

DECS-250 DECS-250N Digital Excitation Control System

Basler Electric's DECS-250 and DECS-250N digital excitation control systems offer high performance, high flexibility, and extreme reliability for brushless excited AC synchronous generators. The DECS-250 offers a 15 amp pulse width modulated power stage providing high field forcing. The DECS-250N utilizes a 20 amp six-thyristor negative forcing output, providing exceptional system transient response. Multiple communication options and an optional integrated power system stabilizer make the DECS-250 and DECS-250N a complete system solution in a reliable and cost effective package.

By utilizing the very intuitive BESTCOMSPlus[®] PC software, the setup, configuration, operation and control can be performed quickly and accurately. The BESTCOMSPlus PC software utilizes the powerful and flexible BESTLogicPlus programmable logic program. This integrates PLC capabilities allowing users to customize their control scheme to meet virtually any application.

FEATURES

- True RMS sensing, Single or Three Phase voltage and current
- Full Generator Metering Capabilities
- AVR / FCR / FVR, Power Factor and var modes of operation
- Integrated Generator Protection (27/59, 81O/U, 32R, 40Q), EDM, 59F, 51F, Loss of PMG, Field Short Circuit, and 25 Sync Check
- Configurable Protection
- Overexcitation Limiting (with temperature compensation)
- Underexcitation Limiting
- Stator Current Limiting (with temperature compensation)
- Var Limiting
- Underfrequency Limiting or V/Hz Limiting

(continued on next page)

WINDOWS[®] SOFTWARE

Interface for setting and communicating with Basler products Request DECS-250-CD

ADDITIONAL INFORMATION

INSTRUCTION MANUAL

Request Publication 9440300990



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FEATURES, continued

- Exciter Diode Monitoring
- Trending, Oscillography, and Sequence of Events Recording
- Sixteen Programmable Contact Inputs
- Twelve Programmable Contact Outputs
- I/O Expansion Module compatibility (CEM-2020 and AEM-2020)
- Extensive Communication Options
 - USB Communication
- Modbus[™] RS-485 RTU
- J1939 CANbus
- Ethernet -100 Base T (Modbus TCP)
- Ethernet -100 Base F (optional)
- Profibus (optional)

- Irig B for time synchronization
- Reactive Load Sharing via Ethernet Communication
- Self-Tuning for automatic PID Gain setup
- Internal Autotracking between modes of operation
- External Autotracking between DECS Units (optional on DECS-250)
- Voltage Matching
- Optional Automatic Synchronizer
- Optional Integrated Power System Stabilizer
- **DECS-250 DESCRIPTION**

The DECS-250 is a microprocessor based excitation control system. The DECS-250 is designed to control and protect the generator and excitation system. Additionally, it provides extensive metering capabilities, communication capabilities, as well as fully programmable I/O. The DECS-250 provides excitation to the generator via a pulse width modulated power stage capable of 32Vdc, 63Vdc, or 125Vdc nominal voltages with a continuous output rating of 15Adc.

DECS-250 SPECIFICATIONS

CONTROL POWER

Nominal Voltage:	Style LXXXXXX: 16-60 Vdc
	Style CXXXXXX: 90-150 Vdc, 82-132 Vac
Burden:	50 VA or 30 Watts

AC OPERATING POWER

Configuration:	Single or Three Phase
Voltage Range:	60 Vac nominal (56V -70 Vac) for 32 Vdc nominal output
	120 Vac nominal (110-139 Vac) for 63 Vdc nominal output
	240 Vac nominal (190-277 Vac) for 125 Vdc nominal output
Frequency Range:	50-420 Hz

GENERATOR AND BUS VOLTAGE SENSING

Single or Three Phase
100/120 Vac ±10%
200/240 Vac ±10%
400/480 Vac ±10%
600 Vac ±10%
50/60 Hz Nominal
< 1 VA per phase

GENERATOR CURRENT SENSING

Configuration:	Single or Three Phase with separate input for cross-current compensation
Current Ranges:	1 Aac or 5 Aac nominal
Frequency Range:	50/60 Hz Nominal
Burden:	1 Aac sensing: < 5 VA
	5 Aac sensing: <10 VA
Contact Inputs:	16 programmable inputs with internally supplied 12 Vdc to accommodate dry contacts.
Accessory Inputs	Two separate analog inputs are provided for remote set point control or limiter scaling.
	They are available for either 4-20 mA or ± 10 Vdc inputs.

