SCAPE

Scape Technologies A/S

With **+20 years** of experience, Scape Technologies streamlines the creation and implementation of robotic automation using advanced vision systems.

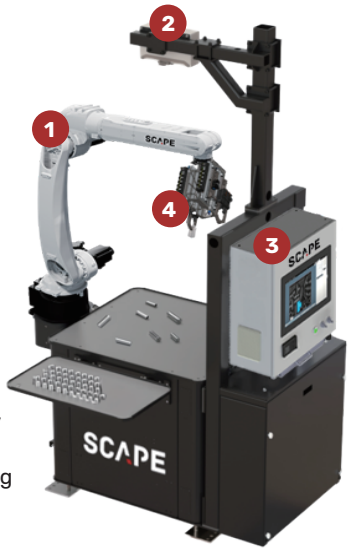
We provide competitively priced robotic equipment and intuitive software solutions.

Our market ranges from small SMEs with limited automation experience to some of the world's most demanding customers in the automotive, logistics, and distribution industries.

SCAPE

SCAPE CNC MACHINE TENDING

SCAPE CNC Tending is designed to optimize loading and unloading processes in machining applications. Equipped with 3D vision technology, it ensures efficient and accurate part handling by picking components from organized or randomly placed material frames. The solution focuses on placing parts with high precision into CNC machines, enabling flexible production, reducing reliance on manual labor, and enhancing both production efficiency and quality.



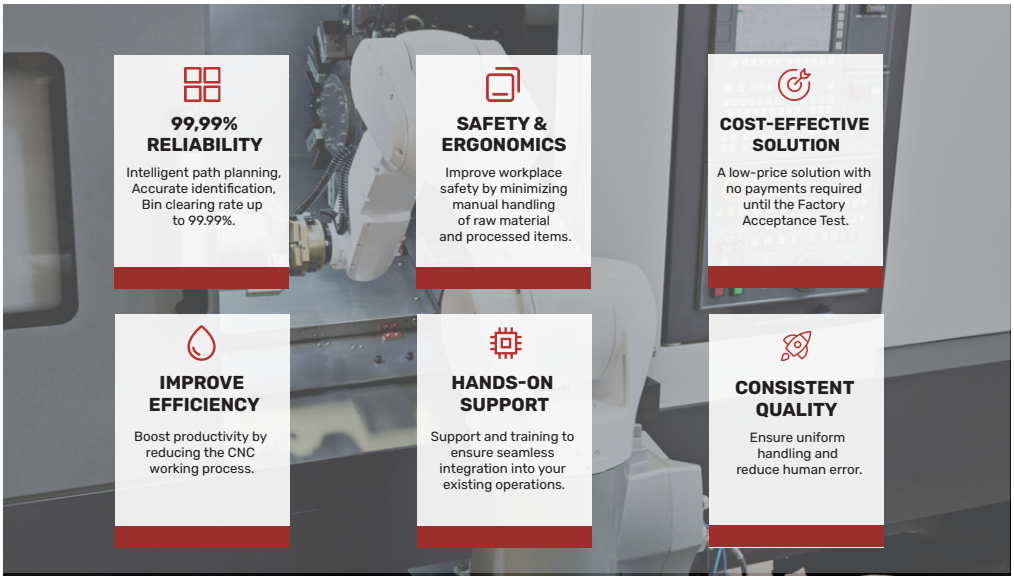
1 SCAPE Robot
Powerful and flexible SCAPE Robot programming language offering high accuracy, speed, stability, and intelligent path planning for enhanced productivity and flexibility.

2 SCAPE Industrial 3D Scanner
High-quality data acquisition enables the efficient handling of various material parts, making it ideal for deep-frame grabbing and bin-picking applications.

4 SCAPE Tool Units & Grippers
Gripper assemblies, including suction cups, magnetic grippers, and finger-type grippers, are mounted on guide rods or cylinders. They are commonly used for precise handling of material parts from bins and boxes.

3 SCAPE Vision Controller
Enables easy visualization, adjustment, and optimization of the workflow guiding your robot application.

