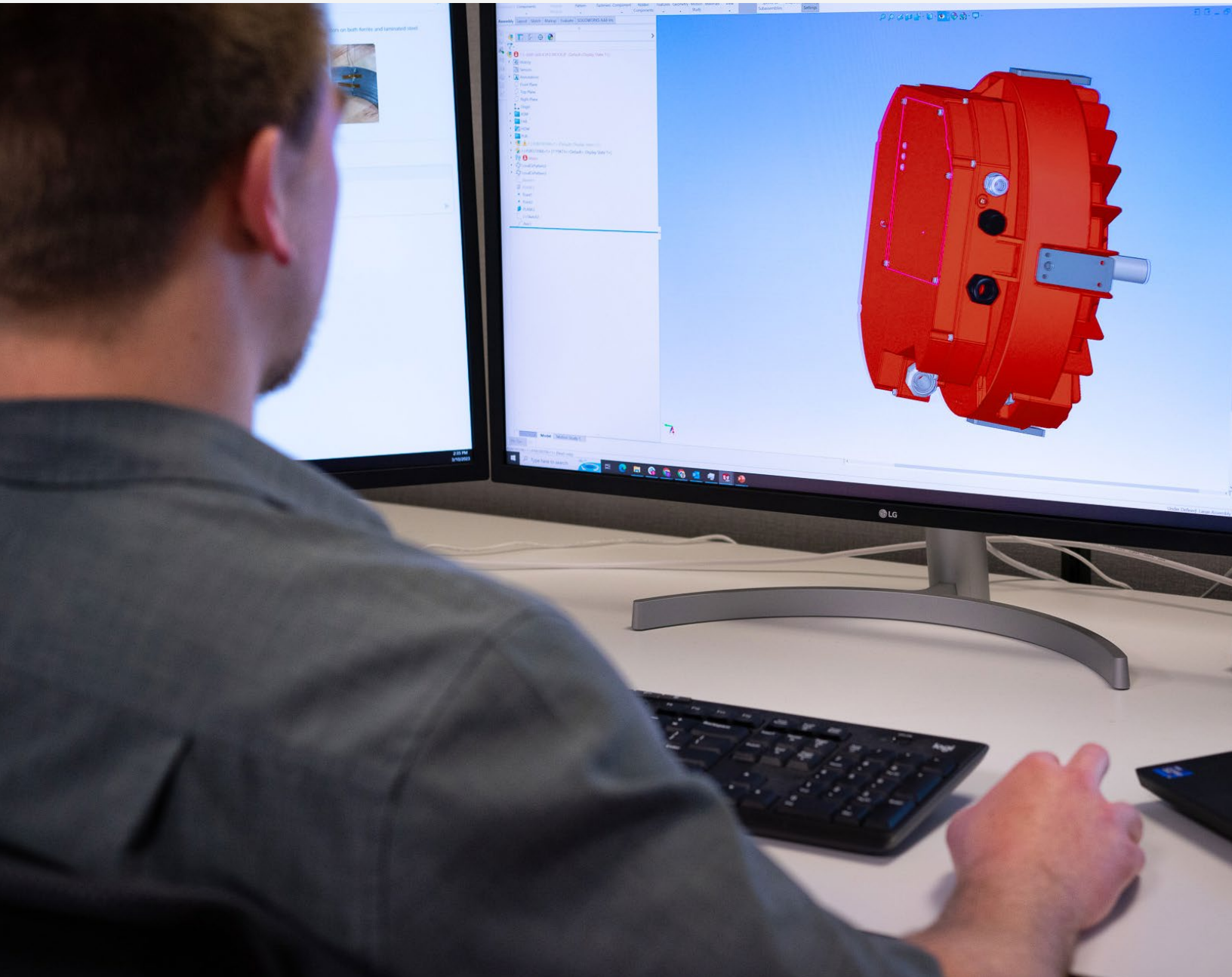


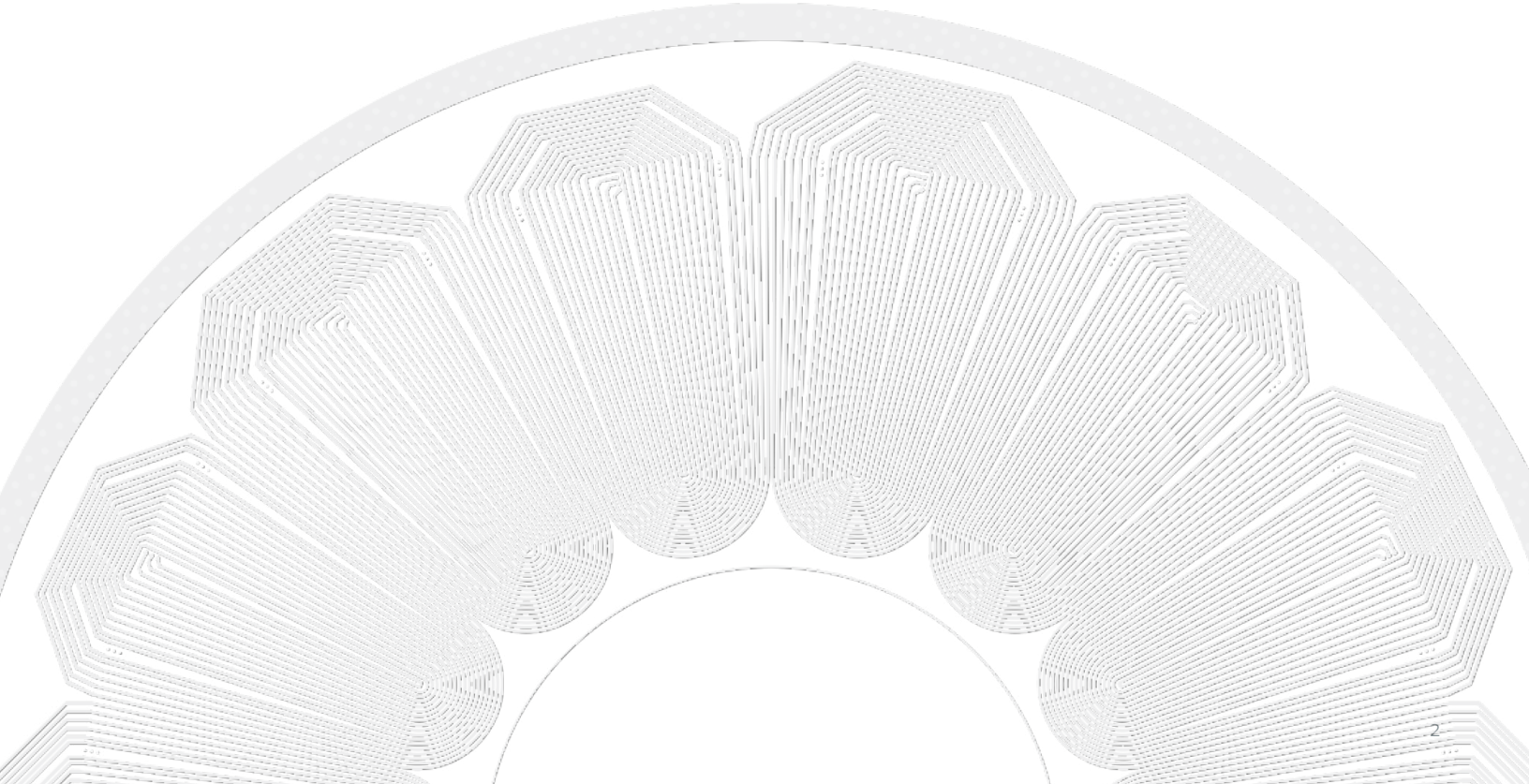


Aircore EC

# I-con Software manual



**Table of contents**



## Icon Software

Icon software allows the user the ability to utilize the advanced functions of the Infinitum Aircore EC motor family. Icon requires Windows based computers. This information is divided into the following sections:

- Preparation
- Set Static IP Address (Windows 10 Professional)
- Connection GUI
- Serial Operation

## Preparation

### Motor installation and connection

**⚠ Warning:** Always Tagout and Lockout the electrical motor circuit and practice all company safety procedures when installing, troubleshooting, or repairing a motor. Always verify power is secured with a multimeter prior to work. Failure to adhere to Tagout/Lock and industry standard practices can result in serious personal injury or death and equipment damage.

TCP and Serial are the two connection protocols used to communicate from a PC to an Infinitum motor. TCP utilizes a RJ45 connector (9), Serial connections are completed at the terminal block (2). (Figure 1)

Complete the following preparation steps:

1. The motor must be installed onto an approved test bench or installed into the equipment it serves.
2. For a TCP connection, verify RJ45 female connector is connected to CAT 5, CAT 5e, CAT 6, CAT 6A or CAT 7 cable. Use connector (9) on the communication card.
3. Remove existing tagout and lockout equipment and energize motor.

