



## DECS-100 Digital Excitation Control System

Basler Electric offers a high powered, low-cost digital excitation control system, the DECS-100. This environmentally rugged product is ideally suited for controlling the output of brushless excited synchronous generators up to 5MW. The DECS-100 has a very impressive 7A<sub>dc</sub> output from a pulse width modulated power stage. The DECS-100 is perfect for machines that will be paralleled to other generators and/or to the utility system. It is ideal for distributed generation, co-generation and peak shaving applications. The DECS-100 is easy to use, and it has communications capability with a PC or a personal data assistant running Palm OS® 3.3 or newer software. The DECS-100 utilizes microprocessor technology and control algorithms pioneered by Basler Electric over the last 12 years. It shares many features and functions of our larger excitation control systems. The DECS-100 is Basler Electric's fifth generation of microprocessor-based excitation system.

### FEATURES

- Microprocessor based
- 0.25% Voltage Regulation Accuracy
- 0.5% accuracy up to 40% THD (harmonics associated with 6 SCR load)
- 63V<sub>dc</sub> @ 7A<sub>dc</sub> PWM output
- 0-3X V/Hz limiting
- Soft Start capability
- 20 standard stability selections and one customizable selection
- VAR/PF control
- Overexcitation limiting
- Voltage Matching
- Manual Mode (Field current regulation)
- Paralleling input from 1 or 5A CT secondaries
- Nominal sensing inputs of 120, 240, 480 and 600Vac
- Power Input from 50/60Hz shunt connections or PMGs operating at 50 to 400Hz
- Five generator protection functions including Loss of Sensing transfer to manual
- Alarm Contact Output
- Accessory input
- LED Annunciation of operating conditions
- Setup via PC or a PDA using Palm OS® 3.3 or newer via BESTCOMS software (included)
- UL recognized
- CSA approved
- CE compliant

### WINDOWS® SOFTWARE

Interface for setting and communicating with Basler products  
Request DECS-100-CD

### ADDITIONAL INFORMATION

#### INSTRUCTION MANUAL

Request Publication 9287500991

**DESCRIPTION and  
SPECIFICATIONS**  
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## DESCRIPTION

The DECS-100 is a microprocessor-based regulation system designed to control the output of a brushless excited synchronous generator. The DECS-100 is perfect for paralleling applications where generator to generator and/or generator to utility paralleling occurs with VAR/PF control and Overexcitation Limiting. The

DECS-100 offers high functionality, communications, and performance at an extremely affordable price. The DECS-100 is very rugged and offers an extremely robust mechanical design that is UL recognized, CSA approved, and CE compliant.

## SPECIFICATIONS

### INPUTS

#### Power Input

Voltage:	88-250Vac
Phase:	Single- or three-phase
Burden:	650VA
Frequency:	50 to 400Hz
Minimum Build-up Voltage:	6.0Vac

#### Sensing Input

Nominal Voltage Input:	100/120, 200/240, 400/480, 600Vac, Single- or three-phase
Burden:	<1VA
Current Input:	1 or 5 Amp (two models)
Burden:	<1 VA
Frequency:	50/60Hz

#### Accessory Input

$\pm 1\text{Vdc}$  creates a  $\pm 10\%$  adjustment for AVR, FCR and VAR  
 $\pm 1\text{Vdc}$  creates a  $\pm 0.1\text{PF}$  adjustment in the PF mode  
(adjusts only the active regulation mode)

### OUTPUTS

#### DC Output

Continuous voltage:	63Vdc
Continuous current:	7.0Adc
10 second Forcing Voltage:	135Vdc (with nominal input applied)
10 second Forcing Current:	15.0Adc
Minimum Field Resistance:	9 Ohms

#### Alarm Contact Output

Dry Contact Rated: 120/240Vac - make 30A for 0.2S, carry 7A continuously, break 0.1A inductive

#### REGULATION ACCURACY

Regulation accuracy:	$\pm 0.25\%$ no load to full load
Temperature drift:	$\pm 0.5\%$ for a $40^\circ\text{C}$ change in one hour
Response time:	<1 cycle to the limit of the A/D converter
THD:	$\pm 0.25\%$ for 20% THD and $\pm 0.5\%$ for 40% THD (distortion as seen with a 6 SCR load)

