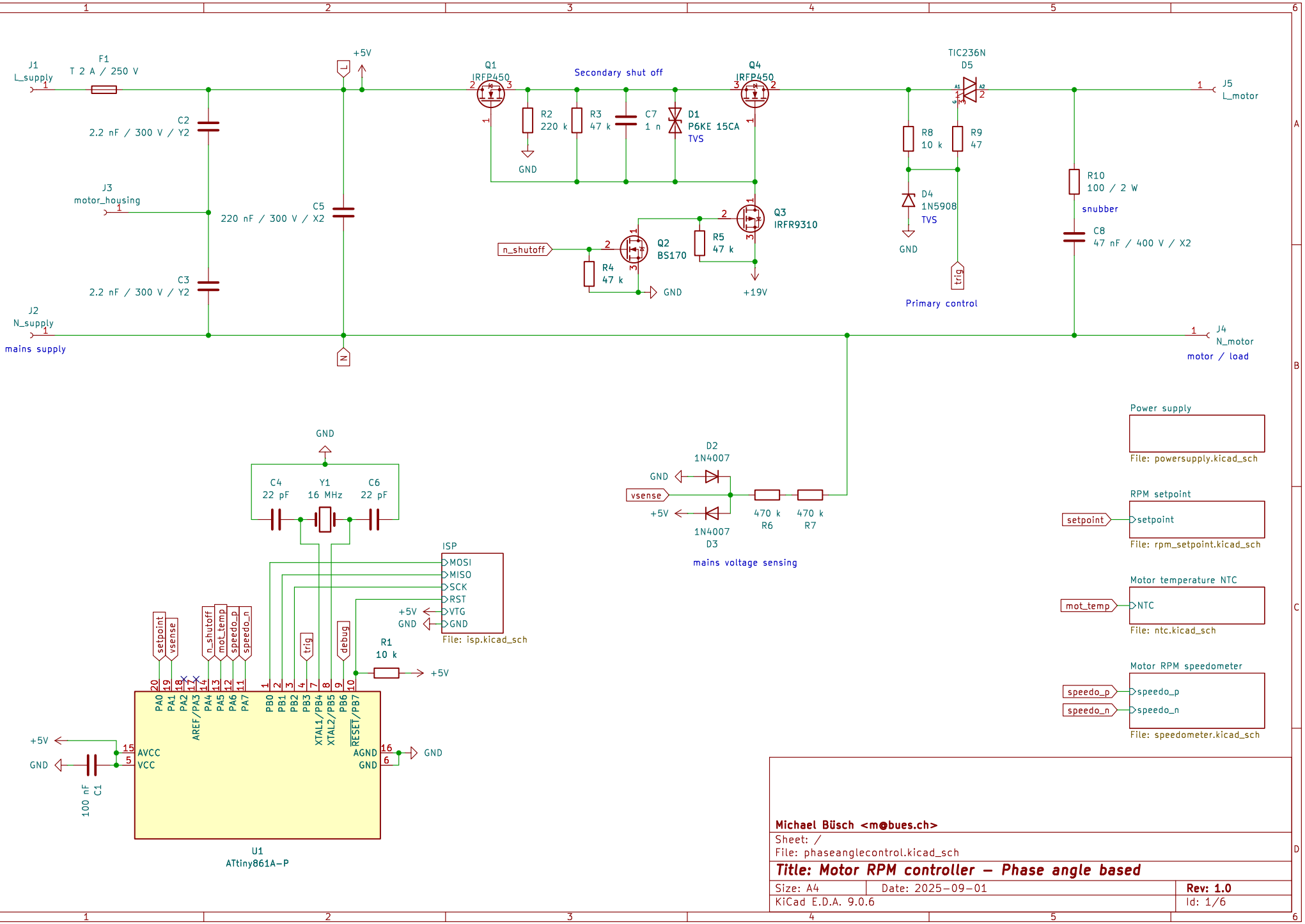
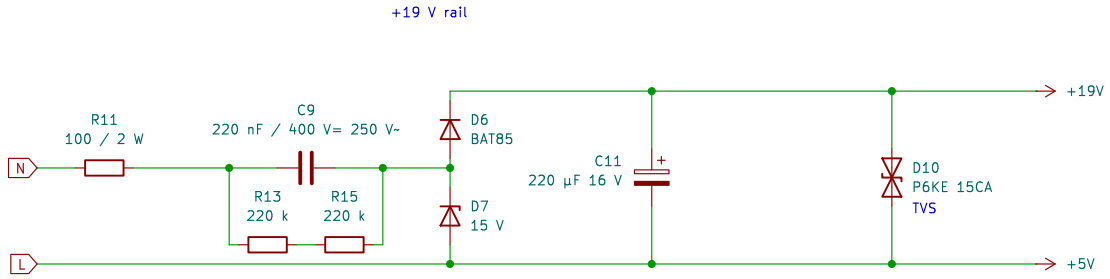
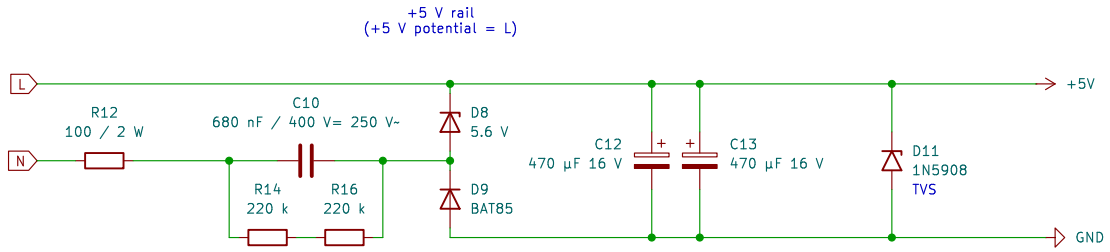

