

**E7830X**

**Rotating Anode X-ray Tube Assembly**

- ◆ Compact X-ray tube assembly for CT scanner featuring extremely high cooling performance.
- ◆ Liquid metal lubricated bearings (LM bearings) is applied in the rotation system.
- ◆ All-metal extra-heavy anode disc is constructed with specially processed rhenium-tungsten-faced molybdenum alloy target.
- ◆ The anode heat storage capacity is 2840 kJ (4000 KHU) and the maximum anode heat dissipation rate is 10.2 kW.

**General Data**

**IEC Classification (IEC60601-1:1988+Amd.1:1991+Amd.2:1995)**

..... **Class I ME EQUIPMENT**

**Electrical:**

Circuit:

High Voltage Generator ..... Constant potential high-voltage generator

Grounding ..... Center-grounded

Nominal X-ray Tube Voltage ..... 135 kV

Nominal Focal Spot Value (IEC60336:1993):

Large Focus ..... 1.4 × 1.4

Small Focus ..... 0.9 × 0.7

Nominal Anode Input Power (at 4s):

Large Focus ..... 48 kW

Small Focus ..... 30 kW

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 ★The information contained herein may be changed without prior notice. It is therefore advisable to contact TETD before proceeding with the design of equipment incorporating this product.

## Motor Ratings:

Stator: XS-AY

Tube status	1st Start-up	2nd Start-up	Stand-by	Boost-up from Stand-by	Scanning
Driven Frequency [Hz]	50	120	105	120	120
Input Power [W]	1500	500	350	950	500
Voltage [V]	130	168	120	200	168
Current [A]	15	7.5	6.0	9.0	7.5
Min. Speed Up [s]	5	15	6	9	-

Notes 1) To be obtained with 3-phase starter ST-7013 or equivalent.

2) These data are indicating standard values.

3) Anode keeps continuous rotation regardless X-ray output.

Anode Rotation Speed ..... Minimum 6360 min<sup>-1</sup>

Stator:

Type ..... Three-phase

Each winding impedance ..... 3.8 Ω

Resistance between Housing and Low Voltage Terminals ..... Minimum 2 MΩ  
(Measured by DC 500 V)

Heat Exchanger Input Power ..... 360 W

Heat Exchanger Input Voltage ..... Single-phase AC 200 V

Heat Exchanger Source frequency ..... 50/60 Hz

Normal Operating Range of the Housing Temperature ..... 16 ~ 75 °C

Mode of Operation ..... Intermittent

**Mechanical:**

Dimensions ..... See dimensional outline.

Overall length ..... 493 mm

Maximum diameter ..... 213 mm

Target:

Anode Angle ..... 7 degrees

Diameter ..... 140 mm

Construction ..... Rhenium-tungsten

Permanent Filtration ..... 1.1 mm Al / 75 kV IEC60522:1999

Radiation Protection (To meets requirements of IEC60601-1-3):

Leakage Technique Factor ..... 135 kV, 29.6 mA

X-ray Coverage:

Longitudinal direction of tube axis ..... Anode side 3.3°

Cathode side 21°

Perpendicular direction of tube axis ..... ± 27°

Weight (Approx.):

