

SHI CRYOCOOLER SPECIFICATION

MODEL: SRDK-101D-HC4A2

Cold Head Unit: RDK-101D
Compressor Unit: HC-4A2

Cryogenics Division
Precision Equipment Group
Sumitomo Heavy Industries, Ltd.

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Rev.	Date	Description	Prepared	Checked	Approved

CRYOCOOLER SPECIFICATION

Cryocooler MODEL

Cold Head Unit Model
Compressor Unit Model

SRDK-101D-HC4A2

RDK-101D
HC-4A2

Regulation

CE

New Condition

1. Cold Head Unit (Model: RDK-101D)

Refrigeration Cycle

Modified Gifford-McMahon
(2-Stage)

Site Condition

Indoor

Cooling Capacity
(Vertical Position)

1st	3.0 / 5.0 W	at 45 K (50/60Hz)
2nd	0.13 W	at 4.2 K (50Hz)
	0.2 W	at 4.2 K (60Hz)

Lowest Temperature

< 3.0 K -- for reference only

Cool Down Time
(300K to 4.2K, 2nd Stage)

< 150 min. -- for reference only

Cooling Capacity Degradation
(10,000Hrs.)

< 10 % -- for reference only

Orientation

Free
(Cooling Capacity Loss: max. 30%)

Ambient Temperature Range

5 to 35 deg.C
(28 to 35 deg.C with cooling capacity loss max. 5%)

Humidity Range

25 to 85 %RH
(without dew)

Dimension	H: 442 x W: 130 x L: 226 mm	-- approx.
Weight	7.2 kg	-- approx.
Maintenance	Shown in Table 1	

**Table 1 MAINTENANCE SCHEDULE
FOR THE COLD HEAD UNIT**

Maintenance	Frequency	Remark
Replace the Inside sliding parts	Every 10,000 Hrs.	"SHI maintenance" Return the Cold Head Unit to SHI, Ltd.

Notes

- The cooling capacity depends on the Flexible Gas Line length.*
- The cooling capacity depends on the ambient temperature.*
- The Heat Station plated with nickel is available upon the request.*
- The room should be provided to install the Cold Head Unit.*

2. Compressor Unit (Model: HC-4A2)

Cooling system	Air Cooled	
Site Condition	Indoor	
Electrical Requirement		
Power Line Voltage	Single phase (2W+PE),	
50Hz	AC 200, 220, 230, 240 V (+ / - 5%)	
60Hz	AC 200, 220, 230, 240 V (+ / - 10%)	
Power Requirement		
Minimum	2.7 kVA (50Hz) 3.3 kVA (60Hz)	
Recommended	3.5 kVA (50Hz) 4.0 kVA (60Hz)	
Power Consumption	Steady	Maximum
50Hz	2.5 kW	3.0 kW-- approx.
60Hz	2.8 kW	3.4 kW-- approx.
Operating Current		
Maximum	16 A	-- approx.
Built-in Circuit Breaker Setting	20 A	
Ambient Temperature Range	4 to 38 deg.C (28 to 38 deg.C with cooling capacity loss max. 5%)	
Humidity Range	25 to 85 %RH (without dew)	
Cooling Air Flow Rate		
50Hz	18 m ³ /min.	-- approx.
60Hz	20 m ³ /min.	-- approx.
Heat Radiation to the Environment		
50Hz	< 3.0 kW	-- approx.
60Hz	< 3.4 kW	-- approx.

Noise Level (1m distance)*
Compressor Unit Only Max. 68 dBA -- approx.

*Noise level of the whole equipment may exceed 70dBA depending on the environment it is used in.

Dimension H: 715 x W: 453 x L: 488 mm**
 H: 715 x W: 453 x L: 607 mm*** - approx.

** without Transformer

*** with Transformer

Weight 102 kg (without Transformer)
 111 kg (with Transformer) --

 approx.

Required Space**** Refer to the ANNEX.
****with air suction, discharge space and maintenance space.

Maintenance Shown in Table 2

**Table 2 MAINTENANCE SCHEDULE
FOR THE COMPRESSOR UNIT**

Maintenance	Frequency	Remark
Replace the Adsorber	Every 30,000 Hrs.	“USER maintenance”
Charge/Purge the Helium Gas	As required	“USER maintenance” Purity of 99.999% up
Replace the Fuse(s)	As required	“USER maintenance”
Cleaning the Heat Exchanger	As required	“USER maintenance” Depending on the site conditions

Notes

- While carrying the compressor unit, do not tilt it by more than 30 degrees.
- While setting the compressor unit, do not tilt it by more than 5 degrees.

3. Accessories (Standard)

Flexible Gas Line	15A x 3 m (F#4-F#8) (Supply) x 1 15A x 3 m (F#4-F#8) (Return) x 1	
Cold Head Power Cable	3 m	x 1
Input Power Cable	3 m	x 1
Tool Kit	Charge & Vent Valve Open End Wrench 1 inch x 3/4 inch 1 1/8 inch x 5/8 inch Open - Ratchet End Wrench 1 3/16 inch x 1 3/16 inch	x 2 x 1 x 1 x 1
Manual	Technical Instruction for Cold Head Unit Technical Instruction for Compressor Unit	x 1 x 1
Optional Accessory	Accessory Cable for Remote On/Off 6m	x
	1	

Notes

- Longer Flexible Gas Lines and Cold Head Power Cable are available up to 20 m.
- Min. length is 3 m.

4. Annex.

- 1) System Configuration
- 2) Cold Head Unit DWG.
- 3) Compressor Unit DWG.
- 4) Electrical Schematic of Compressor Unit
- 5) Electrical Schematic of Air-Cooled Unit
- 6) Required Space of Compressor Unit
- 7) Flexible Gas Line DWG.
- 8) Cold Head Power Cable DWG.
- 9) Input Power Cable DWG.
- 10) Gas Charge Valve DWG.
- 11) Optional Accessory Cable for Remote On/Off 6m

5. Scope of Supply

The followings are included.

- 1) Cold Head Unit
- 2) Compressor Unit
- 3) Input Power Cable
- 4) Flexible Gas Lines (Supply and Return)
- 5) Cold Head Power Cable
- 6) Tool Kit
- 7) Manual

The followings are not included in this spec.

