ENGINEERING
TOMORROW

Selection Guide | VLT® Soft Starter

Improve uptime, save energy and protect motors effectively

www.danfossdrives.com | VLT®

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 penalty from the utility company
- Extended system lifetime due to reduced wear on
  - Motor
  - Power cables
  - Electrical distribution system
- Reduced water hammer in pump applications. For more application benefits, see pages 4 and 5.
- After start-up, you can bypass the soft starter, switching over to run direct-on-line.

More protection, less space

Select a Danfoss soft starter to win unique benefits:

- Care for your motor and soft starter – get good motor and soft starter protection value, with more 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
- Save energy and space with the integrated bypass
- Ratings up to 1250 A

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 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 completely removed.

Therefore it's 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 therefore does not generate harmful harmonics. So when using a soft starter there is no need to consider harmonics at all.

Reduce torque and current

Using a soft starter you can adjust torque to the exact level required, whether or not the application is loaded. By reducing the starting torque, mechanical stress on equipment is alleviated, saving on service and maintenance costs.

The soft starter also 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 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.

The Danfoss portfolio of soft starters comprises:

- VLT® Soft Start Controller MCD 100
- VLT® Compact Starter MCD 201
- VLT® Compact Starter MCD 202
- VLT® Soft Starter MCD 600

For product details, refer to pages 7-15.

Integrated bypass – for all-round savings

Many Danfoss soft starters provide an integrated bypass to allow direct-on-line operation as an alternative. The integrated bypass offers multiple cost-saving benefits.

Reduce heat loss

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

Save space

Danfoss soft starters with integrated bypass take 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 a VLT® Soft Starter with integrated bypass, than an alternative soft starter with external contactor. Less cable is required, which additionally reduces cost. Save even more time, by using the handy set-up software tool VLT® Motion Control Tool MCT 10 to configure the soft starter via PC.
You can use the same set-up tool with VLT® drives.

Save energy – fast payback

The soft starter with integrated bypass contactor saves space by comparison to an external contactor connected to a non-bypassed unit.

Select a soft starter with integrated bypass when you want to save costs. The payback time is just months, using a Danfoss soft starter with integrated bypass. See how in this example:

Example: VLT® Soft Starter MCD 600

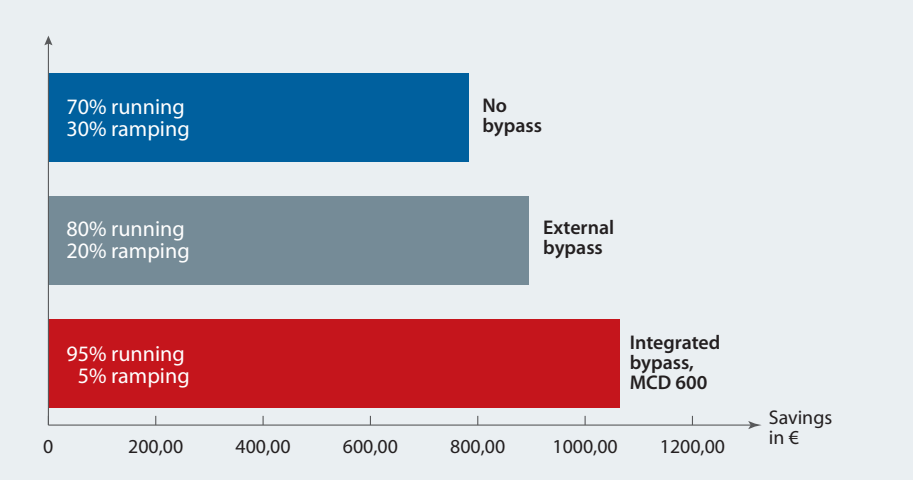
In the example, a VLT® Soft Starter MCD 600 regulates a water pump, with motor specifications as follows:

Motor

Supply.....400 V AC
Rating.....132 kW
FLC.....244 A
Start duty.....300% for 30 seconds
Electricity prices.....(industry – EU)

Estimated savings, non-bypassed versus bypassed

Save more with bypass, compared to no bypass.
The energy saved depends on the relationship between ramping and running.
The more the application is running the more the bypass will save – *see illustration.*



Cost saving using a bypass, showing the beneficial savings effect of increased running time and reduced ramping time.

Integrated bypass versus external bypass

Win back your investment faster with integrated bypass, compared to external bypass. The payback period is only a few months.

Investment (indexed values)	**No bypass, Direct-on-line**	**Soft starter with external bypass**	**Soft starter with integrated bypass VLT® Soft Starter MCD 600**
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

Applications

Centrifugal pump – Water

Need to reduce water pressure surges and mains supply disturbance at start-up? Then 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 design phase – there is no need to specify pressure surge tanks and motorized valves to cater for repetitive high-pressure surges. The minimum start current function reduces electrical disturbance on mains supply and limits demand on supply as well – reducing reticulation costs for example in farmland irrigation projects.

The soft starter

- Prevents motor overheating via integrated protection
- Ensures that pump does not run in reverse, via start-up protection
- Detects blocked pipes or 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, minimizing wear on coupling, belts, and bearings.

The soft starter

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

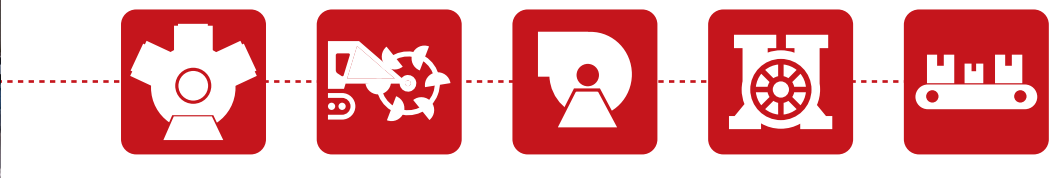
To integrate the soft starter directly with a BMS, the VLT® Soft Starter MCD 600 supports monitoring fan loading, without the need for extra equipment an analog output.

Compressor – Protect your motor

Has the compressor ever locked up, for instance due to entry of liquid ammonia? Using a soft starter, ongoing monitoring prevents damage to motor, compressor, and couplings in a lock up situation.
Soft starters provide instant protection against motor overload, by tripping the motor immediately.

