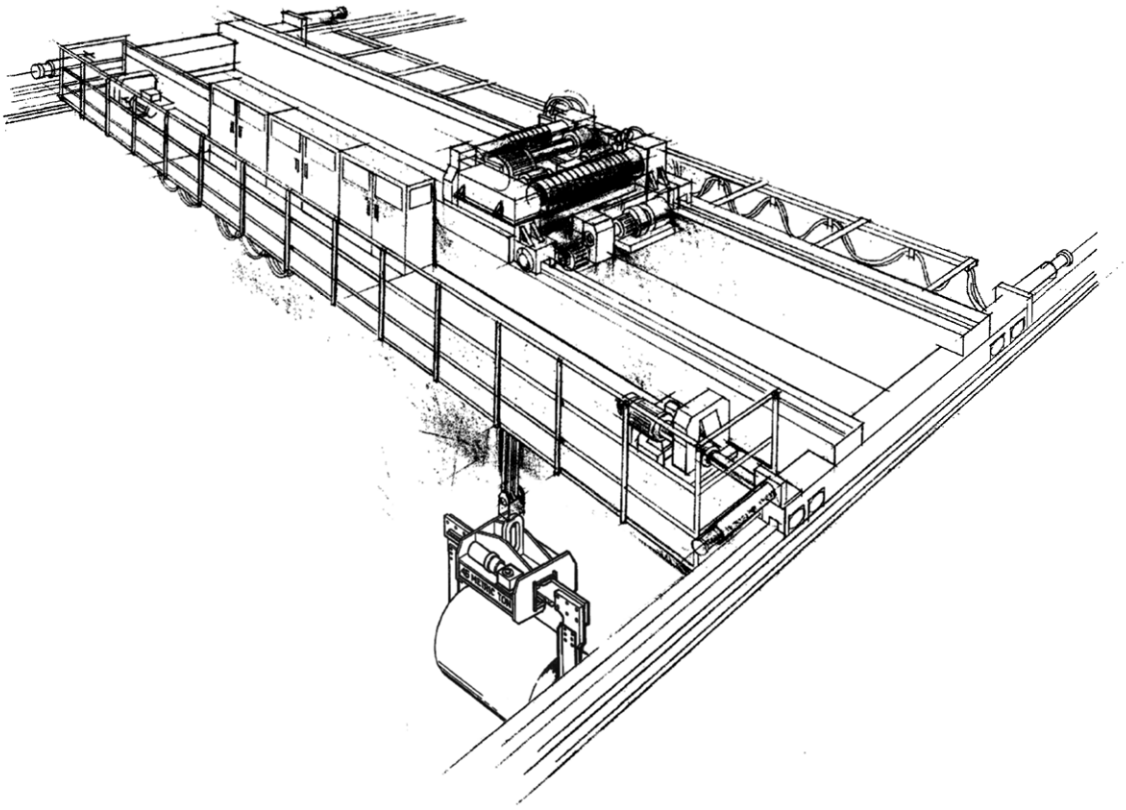

Braketronic™

IMPULSE®•G+ Series 4

Braketronic Instruction Manual

MAGNETEK
MATERIAL HANDLING
MONDEL

February 2013
Part Number: 144-27048 R1
Software Number: 14704.x

Table of Contents

Preface and Safety

Product Safety Information

Magnetek, Inc. (Magnetek) offers a broad range of radio remote control products, control products and adjustable frequency drives, power delivery systems, and industrial braking systems for material handling applications. This manual has been prepared by Magnetek to provide information and recommendations for the installation, use, operation and service of Magnetek's material handling products and systems (Magnetek Products). Anyone who uses, operates, maintains, services, installs or owns Magnetek Products should know, understand and follow the instructions and safety recommendations in this manual for Magnetek Products.

The recommendations in this manual do not take precedence over any of the following requirements relating to cranes, hoists, lifting devices or other equipment which use or include Magnetek Products:

- Instructions, manuals, and safety warnings of the manufacturers of the equipment where the Magnetek Products are used,
- Plant safety rules and procedures of the employers and the owners of the facilities where the Magnetek Products are being used,
- Regulations issued by the Occupational Health and Safety Administration (OSHA),
- Applicable local, state, provincial, or federal codes, ordinances, standards and requirements, or
- Safety standards and practices for the industries in which Magnetek Products are used.

This manual does not include or address the specific instructions and safety warnings of these manufacturers or any of the other requirements listed above. It is the responsibility of the owners, users and operators of the Magnetek Products to know, understand and follow all of these requirements. It is the responsibility of the employer to make its employees aware of all of the above listed requirements and to make certain that all operators are properly trained. **No one should use Magnetek Products prior to becoming familiar with and being trained in these requirements and the instructions and safety recommendations for this manual.**

Product Warranty Information

Magnetek, hereafter referred to as Company, assumes no responsibility for improper programming of a device (such as a drive or radio) by untrained personnel. A device should only be programmed by a trained technician who has read and understands the contents of the relevant manual(s). Improper programming of a device can lead to unexpected, undesirable, or unsafe operation or performance of the device. This may result in damage to equipment or personal injury. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of such programming. Company neither assumes nor authorizes any other person to assume for Company any other liability in connection with the sale or use of this product.

For information on Magnetek's product warranties by product type, please visit www.magnetekmh.com.

Terms

Drive: IMPULSE®•G+ Series 4

Registered Trademarks

Trademarks are the property of their respective owners.

Supplemental Safety Instructions

Read and understand this manual before installing, operating, or servicing the Braketronic. Install the Braketronic according to this manual and local codes.

The following conventions indicate safety messages in this manual. Failure to heed these messages could cause fatal injury or damage products and related equipment and systems.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

NOTICE indicates a potential equipment damage message.

NOTE: A NOTE statement is used to notify installation, operation, programming, or maintenance information that is important, but not hazard-related.

Product Overview

About This Product

The Braketronic system provides a means of varying the braking torque developed by spring-applied, thruster-released shoe and disk brakes.

Single or multiple brakes may be operated from one Braketronic Controller.

Braking torque modulation is achieved by either of the following methods:

- Continuous variation controlled by external means (usually a pedal operated potentiometer).
- Preset rate variation controlled by an internally generated ramp signal.

Control of brake torque is achieved by modulating the electrical supply voltage and frequency to the thruster pump motor. This varies the speed of the pump impeller and thus the pressure and volume of hydraulic fluid delivered to the thruster piston. The thruster piston extends, offsetting the torque spring force applied to the brake shoes as follows:

- Maximum frequency and voltage supplied to the thruster produce full motor speed with maximum pump output. Increased pump output will decrease torque-spring force available to the brake shoes and move them away from the brake wheel; the braking torque falls to zero and shoe clearance reaches its maximum. As pump speed and piston force decrease, the torque-spring force available to the brake shoe increases. This allows the shoes to close on the brake wheel.
- Maximum brake torque is generated as motor and pump speed fall to the level at which the thruster piston is no longer able to offset torque-spring force.

