

BEARING HEATER
<INVERTER DRIVEN INDUCTION HEATER>

INSTRUCTION MANUAL

IHE_N Series

Single Phase: IHE0110AN, IHE0120GN

Three Phase: IHE0320GN, IHE0340GN,
IHE0620GN, IHE0640GN,
IHE1120GN, IHE1140GN



ETOH

Manufacturer: Etoh Inc.
2-2-7 Maeda YahataHigashi-ku
Kitakyushu City, Fukuoka, Japan
TEL:+81-93-681-5338 FAX:+81-93-671-3221

Manual No. TO-IHE-1-0203-E

IHE_N Series Instruction Manual Contents

1.	PREFACE	page 3
2.	GENERAL PRECAUTIONS.....	page 3
3.	SAFETY INFORMATION	page 3
4.	TRANSPORTATION PRECAUTIONS	page 4
5.	WARNING LABEL	page 4
6.	INTRODUCTION	page 5
	6.1 Features and Functions	page 5
	6.2 Full View and Part Description	page 7
7.	HANDLING THE PRODUCT	page 14
	7.1 Confirmations Upon Delivery	page 14
	7.1.1 Name Seal.....	page 15
	7.1.2 Model Number	page 16
	7.2 Usage and Installation	page 16
	7.2.1 Connecting the Power Supply for IHE0320GN, IHE0340GN IHE0620GN, and IHE0640GN	page 17
	7.2.2 Connecting the Power Supply for IHE1120GN, IHE1140GN	page 20
	7.3 Accessory Storage	page 25
	7.3.1 Accessory Storage for IHE0110AN and IHE0120GN	page 25
	7.3.2 Accessory Storage for IHE0320GN, IHE0340GN, IHE0620GN and IHE0640GN	page 26
	7.3.3 Accessory Storage for IHE1120GN, IHE1140GN	page 27
	7.4 The method of I-type core removal device.....	page 28
8.	HEATING PROCEDURES	page 30
	8.1 Control Panel Operation	page 30
	8.1.1 Prepare for heating	page 30
	8.1.2 Heating Procedures	page 30
	8.1.3 Flow Chart	page 31
	8.2 Sequence Operation (External terminal operation)	page 32
9.	MAINTENANCE AND SPARE PARTS	page 32
	9.1 Preventative Maintenance	page 32
	9.2 Spare Parts	page 32
	9.3 Cleaning Instruction	page 32
10.	TROUBLESHOOTING	page 33
11.	SPECIFICATIONS	page 35
	Standard and Optional Accessories.....	page 36
12.	LIMITED WARRANTY	page 37
	Appendix	page 38
	Appendix 1: Inner Diameter Expansion Temperatures.....	page 38
	Appendix 2: Safety Instruction	page 39
	Appendix 2.1: Warning Symbols	page 39
	Appendix 2.2: Warnings.....	page 39
	Appendix 2.3: Caution.....	page 40

1. PREFACE

Thank you for purchasing the Inverter Driven Bearing Heater (IHE_N series). This product is designed to heat metal ring, usually bearing, for the shrink-fitting process.

This manual is designed to provide correct and suitable application information.

Read this manual before attempting to install, operate, maintain or inspect this product. Keep this manual in a safe, convenient location for future reference. Understand all precautions and safety information before attempting use.

2. GENERAL PRECAUTIONS

- (A) Any illustration, photograph or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.
- (B) The products and specifications described in this manual can be changed without notice.
- (C) If this product is used in a manner not specified in this manual, the protection provided by the product may be compromised.
- (D) This product is designed to heat metal rings such as bearing, gear, and etc. only.
- (E) When ordering a new copy of the manual due to damage or loss, please provide the manual number shown on the front page.

3. SAFETY INFORMATION

- (A) Do not heat bearings above 120°C (248°F).
- (B) Wear heavy-duty/heat resistant gloves to prevent burns.
- (C) Keep magnetic materials such as watches, computers, hearing aids, etc. away from the product.
- (D) People with pacemakers shall not be in the vicinity of the product(s).
- (E) Do not touch the main core or I-type core during heating.
- (F) When heating, be sure to place the bearing and install the I-core.
Doing so may result in overcurrent or an increase in the temperature of the device itself.
- (G) Check supply voltage regularly.
- (H) To provide ongoing protection against electric shock, connect only to properly grounded outlets.
- (I) Read "Appendix 2: Safety Instruction" before using.
- (J) Do not attempt to modify or alter the product.
- (K) Follow the instruction manual at all times.
- (L) Turn off the main power when not in use.
- (M) Turn off the main power and unplug the product when a lightning strike may occur.
- (N) In initial state of heating, the inverter output frequency changed from high to low to find the optimal frequency most suitable for heating efficiency for the load.
(Refer "6.1 (A) Constant Apparent Power Control")
Temperature detection is still operated after set frequency. Depending on the condition the heating temperature may over the target while the frequency is adjusting.

4. TRANSPORTATION PRECAUTIONS

The product is packed to minimize the impact of shock, vibration, and humidity on the product. Please pay special attention to the following..

- Do not subject to excessive shock and vibration.
- Do not throw or drop when handling.
- Do not store upside down or standing upright.
- Do not wet the cardboard box.

5. WARNING LABEL

There is a warning label on the product. Always follow the warnings given on this label.

	<p>危険 WARNING AVERTISSEMENT</p>
<p>注意事項 Warning Avertissement:</p> <p>・据付・加熱の前には必ず、取扱説明書を読んで、その指示に従ってください。 May Cause injury or electrical shock. Please follow the instructions in the manual before installation or operation. Peut entrainer des blessures ou des chocs électriciques. Veuillez suivre les instructions du manuel avant l'installation ou l'utilisation.</p> <p>・感電のおそれがあります。確実に接地を行ってください。 Connect to properly grounded outlet only or use proper grounding techniques, to provide continued protection against electrical shock. Branchez uniquement sur une prise correctement mise à la terre ou utilisez les techniques de mise à la terre qui conviennent, afin d'offrir une protection continue contre les chocs électriques</p> <p>・機器と電源の電圧がぁっていることを確認してください。 Check voltages of the power supply and the product. Vrifiez les tensions de l'alimentation et du produit</p> <p>・ペースメーカーを使用している人は、通電中近づかないでください。 Persons with Heart Pacemaker shall not be in the vicinity of the product during heating. Les personnes porteuses d'un pacemaker ne doivent pas se tenir dans le voisinage du produit pendant le chauffage</p> <p>・時計・鉄片等の磁性体は近づけないでください。 Do not put watches or any magnetic materials or sheet of metal near the product. Ne posez ni montre ni matériau magnétique ou feuille métallique à proximité du produit</p>	

6. INTRODUCTION

In this product, when current is applied to the coil built in, an induction current flows to the bearing due to electromagnetic induction. This generates heat due to the bearing's electrical resistance, enabling uniform, quick and clean heating.

6.1 Features and Functions

This product has the advanced features and functions described below, in addition to conventional induction bearing heaters.

(A) Constant Apparent Power Control

Shorter heating time compared to the conventional induction-bearing heater is achieved by constant apparent power control. The built-in inverter supplies its maximum fixed apparent power to excitation coils with variable frequencies, regardless of I-type core and various load conditions (bearing dimensions, weight, electrical characteristics of material used in bearings).

As soon as heating is started, the frequency is adjusted and fixed.

(B) Simple Operation

This product is user-friendly with operational panel ensuring ease and simplicity of operation. Using the LED panel along with its simple-to-use digital controls, increases productivity.

(C) Two Operational Modes

This product has two operational modes: time and temperature. A simple one-touch operation changes the control modes.

In the temperature control mode, it can changeover Celsius or Fahrenheit.

After the temperature reaches the set temperature, it will shift to keep warm mode until the STOP button is pushed.

(D) Automatic Demagnetization and Higher Demagnetization Level

The demagnetization process is performed automatically by pressing the stop button after the set temperature is reached (temperature control mode) or when the timer count reaches zero (timer control mode). The bearing can be demagnetized manually if necessary. The demagnetization level is no more than 3Gauss (300 μ T) at any point on the bearing surface.

(E) I-type Core Removal Device (Built into Slide Type Bearing Installation Table) (Except IHE0110AN and IHE0120GN)

For medium and large types, I-type core removal device is equipped for easy installation of I-type core and bearing.

(F) Safe and Reliable

This product has the protect function by the circuit breaker and built-in inverter, it has also the protect function against coil over temperature and temperature sensor abnormality.

(G) Finishing Acoustic Signal

The built-in buzzer notifies when the heating is complete.

To avoid being considered as noise, the sound level is kept below 75dB.

In temperature control mode, the buzzer sounds when the set temperature is reached. In timer control mode, the buzzer sounds when the countdown ends.

(H) Heating Controllability

This product is designed to have Power Reduction Function by setting the reduction rate 100-50% by 10% steps.

(I) Sequence Operation

In addition to Control Panel Operation, Sequence Operation is also available.