The soft starter

- Enables load shedding before the soft starter trips, for compressor overload or motor overtemperature
- Trips to prevent motor damage when start-up time exceeds a pre-programmed limit, for example due to a jammed or stalled compressor
- Monitors the compressor load using a 0-20 mA/4-20 mA analog output
- Enables optimized compressor performance with dual speed dahlander motor control
- Avoids short cycling via restart delay, promoting longer life of motor, compressor, and coupling
- Is an easy retrofit for start/delta starters



Conveyor belt – Food and beverage industries

Extend the life of your conveyor belt, 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 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 conveyor belt slap during start
- Reduces stress on counter-balances and weights
- Reduces electrical disturbance on the supply, via a minimum start current function
- Provides protection against accidental running in reverse
- Detects broken couplings or broken belts, and trips the motor immediately
- Detects overload, or a jammed or stalled conveyor, and protects equipment by tripping the motor immediately

Crusher and 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

- Eliminates the need for special control equipment, by connecting motor thermistors directly into the VLT® Soft Starter MCD 600 thermistor input
- Extends the life of couplings, belts, and bearings by gentle start-up, minimizing torque transients
- Reduces electrical disturbance on the supply
- Limits the demand on the supply, especially critical on remote sites supplied by generator sets
- Prevents damage due to unintentional running in reverse, by preventing start when rotation of the 3-phase incoming supply changes
- Detects broken couplings and broken crusher belts via undercurrent protection, and trips to prevent further damage

Soft starter application guide: Find the right product for your application

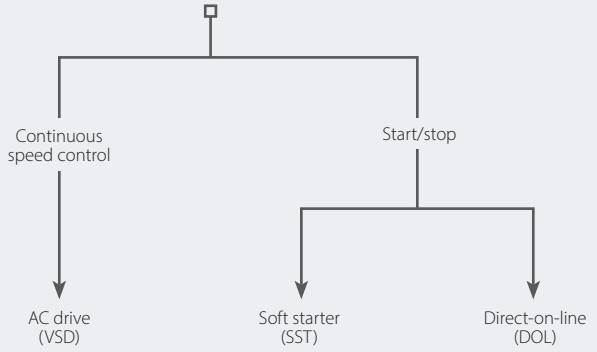
	Application	Inertia	MCD 100	MCD 201	MCD 202	MCD 600
Water	Agitator	High				■
	Centrifugal pump		■	■	■	■
	Compressor (Screw, unloaded)		■	■	■	■
	Compressor (Reciprocating, unloaded)	High				■
	Conveyor	High				■
	Fan (damped)		■	■	■	■
	Fan (undamped)	High				■
	Mixer	High				■
	Positive displacement pump	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				■

Soft starter application guide: Find the right product for your application

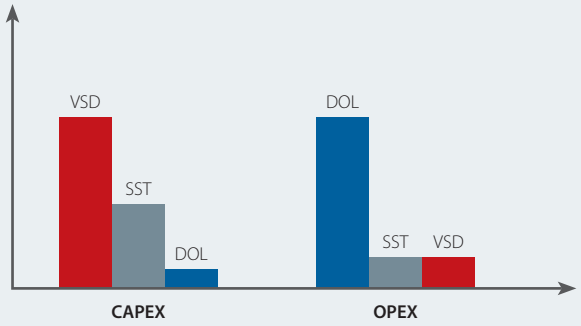
Step 1. Determine what kind of speed control you need

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

Speed control



Initial cost



If you selected an AC drive (VSD), read more about Danfoss drives on **drives.danfoss.com**.
If you selected a soft starter, then read on.

Direct-on-line (DOL) drawbacks

- Wear on motor bearings
- Wear and tear on gearbox
- Water hammer

Step 2. Match your application, motor, and controls

Select the size of the soft starter to match both the motor and the application.

1. Use the soft starter guide on p6 as a starting point
2. Match the soft starter current rating with motor full load current rating, see p8

Soft starter motor and control guide - select a soft starter to match
Select a soft starter that has a current rating at least equal to the motor's full load current rating (see motor nameplate) at the application start duty (Light, Standard, heavy)

Soft starter current rating
The current rating of the soft starter determines the maximum motor size it is compatible with.

The current rating of the soft starter depends on:

- The number of starts per hour
- The duration and current level of each start
- The duration of time the soft starter is turned off (not passing current) between starts

Soft starter start performance
For MCD 100 and MCD 200
Find information on start performance in the **Design Guide**.(add link)

For MCD 600

- Refer to the Design Guide (add link) for information on start performance in different load situations
- Alternatively use the designer tool "Winstart for MCD 600" to tailor the selection to optimize your application. Download Winstart for MCD 600 on **www.danfoss.com**.

Interaction with controls
Designing your application also includes interaction with controls.
The basic soft starters, MCD 100 and MCD 201, depend on other components for warning and alarms.

MCD 202 is able to signal overload, either via digital I/O or fieldbus options.

MCD 600 includes a full warning and alarm handling system to interface controls either via digital I/O or fieldbus options: serial- or Ethernet-based such as PROFINET or EtherNet/IP. Check the specifications for more details.

Serial communication

	MCD 100	MCD 201	MCD 202	MCD 600
Start/stop, reset	■	■	■	■
LED for start, run, trip	■	■	■	■
Trip codes	■	■	■	■
Current display			■	■
Motor temperature display			■	■
4 – 20 mA output				■
Programming keypad, graphical display				■

VLT® Compact Starter MCD 201 and 202, and VLT® Soft Starter MCD 600 come with optional plug-in modules for serial communication.

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

Step 3. Match your needs

Find the right match between your application and the soft starter features you need.
- VLT® Soft Start Controller MCD 100
- VLT® Compact Starter MCD 201 or 202
- VLT® Soft Starter MCD 600

	MCD 100	MCD 201	MCD 202	MCD 600
Power size	0.1-15 kW (3-25 A)	7-110 kW (17-200 A)	7-110 kW (17-200 A)	7.5 - 1400 kW (20-1250 A)
Voltage range	3 x 208 - 600 VAC, 45-66 Hz	3 x 200 - 575 VAC, 45-66 Hz	3 x 200 - 575 VAC, 45-66 Hz	3 x 200 - 690 VAC, 45-66 Hz
Start/ Stop mode	Timed voltage ramp	Timed voltage ramp	Timed voltage ramp Current-controlled ramp	Current-controlled ramp Adaptive-controlled ramp
Protection	None (external components)	None (external components)	7 features	19 features
Inputs	1 DI	1 DI	2 DI	4 DI
Outputs	0	0	2 DO	3 DO/ 1 AO
Control	2-wire control 3 rotary switches	2-3 wire control 3 rotary switches Remote operator	2-3 wire control 8 rotary switches Remote operator	2-wire control Built-in graphical display Remote graphical display
Integrated functions				Reverse control Pump Clean / deragging Power Through and many more
Options	None	PROFIBUS, PROFINET, EtherNet/IP, Modbus TCP[1]		

1] For full details see Options, page 26.

VLT® Soft Starter MCD 600

VLT® Soft Starter MCD 600 is a total motor starting solution. Current transformers measure motor current and provide feedback for controlled motor ramp profiles.

The VLT® Soft Starter MCD 600 combines the latest in advanced controls and protections with an increased level of intelligence for superior performance in fixed-speed applications.

