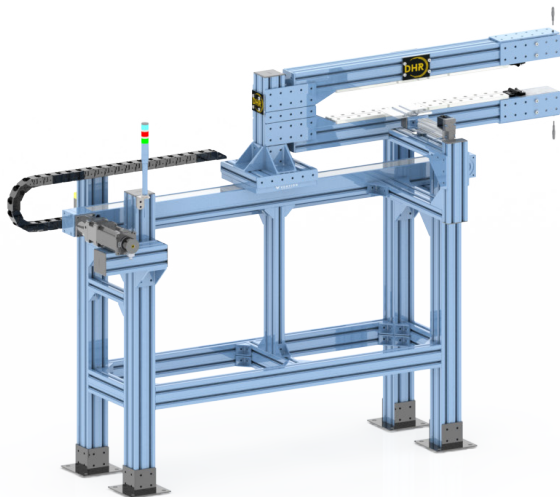









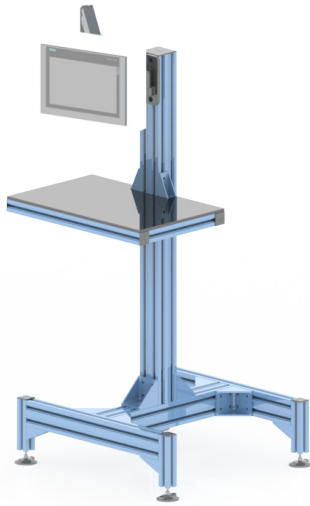




LASER THICKNESS AND COMPLETE WIDTH PROFILE THICKNESS SYSTEM



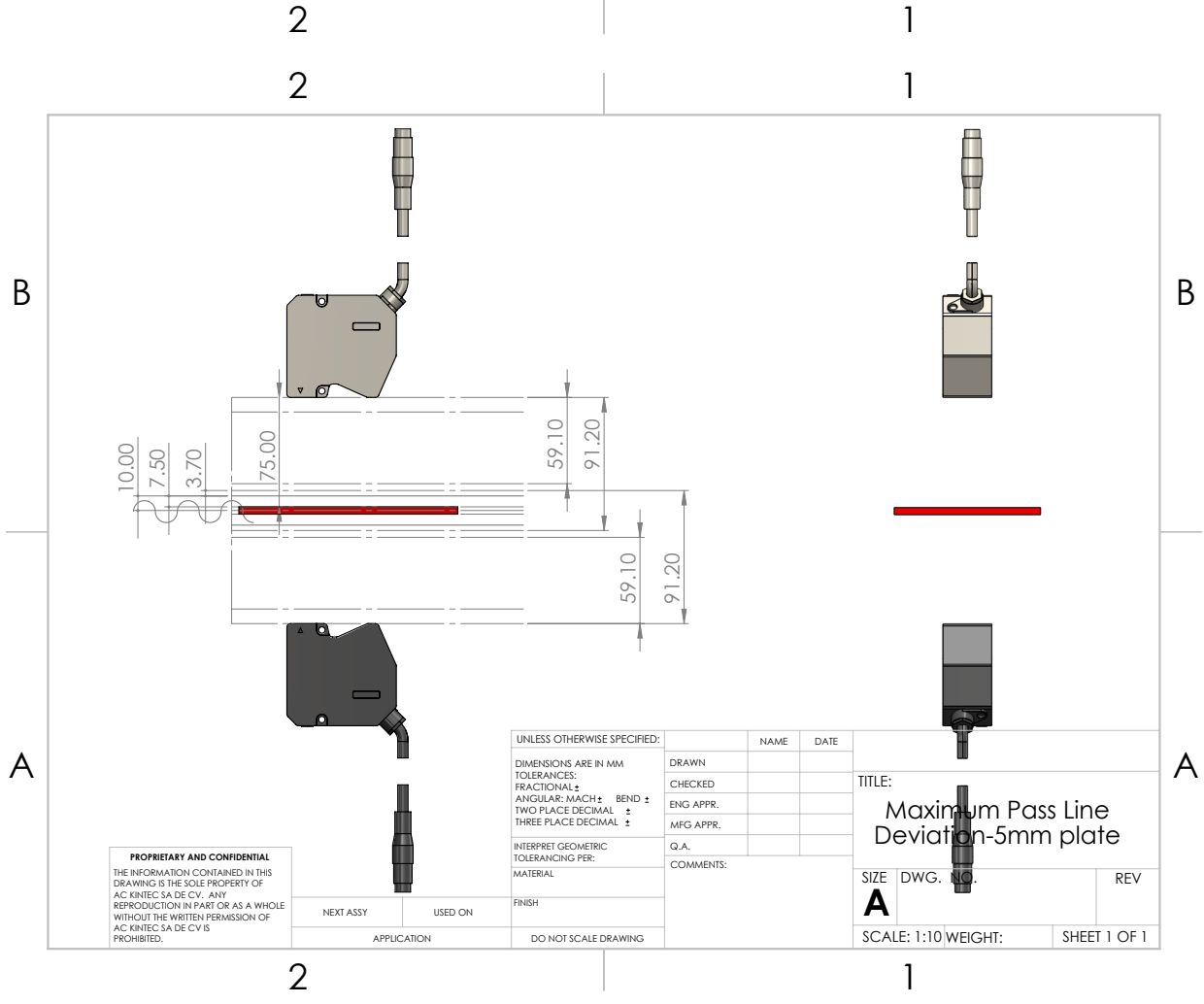
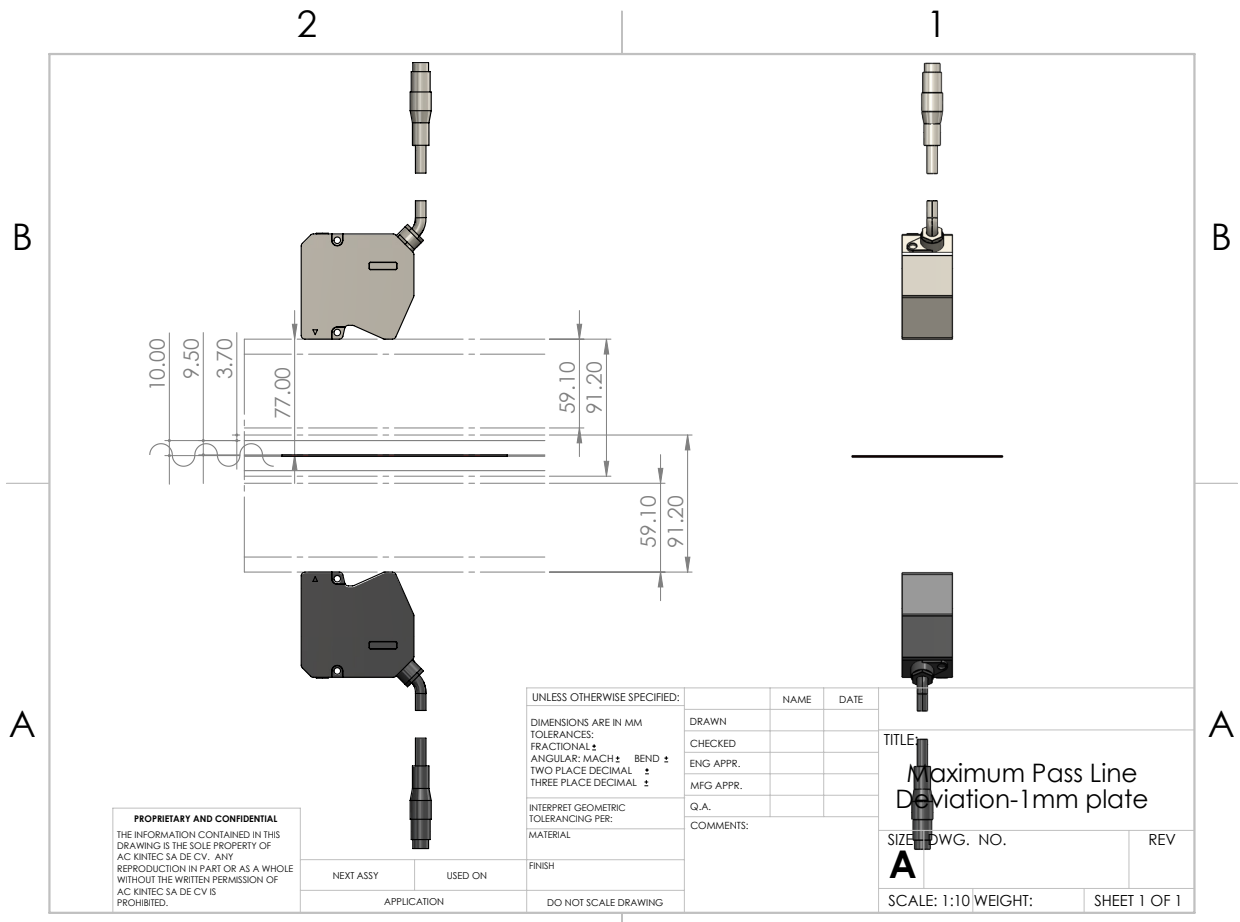
| Nr | Laser System Component | Technical Specifications |
|----|--|--|
| 1 |  Laser Sensor Head | <ul style="list-style-type: none"> • Mounting Mode. Diffuse / Specular Reflective • Light Source. <ul style="list-style-type: none"> ◆ Type. Red Semiconductor Laser ◆ Wavelength. 655nm ◆ Laser Class (JIS C6802). Class 2 ◆ Output. 0.95mW • Spot Diameter (at Standard Distance). 70 μm x 2,500 μm • Linearity. $\pm 0.02\%$ of F.S. (F.S. = 36mm) • Accuracy. $\pm 7.2 \mu\text{m}$ • Repeatability. 0.1 μm • Sampling Cycle. 20/50/100/200/500/1000 μs • Environment Resistance. <ul style="list-style-type: none"> ◆ Enclosure Rating. IP67 ◆ Ambient Light. Incandescent Lamp or Fluorescent Lamp: 10,000 Lux max ◆ Ambient Temperature. 0 to +50 °C (mount sensor on a metal plate before use when ambient temperature raises to 40°C) ◆ Relative Humidity. 35 to 85% RH (No Condensation) ◆ Vibration Resistance. 10 to 55 Hz Double Amplitude 1.5mm, 2 Hrs. XYZ axis • Material. Aluminum die-cast • Weight. Approx. 280 g. |
| 2 |  Stepper Motor | Bipolar Stepper Motor , NEMA size 34, Flat-Shaft, 12Nm, 200 Step/Rev, 6.2A, 9mH. |
| 3 |  Heavy Duty Enclosed Timing Belt Actuator | Material: 6061-T6 Steel, Surface Finish: Anodized 6 μm , Max Output Force 150 N, Load Capacity: 5000N, Linear Range: 1285mm, Repeatability: $\pm 0.025\text{mm}$, Max Linear Speed: 2500mm/s. <i>Position Sensors: M18 Inductive Proximity Sensors, Qty: 2, Material: Stainless Steel, Linear Range: 4 to 10mm, IP Rating: IP65, Temperature Range : -40 to 58 °C.</i> |
