



SOFT STARTERS

Product Overview



ABOUT US

Established in 1974 as a single bearing shop in Durban, South Africa; BMG's aggressive growth strategy has included acquisitions, supplemented by a steady organic growth discipline. BMG attracts best-of-breed talent resulting in technical expertise that differentiates BMG in the industry. Staff are truly part of the BMG family and its success.

BMG boasts an accredited in-house technical and commercial training academy which fosters a culture of staff development and career advancement; it's all about sustainability.

The net result, is a company that reliably supplies and supports 70 000 customers in 15 countries with the widest range of industrial engineered products and expert services in Africa via 105 branches.

BMG is positioned to deliver bespoke 360 degree solutions to its customers, and subsequently return on investment to its investors and shareholders. BMG plays a pivotal role in supporting the productivity and production targets of all Industrial, Manufacturing, Mining and Agricultural sectors of the economies in the countries it serves. With an enviable reputation as Africa's largest distributor, manufacturer and service provider of the highest quality engineering consumables and components; including

- Bearings & Seals
- Power Transmission Components
- Drives, Motors and Controllers
- Hydraulics, Pneumatics and Filtration
- Heavy and Light Duty Materials Handling
- Valves and Lubrication
- Fasteners, Gaskets and Tools

BMG is a level 4 BEE contributor with ISO 9001 Quality Assurance certification. Health and safety of its employees and customers is a paramount focus and the company adheres to ISO 45001. BMG is also committed to environmental care and sustainability and strictly follows the ISO 14001 charter.

As a key contributor to the Invicta Holdings stable, BMG has played a major part in Invicta's unique achievement of being rated in South Africa's Top 100 Companies for 21 consecutive years.



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When to Use a Soft Starter

Need more uptime and less maintenance? Then install a soft starter on your direct-on-line (DOL) or start-delta installation. Payback is fast, and you get these additional benefits:

- Lower inrush current reduces mechanical stress and minimizes penalties from the utility company
- This extends the systems lifetime, due to reduced wear on
 - Motors
 - Power Cables
 - Electrical Distribution Systems
- There is a reduced water hammer in your pump applications. (For more application benefits, see pages 4 & 5).
- After start-up, you can bypass the soft starter, switching over to run direct-on-line.

After the initial start-up, running a DOL saves energy by reducing losses and thus reducing cooling requirements. Danfoss provides an easy solution for switching back and forth to DOL – the VLT® Soft Starter MCD 500 with integrated bypass.

More Protection, Less Space

Select a Danfoss soft starter to gain unique benefits:

- Care for your motor and soft starter – get good protection value with added protection features in the soft starter.
- Save panel space with a very compact footprint
- Integrate the soft starter with VLT® drives
- Programme the soft starter via your PC using the VLT® Motion Control Tool MCT 10 set-up software*
- Enjoy the integrated bypass as a standard for VLT® Soft Starter MCD 500 ratings up to 961 A

*Requires an optional USB module

Why Use a Soft Starter for Speed Control?

Forget harmonics, AC drives, also known as variable speed drives (VSD) work by changing the frequency input to the motor and this causes harmonics on the supply network. Harmonics do not affect the AC drive itself. However, if not kept under control, harmonics can reduce the performance and reliability of other equipment connected to the grid, such as generators and circuit breakers. The solution is to install filters and screened cables, but even then the harmonic effect is not entirely removed.

It is reassuring to know that a soft starter already fulfils all emission and immunity requirements laid out by the EMC directive. The soft starter does not change the frequency and does not generate harmful harmonics. So, when using a soft starter, there is no need to consider harmonics at all.

Reduce Torque & Current

By using a soft starter, you can adjust the torque to the exact level required, whether or not the application is loaded. Alleviate mechanical stress on equipment by reducing the starting torque, therefore saving on service and maintenance costs. The soft starter reduces starting current, which means you can avoid voltage drops in the network.

Save Cost

Soft starters cost up to one-tenth the price of high-power drives. So if your control requirements are covered by limiting current only at the start and stop, with no need for constant acceleration and torque control, then there are significant savings to be won.

Save Space

Soft starters are smaller than AC drives and the difference becomes more significant the higher the amp rating gets. You can save on panel space.

Integrated Bypass for All-Round Savings

The VLT® Soft Starter MCD 500 provides an integrated bypass that allows direct on-line operation as an alternative. The combined bypass offers multiple cost-saving benefits.

Reduce Heat Loss

An integrated bypass provides the opportunity to switch over to direct on-line operation, after initial start-up via the soft starter. By partially running direct-on-line, you win the advantages of reduced losses and need for heat dissipation, therefore saving energy due to decreased cooling requirements.

Save Space

The MCD 500 with an integrated bypass takes up less panel space than a soft starter with an external contactor.

Save Time

With only six terminals instead of twelve, it is much faster to wire an MCD 500 with an integrated bypass, compared to an alternative soft starter with an external contactor. Less cable is required, which additionally reduces the cost. Save even more time by using the handy setup software tool, VLT® Motion Control Tool MCT 10, to configure the MCD 500 via a PC. You can use the same setup tool with all VLT® drives.