APPLICATION ADVANTAGE



WATCH VIDEO

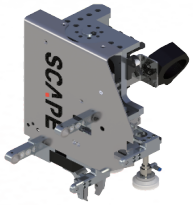
Don't miss out the opportunity.
Get in touch with our experts and discuss your application today!

Website: www.scapetechnologies.com
Email: info@scapetechnologies.com
Phone: + 45 70 25 31 13

KNOW-HOW 20 YEARS INNOVATION

SCAPE

PRODUCT CONFIGURATIONS

Product Option	SCAPE CNC TENDING SMALL LOAD	SCAPE CNC TENDING MEDIUM LOAD	SCAPE CNC TENDING HEAVY LOAD	SCAPE CNC TENDING CUSTOM
Introduction	For small-load robot applications. Ideal for meeting the loading and unloading requirements of small-sized parts.	For medium-load robot applications. Ideal for meeting the loading and unloading requirements of medium-sized parts.	For heavy-load robot applications. Ideal for meeting the loading and unloading requirements of large-sized parts.	Customized to meet specific requirements for complex scenarios. (Scape has extensive expertise in handling custom project demands.)
Features				
Part weight (Recommended)	1KG	3KG	10KG	As needed
Maximum adaptive depth of gripper	100 mm	160 mm	200 mm	As needed
Incoming material status	Random / layered / stacked			
Part placement	High precision delivery into fixture			
SCAPE Robot Units Overview				
DOF	6			
Reach	1602 mm	2013 mm	1617 mm	As needed
Repeatability	±0.05 mm	±0.05 mm	±0.05 mm	As needed
Payload (Recommended)	10 kg	20 kg	30 kg	As needed
SCAPE Tool Units Overview	✓ incl. ○ option – not available			
Tool Units	 TU10-11/12	 TU20-01	 TU30-01	 Custom
Maximum number of gripper components allowed to be installed – TA11-01/03	2/4	-	-	○
Maximum number of gripper components allowed to be installed – TA11-11/13/14/16	-	3	-	○
Maximum number of gripper components allowed to be installed – TA11-21/23/24/26	-	-	3	○
TCP	✓	✓	✓	✓
SCAPE Vision Solutions Overview	✓ incl. ○ option – not available			
OP18-12 PRO C-M 3D Scanner OP18-13 PRO C-L 3D Scanner OP18-14 PRO C-XL 3D Scanner OP18-35 Ultra-L 3D Scanner OP18-36 Ultra-XL 3D Scanner	✓ (Determine the 3D scanner specifications based on the actual scene/bin size)			
OP11-03 3D Orientation Control including SL13-11/12 Camera and Lights	○	○	○	○
SCAPE Controller PC Overview	✓ incl. ○ option – not available			
PC22-01 Vision Controller	✓			
SW10 Bin-Picking Software	✓			

Note: Please refer to the "TU10/TU20/TU30/TA11 - Hardware Installation - Tool Units and Grippers - Compact, Standard, Large", or contact Scape staff.

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KNOW-HOW 20 YEARS ★★★ INNOVATION

SCAPE

CASE

TNDA Gas Equipment - 3D Vision-Guided Machine Tending of Valve Covers

1. **SCAPE Industrial 3D Scanner**
2. **SCAPE 2D Camera**
3. **SCAPE Robot**
4. **SCAPE Vision Controller**

LOADING AND UNLOADING OF VALVE COVERS FROM 2 CNC MACHINES

THE SOLUTION PERFORMS 3D VISUAL IDENTIFICATION OF THE PART IN THE BIN, GUIDING THE ROBOT TO PICK IT AND PLACE IT ONTO A ROTARY TABLE. NEXT, A 2D CAMERA IDENTIFIES THE POSITION OF THE PRESSURE RELIEF VALVE HOLE. BASED ON THIS DATA, THE ROBOT ORIENTS THE WORKPIECE TO THE CORRECT ANGLE FOR FEEDING INTO THE MACHINE. THE ROBOT THEN GRASPS THE PART AND PLACES IT INTO THE LATHE FOR PROCESSING. ONCE THE VALVE COVER IS PROCESSED, THE ROBOT PLACES IT IN AN ORGANIZED MANNER ON THE RECEIVING PALLET.

