Answers for infrastructure.

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Innovative technologies to answer the associated toughest questions
Throughout a 160-year history of proven research and engineering talent, with more than 50,000 active patents, Siemens has continuously provided its customers with innovations in the areas of healthcare, energy, industry and infrastructure – globally and locally.

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SED2 variable speed drives – for simple, energy-saving HVAC operation

Controlling equipment with high power consumption with minimum maintenance and operation costs

Answers for infrastructure.

SIEMENS

SED2 – simply control speed and save energy actively

SED2 variable speed drives control the energy demand of equipment with high power consumption in a highly efficient way. Fans and pumps use up to 50% less energy thanks to SED2: especially thanks to the precise, on-demand control of the motor speed. In addition, the Low Harmonic Technology of the SED2 devices reduces mains harmonics to a minimum.

Based on Siemens' decades of experience, SED2 enable simple, cost-efficient commissioning and maintenance. Thanks to the comfortable commissioning assistant and the library with easy adaptable applications, the devices are ready for use quickly and error-free. During maintenance, the modular design and free accessibility make the exchange of single components easy.

Secure investment thanks to convincing performance

SED2 variable speed drives offer highest investment protection, thanks to their high reliability, long life cycle, and exceptional simplicity. For example, the bypass function assures operation of fans or pumps even in case of a failure. Minimized mains harmonics prolong the life cycle. Free accessibility and easy exchange of components enable quick, cost-efficient maintenance. Standardized modules for all SED2 reduce costs for logistics and storing. And thanks to their high energy efficiency, SED2 amortize within a short period of time.

A strong portfolio especially for HVAC applications

The broad SED2 portfolio is based on the latest variable speed drives technology especially for HVAC applications and is suited for the constant speed control of pumps and fans powered with standard asynchronous 3-phase motors. Via interfaces, SED2 can be easily integrated into building automation systems such as DESIGO™ from Siemens. The most important applications for fans and pumps are included in the respective system libraries. Thus, variable speed drives in combination with systems from Siemens enable tested and proven applications.

Reliable control in the event of fire

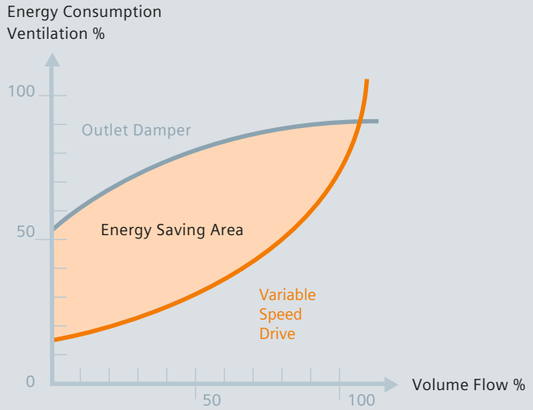
In addition to the HVAC functions, the SED2 variable speed drives provide a special control option in the event of fire. This feature reliably ensures that escape routes are kept free of smoke by means of overpressure.

Everything to support you – from software to service

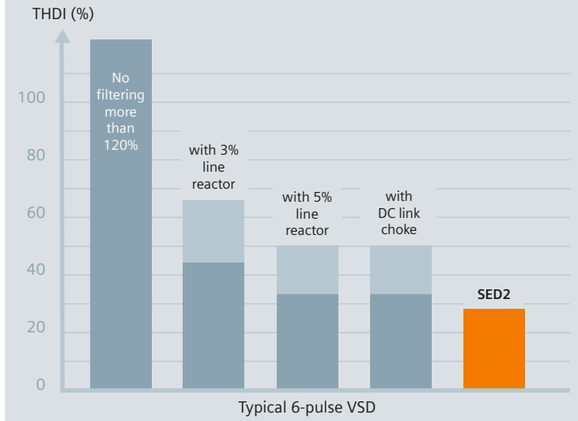
With the SED2 variable speed drives, you receive comprehensive support from Siemens: practice-oriented trainings, comfortable software, for example for quick and guided commissioning, as well as comprehensive documentations.

Highlights

- Energy savings of up to 50% when operating fans and pumps
- Cost savings thanks to quick, straightforward commissioning and maintenance
- Long-term investment protection thanks to high reliability, long life cycle as well as easy maintenance and logistics
- Broad portfolio with latest variable speed drives technology
- Reliable control even in case of fire
- Comprehensive support from Siemens



Typical speed-torque characteristic of a variable torque pump or fan



Comparison of THDI (Total Harmonic Distortion Current) – overall harmonic power distortion

Saving costs with less energy consumption and high efficiency

Energy-saving technology and functions

Requirements for modern heating, ventilation, and air conditioning systems: maximum room comfort with minimum energy consumption. For this, SED2 variable speed drives are an important component. In combination with fans and pumps, they offer a high energy- and cost-saving potential.