The MCD 600 is more flexible than ever to install, thanks to a wide variety of Ethernet and serial-based communication option cards, application-dedicated smart cards and support for eight languages.

The integrated bypass ensures both extremely high efficiency and harmonic-free operation at full speed, reducing energy consumed and required cooling capacity.

Ease of use is also greatly increased with new capabilites, such as the pump-clean function, PowerThrough operation, and calendar or run timebased scheduling. Furthermore, enhanced protection ensures more uptime.

VLT® Soft Starter MCD 600 at a glance:

Mains voltage range

- 3 x 200-525 VAC (T5)
- 3 x 380-690 VAC (T7)

Current range and enclosure

- IP20: 20-129 A (nominal)
- IP00: 144-1250 A (nominal)

S1

S2

S3

Feature	Benefit	Description
Intuitive application setup	Save commissioning time.	– Easy and uncomplicated commissioning. Just enter motor current, select your application, then you are ready to run
Extended simulation mode with full simulation of start behaivor	Test your soft starter without connecting mains supply or motor.	– Test your soft starter functions and integration with controllers, without connecting mains supply or motor
Built-in timers and schedulers	Easy to set up a timer. No need to install external controller or components.	– Easy to set up weekly planned watering programs for agriculture, or just a a single timer to start the pump on demand. No need for external controller or components
Pump Clean (Deragging) function	More uptime and longer pump life.	– For a blocked pump, trigger the Pump Clean function. MCD 600 will automatically start a program to run the motor alternately in reverse/forward. No extra external components required. Just select the input and Pump Clean starts.
Reverse control function	Run the MCD 600 in both forward and reverse directions. MCD 600 will maintain full control over starting current and protection. To use this function, install a reversing contactor in the application.	– Run the MCD 600 in both forward and reverse directions. MCD 600 will maintain full control over starting current and protection. To use this function, install a reversing contactor in the application.
Power Through function	More uptime - bypasses damaged components to keep your motor running.	– If an SCR is damaged, and you don't have time for repair, start the Power Through function. This will bypass the damaged SCR and keep your motor running
Emergency mode	Asset protection - keeps the pump or fan running for as long as possible in an emergency.	– If required, MCD 600 can Switch to Emergency mode. In this mode, MCD 600 ignores all messages and keeps the pump or fan running for as long as possible.

VLT® Local Control Panel LCP 601

Everything you can do with the VLT® Soft Starter MCD 600 controls is also possible via the VLT® Local Control Panel LCP 601

Select a screen view set-up from one user-programmable and 7 standard views.

Language selection
English, Chinese, German, Spanish, Portuguese, French, Italian, Russian.

The LCP 601 is connected to the MCD 600 by using a 3 m cable using a 9-pin (D-sub) plug and 3 m cable provided with the IP65 (NEMA 12) door-mount kit.

Once connected, the soft starter asks whether you want to copy parameters from LCP to starter or starter to LCP (if different).

100% easy connection

- The Modbus, PROFIBUS, EtherNet/IP and DeviceNet modules use another port on the MCD 600, located at the side of the soft starter
- Separate LCP 601 output at the bottom for 9 pin plug and 3 m cable
- One ordering number (LCP with door-mount kit and cable)
- Plug & play connection, even when the soft starter is powered up
- One cable for power and communication
- Powered up by soft starter
- Copy of parameter set-up

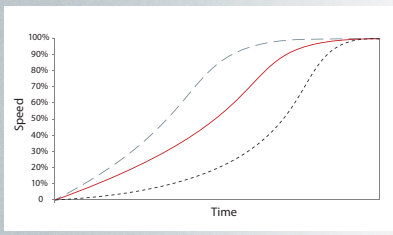
Dimensions

Current rating [A]	Weight [kg]	Height [mm]	Width [mm]	Depth [mm]	Enclosure size
20 - 42	4.8	336	152	231	S1
63 - 69	4.9				
86 - 128	5.5				
144 - 215	12.7	495	216	243	S2
244 - 448	15.5	523			
527 - 579	19.0				
590 - 736	51.0	618	447	310	S3
839 - 979	62.0				
1134 - 1250	65.0				

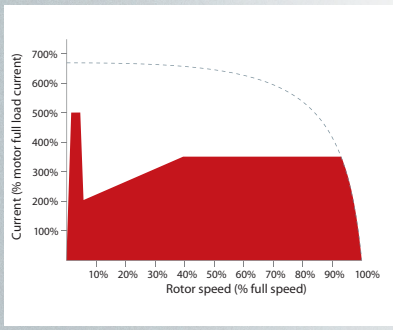
Fieldbus communication modules:

Starting

- AAC Adaptive Acceleration
  - EtherNet/IP
  - PROFINET
  - Modbus TCP
  - PROFIBUS
  - DeviceNet
  - Modbus RTU
- Remote LCP Option
- Application card
  - Smart Pump
- PC software:
  - WinStart
  - VLTR Motion Control Tool MCT 10



Three Adaptive Acceleration Control (AAC) start profiles; early, constant and late acceleration



Constant current/ current ramp – shown here with kickstart

VLT® Compact Starter MCD 200

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 mount-ing 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.

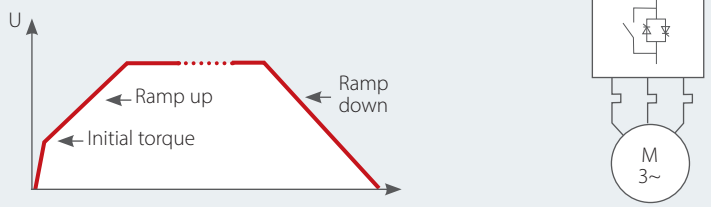
Compatible with grounded delta power systems.

Power range
7.5 – 110 kW

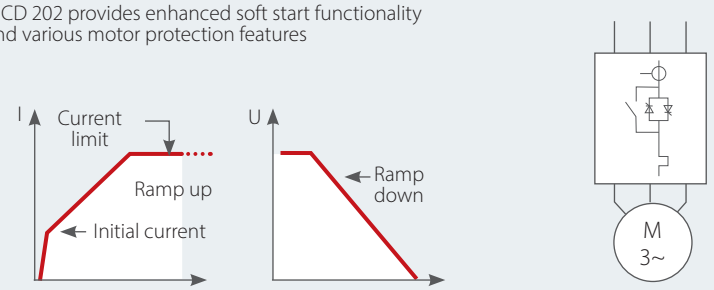
Remote operation
The dedicated remote operator kit facilitates remote operation of VLT® Compact Starter MCD 201 and VLT® Compact Starter MCD 202 .

