FIELD DOMAIN (GF = sensor 0V, VF = protected sensor +V). No net, pour, hole or hardware joins it to HOST.

B1 / FIELD POWER ENTRY AND PROTECTION: J1 -> F1 -> TVS1 -> D1 (reverse blocking in the +V feed) -> VF

J1 +12…24V FIELD

F1 500mA

TVS1 SMF30CA

D1 PMEG4010CEH

C3 100nF 100V X7R

C2 2200uF 50V KZM

J2 SENSOR TERMINAL

SJ2 SENSOR NPN|PNP

TP_SENS SENSOR_IN

TP_VF VF

TP_GF GF

B2 / SENSOR TERMINAL J2 (0V, +V, OUT) AND POLARITY JUMPER SJ2 (centre pad = SENSOR_IN)

SENSOR 0V +V OUT

B3 / OPTOCOUPLER LED BRANCHES: NPN branch (RN, DN, U1) and PNP branch (RP, DP, U2). SJ2 connects SENSOR_IN to one of them

RN 3.3k 1% 1206

DN

RLN 10k 10% 0603

RP 3.3k 1% 1206

DP

RLP 10k 10% 0603

B4 / FIELD POWER-OK BRANCH (ROK, DPWR, U3): passes the 5 V_H feed to RS only while field power is present

ROK 5.6k 1% 1206

DPWR

ISOLATION BARRIER

U1 TLP291(SE,E NPN

U2 TLP291(SE,E PNP

U3 TLP291(GB,E OK

U1 ENDSTOP 5 G 5V

HOST DOMAIN (GND_H = endstop ground from J3 pin 2, +5V_H = endstop 5 V from J3 pin 3, SIG = endstop signal).

B5 / HOST OPEN-DRAIN STAGE Q1 AND JUMPER SJ1 (pads 1–2 = NO, pads 2–3 = NC)

Q1 BSS138

RS 100k 1% 0603

RPD 1M 1% 0603

SENSOR NO|NC SJ1

B6 / HOST CONNECTOR J3 (ENDSTOP 5 G 5V) AND HOST TEST POINTS

TP_SIG SIG

TP_GH GND_H

TP_5V +5V_H

POLARITY: SIG LOW = field healthy and sensor idle; SIG RELEASED (host pull-up high) = sensor triggered OR field power lost OR sensor/cable fault.

The board never drives SIG high; the host supplies the pull-up (native Prime2590: 10 k to the selected 5 V / 3.3 V). Treat as a normally-closed endstop to ground.

SJ1 stripped bridged pads 1–2 = sensor NO (Q1 inverts the opto signal). SJ1 pads 2–3 = sensor NC (phototransistors pull SIG low directly).

SJ2 stripped bridged pads 1–2 = NPN sensor (OUT sinks to 0V); SJ2 pads 2–3 = PNP sensor (OUT sources to +V). Exactly one LED branch is ever connected to SENSOR_IN.

A wrong SJ2 position is NOT detected: wave metal at the sensor and check that the matching amber LED (DN = OUT LOW NPN, DP = OUT HIGH PNP) lights before use.

J3 pin order SIG / GND_H / +5V_H (CLAUDE.md single-input pinout). The native Prime2590 endstop header is pad1 power, pad2 GND, pad3 FIELD, so a native cable must cross pins 1 and 3.

No Gadgeteer socket and no chain port on this board. Supported: 3-wire 10–30 V DC NPN or PNP. Unsupported: 2-wire, AC, NAMUR, push-pull, analog, 5 V sensors.

Net names match the silkscreen and the contract: VIN_RAW, VIN_F, VF, GF, SENSOR_IN, SIG, GND_H, +5V_H, GATE.

CERN-OHL-S-2.0 | KiCad only | black solder mask, white silkscreen | v14 STUDY: schematic and placement stage, not routed, not fabrication-ready.

UF1 TVS2450CF4FB

RF1 82.6k 0.1%

RF2 15k 0.1%

RF3 220k 0.1%

RF4 15k 0.1%

RF5 2.43k 1%

CF1 100nF 25V X7R

CF2 100nF 50V X7R

CF3 1µF 50V X7R

RF7 100k 0.1%

RF8 10k 0.1%

SJF1 CUT 1TRACE

SJF2 1TRACE

SJF3 CUT 1TRACE

RF9 10k 0.25W

RF10 22k 0.25W

RF11 10k 0.25W

RF12 47k 1%

RF13 47k 1%

RF14 10k 1%

CF4 10nF 100V X7R 0805

CF5 10nF 16V X7R 0805

CF6 100nF 25V X7R

RF15 10k 1%

RF16 10k 1%

SJF4 CUT 0R|SHORT

RF17 100k 1%

RF18 10k 1%

QF1 BSS84

DF1 1N4148WS-7-F

DF2 1N4148WS-7-F

DF3 BAT54WS-7-F

DF4 BAT54WS-7-F

DF5 1N4148WS-7-F

DF6 1N4148WS-7-F

DF7 BAT54WS-7-F

DF8 1N4148WS-7-F

DF9 BAT54WS-7-F

DF10 BAT54WS-7-F

DF11 BAT54WS-7-F

Generated from design-contract.json by tools/create_schematic.py
STUDY v01: not fabrication-ready
Smoothieware / CERN-OHL-S-2.0
Sheet: /
File: inductive-proximity-sensor-adapter.kicad_sch

Title: INDUCTIVE SENSOR LEVEL SHIFTER

Size: A2 | Date: 2026-10-01 | Rev: v14
KiCad 10.0.0 | id: 1/1