

PHOTOMULTIPLIER TUBE ASSEMBLY TYPE: H12700A-03

DUKE UNIV

QUANTITY: 8 pcs.

Serial Number	(1) Cathode Luminous Sens. μ A/lm	(2) Anode Luminous Sens. A/lm	(3) Anode Dark Current nA	(4) Cathode Blue Sens. Index	(5) Gain $\times 10^6$		
HA0027	75.0	73.3	0.17	11.30	0.97		
HA0028	70.8	101.0	0.43	11.20	1.43		
HA0037	67.8	174.0	0.61	10.50	2.57		
HA0043	100.0	246.0	0.48	12.90	2.46		
HA0044	108.0	403.0	1.94	12.70	3.73		
HA0045	88.5	132.0	0.25	12.10	1.49		
HA0046	75.1	70.1	0.16	11.40	0.93		
HA0053	80.6	105.0	5.65	11.60	1.30		

NOTES

- (1) (2) (4) Light source: Tungsten filament lamp operated at 2856 K.
- (2) (3) (5) Overall supply voltage: 1000 V
Voltage distribution:

K	Dy1	Dy2	Dy3	...	Dy9	Dy10	GR	P
2	1	1	1	1	1	1	0.5	
- Measured as one anode output by bundling multi anode, although H12700 has multi anode.
- (4) Measured with a Corning CS 5-58 blue filter (half stock thickness).
- (1) (2) (4) (5) Aperture size: \square 49 mm

Date: February 26, 2015

Approved by: *K. Nagura*

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0027

Ratio of Anode Output = 1 : 2.1

P1	P2	P3	P4	P5	P6	P7	P8
74	77	81	82	80	93	93	88
P9	P10	P11	P12	P13	P14	P15	P16
74	71	76	78	78	87	94	100
P17	P18	P19	P20	P21	P22	P23	P24
73	67	70	71	71	81	90	98
P25	P26	P27	P28	P29	P30	P31	P32
69	62	63	66	69	76	85	95
P33	P34	P35	P36	P37	P38	P39	P40
64	59	59	62	65	72	80	90
P41	P42	P43	P44	P45	P46	P47	P48
59	55	57	57	60	69	75	85
P49	P50	P51	P5	P53	P54	P55	P56
51	52	55	56	56	66	72	79
P57	P58	P59	P60	P61	P62	P63	P64
48	54	56	59	61	71	74	74

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0028

Ratio of Anode Output = 1 : 1.6

P1	P2	P3	P4	P5	P6	P7	P8
67	76	66	71	79	87	85	73
P9	P10	P11	P12	P13	P14	P15	P16
80	79	76	79	81	87	88	84
P17	P18	P19	P20	P21	P22	P23	P24
87	82	81	82	83	86	87	86
P25	P26	P27	P28	P29	P30	P31	P32
91	84	83	86	83	87	90	89
P33	P34	P35	P36	P37	P38	P39	P40
90	80	82	87	82	87	92	92
P41	P42	P43	P44	P45	P46	P47	P48
84	74	76	81	79	85	91	93
P49	P50	P51	P52	P53	P54	P55	P56
76	61	62	76	76	82	84	91
P57	P58	P59	P60	P61	P62	P63	P64
78	68	67	83	89	100	98	91

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0037

Ratio of Anode Output = 1 : 1.7

P1	P2	P3	P4	P5	P6	P7	P8
64	69	71	73	70	59	71	64
P9	P10	P11	P12	P13	P14	P15	P16
67	66	72	75	71	66	70	73
P17	P18	P19	P20	P21	P22	P23	P24
68	65	67	72	70	64	65	71
P25	P26	P27	P28	P29	P30	P31	P32
73	71	72	74	73	58	68	75
P33	P34	P35	P36	P37	P38	P39	P40
77	74	78	79	78	71	73	77
P41	P42	P43	P44	P45	P46	P47	P48
78	75	81	84	80	63	77	76
P49	P50	P51	P52	P53	P54	P55	P56
77	74	83	87	84	75	78	76
P57	P58	P59	P60	P61	P62	P63	P64
82	90	99	100	92	96	92	80

