www.eaton.eu/EMS2

# Easy Multifunctional Safe





## EMS2 – The perfect all rounder only 22.5 mm wide

EMS2 electronic motor starters combine an extremely compact design with the traditional functions of conventional motorstarters. Their narrow overall width of 22.5 mm means that these units can be used wherever motors , with a rated power of up to 3 kW, need to be driven.

#### Eaton's electronic motor starters range overview

MSC-D motor starters	MSC-DE motor starters	Electronic motor starter EMS2	DS7 soft starters
Motor-starter combination (motor-protective circuit-breaker and contactor) • Overload and short-circuit protection • A large variety of accessories • Proven components • Can be expanded with SmartWire-DT	Motor-starter combination (motor-protective circuit-breaker and contactor) • High short-circuit breaking capacity • Wide-range overload protection (4:1) • Variable motor protection characteristic (class 5- 20) • Replaceable trip blocks • Additional monitoring functions via SmartWire-DT	Multi-functional motor starter • DOL and reversing starter • Wide-range overload protection • Emergency-stop function (SIL3) • 22.5 mm wide • Additional monitoring functions via SmartWire-DT • Hybrid switching technology • ATEX approval • Short-circuit protection	<ul> <li>45 mm width for up to 32 A</li> <li>Version able to handle temperatures as low as-40°C</li> <li>Improved control of motor torque, ensuring longer gearbox and bearing service lives</li> <li>Comprehensive monitoring functions via SmartWire-DT</li> </ul>
Motor output (AC-3 / 400 V)			
From 0.06 to 15 kW	From 0.06 to 15 kW	From 0.06 to 3 kW	from 2.2 to 110 kW
Application			
Can be used universally for: • Motor protection • Transformer protection • System protection	Can be used universally for: • Motor protection • Transformer protection • System protection	<ul> <li>Slide controls</li> <li>Horizontal / vertical conveyors</li> <li>Small drives</li> <li>Fans</li> </ul>	<ul> <li>Star-delta applications</li> <li>Pumps and fans in HVAC applications</li> <li>Water/sewage treatment industries</li> <li>Conveyor belts</li> </ul>

# EMS2 – Five functions in a single device

The EMS2 electronic motor starter combines a DOL starter, a reversing starter, wide-range overload protection and an emergency-stop function (SIL3) in one device. Additional functions can be implemented via SmartWire-DT.



**Electronic motor protection** 

Despite having only two current ranges, the electronic motor starter can be used to protect motors from from 0.06 up to 3 kW (400 V 50 Hz).



#### Integrated reversing starter

The electronic motor starter enables both clockwise and counterclockwise rotation.





Safe stop

Thanks to its dual-channel design, the electronic motor starter ensures safe stops up to SIL3 / PLe.



## A motor starter with a long life span

The integrated hybrid switching technology not only ensures minimal wear during start-up, but also increases the contact life by a factor of 10, to approximately 30 million operations.



#### Intelligent networking

The SmartWire-DT interface replaces the conventional control wiring and also supplies additional information.

#### What does "hybrid technology" mean?

- The technology is based on a microprocessor-controlled design that combines resilient semiconductors with relays that are built to last.
- In order to reduce wear during switching, each contact is coupled with a semiconductor.
- This gentle switching process increases the service life of the motor starter by a factor of 10, to approximately 30 million operations.



# EMS2 – Complex Functions Made Simple

#### Faster for increased safety

Compared to conventional motor starters, the EMS2 makes it much easier and faster to start applications with safe stop according to SIL 3 and PLe. The multi-functionality simplifies the implementation of the main and control circuit, as a result, the number of hardware components can be reduced, resulting in one thing in a savings of up to 80% in overall width and at the same time reduces assembly work by up to 60%.



Reversing starter with emergency stop



Compared to conventional motor starters, the overall width is reduced by up to 80 %.



## Reversing starter with emergency stop

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#### EMS2 with SmartWire-DT – Faster commissioning, powerful extra features



#### SmartWire-DT adds value to your entire machine

The SmartWire-DT removes the need for control wiring as it is replaced with a plug-in communication connection. It minimises the time needed for planning, wiring and commissioning. The additional communication connection allows to obtain further information on machine and process states, so faults and machine maintenance can be detected much faster.

