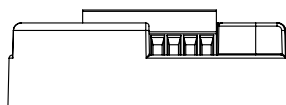
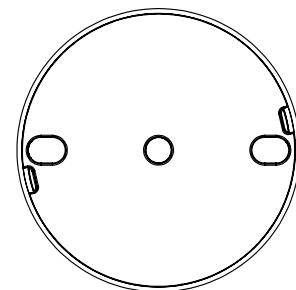
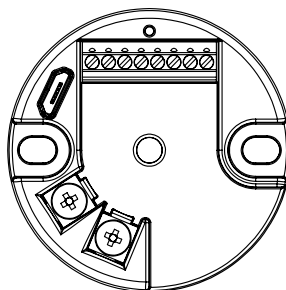
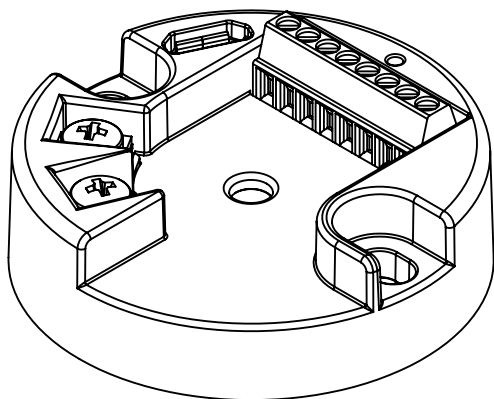
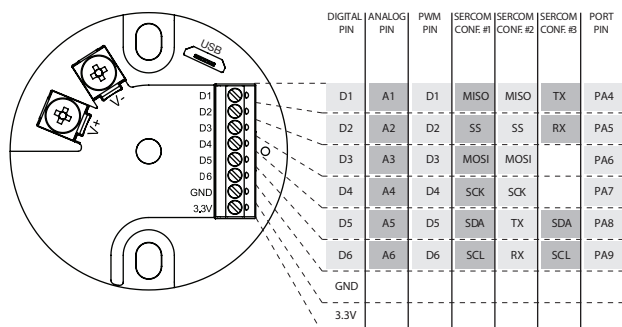




# Industruino 4-20mA.ker Datasheet

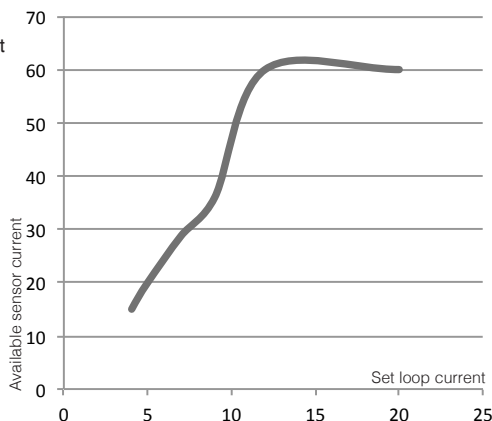


## Block Diagram



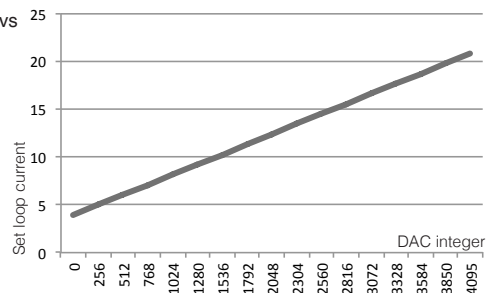
## Set loop current vs Available sensor current

Test conditions  
Loop supply voltage = 24V  
Loop load = 500  $\Omega$   
Sensor voltage = 3.3V



## Linearity - DAC integer vs Set loop current

Test conditions  
Loop supply voltage = 24V  
Loop load = 500  $\Omega$



| Supply voltage                      |                                                        |
|-------------------------------------|--------------------------------------------------------|
| Standard input voltage              | 24V                                                    |
| permissible range, lower limit (DC) | 12 V                                                   |
| permissible range, upper limit (DC) | 32 V                                                   |
| Input protection                    | Reverse polarity, ESD, transients, bursts, HF coupling |

| Input (sensor side)                       |                                                           |
|-------------------------------------------|-----------------------------------------------------------|
| Number of GPIO pins                       | 6                                                         |
| Number of ADC channels                    | 6 (shared with GPIO)                                      |
| Number of DAC channels                    | 1 (shared with GPIO)                                      |
| SERCOM types                              | i2c, SPI, UART                                            |
| Number of simultaneous SERCOM peripherals | 2 (of different type)                                     |
| Sensor supply voltage                     | 3.3V / 2.8V (jumper selectable)                           |
| Sensor supply current (see chart)         | >15mA (24V supply, loop current = 4mA, 500 $\Omega$ load) |
| Sensor power management                   | Ultra-Low Ron load switch under GPIO control              |
| Terminal type                             | 8-pin 2.54mm screw connector terminal                     |

| Processing              |              |
|-------------------------|--------------|
| Microcontroller type    | ATSAML21E18B |
| Instruction set         | 32 bit       |
| Operating frequency     | 48 MHz       |
| Flash memory            | 256 KB       |
| RAM memory              | 32 KB        |
| Programming environment | Arduino IDE  |
| Programming interface   | Micro-USB    |
| Debugging interface     | SWD          |

| Output (loop side) |                                                                                  |
|--------------------|----------------------------------------------------------------------------------|
| Output signal      | 4-20 mA                                                                          |
| Signal conversion  | DAC under MCU software control                                                   |
| DAC resolution     | 12 bit                                                                           |
| DAC speed          | 1 MSPS                                                                           |
| Under-range limit  | 3.8mA (DAC = 0)                                                                  |
| Over-range limit   | 20.7mA (DAC = 4095)                                                              |
| Compliance voltage | 14V typical                                                                      |
| Max load impedance | 700 $\Omega$ with 24V supply, 60mA@3.3V sensor load.<br>(V supply - 10V) / 0.020 |
| Switch on delay    | 2 seconds (during power up output current = 3.7mA)                               |
| Terminal type      | 2x M3 screw terminal                                                             |

| Environmental                 |                                                       |
|-------------------------------|-------------------------------------------------------|
| Protection class              | IP20 / IP66 when installed in appropriate sensor head |
| Ambient operating temperature | -40 to +85 $^{\circ}$ C                               |

| Approvals |                               |
|-----------|-------------------------------|
| CE        | EMC directive, RoHS directive |

| Construction |                                         |
|--------------|-----------------------------------------|
| Enclosure    | UL94 V-0 flame retardant PA66 polyamide |

| Dimensions |       |
|------------|-------|
| Diameter   | 44 mm |
| Height     | 15 mm |
| Weight     | 50 g  |

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