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0043

Ratio of Anode Output = 1 : 1.9

P1	P2	P3	P4	P5	P6	P7	P8
71	76	80	85	87	98	100	87
P9	P10	P11	P12	P13	P14	P15	P16
68	63	67	71	71	79	90	98
P17	P18	P19	P20	P21	P22	P23	P24
66	58	60	61	63	72	85	94
P25	P26	P27	P28	P29	P30	P31	P32
64	56	55	58	61	69	81	89
P33	P34	P35	P36	P37	P38	P39	P40
61	54	55	55	59	67	78	84
P41	P42	P43	P44	P45	P46	P47	P48
58	53	53	54	57	65	78	81
P49	P50	P51	P5	P53	P54	P55	P56
55	53	54	53	56	64	74	77
P57	P58	P59	P60	P61	P62	P63	P64
60	74	73	72	79	86	88	75

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
Light Source : W-Lamp with blue filter (DC Light)
Spot Illumination : 6 mm square on each channel

Serial No. : HA0044

Ratio of Anode Output = 1 : 1.5

P1	P2	P3	P4	P5	P6	P7	P8
69	81	86	93	93	100	96	81
P9	P10	P11	P12	P13	P14	P15	P16
83	76	81	88	88	89	89	94
P17	P18	P19	P20	P21	P22	P23	P24
82	70	75	79	78	82	80	91
P25	P26	P27	P28	P29	P30	P31	P32
81	68	72	78	77	78	76	87
P33	P34	P35	P36	P37	P38	P39	P40
79	66	68	72	72	74	74	83
P41	P42	P43	P44	P45	P46	P47	P48
77	66	68	67	68	71	73	79
P49	P50	P51	P52	P53	P54	P55	P56
75	67	68	66	68	69	68	74
P57	P58	P59	P60	P61	P62	P63	P64
81	87	86	82	86	89	80	74

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0045

Ratio of Anode Output = 1 : 1.7

P1	P2	P3	P4	P5	P6	P7	P8
76	81	81	82	89	97	100	89
P9	P10	P11	P12	P13	P14	P15	P16
76	71	75	80	85	91	97	99
P17	P18	P19	P20	P21	P22	P23	P24
75	66	69	73	76	84	91	96
P25	P26	P27	P28	P29	P30	P31	P32
73	64	67	69	76	81	87	95
P33	P34	P35	P36	P37	P38	P39	P40
71	61	65	68	74	79	85	90
P41	P42	P43	P44	P45	P46	P47	P48
68	60	65	69	73	76	83	87
P49	P50	P51	P52	P53	P54	P55	P56
65	59	64	69	72	74	79	80
P57	P58	P59	P60	P61	P62	P63	P64
67	67	70	76	80	79	84	76

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0046

Ratio of Anode Output = 1 : 1.9

P1	P2	P3	P4	P5	P6	P7	P8
52	56	64	71	75	87	87	85
P9	P10	P11	P12	P13	P14	P15	P16
60	58	64	73	77	86	88	100
P17	P18	P19	P20	P21	P22	P23	P24
60	56	61	68	73	81	88	99
P25	P26	P27	P28	P29	P30	P31	P32
61	58	60	65	72	82	89	99
P33	P34	P35	P36	P37	P38	P39	P40
61	61	62	65	72	82	90	97
P41	P42	P43	P44	P45	P46	P47	P48
55	56	61	67	73	82	89	95
P49	P50	P51	P52	P53	P54	P55	P56
57	57	62	72	79	83	87	94
P57	P58	P59	P60	P61	P62	P63	P64
62	65	67	78	86	95	95	90

Top View

Anode Uniformity of H12700A-03

Supply Voltage : -1000 V
 Light Source : W-Lamp with blue filter (DC Light)
 Spot Illumination : 6 mm square on each channel