### Setting static IP address (Windows 10 Professional)

All computers that communicate with an Infinitum Aircore EC Motor must use a static IP Address. If the correct static IP address is not configured, the computer will not communicate with the motor. (Figure 2)

*Note: Screen shots may change slightly depending on the version of Windows installed on the computer. The concept is the same with all versions. Windows 10 Professional is the operating system shown.*

1. Left click Start Button on bottom tool bar.
2. Quick Access menu appears, left click Settings icon.

Figure 1: CIM board

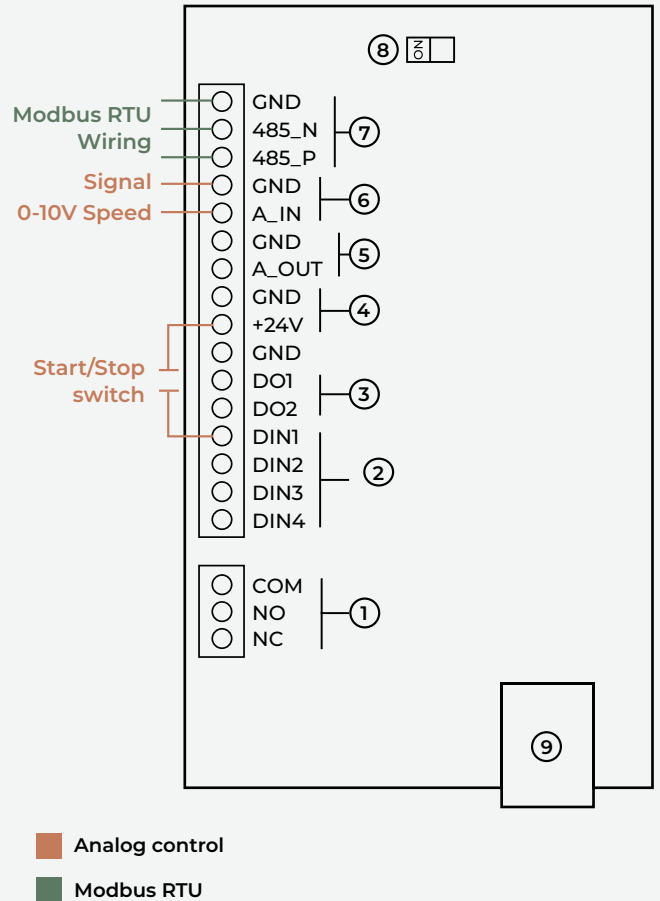
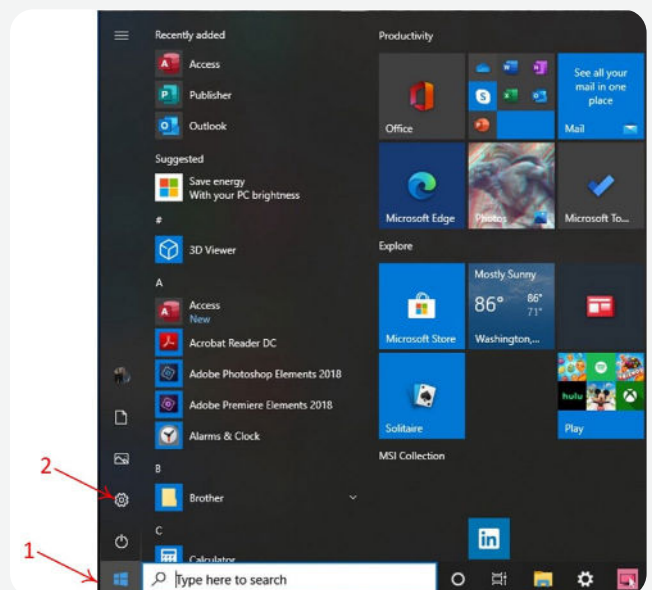


