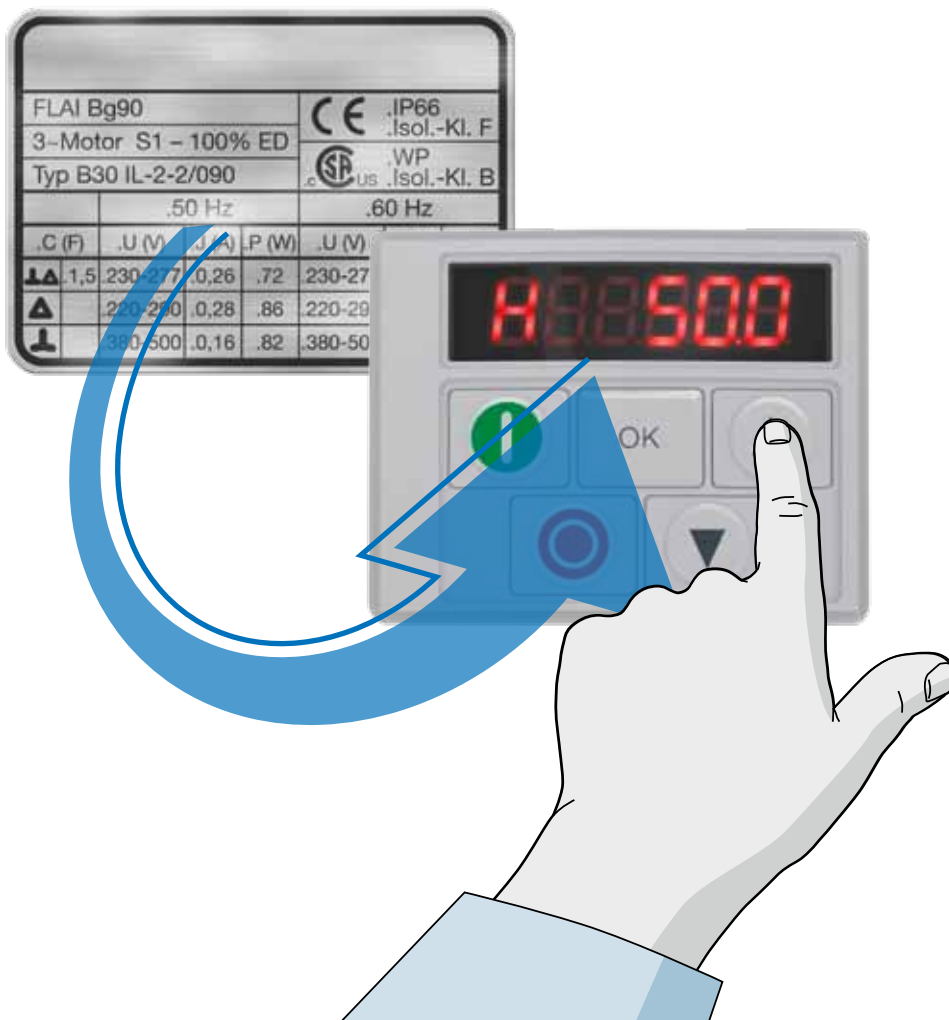
With the communication stick you can simply and quickly copy all parameters from one variable frequency drive to another.



The removable control signal terminals of DC1 and DA1 make installation and connecting devices much simpler.



Up to 63 devices can be accessed through a keypad mounted in the control panel.



