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SIMATIC ET 200 – offers the right solution for every application

SIMATIC ET 200 provides extremely wide range of distributed I/O systems – for solutions in the control cabinet or directly on the machine without a control cabinet and for use in areas where there is an explosion hazard. The modular design means that it is easy to scale and expand the ET 200 systems in small increments. Ready-installed add-on modules reduce the costs, whilst at the same time offering wide-ranging application options. An extremely wide range of combinations is possible: digital and analog inputs/outputs, intelligent modules with CPU functionality, safety systems, motor starters, pneumatics, frequency converters and various technology modules (e.g. for counting and positioning tasks).

Communication via PROFIBUS and PROFINET, uniform engineering, transparent diagnosis possibilities and the optimal connection to SIMATIC Controller and HMI devices provide evidence of the unique uniformity of Totally Integrated Automation.

PROFIBUS

PROFIBUS is the international standard (IEC 61158/61784) for the field area. As the only field bus it permits communication in both manufacturing- and process-related applications.

PROFIBUS is used to connect field devices such as distributed I/O stations or operating mechanisms to automation systems such as SIMATIC S7, SIMOTION, SINUMERIK or PCs.

PROFIBUS, which is standardized according to IEC 61158, is a powerful, open and robust field bus system with short response times. PROFIBUS is available in different physical forms for various applications.

PROFIBUS DP (distributed I/O)

Is used for the connection of distributed field devices, e.g. SIMATIC ET 200, or drives with very rapid response times. PROFIBUS DP is used when actuators/sensors are distributed on the machine or in the system (e.g. field level).

PROFINET

PROFINET is the open and cross-vendor Industrial Ethernet Standard (IEC 61158/61784) for automation.

Based upon Industrial Ethernet, PROFINET enables the direct communication of field devices (I/O devices) with controllers (I/O controllers) right through to the solution of clocked drive controls for Motion Control applications.

Since PROFINET is based upon Standard Ethernet according to IEEE 802.3, devices from the field level to the control level can be universally connected.

PROFINET thus leads to a universal communication, enables system-wide engineering and uses IT standards such as web server or FTP right through to the field level. Proven fieldbus systems, such as PROFIBUS or AS-Interface, are simple to integrate without changes to the existing devices.

AS-Interface

AS-Interface is the international standard (IEC 62026/EN 50295) providing an alternative to the cable harness to connect particularly economical sensors and actuators in the field area via a single 2-wire cable. The power supply to the individual stations also runs via this 2-wire cable. This means that AS-Interface is the ideal partner for the PROFIBUS DP field bus.

SIMATIC ET 200 Configurator

A tailor-made peripheral station in the click of a mouse: with the SIMATIC ET 200 Configurator

With the ET 200 Configurator first-class support is available even for the configuration of the ET 200 station. The software tool leads you through the configuration in a user-friendly, simple and convenient manner and automatically creates order lists inc. accessories. It also provides support for the adherence to limit values such as load currents, slot rules or parameters.

The configuration created in the ET 200 Configurator can easily be imported into STEP 7. This reduces the engineering cost and saves data having to be entered twice.

The software tool is clearly and transparently structured:
six configuration views make the work simple and user friendly.

- General: general station data and a graphic depiction of the configured station
- Module selection: guided selection of the modules by module suggestions
- Limits: display of station size, weight, number of modules, load voltage, parameters, etc.
- Accessories: guided selection of the required accessories (module specific or station wide)
- Potential distribution: graphical representation of the potentials within a station
- Parts list: automatic generation of a clear parts list simplifies the ordering process

The ET 200 Configurator is part of the SIMATIC Selection Tools and is available as a configurator in the Industry Mall.

More information

- Catalogs ST 70, CA 01
- Internet: www.siemens.com/et200 (general)
Overview

**SIMATIC ET 200S**
- Distributed I/O system with IP20 degree of protection and low wiring outlay even for time-critical tasks such as rapid adjustments
- With integral S7 CPU can be used as small control system:
  - also as failsafe PROFIsafe version
  - optionally with lower-level PROFIBUS DP
- Fine modular structure for precise matching to the automation task
- Interface module with PROFIBUS DP or PROFINET interface available
- Can be combined with digital and analog input or output modules, technology modules, motor starters and frequency converters for the control of drives up to 7.5 or 4 kW
- Exchange of modules during operation (hot swapping), permanent wiring with multiple conductor connection
- Channel-specific diagnosis for high availability
- Optionally with integral FO interface
- Transmission rate up to 12 Mbit/s
- FastConnect thanks to stripless quick-connect technology, screw- or spring-type terminals
- Ex approval according to Cat. 3 for Zone 2 according to ATEX 100 a
- Slot reservation with reserve modules
- Failsafe DI module with safety-oriented signal processing according to PROFIsafe
- Options handling – for extremely simple management of machine options

**SIMATIC ET 200S COMPACT**
- Block I/Os in IP20 degree of protection with 32 channels made up of terminal block and electronics block
- Expandable on a finely modular basis to up to 128 channels or max. 12 modules
- Entire ET 200S module spectrum usable (except PROFIsafe module)
- Separation of connection technology and electronics using permanent wiring
- Screw- and spring-type connection technology
- Standard terminal block in 2-wire technology; 3- and 4-wire technology via additional terminals
- Mounting on standard mounting rails
- Hot swapping for the expansion modules
- Communication with PROFIBUS
- Up to 100 bytes inputs and outputs (address area)

More information
- Catalogs ST 70, CA 01
- Internet: [www.siemens.com/et200s](http://www.siemens.com/et200s)
  [www.siemens.com/et200](http://www.siemens.com/et200) (general)
SIMATIC ET 200 Distributed I/O
Systems for the control cabinet

ET 200S
Motor Starters and Safety Motor Starters

General data

**ET 200S motor starters in the ET 200S I/O system**

The SIMATIC ET 200S is the multifunctional and finely modular I/O system in degree of protection IP20 for exact adaptation to the automation task.

Interface modules (IM) are used for connecting the ET 200S to PROFIBUS DP or PROFINET. If interface modules with integrated S7-CPU are used, the ET 200S can act as a small control system.

The ET 200S is designed for combining with a large range of digital and analog input or output modules, technology modules, IO-Link master modules, pneumatic connections, or motor starters and frequency converters for the control of drives.

Device replacement is easy and quick thanks to permanent wiring and automatic re-parameterization. Hot swapping, i.e. the disconnection and connection of modules without prior isolation, guarantees high availability of the automation system along with extensive diagnostics information.

The ET 200S motor starters are connected to the control system and parameterized through the field bus using either PROFIBUS or PROFINET via IM modules which are also available with CPU functionality.

With the ET 200S motor starters, any AC loads can be protected and switched. The communication interface makes them ideal for operation in distributed control cabinets or control enclosures.

Interplay of ET 200S motor starter components in the ET 200S I/O system

**Motor starter types**

The ET 200S motor starters are available as direct-on-line, reversing (reversing) or soft starter versions:

- **Standard motor starters** up to 5.5 kW (direct-on-line and reversing starters)
- **High-Feature motor starters** up to 7.5 kW (direct-on-line, reversing and direct-on-line soft starters)
- **Failsafe motor starters** up to 7.5 kW (direct-on-line and reversing starters)
  - Properties of the High Feature motor starter
  - Failsafe functionality
When using the ET 200S motor starters, the list of parts per load feeder is reduced to two main items. The passive terminal module and the motor starter. This makes the ET 200S ideal for modular machine concepts as well.