Energy Saving, Fast Payback

The soft starter with an integrated bypass contactor saves space in comparison to an external contactor connected to a non-bypassed unit. Select a soft starter with an integrated bypass when you want to save on costs. The payback time is just months, using the MCD 500 with an integrated bypass.

Example

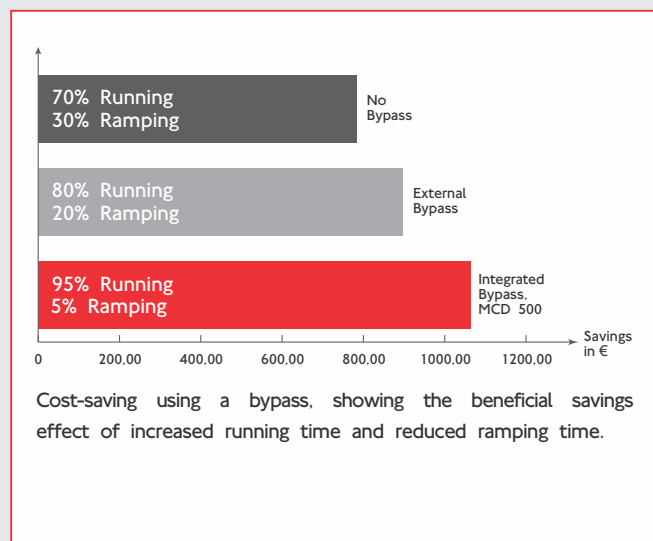
In this example, a soft starter regulates a water pump with the following motor specifications:

Motor

Supply:..... 400 V AC
 Rating:..... 132 kW
 FLC:..... 245 A
 Start Duty:..... 300% for 30 seconds
 Electricity Prices:..... (industry – EU)

Estimated Savings: Non-bypassed Versus Bypassed

Save more with a bypass. The energy saved depends on the relationship between ramping and running. The more the application runs, the more the bypass will save. Refer to the below illustration.



Investment (Indexed Values)	No Bypass, Direct-on-line	Soft Starter with External Bypass	Soft Starter with Integrated Bypass VLT MCD 500
Soft Starter	100	100	137
Bypass Contactor + Wiring + Mounting	0	58	0
Extra Panel Space, Parts and Labour	0	3	0
Total	100	161	137
Extra Cost Compared to No Bypass	-	61	37
Simple Payback Period (months)	-	3.3	2



Centrifugal Pump: Water

Do you need to reduce water pressure surges and mains supply disturbance at start-up? If so, a gentle start using a soft starter is a good idea. It also provides a soft stop to control the effects of fluid hammer often associated with uncontrolled pump stop, ultimately extending pump life and reducing running costs. For new projects, build these savings in at the design phase. There is no need to specify pressure surge tanks and motorised valves to cater for repetitive high-pressure surges. The minimum start current function reduces the electrical disturbance on the mains supply and limits the demand for supply, therefore reducing reticulation costs in farmland irrigation projects.

The Soft Starter

- Prevents the motor from overheating via integrated protection
- Ensures that the pump does not run in reverse, via start-up protection
- Detects blocked pipes or the lack of fluid via undercurrent protection, thus preventing unnecessary pump damage

Centrifugal Fan: HVAC

Extend the life of centrifugal fans by adding a soft starter to ensure gentle acceleration and deceleration, minimising wear on the couplings, belts, and bearings.

The Soft Starter

- Reduces electrical disturbance on the supply via a minimal start current
- Prevents the overheating of the motors windings and body
- Prevents starting when the fan direction is reversed, avoiding damage
- Trips in the event of the excess start time, indicating a jammed or stalled fan, also providing an early indication of bearing failure
- Detects broken couplings and belts or clogged fan filters

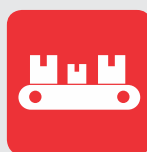
To integrate the soft starter directly with a BMS, the VLT[®] Soft Starter MCD 500 supports monitoring fan loading, without the need for extra equipment and analogue output.

Compressor: Protect your Motor

Has your compressor ever locked up due to the entry of liquid ammonia? By using a soft starter, continuous monitoring prevents damage to the motor, compressor and couplings, in a lock-up situation. Soft starters provide critical protection against motor overload by tripping the motor immediately.

The Soft Starter

- It enables load shedding before the soft starter trips, for compressor overload or motor over temperature.
- Trips prevent motor damage when start-up time exceeds a pre-programmed limit, for example, due to a jammed or stalled compressor.
- They monitor the compressor load using a 0-20 mA/4-20 mA analogue output.
- It enables an optimised compressor performance with dual speed dahlander motor control.
- Helps avoid short cycling through a restart delay, promoting a longer life of the motor, compressor and couplings.
- It's an easy retrofit for start/delta starters.



Conveyor Belt

Food and beverage industries extend the life of their conveyor belts and gain the benefit of consistent start-up regardless of whether the belt is loaded or not. The soft starter ensures gentle acceleration and deceleration, reducing the risk of product damage due to jerky starts and sudden stops. It also protects the couplings, belts, and bearings against mechanical wear.