FLAI Bg90		CE IP66	
3-Motor S1 – 100% ED		.Isol.-KI. F	
Typ B30 IL-2-2/090		c SP US WP	
		.Isol.-KI. B	
		.50 Hz	
		.60 Hz	
.C (F)	.U (V)	.I (A)	.P (W)
1.5	230-277	0.26	.72
2.2	220-250	0.28	.86
3.0	230-277	0.36	1.12
4.0	230-277	0.48	1.44
5.0	230-277	0.60	1.80
6.3	230-277	0.75	2.25
8.0	230-277	0.96	2.88
10	230-277	1.20	3.60
12.5	230-277	1.50	4.50
16	230-277	1.92	5.76
20	230-277	2.40	7.20
25	230-277	3.00	9.00
32	230-277	3.84	11.52
40	230-277	4.80	14.40
50	230-277	6.00	18.00
63	230-277	7.50	22.50
80	230-277	9.60	28.80
100	230-277	12.00	36.00
125	230-277	15.00	45.00
160	230-277	19.20	57.60
200	230-277	24.00	72.00
250	230-277	30.00	90.00
315	230-277	37.50	112.50
400	230-277	48.00	144.00
500	230-277	60.00	180.00
630	230-277	75.00	225.00
800	230-277	96.00	288.00
1000	230-277	120.00	360.00
1250	230-277	150.00	450.00
1600	230-277	192.00	576.00
2000	230-277	240.00	720.00
2500	230-277	300.00	900.00
3150	230-277	375.00	1125.00
4000	230-277	480.00	1440.00
5000	230-277	600.00	1800.00
6300	230-277	750.00	2250.00
8000	230-277	960.00	2880.00
10000	230-277	1200.00	3600.00
12500	230-277	1500.00	4500.00
16000	230-277	1920.00	5760.00
20000	230-277	2400.00	7200.00
25000	230-277	3000.00	9000.00
31500	230-277	3750.00	11250.00
40000	230-277	4800.00	14400.00
50000	230-277	6000.00	18000.00
63000	230-277	7500.00	22500.00
80000	230-277	9600.00	28800.00
100000	230-277	12000.00	36000.00
125000	230-277	15000.00	45000.00
160000	230-277	19200.00	57600.00
200000	230-277	24000.00	72000.00
250000	230-277	30000.00	90000.00
315000	230-277	37500.00	112500.00
400000	230-277	48000.00	144000.00
500000	230-277	60000.00	180000.00
630000	230-277	75000.00	225000.00
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2500000	230-277	300000.00	900000.00
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4000000	230-277	480000.00	1440000.00
5000000	230-277	600000.00	1800000.00
6300000	230-277	750000.00	2250000.00
8000000	230-277	960000.00	2880000.00
10000000	230-277	1200000.00	3600000.00
12500000	230-277	1500000.00	4500000.00
16000000	230-277	1920000.00	5760000.00
20000000	230-277	2400000.00	7200000.00
25000000	230-277	3000000.00	9000000.00
31500000	230-277	3750000.00	11250000.00
40000000	230-277	4800000.00	14400000.00
50000000	230-277	6000000.00	18000000.00
63000000	230-277	7500000.00	22500000.00
80000000	230-277	9600000.00	28800000.00
100000000	230-277	12000000.00	36000000.00
125000000	230-277	15000000.00	45000000.00
160000000	230-277	19200000.00	57600000.00
200000000	230-277	24000000.00	72000000.00
250000000	230-277	30000000.00	90000000.00
315000000	230-277	37500000.00	112500000.00
400000000	230-277	48000000.00	144000000.00
500000000	230-277	60000000.00	180000000.00
630000000	230-277	75000000.00	225000000.00
800000000	230-277	96000000.00	288000000.00
1000000000	230-277	120000000.00	360000000.00
1250000000	230-277	150000000.00	450000000.00
1600000000	230-277	192000000.00	576000000.00
2000000000	230-277	240000000.00	720000000.00
2500000000	230-277	300000000.00	900000000.00
3150000000	230-277	375000000.00	1125000000.00
4000000000	230-277	480000000.00	1440000000.00
5000000000	230-277	600000000.00	1800000000.00
6300000000	230-277	750000000.00	2250000000.00
8000000000	230-277	960000000.00	2880000000.00
10000000000	230-277	1200000000.00	3600000000.00
12500000000	230-277	1500000000.00	4500000000.00
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20000000000	230-277	2400000000.00	7200000000.00
25000000000	230-277	3000000000.00	9000000000.00
31500000000	230-277	3750000000.00	11250000000.00
40000000000	230-277	4800000000.00	14400000000.00
50000000000	230-277	6000000000.00	18000000000.00
63000000000	230-277	7500000000.00	22500000000.00
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315000000000	230-277	37500000000.00	112500000000.00
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50000000000000	230-277	6000000000000.00	18000000000000.00
63000000000000	230-277	7500000000000.00	22500000000000.00
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160000000000000	230-277	19200000000000.00	57600000000000.00
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250000000000000	230-277	30000000000000.00	90000000000000.00
315000000000000	230-277	37500000000000.00	112500000000000.00
400000000000000	230-277	48000000000000.00	144000000000000.00
500000000000000	230-277	60000000000000.00	180000000000000.00
630000000000000	230-277	75000000000000.00	225000000000000.00
800000000000000	230-277	96000000000000.00	288000000000000.00
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12500000000000000	230-277	1500000000000000.00	4500000000000000.00
16000000000000000	230-277	1920000000000000.00	5760000000000000.00
20000000000000000	230-277	2400000000000000.00	7200000000000000.00
25000000000000000	230-277	3000000000000000.00	9000000000000000.00
31500000000000000	230-277	3750000000000000.00	11250000000000000.00
40000000000000000	230-277	4800000000000000.00	14400000000000000.00
50000000000000000	230-277	6000000000000000.00	18000000000000000.00
63000000000000000	230-277	7500000000000000.00	22500000000000000.00
80000000000000000	230-277	9600000000000000.00	28800000000000000.00
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160000000000000000	230-277	19200000000000000.00	57600000000000000.00
200000000000000000	230-277	24000000000000000.00	72000000000000000.00
250000000000000000	230-277	30000000000000000.00	90000000000000000.00
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500000000000000000	230-277	60000000000000000.00	180000000000000000.00
630000000000000000	230-277	75000000000000000.00	225000000000000000.00
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1250000000000000000	230-277	150000000000000000.00	450000000000000000.00
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3150000000000000000	230-277	375000000000000000.00	1125000000000000000.00
4000000000000000000	230-277	480000000000000000.00	1440000000000000000.00
5000000000000000000	230-277	600000000000000000.00	1800000000000000000.00

