

## Terms of Reference

### **[Maintenance services for Equipment at Khmer Cold Chain Facility- LM17- NATIONAL ROAD NO.1]**

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Submission Date:	[21 June 2024]
Proposal Submission:	Khmer Cold Chain Company
Main Contact :	<a href="mailto:pascal.gizard@khmercold.com">pascal.gizard@khmercold.com</a> <a href="mailto:monypech.pak@khmercold.com">monypech.pak@khmercold.com</a>
Site Visit Arrangement:	Prior arrangements for site visits must be made in advance via the contact provided before the visit occurs.
Schedule for Site Visit:	Monday to Friday (From 3 <sup>rd</sup> to 7 <sup>th</sup> of June 2024)
Contact for Site Visit:	<a href="mailto:sometta.nann@khmercold.com">sometta.nann@khmercold.com</a> (+855 69 650 806)
Contact for Technical Info:	<a href="mailto:pascal.gizard@khmercold.com">pascal.gizard@khmercold.com</a> <a href="mailto:monypech.pak@khmercold.com">monypech.pak@khmercold.com</a>
Eligibility for submission:	Service providers are invited to submit proposals for one or more, or all, maintenance services as per their operational capacities and resource capabilities.

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## 1. COMPANY BACKGROUND

Khmer Cold Chain Co., Ltd (KCC) is a third-party logistics (3PL) provider of temperature-controlled logistics (TCL) services, delivering international quality services to regional farmers, agribusinesses, food processors, pharmaceutical companies, food retailers and hotels, restaurants, caterers (HORECA), and the institutional sector at competitive prices. KCC is currently building a refrigerated cross-docking facility near the port of LM-17 on the Mekong River near Phnom Penh, Cambodia and expansion distribution facility in downtown Phnom Penh. The company is embarking on a growth journey and the commercial operations will commence in 2023.

KCC is 100% owned by Infraco Asia Development ([www.infracoasia.com](http://www.infracoasia.com)) (IAD), through its wholly owned Infraco Cold Chain Company (ICCC) Pte Ltd, a Singapore registered subsidiary. IAD is one of the companies of the Private Infrastructure Development Group ([www.pidg.org](http://www.pidg.org)) ("PIDG"), a coalition of donors mobilizing private sector investment to assist developing countries attain infrastructure vital to boosting their economic growth and combating poverty.

## 2. PROJECT OBJECTIVE

The project is proposed to engage in outsourcing the maintenance services for the equipment situated at the premises of Khmer Cold Chain (KCC) consisting but not limited to the following:

1. Maintenance services on Cooling System;
2. Maintenance services on Electric Forklift;
3. Maintenance services on Electric Stacker;
4. Maintenance services on Generator;
5. Maintenance services on Dock-Leveler;
6. Maintenance services on Overhead Door;
7. Maintenance services on Fire Pumps;
8. Maintenance services on Air Conditioners;
9. Maintenance services on CCTV Cameras; and
10. Cleaning services on the solar rooftop installation.

**Type of Contractor/Service Provider:** The service provider should be a company or a consortium. The service provider shall designate the contact person (s) in charge of the assignment.

**Responsibility of the prospective contractor/service provider:** The contractor is required to consistently employ the most economically efficient and widely recognized standards and methodologies to execute maintenance services as outlined in the scope of services. Additionally, the contractor is obligated to provide comprehensive updates to KCC on a monthly basis, ensuring full transparency and timely communication regarding maintenance activities and their progress.

Refer to Appendix L for the specific quantities of equipment needed for the maintenance service.

## 3. SCOPE OF SERVICES

The general scope of work to be provided by the Contractor/Service Provider should entail:

### **3.1. Maintenance services on Cooling System:**

Model: S-150 | Type: All-in-one fan motor (Indoor Unit) and PA-300 (Outdoor Unit). (Refer to Appendix A).

Regular maintenance service for the cooling system will be conducted to proactively examine, replace, and clean both **the outdoor and indoor units**.

### **3.2. Maintenance services on Electric Forklift:**

Model: FB30E, capacity 3000 Kg, lift height 3M duplex mast can work under -15 ~18 C degree freezer, attached smart charger, 72V 202Ah lithium battery Pneumatic tires, 1220mm fork length. (Refer to Appendix B).