## SPECIFICATIONS, continued

### AGENCY APPROVALS

UL 508	"Industrial Control Equipment"
CSA C22.2 Number 14	"Industrial Control Equipment"
CE	EMC and LVD

### MECHANICAL SPECIFICATIONS

Operating temperature:	-40°C to +70°C
Storage temperature:	-40°C to +80°C
Shock:	20 Gs in three mutually perpendicular planes
Vibration:	5-26Hz, 1.2Gs 27-52Hz, 0.036 inch double amplitude 53-500Hz, 5.0G
Salt Fog:	Per MIL-STD-810E, Method 509.3, 48 hours of testing
Weight:	2.42 lbs. (1.10 kg)
Shipping weight:	2.88 lbs. (1.31 kg)
Dimensions:	5.34" (135.6mm) wide x 10.82" (274.8mm) high x 2.84" (72.1mm) deep

### ADJUSTMENTS

#### Adjustment Ranges

AVR Mode:	100/120, 200/240, 400/480, 600Vac
Fine Voltage Adjustment:	0-15% of nominal in 0.1% steps
Manual (FCR) Mode:	0.7Adc in 0.01Adc steps
VAR Mode:	-100 lead VAR to +100 lag VAR in 0.1% steps
PF Mode:	-0.6PF lead to +0.6PF lag in 0.001PF steps
OEL:	Instantaneous limit: 15A in 0.001Adc steps Time Delay to shutdown: 0-10 seconds in integer steps
Volts per Hertz:	Slope, 0-3V/Hz in 0.1V/Hz increments (See Figure 1) UF kneepoint, 40-65Hz in 0.1Hz increments
Parallel Droop:	0-10% in 0.01% increments
Softstart:	Generator Bias (beginning generator voltage) Time: 0-7200 seconds in 1 second steps
Voltage Matching Speed:	0-300 seconds in 0.01 second steps

#### Adjustment Methods

- Contact inputs (one for raise and one for lower)
- Auxiliary input  $\pm 1$ Vdc
- PC via BESTCOMS
- PDA via BESTCOMS

## FEATURES/FUNCTIONS

### PWM Power Stage

A 7.0A<sub>dc</sub> power stage provides fast response and great immunity to noise and sinewave distortion created by non-linear loads and makes the DECS-100 tolerant to many applications previously considered uncontrollable.

### Sensing Input

The sensing input takes nominal voltage up to 600V<sub>ac</sub> without requiring expensive potential transformers. The adjustment range is capable of being controlled in 0.1V<sub>ac</sub> steps. This means that circulating current on paralleled generators, due to overly coarse adjustment steps, is no longer an issue.

### Stability

20 standard stability ranges are provided, as well as one customizable stability range for customized performance. The PC BESTCOMS software provides PID selection software and a sophisticated response time program to facilitate verification of stability performance.

### Front Panel Annunciation

The DECS-100 provides seven LEDs to indicate generator system and DECS-100 conditions without requiring connection to the communications device.

### Protection

Four protection functions have the ability to be user-programmed to shut down the DECS-100 and close the alarm contact. They are:

- Generator Overvoltage
- Loss of Generator Voltage\*
- Overexcitation Voltage
- Overexcitation Limiting

\* Loss of sensing transfer is also selectable by the user in lieu of shutdown due to Loss of Sensing.

### Overexcitation Limiting

This feature limits the output current of the DECS-100 to predetermined levels that are safe for the exciter/generator. There are adjustments for current threshold and time delay to customize the performance of the DECS-100 to meet the system's needs.

### Voltage Matching

This function allows the DECS-100 to match the generator voltage. This feature replaces the same function in the automatic synchronizer, thereby saving money by allowing the use of a less expensive synchronizing device.

### Softstart

Softstart functions as a voltage limiter during generator build-up. It limits the generator voltage overshoot typically present when machines are initially started.