IHE0110AN, IHE0120GN

⑤	Foldable Core Cover
⑥	I-type Core

②

③

④

⑥

ETOH

BEARING HEATER

297mm

470mm

573mm

166mm

347mm

175mm

①

⑤

Page 7 of 41

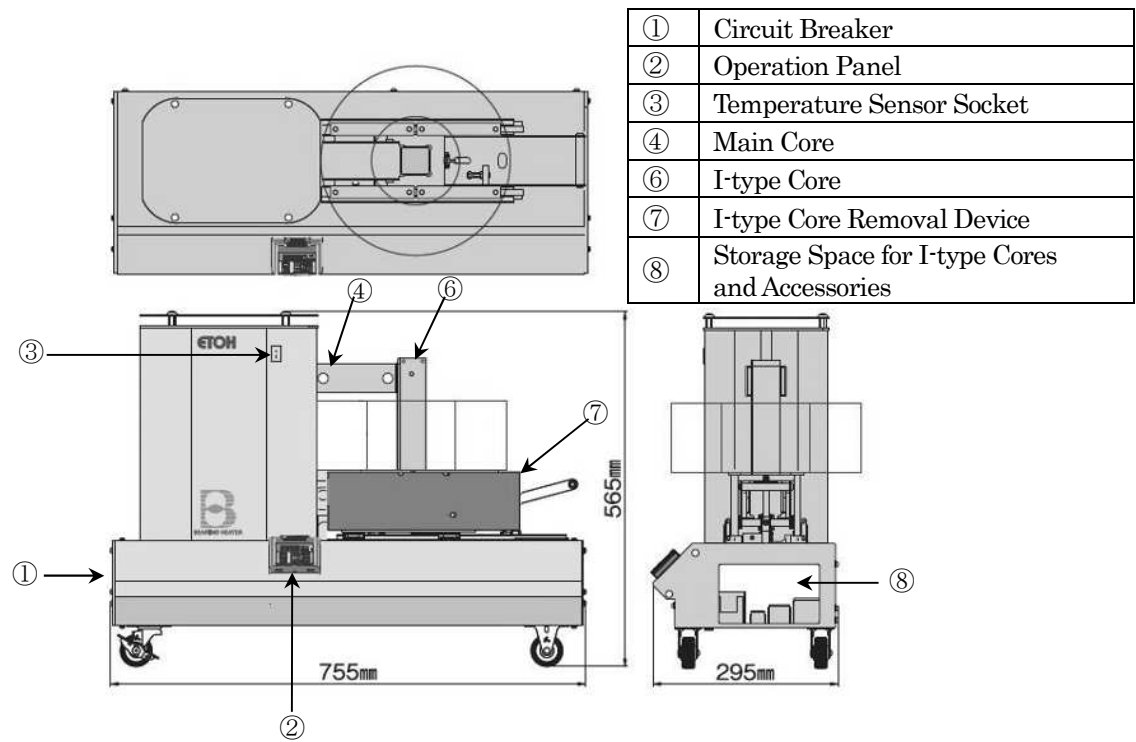


Fig 6-2

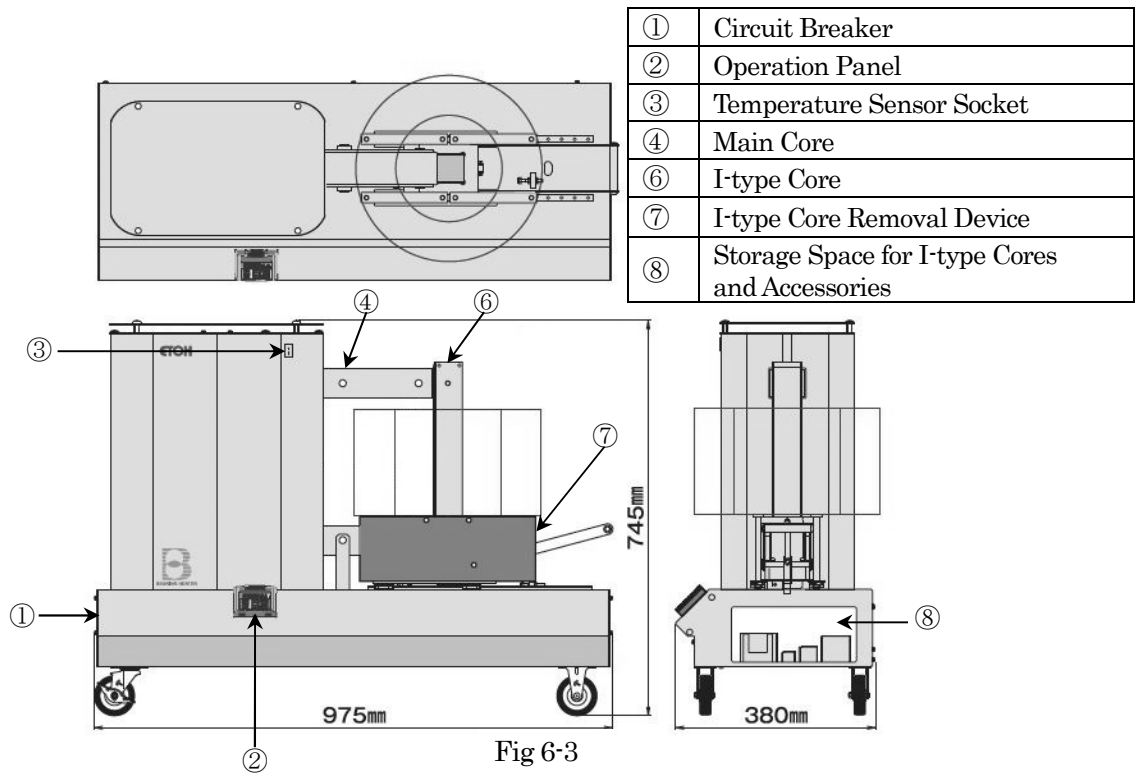
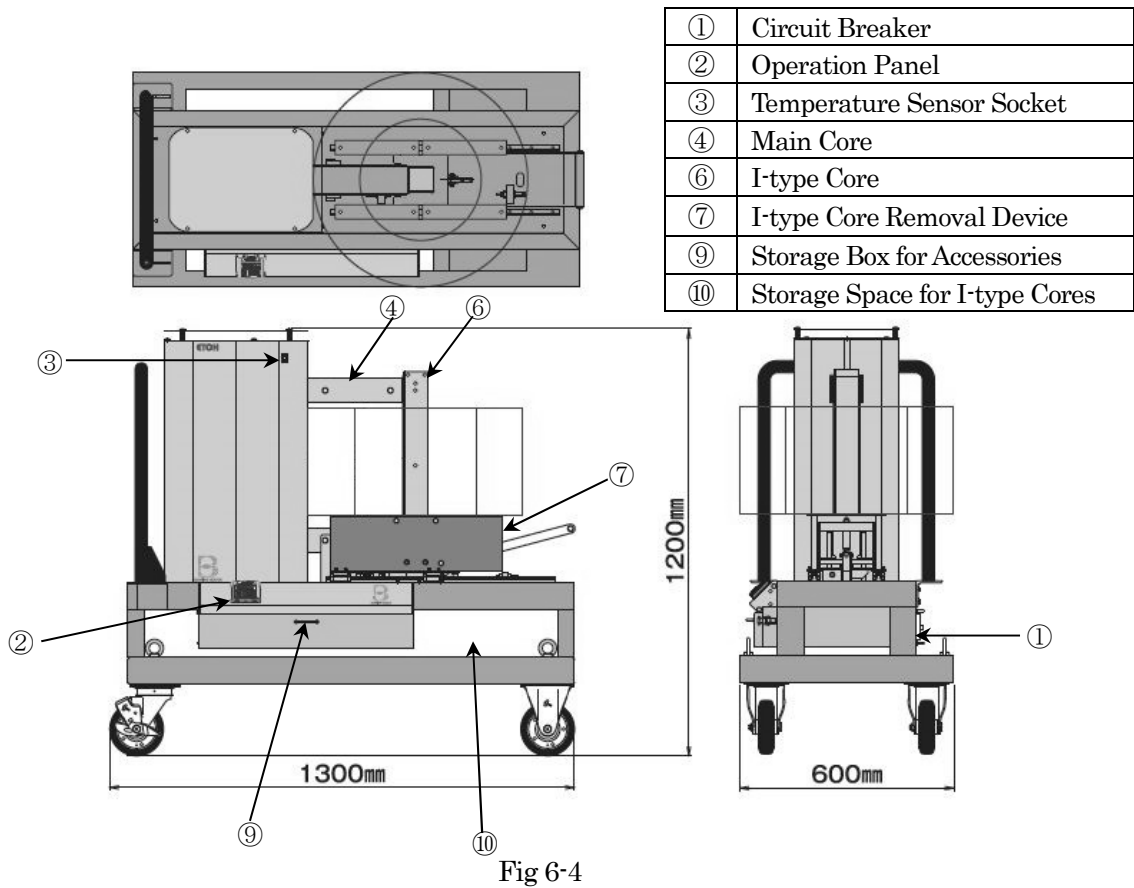


Fig 6-3



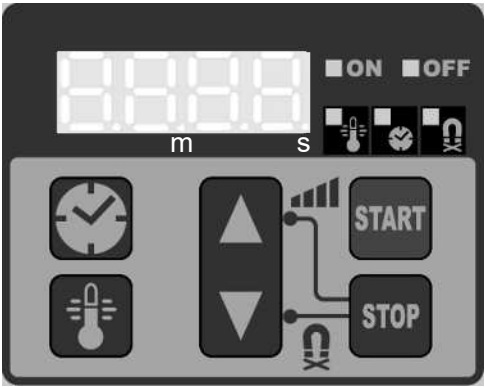
(1) Circuit Breaker

The circuit breaker protects the main circuit and all electrical components downstream.






(2) Operation Panel

The 7-Segment LED displays digital figures such as setting or actual temperature in temperature control mode and setting time or the time counted down in timer control mode.









On the right-hand of the 7-segment LED display, there are five LEDs indicating the state.



The meanings of the stage LEDs are described as below.

-  : Lights up during heating
-  : Lights up after heating
-  : Lights up in temperature control mode
-  : Lights up in timer control mode
-  : Lights up during demagnetization (Automatic/Manual)

The meanings of the function buttons are described as below.

-  Start Heating
-  Stop Heating (Reset)
-  Setting value increase
-  Setting value decrease
-  Temperature control mode selection, setting temperature, current temperature, and rise ratio (double click during heating) is displayed.
-  Timer control mode selection, setting time is displayed.
-  +  Manual demagnetization



Power reduction mode (Default setting:100%)

then



Setting the reduction rate 100-50% by 10% steps

* Once the circuit breaker is turned off, the power reduction setting is returned to default setting(100%)

* It is not necessary for the normal heating to set the power reduction mode.

When rapid heating may damage the work piece, on if slow heating is desired.

By setting the power reduction, the power can be adjusted by 10% steps, from 100% to 50%.



Temperature display changeover

Default setting (Factory shipment): Celsius

It is effective only when the machine is in the STOP state.

* Do not change the temperature display during operation as it may cause any malfunction.

* Confirm the temperature displayed (Celsius or Fahrenheit) is the one intend to use during operation.

(3) Temperature Sensor Socket

Connect the temperature sensor to the sensor socket.

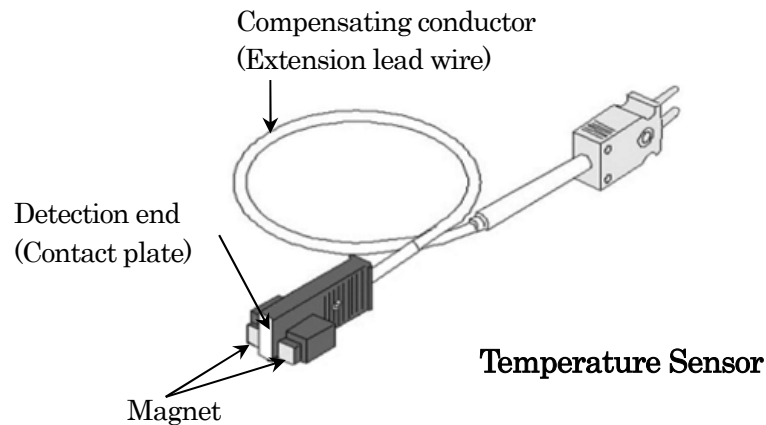
Be aware of the polarity (+ and – of the sensor)

● Temperature Sensor

The temperature sensor is equipped with a permanent magnet to secure the sensor to the inner ring during heating. Make sure the detection edge of the sensor is not damaged. Mount the sensor so that the detection edge securely contacts the surface of the ring being heated. Do not change or alter the extension lead wire of the thermocouple, or it may not measure correctly.

Confirm on the operation panel that the temperature is increasing during heating.

The upper limit of working temperature of the sensor is 250°C (482°F)



(4) Main Core

Main magnetic flux flows through the main core. Make sure the polished faces are always greased. This will protect the ends of the main core against rust, scaring and scratches. The lack of grease may cause the abnormal vibration and/or loud noise.

(5) Foldable Core Cover (IHE0110AN and IHE0120GN only)

Fold up the foldable core cover for protecting the polished faces of the main core when the product is not used. The cover should be kept upright to prevent dust or damage to the polished faces of the main core.

(6) I-type Core

For heating bearing, install an I-type core through the inner bore of the bearing. (See Table 6-1) Choose the largest I-type core for heating. The larger cross-section of the I-type core that is chosen, the shorter the heating time. Meet the polished faces of the I-type core and main core both at the top and bottom. Make sure the polished faces are always greased. During heating, the I-type core is attracted to the main core by magnetism, be careful that your fingers do not become caught between the I-type core and the main core.

Table 6-1 Standard and Optional I-type Cores

Type of body	Type of I-type core	Dimensions D×W×L (mm)	Bore diameter of bearing (mm)
IHE0110AN IHE0120GN	N-CI-1815	15×15×185	20~35
	N-CI-1825	25×25×185	35~50
	N-CI-1835	35×35×185	Above 50
IHE0320GN IHE0340GN	N-CI-2515 (OP)	15×15×250	20~35
	N-CI-2525	25×25×250	35~50
	N-CI-2535	35×35×250	50~70
	N-CI-2545	45×45×250	Above 70
IHE0620GN IHE0640GN	N-CI-3715 (OP)	15×15×370	20~35
	N-CI-3725	25×25×370	35~50
	N-CI-3735	35×35×370	50~80
	N-CI-3755	55×55×370	Above 80
IHE1120GN IHE1140GN	N-CI-5225 (OP)	25×25×520	35~50
	N-CI-5235	35×35×520	50~80
	N-CI-5255	55×55×520	80~100
	N-CI-5270	70×70×520	Above 100

* (OP) . . . Option

(7)I-type Core Removal Device (Built into Slide Type Bearing Installation Table)

(standard for IHE0320GN, IHE0340GN, IHE0620GN, IHE0640GN, IHE1120GN and IHE1140GN)

This device helps mounting and dismounting of the bearing and I-type core.

