

IPC ROBOTIC SCRUBBER

CT110-R



**More job
done in
short time**



**Increase
productivity,
maintain
consistency**



**Reduce the
cost, facing the
challenges of
labor cost
increasing**

CT110-R

OVER 8.5
MILLION
HOURS
IN AUTONOMOUS
MODE



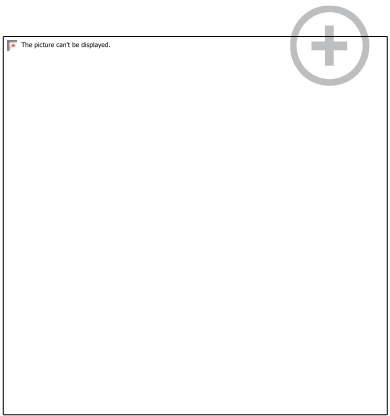
10,000+
UNITS
DEPLOYED



OVER 117
BILLION
SQUARE
FEET



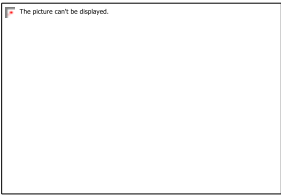
SHIPPED TO
26+
COUNTRIES
WORLDWIDE



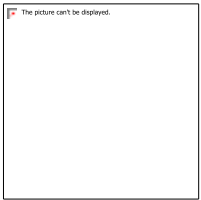
OVER
1,000
UNIQUE
CUSTOMERS



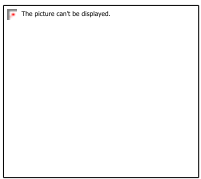
CT110-R



Dual working mode: manual and autonomous



Proven cleaning platform



High productivity, all time in control



Remote start, easy operation, 24 hours stand-by



Working report



Docking station, fill/drain water and auto battery charging

Specification



	Disc Brush	Roller Brush
Voltage	24VDC	24VDC
Clean Path	700mm	800mm
Suction width	960mm	1049mm
Water tank capacity	105L/110L	105L/110L
Vacuum motor power	550W	550W
Brush Motor Power	400Wx2	600Wx2
Ground pressure	35kg	50kg
Brush RPM	180rpm	650rpm
Dimensions(Length x Width x Height)	1660x900x1450mm	1800x950x1450mm
Net weight (Included battery)	305Kg	352Kg
Sound pressure level	72dB (A)	72dB (A)



- Possesses full-stack intelligent technology and product experience
 - Founding team has more than 10 years of experience in the robotics industry
 - Project initiated in 2019 and company established in 2020
-
- Two operation modes – autonomous cleaning + manual operation
 - Easy operation, remote control, 24-hour standby
 - Market-proven cleaning platform
 - Real-time work reports and monitoring
 - High-efficiency operation with real-time supervision
 - Optional docking/refill station for fully automatic all-day cleaning

Key Features & Functions

1. Human-Machine Dual Mode

- Supports both manual operation and autonomous (AMR) mode
- Easy to switch depending on operational needs

2. AI-Powered Intelligent Navigation

Equipped with:

- LiDAR
- Depth cameras
- Ultrasonic sensors
- Fisheye cameras
- Ensures safe, precise, and efficient cleaning
- Advanced controllers (VCU & ACU) enhance performance

3. Smart Route Planning

- Two cleaning path options:
- Manual route setup
- Autonomous route generation
- Efficient mapping and optimized cleaning coverage