### **3.3. Maintenance Services for Electric Stacker**

Model: Everlift | ELEP-30D (Li). (Refer to Appendix C).

### **3.4. Maintenance services on Generator and the Automatic Transfer Switch system**

Model: New Silent Diesel Generator 770KVA (refer to Appendix D).

### **3.5. Maintenance services on Dock-Leveler**

Capacity: 6000kg Dynamic Load, W-1830mm, L-2300mm and 510mm long hinged. (Refer to Appendix E).

### **3.6. Maintenance Services on Overhead Door**

Model: Overhead Door Panel 2490\*530 and Overhead Door Panel 2490\*610. (Refer to Appendix F).

### **3.7. Maintenance Services on Fire Pumps**

Model: Varem 20 Litre Plusvarem CE High Pressure Expansion Vessel 1" S5020361 (Refer to Appendix G).

Planned maintenance shall be undertaken on the Fire pumps to methodically inspect, test, and replace all elements pertaining to the Fire pumps as a proactive measure. Furthermore, additional maintenance services shall be available on standby for provision as needed.

### **3.8. Maintenance Services on Air Conditioners**

Model: Panasonic Wall Mounted 1.5HP, Panasonic Wall Mounted 2.5HP, Panasonic 4-way cassette 3.0HP (IDU), Panasonic 4-way cassette 3.0HP (ODU) and Panasonic 4-way cassette front panel. (Refer to Appendix I).

### **3.9. Maintenance Services on CCTV Cameras**

Model: Lite Series | DH-IPC-HFW2431T-ZS-S2 and Wiz Sense | DH-SD5A432XA-HNR (Refer to Appendix J).

Planned maintenance will be carried out on the CCTV system to methodically inspect, replace, and clean all associated components as a proactive measure. Furthermore, additional maintenance services shall be available for deployment as needed.

### **3.10. Cleaning services on the solar rooftop installation**

Model: On-grid (Grid-tied), Solar Panel Array: 289.3 kWp (526 panels x 550Wp each) (Main Building: 245.4kWp - 446 panels, Parking Roof: 44kWp - 80 panels) and Inverters: 250kW (2 x 125kW each) (Refer to Appendix J).

Plan the regular cleaning of the solar panels installed on the rooftop and on the parking shelter. The total installed PV power is 290kW. (Refer to Appendix K).

## **4. PROPOSAL SUBMISSION**

### **4.1. Proposal Information**

The proposal to undertake the work as described above shall include the following information:

#### **4.1.1. Work Plan and Methodology**

The service providers shall ensure that there are a proper work plan and methodology in place for the purpose of:

- Ensuring systematic and efficient execution of maintenance tasks;
- Optimizing resource utilization and cost-effectiveness;
- Minimizing disruptions to operations and maximize equipment uptime;
- Enhancing safety protocols and adhere to regulatory standards;
- Promoting sustainability practices by implementing environmentally friendly maintenance techniques, reducing energy consumption, and minimizing waste generation
- Facilitating knowledge transfer and skill development among maintenance personnel through training programs, standard operating procedures, and best practice sharing initiatives; and
- Maintain comprehensive reporting system and documentation for accountability and future reference.

#### **4.1.2. Language of Proposal**

All proposal documents shall be prepared and submitted in English.

#### **4.1.3. Qualifications**

The service providers shall ensure that maintenance tasks are exclusively handled by service engineers who possess the necessary training and qualifications. It is expected that the service providers will collaborate closely with the staff of Khmer Cold Chain Company Limited and facilitate knowledge and skills transfer as needed.

#### 4.1.4. Timeframe

The service providers shall arrange an appropriate timeframe to carry out the maintenance service which includes:

- Defining a clear and realistic timeline for the implementation of the maintenance services to ensure alignment with project objectives and scope;
- Providing a precise timeline for each maintenance schedules, specifying the start and end dates, as well as key activities to be carried out for each maintenance schedule;
- Identifying periods in which necessary equipment and materials are required to carry out the maintenance services;
- Specifying a defined timeframe during which the maintenance activities undergo review, approval, and handover; and
- Establishing a structured plan and timeline for reporting progress and communicating with KCC on the status and updates of the maintenance services.

#### 4.1.5. Delivery Schedule

Service provider shall prepare and submit **with the proposal** a complete delivery schedule suitable to provide final report and all deliverables within 1 month of release.

Proposal Schedule shall include, at a minimum:

- Workplan and timeline submittal, and final delivery schedule;
- Draft and final submittal of all deliverables;
- Customer insight Survey question submittal;
- Preliminary Vendor mapping name and location list; and
- Draft of services for Price list for daily, monthly, semi-annually, annually and other standby maintenance services if necessary.

Schedule shall include time for KCC review and approval cycle (5 working days).

#### 4.1.6. Price

KCC intends to award all tasks based on the proposal submitted. Firm-fixed-price contract price to accomplish the deliverables of the assignments. The price proposal shall clearly state the lump sum price for each deliverable inclusive of all out-of-pocket expenses (OPE). Proposal shall clearly state what is excluded, and identify any additional applicable costs, taxes, out of pocket expenses, or fees that are specifically excluded from the price proposal.

In case, there is a necessary replacement part of equipment, the quote of price and other fee is required in advance subjected to be approved by KCC.

#### 4.1.7. Fees and Payment Schedule

The contract payments will be linked to the proposed deliverables. Milestone based payment shall be based upon acceptance and approval of each deliverable, as outlined below. Service providers should provide a proposed value for each deliverable, payment schedule and payment percentage of the total value.



## 4.2. Instructions and Evaluation Criteria

Award will be made to the bidder representing the best value in consideration of past performance, technical and price factors. Technical criteria are more important than cost, although prices must be reasonable and will be considered in the evaluation.

KCC reserves the right to conduct discussions with selected service provider(s) to identify the best value offer. Award of any resulting Contract Agreement shall be made by KCC on a best value basis. KCC reserves the right to inform a bidder about requiring a bid to be withdrawn from evaluation if there is a perceived conflict of interest with the bidder and the implementation country and/or unsatisfied results from reference check and/or integrity due diligence in areas such as anti-money laundering, counter terrorism financing and anti-bribery and corruption, including undertaking anti-bribery and corruption measures in relation to proposed suppliers and associated persons as set out in the InfraCo's Anti- Corruption Compliance Policy (available at [www.infracoasia.com](http://www.infracoasia.com)).

## 4.3. Confidentiality

All prices quoted are confidential. No prices – accepted or rejected – will be shared with other prospective bidders, before, during, or after the process.

Information acquired by KCC, such as the list of RFP participants, and upon award of bid if applicable, participant contact information, must remain confidential and in no way shared with competitors or counterparts of RFP and/or bidder before, during, or after the process. This request for proposal is not an offer to do business but simply a request for information. The Company will preserve the confidentiality of any business proprietary or confidential information submitted by the Contractor, which is clearly designated as such by the Contractor, to the extent permitted by the laws of the Host Country.

## 5. APPENDICES

### 5.1. Appendix A: Cooling System

- Model: S-150 | Type: All-in-one fan motor (Indoor Unit)

**Fig B. S075, S100, S120, S150, S200**

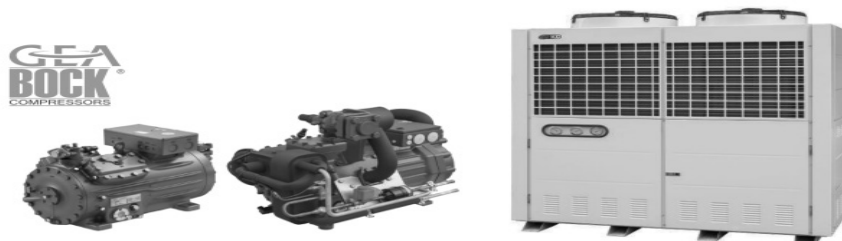
Model	Fan Number	Outline dimension			Anchor size	
		L	W	H	L*	W*
S075	2	1340	386	606	1035	455
S100	2	1640	386	606	1335	455
S120	2	1640	386	669	1335	455
<b>S150</b>	<b>3</b>	<b>2140</b>	<b>386</b>	<b>669</b>	<b>1835</b>	<b>455</b>
S200	3	2140	386	669	1835	455