(8) Storage Space for I-type cores and Accessories (IHE0320GN, IHE0340GN, IHE0620GN, IHE0640GN)

Storage space for I-type core, I-type core guide, and temperature sensor.

(9) Storage Box for Accessories (IHE1120GN, IHE1140GN)

Storage box for I-type core guide, temperature sensor, and I-type core lift-up tool.

(10) Storage Space for I-type cores (IHE1120GN, IHE1140GN)

Storage space for I-type cores.

7. HANDLING THE PRODUCT

7.1 Confirmation Upon Delivery

Check the following items in Table 7-1 when the product is delivered.

Table 7-1 Checks

Items	Method
Are standard accessories and optional accessories included?	According to Table 7-2, check the parts on hand.
Has the correct model of the product been delivered?	Check the model number in the rating name seal on the product. Refer to 7.1.1 Name Seal and 7.1.2 Model Number
Damage?	Inspect the appearance of the entire unit for any damage due to transportation.

Table 7-2 Standard and Optional Accessories

Type	IHE0110AN IHE0120GN	IHE0320GN IHE0340GN	IHE0620GN IHE0640GN	IHE1120GN IHE1140GN
I-type Core	-	N-CI-2515 (OP)	N-CI-3715 (OP)	N-CI-5225 (OP)
	N-CI-1815	N-CI-2525	N-CI-3725	N-CI-5235
	N-CI-1825	N-CI-2535	N-CI-3735	N-CI-5255
	N-CI-1835	N-CI-2545	N-CI-3755	N-CI-5270
I-type Core Guide	-	N-CS-2515 (OP)	N-CS-3715 (OP)	N-CS-5225 (OP)
	-	N-CS-2525	N-CS-3725	N-CS-5235
	-	N-CS-2535	N-CS-3735	N-CS-5255
I-type Core lift-up tool	-	-	-	N-CL-578
Accessory Storage Bag	N-CA-0001	-	-	-
Temperature Sensor	N-CTC-300	N-CTC-500	N-CTC-500	N-CTC-1000

* (OP)…Option

7.1.1 Name Seal

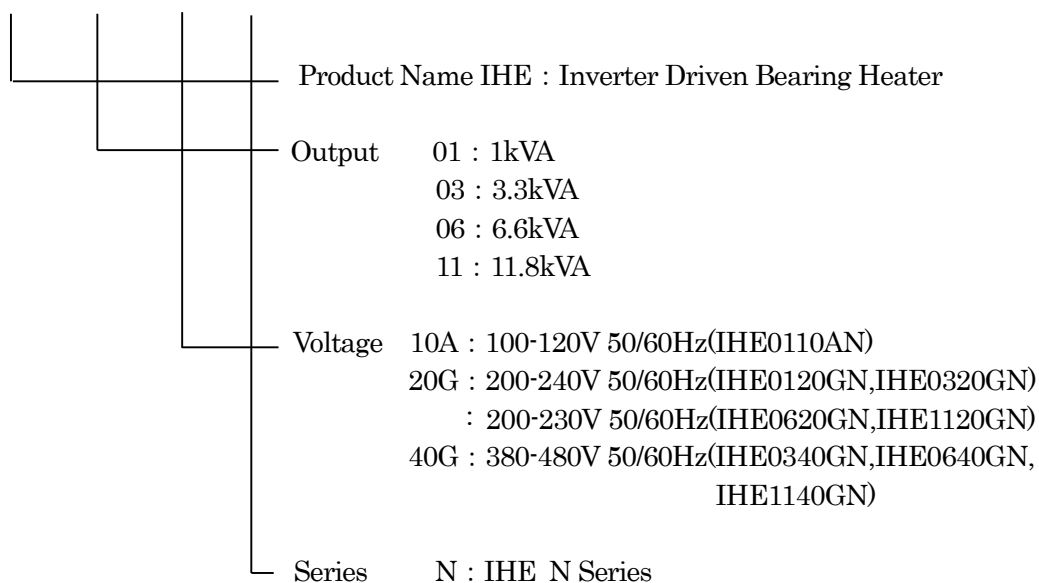
ETOH	Bearing Heater
MODEL: ■ ■ ■ ■ ■ ■	OUTPUT: ■ ■ ■ ■ kVA
INPUT: ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	A
LOT NO: ■ ■ ■ ■	MASS: ■ ■ ■ KG
SER NO: ■ ■ ■ ■ ■ ■ ■ ■	
OVERVOLTAGE CATEGORY: ■	POLUTION DEGREE: ■
CATALOG NO: ■ ■ ■ ■	FACTORY ID: ■
Etoh Inc.	Made in Japan

MODEL	OUTPUT (kVA)	INPUT	MASS (kg)
IHE0110AN	1	AC 1PH 100-120V 50/60Hz 10A	14
IHE0120GN	1	AC 1PH 200-240V 50/60Hz 5A	14
IHE0320GN	3.3	AC 3PH 200-240V 50/60Hz 10A	43
IHE0340GN	3.3	AC 3PH 380-480V 50/60Hz 5A	43
IHE0620GN	6.6	AC 3PH 200-240V 50/60Hz 15A	81
IHE0640GN	6.6	AC 3PH 380-480V 50/60Hz 8A	81
IHE1120GN	11.8	AC 3PH 200-240V 50/60Hz 25A	200
IHE1140GN	11.8	AC 3PH 380-480V 50/60Hz 13A	200

MODEL	OVERVOLTAGE CATEGORY	POLUTION DEGREE
IHE0110AN	2	2
IHE0120GN	2	2
IHE0320GN	3	2
IHE0340GN	3	2
IHE0620GN	3	2
IHE0640GN	3	2
IHE1120GN	3	2
IHE1140GN	3	2

7.1.2 Model Number

I H E 0 1 1 0 A N



7.2 Usage and Installation

(A) Power Supply

Make sure that the power voltage meets the required specifications.

(B) Installation Site

Install the product on a flat and stable surface.

Always lock the safety stoppers on the wheels except moving of the product. (All types except IHE0110AN and IHE0120GN)

Do not place the product in areas subject to high temperature, high humidity, splash, or bad ventilation. Also, avoid using in places subject to dust, metal shavings, or vibration.

Do not place the flammable material in the vicinity of this products.

Do not place this product in the place blocking up the vent.

(C) Inside the Product

Do not open the product for inspection or repair. It may cause damage or injury.

(D) Unplug the Product When Not in Use.

WARNING

(i) Do not install the product in an area that makes it difficult to operate the appliance inlet in a safe manner.

(ii) Do not use the product in any manner other than its intended purpose as specified by the manufacturer. To do so could impair the safety features and user protection provided by the product.

7.2.1 Connecting the Power Supply for IHE0320GN, IHE0340GN, IHE0620GN and IHE0640GN

Open the field wiring compartment cover

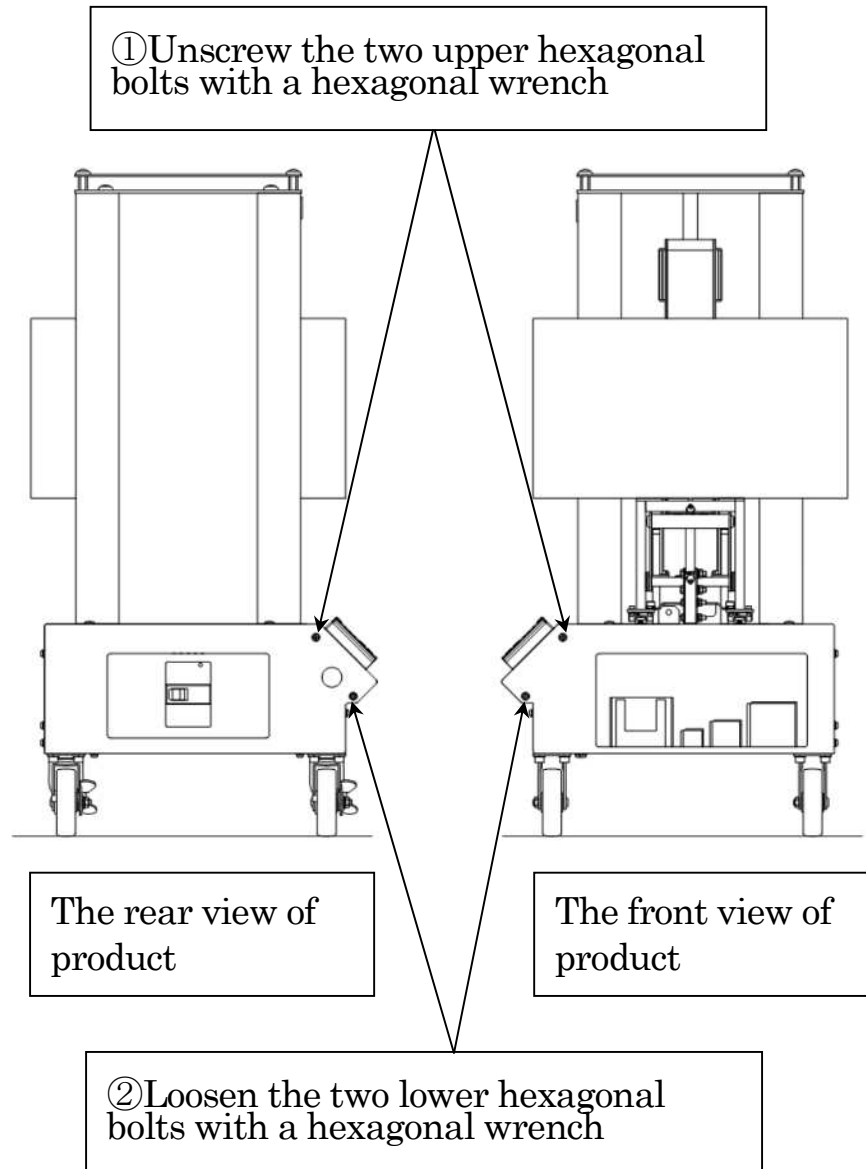


Fig 7-1

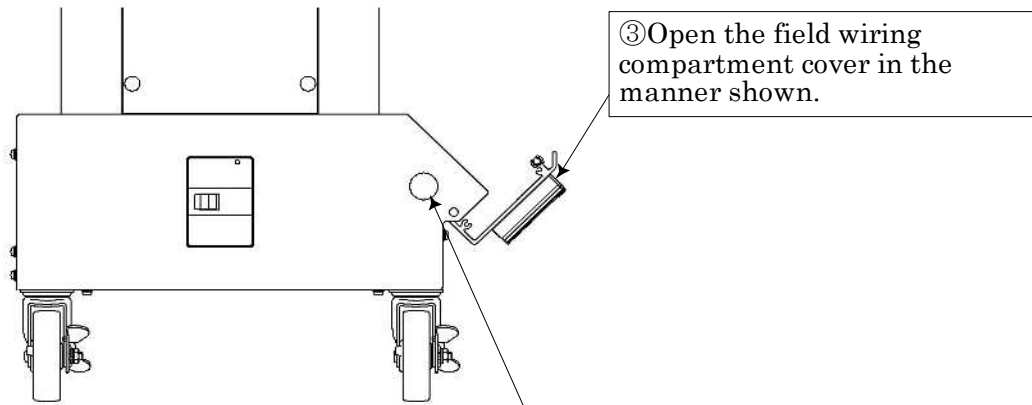


Fig 7-2

④ Penetrate the power supply cable with the strain relief listed in Table 7-3 through the conduit.
 IHE0320GN, IHE0340GN: Conduit Diameter PF 1/2 (21.5mm)
 IHE0620GN, IHE0640GN: Conduit Diameter PF 3/4 (27mm)

⑤ Fix the strain relief onto the metal wall with the locknut.