The Soft Starter

- Prevents the conveyor belt from slapping during the start.
- Reduces stress on counter-balances and weights
- Reduces electrical disturbance on the supply, through a minimum start current function.
- Protects against accidentally running in the reverse.
- Detects broken couplings or belts, and trips the motor immediately
- Identifies overload, or a jammed or stalled conveyor, and protects equipment by tripping the motor immediately

Crusher & Mill: Mining








Maximise your crusher or mill throughput by installing a soft starter at the motor input. The soft starter allows the motor to operate at its upper thermal limit, while carefully monitoring thermal capacity to ensure motor protection. The crusher can then safely ride through temporary product overload situations.

The Soft Starter

- Reduces the demand for special control equipment, by connecting motor thermistors directly onto the VLT® Soft Starter MCD 500 thermistor input
- Extends the life of couplings, belts, and bearings by gentle start-up, minimizing torque transients
- Reduces electrical disturbances on the supply
- Restricts the demand on the supply which is especially critical on remote sites serviced by generator sets
- Prevents damage due to unintentional running in reverse, by preventing start when the rotation of the 3-phase incoming supply changes
- Identifies broken couplings and crusher belts through the undercurrent protection, and trips to prevent further damage



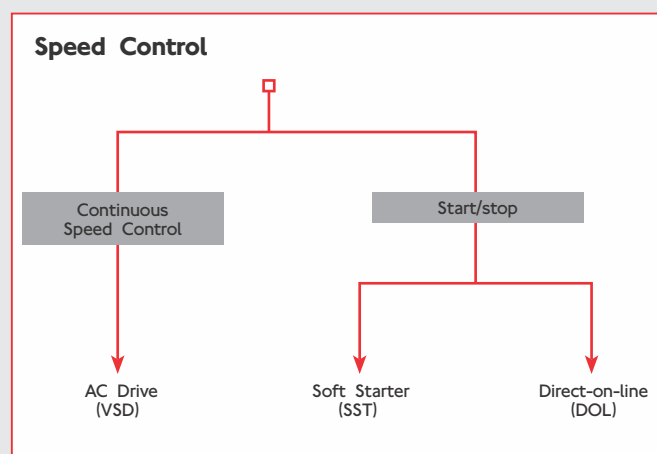
QUICK REFERENCE GUIDE

Application		Inertia	MCD 100	MCD 201	MCD 202	MCD 500
Water 	Agitator	High				■
	Centrifugal Pump		■	■	■	■
	Compressor (Screw, Unloaded)		■	■	■	■
	Compressor (Reciprocating, Unloaded)	High				■
	Conveyor	High				■
	Fan (Damped)		■	■	■	■
	Fan (Undamped)	High				■
	Mixer	High				■
	Positive Displacement Pump	High				■
	Submersible Pump		■	■	■	■
Metals & Mining 	Belt Conveyor	High				■
	Dust Collector		■	■	■	■
	Grinder		■	■	■	■
	Hammer Mill	High				■
	Rock Crusher	High				■
	Roller Conveyor		■	■	■	■
	Roller Mill	High				■
	Tumbler	High				■
	Wire Draw Machine	High				■
Food Processing 	Bottle Washer		■	■	■	■
	Centrifuge	High				■
	Dryer	High				■
	Mill	High				■
	Palletizer	High				■
	Separator	High				■
	Slicer		■	■	■	■
Pulp & Paper 	Dryer	High				■
	Re-pulper	High				■
	Shredder	High				■
Petro-chemical 	Ball Mill	High				■
	Centrifuge	High				■
	Extruder	High				■
	Screw Conveyor	High				■
Transport & Machine Tool 	Ball Mill	High				■
	Grinder		■	■	■	■
	Material Conveyor	High				■
	Palletizer	High				■
	Press		■	■	■	■
	Roller Mill	High				■
	Rotary Table	High				■
Lumber & Wood Products 	Bandsaw	High				■
	Chipper	High				■
	Circular Saw		■	■	■	■
	Debarker		■	■	■	■
	Edger		■	■	■	■
	Hydraulic Power Pack		■	■	■	■
	Planer		■	■	■	■
	Sander	High				■

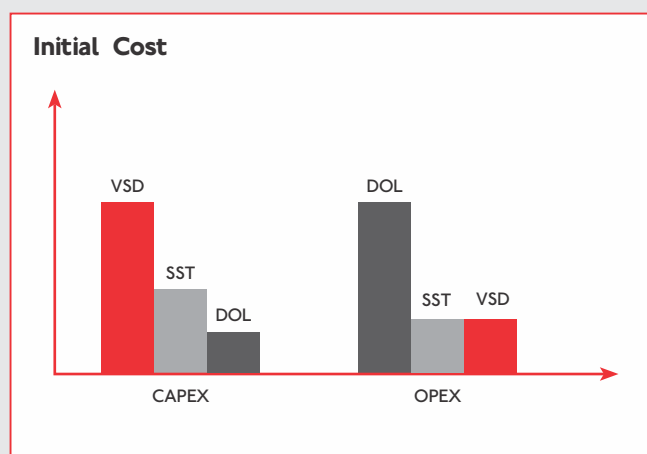
Step 1

Determine what Kind of Speed Control is Needed

- Consider whether a start/stop control or continuous speed control is required.
- Then, consider the scale of both the initial investment and the running costs.



