

Selection Guide

VLT® Integrated Servo Drive ISD® 510 – **flexible** and **open system**

**1.5-13 Nm
torque**

range gives you
more design
flexibility in your
decentralized
system plans



Decentralized motion solution

VLT® Integrated Servo Drives ISD® 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.

The drive and the motor are integrated, creating a decentralized system. This decentralization of the drive units offers benefits and cost-savings in mounting, installation, and operation.

Flexible solutions – 256 motor variants

The VLT® Integrated Servo Drive ISD® 510 System has been designed to cover a wide range of applications, such as turntable applications,

labelling, capping, food packaging, and pharmaceutical packaging.

With 256 standard and advanced motor variants, 4 flange sizes, 3 feedback options, optional mechanical brake, and customization options, the ISD® 510 servo drive can be tailored to meet specific customer requirements.

The servo drives are currently 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 System, 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 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.

Up to
50%
cost savings on
installation costs
thanks to the 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 a Danfoss frequency converter 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®. The reduction of the number of 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® and Ethernet POWERLINK® and allowing third party master controllers to be used.

PROFINET® and EtherNet/IP™ are in preparation.

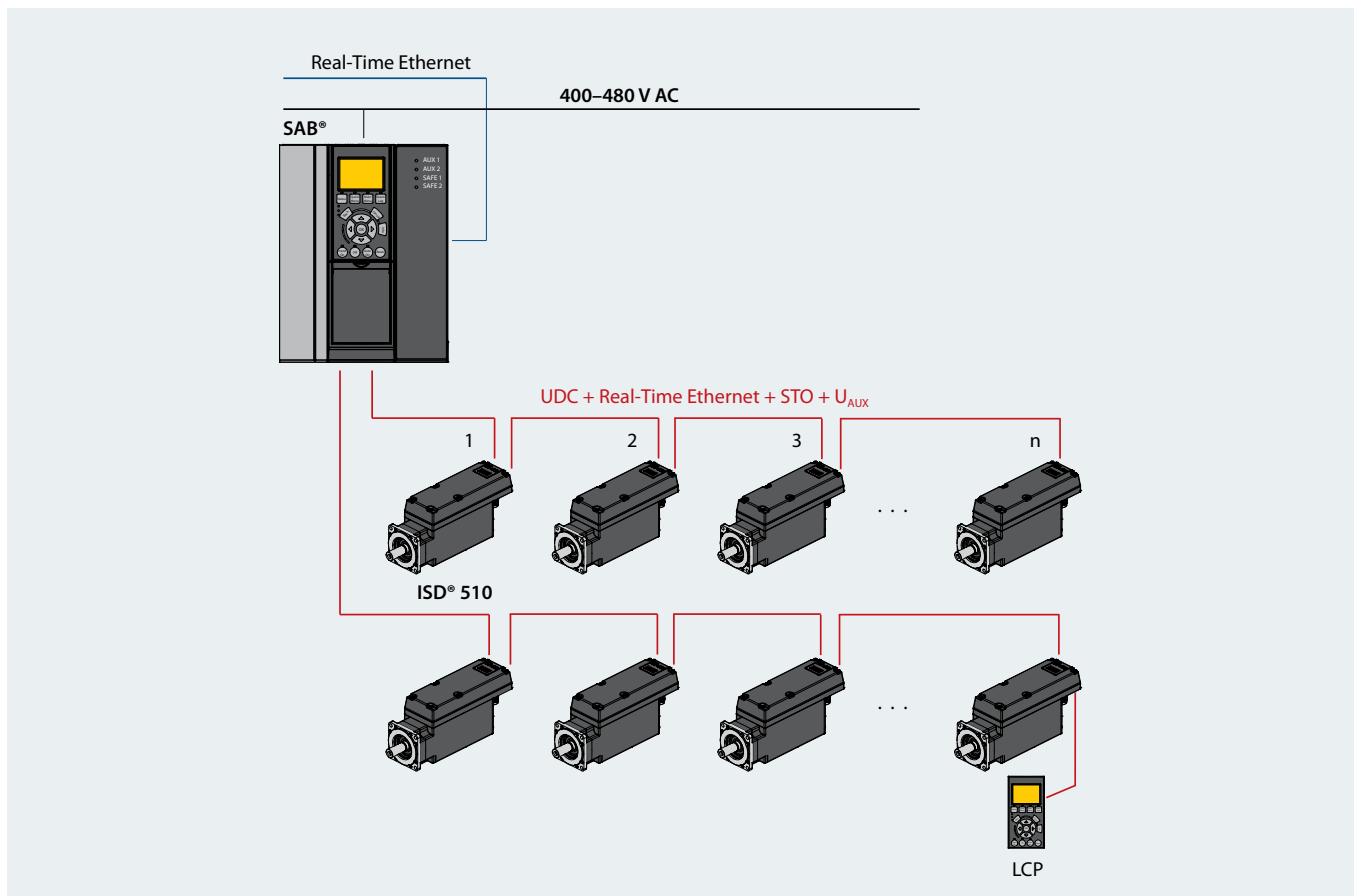
Masters can be programmed via IEC 61131-3 and fieldbus devices can easily be plugged in to the servo drives directly.