- 1) Thermometer
- 2) Temperature indicator
- 3) O-ring between Cold Head Unit and Vacuum Chamber
- 4) Vacuum Chamber
- 5) Vacuum Pump
- 6) Bolts

6. Warranty <Sale and Purchase of New Machines>

Warranty Period

Warranty period for the newly supplied Machines shall be eighteen (18) months from the date of shipment of the Machines from Sumitomo's works or twelve (12) months from the date of the operation and use of the Machines by the customer, whichever comes earlier.

Warranty Conditions

During the warranty period, should any defects are found in the Machines irrespective of the fact that the Machines are properly installed, connected and maintained in conformity to the instructions manuals and are properly operated under the conditions as instructed in the specifications and operation manuals, Sumitomo will, at its discretion, repair or replace free of charge the Machines except for the cases which fall under the category of the warranty exception as enumerated below.

Provided, however, that in the event the Machines are connected with the customer's other equipment, the costs for the removal from and re-installation of the Machines to such equipment, and other costs incidental to such work, including transportation charges thereto and so on shall be borne by the customer.

The scope of Sumitomo's liability pursuant to the warranty shall be limited to the repair or replacement of the Machines.

Sumitomo shall not compensate any expenses, fees or charges for repair or replacement of the Machines or parts therefor incurred by the customer or third parties other than Sumitomo or Sumitomo's authorized servicing companies without prior written consent of Sumitomo or Sumitomo's authorized servicing companies.

SUMITOMO MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE AND PURPOSE OF THE CUSTOMER, NOR ARE ANY OTHER WARRANTIES MADE, EXPRESS OR IMPLIED, UNLESS OTHERWISE SPECIFICALLY AGREED IN WRITING.

Warranty Exception

The warranty shall not apply to the following cases.

1. Any defects caused by improper installation of the Machines or improper connection with other related equipment by the customer or third party other than Sumitomo or Sumitomo's authorized servicing companies.
2. Any defects caused by insufficient maintenance or improper handling of the Machines by the customers.
3. Any defects caused by the operation of the Machines outside the specifications or operation and use conditions beyond Sumitomo's expectation by the customer.
4. Any defects caused by the modification or alteration to the Machines by the customer or third parties other than Sumitomo or Sumitomo's authorized servicing companies.
5. Any defects of the Machines caused by the parts supplied or specified by the customer.
6. Any damage caused by Force Majeure, such as earthquakes, fires, floods, salt damage, gas damage, thunder and other causes beyond the control of Sumitomo.
7. Any other defects caused by the events not attributable to Sumitomo.

Limitation of Damages

Any damages, if any, to be compensated to the customer due to the defects of the Machines attributable to Sumitomo shall be limited to the direct damages actually incurred by the customer and shall not exceed the contract price of the Machines.

Indemnification

Sumitomo shall not be responsible for the following damage irrespective of the causes or reasons for the claims made by the customer.

1. Any losses of profits and operation opportunity and other consequential or indirect loss or damage of any kind incurred by the customer in connection with the Machines.
2. Any damage to the Machines caused by any special circumstance on the part of the customer which is attributable to the customer irrespective of whether such damage is foreseeable or not by Sumitomo.
3. Any damage incurred by the customer resulting from the damages claimed by third party for which Sumitomo is not responsible.
4. Any damage incurred by the customer due to collection and improvement of the same kind of machines or similar to the Machines caused by recall of those machines.