# DC1 – the ideal solution for conventional drives.

The DC1 is Eaton's compact variable frequency drives. Simple to mount and install, the DC1 is ideal for fans, pumps and conveyors. Additional parameters and functionalities can be enabled to master more demanding applications.



Standard applications such as pumps, conveyor belts and fans can be implemented easily and quickly by simply configuring the basic parameters.



### Perfect adaptability

The DC1 controls motors with U/f characteristics mode. To also allow control of high-torque motors at low speeds, the torque can be increased. The DC1 series can run a motor at 150% rated load for 60 seconds and at 175% for two seconds. A built-in PI controller can be used externally, allowing a control circuit to be set up, for example by connecting sensors for flow or pressure control to the device's 0-10 V analog input.

### Flexible expansion capability

All models come with a 7-digit display assembly and a keypad are optionally available with a built-in EMC filter or braking transistor.

Should the variable frequency drives basic equipment level not be sufficient,

it can be easily extended with expansion modules, for example with additional I/O.

### Universal application

In addition to the control panel version in IP20 up to 11 kW devices with a high degree of protection (IP66) for up to 7.5 kW for remote applications are available. With mains voltages of 115V, 230V and 400V and the required CE, UL and c-Tick approvals the DC1 is a true global market product.

Variable frequency drives DC1 is also fully equipped for communications, featuring a CANopen and Modbus RTU interface as standard and – in conjunction with the SWD module – with SmartWire-DT capability.

