author: Dennis van Gils url: https://github.com/Dennis-van-Gils/project-TWT-jetting-grid date : 13-07-2022 Rittal cabinet Purpose: Control 112 solenoid valves @ 24 V by a single Arduino. We will use two Centipede boards (only one shown), each providing 64 digital outputs controlled USB cable USB panel mount over I2C. Each Centipede board will have 4 Sanwo MOSFET boards connected to them, each providing 16 channels. Hence, there is a total of 8 Sanwo MOSFET boards Bulgin px0840-b-5m00 | Bulgin PX0844/B/0M50/B to control in total 112 (max 128) solenoid valves. We will work in groups of 14, because 8x14=112. Also, each of the 4 sides of the tunnel will house 2x14=28 valves. ₁-----USB B USB isolator USB Cable management is easier this way. Hence, instead of populating all 16 channels per MOSFET board, we occupy only the first 14. pressure manifold #1 bulkhead connector i cable connector pressure from cable connector | bulkhead connector N.C. Ø I17 N.C. Ø I16 Harting 19 41 024 0301 | Harting 19 41 124 0523 perfboard Close the jumper to power the Harting 19 41 124 0523 Harting 19 41 024 0301 jetting pump Y16 Ø N.C. & 7x insert 09 14 005 2701 | & 7x insert 09 14 005 2601 solenoid valve 0 0 0 00000000 00000000 Feather externally, WARNING & 7x insert 09 14 005 2701 & 7x insert 09 14 005 2601 Ø 115 Y15 Ø 1 of 4 | 1 of 4 RPE 5105NC-Do not connect to USB in that 111 Ø 11 ND 113 115 110 110 110 8 USB I2C I/O expander, 64 ch. 1 Y14 Ø case to prevent back-powering > valve #1 Macetech Centipede V2 Y13 Ø 24 V, 265 mA the USB port at the PC side. Arduino pass-through Y12 Ø 1 of 28 (not connected) 8 Y11 Ø Y10 Ø Y6 Ø Windows 11 & Python Y4 Ø Adafruit FC20600-0 Feather ∩ LM78xx OUT Y2 Ø Y1 Ø M4 Express D12 Adafruit D11 LED data (3.3V) ADDRESS #3857 D10 CS_pressure_4 jumper GND - GND v- Ø GND **♦Ø** COM D9 CS_pressure_3 0 ADDR 1 35 x 0.5 mm², OD 14.5 mn V+ Ø ▲ 24 VDC D6 CS_pressure_2 ÖLFLEX CLASSIC 110, 1119035 Sanwo 16 ch. ■ GND D5 CS_pressure_1 MOSFET board └───○ valve #1 modified for 3.3V CENTIPEDE 1 of 8 MCP23017 MCP23017 O INTA 3.3 VDC USB-RS485 N.C. Ø 117 Ø 116 Ø 115 Ø 114 Ø 113 Ø 112 Ø 111 opt. isolated pressure snubbei Y17 Ø N.C VDC Omega PS-4E-MG Titan USB-COMi-SI-M Y16 Ø N.C Arduino pass-through 4-20 mA Q Y15 Ø near PC, use long \neg (not connected) Y14 Ø RS485 cable 14 13 12 11 10 9 8 RST 33V3 GND GND CAND 11 22 33 33 55 55 54 Y13 Ø Y12 Ø 000000 000000 pressure sensor #1 Y11 Ø GND 74AHCT125 Y10 Ø N Z Z G IT IS Ø 17 Ø 16 Ø 15 Ø 14 Ø 13 Ø 12 Ø 11 Y7 Ø Y6 Ø iso. 5 GND VDC 3.3 VDC l-----Y3 Ø Y2 Ø LED data (5V) 1-----220 uF, 16 V LED data (3.3V) pressure manifold #2 connecto 2 of 4 (valves 29 to 56 & pressure sensor #2) \emptyset com V- Ø GND V+ Ø △ 24 VDC 1 uF. 50 V Sanwo 16 ch. MOSFET board pressure manifold #3 connecto modified for 3.3V 2000 3 of 4 (valves 57 to 84 & pressure sensor #3) POWER IN LED MATRIX 2 of 8 read pressure 1 (4-20mA) 1-----20mA R click pressure manifold #2 connecto 4 of 4 (valves 85 to 112 & pressure sensor #4) active receiver power switch (provides 16 VDC) Arcolectric c1353algnf Color code cables Harting bulkhead connector fuse pin# cable# color valve# cable connector | bulkhead connector mosfet 1-Y0 Harting 19200031440 Harting 09200030301 OR/WH mosfet 1-Y1 wall power mosfet 1-Y2 230 VAC GN/WH mosfet 1-Y3 mosfet 1-Y4 24 VDC PSU 3.3 VDC PSU 5 VDC PSU 31 A, 750 W + mosfet 1-Y5 2.6 A, 8.6W 6 A, 30 W TRACOPOWER __ XP POWER mosfet 1-Y6 TXLN 750-124 PSK-10D-3-DIN DNR30US05 mosfet 1-Y7 wall GND GND 🗨 mosfet 1-Y10 OR/WH mosfet 1-Y11 10 panel mount 10 B chassis 🛇 plug & cable mosfet 1-Y12 11 Phoenix 1424107 GN/WH mosfet 1-Y13 12 12 B mosfet 1-Y14 13 13 B 14 B BL/WH mosfet 1-Y15 14 15 C mosfet 2-Y0 15 16 C OR/WH mosfet 2-Y1 16 17 C mosfet 2-Y2 17 L1,L2,L3,PE **RGB LED matrix** 18 C GN/WH mosfet 2-Y3 18 NeoPixel 16x16 19 C mosfet 2-Y4 19 BL/WH mosfet 2-Y5 20 Adafruit #2547 20 C water pressure 21 C MODBUS RS485 (D+, D-, GND) mosfet 2-Y6 21 from jetting pump freg. inverter GY/WH mosfet 2-Y7 22 22 C 3ph 400 VAC, I_{max} = 17 A (MS) mosfet 2-Y10 23 **TODO: RS485 cable needs shield** 23 D Xylem Hydrovar 4.075 24 D OR/WH mosfet 2-Y11 24 connected to PE via inverter mosfet 2-Y12 25 motor jetting pump 25 D 3ph 400 VAC, 10.5 A, 7.5 kW 6.8 kW, 2900 rpm, 60 m³/h Lowara PLM 132 B5 7.5 kW Xylem Lowara 46SVH2N075T/4 26 D GN/WH mosfet 2-Y13 26 27 D mosfet 2-Y14 27 28 D BL/WH mosfet 2-Y15 28 29 pressure OR 4-20 mA (+) 30 pressure OR/WH 4-20 mA (-) Terminating Device Daisy Chained Device on RS-485 Segment on RS-485 Segment 31 ground 32 ground 33 ground 34 ground BK

35 ground BK

title : Electronic diagram `TWT jetting grid`

title : Circuit diagram `Sanwo 16 channel MOSFET board`

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