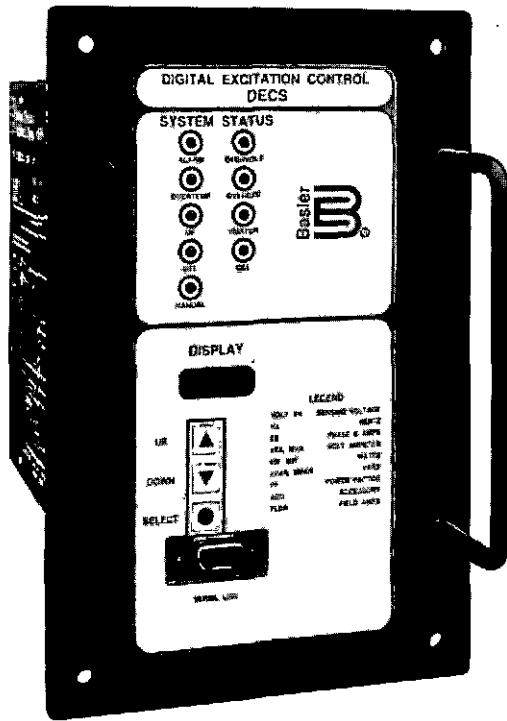


15 Amp DECS DIGITAL EXCITATION CONTROL SYSTEM



APPLICATION:

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
- 0.25% 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
- Serial link
- VAR/Power Factor regulation (option)
- Under/overexcitation limiting (option)
- CSA approval/UL recognition pending
- VDE 0875 Level N compliance pending
- U.S. Patent No. 5,294,879

APPLICATION AND FEATURES

this page

DESCRIPTION AND SPECIFICATIONS

pages 2 and 3

SAMPLE SPECIFICATIONS AND ACCESSORIES

page 3

FUNCTIONS

page 4

INTERCONNECT AND OUTLINE DRAWINGS

pages 5 & 6

FRONT VIEW IDENTIFICATION

page 7

ORDERING INFORMATION

page 8

INSTRUCTION MANUAL

Reference
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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.

SPECIFICATION:

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

	DECS 32-15		DECS 63-15		DECS 125-15	
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.

*Shaded 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.

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

DECS MODEL	NOMINAL VOLTAGE	BURDEN
DECS 32-15-XXX	56-70 V RMS Single or three phase 50 to 400 Hz	780 VA
DECS 63-15-XXX	100-139 V RMS Single or three phase 50 to 400 Hz	1570 VA
DECS 125-15-XXX	190-277 V RMS Single or three phase 50 to 400 Hz	3070 VA

Sensing Voltage
100 to 120 Vac ±10%
200 to 240 Vac ±10%
400 to 480 Vac ±10%
600 Vac ±10%

NOTE: For specific application and operation information, see Instruction Manual 9 2653 00 991.

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: $\pm 0.25\%$ NL to FL

THERMAL STABILITY: 0.5% 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 ± 6 to $\pm 60V$
in 0.5V steps

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

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

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

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

ACCESSORY INPUT: ± 1 Vdc for $\pm 10\%$ voltage change
Input impedance is 1 Kohm

ANNUNCIATION OUTPUT TYPE: Triac rated 30 Vdc,
150 milliamp

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

UNDERFREQUENCY: Refer to Figure 1

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.
5gs at 53 to 500 Hz

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 0.25 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.

ACCESSORY ITEMS:

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 1)

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.

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.

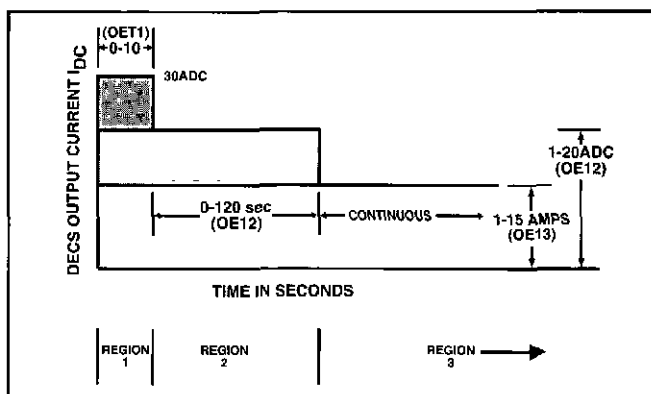


FIGURE 1. OVEREXCITATION LIMITER.

