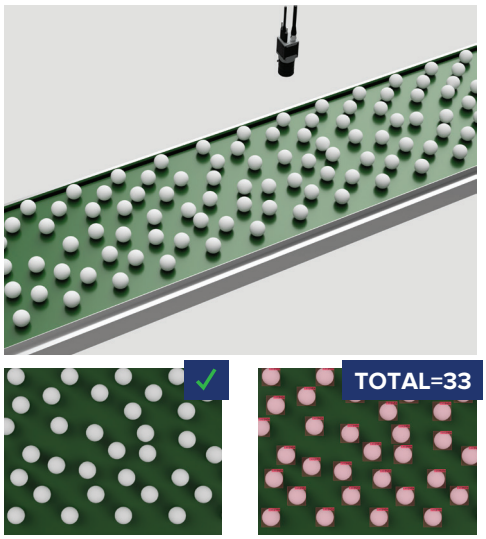
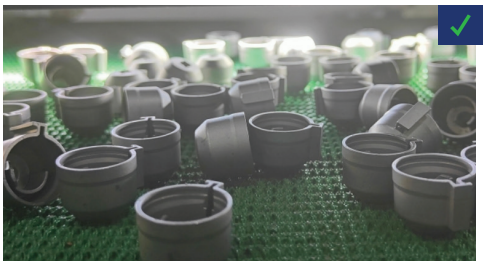
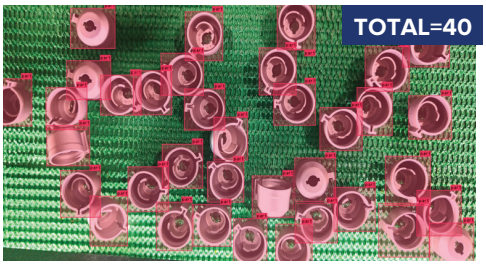
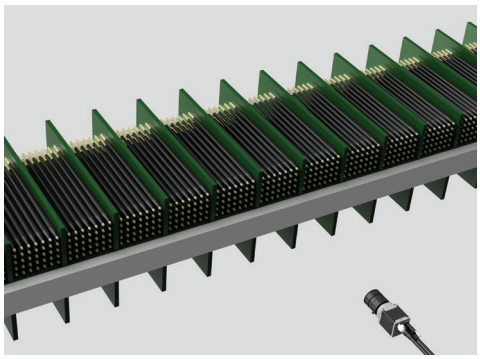
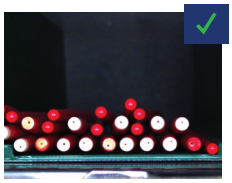
ROBTRO SYSTEMS
Smart Counting and Web Inspection

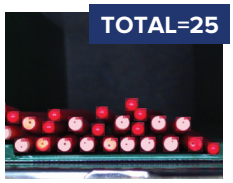












DATA SHEET

KIARA COUNTING SYSTEMS

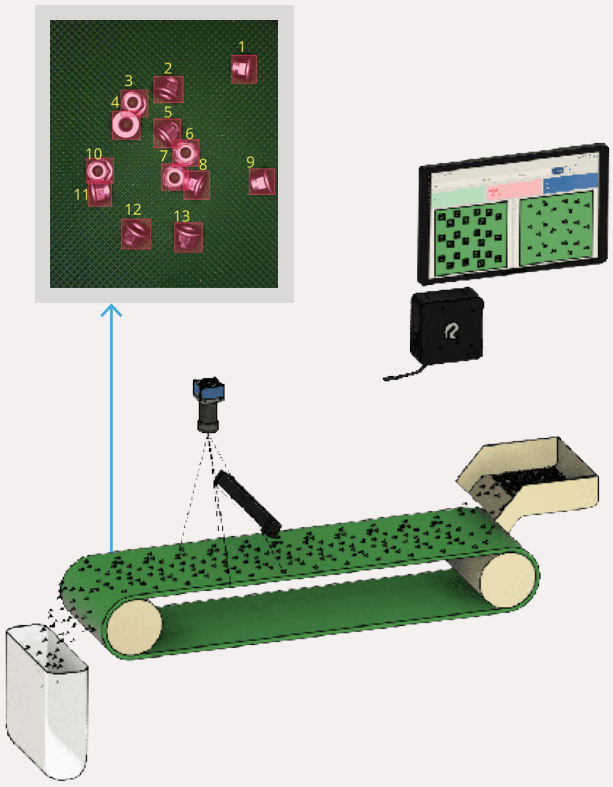
AI Vision facilitates speedy packaging and inventory control by minimizing counting and batching errors.

