

Selection Guide

Uniquely flexible and open system for decentral servo motion control

VLT® Integrated Servo Drive ISD® 510 and VLT® Decentral Servo Drive DSD 510

SMART

**decentral
drive solution**

gives you more
design flexibility in
your decentralized
system plans



Decentralized motion solution

VLT® Integrated Servo Drive ISD® 510 and VLT® Decentral Servo Drive DSD 510 are the fundamental part of a flexible high-performance decentral servo motion solution, developed specifically for the food, beverage, and packaging industries. The servo system comprises a central power supply (VLT® Servo Access Box SAB®), drive modules and cabling infrastructure.

This decentralization of the drive units offers benefits and cost savings in mounting, installation and operation.

Flexible solutions

The VLT® Integrated Servo Drive ISD® 510 System has been designed to cover a wide range of applications, such as turntable applications, labeling, capping, food packaging and pharmaceutical packaging.

With 256 standard and advanced drive variants, 4 flange sizes, optional mechanical brake, and customization options, the ISD® 510 can be tailored to meet specific customer requirements.

The DSD 510 increases the flexibility of using a decentral servo drive concept by offering a wide range of feedback options and usage of various PM servo motors.

Both the servo drives are equipped with Safe Torque Off (STO).

Fast installation and cost savings through hybrid daisy-chain cabling concept

With the VLT® Integrated Servo Drive ISD® 510, Danfoss has developed a flexible decentral servo motion system that significantly reduces the number of cables required.

The first servo drive is connected to the VLT® Servo Access Box via a pre-configured hybrid cable, which combines the 600 V DC power supply, the 24 V DC, the STO signal and the bus communication.

The hybrid cables pass these signals on to further servo drives connected in the daisy-chain concept. This improvement to the cabling infrastructure eliminates the need for separate feedback cables and connection boxes.

**Immense
cost savings**
on installation
costs thanks to
easy hybrid cabling
concept





VLT® Servo Access Box SAB®

The SAB®, which generates a 600 V DC supply and ensures a higher power density, is mounted in the control cabinet. It is based on the proven quality of Danfoss drives and delivers an output of over 7.5 kW and 15 A.

Depending on the application, 2 separate output lines, each with 32 drives, can be connected, meaning a maximum of 64 drives per SAB®.

Reducing multiple units in the control cabinet to just one results in significant space savings.

A master encoder can also be connected to the SAB® directly.

Intuitive Local Control Panel (LCP)

The removable VLT® Local Control Panel (LCP) enables direct connection to the advanced servo drives for fast commissioning, diagnosis, and service. It has an alphanumeric display, numeric menu, status LEDs and quick menus.

Open system architecture

The servo system has an open system architecture, currently supporting EtherCAT®, PROFINET® and Ethernet POWERLINK® and allowing third party master controllers to be used.

EtherNet/IP™ is in preparation.