All ET 200S motor starters are set up without fuses. Contactors and soft starters are activated through the integrated outputs. The inputs of the motor starters evaluate the signal states of the protective devices (short circuit or overload), the switching states of contactor(s) or soft starters, and system faults.

The motor starter protector signaling is freely programmable with regard to group fault signals (group fault at motor starter protector "Off"/group fault signal at motor starter protector "Off" only in case of "On" command from the motor starter).

Brake control modules and optional digital inputs and outputs

With one of the optional brake control modules (xB1-xB6), which is butt-mounted to the right of a motor starter, it is possible to control a mechanical holding brake on a three-phase motor from the process image of the motor starter.

Motors with 24 V DC brakes (xB1, xB3) as well as motors with 500 V DC brakes (xB2, xB4) can be controlled using the brake control modules xB1-xB4.

The modules xB5 (without digital input) and xB6 (with two digital inputs) have been added to the range in order to control a mechanical holding brake with a rated operational voltage of 400 V AC. A further motor brake voltage commonly found on the market is thus supported.

The 24 V DC brakes have an external supply and can be vented independently of the switching state of the motor starter. By contrast the 500 V DC brakes and the 400 V AC brakes usually have a direct supply from the terminal board of the motor through a rectifier module and therefore cannot be vented when the motor starter is switched off. These brakes cannot be used in combination with the DSS1e-x motor starter (soft starter).

The outputs of the brake control modules can be used alternatively for other purposes, e.g. for controlling DC valves.

With two digital inputs available on the brake control modules (xB3, xB4, xB6) and another two digital inputs available on the optional control module it is possible to realize autonomous special functions which work independently of the bus and the higher-level control system, e.g. as a quick stop on gate valve controls. The signals of these digital inputs are in the process image and are reported to the control system.

Power supply through terminal module

Power is supplied through the terminal modules for motor starters:

- The auxiliary voltages are fed in only once via the PM-D or PM-DFx power module which must be connected to the left of the first motor starter.
- The load voltage is fed in at the first (left) TM-xxxxS32 terminal module of a motor starter. The other TM-xxxxS31 terminal modules are automatically supplied with power through the integrated power bus when they are mounted side by side. If the power bus is utilized to its full capacity of 40 A for Standard motor starters or 50 A for High-Feature motor starters, a new supply must be fed in through an additional TM-xxxxS32 terminal module.

Configuration is made easier by the fine modular structure.
SIMATIC ET 200 Distributed I/O
Systems for the control cabinet

ET 200S
Motor Starters and Safety Motor Starters

General data (continued)

TM-DS and TM-RS terminal modules for motor starters
- Mechanical modules in which the motor starter and expansion modules are inserted
- For constructing the permanent wiring and self-assembling voltage bus
- For connecting the motor connection cables
- Positive-locking connection to ensure enhanced vibration resistance

Terminal modules are purely mechanical components for accommodating the ET 200S peripherals. The self-assembling voltage buses integrated into the terminal modules reduce wiring outlay to the single infeed (both of auxiliary and load voltage). All modules following on the right are automatically supplied upon plugging the terminal modules together. The robust design and keyed connection technology enables use in harsh industrial conditions.

The TM-DS and TM-RS terminal modules are available in various versions for the Standard motor starters and the High-Feature motor starters.

Terminal modules with the suffix "-S32"
- The terminal modules with the suffix "-S32" have connection terminals for feeding into the integrated 40 A/50 A power bus and connection terminals for the motor connection cable. They are mounted at the beginning (left) of a power bus segment.
- To configure a new load group, another "-S32" terminal module is plugged in.
- The "-S32" terminal modules are supplied with three caps for closing the power bus contacts on the final terminal module of a segment.
- Optionally expandable with PE/N blocks

Terminal modules with the suffix "-S31"
- The terminal modules with the suffix "-S31" have only connection terminals for the motor connection cable. These terminal modules follow on the right after a "-S32" terminal module.
- Optionally expandable with PE/N blocks

All connection terminals of the terminal modules for motor starters are equipped with strong 10 mm² screw terminals.

Power module (see Catalog ST 70, page 9/152)
PM-D power modules are used for monitoring the two 24 V DC auxiliary voltages for the group of motor starters following on the right or for supplying power to the group of frequency converters following on the right.

Terminal module TM-P for power module PM-D (see Catalog ST 70, page 9/153)
- Connection by means of screw terminals
- Light colored enclosure for visual distinction
- Always before the first TM-DS/TM-RS

ET 200S Safety motor starters with integrated safety technology

The safety-related, communication-capable ET 200S motor starters offer the right solution for every safety application. The range extends from the simple local safety solution through to the user-friendly version with PROFIsafe, which can be used in conjunction with a safe control system (see "Safety modules local and PROFIsafe", page 4/11).

The safety engineering is an integral part and is therefore pre-wired at the factory.

The ET 200S Safety motor starters Solutions comprise:
- Safety modules (page 4/11)
- Standard motor starters (page 4/7)
- High-Feature motor starters (page 4/7)
- Failsafe motor starters (page 4/9)

System configuration with ET 200S motor starters

When constructing an ET 200S station with motor starters a distinction can be made between the following configurations:
- Conventional ET 200S motor starter solution consisting of:
  - PM-D module
  - Standard motor starter or High-Feature motor starter
- Safety motor starter ET 200S Solution local (see page 4/10)
- Safety motor starter ET 200S Solutions PROFIsafe (see page 4/14)

SIRIUS Motor Starter Function Block Library for SIMATIC PCS 7

With the SIRIUS motor starter PCS 7 function block library, SIRIUS ET 200S motor starters (direct-on-line and reversing starters, direct-on-line soft starters) can be easily and simply integrated into the SIMATIC PCS 7 process control system. The SIRIUS motor starter PCS 7 function block library contains the diagnostics and driver blocks corresponding with the diagnostics and driver concept of SIMATIC PCS 7 as well as the elements required for operation and monitoring (symbols and faceplates), (see Catalog IC 10, Chapter "Parameterizing, Configuration and Visualization for SIRIUS").

Configuration tool for ET 200S station

The "SIMATIC Selection Tool" enables the fast and accurate selection of SIMATIC hardware. It is available as a configurator in the Siemens Industry Mall free of charge. Assemble your stations (e.g. S7-1200, S7-300, S7-400, S7-400H) and select the desired distributed I/O (e.g. ET 200S, ET 200pro). You can transfer the Parts Lists you received to the Industry Mall shopping cart and place your order quickly, conveniently and with no problems.