Tube Housing Unit ..... Approx. 41 kg

Heat Exchanger ..... Approx. 26 kg

High Voltage Receptacle ..... To meet requirements of IEC60526Corrigendum 1:2010

Cooling Method ..... Heat Exchanger

Position during operation ..... ± 30° with respect to tube axis

Position during shipping ..... Anode facing upward

G proof in gantry rotation ..... Maximum 6.3 × 9.8 m/s<sup>2</sup>

Housing Model Number ..... XH-168

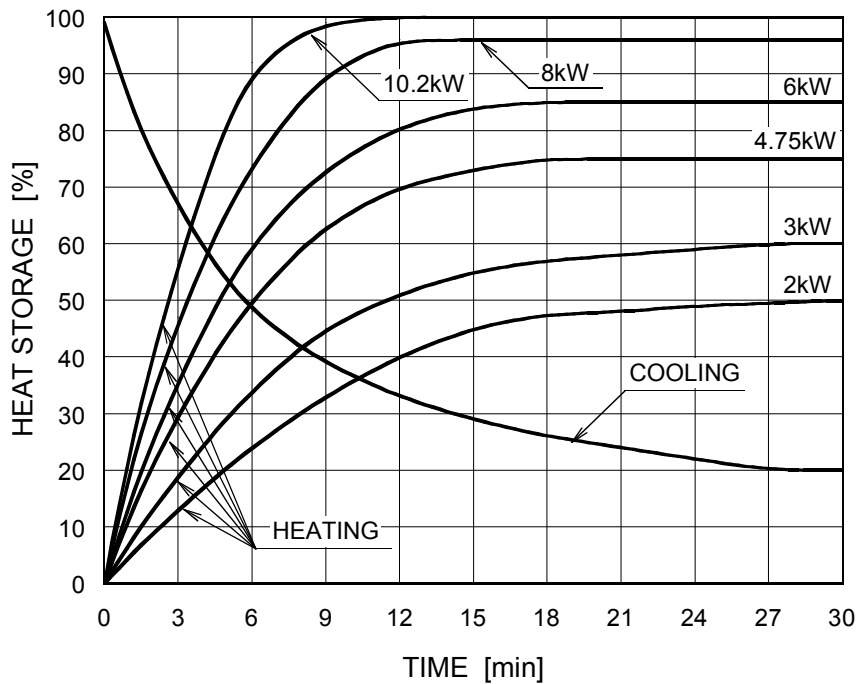
## Absolute Maximum and Minimum Ratings (At any time, these values must not be exceeded.)

Maximum X-ray Tube Voltage .....	135 kV
Between Anode (or Cathode) and Ground .....	67.5 kV
Minimum X-ray Tube Voltage .....	80 kV
Maximum X-ray Tube Current:	
Large Focus .....	400 mA
Small Focus .....	300 mA
Maximum Filament Current:	
Large Focus .....	5.2 A
Small Focus .....	5.2 A
Filament Voltage:	
Large Focus (At maximum filament current 5.2 A) .....	9.7 ~ 13.2 V
Small Focus (At maximum filament current 5.2 A) .....	10.5 ~ 14.4 V
Long Time Maximum Input .....	4.0 kW (5.63 kHU/s)
Thermal Characteristics:	
Maximum Anode Heat Content .....	2840 kJ (4000 kHU)
Maximum Anode Heat Dissipation .....	10.2 kW (14.4 kHU/s)
Operating Anode Heat Dissipation .....	5.7 kW (8.03 kHU/s)
X-ray Tube Assembly Heat Content .....	3750 kJ (5280 kHU)
Maximum Continuous Heat Dissipation:	
With Heat Exchanger .....	4.0 kW (5.63 kHU/s)
	Ambient Temperature 45 °C
	Oil Temperature 80 °C

## Environmental Limits

Operating Limits:	
Temperature .....	18 ~ 45 °C
Relative Humidity .....	30 ~ 80 %
	(No condensation)
Atmospheric Pressure .....	70 ~ 106 kPa
Transport and Storage:	
Temperature:	
With cooling water empty .....	-20 ~ 75 °C
With cooling water filled .....	2 ~ 60 °C
Relative Humidity .....	20 ~ 90 %
	(No condensation)
Atmospheric Pressure .....	50 ~ 106 kPa

