



# Ultimate freedom – one system for central and decentral servo motion

Flexible system for modular  
machine architecture



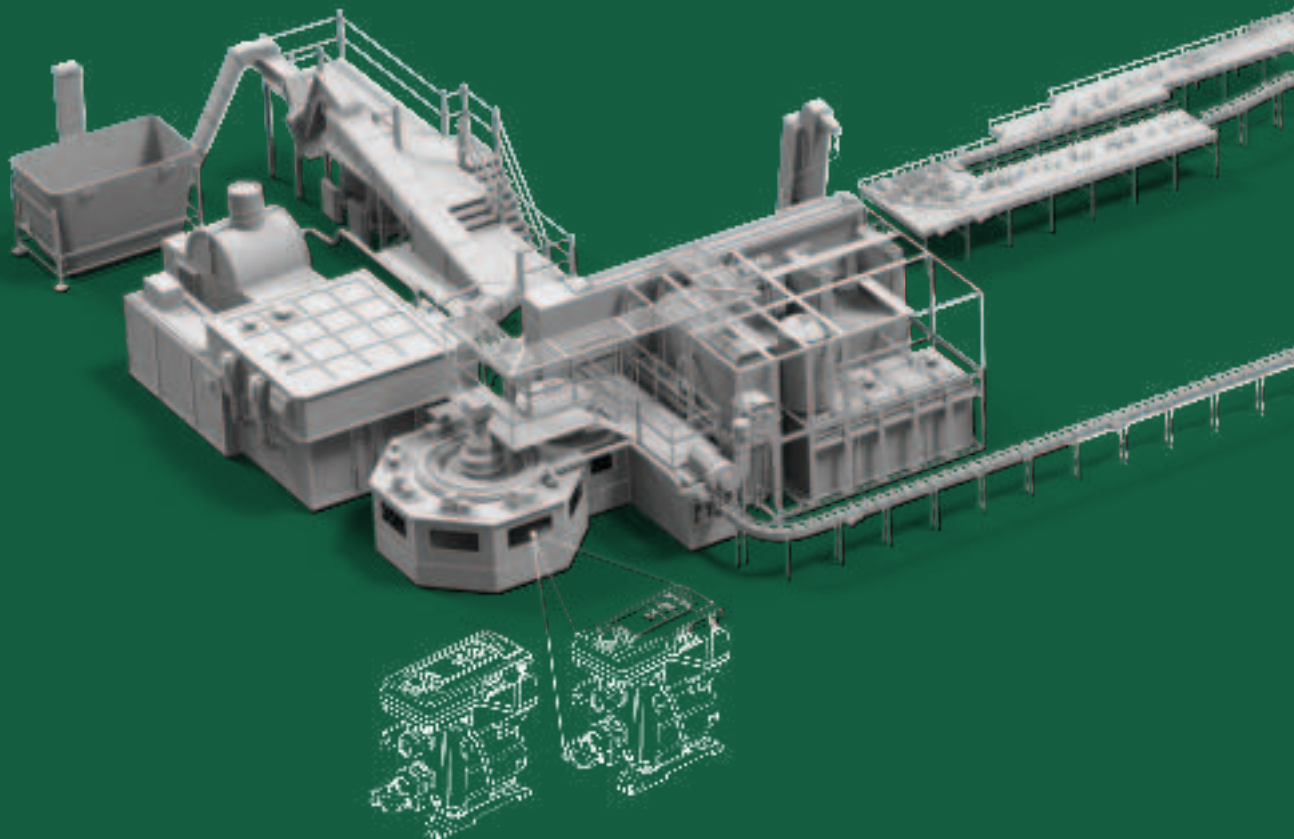
# The future of smart machine design – it's flexible

Are you striving to modularize machine architecture to suit your business?

Then take a look at Danfoss VLT® FlexMotion™. It's a multi-purpose universally compatible servo drive concept, designed to meet the requirements of tomorrow's machine architecture, today. Combine and **scale** the modules to suit your specific needs. That way, its central and decentral modules will allow you to achieve a multitude of functions. **Open** system architecture gives you total freedom to integrate with the motors and PLC you prefer.

Save time and costs thanks to numerous finesses facilitating **fast** installation and commissioning. All designed for absolutely **reliable** operation in demanding environments.

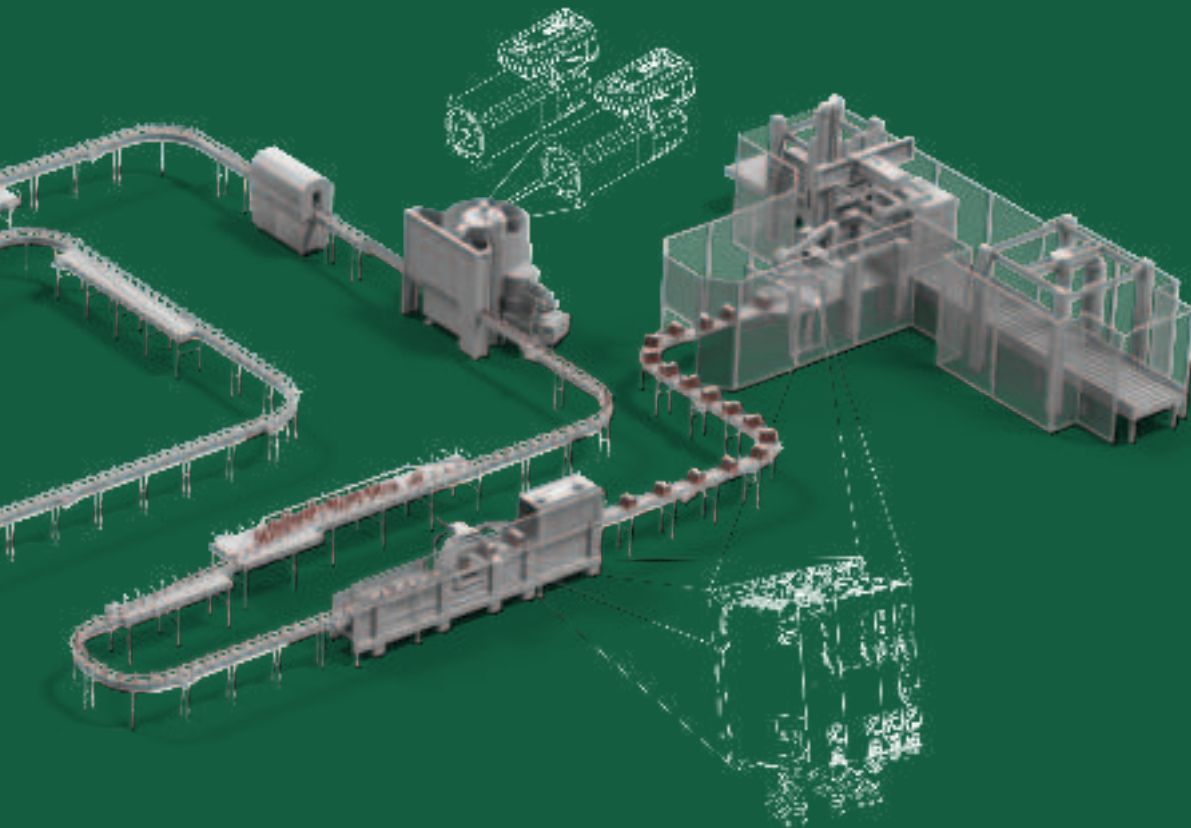
All in all, this system gives you the ultimate freedom in machine design.