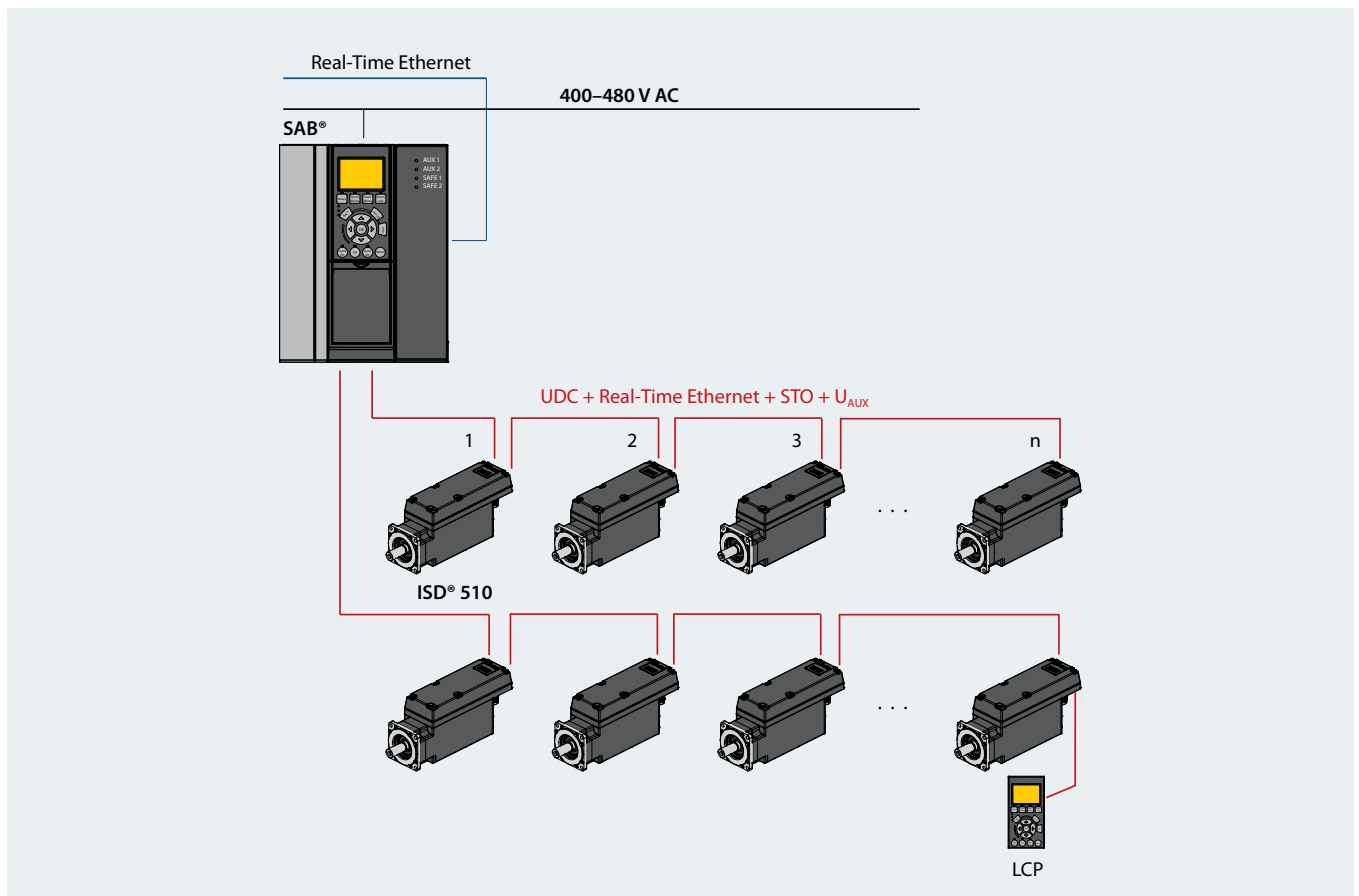
Masters can be programmed via IEC 61131-3 and fieldbus devices can easily be plugged in to the servo drives directly.

Savings in maintenance

Reduced maintenance costs and spare parts stock, along with minimized downtime, are important issues when selecting a servo drive solution.

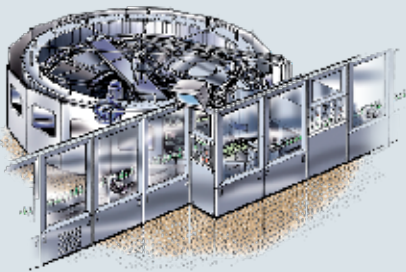
With the VLT® Integrated Servo Drive ISD® 510 system, Danfoss delivers easy preventive maintenance. The use of high-quality, heavy duty bearings, means that the system is virtually maintenance free. The only spare part needed is the shaft seal (when used).

Furthermore, no tools are required to connect and disconnect the hybrid cables.



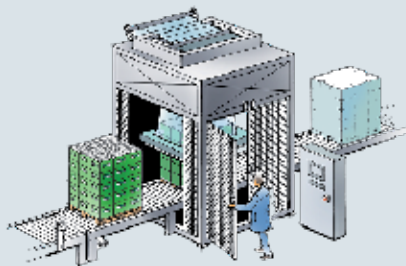


Typical applications



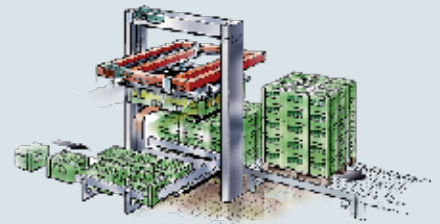
Beverage

- Labeling
- Capping
- PET blow-moulding
- Digital bottle printing



Food and beverage packaging

- Flow wrapping
- Bag maker
- Tray sealing
- Shrink wrapping



Industrial and pharmaceutical packaging

- Palletization
- Top loader
- Cartoning
- Tube filling
- Blister machine
- Liquid filling
- Solid dosing

Advantages at a glance

The VLT® Integrated Servo Drive ISD® 510 system offers numerous advantages, not only in cost savings, but also in installation, operation, and maintenance.

