



Franklin Electric

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IMDS Operating Instructions

General Information

Franklin Electric's IMDS (Integrated Motor Drive System) is a recent product addition, using Franklin Electric developed technology to bring together an AC induction motor and a variable speed electronic control. IMDS provides simple, reliable variable speed capability in a small, cost-effective package.

Safe Installation Procedures



General. Be sure that you are completely familiar with safe operating procedures of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are driven by this equipment. Improper use can cause serious injury or may be fatal. Only qualified personnel should perform start-up procedure or troubleshooting procedures.



Grounding. This unit must be grounded! Electrical shock can cause serious injury or may be fatal. Be sure the system is properly grounded before applying power. Do not apply power before you ensure that all grounding instructions have been followed in accordance with the latest edition of the National Electrical Code, as well as local codes and regulations.



Mounting. Improper operation of equipment may cause violent motion of the motor shaft and driven equipment. Be sure that unexpected shaft movement will not cause injury to personnel or damage to equipment. Do not mount this equipment with the display in the down position. The display should be up or to one side to keep condensation from collecting.



Motor Protection. The IMDS has built-in thermal overload protection in the motor and the control, however, you must install proper circuit protection according to national and local electrical codes. Motors with automatic reset thermal protectors should not be used where unexpected starting of the equipment might create a hazard.



Wiring. Never make connections in the display housing. All power connections should be made only inside the motor conduit box. Do not attempt to service this equipment while capacitor bus voltage is present within the control. Remove input power and wait at least 10 minutes for the voltage to dissipate. A power disconnect should be installed between the input power service and the IMDS for a fail-safe method to disconnect power.



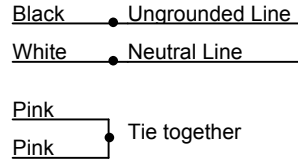
GFCI Information. The IMDS may not work properly when some Ground Fault Circuit Interrupters are installed in the power circuit. Where GFI protection is required, an isolation transformer may be needed.

Power Connections

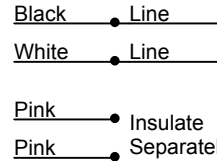
Applies to version 3.x (and above) controls only.

Make power connections as listed on the motor nameplate. The IMDS is operable over a nominal voltage range of 100 to 120 Volts on the low connection and 200 to 240 Volts on the high connection.

LOW VOLTAGE



HIGH VOLTAGE



Touchpad Operating Procedures

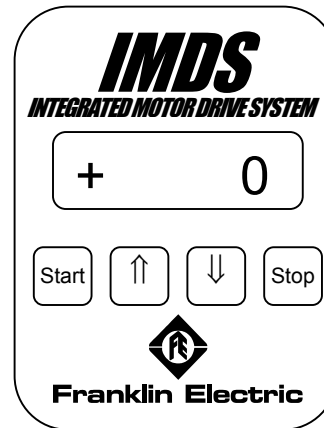
No programming is required. The IMDS unit is ready to use. No additional programming is required. There are many features available to customize the IMDS unit to your application, but the unit is fully ready right out of the box.

When you power up the IMDS unit. At initial startup the display will quickly flash the version and revision of the software that is programmed, and then will read the last value of motor speed that was stored when power was disconnected.

Adjusting speed using the touchpad. To change the preset speed, use the ↑ or ↓ keys to adjust to the desired speed. For example, If desired speed is 800 rpm, then press the appropriate arrow until display reads 800, then press Start and the IMDS will ramp up to 800 rpm. The display will change to + 800. The "+" indicates that the shaft is now turning.

To stop motor rotation, press Stop and the IMDS will ramp down to 0 rpm and display 800, indicating that the preset speed is still 800 rpm. The + is not displayed because the shaft is not turning.

The motor speed may also be changed while the shaft is turning. To change motor speed while motor is running, press either arrow key until the desired rpm is displayed. Motor speed will change as an arrow key is pressed. To change speed more quickly, press and hold an arrow key and the display value will change rapidly. Note that the actual speed will vary from the display speed depending on motor load conditions.



IMDS Touchpad

External Control Signal Operation

Applies to version 4.x controls only.