VLT® Decentral Servo Drive DSD 520

# SCALABLE OPEN FAST RELIABLE

VLT® Integrated Servo Drive ISD® 520



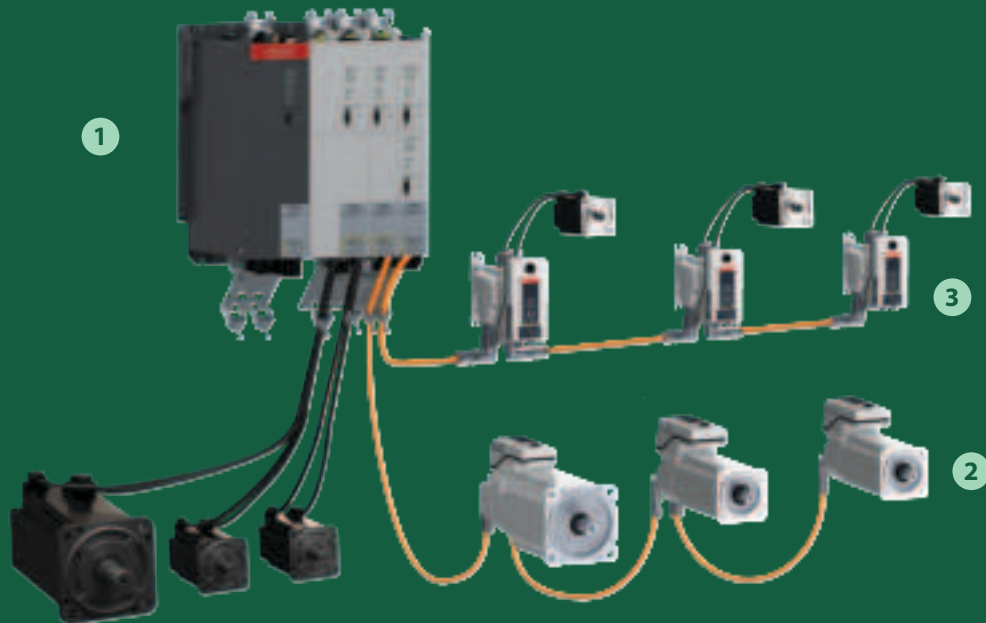
VLT® Multiaxis Servo Drive MSD 520

# Let flexibility flourish in your machine design

Danfoss can help you wherever you are in your 'machines for smart manufacturing' journey. You can achieve a whole new degree of customization and precision – enabling you to get more from less. The combination of central and decentral drives in VLT® FlexMotion™ ensures you achieve maximum flexibility in machine design and system integration.

Be smart. Build your machine to meet tomorrow's requirements.

**Let Danfoss support your business.**



## Build modular machines using a versatile system

### Scalable concept

Modern machine systems need to be extremely flexible in terms of adaptability and extensions. This criterion also applies for all the system components used in the VLT® FlexMotion™ machine design – it is specially designed to give you the ultimate freedom in your design projects.

Each module allows machine builders to sustain maximum flexibility in case the need arises to add a new line – or extend an existing line with additional drives.

Combine these VLT® FlexMotion™ product lines according to your needs:

- 1 VLT® Multiaxis Servo Drive MSD 520
- 2 VLT® Integrated Servo Drive ISD® 520
- 3 VLT® Decentral Servo Drive DSD 520

Use the VLT® Multiaxis Servo Drive MSD 520 as a servo hub and combine with standard permanent-magnet (PM) or asynchronous (ASM) motors, decentral servo drives (DSD 520) or even motors with integrated servo drives (ISD 520). This concept minimizes cabinet space occupied, cable length, and installation time.

At the same time it maximizes performance, precision and modularity.

The VLT® Integrated Servo Drive ISD® 520 system serves a wide range of applications, such as turntable applications, labeling, capping, food packaging and pharmaceutical packaging.

You can tailor the drive to meet specific customer requirements thanks to:

- various drive options
- 5 flange sizes
- optional mechanical brake
- customization options

The VLT® Decentral Servo Drive DSD 520 is a compact servo drive

where the drive electronics are installed close to, but separate from the motor. The servo drives are connected to the motors via cables. This setup optimizes cabinet space and improves your system flexibility by providing a wide range of feedback options and compatibility with permanent magnet (PM) as well as induction motors (IM).

All of these features support you in creating easily extendable and adaptable machines.

## Specify the rest of the system as you please Free choice thanks to **open platform**

We respect that you are in the best position to decide what technologies are optimal for your system. Therefore, we leave all your options open and do not lock you into one protocol. We don't expect you to switch protocols to fit the drive – on the contrary, these drives fit into any system. Feel free to choose the communication and engineering platforms you prefer.

### Your preferred protocol

The open system architecture of VLT® FlexMotion™ supports the real-time Ethernet protocols PROFINET®, POWERLINK® and EtherCAT®. It also allows you to use third-party master controllers. Program masters via IEC 61131-3 and PLCopen-conformant motion libraries make the system even more flexible and easy to integrate into diverse engineering environments. Gateway-free fieldbus communication contributes to seamless communication with less equipment. You can plug other fieldbus devices mounted in the machine directly into the advanced decentral drives.

### Your safety net

Implement servo control for highly demanding applications with the factory option VLT® FlexSafety™, which offers numerous functional safety capabilities. Level SIL3 (IEC 61508), Ple / CAT3 (ISO 13849) is achievable for PROFIsafe and FSoE over fieldbus. The offering includes STO, SS1, SS2, SOS, SLA, SAR, SLS, SSR, SLP, SLI, SDI, SCA, SSM, SBC, SBT for safe stop, speed, ramp, CAM and brake functions. Optionally, safe digital Inputs and outputs allow access to several functions independently from the fieldbus.

### Your optimal motor

Whatever the need, you can choose the motor technology that best fits your application. Whether it's an ISD® 520 with nominal torque up to 13.8 Nm (peak torque up to 39 Nm), a combination of DSD 520 and a PM or ASM motor up to 2.3 kW power, or even a motor up to a power rating of 20 kW combined with one of the central servo drive modules (SDM 521 or SDM 522); by supporting a wider range of feedback encoders, your choice is completely open.

EtherCAT®

Safety over  
EtherCAT®

PROFI  
NET



POWERLINK



# Save time in installation

## Fast and fail-safe

Save time with effective measures that the system electrician will appreciate. With a fresh and inventive approach, the VLT® FlexMotion™ concept reduces the complexity of mounting and commissioning. And there are no compromises – the result meets the highest safety and quality standards.



*Click and Lock mounting concept for easy installation.*

### Click and Lock mounting

Enjoy easy mounting and fail-safe installation thanks to the unique Click and Lock concept where DC-link and control voltage supply are integrated in the backplate of each module. Save time – there is no need to use additional components like wires or bus bars.

### Intelligent user interface

Enjoy the effective all-in-one interface, VLT® Servo Toolbox software: It's streamlined, intuitive, and offers a wealth of integrated tools for commissioning, CAM editing, debugging and test runs.

Commission, troubleshoot and complete service tasks faster with the VLT® Local Control Panel LCP 102. It adds the power of speed in accessing the advanced decentral servo drives and all central modules of the concept. For fast working routines, it features a graphical display, quick access menus and a clear parameter structure as well as easy-to-read status LEDs.

### Streamlined, fail-safe cabling

The decentralization of drives in the VLT® FlexMotion™ concept reduces the number of cables required. The VLT® Power Supply Module PSM520 integrated Decentral Access Module factory option connects to the first servo drive via a pre-configured hybrid cable. This single cable combines the 565-680 V DC power supply, the 24/48 V DC, the STO signal and the bus communication. The hybrid cable loops these signals to further servo drives connected in the daisy-chain format.

For VLT® Integrated Servo Drive ISD® 520, this streamlined cabling infrastructure eliminates the need for extra equipment, such as separate feedback cables and connection boxes. The Plug and Twist cabling concept ensures fast and fail-safe installation.

# When your name is at stake, integrity is critical

## Reliable performance

With your name on the machine it's essential to deliver quality. We recognize and respect your need to maintain the integrity you have established over long relationships with your customers. Save time on researching complex combinations of different equipment to achieve exactly the performance you require. With VLT® FlexMotion™ you tap into a coherent concept of building blocks with proven compatibility and performance. For any system you choose to build, the outcome is fuss-free reliability with maximum uptime.

### Resistance in demanding environments

After years of working with the food and beverage industry, we understand the need for robust performance based on well-protected construction. Therefore, the decentral servo drives ISD® 520 and DSD 520 are available with enclosures rated up to IP67\*. A completely smooth and easy-to-clean surface, free of cooling fins or fans, makes these drives hygienically fully reliable and chemical-resistant. Vibration class 3M7 ensures trouble-free operation and renders these drives ideal for rotating machine parts.

### Time-saving straightforward design

Maintenance costs can be kept to a minimum because the VLT® FlexMotion™ modules are virtually maintenance-free – they're built for robust reliability. The drives use high-quality bearings, and the only spare part needed is the shaft seal. The fact that no tools are required to work with the hybrid cables results in significant time-savings.

Detect errors quickly via LED signals on all central and decentral modules.

The advanced drives versions provide three extra ports for:

- I/Os and external encoder; for example, homing or limit switches
- User interface: VLT® Local Control Panel LCP 102
- Fully functional Ethernet\*\* (for direct connection of third-party fieldbus devices)

\* for details please check ordering type codes on pages 15 and 17.