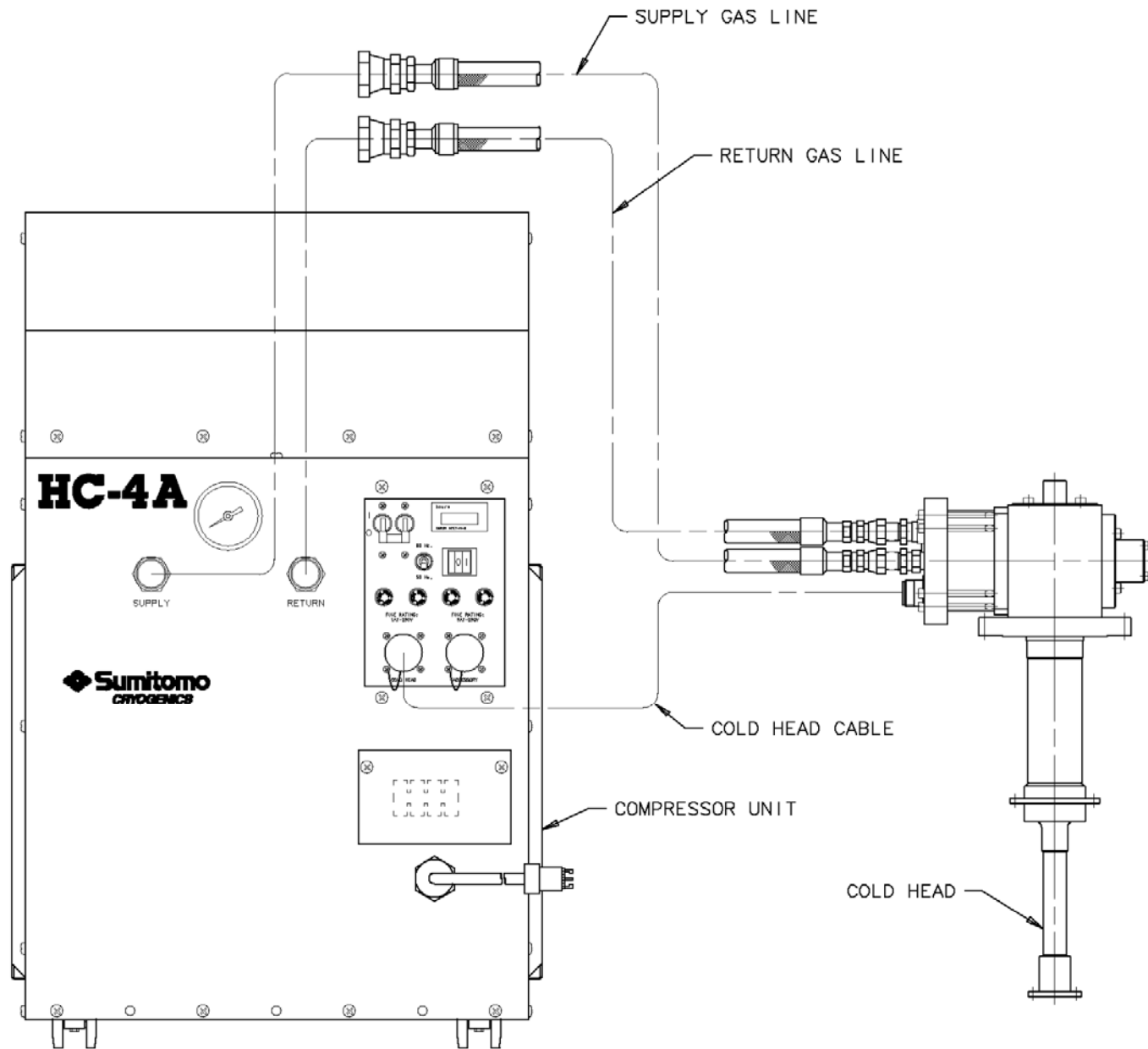
Maintenance

The maintenance work of the Machines shall be recommendable to be performed at an interval which is described in the above sentence.

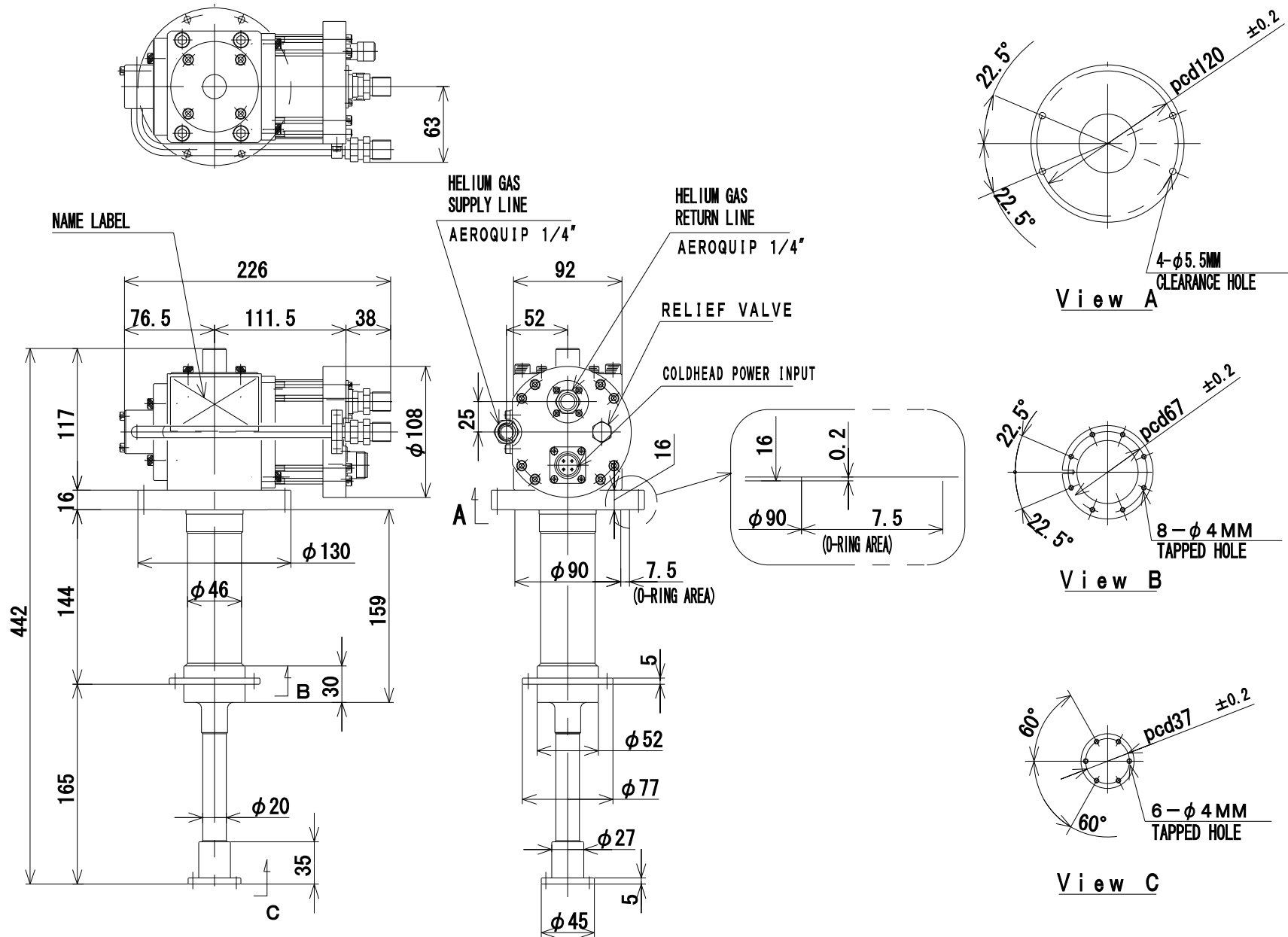
Parts Supply

Unless otherwise specified in the contract documents, Sumitomo shall keep any parts for the Machines for a period of seven (7) years from the delivery date of the Machines to the customer.