DECS-250 SPECIFICATIONS, continued

DC OUTPUT POWER Current: Voltage:	15 A continuous; 30 A 10 second forcing rating 32 Vdc nominal with 60 Vac supplied operating power 63 Vdc nominal with 120 Vac supplied operating power 125 Vdc nominal with 240 Vac supplied operating power
MINIMUM FIELD Resistance:	2.13 Ω at 32 Vdc nominal 4.2 Ω at 63 Vdc nominal 8.3 Ω at 125 Vdc nominal
Output Contacts	11 user programmable form A normally open output contacts are provided as well as one form C output contact dedicated to the watchdog function.
Rating	Make, break and carry 7A resistive @ 24/48/125 Vdc (120/240 Vac).
COMMUNICATION USB: RS-232: RS-485: CANbus: Ethernet: Expansion Port:	USB type B connector for communication with local computers. RS-232, 9 pin, sub D, used to connect primary and backup DECS-250 or DECS-200 units. This port is only used for optional external autotracking. Used to communicate with local and remote devices. Modbus RTU protocol. Used to communicate with expansion modules (AEM-2020 and CEM-2020). Used to communicate with local and remote devices. Standard unit uses 100baseT, optional selection of 100baseF is available. Modbus TCP protocol. Optional communication port used to communicate with local and remote devices. Uses Profibus communication protocol.
Agency Approvals:	Certified per CSA Standard CAN/CSA-C22.2 UL recognized per standard 508 CE compliant, EMC and LVD DNV (Det Norske Veritas) Certification
ENVIRONMENTAL Operating Temp: Storage Temp: Salt Fog: Shock: Vibration: Size: Weight:	-40°C to +70°C (-40°F - 158°F) -40°C to +85°C (-40°F - 185°F) Per MIL-STD 810E method 509.3 15G's in each of three perpendicular planes 5G's from 18-2000Hz in each of three perpendicular planes See diagram on page 7 6.62 kg (14.6 lb)

DECS-250N DESCRIPTION

The DECS-250N is a microprocessor based excitation control system and is very similar in features and functionality to the DECS-250 with the major exception of providing a negative forcing output stage. The DECS-250N is designed to control and protect the generator and excitation system. It provides extensive metering capabilities, communication capabilities, as well as fully programmable I/O. The DECS-250N provides excitation to the generator exciter field via a six thyristor negative forcing power stage capable of 32Vdc, 63Vdc, 125Vdc or 250Vdc nominal voltages at up to a continuous 20Adc. The negative forcing style output of the DECS-250N provides enhanced generator transient performance when used in conjunction with the power system stabilizer option.

DECS-250N SPECIFICATIONS

CONTROL POWER

Nominal Voltage:	Style LXXXXXX: 16-60 Vdc
	Style CXXXXXX: 90-150 Vdc, 82-132 Vac
Burden:	50 VA or 30 Watts

AC OPERATING POWER

Configuration:	Single or Three Phase
Voltage Range:	60 Vac nominal (56V -70 Vac) for 32 Vdc nominal output
	120 Vac nominal (110-139 Vac) for 63 Vdc nominal output
	240 Vac nominal (190-277 Vac) for 125 Vdc nominal output
	480 Vac nominal (380-528 Vac) for 250 Vdc nominal output
Frequency Range:	50-420 Hz

GENERATOR AND BUS VOLTAGE SENSING

Configuration:	Single or Three Phase
Voltage Ranges:	100/120 Vac ±10%
	200/240 Vac ±10%
	400/480 Vac ±10%
	600 Vac ±10%
Frequency Range:	50/60 Hz Nominal
Burden:	< 1 VA per phase

GENERATOR CURRENT SENSING

Configuration: Current Ranges: Frequency Range: Burden:	Single or Three Phase with separate input for cross-current compensation 1 Aac or 5 Aac nominal 50/60 Hz Nominal 1 Aac sensing: < 5 VA 5 Aac sensing: <10 VA
Contact Inputs	16 programmable inputs with internally supplied 12 Vdc to accommodate dry contacts.
Accessory Inputs	Two separate analog inputs are provided for remote set point control or limiter scaling. They are available for either 4-20 mA or ± 10 Vdc inputs.
DC OUTPUT POWER	
Current:	20 A continuous; 40 A 10 second forcing rating
Voltage:	32 Vdc nominal with 60 Vac supplied operating power
	63 Vdc nominal with 120 Vac supplied operating power
	125 Vdc nominal with 240 Vac supplied operating power
	250 Vdc nominal with 480 Vac supplied operating power

DECS-250N SPECIFICATIONS, continued

Resistance:	1.6 Ω at 32 Vdc nominal
	3.15 Ω at 63 Vdc nominal
	6.25 Ω at 125 Vdc nominal
	12.5 Ω at 250 Vdc nominal
Output Contacts	11 user programmable form A normally open output contacts are provided as well as one form C output contact dedicated to the watchdog function.
Rating	Make, break and carry 7A resistive @ 24/48/125 Vdc (120/240 Vac).
COMMUNICATION	
USB [.]	USB type B connector for communication with local computers
RS-232:	RS-232, 9 pin, sub D, used to connect primary and backup DECS-250N or DECS-200N
	units. This port is used for external autotracking only.
RS-485:	Used to communicate with local and remote devices. Modbus RTU protocol.
CANbus:	Used to communicate with expansion modules (AEM-2020 and CEM-2020).
Ethernet:	Used to communicate with local and remote devices. Standard unit uses 100baseT.
	optional selection of 100baseF is available. Modbus TCP protocol.
Expansion Port:	Optional communication port used to communicate with local and remote devices. Uses
	Profibus communication protocol.
Agency Approvals:	Certified per CSA Standard CAN/CSA-C22.2
	UL recognized per standard 508
	CE compliant. EMC and LVD
	DNV (Det Norske Veritas) Certification
ENVIRONMENTAL	
Operating Temp:	-40°C to +60°C (-40°F to 140°F)
Storage Temp:	-40°C to +85°C (-40°F - 185°F)
Salt Fog:	Per MIL-STD 810E method 509.3
Shock:	15G's in each of three perpendicular planes
Vibration:	5G's from 18-2000Hz in each of three perpendicular planes
Size:	See diagram on page 7
Weight:	6.75 kg (14.9 lb)