You can find detailed information about the ET 200S system at:
www.siemens.com/ET200S

Here you will find a link to the SIMATIC Selection Tool.
### Standard motor starters

**Functionality of the Standard motor starters**
- For basic functionality, see ET 200S motor starters and safety motor starters, General Data, Overview, page 4/5
- Direct-on-line and reversing starters up to 5.5 kW
- Power bus up to 40 A
- With circuit breaker and contactor assembly
- Integrated isolating function of the circuit breaker
- Can be combined with local safety technology for use in safety-related system components with F-Kit and PM-D F modules (see “Accessories” page 4/16)

### High-feature motor starters

**Functionality of the High-Feature motor starters**
- For basic functionality, see ET 200S motor starters and safety motor starters, General Data, Overview, page 4/5
- Direct-on-line, reversing or soft starter up to 7.5 kW
- Available with wide range and in 3 setting ranges with 0.3...3 A, 2.4...8 A, 2.4...16 A
- With combination of starter circuit breaker, electronic overload protection (parameterizable), and contactor or soft starter
- Power bus up to 50 A
- Upper and lower current limits for plant and process monitoring
- Motor stall protection, zero current detection and asymmetry detection integrated
- The current motor current is measured and transmitted for diagnostics in the cyclic process image
- Control of the motor starter from the control system and extensive diagnostics status via the cyclic process image
- Optional digital inputs available in the cyclic process image and flexibly assignable with functions for adaptation to all applications
- Detection of the switching state of the starter circuit breaker via auxiliary switches and of the contactor via current evaluation
- Integrated isolating function using starter circuit breakers
- Local safety engineering possible (without failsafe kit in the case of the HF starter, because the function of the failsafe kit is already integrated)
- Front-mounting 2DI LC COM control module for another 2 parameterizable digital inputs
- Optional software "Motor Starter ES" for user-friendly commissioning and diagnostics (as of 11/2011 also available for the innovative -.0AB4 starters) (see Catalog Chapter 3)
- PROFlenergy capable\(^1\)
  - Supplying the motor current in PROFlenergy format
  - Switching off during dead times
- Support of all DPV1 acyclic services on PROFIBUS and PROFINET\(^1\)
  - Changing of parameters during operation, e.g. the rated operational current
  - Reading and writing acyclic data for exact diagnostics of the unit or process and for analysis of the plant status

\(^1\) Only for the innovated -.0AB4 starters

### Device functions (firmware features)


### Selective protection concept for ET 200S High Feature motor starters

As a result of the selective protection concept (separate tripping of short circuit and overload) with solid-state overload evaluation, additional advantages are realized on the High-Feature motor starters – advantages which soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:
- Only two versions up to 7.5 kW – hence little order variance and stock keeping
- All settings can be parameterized by bus – hence full TIA capability
- Separate signaling of overload and short circuit – enables selective diagnostics
- Overload can be acknowledged by remote reset – ideal for highly automated plants
- Current asymmetry monitoring – complete monitoring of the motor
- Stall protection – complete monitoring of the motor
- Emergency start function in case of overload – operation is possible in an emergency
- Current value transmission via bus – monitoring of the application
- Current limit monitoring
- Trip class can be parameterized – overload trip can be adapted to the application
- Type of coordination "2" – still functional after short circuit with magnitude of 50 kA
- Very high contact endurance
High-Feature motor starters (continued)

PROFlenergy for ET 200S High-Feature motor starters

Increasing energy prices, far-reaching ecological problems worldwide and the threat of climate change make it necessary for you to be more conscious about your use of energy. Active and effective energy management is possible with PROFlenergy.

PROFlenergy is a manufacturer-independent profile on PROFINET, which can be used by all manufacturers, has been standardized by PNO and supports the shut-down of electrical devices during dead times and the read-out of measured values.

The ET 200S HF motor starter supplies the motor current in PROFlenergy format and switches off during dead times.

Support of all acyclic services on PROFIBUS and PROFINET

Thanks to the acyclic services, the ET 200S HF motor starters now offer plenty of diagnostics data via data records. There are extensive new options for reading out data from the motor starter for device, system or process monitoring. The motor starter is equipped internally with three logbooks for device faults, motor starter trips and events, which are issued with a time stamp.

These logbooks can be read out of the motor starter on demand at any time and provide the plant operator with plenty of information about the state of his plant and process which he can use to carry out improvements.

With the slave pointer and statistical data functions it is possible to read out, for example, the maximum internal current values or the number of motor starter connection operations. This enables process deviations to be monitored or commissioning to be optimized.

Statistical data or measured values make plant monitoring easy for the user.

The device diagnostics data record contains details of all the states of the motor starter, the device configuration and the communication as a basis for central device and plant monitoring.

The Installation and Maintenance Functions (I&M) store, firstly, information (I&M) about the modules used in the motor starter and, secondly, data (I&M) that can be defined during configuration, e.g. location designations. I&M functions are used for for troubleshooting faults and localizing changes in hardware at a plant or checking the system configuration.

Supported data records:
- DS 0 S7-V1 system diagnostics (S7 diagnostics alarm)
- DS 72, 73, 75 logbooks, device faults, trips, events
- DS 92 device diagnostics
- DS 93 command
- DS 94 measured values
- DS 95 statistics
- DS 96 slave pointer
- DS 100 device identification
- DS 131 device parameters
- DS 134 maintenance
- DS 165 comment
- DS 226 PROFlenergy technology function
- DS 231 I&M 0 (= device identification)
- DS 232 I&M 1 (= equipment identifier)
- DS 233 I&M 2 (= installation)
- DS 234 I&M 3 (= description)

Device functions (firmware features)

**Failsafe motor starters**

The Failsafe motor starter has been developed on the basis of the High-Feature motor starter (-0AA4 starter). It differs in that, in addition to a motor starter protector and contactor assembly, a safe solid-state evaluation circuit is installed for error detection purposes which makes the motor starter failsafe.

If the contactor to be switched fails in an EMERGENCY-STOP case, the evaluation electronics detects a fault and opens the motor starter protector in the motor starter through a shunt release in a failsafe manner. The second redundant shutdown component is therefore no longer a main contactor, as is generally the case, but the motor starter protector installed in the motor.

**All functions of the High-Feature starter are already integrated**

The new failsafe motor starters are characterized by easy, space-saving assembly as well as minimal wiring outlay. Like the High-Feature starters, the Failsafe motor starters have a switching capacity of up to 7.5 kW (16 A) which is achieved with just two motor starter versions. Another important feature is the high availability due to the high short-circuit strength (type of coordination "2").

**Use**

The failsafe motor starter is predestined for use in combination with PROFIsafe (see figure ET 200S Safety Motor Starter Solution PROFIsafe with Failsafe Motor Starters on page 4/15). Another field of application is in combination with ASIsafe or safety relays (see example 2 on page 4/13 Failsafe Motor Starters with ASIsafe and 3TK28).

**High degree of flexibility with safety technology**

**PROFIsafe solution with PM-D F PROFIsafe**

In EMERGENCY-STOP applications, the Failsafe motor starters are selectively switched off through the upstream PM-D F PROFIsafe safety module. For each safety module, six switch-off groups can be formed. In the first delivery stage, the failsafe freely-programmable logic of the SIMATIC controller is used to interface with the relevant Failsafe sensor technology. The interface between PROFIsafe and installations that use conventional safety technologies is implemented through the F-CM Failsafe contact multiplier with four floating contacts.

**Solution local with PM-D FX1**

Failsafe motor starter with safety relay (Version 1) or ASIsafe (Version 2, see example 2, page 4/13): Signals with relevance for safety can be input to ET 200S through a PM-D F X1 infeed terminal module through the enabling circuits of the AS-i Safety Monitor or the safety relay to control the Failsafe motor starters which then selectively switch off the downstream motors.
SIMATIC ET 200 Distributed I/O
Systems for the control cabinet

ET 200S
Motor Starters and Safety Motor Starters

Safety modules local and PROFIsafe

**ET 200S Safety motor starters Solutions local/PROFIsafe**

The ET 200S Safety motor starter Solutions are preferred in all production and process automation fields in which the enhancement of plant availability and flexibility plays a key role.