Figure 2: Static IP Address

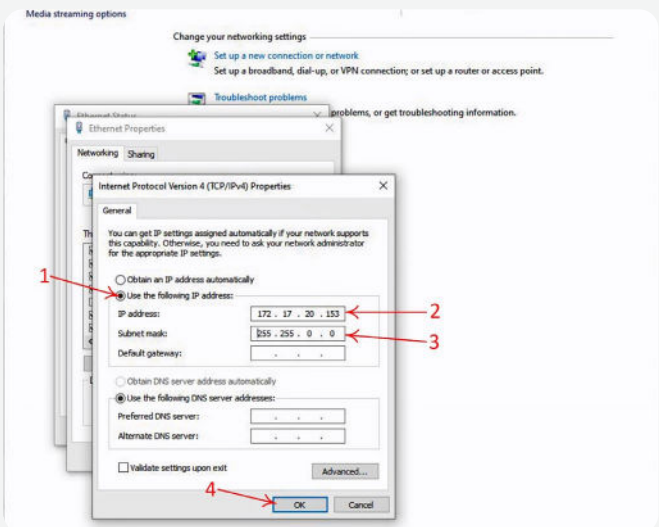
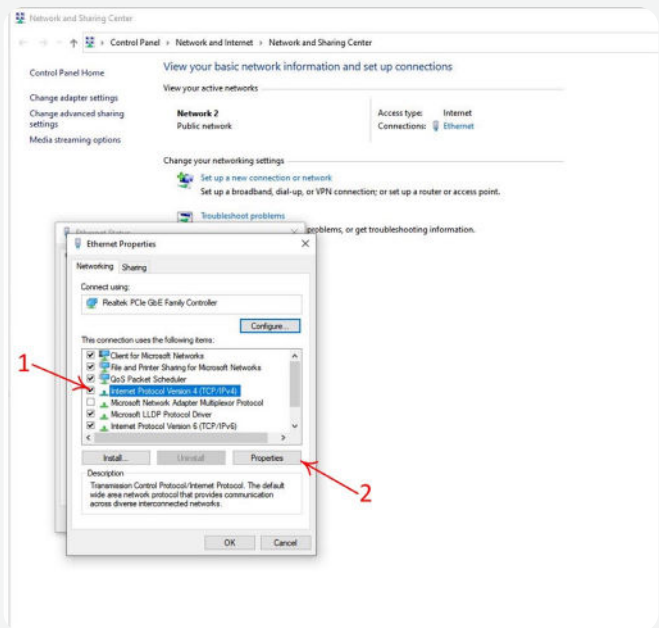
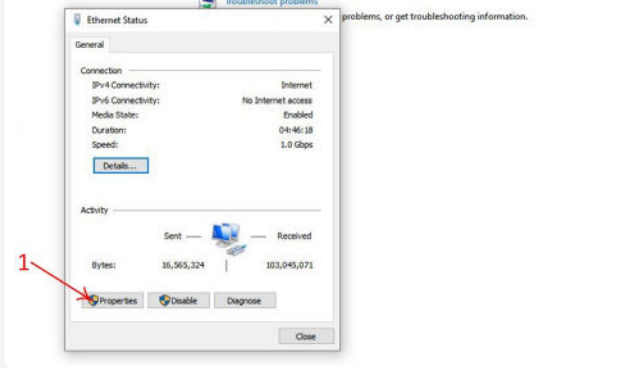
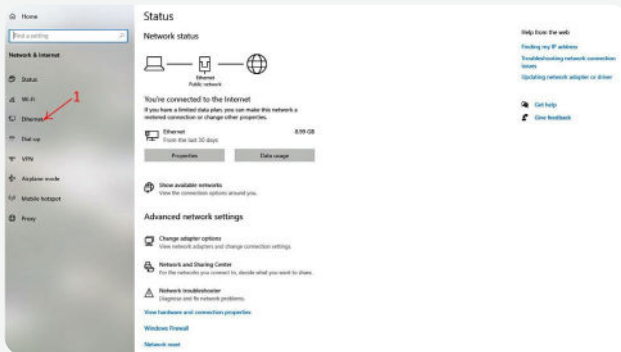
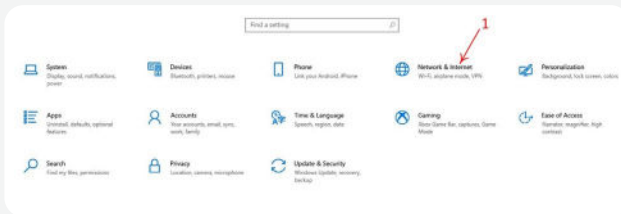


**UPDATE PICTURES - No numbers/arrows**



3. The Windows Settings screen opens.
  4. Left click the Network & Internet icon (1).
  5. The Network Status screen opens.
  6. Left click the Ethernet Icon (1).
  7. The Network and Sharing Screen opens.
  8. Left click on the Ethernet Icon (2).
  9. An Ethernet Status screen opens.
  10. Left click on the Properties button (1).
  11. Ethernet Properties screen opens.
  12. Left click Internet protocol Version 4 (1).
  13. The selection is highlighted.
  14. Click the Properties button (2).
  15. The Internet Protocol Version 4 (TCP/IPv4) screen opens.
  16. The default selection is "Obtain an IP address automatically."
  17. Left click Use the following IP address (1).
  18. Enter 172.17.20.153 into the IP address (2).
  19. Enter 255.255.0.0 into the Subnet mask (3).
  20. Left click the OK button (4).
  21. Close all windows opened when setting the static IP address.
  22. Go to Infinitum SW video to view the video of this process.
- The default selection of "Obtain an IP address automatically" must be reestablished if computer connectivity via Ethernet is desired.