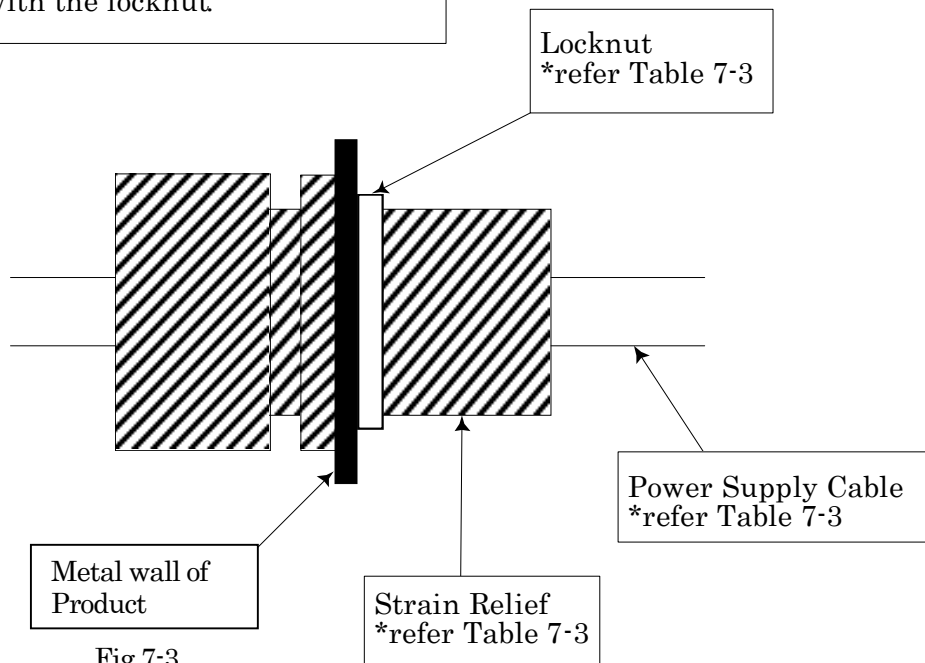


Fig 7-3

⑥Connect the terminals of the power supply cable to the terminal block.

Terminal Blocks

IHE0320GN:TXM10 04(PATLITE corporation)···Mounting Screw M3.5 (Torque 1.0~1.3N·m)

IHE0620GN:TXM10 04(PATLITE corporation)···Mounting Screw M4 (Torque 1.4~1.8N·m)

IHE0340GN:TXM7 04(PATLITE corporation)···Mounting Screw M3 (Torque 0.6~0.9N·m)

IHE0640GN:TXM7 04(PATLITE corporation)···Mounting Screw M3 (Torque 0.6~0.9N·m)

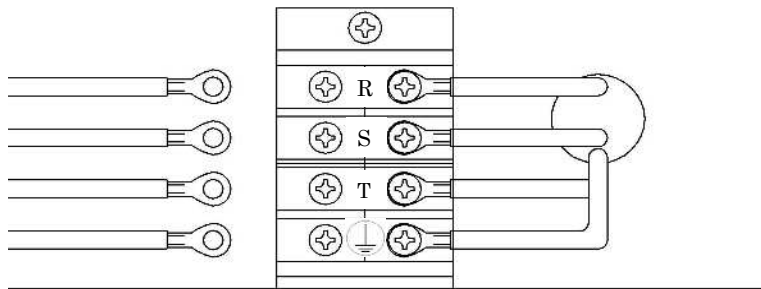


Fig 7-4

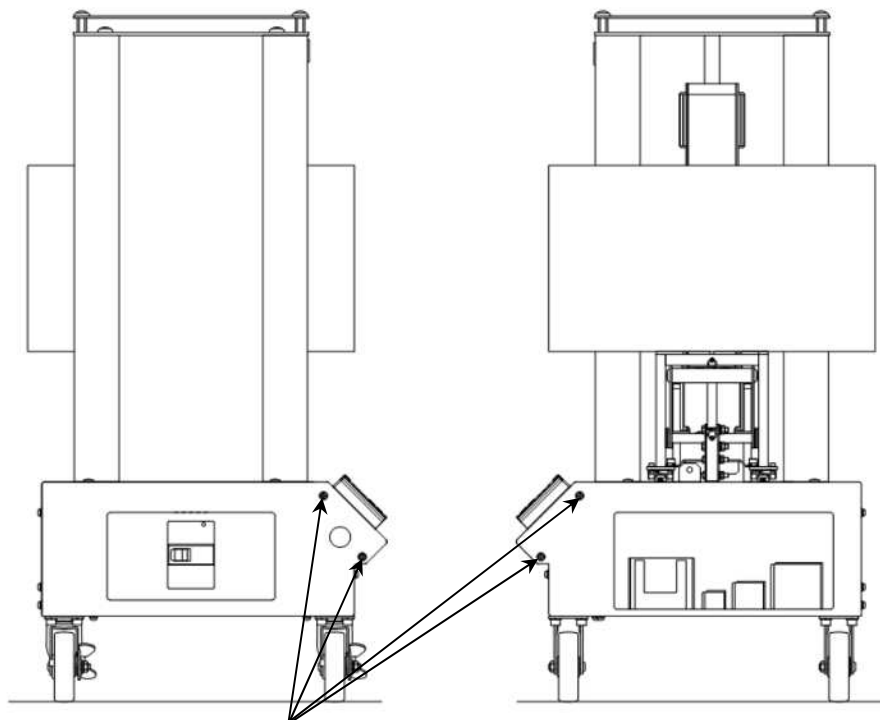


Fig 7-5

⑦Shut the cover and tighten the four hexagonal bolts with a hexagonal wrench.

7.2.2 Connecting the Power Supply for IHE1120GN, IHE1140GN

Open the field wiring compartment cover

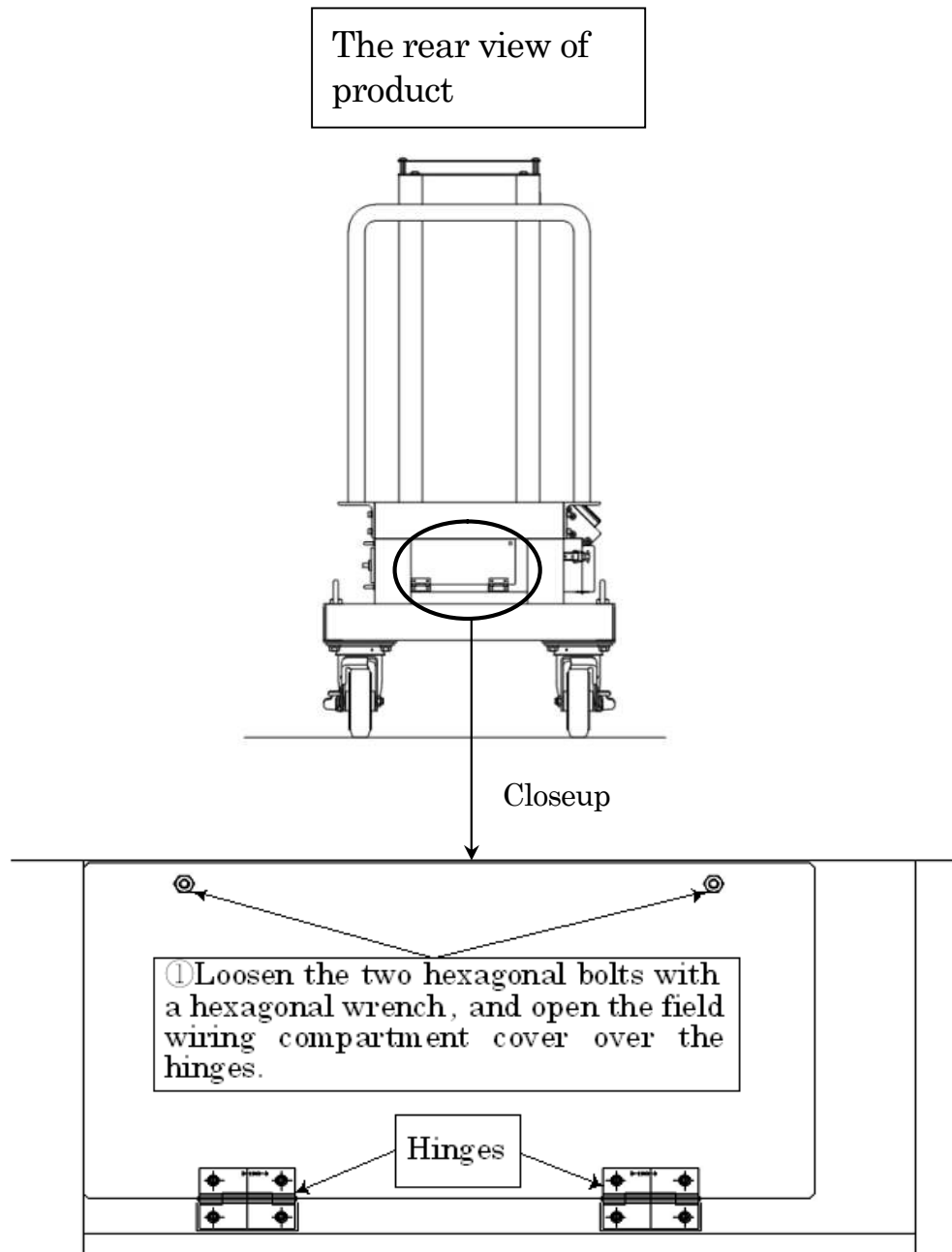


Fig 7-6

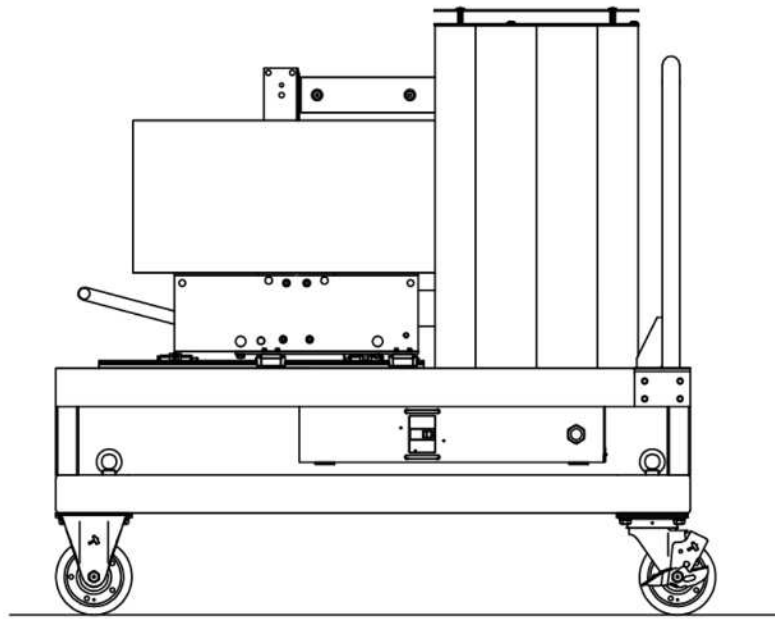


Fig 7-7

②Penetrate the cable with the strain relief listed in the Table 7-3 through the conduit.
IHE1120GN, IHE1140GN: Conduit Diameter PF 3/4 (27mm)