| 4 |  Planetary Reduction Gearbox | Material: Steel & Aluminum, Max Torque 45 Nm, Surface Finish: Black Paint and Anodization. |
| 5 |  Power Off Brake | Max Torque 9 Nm, Current: 0.75 A, Rated Voltage: 24 VDC, Rated Power: 18 W, Engagement Time: 7ms, Brake Type: Power-Off, Permanent Magnet. |
| 6 |  Hollow Shaft Optical Rotary Encoder | Output Type: Incremental, Accuracy: 0.1°, Resolution: 3600 P/r, Operating Voltage 5-24 VDC, Max. Load Current: 100mA, Output Frequency: 200kHz, Operating Temperature -10°C to +60°C Housing Material: Aluminum, Max Speed: 6000 r/min, Ingress Protection: IP54. |
| 7 |  Electric Cylinder | Max Output Force: 255 N, Linear Range: 100mm, Repeatability: $\pm 0.02\text{mm}$, Max Linear Speed: 450 mm/s, Displacement Ratio: 6mm/turn. |
| 8 |  Tower Light | Material: Plastic, Supply Voltage 24 VDC, Colors: Green, Red and Blue. |
| 9 |  Structure (Body) | Material: Aluminum Extrusion 6063-T5, Surface Finish: Dark Blue Anodized, 6 μm , Mechanical Properties for a 45x45 mm Profile. <i>Weight per meter: 2.06 kg, Torsional Constant: 31,851mm⁴, Max deflection (500mm cantilever) at 1500N: 5.58mm. Stress (500mm cantilever) at 1500 N force: 103.96 MPa, Torsional displacement (1m length) at 50 Nm torque: 3.46 degrees.</i> |

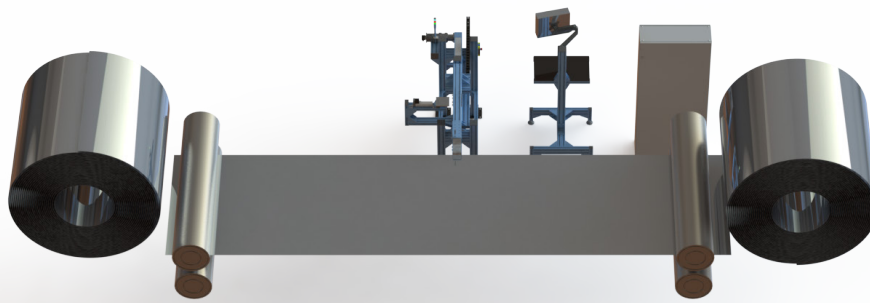


| Nr | Interface | Technical Specifications |
|----|--|--|