If an AC drive (VSD) is selected request the Danfoss VLT® and VACON® drives brochure from us. If you chose a soft starter, then read on.



Direct-on-line (DOL) Drawbacks

- Wear on the Motor Bearings
- Wear & Tear on the Gearbox
- Water Hammer

Step 2

Match the Application

Determine the size of the soft starter based on the inertia level. Refer to the Soft Starter guide on page 5.

Step 3

Match the Requirements

Find the right match between your application and the soft starter features required. The guide recommends which model of Danfoss VLT® Soft Starter is best suited for the job:

- VLT® Soft Start Controller: MCD 100
- VLT® Compact Starter: MCD 201 or 202
- VLT® Soft Starter: MCD 500

	MCD 100	MCD 201	MCD 202	MCD 500
Power Size	0.1-11 kW	7.5-110 kW	7.5-110 kW	7.5-850 kW
Start/Stop	Timed Voltage Ramp	Timed Voltage Ramp	Current Limited Started	Adaptive Acceleration Control
Protection	None	None	7 Features	19 Features
Outputs	None	1 Output Relay	2 Output Relay	3 Programmable Outputs
Control	2 Wire/Control 3 Rotary Switches	2-3 Wire/Control 3 Rotary Switches	2-3 Wire/Control 8 Rotary Switches	8 Language Graphical Display
Options	None	Fieldbus/Remote Display & PC Software		
Initial Cost, Indexed	1	1.8	2.2	3.1

SOFT STARTER: MCD 500 SERIES

The VLT® Soft Starter MCD 500 is a Total Motor Starting Solution. Current Transformers Measure Motor Current and Provide Feedback for Controlled Motor Ramp Profiles.

AAC, the 'Adaptive Acceleration Control', automatically employs the best starting and stopping profile for the application. 'Adaptive Acceleration Control' means that for each start and stop, the soft starter compares and adapts the process to the chosen profile best suited to the application.

The VLT® Soft Starter MCD 500 has a four-line graphical display and a logic keypad making programming easy. Use the advanced setup to view the operational status.

Three menu systems: 'Quick Menu', 'Application Setup' and 'Main Menu' provide the optimum programming approach.

Power Range

21-1600 A, 7.5-850 kW

(1.2 MW inside Delta Connection)

Versions for 200-690 V AC



Features	Benefits
User Friendly	
AAC - Adaptive Acceleration Control	• Automatically adapts to the chosen starting & stopping profile
Adjustable bus bars allow for both top and bottom entry (360-1600 A, 160-850 kW)	• Space saving, less cable cost & easy retrofitting
DC injection braking is distributed evenly over three phases	• Less installation cost & less stress on the motor
Inside Delta (6-wire connection)	• A smaller soft starter can be selected for the application
Log menus, 99 events & the trip log provide information on events, trips & performance	• Eases analysis of the application
Auto Reset	• Less downtime
Jog (slow-speed operation)	• Application flexibility
Second-order Thermal Model	• Allows the motors to be used to their full potential without overload damage
Internal Bypass Contactors (21-215 A, 961 A)	• Save space and wiring compared to external bypass • Very little heat dissipates when running. Eliminates costly external fans, wiring or bypass contactors
Auto-Start/Stop Clock	• Flexible Applications
Compact Size • Amongst the smallest in their class	• Saves space in cabinets & other setups
4-line Graphical Display	• Optimum programming approach & setup for viewing operational status
Multiple Programming Setup (Standard Menu, Extended Menu, Quick Set)	• Simplifies the programming, but still holds to maximum flexibility
Multiple Languages	• Serving the world

MCD 500 Operation Options



VLT® Control Panel LCP 501

Everything you can do on the VLT® Soft Starter MCD 500 control is also possible via the VLT® Control Panel LCP 501.

Select the screen view setup from one user; programmable with 7 standard views.

Language Selection

Languages include English, Chinese, German, Spanish, Portuguese, French, Italian and Russian. By using a 3 m cable, a 9-pin (D-sub) plug and a 3 m cable provided with the IP65 (NEMA 12) door-mount kit, the LCP 501 connects to the MCD 500. Once connected, the soft starter will ask whether you'd like to copy parameters from LCP to starter or starter to LCP (if different).

Easy Connection

- The Modbus, PROFIBUS, Ether-Net/IP and DeviceNet modules use another port on the MCD 500, located at the side of the soft starter
- Separate the LCP 501 output at the bottom for a 9-pin plug and a 3 m cable
- One order number (LCP with a door-mount kit and cable)
- Plug-and-play connection, even when the soft starter is powered up
- One cable for power and communication
- Powered up by a soft starter
- Copy of parameter setup available