Control Signal Connector. The IMDS unit is equipped with a connector for inputting a speed control signal to adjust the motor speed. The connecting cords can be obtained from Franklin Electric or purchased elsewhere. The available inputs are:

- Remote touchpad
- 4 – 20 milliAmps (mA)
- 0 – 5 Volts DC (VDC)
- 0 – 10 Volts DC (VDC)
- Potentiometer

Important: The desired speed control input signal must be selected using Function 11 as described below. None of these are active by default. However, once the speed input mode is selected as anything other than touchpad, the only input the touchpad will accept is a command to enter program model while the motor is stopped (at 0 RPM). All other touchpad inputs are disabled.

List of Functions

To check IMDS setup, simultaneously press and hold both the ↑ and ↓ keys until 0000 is displayed. Once 0000 is displayed, release the ↑ and ↓ keys. The IMDS unit is now in the setup mode. Using the arrow keys you can scroll through the function settings.

Function	Description
0	Last error code
1	Motor rotation
2	Display Units (RPM or Hertz)
3	Starting torque boost
4	Timed Run
5	Minimum speed
6	Maximum speed
7	Acceleration time
8	Deceleration time
9	Automatic restart
10	Application curve (variable/constant torque)
11	Speed input mode

Troubleshooting

Interpreting display faults. The IMDS unit will flash an error code if a protection fault is detected, signified by the following definitions:

- 2222 – Overloaded (too much current)
- 3333 – Over temperature (too hot)
- 4444 – Short circuit (misconnection)
- 5555 – Under voltage (or power loss)
- 6666 – Over voltage (regenerated voltage on deceleration)

Explanation of Functions

The resulting display column is for informational purposes only. The actual values may vary depending on the current setup of your IMDS unit.

Action	Resulting Display	Description
Press Stop		The motor must be stopped to enter setup mode
Press & hold both ↑ and ↓	0000 (flashing)	0000 designates setup mode
Release ↑ and ↓	0 0	Now in setup mode First 0 indicates function number Second 0 indicates setting

Function 0 (Error or Fault Code History)

These error codes apply only to the control unit, since the motor has a separate built-in thermal protector. After the leaving setup mode, any error codes will be cleared. Any display other than 0 indicates that an error has occurred since the last setup (e.g. 0 5 for a power loss). The error (fault) codes available are:

- 2 – Overloaded (too much current)
- 3 – Over temperature (too hot)
- 4 – Short circuit (misconnection)
- 5 – Under voltage (or power loss)
- 6 – Over voltage (regenerated voltage on deceleration)

0 0 No error since last setup.

Function 1 (Motor Shaft Rotation)

Using this setup can change the direction of rotation viewing the lead end.

- 0 – Counterclockwise (CCW)
- 1 – Clockwise (CW)

Press ↑	1 0	Indicates that the rotation is currently set for CCW
Press Start	1 0 (flashing)	Flashing display indicates that the rotation value can be changed
Press ↑	1 1 (flashing)	Rotation has been changed to CW
Press Stop	1 1	Rotation change is now in effect

Function 2 (Display Units)

Using this setup changes the units of motor speed displayed. Changing this value will reset functions 5, 6, 7, and 8 to the factory preset values.

- 0 – RPM (motor shaft speed in revolutions per minute)
- 1 – Hertz (electrical frequency)

Press ↑	2 1	Currently set to display Hertz
Press Start	2 1 (flashing)	Flashing display indicates that the display units value can be changed
Press ↓	2 0 (flashing)	Value has been changed to display RPM
Press Stop	2 0	Display change is now in effect

Function 3 (Starting Torque Boost)

Using this setup can give approximately 20% more torque for the first 2 seconds of startup for hard to start applications, like breaking loose the seal on a pump.

- 0 – Boost is not enabled
- 1 – Boost is enabled

Press ↑	3 0	Boost is not enabled
Press Start	3 0 (flashing)	Flashing display indicates that the torque boost value can be changed
Press ↑	3 1 (flashing)	Value has been changed activating the starting torque boost
Press Stop	3 1	Boost change is now in effect

Function 4 (Timed Run)

This function uses a built-in countdown timer to signal the motor to turn off. The timer will start the countdown when the Start key is pressed. Minutes and seconds can be set independently up to a maximum time of 99 minutes.