- **ET 200S Safety motor starters Solutions local** are preferred from the safety technology point of view for locally restricted safety applications. These motor starters are not dependent on a safe control system.
- **ET 200S Safety motor starters Solutions PROFIsafe**, on the other hand, are often found in safety applications of the more complex type that are interlinked. In this case a safe control system is used with the bus systems PROFINET or PROFIBUS with the PROFIsafe profile.

The ET 200S Safety motor starters Solutions comprise:

- Safety modules (page 4/11)
- Standard motor starters (page 4/7)
- High-Feature motor starters (page 4/7)
- Failsafe motor starters (page 4/9)

**Safety motor starter ET 200S Solution local**

With the ET 200S Solutions safety motor starters there is no complicated and hence cost-intensive configuring and wiring compared to the conventional safety systems. The ET 200S Safety motor starter Solutions are designed for Category 4 according to ISO 13849-1 or SIL 3 IEC 62061.

They enable the use of safety-oriented direct-on-line starters or reversing starters in the SIMATIC ET 200S distributed I/O system on PROFINET or PROFIBUS. The fine modular architecture of the system permits optimum imaging of machine or plant applications.

Within an ET 200S station the Safety motor starters Solutions can also be combined with Standard motor starters or High Feature motor starters without safety functions or the SIMATIC ET 200S FC frequency converters up to max. 4 kW and up to Category 3 according to ISO 13849-1 or SIL 2 according to IEC 62061.

Interplay of ET 200S safety motor starters Solutions local components
Safety modules local and PROFlsafe (continued)

Components for ET 200S Safety motor starter Solution local

The ET 200S Safety motor starter Solutions local comprising:

Version 1 (see example 1, page 4/13):
- Safety modules PMD F1 ... 5
- PM-X module
- Standard motor starter or High-Feature motor starter

Version 2 (see example 2, page 4/13):
- PM-D FX1 safety module
- Fail-safe motor starters

Functionality of the ET 200S Safety motor starters Solutions local

- For use of Standard, High-Feature or Fail-safe motor starters in systems with safety categories 2 to 4 (according to ISO 13849-1)
- Can also be used in combination with external safety relays
- Can also be used to activate external safety systems
- No complex wiring for conventional safety technology
- Safety module available for function-monitored and automatic starting
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules

With Safety motor starters Solutions local the highest safety category can be reached according to ISO 13849-1 and IEC 62061. They can thus be used for evaluation of EMERGENCY-STOP circuits or for monitoring protective doors and also for time-delayed disconnections. With the contact multiplier the safety-relevant signals can also be made available to external systems.

All standard safety applications can be covered through combination of different TM-PF30 terminal modules. Needless to say, ET 200S motor starters can also be used in conjunction with external safety relays or with ASIsafe.

Safety motor starter Solutions local reduce wiring by up to 80% compared to conventional safety systems with local safety applications.

With the Safety motor starters Solutions local it is easy to configure several safety circuits. The safety sensors are connected directly and locally to the safety modules. These safety modules perform the work of the otherwise obligatory safety relays and safely shut down the downstream motor starters in accordance with the function selected. The crosslinks required for this are already integrated in the system and need no additional wiring. All signals from the safety modules are automatically relayed as diagnostic signals, e.g. in the event of crossover in the EMERGENCY-STOP circuit.

The safety module evaluates the signal state of the connected safety sensors and, using the integrated safety relays, shuts down the group(s) of downstream motor starters. The shutdown function is monitored by the module, and the auxiliary voltages likewise.

Safety-relevant system signals, e.g. due to an actuated EMERGENCY-STOP switch or a missing auxiliary voltage, are automatically generated and notified to the interface module. The latter assigns an unambiguous ID to the fault. Using the PROFIBUS DP diagnostics block, faults of this type can be identified and localized without a great deal of programming work.

PM-D F1/F2/F3/F4/F5 safety modules

- PM-D F1/F2/F3/F4/F5 safety modules monitor auxiliary voltages and contain the complete functionality of a safety relay:
  - PM-D F1: For evaluation of EMERGENCY-STOP circuits with the function "monitored start"
  - PM-D F2: For the monitoring of protective doors with the function "automatic start"
  - PM-D F3: Expansion to PM-D F1/F2 for time-delayed tripping.
  - PM-D F4: For the expansion of safety circuits with other ET 200S motor starters, e.g. in a different tier.
  - PM-D F5: Transmits the status from PM-D F1 ... 4 via four floating enabling circuits to external safety devices (contact multipliers)
- The PM-D F1 and PM-D F2 modules can be combined with the PM-D F3 or PM-D F4 modules.
- A PM-D F5 can be positioned at any point between a PM-D F1 ... 4 and a PM-X 1).
- Safety modules monitor the U1 and U2 auxiliary voltages. A voltage failure is relayed as a diagnostic signal over the bus.
- No additional PM-D safety module is required when the safety modules are used.
- Each safety circuit, beginning with a PM-D F1 ... 4, must be terminated with one PM-X each 1).

1) See Catalog ST 70 Accessories for Safety Module Local, page 9/173

PM-D FX1 safety module

PM-D FX1 safety module

The PM-D FX1 safety module is used for feeding in 1 to 6 switch-off groups. The infeed voltage can be switched using 1 to 6 external safety shutdown devices (either ASIsafe monitors or 3TK28 safety relays). This safety module is used in applications with external safety shutdown devices where there is a need for the fully selective safety shutdown of fail-safe motor starters/frequency converters (see Example 2, page 4/13).

Terminal modules for (TM-PF30) safety module

For supplying load and sensor voltage to the potential bars of the motor starters, and for connection of the 2-channel sensor circuit (e.g. EMERGENCY-STOP pushbutton) and a reset button. Different terminal modules are available for the configuring of separate safety circuits or for the cascading of safety circuits, and for applications with time-delayed disconnection (see page 4/16).
**Safety modules local and PROFIsafe** (continued)

**Terminal module (TM-X)**

For connection of an external infeed contactor (2nd shutdown possibility). With terminals for contactor coil and feedback contact. Is always required to terminate a group of safety-oriented motor starters.

**Failsafe Kit**

The Failsafe Kit (F-Kit) must be added to each Standard motor starter in a safety segment in order to monitor the switching function.

**Components needed for applications with safety requirement**

<table>
<thead>
<tr>
<th>Components needed</th>
<th>Maximum achievable safety integrity according to ISO 13849-1 or IEC 62061</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ISO 13849-1</td>
</tr>
<tr>
<td>PM-D</td>
<td>✓</td>
</tr>
<tr>
<td>PM-D F1/-F2/-F4</td>
<td>–</td>
</tr>
<tr>
<td>PM-D F3</td>
<td>–</td>
</tr>
<tr>
<td>PM-X</td>
<td>–</td>
</tr>
<tr>
<td>PM-D FX1</td>
<td>–</td>
</tr>
</tbody>
</table>

1) An external infeed contactor is required in the main circuit (2-channel capability).
2) F-Kit needed only for Standard motor starter; already integrated in High-Feature motor starter.