Serial No. : HA0053

Ratio of Anode Output = 1 : 2.5

P1	P2	P3	P4	P5	P6	P7	P8
84	75	69	78	82	64	54	40
P9	P10	P11	P12	P13	P14	P15	P16
84	70	67	72	69	60	52	47
P17	P18	P19	P20	P21	P22	P23	P24
80	65	62	62	61	57	54	45
P25	P26	P27	P28	P29	P30	P31	P32
80	63	60	56	59	55	51	44
P33	P34	P35	P36	P37	P38	P39	P40
83	63	59	55	58	55	52	44
P41	P42	P43	P44	P45	P46	P47	P48
84	66	62	60	63	58	52	46
P49	P50	P51	P52	P53	P54	P55	P56
86	66	61	63	70	59	52	45
P57	P58	P59	P60	P61	P62	P63	P64
100	84	72	84	100	73	58	44

Top View

FLAT PANEL TYPE MULTIANODE PHOTOMULTIPLIER TUBE ASSEMBLY

H12700 SERIES

《HANDLING PRECAUTION》

【Take sufficient care to avoid electrical shock】 **Warning**

Negative high voltage is applied to the photomultiplier tube assembly and the metal side wall. Although the side wall is protected by the insulating tape, always provide adequate safety measures to prevent the operator or service personnel from receiving an electrical shock or equipment from being damaged.

【Handle the tube assemblies with extreme care】 **Warning**

Photomultiplier tubes are vacuum devices. Allowing the glass or the side wall to be scratched or subjected to shock can cause cracks. Use the screw hole located on the back side of the device for fixing the products position. If the side wall must be used to fix the position, pressure should be applied to the entire surface of the wall. Avoid any pressure applied locally (such as set screws). The connector pins can be damaged if they are bent. Connectors should be aligned as carefully as possible. Remove connectors gradually to avoid any force perpendicular to the pins. Do not modify any part of the product.

【Keep faceplate and connectors clean】

Do not touch the faceplate or the connectors with bare hands. Dirt and fingerprints on the faceplate can cause loss of optical transmittance and dirt or grime on the connectors may cause ohmic leakage. Should they become soiled, clean using alcohol.

【Do not expose to strong light】

Do not expose the photocathode of the photomultiplier tubes to excessive light such as sunlight. If exposed, noise will increase and photocathode sensitivity will deteriorate. No light shield is installed to the back side of the product, therefore, it is possible for light to penetrate from the back which may reach to the photocathode causing an increase in noise as background. Apply a light shield if needed.

【Helium permeation through glass bulb】

Helium will permeate through glass bulbs and increase noise, leading to damage that makes photomultiplier tubes (PMTs) unusable.

