The information provided in this literature contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products: An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of the contract:

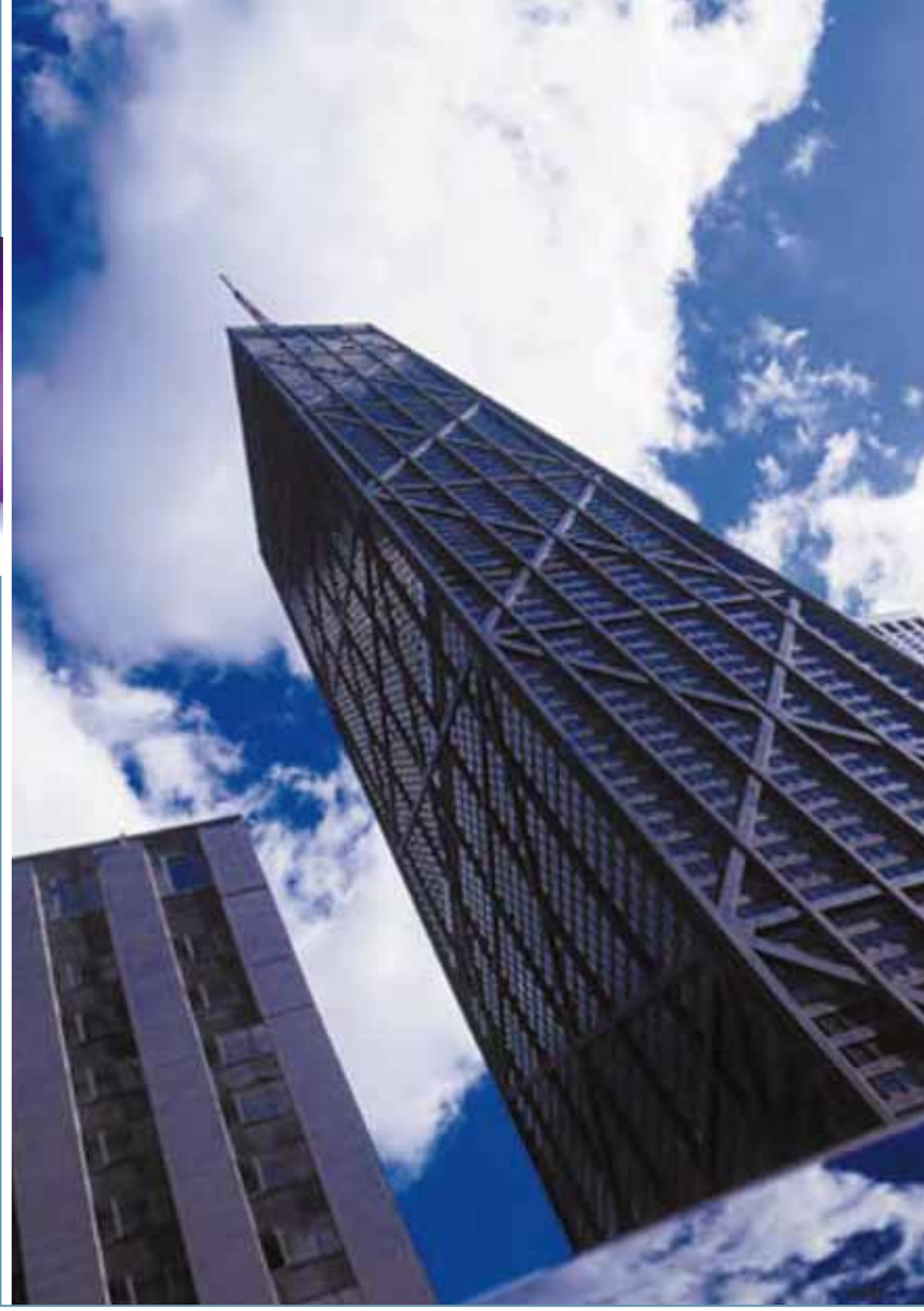
Useful websites

www:thecarbontrust:co:uk
www:inlandrevenue:gov:uk
www:eca:gov:uk
www:actionenergy:org:uk
www:gambica:org:uk