J1
L_supply
F1
T 2 A / 250 V
C2
2.2 nF / 300 V / Y2
J3
motor_housing
C5
220 nF / 300 V / X2
C3
2.2 nF / 300 V / Y2
J2
N_supply
mains supply
+5V
L
N
Q1
IRFP450
Secondary shut off
Q4
IRFP450
R2
220 k
GND
R3
47 k
C7
1 n
D1
P6KE 15CA
TVS
n_shutoff
Q2
BS170
R4
47 k
GND
R5
47 k
Q3
IRFR9310
+19V
TIC236N
D5
R8
10 k
R9
47
D4
1N5908
TVS
GND
trig
Primary control
J5
L_motor
R10
100 / 2 W
snubber
C8
47 nF / 400 V / X2
J4
N_motor
motor / load
GND
C4
22 pF
Y1
16 MHz
C6
22 pF
ISP
MOSI
MISO
SCK
RST
+5V
VTG
GND
File: isp.kicad_sch
D2
1N4007
GND
vsense
+5V
1N4007
D3
470 k
R6
470 k
R7
mains voltage sensing
setpoint
vsense
n_shutoff
mot_temp
speedo_p
speedo_n
trig
debug
R1
10 k
+5V
PA0
PA1
PA2
AREF/PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
XTAL1/PB4
XTAL2/PB5
PB6
RESET/PB7
+5V
GND
AVCC
VCC
100 nF
C1
AGND
GND
GND
U1
ATtiny861A-P
Power supply
File: powersupply.kicad_sch
RPM setpoint
setpoint
setpoint
File: rpm_setpoint.kicad_sch
Motor temperature NTC
mot_temp
NTC
File: ntc.kicad_sch
Motor RPM speedometer
speedo_p
speedo_n
speedo_p
speedo_n
File: speedometer.kicad_sch
Michael Büsch <m@bues.ch>
Sheet: /
File: phaseanglecontrol.kicad_sch
Title: Motor RPM controller – Phase angle based
Size: A4
Date: 2025-09-01
Rev: 1.0
KiCad E.D.A. 9.0.6
Id: 1/6





