

# Perfect Soft Start in the xStart System

Product Information  
**Soft Starter DS7**

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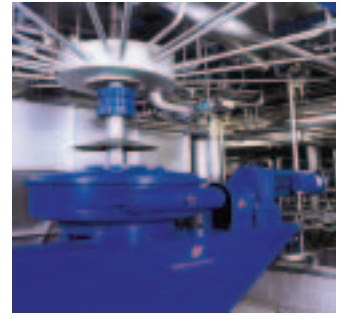
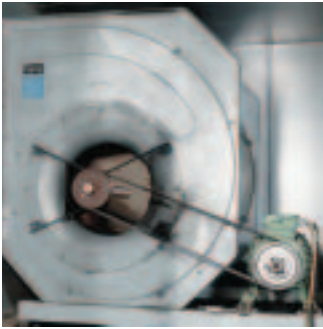


## Soft starter in the xStart system. Soft at the start, high on torque

The soft starter has become increasingly established as an alternative to the star-delta starter. Already a continuous spectrum for the drives up to 110 kW is on offer with the DS4 and DS6 series. This is now followed by the new DS7 series that combines the benefits of the DS4 with the xStart system.

The DS7 is a fully integral element in this system; all existing components can be used. The DS7 replaces the mechanical contactor and extends the function "Motor soft start". Motor start-up is soft but still at a higher torque than other available solutions using a patented method. Extended service intervals and reduced operating costs are welcomed side effects.

Designed for normal applications such as pumps, fans and small conveyors, the compact DS7 is ideal. The DS7 will soon be available with a Darwin connection to simplify wiring and enhance functionality as an automation solution.



### Application examples

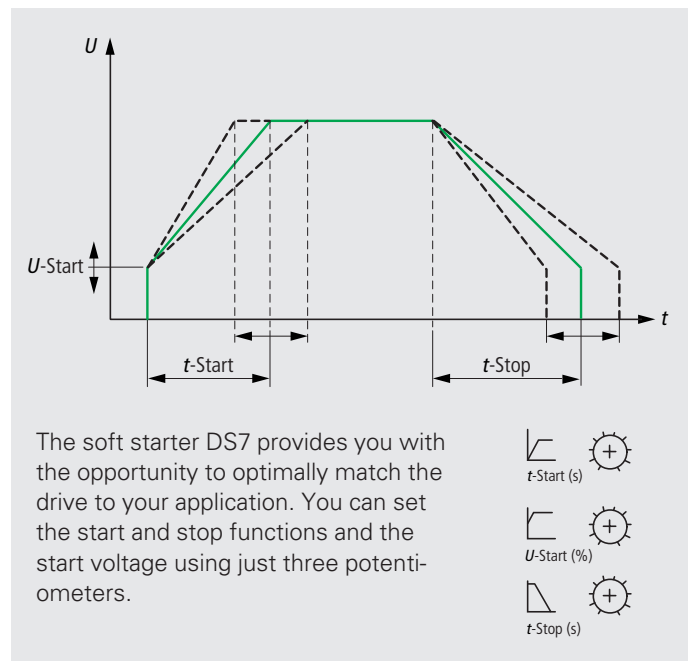
- Three-phase inductive loads
- Noiseless and soft switching of motor starters in transport and conveyor belts
- Soft starting of pumps reduces the load on the entire installation (water impact)
- Solid-state switching of pumps in the extreme environments of chemical plants and filling stations
- Smooth start that reduces wear on V-belts in fan drives

### Soft starting: the modern alternative to star-delta starters

Electronic soft starter fulfil the customer demand for an impact free rise in torque and a determined reduction in current during the start phase. You control the power supply of the three-phase motor in the start phase so that the motor matches the load behaviour of the load machine. The mechanical equipment is accelerated with the minimum of stress as a result. The operating behaviour and the work processes are influenced positively which means that negative influences are avoided such as:

- Impacting of cog edges in the gearbox,
- Reduction of the water hammers in pipe systems,
- Slipping of V-belts,
- Jitter with conveyor systems.

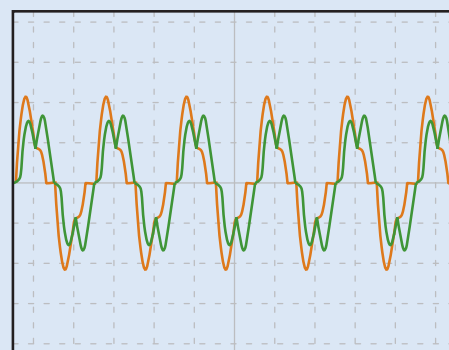
The product standard for the area of soft starters is the IEC / EN 60 947-4-2.