Figure 3: Static IP Address (continued)



UPDATE PICTURES - No numbers/arrows/correct IP address?

## Connection GUI

### Install software

Install the provided Icon software onto a laptop, or desktop computer. This computer must be Windows based. The latest software and download instructions are found on the [Infinitum Support page](#). There is a Icon Installer on the software page. Follow the instructions in the Installer.

1. To run Icon Software on a Windows computer, you will need to install Windows x86 .NET Core SDK v3.1.423.
2. This SDK can be found [here](#). *New link needed*
3. After installing the SDK, restart your computer for the installation changes to take effect.

The Motor Drive Control Software is installed on the laptop or computer: C:\Program Files (x86)\Infinitum-MotorControlGUI. The installer also creates a shortcut to the software on the desktop of the computer.

The connection for Icon between a laptop/PC can be configured to use TCP (Ethernet) or Serial.

### Connection to motor (ethernet)

Connect a standard ethernet cable from the laptop/PC to the motor. This computer requires the static IP address mentioned above. The ethernet connection on the Infinitum motor is on outside of the VFD with Gen4 motors.

### Connection to motor (serial)

Connect a serial cable from the laptop/PC to the motor. The serial connection on the Infinitum motor is on the CIM card, accessible when the VFD access port or VFD cover is removed (depends on version of the VFD). The Serial connections are identified as 485\_P, 485\_N, and GND on the CIM silkscreen by the access port. Polarity must be maintained from the VFD access port to the computer.

### Powering on the motor

Icon software needs to “Connect” to the motor for control. This connection is a two-way handshake between the application running on the computer and the firmware running in the motor VFD. The Connection Protocol is a pull-down option in the upper left of the Motor Drive Control Software. For an ethernet connection (default) the protocol should be TCP. This connection can be changed to “Serial” if a serial connection is desired.

If Icon software is running on the computer, the connection with the motor will be established when the motor is powered on. The “Status” will go from “Not Connected” to “Connected” once this connection is established.

If the motor is powered on after the Icon software is started, the connection must be established manually. To establish this connection, use the “CONNECT” button in the upper left of the window as shown in Figure 4.

