

Electromotive Systems

IMPULSE®•G+ AND VG+ SERIES 3
Adjustable Frequency Crane Controls



MAGNETEK
MATERIAL HANDLING

ELECTROMOTIVE SYSTEMS

IMPULSE®•G+ AND VG+ SERIES 3

ADJUSTABLE FREQUENCY CRANE CONTROLS

Magnetek's IMPULSE Drives have long been the gold standard in crane controls for the material handling industry. Advanced safety and performance features combined with our superior application expertise make IMPULSE®•G+ and VG+ Series 3 Crane Controls the best choice to maximize the performance and safety of your material handling system.

Standard Features Include:

- **Load Check™** — reduces possibility of lifting an overload
- **Load Sharing** — allows two or more mechanically coupled motors to be controlled with master/slave torque control
- **Swift-Lift™/Ultra-Lift™** — Allows overspeeding with light loads or empty hook
- **Intuitive Alarm and Fault Codes** — assist in diagnostics and troubleshooting for reduced downtime
- **Snapped Shaft Detection** — improves safety by detecting drive train discontinuity between high speed shafts and the drum
- **Advanced Encoder Option Cards** — hardware and software detection of improperly wired or faulty encoder. Dual encoder input is optional for added redundancy and/or special features
- **Increased Current Carrying Capacities** — make for a more robust power section
- **Easy to View LCD Display**— every programming parameter shows the factory default and min/max as a separate line included with the parameter being displayed
- **Compact Design** — allows it to easily fit into existing installations
- **Surface Mount Technology** — for increased reliability in a compact chassis



The IMPULSE Series 3 was designed to provide the ease of programming you expect plus the great features you'll come to rely on, like:

- **X-Press Programming™** — allows programming initial setup in seconds
- **Safe Operating Windows™** — reduces the possibility of programming unsafe parameters
- **Multi-level Password Protection** — limits unauthorized modification of drive parameters
- **Alarm and Fault Codes** — programmable alarm and fault codes for external conditions
- **IMPULSE•Link 4.1 Basic** — allows for parameter management, organization, and diagnostics to maximize the efficiency of your IMPULSE drives
- **DataLogger® Data Collection Tool** — simplifies troubleshooting and provides detailed operational histories for preventive maintenance
- **Network Communications** — Compatible with Profibus, Modbus RTU, Modbus+, and Ethernet Communications
- **Diagnostics** — Optional wireless diagnostic communication packages for up to 31 drives (nodes) for remote diagnostics, monitoring and programming
- **Customization** — software available for grab bucket control, hoist synchronization, static stepless simulation and sway control. Additional custom software options are available from our in-house software engineers

KEYPAD/DIGITAL DISPLAY

Our user-friendly keypad with an expanded digital display gives you five lines of 16 characters each, making it easy to navigate and read diagnostics.

Allows for:

- Programming the various drive parameters
- Parameter storage (upload/download)
- Monitoring the functions of the drive
- Reading alpha-numeric fault-diagnostic indications
- Available in English, Spanish and French
- Remote mounting



CONTROL PANELS

PRE-ENGINEERED PANELS



IMPULSE•G+ Series 3 and IMPULSE•VG+ Series 3 Drives can be purchased as part of a complete, pre-engineered motor control system. These quick-ship, easy-to-install panels offer cost-effective and reliable operation using high quality components. Available in 1 to 30 HP at 230V and 1 to 60 HP at 460V, all panels are tested and quality-approved prior to shipment.

Standard Features Include:

- 120 Volt control voltage interface card
- Brake contactor
- Branch fusing
- Built-in electronic motor thermal overload protection
- Dynamic braking resistor(s)
- All wiring to a single terminal strip
- Clearly marked wires (at both ends)
- Basic wiring diagram
- NEMA 4/12 enclosure

CUSTOM SOFTWARE

These custom software applications can be added to our already robust IMPULSE•G+ and VG+ Series 3 drives to meet your unique application requirements:

- Footbrake/Static Stepless Simulation Software
- Drive Synchronization Software
- Grab/Bucket Control Software
- Sway Control System (SCS®) Series 2

Visit www.magnetekmh.com/control.htm for additional information on custom software applications.

CUSTOM PANELS



Magnetek's custom control panels with IMPULSE•G+ and VG+ Series 3 Drives provide the ultimate solution for overhead material handling. Built and designed to your specifications, these panels include all the standard features of our pre-engineered panels, and can be custom designed to your exact specifications. Our experienced engineering staff provides technical support and extensive overhead material handling expertise when quoting your project.

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

Available Custom Options Include:

- Enclosures for caustic and other environments
- Wiring for radio remote controls
- NEMA brake contactors
- Load and line reactors
- Air-conditioning and cooling fans
- Heaters and thermostats
- Door mounted keypads
- UL 508 certification

And many more!

DRIVE SUPPORT TOOLS

DRIVE SIMULATION SOFTWARE

Simulate an IMPULSE drive right on your computer

Our Drive Simulation software is a Windows-based PC program that allows you to program and simulate the functions of a drive.