### Asymmetric control: It does not get any softer

The asymmetrical trigger control developed and patented (PCT/EP00/12938, 19.12.2000) by Moeller makes it possible. It avoids DC components which normally result on a two-phase controlled soft starter (see diagram). They suppress the formation of an elliptical rotating field, which leads to an irregular acceleration of the motor and unnecessarily extends acceleration times. On DS7 series devices, an asymmetric trigger control is active during the start and stop ramp.

### Current characteristic in the uncontrolled phase



Conventional methods:

Symmetrical control with high level of DC components

New process from Moeller:

Asymmetric control without DC components

## Together they are strong – xStart system

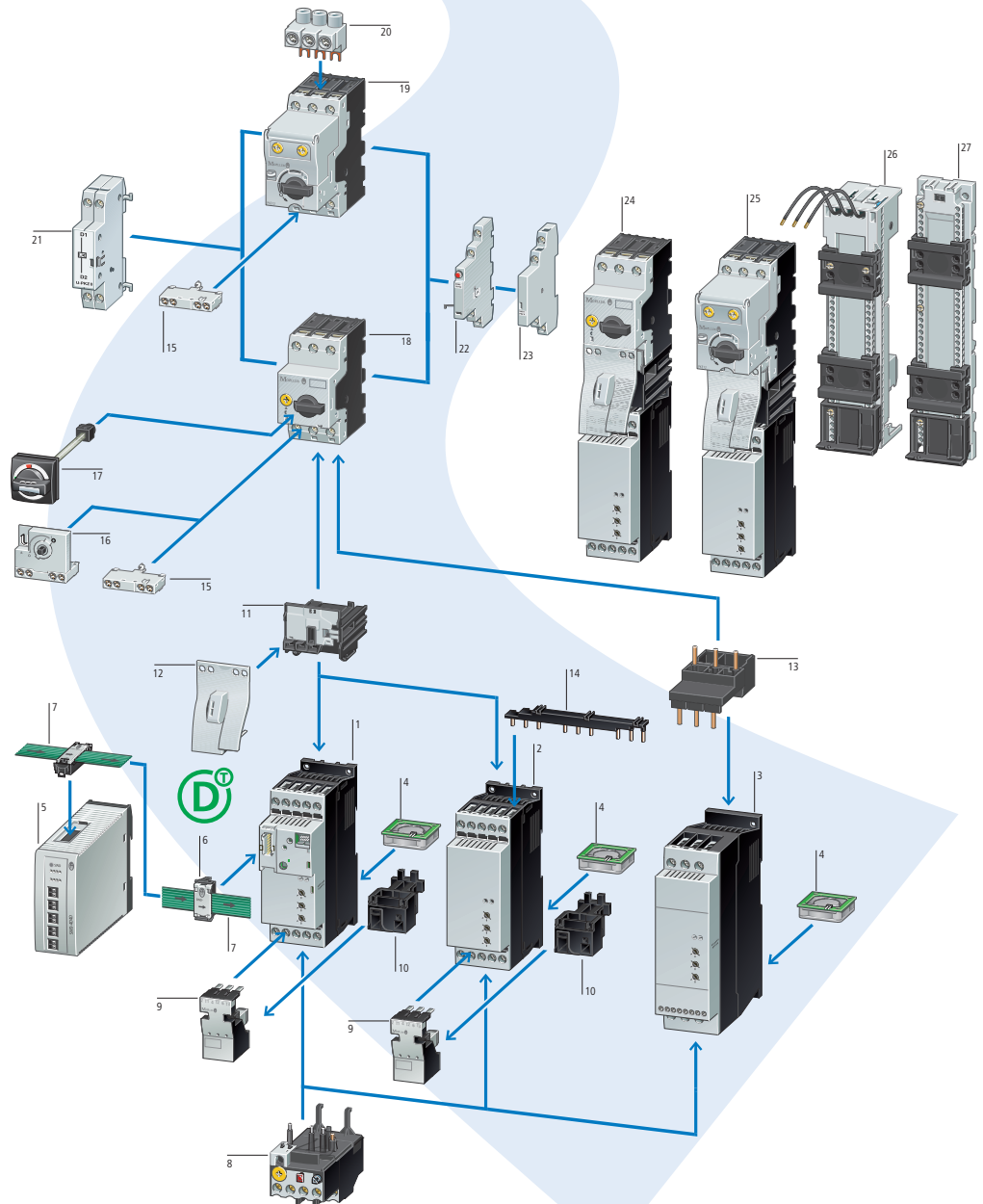
Whether motor connector or PKE connection, the soft starter DS7 integrates seamlessly into this system. Even integration into the automation using a Darwin connection is possible. Should separate motor protection be required, the overload relays ZB12 or ZB32 can also be mounted together with the optional fan. A system without limitations that can be configured to the requirements of the user.