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



Feature	Benefit
Small footprint and compact size	– Saves panel space
Built-in bypass	– Minimizes installation cost and eliminates power loss – Reduces heat build up. Savings in components, cooling, wiring and labor
Advanced accessories	– Allows enhanced functionality
Advanced SCR control algorithms balance output waveform	– Allows more starts per hour, at higher load
Reliable	**Maximum up-time**
Essential motor protection (MCD 202)	– Reduces overall project investment
Max. ambient temperature 60 °C without derating	– No external cooling or oversizing necessary
User friendly	**Save commissioning**
Easy to install and use	
Easy DIN rail mounting for sizes up to 30 kW	– Saves time and space

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

VLT® Soft Start Controller MCD 100

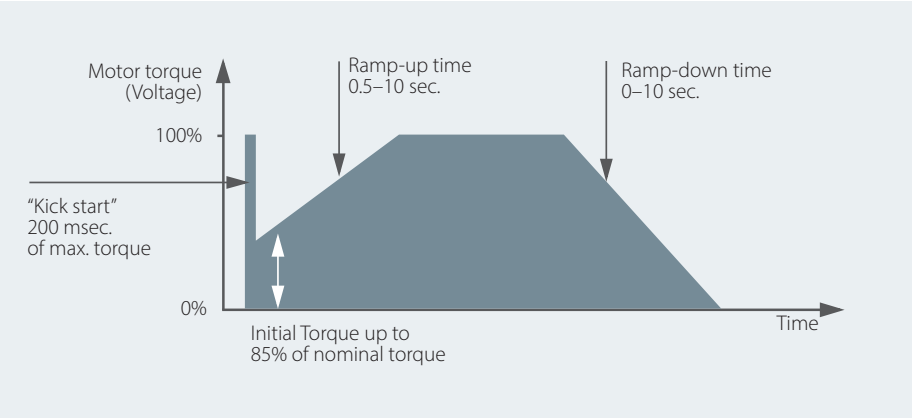
VLT® Soft Start Controller MCD 100 is a cost-effective and extremely compact soft starter for AC motors up to 11 kW, due to a unique semiconductor design.

VLT® Soft Start Controller MCD 100 is a true "fit and forget" product. Selection can be made on the basis of the motor power – exactly as with traditional contactors.

VLT® Soft Start Controller MCD 100 products provide timed voltage ramp up and down. Ramp time can be individually adjusted 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 up to 600 V AC.



Feature	Benefit
Small footprint and compact size	– Saves panel space
Selection can be based on motor power	– Easy selection
Universal control voltage	– Simplifies selection – Keeps stock at a minimum
"Fit and 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
Max. ambient temperature 50 °C without derating	– No external cooling or oversizing necessary
User friendly	**Save commissioning and operating cost**
Easy to install and use	– Saves times
Digitally controlled rotary switches	– Secures precise settings and simplifies installation
Easy DIN rail mounting for sizes up to 30 kW	– Saves time and 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

VLT® Soft Starter MCD 600	VLT® Soft Start Controller MCD 100
Type	
■ Premium soft starter with advanced built-in functions ■ Compact design with high power density	■ A true "fit and forget" soft starter for DIN rail mount, MCD 100 provides basic soft start and stop function
Concept	
■ Multiple enhanced start/stop functions ■ Voltage range: 200-690 VAC ■ Current range: 20 - 1250 A ■ Built in bypass contactor up to 1250 A ■ Control voltage 24 V AC/DC or 110-2030 VAC ■ 3-phase SCR control	■ 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	
■ Two motor parameter sets ■ Constant current and current ramp start ■ Adaptive control starting/stopping ■ Kickstart ■ Coast to stop and TVR stop ■ DC brake ■ Soft brake ■ Jog (forward and reverse)	■ Timed voltage ramp-up ■ Adjustable start torque ■ Selectable kick-start function
■ Inside delta (6 wire) control ■ Soft trip ■ Pump clean ■ Reversing contactor control ■ Emergency run mode	■ Timed voltage ramp-down
Protection	
■ Motor thermistor connection terminals ■ Current imbalance ■ Undercurrent & overcurrent protection ■ Undervoltage & overvoltage protection ■ Dry pump protection (under-power & over-power protection) ■ Phase sequence (forward/reverse/any) ■ Phase loss ■ Power loss ■ Starts per hour limit ■ Restart delay (pump back spin delay)	
Input/output	
■ 2 fixed digital function inputs (Start, Reset) ■ 2 programmable digital inputs ■ 1 fixed digital output (Main contactor) ■ 2 programmable digital outputs ■ 1 programmable analog output ■ 1 motor thermistor input	
Control and connectivity	
■ Multi-language graphical display ■ Configurable display screen ■ Remote keypad IP65 ■ I/O and network expansion options	■ Universal two-wire control ■ Programmable via 3 rotary switches
Option cards	
■ Modbus RTU ■ PROFIBUS ■ DeviceNet ■ Modbus TCP ■ PROFINET ■ EtherNet/IP ■ Smart Card for Pump Control	
Other features	
■ Integrated bypass up to 1250 A ■ USB port and data logging ■ Voltage measurement ■ SCR fail PowerThrough operation ■ Full week /daily on/off scheduling ■ On demand Run timer mode (on/off cycle timer) ■ Run simulation for commissioning ■ 384 event logs ■ QR Code in LCP for service ■ Danfoss MCD Mate for smartphone	■ Extremely robust SCR design for unlimited number of starts per hour, LED indication, IP20
Approvals	
■ S1 and S2: CE, UL, CCC, EAC, RCM, Lloyds ■ S3: CE, UL, CCC, EAC, RCM, Lloyds, ABS ■ Remote keypad IP65 ■ I/O and network expansion options	■ UL, CE

VLT® Compact Starter MCD 201	VLT® Compact Starter MCD 202
Type	
■ A physically compact starter providing basic soft start and stop functionality	■ Physically similar to MCD 201 but providing enhanced soft start functionality and various motor protection functions
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	■ 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	
■ Timed voltage ramp-up ■ Adjustable initial torque	■ Current limit start ■ Initial current ramp-up
■ Timed voltage ramp-down	■ 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	
■ One output relay: Line contactor control	■ Two output relays: – Line contactor control – Run contactor or trip function
Control	
■ Two- or three-wire control Programmable via 3 rotary switches Reset push button **Optional** ■ Modules for serial communication ■ Remote operator kit ■ PC software	■ 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 and heat dissipation during nominal operation ■ LED status indication ■ IP20 (7.5 – 55 kW @ 400 V) ■ IP00 (75 – 110 kW @ 400 V) ■ Protection kit available	■ Integral SCR bypass for minimum physical size and heat dissipation during nominal operation ■ LED status indication ■ IP20 (7.5 – 55 kW @ 400 V) ■ IP00 (75 – 110 kW @ 400 V) ■ Protection kit available
Approvals	
■ UL ■ C – UL ■ CE ■ CCC ■ C-tick ■ Lloyds	■ UL ■ C – UL ■ CE ■ CCC ■ C-tick ■ Lloyds

Ordering type code

VLT® Compact 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 and 380-440 V AC

VLT® Soft Starter MCD 600

[1] [2] [3] [4] [5] [6]

MCD 6 – □ – □ – T □ – G □ X – □ – C V □

[1] Fixed Load Current (FLC) - see tables below	

[2 Supply voltage	
B	With internal bypass contactor
C	No internal bypass contactor (continuous)

[3] Supply voltage	
5	200 - 525 V AC
7	380 - 690 V AC

[4] Enclosures	
S1	Enclosure size 1
S2	Enclosure size 2
S3	Enclosure size 3

[5] Protection rating	
00	IP00
20	IP20

[6] Control voltage	
1	24 V AC or 24 V DC
2	110 or 230 V AC

[4] Enclosures

[4] Enclosure S1

[1] FLC [A]	[2] Bypass	[5] Protection rating
0020	B	IP20
0034	B	IP20
0042	B	IP20
0063	B	IP20
0069	B	IP20
0086	B	IP20
0108	B	IP20
0129	B	IP20

[4] Enclosure S2

[1] FLC [A]	[2] Bypass	[5] Protection rating
0144	B	IP00
0171	B	IP00
0194	B	IP00
0244	B	IP00
0287	B	IP00
0323	B	IP00
0410	B	IP00
0527	B	IP00
0579	B	IP00
0160	C	IP00
0215	C	IP00
0275	C	IP00
0343	C	IP00
0448	C	IP00

[4] Enclosure S3

[1] FLC [A]	[2] Bypass	[5] Protection rating
0654	B	IP00
0736	B	IP00
0950	B	IP00
1154	B	IP00
1250	B	IP00
0590	C	IP00
0667	C	IP00
0839	C	IP00
0979	C	IP00
1134	C	IP00

Electrical data

VLT® Soft Start Controller MCD 100

Power size [kW]	Rated current [A]
1.5	3 A: 5-5:10 (AC 53b)
7.5	15 A: 8-3: 100-3000 (AC 53a)
11	25 A: 6-5:100-480 (AC 53a)

VLT® Compact Starter MCD 201/MCD 202

Power size [kW]	Rated current AC-53b* [A]
7.5	18 A: 4-6: 354
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 Starter MCD 600

IEC - 3 Wire Connection (In-line) - 40°C

For different operating conditions use WinSTART rating software

Internally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 40 °C					4 x FLC, 20s, 40 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0020B	20	7.5	11	15	18.5	16	5.5	7.5	11	15
MCD6-0034B	34	11	18.5	22	30	27	7.5	15	18.5	22
MCD6-0042B	42	11	22	30	37	35	11	18.5	22	30
MCD6-0063B	63	18.5	30	45	60	51	15	22	37	45
MCD6-0069B	69	22	37	45	60	62	18.5	30	45	55
MCD6-0086B	86	22	45	60	75	69	22	37	45	60
MCD6-0108B	108	30	55	75	90	86	22	45	60	75
MCD6-0129B	129	37	60	90	110	103	30	55	75	90
MCD6-0144B	144	45	75	90	132	116	37	60	75	110
MCD6-0171B	171	55	90	110	160	138	45	75	90	132
MCD6-0194B	194	60	110	132	185	157	45	90	110	150
MCD6-0244B	244	75	132	160	220	200	60	110	150	185
MCD6-0287B	287	90	160	185	280	234	75	132	160	220
MCD6-0323B	323	110	185	220	315	263	75	150	185	250
MCD6-0410B	410	132	220	280	400	380	110	200	250	355
MCD6-0527B	527	160	300	355	500	427	132	220	280	400
MCD6-0579B	579	185	315	400	500	470	150	250	315	450
MCD6-0654B	654	185	355	450	600	535	160	300	355	500
MCD6-0736B	736	220	400	500	700	603	185	315	400	600
MCD6-0950B	950	300	500	600	900	785	250	450	500	700
MCD6-1154B	1154	355	600	800	1100	959	300	500	600	950
MCD6-1250B	1250	400	700	900	1200	1156	355	600	800	1050

Continous Operation (no internal bypass)										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 40 °C, 50% Duty Cycle					4 x FLC, 20s, 40 °C, 50% Duty Cycle				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0160C	163	45	90	110	160	142	45	75	90	132
MCD6-0215C	216	60	110	150	185	183	60	90	132	160
MCD6-0275C	276	90	150	185	250	231	75	132	150	220
MCD6-0343C	345	110	185	220	315	298	90	160	185	280
MCD6-0448C	449	132	280	315	400	419	132	220	280	400
MCD6-0590C	590	185	315	400	550	492	160	250	315	450
MCD6-0667C	667	187	355	450	600	557	160	315	400	500
MCD6-0839C	839	250	450	550	800	710	220	400	500	700
MCD6-0979C	979	300	500	700	900	838	250	450	600	800
MCD6-1134C	1134	355	600	800	1100	964	315	500	700	900

Externally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 40 °C					4 x FLC, 20s, 40 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0590C	732	220	400	500	700	593	185	315	400	500
MCD6-0667C	822	250	450	550	800	667	220	355	450	600
MCD6-0839C	1067	355	600	750	1000	874	280	500	600	800
MCD6-0979C	1307	400	750	900	1200	1076	355	600	700	1000
MCD6-1134C	1620	500	900	1100	1400	1309	400	750	900	1200

IEC - 3 Wire Connection (In-line) - 50°C

For different operating conditions use WinSTART rating software

Internally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 50 °C					4 x FLC, 20s, 50 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0020B	18	5.5	11	11	15	15	4	7.5	11	11
MCD6-0034B	31	7.5	15	22	30	24	5.5	11	15	22
MCD6-0042B	38	11	18.5	22	37	31	7.5	15	22	30
MCD6-0063B	55	15	30	37	55	44	11	22	30	45
MCD6-0069B	69	22	37	45	60	56	15	30	37	55
MCD6-0086B	76	22	37	55	75	60	18.5	30	37	60
MCD6-0108B	99	30	45	60	90	79	22	37	55	75
MCD6-0129B	119	37	55	75	110	95	30	45	60	90
MCD6-0144B	126	37	60	90	110	101	30	55	75	90
MCD6-0171B	155	45	90	110	150	125	37	60	90	110
MCD6-0194B	179	55	90	110	160	145	45	75	90	132
MCD6-0244B	224	60	110	150	220	184	60	90	132	160
MCD6-0287B	263	75	150	185	250	214	60	110	150	185
MCD6-0323B	302	90	160	200	300	246	75	132	160	220
MCD6-0410B	410	132	220	280	400	353	110	185	250	315
MCD6-0527B	483	150	250	315	450	392	110	200	280	355
MCD6-0579B	538	160	280	355	500	437	132	220	300	400
MCD6-0654B	581	185	315	400	550	475	150	250	315	450
MCD6-0736B	668	220	355	450	600	546	160	280	355	500
MCD6-0950B	886	280	500	600	800	732	220	400	500	700
MCD6-1154B	1078	315	600	750	1000	895	280	500	600	800
MCD6-1250B	1130	355	650	800	1200	1075	355	600	700	1000

