2D LIDAR based Automatic Vehicle Classifier

TECHNICAL DATASHEET

VaaaN

AVC System

Vehicle Before Sensors

Vehicle Passing through Sensors

Computing Unit

Classification

The AVC Computing Unit classifies the vehicle. Classified information is passed over Ethernet and/or, Serial for Audit.

LIDAR Profile

Ethernet — For Auditing (iAVC)

**Serial Port** — To Other System (TLC)

At a Glance

- ➢ The 3D profiler based AVC allows automatic classification of vehicles in Tolling Environment for purposes of Auditing.
- ➢ The classification computing Unit also provides an image output or vehicle profile with depth information for manual verification.
- ➢ The Sensor array also includes a Through-Beam / Reflective / Diffuse sensor which provide information such as double wheel detection as well as allow the AVC System to work in a degraded mode, should the LIDAR / any other sensor fail.

- ➢ The Computing Unit receives the sensor input and classifies multiple categories of vehicles; currently, up to 50 classes are pre-defined.
- ➢ The software is highly flexible and can be trained for classifying additional classes, if required.
- ➢ Can be adapted for classification requirements as per regulations in the country.
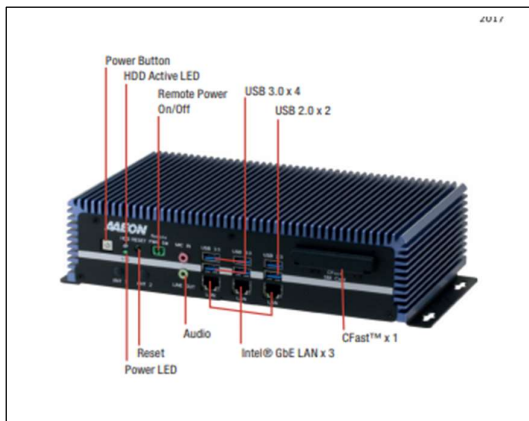- ➢ Robust design & High availability guaranteed.

Technical Specification of LIDAR

SNo	Parameter	Specification
1	Application	Outdoor
2	Light Source	Infrared (905m)
3	Laser class	1
4	Aperture Angle	Horizontal 270°
5	Scanning Frequency	25 Hz / 50 Hz
6	Angular resolution	0.25° ~ 0.5°
7	Heating	Yes
8	IP Rating	IP67
9	Working range	0.5 m – 20 m
10	Voltage Range	10-30 VDC
11	Temperature Range	0 to + 65 ˚C
12	Scanning range	At 10% remission 18m At 90% remission 20 m
13	Fog Correction	Yes
14	Power Consumption	Typ. 8W Heating Typ.35W
15	Interface Ethernet	TCP/IP 10/100 MB/s
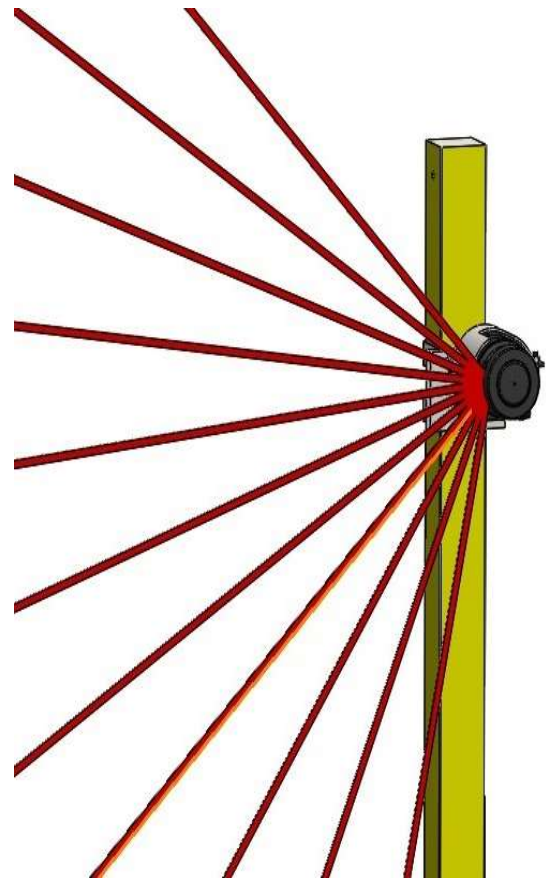
3H0039

