

**NEW!**

# THE NEXT GENERATION OF CRANE PERFORMANCE



## **IMPULSE<sup>®</sup> G+ & VG+** *Series 4*

Adjustable Frequency Crane Controls



**MAGNETEK**  
MATERIAL HANDLING

**ELECTROMOTIVE SYSTEMS**

# IMPULSE®•G+ AND VG+ SERIES 4

## ADJUSTABLE FREQUENCY CRANE CONTROLS

### The Next Generation of Crane Performance

Magnetek's new IMPULSE•G+ and VG+ Series 4 drives continue our tradition of providing the most reliable and cost-effective adjustable frequency crane controls available. Industry-leading safety and performance features combine with our superior application expertise to provide unmatched performance for your material handling system.



**Load Check II™** — continuously detects hoist overload conditions, halting upward motion and only allowing the load to be lowered. Load Check II continuously monitors the hook load, both during acceleration and constant speed, eliminating the need for load cells in most applications. It provides an auto-setup function which defines the hoist's maximum hook load in seconds. With these control advancements, the drive no longer pauses for tests unless rated capacity is approached, providing increased productivity.

**Safe Torque Off** — provides a redundant hardware safety circuit that guarantees motor and brake power are removed when an E-STOP switch or safety controller opens the drive input, eliminating the need for external disconnects. This functionality is provided in a safety category 3 architecture, and designed to PLd and SIL CL2 according to ISO/EN 13849-1 and IEC/EN 62061 respectively, meeting the requirements of IEC/EN 61508.

**Adaptive Ultra-Lift™** — allows for hoist operation above base speed with a light load or empty hook. Adaptive Ultra-Lift continuously monitors motor torque and adjusts motor speed to operate at peak performance, improving plant safety and maximizing throughput. For example, motor speed can now be increased automatically when a magnet releases a load or gear ratios change with overwrapping drums.

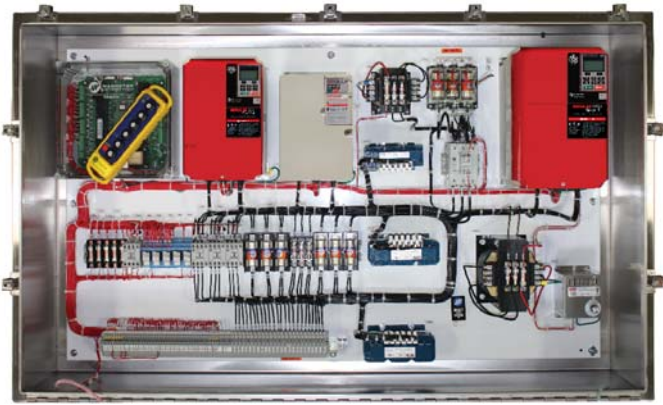
**Brake Test** — verifies brake torque with the press of a button, capturing breakaway torque with a monitor parameter on the keypad. Diagnose brake issues, perform preventative maintenance, and quickly commission the crane with this valuable tool.

**Quick-Set™** — drive setup is even easier with the new Quick-Set parameter group. The drive populates a single menu with the most frequently used parameters based on the motion and speed reference selected. For example, when a 3-step traverse drive is configured the three speed reference, two acceleration-deceleration, programmable input, motor FLA, and Reverse Plug Simulation™ parameters are all added to a convenient, single menu.

**Option Cards** — provide the drive flexibility needed with expandable AC, DC digital and analog input and output option cards. Simplify automation and diagnostics integration with our Ethernet IP, Modbus TCP/IP, and PROFIBUS-DP option cards. The new control power supply option maintains diagnostic, I/O and communications when main power is disconnected from the drive.

**IMPULSE•Link 4.1 Basic and Wireless Diagnostics Systems (WDS)** — maximizes the efficiency of your drive by providing easy parameter management right on your PC. WDS can communicate with up to 31 drives remotely, allowing wireless drive diagnostics, monitoring, and programming.

**Built In Reliability** — Magnetek drives are designed with reliability and economy in mind! The hardware and software were designed and extensively tested specifically for the operating conditions seen in overhead material handling applications. These durable drives feature new power modules which can withstand four times more thermal cycles than previous generations. Preventative maintenance monitors provide the feedback you need to proactively schedule maintenance and minimize downtime. IMPULSE•G+ & VG+ Series 4 drives are backed by our industry-leading three-year warranty.