SED2 exactly adjust to the delivery rate of fan or pump motors in an energy-efficient way. Automatic switching to the integrated bypass function in nominal load operation reduces the electric switching loss of the variable speed drives. The hibernation function that is based on the PID controller reduces energy consumption by switching the SED2 off when demand is low. The seven-days time switching function can be realized with the advanced operator panel AOP and helps to save energy and costs as well.

Low Harmonic Technology

Typical applications for the SED2 variable speed drives are variable torque fans and pumps. To reduce harmonic currents on the AC line, Siemens has developed a technology for use with the SED2 that does away with extra components such as AC line reactors. The technology is called Low Harmonic Technology.

Tests reveal that the Low Harmonic Technology clearly leads to a reduction of low order harmonic currents on the AC line. In contrast to standard variable speed drives, the SED2 deliver good test results without using AC line reactors. Harmonics characteristics of the SED2 are comparable or even better than those of variable speed drives equipped with extra AC line reactors or DC link chokes.

Benefits of the Low Harmonic Technology include:

– Direct cost savings since AC line reactors are not needed
– Lower maintenance costs since the motors produce less heat, leading to longer motor life cycles
– Added protection for sensitive equipment such as computers and communication modules, etc.
– Reduced quantity of blind current and reduction of potential compensation costs

More benefits for increased efficiency

The commissioning assistant of the parameterizing software EasyComm supports the user step-by-step and thus reduces time, effort, and costs for commissioning. Thanks to the intuitive user guidance, even complex PID controller tasks can be easily parameterized in just a few seconds.

In addition, the software also includes a comprehensive application library. The applications can be adjusted to customer requirements easily and quickly.

Highlights

- Drastic energy savings thanks to demand-controlled, bypass, hibernation as well as time switching functions
- Minimized mains harmonics thanks to Low Harmonic Technology
- Drastic time and cost savings thanks to commissioning assistant and application libraries

Frame size FSA IP20

Frame size FSB/C IP20

Frame size FSA/B/C IP20

Frame size FSD/E IP20

Frame size FSF IP20

Overview of SED2 products

Variable speed drives for all requirements

SED2 variable speed drives are available in different designs and sizes. The power range of the IP20 devices ranges from 0.37 kW to 90 kW. The IP54 designs range from 1.10 kW to 90 kW.

Standard features

– Modular design offers maximum flexibility in terms of configuration
– Very low motor noise level thanks to high pulse frequency
– Complete protection of drive and motor
– Separate mains and motor terminals for optimum electromagnetic compatibility
– Low Harmonic Technology (LHT): Special technology for suppressing harmonics without additional components
– Plug-in type operator panels
– Control terminal strip without screws, with removable I/O board
– Advanced IGBT technology
– Microprocessor control
– Quadratic U/f characteristic
– Flying restart
– Automatic restart on power failure or operating fault
– Self-regulating PID controller
– Programmable runup/rundown from 0 to 650 s
– Fast current limitation (FCL) for trouble-free operation
– Fast, reproducible response of the digital inputs
– Precise setpoint indication owing to high-resolution 10-bit analog input
– 4 skip frequencies
– Onboard kWh meter
– 15 test frequencies

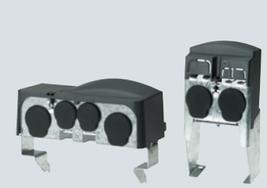
Highlights

- Broad range of different sizes
- Maximum flexibility thanks to modular design
- Easy operation with basic operator panel BOP or optional advanced operator panel AOP

Options

AOP (Advanced Operator Panel)

– Clear text display for reading the parameter values
– Backlit LCD, 4 lines each with 30 characters
– Display in 5 languages
– Up to 10 parameter sets can be stored and downloaded to other drives
– Integrated time switch function
– Can also be used as a small network (RS485) in connection with the door mounting kit



Gland plate, size A – C, IP20

– For direct fitting to variable speed drives of frame sizes A, B and C
– Integrated in variable speed drives of frame sizes D, E and F
– The gland plate simplifies the shielding connection of motor and data cable, ensuring optimum wiring