Savings in maintenance

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

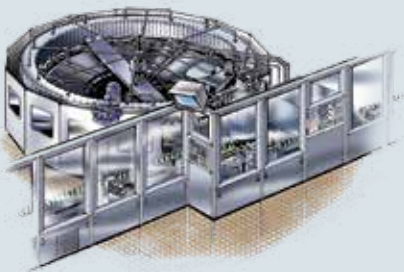
With the VLT® Integrated Servo Drive ISD® 510 System, Danfoss delivers easy preventive maintenance. The use of high-quality, heavy duty bearings, means that the system is virtually maintenance free. The only spare part needed is the shaft seal (when used).

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



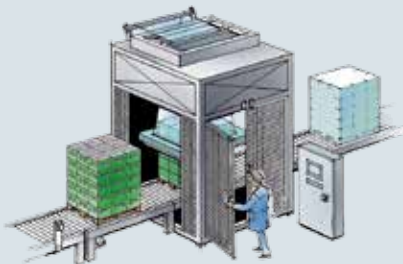


Typical applications



Beverage

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



Food and beverage packaging

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



Industrial and pharmaceutical packaging

- Palletisation
- 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 open system architecture with EtherCAT® and Ethernet POWERLINK® allows the choice of the preferred master controller, and enables the development of high-performance and complex machines. The planned PROFINET® and EtherNet/IP™ solutions will increase the choice further.

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.

Licence-free software

The licence-free ISD® Toolbox software is easy to use and offers tools for commissioning, CAM editing, debugging, and test runs.

Control cabinet space

The fact that the SAB® is the only device located in the control cabinet, means 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

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

Shorter machine downtime

Quicker error detection 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

- 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 it 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 IP54 and IP67 (shaft IP65).



**Flexible
Servo Motion
Solution**
with open system
architecture

Real-time communication

Fast process communication

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

PROFINET® and EtherNet/IP™ are planned.