When using the pedal (or similar remote control) and all conditions for operation are met, the output voltage and frequency produced by the Braketronic controller will vary, depending upon the position of the pedal, as follows:

- With the pedal released (OFF), the Braketronic supplies full rated voltage and frequency to the thruster motor. The motor will run at its rated RPM to fully release the brake.
- When foot pressure is applied to the pedal, an internal switch trips after the pedal leaves the released (OFF) position. This switch signal causes the controller output frequency to decrease at a preset ramp rate, quickly moving the shoes into light “kiss” contact with the brake wheel.
- As pressure on the pedal increases, a potentiometer arranged to sense pedal position adjusts the controller to produce a gradual increase in braking torque.
- When the pedal is fully depressed, the controller output decreases to the point where the thruster is unable to offset any torque spring force and maximum braking torque is produced.
- A small decrease in pedal pressure changes the position of the controller potentiometer, producing an increase in controller output which increases the thruster motor RPM. The thruster motor speed increase acts to offset torque spring force and decrease the braking torque.
- When pressure on the foot pedal is completely removed, the internal switch resets to produce maximum controller output and quickly move the shoes clear of the wheel.

NOTE: When circumstances permit, ramp rate parameters are factory set for operation with a specified brake, or brakes. However, a digital operator is supplied with each Braketronic controller to allow on-site modification of parameters.

“Wireless Remote Control” (supplied separately) can be used to regulate the output of a Braketronic controller. Braking characteristics are similar to those offered by the pedal operator while allowing the operator considerable mobility. Operation is generally as follows:

- When the wireless “Brake Master Switch” is not operated, the Braketronic unit supplies rated voltage and frequency to the thruster motor, and fully releases the brake.

- Initial movement of the “Brake Master Switch” activates a primary relay. This sets the controller output to a value that quickly moves the shoes into light “kiss” contact with the brake wheel.
- Advancing the “Brake Master Switch” to nearly full travel produces a continued, but slower, decrease in controller output with a corresponding increase in brake torque.
- When the “Brake Master Switch” reaches full travel, controller output continues to decrease to the point where the thruster is unable to offset any torque spring force and maximum braking torque is produced.
- Gradually allowing the “Brake Master Switch” to return to its starting position increases controller output and thruster motor RPM. The thruster motor speed increase acts to offset torque spring force and decrease the braking torque.
- When the “Brake Master Switch” returns to its starting position, the primary relay releases to produce maximum controller output and quickly move the shoes clear of the wheel.

Pre-programmed “Fixed Rate Ramp Control” is available as an alternative to variable rate braking. With “Fixed Rate Ramp Control,” the controller produces an output whose voltage and frequency emulate pedal operation.

NOTE: Ramp function parameters are factory pre-programmed, but can be modified on-site using the digital operator provided with each Braketronic Controller.

- As soon as the “kiss” stage is reached, controller output decreases linearly to produce a ramp controlled increase in braking torque. At the end of this ramp period, controller output decreases to the point where the thruster is unable to offset torque spring force to produce maximum attainable braking torque.
- Opening the voltage-free contact signals the Braketronic output to increase at the predetermined ramp rate(s). The frequency and voltage will ramp to maximum and the brake will return to the fully released state. The brake will remain released until “Ramp Control” mode is selected and the voltage-free ramp initiation contact closes, or power to the Braketronic system is interrupted.

Figure 1 shows the Industrial Duty foot pedal unit. It consists of a floor mounted, NEMA 4 rated, cast aluminum enclosure containing three switches and a potentiometer. The pedal drives the potentiometer via a gear set and the switches via independently adjustable cams.

Figure 2 shows the Mill Duty foot pedal. It consists of a floor mounted, NEMA 4 rated, cast aluminum enclosure containing a contact block and a gear-driven potentiometer. The pedal may contain a circuit to regulate the pot output to a maxium of 10 VDC, and also to prevent damage to the potentiometer when it is connected incorrectly.

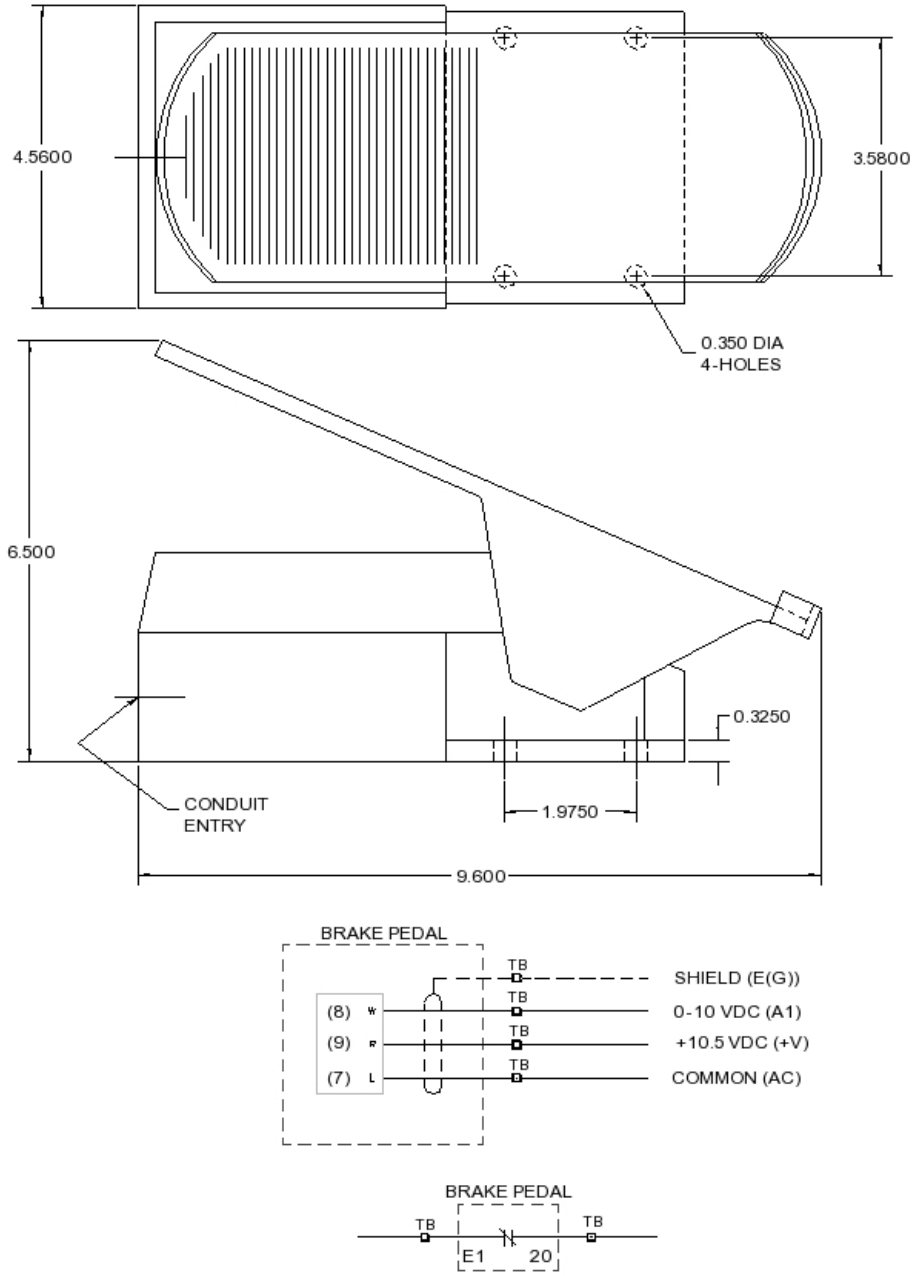

Figure 1: Industrial Duty Foot Pedal (Part Number BRKTN OPTION I)