Nominal capacity R404A

	Fin DT1=10K DT1=8K DT1=7K				Air	Air	Tube		Fan data		Connection			Defrost heater		Weight	
Model	spacing t=0°C t=8°C t=25°C Surface				volume	throw	Sound	volume	Dia	Power input	Inlet	Outlet	Drain	Coil	Drain	Fan	
	mm	W	W	W	m²	m³/h	m	dB(A)5m	dm²	Ø x St	W	Voltage	mm	mm	A	kW x No	kg
S150L	8.5	23269	17652	13157	45.1	10908	21	49	14.0	400 x 3	600	220V 1Ph 50Hz	22.2	41.3	25	1.98kW x 5	1.63kW x 1 0.64kW x 1 82


- Model: PA-300 (Outdoor Unit)




**MODEL NOMENCLATURE**

PA	0 3 0	S	L	G
Model	Equiv. HP	Comp.	Temp.	Comp Maker
PA	0 3 0 = 3 HP	S = Semi-hermetic	M = Medium Temp.	G = GEA BOCK
	0 5 0 = 5 HP		L = Low Temp.	
	0 7 5 = 7.5 HP		F = Freezing Temp.	
	1 0 0 = 10 HP			
	1 5 0 = 15 HP			
	2 0 0 = 20 HP			
	2 5 0 = 25 HP			
	3 0 0 = 30 HP			
	4 0 0 = 40 HP			

## 5.2. Appendix B: Electric Forklift

PIC	MODEL	DESCRIPTION OF GOODS
	<b>FB30E</b>	model FB30E , capacity 3000 Kg ,lift height 3M duplex mast can work under -15 ~18 C degree freezer attached smart charger , <b>72V 202Ah lithium battery</b> Pneumatic tires , 1220mm forklength .

## 5.3. Appendix C: Electric Stacker

	<b>ELEP-30D (Li )</b>	<p>Rider Electric Pallet Truck with Platform/arms ELEP-30D (Li )</p> <p>--15 ~18 C degree freezer work</p> <ul style="list-style-type: none"> <li>- Capacity: 2000kg, AC motor, heavy-duty designed, with standing platform and protection arms, more safe and more efficient</li> <li>- <b>24V/150Ah lithium battery,</b></li> <li>- outside charger, charging time around 8-10hours</li> <li>- Import pump and braking sytem, much stable quality and easy for maintainance</li> <li>- Curtis AC 1230 controller with error code , easy to find problem</li> <li>- Emergency stop/hour meter/Battery level indicator</li> <li>- OEM for European and USA customers, good reputation all over the world</li> </ul>
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## 5.4. Appendix D: Generator

<b>Supply generator as Outline Below:</b>		
<b><u>New Generator 770KVA</u></b>		
Stand By Generator 500kVA, Slient Type: - Prime Power: 560KW/ 700KVA - Standby Power : 616KW/ 770KVA - Engine: Lister Petter LP625EG4 - Alternator : Leroy Somer TAL -A49-B - Controller : DEESEA DSED6120 - Frenquency : 50Hz/ 1500rpm - Phase : 3 Phase, Voltage : 380/220V, Current : 1063.6A - Dimension : L 5200 x W 1900 x H 2250 - Weight : 6300 Kg - Sound : 75dBA @ 7m		Tide Power

## 5.5. Appendix E: Dock Leveler

Capacity	6000kg Dynamic LOAD.
Platform Width	W-1830 MM
Platform Length	L2300 MM
Lip Length	510MM long hinged, cranked or flat with chamfered edge
Platform Material	Carbon Steel SS400 with Checker Plate steel
Main Ram	Hydraulic Double acting with burst valve to prevent platform descending under load, if vehicle inadvertently pulls away, or in the event of hose failure
Lip Ram	Hydraulic double acting
Power Pack	3 Phase 0.75kw 4 Poles 220V/380V, IP 44, 1390 RPM
Control Panel	Size 600MM×400MM×120MM 380 V 50Hz PLC
Maintenance Prop	Included
Fixing Application	All dock levelers can be manufactured to suit pit mounted, suspended or cast in applications.
Toe Guards	Galvanized , Telescopic



## 5.6. Appendix F: Overhead Door

**\* OVERHEAD DOOR (DNS VINA)**

- 1.Panel : 0.5mm thick galvanized steel & painted on both sides.
- 2.Panel type:THK 50mm
- 3.Panel finishing : Exterior surface cover by 2 paint coating layers , finishing coating by Primer and Polyester. (Color: White and Silver)
- 4.Track : 2" Hi Lift Track.
- 5.Door Selling : EPDM Rubber ( Top, Bottom, Left, Right)
- 6.Counter Balance system : Torsion Spring
- 7.Operating Principle: Manual operation, by rope.  
(Emergency or power failure: Manual operation by rope).