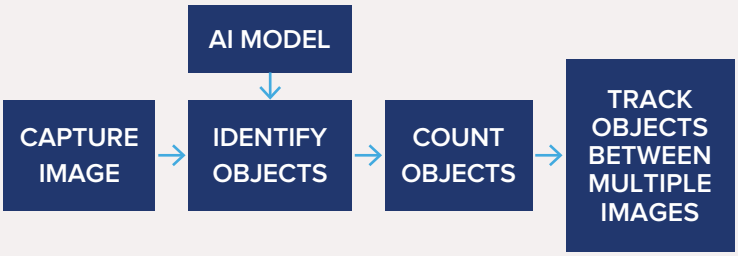
KCS Overview

Current methods, like weighing, manual counting and sensor-based counting have restrictions related to part shapes, speeds, and precision. Kiara Counting Systems (KCS) uses cameras and AI to count objects in images accurately and at high speeds.

Concept:

To employ AI to identify and count objects in images.





Neural networks can become intelligent by observing examples of things. As more data is entered, the system's accuracy improves.

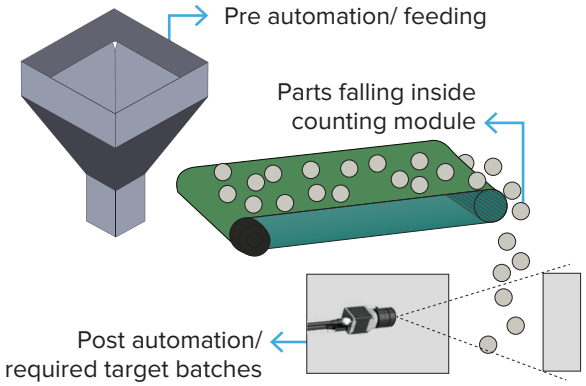
Image Capturing Scenarios

KCS-CT: Camera mounted on the conveyer top.

The camera tracks and counts objects on the conveyer as they pass by

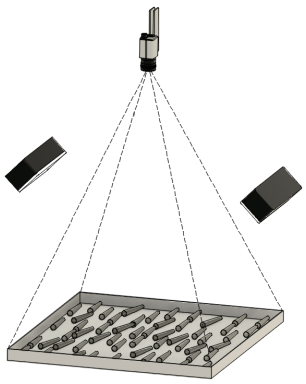
KCS-G98: Count in the air

Using high-speed cameras and lights in a falling objects chamber, images are captured to identify and count the objects going through.



KCS TT: Camera mounted on tabletop

A stationary setup allows the camera to identify and count the objects seen from the top.



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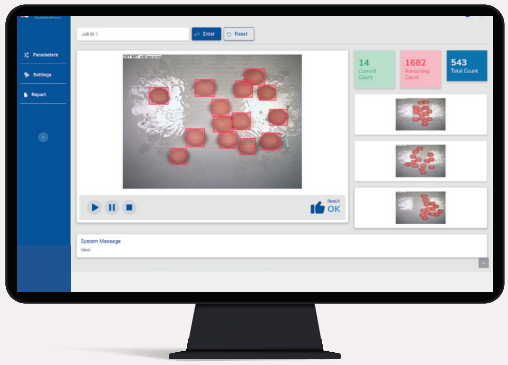
KCS Software Suite

The Software Suite is the heart of KCS, as it allows for fast and accurate counting of parts. Cameras capture images which are then identified, tracked, and integrated with industrial equipment using advanced algorithms to control the feeding mechanisms.