Figure 4: GUI

UPDATE PICTURE

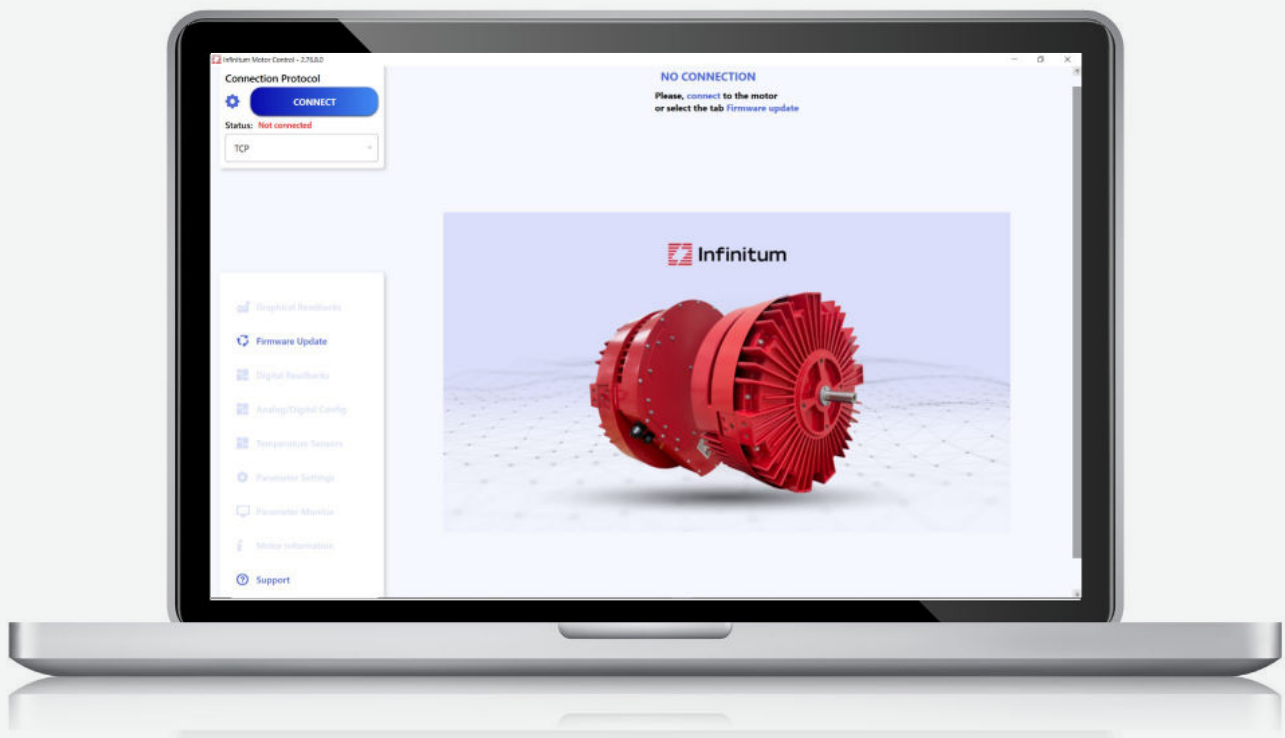
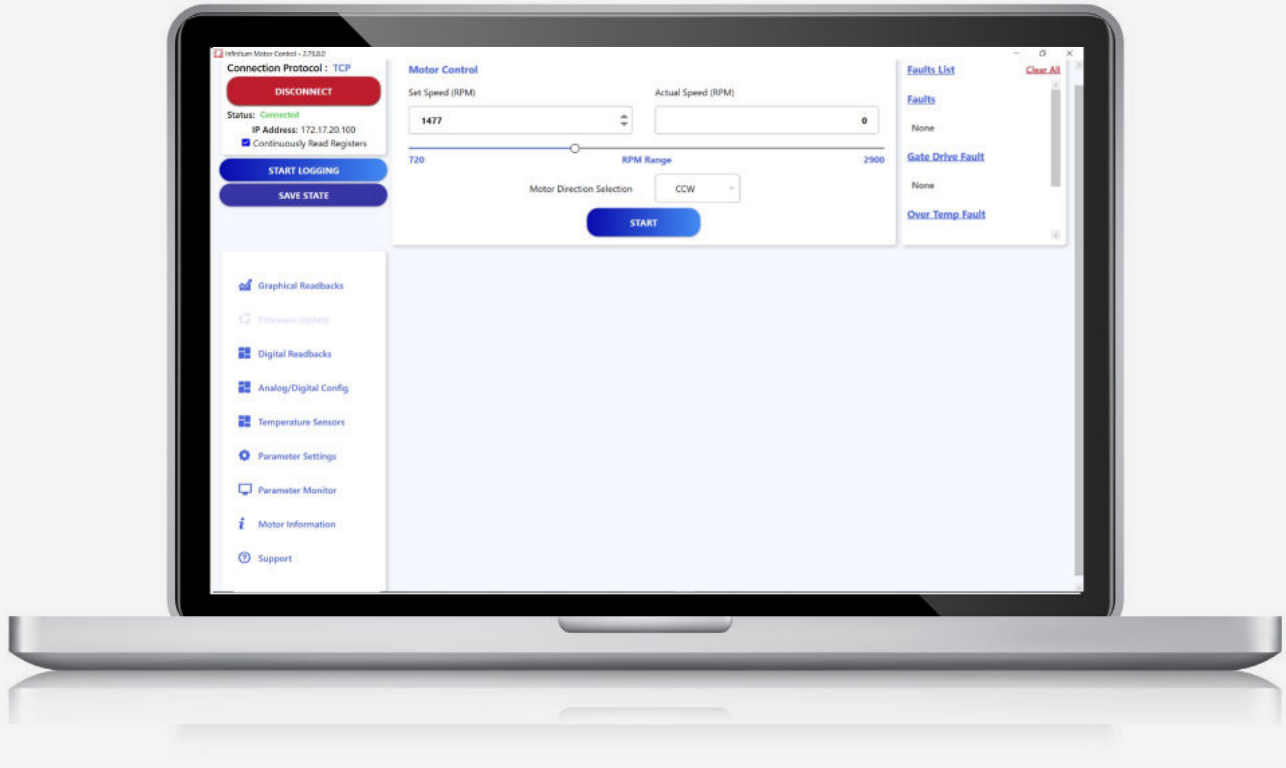


Figure 5:

UPDATE PICTURE?



Once the motor is connected to the computer, the “Status” in the upper left box should indicate “Connected” in green text and the connect button changes to a red “DISCONNECT” button as indicated in Figure 5. This button is used to break the connection between the GUI and the motor.

**Add paragraph headline – All info below needs to be evaluated**

While connected, the following data can be set or read by Icon for parameters of the motor.

The upper portion of the Icon window is for real-time motor information. The lower portion is to set motor parameters.