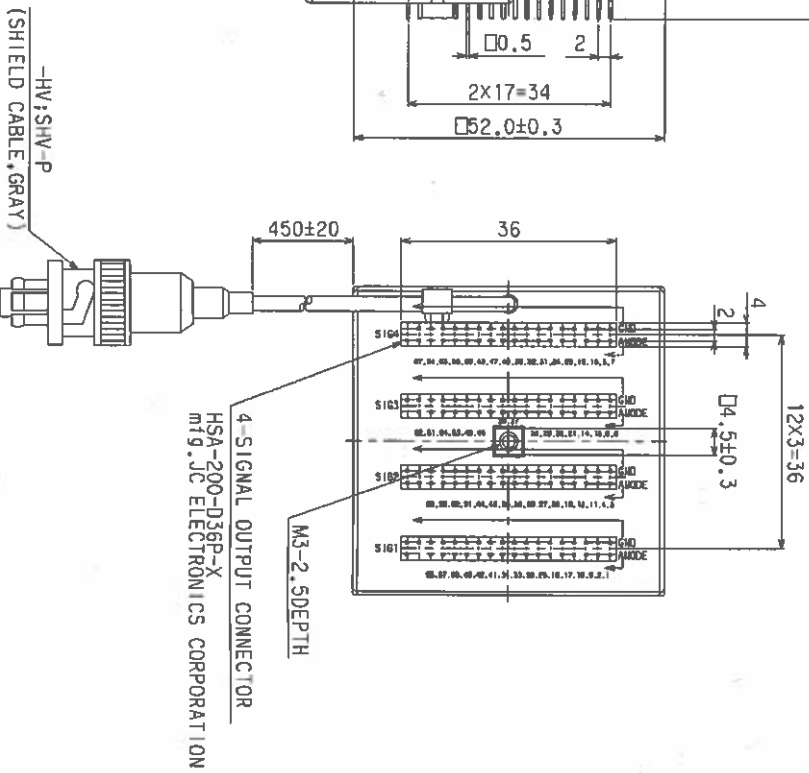
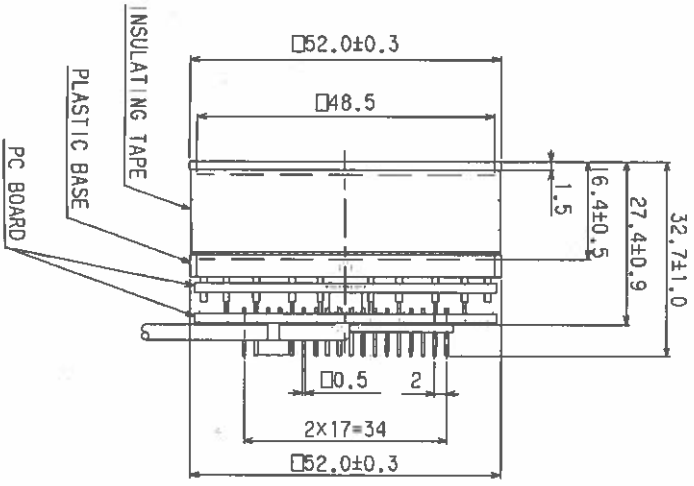
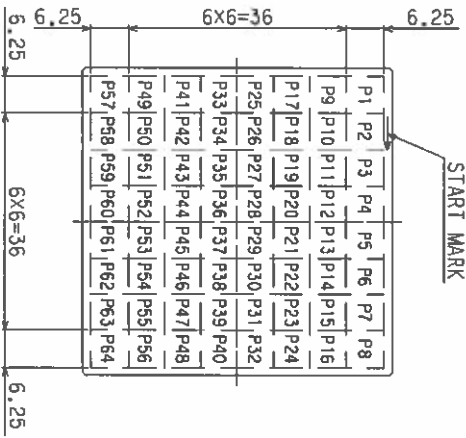
To avoid operation or storage in an atmosphere where helium is present, it's recommended that PMTs should be kept in a desiccator while filling it with nitrogen.

【Cautions for Storage and Disposal】

Storage temperature range: -15 °C to +50 °C

Recommended storage humidity range: less than 60 % (No condensation)

The material in H12700 contains lead. Please follow the applicable regulations regarding disposal of hazardous materials and industrial wastes in your country, state, region, or province.



CONNECTION FOR SIGNAL CONNECTORS (BOTTOM VIEW)

GND P7	GND P5	GND P3	GND P1
GND P8	GND P6	GND P4	GND P2
GND P15	GND P13	GND P11	GND P9
GND P16	GND P14	GND P12	GND P10
GND P23	GND P21	GND P19	GND P17
GND P24	GND P22	GND P20	GND P18
GND P31	GND P29	GND P27	GND P25
GND P32	GND P30	GND P28	GND P26
GND P39	GND P37	GND P35	GND P33
GND P40	GND P38	GND P36	GND P34
GND P47	GND P45	GND P43	GND P41
GND P48	GND P46	GND P44	GND P42
GND P55	GND P53	GND P51	GND P49
GND P56	GND P54	GND P52	GND P50
GND P63	GND P61	GND P59	GND P57
GND P64	GND P62	GND P60	GND P58
KA GND	KA GND	KA GND	KA GND
SIG4	SIG3	SIG2	SIG1