Computing Unit

SNo	Parameter	Specification	Units
1	CPU	Intel Core i7	7th generation
2	Clock Speed	2.9 GHz	
3	RAM	8	GB DDR4
4	SDD	512	GB
5	Operating System	Windows 10 pro	64-bit
6	Communication ports	Intel® Industrial-grade GbE LAN	3 Nos.
7	I/O Ports	4X USB3.0 HDMI x 2 Triple Display, 4K HDMI 32-BIT DIO Socket 6X RS-232/422/845	
8	Size	264.2 x 124.5 x 156.2	MM
9	Voltage Range:	9~36 V DC	3-pin terminal block
10	Temperature Range:	-20°C ~ 55°C	˚C

2D Profiler based Automatic Vehicle Classifier System (AVCS)

Technical Datasheet

AVC System

Rx — Tx — Rx — Tx

Vehicle Before Light Curtain

Vehicle Passing Light Curtain

Computing Unit

Classification

The Light curtain sensor output is fed to the AVCS Computing Unit which classifies the vehicle. Classification information is passed over Ethernet and/or, Serial for Audit.

2D Profile

Ethernet

Serial Port

For Auditing (iAVC)

To Other System (TLC)
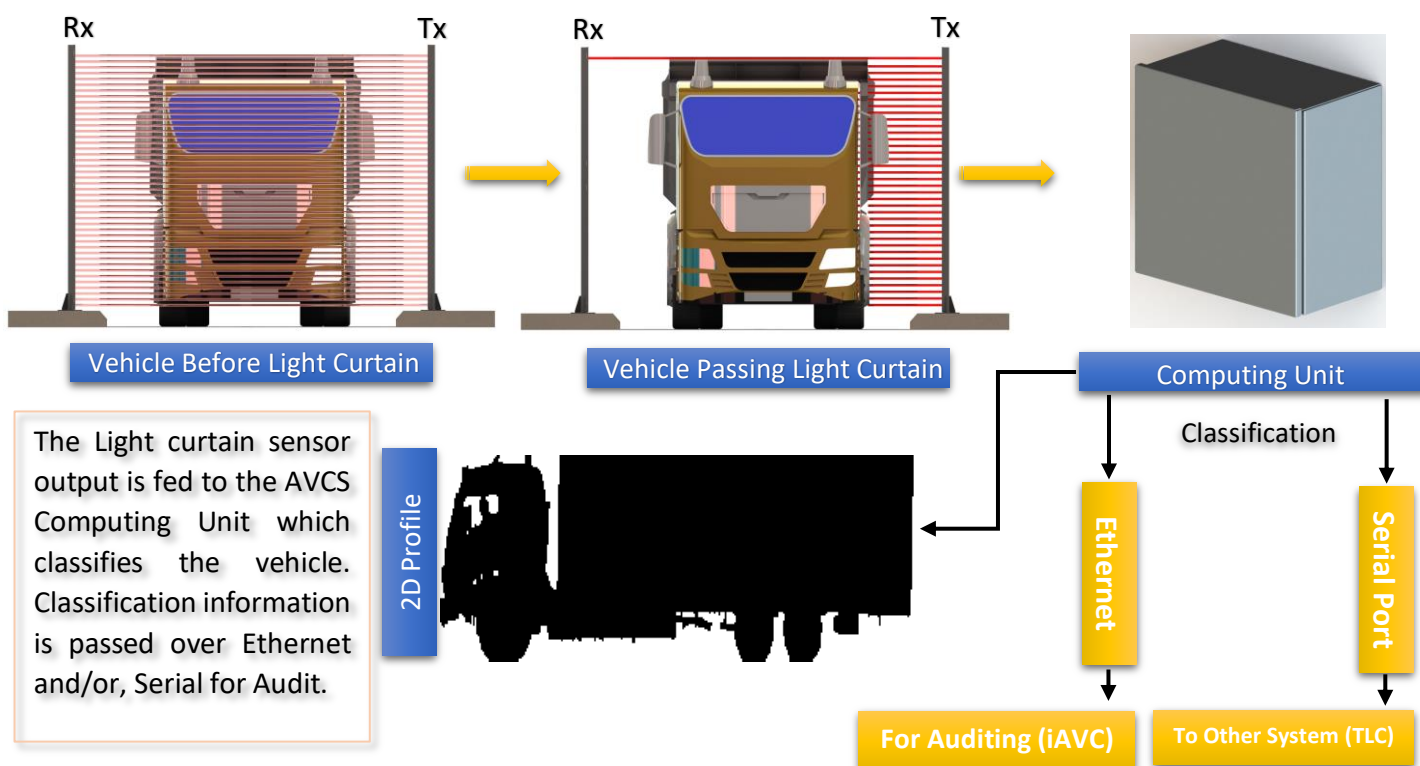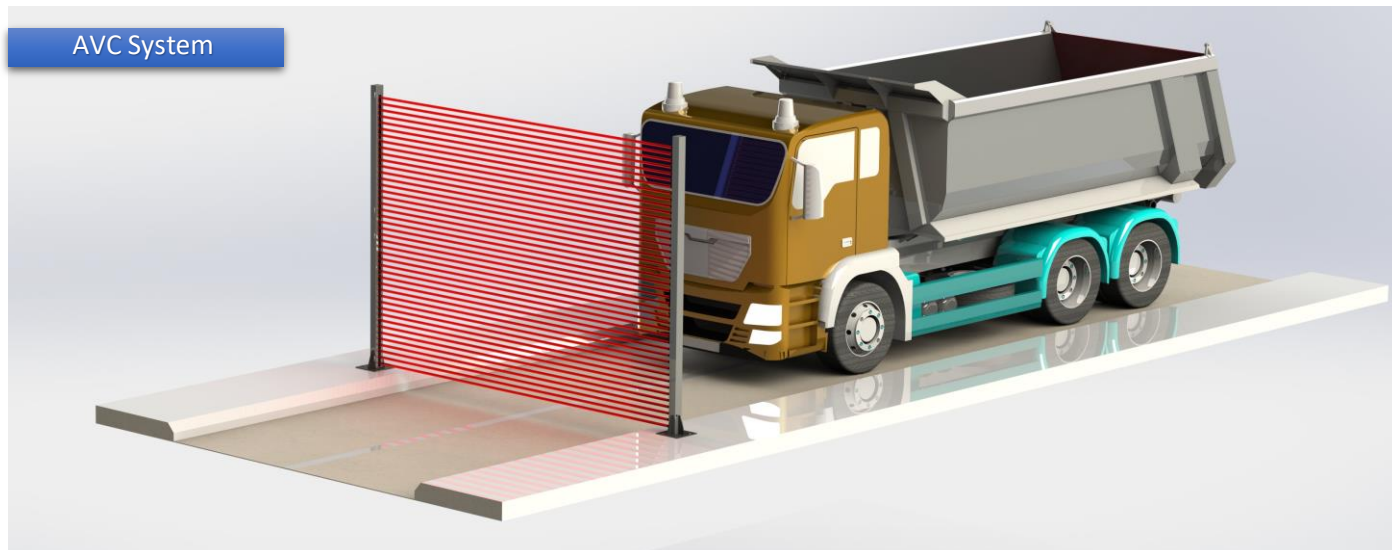
At a Glance

- The 2D profiler based AVC allows automatic classification of vehicles in Tolling Environment for purposes of Auditing.
- The classification computing Unit also provides an image output or, vehicle profile for manual verification of classification performed.
- The Sensor system comprises of a transmitter system and a receiver system, height of each being 3 meters.

- The Computing Unit receives the sensor input and classifies multiple categories of vehicles; currently, upto 50 classes are pre-defined.
- The software is highly flexible and can be trained for classifying additional classes, if required.
- Can be adapted for classification requirements of the customer / regulations in the country.
- Robust design & High availability guaranteed.