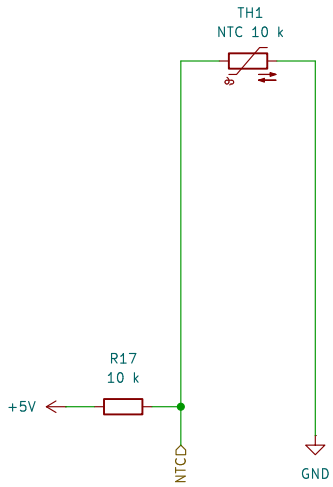
Michael Büsch <m@bues.ch>

Sheet: /Power supply/
File: powersupply.kicad_sch

Title: Motor RPM controller – Power supply

Size: A4	Date: 2025-09-01	**Rev: 1.0**
KiCad E.D.A. 9.0.6		Id: 2/6

Motor temperature NTC



Michael Büsch <m@bues.ch>

Sheet: /Motor temperature NTC/
File: ntc.kicad_sch

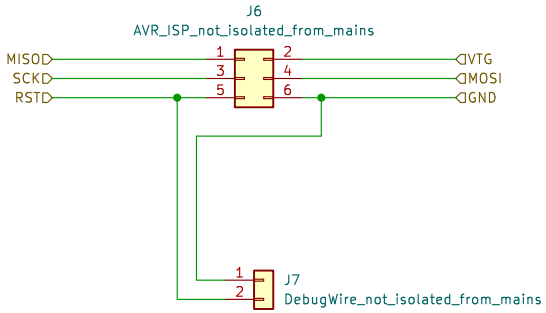
Title: Motor RPM controller – Motor temperature

Size: A4	Date: 2025-09-01	**Rev: 1.0**
KiCad E.D.A. 9.0.6		Id: 4/6

WARNING WARNING WARNING

This circuit is **NOT** electrically isolated from mains L and N!
NEVER connect an ISP programmer/computer directly!

WARNING WARNING WARNING

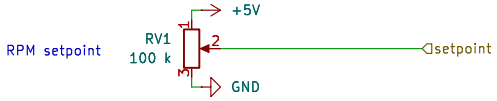


Michael Büsch <m@bues.ch>

Sheet: /ISP/
File: isp.kicad_sch

Title: Motor RPM controller – ISP – WARNING not isolated

Size: A4	Date: 2025-09-01	**Rev: 1.0**
KiCad E.D.A. 9.0.6		Id: 5/6



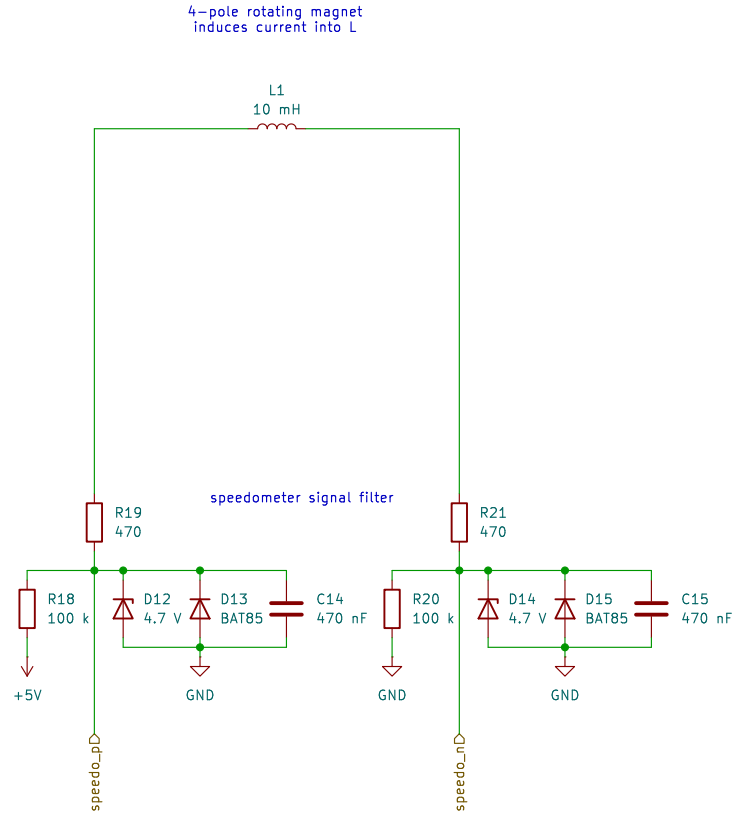
WARNING:
Pot spindles reaching touchable surfaces
must be non-metal
and must be capable of insulating 400 V.

Michael Büsch <m@bues.ch>

Sheet: /RPM setpoint/
File: rpm_setpoint.kicad_sch

Title: Motor RPM controller – Setpoint

Size: A4	Date: 2025-09-01	**Rev: 1.0**
KiCad E.D.A. 9.0.6		Id: 6/6



Michael Büsch <m@bues.ch>

Sheet: /Motor RPM speedometer/
File: speedometer.kicad_sch

Title: Motor RPM controller – Motor speedometer input

Size: A4	Date: 2025-09-01	**Rev: 1.0**
KiCad E.D.A. 9.0.6		Id: 7/6