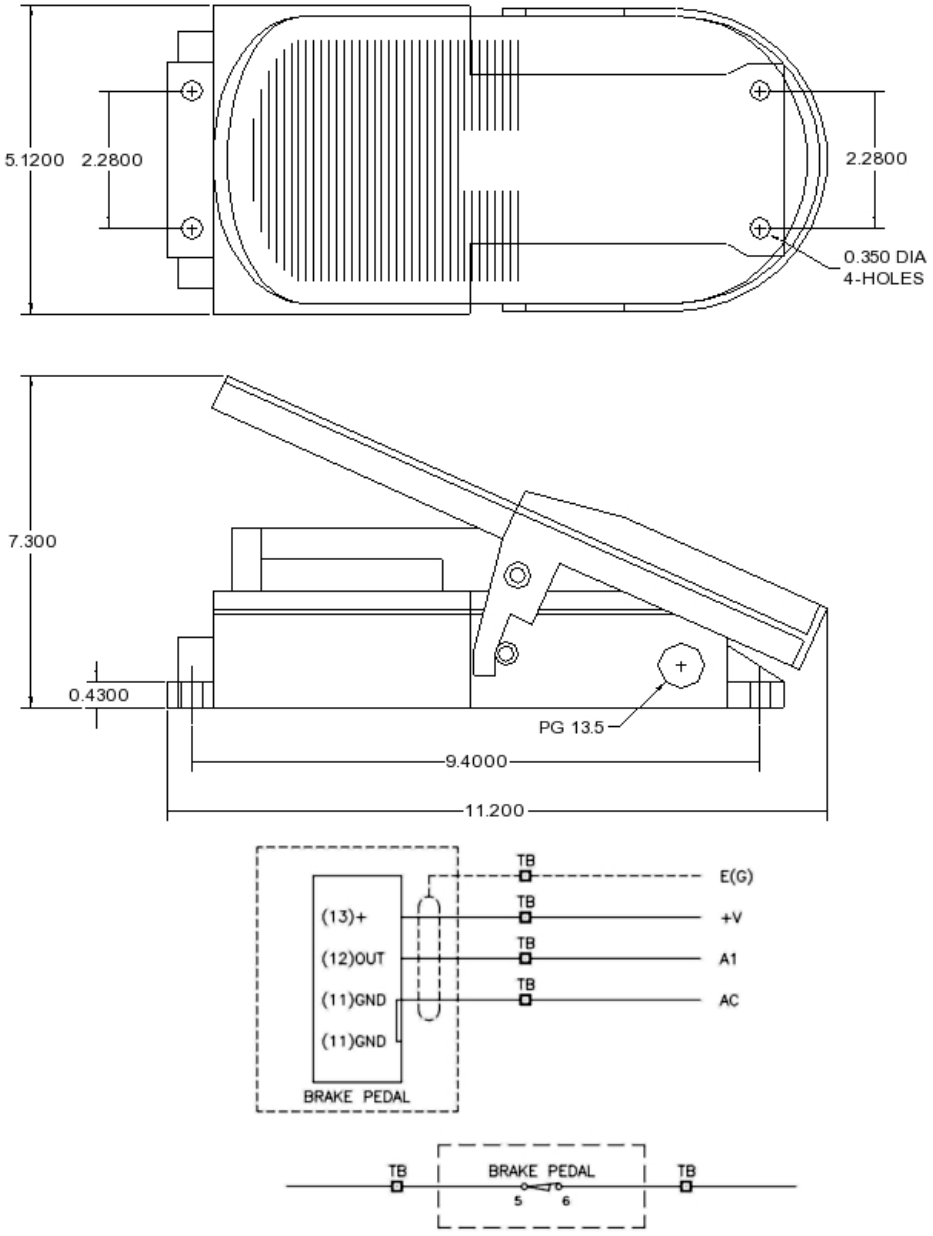

Figure 2: Mill Duty Foot Pedal (Part Number BRKTN OPTION M)

NOTE: Only one of the GND terminals inside the pedal needs to be wired to terminal AC.

Installation

These notes form part of the scope of supply for Braketronic systems when used with Mondel spring-applied, thruster-released brakes. These notes are valid only when the equipment is installed in accordance with drawings and supporting documentation specific to the equipment.

Magnetek will not be responsible for modifications made by others after this equipment leaves the factory, unless prior written authorization has been obtained from Magnetek.

Based on data furnished to us by the purchaser or his agents, Magnetek will adjust and calibrate Braketronic controllers to suit specific brake applications.

The installer is responsible for compliance with all relevant safety codes and regulations.

Locating the Braketronic Controller

Mount the control enclosure with the hinge vertical to ensure the effectiveness of internal cooling fins.

Allow 4” minimum clearance all around the enclosure for ventilation (see Figure 3 below). Protect from unreasonable amounts of dust, grease, liquids or gases.

Mount in a shaded location out of direct sunlight and provide radiant heat shielding, where necessary, to protect the temperature-sensitive components.

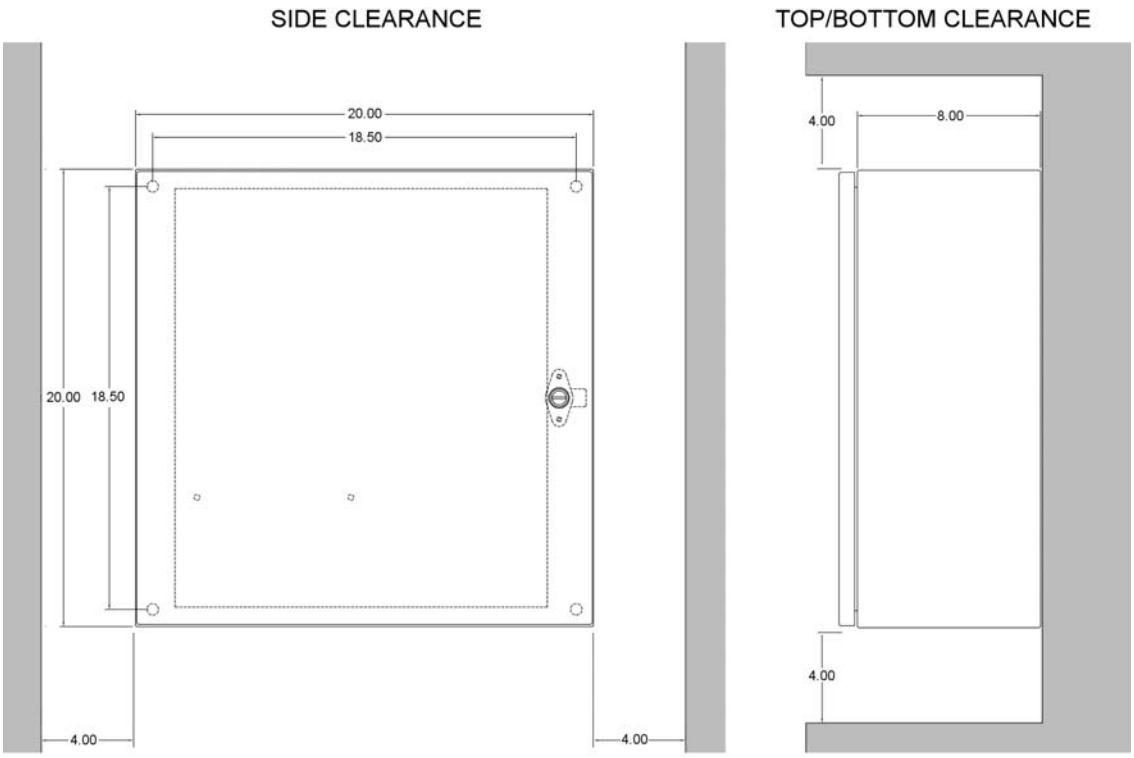

Figure 3: Example of Minimum Clearance

Electrical Connections

DANGER

Unexpected movement or hazardous voltage can cause injury or death. Disconnect, lock out, and tag out the power source that feeds this device to prevent power from being applied while work is carried out.