#### From conventional control wiring...

Traditionally motor starters have usually been driven through a PLC system's inputs and outputs. The wiring required for this is time consuming prone to errors, and, once installed, can only provide limited information on the corresponding application's state..

## ...for controlling the EMS2 with SmartWire-DT

SmartWire-DT replaces the PL system's digital inputs and outputs. It provides switchgear with communication capabilities and makes it possible to obtain much more detailed information about the application. Additionally the SmartWire-DT detects critical errors in advance and ensures that your machine will keep running without any interruptions.

#### The benefits:

- Faster commissioning thanks to plugin control wiring
- Save space by eliminating the need for PLC I/O
- Improved machine reliability thanks to more comprehensive information being available



# The EMS2 terminals are flexible and versatile



#### Terminals are simple, flexible and cost-effective

The EMS2 combines a number of functions in a single device, including a reversing circuit, motor protection, connectivity and various safety features.

- Fewer wires and components make the EMS2 solution particularly cost-effective
- The devices are easy to install, reducing the risk of errors during the installation
- The wiring time is significantly reduced





#### EMS2 with Motor Started Feeder System: A plug-in technology that's simple, flexible and safe

The MSFS feeder system forms the basis for safe and innovative power distribution systems up to 125 A. Thanks to the modular design, this plug-in solution can be easily and intuitively integrated into any machine or system. The easy and flexible handling of the MSFS System reduces the installation time and costs. The components can be placed anywhere on the board. The IP20XB rating makes the devices especially touch safe. Components such as our proven motorprotective circuit breakers and motor-starter combinations can be easily mounted on the feeder system adapters. The EMS2 does not require any adapter on the board itself.

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#### **EMS2 with Motor Starter Feeder System**

Thanks to the tool-free plug-in technology, the EMS2-ROSF version of the electronic motor starter (which is available in two separate sizes) can be quickly installed anywhere on the base module of the feeder system. The positioning of the adapters - and thus that of the motor starter itself - can be changed at any time, in line with the exact requirements placed on the machine or system. As the user-friendly plug-in technology automatically establishes an electrical and mechanical connection to the feeder module, the motor starter is immediately ready for use. While the integrated covers ensure that there are no exposed live parts, the so-called "push lock system" guarantees that everything stays firmly in place during transport or when the machine is in use - this provides additional safety and prevents accidents and malfunctions.