Intelligence inside the drive

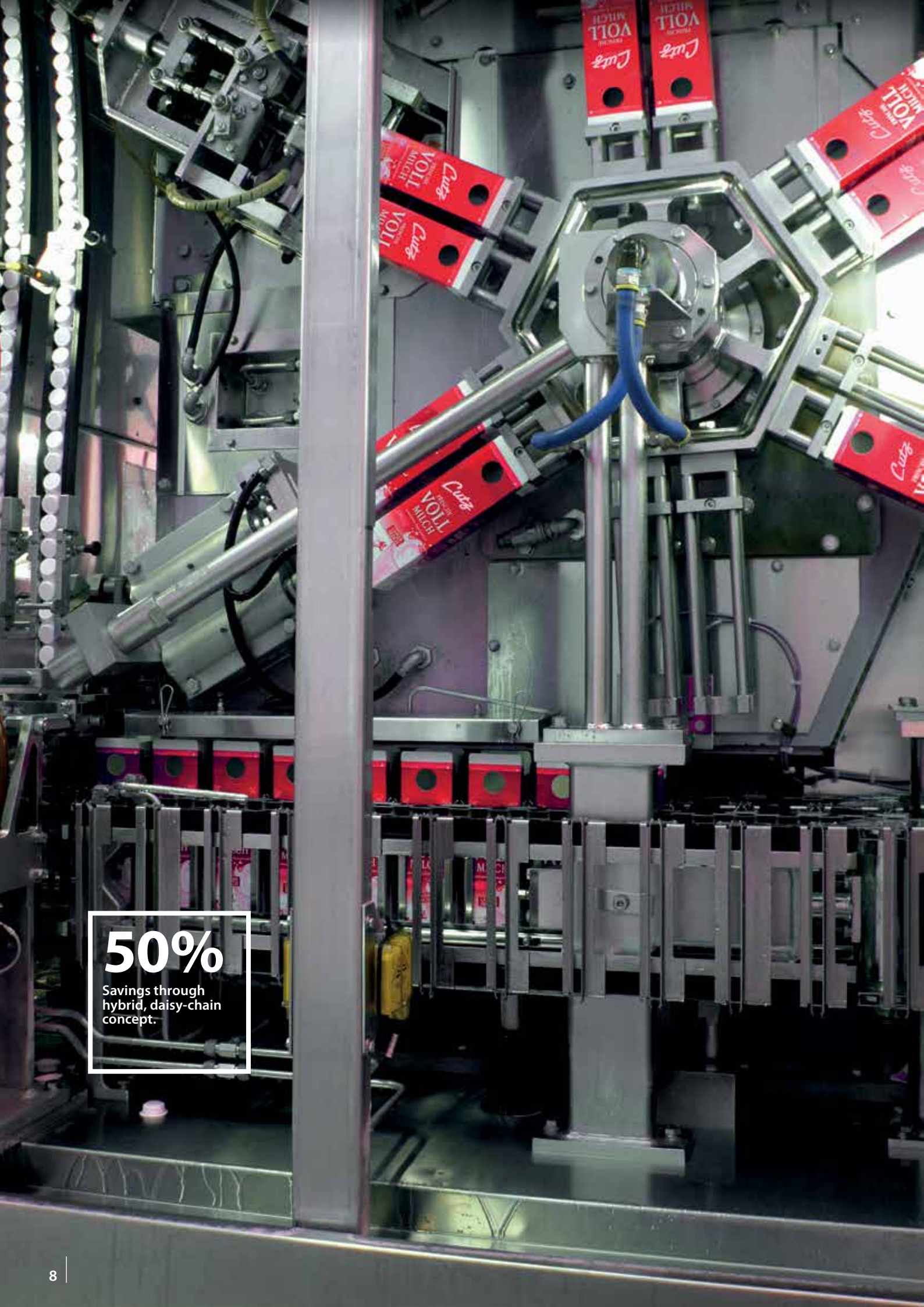
The motion control is integrated into the drive so that the motion sequence takes place independently. This enables scaling of the system size independently of the controller.

User-friendly programming

The VLT® Integrated Servo Drive ISD® 510 System includes extensive motion libraries for integration in the corresponding EtherCAT® or Ethernet POWERLINK® engineering environments.

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





50%

Savings through
hybrid, daisy-chain
concept.

Features and benefits

Feature	Benefit
Dynamic servo performance	Fast, accurate, and energy-efficient
Compact and decentral servo drive	Reduced costs and high flexibility
64 standard servo drive variants in sizes 1 & 2	Selection of most suitable drive for the application's torque and power requirements
Real-time systems 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