Siemens Water Technologies
Unit 1
Priory Works
Tonbridge
Kent
TN11 0QL
Tel 01732 771777
Fax 01732 771800
wtuk:water siemens:com

Subject to technical alteration
Siemens UK Printed in the UK

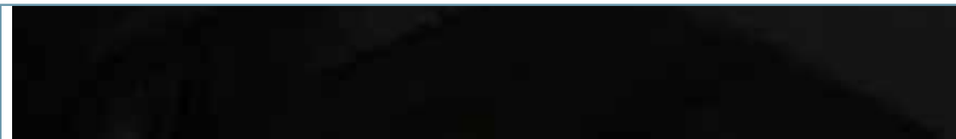
www siemens co uk-stranco leisure



Some like it easy, Siemens Easy Drive.

Answers for infrastructure

SIEMENS



Standard I-Os
Hardware at a Glance

2 x ANALOGUE INPUTS

- DC 0 10V
- DC 2 10V
- 0 20 mA
- 4 20mA
- Ni 1000

6 x DIGITAL INPUTS

- Opto Isolated
- Fully programmable
- PNP or NPN

1 x MOTOR PTC

2 x ANALOGUE OUTPUTS

- DC 0 10V
- DC 2 10V
- 0 20 mA
- 4 20mA
- Programmable

2 x RELAY OUTPUTS

- AC 250V-2A
- DC 30V-5A
- Configurable

RS 485

- RS485
- P1
- N2
- LONMARK
- USS Protocol

List of associated SED 2 literature

Commissioning Guide CM1G5192en
Operating instructions CM1U5192en
Getting started Guide CM1G5192XE1
Installation guidelines
AOP Operating instructions CM1B5192en
LON interface installation guidelines

List of associated SED 2 software

HarmonEE SED 2 Harmonic Calculator
SED 2 Monitor PC software for downloading and uploading SED 2 parameters
SED 2 energy calculator Energy calculator to calculate payback period for SED 2 VSD s

SED2 The energy saver: Cost saving is a top priority for our customers

Reasons for choosing the SED2

In the current economic climate customers are looking for easy to use cost effective products that provide tangible benefits across their lifecycle: These include cost savings on installation and commissioning time and also energy savings by usage of the product:

One of the most effective energy saving devices that can be installed in a new or upgraded HVAC system is a variable speed drive: The SED2 is the first variable speed drive to be designed and built by a building management controls company: A combination of over 100 years experience Siemens vast R D resources and the latest technology have been combined to produce a variable speed drive specifically designed for HVAC applications:

Siemens began selling this generation of drives in 1999 and since then we have been collaborating with our customers to understand the features and benefits they require in a variable speed drive: This has resulted in the new version 20 software that greatly enhances the performance of the SED2: Energy saving is listed as a top priority by our customers and the SED2 enables them to achieve this due to the following features:

Energy Legislation
Concern for the environment has led to the introduction of various legislation to encourage energy saving: These include the following:

The climate change levy a taxation levied on all industrial and commercial energy usage came into force in April 2001: This had the effect of increasing the price of electricity by approximately 10 15 : Energy prices are expected to rise in the next few years:

The new part L building regulations were introduced in April 2002: These had the aim of conserving energy within refurbished and new buildings: The regulations state that air and cooling distribution must be controlled using efficient means such as a variable speed fan or variable pitch blade: Guide vanes are prohibited:

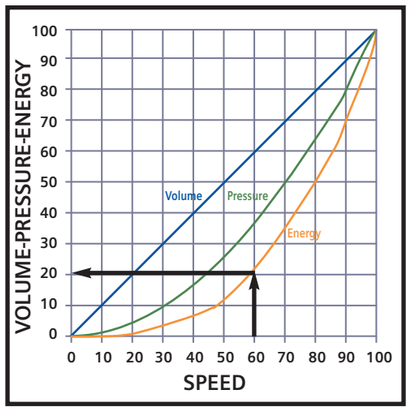
The enhanced capital allowance is a system where owners who purchase capital equipment included in the ECA scheme can recover tax relief more rapidly than on existing capital purchase schemes: The SED2 products are fully approved by the scheme: An example of how the ECA works based on a 100 capital equipment investment is shown below:

Total	£100 000				
	Standard Allowances £			ECA £	
	Reducing Balance	Capital Allowance	Tax Saving	100 Allowance In year 1	Tax saving 31
Year 1	75 000	25 000	7 750	100 000	31 000
Year 2	56 250	18 750	5 813		
Year 3	42 188	14 063	4 359		
Year 4	31 641	10 547	3 270		
Year 5	23 730	7 910	2 452		
Year 6	17 798	5 933	1 839		
Year 7	13 348	4 449	1 379		
Year 8	10 011	3 337	1 035		
Year 9	7 508	2 503	776		
Year 10		7 508	2 328		
Total		100 000	31 000	100 000	31 000

The ECA improves cashflow giving a net present value benefit of approximately 5 of the initial capital investment of £100 000

Energy saving variable speed technology

The SED2 variable speed drive will significantly reduce energy usage when applied to variable torque pump and fan applications as illustrated in the following diagram:



Intelligent control brings cost savings

The SED2 incorporates many control features that optimise energy and cost savings to the customer:

The AOP allows users to set a 7 day timer program for the SED2 controlling usage and helping to save energy
The integral PID loop allows demand based control of the SED2 meaning only the energy required is used
Hibernation mode starts and stops the drive automatically on demand help to save energy
Flux current control)FCC gives improved response and optimised motor control
Peak electricity demands are reduced when using the SED2 compared to other starting methods
Control of an external bypass eliminates heat losses within the SED2 if running at 50Hz for extended periods

Unique harmonic solutions to an old problem brings cost benefits

The introduction of the SED2 has marked a breakthrough in pulse width modulation technology by reducing input line harmonics without the use of additional filtering devices: This is achieved by significantly reducing the size of capacitance incorporated in the DC link design: This means that additional equipment such as DC link chokes or line chokes are not required with the SED2 and this is turn leads to reduced installation costs:

This also provides the following benefits

Maintenance costs are reduced due the prevention of unwanted motor heating problems and the subsequent increase in motor life cycles
Better protection from failure or malfunction for sensitive equipment such as computers communication equipment and instrumentation
RMS currents through transformers and associated equipment are reduced: This negates the requirement for oversizing of transformers and cabling to accommodate for the false load requirements reflected back onto the power line: This leads to reduced installation and component costs:

As an aid for customers in assessing the level of harmonic distortion at the point of common coupling when installing SED2 drives Siemens has produced the HarmonEE calculator software tool: HarmonEE also enables the user to compare the harmonic results of the SED2 against standard pulse width modulation technology:

All the features you could want from a Variable Speed Drive:

On board kWh meter
The SED 2 has incorporated a kWh meter that is displayed via the keypad: The meter can be reset to begin measurement predefined by the user: The incorporation of a kWh meter meets the metering requirements for Part L1 and L2 of the building regulations in the UK:

Direct connection of a Ni1000 sensor for temperature control
Direct connection of the LG Ni 1000 Temperature sensor offers a low cost temperature control loop solution: The built in PID controller with anti wind up function is optimised for HVAC applications:

Hibernation mode
Hibernation Mode starts and stops the drive automatically on demand: This enables greater energy saving and control by stopping the drive if it runs at a user defined minimum speed for a given time:

Belt failure detection without sensor
The SED2 ensures reliable V belt monitoring without the expense of an external sensor: Both speed and torque are compared to a user defined tolerance band: If the parameters do not match the SED 2 trips in the event of V belt failure:

Staging pumps and fans
This function allows for the control of up to two additional staging pumps or fans: With the two relay contacts the SED2 performs the staging logic without any requirement or expense of additional controllers or I-O cards:

Bypass control of the SED 2
Bypass control ensures high availability of the application: The SED2 controls an external bypass in the event of failure: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)50Hz for a preselected time:

The BOP)Basic Operator Panel keypad 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 makes the SED2 the easiest drive on the market to program:

The AOP)Advanced Operator Panel offers the following in addition to the BOP functionality

- Unique 10 parameter set storage with full uploading-downloading capability
- Multi lingual and multi line plain text display
- Plain language commentary and diagnostics menu
- 7 day timer function with 3 switching operations per day
- Multi drop capability to control 31 SED2 VSD s together

Operating a variable speed drive outside of the recommended temperature envelope can half the life expectancy: The SED2 will convert 3 energy into heat:

To ensure the ambient temperature does not exceed 40 C:

Temperature is measured at the heat sink
Temperature is measured at the bridge rectifier

The force venting design allows IP20 units to be installed side by side:

Saving vital panel space
Allowing easy access for fan replacement

The SED2 innovative intermediate design has produced a harmonic performance only previously achieved by VSD manufacturers adding costly line reactors and DC line chokes: The SED2 demonstrates significant reductions in the lower order harmonics currents drawn from AC power systems at no extra cost to the end user:

The complete range of SED2 VSD S incorporate a class B RFI filter as standard: By including the highest class of filterisation Siemens have removed the pitfalls and confusion of navigating present EMC legislation: The SED2 low noise EMC design is suitable for all building types:

The introduction of plastic electrolytic capacitors within the SED2 improve mean time between failure)MTBF tests significantly over conventional aluminium capacitor technology: This increases product life and durability:

As well as all these features Siemens offers a two year warranty as standard

Range Overview IP20
AC 380 480 V)3 phase

Part Number	Output Rating kW	Output Current Max)Amps	Frame Size	Dimensions)mm H x W x D	Weight)kgs	Fuse Rating)Amps
SED2 0 37-32B	0 37	1 2	A	200 x 73 x 192 5	2 0	10
SED2 0 55-32B	0 55	1 6	A	200 x 73 x 192 5	2 0	10
SED2 0 75-32B	0 75	2 1	A	200 x 73 x 192 5	2 0	10
SED2 1 1-32B	1 1	3 0	A	200 x 73 x 192 5	2 0	10
SED2 1 5-32B	1 5	4 0	A	200 x 73 x 192 5	2 0	10
SED2 2 2-32B	2 2	5 9	B	213 x 149 x 222 5	4 2	16
SED2 3-32B	3 0	7 7	B	213 x 149 x 222 5	4 2	16
SED2 4-32B	4 0	10 2	B	213 x 149 x 222 5	4 2	20
SED2 5 5-32B	5 5	13 2	C	261 x 185 x 250	6 7	20
SED2 7 5-32B	7 5	18 4	C	261 x 185 x 250	6 7	32
SED2 11-32B	11 0	26 0	C	261 x 185 x 250	6 7	32
SED2 15-32B	15 0	32 0	C	261 x 185 x 250	6 7	50
SED2 18 5-32B	18 5	38 0	D	520 x 275 x 245	17 0	63
SED2 22-32B	22 0	45 0	D	520 x 275 x 245	17 0	80
SED2 30-32B	30 0	62 0	D	520 x 275 x 245	17 0	100
SED2 37-32B	37 0	75 0	E	650 x 275 x 245	22 0	125
SED2 45-32B	45 0	90 0	E	650 x 275 x 245	22 0	160
SED2 55-32B	55 0	110 0	F	850 x 350 x 320	75 0	160
SED2 75-32B	75 0	145 0	F	850 x 350 x 320	75 0	200
SED2 90-32B	90 0	170 0	F	850 x 350 x 320	75 0	200

Also available on request Sing le phase AC 230V versions 3 phase 110 315 kW v ersions
3 phase AC 200 240V versions 3 phase A C 500 600V versions