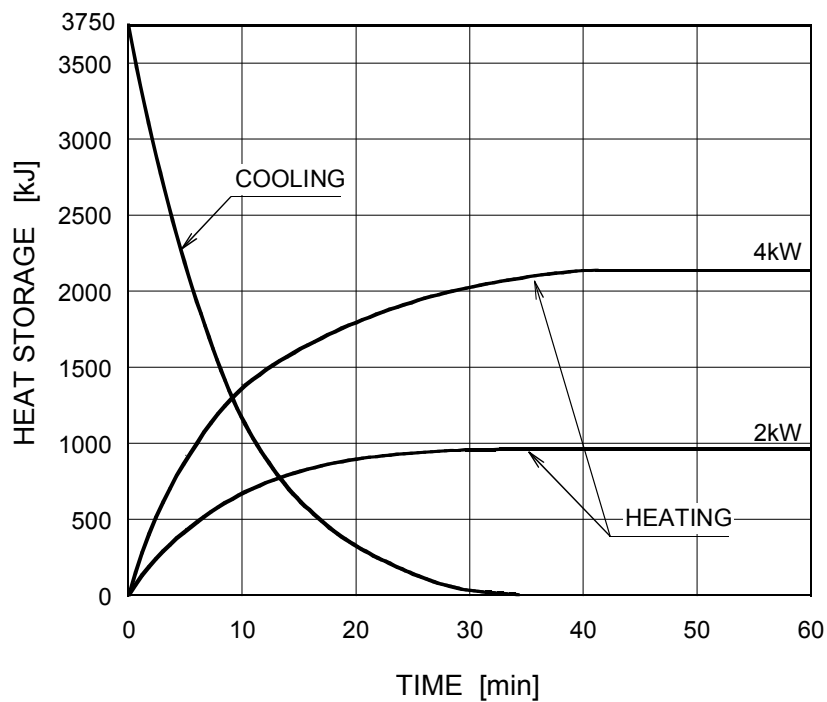
## Anode Heating / Cooling Curve



### Notes

1. Heat storage of the anode is calculated based on the anode thermal characteristics. This determines the X-ray input conditions for subsequent X-ray exposure. For specifying conditions, contact TETD.
2. To avoid the over-load, the OLP (overload protection) program should be used to restrict the X-ray input conditions. The X-ray tube assembly should not be used in systems which do not incorporate the OLP program. When absolutely impossible to use a system which incorporate the OLP program, contact TETD for operating procedures.
3. Before you make the OLP program, contact TETD for the detail conditions.

### X-ray Tube Assembly Heating / Cooling Curve

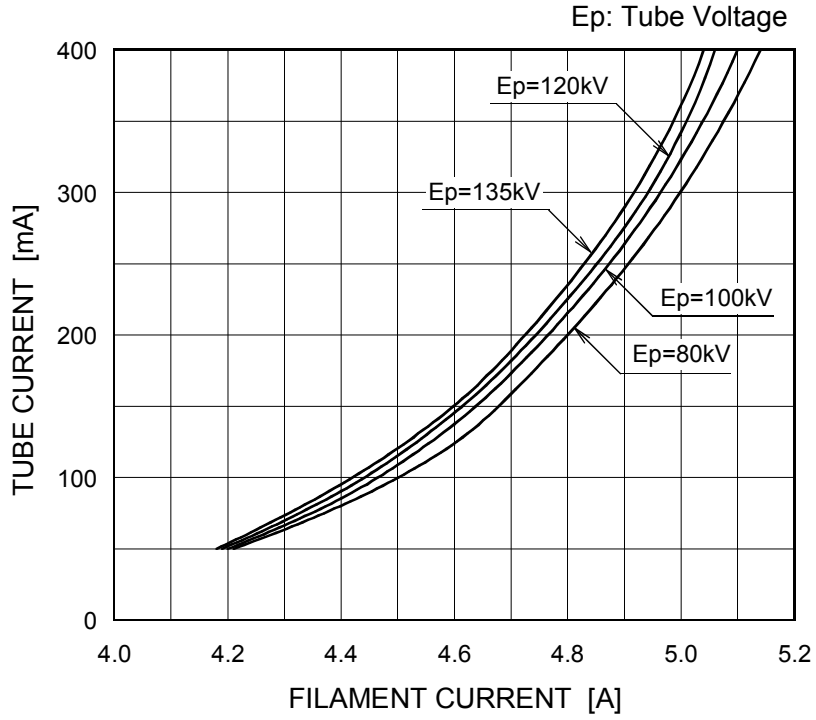


### Maximum Rating Tables (Absolute Maximum Rating Tables)

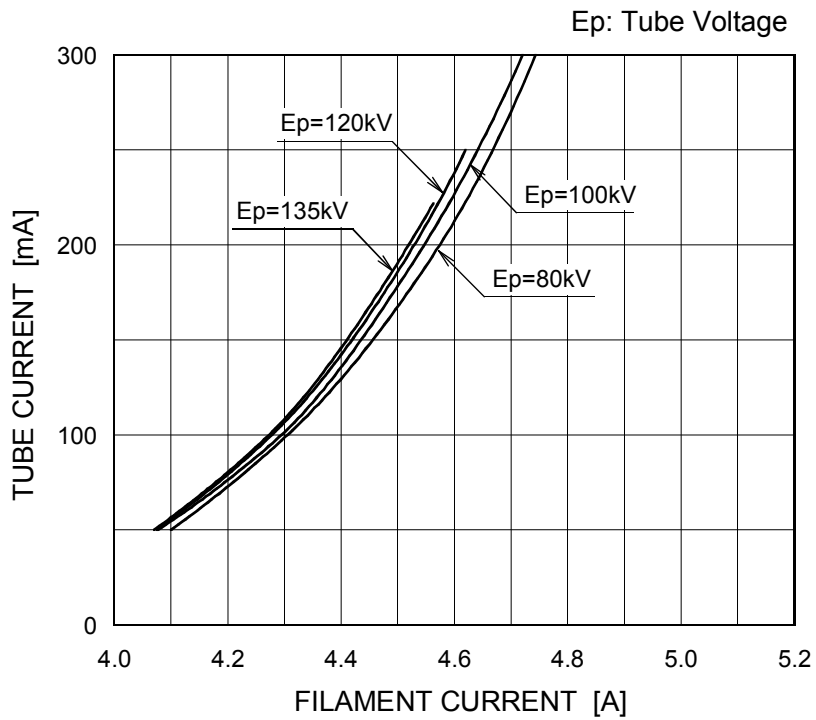
Scan Time [Seconds]	Large Focus [kW]	Small Focus [kW]
1	48	30
5	48	30
10	43.5	29
20	40	27
30	37	26
40	36	25
50	28	24
60	28	22