## CUSTOM CONTROL PANELS

Magnetek's custom control panels with IMPULSE•G+ and VG+ Series 4 drives provide the ultimate solution for overhead material handling. These panels are custom built and designed to your specifications to meet your exact application requirements. Our experienced engineering staff provides technical support and extensive overhead material handling expertise when quoting and designing your project.

Custom panels are available with an unlimited number of configurations, components and accessories.

Common Options Include:

- 120V control transformer and interface card
- Brake contactor
- Branch fusing
- Built-in electronic motor thermal overload protection
- Clearly marked wires (at both ends)
- Wiring diagram
- NEMA 4/12 enclosure
- Enclosures for caustic and other environments
- Wiring for radio remote controls
- NEMA brake contactors
- Load and line reactors
- Air-conditioning or cooling fans
- Heaters and thermostats
- Door mounted keypads
- UL508 certification
- And many more!

## KEYPAD/DIGITAL DISPLAY

Our user-friendly keypad gives you five lines of sixteen characters each, includes soft keys and upgraded parameter selection. Makes navigation and reading diagnostics even easier!

Allows for:

- Programming the various drive parameters
- Parameter back-up (store and copy)
- Monitoring functions of the drive
- Reading of alpha-numeric fault diagnostic instructions
- Remote monitoring



## ENHANCEMENTS COMING SOON

- **IMPULSE•Link 5.0 Diagnostic System**
  - Crane Project Manager
  - Improved Drive Trending Tool
- **DataLogger Series 4**
  - Color touch screen diagnostics, fault logging, and performance history
  - Compatible with IMPULSE•G+Mini, IMPULSE•G+ and VG+ Series 3, IMPULSE•G+ and VG+ Series 4, and OmniPulse DDC
- **Application Specific Custom Software**
  - Drive Synchronization
  - Footbrake/Static Stepless Simulation
  - Grab/Bucket Control
  - Sway Control System (SCS®) Series 2



# IMPULSE® • SERIES 4 G+ AND VG+ FEATURES

## FEATURES

## BENEFITS

### SAFETY

Brake Test*	Allows testing of available brake torque
Encoder Loss Detection*	Signal loss detection at all times, even when the motor is not rotating (load float)
Snapped Shaft Detection*	Detects a broken coupling shaft or discontinuity in the drive train
Roll Back Detection/Torque Proving at Start/Brake Check at Stop*	Drive monitors brake functionality and motor torque at start and stop; the drive will maintain control of the load in case of a brake failure
Safe Operating Windows	Reduces the possibility of programming unsafe parameters
Load Check™	Prevents lifting an overload
Quick Stop™	Reduces the possibility of load and crane collision
Slack Cable Detection	Provides annunciation of the slack cable condition to the operator
Multi-Level Password Protection	Limits unauthorized modification of drive parameters
Phase Loss Detection	In case of output phase loss, brake will set immediately, retaining load
Control Interface	Optically isolated quick disconnect 120 Vac control interface with parameter backup
UL/cUL Rated	Tested and listed by Underwriters Laboratory
Safe Torque Off	Redundant crane monitoring circuits can externally stop the drive to safety category 3
Ground Fault Short Circuit Protection	Reduces damage to motor and drive
DC BUS Charge Indicator	Indicates when the DC BUS has discharged to a safe level

### PERFORMANCE

Indexing*	Allows precise programmed motor movement
Load Sharing*	Allows two or more mechanically coupled motors to be controlled in a master/slave torque control fashion
Hook Height Measurement*	Uses incremental encoder signal to determine hook height from calibrated position
Electronic Programmable Limit Switch*	Allows slow down and stop limits without a geared limit switch
Automatic Reset	Allows selectable conditions to be automatically reset with a new run command
Over-Torque/Under-Torque Detection	Allows programmable outputs and actions based on torque conditions
Slip Compensation	Automatically compensates for motor slip
Motor Lead Reversal	Electronically swaps motor leads for reverse operation
Keypad Copy	Copy, store and write parameters from keypad
Communication	Built-in RS-485 communication (Modbus - RTU)
Static Auto Tune	Allows auto tune without mechanical disconnection
Enhanced Keypad Display	Easily navigate and read diagnostics
Load Float™*	Allows a load to be held aloft at zero speed without setting the electric brake
Weight Calculation*	Enables load weight to be calculated with an accuracy of $\pm 5\%$ of full load (0–10 Vdc Output)
X-Press Programming™	Allows programming initial setup in seconds
Swift-Lift™/Ultra-Lift™	Allows overspeeding with light loads or empty hook
Reverse Plug Simulation™	Allows operator to smoothly and quickly stop and change directions without setting parking brake
Stall Prevention	Extends acceleration time and prevents the motor torque limits from being exceeded
Micro-Positioning™	Allows operator to make precise, slow movements
Multi-Function Input Terminals	Set end of travel/slow down limits or other functions
Flash Memory	Stores last ten fault occurrences, even after power-down, for diagnostic purposes
Elapsed Time Counter	Indicates actual time of operation (power on or run time)

