



## DECS-250 Digital Excitation Control System

Basler Electric's DECS-250 digital excitation control system offers 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. Multiple communication options and an optional integrated power system stabilizer make the DECS-250 a complete system solution in a reliable and cost effective package.

By utilizing the very intuitive BESTCOMSPi<sup>us</sup>® PC software, the setup, configuration, operation and control can be performed quickly and accurately. The BESTCOMSPi<sup>us</sup> PC software utilizes the powerful and flexible BESTLogicPi<sup>us</sup> 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

**FEATURES**  
Pages 1 and 2

**DESCRIPTION and  
SPECIFICATIONS**  
Pages 2 and 3

**INTERCONNECT  
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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
- Optional External Autotracking between DECS Units
- 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 AND DC OUTPUT POWER

	32Vdc		63Vdc		125Vdc	
	1 phase	3 phase	1 phase	3 phase	1 phase	3 phase
Power Input Configuration	1 phase	3 phase	1 phase	3 phase	1 phase	3 phase
Nominal Input Voltage	60Vac		120Vac		240Vac	
Full Load Continuous Voltage	32Vdc		63Vdc		125Vdc	
Full Load Continuous Current	15Adc		15Adc		15Adc*	15Adc
Power Input Frequency	50-500Hz		50-500Hz		50-500Hz	
Operating Temperature	-40°C to +60°C		-40°C to +60°C		-40°C to +55°C*	-40°C to +60°C
Minimum Field Resistance	2.13 Ω		4.2 Ω		8.3 Ω	

\* Operating temperature can be increased to +60°C if continuous current is less than 12Adc.

### 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

## DECS-250 SPECIFICATIONS, continued

### GENERATOR CURRENT SENSING

<b>Configuration:</b>	Single or Three Phase with separate input for cross-current compensation
<b>Current Ranges:</b>	1 Aac or 5 Aac nominal
<b>Frequency Range:</b>	50/60 Hz Nominal
<b>Burden:</b>	1 Aac sensing: < 5 VA 5 Aac sensing: < 10 VA

### INPUTS AND OUTPUTS

<b>Contact Inputs:</b>	16 programmable inputs with internally supplied 12 Vdc to accommodate dry contacts.
<b>Accessory Inputs:</b>	Two separate analog inputs are provided for remote set point control or limiter scaling. They are available for either 4-20 mA or $\pm 10$ Vdc inputs.
<b>Output Contacts:</b>	11 user programmable form A normally open output contacts are provided as well as one form C output contact dedicated to the watchdog function.
<b>Rating:</b>	Make, break and carry 7A resistive @ 24/48/125 Vdc (120/240 Vac).