\*\* available for EtherCAT and POWERLINK drives.

### Typical applications



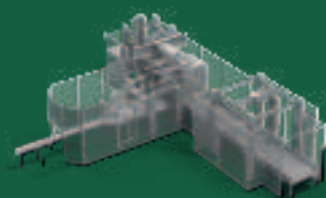
#### Beverage

- 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

# VLT® Multiaxis Servo Drive MSD 520

The MSD 520 system is a generic central servo solution and forms the basis of the VLT® FlexMotion™ concept. Its flexibility and modularity in hardware and software gives you the freedom to design machines according to the application needs.

The MSD 520 system comprises these modules:

- VLT® Power Supply Module PSM 520
- VLT® Servo Drive Module SDM 521 for single axis and SDM 522 for double axis
- VLT® Expansion Module EXM 520



To optimize the space requirements, some of the modules are available in two frame sizes, either 50 mm [1.97 inch] or 100 mm [3.94 inch] wide.

Enjoy easy mounting and fail-safe installation thanks to a unique Click and Lock concept where DC-link and control voltage supply are integrated in the backplate of each module. Depending on the machine architecture, you can use the MSD 520 as a stand-alone central concept or in a mixed system together with the VLT® Integrated Servo Drive ISD® 520 and VLT® Decentral Servo Drive DSD 520. Extensions or adjustments to the machine are easy to implement – just add or swap modules accordingly.

> VLT® Power Supply Module PSM 520

> VLT® Servo Drive Modules SDM 521 and SDM 522

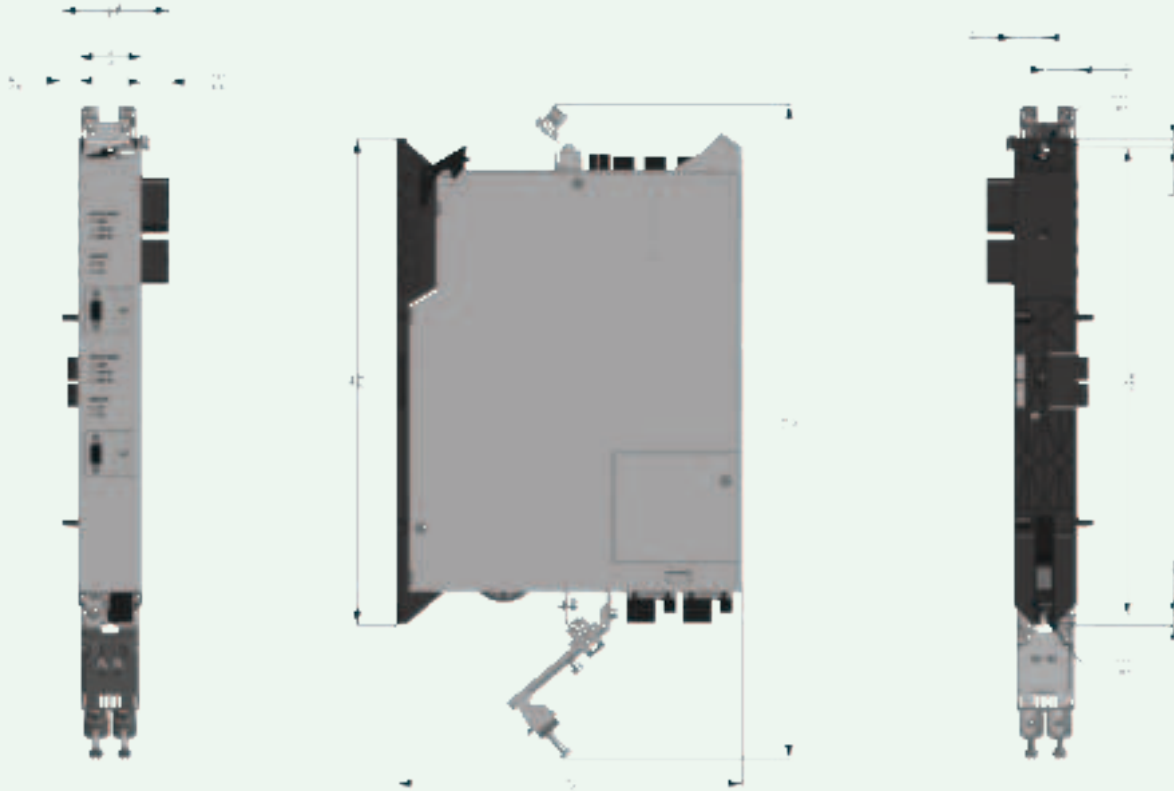
> VLT® Expansion Module EXM 520

## Specifications

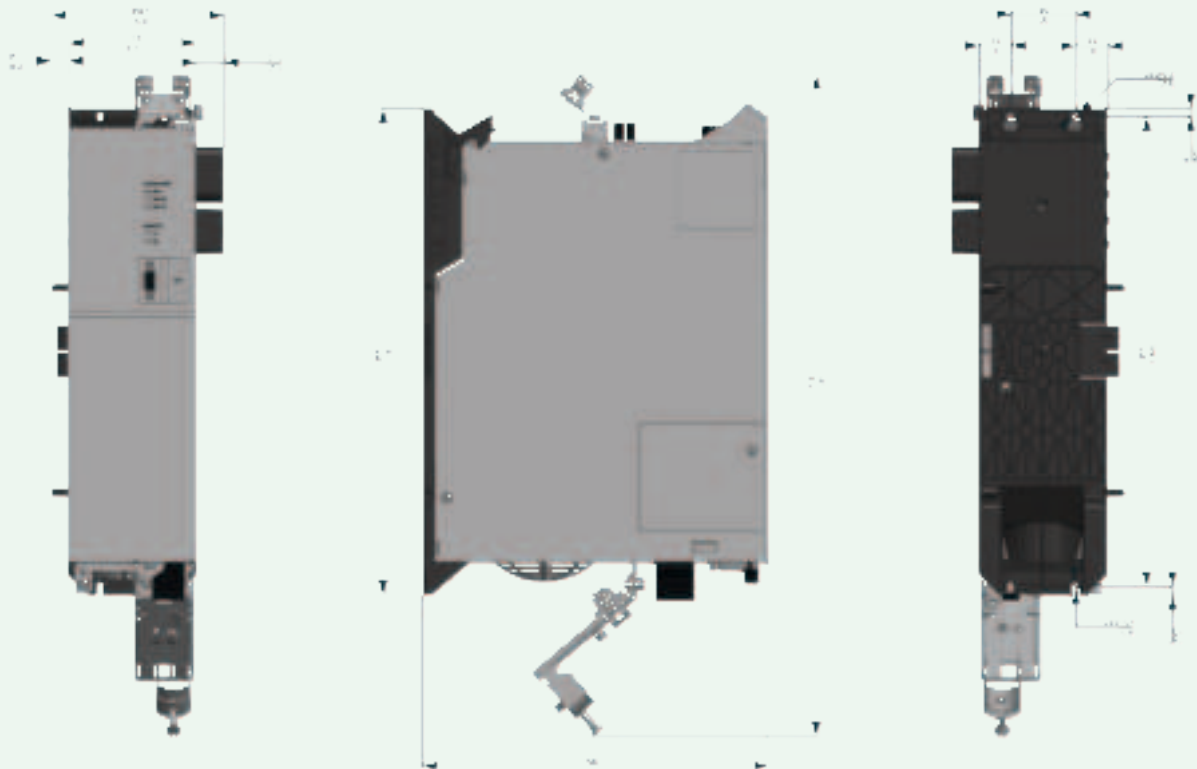
|                                         |                                                                        |
|-----------------------------------------|------------------------------------------------------------------------|
| Nominal input voltage                   | 3 ~ 400-480 V AC +/-10%                                                |
| Mains frequency                         | 50/60 Hz                                                               |
| DC-link voltage                         | 565-680 V DC +/-10%                                                    |
| Control voltage                         | 24/48 V DC +/-10%                                                      |
| Ambient temperature                     | 5-40 °C, max 55 °C with derating [41-104 °F, max 131 °F with derating] |
| Fieldbus                                | PROFINET®, POWERLINK®, EtherCAT®                                       |
| IP protection class                     | IP20                                                                   |
| Modular construction with 2 frame sizes | FS1 50 mm [1.97 inch] or FS2 100 mm [3.94 inch]                        |
| Mounting                                | Wall-mounting on backplate – click & lock                              |
| EMC according 61800-3                   | C3, C2 with external filter                                            |
| Certificates/Approvals                  | CE, UL                                                                 |
| Functional safety                       | STO SIL 2 PL d                                                         |

## Dimensions

Frame size 1 (FS1)



Frame size 2 (FS2)



Dimensions are in mm [inch]

## VLT® Power Supply Module PSM 520



The PSM 520 module generates a 565-680 DC-link voltage and is available in 3 power sizes with either 10, 20 or 30 kW and 200% overload capability. To achieve a nominal output up to 60 kW, install two PSM 520 units in parallel.