WARNING

Before working on a Braketronic system, ensure that the power has been disconnected for at least three minutes. Internal capacitors hold a charge and hazardous voltages remain present at terminals and components for up to three minutes after power is turned off.

WARNING

Do NOT connect power directly to terminals T1, T2, and T3 under any circumstances.

Wiring diagrams specific to the Braketronic Controller are shipped with each unit. External (user) connections are shown on the diagram that shipped with the unit.

Power Supply Connections

Select appropriate conductor size, insulation, jacket and branch circuit protection in accordance with local electrical codes. Connect power only to the power supply terminals as shown on the wiring diagram. Verify polarity when a direct current supply is specified.

Internal fuses or circuit breakers, suitable for the application, are provided. The fuse/breaker rating is shown on the wiring diagram that shipped with the unit.

A ground stud is provided on the sub-panel to receive all connections from power line protective ground wire conductors. Ground all enclosures and components as required by local electrical codes.

External electrical wiring must be connected only at the terminal block; the wiring diagrams shipped with the unit show connection details.

Conduit/cable entries must be located in the bottom face of the enclosure to minimize moisture entry. Use separate conduits for power line input and control wiring.

Power Connection to the Brake Thruster

Select appropriate conductor size, insulation, and jacket in accordance with local electrical codes. Specific electrical characteristics will be found on the Thruster nameplate. Use a separate conduit to connect from the brake thruster terminals to terminals on the controller. A ground connection between the thruster and the control is required. The thruster moves during operation. Flexible conduit is required. Shielded conductors are unnecessary under most conditions; however, output cable runs exceeding 150 feet require motor line reactors to be installed. For information concerning unusual operating conditions contact Magnetek at 1-800-288-8178.

Control Connection

The control lines (16 to 20 AWG, low voltage 0–10.5 VDC) between the controller and the pedal unit or any other remote control devices must be shielded. Ground the control conductor shields only at the Braketronic terminal block. Run the control wiring in a separate conduit containing no other circuits.

Operational Test

WARNING

Review and verify the following checklist before applying power to the system:

- Components are as supplied by the factory.
- Wiring is correct per the factory-supplied drawings.
- Enclosures and thrusters are grounded in accordance with local electrical codes.
- Power supply is within the specified range, and the correct voltage/polarity is available at the power supply input terminals.
- Brake adjustments are complete in accordance with the relevant brake instruction manual.

WARNING

Before conducting an operational test, remove all tools, chocks, and other equipment which may create a hazard when the machine is operating.

WARNING

Before attempting to operate any motion in any application, advise and account for the location and security of all personnel.

Comply with the owners' safety procedures and heed all warnings and cautions, both in the BRAKETRONIC and BRAKE instruction manuals.

Follow all standards and local statues.

As a preliminary test, operate the brake system without load or movement.

Pedal/Radio Controlled Variable Torque

Switch ON the power supply to the Braketronic unit. If the drive is configured to “Allow Run at Power Up” (B03-10=1), the brake will release quickly.

Apply light pressure to the brake pedal; the shoes should quickly move into light “kiss” contact with brake wheel.

Apply more force to the pedal; braking torque will increase as shoe pressure on the brake wheel increases.

Just before the pedal reaches its fully depressed position, maximum brake shoe to wheel pressure is achieved; full torque is applied.

If the brake fails to respond as above, check the wiring, and repair or re-adjust the brake as necessary. Visually inspect the brake during operation to ensure all adjustments are correct. If successful, continue with longer duration tests until confident that the brake and Braketronic system is operating satisfactorily.

Ramp Controlled Torque (Radio Control without Pedal)

Switch ON the power supply to the Braketronic unit. If the drive is configured to “Allow Run at Power Up” (B03-10=1), the brake will release quickly.

Initiate the ramp signal contact; the shoes should move quickly into light “kiss” contact with the brake wheel.

After the “kiss” contact stage is reached, shoe movement slows and pressure increases on the wheel; braking torque rises as shoe pressure on the brake wheel increases.

The time taken from ramp contact initiation to the development of full torque is determined by the duration of the ramp signal.

When the ramp signal duration times out, the controller output decreases to produce maximum brake shoe to wheel pressure; full torque is applied.

If the brake fails to respond as above, check the wiring, and repair or re-adjust the brake as necessary. Visually inspect the brake during operation to ensure all adjustments are correct. If successful, continue with longer duration tests until confident that the brake and Braketronic system is operating satisfactorily.

Parameter Settings and Timing Charts

230/460/575 VAC Braketronic Applications with Foot Pedal

Table 1: Parameter Settings for IMPULSE®•G+ Series 4 Drives 230/460/575 VAC Braketronic Applications with Foot Pedal

Parameter	Default Setting	Parameter Description Setting Description
A01-01	2	Setting determines which parameters are accessible Allow access to advanced programming parameters
A01-02	0	Determines method of control V/f Control Method
A01-03	4	Parameter set to match motion of the application Braketronic motion
A01-04	0	Parameter set to define input terminals Two speed multi-step. Defines Terminal S2 = 2nd Speed (Kiss Frequency)
B01-01	0.00	Frequency Reference (1)
B01-02	60.00	Frequemcy Reference (2) - Full Release Frequency Brake is fully released at 60 Hz
B01-18	2	Parameter is set to select reference terminal Higher reference automatically selects the fastest input frequency
B03-10	1	Allow Run at power up Enabled - this allows the brake to release when power is turned on
B05-01	0.3	Acceleration Time (1) - Brake release time Time for brake to release to full open is 0.3 seconds
B05-02	0.3	Deceleration Time (1) - Approx time from Fully Released to Kiss Frequency Decel time from 60 Hz to Kiss Frequency is 0.3 seconds
D09-01	0.00	S-Curve characteristic Acceleration s-curve at start is set to 0 seconds
D09-02	0.00	S-Curve characteristic Acceleration s-curve at end is set to 0 seconds.
D09-03	0.00	S-Curve characteristic Deceleration s-curve at start is set to 0 seconds
D09-04	0.00	S-Curve characteristic Deceleration s-curve at end is set to 0 seconds
E02-01	***	Full load amps Set to total full load amps of all connected acutators. Default is drive capacity.
H03-03	75	Auto speed reference signal gain - Cab Kiss Frequency Setting Cab Kiss Frequency is 75% of B01-02 (60 Hz * 75% = 45 Hz)
H03-04	33.3	Bias multiplier for terminal 13 analog input signal - Min frequency of thruster Minimum thruster frequency is 33.3% of B01-02 (60 Hz * 33.3% = 20 Hz)

Do not change parameter

*** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

230 VDC Braketronic Applications with Foot Pedal

Table 2: Parameter Settings for IMPULSE®•G+ Series 4 Drives 230 VDC Braketronic Applications with Foot Pedal