**5.7. Appendix G: Fire Pumps**



**5.8. Appendix I: Air Conditioners**

**WALL-MOUNTED STANDARD INVERTER R32 Single-Split Type**



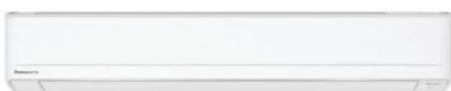
**CS-QU9XKH | CS-QU12XKH | CS-QU18XKH**



**Wireless (Standard)**



**Wired CZ-RD514C (Optional)**



**CS-QU24XKH**



**Wireless (Standard)**



**Wired CZ-RD514C (Optional)**

**BIG FLAP | AEROWINGS | POWERFUL | INVERTER | ECO+AI**  
(CS-QU9/12/18/24KH) (CS-QU24XKH)

MODEL	INDOOR UNIT OUTDOOR UNIT	ISOH2	CS-QU9XKH CU-QU9XKH	CS-QU12XKH CU-QU12XKH	CS-QU18XKH CU-QU18XKH	CS-QU24XKH CU-QU24XKH
Cooling Capacity	(min-max)	kW	2.65 [9.84-2.90]	3.51 [11.02-4.00]	5.00 [13.70-18.40]	6.25 [17.7-21.8]
	(min-max)	Btu/h	9,040 [2,863-9,890]	12,000 [3,480-13,600]	17,100 [5,000-53,500]	21,300 [6,220-64,500]
EER	(min-max)	W/W	3.40 [3.73-3.22]	3.41 [3.71-3.25]	3.23 [3.79-3.00]	3.72 [4.48-3.50]
	(min-max)	Btu/hW	11.59 [12.71-10.99]	11.65 [12.65-11.04]	11.03 [12.93-10.22]	12.68 [15.28-11.95]
Electrical Data	Voltage	V	220-240	220-240	220-240	220-240
	Current	A	3.9-3.6	5.0-4.6	7.5-6.9	7.8-7.2
	Power Input (min-max)	W	780 [225-900]	1,030 [275-1,230]	1,550 [290-1,800]	1,680 [250-2,050]
Moisture Removal	L/h		1.6	2.0	2.8	3.5
	Pt/h		3.4	4.2	5.9	7.4
Air Circulation	Indoor	m <sup>3</sup> /min (ft <sup>3</sup> /min)	10.3 [365]	10.8 [380]	12.6 [445]	19.2 [680]
	Outdoor	m <sup>3</sup> /min (ft <sup>3</sup> /min)	26.7 [940]-28.3 [1,000]	30.2 [1,065]-30.8 [1,085]	39.3 [1,390]-39.3 [1,390]	34.9 [1,230]-39.3 [1,390]
Noise Level	Indoor (H / L / Q-Le)	dB (A)	36/26/21	38/28/21	44/34/28	45/34/29
	Outdoor (H)	dB (A)	47-48	48-49	51-51	51-51
Dimensions	Height	mm	290 [511]	290 [542]	290 [619]	295 [619]
	Width	mm	11-7/16 [20-1/8]	11-7/16 [21-1/32]	11-7/16 [24-3/8]	11-5/8 [24-3/8]
	Depth	mm	779 [650]	779 [780]	779 [824]	1,040 [824]
	Indoor (HxWxD)	mm	30-11/16 [25-19/32]	30-11/16 [30-23/32]	30-11/16 [32-15/32]	40-31/32 [32-15/32]
	Outdoor (HxWxD)	mm	209 [230]	209 [289]	209 [299]	244 [299]
Net Weight	Indoor	kg (lb)	8 [18]	8 [18]	9 [20]	12 [26]
	Outdoor	kg (lb)	17 [37]	22 [49]	28 [62]	31 [68]
Refrigerant Pipe Diameter	Liquid Side	mm	ø 6.35	ø 6.35	ø 6.35	ø 6.35
	Gas Side	mm	1/4	1/4	1/4	1/4
	Chargeless Pipe Length	m	7.5	7.5	10.0	10.0
Pipe Extension	Maximum Pipe Length	m	20	20	30	30
	Maximum Elevation Length	m	15	15	20	20
	Additional Refrigerant Gas*	g/m	10	10	15	15
Power Supply			Indoor	Indoor	Indoor	Indoor

## 4-WAY CASSETTE

- Industry-leading Powerful, 360° Wide & Comfortable Airflow.
- The drain pump can pump water up to a height of 850 mm, making drain pipe layout easy.