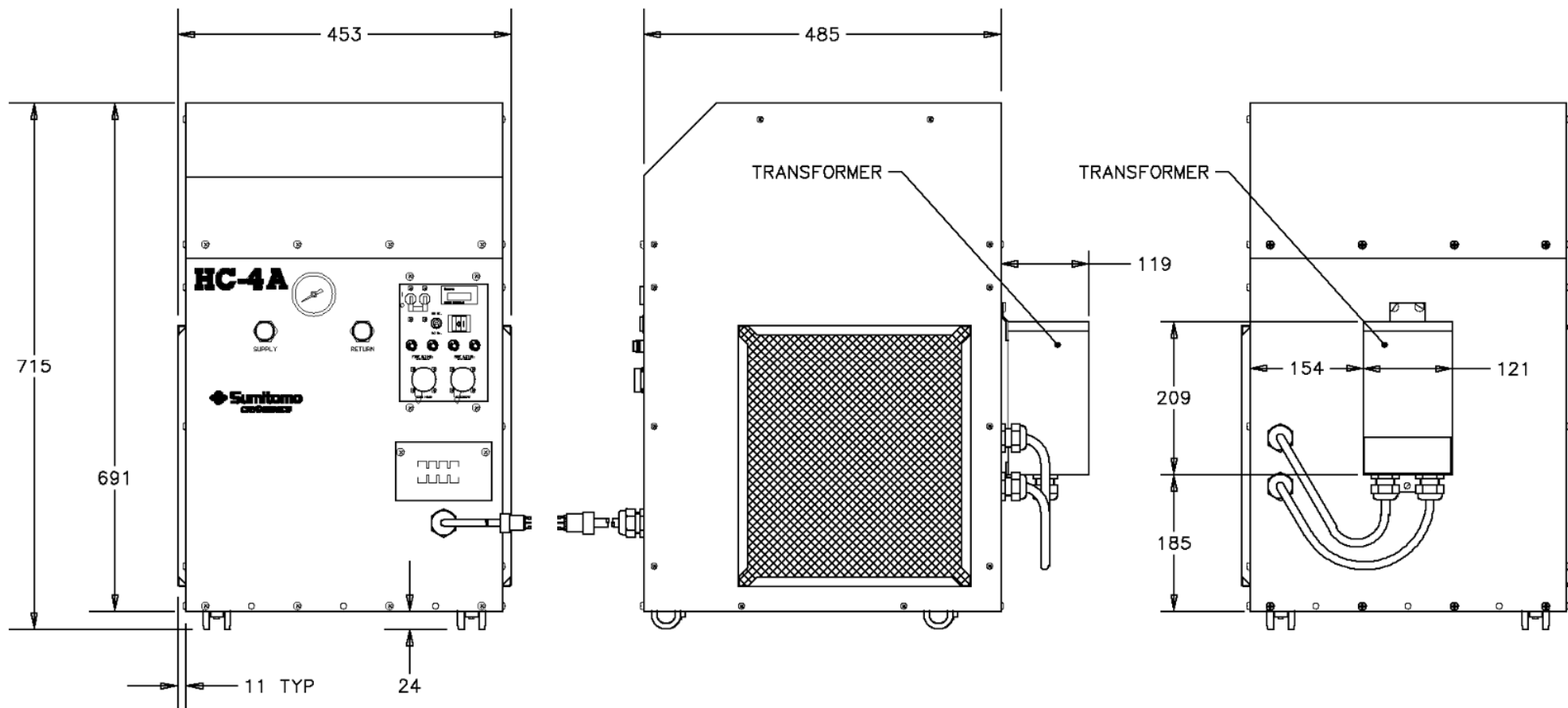
Notes; Specifications subject to change or delete without notice.