What to Expect

Accuracy

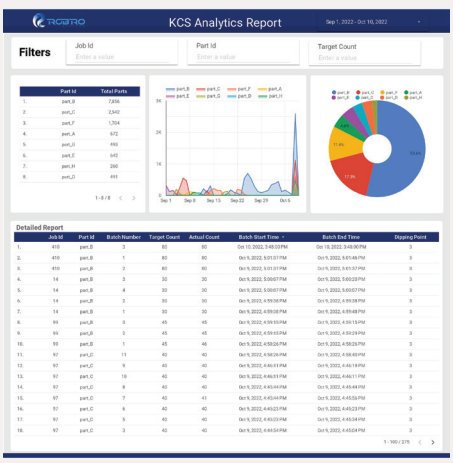
The KCS Software suite can accurately recognize parts in each image and track them throughout multiple images, resulting in maximum accuracy.



99.98% accuracy with 0.02% probability of over packing

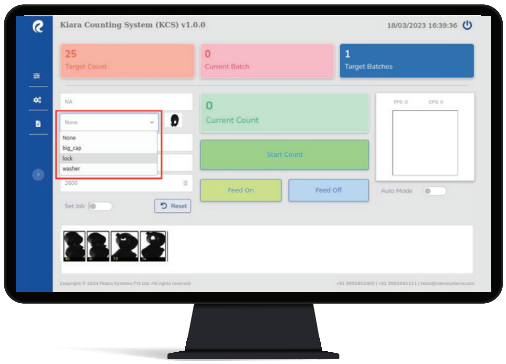
Digital Reports

The system holds digital, time-stamped data for the number of parts counted and batches created. This data can integrate with existing ERPs and can also be used as a knowledge base.



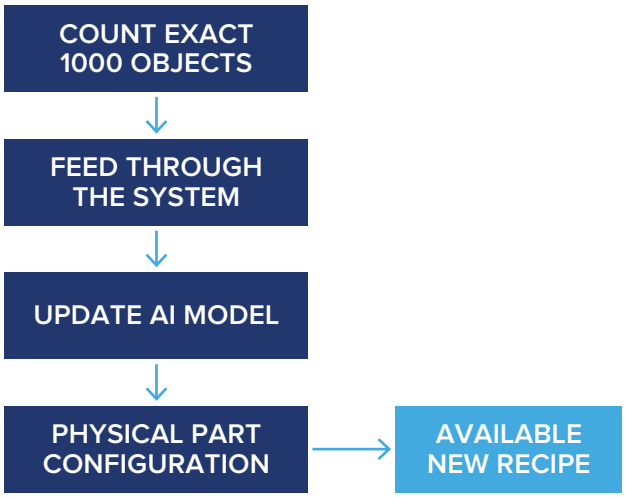
Quick Configuration

KCS quickly adapts itself to a large variety of parts. Just show the KCS some examples of your object and the system will quickly learn to count it.



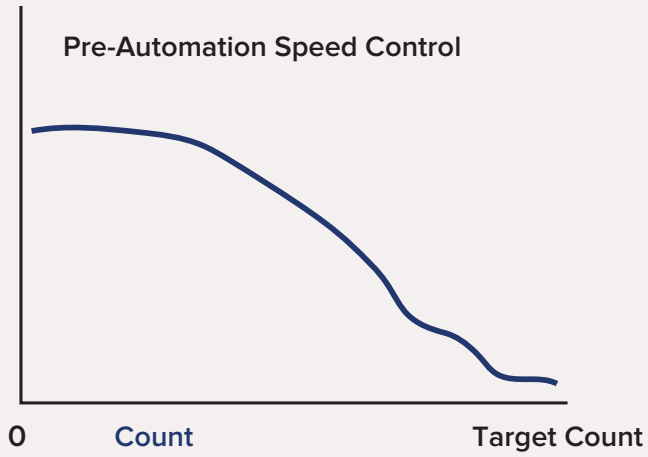
Example Training Flow

Each configured part is available on the Operator Screen as a "Recipe" to select from.