APPLICATION RESULTS

THE CUSTOMER'S FACTORY HAS BEEN OPERATIONAL FOR THREE YEARS, AND WITH SCAPE 3D VISION TECHNOLOGY, INTELLIGENT OPERATIONS ARE NOW ACHIEVABLE, LEADING TO A SIGNIFICANT IMPROVEMENT IN OPERATIONAL EFFICIENCY. THE MODULAR HARDWARE AND SOFTWARE DESIGN ENABLE QUICK AND SEAMLESS DEPLOYMENT.

CYCLE TIME:	3 MIN - PARTS THAT DO NOT REQUIRE THREADED HOLE 4 MIN - PARTS THAT REQUIRE THREADED HOLE MACHINING
PART WEIGHT AND DIMENSIONS:	4 KG (MAX); 249 MM IN DIAMETER
PART DELIVERY:	HIGH PRECISION DELIVERY INTO FIXTURE
PART:	ALUMINUM VALVE COVER - DISORDERED STACKED IN THE SAME DIRECTION

WATCH VIDEO

Don't miss out the opportunity.
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KNOW-HOW 20 YEARS ★★★ INNOVATION

HARDWARE SPECIFICATION

SCAPE

SCAPE 3D SCANNER PORTFOLIO

www.scapetechnologies.com

HARDWARE SPECIFICATION

SCAPE Mini 3D Scanner™

Product Option OP13-20/21/22

Introduction

The SCAPE Mini-series is part of the SCAPE hand-eye 3D sensor system, which uses a high-power laser light source and offers strong resistance to ambient light interference. It is rugged, compact, and lightweight, making it easy to install directly on a robot arm for high-precision tasks such as guidance, grasping, welding position detection, and more. The Mini-series features a large field of view, which makes it ideal to install on a robot arm.

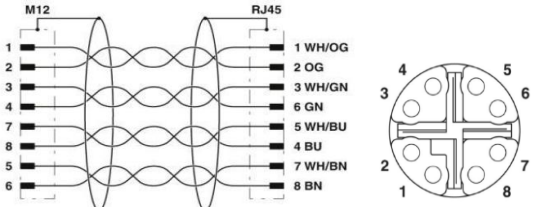
Technical Performance Specifications

The SCAPE Mini Industrial 3D Scanner comes in 3 different options: Mini Pro-700 which is extremely compact and can work at close range, Mini Pro C-700 and Mini Pro C-1000 which include color camera but have two different scan volumes.
All models generate up to 1.3 M points and use blue laser light (447 nm).

Model	Mini Pro-700 (OP13-20)	Mini Pro C-700 (OP13-21)	Mini Pro C-1000 (OP13-22)
Working Range (Z-direction)	400-700 mm	400-700 mm	380-1000 mm
Field of View (see plots on page 2)[1]	700 x 600 mm	700 x 620 mm	650 x 640 mm
Lateral Resolution (XY-plane)[1]	0.55/0.59 mm	0.55/0.61 mm	0.51/0.63 mm
Min Surface Area for Scanning[1]	2.0 x 2.0 mm	2.0 x 2.0 mm	2.0 x 2.0 mm
Depth Uncertainty RMS Closest to/Furthest from Scanner	0.4/0.7 mm	0.4/0.7 mm	0.38/1.0 mm
Baseline	80 mm	125 mm	125 mm