Key Features & Functions

4. Real-Time Monitoring & IoT Integration

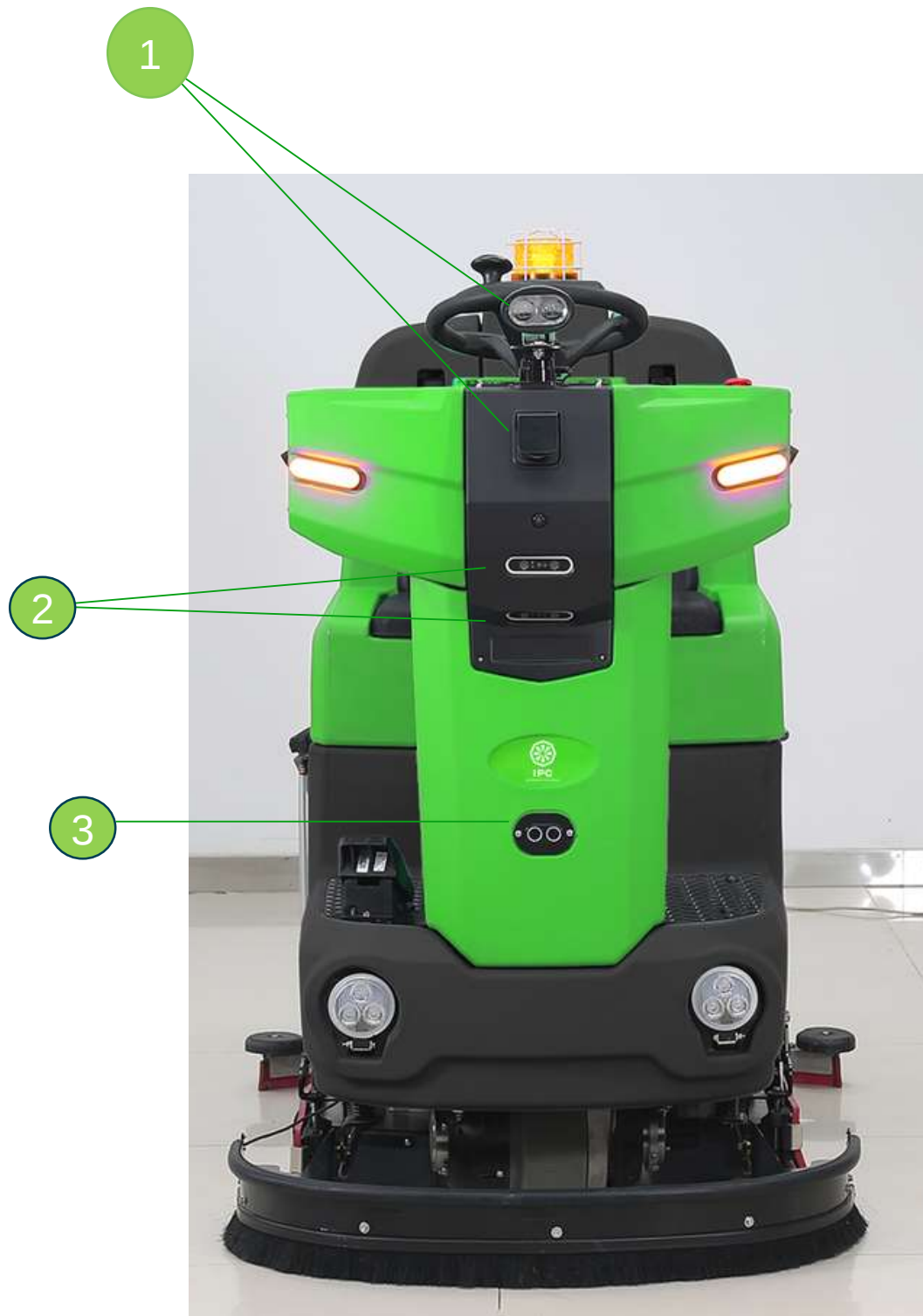
- Monitor machine status in real time
- Access cleaning data and reports instantly
- Helps reduce management and operational costs

5. 24/7 Continuous Cleaning

- Compatible with automatic replenishment station
- Enables non-stop operation
- Ensures consistent cleaning results at all times

6. User-Friendly Operation

- Simple control panel
- Mobile app support for remote operation
- Designed for easy daily use by cleaning staff