VAR/Power Factor Control:

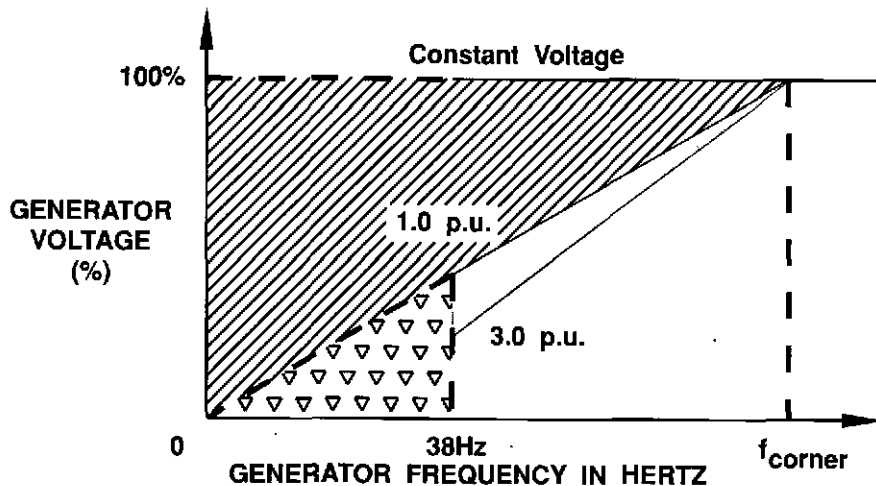
With this optional feature, the user can select between automatic VAR and Power Factor regulation when the generator is paralleled to the utility. The desired leading or lagging setpoint can be selected during setup.

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 OPTION:

DECS allows communications for user customization, set-up and monitoring system parameters. This is accomplished with an optional DECS Communication Interface Module (DCIM) and 3½" software diskette.



Range of f_{corner} : 40Hz to 65Hz




-  - Prolonged generator operation in this area is not recommended
 -  - Operating range adjustable from 1.0 to 3.0 p.u. V/Hz
 -  - Operation limited at or below 1.0 p.u. V/Hz
- p.u. - per unit number representation

FIGURE 2. UNDERFREQUENCY PROTECTION CHARACTERISTIC.