### Control methods: Voltage/frequency (U/f) control and voltage boost

part no.	Input voltage	Output voltage	Assigned motor rating	Degrees of protection	Note
DC1-12...	1~ 230 V	3~ 230 V	0.37 – 4 kW	IP20, IP66	Three-phase motors
DC1-32...	3~ 230 V	3~ 230 V	0.37 – 4 kW	IP20, IP66	Three-phase motors
DC1-34...	3~ 400 V	3~ 400 V	0.75 – 11 kW	IP20, IP66*	Three-phase motors
DC1-1D...	1~ 115 V	3~ 230 V	0.37 – 1.1 kW	IP20, IP66	Three-phase motors, voltage doubler
DC1-S2...	1~ 230 V	1~ 230 V	0.37 – 1.1 kW	IP20, IP66	AC motors
DC1-S1...	1~ 115 V	1~ 115 V	0.37 – 0.55 kW	IP20, IP66	AC motors

\* to 7.5 kW

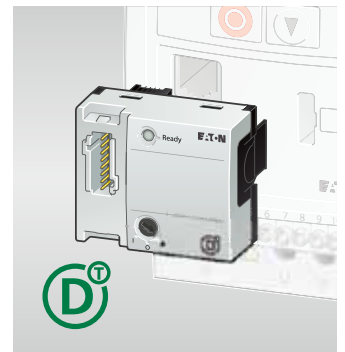
## No problems at 50 °C

All IP20 devices of series DC1 and DA1 support an ambient temperature of 50 °C without needing derating, i.e. the variable frequency drives can be operated at the device's full rated current.

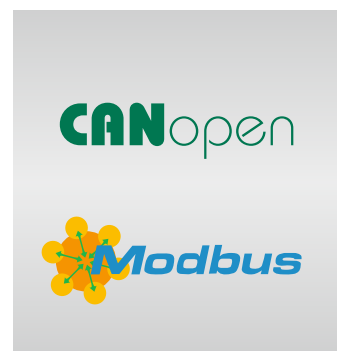
#### Advantages:

- Smaller control panel possible
- No added costs for additional ventilation

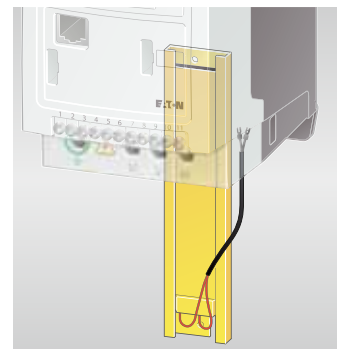
In addition side-by-side mounting of the devices allows an optimized space utilization in the control panel.



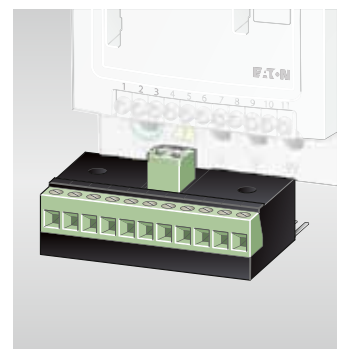
Simple connection to SmartWire-DT



The DC1 has CANopen and Modbus RTU onboard as standard



A braking resistor can be built into the enclosure.



Retrofit I/O extensions optionally available



# DA1 – The multi-talent for demanding drives.

DA1 variable frequency drives are the perfect match for demanding, speed-dependent applications. Their wide performance range of up to 250 kW, together with their compact dimensions and high level of functionality, are sure to leave a lasting impression.



Plenty of performance even for demanding lifting applications



For the DA1 DNV shipping classification will soon be available.



For Emergency Stop functionality the DA1 has the STO function built in.





## Full range of features

The DA1 series is equipped for every application as standard, supports the Modbus RTU and CANopen protocols and features a built-in EMC filter, braking transistor and a performance range up to 250 kW.

In addition to sensorless vector control (SLV) the motor can be operated at 150% in rated operation and at 200% overload at startup.

Ingress-protected to IP66 the DA1 is ideally suited for remote applications outside the control panel.

## Ready for all eventualities

With the PLC functionality of the drivesConnect parameterization software you can create your own logic links, for example with time dependencies, to generate your own

applications. A comprehensive range of expansions as well as additional inputs and outputs (analog and digital) can be added to the devices.

With the Safe Torque Off (STO) function the DA1 provides the most basic drive-integrated safety function, keeping the motor torque-free and preventing inadvertent starting.