Continous Operation (no internal bypass)										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 50 °C, 50% Duty Cycle					4 x FLC, 20s, 50 °C, 50% Duty Cycle				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0160C	148	45	75	90	132	129	37	60	90	110
MCD6-0215C	197	60	110	132	185	167	55	90	110	160
MCD6-0275C	257	75	132	160	250	215	60	110	150	185
MCD6-0343C	321	90	160	220	315	277	90	150	185	250
MCD6-0448C	391	110	185	280	355	365	110	185	250	355
MCD6-0590C	522	160	280	355	500	435	132	220	300	400
MCD6-0667C	603	185	315	400	600	503	160	280	355	500
MCD6-0839C	725	220	400	500	700	660	185	355	450	600
MCD6-0979C	890	280	500	600	800	779	250	450	550	700
MCD6-1134C	990	315	550	700	900	893	280	500	600	800

Externally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 50 °C					4 x FLC, 20s, 50 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0590C	652	185	355	450	600	528	160	280	355	500
MCD6-0667C	747	220	400	500	700	606	185	315	400	600
MCD6-0839C	997	315	500	700	900	816	250	450	500	800
MCD6-0979C	1220	355	700	800	1200	1006	315	500	700	1000
MCD6-1134C	1370	400	800	900	1300	1221	400	700	800	1200

IEC - 6 Wire Connection (Inside Delta) - 40°C

For different operating conditions use WinSTART rating software

Internally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 40 °C					4 x FLC, 20s, 40 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0020B	30	7.5	15	18.5	22	24	7.5	11	15	22
MCD6-0034B	51	15	22	30	45	40	11	18.5	22	37
MCD6-0042B	63	18.5	30	37	60	52	15	22	30	45
MCD6-0063B	94	30	45	60	90	76	22	37	45	60
MCD6-0069B	103	30	55	60	90	93	30	45	60	90
MCD6-0086B	129	37	60	90	110	103	30	55	75	90
MCD6-0108B	162	45	90	110	150	129	37	60	90	110
MCD6-0129B	193	60	110	132	185	154	45	75	110	150
MCD6-0144B	216	60	110	150	200	174	55	90	110	160
MCD6-0171B	256	75	150	160	250	207	60	110	132	185
MCD6-0194B	291	90	160	185	280	235	75	132	160	220
MCD6-0244B	366	110	185	250	355	300	90	160	185	280
MCD6-0287B	430	132	220	300	400	351	110	185	250	315
MCD6-0323B	484	150	250	315	450	394	110	220	280	355
MCD6-0410B	615	185	315	400	600	570	185	315	400	500
MCD6-0527B	790	250	450	500	700	640	185	355	450	600
MCD6-0579B	868	280	500	600	800	705	220	400	500	700
MCD6-0654B	981	315	500	700	900	802	250	450	500	800
MCD6-0736B	1104	355	600	750	1000	904	280	500	600	900
MCD6-0950B	1425	450	800	1000	1300	1177	355	600	800	1100
MCD6-1154B	1731	500	900	1200	1600	1438	450	800	1000	1300
MCD6-1250B	1875	600	1000	1300	1700	1734	500	1000	1200	1600

Continous Operation (no internal bypass)										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 40 °C, 50% Duty Cycle					4 x FLC, 20s, 40 °C, 50% Duty Cycle				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0160C	245	75	132	160	220	213	60	110	150	200
MCD6-0215C	324	90	185	220	315	275	90	150	185	250
MCD6-0275C	414	132	220	280	400	347	110	185	220	315
MCD6-0343C	518	160	280	355	500	447	132	250	300	400
MCD6-0448C	674	220	355	450	600	629	185	355	400	600
MCD6-0590C	885	280	500	600	800	738	220	400	500	700
MCD6-0667C	1000	315	550	700	900	835	250	450	500	800
MCD6-0839C	1258	400	700	900	1200	1065	315	600	700	1000
MCD6-0979C	1468	450	800	1000	1300	1257	400	700	800	1200
MCD6-1134C	1701	500	900	1200	1600	1446	450	800	1000	1300

Externally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 40 °C					4 x FLC, 20s, 40 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0590C	1098	355	600	700	1000	890	280	500	600	800
MCD6-0667C	1233	400	700	800	1200	1001	315	550	700	1000
MCD6-0839C	1600	500	900	1100	1500	1311	400	800	900	1300
MCD6-0979C	1960	600	1100	1200	1800	1614	500	900	1100	1500
MCD6-1134C	2430	800	1300	1400	2200	1964	600	1100	1200	1800

IEC - 6 Wire Connection (Inside Delta) - 50°C

For different operating conditions use WinSTART rating software

Internally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 50 °C					4 x FLC, 20s, 50 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0020B	27	7.5	11	18.5	22	23	5.5	11	15	22
MCD6-0034B	47	15	22	30	45	36	11	18.5	22	30
MCD6-0042B	57	18.5	30	37	55	47	15	22	30	45
MCD6-0063B	83	22	45	55	75	66	185	30	45	60
MCD6-0069B	104	30	55	75	90	84	22	45	60	75
MCD6-0086B	114	37	55	75	110	90	30	45	60	90
MCD6-0108B	149	45	75	90	150	119	37	55	75	110
MCD6-0129B	179	55	90	110	150	143	45	75	90	132
MCD6-0144B	189	60	110	132	185	152	45	75	110	150
MCD6-0171B	233	75	132	160	220	188	60	90	132	185
MCD6-0194B	269	90	150	185	250	218	60	110	150	220
MCD6-0244B	336	110	185	220	315	276	90	150	185	280
MCD6-0287B	395	110	220	280	355	321	90	185	220	315
MCD6-0323B	453	132	250	315	450	369	110	185	250	355
MCD6-0410B	615	185	315	400	600	530	160	280	355	500
MCD6-0527B	725	220	400	500	700	588	185	315	400	550
MCD6-0579B	807	250	450	550	800	656	185	355	450	600
MCD6-0654B	872	280	500	600	800	713	220	400	500	700
MCD6-0736B	1002	315	550	700	1000	819	250	450	550	800
MCD6-0950B	1329	400	700	900	1200	1098	355	600	750	1000
MCD6-1154B	1617	500	900	1100	1500	1343	400	800	900	1200
MCD6-1250B	1695	500	950	1200	1600	1613	500	900	1100	1600

