

XRC-4551X

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 content is 2840 kJ (4000 kHU) and the maximum anode heat dissipation rate is 10.2 kW.

General Data

IEC Classification (IEC660601-1:2005+A1:2012) 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:	
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
Nominal CT Anode Input Power:	
Large Focus	48 kW
Small Focus	26 kW
Nominal CT Scan Power Index (CTSPI):	
Large Focus	42 kW
Small Focus	22 kW

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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 Speed Minimum 6360 min⁻¹
 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
 Envelope Current (135kV / 100mA) (Approx) 10 mA
 Envelope Voltage (135kV / 100mA) 0 kV

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:
 X-ray Leakage Maximum 0.87 mGy/h
 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:
 Tube Housing Unit Approx. 41 kg
 Heat Exchanger Approx. 26 kg
 High Voltage Receptacle To Meet Requirements of IEC60526 Corrigendum1:2010
 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 8.6 × 9.8 m/s²
 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 (25 kHz Maximum):	
Large Focus	5.2 A
Small Focus	5.2 A
Filament Voltage (25 kHz Maximum):	
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
Continuous Anode Input Power	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)
Nominal Continuous Input Power:	
With Heat Exchanger	4.0 kW (5.63 kHU/s)
	Ambient Temperature 40 °C
	Oil Temperature 80 °C

Peak Power Input Ratings:

Do not exceed these value in any anode heat content.

Exposure Time [sec]	Peak Power [kW]	
	Small Focal Spot	Large Focal Spot
4	30	48
10	29	43.5
20	27	40
30	26	37
40	25	36
100	15	20
300	0	0

Environmental Limits

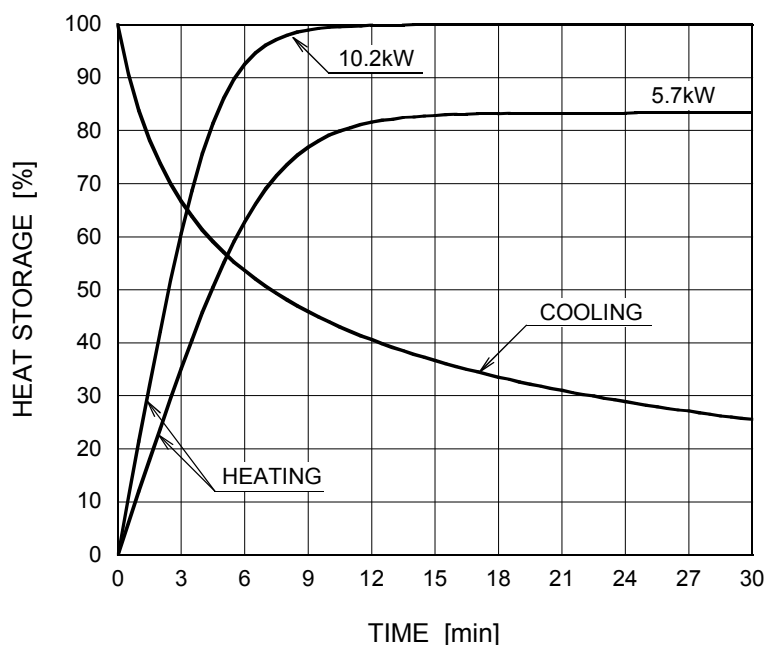
Operating Limits:

Temperature	18 ~ 45 °C
Humidity	30 ~ 80 % (No Condensation)
Atmospheric Pressure	70 ~ 106 kPa
Altitude.....	2000 m

Shipping and Storage Limits:

Temperature	-20 ~ 75 °C
Humidity	20 ~ 90 % (No Condensation)
Atmospheric Pressure	50 ~ 106 kPa