Available options

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

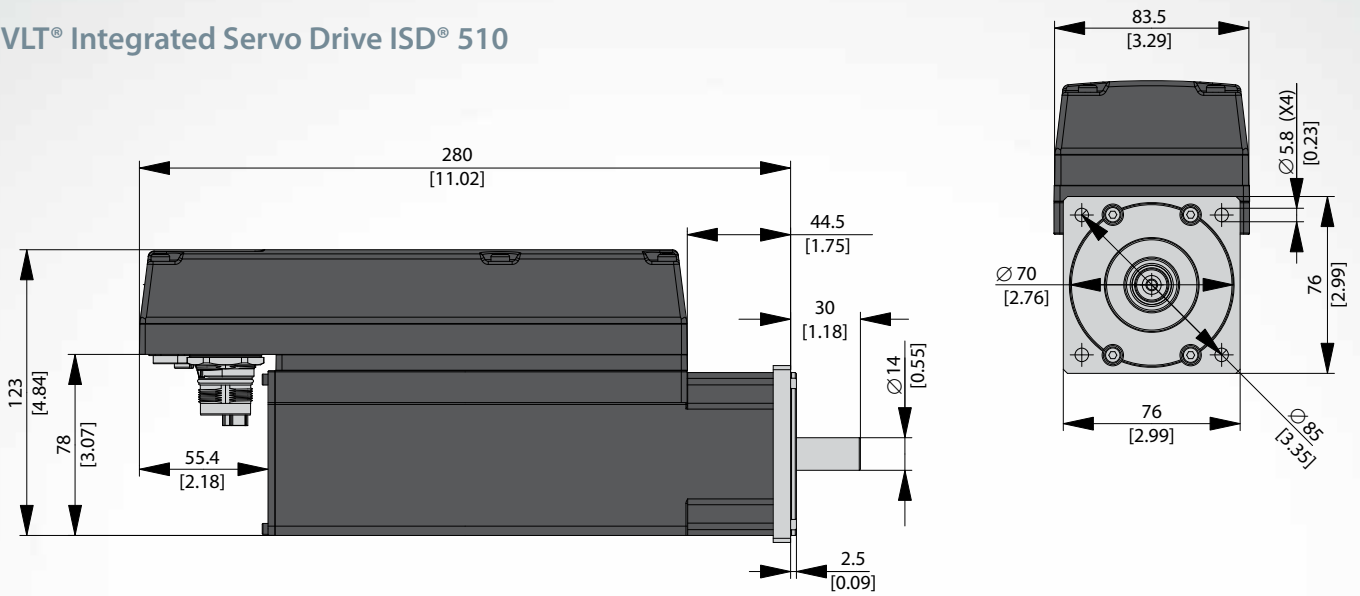
Specifications

ISD® 510 Servo Drive		
Rated voltage	U_{DC} link	565 V DC
Rated torque	M_N	1.5-3.8 Nm
Maximum torque	M_{0max}	6.1-13 Nm
Rated current	I_N	1.4-1.8 A
Maximum current	I_{0max_rms}	5.7-6.4 A
Rated speed	n_N	2400-4600 rpm
Rated power	P_N	0.72-0.94 kW
Inertia (without mech. brake)	J	0.85 / 1.45 / 2.09 / 2.73 kgcm ²
Shaft diameter		14 / 19 mm
Protection rating		IP54 / IP67 (shaft IP65)
Safety		STO (Safe Torque Off)

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

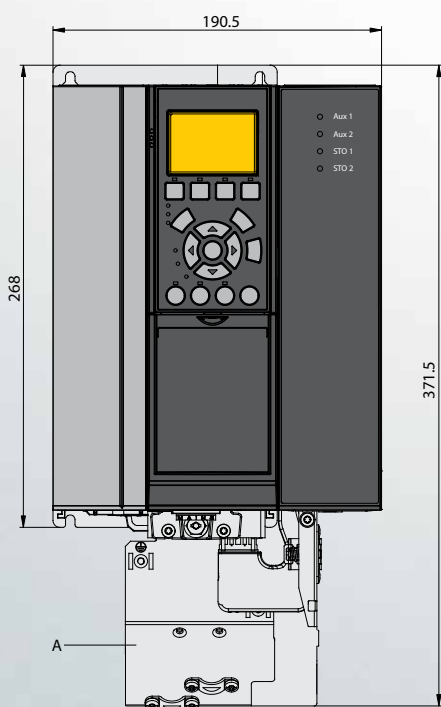
Dimensions

VLT® Integrated Servo Drive ISD® 510



Servo Drive ISD® 510	Dimensions [mm]									
	A	B	C	D	E	F	G	H	I	J
Size 1 (1.5 Nm)	85	70	76	280	39.5	30	14	2.5	70	123
Size 2 (2.1 Nm)	100	80	84	252.5	15	40	19	3.0	84	137
Size 2 (2.9 Nm)	100	80	84	281.5	44.5	40	19	3.0	84	137
Size 2 (3.8 Nm)	100	80	84	310.5	73.5	40	19	3.0	84	137

VLT® Servo Access Box SAB®



A = decoupling plates
All measurements are in mm

Ordering type code for 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	5	C	1																					N	2	3					
									0	7	C	2																					N	2	2					
									1	0	C	4																					N	1	6					
									1	5	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 05C1 5.1 Nm * 07C2 7.2 Nm * 10C4 10.4 Nm * 15C0 15 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 N23 2300 rpm * N22 2200 rpm * N16 1600 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



Danfoss Drives

Danfoss Drives is a world leader in variable speed control of electric motors. We aim to prove to you that a better tomorrow is driven by drives. It is as simple and as ambitious as that.

We offer you unparalleled competitive edge through quality, application-optimized products targeting your needs – 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.

We draw on decades of experience within industries that include:

- Chemical
- Cranes and Hoists
- Food and Beverage
- HVAC
- Lifts and Escalators
- Marine and Offshore
- Material Handling
- Mining and Minerals
- Oil and Gas
- Packaging
- Pulp and Paper
- Refrigeration
- Water and Wastewater
- Wind

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.

Since 1968, we have been pioneers in the drives business. In 2014, Vacon and Danfoss merged, forming one of the largest companies in the industry. Our AC drives can adapt to any motor technology and we supply products in a power range from 0.18 kW to 5.3 MW.