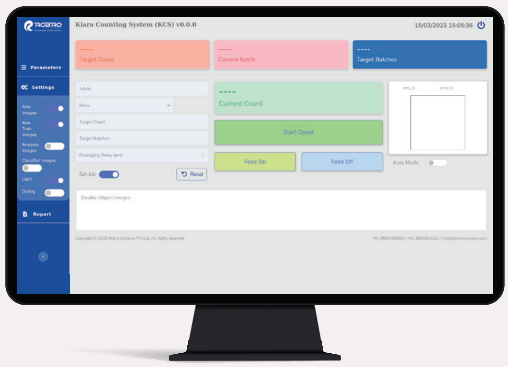
Advanced Speed Control

KCS can control speeds of equipment such as conveyor belts and linear vibratory feeders and adjust the speedfor creating batches. The Sweet spot between high-speed and high-accuracy is delivered.

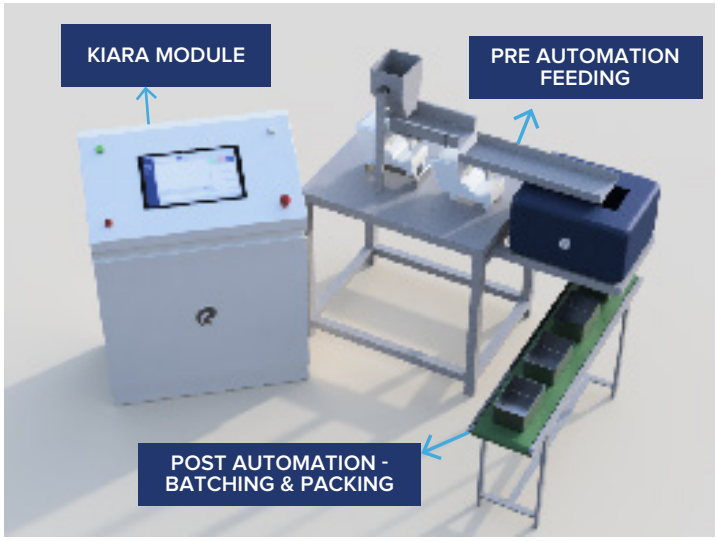


Intuitive Operator Interface

KCS provides an interface that is both operator friendly and touch enabled.



Pre-Automation and Post-Automation



Pre Counting Automation:

Prevents objects from interlocking and overlapping.

- Bowl Feeders
- Linear Feeders

Post Counting Automation:

Creates batches and packets and helps automate the packing process.

- FFS Machine
- Conveyor Belt
- Printers

Additional System Features and Benefits

Accurately count many items at once, speeding up the counting process. Also known as bulk counting.

Suitable for use with a wide range of complex and irregular parts, such as hardware, brass, fasteners, metal injection molding, plastics, and the like.

Integration with industrial control equipment, such as feeder controllers, motor drivers, and packing machines.

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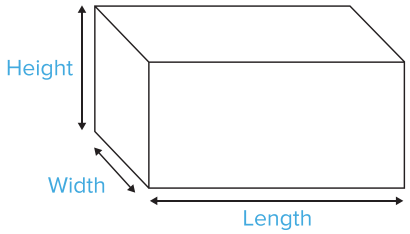
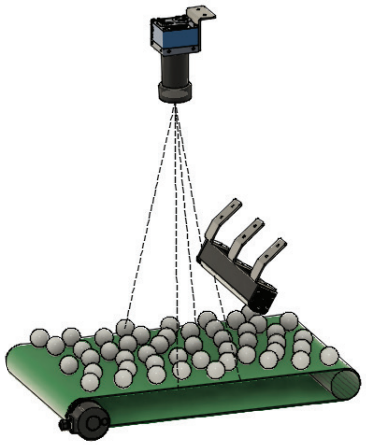
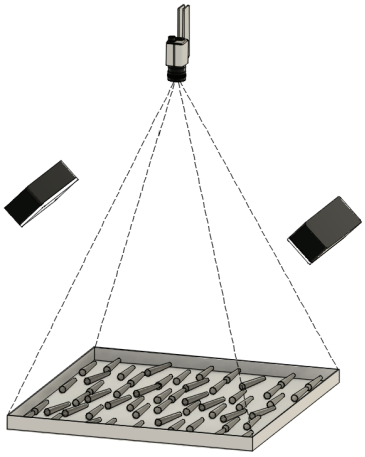
Technical Specifications