Door mounting kit

– For fitting BOP/AOP in control panel doors
– Straightforward detached mounting
–Degree of protection IP56

Technical data

Power and voltage range IP20	0.37 – 45 kW/3 AC 200...240 V ±10% 50/60 Hz 0.37 – 90 kW/3 AC 380...480 V ±10% 50/60 Hz
Power and voltage range IP54	1.10 – 90 kW/3 AC 380...480 V ±10% 50/60 Hz
EMC filter	B-class filter (EN 55011-B) built in as standard
Harmonic Current Distortion	LHT (Low Harmonic Technology): special DC link ensuring typically < 30% THDI
Power factor	≥ 0.9
Efficiency	96 – 97%
Overload capacity	110% for 60 s
Communication and network integration	RS485 Installed: Siemens USS and P1; N2 Additional: LonMark®, PROFIBUS DP
Standards	UL, cUL, CE, C-Tick

SED2 variable speed drives – all the features you could want for HVAC applications

Onboard kWh meter 1

The SED2 variable speed drives have an integrated kWh meter that is displayed via the keypad. The meter can be reset to start metering predefined by the user.

Direct connection of an LG-Ni 1000 sensor for temperature control 2

Direct connection of the LG-Ni 1000 temperature sensor offers a low-cost temperature control loop solution. The built-in PID controller is optimized for HVAC applications.

Hibernation mode 3

Hibernation mode starts and stops the SED2 automatically on demand. This enables greater energy savings and control by stopping the SED2 if it runs at a user-defined minimum speed for a given time. If demand is low, more energy can be saved. If the demand increases, the SED2 switch on automatically.

Belt failure detection with or without sensor 4

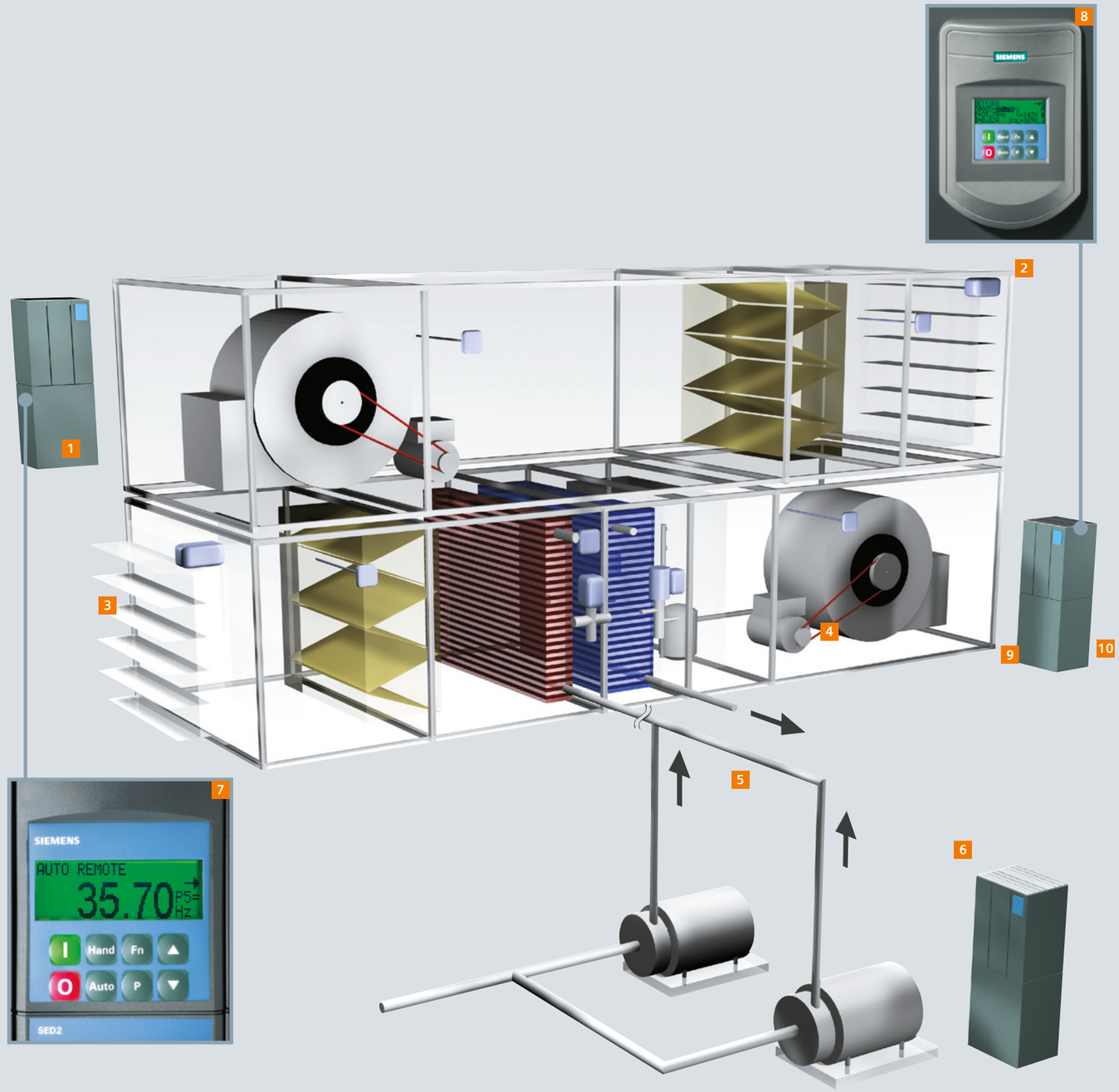
The SED2 ensure reliable V-belt monitoring without the expense of an external sensor. Both speed and torque are compared with a user-defined tolerance band. If the parameters do not match, the SED2 trip in the event of V-belt failure.