### Emission Characteristics

Large Focus ■



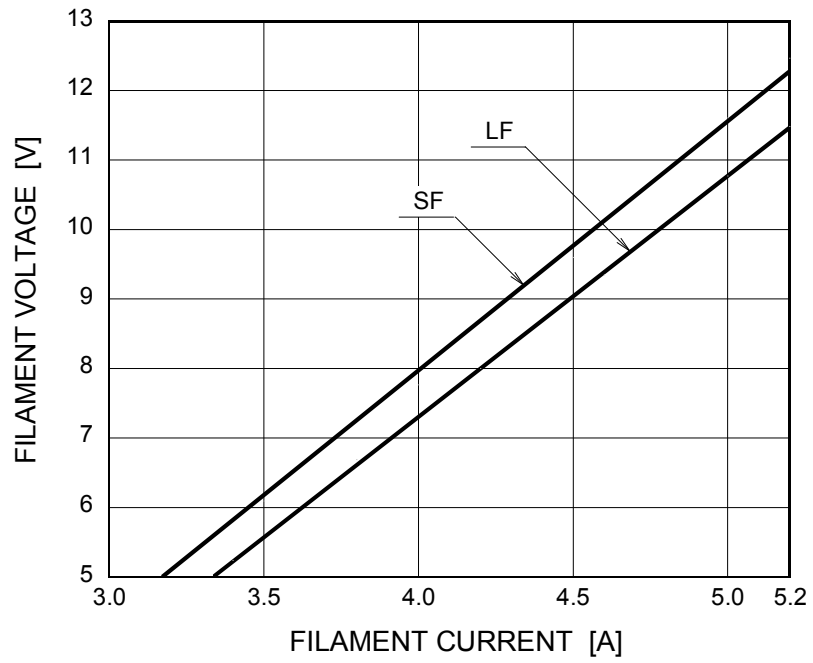
Small Focus □



## Filament Characteristics