**Possible combinations of safety and terminal modules**

<table>
<thead>
<tr>
<th>Terminal modules</th>
<th>PM-D F1</th>
<th>PM-D F2</th>
<th>PM-D F3</th>
<th>PM-D F4</th>
<th>PM-D F5</th>
<th>PM-X</th>
<th>PM-DFX1</th>
<th>FCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-PF30 S47-B0</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>TM-PF30 S47-B1</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>TM-PF30 S47-C0</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>TM-PF30 S47-C1</td>
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<td>–</td>
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<td>✓</td>
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<td>–</td>
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<td>–</td>
</tr>
<tr>
<td>TM-PF30 S47-D0</td>
<td>–</td>
<td>–</td>
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<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>TM-X15 S27-01</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>TM-PFX30 S47-G0</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>✓</td>
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<td>–</td>
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<tr>
<td>TM-PFX30 S47-G1</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>TM-FCM30 S47</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>✓</td>
</tr>
</tbody>
</table>
Safety modules local and PROFIsafe (continued)

**Examples**

The diverse possible uses of the safety motor starter Solutions local are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications.

Safety functional examples for easy, quick and low-cost implementations of applications with Safety motor starters Solutions local are available on the Internet:

You can find more information on the Internet at:

www.siemens.com/ET200S-motorstarter

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**Example 1:**

ET 200S Safety motor starter Solutions local with 2 safety circuits (= switch-off groups), Standard motor starters and High Feature motor starters.

---

**Example 2:**

ET 200S safety motor starter Solutions local with 2 external safety combinations (= safety relays or ASIsafe monitors) and with Failsafe motor starters (PM-DFX1 application). 2 of the 6 available safe switch-off groups are used.

Signals with relevance for safety can be input to ET 200S through a PM-DFX1 infeed terminal module through the enabling circuits of the ASIsafe monitor or the safety relay to control the Failsafe motor starters which then selectively switch off the downstream motors.
Safety modules local and PROFlsafe (continued)

ET 200S Safety motor starter Solutions PROFlsafe

Interplay of ET 200S Safety motor starter Solutions PROFlsafe components

Components for ET 200S Safety motor Starter Solution PROFlsafe
The ET 200S Safety motor starter Solutions PROFlsafe consists of (see example, page 4/15):
- PMD F PROFlsafe safety modules
- Failsafe motor starters
- Safe control system is used with the PROFINET or PROFIBUS bus systems with the PROFlsafe profile

Functionality of the ET 200S Safety motor starter Solutions PROFlsafe
- For the use of Failsafe motor starters in plants with safety category 2 to 4 according to ISO 13849-1 and SIL 2 and 3 acc. to IEC 62061. The use of Standard or High-Feature motor starters is also possible with certain assemblies
- High flexibility (any assignment of sensors to motor starters using the PLC)
- Full selectivity of disconnection of the Failsafe motor starters
- No complex wiring for conventional safety systems, e.g. no infeed contactors even in the highest safety category
- Can also be used to activate external safety systems through F-CM contact multiplier
- Safety module available for any safety function
- Safety module available for Stop category 0 and 1
- Safety module for monitoring the auxiliary voltages for motor starters
- Safety modules can be plugged into the TM-PF30 terminal modules

Sensor and actuator assignment are freely configurable within the framework of the distributed safety concept:
The logic of the safety functions is implemented by software. Safety-oriented PROFlsafe communication and the use of a safety-oriented control system are required. Integration of the safety technology in the standard automation is realized through a single bus system (see Advantages of PROFlsafe), using PROFIBUS as well as PROFINET.
Safety modules local and PROFlsafe (continued)

High degree of flexibility with safety technology

Failsafe motor starters for PROFlsafe

In EMERGENCY-STOP applications, the Failsafe motor starters are selectively switched off through the upstream PM-D F PROFlsafe safety module. For each safety module, six switch-off groups can be formed. In the first delivery stage, the failsafe freely-programmable logic of the SIMATIC controller is used to interface with the relevant Failsafe sensor technology.

F-CM contact multipliers

The interface between PROFlsafe and installations that use conventional safety technologies is implemented through the F-CM Failsafe contact multiplier with four floating contacts.

PM-D F PROFlsafe safety modules

The PM-D F PROFlsafe safety module receives the shutdown signal from the interface module of the ET 200S and safely switches off 1 to 6 switch-off groups. This safety module is used in PROFlsafe applications where there is a need for the selective safety shutdown of Failsafe motor starters/frequency converters.

Terminal modules

The terminal assignment of the terminal modules for safe motor starters corresponds to the terminal assignment of the 45 and 65 mm terminal modules. The terminal modules for safe motor starters have a coding module in addition. This enables the safe motor starter to be assigned to one of the six switch-off groups.

The terminal module contains three coding elements which fully cover the three coding openings in the terminal module. The labeled coding element contains (in the chamber marked with the dash) the busbar tap; the non-labeled coding elements are used only to cover the coding openings. Switch-off group 1 (AG1 or SG1) is coded in the as-delivered state. The coding can be changed to switch-off group 2 by releasing the coding element and turning it through 180°. Changing the coding to switch-off group 3 is possible by exchanging the labeled and blank coding elements. In this case the dash on the labeled coding element must correlate with the dash of the required switch-off group (symbolized busbar).

Example:

The diverse possible uses of the Safety motor starter Solutions PROFlsafe are presented in the manual SIMATIC ET 200S Motor Starters in the context of typical sample applications. Safety functional examples for easy, quick and low-cost implementations of applications with safety motor starters Solution PROFlsafe are available on the Internet:

You can find more information on the Internet at: www.siemens.com/ET200S
Safety modules local and PROFlsafe (continued)

Within an ET 200S station the Failsafe motor starters are assigned to one of 6 safety segments. For plants with distributed configuration the shutdown signals of these safety segments are preferably issued by a higher-level, safety-oriented control system through PROFlsafe. This permits the greatest flexibility for assigning the motor starters to different safety circuits.

Alternatively, an ET 200S F-CPU can also be used for control purposes.

If a safety-oriented SIMATIC CPU is used, the ET 200S is available as a safety-oriented peripheral. Nevertheless, in such a station it is possible to configure conventional motor starters and input/output modules mixed with modules with safety functions.

Accessories

Accessories for Standard motor starters

Control kit

The control kit for the Standard motor starter provides the possibility of testing the motor during start-up or service by actuating the motor starter protector. Using the control kit with the motor starter protector tripped, the contactor is mechanically locked in ON position.

Control unit

With the control unit the contactor coils of the Standard motor starter can be directly controlled using 24 V DC. The motor starter can thus be started as normal using a local control station or to the right of an xB1-4 brake module in order to improve heat removal to the side. The distance module is a completely passive module and does not need to be taken into account when configuring the control system during configuration.

DM-V15 distance module

- Passive module without bus connection and terminals
- Does not need a separate terminal module
- Follows a TM-DS45 or TM-RS90 or TM-xB if required
- Does not need to be taken into account when configuring the GSD file

The distance module is available for applications with high motor currents or high ambient temperatures involving Standard motor starters. It can be used to the right and left of a DS1-x direct-online starter or to the right of an xB1-4 brake module in order to improve heat removal to the side. The distance module is a completely passive module and does not need to be taken into account with regard to the control system during configuration.

Details of the distance module can be found in the manual "SIMATIC ET 200S". If you have any queries concerning the use of the distance module, contact Technical Support for Siemens Low-Voltage Controls and Distribution (fax: +49(0)911/896-5907).

Thanks to the PROFlsafe profile, the safety functions are available in the complete network, which means that the Safety motor starter Solutions PROFlsafe enable the selective disconnection of a Failsafe motor starters or the disconnection of a group of Standard and High-Feature motor starters regardless of where and on which peripheral station the safe control devices were connected. As such, this solution provides an unprecedented level of flexibility and reduction of wiring for applications in widely-spread plants or with a sporadic demand for changes in the assignment of safety segments.