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TECHNICAL SPECIFICATION OF SENSOR

SNo	Parameter	Specification
1	Communication Interface	RS-485
2	Communication baud rate	115200
3	Receiver Activation Technique	One to One
4	Minimum thickness detection	30 mm
5	Vehicle Direction Detection	Yes
6	Sun Protection	Yes
7	Moisture Protection	Yes
8	IP Rating	IP67
9	Size	3000x80x80 mm
10	Voltage Range	24 V DC
11	Temperature Range	0 to + 65 ˚C
12	Make	toll*M*ax
13	Model No	3H0039

3H0039

Mild Steel Pole with **Profiler Sensor**
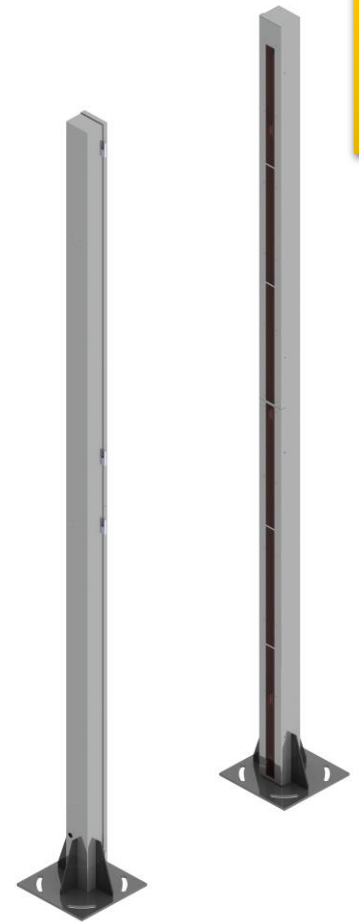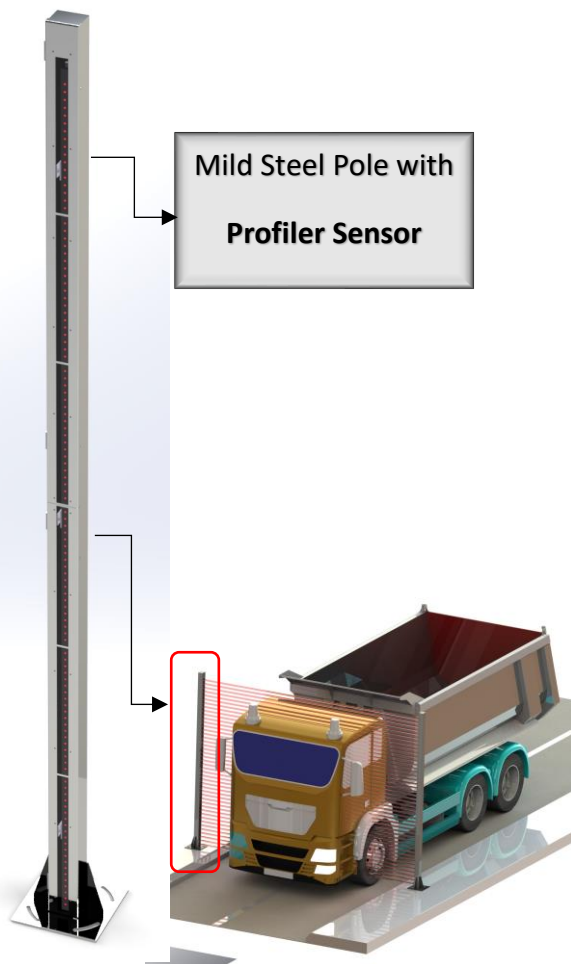
Computing Unit

SNo	Parameter	Specification	Units
1	CPU	1.4	GHz (4 core)
2	Core	4 (Quad)	
3	RAM	1	GB
4	Flash	4	GB
5	Digital Input	8	Nos.
6	Digital Output	2	Nos.
7	External Memory	Up to 64	GB
8	Operating System	Windows Embedded Compact 2013(CE8)	
9	IP Rating:	IP55	
10	Size	400x200x210	
11	Voltage Range:	230	V AC
12	Temperature Range:	0 to + 65	˚C
13	Make	toll*M*ax®	
14	Part No.	3H0038	

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2

Fisheye Camera based Automatic Vehicle Classifier
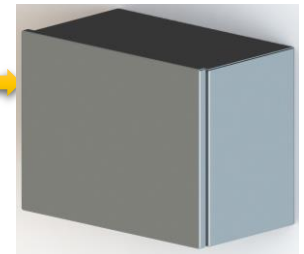
Technical Datasheet

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AVC System

Vehicle Before Sensors

Vehicle Passing through Sensors

Computing Unit

Classification

The AVC Computing Unit classifies the vehicle. Classified information is passed over Ethernet and/or, Serial for Audit.