1 Lidar

- 270° view
- 80 meter range

2 Depth Camera

- 0,15-3m range
- 5 sets

3 Supersonic Sensor

- Detecting glasses
- 3 sets

Bumper Front



4 Fisheyes Camera

- Wide view
- 4 sets

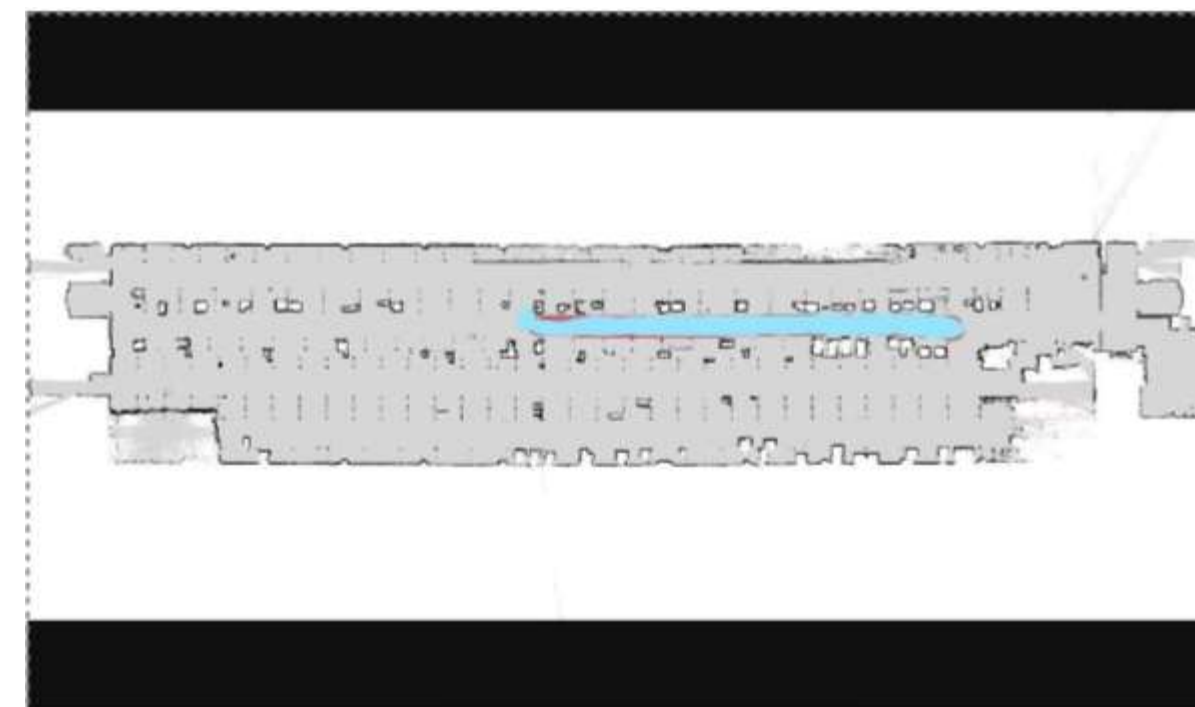
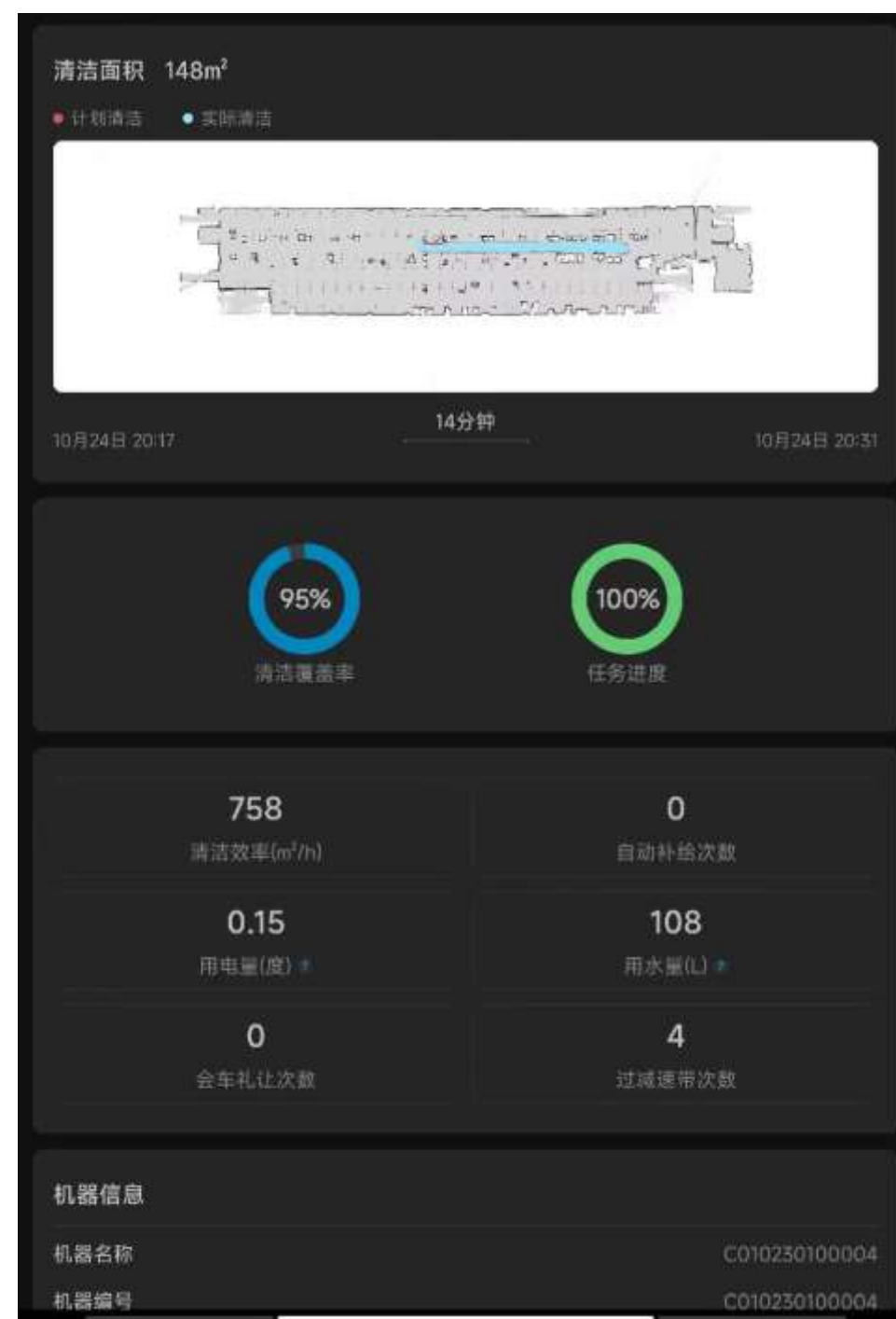
Bump Rear



