

## 15 Amp DECS DIGITAL EXCITATION CONTROL SYSTEM

Basler's Digital Excitation Control System (DECS) provides customizable performance and high reliability. The microprocessor based design allows greater flexibility in setting all functions and adjustments to meet the most stringent applications. DECS is designed to operate on 50 and 60 Hz brushless and brush-type generating systems requiring a maximum continuous current up to 15 amps at 32, 63, or 125 Vdc. DECS provides many features not available with analog type devices from precise voltage regulation to system protection. DECS receives its power from the generator's permanent magnet generator (PMG) or can be shunt fed from the generator line. Optional VAR/Power Factor regulation and Field Excitation Limiting can be incorporated within DECS to provide expanded system control.

### FEATURES

- Microprocessor based design
- Non-volatile memory
- 20 standard stability selections
- Customizable stability range
- Three standard models available
- 0.2% voltage regulation
- Soft start capability
- Adjustable underfrequency
- User external control capability
- Overvoltage protection
- True rms sensing, single or three phase
- Overexcitation protection
- Single or Three phase shunt or PMG power input
- Manual Excitation Control
- Voltage Matching
- Thermal protection for internal circuitry
- Solid state build-up circuit
- Parallel compensation standard
- External alarm contact
- Alpha/numeric display
- Front panel programmability via RS-232 and BESTCOMS™ PC software
- VAR/Power Factor regulation (option)
- Under/overexcitation limiting (option)
- CSA certified, File #LR23131-139
- UL recognized, File #E97035
- U.S. Patent No. 5,294,879
- Optional CE compliant

### WINDOWS® SOFTWARE

Interface for setting and communicating with Basler products  
 Request BESTCOMS™-DECS15-16 (Windows® 3.1)  
 Request BESTCOMS™-DECS15-32 (Windows® 95/98/NT)

### ADDITIONAL INFORMATION

#### INSTRUCTION MANUAL

Request Publication 9265300995 (software version 2.0.9 and subsequent)  
 Request Publication 9265300993 (software version 2.0.5 and subsequent)  
 Request Publication 9265300991 (software version 1.6.0 and earlier)  
 Request Publication 9265300994 (CE option)

**DESCRIPTION &  
SPECIFICATIONS**  
pages 2 & 3

**SAMPLE  
SPECIFICATION  
AND ACCESSORIES**  
page 3

**FUNCTIONS**  
page 4

**INTERCONNECT,  
FRONT VIEW &  
OUTLINE DRAWINGS**  
pages 5 through 7

**ORDERING**  
page 8

**B Basler Electric**

## DESCRIPTION

DECS (Digital Excitation Control System) incorporates microprocessor technology to support a wide range of generating systems. With its microprocessor, DECS is extremely flexible, allowing customizations of its performance to match the generating system's requirements. DECS can be used on single or three phase permanent magnet generators (PMG) or shunt excited generators. When shunt fed, DECS allows build-up with input voltage as low as 8 volts. Optional VAR/Power Factor Regulation and Under/Overexcitation Limit can be incorporated within DECS to provide expanded system control.

BESTCOMS™ Windows®-based PC software is included with the DECS-15 to provide user-friendly setup of all of DECS-15's parameters. This software allows the PC to interface with the DECS-15 via the front panel RS-232 DB9 connector for setup and monitoring of the various parameters of the generator system and the DECS-15.

## SPECIFICATION

**DC OUTPUT POWER:** DECS is available in three standard models to meet the following field requirements.

	DECS32-15		DECS63-15		DECS125-15	
Rated Continuous Field Voltage	32 Vdc	45 Vdc*	63 Vdc	90 Vdc*	125 Vdc	180 Vdc*
Rated Continuous Field Current	15 Adc	15 Adc	15 Adc	15 Adc	15 Adc	15 Adc
Rated 10 Second Forcing Voltage*	50 Vdc	75 Vdc*	100 Vdc	150 Vdc*	200 Vdc	300 Vdc*
Rated 10 Second Forcing Current	30 Adc	30 Adc	30 Adc	30 Adc	30 Adc	30 Adc
Minimum Field Resistance	2.13 Ohm	3.0 Ohm*	4.2 Ohm	6.0 Ohm*	8.3 Ohm	12.0 Ohm*

NOTE: Above parameters with nominal RMS power input into the DECS power module.