# Electronic motor starter EMS2

							Actuating voltage 24 V DC	
Function	Rated output AC-53 380 V 400 V 415 V	operational t a	Adjustment range overload release	Connection technique			<b>Type</b> Article-No	
	Р							
	kW							
Direct starter Motor protection Switching principle: safety output stage with b For connection to SmartWire-DT for extended	bypass, t diagnos	three-phase stics. Motor c	witch-off. urrent additionally	v adjustable vi	a Smart <sup>v</sup>	Wire-DT		
		0.06 - 1.1	0.18 - 3	Push-in- terminal			EMS2-D0-T-3-SWD <sup>1)</sup> 192383	(D)
EMERGENCY STOP via additional enabling ter to SIL3/Ple.	rminal			contract of the second s	ATEX	Ex	<b>EMS2-DOS-T-3-SWD</b> <sup>2) 3) 4)</sup> 192385	©
		0.55 - 3	1.5 - 7 (AC-53a) 9 (AC-51)				<b>EMS2-D0-T-9-SWD</b> <sup>1)</sup> 192387	Ø
EMERGENCY STOP via additional enabling ter to SIL3/Ple.	rminal				ATEX	<u>{</u> x}	<b>EMS2-DOS-T-9-SWD</b> <sup>2) 3) 4)</sup> 192389	Ø
Motor protection Switching principle: safety output stage with t For connection to SmartWire-DT for extended	bypass, t diagnos (	three-phase s tics. Motor c 0.06 - 1.1	witch-off. urrent additionally 0.18 - 3	adjustable vi Push-in- terminal	a Smart'	Wire-DT	EMS2-RO-T-3-SWD <sup>1)</sup> 192384	D
EMERGENCY STOP via additional enabling ter to SIL3/Ple.	rminal				ATEX	(Ex)	<b>EMS2-ROS-T-3-SWD</b> <sup>2) 3) 4)</sup> 192386	D
EMERGENCY STOP via additional enabling ter to SIL3/PIe.	rminal	0.55 - 3	1.5 - 7 (AC-53a) 9 (AC-51)				<b>EMS2-RO-T-9-SWD</b> <sup>1)</sup> 192388	Ø
					ATEX	Ex	<b>EMS2-ROS-T-9-SWD</b> <sup>2) 3) 4)</sup> 192390	Ø
<b>Reversing starter with integrated short</b> - Motor protection Switching principle: safety output stage with by	<b>-circuit</b> ypass, th	<b>fuse</b> nree-phase sv	vitch-off. For mou	nting on the fe	eder sy	stem		
EMERGENCY STOP via additional enabling	0.06 -	1.1	0.18 - 3	Screw - terminals	ATEX	<u>⟨ξ</u> χ⟩	<b>EMS2-ROSF-Z-3-24VDC</b> <sup>1) 2)</sup> 192399	3)
terminal to SIL3/Ple.	0.55 -	3	1.5 - 7 (AC-53a) 9 (AC-51)		ATEX	(Ex)	<b>EMS2-ROSF-Z-9-24VDC</b> <sup>1) 2)</sup> 192400	3)
Notes <sup>1)</sup> Explosion protection (accordi II (2) G [Ex db] [Ex eb] [Ex pxb] II (2) D [Ex tb] [Ex pb]	ing to AT	TEX 94/9/EG)					Information relevant for export to North Ame	rica
<sup>2)</sup> EG-Type-examination certific PTB 13 ATEX 3000	cate						→ Go to online catalog	

					Actuating voltage 24 V DC	Actuating voltage 230 V AC
	Function	Rated operational output AC-53a 380 V	Adjustment range overload release	Technical connection	<b>Түре</b> Article-No.	<b>Туре</b> Article-No.
		400 V 415 V P kW				
	Direct starter					
	Motor protection Switching principle: safety output s	stage with bypass,	three-phase switch-	off.		
)		0.06 - 0.75	0.18 - 2.4	Push-in- terminals	<b>EMS2-D0-T-2,4-24VDC</b> <sup>1)</sup> 192391	

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]		0.06 - 0.75	0.18 - 2.4	Push-in- terminals			<b>EMS2-DO-T-2,4-24VDC</b> <sup>1)</sup> 192391	
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.	0.06 - 1.1	0.18 - 3	-	ATEX	(£x)	<b>EMS2-DOS-T-3-24VDC</b> <sup>1) 2) 3)</sup> 192393	
۵		0.55 - 3	1.5 - 6.5 (AC-53a) 9 (AC-51)	-			<b>EMS2-DO-T-9-24VDC</b> <sup>1)</sup> 192395	
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.		1.5 - 7 (AC-53a) 9 (AC-51)	-	ATEX	(Ex)	<b>EMS2-DOS-T-9-24VDC</b> <sup>1) 2) 3)</sup> 192397	
}		0.06 - 0.75	0.18 - 2,4	Screw terminals			<b>EMS2-DO-Z-2,4-24VDC</b> <sup>1)</sup> 197160	<b>EMS2-D0-Z-2,4-230VAC</b> <sup>1)</sup> 197168
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.	0.06 - 1.1	0.18 - 3	-	ATEX	(Ex)	EMS2-DOS-Z-3-24VDC <sup>1) 2) 3)</sup> 197162	
۵		0.55 - 3	1.5 - 6.5 (AC-53a) 9 (AC-51)	-			<b>EMS2-DO-Z-9-24VDC</b> <sup>1)</sup> 197164	<b>EMS2-D0-Z-9-230VAC</b> <sup>1)</sup> 197170
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.		1.5 - 7 (AC-53a) 9 (AC-51)	-	ATEX	<b>(£x</b> )	EMS2-DOS-Z-9-24VDC <sup>1) 2) 3)</sup> 197166	

#### Reversing starter

Motor protection

Switching principle: safety output stage with bypass, three-phase switch-off.