KCS Model Number	R-KCS-G98-100 Free-Falling Counting	R-KCS-G98-200 Free-Falling Counting	R-KCS-G98-300 Free-Falling Counting
Part Size	~ (5mm to 30 mm)	~ (5mm to 60 mm)	~ (25mm to 90 mm)
Aspect Ratio (W/L) & (H/W) & (L/H)	All three dimension ratio should be in between 0.7 to 1.3 		
View Area (width x height)	200 mm x 100 mm	200 mm x 200 mm	800 mm x 300 mm
Speed	**Speed of the system depends upon the feeding mechanism and is subject to fluctuation based on the shape and dimensions of the components** Count ~ 1000 parts/min of 10 mm size		
Controller	Kiara AI engine (IPC) Intel® Core™ i5 - 3300 CPU @ 3.00 GHz x4 NVIDIA Corporation TU116 [GeForce GTX 1600 SUPER] OS- Ubuntu 20.04.1 LTS 64 bit		
Batching	Operator Assisted batching is possible. Can combine a single-part feeder to be turned on after 95% batch completed.		
UPS	1600VA		
Camera & Lens	Camera - 1.3 Megapixel, 8mm lens		
Interface Options	RS232/RS485/USB/WiFi		
Electrical Panel	PLC, SMPS, Feeder Controller		
PLC Model	Delta - DVP14SS2 MPU points: 14 (8DI + 6DO) COM Ports: RS485, RS232		
Pre Automation/ Feeding Module	2 channel (0 to 10V) Analog signal is available for vibratory feeder integration Recommended Feeders:		
Post Automation	Single 24V Digital output and input is available for packing machine, Conveyor stopping, or any other post automation integration **a.** 95% of Target Count Reached. **b.** 100% of Target Count Reached **c.** Delay options for above 2		
Environmental Conditions	45°C 90% RH 336 hrs, Oil and dust free environment		
Power Requirements	230V AC, 5A		
Part Constraints	**Unbreakable and Non Scratching, no foreign particles, Solid parts, non-sticky, non-overlapping, non-interlocking, non-elongated**		

Customized Models





KCS-CT	
Camera & Controller	1.3MP Global Shutter. Kiara Lite Controller. NVIDIA Maxwell based.
Synchronization	Encoder with Wheel
Feeding Control	2 channel (0 to 10V) Analog signal is available for vibratory feeder or conveyor speed integration
View Area	300x300 mm (can be customized)
Loading	Loading & Separation be ensured by feeding system or done manually
Unloading	24V Signal available at **1)** 95% of Target Count Reached. **2)** 100% of Target Count Reached Can integrate conveyor stopping, packing machine, or any other post automation. Time Delay Options available.
View Areas & Part sizes	**Example:** View Area: 200 x 200 mm Min and Max PartSize: 1.5 mm, 50 mm
Trigger & Action	Button on Screen or push-button. Accept count or re-count.
Batching	Operator Assisted batching is possible. Can combine a single-part feeder to be turned on after 95% batch completed.
Overpacking	Overpacking refers to extra parts being packed which the system identifies. Corrective action can be taken to reject.
Part Teaching	Required for every new family of parts

KCS-TT	
Camera & Controller	1.3MP Global Shutter. Kiara Lite Controller. NVIDIA Maxwell based.
View Areas & Part sizes (Can be customized)	**Example:** View Area: 200 x 200 mm MinPartSize: 1.5 mm MaxPartSize: 50 mm
Loading, Unloading & Separation	Manual
Trigger	Button on Screen or push-button
Action	Accept count or Recount
Time	Single Trigger Cycle: < 50 msec
Batching	Can combine multiple triggers until specified count is reached.
Part Teaching	Required for every new family of parts