\*These areas indicate D.C. output levels that may be up to 50% greater than listed if:

- 1) 3 phase input power is used, or
- 2) Field current is significantly lower than that listed.

**AC INPUT POWER:** DECS uses a power module to convert and filter the input power. This allows DECS to use 50/60 Hz single or three phase, shunt-excited, or PMG power from 50 to 400 Hz.

DECS MODEL	NOMINAL VOLTAGE	BURDEN
DECS32-15-XXX	56-70 VRMS Single or three phase 50 to 400 Hz	780 VA
DECS 63-15-XXX	100-139 VRMS Single or three phase 50 to 400 Hz	1570 VA
DECS 125-15-XXX	190-277 VRMS Single or three phase 50 to 400 Hz	3070 VA

**AC INPUT SENSING:** True rms sensing designed to precisely regulate generator voltage at 50/60 Hz single or three phase.

Sensing Voltage
100 to 120 Vac $\pm 10\%$
200 to 240 Vac $\pm 10\%$
400 to 480 Vac $\pm 10\%$
600 Vac $\pm 10\%$

NOTE: For specific application and operation information, see Instruction Manual.

## SPECIFICATION, Continued

INPUT SENSING BURDEN: Less than 1.0VA per phase nominal

PARALLELING COMPENSATION INPUT:  
1 Amp or 5 Amp, less than 1 VA

REGULATION ACCURACY:  $\pm 0.2\%$  NL to FL

THERMAL STABILITY: 0.2% over 40°C change

SOLID STATE VOLTAGE BUILD-UP: With minimum 8 Vac into power input

RESPONSE TIME: Less than a cycle

VOLTAGE ADJUST RANGE: Adjustable from  $\pm 6$  to  $\pm 60V$ , in 0.5V steps

UNDERFREQUENCY: Refer to Figure 2

FREQUENCY COMPENSATION: Adjustable from constant voltage to 3 p.u. V/Hz

SOFT START CAPABILITY: Not to exceed 110% of nominal generator line voltage at start-up

OPERATING TEMPERATURE RANGE: -40°C to +60°C

STORAGE TEMPERATURE RANGE: -40°C to +85°C

ACCESSORY INPUT:  $\pm 3$  Vdc for  $\pm 30\%$  voltage change  
Input impedance is 1 Kohm

ALARM INDICATION: When an alarm condition exists, the normally open contacts of the relay will be closed. Contacts are rated 30 A for .2 seconds, 7A continuous, or .3 A at 125 and 250 Vdc ( $L/R \leq .04$ ).

OVERVOLTAGE PROTECTION: Factory set 135% of nominal and alarms if the overvoltage condition persists for 0.75 seconds

OVEREXCITATION PROTECTION: Monitors the output voltage of DECS and alarms if the preset voltage is exceeded for 15 seconds

LOSS OF SENSING PROTECTION: Monitors the sensing voltage input and, if the voltage drops below a preset level and remains there for a programmable period of time, the DECS will transfer control to the manual mode.

SHOCK: 15 gs in each of 3 mutually perpendicular planes

VIBRATION: 1g at 5 to 26 Hz.  
0.036" double amplitude at 27 to 52 Hz.  
5g at 53 to 500 Hz  
(CE version: 10Hz to 500Hz to 10Hz @ 2gs)

WEIGHT: 9 lbs (4.05 kg) net, 12 lbs (5.40 kg) shipping

DIMENSIONS: 5.85"w x 9"h x 10.45"l

## SAMPLE SPECIFICATION

The excitation control device shall be 100% solid state, microprocessor controlled, providing 0.2 percent voltage regulation or better. The power input shall be either shunt fed or PMG single or three phase, with frequency of 50 to 400 Hz, at 120 or 240 Vac nominal. Power input selected shall be dependent upon field requirements. Sensing must be true rms, single or three phase, with nominal input of 100 to 600 Vac, 50 or 60 Hz. The output power shall conform to the NEMA standard voltages of 32, 63, or 125 Vdc with a maximum continuous current rating of 15 amps. The device provides optional VAR/Power Factor control and Excitation Limiting without the use of accessory devices. The device shall allow for regulation setpoint control without the use of a motor operated controller. The device must have the following standard control and protection features: minimum 20 stability ranges, paralleling capability, thermal protection, manual excitation control, remote voltage adjust capability, accessory input, stability network, overexcitation, overvoltage, underfrequency and softstart. The device shall be Basler Electric Digital Excitation Control System, the DECS 32-15, DECS 63-15, or DECS 125-15.