| 1 |  HMI | <ul style="list-style-type: none"> • Touch operation, 12" widescreen TFT display, 16 million colors, PROFINET interface, MPI/PROFIBUS DP interface, 12 MB configuration memory, Windows CE 6.0. • Display <ul style="list-style-type: none"> ◆ Design of Display: TFT ◆ Screen Diagonal: 12.1 in ◆ Display Width 261.1 mm ◆ Display Height 163.2 mm ◆ Number of Colors: 16 777 216 ◆ Resolution: 1280 Pixel (Horizontal), 800 Pixel (Vertical) • Supply Voltage: 24 VDC • Current Consumption: 0.85 A • Power: 20 W • Processor Type: X86 • Protocols <ul style="list-style-type: none"> ◆ PROFINET/PROFINET IO ◆ PROFIBUS, ETHERNET/IP, MODBUS ◆ WEB: HTTP, HTTPS, HTML, XML • IP65 (At the Front), IP20 (Rear) • Ambient Temperature during Operation: 0°C to 50°C |
| 2 |  <p>AX compact control cabinet Operating housing AX for desktop TFT up to 24"</p> | <p>For the installation of standard commercially available desktop TFTs with a screen diagonal of up to 24" in the formats 16:9/16:10 .</p> <p>Cover caps: Plastic Door: Carbon steel all-round foamed-in PU seal Housing: Carbon steel Viewing window: Single-pane safety glass Handle strips: Aluminum TFT holder: Carbon steel</p> <p>IP 65</p> |

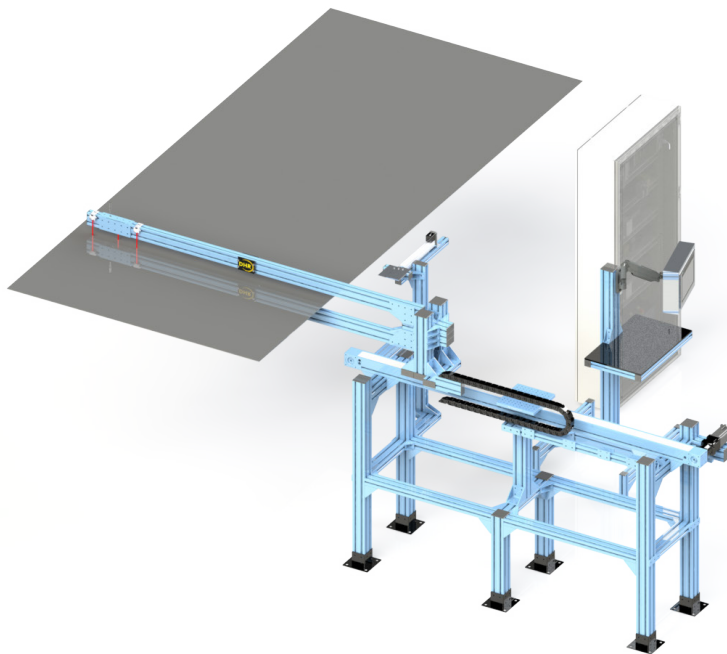


| Nr | Control Panel | Technical Specifications |
|----|--|--|
| 1 |  CPU | <p>Central processing unit with working memory 300 KB for program and 1.5 MB for data, 1. interface: PROFINET IRT with 2 port switch, 40 NS bit-performance.</p> <ul style="list-style-type: none"> Type of Voltage: 24 VDC. Current Consumption: 0.95 A CPU Processing Times <ul style="list-style-type: none"> For bit operations, typ. 40 ns For word operations, typ. 48 ns For fixed point arithmetic, typ. 64 ns For floating point arithmetic, typ. 256 ns Protocols: IP Protocol, Web Server, PROFINET, Open IE Communication, MOD-BUS TCP Ambient Conditions: -25 °C to 40 °C. Environment Resistance. Enclosure Rating: IP20. Weight. Approx. 405 g. |