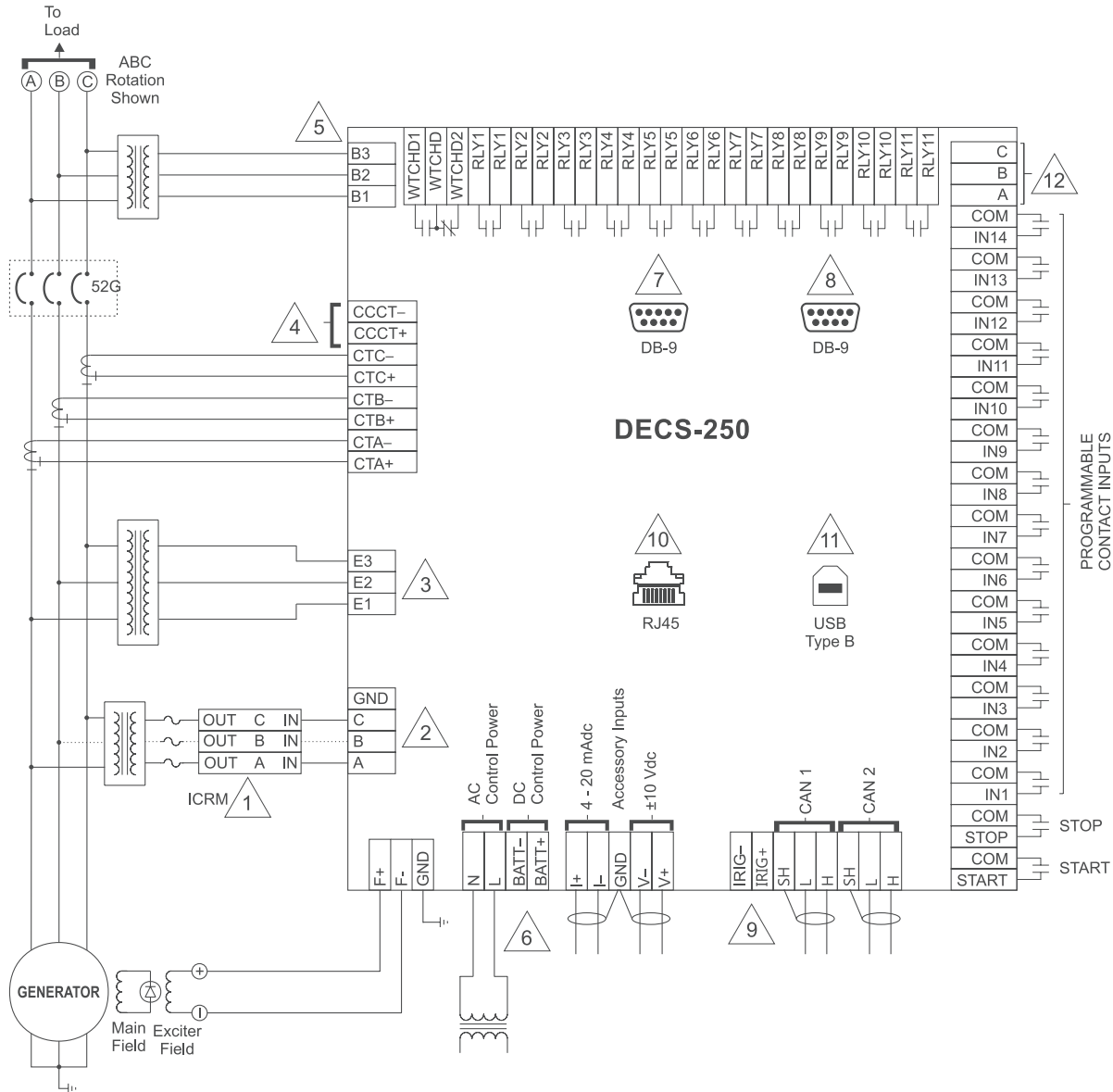
### COMMUNICATION

<b>USB:</b>	USB type B connector for communication with local computers.
<b>RS-232:</b>	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.
<b>RS-485:</b>	Used to communicate with local and remote devices. Modbus RTU protocol.
<b>CANbus:</b>	Used to communicate with expansion modules (AEM-2020 and CEM-2020).
<b>Ethernet:</b>	Used to communicate with local and remote devices. Standard unit uses 100baseT, optional selection of 100baseF is available. Modbus TCP protocol.
<b>Expansion Port:</b>	Optional communication port used to communicate with local and remote devices. Uses Profibus communication protocol.
<b>Agency Approvals:</b>	Certified per CSA Standard CAN/CSA-C22.2 UL recognized per standard 508 CE compliant, EMC and LVD DNV (Det Norske Veritas) Certification

### ENVIRONMENTAL

<b>Operating Temp:</b>	-40°C to +60°C* (-40°F - 140°F) *See note under AC OPERATING POWER AND DC OUTPUT POWER table on page 2.
<b>Storage Temp:</b>	-40°C to +85°C (-40°F - 185°F)
<b>Salt Fog:</b>	Per MIL-STD 810E method 509.3
<b>Shock:</b>	15G's in each of three perpendicular planes
<b>Vibration:</b>	5G's from 18-2000Hz in each of three perpendicular planes
<b>Size:</b>	See diagram on page 5
<b>Weight:</b>	6.62 kg (14.6 lb)