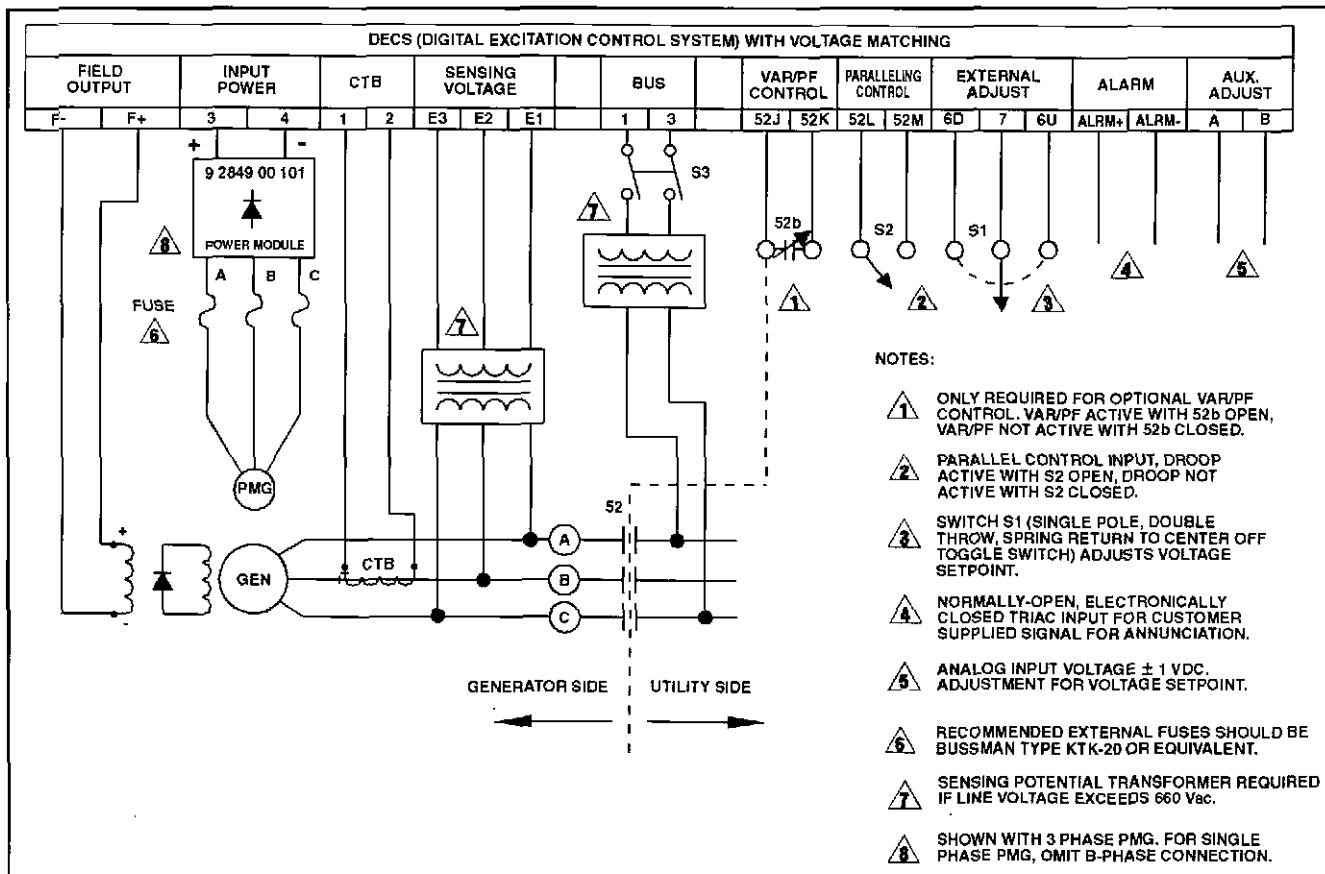


FIGURE 3. TYPICAL INTERCONNECTION DRAWING.