③Fix the strain relief onto the metal wall with the locknut

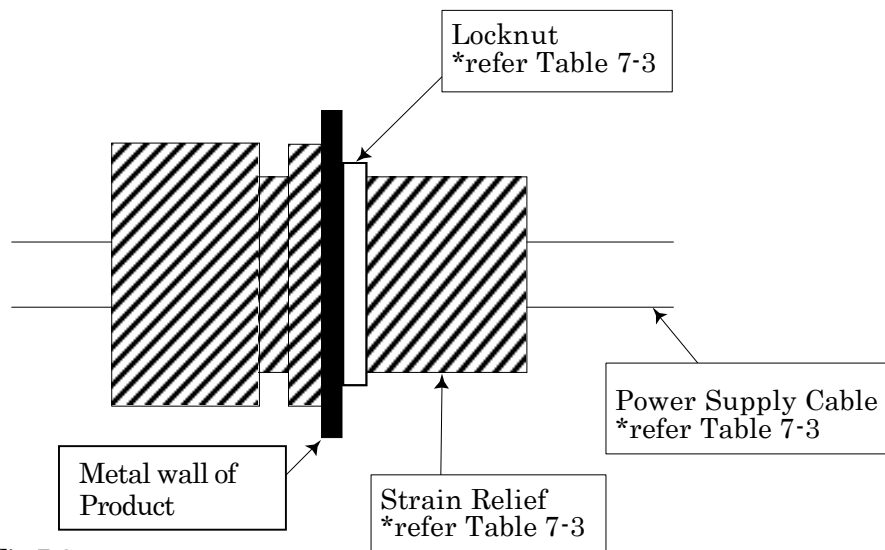
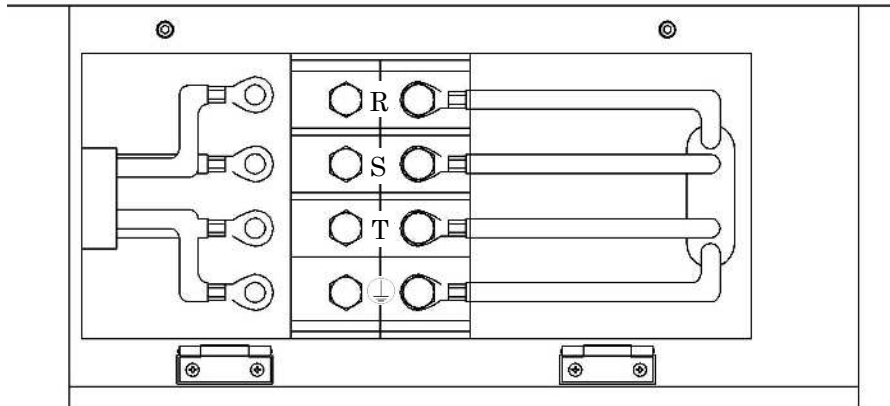


Fig 7-8



⑥Connect the terminals of the power supply cable to the terminal block.

Terminal Blocks

IHE1120GN:TXM50 04(PATLITE corporation)···Mounting Screw M5 (Torque 2.2~2.8N·m)

IHE1140GN:TXM10 04(PATLITE corporation)···Mounting Screw M3.5 (Torque 1.0~1.3N·m)

Fig 7-9

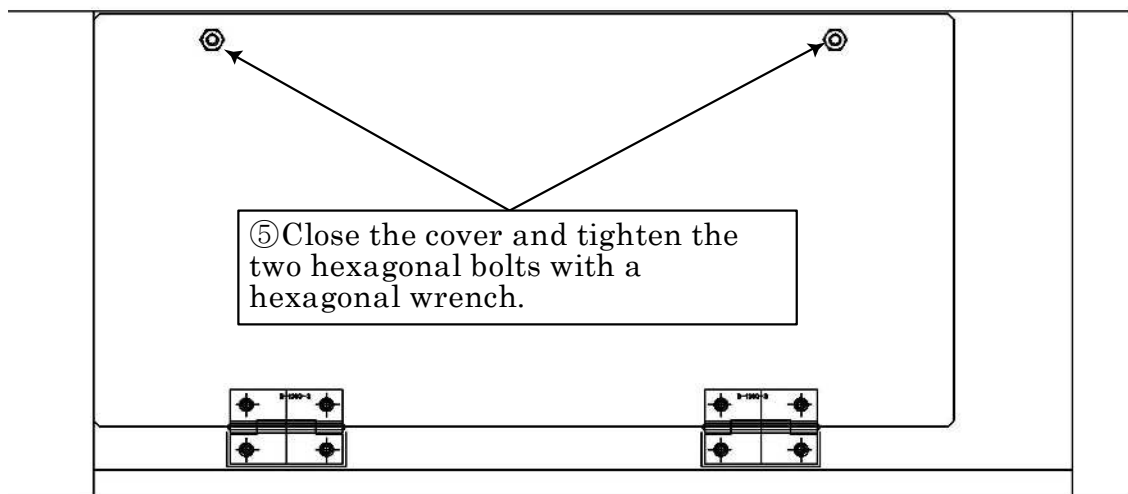


Fig 7-10

Table 7-3 Recommended cables and parts for replacement

IHE0320GN			
Parts	Type	Vendor	Applicable Cable Size
Power Supply Cable	RO-FLEX 7700T AWG16*4 PartNo.7700 0015004 Standard UL62 Cable Designation STO (600V,105C)	NICHIGOH	—
Plug Cap	Industrial Hart-Lock Locking Device PartNo.CWL1520P ,3 pole 4 wiring ground 3 phase 250V,20A, NEMA L15-20	Cooper Wiring Devices	—
Cable glands	FGA21L-14-G PF 1/2 (Strain Relief + Locknut)	MISUMI	9-14mm ϕ

IHE0620GN			
Parts	Type	Vendor	Applicable Cable Size
Power Supply Cable	RO-FLEX 7700T AWG14*4 PartNo.7700 0025004 Standard UL62 Cable Designation STO (600V,105C)	NICHIGOH	—
Plug Cap	Industrial Hart-Lock Locking Device PartNo.CWL1520P ,3 pole 4 wiring ground 3 phase 250V,20A, NEMA L15-20	Cooper Wiring Devices	—
Cable glands	FGA26-18-G PF 3/4 (Strain Relief + Locknut)	MISUMI	13-18mm ϕ

IHE1120GN			
Parts	Type	Vendor	Applicable Cable Size
Power Supply Cable	RO-FLEX 7700T AWG12*4 PartNo.7700 0040004 Standard UL62 Cable Designation STO (600V,105C)	NICHIGOH	—
Plug Cap	Industrial Hart-Lock Locking Device PartNo.CWL1530P ,3 pole 4 wiring ground 3 phase 250V,30A, NEMA L15-30	Cooper Wiring Devices	—
Cable glands	FGA26-18-G PF 3/4 (Strain Relief + Locknut)	MISUMI	13-18mm ϕ

IHE0340GN			
Parts	Type	Vendor	Applicable Cable Size
Power Supply Cable	RO-FLEX 7700T AWG18*4 PartNo.7700 0007504 Standard UL62 Cable Designation STO (600V,105C)	NICHIGOH	—
Plug Cap	Industrial Hart-Lock Locking Device PartNo.CWL1620P ,3 pole 4 wiring ground 3 phase 480V,20A, NEMA L16-20	Cooper Wiring Devices	—
Cable glands	FGA21L-14-G PF 1/2 (Strain Relief + Locknut)	MISUMI	9-14mm ϕ

IHE0640GN			
Parts	Type	Vendor	Applicable Cable Size
Power Supply Cable	RO-FLEX 7700T AWG18*4 PartNo.7700 0007504 Standard UL62 Cable Designation STO (600V,105C)	NICHIGOH	—
Plug Cap	Industrial Hart-Lock Locking Device PartNo.CWL1620P ,3 pole 4 wiring ground 3 phase 480V,20A, NEMA L16-20	Cooper Wiring Devices	—
Cable glands	FGA26S-14-G PF 3/4 (Strain Relief+Locknut)	MISUMI	9-14mm ϕ

IHE1140GN			
Parts	Type	Vendor	Applicable Cable Size
Power Supply Cable	RO-FLEX 7700T AWG16*4 PartNo.7700 0015004 Standard UL62 Cable Designation STO (600V,105C)	NICHIGOH	—
Plug Cap	Industrial Hart-Lock Locking Device PartNo.CWL1620P ,3 pole 4 wiring ground 3 phase 480V,20A, NEMA L16-20	Cooper Wiring Devices	—
Cable glands	FGA26S-14-G PF 3/4 (Strain Relief+Locknut)	MISUMI	9-14mm ϕ

7.3 Accessory Storage

7.3.1 Accessory Storage for IHE0110AN and IHE0120GN

The accessories of I-type cores N-CI-1815, N-CI-1825, and N-CI-1835 are found in the accessory storage bag (N-CA-0001). I-type core, temperature sensor N-CTC-300, and power supply cable are stored inside in the main body of the product.

Unlock the side-panel lock by lowering the snap-fit and open the side-panel.

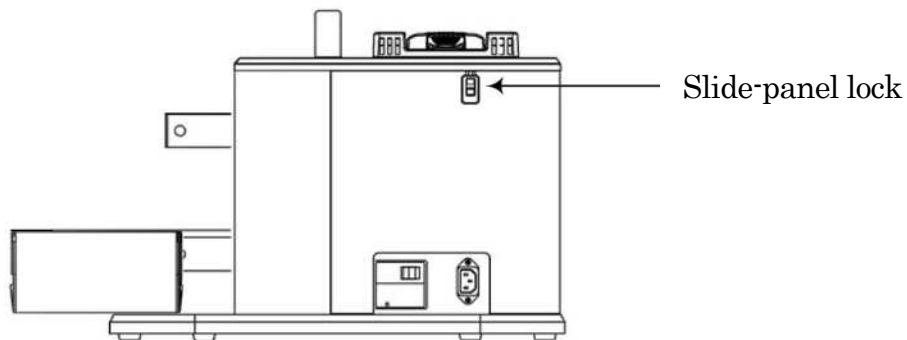


Fig 7-11

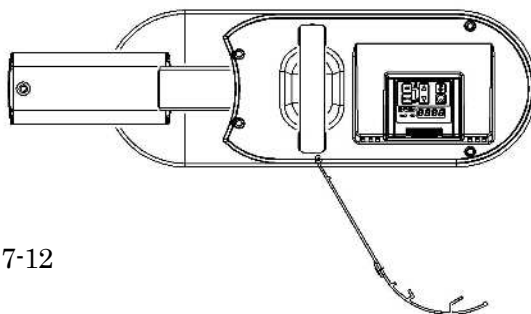


Fig 7-12

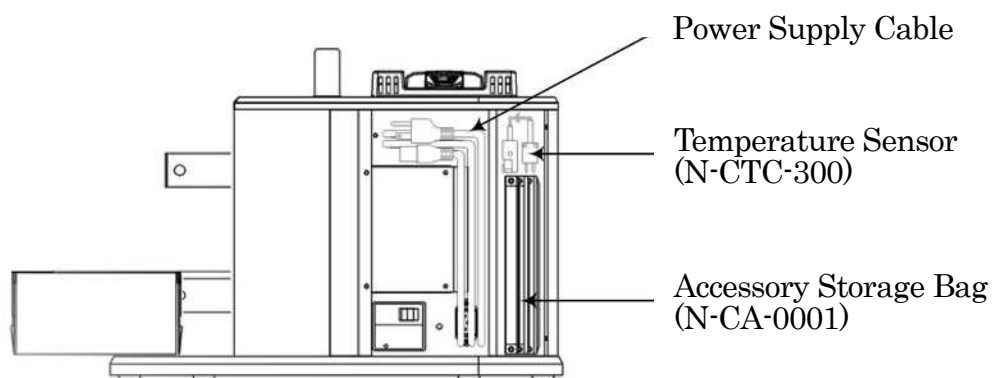


Fig 7-13

7.3.2 Accessory Storage for IHE0320GN, IHE0340GN, IHE0620GN, and IHE0640GN

The following accessories are stored in the main body of the product.