# CONNECTIONS



- △1 Optional - Basler part number 9387900104.
- △2 Operating (bridge) power input. For single-phase power, omit one phase connection. See *Power Inputs* or *Specifications* for operating power ratings.
- △3 Generator voltage sensing input. Potential transformer required if line voltage exceeds 600 Vac.
- △4 Cross-current compensation input, 1 Aac or 5 Aac.
- △5 Connections required only if voltage matching, sync-check, or auto synchronizer functions are used.
- △6 See *Power Inputs* or *Specifications* for control power input ratings.
- △7 RS-232 port used for communication with another DECS in a redundant DECS system.
- △8 Optional communication port (style xxxxxP) uses PROFIBUS protocol.
- △9 IRIG time synchronization input.
- △10 Ethernet communication port can be copper (style xxxxx1x) or fiber optic (style xxxxx2x) and uses Modbus communication protocol.
- △11 Type B USB jack for temporary, local communication.
- △12 RS-485 port uses the Modbus RTU protocol for communication with other networked devices.

Figure 1 - Typical Connection Diagram

## DIMENSIONS

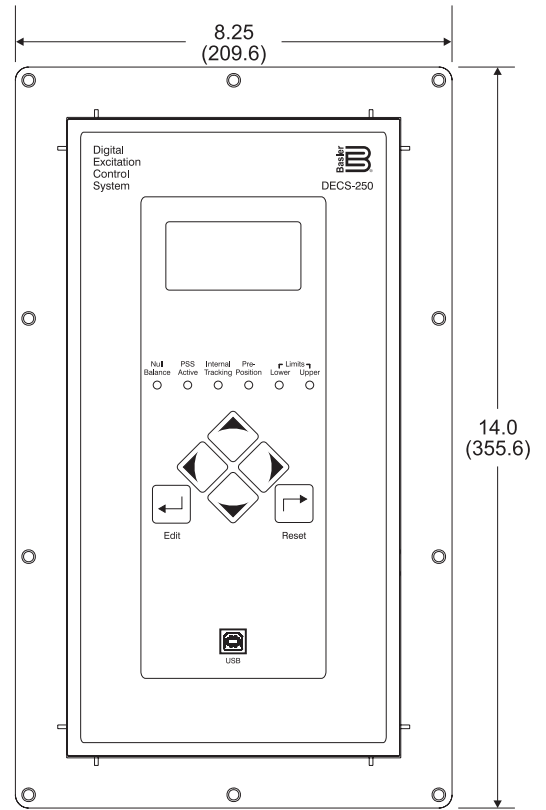
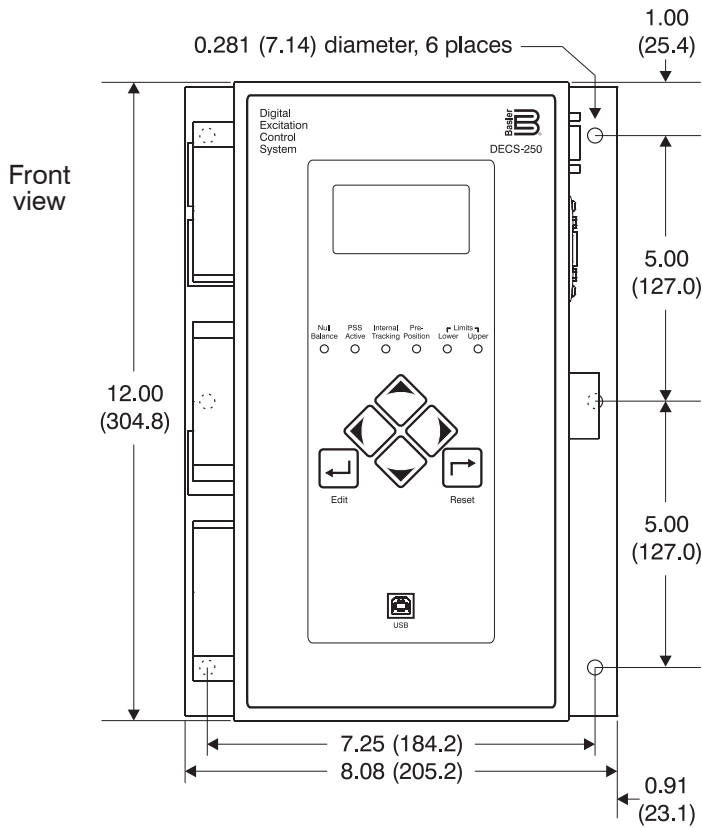