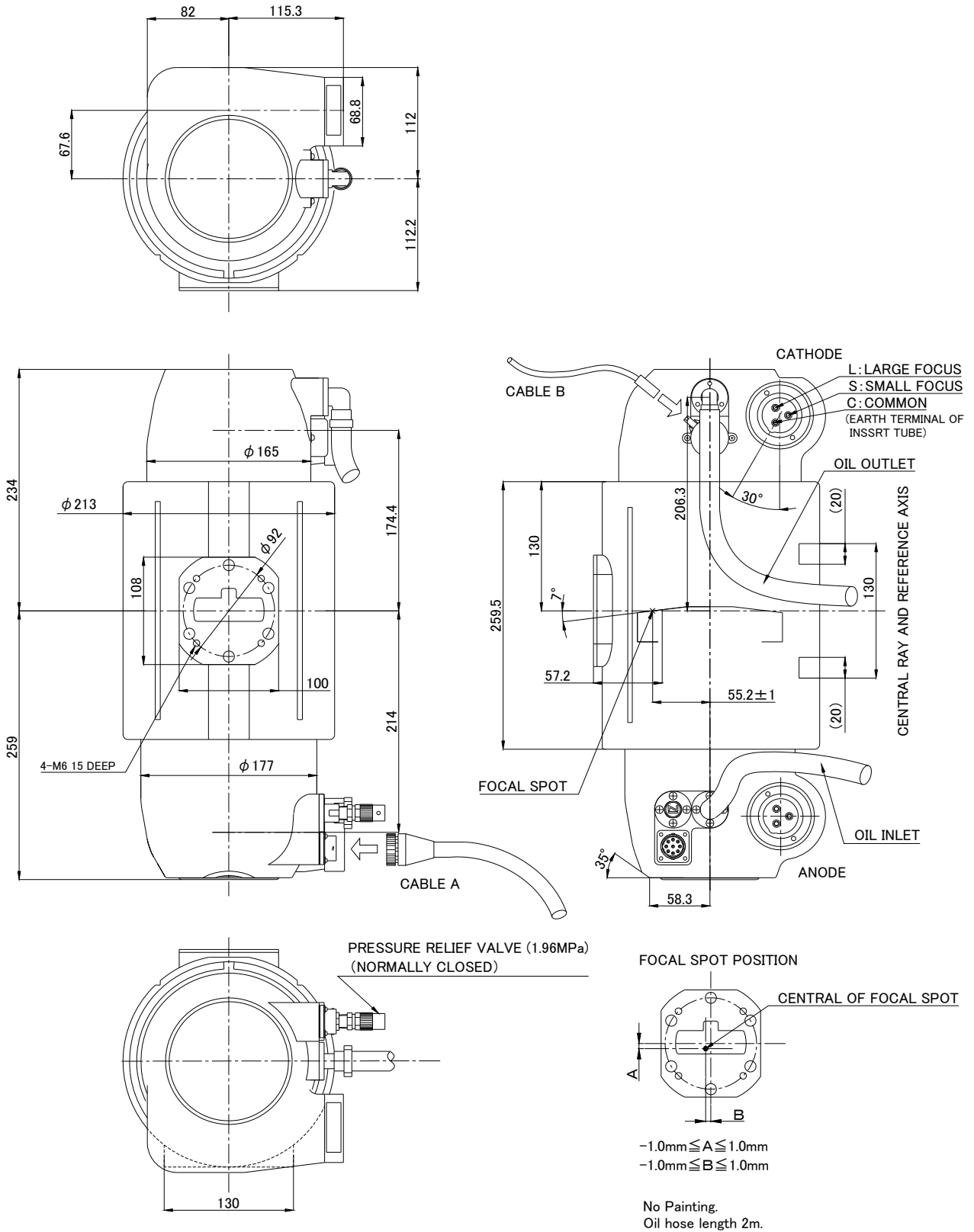
SF : Small Focus

LF : Large Focus



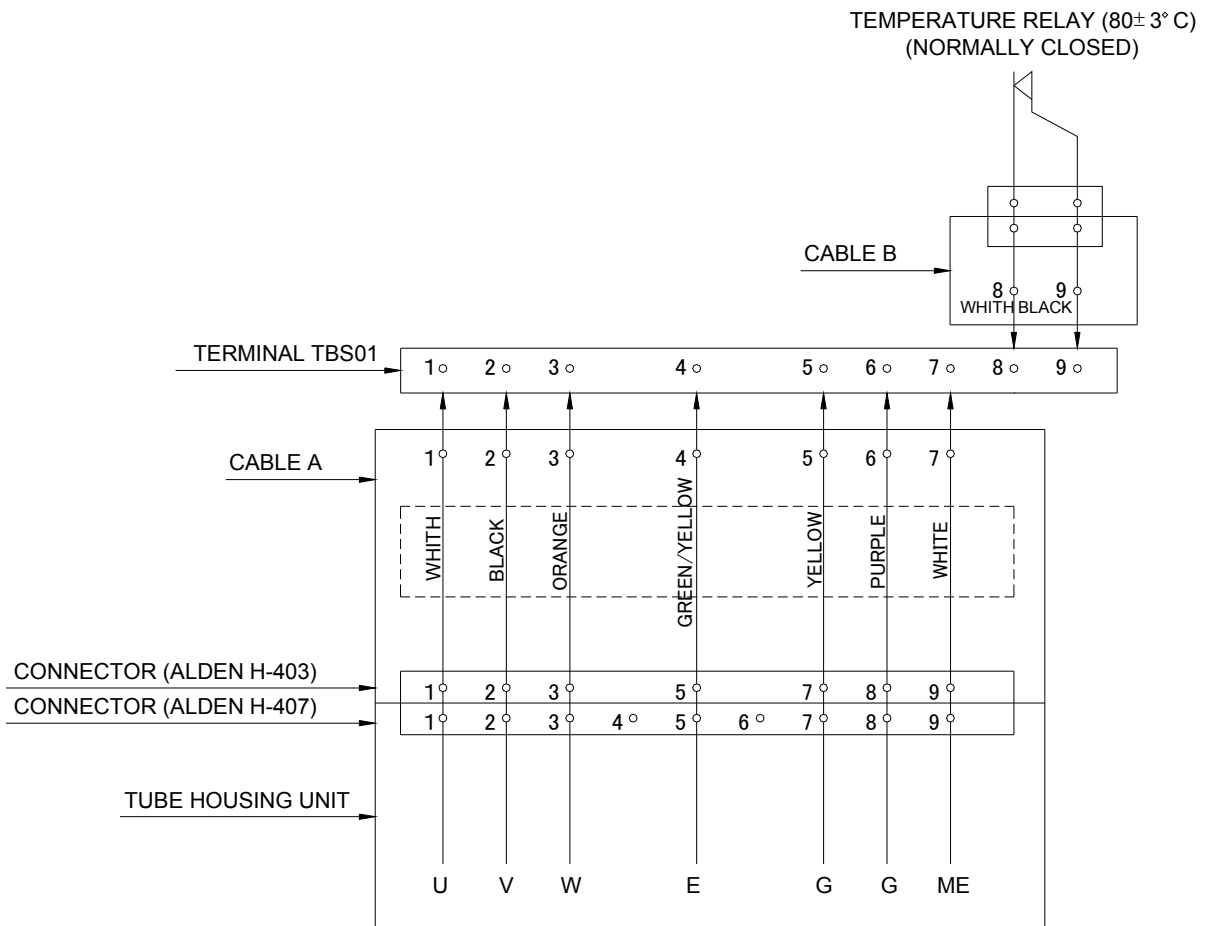
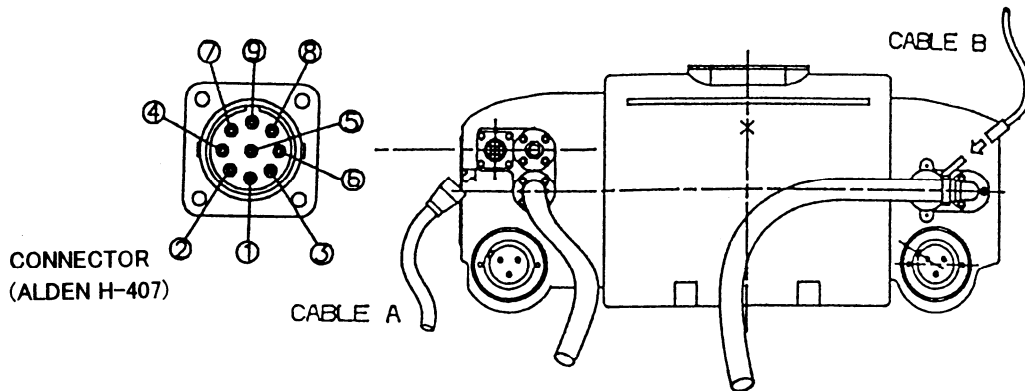
## Dimensional Outline of Tube Housing Unit

unit : mm





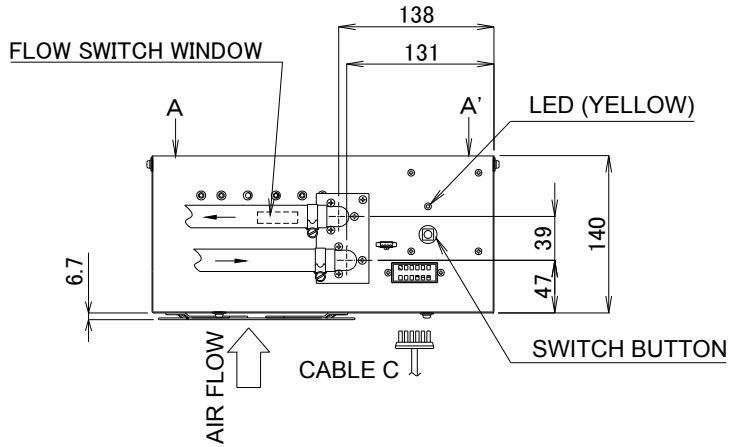
## Terminal Connections of Tube Housing Unit