- (A) 3 types of I-type cores
N-CI-2525, N-CI-2535 and N-CI-2545 for IHE0320GN and IHE0340GN
N-CI-3725, N-CI-3735 and N-CI-3755 for IHE0620GN and IHE0640GN
- (B) 2 types of I-type core guides
N-CS-2525 and N-CS-2535 for IHE0320GN and IHE0340GN
N-CS-3725 and N-CS-3735 for IHE0620GN and IHE0640GN
- (C) Temperature Sensor N-CTC-500

Find the accessories in the opening section at the side (see figure below).

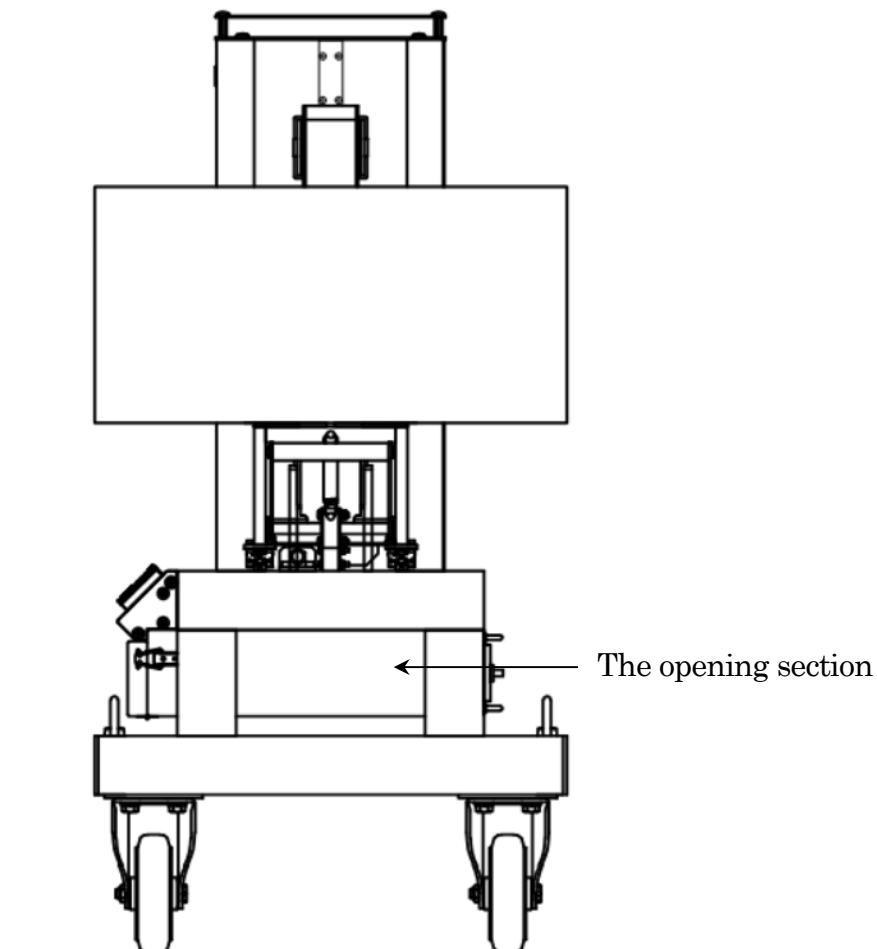


Fig 7-14

7.3.3 Accessory Storage for IHE01120GN, and IHE1140GN

The following accessories are stored in the main body of the product.

- (A) 3 types of I-type cores
N-CI-5235, N-CI-5255 and N-CI-5270 for IHE1120GN and IHE1140GN
- (B) 2 types of I-type core guides
N-CS-5235 and N-CS-5255 for IHE1120GN and IHE1140GN
- (C) I-type core lift up tool... Accompanying sheet, I-type core lift up tool instruction manual is attached.
N-CL-578 for N-CI-5255, N-CI-5270
- (D) Temperature sensor N-CTC-1000

Find the I-type cores on the right part of the support frame and the other accessories in the storage compartment as shown in the figure below.

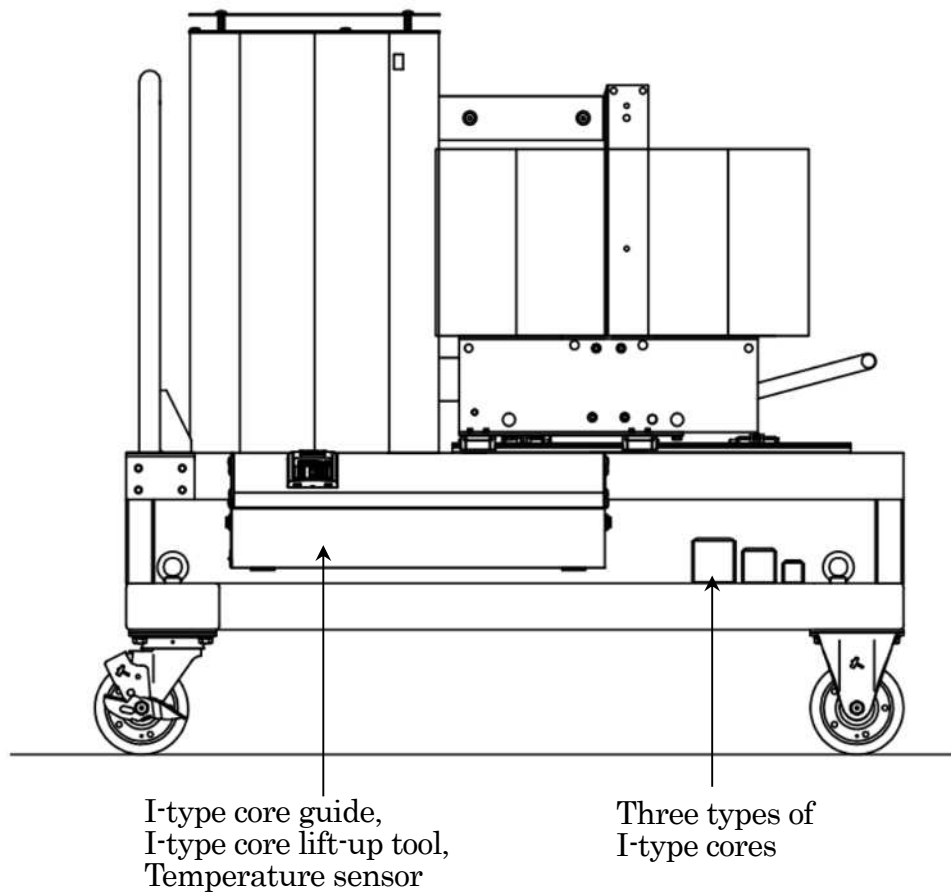


Fig 7-15

7.4 The method of I-type core removal device (Built into Slide Type Bearing Installation Table)

(IHE0320GN, IHE0340GN, IHE0620GN, IHE0640GN, IHE1120GN, IHE1140GN)

- 1) Operating instructions for the I-type core removal device
(Before heating process starts)
 - (i) Ensure that the ① I-type core removal device is drawn to the far-right portion as shown in Figure 7-16.
 - (ii) Select one of the three different types of I-type cores which suits the inside diameter of the bearing to be used.
Refer to I-type core in Table 6-1 for the meaning of I-type core type.
 - (iii) If you use the ② I-type core other than the largest cross-section for the type, insert the I-type core guide shown in Figure 7-17 into the core insertion part of the I-type core removal device. (The side with the stainless steel board is to be upside.)
 - (iv) Place the ③ bearing on the I-type core removal device
 - (v) Stand the ② I-type core on the ① I-type core removal device as indicated in Figure 7-16.
 - (vi) Lower the ④ lever and slide it toward the ⑤ main core.
 - (vii) Release the ④ lever after the ② I-type core touches the ⑤ main core as indicated in Figure 7-18.
- 2) Operating instructions for the I-type core attaching and detaching device
(After completion of heating process)
 - (i) From the state of Figure 7-18, lower the ④ lever and pull it until it is as shown in Figure 7-16.
 - (ii) Detach the ② I-type core.
 - (iii) Remove the ③ bearing from the I type core removal device. Be sure to use heavy-duty/ heat resistant gloves since the bearing is hot.

Using the I-type core removal device (Start of heating)

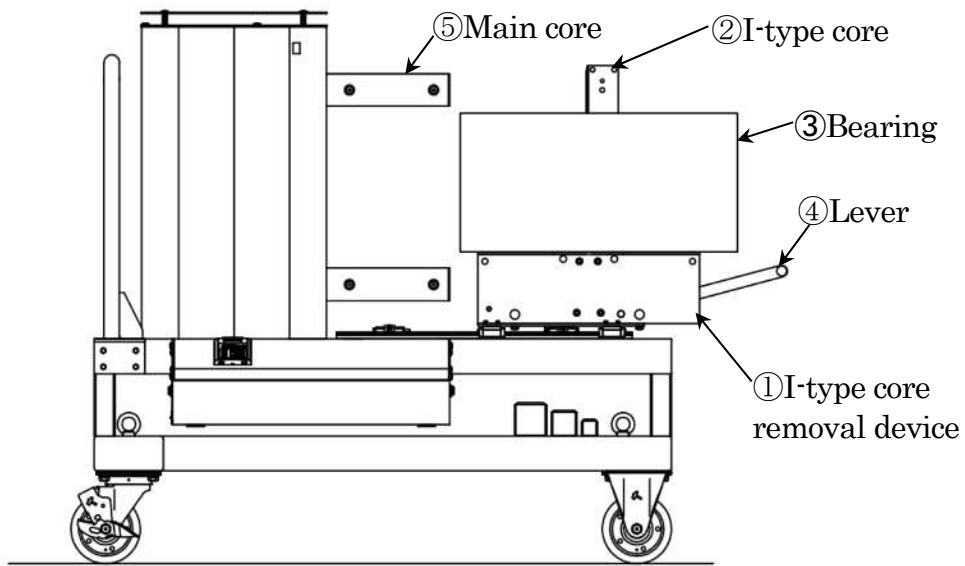


Fig 7-16

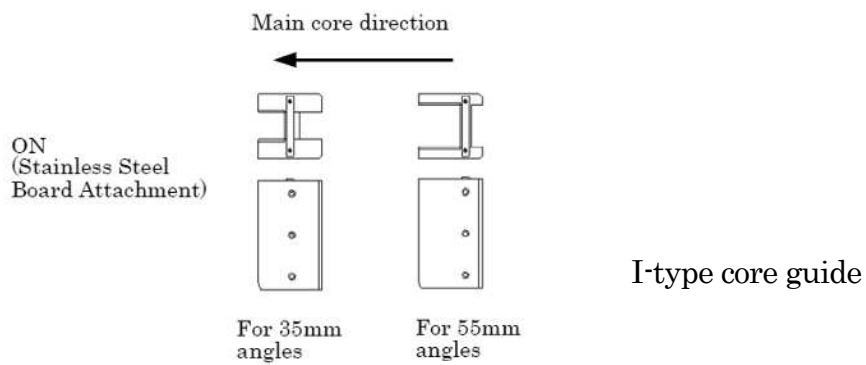


Fig 7-17

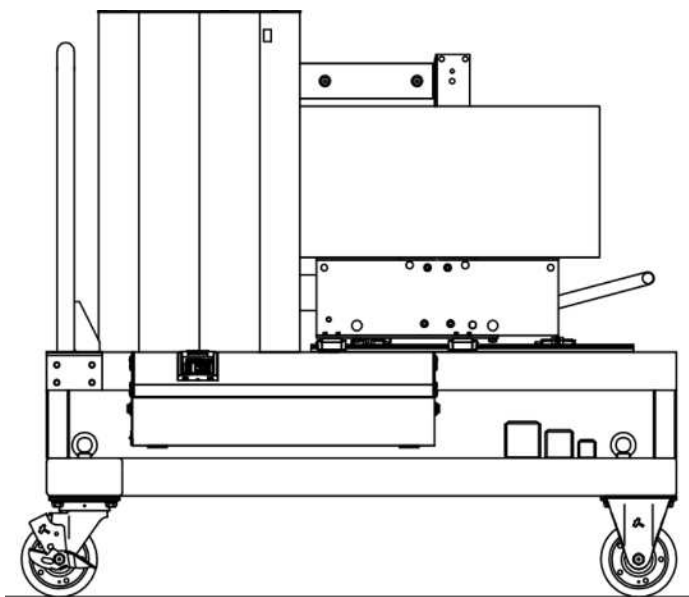


Fig 7-18

8. HEATING PROCEDURES

8.1 Control Panel Operation

8.1.1 Preparing for heating

- (1) Ensure that the product placement complies with all the safety requirements as outlined on page 3 and with the warnings on the attached safety-warning label on page 4.
- (2) Connect power supply cable. Make sure the plug is correctly inserted in the socket and connect to properly grounded outlet only.
- (3) Apply enough grease on the polishing face of the I-type core and the main core. The lack of grease may cause rust, noise, and vibration. Also metal shavings, dust etc. between the I-type core and the main core may cause the vibration and noise.
* Use the low combustive grease.