### RELIABILITY

Fault Storage	Stores the last ten faults with trace data
Preventative Maintenance Monitors	Perform drive maintenance before a failure to minimize downtime
Programmable Fan	Cooling fan on/off control selections for longer life
Ambient Compensated Overload	High ambient motor protection
Increased Drive Output Current Ratings	Designed for 2x longer life than previous models including 4x longer power module life
Built-in Auto Tune	Maximizes performance and life of motor (rotational or static)
Serial Communication	Provides reliable digital link among various crane system peripherals, including Modbus RTU, PROFIBUS-DP, and Ethernet IP
Operation/Fault Display	Simplifies setup and troubleshooting

\* Features available on VG+ only

# CAPABILITIES

## IMPULSE® •G+ Series 4

Ratings	200-240 Vac, 3.0 to 415 AMP (0.75 to 150 HP) 400-480 Vac, 1.8 to 605 AMP (0.75 to 500 HP) 575-600 Vac, 1.7 to 200 AMP (1 to 200 HP)
Class of Service	CMAA Class A-F Service AISE TR6 Class 1 to 4 ASME HST – 4M H1 to H5
Speed Range	40:1 in V/F Mode (15 preset V/F Patterns, 1 Adjustable) 200:1 in Open Loop Vector Mode
Speed Control Methods	Up to 17 Distinct Speeds (Stepped) 2-Step Infinitely Variable 3-Step Infinitely Variable Analog Signal (0–10 Vdc, 4–20 mA, ±10 Vdc) Digital Pulse Train Input (32 KHz Max) Radio Drive Serial Interface (RDSI)
Programmable Terminals	(8) 120 Vac Inputs (3) Digital Dry Contact Relay Outputs (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form A) (1) Dedicated Fault Relay Output (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form C) (3) Analog Inputs (0-10 Vdc and ±10 Vdc (20K Ω), 4-20ma (250Ω)) (2) Analog Outputs (0-10 Vdc and ±10 Vdc Max Current 2mA, 4-20ma (500Ω)) (Consult factory for additional analog/digital input/output option cards)
Applications	Traverse Motions Worm Gear and Mechanical Load Brake Hoists

## IMPULSE® •VG+ Series 4

Ratings	200-240 Vac, 3.0 to 415 AMP (0.75 to 150 HP) 400-480 Vac, 1.8 to 605 AMP (0.75 to 500 HP) 575-600 Vac, 1.7 to 200 AMP (1 to 200 HP)
Class of Service	CMAA Class A-F Service AISE TR6 Class 1 to 4 ASME HST – 4M H1 to H5
Speed Range	1500:1 in Flux Vector Mode
Speed Control Methods	Up to 17 Distinct Speeds (Stepped) 2-Step Infinitely Variable 3-Step Infinitely Variable Analog Signal (0–10 Vdc, 4–20 mA, ±10 Vdc) Digital Pulse Train Input/Output (32 KHz Max) Radio Drive Serial Interface (RDSI)
Programmable Terminals	(8) 120 Vac Inputs (3) Digital Dry Contact Relay Outputs (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form A) (1) Dedicated Fault Relay output (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form C) (3) Analog Inputs (0-10 Vdc and ±10 Vdc (20KΩ), 4-20ma (250Ω)) (2) Analog Outputs (0-10 Vdc and ±10 Vdc Max Current 2mA, 4-20ma (500Ω)) (1) Single line driver/open collector encoder option card with 5/12 Vdc (200ma) power supply (Consult factory for additional analog/digital input/output and encoder option cards)
Applications	Traverse Motions (Consult factory) Non-Mechanical Load Brake Hoists