Parameter	Default Setting	Parameter Description Setting Description
A01-01	2	Setting determines which parameters are accessible Allow access to advanced programming parameters
A01-02	0	Determines method of control V/f Control Method
A01-03	4	Parameter set to match motion of the application Braketronic motion
A01-04	0	Parameter set to define input terminals Two speed multi-step. Defines Terminal S2 = 2nd Speed (Kiss Frequency)
B01-01	0.00	Frequency Reference (1)
B01-02	60.00	Frequency Reference (2) - Full Release Frequency Brake is fully released at 60 Hz
B01-18	2	Parameter is set to select reference terminal Higher reference automatically selects the fastest input frequency
B03-10	1	Allow Run at power up Enabled - this allows the brake to release when power is turned on
B05-01	0.3	Acceleration Time (1) - Brake release time Time for brake to release to full open is 0.3 seconds
B05-02	0.3	Deceleration Time (1) - Approx time from Fully Released to Kiss Frequency Decel time from 60 Hz to Kiss Frequency is 0.3 seconds
D09-01	0.00	S-Curve characteristic Acceleration s-curve at start is set to 0 seconds
D09-02	0.00	S-Curve characteristic Acceleration s-curve at end is set to 0 seconds
D09-03	0.00	S-Curve characteristic Deceleration s-curve at start is set to 0 seconds.
D09-04	0.00	S-Curve characteristic Deceleration s-curve at end is set to 0 seconds
E01-03	F	Input voltage setting Custom V/f pattern selected
E01-05	208***	Maximum voltage Set to actuator nameplate voltage
E01-06	60	Maximum voltage frequency The frequency at which maximum voltage should occur - base frequency
E01-13	208***	Base voltage Set to acuator nameplate voltage
E02-01	****	Full load amps Set to total full load amps of all connected acutators. Default is drive capacity.
H03-03	75	Auto speed reference signal gain - Cab Kiss Frequency Setting Cab Kiss Frequency is 75% of B01-02 (60 Hz * 75% = 45 Hz)
H03-04	33.3	Bias multiplier for terminal 13 analog input signal - Min frequency of thruster Minimum thruster frequency is 33.3% of B01-02 (60 Hz * 33.3% = 20 Hz)

Do not change parameter

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

Parameter	Default Setting	Parameter Description Setting Description
L02-01	2	Momentary power loss detection setting - provides voltage sag protection Setting allows drive to re-start after undervoltage without faulting out
L02-08	151	Under-voltage threshold - Drive shuts down below this supply voltage Undervoltage detection setting is 151 volts

Do not change parameter

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

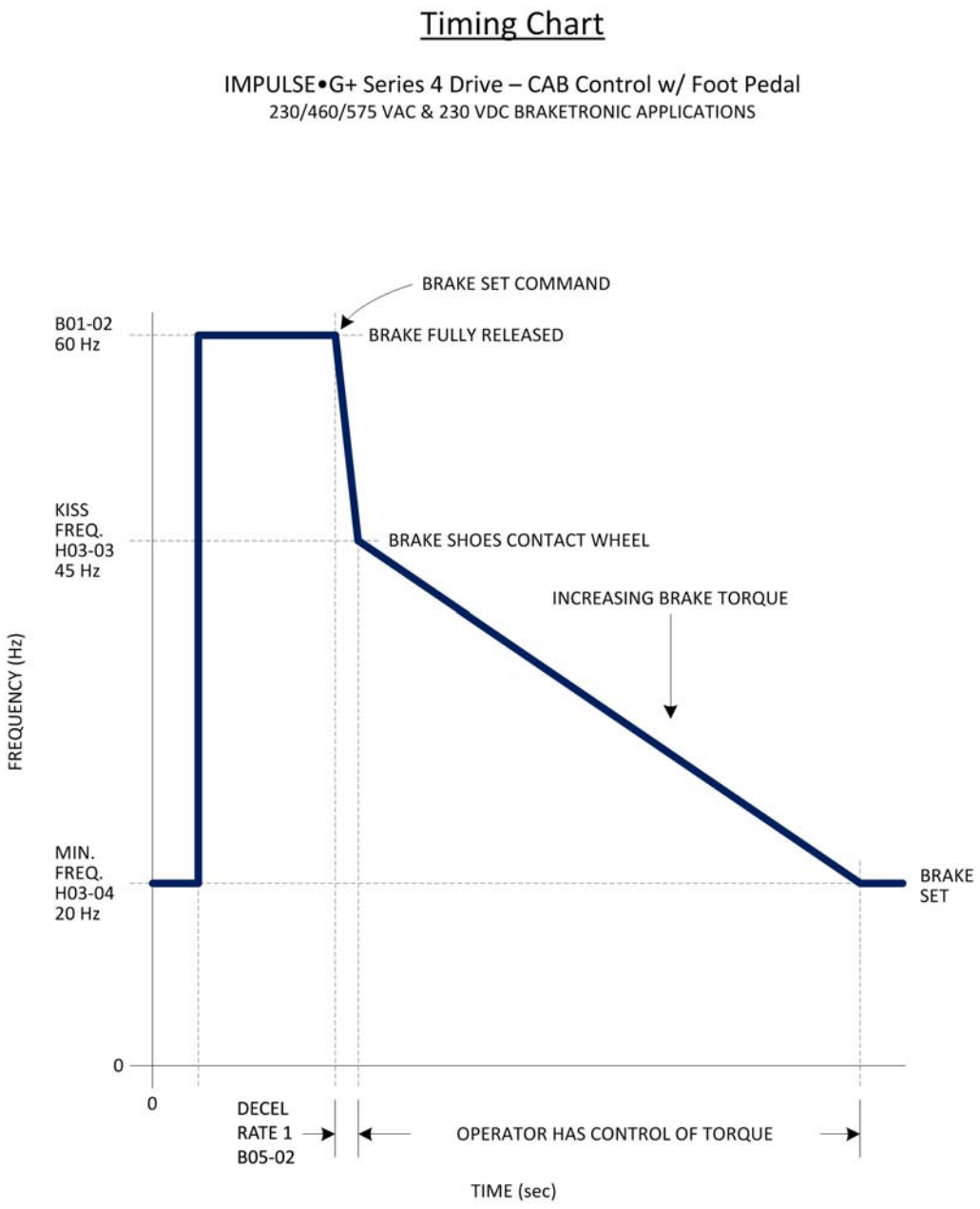

Figure 4: Cab Control - 230/460/575 VAC and 230 VDC Braketronic Applications

230/460/575 VAC Braketronic Applications with Radio Control

Table 3: Parameter Settings for IMPULSE®•G+ Series 4 Drives 230/460/575 VAC Braketronic Applications with Radio Control

Parameter	Default Setting	Parameter Description Setting Description
A01-01	2	Setting determines which parameters are accessible Allow access to advanced programming parameters
A01-02	0	Determines method of control V/f Control Method
A01-03	4	Parameter set to match motion of the application Braketronic motion
A01-04	0	Parameter set to define input terminals Two speed multi-step. Defines Terminal S2 = 2nd Speed (Kiss Frequency)
B01-01	0.00	Frequency Reference (1)
B01-02	60.00	Frequency Reference (2) - Full Release Frequency Brake is fully released at 60 Hz
B01-18	2	Parameter is set to select reference terminal Higher reference automatically selects the fastest input frequency
B03-10	1	Allow Run at power up Enabled - this allows the brake to release when power is turned on
B05-01	0.3	Acceleration Time (1) - Brake release time Time for brake to release to full open is 0.3 seconds
B05-02	0.3	Deceleration Time (1) - Approx time from Fully Released to Kiss Frequency Decel time from 60 Hz to Kiss Frequency is 0.3 seconds
D08-03	40.0*	Dwell Frequency at stop Determines braking torque level, factory set to 40 Hz
D08-04	3.0**	Dwell time at stop Time brake is held at torque level set by D08-03
D09-01	0.00	S-Curve characteristic Acceleration s-curve at start is set to 0 seconds
D09-02	0.00	S-Curve characteristic Acceleration s-curve at end is set to 0 seconds.
D09-03	0.00	S-Curve characteristic Deceleration s-curve at start is set to 0 seconds
D09-04	0.00	S-Curve characteristic Deceleration s-curve at end is set to 0 seconds
E02-01	***	Full load amps Set to total full load amps of all connected acutators. Default is drive capacity.
H01-07	65	Multi-Function Digital Input - Terminal 7 Activates the B08-04 Dwell at Stop Timer for the dwell function
H03-03	75	Auto speed reference signal gain - Cab Kiss Frequency Setting Cab Kiss Frequency is 75% of B01-02 (60 Hz * 75% = 45 Hz)
H03-04	33.3	Bias multiplier for terminal 13 analog input signal - Min frequency of thruster Minimum thruster frequency is 33.3% of B01-02 (60 Hz * 33.3% = 20 Hz)