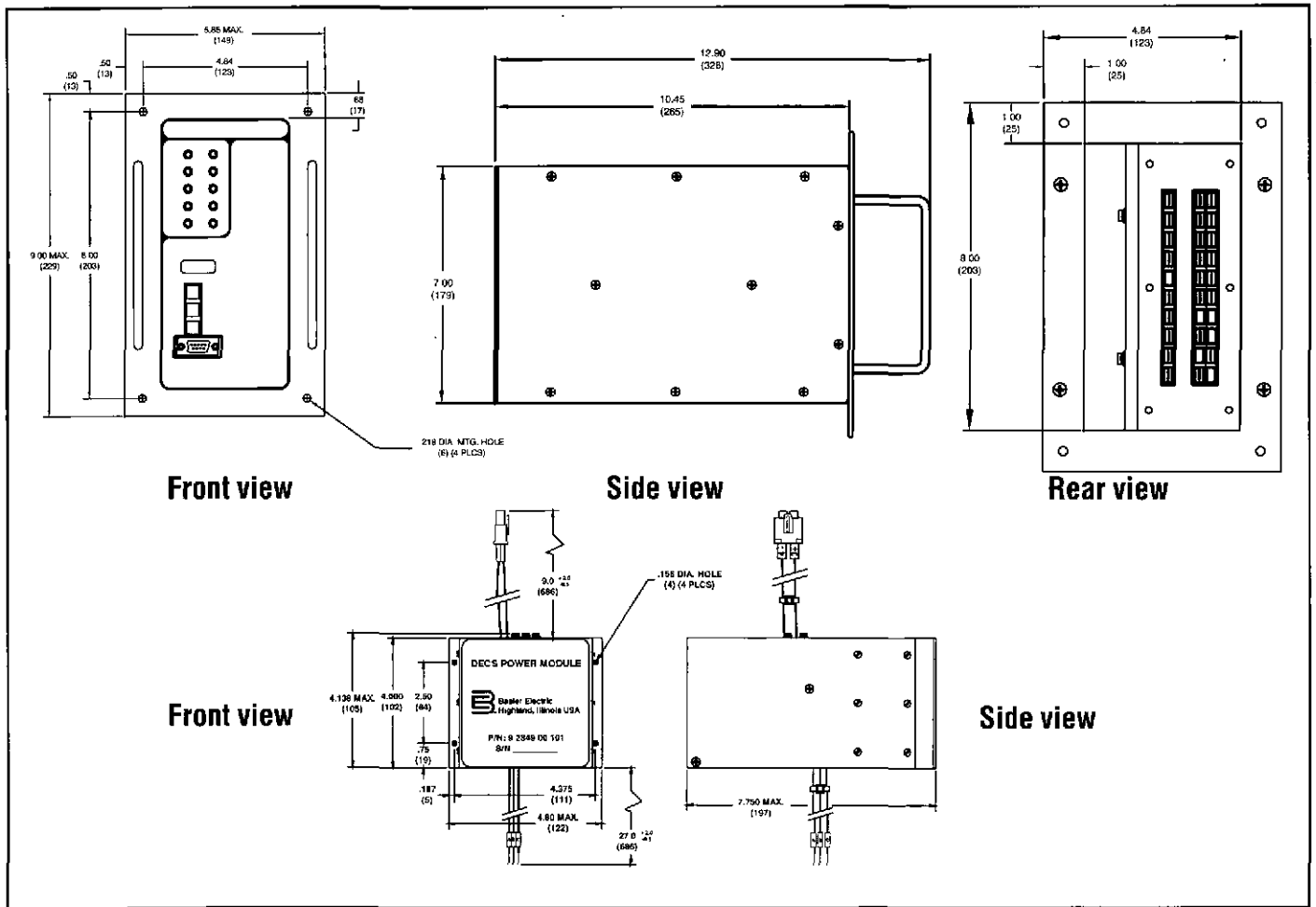


FIGURE 4. OUTLINE DRAWINGS.

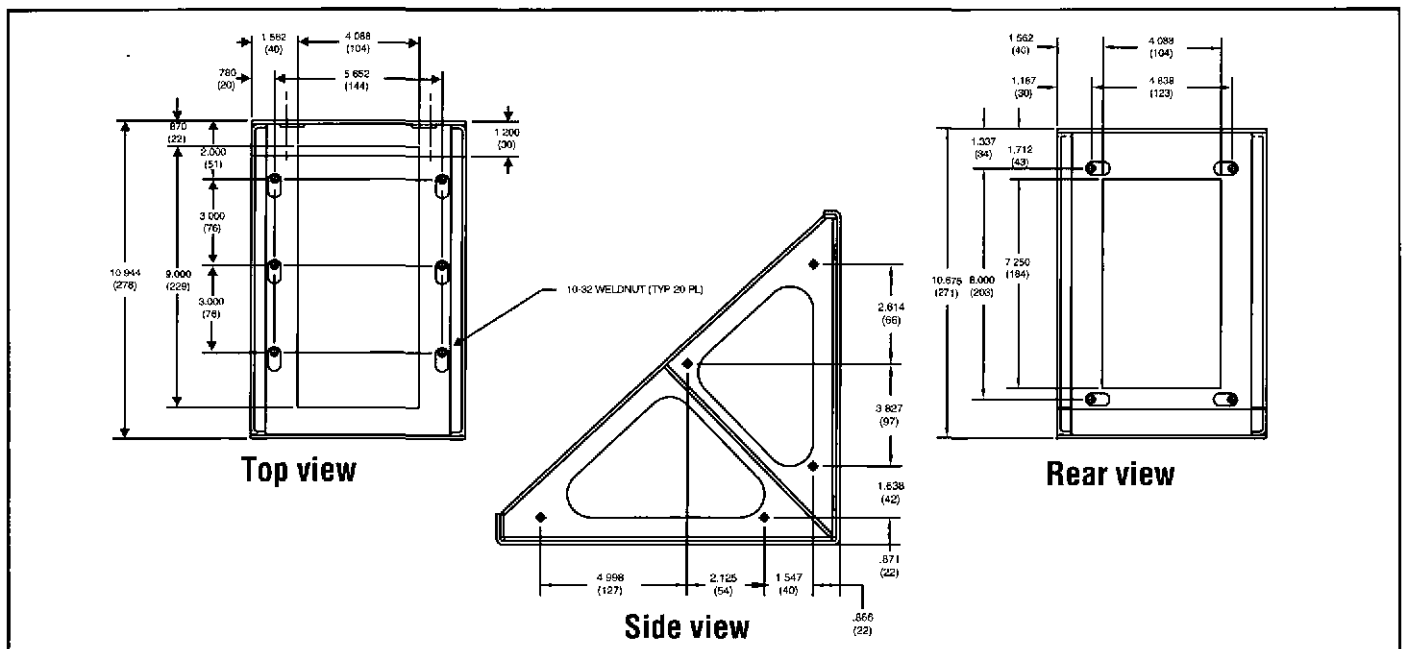


FIGURE 5. OUTLINE DRAWINGS - BEHIND PANEL MOUNTING KIT (OPTION).