The PROFlsafe safety motor starters Solution are ideally suited for safety concepts with Cat. 2 to 4 according to ISO 13849-1 and up to SIL 3 according to IEC 62061.

Each safety module switches up to 6 switch-off groups for Failsafe motor starters/frequency converters.

Accessories for High-Feature motor starters

2DI 24 V DC COM control module

The 2DI 24 V DC COM control module is plugged onto the interface on the front of the motor starter. The module provides two inputs which can receive signals from the process and be assigned directly to the starter.

The functionality can be selected from a list of various control functions as part of the PROFIBUS parameterization. Local control station, emergency start and quick stop, for example, are available as functions. The signal levels can also be parameterized (NO/NC). For more extensive control functions the two inputs of a xB3 or xB4 brake control module, which is plugged in alongside on the right, can be integrated in addition. The signal states of all inputs are transmitted in parallel with the internal use to the higher-level control system.

When a motor starter is replaced, the parameterization is automatically transmitted by download to the new starter. The inputs on the motor starter ensure autonomous operation, e.g. in the event of PLC failure, on the one hand and short response times through direct processing in the starter on the other hand. Another advantage results from the direct assignment of functions to modular machine concepts.

The 2DI 24 V DC COM control module has in addition a PC interface for connecting the Switch ES Motor Starter parameterization and diagnostics software (Version 2.0 and higher). The module works solely on High-Feature motor starters with ES Motor Starter interface. The Logo!-PC cable is used as connecting cable between the 2DI 24 V DC COM control module and the High-Feature motor starter.
Accessories (continued)

Accessories for Standard and High-Feature motor starters

PE/N bridge module
PE/N bridge modules are used to bridge gaps in the PE/N bus which are caused, for example, by using brake control modules, PM-D(F) power modules or PM-X connection modules. If a bridge module is used, the supply must not be fed anew. They are available in widths of 15 and 30 mm.

L123 bridge modules
The L123 bridge modules are used to bridge gaps in the power bus (see above). They are available in widths of 15 and 30 mm.

Brake control module
For motors with mechanical brakes (see also ET 200S Motor Starters and Safety Motor Starters, General Data, Overview, Section Brake Control Module, page 4/5)

Terminal modules for brake control modules
The TM-xB terminal modules are used to accommodate the xB1, xB2, xB3 and xB4 brake control modules. The TM-xB terminal module must always follow directly after a terminal module for Standard motor starters, High-Feature motor starters or frequency converters as control of the solid-state braking switch is provided through an output of the motor starter/frequency converter. The xB215 terminal modules for the brake control modules have not only the terminals for connecting the cable for the motor brake but also the terminals of the two local acting inputs. These local inputs are not evaluated by a frequency converter, which is why the xB215 terminal module can only be switched behind a motor starter.

Accessories for Standard, High Feature, Failsafe motor starters

PE/N terminal blocks
The PE/N terminal block is required for direct connection of the protective conductor in the motor cable without intermediate terminals. It is plugged together with the terminal module for motor starters or frequency converters before the latter is mounted on the standard mounting rail. With two PE terminals and one N terminal the "F" version is connected to the "S32" terminal modules for motor starters or frequency converters. The "S" version is combined with the "S31" terminal module. The "F" terminal modules are delivered with two caps for closing the PE/N bus contacts on the final terminal module of a segment. The modules for the Standard motor starters have a width of 45 mm and the modules for the High-Feature motor starters and frequency converters have a width of 65 mm.

There is no electrical connection between the terminals of the PE/N terminal block and the integrated shielding of the frequency converter. The PE/N terminal block must therefore not be used for the shielding of the motor cable.

Accessories for Safety modules local
The Failsafe Kit (F-Kit) is required for Standard motor starters in a safety segment (see Safety Module local and PROFlsafe, Overview, page 4/12).

More information
- Catalogs ST 70, IC 10, CA 01
- Internet: www.siemens.com/et200s
  www.siemens.com/et200 (general)
Overview

- Modular peripheral system in IP20 degree of protection, which is particularly suited for user-specific and complex automation tasks.
- Expandable by the signaling, communication and functional modules of the S7-300 automation system.
- The explosion analog input and output modules with HART optimize the ET 200M for use in process engineering.
- Can be used with redundant systems (S7-400H, S7-400F/FH).
- Consists of a PROFIBUS DP connection IM 153, up to 8 or 12 I/O modules of the S7-300 automation system (designed with bus connectors or with active bus modules) and possibly also a power supply.
- Replacement of modules during operation (hot swapping) with active bus modules.
- Optionally with integral FO interface.
- Transmission rate up to 12 Mbit/s.
- Ex approval according to Cat. 3 for Zone 2 according to ATEX 100 a.
- Failsafe digital inputs and outputs and analog inputs for safety-oriented signal processing according to PROFIsafe.
- Support of modules with expanded user data, e.g. HART modules with HART additional variables.

More information

- Catalogs ST 70, CA 01.
- Internet:
  - www.siemens.com/et200m
  - www.siemens.com/et200 (general)

ET 200L

Overview

The ET 200L is a small, compact I/O station in IP20 degree of protection.

The ET 200L is primarily used where few inputs/outputs are required in the lower performance range and where little space is available.

The ET 200L is a passive station (slave) in the PROFIBUS DP with transmission rates of up to 1.5 Mbit/s.

More information

- Catalogs ST 70, CA 01.
- Internet:
  - www.siemens.com/et200l
  - www.siemens.com/et200 (general)
Overview

- Intrinsically safe distributed I/O system in IP30 degree of protection for use in gas and dust areas with an explosion hazard, i.e. in Zone 1 and 2 as well as 21 and 22
- Sensors and actuators can lie directly in Zone 0 and 20
- Individual configuration and flexible expansion thanks to modular design for optimal adaptation to the current automation task
- Permanent wiring permits prewiring without existing electronics
- Optimal integration into control systems (e.g. SIMATIC PCS 7)
- Parameterization via SIMATIC PDM
- Optimal integration of HART field devices (HART transparency)
- Failsafe digital inputs and outputs and analog inputs for safety-oriented signal processing according to PROFIsafe
- Connection to PROFIBUS DP via isolating transformers
- Module exchange (hot swapping) and configuration expansion (Configuration in Run) possible during operation
- Comprehensive diagnostic signals
- Moisture-resistant modules in temperature range -20 °C to +70 °C
- EMC according to NE 21 (on Namur recommendation)
- Full redundancy of PROFIBUS and power supply

More information
- Catalogs ST 70, CA 01
- Internet: www.siemens.com/et200isp
  www.siemens.com/et200 (general)
Overview

- Distributed I/O system in IP65/67 degree of protection for cabinet-free, machine-level use
- Small, multifunctional complete solution: Digital inputs/outputs, failsafe modules, motor starter up to 5.5 kW, frequency converter up to 1.5 kW, etc.