Flexibility and fast process communication

The unique open system architecture with EtherCAT®, Ethernet POWERLINK® and PROFINET® allows the choice of the preferred master controller, and enables the development of high-performance and complex machines.

Fast and simple installation

The use of pre-configured hybrid cables in daisy-chain format reduces the number of cables needed and the risk of incorrect installation. This, together with the quick locking connectors, significantly reduces installation time.

Software

The Toolbox software is easy to use and offers tools for commissioning, CAM editing, debugging and test runs.

Control cabinet space

Because VLT® Servo Access Box SAB® is the only device located in the control cabinet, the size of the cabinet can be significantly reduced. In some applications, this enables the control cabinet to be integrated into the machine frame.

Cost-effective solution

Depending on the application, each SAB® can power up to 64 drives, reducing the number of power supply or distribution modules required. Standard and advanced servo drive variants enable the selection of the most efficient drive for the application.

High protection level

Robust hygienic reliability is assured thanks to:

- IP67 for the housing (shaft IP65)
- Vibration class 3M7 (ideal for rotating machine parts)
- Chemical class 3C3

Shorter machine downtime

Error detection is quick via LEDs on both the servo drive and the SAB®. The LCP can be used for reading error logs directly on the advanced servo drive and SAB®.

Advanced drive user interface

3 extra ports for:

- I/Os and external encoder (e.g. homing or limit switches)
- LCP
- Fully functional Ethernet port (direct connection of third-party fieldbus devices)

Intuitive LCP

Operation is easy thanks to:

- Alphanumeric display and numeric menu
- Quick menus
- Control of brake (for testing)



Smooth surface

The servo drives have a completely smooth, easy-to-clean surface without cooling fins or fan. This design characteristic makes them ideal for food and beverage and pharmaceutical applications.

Protection

High degrees of protection

After years working with the food and beverage industry, Danfoss knows better than most the need for a robust and protected construction.

Therefore, the VLT® Integrated Servo Drive ISD® 510 is available in enclosures with protection ratings IP54 and IP67 (shaft IP65). VLT® Decentral Servo Drive DSD 510 is available in enclosures with protection rating IP67.





Flexible Servo Motion Solution

with unique open system architecture

Real-time communication

Fast process communication

As the servo system supports PROFINET®, EtherCAT® and Ethernet POWERLINK®, fast process communication is guaranteed.

EtherNet/IP™ is planned.

User-friendly programming

The VLT® Integrated Servo Drive ISD® 510 and VLT® Decentral Servo Drive DSD 510 systems include extensive motion libraries for integration in the corresponding PROFINET®, EtherCAT® or Ethernet POWERLINK® engineering environments.

Intelligence inside the drive

The motion control is integrated into the drive so that the motion sequence takes place independently. This enables scaling of the system size independently from the controller.

Conformance to the industry standard IEC 61131-3 increases efficiency when developing applications, and reduces software maintenance costs.



Features and benefits

Feature	Benefit
Dynamic servo performance	Fast, accurate and energy efficient
Compact and decentral servo drive	Reduced costs and high flexibility
Wide range of integrated servo drive variants in frame sizes 1-4	Selection of most suitable drive for the application's torque and power requirements
Real-time systems PROFINET®, EtherCAT® and Ethernet POWERLINK®	Fast process communication
Control via IEC 61131-3	Open system
System setup performance	Simple and fast configuration of several drives
Hybrid cables in daisy-chain concept	Easy and fast installation, reduced number of cables
Removable Local Control Panel (LCP)	Direct connection to the advanced servo drives for fast commissioning, diagnosis and service
LEDs on servo drive and SAB®	Fast and effective monitoring
Standard and Advanced servo drive variants	Cost-effective solution
VLT® Decentral Servo Drive DSD supports HIPERFACE DSL®	Single cable technology, reduced number of cables

Available options

ISD® 510

- Mechanical holding brake
- Feedback:
 - Resolver
 - Single-turn
 - Multi-turn
- Customized flange on request
- Shaft seal
- Flexible hybrid cable

DSD 510

- Feedback:
 - Resolver
 - BiSS single-turn
 - BiSS multi-turn
 - EnDat 2.1
 - EnDat 2.2
 - SinCos
 - Hiperface
 - Hiperface DSL