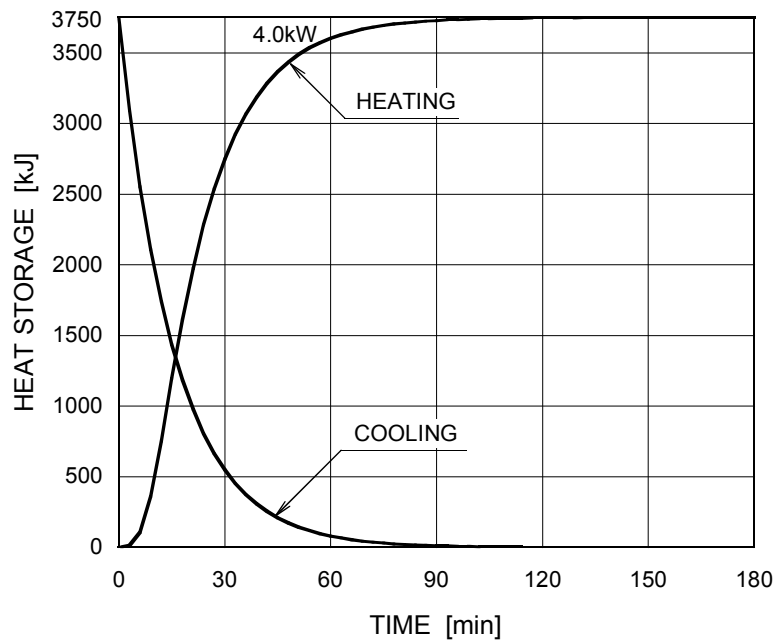
Anode Heating / Cooling Curve



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 CETD.
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 CETD for operating procedures.
3. Before you make the OLP program, contact CETD for the detail conditions.

X-ray Tube Assembly Heating / Cooling Curve



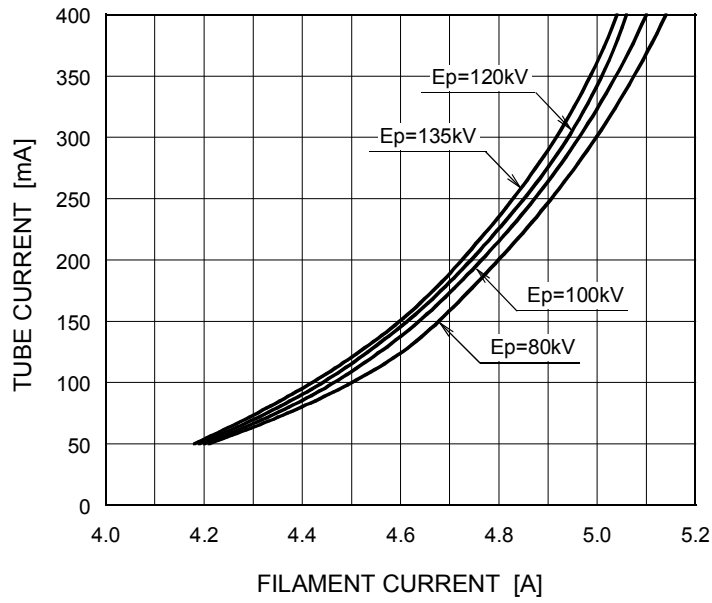
Maximum Rating Tables (Absolute Maximum Rating Tables)