## ACCESSORIES

DECS is designed to incorporate VAR/Power Factor regulation, under/overexcitation limit and voltage matching as options within the unit. To retrofit existing systems, the standard DECS unit is compatible with the accessories listed here.

- Current Transformer (CT2 through CT50)
- Manual Voltage Control (MVC 236)
- Power Isolation Transformers
- Auto Synchronizer (BE1-25A)
- Auto Synchronizer (BE3-25A)

## FUNCTIONS

### Stability

With enhanced microprocessor technology, DECS contains 20 selectable front panel stability ranges that cover a wide range of generator time constants. Fine adjustment of the 20 standard stability ranges is made from the front panel. DECS also offers the ability to customize the stability performance through an optional communications package (DCIM). This feature enables precise adjustment of the stability parameters for those applications requiring enhanced performance.

### Front Panel Programming

The front panel of DECS has pushbutton programming of setpoints to fine tune DECS to the system's requirements.

### Underfrequency

The DECS underfrequency curve can be adjusted between constant voltage to three per unit volts/Hertz. The roll-off frequency is also customized by adjustability. When DECS enters the underfrequency range, a LED is lit. (See Figure 2)

### Overexcitation

The overexcitation function monitors the output voltage of DECS. If a preset voltage limit is exceeded, the "OVEREXC" LED is lit. If the condition persists for a time-out period of 15 seconds, DECS will light the "ALARM" LED and close a triac contact for external annunciation. DECS can also be programmed to shut down, using the DCIM option and a PC.

### Overexcitation Presets

DECS Model	Voltage Trip Point
DECS 32-15	50 Vdc
DECS 63-15	100 Vdc
DECS 125-15	200 Vdc

### Overvoltage Protection

The overvoltage function monitors sensed voltage input. When this voltage exceeds 135 percent of nominal, the "OVERVOLT" LED is lit. If the condition persists for 0.75 seconds, DECS will light the "ALARM" LED and close a triac contact for external annunciation. DECS can also be programmed to shut down, using the DCIM option and a PC.

### Loss of Sensing Protection

The DECS-15 is capable of monitoring the sensing input and, if the input voltage drops below 25Vac and remains there for a customer-defined period of time, the DECS unit will transfer control to the manual mode of operation.

### Parallel Operation

DECS has provisions to parallel two or more generators, using reactive droop or reactive differential compensation, with the addition of an external 1 amp or 5 amp, 1 VA current transformer.

### Soft start

A user adjustable soft start feature enables generator line voltage to build up with little or no overshoot. This feature allows the coordination of response time with overshoot.

### External Excitation Level Control

By use of a user supplied external raise and lower dry contact, a motor operated control (MOC) is no longer required for remote control of the generator line voltage VAR or Power Factor. This contact arrangement can also be used for local control if desired by the user.

### Overtemperature Protection

DECS is equipped with a temperature circuit to monitor the power stage. When the temperature exceeds a preset limit due to excessive power dissipation or ambient condition, DECS will light the "OVERTEMP" and "ALARM" LEDs and close a triac contact for external annunciation. DECS can also be programmed to shut down, using the DCIM option and a PC.

### Under/Overexcitation Limit

The Over and Under Excitation limiters will establish and maintain a safe level of excitation for the generator. They will not allow the excitation to drop to a level where the generator could slip out of synchronization nor will they allow the generator to be overexcited to the point of damaging the generator field windings.