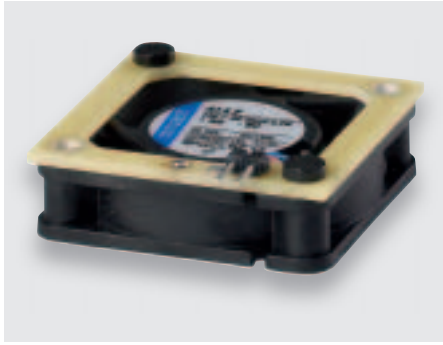


## DS7 in the xStart System

### Legend

- 1 DS7 with SmartWire-Darwin
- 2 DS7 size 1 up to 12 A
- 3 DS7 size 2 up to 32 A
- 4 Device fan DS7-FAN-32
- 5 SmartWire-Darwin gateways
- 6 SmartWire-Darwin external device connector
- 7 SmartWire-Darwin cable
- 8 Overload relay
- 9 Motor connector in tool-less plug connection
- 10 Socket for motor connector
- 11 Wiring set PKZM0-XDM in tool-less plug connection
- 12 Wiring set PKZM0-XDM in tool-less plug connection
- 13 Wiring set PKZM0-XDM
- 14 Three-phase commoning link
- 15 Standard auxiliary contact
- 16 Early-make auxiliary contact
- 18 Motor-protective circuit-breaker PKZM0
- 19 Motor-protective circuit-breaker PKE
- 20 Incoming terminal
- 21 Voltage release
- 22 Standard auxiliary contact
- 23 Standard auxiliary contact
- 24 Motor-starter combination with PKZ
- 25 Motor-starter combination with PKE
- 26 Busbar adapter
- 27 Top-hat rail adapter plate









### Full integration prevents limitations

The built-in fan removes any limitations when connecting accessories. Even with a built-in fan, the overload relay can be attached directly to the DS7. Accordingly, the handling does not need to be reconsidered irrespective of whether standard appli-

cations or applications requiring additional cooling are necessary, e.g. with increased starting frequency or higher ambient temperatures.

The xStart system concept is retained.

### Soft starters for three-phase power supply, low operating frequency (5 s, 3x I<sub>e</sub>, 10 starts)

						
<b>Part no.</b>	Assigned motor rating at 400 V	Assigned motor rating at 460 V	Rated operational current	<b>Part no.</b>	<b>Part no.</b>	<b>Part no.</b>
DS7-34xSX004NO-x	1.1	1.5	3	PKZM0-4 (+ CL-PKZ0)	ZB12-4	DILM7
DS7-34xSX004NO-x	1.5	2	4	PKZM0-4 (+ CL-PKZ0)	ZB12-4	DILM7
DS7-34xSX007NO-x	2.2	2	5	PKZM0-6,3 (+ CL-PKZ0)	ZB12-6	DILM7
DS7-34xSX007NO-x	3	3	7	PKZM0-10 (+ CL-PKZ0)	ZB12-10	DILM7
DS7-34xSX009NO-x	4	5	9	PKZM0-10 (+ CL-PKZ0)	ZB12-10	DILM9
DS7-34xSX012NO-x	5.5	7.5	12	PKZM0-12 (+ CL-PKZ0)	ZB12-12	DILM12
DS7-34xSX016NO-x	7.5	10	16	PKZM0-16 (+ CL-PKZ0)	ZB12-16	DILM17
DS7-34xSX024NO-x	11	15	24	PKZM0-25 (+ CL-PKZ0)	ZB12-24	DILM25
DS7-34xSX032NO-x	15	20	32	PKZM0-32 (+ CL-PKZ0)	ZB12-32	DILM32

**Notes:** Rated operational current related to the stated load cycle.

States the required circuit-breaker for the defined load cycle. With other switching operations (operating frequency, overcurrent, overcurrent time, duty factor) this value changes and must be matched accordingly. The same applies with higher motor currents.

A mains contactor is not necessary. Isolating characteristics to VDE can only be assured via the stated circuit-breaker.

An external overload relay is necessary, if the main circuit is not to be disconnected with an overload but rather a controlled soft stop is required.

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