

CRANE CONTROL

THE RESPONDOR 9000 SERIES
ADJUSTABLE FREQUENCY DRIVES



RESPONDOR
AF CRANE
CONTROL **9000**



Cutler-Hammer

EATON

OUR MULTI-LINE CONTROL PANEL COMES STANDARD WITH THE RESPONDOR 9000 DRIVE. AT A GLANCE, CHECK DRIVE STATUS ICONS AND VIEW ALPHA-NUMERIC CHARACTERS ON ITS BACKLIT LCD DISPLAY.

Cutler-Hammer

RUN

READY

V1

Output Frequency
58.5 Hz



ENTER

RESET

START

STOP

RESPONDOR
AF CRANE
CONTROL **9000**

CUTLER-HAMMER OFFERS A COMPLETE LINE OF WINDOWS-BASED SOFTWARE FOR PROGRAMMING AND CONFIGURING RESPONDOR 9000 SERIES DRIVES:

SET PARAMETERS, OPERATE AND MONITOR THE RESPONDOR 9000 DRIVE THROUGH YOUR PC.

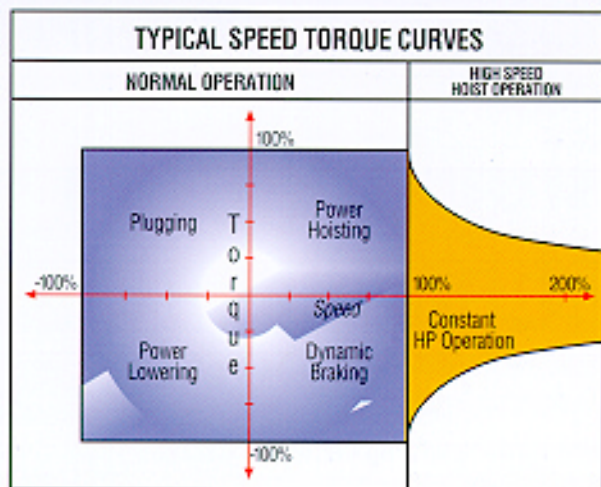
SET PARAMETERS OFFLINE, PRINT PARAMETER LISTS, COPY PARAMETER SETTINGS, DISPLAY TREND DATA, AND MONITOR OPERATION.

RESPONDOR 9000

Technical Highlights.