| 2 |  Baying System (Enclosure) | <p>Dimensions : Height: 1800 mm (71 "), Width: 800 mm (31 "), Depth: 400 mm (16 ") Protection category IP to IEC 60529: IP55 Weight: 113.5 kg eCl@ss 8.0/8.1: 27180101, eCl@ss 7.0/7.1: 27180101, eCl@ss 6.0/6.1: 27180101, eCl@ss 5.1/5.1.4: 27180101.</p> |
| 3 |  IO System | <p>1 Bus Coupler. PROFINET, RJ45 jack, transmission speed in the local bus: 100 Mbps, degree of protection: IP20. Up to 63 Axioline F devices can be connected to the bus coupler.</p> <p>4 Analog Input. 4, 0 mA ... 20 mA, 4 mA ... 20 mA, -20 mA ... 20 mA, connection method: 2-, 3-, 4-conductor, transmission speed in the local bus: 100 Mbps, integrated sensor supply, degree of protection: IP20</p> <p>8 Digital Input. Digital inputs: 8, 24 V DC, connection method: 2-conductor, corresponds to standard IEC 61850-3, transmission speed in the local bus: 100 Mbps, degree of protection: IP20</p> <p>8 Digital Output. Digital outputs: 8, 24 V DC, 2 A, connection method: 2-conductor, transmission speed in the local bus: 100 Mbps, degree of protection: IP20 .</p> |
| 4 |  Gateway | <p>The EtherNet/IP™ to PROFINET® IO Device (slave) gateway offers bi-directional data transfers between EtherNet/IP™ controllers and a PROFINET® IO controller. The gateway supports 1440 bytes of input data and 1440 bytes of output data for larger applications.</p> |