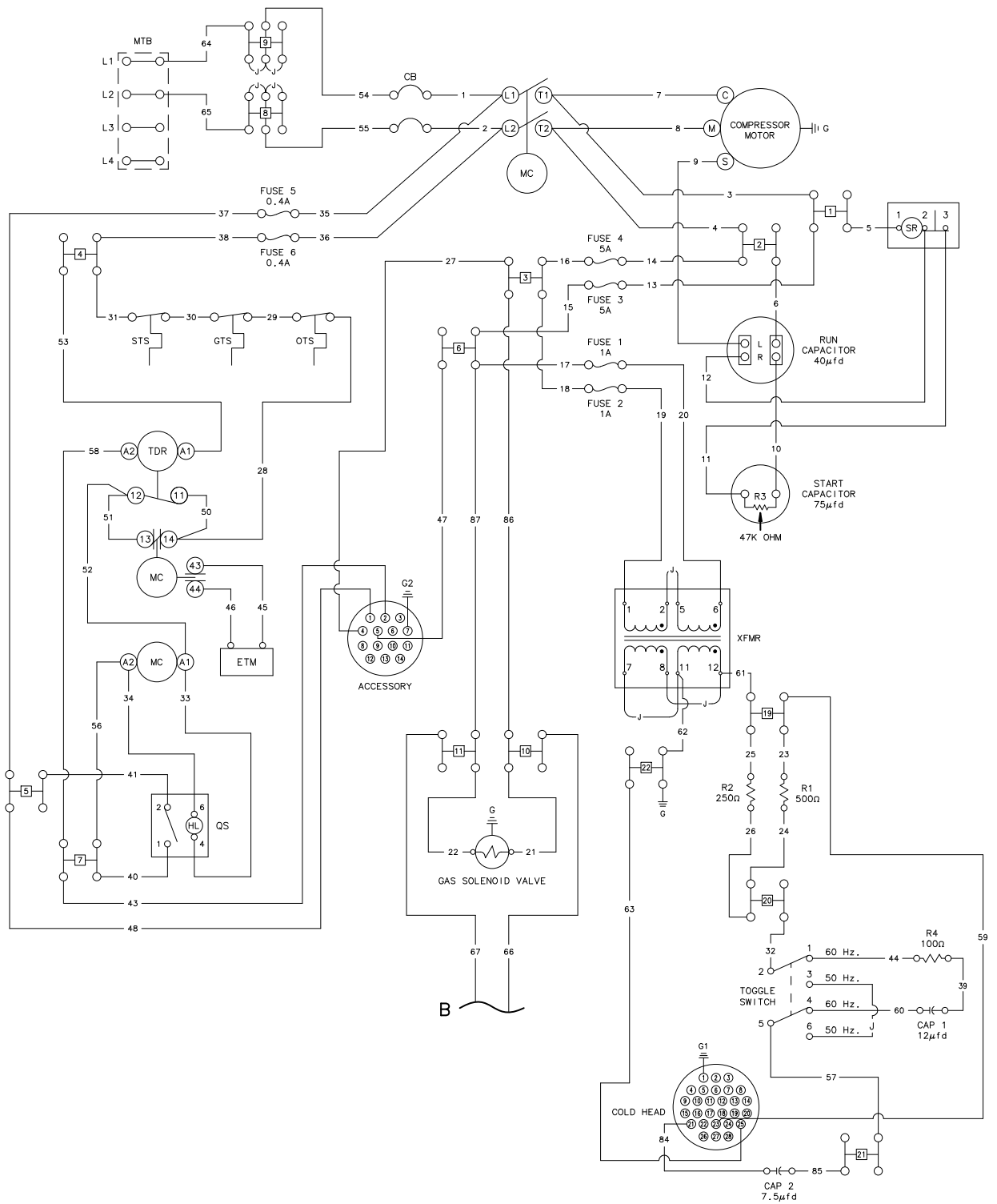
SYSTEM CONFIGURATION



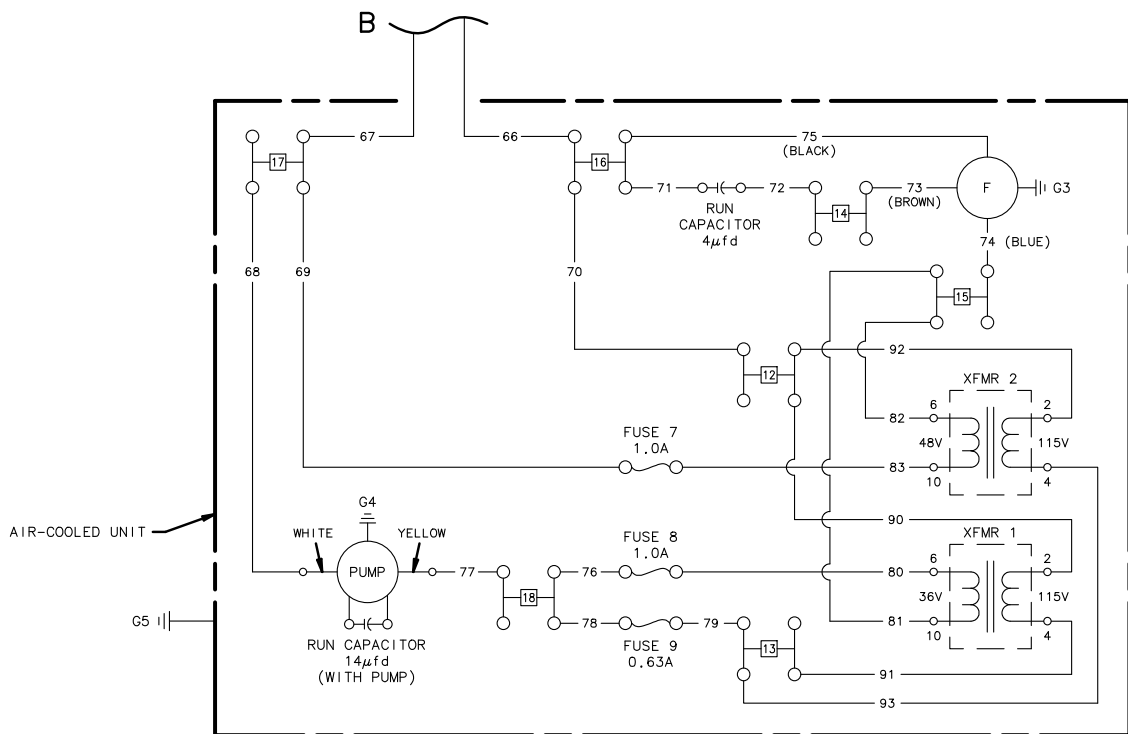
COLD HEAD UNIT



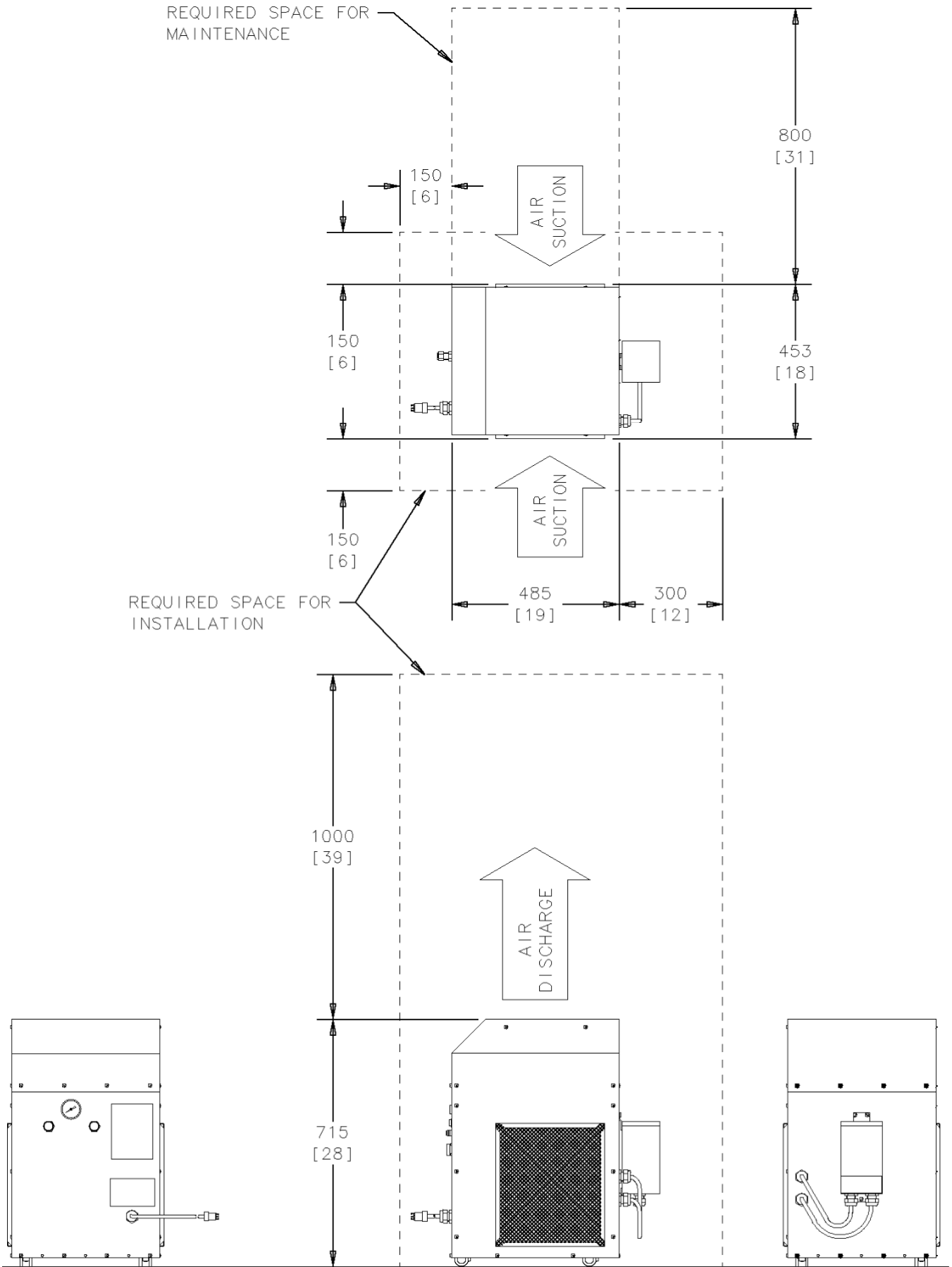
COMPRESSOR UNIT (with Transformer)