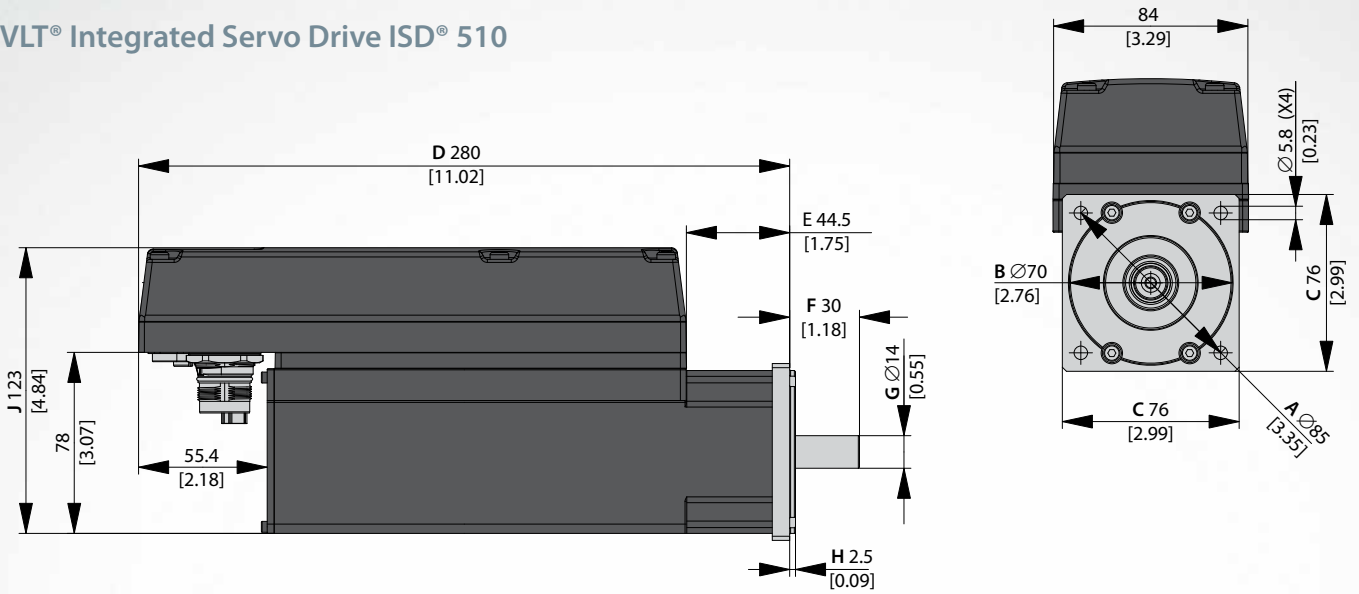
- Supported thermal sensors:
 - KTY
 - PTC
 - NTC
- Flexible hybrid cable

Specifications

VLT® Integrated Servo Drive ISD® 510		Enclosure sizes 1 and 2	Enclosure sizes 4 and 5
Rated voltage	U_{DC} link	565 V DC	565 V DC
Rated torque	M_N	1.5-3.8 Nm	4.6-13 Nm
Maximum torque	M_{0max}	6.1-13 Nm	30-50 Nm
Rated current	I_N	1.4-1.8 A	3.25-5.2 A
Maximum current	I_{0max_rms}	5.7-6.4 A	21.5 A
Rated speed	n_N	2400-4600 rpm	2000-3000 rpm
Rated power	P_N	0.72-0.94 kW	1.5-2.7 kW
Inertia (without mech. brake)	J	0.85/1.45/2.09/2.73 kgcm ²	6.2/9.1/24/40 kgcm ²
Shaft diameter		14/19 mm	24/32 mm
Protection rating		IP54/IP67 (shaft IP65)	IP54/IP67 (shaft IP65)
Safety		STO (Safe Torque Off)	STO (Safe Torque Off)
VLT® Decentral Servo Drive DSD 510			
Rated voltage	U_{DC_LINK}	565 V DC	
Rated current	I_{IN}	8.8 A	
Maximum current	I_{max}	21.5 A	
Rated power	P_N	4.4 kW*	
Protection rating		IP67	
* With mounting plate mm			
VLT® Servo Access Box SAB®			
Input voltage	U_{IN}	400-480 V AC ±10%, 3-phase	
Input current	I_{IN}	11.14 A @ 400 V / 9.3 A @ 480 V	
Output voltage	U_{OUT}	565-680 V DC ±10%	
Rated power	P_N	7.5 kW	
Rated current	I_N	15 A	
Protection rating		IP20	

