

# Delta-Q IC650

650W Industrial Battery Charger

## IC650 Troubleshooting Guide



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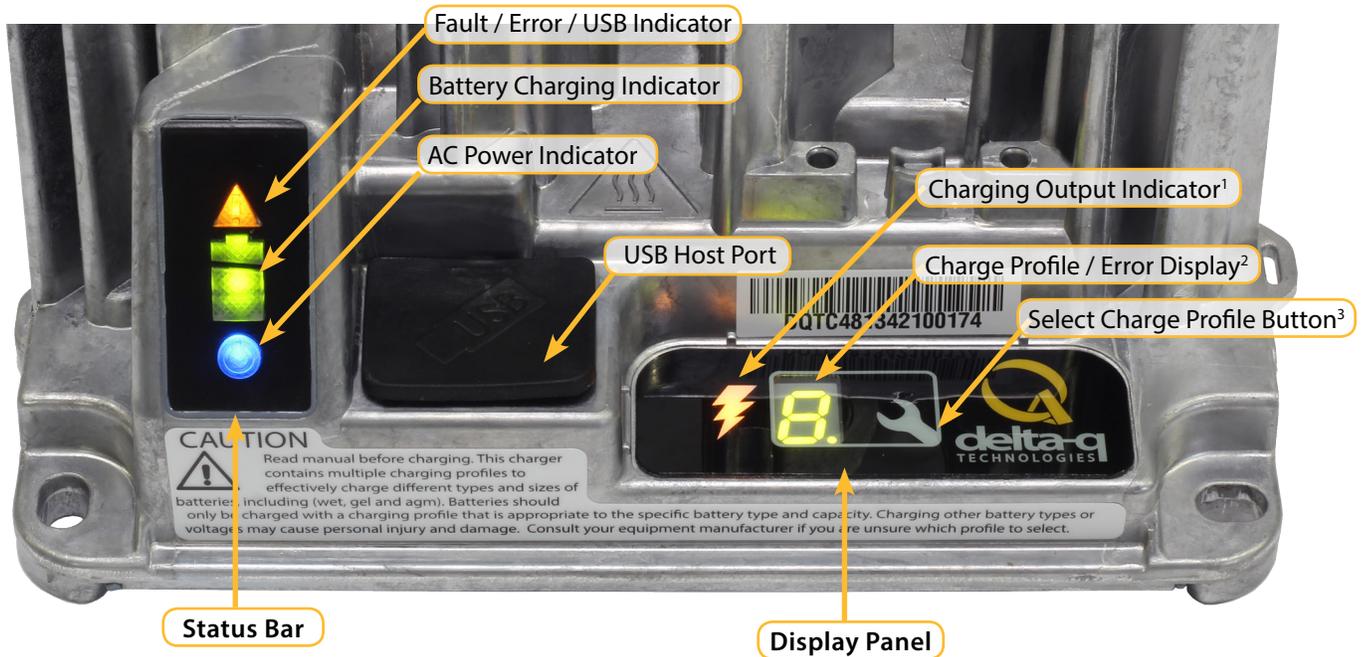
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# 1.0 Charger Interface



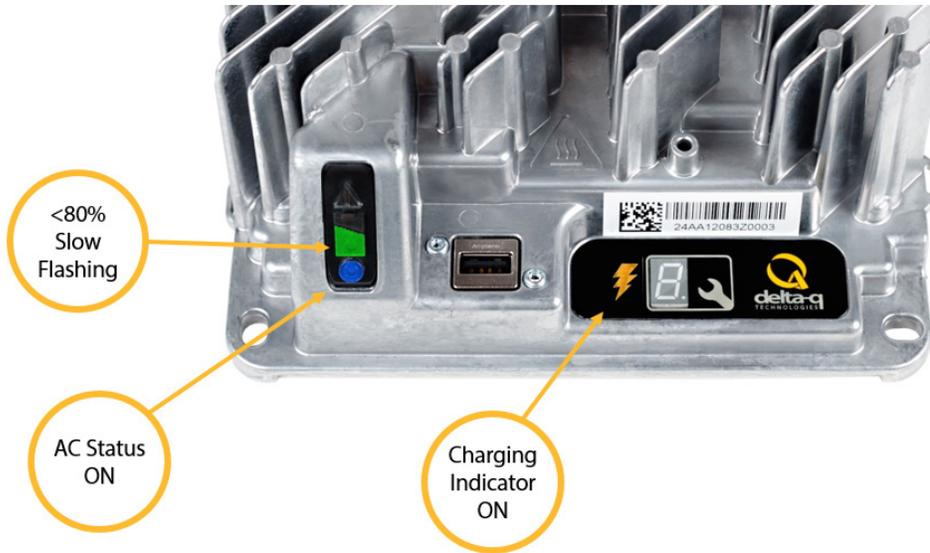
	Solid red = Charger fault See display panel for details		Solid blue = AC power available
	Flashing amber = External error condition - caution See display panel for details		Flashing green = Low state of charge Solid green = High state of charge
	Flashing green = USB port active Solid green = Safe to remove USB flash drive		Flashing green = High state of charge Solid green = Charge completed

1. The Charging Output Indicator is solid yellow when the charger output is active. Take appropriate actions while handling the charger, as there is a risk of electric shock.
2. The USB Host Port provides read and write USB functionality. Using a standard USB flash drive, a user can download charge tracking data, and update the charger's software and charging profiles. See the [USB Host Port](#), [IC650 Configuration](#), and [Charge Cycle Tracking Data](#) sections for more information.
3. The Charge Profile / Error Display shows one of four possible codes to indicate different conditions:
  - ✦ 'F' codes mean that an internal fault condition has caused charging to stop.
  - ✦ 'E' codes mean that an external error condition has caused charging to stop.
  - ✦ 'P' codes mean that the charger programming mode is active.
  - ✦ 'USB' code meaning that the USB interface is active, and the USB flash drive should not be removed.

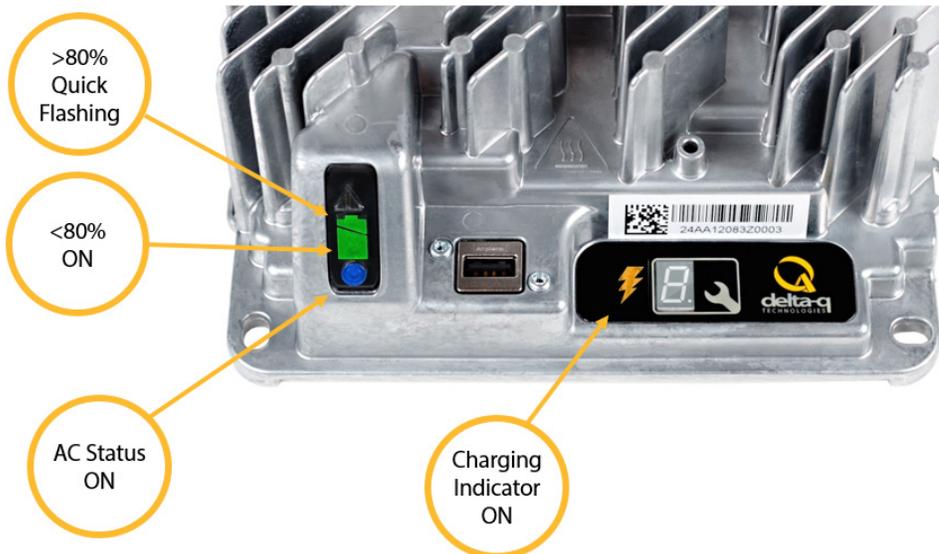
The 'E','F' and 'P' codes are followed by three numbers and a period to indicate different conditions (e.g. E-0-0-4.). See the [Charger Fault Codes](#) or [Charger Error Codes](#) sections for details on these conditions and their solutions. 'P' codes indicate the charging profile number.

4. The Select Charge Profile Button is used to select a charge profile from those stored on the charger. Up to 25 charge profiles can be stored. See the [Selecting A Charge Profile](#) section for instructions.

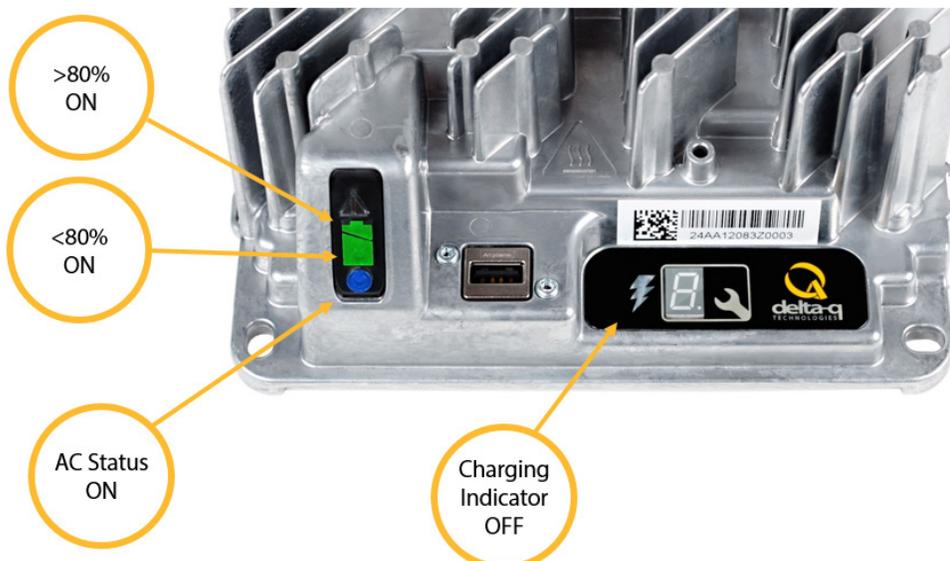
### 1.1 Normal Operation: Bulk charging, <80% complete



### 1.2 Absorption / Finish phase, >80% complete



### 1.3 Charging complete



## 2.0 IC650 Configuration

There are two ways to alter the configuration on the IC650 Charger:

1. Use the Select Charge Profile Button.
2. Use a pre-programmed USB flash drive.

### 2.1 Selecting A Charge Profile Using the 'Select Charge Profile Button'

1. Disconnect AC input from the charger, or from the wall outlet. Wait 30 seconds for the input relay to open.



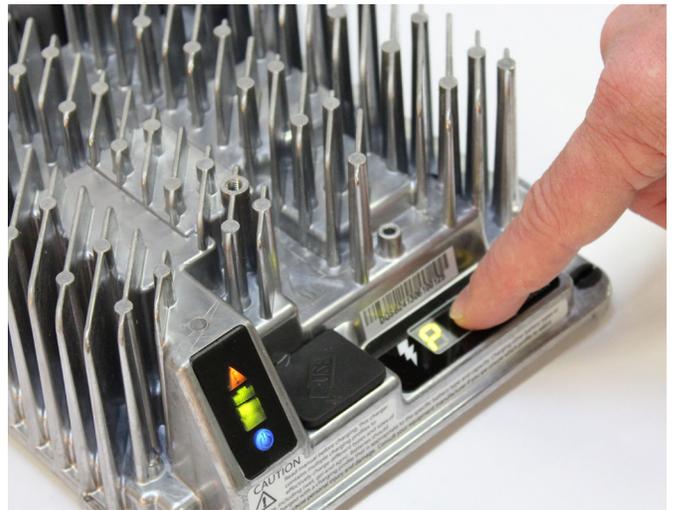
Figure 1. Disconnect AC input from the charger.

2. While reconnecting AC input, press and hold the Select Charge Profile Button. Hold the button (approximately 10 seconds) through the light check function until Error Indicator is on (in amber) and Battery Charging Indicator (in green) starts flashing.



Figure 2. Reconnect AC input while holding the Select Charge Profile Button.

3. Press and release the Select Charge Profile Button to advance through charging profiles loaded on the charger. The selected charging profile will be displayed up to three times (e.g. "P-0-1-1" for Profile 11).\*



4. Once the desired charging profile is displayed, press and hold the Select Charge Profile button for 10 seconds to confirm selection and exit Profile Selection Mode. When the charge profile is confirmed, the Error Indicator and Battery Charging INdicator lights will turn off, while the blue AC Power Indicator remains lit. At this point, the button can be released.

\*Process will time out and profile will remain unchanged if there is 15 seconds of inactivity, a profile number is allowed to display three times, or if AC power is cycled.

4. Once the desired charging profile is displayed, press and hold the Select Charge Profile button for 10 seconds to confirm selection and exit Profile Selection Mode. When the charge profile is confirmed, the Error Indicator and Battery Charging INdicator lights will turn off, while the blue AC Power Indicator remains lit. At this point, the button can be released.

5. Press the Select Charge Profile Button to check that the desired profile is selected.

## 2.2 Configuring the IC650 Charger Using a USB Flash Drive

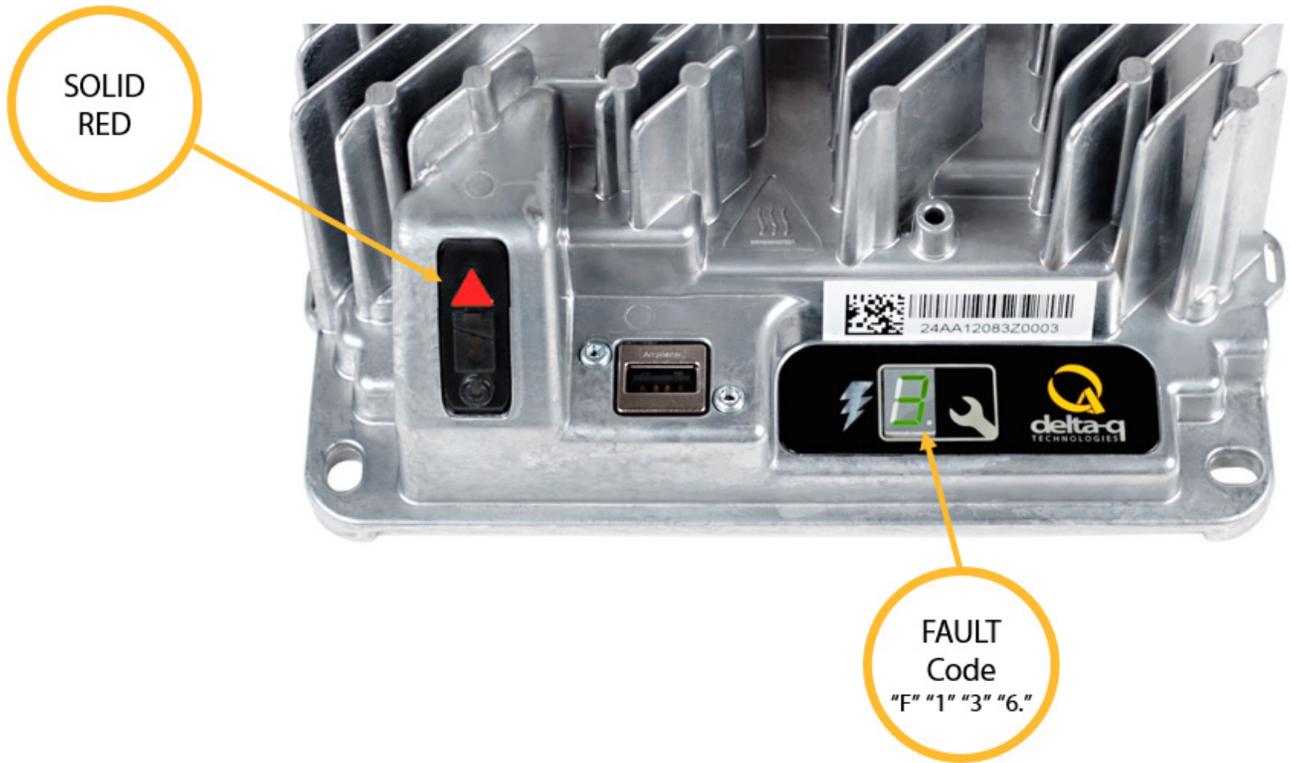
Using the Delta-Q software, USB storage drives can be pre-programmed to certain charger configurations. To use the USB port, follow these steps:

1. Insert the USB flash drive at any time, but preferably not during a charge cycle. Stop the charge cycle by removing AC power or the DC connection to the batteries. The charger can power the USB port from the AC connection (DC disconnected) or from the DC connection (AC disconnected).
2. If there is enough disk space (about 2 mb), the charger will write charge tracking data to the drive. The Fault / Error / USB Indicator will flash green during reading and writing.
3. If the drive contains compatible configuration files, the charger will load them.
4. The IC650 Charger will briefly reset.
5. Remove the drive when the Fault / Error / USB indicator is solid green.



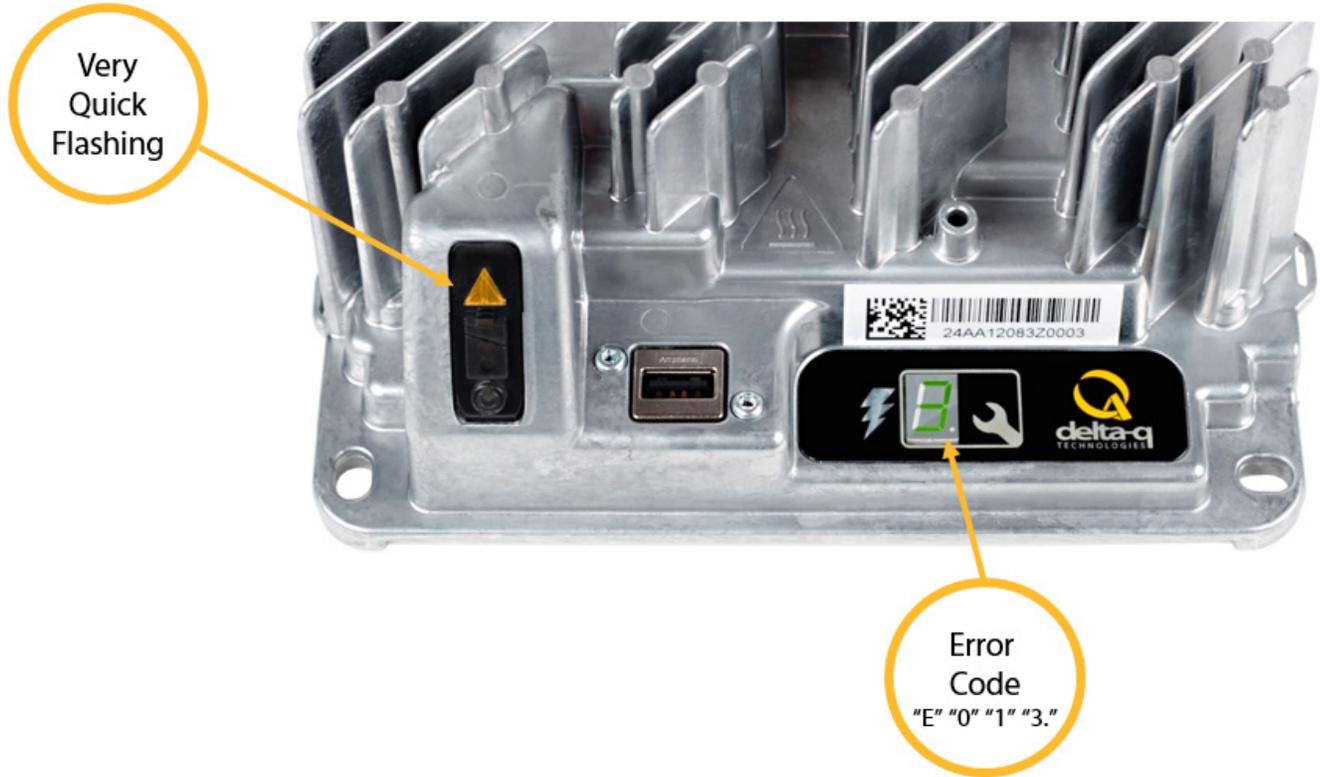
Figure 4. Insert the USB flash drive to begin the reprogramming process. When complete, the Fault / Error / USB indicator will be solid green as shown.

# 3.0 Charger Fault Codes



Fault Code	Description	Troubleshooting / Customer Actions
F-0-0-1	PFC failure - PFC Excessive Leakage Fault	<p><i>If a unit is not functioning and an Error is not indicated or logged, and this condition persists after cycling both AC and DC, it should be sent back to Delta-Q for root cause analysis.</i></p> <p>Internal charger fault. Remove AC and battery for minimum 30 seconds and retry charger. If fault persists, contact the manufacturer of your vehicle/machine or Delta-Q Technologies.</p>
F-0-0-2	PFC failure - PFC Excessive Leakage Fault	
F-0-0-3	PFC has taken too long to boost	
F-0-0-4	The charger has been unable to calibrate the current offset	
F-0-0-5	The output relay voltage is too high when relay is closed	

# 4.0 Charger Error Codes



Battery and Set Up Errors		
Error Code	Description	Troubleshooting / Customer Actions
E-0-0-1 E-0-2-1	High battery voltage error	Battery Voltage is too high to charge. Check the battery voltage and cable connections. Check battery size and condition (could be too full to charge). This error will automatically clear once the condition has been corrected.
E-0-0-2 E-0-2-2	Low battery voltage	Battery Voltage is too low to charge. Check the battery voltage and cable connections. Check battery size and condition. This error will automatically clear once the condition has been corrected.
E-0-0-3	Charge timeout	Charge Timeout caused by battery pack not reaching required voltage within safe time limit. Possible causes: Poor battery health. Very deeply discharged battery. Poorly connected battery. Extra loads. Replace battery pack. Check DC connections. Charger output reduced due to high temperatures. This error will automatically clear once the charger is reset by cycling DC.
E-0-0-4	Battery defective	Battery could not be trickle charged up to the minimum voltage. Battery voltage has not reached the level for normal charge cycle to take place, Check for shorted or damaged cells. Replace battery pack. Check DC connections. This error will automatically clear once the charger is reset by cycling DC.
E-0-0-7	Ah limit rceeded	Safety limit exceeded. Possible causes: Poor battery health. Very deeply discharged battery. Poorly connected battery. High parasitic loads on battery while charging. Possible solutions: Replace battery pack. Check DC connections. Disconnect parasitic loads. This error will automatically clear once the charger is reset by cycling DC.
E-0-0-8	Battery temperature out of range error	Check temperature sensor and connections. Reset charger. This error will automatically clear once the condition has been corrected.

Error Code	Description	Troubleshooting / Customer Actions
E-0-1-2	Reverse polarity error	Battery is connected the wrong way around. Check the battery connections. This error will automatically clear once the condition has been corrected.
E-0-1-3	Battery does not take current	Battery voltage is detected but the charger is unable to charge the battery. This can be due to an electrical device connected between the charger and the battery, which passes through voltage but not current verify correct set up with OEM.
E-0-2-3 E-0-2-5	AC voltage out of range	AC voltage is out of range. Connect charger to an AC source that provides stable AC between 85 - 270 VAC / 45-65 Hz. This error will automatically clear once the condition has been corrected.

### Software / Algorithm Error - Quote error code to OEM support to assist with troubleshooting

Error Code	Description	Troubleshooting / Customer Actions
E-0-1-1 E-0-2-9 E-0-3-0 E-0-3-2 E-0-3-8	Charger is disabled by External command e.g. CANbus	Charger has been disabled by an external controller over the CANbus network contact OEM for instruction.
E-0-1-6 E-0-1-8 E-0-1-9 E-0-2-6	Software error	The software update failed. Ensure the USB Flash Drive is properly formatted and retry the update by reinserting the USB Flash Drive into the charger. If software updates continue to fail, contact Delta-Q.
E-0-2-0 E-0-2-8	Algorithm error	The selected charging profile is incompatible with the charger software. Update charger software or select a different charging profile. Ensure default algorithm is selected.
E-0-1-7 E-0-2-7	USB error	There has been a problem mounting or un mounting the USB Flash Drive. Remove and re-insert the USB Drive. If the condition persists then remove AC and battery for minimum 30 seconds and retry charger. If the problem persists then contact Delta-Q for further help.

### Configuration Error - Quote error code to OEM support to assist with troubleshooting

Error Code	Description	Troubleshooting / Customer Actions
E-0-1-4 E-0-1-5 E-0-2-4 E-0-3-1 E-0-3-3 E-0-3-4 E-0-3-5 E-0-3-6 E-0-3-7	Configurations error	There is an error with the charger's internal configuration, Contact the OEM or Delta-Q and quote the error code. USB drive update may be provided to clear error.