8.1.2 Heating Procedures

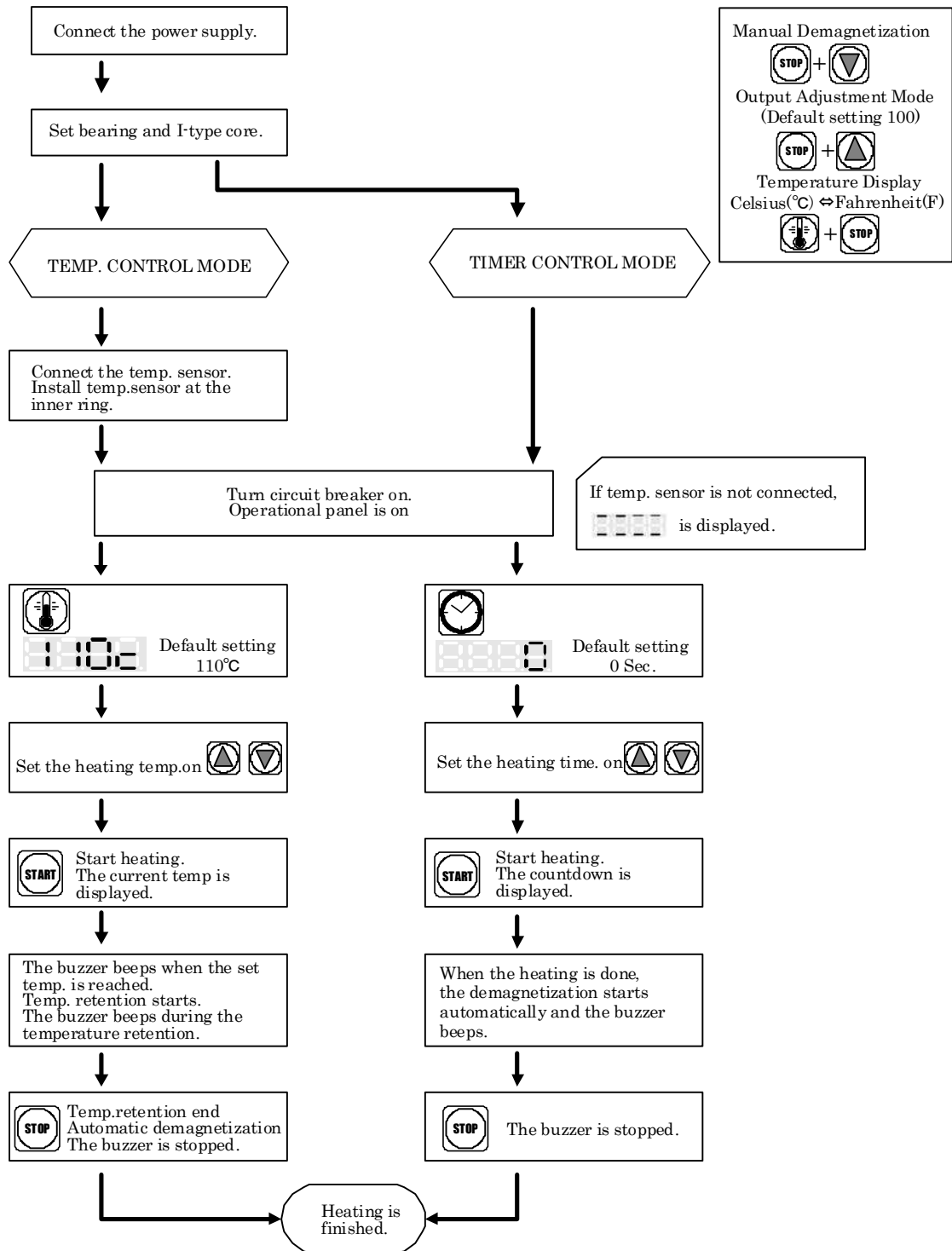
There are two control modes, temperature control mode and timer control mode.

For heating procedure, refer “8.1.3 Flow Chart. For the operation of the control panel, follow explanation of operation panel as described in part “6.2 Full View and Part Description (2) Operation Panel”.

- 1) Set the bearing and install the I-type core so that it pass through the bore of the bearing and the polished faces of the main core and the I-type core meets each other.
- 2) For temperature control mode, connect a temperature sensor to the yellow socket of the main body and mount the detection end of the temperature sensor so that it firmly contacts the inner rim of the bearing.
- 3) Turn the circuit breaker to the ON position. (ON→RED)
- 4) Please enter the set temperature. (The initial value of 110 ° C is displayed.) Select either the temperature control mode or the timer control mode. Set the setting temperature (temperature control mode) or input the heating time (timer control mode).
*In temperature control mode, confirm that the temperature display proper to the location used (Celsius or Fahrenheit) is selected.
*In the case necessary, especially in the case where it is necessary to heat slowly, set the power reduction to prevent the damage to the bearing due to quick heating.
By setting the power reduction, the power can be adjusted by 10% steps, from 100% to 50%.
- 5) Press the start button.
- 6) During the operation, the operation panel will display either the current temperature of the inner rim of bearing (temperature control mode) or the time countdown (timer control mode).
- 7) Once the heating is completed, the buzzer will sound. In temperature control mode, the temperature of the inner ring is retained (blinked indication of “H” on the display) until the stop button is pressed. Then followed with automatic demagnetization. In timer control mode, the automatic demagnetization is followed on the completion of heating and buzzer will stop when the stop button is pressed.
- 8) Remove the bearing (use heavy-duty/ heat resistant gloves to prevent burning).
- 9) Turn the circuit breaker to the OFF position. (OFF→GREEN) In the case of continuous heating, after installing the bearing, I-type core, and temperature sensor follow the procedure from 4) to 8).

8.1.3 Flow Chart

A heating operation flow chart is pictured as below. Ensure that operators follow the correct operating procedures at all times.



8.2 Sequence Operation (External terminal operation)

In addition to heating on Control Panel Operation (Standard), it is possible that the product can be controlled by PLC (programmable logic controller) or other FA controller in a customer's automation system.

It has six input terminals and two output terminals, and the functions as below.

- (1) The operation mode can be changed from Control Panel Operation to Sequence Operation and vice versa with an input terminal signal.
- (2) Sequence Operation has two control modes, temperature control mode and forced heating mode (open loop heating), and able to select the mode as necessary.
- (3) In temperature control mode, it is possible to set three temperature setting values at maximum preset at our factory shipment other than the setting on the operation panel.
- (4) It outputs the operation condition of product and informs the upper controller of the heating situation.

Control Panel Operation is standard in this product(s).

If you need the sequence operation, please contact Etoh Inc.

9. MAINTENANCE AND SPARE PARTS

Do not disassemble the product(s) for repair without any manufacturer's permission and/or authorization.

9.1 Preventative Maintenance

(A) The polished face of the main core

The polished faces of the main core are susceptible to rust and/or scratch. Keep the polished face greased to prevent oxidization. Any kind of rust and/or scratches may cause vibration and loud acoustic noise around the main core during heating.

(B) I-type core

The polished face of the I-type core is also susceptible to rust and/or scratching. Keep the surface greased to prevent oxidization. Also, I-type core consists of multiple thin, fragile layers of electrical steel sheets that may be damaged if dropped or exposed to equivalent mechanical shock.

Do not use the broken I-type core.

9.2 Spare Parts

I-type core and the temperature sensor are susceptible to damage. It is recommended that the I-type cores and the temperature sensor are kept as spare parts for your uninterrupted operation. Contact the shop where you purchased the product or Etoh Inc. (details on the front page) if you would like to purchase the items listed in Table 7-2.

9.3 Cleaning Instruction

When the product(s) become dirty, wipe with a cloth and proper cleaning agent. Also, avoid cleaning during heating and immediately thereafter. Do not wash the product(s) with water.

10. TROUBLESHOOTING










Table 10-1 Main Problems and Possible Solutions

Problems	Cause	Possible solution
The operation panel displays nothing.	The power supply is not correctly connected.	Check if the power supply is correctly connected.
	The circuit breaker has tripped.	Confirm the circuit breaker ON/OFF – A possible cause is a short circuit or electrical overload. After removing the cause, reset the circuit breaker. – The inside of the product may be broken and short circuited. Consult manufacturer.
	The cable may have disconnected from the operation panel or the cable is broken.	Contact manufacturer.
	For causes other than described above.	Contact manufacturer.
Abnormal vibration or loud noise occurs during heating.	Rust and/or scratch on the polished face of I-type core and/or main core.	Clean the mating faces of the main core and the I-type core. Grease before operation.
	Broken the I-type core	Replace the new I-type core.
	Broken the main core	Consult manufacturer.

If any of the breakdown indications shown in Table 10-2 occur, press the reset (stop) button. When the cause of a breakdown has been found and removed, the operation panel should return to normal display.

Breakdown indications on the operation panel and countermeasures

Table 10-2.

Display Panel	Meaning	Cause & Possible Solution
 ====	The temperature sensor is not connected or has a broken wire.	<ul style="list-style-type: none"> • Check the connection of the temperature sensor. Be aware of the polarity (+ and -) of the sensor. • Check for a broken wire. Replace sensor with new unit.
 uuuu	Improper installation of the temperature sensor	<ul style="list-style-type: none"> • The temperature sensor has not been installed correctly. Place the detection end of the temperature sensor so that it contacts with the inner rim of the bearing. Note that deforming the contact plate will result in the incorrect measurement of the temperature. • The contact plate of the temperature sensor is damaged. The thin wires of the thermocouple are welded inside the contact plate. Applying excessive stress to this part may cause internal damage. • Temperature setting is 32°C and under. Set the temperature 33°C and more.
 COIL	Overheating of main coil	<ul style="list-style-type: none"> • If the heating coil is overheating due to some cause, this protection feature automatically activates. Wait for the heating coil to cool down. Reset unit.
 LV	Low-voltage protection	<ul style="list-style-type: none"> • The voltage of input power source has decreased. Check if the power-supply voltage is lower than the rated value.
 OC	Over-current protection	<ul style="list-style-type: none"> • Consult manufacturer.
 OV	Over-voltage protection	<ul style="list-style-type: none"> • The input voltage is higher than the rated voltage. Check the power-supply voltage. Consult manufacturer
 OH	Inverter overheating protection	<ul style="list-style-type: none"> • Check if the outside air temperature is not in the rated range. • Check the cooling fan on the inverter to make sure it has not malfunctioned. • For causes other than described above, consult manufacturer.
 OLV	Over-load protection	<ul style="list-style-type: none"> • Contact manufacturer if it occurs continuously.
 0°C	0°C	<ul style="list-style-type: none"> • Contact manufacturer.