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 ■

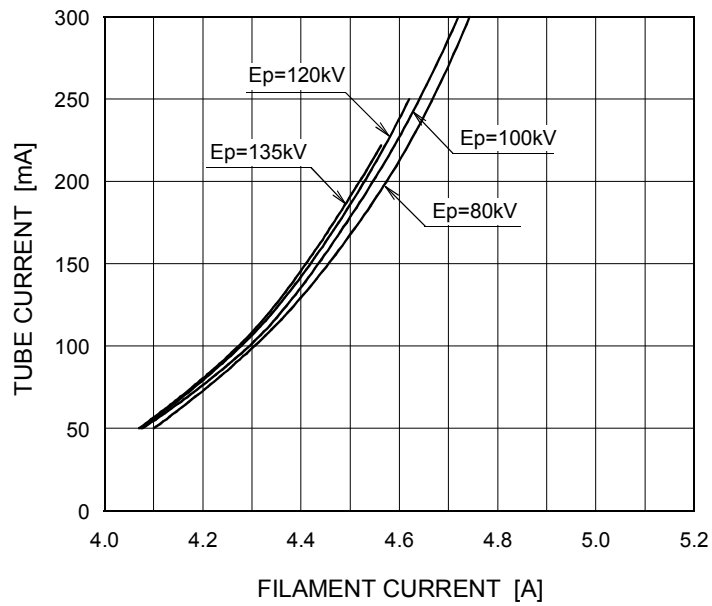
Ep: Tube Voltage



For Reference Only

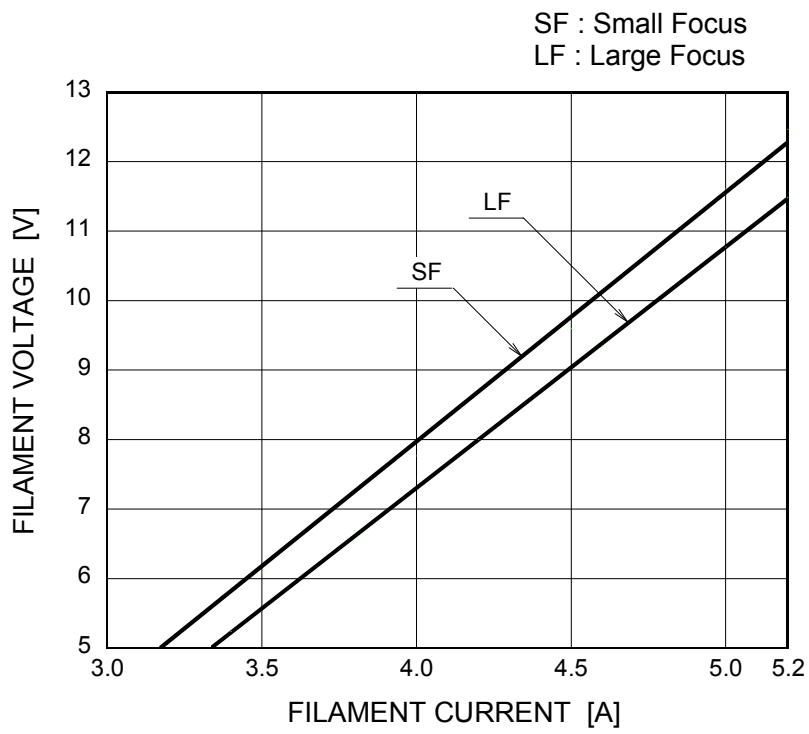
Small Focus □

Ep: Tube Voltage



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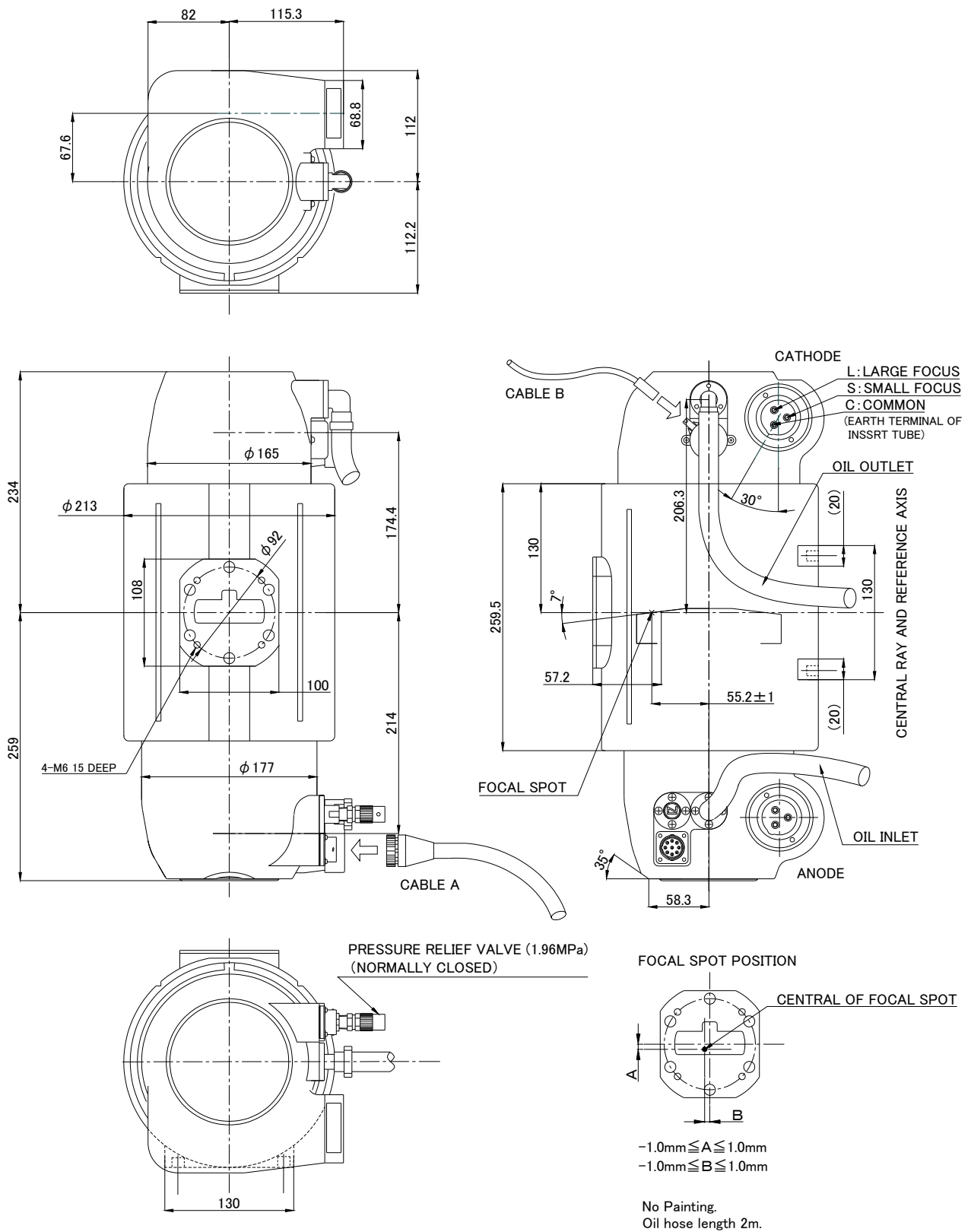
Filament Characteristics



