



Twin Tec

Installation and Tuning M8RCI Racing Ignition

CAUTION: READ INSTRUCTIONS BEFORE PROCEEDING. DESIGNED FOR RACING - NOT LEGAL FOR SALE OR USE IN CALIFORNIA OR ON ANY POLLUTION CONTROLLED VEHICLES.

OVERVIEW

The M8RCI Racing Ignition module shares the housing and utilizes the same spark table editing software as the Daytona Twin Tec TC88 module for Twin Cam engines (PC LINK TC88.exe).

The M8RCI Racing Ignition is designed to replace the original equipment ECU on HD motorcycles equipped with the M8 engines (2017+). This ignition offers adjustable advance maps and adjustable RPM limit settings in 100 RPM increments. To adjust the advanced features **PC Link TC88** software and our **optional USB interface cable (P/N 18014)** is utilized to reprogram the ignition module with a custom advance table and to set and adjust other advanced engine parameters such as rear cylinder timing offset. You must use **version 8.1** or greater of **PC Link TC88** for programming custom advance curves and other engine parameters.

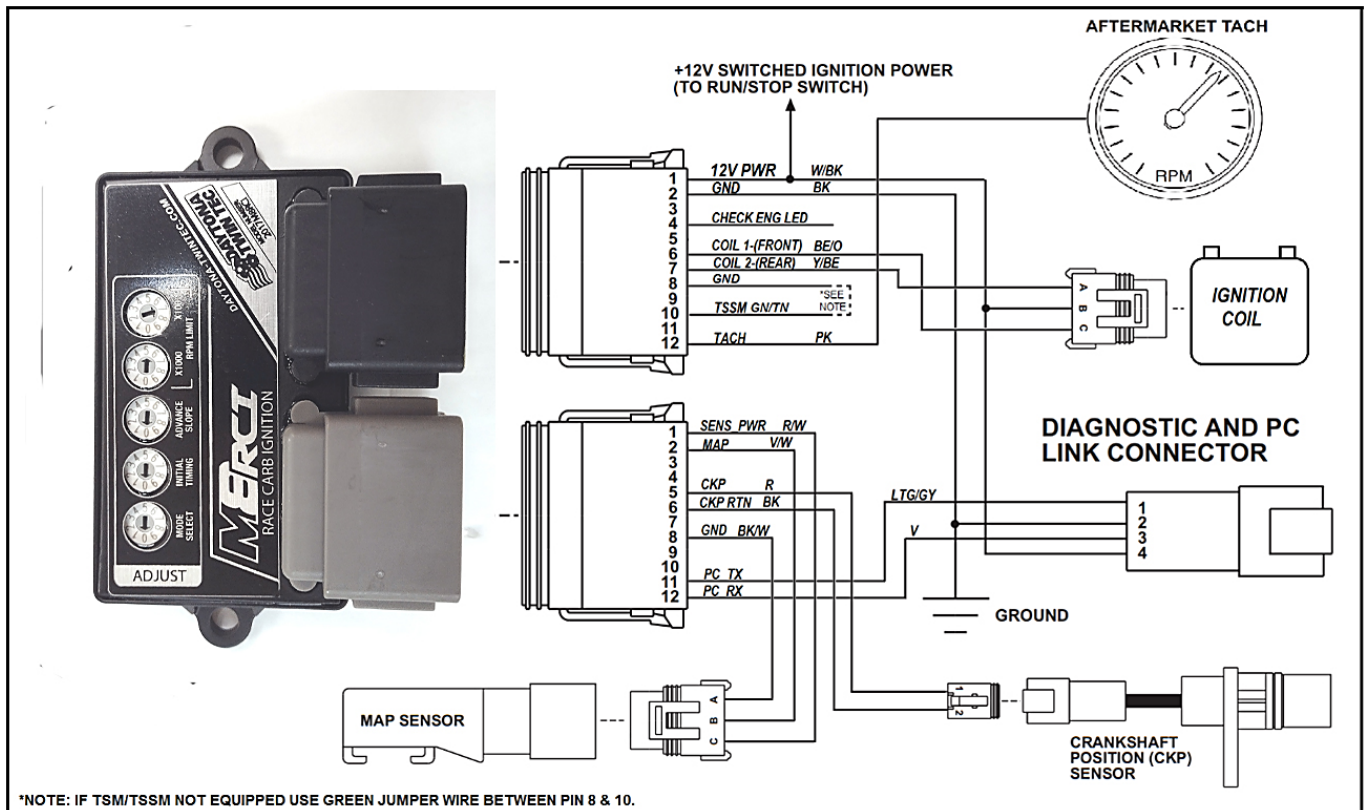
We offer different kit part numbers that have different options (including the USB). The base setup requires the M8RCI Racing Ignition module, DTT ignition coil p/n: 2018M8 and the wire harness. Alternatively our 2017M8 coil could be used but it requires an extra coil adapter harness (flat edged connector vs curved).



INSTALLATION

1. Turn off the ignition switch and disconnect the battery ground cable before proceeding.
2. It is assumed that you have installed and secured the carburetor already. If you plan to keep the OEM intake manifold, you can leave the injectors installed and use an adapter flange and gasket.
3. Disconnect and remove the OEM ECU. The ECU module is usually located under the seat or under a side cover.
4. Install and connect the M8RCI ignition module and wiring harness – Black Connector Verify Pin 1 is connected to +12v key/on power, Pin 2 to ground and Pin 10 should either be NOT connected or connected to your two step input.
5. Verify the connector keyways before installing the Black and Grey connector plugs in the M8RCI Ignition. It is possible to force them into the unit upside down (engine will not start)
6. Reconnect the battery ground cable.
7. Black Connector Pin 4 – Optional Check Engine Light output wire – can be connected to an external 12v LED.
Example: <https://www.digikey.com/en/products/detail/mallory-sonalert-products-inc/FL1P-8QW-2-Y12V/9958216>
8. All M8RCI Ignitions include a built in Two Step Staging Rev Limiter – This feature activates by grounding Pin 10 on the Black Connector. The wiring harness ships with Pin 10 grounded to Pin 8 (Green Loop). Normal use: leave the Green Loop in place and adjust the RPM Limit switches. If you want to use Two Step – cut the Green loop and set the MAX RPM using the PC Link TC88 Software to your desired RPM (normal limit). When Pin 10 is grounded the Two Step limiter is active and this is adjusted via the two RPM switches on the unit.

Note: After adjusting the switches on the front panel → power off and power on the unit for the changes to take effect.



IMPORTANT NOTE: Make sure the ACR (automatic compression release) is functional – that is, when you engage the starter motor, the ACR valves open and once the engine has started, they are closed. The simplest method is to wire the push button that starts the engine to a high current relay and the relay opens the ACR anytime that you are starting the engine – it is not a perfect solution but it is better than not using the ACR. The ACR relay is not included, but we do offer a relay kit that you can wire in that includes a harness, it is DTT pn: 1030.

SETTING UP THE IGNITION ADVANCE

There are 3 rotary switches which enable you to optimize the ignition timing and 2 switches for rpm limiting:

1. MODE SELECT switch

A single 10 position rotary switch is used to select the operating modes. Switch settings are as follows:

- 0 Multi-spark disabled
- 1 Multi-spark enabled
- 2-7 Not used (Do NOT USE)
- 8-9 Boot load mode (see text)

Recommend setting 0 or 1

TUNING TIP: Lean air/fuel ratio (AFR) increases the tendency for spark knock. Check AFR and re-jet carburetor before optimizing ignition timing. Test the motorcycle on a dyno with an exhaust gas sniffer or use our WEGO III Dual Display Widband O2 pn 112005 or 112006.

2. INITIAL TIMING switch

The M8 engine utilizes a non-adjustable crankshaft position sensor. Thus, no mechanical means exist for adjusting the timing. The M8RCI module overcomes this limitation. The **Initial Timing** switch allows you to shift the entire advance table up or down. Switch setting 5 corresponds to nominal timing (no advance). Lower switch settings decrease (retard) the initial timing and higher switch settings increase (advance) the initial timing in one-degree steps.

3. ADVANCE SLOPE switch

The M8RCI Module has 2 timing tables pre-programmed: a minimum spark and a maximum spark table. The **Advanced Slope** switch will blend the two tables, using a weighted average algorithm. Start with the lower setting and increase until the engine starts detonating ("pinging"), then go back one notch. Switch Position 6 is recommended for street riding.