ELECTRICAL SCHEMATIC
(Main Electrical Chassis and Components of COMPRESSOR UNIT)

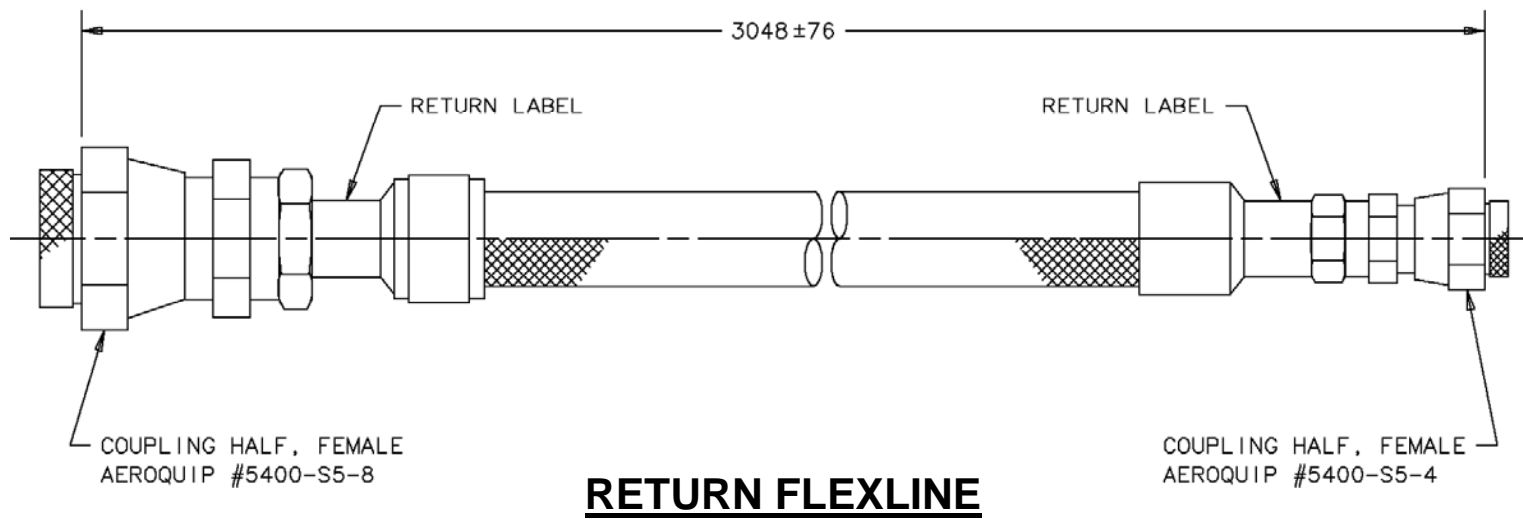
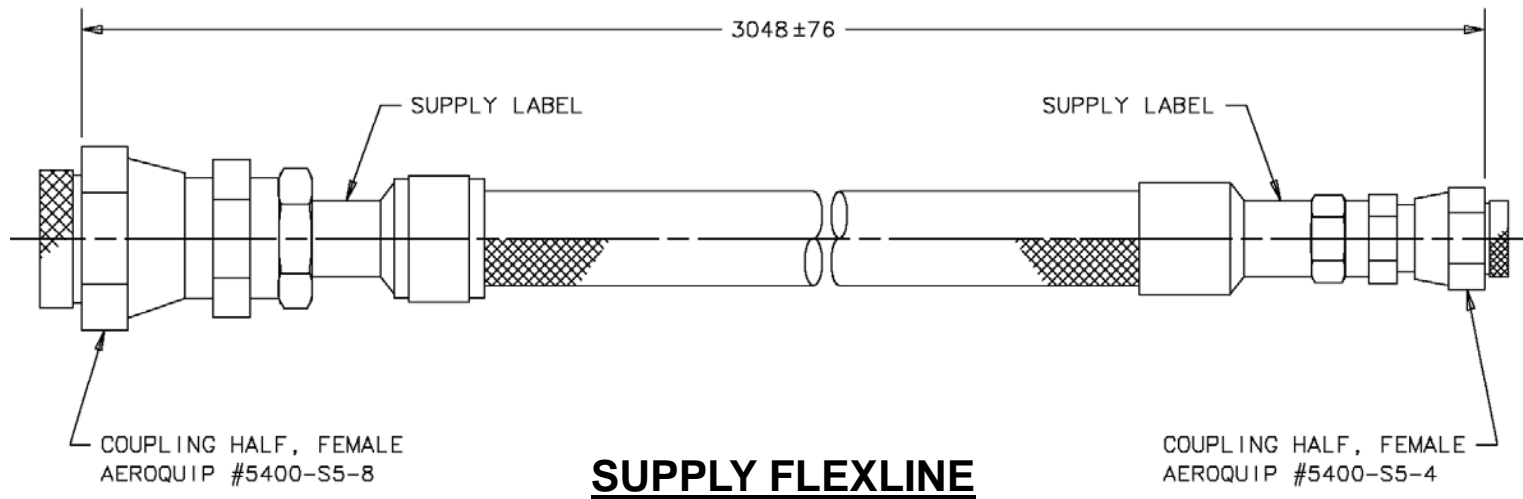