Profile

Ethernet

Serial Port
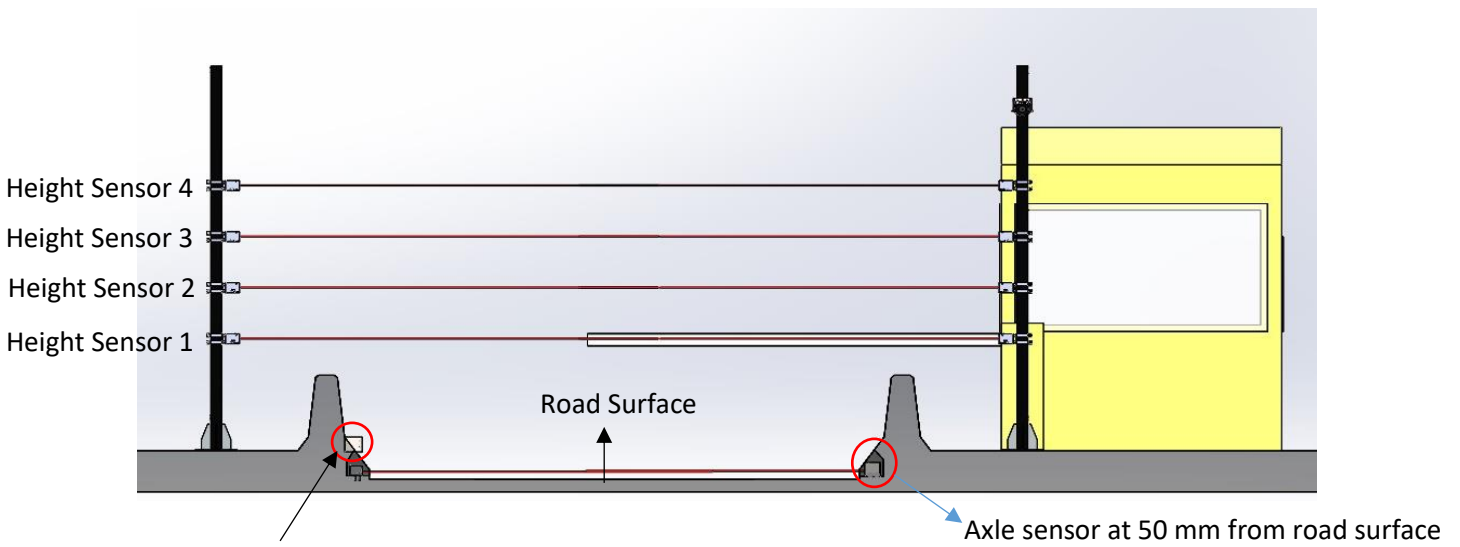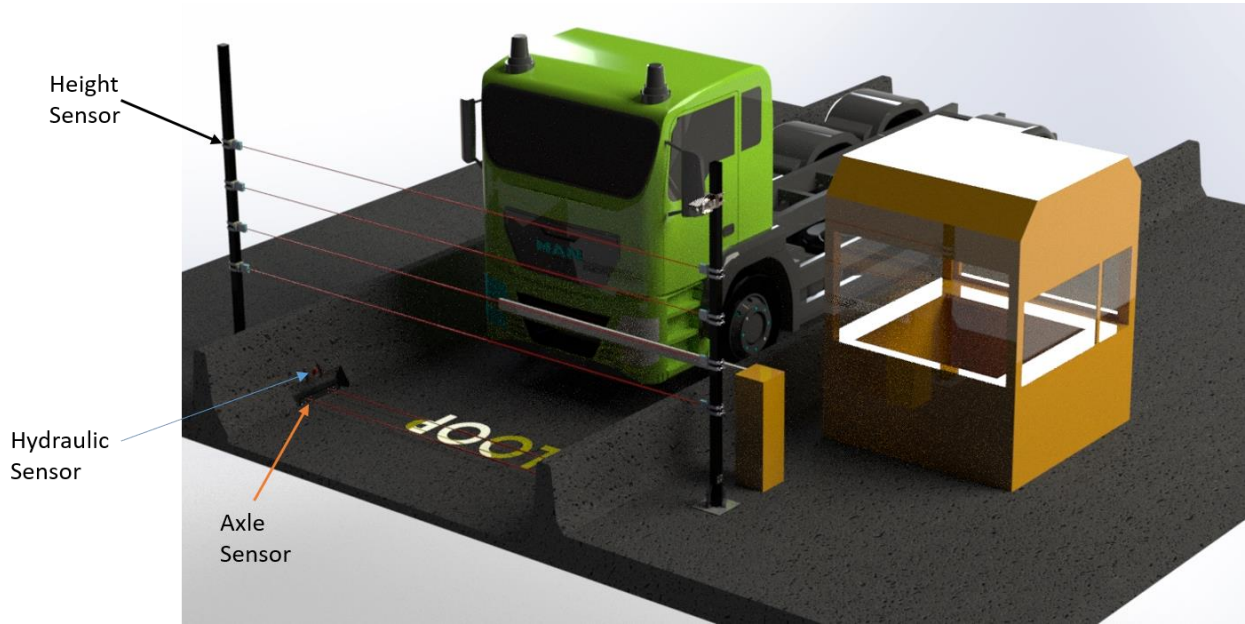
For Auditing (iAVC)