4. RPM LIMITER SETTING switches

You can set the RPM limit from 3,000 to 9,900 RPM in 100 RPM increments by means of two rotary switches. The RPM limit is X100 switch setting (i.e. 57 = 5,700 RPM). Inadvertent settings below 3,000 RPM are ignored and result in a 3,000 RPM limit.

Set a safe RPM limit that is appropriate for your engine. Most M8 engines with OE valvetrain components should not be run over 6,000 RPM.

The M8RCI was designed for racing and it does not support the TSSM module input on the black connector pin 10. As delivered a green loop is installed from pin 8 to pin 10 (grounding pin 10). This forces the unit to use the switches for the RPM limit. If you cut the green loop and pin 10 is no longer grounded – the rpm limit is the base RPM value (3000rpm). To change use PC LINK TC88 and the USB module. When pin 10 is grounded via a micro-switch the Two Step is activated and the RPM Limit is controlled by the Two Switches on the panel.

RECOMMENDED TIMING SETTINGS

Initial Timing switch setting 5 corresponds to nominal timing (no extra advance). Lower switch settings decrease (retard) the initial timing and higher switch settings increase (advance) the initial timing in one-degree steps.

Tuning a particular engine setup always requires some trial-and-error experimentation, but maximum power is usually obtained by using the highest advance settings possible without audible spark knock. Some recommended starting points are given below:

Stock engines on normal pump gas (87 octane): **Initial Timing** setting of 5 and an **Advance Slope** setting 6.

Stock or mild engines on 92 or higher-octane gas: **Initial Timing** setting 5 and **Advance Slope** setting of 8 or 9.

High compression engines that tend to detonate, use **Initial Timing** setting 2 and **Advance Slope** setting 2.

If you experience spark knock only at low RPM, you can try reducing the initial timing switch setting while maintaining a more aggressive advance slope for maximum power at high RPM by increasing the advance slope switch setting. If spark knock is a problem at high RPM, decrease the advance slope switch setting.

Below are the built in, pre-programmed, non-adjustable minimum and maximum advance tables. The algorithm outputs a weighted average between the 2 tables, based on the position of the **Advance Slope** switch.

Min advance table

MAP/RPM	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500
16	0	24	25	18	15	17	22	21	21	21	21	21	21	21	21	21
18	0	21	22	16	16	19	23	22	23	23	23	23	23	23	23	23
20	0	18	18	15	14	17	23	22	23	23	23	23	23	23	23	23
22	0	16	16	14	12	12	17	18	22	23	23	23	23	23	23	23
24	0	12	11	11	9	11	14	16	20	22	22	22	22	22	22	22
26	0	7	7	7	8	10	13	19	21	25	27	27	27	28	29	29
28	0	6	6	6	7	10	13	19	21	25	27	27	27	28	29	29
30	0	5	5	5	6	8	11	19	20	24	25	25	25	26	27	27

Max advance table

MAP/RPM	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500
16	0	28	29	22	21	23	28	28	28	28	28	28	28	28	28	28
18	0	25	26	20	22	25	29	29	30	30	30	30	30	30	30	30
20	0	22	22	19	20	23	29	29	30	30	30	30	30	30	30	30
22	0	20	20	18	18	18	23	25	29	30	30	30	30	30	30	30
24	0	16	15	15	15	17	20	23	27	29	29	29	29	29	29	29
26	0	11	11	11	14	16	19	26	29	33	35	35	35	36	37	37
28	0	10	10	10	13	16	19	26	29	33	35	35	35	36	37	37
30	0	9	9	9	12	14	17	26	28	32	33	33	33	34	35	35

CUSTOM SPARK CURVE – VIA PC LINK TC88

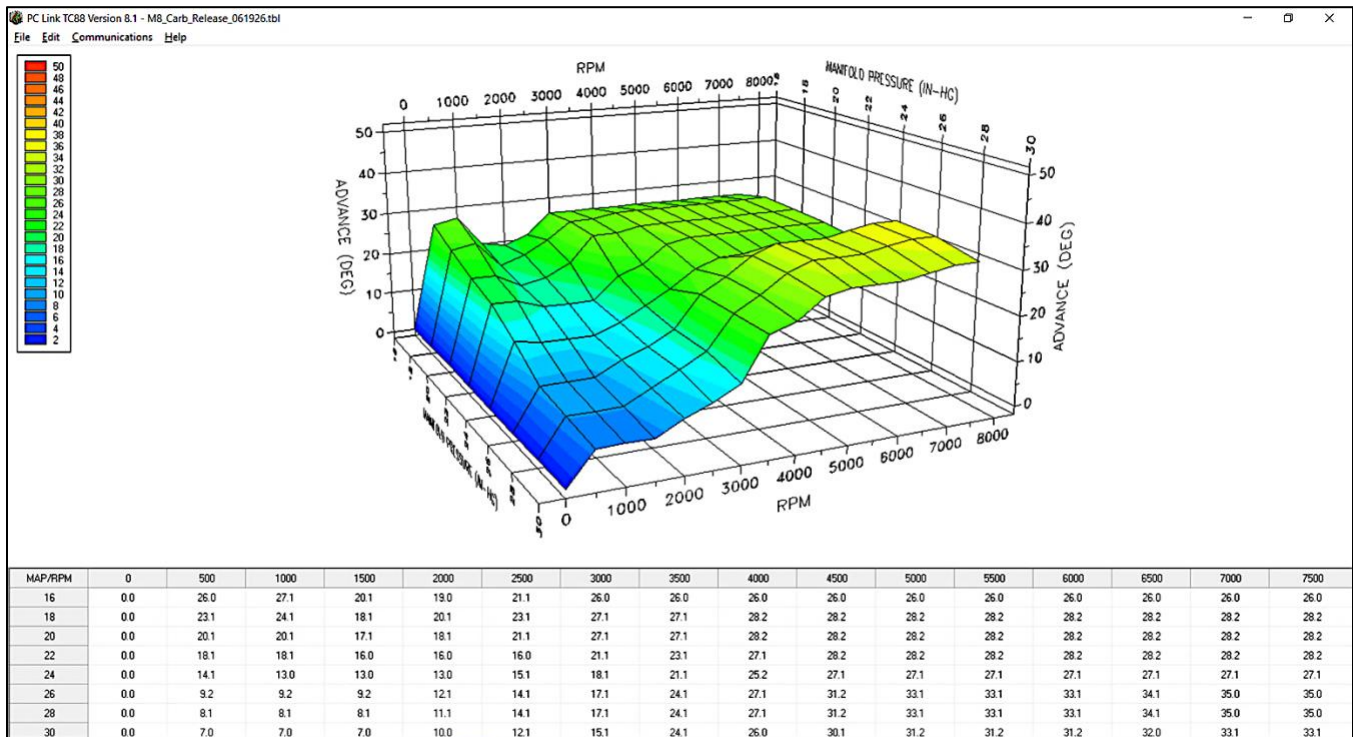
Optional **Twin Tec** USB Interface (P/N 18014) provides PC connectivity to the M8RCI Racing Ignition Module.

PC LINK TC88 is a Windows based program that is used to adjust and program custom advance curves and options. The latest versions of our software are always available for download on our website. The software is free and will work in demo mode without a **Twin Tec** module attached. Refer to the software documentation for details.

The optional USB interface (P/N 18014) is required to connect the ignition module to the PC.

PC Link TC88 software can access the M8RCI Ignition module **ONLY** after the ignition module is turned on and the engine has not yet been started. Once the engine is started, connectivity to the PC Link software is disabled. Note that no damage will occur if the engine is inadvertently started while the PC link is still attached.

The **M8RCI** ignition module ships with a custom spark table which is 2 degrees lower than the max table – photo below:



To access the custom table or change the MAX Rev Limit with the Green Wire cut: Install **PCLINK TC88** on your PC.

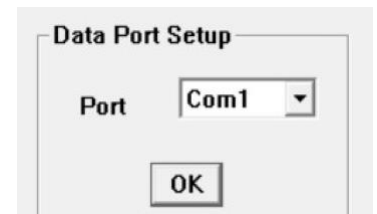
Download and install from: <http://www.daytona-twintec.com/instructions/>

• **Connect the USB Interface 18014 to your PC.**

Open the Device Manager program on your PC and click Com Ports, unplug and re-plug the USB Interface to verify the com port number.

Choose the port in PC LINK TC88 software by reconnecting the USB Module to the PC and wire harness, Power on the M8RCI Ignition, Open the program, and **Click:**

Communications→ Port Setup and select the Com Port assigned to the USB Interface.

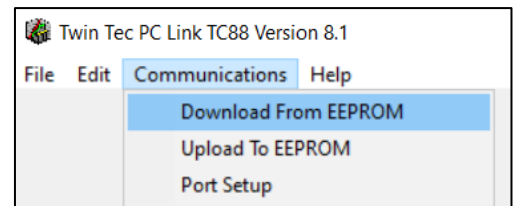


• **Read the tune out of the M8RCI Ignition Module**

Communications→Download From EEPROM

• **Save the Ignition Module read. File→Save Table**

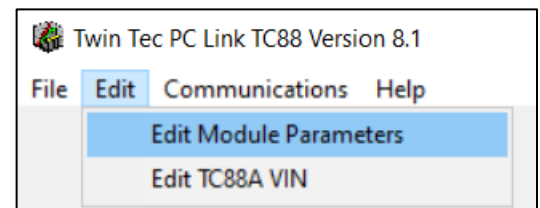
This command saves both the Timing Table and the Module Parameters into a *.tbl file.



• **Edit→Edit Module Parameters**

Choose EEPROM Advance Table (Your custom table) or choose FLASH Advance Tables (Advance Slope and Initial Timing switches)

Click Fixed Initial Timing to Adjust the Initial Base Timing



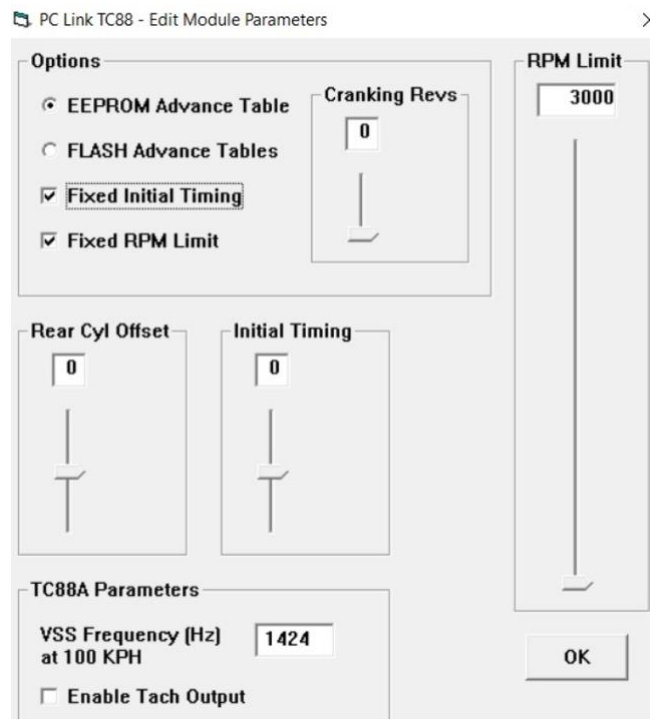
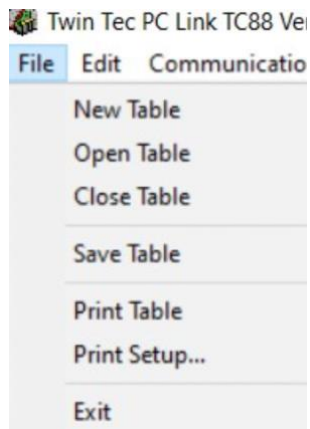
Adjust the MAX RPM Limiter – Enabled when the Green Wire loop is cut and Pin 10 is not grounded – Edit→Edit Module Parameters→Fixed RPM Limit (check)

Adjust Rear Cylinder Timing Offset – If required

Adjust the number Cranking Revolutions prior to starting

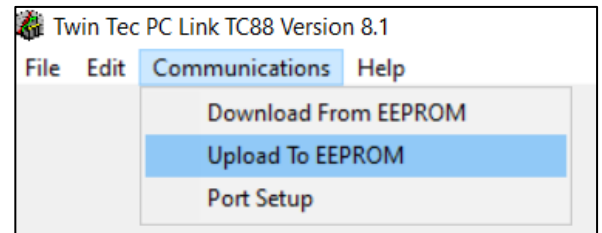
Note: TC88A Parameters on this screen are NOT used

File→Save Table stores the spark table + parameters in the file.



• **File→Open Table** – This allows you to edit your spark table after you have either Downloaded from EEPROM (read the ignition module) or this will open a saved *.tbl file that also contains module parameters.

• **Communications→Upload to EEPROM** programs the current file into the ignition module. Make sure that you have the correct file open prior to programming.



GENERAL RECOMMENDATIONS

The M8RCI Ignition is designed to be used with our ignition coil part number: 2018M8.

Due to the short lengths involved on motorcycle applications, energy losses in spark plug wires are insignificant. OE carbon core suppression cables will deteriorate after several years. For a more durable replacement, we suggest spiral core type spark plug cables.

M8 ENGINE HOT STARTING PROBLEMS

Some M8 engines are prone to hot starting problems. When cranked after a short hot soak, the engine may “kick back.” Over time, this will cause damage to the ring gear and starter pinion.

Our ignition module uses an improved starting algorithm that includes a programmable cranking delay - Cranking Revs. The M8RCI ignition module is shipped with a zero-cranking delay: it fires on the first recognized compression stroke. This works best on stock and mildly modified engines.

High compression engines may exhibit a “dieseling” phenomenon after a hot soak. This can be verified by temporarily disconnecting the 3 terminal coil primary connector to disable the ignition. If the engine still kicks back or runs for several revolutions after cranking, the problem is dieseling. The only solution is to install compression releases. When compression releases are installed, best starting results will be obtained by programming the M8RCI module for a 1-2 revolution cranking delay. This can be done by means of the PC Link TC88 software and optional USB interface cable.

CHECK ENGINE LED DIAGNOSTICS

The M8RCI is NOT compatible with H-D® scan tools that can connect to the diagnostic link in the wire harness.

A check engine led diagnostic routine is built into the M8RCI. It communicates fault conditions by means of the check engine LED either wired directly to the unit or via an instrument cluster (Note: a cluster is not required).

If you do not have a instrument cluster, you can connect the M8RCI Check Engine Line Output to an external 12v LED. Located on Black Connector Pin 4 – Optional Check Engine Light output wire – connect to an external 12v LED. Example LED Link: <https://www.digikey.com/en/products/detail/mallory-sonalert-products-inc/FL1P-8QW-2-Y12V/9958216>

When the ignition switch is first turned on, the check engine LED illuminates. The LED will remain on until the engine is started. If a diagnostic fault is detected, the LED will flash a number of times and then pause for several seconds. The number of flashes indicates the fault condition as follows:

- 1 Flash - Crankshaft position (CKP) sensor signal lost.** This fault occurs if the engine stalls while the ignition is on. It may also indicate a defective CKP sensor or intermittent wire harness connection.
- 2 Flashes - Note: 2 Flashes is Not Applicable on this racing unit.** This fault would only occur if the security system (2001 and later models only) is activated or the bank angle sensor indicates a "tipped over" condition. It may also indicate a defective TSSM or bank angle sensor module or intermittent wire harness connection.
- 3 Flashes - Manifold pressure (MAP) sensor rationality check failure.** The MAP sensor signal is outside the expected range. The sensor may be defective or have an intermittent wire harness connection.
- 4 Flashes - Low battery voltage.** This fault warns that the battery is almost totally discharged. The most likely cause is a defective voltage regulator, alternator, or battery. This fault may occur immediately after cranking if the battery is weak but should be cleared within several minutes if the charging system is functioning.
- 5 Flashes - High battery voltage.** The most likely cause is a defective battery or voltage regulator or loose battery connection.

USING THE BUILD IN TWO STEP – LAUNCH RPM FEATURE

M8RCI harness ships with a Green Wire Loop installed between Pins 10 and 8 on the Black Connector.

The Green Loop connects Pin 8 (ground) to Pin 10 (input that enables the Two Step).

The Green Wire Loop grounds Pin 10 and this forces the switches on the front panel to be used for the RPM LIMIT.

To enable the Two Step – CUT the Green loop and set the Fixed RPM Limit (MAX ENGINE RPM) using the PC Link TC88 Software to your desired MAX RPM. The value in the software now becomes the MAX RPM LIMIT. When Pin 10 is OPEN (not grounded) the Fixed RPM Limit value programmed via the PC Link software is the MAX RPM LIMIT.

When Pin 10 is grounded via a micro-switch, the Two Step RP Limiter is active and this is adjusted via the two RPM switches on the front of the unit.

Note: After adjusting the switches on the front panel → power off and power on the unit for the changes to take effect.

TROUBLESHOOTING FLOWCHART

Experience has shown that most units returned for warranty are OK and that usually another problem is causing the issue, such as a defective coil, wires or plugs.