### VAR/PF Control

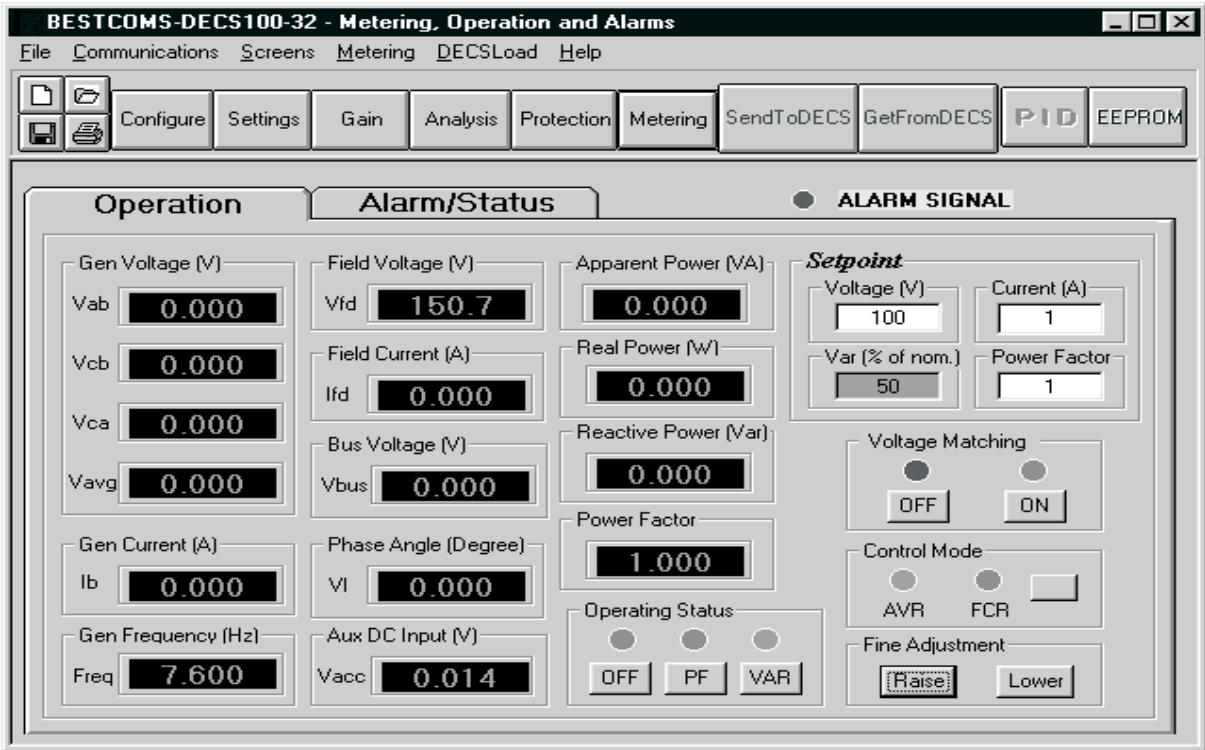
Integrated VAR/PF controls save the user the cost of purchasing and installing remote devices that perform the same functions. This function is typically used on utility-paralleled generators that cannot control the grid voltage. Once set, the VAR or PF of the generator output will be regulated.

### External Adjustments

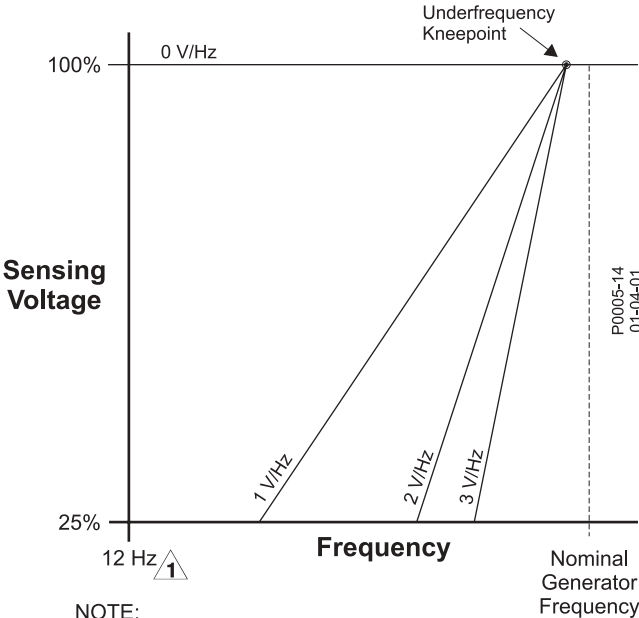
The DECS-100 allows for multiple points and methods of external adjustment of the active regulation mode. There are four methods for adjustment: contact input, auxiliary voltage input, PC adjustment, or PDA device operating on Palm OS® 3.3 or newer. The PC and Palm OS® 3 communications also can change operating modes and set points.