Electrical Connections

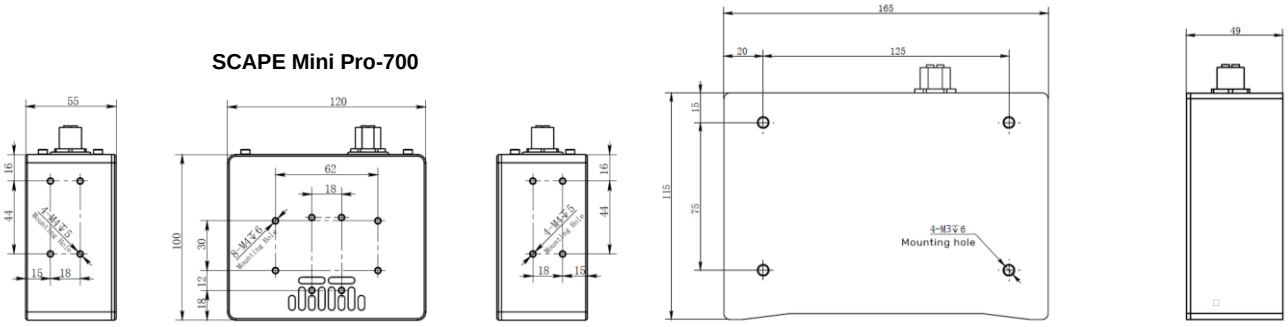
Ethernet port



Connect 1 Gbps PoE ethernet cable with RJ45/M12-X connector (supplied with scanner). If supplying own cables: Use category Cat5e or better ethernet cables (cables capable of 1 Gbps or 10 Gbps transfer rate).

Mounting (all models):

SCAPE Mini Pro-700



[1] At max. distance

HARDWARE SPECIFICATION

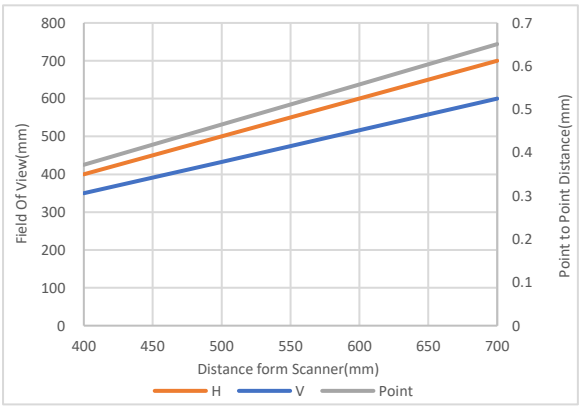
LED Status	Red	Green	Yellow
On	Power available through ethernet cable (PoE)	Connecting	Continuously on, it indicates a short circuit in the network cable
Off	No power available through ethernet cable	Connected, normal operation	No communication
Flashing	-	-	Signal is normal, and communication is ongoing

Physical Specifications

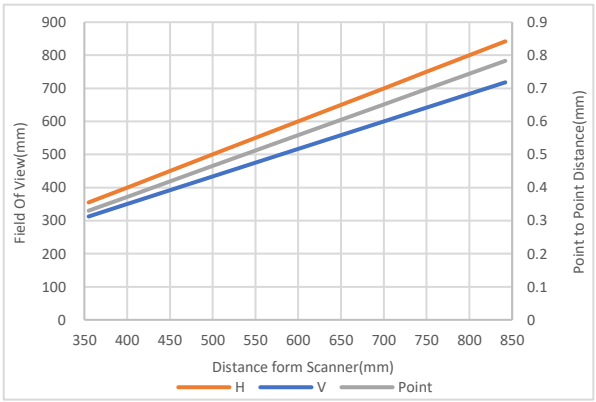
Dimensions and Weight	Mini Pro-700: 120 x 100 x 55 mm 780 g Mini Pro C-700: 165 x 115 x 49 mm 1030 g Mini Pro C-1000: 165 x 115 x 49 mm 1030 g
Safety Classification (EN 62471) and Protection	Class 3R. Class 3R lasers are considered safe when handled carefully. Avoid direct eye exposure. IP65.

Field of View and sensor resolution as a function of scanning distance

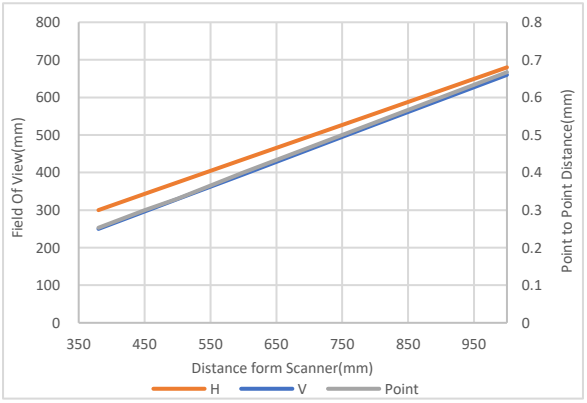
Mini Pro-700



Mini Pro C-700



Mini Pro C-1000



SCAPE Mini Box Content

- SCAPE Industrial 3D Scanner (Mini Pro-700, Mini Pro C-700 or Mini Pro C-1000)
- Ethernet cable RJ45/M12 X-coded 5 m (between SCAPE Controller PC and scanner)
- Power supply injector for PoE

SCAPE Controller PC Extra Requirements

1 Ethernet connector, 1 Gbit

HARDWARE SPECIFICATION

SCAPE Pro Industrial 3D Scanner™

Product Option OP18-12/13/14

Introduction

The SCAPE Pro Industrial 3D Scanner comes in three different sizes and is mounted above the scene. It is a binocular scanner which is optimal for bin-picking tasks and certain other tasks where different view-angles are beneficial. The advantages of a stationary scanner compared to a robot mounted scanner are faster cycle times since the robot is not involved in acquiring data. In some cases, the scanner can handle two bins next to each other.
How it works: The scanner projects several patterns onto the scene and records them by means of two cameras. As a result, the object is digitalized as a 3D point cloud. Neither the object nor the 3D sensor is in motion, which means that scanning is conducted quickly and extremely precise.

Technical Performance Specifications

The SCAPE Pro Industrial 3D Scanner comes in 3 different sizes corresponding to 3 different scan volumes and resolutions.
All models generate up to 2.0 M points and use blue laser light (447 nm).

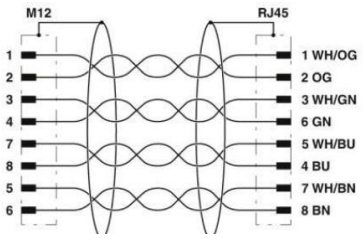
Model	Pro C-M (OP18-12)	Pro C-L (OP18-13)	Pro C-XL (OP18-14)
Working Range (Z-direction)	969-1573 mm	1326-2800 mm	1100-3500 mm
Extended Range[1]	-	2800–4000 mm	3500-4900 mm
Field of View (see plots on page 2)[2]	1300 x 1000 mm	2100 x 1800 mm	3200 x 3100 mm
Lateral Resolution (XY-plane)[2]	0.820 mm	1.369 mm	2.155 mm
Min Surface Area for Scanning[2]	2.9 x 2.9 mm	4.8 x 4.8 mm	7.5 x 7.5 mm
Depth Uncertainty RMS Closest to/Furthest from Scanner	0.97/1.57 mm	1.3/2.8 mm	1.1/3.5 mm
Baseline	200 mm	400 mm	400 mm

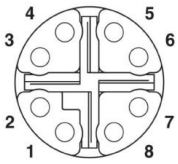
Electrical Connections

Power + GPIO port Use 24 VDC to power the scanner. Use only the supplied power adapter.

No.	Signal definition	Function description	Color	Electric parameter	Unit
1	Trigger_OUT	Trigger signal output	white	Trigger Power	V
2	Sys_VCC	System VCC	brown	12 ~ 30	V
3	Sys_GND	System GND	green	0	V
4	Trigger_Power	Trigger signal power	yellow	12 ~ 24	V
5	Trigger_GND1	Trigger circuit GND1	grey	0	V
6	Trigger_IN1	Trigger circuit Input1	pink	Trigger_Power	V
7	Trigger_GND2	Trigger circuit GND2	blue	0	V
8	Trigger_IN2	Trigger circuit Input2 (reserved)	red	Trigger_Power	V

Ethernet port Connect 1 Gbps ethernet cable with RJ45/M12-X connector (supplied with scanner). If supplying own cables: Use category Cat5e or better ethernet cables (cables capable of 1 Gbps or 10 Gbps transfer rate). Powering the device through PoE is not possible.