- Communication via PROFIBUS or PROFINET
- Mixture of failsafe modules and standard modules possible in a single station
- Free choice of connection technology: direct, ECOFAST or M12 7/8"
- Power module for simple realization of load groups
- Module exchange during operation (hot swapping)
- Simple assembly and permanent wiring
- Transmission rate up to 12 Mbit/s
- Comprehensive diagnostics: module- or channel-specific
- Intelligent motor starter for the starting and protection of motors and loads up to 5.5 kW
  - Versions: Direct-on-line and reversing starters - Standard and High Feature
- Frequency converter up to 1.5 kW in standard version and with integral safety functions
- Failsafe module with safety-oriented signal processing according to PROFIsafe

More information

- Catalogs ST 70, CA 01
General data

Motor starters
- Only two versions up to 5.5 kW
- All settings can be parameterized by bus
- Comprehensive diagnostic signals
- Overload can be acknowledged by remote reset
- Current unbalance monitoring
- Stall protection
- Emergency start function in the event of overload
- Current value transmission by bus
- Current limit monitoring
- Direct-on-line or reversing starters
- Power bus can be plugged in using the new HAN Q4/2 plug-in connectors
- Conductor cross-sections up to 6 x 4 mm²
- 25 A per segment (power looped through using jumper plug)
- In the Standard and High-Feature versions (with 4 DI onBoard)
- Electromechanical switching and electronic switching
- Electronic starter for direct activation or with integrated smooth starter function
- Supplied with 400 V AC brake contact as an option

Isolator modules
The isolator module with switch disconnector function is used for safe disconnection of the 400 V operational voltage during repair work in the plant and provides an integrated group fusing function (i.e. additional group short-circuit protection for all subsequently supplied motor starters).

Depending on the power distribution concept, all stations can be equipped with an isolator module as an option.

Safety applications
Safety local isolator module
With the Safety local modules
- Safety local isolator module and
- 400 V disconnecting module
it is possible to achieve safety category 4/SIL 3 with an appropriate connection.

Safety Solution PROFIsafe
With the Safety PROFIsafe modules
- F-Switch and
- 400 V disconnecting module
it is likewise possible to achieve safety category 4/SIL 3 with an appropriate connection.

Motor Starter ES software
Motor Starter ES software for parameterization, monitoring, diagnostics and testing of motor starters.
(See Chapter 3).

Functionality
With the ET 200pro motor starters, any AC loads can be protected and switched. They are an integral part of ET 200pro and have the high degree of protection IP65. This makes them ideal for operation in modular, distributed I/O without control cabinets or control enclosures.

The ET 200pro motor starters are available both with mechanical as well as electronic contacts.

The ET 200pro electromechanical starters are offered as direct (DS0/DSt) and reversing starters (RS0/RSst) in the High Feature version with the following equipment:
- 4 digital inputs
- Device versions with or without control for externally fed brakes with 400 V AC
- With expanded parameterization capabilities.

The ET 200pro electronic starters are offered as direct (sDS0/sDSt) and reversing starters (sRSS0/sRSSst) in the High Feature version with the following equipment:
- 4 digital inputs
- With soft-start and smooth ramp-down function
- With the deactivated smooth start function as an electronic starter for applications with a high level of switching frequency
- Device versions with or without control for externally fed brakes with 400 V AC
- With expanded parameterization capabilities.

As the result of the protection concept with solid-state overload evaluation and the use of SIRIUS controls size S00, additional advantages are realized on the standard and High-Feature motor starters - advantages which soon make themselves positively felt particularly in manufacturing processes with high plant stoppage costs:
- Configuration is made easier by the fine modular structure.
- Machine concepts or solutions for conveying systems and in machine-tool building.
- Expansions are easily possible through the subsequent adding of modules. The innovative plug-in technology also does away with the wiring needed up to now. Through the hot swapping function (disconnection and connection during operation) a motor starter can be replaced within seconds if necessary, without having to shut down the ET 200pro station and with it the process in the plant. The motor starters are therefore recommendable in particular for applications with special demands on availability. Storage costs are optimized in addition by the low level of variance (2 units up to 5.5 kW).

The ordering option for motor starters with a 400 V AC brake output provides the possibility of controlling motors with 400 V AC brakes. With four locally acting inputs available on the High-Feature motor starter it is possible to realize autonomous special functions which work independently of the bus and the higher level control system, e.g. as a quick stop on gate valve controls or limit position disconnectors. In parallel with this, the states of these inputs are signaled to the control system.
## General data (continued)

<table>
<thead>
<tr>
<th>Device functions</th>
<th>Standard motor starters DSe, RSe</th>
<th>High-Feature motor starters DSe, RSe</th>
<th>sDStSe, sDStSe, sRStSe, sRStSe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameterizable rated operational current</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterizable current limit values</td>
<td>No</td>
<td>Yes, 2 limit values</td>
<td></td>
</tr>
<tr>
<td>Parameterizable response in case of current limit violation</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Zero current monitoring</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterizable response in case of zero current violation</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterizable current unbalance limit</td>
<td>No, fixed limit value (30 % x (I_e))</td>
<td>Yes, 30 % ... 60 % x (I_e)</td>
<td></td>
</tr>
<tr>
<td>Parameterizable response in case of unbalance limit violation</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor blocking monitoring</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Parameterizable blocking current limit</td>
<td>No</td>
<td>Yes, 150 % ... 1000 % x (I_e)</td>
<td></td>
</tr>
<tr>
<td>Parameterizable blocking time limit</td>
<td>No</td>
<td>Yes, 1 ... 5 s</td>
<td></td>
</tr>
<tr>
<td>Current value transmission</td>
<td>Yes</td>
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<td></td>
</tr>
<tr>
<td>Group warning diagnostics</td>
<td>No</td>
<td>Yes, parameterizable</td>
<td></td>
</tr>
<tr>
<td>Group diagnostics</td>
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</tr>
<tr>
<td>Emergency start</td>
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<tr>
<td>Digital inputs</td>
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<td>• Parameterizable input signal</td>
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<td>Yes, latching/ non-latching</td>
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<tr>
<td>• Parameterizable input level</td>
<td>No</td>
<td>Yes, NC contacts/NO contacts</td>
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<tr>
<td>• Parameterizable input signal delay</td>
<td>No</td>
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<tr>
<td>• Parameterizable input signal extension</td>
<td>No</td>
<td>Yes, 0 ... 200 ms</td>
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</tr>
<tr>
<td>• Parameterizable input control actions</td>
<td>No</td>
<td>Yes, 12 different actions</td>
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<tr>
<td>400 V brake output</td>
<td>Yes, ordering option</td>
<td></td>
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<tr>
<td>Parameterizable brake enabling delay</td>
<td>Yes, -2.5 ... 2.5 s</td>
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</tr>
<tr>
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<td>Yes, 0 ... 25 s</td>
<td></td>
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<tr>
<td>Parameterizable start-up type</td>
<td>No</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Parameterizable ramp-down time</td>
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<tr>
<td>Parameterizable starting voltage</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Parameterizable stopping voltage</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Local device interface</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Firmware update</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal motor model</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterizable trip class</td>
<td>No, CLASS 10 fixed</td>
<td>Yes, CLASS 5, 10, 15, 20</td>
<td></td>
</tr>
<tr>
<td>Parameterizable response in case of overload of thermal motor model</td>
<td>No</td>
<td>Yes, 3 possible states</td>
<td></td>
</tr>
<tr>
<td>Advance warning limit for motor heating</td>
<td>No</td>
<td>Yes, parameterizable 0 ... 95 %</td>
<td></td>
</tr>
<tr>
<td>Advance warning limit time-related trip reserve</td>
<td>No</td>
<td>Yes, parameterizable 0 ... 500 s</td>
<td></td>
</tr>
<tr>
<td>Parameterizable recovery time</td>
<td>No</td>
<td>Yes, 1 ... 30 min</td>
<td></td>
</tr>
<tr>
<td>Parameterizable protection against voltage failure</td>
<td>No, permanently integrated</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Reversing start function</td>
<td>Yes, ordering option</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterizable interlock time for reversing starters</td>
<td>No, 150 ms fixed</td>
<td>Yes, 0 ... 60s</td>
<td></td>
</tr>
<tr>
<td>Integrated logbook functions</td>
<td>Yes, 3 device logbooks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated statistics data memory</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterizable response in case of CPU / master stop</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Device indications

- **Group fault**: SF LED (red)
- **Switching state**: STATE LED (red, yellow, green)
- **Device status**: DEVICE LED (red, yellow, green)
- **Digital inputs**: No, IN 1 ... IN 4, LED
Solutions local – Safety Module

ET 200pro motor starter: Safety local isolator module, disconnecting module, Standard starter and High-Feature starter mounted on a wide module rack

Safety local isolator module

The Safety local isolator module is a repair switch with integrated safety evaluation functions that can be parameterized using DIP switches.