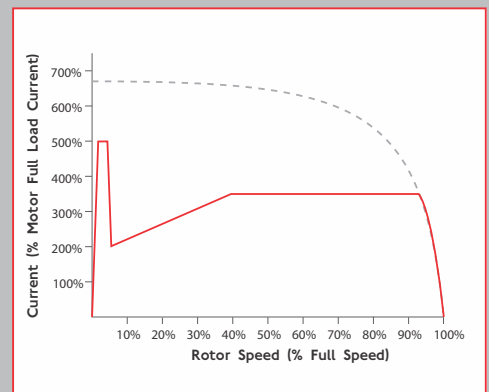
Dimensions					
Current Rating (A)	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Enclosure Size
21, 37, 43 & 53	4.2	295	150	183	G1
68	4.5			213	
84, 89 & 105	4.9				
131, 141, 195 and 215	14.9	438	275	250	G2
245	24	440	424	296	G3
331 & 396	30.2				
469, 525, 632, 744, 826 & 961	60	640	433	295	G4
1200, 1410 & 1600	120	856	585	364	G5

Starting:

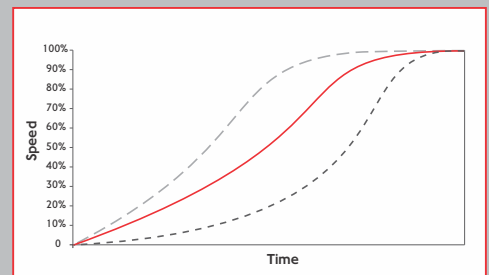
- AAC (Adaptive Acceleration Control)
- Current Ramp
- Constant Current
- Kickstart

Stopping:

- Coast to Stop
- TVR Soft Stop
- ADC (Adaptive Deceleration Control)
- Brake



Constant Current/Current Ramp (Shown Here with Kickstart)



Three AAC start profiles include early, constant and late acceleration.

COMPACT STARTER: MCD 200 SERIES

VLT® Compact Starter MCD 200 Series from Danfoss Includes Two Soft Starters in the Power Range 7.5-110 kW.

The series offers easy DIN rail mounting for sizes up to 30 kW, 2-wire or 3-wire start/stop control and excellent starting duty (4 x IE for 6 seconds).

Heavy starting ratings at 4x IE for 20 seconds.

Compatible with grounded delta power systems.

Power Range

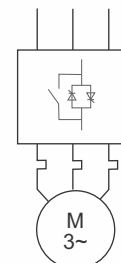
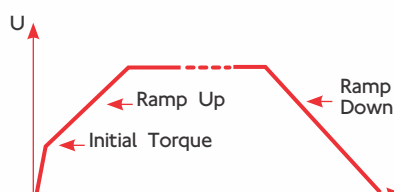
7.5-110 kW

Remote Operation

The dedicated remote operator kit facilitates the remote operation of the VLT® Compact Starter MCD 201 and the VLT® Compact Starter MCD 202. The operator (IP54/NEMA 12) is mounted on the cabinet front and allows remote control, status indication and motor monitoring of an individual VLT® Compact Starter using RS485 serial communication.

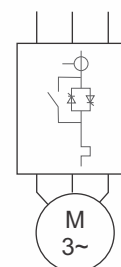
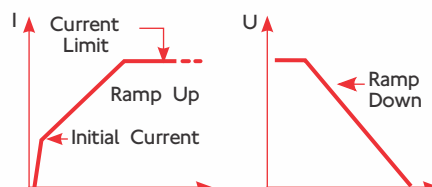


MCD 201



MCD 202

MCD 202 provides enhanced soft start functionality and various motor protection features



Features	Benefits
A Small Footprint & Compact Size	• Saves Panel Space
Built-in Bypass	• Minimises installation costs & eliminates power loss • Reduces heat build up, savings in components, cooling, wiring & labour
Advanced Accessories	• Allows Enhanced Functionality
Advanced SCR Control Algorithms Balance Output Waveform	• Allows more Starts per Hour, at a Higher Load
Reliable	Maximum Up-time
Essential Motor Protection (MCD 202)	• Reduces Overall Project Investment
Maximum Ambient Temperature of 60°C, without Derating	• No External Cooling or Oversizing Necessary
User Friendly	Safe Commissioning
Easy to Install & Use	• Saves Time & Space
Easy DIN Rail Mounting for Sizes up to 30 kW	

Dimensions

Power Range (400 V)	7-30 kW	37-55 kW	75-110 kW
Height (mm)	203	215	240
Width (mm)	98	145	202
Depth (mm)	165	193	214

SOFT START CONTROLLER: MCD 100 SERIES

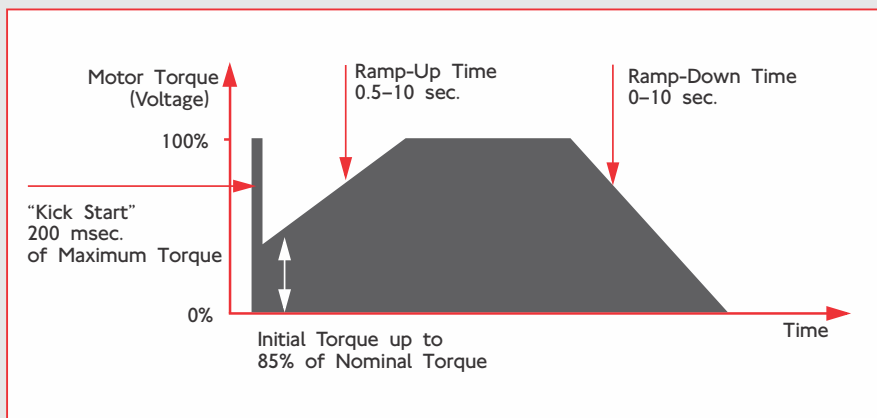
VLT® Soft Start Controller MCD 100 is a Cost-Effective and Extremely Compact Soft Starter for AC Motors up to 11 kW, Due to a Unique Semiconductor Design.