Continous Operation (no internal bypass)										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 50 °C, 50% Duty Cycle					4 x FLC, 20s, 50 °C, 50% Duty Cycle				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0160C	222	60	110	150	220	194	60	110	132	185
MCD6-0215C	296	90	150	185	280	251	75	132	160	250
MCD6-0275C	386	110	185	353	355	323	90	185	220	300
MCD6-0343C	482	150	250	315	450	416	132	220	280	400
MCD6-0448C	587	185	300	400	500	548	160	300	355	500
MCD6-0590C	783	250	450	550	700	653	185	355	450	600
MCD6-0667C	905	280	550	600	900	755	250	400	500	700
MCD6-0839C	1088	355	600	750	1000	990	315	550	700	900
MCD6-0979C	1335	400	800	950	1200	1169	355	600	800	1100
MCD6-1134C	1485	450	850	1000	1400	1340	400	800	900	1200

Externally Bypassed										
MCD 600	Normal Duty					Heavy Duty				
	3.5 x FLC, 15s, 50 °C					4 x FLC, 20s, 50 °C				
	FLC	Motor Power [kW]				FLC	Motor Power [kW]			
	Amps	230 V	400 V	500 V	690 V	Amps	230 V	400 V	500 V	690 V
MCD6-0590C	978	315	500	700	900	792	250	450	500	700
MCD6-0667C	1121	355	700	800	1100	909	280	500	600	900
MCD6-0839C	1496	450	800	1000	1400	1224	400	700	800	1200
MCD6-0979C	1830	600	1000	1200	1700	1509	500	800	1000	1500
MCD6-1134C	2055	600	1100	1300	1800	1832	600	1000	1200	1700

NEMA - 3 Wire Connection (In-line) - 40°C

For different operating conditions use WinSTART rating software

Internally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 40 °C				4.5 x FLC, 30s, 40 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0020B	14	3	10	10	14	3	10	10
MCD6-0034B	30	10	20	25	24	7.5	15	20
MCD6-0042B	38	10	25	30	29	10	20	25
MCD6-0063B	54	20	40	50	42	15	30	40
MCD6-0069B	68	25	50	60	50	15	30	40
MCD6-0086B	70	25	50	60	54	20	40	50
MCD6-0108B	88	30	60	75	68	25	50	60
MCD6-0129B	105	40	75	100	82	30	60	75
MCD6-0144B	125	40	100	125	96	30	75	75
MCD6-0171B	144	50	100	150	112	40	75	100
MCD6-0194B	164	60	125	150	130	50	100	125
MCD6-0244B	212	75	150	200	164	60	125	150
MCD6-0287B	248	100	200	250	192	75	150	200
MCD6-0323B	278	100	200	250	216	75	150	200
MCD6-0410B	404	150	300	400	314	125	250	300
MCD6-0527B	448	150	350	450	348	125	250	350
MCD6-0579B	495	200	400	500	385	150	300	400
MCD6-0654B	565	200	450	550	440	150	350	450
MCD6-0736B	638	250	500	600	496	200	400	500
MCD6-0950B	864	350	700	900	664	250	500	600
MCD6-1154B	1055	400	850	1000	843	350	700	800
MCD6-1250B	1249	500	1000	1300	971	400	800	1000

Continous Operation (no internal bypass)								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 40 °C, 50% Duty Cycle				4.5 x FLC, 30s, 40 °C, 50% Duty Cycle			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0160C	159	60	125	150	130	50	100	125
MCD6-0215C	198	75	150	200	161	60	125	150
MCD6-0275C	250	100	200	250	198	75	150	200
MCD6-0343C	331	125	250	300	266	100	200	250
MCD6-0448C	414	150	350	450	377	150	300	350
MCD6-0590C	535	200	450	500	421	150	350	450
MCD6-0667C	605	250	500	600	480	200	400	500
MCD6-0839C	775	300	600	800	618	250	500	600
MCD6-0979C	920	350	700	850	740	300	600	700
MCD6-1134C	1044	450	800	1000	864	350	700	900

Externally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 40 °C				4.5 x FLC, 30s, 40 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0590C	621	250	500	600	483	200	400	500
MCD6-0667C	699	250	550	700	544	200	450	500
MCD6-0839C	960	400	800	1000	735	300	600	700
MCD6-0979C	1180	500	950	1200	916	350	700	900
MCD6-1134C	1403	550	1150	1400	1091	500	900	1100

NEMA - 3 Wire Connection (In-line) - 50°C
For different operating conditions use WinSTART rating software

Internally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 50 °C				4.5 x FLC, 30s, 50 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0020B	17	5	10	15	14	3	10	10
MCD6-0034B	28	10	20	25	22	7.5	15	20
MCD6-0042B	34	10	25	30	28	10	20	25
MCD6-0063B	52	15	30	40	40	10	25	30
MCD6-0069B	58	20	40	50	45	15	30	40
MCD6-0086B	77	25	50	60	52	15	40	50
MCD6-0108B	81	30	60	75	65	20	50	60
MCD6-0129B	99	30	75	100	77	25	60	75
MCD6-0144B	124	40	75	100	96	30	60	75
MCD6-0171B	130	50	100	125	104	40	75	100
MCD6-0194B	156	60	125	150	124	40	100	100
MCD6-0244B	194	75	150	200	156	60	125	150
MCD6-0287B	240	75	150	200	180	60	150	150
MCD6-0323B	260	100	200	250	202	75	150	200
MCD6-0410B	377	150	300	350	302	100	250	300
MCD6-0527B	414	150	350	450	319	125	250	300
MCD6-0579B	477	200	400	500	361	150	300	350
MCD6-0654B	515	200	450	500	414	150	350	450
MCD6-0736B	590	200	500	600	480	200	400	500
MCD6-0950B	796	300	600	800	619	250	500	600
MCD6-1154B	984	400	800	1000	768	300	600	800
MCD6-1250B	1130	450	900	1100	903	350	700	900

Continous Operation (no internal bypass)								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 50 °C, 50% Duty Cycle				4.5 x FLC, 30s, 50 °C, 50% Duty Cycle			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0160C	146	50	100	150	118	40	75	100
MCD6-0215C	176	60	125	150	144	50	100	150
MCD6-0275C	233	75	150	200	185	60	150	150
MCD6-0343C	306	100	250	300	246	75	200	250
MCD6-0448C	354	125	250	350	336	125	250	350
MCD6-0590C	480	200	400	500	382	150	300	400
MCD6-0667C	576	200	450	600	431	150	350	450
MCD6-0839C	722	300	600	700	590	200	500	600
MCD6-0979C	864	350	700	900	722	300	600	700
MCD6-1134C	966	400	800	1000	784	300	600	800