The PSM 520 module connects the VLT® Integrated Servo Drive ISD® 520 and VLT® Decentral Servo Drive DSD 520 through a hybrid feed-in cable to the MSD 520 system. This gives you great flexibility and freedom to design the servo system according to your application needs. Supports modular machine architectures.

## Specifications

|                                                |           | PSM 520 10 kW      | PSM 520 20 kW      | PSM 520 30 kW |
|------------------------------------------------|-----------|--------------------|--------------------|---------------|
| Nominal input voltage                          | V AC      |                    | 3 x 400-480 +/-10% |               |
| DC-link voltage                                | V DC      |                    | 565-680 +/-10%     |               |
| Rated output current                           | A         | 20                 | 40                 | 60            |
| Rated output power                             | kW [hp]   | 10 [13.4]          | 20 [26.8]          | 30 [40.2]     |
| Peak current $i_{max}$                         | A         | 40                 | 80                 | 120           |
| Peak power $P_{max}$                           | kW [hp]   | 20 [26.8]          | 40 [53.6]          | 60 [80.4]     |
| Internal brake resistor                        |           |                    |                    |               |
| Peak power $P_{max}$                           | kW        |                    | 8                  |               |
| Rated power $P_N$                              | W         |                    | 150                |               |
| Nominal resistance                             | $\Omega$  |                    | 15                 |               |
| External brake resistor                        |           |                    |                    |               |
| Peak power $P_{max}$                           | kW        |                    | 37.5               |               |
| Rated power $P_N$                              | kW        |                    | 7.5                |               |
| Minimum resistance                             | $\Omega$  |                    | 15                 |               |
| Cooling                                        |           |                    | Integrated fan     |               |
| Module width                                   | mm [inch] |                    | 100 [3.94]         |               |
| Frame size                                     |           |                    | FS 2               |               |
| Weight                                         | kg [lbs]  |                    | 6 [13.2]           |               |
| <b>Factory Option, Decentral Access Module</b> |           | <b>DAM 15-25 A</b> |                    |               |
| DC-link voltage                                | V DC      |                    | 565-680 +/-10%     |               |
| Output current DC-link                         | A         |                    | 15-25              |               |
| Output current auxiliary supply                | A         |                    | 15                 |               |

## VLT® Servo Drive Modules SDM 521 and SDM 522



The SDM 521 module is a single-axis servo drive, available in 5 power sizes. The SDM 522 module is a double-axis servo drive, available in 3 power sizes.

A wide range of feedback options allows you to choose your preferred PM or ASM motor. Alternatively you can also run the motor without feedback. Furthermore, the drive modules are equipped with digital I/Os and integrated Safe Torque Off (STO). Functional safety over fieldbus and additional I/O are available as factory options.

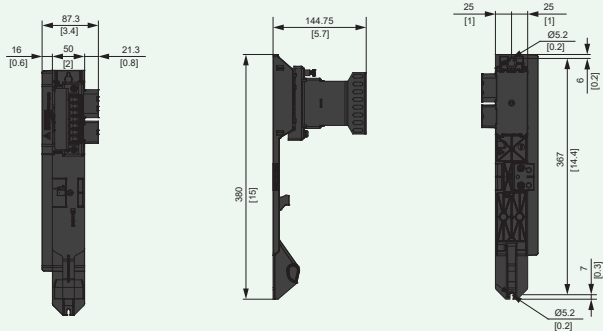
## Specifications

|                              |           | SDM521-xx      | SDM521-xx  | SDM521-xx   | SDM521-xx   | SDM521-xx   | SDM522-xx     | SDM522-xx      | SDM522-xx     |
|------------------------------|-----------|----------------|------------|-------------|-------------|-------------|---------------|----------------|---------------|
| DC-link                      | V DC      | 565-680 +/-10% |            |             |             |             |               |                |               |
| Rated current I <sub>n</sub> | A         | 2.5            | 5          | 10          | 20          | 40          | 2 x 2.5       | 2 x 5          | 2 x 10        |
| Rated power P <sub>n</sub>   | kW [hp]   | 1.4 [1.9]      | 2.8 [3.8]  | 5.7 [7.6]   | 11.3 [15.2] | 22.6 [30.3] | 2 x 1.4 [1.9] | 2 x 2.8 [3.8]  | 2 x 5.7 [7.6] |
| Peak current                 | A         | 7.5            | 15         | 30          | 45          | 90          | 2 x 7.5       | 2 x 15         | 2 x 30        |
| Peak power                   | kW [hp]   | 4.2 [5.7]      | 8.5 [11.5] | 17.0 [22.8] | 25.4 [34.5] | 50.8 [69.1] | 2 x 4.2 [5.7] | 2 x 8.5 [11.6] | 2 x 17 [23.1] |
| Nominal switching frequency  | kHz       | 4/5            |            |             |             |             |               |                |               |
| Possible switching frequency | kHz       | 8/10           |            |             |             |             |               |                |               |
| Maximum output frequency     | Hz        | 590            |            |             |             |             |               |                |               |
| Number of motor connections  |           | 1              |            |             |             |             | 2             |                |               |
| Cooling                      |           | Integrated fan |            |             |             |             |               |                |               |
| Module width                 | mm [inch] | 50 [1.97]      |            |             |             | 100 [3.94]  | 50 [1.97]     |                |               |
| Frame size                   |           | FS 1           |            |             |             | FS 2        | FS 1          |                |               |
| Weight                       | kg [lbs]  | 3.9 [8.6]      |            |             |             | 5.5 [12.1]  | 4.0 [8.8]     |                |               |

## VLT® Expansion Module EXM 520



Expansion Module (EXM 520)



Dimensions are in mm [inch]

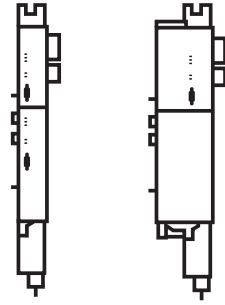
To support a modular machine architecture the EXM 520 can be used to split the MSD 520 system into 2 cabinets. The max. distance between the cabinets (cable length) is 5 meters.

### Specifications

| EXM 520                 |           |                |
|-------------------------|-----------|----------------|
| Ordering number         |           | 175G0194       |
| DC-link                 | V DC      | 565-680 +/-10% |
| Maximum current DC-link | A         | 62             |
| Module width            | mm [inch] | 50 [1.97]      |
| Weight                  | kg [lbs]  | 0.6 [1.1]      |



## Ordering model code <sup>1)</sup>



| Product group (character 1-5)             |                                    |
|-------------------------------------------|------------------------------------|
| MSD510                                    | VLT® Multiaxis Servo Drive MSD 520 |
| Product category (character 6-7)          |                                    |
| SA                                        | Air-cooled                         |
| Product type (character 8-9)              |                                    |
| PS                                        | Power Supply Module                |
| AS                                        | Axis Single Module                 |
| AD                                        | Axis Double Module                 |
| Mains voltage (character 10-11)           |                                    |
| 04                                        | 400-480 V AC                       |
| D6                                        | 600 V DC                           |
| Output (character 12-16)                  |                                    |
| Power supply modules                      |                                    |
| -10P0                                     | 10 kW                              |
| -20P0                                     | 20 kW                              |
| -30P0                                     | 30 kW                              |
| Axis single/double modules                |                                    |
| -02A5                                     | 2.5 A                              |
| -05A0                                     | 5.0 A                              |
| -10A0                                     | 10 A                               |
| -20A0                                     | 20 A                               |
| -40A0                                     | 40 A                               |
| Communication interface (character 17-18) |                                    |
| PL                                        | Ethernet POWERLINK®                |
| EC                                        | EtherCAT®                          |
| PN                                        | PROFINET®                          |