Staging pumps and fans 5

This function allows for the control of up to 2 additional staging pumps or fans. With the 2 relay contacts, the SED2 perform the staging logic without any requirement or expense of additional controllers or I/O cards.

Bypass control 6

Bypass control ensures high availability of the application. This function is activated either automatically or by a digital input. In addition, to save even more energy, the SED2 changes to bypass mode if the motor runs at mains frequency for a preselected period of time.



Basic Operator Panel BOP 7

The BOP included as standard is fully removable and interchangeable with all frame sizes. The 5-digit LCD clearly displays if the hand or auto functions have been selected on the keypad. Push button speed control and intuitive 10-step commissioning make the SED2 the easiest variable speed drives on the market to program.

Advanced Operator Panel AOP as an option 8

The AOP offers the following in addition to the functionality of the BOP:
- Unique 10 parameter set storage with full uploading/downloading capability
- Multilingual and multiline clear text display
- Plain language commentary and diagnostics menu
- Seven-days timer function with three switching operations per day
- Mulitdrop capability to control 32 SED2 with one AOP

EMC filter of class B 9

The entire range of SED2 variable speed drives feature EMC filters that comply with the requirements for conducted radio-frequency emissions used in the first environment/category C1 according to EN 61800-3 (equivalent to EN 55011 class B). Thus, SED2 are suited for use in residential, business, and commercial areas.

Operation in case of an emergency/fire 10

In this operating mode, the SED2 ignore internal alarm and fault messages to keep up the operation of fans as long as possible. This ensures an exact overpressure in a stairway. Escape routes stay free of smoke and doors can be opened easily.

LON I/F module

TXI1.OPEN module for DESIGO PX

Communication and software

System integration
- TXI1.OPEN module for integration into DESIGO PX
- Implemented P1 protocol for Apogee from Siemens
- Third-party systems can easily communicate with the SED2 via USS-Talk or N2

LonMark communication
- The module conforms to the LonMark regulations with regard to Variable Speed Drive Profile Number 6010
- Standard Network Variable Types (SNVTs) are used for communication
- Configuration, control and monitoring via the LonTalk® network
- 48 SNTVs are preconfigured
- Direct integration into control systems
- Snap-on facility for straightforward installation and easy integration

TXI1.OPEN module
- General control: On/off and preselected setpoint (in frequency, % PID or pressure); both with checkback signal
- SED2 data points: Output frequency (Hz), output current (A), cumulated energy (kWh), and output (kW)
- Errors: Display and acknowledgement

PROFIBUS module
- For a complete PROFIBUS connection with ≤12MBaud
- With an operator panel (AOP/BOP) snapped on the PROFIBUS module, remote communication and operation can be combined with SED2
- Snap-on facility for straightforward and easy installation

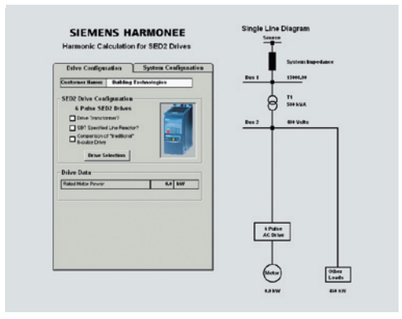
HarmonEE
- Calculator software tool for harmonics generated by the variable speed drive