To Other System (TLC)

At a Glance

➢ The Fisheye Camera based AVC allows automatic classification of vehicles in Tolling Environment for purposes of Auditing.

➢ The classification computing Unit also provides an image output and video clip for manual verification.

➢ Image Processing & Machine Learning Techniques are used for Automatic Vehicle classification and axle counting. The algorithm provides confidence level which may be used for triggering Manual Auditing.

➢ The Computing Unit receives the sensor input and classifies multiple categories of vehicles; currently, up to 50 classes are pre-defined.

➢ The software is highly flexible and can be trained for classifying additional classes, as required for country/region specific vehicles.

➢ Can be adapted for classification requirements as per regulations in the country.

➢ Robust design & High availability guaranteed.

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PD4200000

Axle & Height Sensor based Automatic Vehicle Classification (AVC) System
Technical Datasheet

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STANDARD EQUIPMENT

Height Sensor

Hydraulic Sensor

Axle Sensor

Height Sensor 4
Height Sensor 3
Height Sensor 2
Height Sensor 1

Road Surface

Axle sensor at 50 mm from road surface
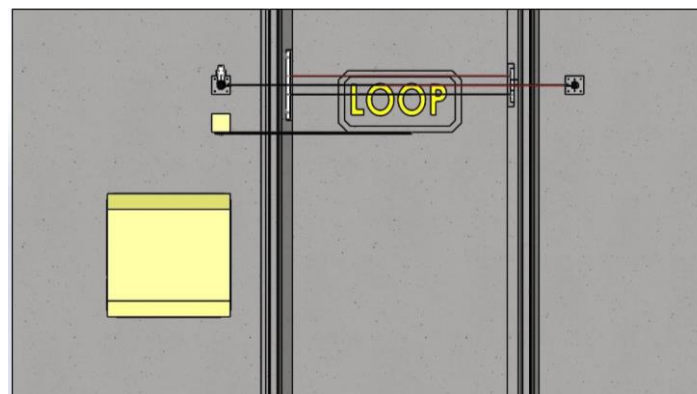
Hydraulic sensor at 280 mm from road surface

- The AVC identifies the class of vehicle passing through the Toll Lane based on axle count, distance between axles & height of vehicle. An OS-less *32-bit Microcontroller* enables raw data transfer to an associated computer wherein a classification library is accessed to obtain vehicle classification.

- Following classes can be derived using the AVC:
  - Car/Jeep/Van
  - LCV
  - Trucks/Bus
  - ≥3 Axle vehicles

- The Microcontroller based AVC solution assures cost-effectiveness vis-à-vis other VaaaN Profiler based AVC variants, albeit at the cost of lower accuracies.

TECHNICAL SPECIFICATION OF SENSOR CONTROLLER

SNo	Parameter	Specification
1	Serial Port	2
2	Internal Memory	512 KB
3	I/O Scanning Time	1uS
4	Real Time	Clock & Calendar
5	I/O Port	18 inputs + 24 outputs
6	Operating Temp.	0 to 65˚C
7	Humidity	90%
8	Voltage Range	24 VDC
9	Power Consumption	50W
10	Enclosure IP Rating	IP55

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