ELECTRICAL SCHEMATIC
(Air-Cooled Unit of COMPRESSOR UNIT)

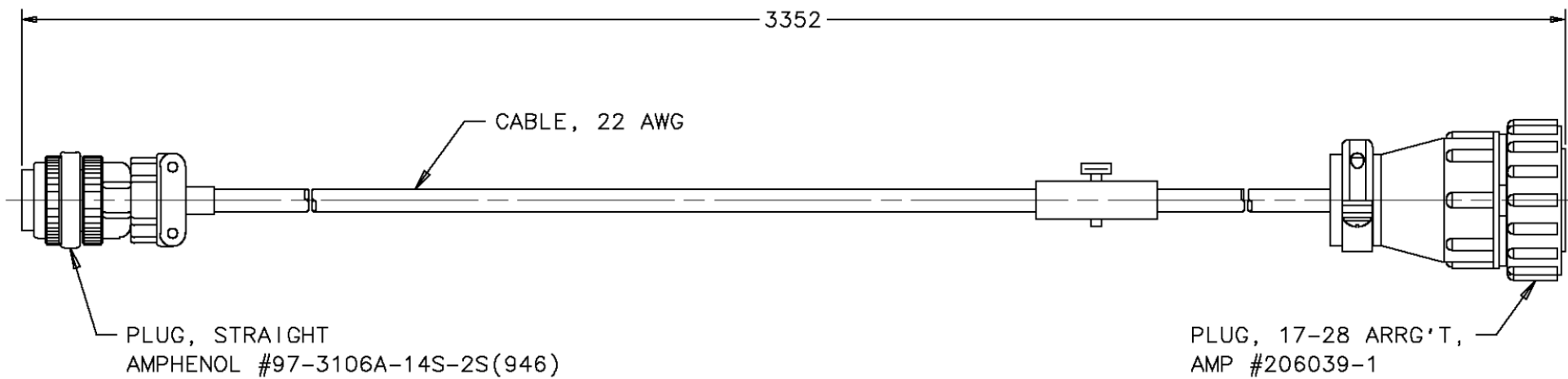


* At least two surfaces will be opened to maintain the sufficient cooling airflow.