**Real-time motor information: Upper portion of window**

- Connection Protocol: TCP or Serial
- Connect or Disconnect: Button to establish or break the communication link with the motor
- Status: Connected or Not Connected (Connection status to motor)
- IP Address: Address used for ethernet connection
- Continuously Read Registers- Check box for continuous data updates. Uncheck to validate Fail-Over features
- Start Logging: Real-time data logging. If logging is selected, the Motor Drive Control Software will prompt a directory to record the log file. The default is the Windows Documents directory. The log file is a standard Windows Excel file.
- Save State: Saves values of all software parameters in a JSON file

- Motor Control: Allows Speed and Direction control: Set Speed, Actual Speed, RPM range, Motor Direction, Start/Stop indicator
- Faults: Operational Fault indications

**User Information: Lower section of window**

Some information below may look slightly different due to different versions of the Communications Interface Module (CIM) and Inverter board firmware.

- Graphical Readbacks: Displays selected operational parameters in graphical format. X and Y axis values are user settable. Options include Stator Temperature, Power Output, DC Bus Voltage, Average RMS Current, and Torque. The graph Period is selectable (30 sec – 1 hr. in 15 min increments)
- Digital Readbacks Displays actual motor operating parameters and fault/warning messages: DC Bus Voltage (V), Average RMS Current (A), Stator Temp (°C), Power Output (W), and Torque (Nm)
- Analog/Digital Config. Displays values for motor functions including Analog In 1 Function, Analog In 1 Minimum Setting, Analog In 1 Maximum Setting, Analog In 1 Type, Analog Out 1 Function, Analog Out 1 Type, Digital In 1 Function, Digital In 2 Function, Digital In 3 Function, Digital In 4 Function, Digital Out 1 Function, Digital Out 2 Function
- Temperature Sensors: Realtime information on Stator RTD Temp (°C), Inverter Board Temp (°C), Heat Sink (Internal Case) Temp

SUB BULLETS?

(°C), CIM Temp (°C)

- Parameter Settings: User configurable options (see table below) for Operating Limits:
  - › Operation Type
  - › Communication Settings
  - › Fault Reset
  - › Terminal Settings
  - › Fail Over Settings.
 

Remember to use the “Apply” button to save this information in the motor if you change any values. You must use the Apply button to Enable the Fail Over Settings.
- Parameter Monitor: Displays live information on settings established by the Parameter Setting function. These include Operating Limits:
  - › Motor Max Current (A)
  - › Speed Model Minimum (rpm)
  - › Speed Model Maximum (rpm)
  - › Max Acceleration
  - › Max Deceleration
  - › Monitor – Electrical (Average RMS Current)
  - › Monitor – Performance (Consumed Power, Drive Run Time, Motor Run Time, Output Torque, Output Power)
  - › Monitor – Operating (Start/Stop Actual, Direction Actual, Speed Actual)
  - › Monitor – AI/AO (AI1 Value, AO1 Value)
  - › Monitor – DI/DO (DI1 Value, DI2 Value, DI3 Value, DI4 Value, DO1 Value)
- Motor Information (displays motor operating information. This section cannot be changed by users):
  - › Motor serial number
  - › Motor Voltage (V)
  - › Rated Speed (rpm)
  - › Tiva (firmware) version
  - › Inverter (firmware) version

## Support

All information and setting options are available via pull-down settings or direct numerical input into the software. For more information, see the [Aircore EC Motor Drive Control Software Overview Video \(link\)](#) on the [Infinitum support site](#). It is in the “Videos” section. We recommend viewing the Motor Drive Control Software video before starting your motor.

After setting the correct parameter settings, you can “START” your motor. After starting, the motor runtime information will be displayed including the “Actual Speed”, the Motor Information windows, the Graphical Readbacks, and Digital Readbacks.

## Firmware update **Much of this has changed**

Firmware for the boards in the motor is the programmed software for the Infinitum Motor Control. Updating the firmware can add extra capabilities and fix bugs that occur during operation in the field and testing. The firmware files must be requested from Infinitum.

The motor cannot be “Connected” during a firmware update. Make sure the blue Connect button (1) is visible. The motor should be powered on. If red Disconnect button is visible, click it to disconnect motor.

The “Firmware Update” button should now be visible.

The following updates can be made:

- Kernel File (3) - Inverter software
- Application File (2) - Inverter software
- Tiva File (1) - Tiva Control software.

## Updating instructions

1. Download the file(s) you wish to update from the Infinitum support website to your PC or laptop
2. Use the “Select Files to Upload” feature to upload the specific files you wish to change into the Motor Drive Control Software. Individual items may be left blank.
3. Once all desired files are uploaded hit the “CONNECT” button (beside the blue Upload button). There should be green text displaying “Connected.”
4. Click the UPLOAD button to move the selected files from the PC/Laptop to the motor.
5. The Status window should start updating to show upload progress.
6. Once the update is complete, the Firmware Update window closes.
7. The motor can be connected to the Motor Drive Control Software after update is complete using the “CONNECT” button in the top Connection Protocol box.