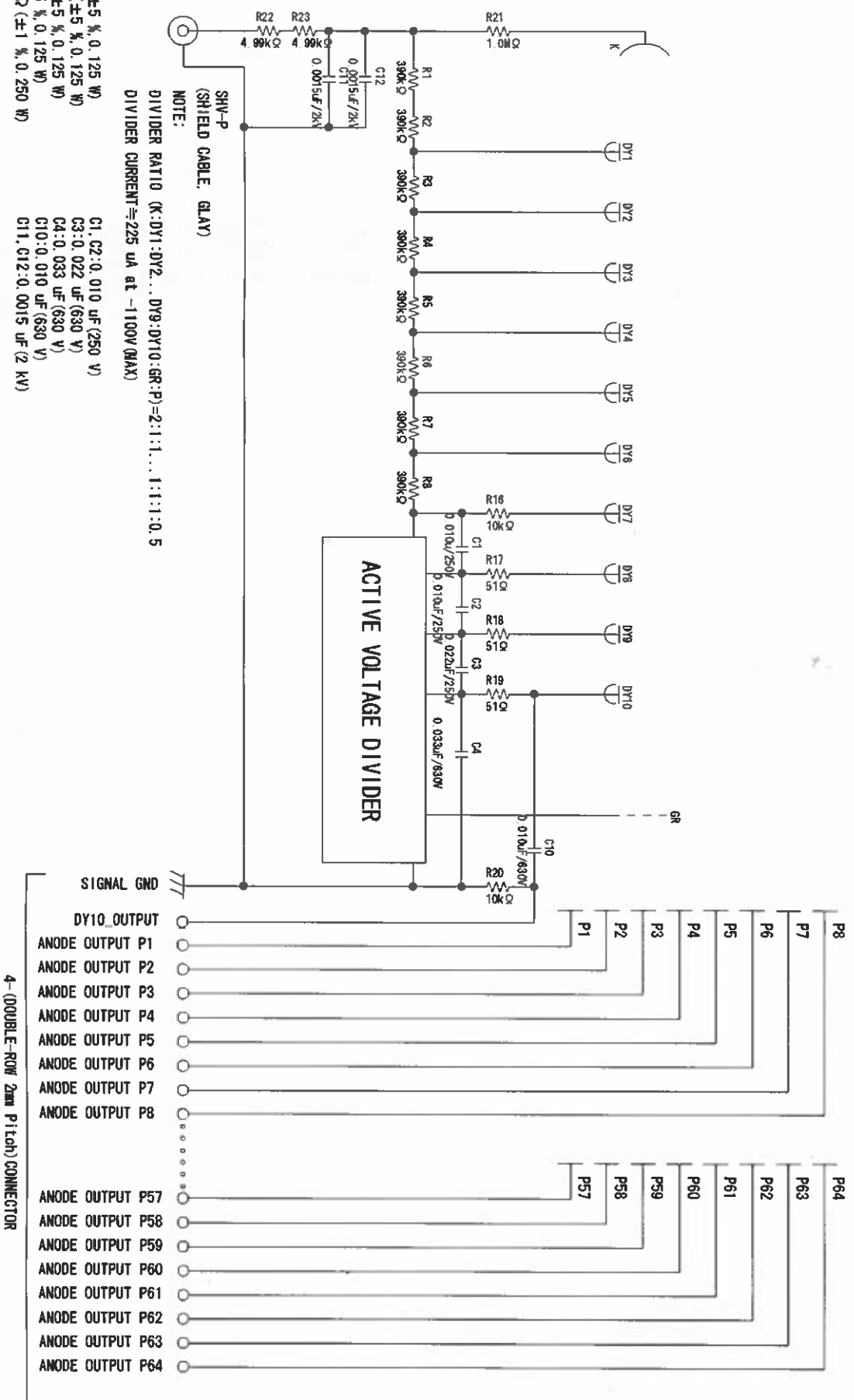
NOTE *A:NO PIN.

DIMENSIONAL OUTLINE
 H12700A, H12700A-0

- R1-R8: 390 kΩ (±5 %, 0.125 W)
- R16, R20: 10 kΩ (±5 %, 0.125 W)
- R17-R19: 51 Ω (±5 %, 0.125 W)
- R21: 1.0 MΩ (±5 %, 0.125 W)
- R22, R23: 4.99 kΩ (±1 %, 0.250 W)

- C1, C2: 0.010 μF (250 V)
- C3: 0.022 μF (630 V)
- C4: 0.033 μF (630 V)
- C10: 0.010 μF (630 V)
- C11, C12: 0.0015 μF (2 kV)

NOTE:
 DIVIDER RATIO (K: DY1: DY2... DY9: DY10: GR: P)= 2:1:1... 1:1:1:0.5
 DIVIDER CURRENT ≈ 225 μA at -1100V (MAX)



VOLTAGE DIVIDER CIRCUIT
 H12700A, H12700A-0: