SHI

Sumitomo Heavy Industries, Ltd.

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TECHNICAL INSTRUCTION

Pulse Tube Cryocooler
RP-1512A

For Service Personnel Only

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CROSS REFERENCE

Before using this equipment, thoroughly read this manual and following manuals.

MANUAL NAME	MANUAL No.
OPERATION MANUAL SRP-1512-A11B CRYOCOOLER*	CD32ZZ-131
OPERATION MANUAL SRP-1512-A11C CRYOCOOLER*	CD32ZZ-125
TECHNICAL INSTRUCTION CNA-11B COMPRESSOR UNIT**	CD32ZZ-132
TECHNICAL INSTRUCTION CNA-11C COMPRESSOR UNIT**	CD32ZZ-124

* See the TECHNICAL INSTRUCTION of Compressor Unit used.
** See the TECHNICAL INSTRUCTION of Compressor Unit used.

1 GENERAL INFORMATION

The RP-1512A Cold Head is a single-stage Pulse Tube cryo-refrigerator. The function of the Cold Head is to produce continuous closed-cycle refrigeration at temperatures, depending upon the heat load imposed, in the range of 50 K to 80 K for the first-stage cold station.
The cooling capacity of RP-1512A is approximately 5W at 80K

The Cold Head Unit has two major components: the cold head and the valve unit.

Functionally, the high-pressure helium gas from the Compressor Unit will be supplied to the Cold Head through the valve unit. The supply gas will be passed into the regenerator assembly, come out through the regenerator assembly to the valve unit through the motor housing, and finally will be returned to the Compressor Unit through the helium gas return connector. The helium gas expansion in the between regenerator and pulse tube will provide cooling condition for the cold stations.

1-1 SPECIFICATIONS

The specifications of the RP-1512A Cold Head Unit are summarized in **Table 1.1**
Figure 1.1 shows the outline view of Cold Head .
Figure 1.2 shows the outline view of Valve Unit .

Table 1.1 RP-1512 COLD HEAD UNIT SPECIFICATION

Refrigeration Capacity First Stage		5 W at 80 K (50 / 60 Hz)
Orientation		From vertical to horizontal
Ambient Operating Temperature		5 to 28 deg.C (41 to 82.4 deg.F) 28 to 35 deg.C (82.4 to 95 deg.F) with Cooling Capacity Loss max.10%
Helium Gas Pressure Static Operating (High Side)*		1.95 - 2.00 MPa at 20 deg.C (68 deg.F) (19.9 – 20.4 kgf/cm^{2}G, 283 - 290 psig) 2.20 - 2.30 MPa --- approx. (22.4 – 23.5 kgf/cm^{2}G, 319 - 334 psig)
Gas Supply Connector		1/4-inch Coupling
Gas Return Connector		1/4-inch Coupling
Dimension	Cold Head	Diameter : 96mm (3.80') Length : 284mm (11.19')
	Valve Unit	Width : 156mm (6.15') Depth : 160mm (6.30') Length : 276mm (10.87')
Weight	Cold Head	1.8 kg --- approx.
	Valve Unit	7.0 kg --- approx.

* The operating pressure varies according to the heat load of cold head and temperature around the equipment.