Externally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 50 °C				4.5 x FLC, 30s, 50 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0590C	551	200	450	500	429	150	350	450
MCD6-0667C	634	250	500	600	493	200	400	500
MCD6-0839C	882	350	700	900	686	250	500	700
MCD6-0979C	1100	450	900	1100	864	350	700	900
MCD6-1134C	1320	500	1100	1300	1030	450	800	1000

NEMA - 6 Wire Connection (Inside Delta) - 40°C

For different operating conditions use WinSTART rating software

Internally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 40 °C				4.5 x FLC, 30s, 40 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0020B	21	5	15	15	21	5	15	15
MCD6-0034B	45	15	30	40	36	10	25	30
MCD6-0042B	57	20	40	50	44	15	30	40
MCD6-0063B	81	30	60	75	63	20	40	60
MCD6-0069B	102	30	75	100	75	25	50	60
MCD6-0086B	105	40	75	100	81	30	60	75
MCD6-0108B	132	50	100	125	102	30	75	100
MCD6-0129B	158	60	125	150	123	40	75	100
MCD6-0144B	188	60	150	150	144	50	100	150
MCD6-0171B	216	75	150	200	168	60	125	150
MCD6-0194B	246	75	200	250	195	75	150	200
MCD6-0244B	318	125	250	300	246	75	200	250
MCD6-0287B	372	150	300	350	288	100	200	300
MCD6-0323B	417	150	350	450	324	125	250	300
MCD6-0410B	606	250	500	600	471	150	350	500
MCD6-0527B	672	250	550	700	522	200	450	550
MCD6-0579B	743	300	600	750	578	200	450	600
MCD6-0654B	848	350	700	800	660	250	500	650
MCD6-0736B	957	400	800	1000	744	300	600	700
MCD6-0950B	1296	500	1000	1300	996	400	800	1000
MCD6-1154B	1583	600	1300	1500	1265	500	1000	1300
MCD6-1250B	1874	700	1500	1700	1457	600	1200	1500

Continous Operation (no internal bypass)								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 40 °C, 50% Duty Cycle				4.5 x FLC, 30s, 40 °C, 50% Duty Cycle			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0160C	242	75	200	250	192	75	150	200
MCD6-0215C	302	100	250	300	242	75	200	250
MCD6-0275C	375	150	300	350	302	100	250	300
MCD6-0343C	497	200	400	500	399	150	300	400
MCD6-0448C	612	250	500	600	566	200	450	500
MCD6-0590C	803	300	600	800	632	250	500	600
MCD6-0667C	908	350	700	900	720	250	600	700
MCD6-0839C	1163	450	900	1200	927	350	700	900
MCD6-0979C	1380	500	1100	1400	1110	450	900	1100
MCD6-1134C	1566	600	1300	1500	1296	500	1000	1300

Externally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 40 °C				4.5 x FLC, 30s, 40 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0590C	932	350	700	900	725	300	600	700
MCD6-0667C	1056	450	800	1100	816	300	600	800
MCD6-0839C	1444	550	1100	1500	1103	400	900	1100
MCD6-0979C	1767	700	1400	1600	1374	500	1100	1400
MCD6-1134C	2105	800	1500	1900	1637	600	1300	1500

NEMA - 6 Wire Connection (Inside Delta) - 50°C

For different operating conditions use WinSTART rating software

Internally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 50 °C				4.5 x FLC, 30s, 50 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0020B	26	7.5	15	20	21	5	15	15
MCD6-0034B	42	15	30	40	33	10	20	30
MCD6-0042B	51	15	30	40	42	15	30	40
MCD6-0063B	78	25	60	75	60	20	40	50
MCD6-0069B	87	30	60	75	68	25	50	60
MCD6-0086B	116	40	75	100	78	25	60	75
MCD6-0108B	122	40	75	100	98	30	75	100
MCD6-0129B	149	50	100	150	116	40	75	100
MCD6-0144B	186	60	150	150	144	50	100	150
MCD6-0171B	195	75	150	200	156	60	125	150
MCD6-0194B	234	75	150	200	186	60	150	150
MCD6-0244B	291	100	200	300	234	75	150	200
MCD6-0287B	360	150	300	350	270	100	200	250
MCD6-0323B	390	150	300	400	303	100	250	300
MCD6-0410B	566	200	450	500	453	150	350	450
MCD6-0527B	621	250	500	600	479	200	400	500
MCD6-0579B	716	250	600	700	542	200	450	550
MCD6-0654B	773	300	600	800	621	250	500	600
MCD6-0736B	885	350	700	900	720	250	600	750
MCD6-0950B	1194	500	900	1100	929	350	700	900
MCD6-1154B	1476	600	1200	1500	1152	450	900	1200
MCD6-1250B	1695	700	1400	1600	1355	500	1100	1400

Continous Operation (no internal bypass)								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 50 °C, 50% Duty Cycle				4.5 x FLC, 30s, 50 °C, 50% Duty Cycle			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0160C	219	75	150	200	180	60	150	150
MCD6-0215C	264	100	200	250	216	75	150	200
MCD6-0275C	360	150	250	350	278	100	200	250
MCD6-0343C	459	150	350	450	369	150	300	350
MCD6-0448C	531	200	450	500	503	200	400	500
MCD6-0590C	720	250	600	700	573	200	450	600
MCD6-0667C	864	350	700	900	647	250	500	650
MCD6-0839C	1083	450	900	1100	885	350	700	900
MCD6-0979C	1296	500	1000	1300	1083	450	900	1100
MCD6-1134C	1449	600	1200	1500	1176	500	950	1200

Externally Bypassed								
MCD 600	Normal Duty				Heavy Duty			
	3.5 x FLC, 30s, 50 °C				4.5 x FLC, 30s, 50 °C			
	Current	Motor Power [HP]			Current	Motor Power [HP]		
	Amps	230 V	460 V	575 V	Amps	230 V	460 V	575 V
MCD6-0590C	840	350	700	800	644	250	500	600
MCD6-0667C	960	400	800	900	740	300	600	700
MCD6-0839C	1323	500	1100	1300	1030	450	800	1000
MCD6-0979C	1650	600	1300	1600	1284	500	1000	1300
MCD6-1134C	1961	800	1500	1900	1524	600	1200	1500

Options

Serial communication options for MCD 600

Ordering number	Option
175G0127	MCD 600 Modbus RTU
175G0129	MCD 600 DeviceNet
175G0128	MCD 600 PROFIBUS
175G0130	MCD 600 Modbus TCP
175G0131	MCD 600 EtherNet/IP
175G0132	MCD 600 PROFINET

Serial communication options for MCD 200

Ordering number	Option
175G9000	MCD 200 Modbus RTU module
175G9001	MCD 200 PROFIBUS module
175G9002	MCD 200 DeviceNet module
175G9009	MCD USB module
175G9904	MCD 200 Modbus TCP module
175G9905	MCD 200 PROFINET module
175G9906	EtherNet/IP module

Notes

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