It is used for:
- Connection of a 1 or 2-channel EMERGENCY-STOP circuit up to Cat. 3-4/SIL 3 (protective door or EMERGENCY-STOP pushbuttons) and parameterizable start behavior
- Control of the 400 V disconnecting module by means of a safety rail signal

400 V disconnecting module

The 400 V disconnecting module enables the safe disconnection of an operational voltage of 400 V up to Category 3-4/SIL 3. For operation in a Safety Solution local application it functions only in combination with the Safety local isolator module.

For operation in a Safety PROFI safe application it functions only in combination with the F-Switch.

F-Switch

Fail-safe digital inputs/outputs in degree of protection IP65/66/67 for near-machine, cabinet-free use.

Fail-safe digital inputs
- For the failsafe reading in of sensor information (1-/2-channel)
- Including integrated discrepency evaluation for 2v2 signals
- Internal sensor supplies (incl. testing) available

Fail-safe digital outputs
- 3 failsafe PP-switching outputs for safe switching of the backplane busbars

The F-Switch is certified up to Cat. 4 (EN 954-1) and up to SIL 3 (IEC 61508) and has detailed diagnostics.

It supports PROFI safe in PROFI BUS configurations as well as in PROFINET configurations.

Functionality

Safety local isolator module

The Safety local isolator module features the same functions as a standard isolator module with an additional local safety function.

The Safety local isolator module contains a 3TK28 41 module and is equipped with M12 terminals for the connection of external safety components.

Terminals 1 and 2 can be used to connect either 1-channel or 2-channel EMERGENCY-STOP circuits or protective door circuits (IN 1, IN 2).

For monitored starts, an external START switch can be connected to terminal 3.

The required safety functions can be set using 2 slide switches located under the left M12 opening.

In the event of an EMERGENCY-STOP, the Safety local isolator module trips the downstream 400 V disconnecting module. This safely isolates the 400 V circuit up to Cat. 4/SIL 3.

In combination with the 400 V disconnecting module, the Safety local isolator module can be used for safety applications up to Cat. 4/SIL 3 according to EN 13849-1 / IEC 61508 1-4.

400 V disconnecting module

The 400 V disconnecting module can be used together with the Safety local isolator module for local safety applications and together with the F-Switch for PROFI safe safety applications.

It contains two contactors connected in series for safety-oriented disconnection of the main circuit.

The auxiliary circuit supply of the device is over a safety power rail in the backplane bus module.

The 400 V disconnecting module can be used together with the Safety local isolator module or with the F-Switch for safety applications up to Cat. 4/SIL 3 according to EN ISO13849-1 / IEC 61508 1-4.

F-Switch

The F-Switch is a failsafe solid-state module for PROFI safe safety applications. It has two failsafe inputs and outputs for safe switching of the 24 V supply over backplane busbars. In combination with the 400 V disconnecting module it can be used in PROFI safe applications for the failsafe disconnection of ET 200pro motor starters up to Cat. 4/SIL 3.
Accessories

Basic design of an ET 200pro motor starter

Infeed on the ET 200pro motor starter

Infeed on the RSM isolator module

Legend:
1. Power feeder plug (see Catalog ST 70, page 9/319)
2. Power connection plug (see Catalog ST 70, page 9/319)
3. Power jumper plug (see Catalog ST 70, page 9/319)
4. Motor connection plug (see Catalog ST 70, page 9/319)
5. Motor plugs (see Catalog ST 70, page 9/319)
6. Motor plugs with EMC suppressor circuit (see Catalog ST 70, page 9/319)
7. Power loop-through plugs (see Catalog ST 70, page 9/319)
8. Power connection cables (see Catalog ST 70, page 9/319)
9. Power connection cables for isolator module (see Catalog ST 70, page 9/319)
10. Motor cable (see Catalog ST 70, page 9/320)

More information
- Catalogs ST 70, IC 10, CA 01
- Internet: www.siemens.com/et200pro
  www.siemens.com/et200 (general)
Overview

- Compact block I/Os for processing digital, analog and IO-Link signals for connecting to the PROFINET bus system
- Construction without control cabinet, degree of protection IP65/66/67 with M12 connection method
- Very robust and resistant metal casing and enclosure

- Compact module in two enclosure forms:
  - 30 mm x 200 mm x 37 mm (W x H x D, long and narrow enclosure) with 4 x M12 for digital signals
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure) with 8 x M12 for digital signals and IO-Link
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure) with 4 x M12 or 8 x M12 for analog signals
- PROFINET connection: 2 x M12 and automatic PROFINET addressing
- Data transmission rate 100 MBit/s
- LLDP proximity detection without PG and Fast Startup (starting within approx. 0.5 s)
- Supply and load voltage connection: 2 x M12
- Module variance:
  - 8 DI,
  - 16 DI,
  - 8 DO (2 A),
  - 8 DO (1.3 A),
  - 8 DO (0.5 A),
  - 16 DO (1.3 A),
  - 8 DI/DO (1.3 A),
  - 8 AI (U, I, TC, RTD),
  - 4 AO (U, I),
  - 4 I/O-Link + 8 DI + 4 DO (1.3 A)
- Channel-specific diagnosis

More information
- Catalogs ST 70, CA 01
- Internet: www.siemens.com/et200ecopn
  www.siemens.com/et200 (general)
Overview

- Compact, economical, I/O peripherals for the processing of digital signals
- Cabinet-free design in IP65/67 degree of protection with flexible and rapid connection technology

- Consists of basic module and various connection blocks for application-adapted realization options:
  - ECOFAST: 2 x RS 485 hybrid field bus connections with identification plug for PROFIBUS address setting
  - M12: 2 x M12 and 2 x 7/8" with 2 rotary coding switches for PROFIBUS address assignment
- Connection block includes T functionality for bus and voltage supply so that the module can be removed from and reconnected to PROFIBUS without interruption during commissioning and service
- Module variance: 8DI, 16DI, 8DI/8DO (1.3 A), 8DI/8DO (2.0 A), 8DO (2.0 A), 16DO (0.5 A)
- Transmission rates up to 12 Mbit/s
- Failsafe DI module with 4/8 F-DI with safety-oriented signal processing according to PROFIsafe

More information

- Catalogs ST 70, CA 01
- Internet: www.siemens.com/et200eco
  www.siemens.com/et200 (general)