### Communications

PC (Windows® 95, 98, NT, Me compatible) and PDA (or equivalent device using Palm OS® 3.3 or newer) communications software is provided by Basler Electric with the DECS-100. The PC BESTCOMS allows for total setup, control, and monitoring of all parameters of the DECS-100. The PC BESTCOMS allows for custom PID selection and has a monitoring screen for viewing all of the generator parameters in actual machine levels. The Palm OS® 3 BESTCOMS allows for most of the PC-based features while using a low cost communications tool. Both methods use the RS-232 DB9 connector located on the DECS-100. Both software packages are provided with every DECS-100 on a single CD-ROM along with the instruction manual and product bulletin.



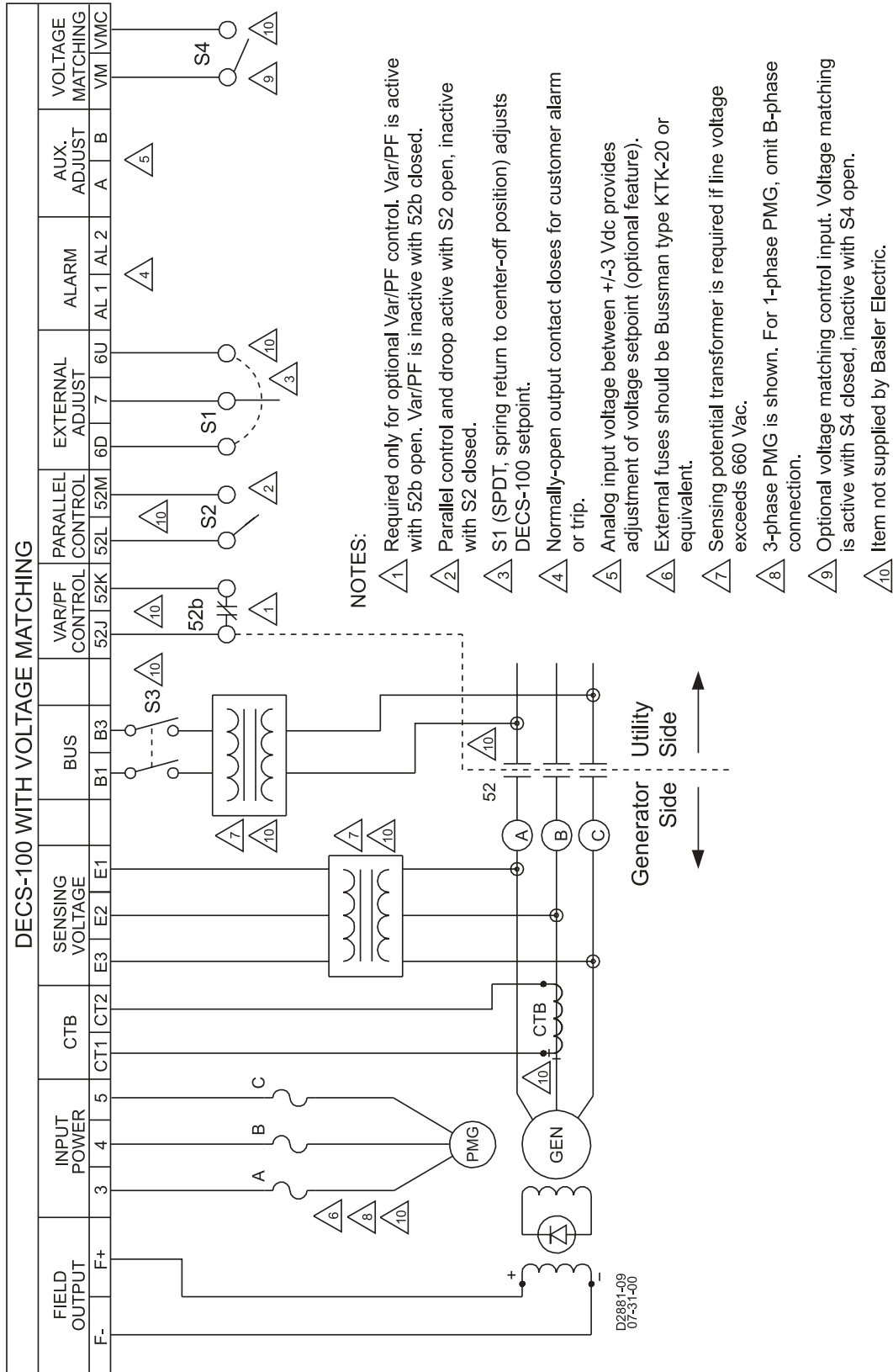
Typical BESTCOMS PC Software Screen



NOTE:  
 1 DECS operation is not specified below 12Hz.  
 Power must be removed below this frequency.

Figure 1 - Typical Volts per Hertz Curve

# CONNECTIONS



**NOTES:**

- 1 Required only for optional Var/PF control. Var/PF is active with 52b open. Var/PF is inactive with 52b closed.
- 2 Parallel control and droop active with S2 open, inactive with S2 closed.
- 3 S1 (SPDT, spring return to center-off position) adjusts DECS-100 setpoint.
- 4 Normally-open output contact closes for customer alarm or trip.
- 5 Analog input voltage between +/-3 Vdc provides adjustment of voltage setpoint (optional feature).
- 6 External fuses should be Bussman type KTK-20 or equivalent.
- 7 Sensing potential transformer is required if line voltage exceeds 660 Vac.
- 8 3-phase PMG is shown. For 1-phase PMG, omit B-phase connection.
- 9 Optional voltage matching control input. Voltage matching is active with S4 closed, inactive with S4 open.
- 10 Item not supplied by Basler Electric.

Figure 2 - Typical Connections for PMG Application with ABC Rotation and Three-Phase Sensing