The VLT® Soft Start Controller MCD 100 is a real 'fit and forget' product. Selection can be made based on the motor power, as per traditional contactors.

The VLT® Soft Start Controller MCD 100 provides timed voltage up-and-down ramping. Ramp time can be adjusted individually with rotary switches from 0.4 to 10 seconds.

The start torque can be adjusted from 0 to 85% of the direct on-line torque.

All sizes are rated for line voltage of up to 600 V AC.



Features	Benefits
A small Footprint & Compact Size	• Saves Panel Space
Selection can be based on the motors power	• Easy Selection
Universal Control Voltage	• Simplifies Selection • Keeps Stock at a Minimum
'Fit & forget' Contactor Design	• Simplifies Installation • Reduces Required Panel Space
Reliable	Maximum Up-time
Robust Semiconductor Design	• Reliable Operation
Almost Unlimited Number of Starts per hour without Derating	• Prevents Unauthorized Changes
Maximum Ambient Temperature of 50°C without Derating	• No External Cooling or Oversizing is Necessary
User Friendly	Save Commissioning and Operating Cost
Easy to Install & Use	• Saves Time
Digitally Controlled Rotary Switches	• Secures Precise Settings & Simplifies Installation
Easy DIN Rail Mounting for Sizes up to 30 kW	• Saves Time & Space

Dimensions			
Power Range	1.5 kW	7.5 kW	11 kW
Height (mm)	102	110	110
Width (mm)	22.5	45	90
Depth (mm)	123.5	128.1	128

SPECIFICATIONS

Serial Communication

The VLT® Compact Starter MCD 201, 202 and the VLT® Soft Starter MCD 500 come with optional plug-in modules for serial communication.

- DeviceNet
- EtherNet/IP
- PROFIBUS
- Modbus RTU
- USB

Specifications	MCD 100	MCD 201	MCD 202	MCD 500
Start/Stop, Reset	■	■	■	■
LED for Start, Run & Trip	■	■	■	■
Trip Codes	■	■	■	■
Current Display			■	■
Motor Temperature Display			■	■
4-20 mA Output			■	■
Programming Keypad, Graphical Display				■

Ordering Typecode

VLT® Soft Starter MCD 500

[1]	[2]	[3]	[4]	[5]	[6]
MCD 5-	-	-	T	-	G
			X		-
					C
					V

[1] FLC, [A]
0021
0037
0043
0053
0068
0084
0089
0105
0131
0141
0195
0215
0245
0331
0396
0360
0380

0428
0469
0525
0595
0619
0632
0744
0790
0826
0927
0961
1200
1410
1600

[2] Bypass Indication

B	With Internal Bypass Contactor
C	Without Internal Bypass Contactor (Continuous)

[3] Supply Voltage	
5	200-525 V AC
7	380-690 V AC
[4] Enclosure	
1	Enclosure Size 1
2	Enclosure Size 2
3	Enclosure Size 3
4	Enclosure Size 4
5	Enclosure Size 5
[5] IP Rating	
00	IP00
20	IP20
[6] Control Voltage	
1	24 V AC or 24 V DC
2	110 or 220 V AC

VLT® Soft Starter MCD 200

[1]	[2]	[3]	[4]
MCD 2 0	-	-	T
			-
			C
			V

[1] Series	
1	Soft Start/Stop
2	Soft Start/Stop & Protection
[2] Nominal Motor kW, 400 V	
055	E.g. 55 kW
110	110 kW

[3] Line Supply Voltage	
4	200-440 V
6	200-575 V
[4] Control Supply Voltage	
1	24 V AC/DC
3	110-240 V AC & 380-440 V AC

Sizes

VLT® Compact Starter MCD 201/MCD 202

Power Size (kW)	Rated Current AC-53b* (A)	Approvals
7.5	18 A: 4-6: 354	UL C – UL CE CCC C-tick Lloyds
15	34 A: 4-6: 354	
18	42 A: 4-6: 354	
22	48 A: 4-6: 354	
30	60 A: 4-6: 354	
37	75 A: 4-6: 594	
45	85 A: 4-6: 594	
55	100 A: 4-6: 594	
75	140 A: 4-6: 594	
90	170 A: 4-6: 594	
110	200 A: 4-6: 594	

* Example: AC 53b: 42 A: 4-6: 354
Starting Current Max. 4 times FLC (42 A)
in 6 seconds. 354 seconds minimum between starts.