Range Overview IP54
AC 380 480 V)3 phase

Part Number	Output Rating kW	Output Current Max)Amps	Frame Size	Dimensions)mm H x W x D	Weight)kgs	Fuse Rating)Amps
SED2 1 1-35B	1 1	3 0	B	385 x 270 x 268	11 5	10
SED2 1 5-35B	1 5	4 0	B	385 x 270 x 268	11 5	10
SED2 2 2-35B	2 2	5 9	B	385 x 270 x 268	11 5	16
SED2 3-35B	3 0	7 7	B	385 x 270 x 268	11 5	16
SED2 4-35B	4 0	10 2	B	385 x 270 x 268	11 5	20
SED2 5 5-35B	5 5	13 2	C	606 x 350 x 284	21 0	20
SED2 7 5-35B	7 5	18 4	C	606 x 350 x 284	21 0	32
SED2 11-35B	11 0	26 0	C	606 x 350 x 284	21 0	35
SED2 15-35B	15 0	32 0	C	606 x 350 x 284	21 0	50
SED2 18 5-35B	18 5	38 0	D	685 x 360 x 353	35 0	63
SED2 22-35B	22 0	45 0	D	685 x 360 x 353	35 0	80
SED2 30-35B	30 0	62 0	D	685 x 360 x 353	35 0	100
SED2 37-35B	37 0	75 0	E	885 x 360 x 453	48 0	125
SED2 45-35B	45 0	90 0	E	885 x 360 x 453	48 0	160
SED2 55-35B	55 0	110 0	F	1150 x 450 x 470	99 0	160
SED2 75-35B	75 0	145 0	F	1150 x 450 x 470	99 0	200
SED2 90-35B	90 0	178 0	F	1150 x 450 x 470	99 0	200

Also available on request Sing le phase AC 230V versions 3 phase 110 315 kW v ersions
3 phase AC 200 240V versions 3 phase A C 500 600V versions

Accessories:::

Accessories:::

Communication Options

LON Module with AOP fitted

LON Module with AOP removed

Commissioning of SED using PC software

The SED2 drives can either be used in stand alone mode or as part of a communicating system: The communicating option provides the following benefits

- Utilises spare inputs and outputs within the SED resulting in smarter controllers and significant cost savings
- Reduces cabling and installation costs by using twisted pair cabling
- Remote monitoring capability conforms to Building regulations Part L1 L2 for metering using in built kWh meter
- Remote monitoring allows for rapid fault analysis and diagnosis
- The drives can be made tamperproof by removing the keypad and still maintaining control over communications
- Options are available to make the drives fully integrated into a building management system

The SED2 is supplied with on board communications: These use an RS485 network with the UCC protocol:

There are a number of options for linking the SED2 to building management systems: These allow values to be viewed and accessed using the BMS graphics and also the trending of values in monitoring applications: The options available are listed below:

LONMARK

A plug in LONMARK module is available: This plugs onto the front of the SED2 drive one module can be connected per drive: The module is fully LONMARK compliant allowing the SED2 to be integrated in any LON system:

Compass Node

Up to 32 SED2 units can be connected to a Compass node or other technologies available from North Building Technologies Ltd:

Siemens Desigo PX

Connection through a Desigo PX communication node:

Siemens Integral NCRS Controller

Up to 32 SED2 units can be connected to a Siemens Building Technologies NCRS controller using a KK SED2 interface and the RS485 communications:

Siemens APOGEE system

Up to 32 SED2 units can be connected directly to an FLN trunk without the need for any other interface devices:

Siemens Visonik system

Two SED2 units can be connected to a specially developed PTM::: module and then integrated into the Visonik system:

Johnsons Metasys N2

The SED2 can be connected into a Johnsons Metasys system using the standard communications bus configured to the N2 protocol: The configuration and capabilities are project dependant:

Configuration Commissioning Tools

Options are available to configure and commission either individual or multiple drives using software tools available from Siemens: These also allow data logging to be carried out and are ideal for fault finding: Parameters can be copied from one drive to another helping to reduce commissioning times: