Microsquirt stepper adapter

for 4/6 wire stepper idle valves

This version of the documentation applies to:

- Microsquirt Stepper adapter from EFI Source
- Microsquirt ECU running MS2/Extra firmware 3.3.x or later

1: Pre-requisites

Microsquirt ECU

4 or 6 wire stepper idle valve

MS2/Extra 3.3.x or later firmware

Tuning laptop computer

TunerStudio installed on computer and communicating with Microsquirt

Wiring tools

Ability to use a computer and install wiring.

2: Wiring

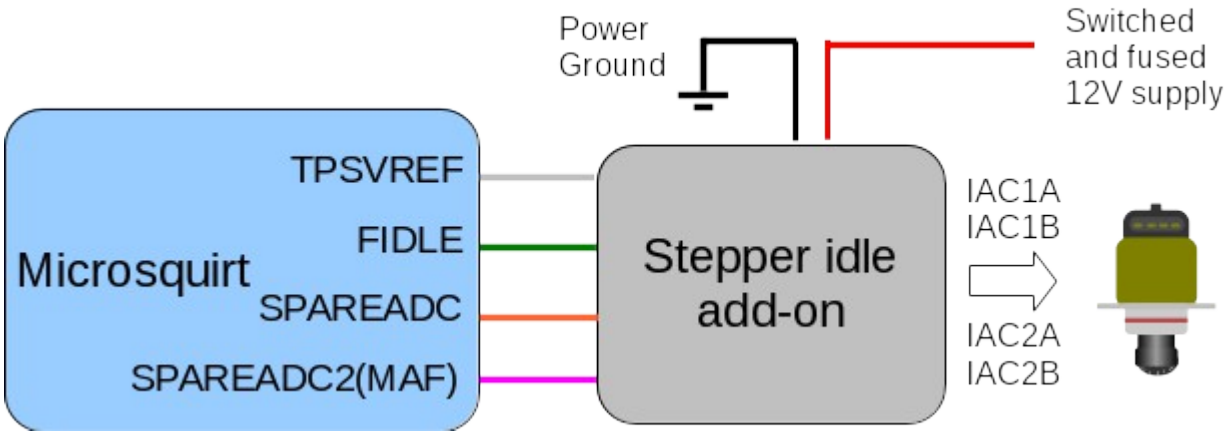
The stepper idle adapter add-on has 12V and 5V power supply wires and ground; three signal inputs and four control outputs.

Function	Wire Color	Stripe	Type
12V	Red		power
5V Vref	Gray		power
Ground	Black		power
Fidle	Green		signal in
SpareADC	Orange	Green	signal in
SpareADC2	Pink	Black	signal in
IAC1A	Blue		output
IAC 1B	White	Blue	output
IAC 2A	White	Green	output
IAC 2B	Green		output

The wiring between the stepper idle adapter add-on and the Microsquirt uses the three signal wires.