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

230 VDC Braketronic Applications with Radio Control

Table 4: Parameter Settings for IMPULSE®•G+ Series 4 Drive 230 VDC Braketronic Applications with Radio Control

Parameter	Default Setting	Parameter Description Setting Description
A01-01	2	Setting determines which parameters are accessible Allow access to advanced programming parameters
A01-02	0	Determines method of control V/f Control Method
A01-03	4	Parameter set to match motion of the application Braketronic motion
A01-04	0	Parameter set to define input terminals Two speed multi-step. Defines Terminal S2 = 2nd Speed (Kiss Frequency)
B01-01	0.00	Frequency Reference (1)
B01-02	60.00	Frequency Reference (2) - Full Release Frequency Brake is fully released at 60 Hz
B01-18	2	Parameter is set to select reference terminal Higher reference automatically selects the fastest input frequency
B03-10	1	Allow Run at power up Enabled - this allows the brake to release when power is turned on
B05-01	0.3	Acceleration Time (1) - Brake release time Time for brake to release to full open is 0.3 seconds
B05-02	0.3	Deceleration Time (1) - Approx time from Fully Released to Kiss Frequency Decel time from 60 Hz to Kiss Frequency is 0.3 seconds
D08-03	40.0*	Dwell Frequency at stop Determines braking torque level, factory set to 40 Hz
D08-04	3.0**	Dwell time at stop Time brake is held at torque level set by D08-03
D09-01	0.00	S-Curve characteristic Acceleration s-curve at start is set to 0 seconds
D09-02	0.00	S-Curve characteristic Acceleration s-curve at end is set to 0 seconds
D09-03	0.00	S-Curve characteristic Deceleration s-curve at start is set to 0 seconds.
D09-04	0.00	S-Curve characteristic Deceleration s-curve at end is set to 0 seconds
E01-03	F	Input voltage setting Custom V/f pattern selected
E01-05	208***	Maximum voltage Set to actuator nameplate voltage
E01-06	60.0	Maximum voltage frequency The frequency at which maximum voltage should occur - base frequency
E01-13	208***	Base voltage Set to acuator nameplate voltage

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

Parameter	Default Setting	Parameter Description Setting Description
E02-01	****	Full load amps Set to total full load amps of all connected acutators. Default is drive capacity.
H01-07	65	Multi-Function Digital Input - Terminal 7 Activates the B08-04 Dwell at Stop Timer for the dwell function
H03-03	75	Auto speed reference signal gain - Cab Kiss Frequency Setting Cab Kiss Frequency is 75% of B01-02 (60 Hz * 75% = 45 Hz)
H03-04	33.3	Bias multiplier for terminal 13 analog input signal - Min frequency of thruster Minimum thruster frequency is 33.3% of B01-02 (60 Hz * 33.3% = 20 Hz)
L02-01	2	Momentary power loss detection setting - provides voltage sag protection Setting allows drive to re-start after undervoltage without faulting out
L02-08	151	Under-voltage threshold - Drive shuts down below this supply voltage Undervoltage detection setting is 151 volts

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

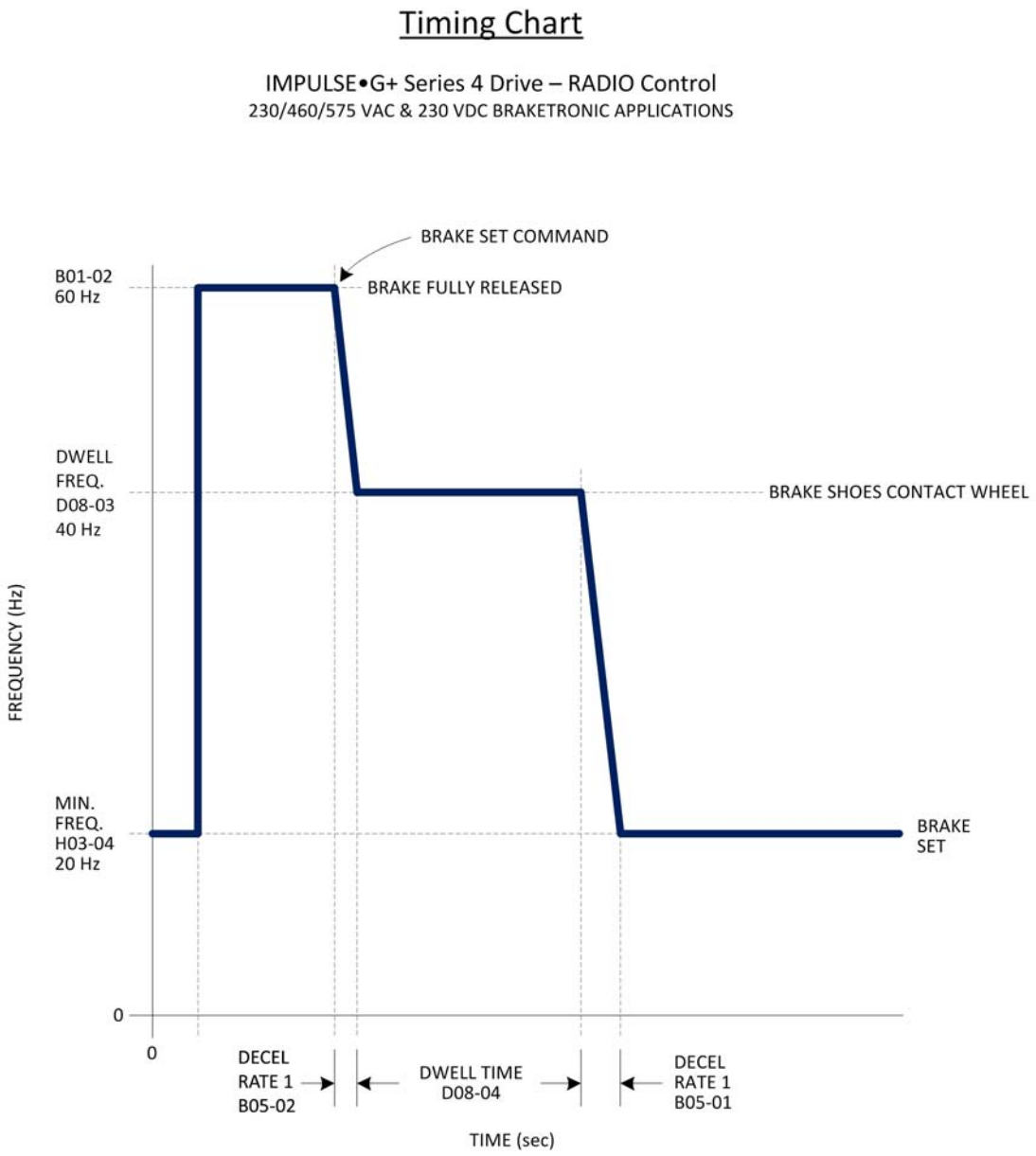

Figure 5: Radio Control - 230/460/575 VAC and 230 VDC Braketronic Applications

230/460/575 VAC Braketronic Applications with Radio Control and Alternate Decel

Table 5: Parameter Settings for IMPULSE®•G+ Series 4 Drives 230/460/575 VAC Braketronic Applications w/ Radio Control & Alternate Decel