VLT® Soft Start Controller MCD 100

Power Size (kW)	Rated Current (A)	Approvals
1.5	3 A: 5-5:10 (AC 53b)	UL, CE
7.5	15 A: 8-3: 100-3000 (AC 53a)	
11	25 A: 6-5:100-480 (AC 53a)	

Size Indication for VLT® Soft Starter MCD 500

Motor Size (kW) @ 400 V	Enclosure Type	Starts per Hour	Max. FLC	Rated FLC (40°C, 1000 m). Outside Delta Motor Connection					
				Light 300%, 30s, Internal Bypass	Medium 400%, 20s, Internal Bypass	Heavy 450%, 30s, Internal Bypass			
11	G1 (no fan)	10	23	21	17	15			
18.5		10	43	37	31	26			
22		10	50	43	37	30			
25		10	53	53	46	37			
30	G1	6	76	68	55	47			
37		6	97	84	69	58			
45		6	100	89	74	61			
55		6	105	105	95	78			
60	G2	6	145	131	106	90			
75		6	170	141	121	97			
90		6	200	195	160	134			
110		6	220	215	178	149			
110	G2x	6	245	245	194	169			
160		6	331	331	266	229			
200		6	396	396	318	273			
250	G4x	6	469	469	383	326			
285		6	525	525	425	364			
315		6	632	632	512	438			
400		6	744	744	606	516			
450		6	826	826	684	571			
500		6	961	961	796	664			
132	G3x	6	255	245	255	195	201	171	176
185	G4x	6	360	360	360	303	310	259	263
200		6	380	380	380	348	359	292	299
220		6	430	428	430	355	368	301	309
315		6	620	595	620	515	540	419	434
335		6	650	619	650	532	561	437	455
445		6	790	790	790	694	714	567	579
500		6	930	927	930	800	829	644	661
650	G5x	6	1200	1200	1200	1135	1200	983	1071
750		6	1410	1410	1410	1187	1319	1023	1114
850		6	1600	1600	1600	1433	1600	1227	1353

NOTE: Optimise your selection with the WinStart Soft Starter PC tool.

SPECIFICATIONS

Soft Starter: MCD 500 Series
Type
<ul style="list-style-type: none"> The total motor starter solution Provides advanced control methods for starting & stopping & the protection of the motor & application
Concept
<ul style="list-style-type: none"> Enhanced soft start & soft stop Motor & system protection 7.5-850 kW @ 400 V (21-1600A) 200-690 V Mains Voltage 110-220 V AC or 24V AC/DC Control Supply 3-phase SCR Control
Start/Stop
<ul style="list-style-type: none"> Adaptive Acceleration Control (AAC) Current Limit Start Current Ramp Start Dual Parameter Function Kick-start Jog Adaptive Deceleration Control (AAC) TVR Soft Stop (Timed Voltage Ramp) Coast to Stop DC Brake Function – Three Phase Soft Brake Function
Protection
Same as MCD 202 &: <ul style="list-style-type: none"> Under Current Current Imbalance Starter Overheat Restart Delay Warning Before Trips Adjustable Phase Imbalance Sensitivity <ul style="list-style-type: none"> Programmable Input Trip Individual Phase Loss Trips Individual Shorted SCR Trips Internal Bypass Relay Overload Internal Bypass Relay Fail Fully Adjustable Protections Network Communication Timeout Heatsink Overtemperature Battery/Clock Failure Supply Frequency External Trip
Output
<ul style="list-style-type: none"> Three Programmable Output Relays: Programmable analogue output Motor Thermistor
Control
<ul style="list-style-type: none"> 8 Language Graphical Display & Keypad Quick Menu & Application Menu Buttons for Start, Stop, Reset & Remote Control Inputs for two- or three-wire Control
Optional
<ul style="list-style-type: none"> Modules for Serial Communication VLT® Control Panel LCP 501 PC Software
Other Features
<ul style="list-style-type: none"> Bypass of up to 961A (500 kW) Configurable Bus Bars from 360 A & up Operation Timers Jog – Slow Speed Operation Auto Reset of Fault Situations Emergency Run 99 Event Log Trip Log User Programmable Metering & Monitoring Simulation Before Connecting Line Voltage

Soft Start Controller: MCD 100 Series
Type
<ul style="list-style-type: none"> A true 'fit & forget' soft starter for a DIN rail mount, MCD 100 provides basic soft start & stop function
Concept
<ul style="list-style-type: none"> Soft Start Soft Stop 0.1-11 kW @ 400 V 208-600 V Mains Voltage 24-480 V AC/DC Control Voltage 2-phase SCR Control
Start/Stop
<ul style="list-style-type: none"> Timed Voltage Ramp-up Adjustable Start Torque Selectable Kick-start Function Timed Voltage Ramp-down
Protection
Output
Control
<ul style="list-style-type: none"> Universal Two-wire Vontrol Programmable through 3 Rotary Switches
Other Features
<ul style="list-style-type: none"> Extremely robust SCR design for an unlimited number of starts per hour, LED indication, IP20 number

Compact Starter: MCD 201 Series

Type

- A physically compact starter providing basic soft start & stop functionality

Concept

- Soft Start
- Soft Stop
- 7.5-110 kW @ 400 V
- 200-575 V Mains Voltage
- 110-440 V AC or 24 V AC/DC Control Supply
- 2-phase SCR Control