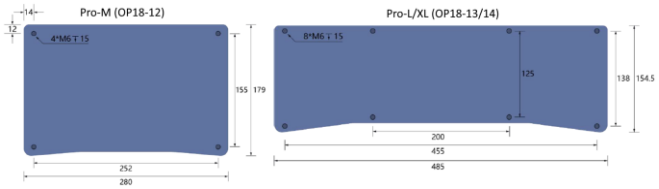
[1] Extended range: Good point clouds can still be acquired in this working range, but the accuracy decreases compared to the normal “Working range”
[2] At max. distance

HARDWARE SPECIFICATION

Indicator Status

Status	Red	Green	Yellow
Power off	Off	Off	off
Starting	On	Off	Off
Startup complete, faulted	Flash	Off	Off
Startup complete, disconnected	Off	On	Off
Startup complete, connection successful/ no data transfer	Off	On	On
Connection successful & Data transmitted	Off	On	Flash

Mounting (all models):

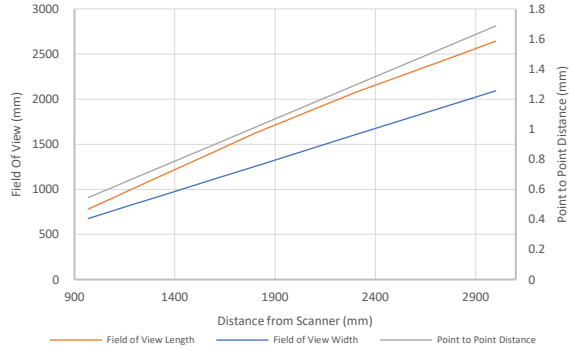


Physical Specifications

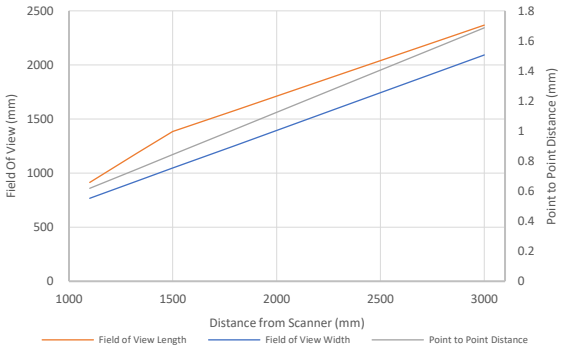
Dimensions and Weight	Pro C-M: 280 x 165 x 74 mm	2600 g
	Pro C-L: 480 x 148 x 65 mm	3700 g
	Pro C-XL: 480 x 148 x 68 mm	3740 g
Safety Classification (EN 62471) and Protection	Class 3R. Class 3R lasers are considered safe when handled carefully. Avoid direct eye exposure. IP65.	

Field of View and sensor resolution as a function of scanning distance

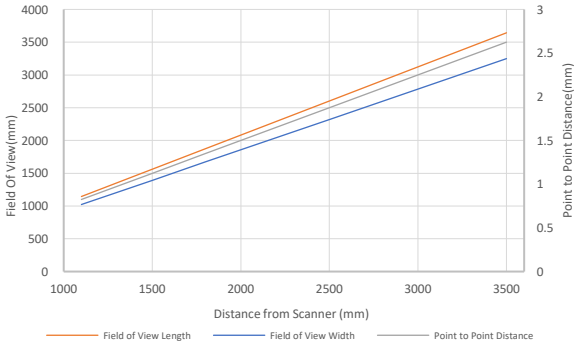
Pro C-M



Pro C-L



Pro C-XL



SCAPE Pro Industrial 3D Scanner™ Box Content

- SCAPE Pro C-M/L/XL Industrial 3D Scanner
- Power Supply (100-240 VAC/50-60 Hz, 1.3 A, Output: 24VDC, 90 W) incl. 1.8 m cable to wall outlet and 20 m between power supply and scanner
- Ethernet cable RJ45/M12 X-coded 20 m (between SCAPE Controller PC or SCAPE Vision Controller and scanner)
- Shutters to prevent projected light outside bin(s) or scene