Parameter	Default Setting	Parameter Description Setting Description
A01-01	2	Setting determines which parameters are accessible Allow access to advanced programming parameters
A01-02	0	Determines method of control V/f Control Method
A01-03	4	Parameter set to match motion of the application Braketronic motion
A01-04	0	Parameter set to define input terminals Two speed multi-step. Defines Terminal S2 = 2nd Speed (Kiss Frequency)
B01-01	0.00	Frequency Reference (1)
B01-02	60.00	Frequency Reference (2) - Full Release Frequency Brake is fully released at 60 Hz
B01-18	2	Parameter is set to select reference terminal Higher reference automatically selects the fastest input frequency
B03-10	1	Allow Run at power up Enabled - this allows the brake to release when power is turned on
B05-01	0.3	Acceleration Time (1) - Brake release time Time for brake to release to full open is 0.3 seconds
B05-02	0.3	Deceleration Time (1) - Approx time from Fully Released to Kiss Frequency Decel time from 60 Hz to Kiss Frequency is 0.3 seconds
B05-06	10.0	Deceleration Changeover Time Decel time when B05-10 frequency is reached
B05-10	40	Deceleration Changeover Frequency Frequency to trigger the B05-06 decel time
B05-11	0	Switching Frequency Compare B05-06 time is enabled when U01-02 < B05-10
D08-03	40.0*	Dwell Frequency at stop Determines braking torque level, factory set to 40 Hz
D08-04	3.0**	Dwell time at stop Time brake is held at torque level set by D08-03
D09-01	0.00	S-Curve characteristic Acceleration s-curve at start is set to 0 seconds
D09-02	0.00	S-Curve characteristic Acceleration s-curve at end is set to 0 seconds
D09-03	0.00	S-Curve characteristic Deceleration s-curve at start is set to 0 seconds.
D09-04	0.00	S-Curve characteristic Deceleration s-curve at end is set to 0 seconds

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

Parameter	Default Setting	Parameter Description Setting Description
E02-01	****	Full load amps Set to total full load amps of all connected acutators. Default is drive capacity.
H01-07	65	Multi-Function Digital Input - Terminal 7 Activates the B08-04 Dwell at Stop Timer for the dwell function
H03-03	75	Auto speed reference signal gain - Cab Kiss Frequency Setting Cab Kiss Frequency is 75% of B01-02 (60 Hz * 75% = 45 Hz)
H03-04	33.3	Bias multiplier for terminal 13 analog input signal - Min frequency of thruster Minimum thruster frequency is 33.3% of B01-02 (60 Hz * 33.3% = 20 Hz)

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

230 VDC Braketronic Applications with Radio Control and Alternate Decel

Table 6: Parameter Settings for IMPULSE®•G+ Series 4 Drive 230 VDC Braketronic Applications w/ Radio Control & Alternate Decel

Parameter	Default Setting	Parameter Description Setting Description
A01-01	2	Setting determines which parameters are accessible Allow access to advanced programming parameters
A01-02	0	Determines method of control V/f Control Method
A01-03	4	Parameter set to match motion of the application Braketronic motion
A01-04	0	Parameter set to define input terminals Two speed multi-step. Defines Terminal S2 = 2nd Speed (Kiss Frequency)
B01-01	0.00	Frequency Reference (1)
B01-02	60.00	Frequency Reference (2) - Full Release Frequency Brake is fully released at 60 Hz
B01-18	2	Parameter is set to select reference terminal Higher reference automatically selects the fastest input frequency
B03-10	1	Allow Run at power up Enabled - this allows the brake to release when power is turned on
B05-01	0.3	Acceleration Time (1) - Brake release time Time for brake to release to full open is 0.3 seconds
B05-02	0.3	Deceleration Time (1) - Approx time from Fully Released to Kiss Frequency Decel time from 60 Hz to Kiss Frequency is 0.3 seconds
B05-06	10.0	Deceleration Changeover Time Decel time when B05-10 frequency is reached
B05-10	40	Deceleration Changeover Frequency Frequency to trigger the B05-06 decel time
B05-11	0	Switching Frequency Compare B05-06 time is enabled when U01-02 < B05-10
D08-03	40.0*	Dwell Frequency at stop Determines braking torque level, factory set to 40 Hz
D08-04	3.0**	Dwell time at stop Time brake is held at torque level set by D08-03
D09-01	0.00	S-Curve characteristic Acceleration s-curve at start is set to 0 seconds
D09-02	0.00	S-Curve characteristic Acceleration s-curve at end is set to 0 seconds
D09-03	0.00	S-Curve characteristic Deceleration s-curve at start is set to 0 seconds.
D09-04	0.00	S-Curve characteristic Deceleration s-curve at end is set to 0 seconds

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

Parameter	Default Setting	Parameter Description Setting Description
E01-03	F	Input voltage setting Custom V/f pattern selected
E01-05	208***	Maximum voltage Set to actuator nameplate voltage
E01-06	60.0	Maximum voltage frequency The frequency at which maximum voltage should occur - base frequency
E01-13	208***	Base voltage Set to acuator nameplate voltage
E02-01	****	Full load amps Set to total full load amps of all connected acutators. Default is drive capacity.
H01-07	65	Multi-Function Digital Input - Terminal 7 Activates the B08-04 Dwell at Stop Timer for the dwell function
H03-03	75	Auto speed reference signal gain - Cab Kiss Frequency Setting Cab Kiss Frequency is 75% of B01-02 (60 Hz * 75% = 45 Hz)
H03-04	33.3	Bias multiplier for terminal 13 analog input signal - Min frequency of thruster Minimum thruster frequency is 33.3% of B01-02 (60 Hz * 33.3% = 20 Hz)
L02-01	2	Momentary power loss detection setting - provides voltage sag protection Setting allows drive to re-start after undervoltage without faulting out
L02-08	151	Under-voltage threshold - Drive shuts down below this supply voltage Undervoltage detection setting is 151 volts

Do not change parameter

* Adjust lower for greater braking torque

** Set equal to the time it takes to bring the motion from full speed to stop

*** The standard actuator used on 230 VDC applications is rated at 208 VAC; however, DC Braketronic panels can be applied to 180 VAC actuators. If so, this parameter should be set to 180.