Figure 6:

**PICTURE?**

## Parameter Settings **This will require some changes. Use public parameter list?**

This section describes motor drive settings that can be updated by users via the Motor Drive Control Software.

Operating limits	Definition	Values
Speed – user minimum	User defined minimum speed	New speed must be between Absolute Minimum and Absolute Maximum
Speed – user maximum	User defined maximum speed	New speed must be between Absolute Minimum and Absolute Maximum
Acceleration ramp (sec)	Ramp time to maximum speed	30 – 90 (sec)
Deceleration ramp (sec)	Ramp time to minimum speed	30 – 90 (sec)
Skip speed 1	Avoids operation at this speed	Speed must be between User Minimum and User Maximum
Skip speed 2	Avoids operation at this speed	Speed must be between User Minimum and User Maximum
Skip speed 3	Avoids operation at this speed	Speed must be between User Minimum and User Maximum
Skip speed Bandwidth	Bandwidth for speed ranges to be avoided in SKIP SPEED selection	30 RPM, 60 RPM, 120 RPM
Direction allowed	Shaft rotation options	CW, CCW
Operation Type	Definition	Values
Control Mode	Sourced for control signals	Analog/Digital or Modbus
Speed Input Source	Speed control mechanisms	Modbus, ANALOG, DI1 and DI2, DI2 and DI3, DI3 and DI4
Start/Stop Input Source	Selects source for Start/Stop	Modbus, DI1, DI2, DI3, DI4
Direction Input Source	Selects source for Direction	Modbus, DI1, DI2, DI3, DI4
Clear Fault Input Source	Selects source for fault reset command	Modbus, DI1, DI2, DI3, DI4
Emergency Stop Input Source	Selects source for Emergency Stop	Modbus, DI1, DI2, DI3, DI4
Communication Settings	Definition	Values
RTU Slave Address	Modbus RTU Slave address	0-247
RTU Baud Rate	Modbus RTU Baud Rate	1200, 2400,4800, 9600, 19200,38400, 57600,76800,115200
RTU Parity	Modbus Parity	None, Even, Odd
IoT Update Rate	IoT Refresh Rate (IoT is optional)	60-32767 (sec)
Fault Reset	Definition	Values
Number of Attempts	Defines number of automatic fault reset attempts	0-10, 99 (infinite)
Reset Delay (Seconds)	Defines time between successive automatic reset attempts	0-120 (seconds)

Figure 7:

**PICTURE?**



<b>Terminal Settings</b>	<b>Definition</b>	<b>Values</b>
All Function	Analog In 1 selection	Speed
All Minimum Setting	Defines percent value corresponding to minimum mA(V) signal for analog input AI1	80 = 0 to 80% (0 to 16 mA) 100 = 0 to 100% (0 to 20 mA)
All Maximum Setting	Defines percent value corresponding to minimum mA(V) signal for analog input AI1	80 = 0 to 80% (0 to 16 mA) 100 = 0 to 100% (0 to 20 mA)
All Type	Analog Input Type selector	Voltage, Current
Constant Speed 1 (rpm)	Speed motor operates at when corresponding combination of digital inputs are activated	
Constant Speed 2 (rpm)	Speed motor operates at when corresponding combination of digital inputs are activated	
Constant Speed 3 (rpm)	Speed motor operates at when corresponding combination of digital inputs are activated	
Constant Speed 4 (rpm)	Speed motor operates at when corresponding combination of digital inputs are activated	
AO1 Function	Connects motor signal to analog output AO1) Note: Analog Out is not available on -C motors	Speed, Torque, Power, Current, 10V (Potentiometer)
AO1 Type	Type of Analog Output	Voltage, Current
DO1 Function	Selects motor status indicated by corresponding output	None, Active, Fault
DO2 Function	Selects motor status indicated by corresponding output	None, Active, Fault
<b>Fail Over Settings</b>	<b>Definition</b>	<b>Values</b>
Modbus Monitor Enable	User option to Enable or Disable Fail Over Feature	Enable, Disable
Modbus Monitor Timeout	Time before fail over feature is implemented after loss of communication	1-3600 (seconds)
Modbus Monitor Stop	Selectable options for process to follow for communication loss	Implement Fail Over Speed, Stop Motor
Modbus Monitor Resume	Preferred action on communication restoration	Resume previous speed, Disable
Modbus Monitor Speed	Fail-over speed if communication loss occurs Modbus Monitor Stop is set to Implement Fail Over Speed	Speed must be between User Minimum and User Maximum



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