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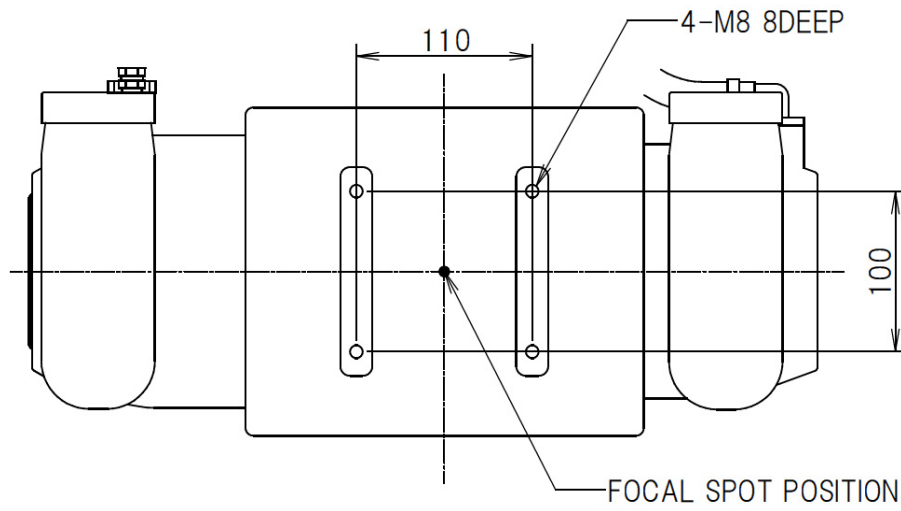
Dimensional Outline of Tube Housing Unit

unit : mm

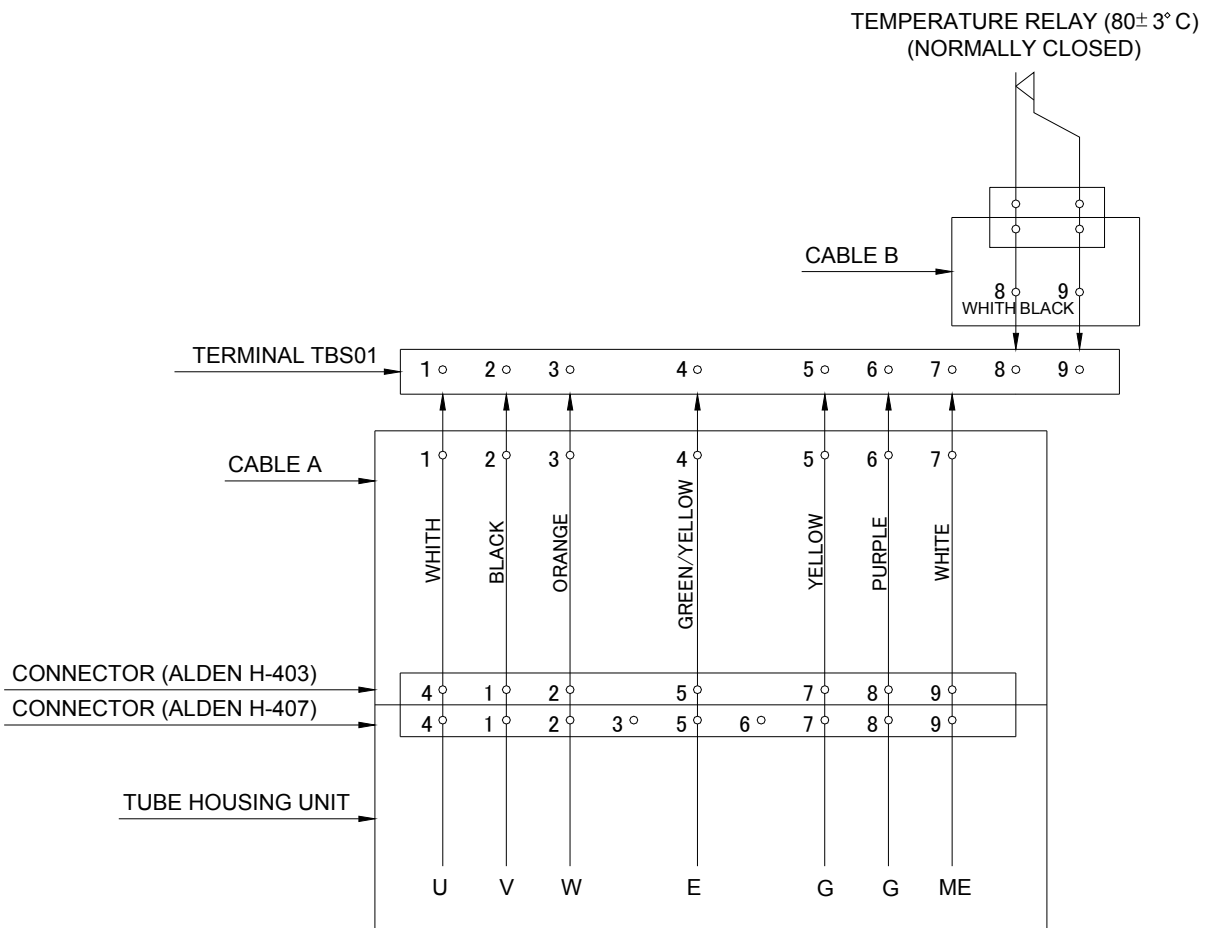
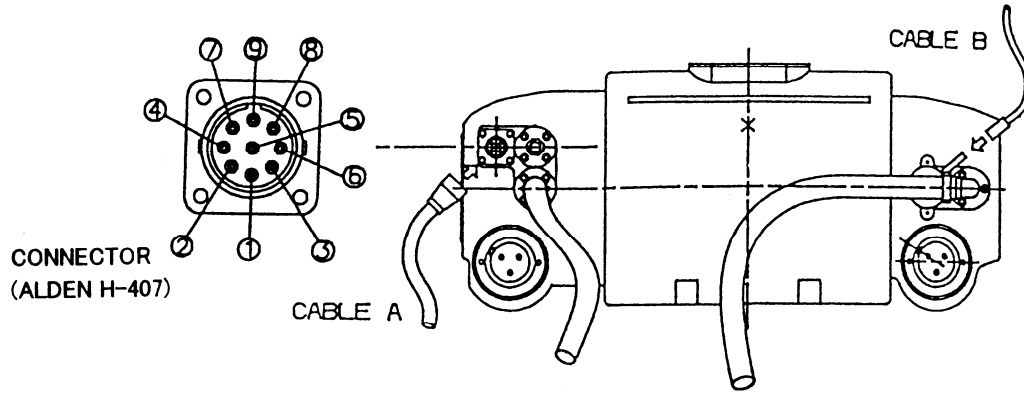


Position of Screw Hole for Fixing to Gantry

unit : mm



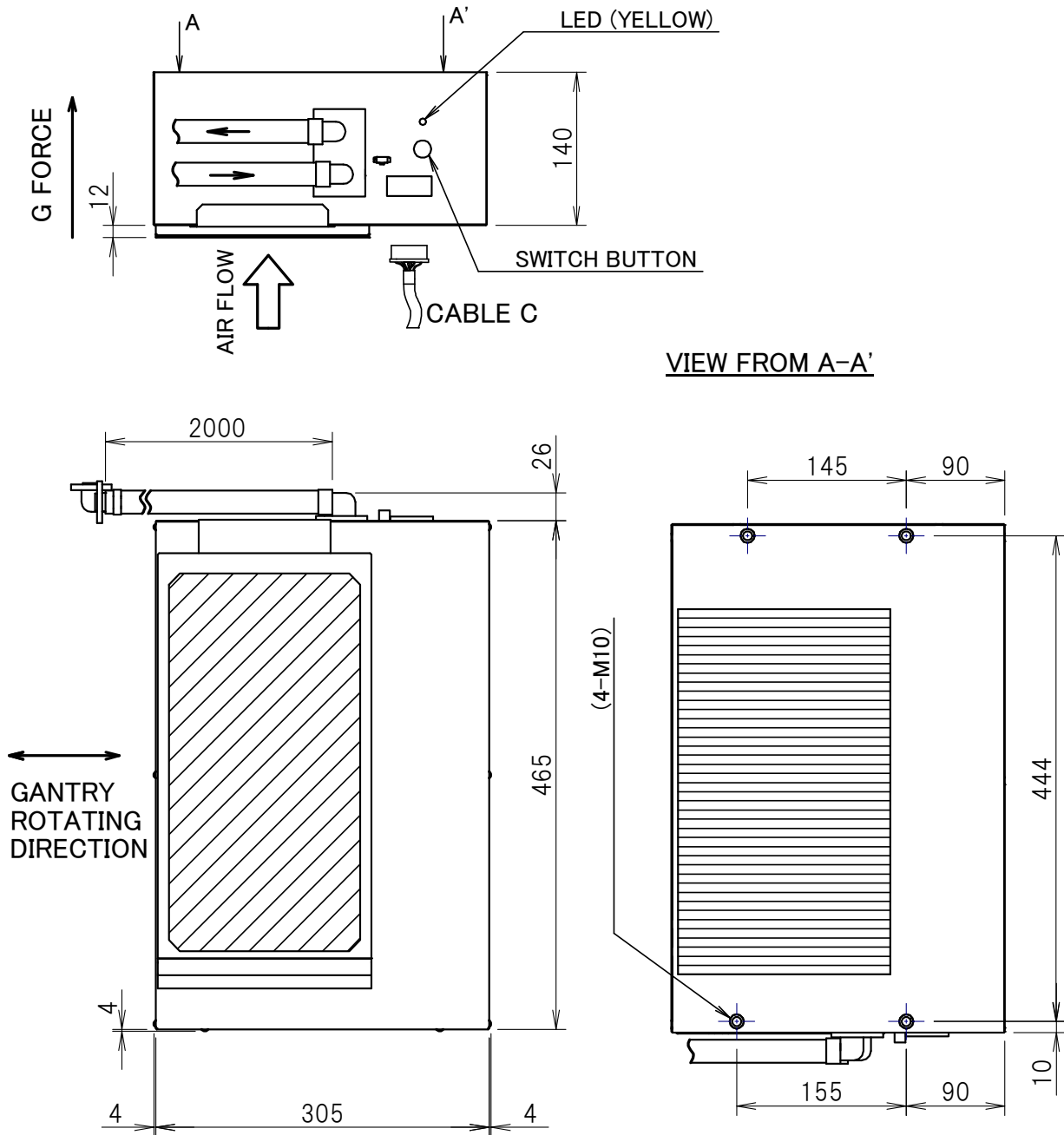
Terminal Connections of Tube Housing Unit



- U : U PHASE WINDING OF THE STATOR COIL
- V : V PHASE WINDING OF TNE STATOR COIL
- W : W PHASE WINDING OF THE STATOR COIL
- E : EARTH TERMINAL OF HOUSING ASS.
- G : GETTER TERMINAL
- ME : EARTH TERMINAL OF INSERT TUBE METAL ENVELOPE

Dimensional Outline of Heat Exchanger

Unit : mm



PAINT COLOR: WHITE (Munsell N9.5)



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·Canon Electron Tubes & Devices Co., Ltd. has been certified to meet all the requirements of Quality Management Systems ISO9001 and ISO13485.
Product scope is referred to the following URL. <https://etd.canon/company/quality.htm>