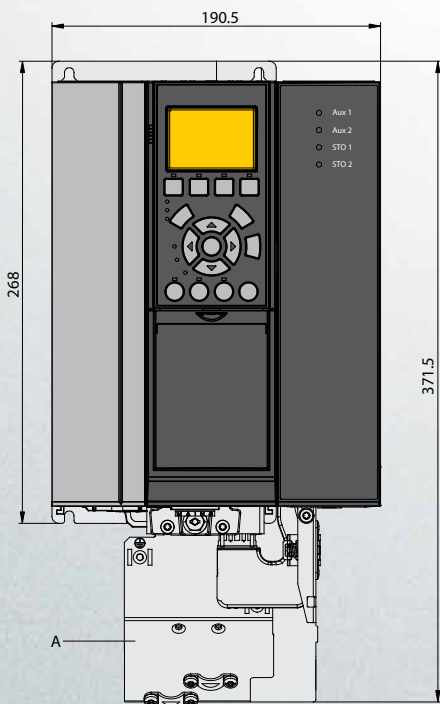
Dimensions

VLT® Integrated Servo Drive ISD® 510



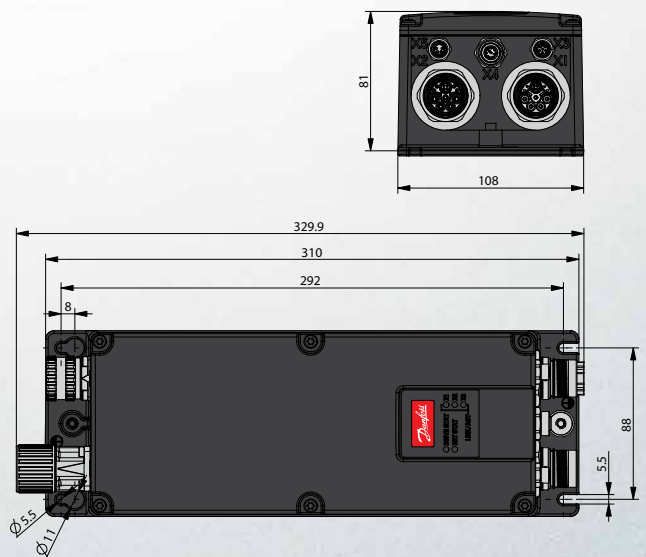
ISD® 510	Dimensions [mm]								
	A	B	C	D	E	F	G	H	J
Size 1 (1.5 Nm)	85	70	76	280	39.5	30	14	2.5	123
Size 2 (2.1 Nm)	100	80	84	252.5	15	40	19	3.0	137
Size 2 (2.9 Nm)	100	80	84	281.5	44.5	40	19	3.0	137
Size 2 (3.8 Nm)	100	80	84	310.5	73.5	40	19	3.0	137
Size 3 (4.1 Nm)	130	110	108	272	N.N.	50	24	3.0	156
Size 3 (5.2 Nm)	130	110	108	306	N.N.	50	24	3.0	156
Size 4 (9 Nm)	165	130	138	333	N.N.	58	32	3.5	186
Size 4 (13 Nm)	165	130	138	351	N.N.	58	32	3.5	186

VLT® Servo Access Box SAB®



A = decoupling plates
All measurements are in mm

VLT® Decentral Servo Drive DSD 510



Ordering type code

VLT® Integrated Servo Drive ISD® 510

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
Fixed	I	S	D	S	1	0		T					D	6																											
Variants							A		0	1	C	5			E	5	4	F	R	X	P	L	S	X	X	T	F	0	7	6	S	X	N	4	6	X	S	X	S	X	
							S		0	2	C	1			E	6	7	F	S	1	E	C	S	C	0	F	F	0	8	4	C	0	N	4	0	B	K	S	C	X	
									0	2	C	9						F	M	1	P	N					F	1	0	8			N	2	9			C			
									0	3	C	8									E	N					F	1	3	8			N	2	4						
									0	4	C	1																					N	3	0						
									0	5	C	2																					N	2	0						
									0	9	C	0																													
									1	3	C	0																													

[01-03] Product group	ISD VLT® Integrated Servo Drive
[04-06] Product variant	510 ISD® 510
[07] Hardware configuration	A Advanced S Standard
[08] Drive torque	T Torque
[09-12] Torque	01C5 1.5 Nm 02C1 2.1 Nm 02C9 2.9 Nm 03C8 3.8 Nm 04C1 4.1 Nm 05C2 5.2 Nm 09C0 9 Nm 13C0 13 Nm
[13-14] DC voltage	D6 600 V DC link voltage
[15-17] Drive enclosure	E54 IP54 E67 IP67

[18-20] Drive feedback	FRX Resolver FS1 Single-turn feedback (17 bit) FM1 Multi-turn feedback (17 bit)
[21-22] Bus system	PL Ethernet POWERLINK® EC EtherCAT® PN PROFINET® EN EtherNet/IP™ *
[23-25] Firmware	SXX Standard SC0 Customized version
[26] Safety	T Safe torque off (STO) F Functional safety *
[27-30] Flange size	F076 76 mm F084 84 mm F108 108 mm * F138 138 mm *
[31-32] Flange type	SX Standard C0 Customized version

[33-35] Motor rated speed	N46 4600 rpm N40 4000 rpm N29 2900 rpm N24 2400 rpm N30 3000 rpm N20 2000 rpm
[36] Mechanical brake	X Without brake B With brake
[37] Motor shaft	S Standard smooth shaft K Standard fitted key C Customized
[38] Motor sealing	X Without sealing S With sealing
[39-40] Surface coating	SX Standard CX Customized

* In preparation

VLT® Decentral Servo Drive DSD 510

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
Fixed	D	S	D	S	1	0							D	6	E	6	7											X	X	X	X	X	X	X	X	X	X	X	X		
Variants							A	C	0	8	C	8						F	X	X	P	L	S	X	X	T													S	X	
							S											F	R	X	E	C	S	C	0	F*													C	X	
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[01-03]	Product group	DSD VLT® Decentral Servo Drive
[04-06]	Product variant	510 DSD 510
[07]	Hardware configuration	A Advanced S Standard
[08]	Current rating	C08C8 8.8 A
[13-14]	DC voltage	D6 600 V DC link voltage
[15-17]	Drive enclosure	E67 IP67

[18-20]	Drive feedback	FXX Without feedback FRX Resolver FS1 BiSS ST Feedback 17bit FM1 BiSS MT Feedback 17bit FSC SinCos FE1 EnDat 2.1 FE2 EnDat 2.2 FHF Hiperface FHD Hiperface DSL
[21-22]	Bus system	PL Ethernet POWERLINK® EC EtherCAT® PN PROFINET® EN EtherNet/IP™

[23-25]	Firmware	SXX Standard SC0 Customized version
[26]	Safety	T Safe torque off (STO) F Functional safety
[39-40]	Surface coating	SX Standard CX Customized

* In preparation



A better tomorrow is **driven by drives**

Danfoss Drives is a world leader in variable speed control of electric motors.

We offer you unparalleled competitive edge through quality, application-optimized products and a comprehensive range of product lifecycle services.

You can rely on us to share your goals. Striving for the best possible performance in your applications is our focus. We achieve this by providing the innovative products and application know-how required to optimize efficiency, enhance usability, and reduce complexity.

From supplying individual drive components to planning and delivering complete drive systems; our experts are ready to support you all the way.

You will find it easy to do business with us. Online, and locally in more than 50 countries, our experts are never far away, reacting fast when you need them.

You gain the benefit of decades of experience, since 1968. Our low voltage and medium voltage AC drives are used with all major motor brands and technologies in power sizes from small to large.

VACON® drives combine innovation and high durability for the sustainable industries of tomorrow.

For long lifetime, top performance, and full-throttle process throughput, equip your demanding process industries and marine applications with VACON® single or system drives.

- Marine and Offshore
- Oil and Gas
- Metals
- Mining and Minerals
- Pulp and Paper

- Energy
- Elevators and Escalators
- Chemical
- Other heavy-duty industries

VLT® drives play a key role in rapid urbanization through an uninterrupted cold chain, fresh food supply, building comfort, clean water and environmental protection.

Outmaneuvering other precision drives, they excel, with remarkable fit, functionality and diverse connectivity.

- Food and Beverage
- Water and Wastewater
- HVAC
- Refrigeration
- Material Handling
- Textile

VLT® | VAGON®

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