Figure 3 - DECS-250 with Optional Escutcheon Plate

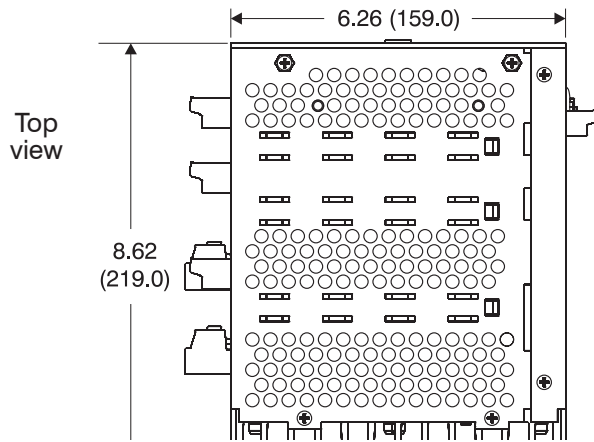


Figure 2 - Dimensions

## ACCESSORIES

- Front panel mounting bracket for DECS-250, plate only part number 9440300039, kit (plate and installation hardware) part number 9440311100.
- 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.
- 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. These modules communicate to the DECS-250 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 BESTCOMSP*lus*, 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. Two modules of the CEM are available, CEM-2020 and CEM-2020H. Both modules add an additional ten contact inputs to the DECS-250.

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 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 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.

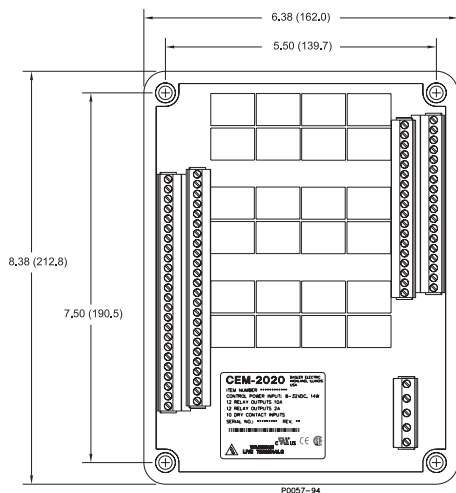


Figure 4 - CEM-2020 Overall Dimensions

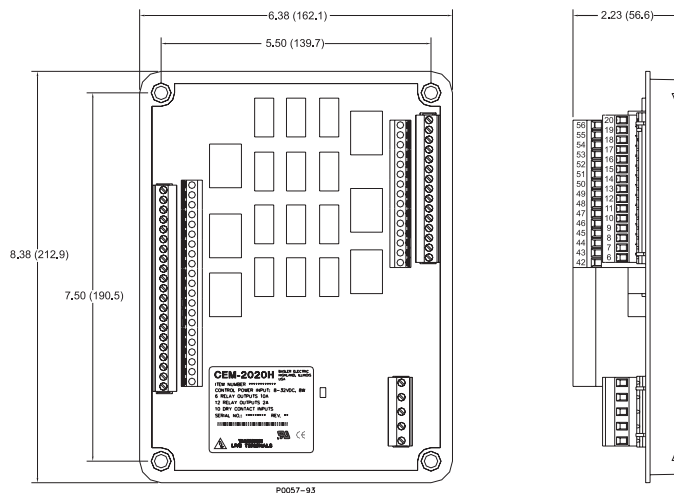


Figure 4A - CEM-2020H Overall Dimensions

## 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. The AEM-2020 communicates with the DECS-250 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.