| 5 |  Overall Technical Specifications (Control Panel) | <p>Voltage for Operation: 120 VAC, 60 Hz. Max Current: 30 A.. Temperature for Operation: 5° C to 35° C.</p> <p>Control Panel Components' Approvals:</p> <p>Safety Relays: UL Listed, cUL Listed, Functional Safety, EAC, cULus Listed.</p> <p>Lever Type Disconnect, Feed Through, Spring Cage Ground and Fuse Modular Terminal Block: CSA, ClassNK, UL Recognized, cUL Recognized, IEC/EN, EAC, DNV GL, RS.</p> <p>Wiring Duct: RoHS Compliant, UL Recognized, CE Compliant, CSA.</p> <p>Wire Ferrule: DIN 46228, CSA C22.2 No. 291-14, UL 486F.</p> <p>Lead and Hook Up Wire (Electrical Panel building): Material PPO, -40°C to 105°C, Insulation System Class: 130 (B) UL Standard 1446, UL Voltage Rating: 600V RMS, UL AWM Style 11028.</p> <p>Supplementary Protectors: Supplemental Circuit Breakers, 2-Pole, Trip Curve C, 15 A, 30 A. 400 VAC (IEC/EN 60947-2).</p> <p>EMC Filter for Control Equipment: 250 VAC, 6 to 16 A @ 50°C. UL 1283, CSA 22.2 No.8 1986, IEC/EN 60939.</p> |





| Nr | Application Characteristic | Technical Specifications |
|----|-------------------------------|---|
| 1 | Type Of Material | <ul style="list-style-type: none"> Aluminum Steel *Incident laser Beam can have either a Diffuse or Specular Reflection over the Material. |
| 2 | Material Thickness | Max. Material Thickness: 5mm Min. Material Thickness: 0.5mm |
| 3 | Pass Line Deviation | For a 5mm Coil: Max. ± 7.5 mm For a 1mm Coil: Max. ± 9.5 mm *If thickness is smaller than 1mm, a higher Pass Line Deviation can be accepted. |
| 4 | Temperature Range of Material | 0-45 ° C |
| 5 | Type of Measuring | Thickness (@ Centre only) |