(Accessory)



CZ-RTC6BLW (BLE&WLAN)



R32 REFRIGERANT

Capacity [Btu/h(Phase)]	17,100	20,500	24,200	29,000	34,100	42,700	42,700 [3]	47,800	47,800 [3]
Power Source	V/Phase Hz		220-240V, 10 Phase - 50Hz				380-415V, 30 Phase - 50Hz	220-240V, 10 Phase - 50Hz	380-415V, 30 Phase - 50Hz
Indoor	S-1821PU3H	S-1821PU3H	S-2430PU3H	S-2430PU3H	S-3448PU3H	S-3448PU3H	S-3448PU3H	S-3448PU3H	S-3448PU3H
Outdoor	U-18PR1H5	U-21PR1H5	U-24PR1H5	U-30PR1H5	U-34PR1H5	U-43PR1H5	U-43PR1H5	U-48PR1H5	U-48PR1H5
Panel	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H	CZ-KPU3H
Cooling Capacity: Rated (Min-Max)	kW	5.00 [2.00-5.60]	6.00 [2.00-6.30]	7.10 [2.10-8.00]	9.50 [2.10-10.00]	10.00 [3.20-11.20]	12.50 [3.80-14.00]	12.50 [3.80-14.00]	14.00 [3.80-14.71]
	Btu/h	17,100 [5,820-19,100]	20,500 [6,820-21,500]	24,200 [7,170-27,300]	32,000 [7,170-34,100]	34,100 [10,900-38,200]	42,700 [13,000-47,800]	42,700 [13,000-47,800]	47,800 [13,000-50,200]
Current: Rated (Min-Max)	A	5.2-5.5	7.5-8.0	8.5-9.2	10.7-11.7	13.7-15.0	16.9-18.5	5.6-6.1	21.9-23.9
Power Input: Rated (Min-Max)	kW	1.14 [0.38-1.50]	1.71 [0.38-2.10]	1.99 [0.30-2.26]	3.52 [0.28-3.33]	3.23 [0.61-3.73]	3.74 [0.63-4.25]	3.74 [0.63-4.25]	4.83 [0.63-5.10]
CSPF		6.27	5.89	6.08	9.7	5.89	5.80	5.23	5.23
COP/EER	W/W	4.39	3.51	3.57	3.7	3.10	3.34	3.34	2.90
	Btu/hW	15.00	11.99	12.16	11.51	10.56	11.42	11.42	9.90
Indoor Unit									
Air Volume	m <sup>3</sup> /min	25.0	25.0	25.0	35.0	36.4	36.4	36.4	36.4
	cfm	88.2	88.2	88.2	125	128.5	128.5	128.5	128.5
Sound Pressure Level (Hi/Lo)	dB (A)	42 / 35	42 / 35	42 / 35	42 / 35	47 / 41	47 / 41	47 / 41	47 / 41
Sound Power Level (Hi/Lo)	dB	57 / 50	57 / 50	57 / 50	57 / 50	62 / 56	62 / 56	62 / 56	62 / 56
Dimension	Indoor (HxWxD)	mm	256 x 840 x 840	256 x 840 x 840	256 x 840 x 840	319 x 840 x 840	319 x 840 x 840	319 x 840 x 840	319 x 840 x 840
	Panel (HxWxD)	mm	44 x 950 x 950	44 x 950 x 950	44 x 950 x 950	44 x 950 x 950	44 x 950 x 950	44 x 950 x 950	44 x 950 x 950
Net Weight	Indoor	kg	21	21	21	24	24	24	24
	Panel	kg	5	5	5	5	5	5	5
Outdoor									
Sound Pressure Level	dB (A)	49	50	51	53	55	57	57	58
Sound Power Level	dB	68	69	70	72	74	76	77	77
Dimension	Outdoor (HxWxD)	mm	619 x 824 x 299	619 x 824 x 299	695 x 875 x 320	695 x 875 x 320	996 x 980 x 370	996 x 980 x 370	996 x 980 x 370
Net Weight		kg	29	29	33	39	48	68	67
Piping Connection	Gas Pipe	mm (inch)	12.70 (1/2)	12.70 (1/2)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)	15.88 (5/8)
	Liquid Pipe	mm (inch)	6.35 (1/4)	6.35 (1/4)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
Pipe Length	Min-Max	m	5-30	5-30	5-30	5-50	5-50	5-50	5-50
Elevation Difference		m	20	20	20	30	30	30	30
Maximum Chargeless Length	Max	m	15	15	15	25	25	25	25
Additional Gas	g/m	10	10	10	10	30	30	30	30
Operation Range, Outdoor	Min-Max	°C	16-46	16-46	16-46	16-46	16-46	16-46	16-46