SCAPE Controller PC Extra Requirements

1 Ethernet connector, 1 Gbit

Optional SCAPE Stationary Scanner Tower

The SCAPE Stationary Scanner Tower is an option for mounting the SCAPE Stationary Scanner above the scene. Please contact Scape for more information.

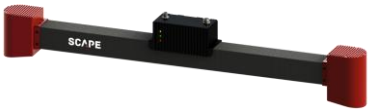
Position of Scanner relative to the scene

Scape provides a CAD model including scan volume for each scanner model. This makes it easy to position the scanner in the correct position during the layout phase. As an example, the CAD model for Pro-L (OP18-13) is shown below.

HARDWARE SPECIFICATION

SCAPE Ultra 3D Scanner™

Product Option OP18-35/36



Introduction

The SCAPE Ultra series comes in two different sizes and is stationary mounted. It is a monocular scanner with high precision and low noise on the acquired point cloud. It includes built-in shutters to prevent projected light outside the scene which can cause decreased data quality. The advantages of a stationary scanner compared to robot mounted scanners are faster cycle times since the robot is not involved in acquiring data.
How it works: The scanner projects several patterns onto the scene and records them by means of a camera. As a result, the scene is digitalized as a 3D point cloud. Neither the scene nor the 3D sensor is in motion, which means that scanning is conducted extremely precise.

Technical Performance Specifications

The SCAPE Ultra 3D Scanner comes in two different sizes corresponding to two different scan volumes and resolutions.
Ultra-L generates 2.0 M points whereas Ultra-XL generates 3.1 M points. Both models use blue laser light (447 nm).

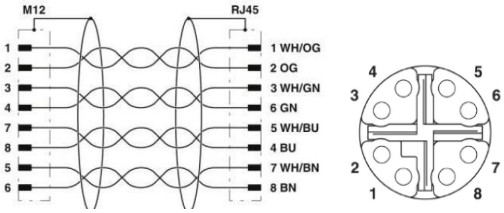
Model	Ultra-L (OP18-35)	Ultra-XL (OP18-36)
Working Range (Z-direction)	1057-2070 mm	1521-3800 mm
Field of View (see plots on page 2)[1]	1700 x 1400 mm	2600 x 2500 mm
Lateral Resolution (XY-plane)[1]	1.05/1.13 mm	1.27/1.63 mm
Min Surface Area for Scanning[1]	3.9 x 3.9 mm	4.6 x 4.6 mm
Depth Uncertainty RMS Closest to/Furthest from Scanner	1.06/2.07 mm	1.5/3.8 mm
Baseline	550 mm	860 mm

Electrical Connections

Power + GPIO port Use 24 VDC to power the scanner. Use only the supplied power adapter.

No.	Signal definition	Function description	Color	Electric parameter	Unit
1	Trigger_OUT	Trigger signal output	white	Trigger Power	V
2	Sys_VCC	System VCC	brown	12 ~ 30	V
3	Sys_GND	System GND	green	0	V
4	Trigger_Power	Trigger signal power	yellow	12 ~ 24	V
5	Trigger_GND1	Trigger circuit GND1	grey	0	V
6	Trigger_IN1	Trigger circuit Input1	pink	Trigger_Power	V
7	Trigger_GND2	Trigger circuit GND2	blue	0	V
8	Trigger_IN2	Trigger circuit Input2 (reserved)	red	Trigger_Power	V

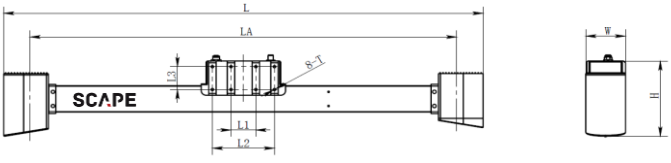
Ethernet port Connect 1 Gbps ethernet cable with RJ45/M12-X connector (supplied with scanner). If supplying your own cables: Use category Cat5e or better ethernet cables (cables capable of 1 Gbps or 10 Gbps transfer rate). Powering the device through PoE is not possible.