Manual Mode



AMR Mode



Mobile APP

- Remotely start a task
- Cleaning report
- Machine status
- Warning message

Two emergency stop buttons, secure safety

Green start button, enables route initiation

Horizontal & slanted Lidar for autonomous positioning and mapping

Supersonic sensors can detect clear glass

Front & rear bumper ensure safety



Front mounted operator seat makes easy driving and great visibility in manual mode

Stereo depth camera provide navigation and obstacle avoidance

105/110L tank capacity reduces dump/fill time and improve efficiency

Docking Station



- All-weather auto-docking station enables fully autonomous operation.
- The system automatically refills clean water, drains wastewater, and recharges the battery, ensuring 24/7 continuous readiness.



Easy Maintenance & Serviceability

- Ergonomic design with easy access to key components
- Professional after-sales service support
- Reliable spare parts availability

Safety

Internal testing based on IEC62237 rules

- More than 200 testing items
- Review the reliability requirements of each intelligent component
- Meet the regulatory

Formal IEC63327 Compliance Validation

IEC 63327 Coverage Summary

Risk Mitigation	Nb. Of Tests	Status
Maximum stopping distance < 1.2 * maximum rated autonomous speed	1	Pass
Stopping reaction time <= 0.3 seconds	1	Pass
Detect and avoid obstacles further ahead than the stopping distance	45	Pass
Prevent machine from falling over abrupt surface elevation change	32	Pass
After switching from manual to autonomous mode, the machine can only move if there are no obstacles in the direction of travel	30	Pass
Following a category 2 stop, the machine can only move if there are no obstacles in the direction of travel	20	Pass
Monitor the operating status of all safety-related components before starting the machine in autonomous mode	1	Pass
Monitor the operating status of all safety-related components while the machine is in autonomous mode	1	Pass
Perform a stop category 0 or 1 when a malfunction of a component is detected	1	Pass
Perform a category 2 stop or obstacle avoidance when an obstacle enters the stopping zone	49	Pass
Perform a stop category 0 or 1 when an obstacle enters the contact zone while the machine is moving	24	Pass
Prevent crushing hazard during autonomous docking process	2	Pass
Bring machine to a complete stop within safety distance before starting the docking process	1	Pass
Give acoustic or visual warning during docking process	1	Pass
Maximum docking process speed: 0.05 m/s	1	Pass
Maximum linear distance of the docking process: 0.2m	1	Pass
Perform a stop category 2 when an obstacle is detected during the docking process	1	Pass
Total	238	All Pass

TENNANT CONFIDENTIAL - WORK ITEM

Formal IEC63327 Compliance Validation

Test Activity

- Dates: January 29th, 2024 – January 31st, 2024
- Performed by: Daniel Messer, Nan Zhu, Jianguo Chen, Grace Shan
- Witnessed by: Jim Jiang

Report

- ETR240019

IEC 63327 Coverage Summary

Risk Mitigation	Nb. Of Tests	Status
No operator presence on the machine in autonomous mode	3	Pass
Resetting of stop category 0 or 1 only done on the machine (no remote reset)	1	Pass
Resetting of stop category 0 or 1 requires an operator intervention	1	Pass
Provide a dedicated mechanism on the machine to switch from manual to autonomous operation	1	Pass
Maximum autonomous speed in open space: 6km/h	2	Pass
Maximum autonomous speed in confined space: 4km/h	4	Pass
Maximum autonomous speed cannot be higher than maximum manual speed	2	Pass