		0.06 - 0.75	0.18 - 2.4	Push-in- terminals			EMS2-RO-T-2,4-24VDC <sup>1)</sup> 192392	
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.	0.06 - 1.1	0.18 - 3	-	ATEX	(Ex)	<b>EMS2-ROS-T-3-24VDC</b> <sup>1) 2) 3)</sup> 192394	
		0.55 - 3	1.5 - 6.5 (AC-53a) 9 (AC-51)	-			<b>EMS2-RO-T-9-24VDC</b> <sup>1)</sup> 192396	
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.		1.5 - 7 (AC-53a) 9 (AC-51)	-	ATEX	(Ex)	<b>EMS2-ROS-T-9-24VDC</b> <sup>1) 2) 3)</sup> 192398	
		0.06 - 0.75	0.18 - 2.4	Screw terminals			<b>EMS2-RO-Z-2,4-24VDC</b> <sup>1)</sup> 197161	EMS2-RO-Z-2,4-230VAC 197169
	EMERGENCY STOP via additional Release terminal up to SIL3/Ple.	0.06 - 1.1	0.18 - 3	-	ATEX	(Ex)	<b>EMS2-ROS-Z-3-24VDC</b> <sup>11213)</sup> 197163	
-		0.55 - 3	1.5 - 6.5 (AC-53a) 9 (AC-51)	-			<b>EMS2-RO-Z-9-24VDC</b> <sup>1)</sup> 197165	<b>EMS2-RO-Z-9-230VAC</b> <sup>1)</sup> 197171
	EMERGENCY STOP via additional Belease terminal up to SIL3/Ple		1.5 - 7 (AC-53a) 9 (AC-51)	-	ATEX	(£x)	<b>EMS2-ROS-Z-9-24VDC</b> <sup>1) 2) 3)</sup> 197167	

	Pole	Number of devices	Conductor cross-section	Suitable for	<b>Type</b> Article-No.
			mm <sup>2</sup>		
	Three-phase connec	ctor with plug			
	3	2	2.5	EMS2-D-Z EMS2-R-Z	<b>EMS2-XBR-Z-2</b> <sup>1)</sup> 197172
6				EMS2-D-T EMS2-D-TSWD EMS2-R-T EMS2-R-TSWD	<b>EMS2-XBR-T-2</b> 197176 <sup>1)</sup>
		3	_	EMS2-D-Z EMS2-R-Z	<b>EMS2-XBR-Z-3</b> <sup>1)</sup> 197173
6				EMS2-D-T EMS2-D-TSWD EMS2-R-T EMS2-R-TSWD	<b>EMS2-XBR-T-3</b> <sup>1)</sup> 197177
		4	_	EMS2-D-Z EMS2-R-Z	<b>EMS2-XBR-Z-4</b> <sup>1)</sup> 197174
				EMS2-D-T EMS2-D-TSWD EMS2-R-T EMS2-R-TSWD	<b>EMS2-XBR-T-4</b> <sup>1)</sup> 197178
<b>MAREA</b>		5	_	EMS2-D-Z EMS2-R-Z	<b>EMS2-XBR-Z-5</b> <sup>1)</sup> 197175
				EMS2-D-T EMS2-D-TSWD EMS2-R-T EMS2-R-TSWD	<b>EMS2-XBR-T-5</b> <sup>1)</sup> 197179

### Adapter

Mounting ra	il adaptor			
3	1	-	EMS2-ROSF	<b>EMS2-XTH</b> <sup>1)</sup> 192401



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	)
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busbar adapter for mounting on CU flat rails with 60 mm rail centre distance 3

1 \_ **EMS2-XBB-60**<sup>1)</sup> 192408

# Dimensions

Direct starter EMS2-D0, Reversing starter EMS2-R0 EMS2-D(R)0-...-SWD

EMS2-D(R)OS-...-SWD



EMS2-D(R)0-T... EMS2-D(R)0S-T...



EMS2-D(R)0-Z...



EMS2-ROSF...



Additional equipment EMS2-X



EMS2-XTH



Eaton is a power management company with 2018 sales of \$21.6 billion. We provide energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. Eaton is dedicated to improving the quality of life and the environment through the use of power management technologies and services.

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