# Specification Value and Information for all IMPULSE®• G+ and VG+ Series 4 Models

Certification	UL, cUL, CSA (CE available upon request)
Rated input power supply volts	3-phase 200–240 Vac, 380–480 Vac, or 500-600 Vac; 50 or 60 Hz and frequency
Allowable input voltage fluctuation	+10% or -15% of nominal, 3-phase
Allowable input frequency fluctuation	±5% of nominal
Control method	Fully digital; sine-wave, V/F control, open loop vector control, flux vector control
Maximum output voltage (Vac)	Max output voltage 3-phase, 200/208/230/240/380/400/415/440/460/480 500/575/600V (proportional to input voltage)
Rated output frequency (Hz)	0 to 150 Hz (consult factory for applications above 150 Hz)
Output frequency accuracy	0.01% — with digital reference command, -10° to 40°C; 0.1% — with analog reference command; 10 bits/10V; 25°C, ±10°C
Frequency reference resolution	Digital: 0.01 Hz; analog: 0.03 Hz (at 60 Hz)
Output frequency resolution	0.01 Hz
Overload capacity	150% of rated load for 1 minute
Remote frequency reference sources	0–10 Vdc (20Ω); 4–20 mA (250Ω); ±10 Vdc; serial (RS-485)
Acceleration/deceleration times	0.1 to 25.5 sec — 4 sets; 8 parameters are independently adjustable
Braking torque	150% or more with dynamic braking (optional)
Motor overload protection	Electronic thermal overload relay; UL recognized (I <sup>2</sup> T)
Overcurrent protection level (OC)	200% of rated current
Circuit protection	Ground fault and blown-fuse protection
Overvoltage protection level	410 Vdc (200V), 820 Vdc (400V), 1040 Vdc (600V)
Undervoltage protection level	190 Vdc (200V), 380 Vdc (400V), 475 Vdc (600V)
Heatsink over temperature	Thermostat trips at 105°C
Four quadrant torque limit selection	Separate functions for FORWARD, REVERSE, REGEN; all selectable from 0–300%
Stall prevention	Separate functions for acceleration, at-speed and constant horsepower region
Other protection features	Speed deviation, overspeed, mechanical brake failure, lost output phase, lost input phase, failed-oscillator, PG-disconnect, mechanical overload, roll-back detection, internal braking transistor failure, and built in watchdog
DC bus voltage indication	Charge LED is on until DC bus voltage drops below 50 Vdc
Location	Indoors; requires protection from moisture, corrosive gases and liquids
Ambient operating temperature	14° to 140°F (-10° to 60°C). Consult factory for high ambient applications
Storage temperature	-4° to 158°F (-20° to 70°C)
Humidity	95% relative; noncondensing
Vibration	1 G for 10-20 Hz 0.6 G for 20-55 Hz (2003-2180, 4001-4150, 5001-5077) 0.2 G for 20-55 Hz (2215-2415, 4180-41090, 5099-5200)
Elevation	3300 ft. (1000m) or less 9900 ft. (3000m) or less with current derating
Safety Standard	UL 508C

## UNSURPASSED PRODUCT SUPPORT

As always, you can count on Magnetek and IMPULSE® drives to help you achieve the maximum performance and reliability of your overhead material handling system, including:

- Three-year warranty
- Magnetek Service Technicians on-call 24/7/365
- On-site and in-house product training programs
- Fully tested prior to shipment

For maximum control flexibility, match the IMPULSE•G+/VG+ Series 4 with SBP®/SBP2® Pendant Pushbutton Stations or Magnetek's extensive line of Radio Remote Crane Controls.

**For more information, contact Magnetek Material Handling or your local Magnetek Sales Representative.**



**MAGNETEK**  
MATERIAL HANDLING

**ELECTROMOTIVE SYSTEMS**

N49 W13650 Campbell Drive  
Menomonee Falls, WI 53051  
Toll-Free Phone 800.288.8178  
Toll-Free Fax 800.298.3503  
Phone 262.783.3500  
Fax 262.783.3510  
email sales@magnetek.com

WWW.MAGNETEKMH.COM

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