| Power supply modules                        |                                    |
|---------------------------------------------|------------------------------------|
| Functional safety (character +)             |                                    |
| +BEF1                                       | Hard-wired STO (standard)          |
| Option board (character +)                  |                                    |
| +CTXX                                       | Without option board (standard)    |
| Integrated brake chopper (character +)      |                                    |
| +ACBC                                       | Yes (with integrated resistor)     |
| Integrated common mode filter (character +) |                                    |
| +AIC1                                       | Yes (with integrated filter)       |
| DC fuses and devices (character +)          |                                    |
| +AKXX                                       | Without (standard)                 |
| +AKD1                                       | DAM option 15A                     |
| +AKD2                                       | DAM option 20A                     |
| Standard I/Os (character +)                 |                                    |
| +BDS1                                       | With Basic I/Os                    |
| Product software (character +)              |                                    |
| +ECXXX                                      | Latest released version (standard) |
| Technical documentation (character +)       |                                    |
| +EGXX                                       | Without (standard)                 |
| +EGIN                                       | Installation Guide                 |
| Packaging (character +)                     |                                    |
| +TACB                                       | Cardboard box (standard)           |

| Axis single/double modules            |                                                 |
|---------------------------------------|-------------------------------------------------|
| Functional safety (character +)       |                                                 |
| +BEF1                                 | Hard-wired STO (standard)                       |
| +BEFS                                 | VLT® FlexSafety™ functional safety via fieldbus |
| Option board (character +)            |                                                 |
| +CTXX                                 | Without option board (standard)                 |
| +CTIO                                 | Standard I/O option board                       |
| +CTSO                                 | Safe I/O option board                           |
| DC fuses and devices (character +)    |                                                 |
| +AKFX                                 | With DC link fuses (standard)                   |
| Standard I/Os (character +)           |                                                 |
| +BDS1                                 | With Basic I/Os                                 |
| Motor feedback (character +)          |                                                 |
| +FFMF                                 | Multi feedback (standard)                       |
| Motor brake control (character +)     |                                                 |
| +IDBS                                 | With brake control (standard)                   |
| Product software (character +)        |                                                 |
| +ECXXX                                | Latest released version (standard)              |
| Technical documentation (character +) |                                                 |
| +EGXX                                 | Without (standard)                              |
| +EGIN                                 | Installation Guide                              |
| Packaging (character +)               |                                                 |
| +TACB                                 | Cardboard box (standard)                        |

<sup>1)</sup> Note: Not all combinations are possible.  
To configure your drive with correct combinations,  
use the online configurator located here:  
[Motion Controls and Servo Drives](#)

## Example

### Servo drive modules

[1-5] [6-7] [8-9] [10-11] [12-16] [17-18] [+]  
MSD-520 + SA + PS + 04 + -10P0 + PL + +AKD1 + ...

**MSD-520SAPS04-10P0PL+AKD1+...**

### Power supply modules

[1-5] [6-7] [8-9] [10-11] [12-16] [17-18] [+] [+] [+] [+] [+]  
MSD-520 + SA + PS + 04 + -10P0 + PL + +BEF1 + +CTXX + +ACBC + +AIC1 + +AKD1 + ...

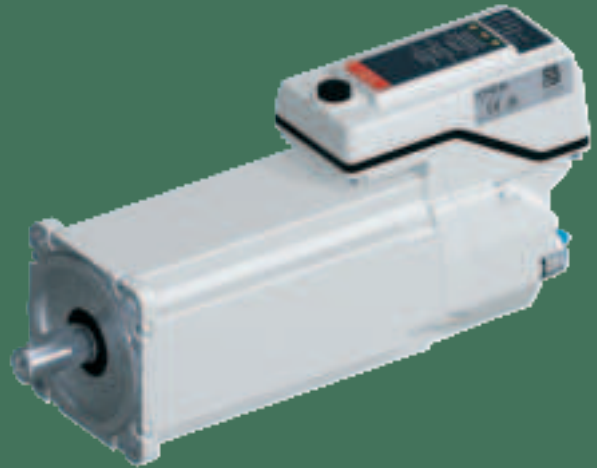
**MSD520SAP04-10P0-02A5PL+BEF1+CTXX+ACBC+AKC1+AKD1...**

# VLT® Integrated Servo Drive ISD® 520

The VLT® Integrated Servo Drive ISD® 520 combines a servo motor and servo drive in one compact unit. It offers great benefits in diverse applications, such as turntables, labeling, capping, and packaging of food and pharmaceuticals.

The ISD 520 is powered by the VLT® Power Supply Module PSM 520 with the integrated Decentral Access Module (DAM) option. The Plug and Twist hybrid cabling concept, including supply and control voltage as well as functional safety and fieldbus wires, makes the installation fast, easy, fail-safe and cost-efficient. Since multiple decentral drive units can be connected to just one PSM 520 (*including integrated DAM option*) through simple daisy-chain wiring, no distribution boxes are needed and cables can be reduced to a minimum.

A completely smooth and easy-to-clean surface together with high protection IP67 enclosure and vibration resistance class 3M7 ensure the perfect fit for all kinds of rotating applications in demanding environments.

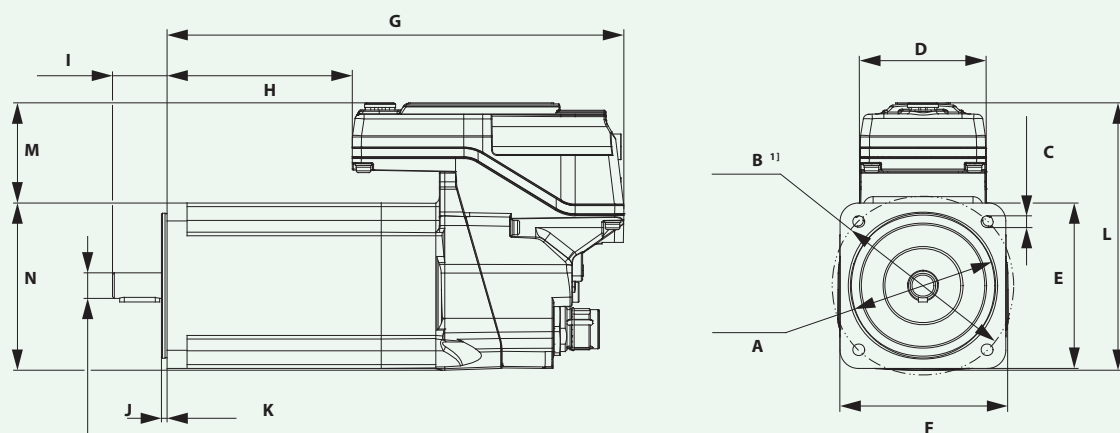


# Specifications

|                                         |                                   | Size 1         | Size 2 |           | Size 3    | Size 4    | Size 5    |
|-----------------------------------------|-----------------------------------|----------------|--------|-----------|-----------|-----------|-----------|
| Common                                  |                                   |                |        |           |           |           |           |
| Flange size                             | mm [inch]                         | 70             | 87     | 91        | 100       | 116       | 142       |
| Shaft diameter                          | mm [inch]                         | 11             | 19     | 14/19     | 19        | 24        | 24        |
| Weight (without brake)                  | kg [lbs]                          | 2.6            | 4.2    | 3.9-5.7   | 6.6...TBD | 9.1-11.0  | 11.8-13.2 |
| Inertia                                 | 10 <sup>-4</sup> kgm <sup>2</sup> | 0.63           | 2.3    | 0.80-1.80 | 2.60-3.20 | 5.10      | 9.80-12.9 |
| Rated voltage                           | V DC                              | 565-680 +/-10% |        |           |           |           |           |
| Rated switching frequency               | kHz                               | 8/10           |        |           |           |           |           |
| Possible switching frequency            | kHz                               | 4/5            |        |           |           |           |           |
| Auxiliary voltage                       | V DC                              | 24/48          |        |           |           |           |           |
| Maximum auxiliary current <sup>1)</sup> | A DC                              | 0.82           | 0.4    | 0.82-1.21 | 1.24      | 1.19-1.42 | 1.42      |
| Low speed                               |                                   |                |        |           |           |           |           |
| Rated speed                             | rpm                               | 3000           | 2000   | 3000      | 3000      | 2200      | 2200      |
| Max speed                               | rpm                               | 6600           | 2500   | 6600      | 6600      | 6000      | 5000      |
| Rated torque                            | Nm                                | 1.65           | 2.5    | 2.5-4.6   | 5.2-6.4   | 9.0-11.2  | 10.6-13.8 |
| Stall torque                            | Nm                                | 2.6            | 2.6    | 2.6-5.0   | 6.4-8.4   | 11.2      | 10.6-16.0 |
| Peak torque                             | Nm                                | 6.3            | 11.0   | 7.5-15.5  | 16.0-25.6 | 29.0-32.0 | 33.0-39.0 |
| Rated current                           | A DC                              | 1.1            | 1.1    | 1.7-3.2   | 3.2-3.9   | 5.5-7.0   | 6.2-7.0   |
| Peak current                            | A DC                              | 6.2            | 6.0    | 7.6-12.5  | 12.5-22.0 | 22.0      | 22.0      |
| High speed                              |                                   |                |        |           |           |           |           |
| Rated speed                             | rpm                               | 6000           | n.a.   | 6000      | 6000      | 4500      | 4500      |
| Max speed                               | rpm                               | 6600           |        | 6600      | 6600      | 6000      | 5000      |
| Rated torque                            | Nm                                | 1.5            |        | 2.1-2.7   | 3.0-4.8   | 4.7-6.5   | 7.2-7.5   |
| Stall torque                            | Nm                                | 1.8            |        | 2.6-2.7   | 3.0-5.4   | 6.3-7.4   | 7.0-7.4   |
| Peak torque                             | Nm                                | 6.3            |        | 7.0-8.6   | 9.4-22.0  | 17.4-23.1 | 21.5-22.8 |
| Rated current                           | A DC                              | 2.1            |        | 2.9-3.9   | 3.7-3.9   | 4.4-7.0   | 7.0       |
| Peak current                            | A DC                              | 12.5           |        | 12.5      | 12.5-14.0 | 22.0      | 22.0      |