# DIMENSIONS

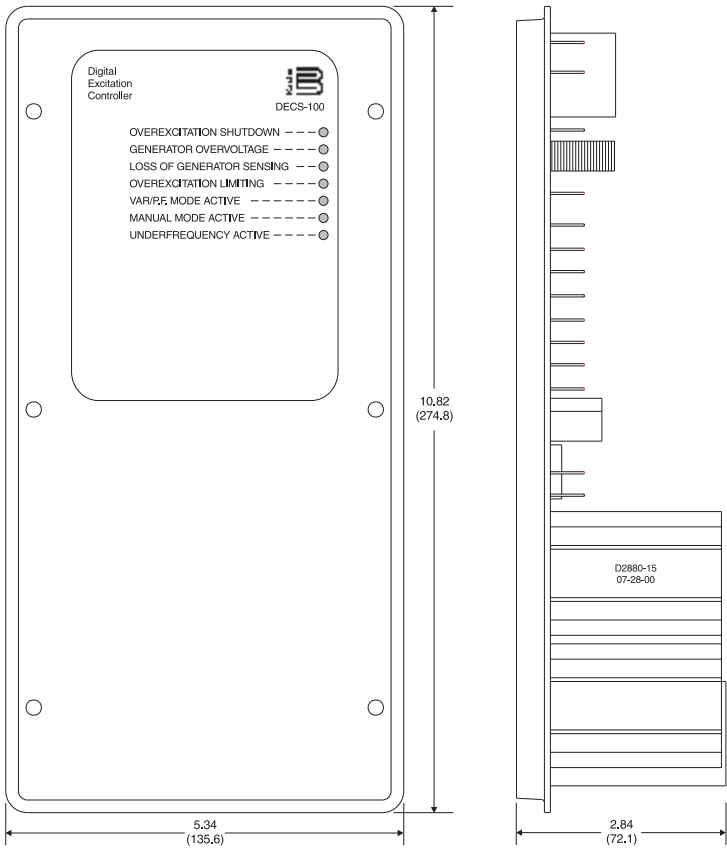


Figure 3 - DECS-100 Dimensions

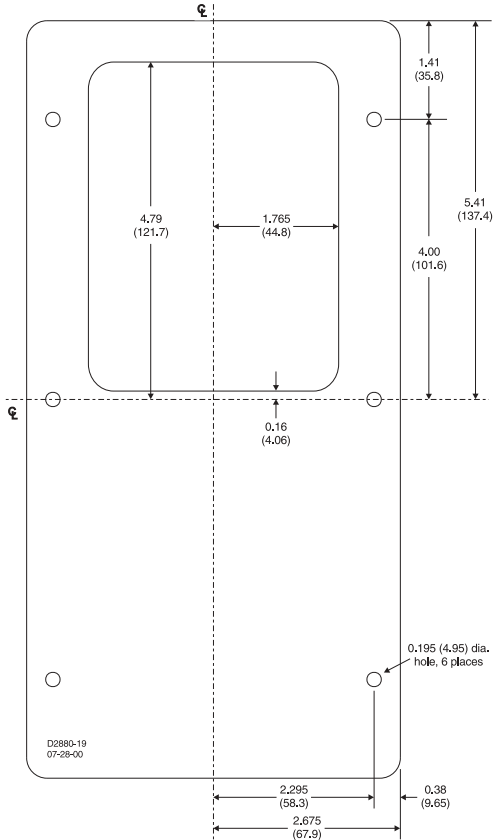
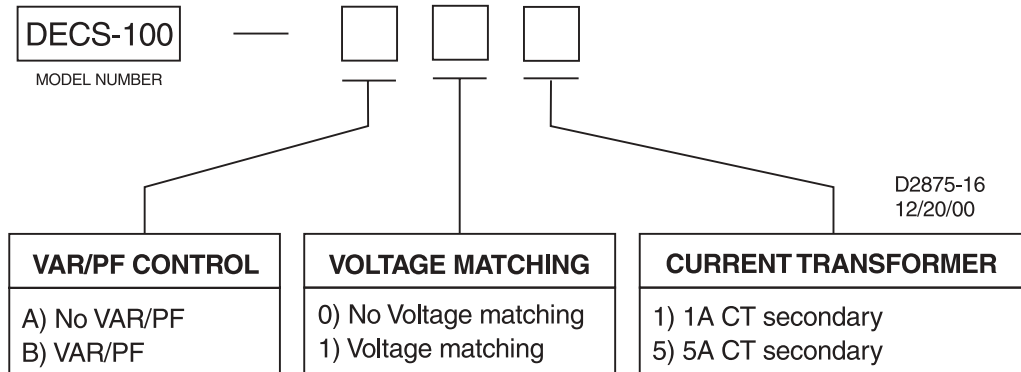


Figure 4 - Cutout and Drilling Dimensions

## HOW TO ORDER

The DECS-100 is selected by the style chart below. For example, if a DECS-100 is required with VAR/PF control, voltage matching, and a 5 Amp CT, the complete model number would be DECS-100-B15.



### Additional information:

- The DECS-100 is available in bulk-packaged shipments of 50 pieces. If this is desired, please inform your customer service representative.
- The DECS-100 is shipped with a CD-ROM that contains the Instruction Manual, Product Bulletin, BESTCOMS for PC Windows® NT 3.51 or later, 95, 98, or Me and BESTCOMS for Palm OS® 3.3 or newer users. Printed manuals and bulletins are available at an additional cost.

## ACCESSORIES

DECS-100 is designed to operate with the following accessories. For additional product compatibility, please contact your application specialist at Basler Electric or your sales representative.

- MVC300 Manual Voltage Controller
- EDM200 Exciter Diode Monitor
- EL200 Min/Max Excitation Limiter
- SCP250 VAR/PF controller



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