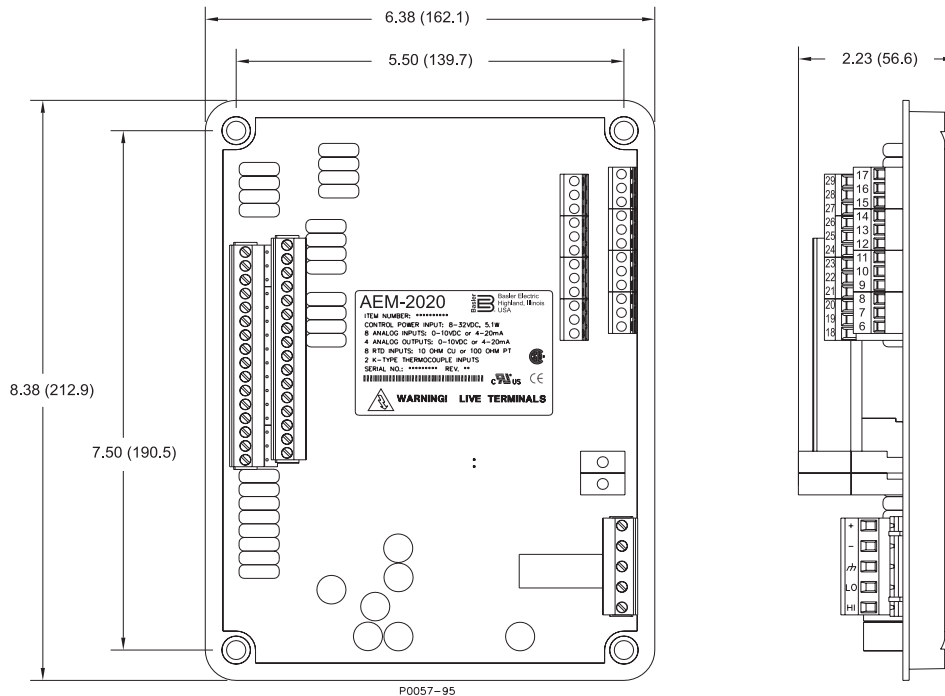
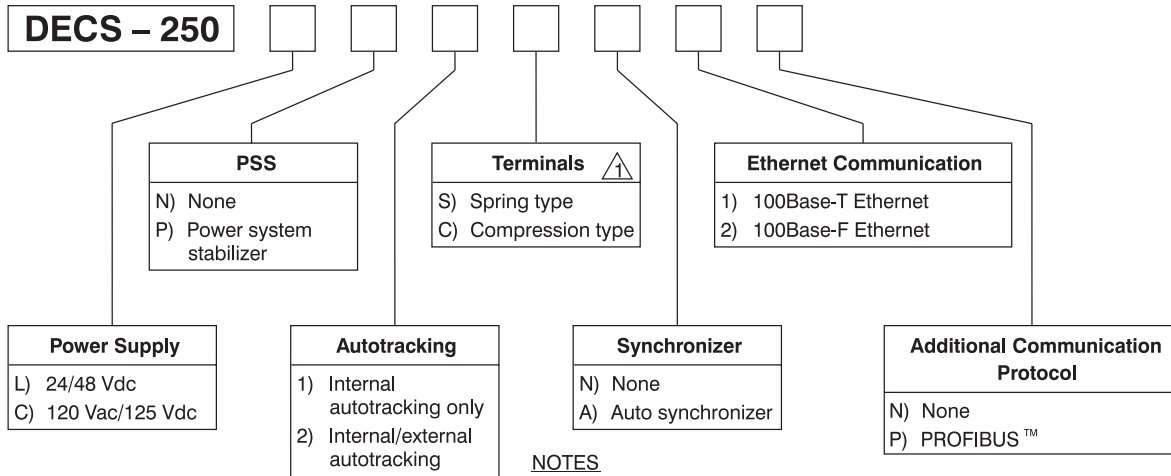


Figure 5 - AEM-2020 Overall Dimensions

## HOW TO ORDER



**NOTES**

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



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