A variety of drive capabilities can be experienced, including:

- Programming a drive using a keypad interface
- Running the drive using a pendant station
- Monitoring input/output status
- Programming/executing special functions within the drive such as auto-tuning
- Simulating motor loading
- Charting/viewing performance characteristics
- Simulating alarms/faults
- Viewing/editing parameter settings

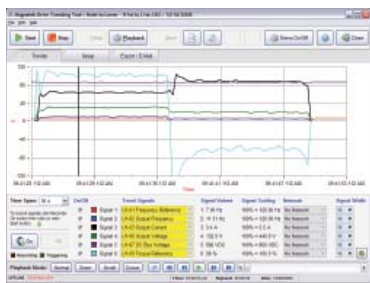


IMPULSE® DRIVE TRENDING TOOL

Trend diagnostic feedback from IMPULSE drives

The IMPULSE Drive Trending Tool is a Windows-based PC program that serves as a digital chart recorder. It lets you monitor and analyze the performance of a crane or hoist using IMPULSE drives in real-time. The Drive Trending Tool allows you to:

- Monitor and chart up to 6 data points (motor current, output frequency, input/output, etc.)
- Replay recorded data in real time
- Save, open, e-mail, and convert data into multiple file formats for offline analysis
- Connect over RS-232, RS-485, or Ethernet using IMPULSE®•Link 4.1 Wireless Diagnostic system



IMPULSE®•LINK 4.1 WIRELESS DIAGNOSTIC SYSTEM (WDS)

Bridging the gap between your facility's IMPULSE•G+ and VG+ Series 3 Crane Controls and Ethernet network

IMPULSE•Link 4.1 WDS is a Windows-based interactive drive software and hardware package designed to enhance productivity by allowing you to efficiently

program, monitor and troubleshoot your IMPULSE•Series 3 crane controls from a remote location. It allows you to:

- Use all features included in IMPULSE®•Link 4.1 Basic
- Monitor drive parameters and status
- Modify and upload/download parameters
- Reset faults remotely
- Log fault, alarm and run events with DataLogger function
- Graph, print and e-mail items such as motor speed, torque, current etc.
- Includes Drive Trending Tool



IMPULSE®•LINK 4.1 BASIC

Your 1-to-1 link between your PC and your IMPULSE•G+ and VG+ Series 3 Drives

IMPULSE Link 4.1 Basic is a Windows-based interactive software package which allows you to:

- Upload and download drive parameters
- Adjust drive parameters online or offline
- View and print drive parameters
- View complete parameter descriptions
- Compare drive parameters

DATALOGGER/DATAPULSE Simplifies troubleshooting and gathers information for preventive maintenance

This user-friendly recording device simply plugs into the keypad pocket of the drive and allows operators to easily access the run, alarm and fault histories. It includes enough memory to log the last 1400 drive run events,

the last 400 alarm and fault events, and provides a date/time stamp for each event. A trace function is provided for viewing drive data that occurred prior to the alarm/fault condition. The stored information can be locally viewed or extracted via USB to a Windows-based PC.



IMPULSE®•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 (during load float)
Snapped Shaft Detection*	Detects a broken coupling shaft or discontinuity in the drive train
Slack Cable Detection*	Identifies a slack cable condition and provides a selectable response (stop, slow down, alarm)
Roll Back Detection/Torque Proving at Start/Brake Check at Stop*	Drive monitors brake functionality and motor torque at start and stop
Safe Operating Windows	Reduces the possibility of programming unsafe parameters
Load Check™	Reduces the possibility of lifting an overload
Quick Stop™	Reduces the possibility of load collision
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 (24 Vac, 48 Vac, and 24 Vdc available)
UL/cUL Rated	Tested and listed by Underwriters Laboratory
Ground Fault Short Circuit Protection	Reduces damages 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
Over-Torque/Under-Torque Detention	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 ±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	For end of travel/slow down, limits stops or other options
Flash Memory	Stores last ten fault occurrences, even after powerdown, for diagnostic purposes
Elapsed Time Counter	Indicates actual time of operation (power on or run time)
Hoist Synchronization*	Synchronizes multiple motors in master/slave configuration (speed matching)
RELIABILITY	
Fault Storage	Stores the last ten faults with trace data
Maintenance Timer	Alerts operator when maintenance is required (run time)
Programmable Fan	Cooling fan on/off control selections for longer life
Ambient Compensated Overload	High ambient motor protection
Increased Drive Output Current Ratings	Robust power section
Built-in Auto Tune	Maximizes performance and life of motor (rotational or static)
Serial Communication	Provides reliable digital linkage among various crane system peripherals, including Modbus, Modbus+, Profibus and Ethernet
Operation/Fault Display	Simplifies setup and troubleshooting

* Features available on VG+ only

CAPABILITIES

IMPULSE® • G+ Series 3

Adjustable Frequency/Open Loop Vector Controls

Ratings	200–240 Vac, 7 to 346 AMP (1 to 125 HP) 380–460 Vac, 2.1 to 675 AMP (1 to 500 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) 100:1 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/Output (32 KHz Max)
Programmable Terminals	(8) 120 Vac Inputs (3) Digital Dry Contact Relay Outputs (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form A/Form C) (1) Dedicated Fault Relay output (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form A/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 3

Flux Vector Controls

Ratings	200-240 Vac, 7 to 346 AMP (1 to 125 HP) 380-460 Vac, 2.1 to 675 AMP (1 to 500 HP)
Class of Service	CMAA Class A-F Service AISE TR6 Class 1 to 4 ASME HST – 4M H1 to H5
Speed Range	1000:1
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)
Programmable Terminals	(8) 120 Vac Inputs (3) Digital Dry Contact Relay Outputs (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form A/Form C) (1) Dedicated Fault Relay output (1A Max @ 250 Vac, 1A Max @ 30 Vdc, Form A/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, Clam Shell/Grab Bucket Hoists, Synchronizations

Specification Value and Information for all IMPULSE® • G+/VG+ Series 3 Models

Certification	UL, cUL (CE available upon request)
Rated input power supply volts and frequency	3-phase 200–240 or 380–480 Vac; 50 or 60 Hz
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, 200/208/220/230/240V; 380/400/415/440/460/480V (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 ² T)
Overcurrent protection level (OC)	200% of rated current
Circuit protection	Ground fault and blown-fuse protection
Overvoltage protection level	410/820 Vdc
Undervoltage protection level	190/380 Vdc
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 113°F (-10° to 45°C) for open chassis (Consult factory for high ambient applications)
Storage temperature	-4° to 140°F (-20° to 60°C)
Humidity	95% relative; noncondensing
Vibration	1 G 10 to 20 Hz; 0.2 G for 20-50 Hz
Elevation	3300 ft. (1000m) or less
Efficiency	96 to 98%
Displacement Power Factor	0.98
Twelve-Pulse Capability	30 to 125 HP @ 230 Vac, 30 to 500HP @ 460 Vac



YOUR ONE-STOP SOURCE FOR MATERIAL HANDLING CONTROL SOLUTIONS



ENGINEERED SYSTEMS & SOLUTIONS

Project Evaluation
Project Management
Engineering Design
System Manufacturing and Testing
Field Startup, Testing, Training and Support
Customer Training and Maintenance Support
Application Solutions
PLC/PC Program Development

**IMPULSE™ AC ADJUSTABLE
FREQUENCY DRIVES**

230, 460 and 575 Volt Power Platforms
.25–1,500 Hp
Exclusive Application Software
Specific Crane & Hoist Software

OMNIPULSE™ DIGITAL DRIVES

DSD – AC in/DC out
15–800 Hp
DDC – DC in/DC out
5–500 Hp

**MAC™•2000 MOTOR
ACCELERATION CONTROL**

Single & 2 Speed — up to 15.2 Amps
Contactor Panels

VARIABLE SPEED MOTOR CONTROL PANELS

Standard Pre-Engineered Systems
Custom Engineered Systems

MOTORS & ACCESSORIES

Standard Inverter Duty AC Induction Motors
Flux Vector Designed Motors

POWER DELIVERY SYSTEMS

ELECTROBAR® 8-Bar — 90, 110, 250, 350 Amps
ELECTROBAR® FS — 90, 110, 125, 250, 400 Amps
ELECTROBAR® ELITE — 60, 100, 130, 200 Amps
ELECTROBAR® HX — 400, 700, 1000 Amps
FABA® Conductor Bar Systems — 100 Amps

ELECTROMOTIVE™ FESTOONING SYSTEMS

Standard Duty
Heavy Duty
Mill Duty

**SBP® & SBP2® PENDANT PUSH
BUTTON STATIONS**

Standard 2 through 12 Button Stations
Custom Configured Stations

**TELEMOTIVE & ENRANGE RADIO REMOTE
CONTROL SYSTEMS**

Flex Ex
telePendant™
300T
Pendant™
telePilot™
100T
PGT
DTX
MLTX™
SLTX™
700T
JLTX™
Locomotive Control Systems

COLLISION AVOIDANCE SYSTEMS

LaserGuard™
ReFlx™

MONDEL BRAKES

200S Industrial Shoe Brakes
4"–19" Diameter
6–2,250 Lb. Ft. Torque
AC, DC, Hydraulic Actuators
AC Explosion Proof Actuators

AIST-NEMA 300M Mill Duty Shoe Brakes

5"–30" Diameter
10–11,000 Lb. Ft. Torque
AC, DC, Hydraulic Actuators
AC Explosion Proof Actuators

400D Heavy Duty Disc Brakes

8"–50" Diameter
50–30,000 Lb. Ft. Torque
AC, DC, Hydraulic Actuators
AC Explosion Proof Actuators

Braketronic™ Control System

Braketronic Controller
Standard Pre-engineered Panel
Mill Duty Foot Pedal (optional)

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