- 0 – Timer is not enabled
- 1 – Timer is enabled

Press ↑	4 0	Timer function
Press Start	4 0 (flashing)	Flashing display indicates that the timer value can be changed
Press ↑	4 1 (flashing)	Value has been changed activating the timer function
Press Start	00:00 (flashing)	Flashing display indicates that the timer seconds can be changed Start will alternate the flashing of the minutes and the seconds
Press ↑ or ↓	00:01 (flashing)	Seconds can be changed by using the arrow keys
Press Start	00:01 (flashing)	Flashing display indicates that the timer minutes can be changed
Press ↑ or ↓	01:01 (flashing)	Minutes can be changed by using the arrow keys
Press Stop	4 1	Timer changes are now in effect

Functions 5 & 6 (Minimum & Maximum Speed)

These functions allow a minimum speed of greater than 0 and a maximum speed less than the speed represented by 80 Hertz. By setting this function, during normal operation the speed can not be adjusted outside these values with either the touchpad or an external control signal. Note that speeds less than **240 RPM** are not recommended, unless there is very little power required from the control, or there is some additional external cooling air supplied. Both functions 5 and 6 are set up identically.

Press ↑	5	Minimum speed function
Press Start	240 (flashing)	Flashing display indicates that the minimum speed can be changed If the display setting (function 2) is Hertz, 8 would be displayed
Press ↑ or ↓	250 (flashing)	Minimum speed has been changed
Press Stop	5	Minimum speed changes are now in effect

Functions 7 & 8 (Acceleration & Deceleration Time)

These functions allow the independent setting of acceleration time (from 0 Hz to 80 Hz) and deceleration time (80 Hz to 0 Hz). As an example, if the desired operating point is at 40 Hz, and the programmed acceleration time is 10 seconds, then the motor will reach the 40 Hz operating point in 5 seconds. Both functions 7 and 8 are set up identically.

Press ↑	7	Acceleration time function
Press Start	2 (flashing)	Flashing display indicates that the acceleration time can be changed
Press ↑	4 (flashing)	Acceleration time has been changed
Press Stop	7	Acceleration time changes are now in effect

Function 9 (Automatic Restart)

Using this setup will automatically restart the motor in the event of a power outage or disconnection.

- 0 – Automatic restart is not enabled
- 1 – Automatic restart is enabled

Press ↑	9 0	Automatic restart
Press Start	9 0 (flashing)	Flashing display indicates that the Automatic restart value can be changed
Press ↑	9 1 (flashing)	Value has been changed to activate the automatic restart
Press Stop	9 1	Automatic restart change is now in effect

Function 10 (Application Curve)

Using this setup will change the Volts/Hertz curve output by the control. Changing this value will reset functions 5, 6, 7, and 8 to the factory preset values.. Although many curves may be available, the most common ones are:

- 0 – Variable torque (e.g. pumps & fans)
- 1 – Constant torque (e.g. conveyors)

Press ↑	10 0	Application curve
Press Start	10 0 (flashing)	Flashing display indicates that the curve value can be changed
Press ↑	10 1 (flashing)	Value has been changed to variable torque Volts/Hertz curve
Press Stop	10 1	Curve change is now in effect

Function 11 (Speed Input Mode)

Using this setup allows the selection of the type of speed input the IMDS will accept. The available choices are:

- 0 - Touchpad
- 1 - Potentiometer
- 2 - 4 to 20 milliAmps (mA)
- 3 - 0 to 5 Volts DC or 0 to 10 Volts DC
- 4 - Remote connected touchpad

Press ↑	11 0	Indicates the speed input mode is currently set to touchpad
Press Start	11 0 (flashing)	Flashing display indicates that the speed input mode can be changed
Press ↑	11 1 (flashing)	Speed input mode has been changes to accept potentiometer
Press Stop	11 1	Speed input change is now in effect

Holding down on both arrow keys at any time will toggle the control unit from setup mode back to normal operation.