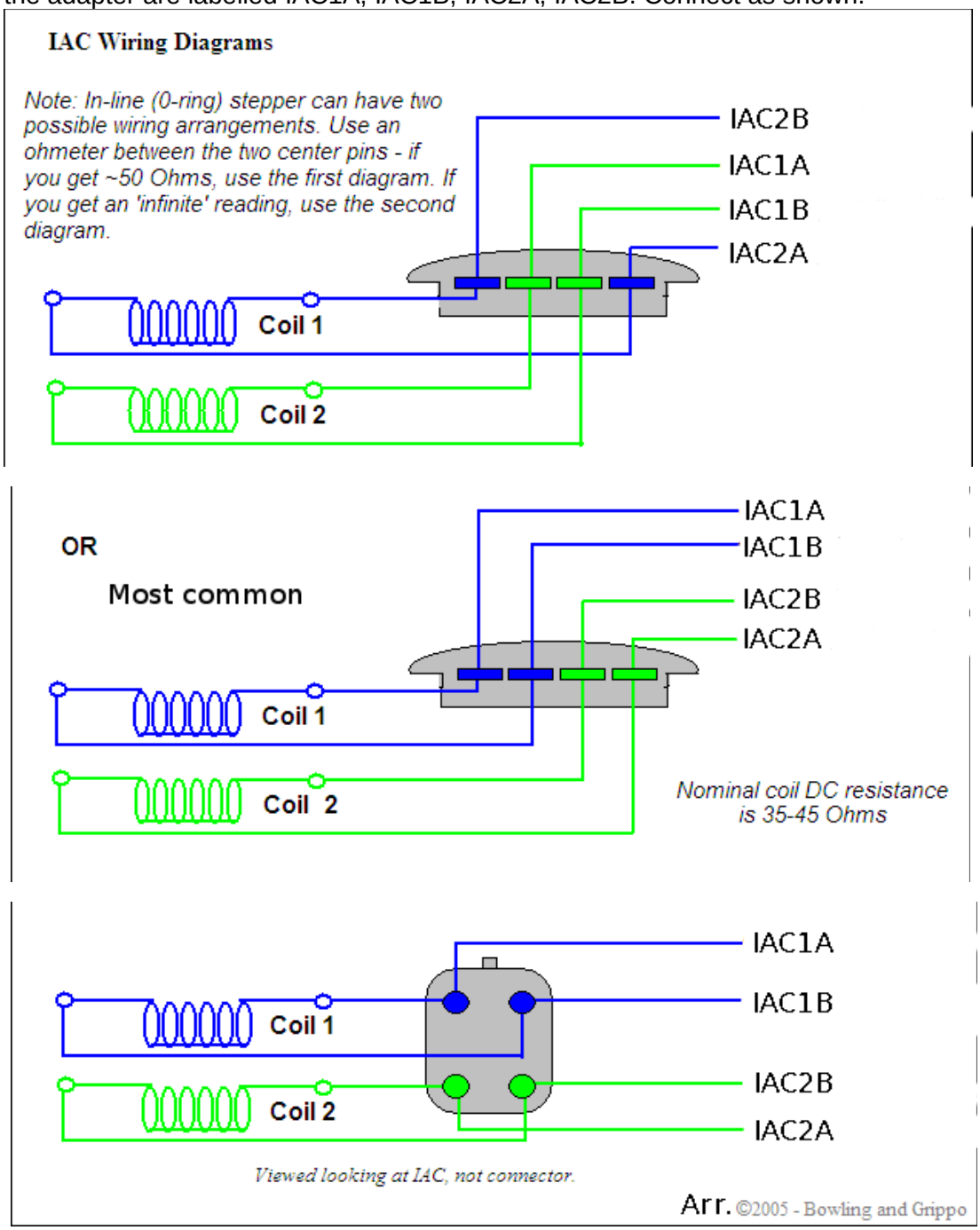
Typically these are FIDLE, SPAREADC, SPAREADC2. When these are used, the colors on the wire in the Microsquirt loom will match up with the colors on the adapter wiring. Crimp or solder and heat-shrink.

There are other options available - see section 2.2



When wiring up the adapter, ensure that TPSVREF (5V) is never connected to 12V. This will likely cause permanent damage to the Microsquirt, the adapter or both.

There are three known variations of wiring of the stepper motor valve itself. The output wires from the adapter are labelled IAC1A, IAC1B, IAC2A, IAC2B. Connect as shown.



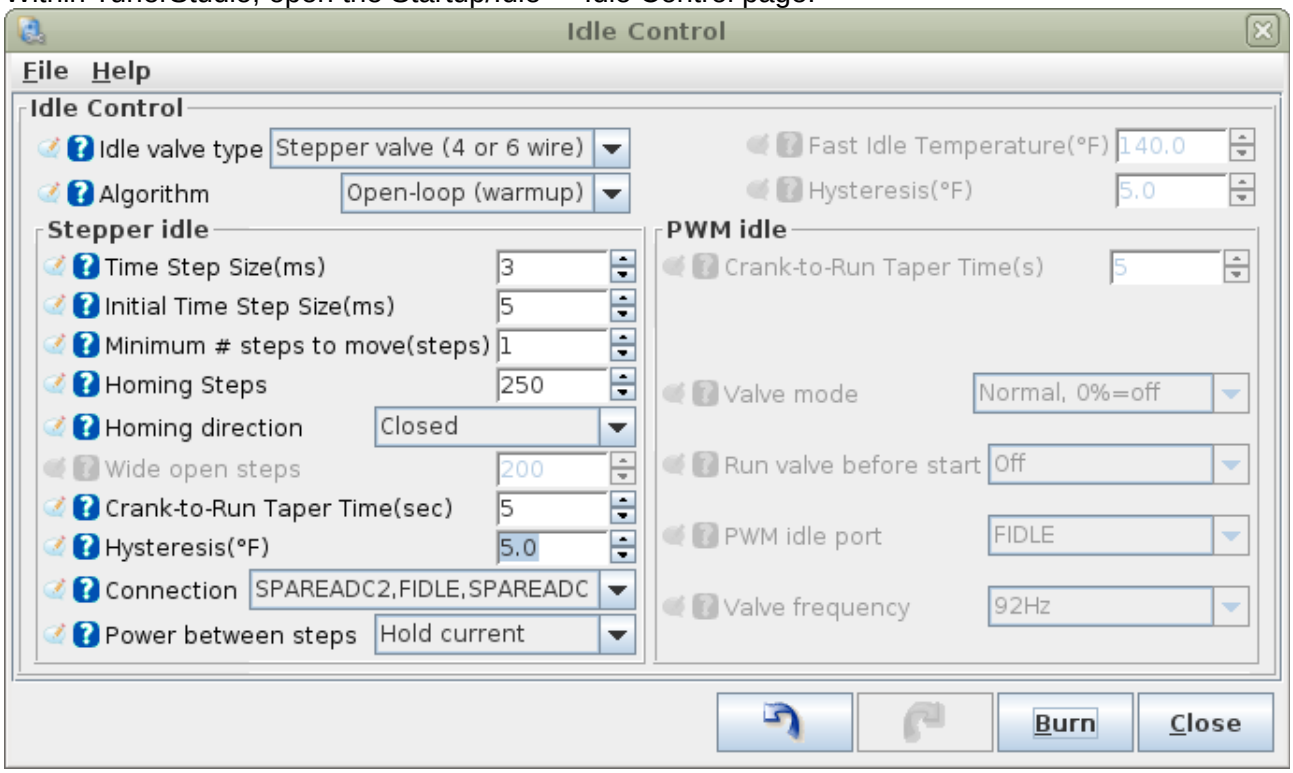
6 wire steppers are also supported. The exact wiring varies per vehicle. The middle pins on the connector (centre tap) are usually either left floating or connected to 12V. Try both.

3: Software configuration

As per the pre-requisites in section 1.3, MS2/Extra 3.3.x and TunerStudio need to be installed and working before you can begin.

Also refer to the MS2 TunerStudio reference guide which is available from www.msextra.com/downloads

Within TunerStudio, open the Startup/Idle -> Idle Control page.



Idle valve type must be set to "Stepper valve (4 or 6 wire)"

Algorithm should be set to "Open-loop (warmup)" to start with. Once this is correctly functioning, you can optionally enable the closed-loop idle control.

Connection offers three options.

Option#	Wire 1 (Enable)	Wire 2 (IAC1)	Wire 3 (IAC2)
1	SPAREADC2 (MAF)	FIDLE	SPAREADC
2	WLED	FIDLE	SPAREADC
3	none	FIDLE	SPAREADC

Option#1 is recommended.

Option#2 uses WLED instead of SPAREADC2. This allows SPAREADC2 to be used as an analogue or switch input instead.

Option#3 only requires two signals from the Microsquirt. In this case the "SPAREADC2/MAF" wire

on the adapter must be connected to ground. The stepper motor will be receive constant power in this case. Some motors are fine with constant power, others may get too hot - check!

The remaining options on the screen are documented in the TunerStudio reference manual and are not specific to this adapter.

4: Web links

Main Microsquirt and Megasquirt sales and support website - www.msextra.com

Documentation and firmware downloads - www.msextra.com/downloads/

EFISource - www.efisource.com