1) Value at auxiliary voltage 24 V DC, including mechanical holding brake

## Dimensions



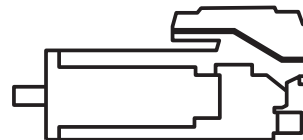
<sup>1)</sup> Dimension B is the Bolt Circle Diameter (BCD)

|                   | A   |      | B   |      | C                |      | D    |      | E    |      | F    |      | G     |       |
|-------------------|-----|------|-----|------|------------------|------|------|------|------|------|------|------|-------|-------|
|                   | mm  | inch | mm  | inch | mm               | inch | mm   | inch | mm   | inch | mm   | inch | mm    | inch  |
| <b>Size 1, E0</b> | 80  | 3.15 | 96  | 3.79 | M8 <sup>1)</sup> | 0.31 | 69.9 | 2.75 | 68   | 2.68 | 92.4 | 3.64 | 217.7 | 8.57  |
| <b>Size 1, E1</b> | 60  | 2.36 | 75  | 2.95 | 5.8              | 0.23 | 69.9 | 2.75 | 70   | 2.76 | 92.7 | 3.65 | 290.7 | 11.44 |
| <b>Size 2</b>     | 80  | 3.15 | 100 | 3.94 | 6.5              | 0.26 | 69.9 | 2.75 | 91.3 | 3.59 | 92.4 | 3.64 | 217.7 | 8.57  |
| <b>Size 3</b>     | 95  | 3.74 | 115 | 4.53 | 9                | 0.35 | 69.9 | 2.75 | 100  | 3.94 | 100  | 3.94 | 287.2 | 11.31 |
| <b>Size 4</b>     | 110 | 4.33 | 130 | 5.12 | 9                | 0.35 | 69.9 | 2.75 | 116  | 4.57 | 142  | 5.59 | 338.3 | 13.32 |
| <b>Size 5</b>     | 130 | 5.12 | 165 | 6.50 | 12.5             | 0.49 | 69.9 | 2.75 | 142  | 5.59 | 142  | 5.59 | 329   | 12.95 |

<sup>1)</sup> Use M8 screw at 'C', approx 8 mm diameter

|                   | H     |      | I    |      | J  |      | K   |      | L     |      | M    |      | N     |      |
|-------------------|-------|------|------|------|----|------|-----|------|-------|------|------|------|-------|------|
|                   | mm    | inch | mm   | inch | mm | inch | mm  | inch | mm    | inch | mm   | inch | mm    | inch |
| <b>Size 1, E0</b> | 68    | 2.68 | 46.5 | 1.83 | 19 | 0.75 | 4.0 | 0.16 | 146.7 | 5.78 | 48.0 | 1.89 | 98.7  | 3.89 |
| <b>Size 1, E1</b> | 141   | 5.55 | 23   | 0.91 | 11 | 0.43 | 2.5 | 0.10 | 147   | 5.79 | 47.9 | 1.89 | 99.1  | 3.90 |
| <b>Size 2</b>     | 102   | 4.02 | 30   | 1.18 | 14 | 0.55 | 3.0 | 0.12 | 147.6 | 5.81 | 55.2 | 2.17 | 92.4  | 3.46 |
| <b>Size 3</b>     | 137.5 | 5.41 | 40   | 1.57 | 19 | 0.75 | 3.0 | 0.12 | 148.4 | 5.84 | 48   | 1.89 | 100   | 3.94 |
| <b>Size 4</b>     | 188.6 | 7.43 | 50   | 1.97 | 24 | 0.94 | 3.0 | 0.12 | 169   | 6.65 | 52.1 | 2.05 | 116.9 | 4.60 |
| <b>Size 5</b>     | 179.3 | 7.06 | 50   | 1.97 | 24 | 0.94 | 3.5 | 0.14 | 190.4 | 7.50 | 48   | 1.89 | 142   | 5.59 |

## Ordering model code <sup>1)</sup>



| Product group (character 1-7)             |                                 |
|-------------------------------------------|---------------------------------|
| ISD-520                                   | VLT® Integrated Servo Drive 520 |
| Mains voltage (character 8-9)             |                                 |
| D6                                        | 600 V DC                        |
| Torque level (rated) (character 10-14)    |                                 |
| -01T5                                     | 1.5 Nm                          |
| -02T5                                     | 2.5 Nm                          |
| -03T5                                     | 3.5 Nm                          |
| -04T0                                     | 4.0 Nm                          |
| -04T5                                     | 4.5 Nm                          |
| -05T0                                     | 5.0 Nm                          |
| -06T5                                     | 6.5 Nm                          |
| -09T0                                     | 9.0 Nm                          |
| -12T0                                     | 12.0 Nm                         |
| -14T0                                     | 14.0 Nm                         |
| -16T5                                     | 16.5 Nm                         |
| Communication interface (character 15-16) |                                 |
| PL                                        | Ethernet POWERLINK®             |
| EC                                        | EtherCAT®                       |
| PN                                        | PROFINET®                       |
| Functional Safety (character +)           |                                 |
| +BEF1                                     | Hard-wired STO (standard)       |
| +BEFS                                     | VLT® FlexSafety™ over fieldbus  |
| Option board (character +)                |                                 |
| +CTXX                                     | Without option board (standard) |
| +CTIO                                     | Standard I/O option board       |
| +CTSO                                     | Safe I/O option board           |

| Technical documentation (character +) |                                       |
|---------------------------------------|---------------------------------------|
| +EGXX                                 | None (Standard)                       |
| +EGIN                                 | Installation guide                    |
| Documentation language (character +)  |                                       |
| +EHXX                                 | Multilanguage (Standard)              |
| Customer-specific label (character +) |                                       |
| +EJXX                                 | None (Standard)                       |
| Mechanical brake (character +)        |                                       |
| +FAXX                                 | Without holding brake                 |
| +FAHB                                 | With holding brake (Standard)         |
| Motor shaft (character +)             |                                       |
| +FCSS                                 | Smooth shaft                          |
| +FCKS                                 | Fitted key                            |
| Motor shaft size (character +)        |                                       |
| +FD11                                 | 11 mm                                 |
| +FD14                                 | 14 mm                                 |
| +FD19                                 | 19 mm                                 |
| +FD24                                 | 24 mm                                 |
| +FD32                                 | 32 mm                                 |
| Feedback type (character +)           |                                       |
| +FFS0                                 | Singleturn 17-bit BISS-C              |
| +FFS1                                 | Singleturn 17-bit HIPERFACE DSL       |
| +FFM1                                 | Multiturn 17-bit HIPERFACE DSL        |
| +FFM3                                 | Safety multiturn 20-bit HIPERFACE DSL |

| Flange size (character +)      |                                   |
|--------------------------------|-----------------------------------|
| +FG070                         | 70 mm                             |
| +FG087                         | 87 mm                             |
| +FG091                         | 91 mm                             |
| +FG100                         | 100 mm                            |
| +FG116                         | 116 mm                            |
| +FG142                         | 142 mm                            |
| Gear (character +)             |                                   |
| +FHXX                          | Without gear (Standard)           |
| Rated speed (character +)      |                                   |
| +FN04                          | 400 RPM                           |
| +FN10                          | 1000 RPM                          |
| +FN20                          | 2000 RPM                          |
| +FN22                          | 2200 RPM                          |
| +FN30                          | 3000 RPM                          |
| +FN45                          | 4500 RPM                          |
| +FN60                          | 6000 RPM                          |
| Shaft seal (character +)       |                                   |
| +FSXX                          | Without shaft seal                |
| +FSSS                          | With shaft seal                   |
| Shipping package (character +) |                                   |
| +TACB                          | Individually packaged (Standard)  |
| +TAMP                          | All products shipped in 1 package |