## The communications genius

A range of field bus modules for the DA1 provide connectivity using Ethernet-based protocols (PROFINET, Ethernet/IP, EtherCAT, Modbus TCP, BACnet IP), the widely-used PROFIBUS or – for the North American market – DeviceNet. With an SWD module, the variable frequency drives can be connected to SmartWire-DT.

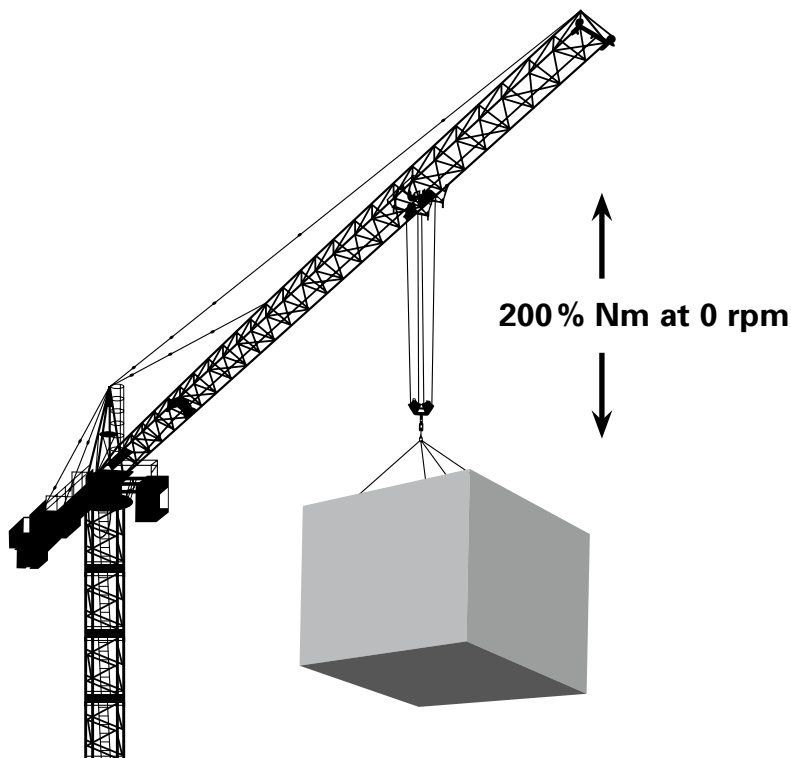
## Control methods: Voltage/frequency (U/f) control as well as sensorless vector (SLV) and closed-loop vector (CLV) control

part no.	Input voltage	Output voltage	Assigned motor rating	Degrees of protection	Note
DA1-12...	1~ 230 V	3~ 230 V	0.75 – 2.2 kW	IP20, IP66	Three-phase motors
DA1-32...	3~ 230 V	3~ 230 V	0.75 – 75 kW	IP20, IP55, IP66*	Three-phase motors
DA1-34...	3~ 400 V	3~ 400 V	0.75 – 250 kW	IP20, IP40, IP55, IP66**	Three-phase motors

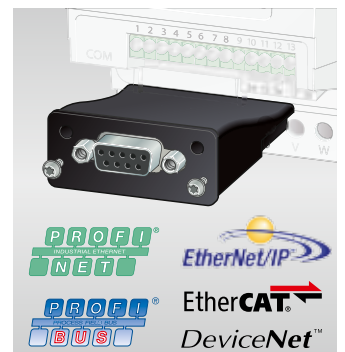
\* up to 4 kW, \*\* up to 7.5 kW

## Ideal for all heavyweights

The sensorless vector control (SLV) of variable frequency drives DA1 offers 200% torque at 0 rpm, making it ideal for crane applications.



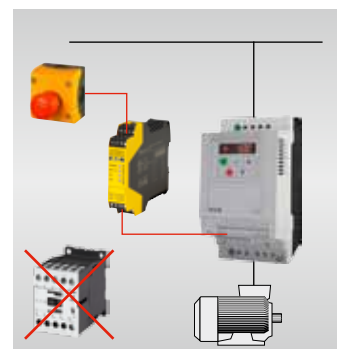
High-resolution OLED display with language selection available for all ratings



All common field bus types available as modules.