TENNANT CONFIDENTIAL - WORK ITEM

001_AMR_FUNC_SAFETY_38.4km/h
002_AMR_FUNC_SAFETY_35.0km/h
003_AMR_FUNC_SAFETY_30.0km/h
004_AMR_FUNC_SAFETY_25.0km/h
005_AMR_FUNC_SAFETY_20.0km/h
006_AMR_FUNC_SAFETY_15.0km/h
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Safety

Internal testing based on IEC 63327



Dark object



AMR anti-cliff

Large Exhibition Halls



Transportation hubs
(airports, stations)



Healthcare facilities



Educational institutions



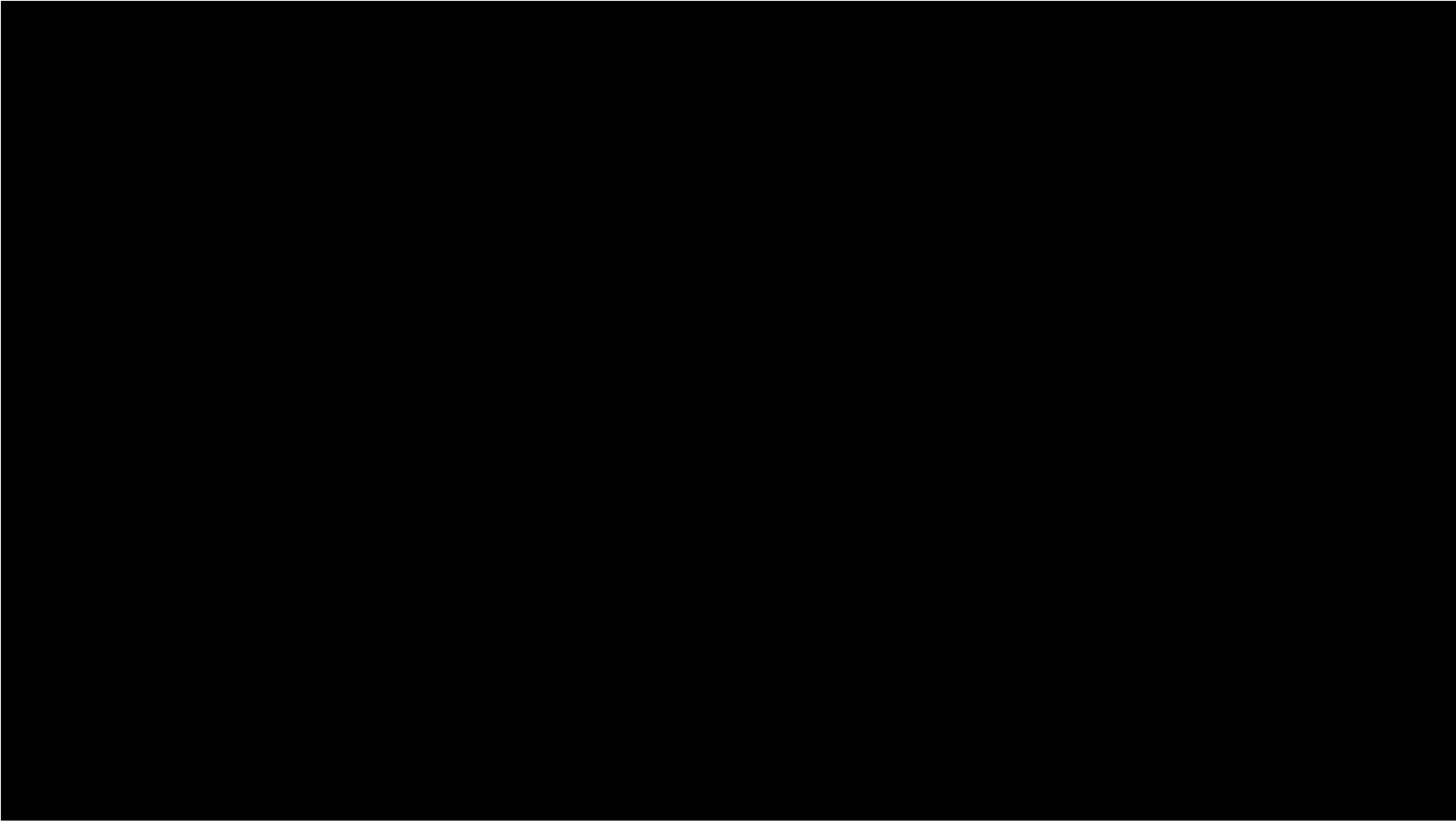
Retail & hypermarkets



Warehousing & logistics



Manufacturing plants



THANK YOU