<sup>1)</sup> Note: Not all combinations are possible.  
To configure your drive with correct combinations,  
use the online configurator located here:  
[Motion Controls and Servo Drives](#)

## Example

[1-7] [8-9] [10-14] [15-16] [+] [+] [+] [+]

ISD-520 + D6 + -01T5 + PL + +BEF1 + +CTXX + +EGXX + +EHXX + +FAXX + +FCSS + ...

**ISD-520D6-10T5PL+BEF1+CTXX+EGXX+EHXX+FAXX+FCSS...**

# VLT® Decentral Servo Drive DSD 520

The VLT® Decentral Servo Drive DSD 520 extends the decentral servo drive concept. With rated power up to 2.3 kW and supporting a wide range of feedback encoders, its architecture is completely open and allows you to choose your preferred PM or ASM motor.

The DSD 520 is powered by the VLT® Power Supply Module PSM 520 and the integrated option, Decentral Access Module (DAM). The Plug and Twist hybrid cabling concept, including supply and control voltage as well as functional safety and fieldbus wires, makes the installation fast, easy, fail-safe, and cost-efficient. Since multiple decentral drive units can be connected to just one PSM 520 module (including integrated DAM option) through simple daisy-chain wiring, no distribution boxes are needed and you can reduce cabling to a minimum.

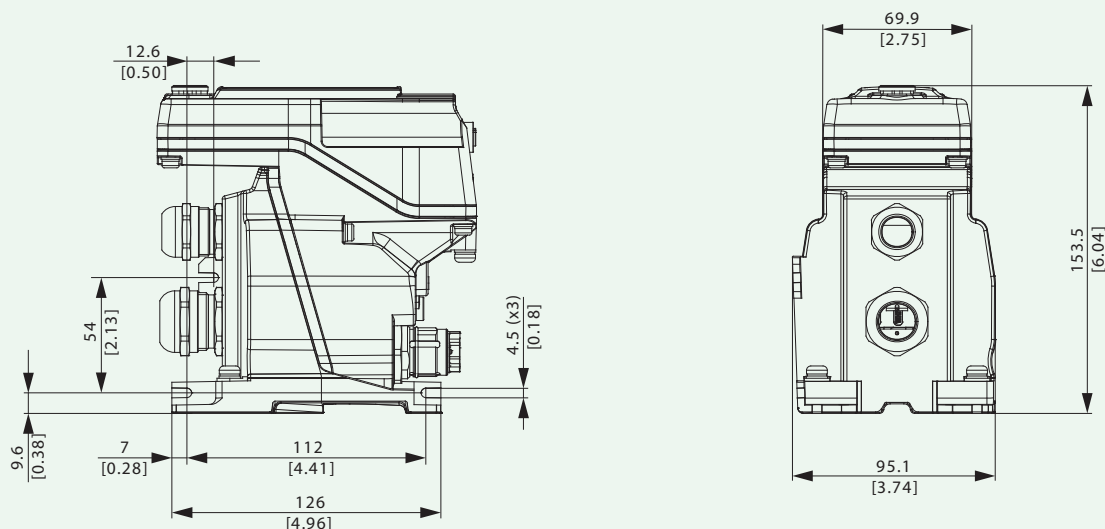
A completely smooth and easy-to-clean surface, together with high-protection IP67 enclosure and vibration resistance class 3M7, ensures the perfect fit for all kinds of rotating applications in demanding environments.



## Specifications

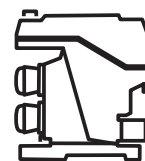
| <b>DSD 520</b>               |          |                |
|------------------------------|----------|----------------|
| Rated voltage                | V DC     | 565-680 +/-10% |
| Rated current $I_N$          | A rms    | 4.5            |
| Maximum current $I_{max}$    | A rms    | 12.5           |
| Rated power $P_N$            | kW [hp]  | 2.3 [3.08]     |
| Nominal switching frequency  | kHz      | 8/10           |
| Possible switching frequency | kHz      | 4/5            |
| Protection rating            |          | IP67           |
| Weight                       | kg [lbs] | 2.3            |

## Dimensions



Dimensions are in mm [inch]

## Ordering model code <sup>1)</sup>



| Product group (character 1-7)             |                                           |
|-------------------------------------------|-------------------------------------------|
| DSD-520                                   | VLT® Decentral Servo Drive 520            |
| Mains voltage (character 8-9)             |                                           |
| D6                                        | 600 V DC                                  |
| Current rating (character 10-14)          |                                           |
| -05A0                                     | 4.5 A                                     |
| Communication interface (character 15-16) |                                           |
| PL                                        | Ethernet POWERLINK®                       |
| EC                                        | EtherCAT®                                 |
| PN                                        | PROFINET®                                 |
| Functional Safety (character +)           |                                           |
| +BEF1                                     | Hard-wired STO (standard)                 |
| +BEFS                                     | Functional safety option VLT® FlexSafety™ |

| Option board (character +)            |                                     |
|---------------------------------------|-------------------------------------|
| +CTXX                                 | Without option board (standard)     |
| +CTIO                                 | Standard I/O option board           |
| +CTSO                                 | Safe I/O option board               |
| Technical documentation (character +) |                                     |
| +EGXX                                 | None (Standard)                     |
| +EGIN                                 | Installation guide                  |
| Documentation language (character +)  |                                     |
| +EHXX                                 | Multilanguage (Standard)            |
| Customer-specific label (character +) |                                     |
| +EJXX                                 | None (Standard)                     |
| Feedback type (character +)           |                                     |
| +FFMF                                 | Multi-feedback interface (Standard) |

| Motor connection (character +) |                                   |
|--------------------------------|-----------------------------------|
| +FITS                          | Terminal box single connection    |
| +FITD                          | Terminal box dual connection      |
| +FIBE                          | Terminal bottom-entry connection  |
| +FIS3                          | Single plug M23 connection        |
| +FID3                          | Dual plug M23 connection          |
| Shipping package (character +) |                                   |
| +TACB                          | Individually packaged (Standard)  |
| +TAMP                          | All products shipped in 1 package |

<sup>1)</sup> Note: Not all combinations are possible.  
To configure your drive with correct combinations,  
use the online configurator located here:  
[Motion Controls and Servo Drives](#)