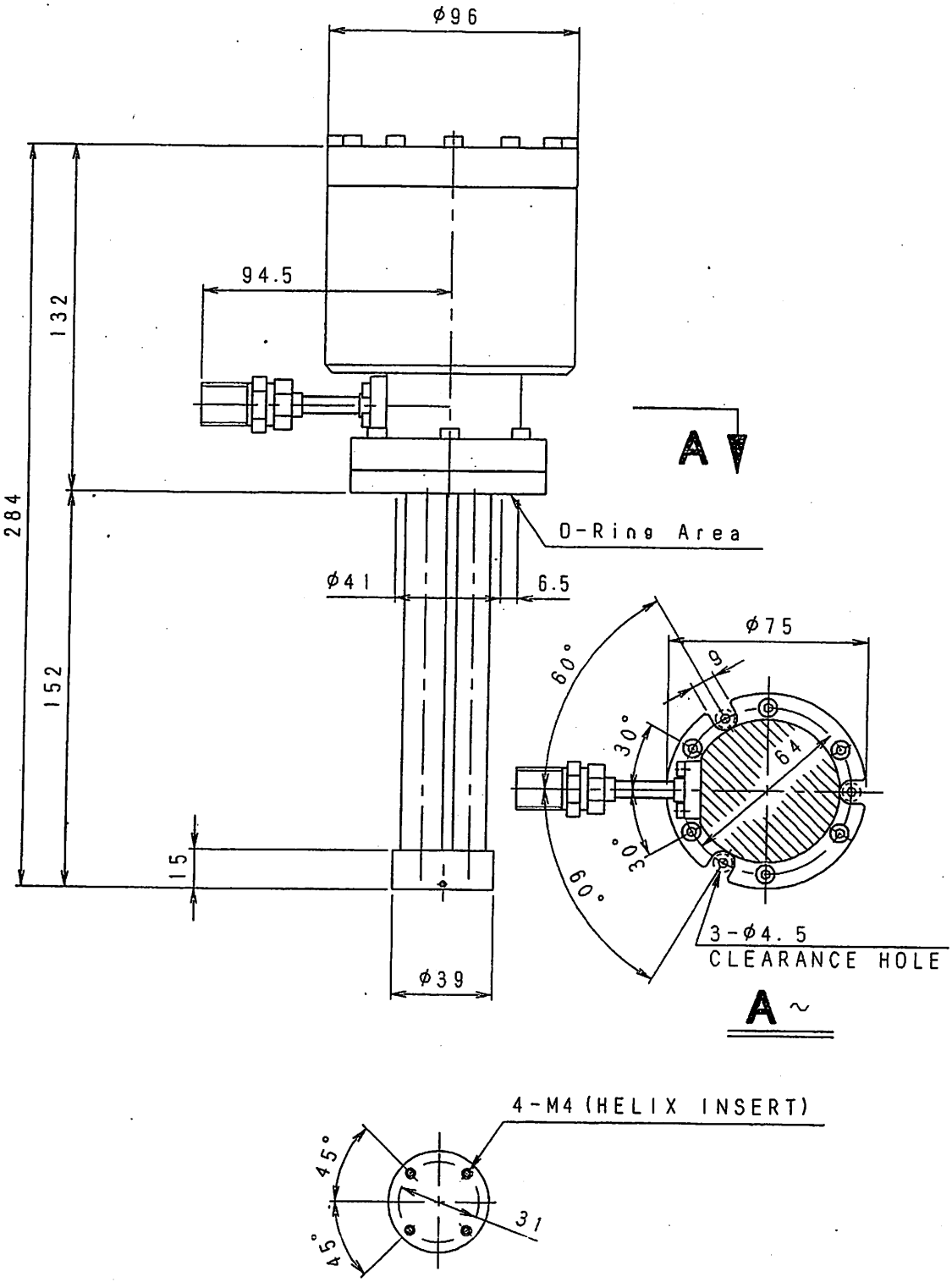

Fig1.1 Cold Head

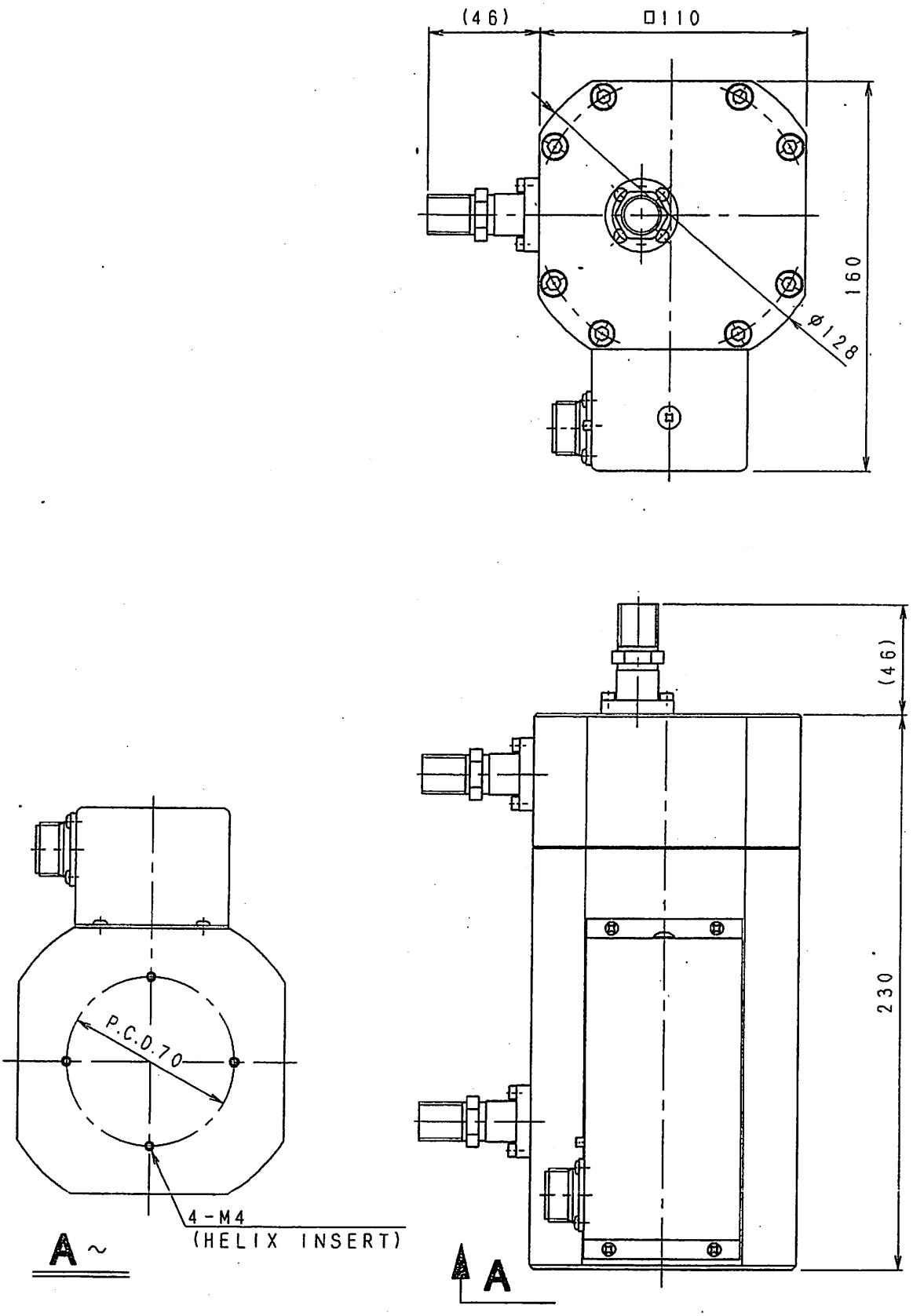

Fig1.2 Valve Unit

2 MAINTENANCE

The RP-1512A Cold Head Unit is to be required to replace the sliding parts inside every 20,000 Hrs. The maintenance work is not a Use's maintenance. Replace the Valve Unit completely at site and return it to Sumitomo Heavy Industries, Ltd. for refurbishment.

APPENDIX

DRAWINGS

No.	PART NAME
1	RP-1512A COLD HEAD
2	RP-1512A VALVE UNIT

REVISION CONTROL

Manual No.	Revision	Remarks	Date
CD32ZZ-126	-A	Publication of first edition.	Feb. 27 / 2002
	-B	Change design for Valve Unit.	July. 10 / 2002