RESPONDOR 9000 COMPACT NEMA 1 • RESPONDOR 9000 STANDARD PROTECTED/OPEN CHASSIS

Output Ratings	RESPONDOR 9000 Compact NEMA 1 (IP20)	208 – 240V 380 – 440V 460 – 500V	3/4–20Hp CT 3/4–22KW CT 1–30Hp CT
	RESPONDOR 9000 Standard Protected (IP20)/Open Chassis (IP00)	208 – 240V 380 – 440V 460 – 500V 525 – 690V	2–75Hp CT 2.2–100KW CT 3–1100Hp CT 2–800Hp CT
	Output Voltage Continuous Output Current Starting Torque Starting Current	0 to Rated Voltage Constant Torque: 150% of rated output (1 min/10 min) 200% 250% of rated output (Max 2 sec/20 sec) with Max output frequency <30Hz and heatsink temperature <+60°C	
	Output Frequency Frequency Resolution	0 to 500Hz (Special high-speed application up to 7200Hz) 0.01Hz	
Input Data	Frequency Voltage	45 to 66Hz 208 – 240V, -15% – +10% 380 – 440V, -15% – +10% 460 – 500V, -15% – +10% 525 – 690V, -15% – +10%	
Control Characteristics	Control Method Carrier Frequency Frequency Reference Acceleration / Deceleration Time Braking Torque	Volts/Hertz, sensorless vector, closed-loop Programmable: 1 to 16kHz Analog Input: Resolution 12 bit, 1% Control Panel: Reference 0.01Hz increments 0.1 to 3000 seconds DC injection brake—30% of rated	
Protection Features	Overcurrent Protection Overvoltage Trip Undervoltage Trip Ground Fault Input / Output Phase Loss Protection Motor Overload Motor Stall Unit Overtemperature Internal Power Supply Short Circuit Protection	Trip Limit 400% of CT Rated Current 208 – 240V: 320V AC 380 – 440V: 560V AC 460 – 500V: 675V AC 525 – 690V: 900V AC 65% of Rated Voltage Standard Standard Standard Standard Standard Standard	
Control Connections	Analog Input Digital Inputs Auxiliary Supply Reference Supply Analog Output Digital Outputs	0–10V DC, input impedance 200K Ohms 4–20mA, input impedance 250 Ohms, differentially isolated External Potentiometer, 0–10V DC, 1K Ohm minimum 6 programmable: positive or negative control logic 24V DC \pm 25%, 100mA 10V DC (-0% to +3%), 10mA Programmable: 0–20mA, impedance 500 Ohms, Resolution 10-bit, 1% 2 programmable form C relays, 250V AC 2 Amp, or 30V DC 2 Amp resistive 1 programmable open collector, 48V DC, 50mA	
Environment	Operating Temperature Storage Temperature Relative Humidity Altitude (Max without derate) Vibration Shock Enclosure	-10°C – +50°C (Constant Torque) -40°C – +60°C <95%, noncondensing 3300 feet (1000 meters) Operation: Max amplitude 3mm in frequency range 2Hz–9Hz, Max acceleration amplitude 0.5G in frequency range 9Hz–200Hz Operation: Max 8G, 11ms Plastic coated, hot-dip galvanized sheet steel	
Certifications	Codes and Standards	UL Listed to 600V cUL Listed CE Marked CSA Pending	
	Immunity Emissions • RESPONDOR 9000 Compact NEMA 1 • RESPONDOR 9000 Standard NEMA 1, 12	EN50062-1, -2 EMC Level I: EN50061-2, EMC Level C: EN50081-1, -2 EMC Level I: EN50061-2, EMC Level C: EN50081-1, -2	



CONSTANT HORSEPOWER FOR CRANE HOIST APPLICATION

HIGH SPEED HOIST OPERATION:

TAKE FULL ADVANTAGE OF THE MOTOR HORSEPOWER AND ALLOW A LIGHTLY LOADED HOOK TO GO TO A HIGHER SPEED THAN A FULLY LOADED ONE. THIS IS IMPORTANT FOR DUTY CYCLE CONSIDERATIONS, ALLOWING THE MOTOR TO USE ITS FULL CAPABILITY BY PRODUCING SPEED OR TORQUE AS REQUIRED FOR HOISTING AND LOWERING.

FOR CONSTANT HORSEPOWER OPERATION, IT IS IMPORTANT TO KNOW HOW MUCH TORQUE LOAD IS PRESENT ON THE MOTOR RESULTING FROM THE LOAD ON THE HOOK. THE REGULATOR MEASURES TORQUE LOAD AND CALCULATES THE MAXIMUM ALLOWABLE OPERATING SPEED FOR THE LOAD. HOISTING AND LOWERING MAXIMUM SPEEDS ARE SEPARATELY ADJUSTABLE.



NEMA CLASS I MILL DUTY HOIST CONTROL

PANEL INCLUDES:

- RESPONDER FLUX VECTOR CONTROL DRIVE
- 110V AC CONTROL INTERFACE RELAYS
- MAIN AND CONTROL DISCONNECTS
- UNDERVOLTAGE RELAY AND FUSED 110V CONTROL TRANSFORMER
- NEMA-RATED LINE CONTACTOR
- OPTIONAL BRAKE CONTROL CIRCUITRY WITH BRAKE CONTACTOR & BRANCH FUSING

VECTOR DRIVE MOTORS

Designed for the demanding application requirements of crane duty. Premium efficiency designs increase energy savings, lower temperature rise and increase motor life. Motors feature full class H insulation, TENV and TEBC enclosures, standard foot and C face mounting and precision balance.

MILL DUTY BRAKES

GH505 electro-mechanical in seven wheel sizes up to 30 inches. GH506 electrohydraulic and GH509 hydraulic in five wheel sizes up to 19 inches. Proven performers with many interchangeable parts reduce replacement parts inventories for users of both mechanical and hydraulic brake systems. Simple direct acting electro-hydraulic assist package is also available (no air compressor required).