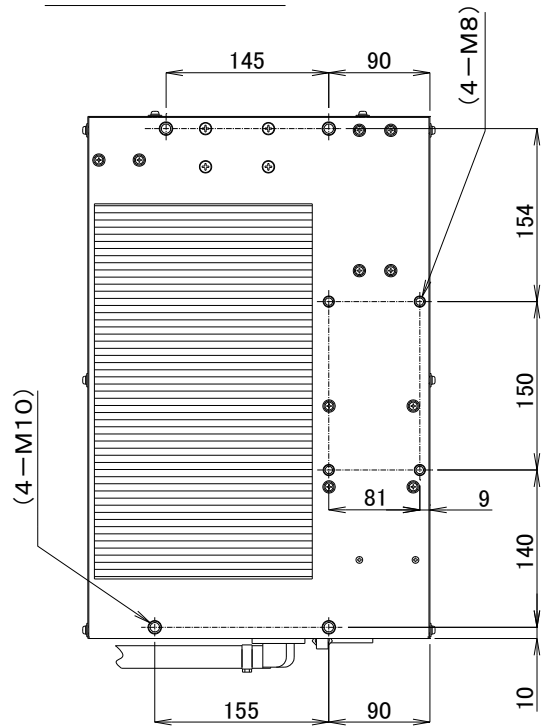
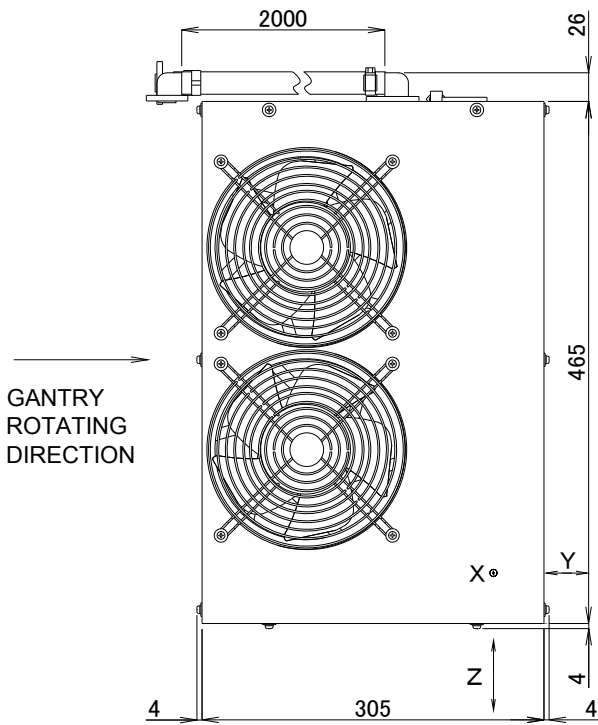
- U : FU PHASE WINDING OF THE STATOR COIL
- V : FV PHASE WINDING OF TNE STATOR COIL
- W : FW PHASE WINDING OF THE STATOR COIL
- E : FEARTH TERMINAL OF HOUSING ASS.
- G : FGETTER TERMINAL
- ME : FEARTH TERMINAL OF INSERT TUBE METAL ENVELOPE