Indicator Status

Status	Red	Green	Yellow
Power off	Off	Off	off
Starting	On	Off	Off
Startup complete, faulted	Flash	Off	Off
Startup complete, disconnected	Off	On	Off
Startup complete, connection successful/ no data transfer	Off	On	On
Connection successful & Data transmitted	Off	On	Flash

Mounting (all models):



[1] At max. distance

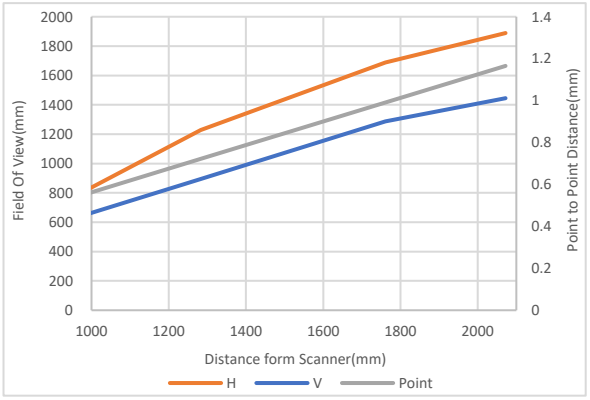
HARDWARE SPECIFICATION

Physical Specifications

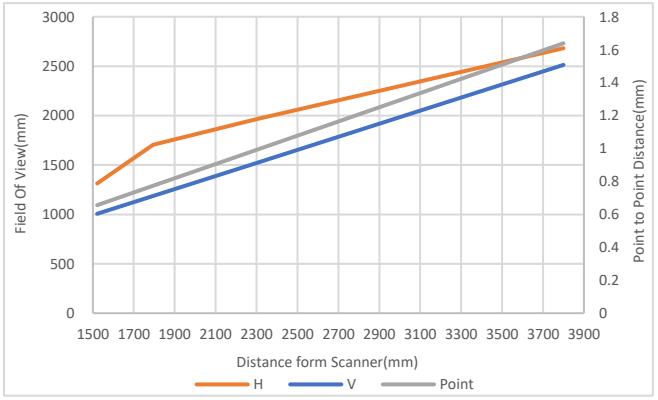
Dimensions and Weight	Ultra-L: 647 x 165 x 78 mm Ultra-XL: 966 x 165 x 80 mm	2490 g 2950 g
Safety Classification (EN 62471) and Protection	Class 3R. Class 3R lasers are considered safe when handled carefully. Avoid direct eye exposure. IP65.	

Field of View and sensor resolution as a function of scanning distance

Ultra-L



Ultra-XL



SCAPE Ultra Industrial 3D Scanner™ Box Content

- SCAPE Ultra Industrial 3D Scanner (Ultra-L or Ultra-XL)
- Power Supply (100-240 VAC/50-60 Hz, 1.3 A, Output: 24VDC, 90 W) incl. 1.8 m cable to wall outlet and 20 m between power supply and scanner
- Ethernet cable RJ45/M12 X-coded 20 m (between SCAPE Controller PC and scanner)

SCAPE Controller PC Extra Requirements

- 1 Ethernet connector, 1 Gbit

Optional SCAPE Stationary Scanner Tower

The SCAPE Stationary Scanner Tower is an option for mounting the SCAPE Stationary Scanner above the scene. Please contact Scape for more information.

Position of Scanner relative to the scene

Scape provides a CAD model including scan volume for each scanner model. This makes it easy to position the scanner in the correct position during the layout phase. As an example, the CAD model for Ultra-XL (OP18-36) is shown below.