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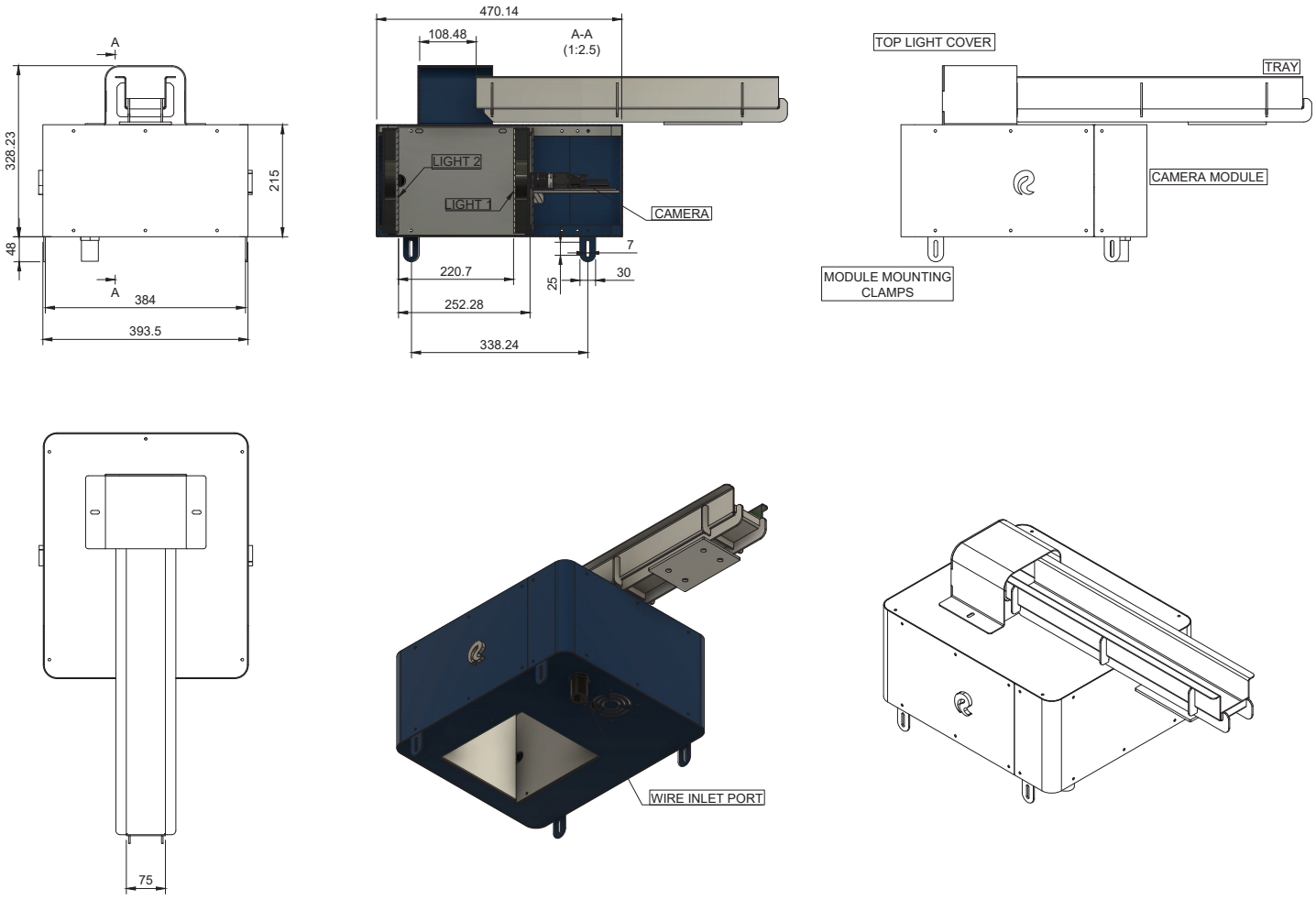
Dimensions



Note: Tray isn't part of the module. It is for representation purpose for the feeding module.

Important Note for System Integrators & End Users

The Kiara Counting System (KCS) is not a magic wand.

It operates within given constraints for counting many types of parts. Complex AI models and tracking logics ensure accuracy, but material movement depends heavily on part shape and material. Expectations should be managed and joint knowledge sharing is necessary. Robro Systems has a dedicated R&D team and a roadmap for new features and covering more variety of parts. We welcome discussions and suggestions on system improvements.

Thank you for your kind understanding and cooperation.