**** Set to total full load amps of all connected actuators. Initial value is determined by O02-04 (kVA Selection).

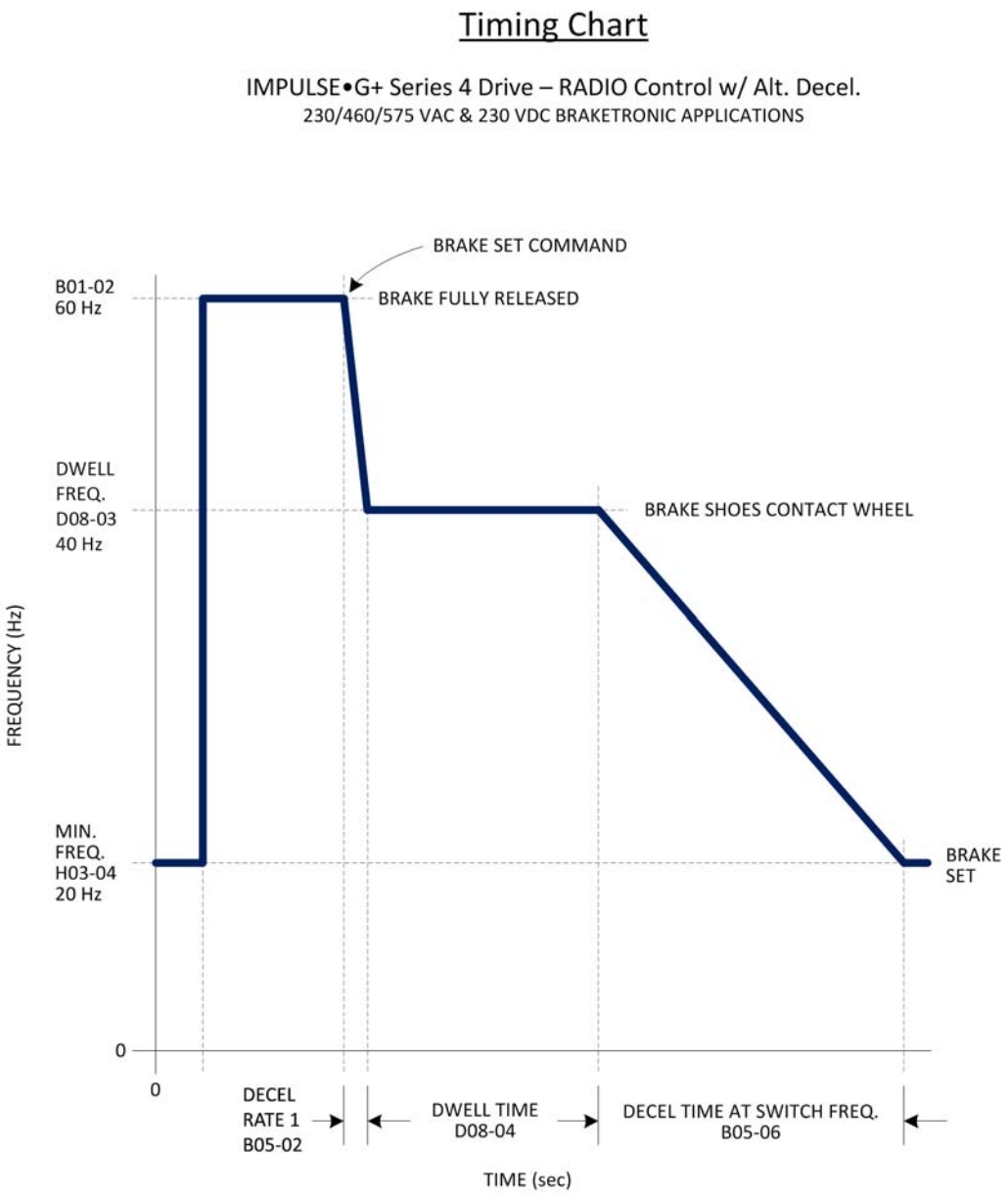

Figure 6: Radio Control w/ Alternate Decel - 230/460/575 VAC and 230 VDC Braketronic Applications

Dwell Function

The Dwell Function is used to temporarily hold the output frequency at a set reference for a set time. Enable by setting H01-01 – 08 to 65.

Table 7: Dwell Function Parameter Settings

Parameter Code	Display	Function	Range	Initial Value	Access Level
D08-01	Dwell Ref @ Start	Sets Dwell frequency reference at start.	0.0–150.0 Hz	0.0	Adv
D08-02	Dwell Time @ Start	Sets the time duration for the Dwell function at start.	0.0–10.0 sec	0.0	Adv
D08-03	Dwell Ref @ Stop	Sets Dwell frequency Reference at stop.	0.0–150.0 Hz	0.0	Adv
D08-04	Dwell Time @ Stop	Sets the time duration for the Dwell function at stop.	0.0–10.0 sec	0.0	Adv

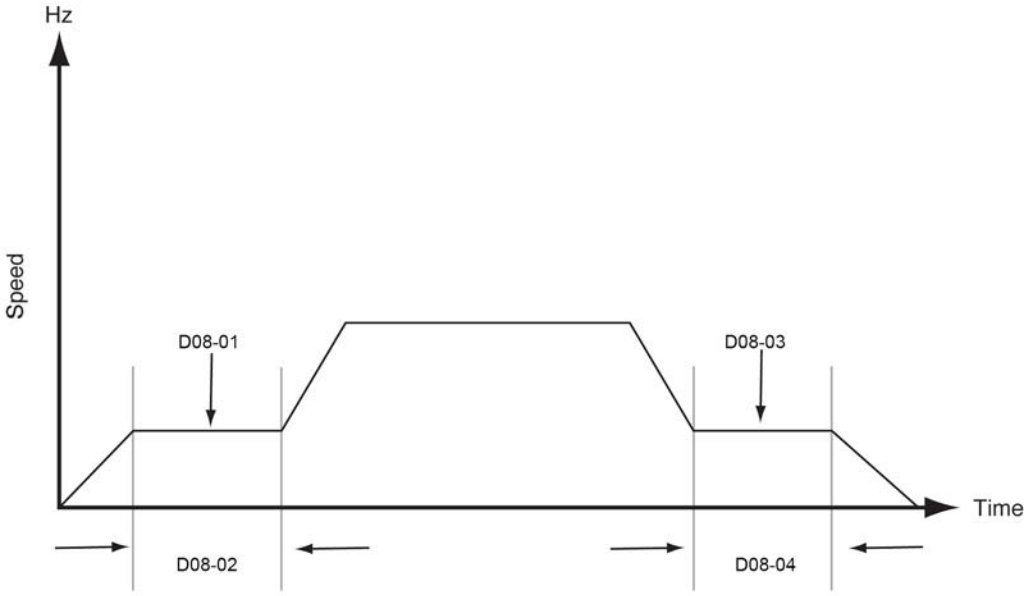

Figure 7: Dwell Function

Servicing

Maintain cleanliness and ensure that all covers and doors are sealed to exclude dirt.

Parameter adjustments and trouble shooting guidelines for the integral solid state drive are beyond the scope of this publication. Refer to the Technical Manual supplied with the Braketronic system for related information.

Long Term Storage

If the equipment will not be installed immediately, it can be stored indoors in a dry location indefinitely or outdoors for a reasonable time if adequately protected from moisture and corrosive atmosphere. The equipment must always be protected from direct exposure to the elements unless specifically treated at the factory for use in that environment. Covering with plastic sheeting is not acceptable unless provision is made to prevent condensation under the plastic.

Braketronics in long term storage should be powered every six months to keep the drive's internal capacitors in good condition.

If the Braketronic is being stored for over one year, please refer to "Long Time Storage" in the IMPULSE•G+/VG+ Series 4 Instruction Manual, available at www.magnetekmh.com.