CONNECTIONS



- B Optional communication port (style xxxxxP) uses PROFIBUS protocol.
- IRIG time synchronization input.
- thernet communication port can be copper (style xxxx1x) or fiber optic (style xxxx2x) and uses Modbus communication protocol.
- Type B USB jack for temporary, local communication.
- A RS-485 port uses the Modbus RTU protocol for communication with other networked devices.

Figure 1 - Typical Connection Diagram



DIMENSIONS

ACCESSORIES

- Front panel mounting bracket for DECS-250, plate only part number 9440300039, kit (plate and installation hardware) part number 9440311100.
- Front panel mounting bracket for DECS-250N, plate only part number 9440500030, kit (plate and installation hardware) part number 9440506100.
- Interconnection cable (5') for redundant systems, part number 9310300032.
- Control power isolation transformer; part number BE31449001. Provides required isolation on AC control power when dual control power sources are used.
- Freewheeling diode module, part number 9293600101, required in redundant systems with live transfer.
- Inrush current reduction module, part number 9387900104, required when the operating power is supplied via a station service source. Only required for the DECS-250.
- Interactive display panel for remote control, metering and annunciation: IDP-800.
- Contact Expansion Module: CEM-2020 and CEM-2020H.
- Analog Expansion Module: AEM-2020.

Contact Expansion Module for paralleled genset applications, CEM-2020 and CEM-2020H

Basler Electric offers two add-on modules to increase the already abundant contact input and output capability of the DECS-250 and DECS-250N. These modules communicate to the DECS-250 and DECS-250N via SAE J1939 CANbus and allow the user to program the functionality of these inputs and outputs in Basler's very powerful logic program. The user can add labels for the inputs and outputs that appear in BESTCOMS*Plus*, on the front panel, and in programmable logic. All of the functionality can be assigned to these inputs and outputs as if they were an integrated part of the DECS-250 and DECS-250N. Two modules of the CEM are available, CEM-2020 and CEM-2020H. Both modules add an additional ten contact inputs to the DECS-250 and DECS-250N.

The CEM-2020 output ratings of the form C contacts are:

- (12 contacts) 4A @ 30 Vdc
- (12 contacts) 1A @ 30 Vdc

The CEM-2020H output ratings of the form C contacts are:

- (12 contacts) 2A @ 30Vdc
- (6 contacts) 10A @ 30Vdc

The 1A rated contacts are gold contacts for low current circuits. These modules provide the user with the flexibility to use the DECS-250 and DECS-250N for more complicated applications that require contact functionality or duplication of contacts for remote annunciation. Pure flexibility is one of the benefits of the DECS-250 and DECS-250N, and this add-on module enhances that benefit even further. Drop it in, connect it, and you have added 10 more contact inputs and 24 or 18 more contact outputs.

For installation instructions, see Instruction Manual Publication 9440300990.

ACCESSORIES, continued







Figure 5A - CEM-2020H Overall Dimensions

ACCESSORIES, continued

Analog Expansion Module for applications requiring analog inputs/outputs and temperature monitoring, AEM-2020

Basler's optional AEM-2020 module provides eight remote analog inputs, eight remote RTD inputs, two remote thermocouple inputs, and four remote analog outputs to the DECS-250 and DECS-250N. The AEM-2020 communicates with the DECS-250 and DECS-250N through a CANbus interface.

The eight analog inputs are user-selectable for 4 to 20 mA or 0 to 10 Vdc. Each analog input has under/over thresholds that can be configured as status only, alarm, or pre-alarm. Each of these inputs can be selected and used in our powerful programmable logic software. For temperature measurement, the AEM provides for eight RTD inputs that can be configured for 10 or 100 Ohm RTDs. It also has two inputs for K-type thermocouples. Each of these ten temperature measurement inputs can be configured with high or low temperature thresholds. Each of these inputs can be selected and used in our powerful programmable logic software. Also, these allow for RTD's to be plotted for OEL and SCL functions.

The analog outputs are user-selectable for 4 to 20 mA or 0 to 10 Vdc. These outputs are intended to drive external analog meters and can be configured for indication of generator voltage, bus voltage, generator frequency, generator kW as well as numerous addition parameters.

For installation instructions, see Instruction Manual Publication 9440300990.



Figure 6 - AEM-2020 Overall Dimensions

NOTES



HOW TO ORDER

Compression type terminals are available for the current sensing (CT) inputs, operating power input, and power output connections only.



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