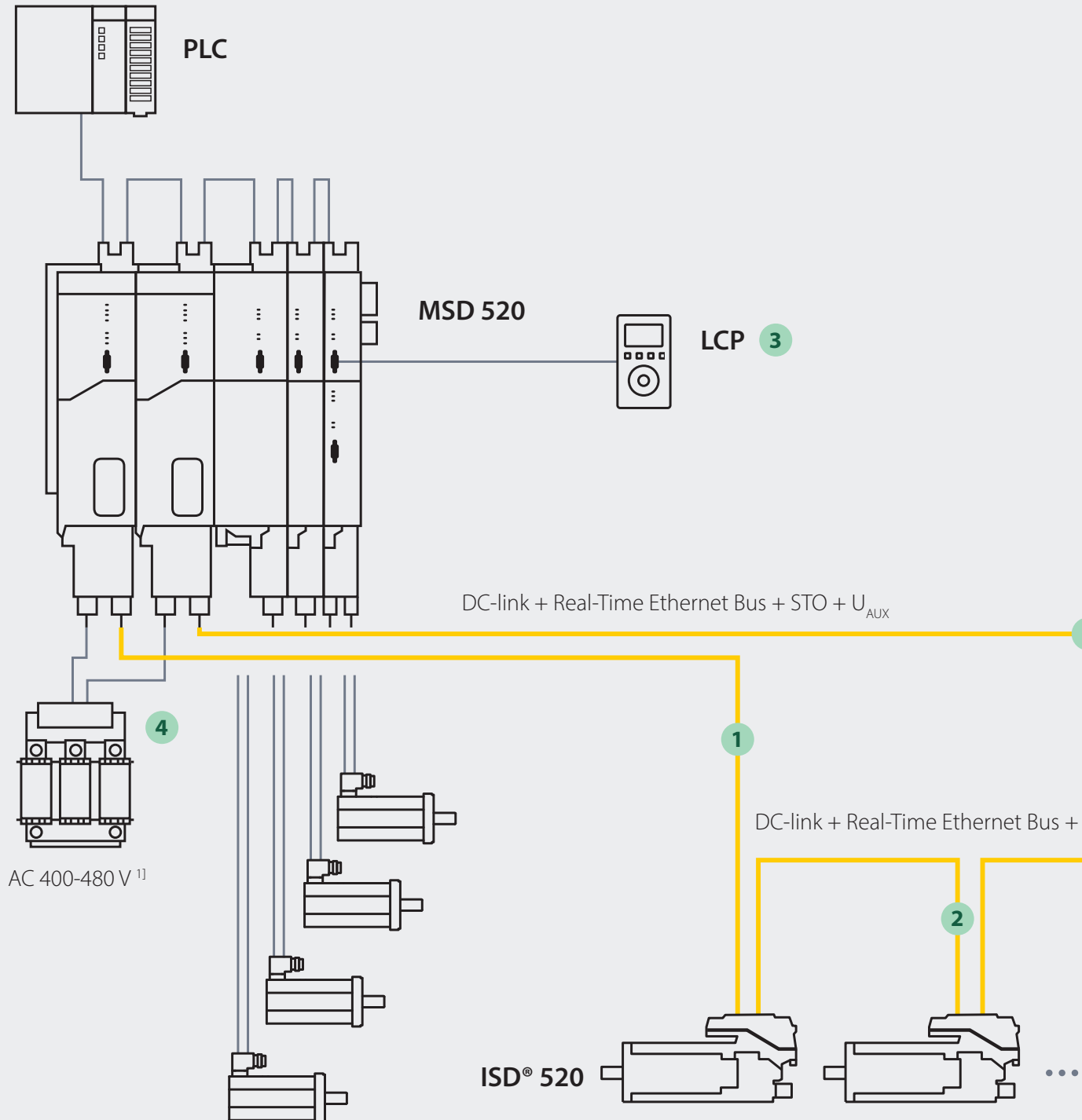
## Example

[1-7] [8-9] [10-14] [15-16] [+] [+] [+] [+] [+]

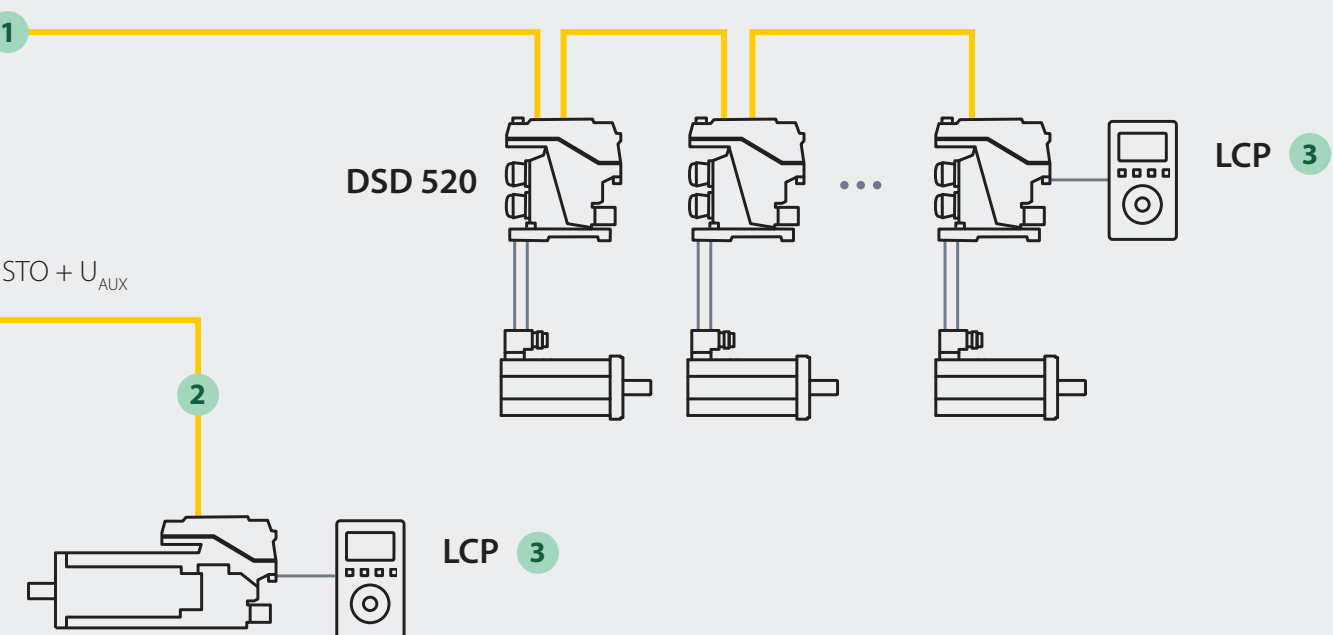
DSD-520 + D6 + -05A0 + PL + +BEF1 + +CTXX + +EGXX + +EHXX + +FFMF + +FITS + ...

**DSD-520D6-05A0PL+BEF1+CTXX+EGXX+EHXX+FFMF+FITS...**

# Accessories and options



<sup>1)</sup> It is mandatory to use a 3-phase AC line choke close to the PSM 520.  
For technical details please refer to the MSD 520 Operating Guide.



# Accessories and options

Fast, reliable and simple hybrid cables are available in numerous configurations and various lengths. Use feed-in cables to connect the PSM 520 (*with integrated DAM option*) with the first decentral drive in the line. Then use loop cables to continue the daisy chain from one ISD 520 or DSD 520 to the next. For flexibility as well as drag chain robustness, selected hybrid cable materials fulfill the individual application demands.

Check the product catalog at [store.danfoss.com](https://store.danfoss.com) to find the full range of accessories available.

 **Search for Accessories during product configuration at Motion Controls and Servo**

1

2



Loop cable M23 90° - M23 90°



Loop cable M23 180° - M23 180°



Feed-in cable Open - M23 90°



Feed-in cable Open - M23 180°



Feed-in cable DAM - M23 180°



Feed-in cable DAM - M23 90°

### 3 VLT® Local Control Panel LCP 102

| Description                                                                                         | Ordering number        |
|-----------------------------------------------------------------------------------------------------|------------------------|
| VLT® Local Control Panel LCP 102 ( <i>Graphical</i> )                                               | 130B1107               |
| LCP Cable (SUB-D to M8), 3 m [9.8 ft] cable                                                         | 175G8942 <sup>1)</sup> |
| LCP Cable (SUB-D to SUB-D) 3 m [9.8 ft] cable                                                       | 175Z0929 <sup>2)</sup> |
| LCP remote mounting kit (IP21) including LCP, fasteners, 3 m [9.8 ft] cable, and gasket             | 130B1170               |
| LCP remote mounting kit (IP21) without LCP, but including fasteners, 3 m [9.8 ft] cable, and gasket | 130B1117               |

<sup>1)</sup> Use 175G8942 for ISD 520 and DSD 520

<sup>2)</sup> Use 175Z0929 for MSD 520 (PSM 520, SDM 521, and SDM 522)

### 4 AC line choke

| Description                | Ordering number |
|----------------------------|-----------------|
| 3 Phase Line Reactor 20 A  | 175G0179        |
| 3 Phase Line Reactor 63 A  | 175G0178        |
| 3 Phase Line Reactor 40 A  | 175G0192        |
| 3 Phase Line Reactor 125 A | 175G0299        |



Discover more about VLT® FlexMotion™ here:  
[drives.danfoss.com/flexmotion](https://drives.danfoss.com/flexmotion)



## General-purpose servo drive solution

Imagine versatile and highly secure power conversion and motor control. Intensely powerful and compact converters and drives built to optimize a vast range of systems while giving you the flexibility to distribute intelligence the way you want.

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