Start/Stop

- Timed Voltage Ramp-up
- Adjustable Initial Torque
- Timed Voltage Ramp-down

Protection

Output

- One Output Relay:
Line Contactor Control

Control

- Two- or Three-wire Control
Programmable via 3 Rotary Switches
Reset Push Button
- Optional
 - Modules for Serial Communication
 - Remote Operator Kit
 - PC Software

Other Features

- Integral SCR Bypass for Minimum Physical Size & Heat Dissipation During Nominal Operation
- LED Status Indication
- IP20 (7.5 – 55 kW @ 400 V)
- IP00 (75 – 110 kW @ 400 V)
- Protection Kit Available

Compact Starter: MCD 202 Series

Type

- Physically similar to the MCD 201 but providing enhanced soft start functionality & various motor protection functions

Concept

- Current Limit Start
- Soft Stop
- Motor Protection
- 7.5-110 kW @ 400 V
- 200-575 V Mains Voltage
- 110-440 V AC or 24 V AC/DC Control Supply
- 2-phase SCR Control

Start/Stop

- Current Limit Start
- Initial Current Ramp-up
- Timed Voltage Ramp-down

Protection

- Motor Overload (Adjustable Trip Class)
- Excess Start Time
- Reverse Phase Rotation
- Motor Thermistor Input
- Shorted SCR – No Start
- Supply Fault – No Start
- Instantaneous Overload

Output

- Two Output Relays:
 - Line Contactor Control
 - Run Contactor or Trip Function

Control

- Two- or Three-wire Control
- Programmable via 8 Rotary Switches
- Reset Push Button
- Optional
 - Modules for Serial Communication
 - Remote Operator Kit
 - PC Software

Other Features

- Integral SCR Bypass for Minimum Physical Size & Heat Dissipation During Nominal Operation
- LED Status Indication
- IP20 (7.5 – 55 kW @ 400 V)
- IP00 (75 – 110 kW @ 400 V)
- Protection Kit Available

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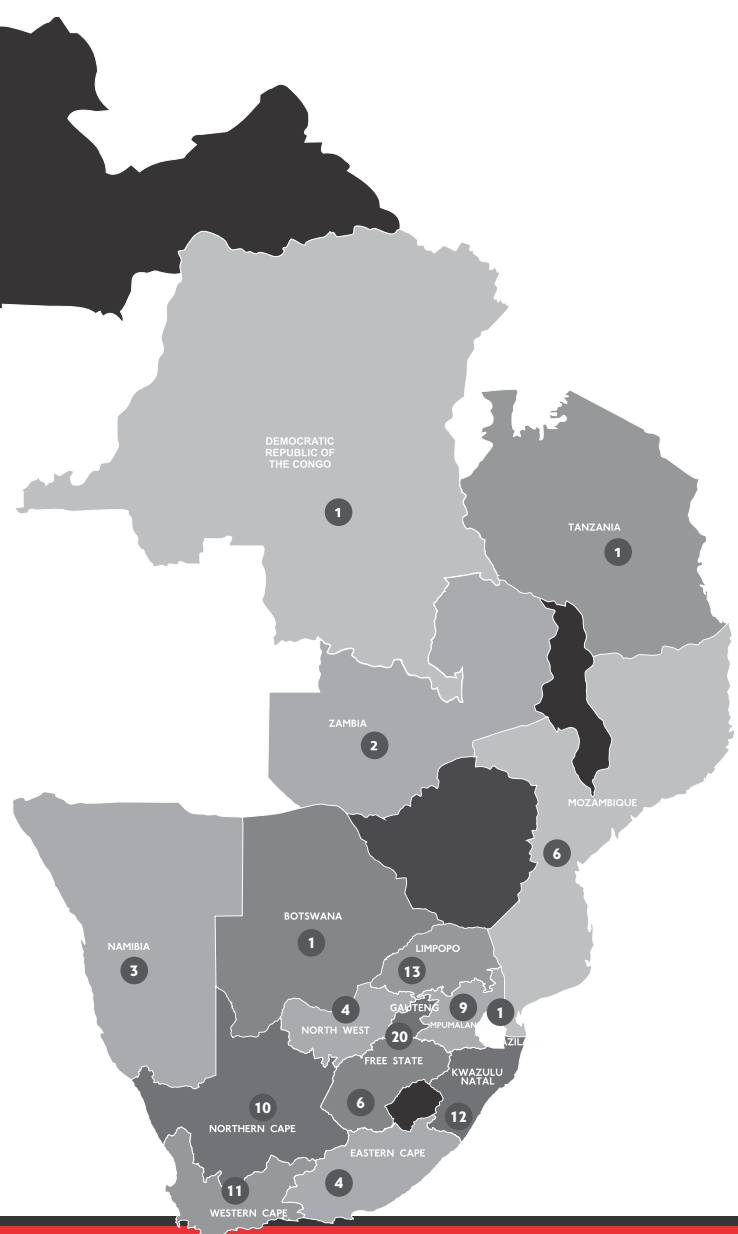


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105
BRANCHES

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- Locally empowered distribution chains



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