EasyComm commissioning and engineering software
- Integrated commissioning assistant to parameterize easy to complex applications without parameter know-how
- Clear and easy user guidance to reduce errors, effort and costs

Highlights

- Straightforward integration into building automation via the respective modules
- Easy calculation of mains harmonics with SED2 HarmonEE
- Quick, error-free commissioning thanks to integrated commissioning assistant

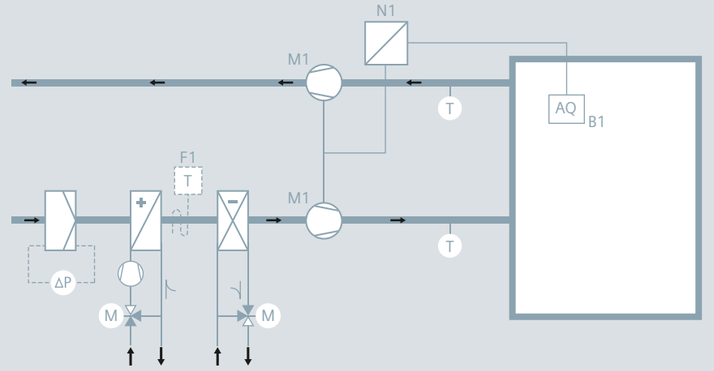
HarmonEE



PROFIBUS module

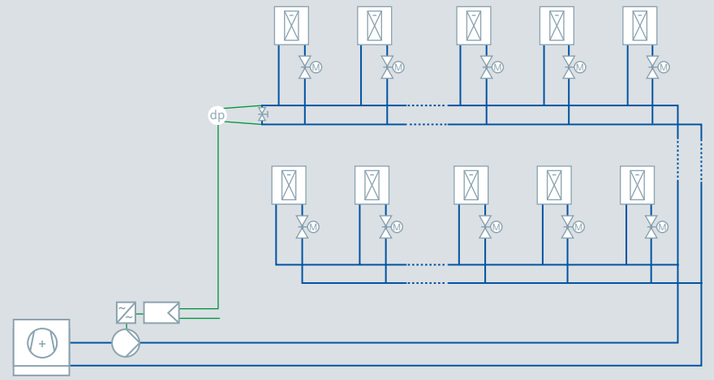
Application examples

Demand-controlled fans



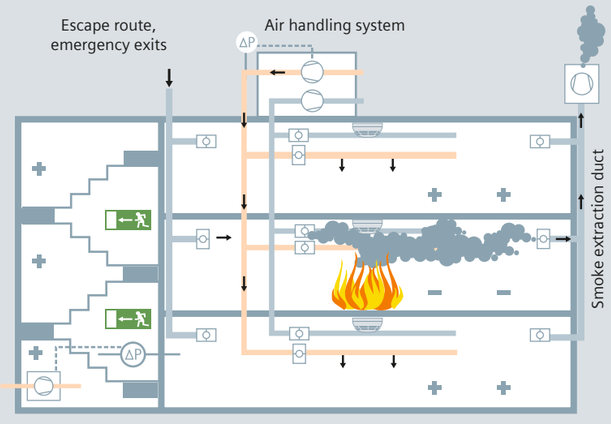
Energy-efficient realization of customer-specific demands: Air quality sensors, controllers as well as the know-how from Siemens guarantee an on-demand operation of your ventilation system. The fans are controlled exactly to the actual demand of fresh air. Thus, cost and energy savings of up to 60% are possible.

Demand-controlled pumps



Pumps can only be operated efficiently if the control strategy of the pump and the hydraulic network are accurately harmonized. In addition, an optimum layout of the pump and the right placing of the pressure detector are decisive for operation at optimal cost. Siemens possesses broad application know-how and provides you with the right controllers to reduce your operating costs and energy consumption.

Optimum interaction of ventilation system and fire control panel



Without additional control logics, the SED2 support two operating modes. In the comfort mode, the supply air and extract air fans are controlled exactly according to the actual demand. Thus, a high level of comfort is guaranteed at lowest energy consumption.

If a fire control panel signals a fire, the SED2 change their operating mode to the fire emergency mode. This operating mode ensures that rooms for example are specifically controlled by means of overpressure to make sure escape routes are kept free of smoke.