DA1 can be used to drive high-efficiency permanent-magnet motors



The built-in STO (Safe Torque Off) safety function makes a mains contactor unnecessary.

# drivesConnect – the software for optimum implementation.

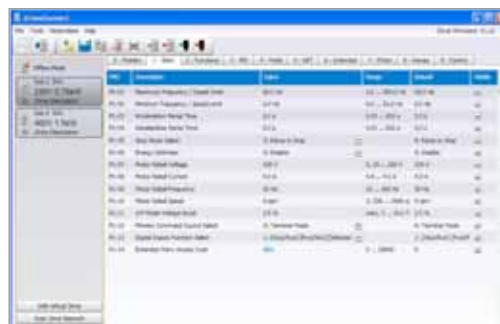
The drivesConnect software for PCs is a powerful commissioning tool for the PowerXL™ family. Beside parameterization and diagnosis user-defined internal logic links can be set up through a PLC function and transferred to the variable frequency drives.



# Parameterization

## Online and offline

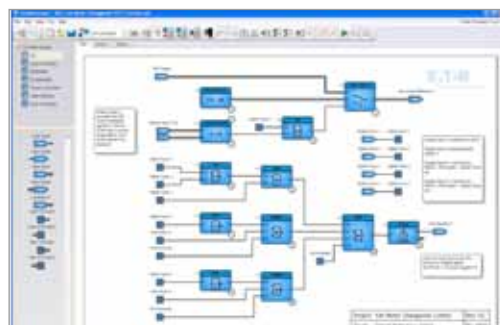
The parameterization function has an uncluttered, easy to understand user interface. With the editor variable frequency drives can be parameterized both online and offline. In online mode monitor values can be used for diagnostics.



# PLC function

## Simple programming

PLC programming lets you establish a logic link with, for example, time dependencies within variable frequency drives DA1 to generate your own application. The variable frequency drives can therefore be adapted to every application and helps you save additional hardware costs.



# Selection aid

## Efficient planning and engineering

An electronic selection aid provides simple planning, helping you quickly select the drive required for your application and the associated switchgear, protective elements chokes and filters complete with the corresponding article number.

[www.eaton.eu/selectiontools](http://www.eaton.eu/selectiontools)



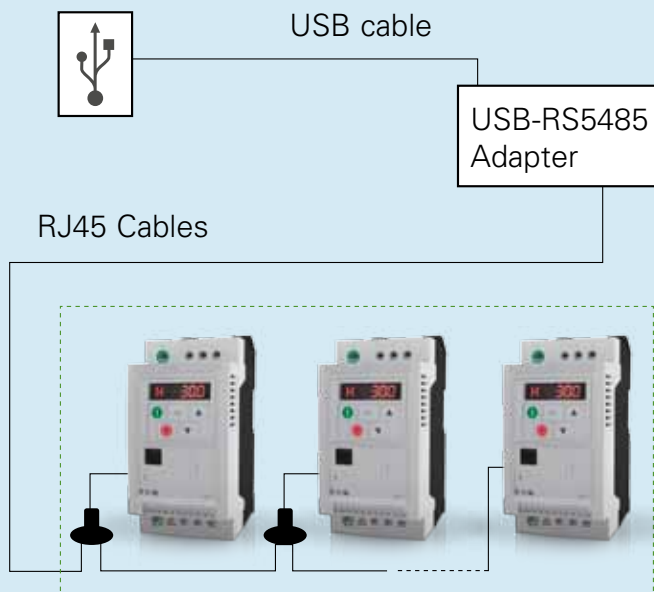
# PC connection

## Hardwired:

With a hardwired USB connection you can connect up to 63 variable frequency drives with the PC and conveniently parameterize them with the software and used with the PLC's functionality.

## Wireless (Bluetooth):

The communications sticks can be used to establish a wireless Bluetooth connection to the variable frequency drives.



Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority. For more information, **visit [www.eaton.com/electrical](http://www.eaton.com/electrical)**.

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