| 6 | Max. Material Width | 1800mm |
| 7 | Max. Material Speed | Min. Sampling Cycle Mode for Laser: 20 μ s (1s = 50,000 samples, 1 min = 3,000,000 samples) @ Speed of 500m/min = every 166 μ m a sample is taken. (6,000 samples/m) |
| 8 | Type of Measuring Technology | Laser, Class II |



| Nr | Application Characteristic | Technical Specifications |
|----|-------------------------------|---|
| 1 | Type Of Material | <ul style="list-style-type: none"> Aluminum Steel <p>*Incident laser Beam can have either a Diffuse or Specular Reflection over the Material.</p> |
| 2 | Material Thickness | <p>Max. Material Thickness: 5mm</p> <p>Min. Material Thickness: 0.5mm</p> |
| 3 | Pass Line Deviation | <p>For a 5mm Coil: Max. ± 7.5mm</p> <p>For a 1mm Coil: Max. ± 9.5mm</p> <p>*If thickness is smaller than 1mm, a higher Pass Line Deviation can be accepted.</p> |
| 4 | Temperature Range of Material | 0-45 ° C |
| 5 | Type of Measuring | Complete Width Thickness Profile |
| 6 | Max. Material Width | 1800mm |
| 7 | Max. Material Speed | <p>Min. Sampling Cycle Mode for Laser: 20μs (1s = 50,000 samples, 1 min = 3,000,000 samples)</p> <p>Process Line @ Speed of 500m/min</p> <p>Stepper Motor:</p> <p>Step Angle: 1.8° $\pm 5\%$ (1.89° - 1.71°). 200 steps/turn.</p> <p>Timing belt:</p> <p>Linear Range: 2050 mm</p> <p>Displacement Ratio: 208 mm/turn</p> <p>@ Stepper Motor Speed of 200 rpm:</p> <p>9.86 turns = ~2050mm</p> <p>9.86 turns = ~3seg</p> <p>Coil Width: 1800mm</p> <p>8.66 turns = ~1800mm</p> <p>8.66 turns = ~ 2.64 seg</p> |
| 8 | Type of Measuring Technology | Laser, Class II |