### Dimensional Outline of Heat Exchanger

Unit : mm

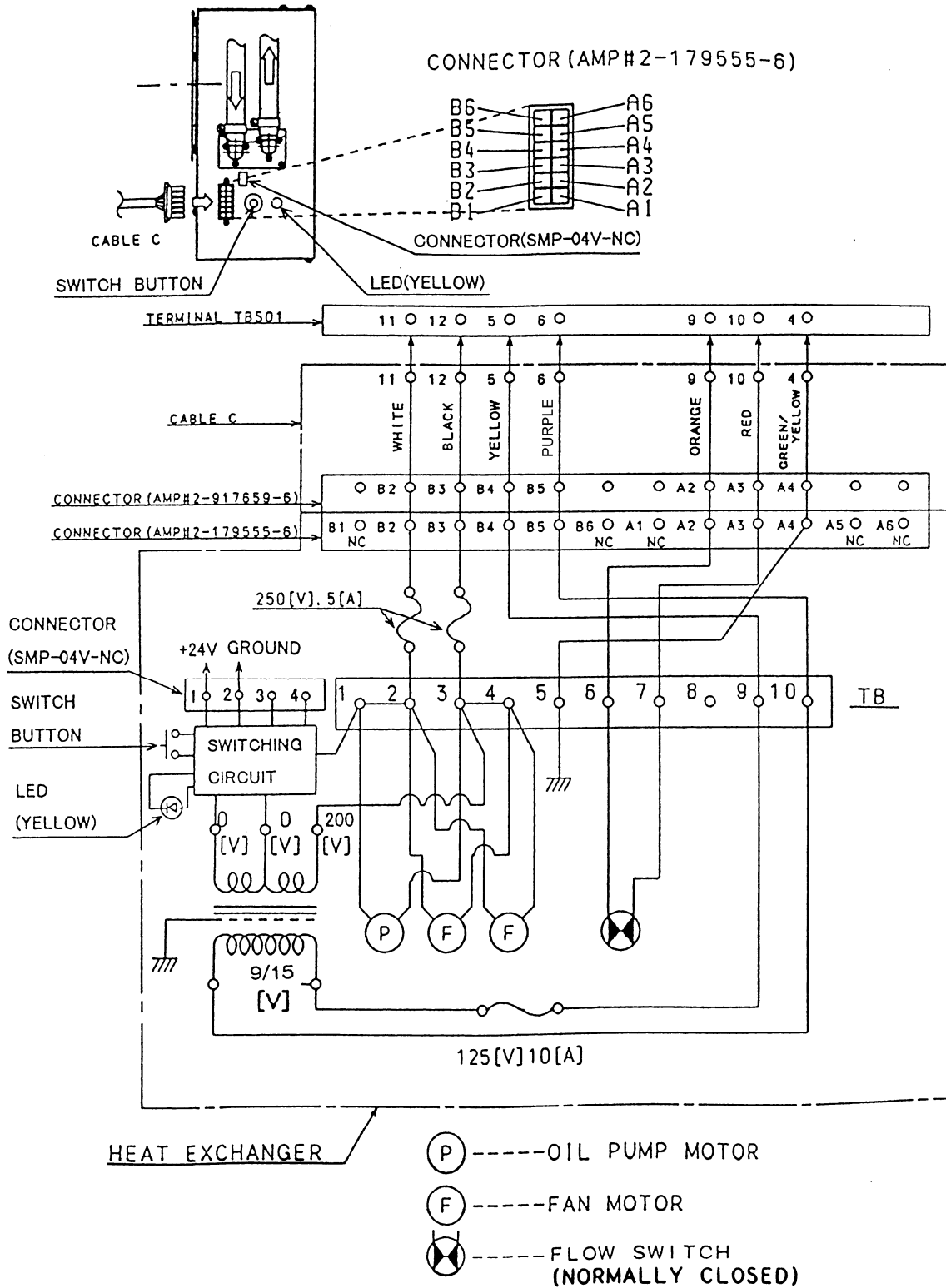


VIEW FROM A-A'



PAINT COLOR: WHITE (Munsell N9.5)

## Terminal Connections of Heat Exchanger



## OVERSEAS SUBSIDIARIES AND AFFILIATES

### EU REPRESENTATIVE

#### ·TOSHIBA ELECTRONICS EUROPE GMBH

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY

PHONE +49 (211) 5296-107      FAX +49 (211) 5296-402

**For Sales & Technical Services, please contact the following representative:**

#### ·TOSHIBA ELECTRONICS EUROPE GMBH

HANSAALLEE 181 40549 DÜSSELDORF, GERMANY

PHONE +49 (211) 5296-107      FAX +49 (211) 5296-402

#### ·TOSHIBA AMERICA ELECTRONIC COMPONENTS, INC.

2150 EAST LAKE COOK ROAD, SUITE 310

BUFFALO GROVE, ILLINOIS 60089 USA

PHONE +1 (847) 484-2400      FAX +1 (847) 541-7287

#### ·TOSHIBA ELECTRON DEVICES & MATERIALS (SHANGHAI) CO., LTD. (TEMS)

RM1606, SH-PLAZA,

No.336, XIZANG ROAD (MIDDLE), SHANGHAI, 200001, CHINA

PHONE +86 (21) 6361-0077      FAX +86 (21) 6351-5760

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### TOSHIBA ELECTRON TUBES & DEVICES CO., LTD.

(Product Development Engineering Department)

1385 SHIMOISHIGAMI, OTAWARA-SHI, TOCHIGI-KEN, 324-8550, JAPAN

PHONE: +81-287-26-6666      FAX: +81-287-26-6060

<http://www.toshiba-tetd.co.jp/>

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·Toshiba Electron Tubes & Devices Co., Ltd. meets internationally recognized Standards for Quality Management System ISO9001, ISO13485.