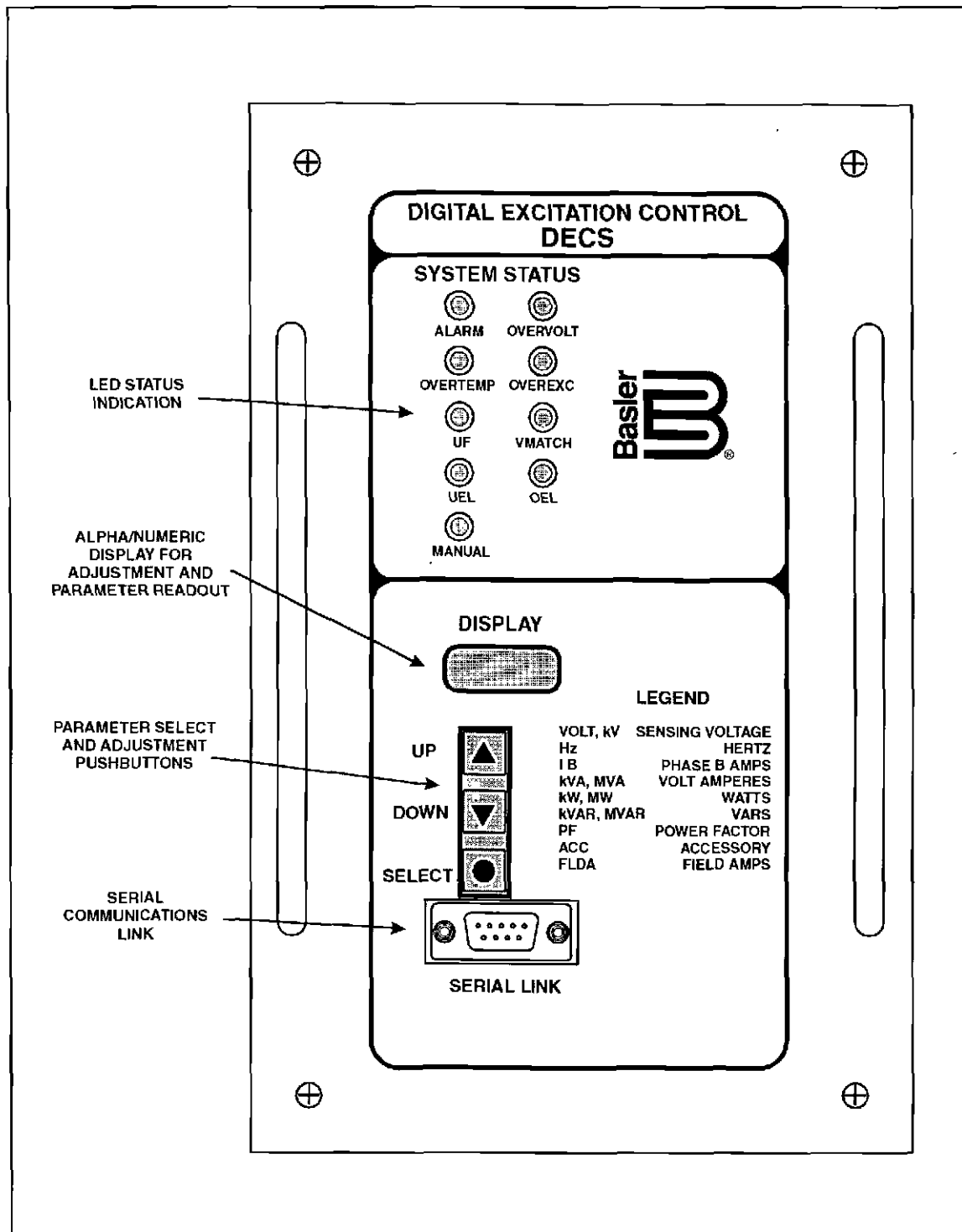


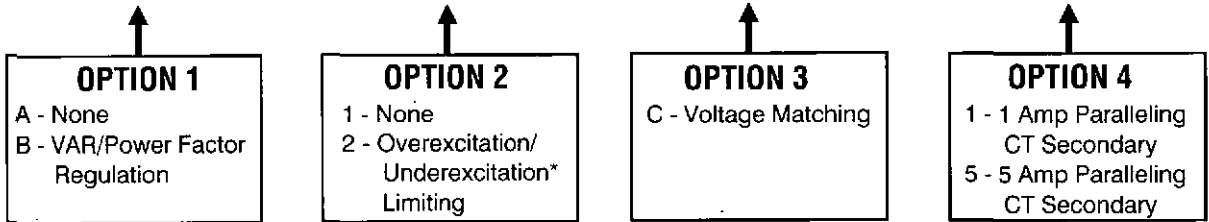
FIGURE 6. FRONT VIEW.

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ORDERING:

When ordering, order per model and style selection as listed below. For DECS pricing and ordering the DCIM kit or panel mounting kit, see DECS pricing page.

DECS 32-15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DECS 63-15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DECS 125-15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



* Underexcitation Limiting can only be enabled in VAR/PF regulation. Ordering option 1-B is required to use this function.

To adjust DECS via a PC or to customize the stability network, the DCIM option is required. The DCIM kit includes an interface module and software diskette. An optional panel mounting kit is also available.