\* Specifications are subject to change without notice. Please refer to technical documents for more details.  
\* The sound pressure level is measured in accordance with JIS C 9612 and JIS B 8616.

## 5.9. Appendix J: CCTV Cameras

### - Lite Series | DH-IPC-HFW2431T-ZS-S2

#### DH-IPC-HFW2431T-ZS-S2

4MP Lite IR Vari-focal Bullet Network Camera

**APPROVED**

By Rommel C. Viado at 10:09 am, Jan 25, 2023



- 4MP, 1/3" CMOS image sensor, low illuminance, high image definition
- Outputs 4MP (2560 x 1440)@25/30 fps, max. supports 4MP (2688 x 1520)@20 fps
- H.265 codec, high compression rate, ultra-low bit rate
- Built-in IR LED, max IR distance: 60 m
- ROI, SMART H.264+/H.265+, flexible coding, applicable to various bandwidth and storage environments
- Rotation mode, WDR, 3D NR, HLC, BLC, digital watermarking, applicable to various monitoring scenes
- Intelligent detection: Intrusion, tripwire
- Abnormality detection: Motion detection, video tampering, no SD card, SD card full, SD card error, network disconnected, IP conflict, illegal access, voltage detection
- Supports max. 256 GB Micro SD card
- 12V DC/PoE power supply
- IP67 protection, IK10 protection (optional)





- Wiz Sense | DH-SD5A432XA-HNR

## DH-SD5A432XA-HNR

4MP 32x Starlight IR WizSense Network PTZ Camera

**APPROVED**

By Rommel C. Viado at 10:09 am, Jan 25, 2023



**WizSense**

- 1/2.8" 4Megapixel STARVIS™ CMOS
- Powerful 32x optical zoom
- Max. 25/30fps@4M
- IR distance up to 150 m
- Deep-learning-based auto tracking and perimeter protection
- SMD PLUS
- PoE+
- IP67, IK10
- Face Detection



### 5.10. Appendix K: Solar Rooftop Installation



### 5.11. Appendix L: Quantities of Equipment

Type of Equipment	Quantity (units)	Model
Cooling System	18	S-150  Type (Indoor unit) and PA-300 (Outdoor unit)
Electric Forklift	2	FB30E, capacity 3000 Kg, lift height 3M duplex mast can work under -15 ~18 C degree freezer, attached smart charger, 72V 202Ah lithium battery Pneumatic tires, 1220mm fork length
Electric Stacker	2	Everlift   ELEP-30D (Li).
Generator	1	New Silent Diesel Generator 770KVA
Dock-Leveler	6	6000kg Dynamic Load, W-1830mm, L-2300mm and 510mm long hinged
Overhead Door	10	Overhead Door Panel 2490*530 and Overhead Door Panel 2490*610
Fire Pumps	2	Varem 20 Litre Plusvarem CE High Pressure Expansion Vessel 1" S5020361
Floor Sweeper;	1	Hand push unpowered ZL-S22A
Air Conditioners	8	Panasonic Wall Mounted 1.5HP, Panasonic Wall Mounted 2.5HP, Panasonic 4-way cassette 3.0HP (IDU), Panasonic 4-way cassette 3.0HP (ODU) and Panasonic 4-way cassette front panel
CCTV Cameras	8	Lite Series   DH-IPC-HFW2431T-ZS-S2 and Wiz Sense   DH-SD5A432XA-HNR
Solar Rooftop	526 panels	Type: On-grid (Grid-tied), Solar Panel Array: 289.3 kWp (526 panels x 550Wp each) (Main Building: 245.4kWp - 446 panels, Parking Roof: 44kWp - 80 panels) and Inverters: 250kW (2x 125kW each)