MILL DUTY RESISTORS

Available in unbreakable welded and high capacity reflex. Both feature "drawout" design which permits replacement of resistor assemblies without disturbing the end plates. And both are "stackable" (without the use of special frames) to conserve space.

MASTER SWITCHES

New, improved Type F in step-type, stepless and joystick configurations. Narrow contour design fits in small spaces. Highly reliable electrical contacts; steel-to-steel cam and roller bearing surfaces for superb mechanical life.

PANELMATE® DISPLAYS

CRT operator interface provides remote operation and monitoring capability, available in either color or gray scale.

CRANE POWER AND CONTROL LIMIT SWITCHES

Prevent crane hook and overtravel in hoisting by disconnecting the hoist motor with Cutler-Hammer's line of power limit switches. For single and duplex motor arrangements, type E84 and Type 102 Rotating Cam limits provide control circuit overtravel protection for hoists and travel motions.

CRANE SAFETY DISCONNECT SWITCHES

Manual-magnetic provide optimum power circuit isolation at the power input to the crane. Power can be disconnected either by the lever on the switch itself or from an ON/OFF pushbutton station in the operator's cab. Available in Size 4 (150A) through Size 9A (5000A).

The Most Complete Line of Crane Control.

Cutler-Hammer offers the most complete line of crane controls and accessories. Purchasing a complete crane system from Cutler-Hammer provides single source responsibility, reduced costs and perfectly-matched performance between drives, motors and accessories.



Rely on Cutler-Hammer Crane Control Leadership.

The **RESPONDOR 9000 SERIES** of flux vector adjustable frequency drives and accessories is the latest addition to the

Cutler-Hammer family of crane control products. Designed by people who know and helped define the meaning of Mill Duty, these products are the result of more than 90 years of crane control experience in the primary metals industry.

STANDARD CRANE SOFTWARE, specifically written for crane applications, is accessible with the industry's easiest-to-use, fully programmable keypad featuring a multi-line English language display. With the keypad on the controller or remotely mounted, you can program or monitor crane parameters. **OPERATOR INTERFACES** include stepless, multi-step, 3 contact ramp & hold, 2 contact ramp & hold,

master switches, pendants, radio control, or direct interface to PC and PLC ports. The **SERIAL INTERFACE OPTION** allows two-way communication between several drives and PC, PLC, radio control or industry-leading Cutler-Hammer PanelMate products.

Respondor drives provide **PRECISE HOOK CONTROL** with constant torque, user selectable constant horsepower operation, dynamic braking, and optional line regeneration. With a 1000 to 1 Speed Range and speed error less than 0.01% regulation no load to full load with encoder, Respondor Series AF Drives provide superior speed regulation.

The Respondor 9000 has a **COMPLETE** line with drives available up to 1100 HP. The drives share common hardware with the SV9000 thus allowing stocking and renewal parts synergies.



WITH THE OPTIONAL GRAPHIC CONTROL PANEL YOU CAN VIEW MULTIPLE FUNCTIONS ON THE 64 x 128 PIXEL SCREEN. CONCURRENTLY DISPLAY AND MONITOR A WIDE RANGE OF PARAMETERS SUCH AS MOTOR CURRENT, OUTPUT FREQUENCY, AND OUTPUT VOLTAGE. VIEW TRENDING GRAPHS AT INTERVALS OF 30 SECONDS TO EIGHT HOURS. THE BUILT-IN UPLOAD/DOWNLOAD FEATURE ALLOWS YOU TO TRANSFER PARAMETER SETS FROM ONE DRIVE TO ANOTHER SIMPLY BY ATTACHING IT TO A DIFFERENT DRIVE.

Cutler-Hammer, a part of Eaton Corporation, is a worldwide leader providing customer-driven solutions. From power distribution and electrical control products to industrial automation, Cutler-Hammer utilizes advanced product development, world-class manufacturing, and offers global engineering services and support.

For more information on Cutler-Hammer products, call 1-800-525-2000 or 1-616-982-1059, for engineering services call 1-800-498-2678, or visit our web site at www.cutlerhammer.eaton.com

For Cutler-Hammer RESPONDOR 9000 Adjustable Frequency Drives technical information and support, please call 1-414-449-7611.

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