If the power adjustment (Power Reduction) is set in temperature control mode, make sure again that the temperature sensor is properly installed because the “uuuu” protection is bypassed in this case.

11. SPECIFICATIONS

Type of body			IHE0110AN	IHE0120GN	IHE0320GN	IHE0340GN	IHE0620GN	IHE0640GN	IHE1120GN	IHE1140GN
Heating Capacity	kVA		1kVA		3.3 kVA		6.6 kVA		11.8 kVA	
Slide Type Bearing Installation Table			–		Yes					
Applicable Bearing Size	Minimum bore diameter (mm ϕ)		20		35		35		50	
	Maximum outside diameter (mm ϕ)		200		300		400		600	
	Thickness (mm)		70		110		200		300	
	Weight (kg)		12		40		80		300	
Heating Bearing type	Can heat pre-greased bearing		Yes							
	Can heat sealed bearing		Yes							
Power Supply Characteristics	Phase		Single		Three					
	Voltage (V)		100 - 120	200 - 240	200 - 240	380 - 480	200 - 240	380 - 480	200 - 240	380 - 480
	Frequency (Hz)		50 / 60							
	Rated Current (A)		10	5	10	5	15	8	25	13
Dimensions of body	H(mm)		347		565		745		1200	
	W(mm)		175		295		380		600	
	L(mm)		470		755		975		1300	
	Body weight (kg)		14		43		81		200	
	Accessory weight(kg)		3		7		13		34	
Control Specifications	Temperature control mode	Range	33 – 250°C							
		Temp sensor type	K-type							
		Temperature Settings	digital							
	Timer control mode	Range	0 – 99Min59Sec							
	Power Reduction	By 10%	50 – 100%							
	Demagnetization		300 μ T(3G)							
Heating Core Specifications	Maximum Flux (T)		1.5T							
	Core cross section (mm)		42×35		56×45		62×55		75×70	
Operation Specifications	Operation		Operator with LEDs							
	Sequence Operation		Yes							
Temp Display			Celsius/Fahrenheit							
Environment Specifications	Application site		Indoor (No corrosive gas, dust, direct sunlight, condensation etc)							
	Over voltage Category		2		3					
	Pollution Degree		2							
	Ambient Operating Temp.		– 10°C~35°C							
	Altitude		2000m max							
	Ambient Operating Humidity.		85% RH max							

Table 11.1 Standard and Optional Accessories

Type		IHE0110AN IHE0120GN	IHE0320GN IHE0340GN	IHE0620GN IHE0640GN	IHE1120GN IHE1140GN
I-type core	N-CI-1815(diameter:20-35)	●			
	N-CI-1825(diameter:35-50)	●			
	N-CI-1835(diameter:50 over)	●			
	N-CI-2515(diameter:20-35)		OP		
	N-CI-2525(diameter:35-50)		●		
	N-CI-2535(diameter:50-70)		●		
	N-CI-2545(diameter:70 over)		●		
	N-CI-3715(diameter:20-35)			OP	
	N-CI-3725(diameter:35-50)			●	
	N-CI-3735(diameter:50-80)			●	
	N-CI-3755(diameter:80 over)			●	
	N-CI-5225 (diameter:35-50)				OP
	N-CI-5235 (diameter:50-80)				●
	N-CI-5255(diameter:80-100)				●
	N-CI-5270(diameter:100 over)				●
I-type core guide	N-CS-2515(for N-CI-2515)		OP		
	N-CS-2525(for N-CI-2525)		●		
	N-CS-2535(for N-CI-2535)		●		
	N-CS-3715 (for N-CI-3715)			OP	
	N-CS-3725 (for N-CI-3725)			●	
	N-CS-3735 (for N-CI-3735)			●	
	N-CS-5225 (for N-CI-5225)				OP
	N-CS-5235 (for N-CI-5235)				●
	N-CS-5255 (for N-CI-5255)				●
I-type core lift-up tool	N-CL-578				●
Temperature Sensor	N-CTC-300 (length:300mm)	●			
	N-CTC-500 (length:500mm)		●	●	
	N-CTC-1000 (length:1000mm)				●
Accessory Storage Bag	N-CA-0001	●			

●···Standard OP···Option

12. LIMITED WARRANTY

(1) Warranty period

The warranty period is one year from the date of purchased or 3000 hours on total power activation hours, whichever occurs first

Accessories, such as I-type cores and temperature sensor, are not included in this warranty.

(2) Warranty Coverage

Regarding any trouble under normal operation when used in compliance with Instruction manual, the repair of product is covered. Please note that transportation costs related to repair is not covered by manufacturer's warranty.

Warranty is limited as mentioned as above.

Indirect or consequential damages including damage of other devices, loss of business, loss of opportunity, loss of profits are not covered.

(3) Disclaimer

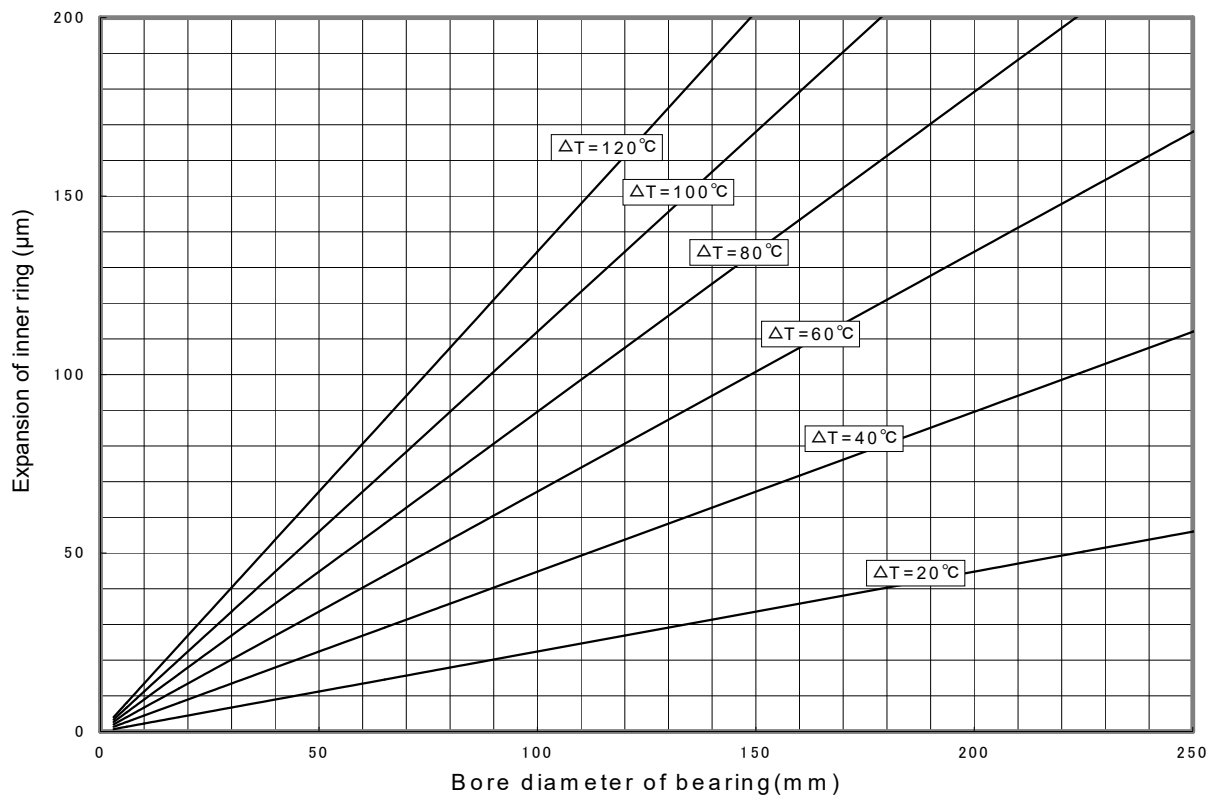
The warranty does not apply to products if the trouble is caused by any of following:

- ① Improper installation, environment, the usage except the description in the instruction manual and User's guide
- ② Causes originating from other than this product (Bearing Heater)
- ③ Repairs or alteration not authorized by manufacturer
- ④ Causes which could not have been foreseen with the level of science and technology at the time of shipping from manufacture
- ⑤ External causes which are out of manufacture's responsibility such as fire, earthquake, war, flood, lightning strike, abnormal voltage etc.

Appendix

Appendix 1: Inner Diameter Expansion Temperatures

Expansion of inner ring for temperature difference



Reference

According to the diagram as above, temperature difference needs to be above 50°C in the situation ,the bore diameter :100mm, shaft fitting: n6.

Fitting would be difficult if the bore of bearing get cold after the heating.

It is recommended that the target temperature is 20~30°C higher than required temperature.

Don't heat above 120°C when you heat the bearing.

Appendix 2: Safety Instruction

Appendix 2.1 Definition of Warning Symbols



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates that mishandling may result in unexpected danger and that the operator may be at risk of injury or the equipment is at risk for damage.



Indicates caution. Specific cause may be stated in this symbol.



Indicates forbiddance. Specific cause may be stated in this symbol.



Indicates compulsion or direction. Specific cause maybe stated in this symbol.

Appendix 2.2 Warnings



Do not plug in or pull out power cord or operate the machine with a wet hand. **Failure to observe this may result in severe injury through electric shock.**



Never put finger, other body parts or foreign materials in the machine. **Failure to observe this may result in unexpected injury.**



This machine is for industrial use. Inexperienced personnel and children should not touch the machine. **It could cause unexpected injury.**



Turn the power off and unplug machine prior to replacing any parts or during maintenance of this machine. **Failure to observe this may result severe injury.**



Do not use this machine for anything other than its specified applications. **Use of the machine for unintended applications can cause unexpected injury or machine failure.**

Appendix 2.3 Caution



Do not wet the machine. Do not install the machine at a location that is at risk of water splash. Failure to comply with this warning could cause unexpected injury, electric shock or machine failure.



Never modify or disassemble the machine. It can cause unexpected injury or failure of the machine.



Don't use the machine at the place where external noise and surge may intrude. It can cause unexpected injury or failure of the machine.



Don't use the machine when a lightning strike may occur. Turn off the main power and unplug the machine. It can cause failure of the machine, electric shock or fire.



Turn off the main power when not in use. It can cause unexpected injury or failure of the machine.



Always plug in or pull out the power cord holding the power plug. Never pull on the cord. Pulling on the cord may cause electric shock, short, and fire.



Never put any foreign objects into the machine. It can cause machine failure.



Operator's presence is always required during the operation. Turn off the main power and unplug the machine when not in use.



Do not damage the power cord. The power supply cable should not be touched in the heated parts. It can cause electric shock, short circuit, or ignition.



Insert the power plug securely into an electric outlet. A loose fitting plug may result in generation of heat and fire.



Do not operate in places where temperature, moisture, dirt, or dust may be excessive. It can cause machine failure.

Do not place the flammable material in the vicinity of this products. It may cause the fire.

Do not place this product in the place blocking up the vent.

It may cause the fire.



Install the machine on a flat and stable surface.

Dropping of the machine may cause injury or machine failure.

Always lock the safety stoppers on the wheels except moving of the machine.



To provide continued protection against electric shock, connect to properly grounded outlets only.