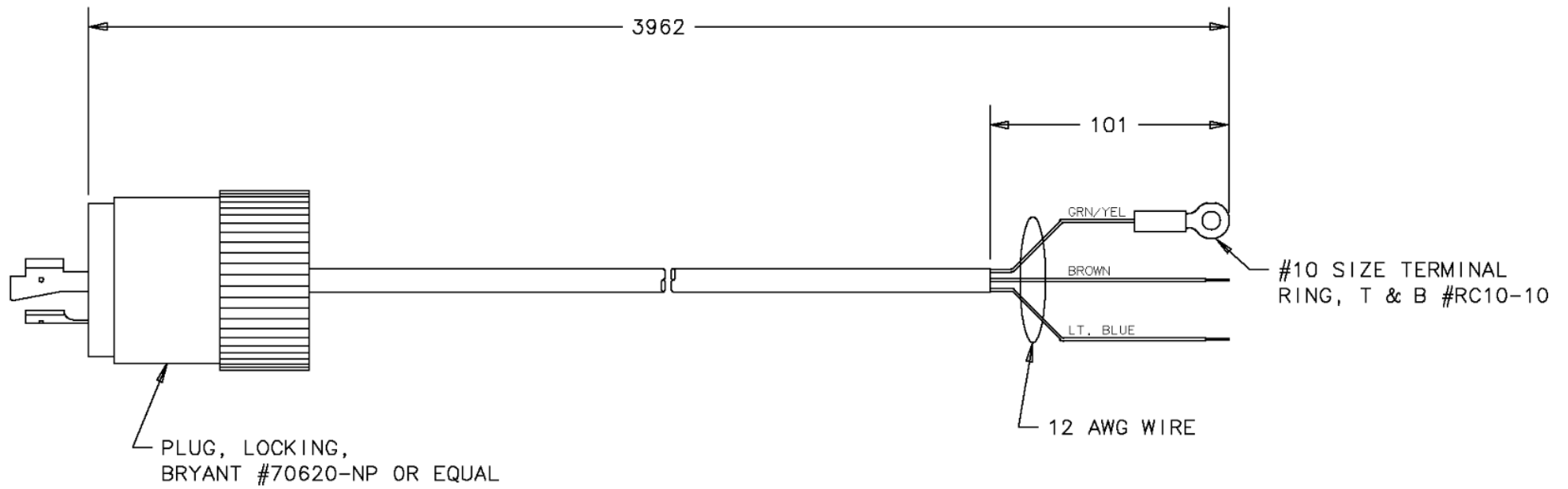
REQUIRED SPACE OF COMPRESSOR UNIT



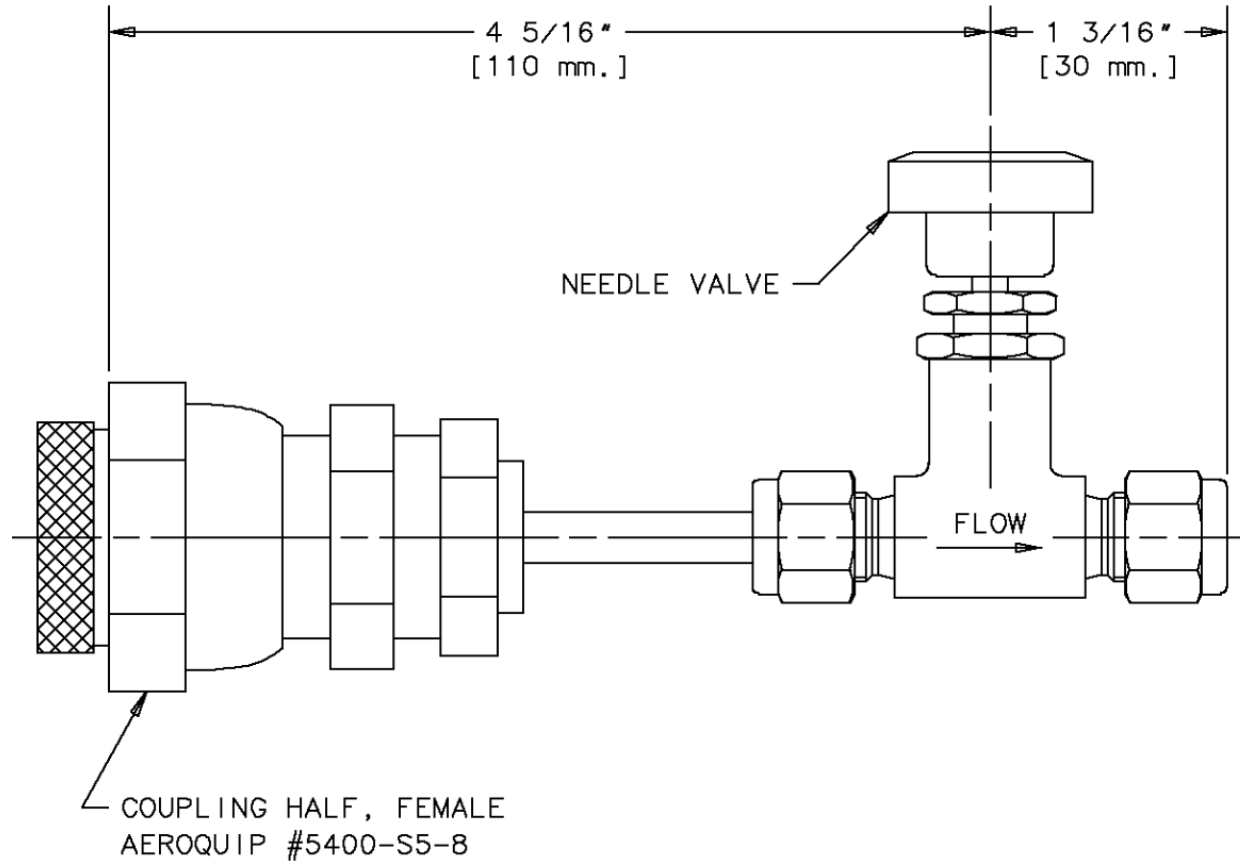
15A x 3m (F#4-F#8) FLEXIBLE GAS LINE



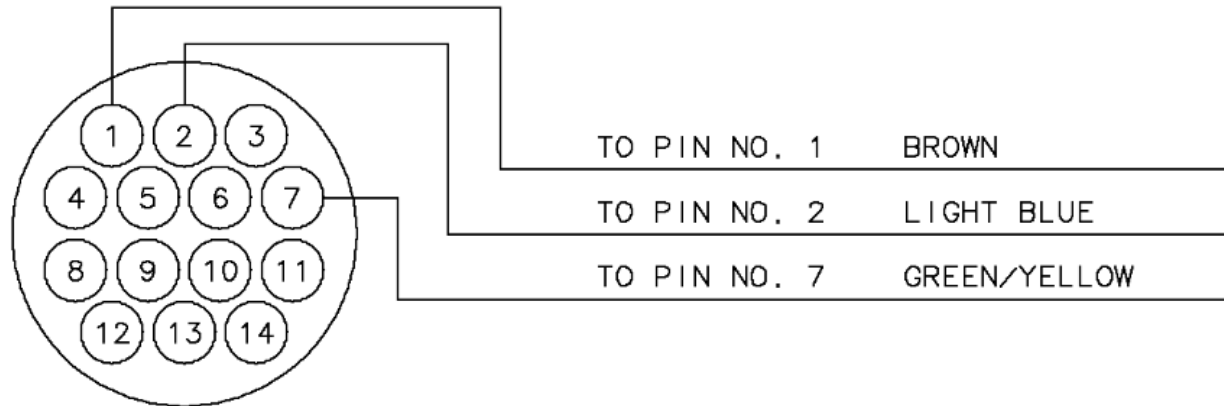
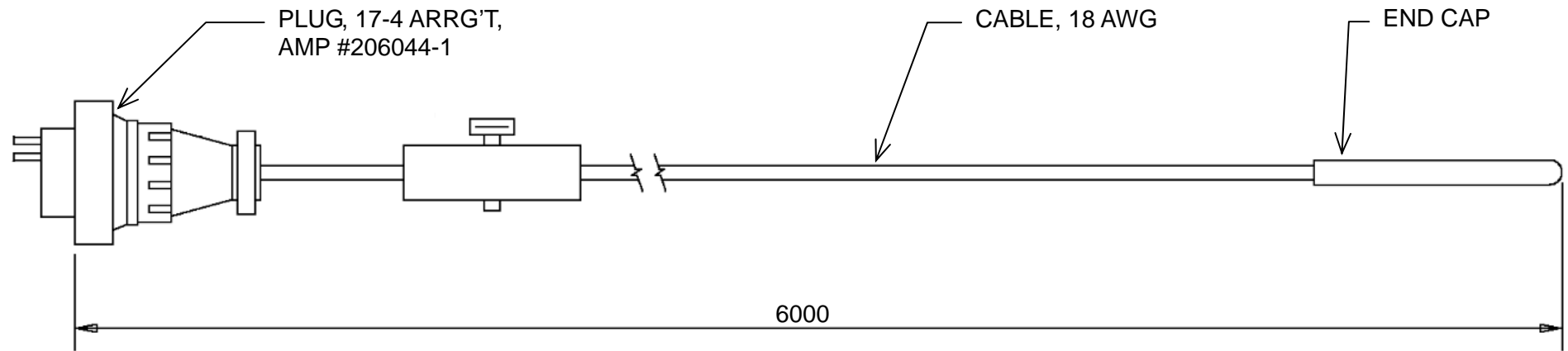
COLD HEAD POWER CABLE (3 m)



INPUT POWER CABLE (3 m)



CHARGE & VENT VALVE



WIRING DIAGRAM

OPTIONAL ACCESSORY CABLE FOR REMOTE ON/OFF (6m)