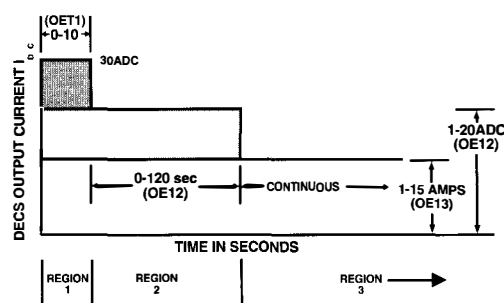


Figure 1 - Overexcitation Limiter

### VAR/Power Factor Control

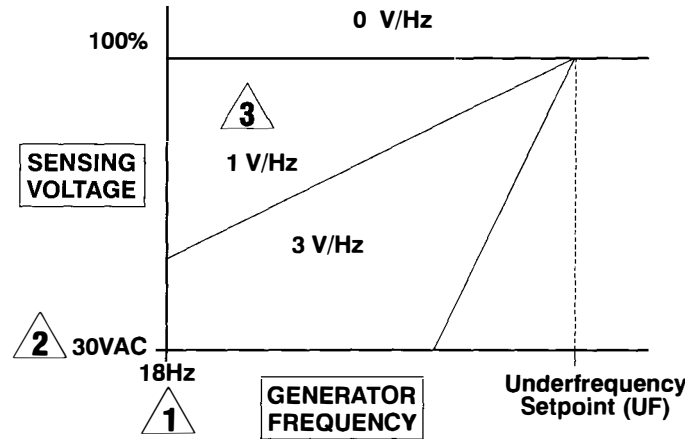
With this optional feature, the user can select between automatic VAR and Power Factor regulation when the generator is paralleled to the utility. The desired leading or lagging setpoint can be selected during setup.

### Voltage Matching

Voltage matching will adjust the generator line voltage to within 0.5% of the bus (main) voltage. Adjustment to the voltage matching acceptance band, matching step size and matching rate can be made. When the generator and bus voltages match (within the limits selected) the "V MATCH" LED is lit.

### Communications

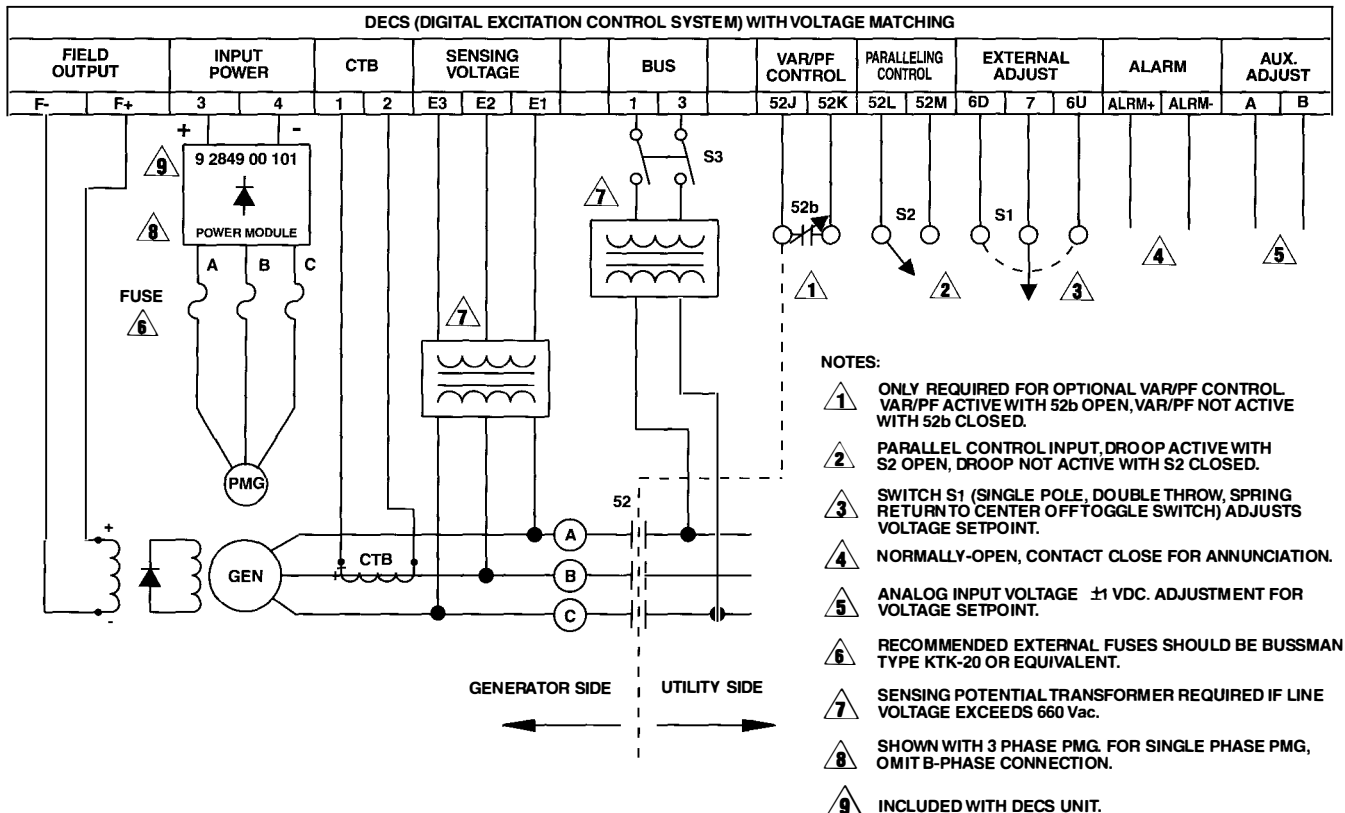
DECS-15 comes complete with PC software to enable the user to program all the functions of the DECS-15 unit. With this software the user can select customized stability parameters to obtain the maximum performance possible from the generator. The user can save and transfer setup files to the DECS-15 unit, making setup of multiple DECS-15 units possible in just minutes. The software provides remote monitoring of all alarms and generator parameters such as kVA, kW, PF, Voltage, Amps and frequency. The software is so user-friendly it even allows for voltage step changes to facilitate the selection of the stability parameters. If the user knows the main and exciter field time constants, the software picks the stability numbers for them. All this functionality is included at no additional cost.



**NOTES:**

- 1** DECS operation is not specified for generator voltages below 18Hz. Power must be removed from DECS below this frequency.
- 2** DECS operation is not specified for sensing voltages below 30VAC.
- 3** Operation above the 1V/Hz curve for extended periods may overheat the generator.

**Figure 2 - Underfrequency Protection Characteristic**



**Figure 3 - Typical Interconnection Drawing**

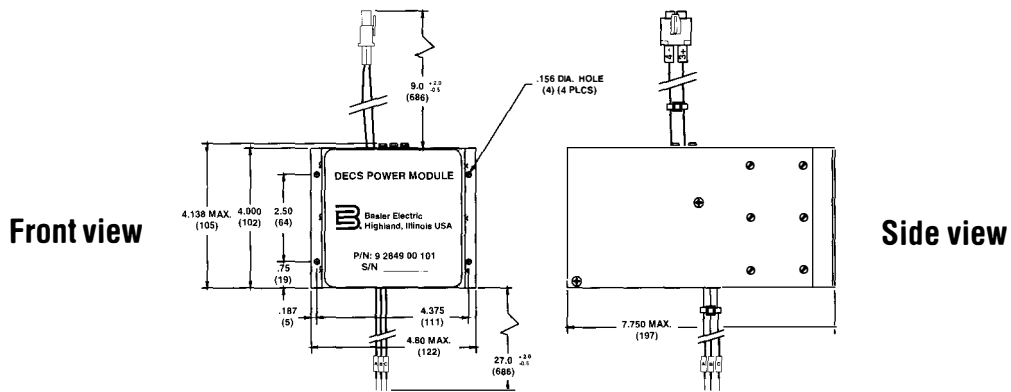
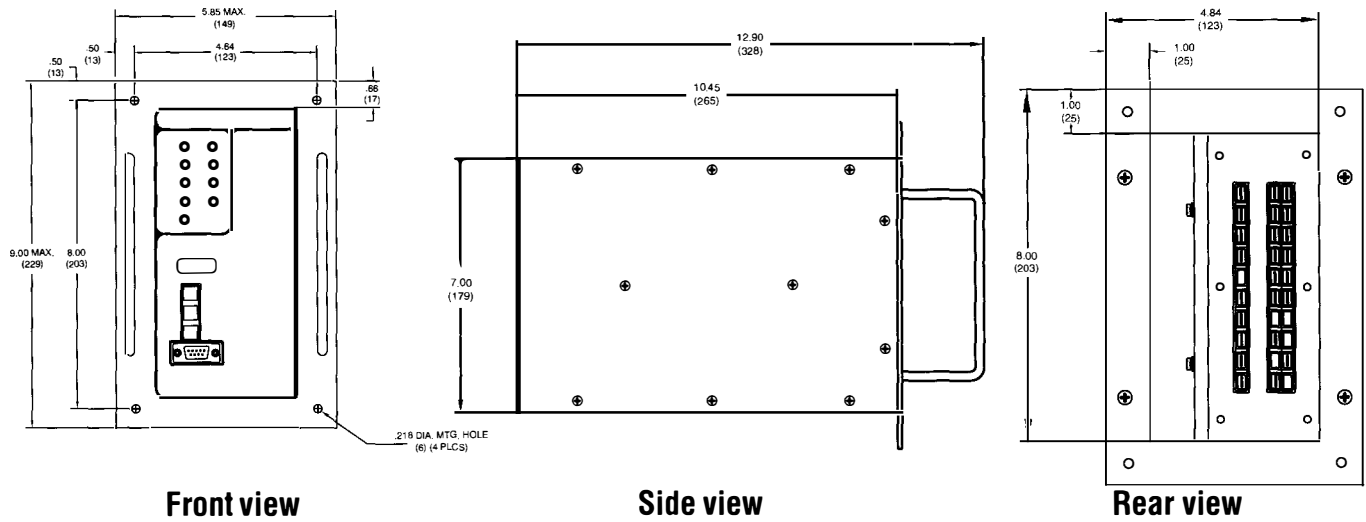


Figure 4 - Outline Drawings

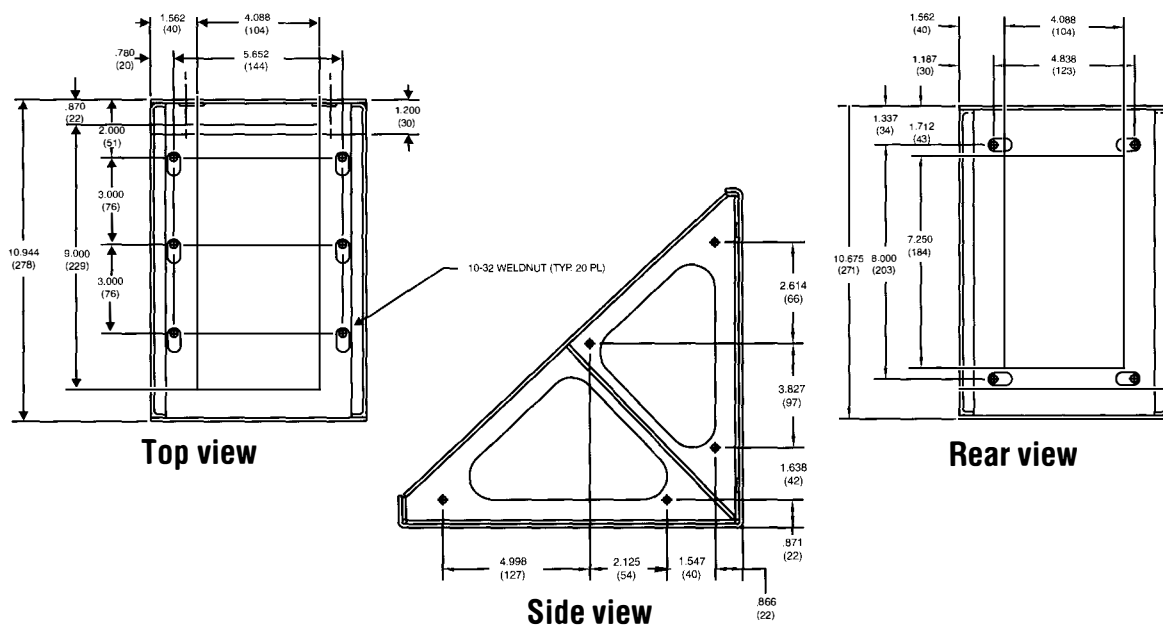


Figure 5 - Outline Drawings - Behind Panel Mounting Kit (Option)

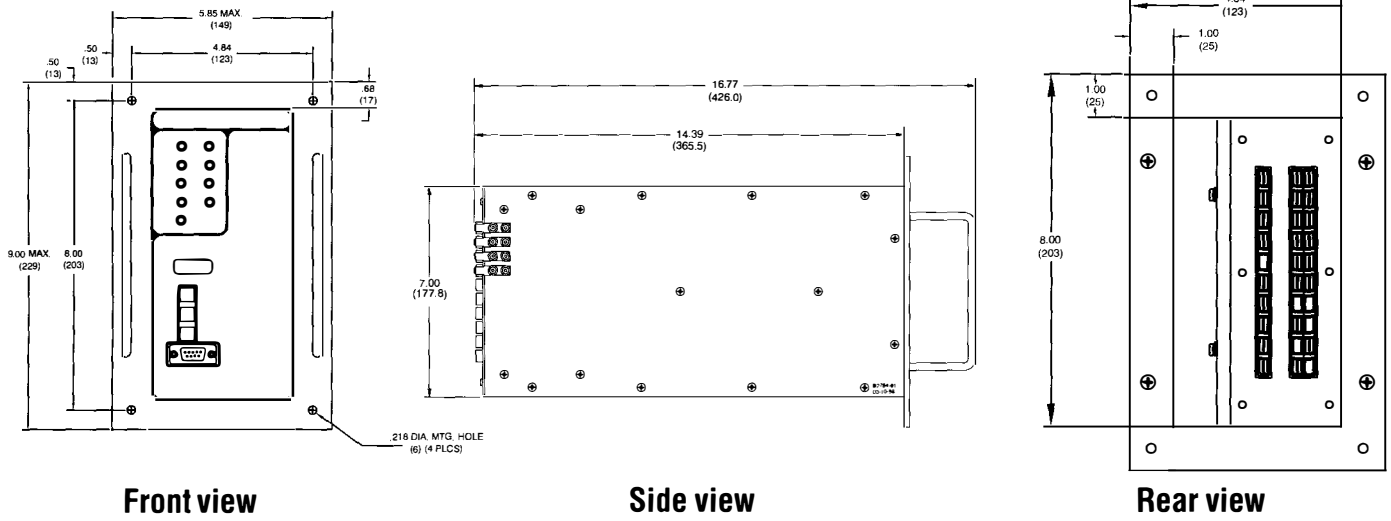


Figure 6 - Outline Drawings (CE Option)

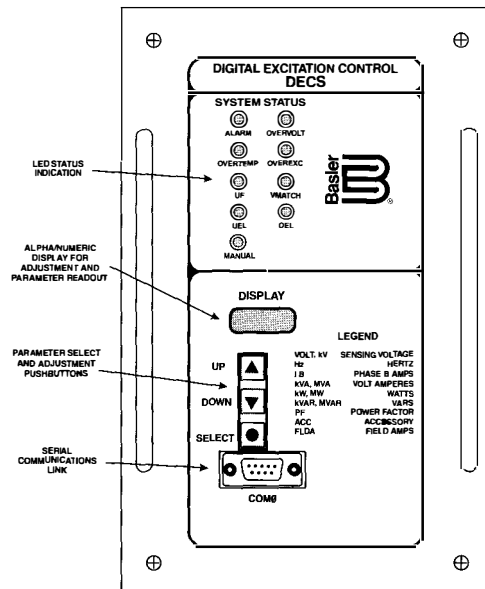


Figure 7 - Front View

## ORDERING

Order per model and style selection as listed below. For DECS pricing and optional accessory pricing, please refer to the DECS pricing page "PPDEC" in catalog.

DECS32-15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DECS63-15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DECS125-15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	↑	↑	↑	↑
	<b>OPTION 1</b> A - None B - VAR/Power Factor Regulation	<b>OPTION 2</b> 1 - None 2 - Overexcitation/ Underexcitation Limiting	<b>OPTION 3</b> C - Voltage Matching	<b>OPTION 4</b> 1 - 1 Amp Paralleling CT Secondary 5 - 5 Amp Paralleling CT Secondary

### OPTIONAL ACCESSORIES

BESTCOMS™ software for DECS Versions 2.0.7 and previous is available on a special order basis. These DECS-15 units require the use of the DCIM Communications Interface Module. Please refer to the DECS price page in the pricing section of the catalog for details.

CE compliant DECS are available by ordering the following part numbers:

Part Number	Model Number
9265300113	DECS32-15-B2C1
9265300114	DECS63-15-B2C1
9265300115	DECS125-15-B2C1
9265300116	DECS32-15-B2C5
9265300117	DECS63-15-B2C5
9265300118	DECS125-15-B2C5

**B** Basler Electric



ROUTE 143, BOX 269, HIGHLAND, ILLINOIS U.S.A. 62249  
PHONE 618-654-2341 FAX 618-654-2351

P.A.E. Les Pins, 67319 Wasselonne Cedex FRANCE  
PHONE (33-3-88) 87-1010 FAX (33-3-88) 87-0808

<http://www.basler.com>, [info@basler.com](mailto:info@basler.com)