



THE CITY OF WINNIPEG

REQUEST FOR PROPOSAL

RFP NO. 643-2005

YORK TURBOPAK CHILLER REPLACEMENT AT 421 OSBORNE STREET

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PART B - BIDDING PROCEDURES

B1. PROJECT TITLE

B1.1 YORK TURBOPAK CHILLER REPLACEMENT AT 421 OSBORNE STREET

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 4:00 p.m. Winnipeg time, January 6, 2006.

B2.2 Proposal Submissions determined by the Manager of Materials to have been received later than the Submission Deadline will not be accepted and will be returned upon request.

B2.3 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

B3.1 Further to GC.2.01, the Bidder may make an appointment to view the Site by contacting the Contract Administrator.

B3.2 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.

B4. ENQUIRIES

B4.1 All enquiries shall be directed to the Contract Administrator identified in D4.1.

B4.2 If the Bidder finds errors, discrepancies or omissions in the Request for Proposal, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.

B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Request for Proposal will be provided by the Contract Administrator to all Bidders by issuing an addendum.

B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Request for Proposal will be provided by the Contract Administrator only to the Bidder who made the enquiry.

B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.

B5. CONFIDENTIALITY

B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator.

B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Request for Proposals to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

- B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies or omissions in the Request for Proposal, or clarifying the meaning or intent of any provision therein.
- B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B6.2.1 Addenda will be available on the Bid Opportunities page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.
- B6.2.2 The Bidder is responsible for ensuring that he has received all addenda and is advised to check the Materials Management Branch internet site for addenda shortly before submitting his Proposal.
- B6.3 The Bidder shall acknowledge receipt of each addendum in Paragraph 8 of Form A: Proposal. Failure to acknowledge receipt of an addendum may render a Proposal non-responsive.

B7. SUBSTITUTES

- B7.1 The Work is based on the Plant, Materials and methods specified in the Request for Proposal.
- B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least five (5) Business Days prior to the Submission Deadline.
- B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified and can be incorporated into the Work, strictly in accordance with the proposed work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his sole discretion grant approval for the use of a substitute as an "approved equal" or as an "approved alternative", or may refuse to grant approval of the substitute.

- B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, only to the Bidder who requested approval of the substitute.
- B7.6.1 The Bidder requesting and obtaining the approval of a substitute shall be entirely responsible for disseminating information regarding the approval to any person or persons he wishes to inform.
- B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative shall base his Total Bid Price upon the specified item but may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B15.
- B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. PROPOSAL SUBMISSION

- B8.1 The Proposal Submission consists of the following components:
- (a) Form A: Proposal;
 - (b) Form B: Prices;
 - (c) Proposed Equipment to be installed, method of removing existing system and proposed use of existing system.
- B8.2 The Proposal Submission shall be submitted enclosed and sealed in an envelope clearly marked with the RFP number and the Bidder's name and address.
- B8.2.1 Samples or other components of the Proposal Submission which cannot reasonably be enclosed in the envelope may be packaged separately, but shall be clearly marked with the RFP number, the Bidder's name and address, and an indication that the contents are part of the Bidder's Proposal Submission.
- B8.3 Proposal Submissions submitted by facsimile transmission (fax) or internet electronic mail (e-mail) will not be accepted.
- B8.4 Proposal Submissions shall be submitted to:
- The City of Winnipeg
Corporate Finance Department
Materials Management Branch
185 King Street, Main Floor
Winnipeg MB R3B 1J1

B9. PROPOSAL

- B9.1 The Bidder shall complete Form A: Proposal, making all required entries.
- B9.2 Paragraph 2 of Form A: Proposal shall be completed in accordance with the following requirements:
- (a) if the Bidder is a sole proprietor carrying on business in his own name, his name shall be inserted;

- (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
- (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
- (d) if the Bidder is carrying on business under a name other than his own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

B9.2.1 If a Proposal is submitted jointly by two or more persons, each and all such persons shall identify themselves in accordance with B9.2.

B9.3 In Paragraph 3 of Form A: Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Proposal.

B9.4 Paragraph 10 of Form A: Proposal shall be signed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his own name, it shall be signed by the Bidder;
- (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
- (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers and the corporate seal, if the corporation has one, should be affixed;
- (d) if the Bidder is carrying on business under a name other than his own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B9.4.1 The name and official capacity of all individuals signing Form A: Proposal shall be printed below such signatures.

B9.4.2 All signatures shall be original and shall be witnessed except where a corporate seal has been affixed.

B9.5 If a Proposal is submitted jointly by two or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Proposal Submission and the Contract, when awarded, shall be both joint and several.

B10. PRICES

B10.1 The Bidder shall state the lump sum price in Canadian funds for the Work on Form B: Prices.

B10.1.1 Notwithstanding GC.9.01(2), the price on Form B: Prices shall not include the Goods and Services Tax (GST) or Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

B11. QUALIFICATION

B11.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Bidder does not carry on business in Manitoba, in the jurisdiction where the Bidder does carry on business;
- (b) be responsible and not be suspended, debarred or in default of any obligation to the City;
- (c) be financially capable of carrying out the terms of the Contract;

- (d) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract;
- (e) have successfully carried out work, similar in nature, scope and value to the Work;
- (f) employ only Subcontractors who:
 - (i) are responsible and not suspended, debarred or in default of any obligation to the City (a list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>); and
 - (ii) have successfully carried out work similar in nature, scope and value to the portion of the Work proposed to be subcontracted to them, and are fully capable of performing the Work required to be done in accordance with the terms of the Contract;
- (g) have a written workplace safety and health program in accordance with The Workplace Safety and Health Act (Manitoba);

B11.2 The Bidder shall be prepared to submit, within three (3) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B11.3 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B12. OPENING OF PROPOSALS AND RELEASE OF INFORMATION

B12.1 Proposal Submissions will not be opened publicly.

B12.2 After award of Contract, the name(s) of the successful Bidder(s) and the Contract Amount(s) will be available on the Closed Bid Opportunities (or Public/Posted Opening & Award Results) page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

B12.3 To the extent permitted, the City shall treat all Proposal Submissions as confidential, however the Bidder is advised that any information contained in any Proposal Submission may be released if required by City policy or procedures, by The Freedom of Information and Protection of Privacy Act (Manitoba), by other authorities having jurisdiction, or by law.

B13. IRREVOCABLE OFFER

B13.1 The Proposal(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 9 of Form A: Proposal.

B13.2 The acceptance by the City of any Proposal shall not release the Proposals of the other responsive Bidders and these Bidders shall be bound by their offers on such Work until a Contract for the Work has been duly executed and the performance security furnished as herein provided, but any offer shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 9 of Form A: Proposal.

B14. WITHDRAWAL OF OFFERS

B14.1 A Bidder may withdraw his Proposal without penalty by giving written notice to the Manager of Materials at any time prior to the Submission Deadline.

B14.1.1 Notwithstanding GC.7.06(2), the time and date of receipt of any notice withdrawing a Proposal shall be the time and date of receipt as determined by the Manager of Materials.

B14.1.2 The City will assume that any one of the contact persons named in Paragraph 3 of Form A: Proposal or the Bidder's authorized representatives named in Paragraph 10 of Form A: Proposal, and only such person, has authority to give notice of withdrawal.

B14.1.3 If a Bidder gives notice of withdrawal prior to the Submission Deadline, the Manager of Materials shall:

- (a) retain the Proposal Submission until after the Submission Deadline has elapsed;
- (b) open the Proposal Submission to identify the contact person named in Paragraph 3 of Form A: Proposal and the Bidder's authorized representatives named in Paragraph 10 of Form A: Proposal; and
- (c) if the notice has been given by any one of the persons specified in B14.1.3(b), declare the Proposal withdrawn.

B14.2 A Bidder who withdraws his Proposal after the Submission Deadline but before his offer has been released or has lapsed as provided for in B13.2 shall be liable for such damages as are imposed upon the Bidder by law and subject to such sanctions as the Chief Administrative Officer considers appropriate in the circumstances. The City, in such event, shall be entitled to all rights and remedies available to it at law, including the right to retain the Bidder's bid security.

B15. INTERVIEWS

B15.1 The Contract Administrator may, in his sole discretion, interview Bidders during the evaluation process.

B16. NEGOTIATIONS

B16.1 The City reserves the right to negotiate details of the Contract with Bidders.

B16.2 Negotiations, if any, are intended to address administrative and technical details of the Contract. The Bidder is advised to present his best offer, not a starting position for negotiations, in his Proposal Submission; the City will not necessarily pursue negotiations with any Bidder.

B16.3 If, in the course of negotiations pursuant to B16.2 or otherwise, the Bidder amends or modifies a Proposal after the Submission Deadline, the City may consider any amended Proposal as an alternative to the Proposal as originally submitted without releasing the Bidder from the Proposal as originally submitted.

B17. EVALUATION OF PROPOSALS

B17.1 Award of the Contract shall be based on the following evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Request for Proposal:
 - (i) mandatory requirements (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B11:
 - (i) mandatory qualifications (pass/fail);
- (c) Proposed chiller replacement (50%);
- (d) Total Bid Price (50%);
- (e) economic analysis of any approved alternative pursuant to B7.

B17.2 Further to B17.1(a), the Award Authority may reject a Proposal as being non-responsive if the Proposal Submission is incomplete, obscure or conditional, or contains additions, deletions,

alterations or other irregularities. The Award Authority may reject all or any part of any Proposal, or waive technical requirements if the interests of the City so require.

- B17.3 Further to B17.1(b), the Award Authority shall reject any Proposal submitted by a Bidder who does not demonstrate, in his Proposal Submission or in other information required to be submitted, that he is responsible and qualified.
- B17.4 Further to B17.1(c), the proposed chiller replacement will be evaluated based upon the information submitted and the suitability of the equipment for this facility.
- B17.5 Further to B17.1(d), the Total Bid Price shall be the lump sum price shown on Form B: Prices.
- B17.5.1 If there is any discrepancy between the lump sum price written in figures and the lump sum price written in words, the price written in words shall take precedence.
- B17.6 This Contract will be awarded as a whole.

B18. AWARD OF CONTRACT

- B18.1 The City will give notice of the award of the Contract by way of a letter of intent, or will give notice that no award will be made.
- B18.2 The City will have no obligation to award a Contract to a Bidder, even though one or all of the Bidders are determined to be responsible and qualified, and the Proposals are determined to be responsive.
- B18.2.1 Without limiting the generality of B18.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one Proposal is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B18.3 Where an award of Contract is made by the City, the award shall be made to the responsible and qualified Bidder submitting the most advantageous offer.

PART C - GENERAL CONDITIONS

C1. GENERAL CONDITIONS

C1.1 The *General Conditions for Provision of Services* (Revision 1996 02 05) are applicable to the Work of the Contract.

C1.1.1 The *General Conditions for Provision of Services* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Branch internet site at <http://www.winnipeg.ca/matmgt>.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

- D1.1 In addition to the *General Conditions for Provision of Services*, these Supplemental Conditions are applicable to the Work of the Contract.
- D1.2 The General Conditions are amended by striking out "The City of Winnipeg Act" wherever it appears in the General Conditions and substituting "The City of Winnipeg Charter".
- D1.3 The General Conditions are amended by striking out "Board of Commissioners" or "Commissioner" wherever it appears in the General Conditions and substituting the "Chief Administrative Officer".
- D1.4 The General Conditions are amended by striking out "Tender Package" wherever it appears in the General Conditions and substituting "Request for Proposal".
- D1.5 The General Conditions are amended by striking out "Tender Submission" wherever it appears in the General Conditions and substituting "Proposal Submission".
- D1.6 The General Conditions are amended by striking out "Bidding Instructions" wherever it appears in the General Conditions and substituting "Bidding Procedures".

D2. SCOPE OF WORK

- D2.1 The Work to be done under the Contract shall consist of York Turbopak chiller replacement utilizing new and existing components based on operating conditions provided for this facility;
- D2.2 The major components of the Work are as follows:
- (a) Evaluation of the existing HVAC system components and operation;
 - (b) York Turbopak chiller replacement project design development utilizing new and existing components based on operating conditions provided for this facility;
 - (c) Demolition, construction, installation, and commissioning of all new and existing HVAC system components for the complete Yourk Turbopak chiller replacement project;
 - (d) Final design documentation and drawings shall be signed and sealed by a professional engineer;

D3. DEFINITIONS

- D3.1 When used in this Request for Proposal:
- (a) "**Business Day**" means any Calendar Day, other than a Saturday, Sunday, or a Statutory or Civic Holiday;
 - (b) "**Submission Deadline**" and "**Time and Date Set for the Final Receipt of Bids**" mean the time and date set out in the Bidding Procedures for final receipt of Proposals;

D4. CONTRACT ADMINISTRATOR

- D4.1 The Contract Administrator is:
Mr. Alex Vecherya C.E.T.
Facilities Maintenance Coordinator

Winnipeg Transit Department
421 Osborne Street
Winnipeg, Manitoba R3L 2A2
Telephone No. (204) 986-3821
Facsimile No. (204) 986-6863

- D4.2 At the pre-commencement meeting, the Contract Administrator will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D5. CONTRACTOR'S SUPERVISOR

- D5.1 At the pre-commencement meeting, the Contractor shall identify his designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D6. NOTICES

- D6.1 GC.7.06 is hereby amended to delete reference to "registered mail" and to replace same with "ordinary mail".
- D6.2 GC.7.06 is further amended hereby to include delivery by facsimile transmission (fax) as an acceptable means of delivering notices, consents, approvals, statements, authorizations, documents or other communications required or permitted to be given under this Contract. Deliveries by fax will be deemed to have been received on the day of delivery, if a business day, or if not a business day, on the business day next following the day of delivery.
- D6.3 Further to GC.7.06, all notices, consents, approvals, statements, authorizations, documents or other communications to the City, except as expressly otherwise required in D6.4, D6.5 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator at the address or facsimile number identified in D4.1.
- D6.4 All notices of appeal to the Chief Administrative Officer shall be sent to the attention of the Chief Financial Officer at the following address or facsimile number:
The City of Winnipeg
Chief Administrative Officer Secretariat
Administration Building, 3rd Floor
510 Main Street
Winnipeg MB R3B 1B9
Facsimile No.: (204) 949-1174
- D6.5 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents or other communications required to be submitted or returned to the City Solicitor shall be sent to the following address or facsimile number:
The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1
Facsimile No.: (204) 947-9155

D7. CONFIDENTIALITY AND OWNERSHIP OF INFORMATION

- D7.1 Information provided to the Contractor by the City or acquired by the Contractor during the course of the Work is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator.
- D7.2 The Contract, all deliverables produced or developed, and information provided to or acquired by the Contractor are the property of the City. The Contractor shall not disclose or appropriate to its own use, or to the use of any third party, all or any part thereof without the prior written consent of the Contract Administrator.
- D7.3 The Contractor shall not make any statement of fact or opinion regarding any aspect of the Contract to the media or any member of the public without the prior written authorization of the Contract Administrator.

SUBMISSIONS

D8. AUTHORITY TO CARRY ON BUSINESS

- D8.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D9. WORKERS COMPENSATION

- D9.1 The Contractor shall be registered with the Workers Compensation Board of Manitoba, shall provide and maintain Workers Compensation coverage throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D10. INSURANCE

- D10.1 The Contractor shall provide and maintain the following insurance coverage:
- (a) commercial general liability insurance, in the amount of at least two million dollars (\$2,000,000.00) all inclusive, with The City of Winnipeg being added as an additional insured, with a cross-liability clause, such liability policy to also contain a contractual liability, an unlicensed motor vehicle liability and a products and completed operations endorsement to remain in place at all times during the performance of the Work and throughout the warranty period;
 - (b) automobile liability insurance for owned and non-owned automobiles used for or in connection with the Work in the amount of at least two million dollars (\$2,000,000.00) at all times during the performance of the Work and until the date of Total Performance.
- D10.2 Deductibles shall be borne by the Contractor.
- D10.3 The Contractor shall provide the Contract Administrator with a certificate of insurance of each policy at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in GC.3.01 for the return of the executed Contract.
- D10.4 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least fifteen (15) Calendar Days prior written notice to the Contract Administrator.

D11. PERFORMANCE SECURITY

- D11.1 The Contractor shall provide and maintain performance security until the expiration of the warranty period in the form of:
- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; or
 - (b) an irrevocable standby letter of credit issued by a bank or other financial institution registered to conduct business in Manitoba and drawn on a branch located in Winnipeg, in the form attached to these Supplemental Conditions (Form H2: Irrevocable Standby Letter of Credit), in the amount of fifty percent (50%) of the Contract Price; or
 - (c) a certified cheque or draft payable to "The City of Winnipeg", drawn on a bank or other financial institution registered to conduct business in Manitoba, in the amount of fifty percent (50%) of the Contract Price.
- D11.1.1 Where the performance security is in the form of a certified cheque or draft, it will be deposited by the City. The City will not pay any interest on certified cheques or drafts furnished as performance security.
- D11.2 The Contractor shall provide the City Solicitor with the required performance security within seven (7) Calendar Days of notification of the award of the Contract by way of letter of intent and prior to the commencement of any Work on the Site.

D12. COMMENCEMENT

- D12.1 The Contractor shall not commence any Work until he is in receipt of a letter of intent from the Award Authority authorizing the commencement of the Work.
- D12.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence that the Contractor is in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed or permitted by law to carry on business in Manitoba;
 - (ii) evidence of the workers compensation coverage specified in D9;
 - (iii) evidence of the insurance specified in D10;
 - (iv) the performance security specified in D11; and
 - (b) the Contractor has attended a meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a meeting.
- D12.3 The Contractor shall commence the Work on the Site within seven (7) Working Days of receipt of the letter of intent.

D13. SUBSTANTIAL PERFORMANCE

- D13.1 The Contractor shall achieve Substantial Performance within one hundred twenty (120) consecutive Working Days of the commencement of the Work as specified in D12.
- D13.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D13.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D14. TOTAL PERFORMANCE

D14.1 The Contractor shall achieve Total Performance within one hundred fifty (150) consecutive Working Days of the commencement of the Work as specified in D12.

D14.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be reinspected.

D14.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D15. LIQUIDATED DAMAGES

D15.1 If the Contractor fails to achieve Substantial Performance in accordance with the Contract by the day fixed herein for Substantial Performance, the Contractor shall pay the City three hundred dollars (\$300) per Working Day for each and every Working Day following the day fixed herein for Substantial Performance during which such failure continues.

D15.2 The amount specified for liquidated damages in D15.1 is based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve Substantial Performance by the day fixed herein for same.

D15.3 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.

D16. SCHEDULED MAINTENANCE

D16.1 The Contractor shall perform the following scheduled maintenance in the manner and within the time periods required by the Specifications:

- (a) One year full maintenance (above warranty) including monthly inspections and reports;
- (b) To train in house building maintenance personnel of two (2) employees for three sessions of two hours each on the first operating season;

D16.2 Determination of Substantial Performance and Total Performance shall be exclusive of scheduled maintenance identified herein. All scheduled maintenance shall be completed prior to the expiration of the warranty period. Where the scheduled maintenance cannot be completed during the warranty period, the warranty period shall be extended for such period of time as it takes the Contractor to complete the scheduled maintenance.

CONTROL OF WORK

D17. JOB MEETINGS

D17.1 Regular weekly job meetings will be held at the Site. These meetings shall be attended by a minimum of one representative of the Contract Administrator, one representative of the City and one representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City and the Contractor

respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.

D17.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he deems it necessary.

D18. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

D18.1 Further to GC.5.02, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

WARRANTY

D19. WARRANTY

D19.1 Further to GC.10.01, if a defect or deficiency prevents the full and normal use or operation of the Work or any portion thereof, for purposes of calculating the warranty period, time shall be deemed to cease to elapse for the defective or deficient portion, and for any portion of the Work whose use or operation is prevented by such defect or deficiency, as of the date on which the defect or deficiency is observed or the use or operation is prevented and shall begin to run again when the defect or deficiency has been corrected or the Work may be used or operated to the satisfaction of the Contract Administrator.

D19.2 Notwithstanding GC.10.01, GC.10.02 and D19.1, if any law of Manitoba or of the jurisdiction in which the Work was manufactured requires, or if the manufacturer provides, a longer warranty period or a warranty which is more extensive in its nature, then the provisions of such law or manufacturer's warranty shall apply.

FORM H1: PERFORMANCE BOND
(See D11)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

_____ ,
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter
called the "Obligee"), in the sum of

_____ dollars (\$_____)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which
sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and
assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee dated the

_____ day of _____, 20____, for:

RFP NO. 643-2005

YORK TURBOPAK CHILLER REPLACEMENT AT 421 OSBORNE STREET

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

- (a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
- (b) perform the Work in a good, proper, workmanlike manner;
- (c) make all the payments whether to the Obligee or to others as therein provided;
- (d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
- (e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

_____ day of _____, 20____ .

SIGNED AND SEALED
in the presence of:

(Witness)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

**FORM H2: IRREVOCABLE STANDBY LETTER OF CREDIT
(PERFORMANCE SECURITY)**
(See D11)

(Date)

The City of Winnipeg
Corporate Services Department
Legal Services Division
185 King Street, 3rd Floor
Winnipeg MB R3B 1J1

RE: PERFORMANCE SECURITY – RFP NO. 643-2005

YORK TURBOPAK CHILLER REPLACEMENT AT 421 OSBORNE STREET

Pursuant to the request of and for the account of our customer,

(Name of Contractor)

(Address of Contractor)

WE HEREBY ESTABLISH in your favour our irrevocable Standby Letter of Credit for a sum not exceeding in the aggregate

_____ Canadian dollars.

This Standby Letter of Credit may be drawn on by you at any time and from time to time upon written demand for payment made upon us by you. It is understood that we are obligated under this Standby Letter of Credit for the payment of monies only and we hereby agree that we shall honour your demand for payment without inquiring whether you have a right as between yourself and our customer to make such demand and without recognizing any claim of our customer or objection by the customer to payment by us.

The amount of this Standby Letter of Credit may be reduced from time to time only by amounts drawn upon it by you or by formal notice in writing given to us by you if you desire such reduction or are willing that it be made.

Partial drawings are permitted.

We engage with you that all demands for payment made within the terms and currency of this Standby Letter of Credit will be duly honoured if presented to us at:

(Address)

and we confirm and hereby undertake to ensure that all demands for payment will be duly honoured by us.

All demands for payment shall specifically state that they are drawn under this Standby Letter of Credit.

Subject to the condition hereinafter set forth, this Standby Letter of Credit will expire on

(Date)

It is a condition of this Standby Letter of Credit that it shall be deemed to be automatically extended from year to year without amendment from the present or any future expiry date, unless at least 30 days prior to the present or any future expiry date, we notify you in writing that we elect not to consider this Standby Letter of Credit to be renewable for any additional period.

This Standby Letter of Credit may not be revoked or amended without your prior written approval.

This credit is subject to the Uniform Customs and Practice for Documentary Credit (1993 Revision), International Chamber of Commerce Publication Number 500.

(Name of bank or financial institution)

Per: _____
(Authorized Signing Officer)

Per: _____
(Authorized Signing Officer)

PART E - SPECIFICATIONS

GENERAL

E1. GENERAL

E1.1 These Specifications shall apply to the Work.

E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing Name/Title</u>
A-1	Plan – location for existing and proposed chilling systems
311374 Sht4	SF-1 Air conditioning unit located in boiler room
311374 Sht5	SF-2 Air conditioning unit located in mechanical room
2185-405	Admin building. Plumbing and drainage
2185-609	Admin building. HVAC plan
2185-610	Admin building. HVAC details
2185-611	Admin building. Mechanical equipment layout, details and schedule
2185-612	Admin building. Mechanical equipment layout and details
2185-613	Admin building. HVAC schematic, hot and chilled water piping diagram

E2. SERVICES

E2.1 The Contractor shall replace the existing York Turbopak chiller with new unit utilizing new and existing components based on operating conditions for this facility;

E2.2 The supply and installation of new chiller for administration building shall be as follows:

- (a) The Contractor shall review and investigate proposed location for chiller with air cooled condenser outside the administration building;
- (b) The Contractor shall investigate and evaluate the existing HVAC system components and operation for the administration building;
- (c) The Contractor shall provide a new design complete with drawings of the entire York Turbopak chiller replacement project that meets all standards, codes and requirement that will be in effect on the date of Total Performance;
- (d) The Contractor shall review the Work to ensure it meets the original intent, and will not depreciate the value of the building, and will not affect the safety of occupants or exceed the agreed impact on the City's operations at any time during or after construction;
- (e) The Contractor shall ensure that all changes in design and operation meet the latest codes, standards and best practices including, but not limited to, the current provincial building code, WCB regulations, provincial plumbing code, boiler and refrigeration regulations, electrical codes, IES Lighting Handbook, City By-Laws, ASHRAE and SMACHNA Standards, and Manitoba Department of Labour Regulations;
- (f) The Contractor shall provide all necessary demolition, removal of all equipment and materials and dispose in a disposal area. Contractor shall be qualified and experienced to perform the demolition and construction. Any related damage to existing structure or alterations to the facility to assist demolition shall be restored to original condition at the Contractor's expenses;
- (g) All equipment and components selection shall be based on achieving optimum operation of the new Chilling system and maintaining energy efficiency;

- (h) Design shall be based on new type of refrigerants in compliance with Federal and Provincial regulations. All Work shall be done in accordance with the requirements of CAN/CSA B52 and the Manitoba Ozone Depleting Substances Act;
- (i) The Contractor shall provide all detailed design calculations for all equipment selection;
- (j) Design to include modifications to the existing boiler room and mechanical room on the basement for the installation of new equipment and components for HVAC system;
- (k) Design shall optimize existing space without major structural modifications;
- (l) All piping shall be labelled with service, pipe size and flow direction, Labelling shall be capital lettering using fire resistant interior latex paint, waterproof, heat resistant plastic marker tags. Upon completion of the Work all piping shall be cleaned and flushed of debris;
- (m) All drawings shall be sealed and signed by the Professional Engineer registered and licensed and in good standing in the Province of Manitoba. The Contractor must hold, or be eligible to hold a Certificate of Authorization from the Association of Professional Engineers and Geoscientists of Manitoba;
- (n) Three (3) complete sets of construction drawings and specifications for review by the Contract Administrator shall include as a minimum demolition and disposal of chilling system equipment and components, as well as structural, mechanical and electrical details, control wiring for the installation and/or construction of new chilling equipment and components, including identification of asbestos or any other hazardous materials;
- (o) Provide three (3) complete sets of "as build" drawings showing all mechanical, electrical wiring schematics and structural components refrigeration system;

E3. APPENDICES

- E3.1 York Model HT 100 OT 14 Liquid Chilling System. (original copy of brochure attached)

YORK

INSTRUCTIONS
INSTALLATION

Supersedes: Form 160.42-N Coded 567 568

Form 160.42-N

RECEIVED

AUG 6 1960

SEMANS PLUMBING &
HEATING LTD

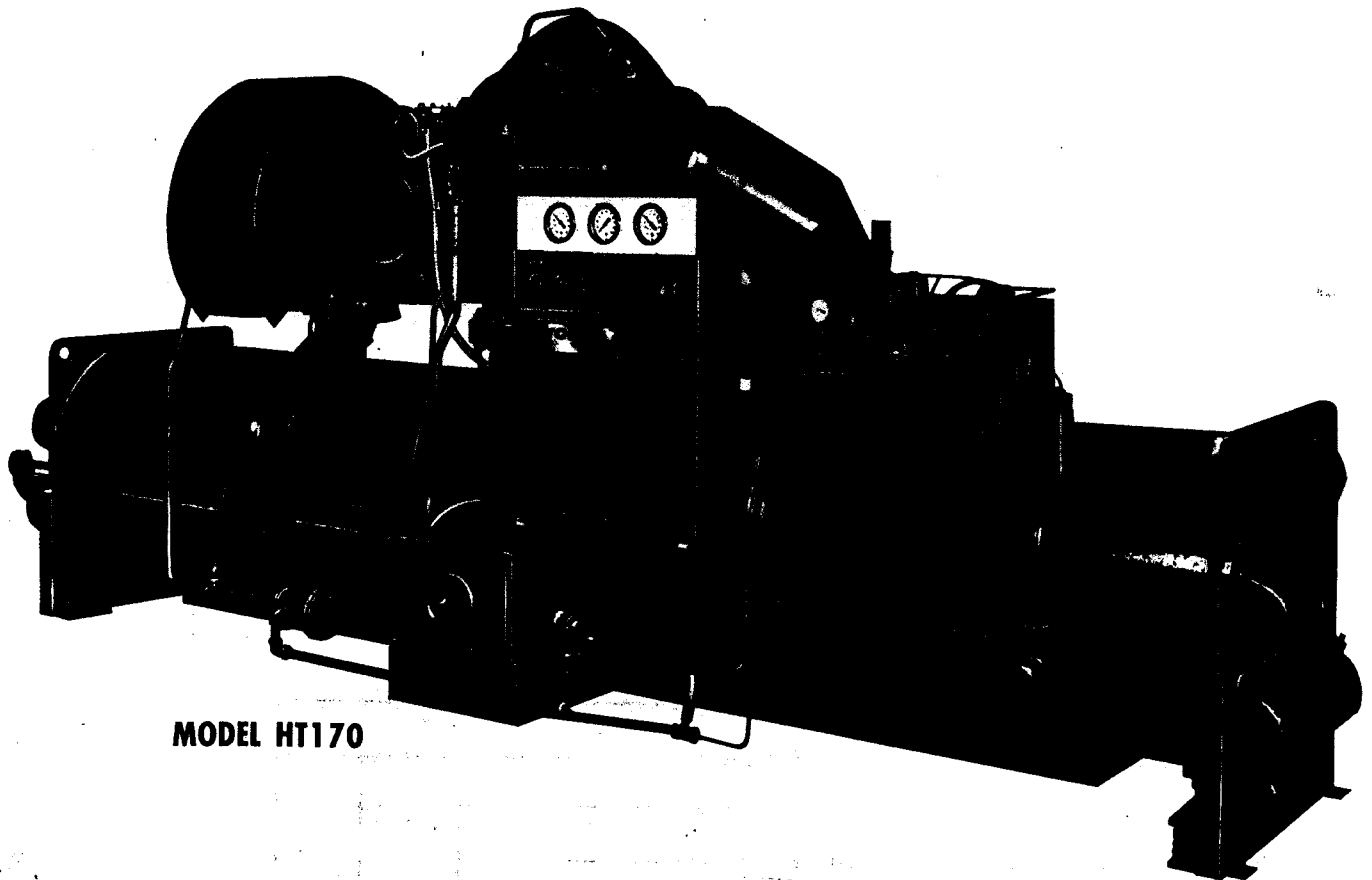
MODEL HT HERMETIC TURBOPAK

LIQUID CHILLING SYSTEMS, R_{refrigerant} 11

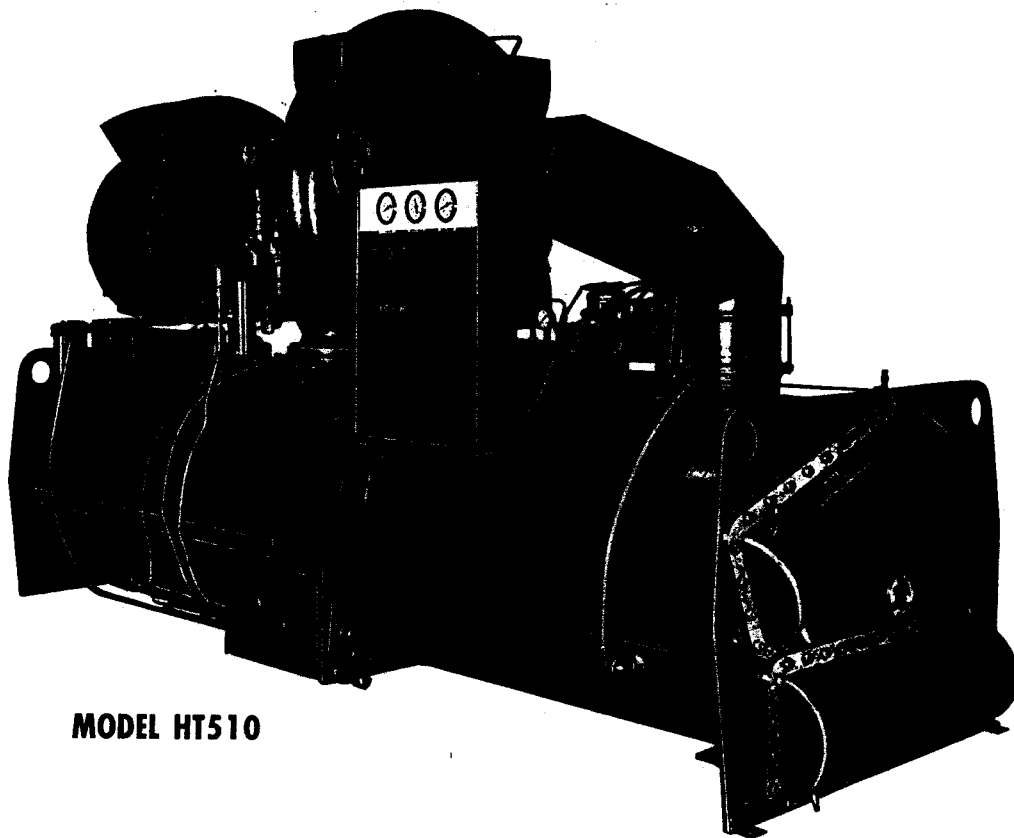
90 THRU 600 TONS

TM MODELS

HT 90	HT 290
HT 100	HT 320
HT 110	HT 350
HT 120	HT 390
HT 130	HT 430
HT 150	HT 470
HT 170	HT 510
HT 200	HT 560
HT 230	HT 600
HT 260	



MODEL HT170



MODEL HT510

GENERAL DESCRIPTION

Models HT 90 through 600 Refrigerant-11 single stage liquid cooling systems combine the demonstrated reliability and performance of the York Refrigerant-11 line of Turbopaks to provide a wide range of capacities, 90 to 600 tons of refrigeration, with nineteen models having the following outstanding features:

Refrigerant liquid cooled motor for highly efficient motor heat removal, greater reliability and longer life.

Refrigerant cooled oil cooler and purge unit, eliminating installation and maintenance of water valves and piping and providing improved system reliability.

Electronic control center with solid state electronic components, eliminates the need for an air supply to the unit and is provided with safety control signal lights as standard equipment.

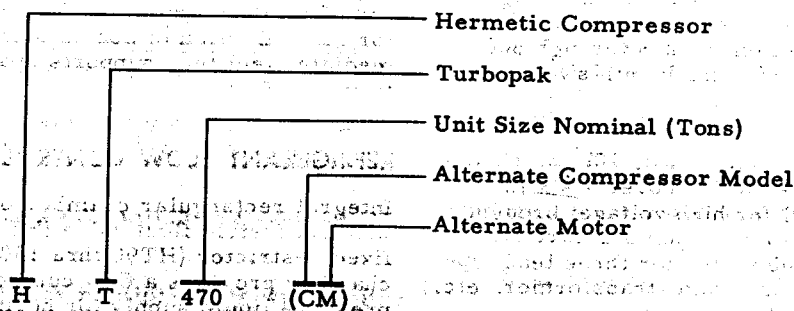
Improved heat exchanger design yielding optimum performance per square foot of heat transfer surface, providing reduced operating weight and reduced floor space requirements.

Removable fabricated water heads eliminating cumbersome marine type water boxes and providing reduced operating weight with direct access to tube sheet surfaces for inspection.

High capacity float valve providing stable system operation even at low head pressures (HT150-600). Fixed restrictor flow control provides stable efficient operation with no moving parts (OT90-130).

Completely factory assembled, piped, control wired, evacuated and charged - with reduced weight and size - all for ease of installation and greater system reliability.

NOMENCLATURE



MECHANICAL SPECIFICATION

STANDARD UNIT

COMPRESSOR

CASING - Accessible hermetic - cast iron vertical circular joints - complete operating assembly removable from compressor scroll housing.

ROTOR - Cast aluminum alloy impeller - designed for balanced thrust - overspeed tested - statically and dynamically balanced - heat treated alloy steel impeller shaft and drive shaft.

BEARINGS - Main and thrust - aluminum alloy - precision bored - insert type.

LUBRICATION SYSTEM - Forced feed to all bearings - centrifugal oil pumps integral with rotor shafts for assured lubrication during operation and coast down, even in event of power failure - externally mounted auxiliary oil pump driven by 1/3 HP, 115-1-60, 1725 RPM, TEFC, inherently protected motor - 15 micron external oil filter with replaceable type cartridge and service valves - refrigerant cooled oil cooler - two 285 watt cartridge type oil heaters, 115-1-60, in oil reservoir - oil piping completely factory installed and tested.

INTERNAL GEARS - Specially engineered single helical gears with crowned teeth sized so that more than one tooth is in contact at all times for quiet operation, and to prevent abnormal stresses on any one tooth - film lubricated for most efficient heat removal - integrally assembled in compressor rotor support.

CAPACITY REDUCTION - York prerotation vanes (PRV) capable of maintaining capacity as low as 10% of design on most normal air conditioning jobs - minimum percent of design load which may be achieved depends on such variables as condenser water flow, variation in condenser water temperatures with reduction in cooling load, and individual compressor performance characteristics. Rugged airfoil shaped manganese bronze vanes - vane linkage, simple in design - electric PRV operator, 115-1-60, for automatic operation.

MOTOR HERMETIC TYPE

3600 RPM ROTOR - STATOR - Constructed to York design specifications by nationally known manufacturers - for 208, 220/230/240, 440/460/480, 550/575/600 volts-3-phase-60 cycle service for full or reduced voltage starting (across the line, auto-transformer or start delta) high voltage (2300 and 4160 - 3 phase - 60 cycle for Models HT 150 through 600 available for full or reduced voltage starting (only across-the-line, or auto-transformer) inherent overload protection for 208 through 600 volts - factory applied, 3/4" thick anti-sweat insulation of flexible closed cell plastic type on motor housing.

TERMINAL BOX - Heavy gauge (No. 10) end sheets for conduit connections - 18 Ga. cover - six (6) terminal posts (three (3) for high voltage) brought through hermetic seals to box - jumper bars furnished on 208 through 600 volts, for three lead types of starting (across-the-line, auto-transformer, etc.) motor terminal lugs not furnished.

SINGLE SHELL COMBINING COOLER, CONDENSER AND FLOW CONTROL CHAMBER

MOTOR COOLING - By condenser liquid supplied to the motor by sprays and jacket and returned to the evaporator as refrigerant vapor.

SHELL - Steel - fusion welded seams - internal steel division plate between condenser and cooler - common steel tube end sheets - necessary intermediate steel tube supports - 15 psig design working pressure.

TUBES - 20 BWG seamless copper (0.035" wall at finned section, approximately two gauges heavier, 0.049" wall, at plain section where rolled into tube sheets) - integral finned 19 fins per inch, HT 150 thru HT600) (26 fins per inch, HT 90 thru HT 130) - continuous finned condenser tubes and skip finned cooler tubes - roller expanded into concentrically grooved 3/4" thick steel tube sheets.

WATER HEADS - Removable fabricated steel water heads - 150 psig design working pressure - schedule 40 pipe stub-out water connections with Victualic grooves suitable for welding or adaptation of Victualic couplings, capped for shipment and with 1/2" couplings with separate wells on cooler nozzles for LWT cut-out bulb and temperature controller bulb - integral steel water baffles to provide required pass arrangements - coolers available 1, 2 or 3-pass; condensers 1, 2 or 3 pass, (three pass not available for HT 150 thru 350) variety of nozzle arrangements - plugged 1/2" drain and vent connections.

COOLER - Horizontal flooded shell and tube type - highly efficient integral wire mesh eliminators - liquid distribution system consisting of primary distributor trough to give uniform liquid distribution throughout shell length and secondary distributor under entire tube bundle with flow areas designed for refrigerant velocities to yield optimum heat transfer with minimum surface area - intermediate steel tube supports spaced at intervals less than four feet - two 4" liquid sight ports - 2" bursting disc relief device in accordance with USA B9.1 safety code.

CONDENSER - Horizontal shell and tube type - discharge gas impingement and distribution baffle to prevent direct high velocity impingement on tubes and to distribute the gas flow properly to utilize all heat transfer surface - steel purge collection chamber provided above the condenser tube bundle at one end of shell to furnish a "dead spot" within condenser for the collection of non-condensable gases - intermediate steel tube supports spaced at intervals less than four feet.

REFRIGERANT FLOW CONTROL

Integral rectangular chamber on front side of unit with accessible float valve (HT150 thru 600) or fixed restrictor (HT90 thru 130) flow control - chamber provides a flow control deck and high pressure liquid supply for hermetic motor cooling

and purge unit operation — large cover with sight ports to observe operation and provide easy access to flow control — system refrigerant charging valve connection — float valve in HT150 - 600 provided with external adjuster — fixed restrictor flow control in HT90 thru 130 meters liquid refrigerant efficiently at all operating conditions, with no moving parts.

PURGE UNIT

Self-contained compressor type - reciprocating purge service compressor - initial oil charge - compressor oil level sight glass - 1/2 HP, 115-1-60, 1800 RPM, open drip-proof, inherently protected, capacity start motor - V-belt drive with belt guard - refrigerant dehydrator - 50 watt strip heater - concentrator shell - purge drum - 2-1/2" dial purge pressure gauge - moisture indicator - purge solenoid valve - controls for automatic operation with manual start/stop - automatic cycling by high pressure switch - factory assembled, mounted, piped and wired to system.

ELECTRONIC CONTROL CENTER

Attractively styled eye-level enclosure, mounted on factory installed rubber isolators on front of unit - 30 amp, 115-1-60 supply current required - factory piped, wired and fused - solid state chilled water temperature controller with control point adjustment - solid state current demand limiting controller (50% to 100% range) - evaporator, condenser and oil 3-1/2" dial pressure gauges - high condenser pressure, low evaporator pressure, low oil pressure, high oil temperature and high motor temperature, manual reset protective controls with indicating red neon signal lights, auxiliary SPDT contacts which may be used as desired to energize an alarm circuit (alarm circuit, alarms, etc. not included) - low water temperature protective control with signal light, automatic reset-low oil level signal light - purge unit start/stop SPDT switch with operation signal light - auxiliary oil

pump manual/automatic switch with operating signal light - anti-recycle control with signal light - system running signal light - oil heater operating signal light - manual/automatic control selector with manual adjustment - compressor start and stop/reset pushbutton switches - internal components arranged for maintenance - enclosure with lock and key.

ASSEMBLY AND PIPING

Unit completely factory assembled including inter-connecting refrigerant piping, auxiliary piping, control wiring, gauge and control piping.

ISOLATION MOUNTING

Four level adjusting spring type isolator assemblies with non-skid pads - for mounting in brackets at four corners of shell (no structural or concrete base required - only floor level within 1/4 inch capable of supporting operating weight) - sized for one inch deflection.

REFRIGERANT AND OIL CHARGE

Unit normally evacuated and charged with Refrigerant-11 or a dry charge of nitrogen prior to shipment. Initial charge of compressor oil shipped separately. Unit can be shipped less R-11 charge if desired.

OPERATING INSTRUCTIONS AND DRAWINGS

Factory supplied. Installation, Operating and Service Instructions (five sets).

THERMOMETER WELLS

Three (3) - one in compressor suction line, one in compressor discharge line and one in float chamber. (High pressure liquid) - for test type thermometers - thermometers are not furnished.

PAINTING

Exterior surfaces protected with machinery paint.

SHIPMENT—UNIT SKIDDED Protective covering on control panel, purge unit and water nozzles.

ACCESSORIES AND MODIFICATIONS

1. Water flanges: Four - 150 lb. USAS (ASA) - RF flanges for condenser and cooler water connections, factory welded to water nozzles. Companion flanges, bolts, nuts and gaskets not included.

2. Cooler Insulation: Factory applied anti-sweat insulation of flexible closed cell plastic type, 3/4" thick, applied with vapor proof cement to cooler shell, float chamber, tube sheets, suction connection, motor cooling connections and as necessary to small tubing. Does not include insulation of water heads and nozzles. This insulation will normally prevent sweating in environments with relative humidity of 75% or less and dry bulb temperatures ranging from 50 to 90 F. 1-1/2" insulation is also available for 90% or less relative humidity and dry bulb temperatures ranging from 50 to 90 F.

3. Water flow switches for chilled and condenser water circuits.

4. Sequence controls for multiple units with chilled

water circuit connected in series or parallel.

5. Non-controlling type temperature recorders.

6. Low Evaporator Temperature Protection (LETP) required on all applications having evaporator temperatures below 34 F.

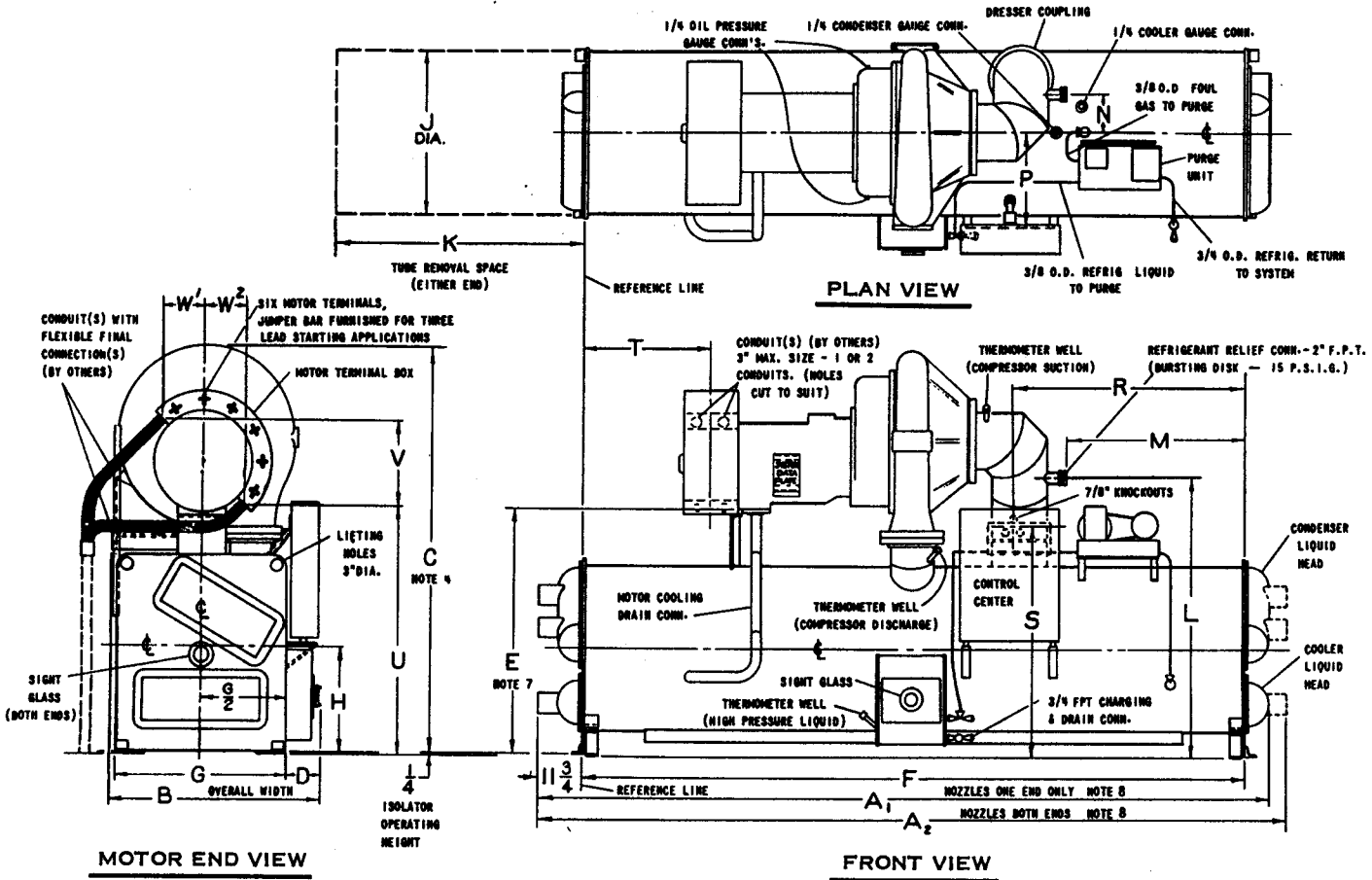
7. Compressor motor starter of proper size and type for job requirements, in accordance with requirements of York engineering standard.

8. Pneumatic Control Signal: The standard York Electronic Control Center can be modified to accept a pneumatic chilled water temperature signal to control capacity, in lieu of electronic signal, using a transducer and pneumatic controller.

9. Pneumatic Control Center: With pneumatic chilled water temperature controller and pneumatic load limiter, for use with compressor having a pneumatic PRV operator.

10. Other accessories and modifications on application.

DIMENSIONS • INCHES MODELS HT90 THRU 350

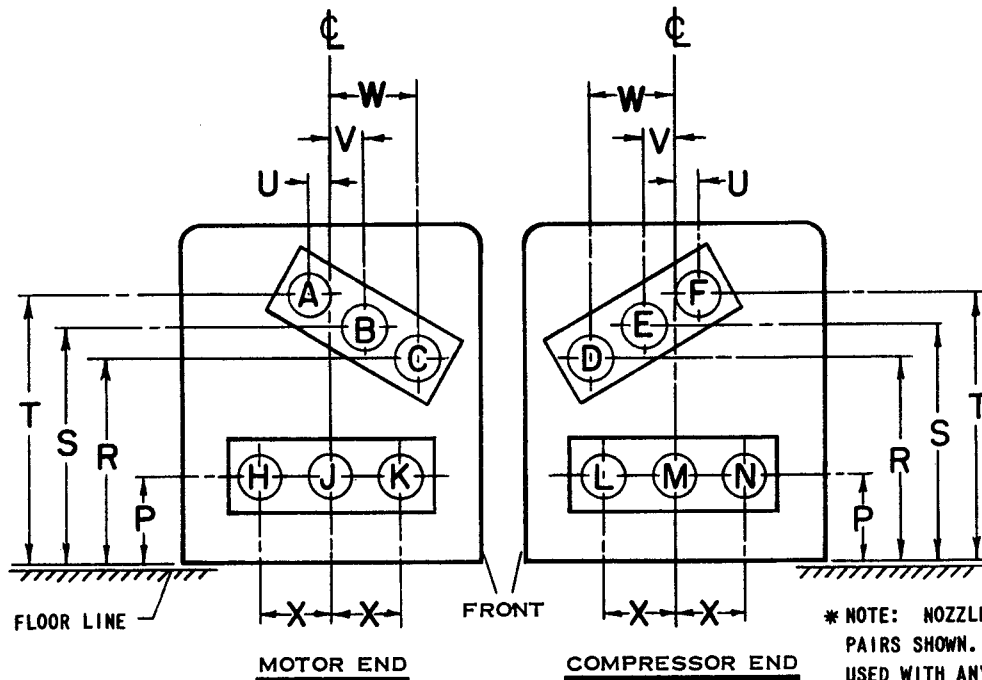


MODEL HT	OVERALL																TUBE REMOVAL				RELIEF CONNECTION				ELECTRICAL CONNECTIONS							
																									CONTROL CENTER				MOTOR			
	A ₁	A ₂	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W ¹	W ²										
90, 100, 110 120, 130	160-7/8	167-1/2	37-7/8	73-3/8	4	50-5/8	144	32	20-3/4	30	145	51-5/8	36-3/4	7	12	48-7/8	51-1/2	26-3/4	43-5/8	18	10-1/2	7-1/2										
150 & 170	184-5/8	191-1/2	45-5/8	78-1/2	10	51-5/8	168	32	20-3/4	30	160	53-1/2	46-1/2	7-1/4	16-1/4	60-7/8	45-1/2	31-1/2	44-1/4	22	11	11										
200 & 230	185-1/2	191-1/2	46-3/8	80-1/2	8-3/4	53-5/8	168	34	21-3/4	32	160	55-1/2	46-1/2	7-1/4	17-3/4	60-7/8	45-1/2	31-1/2	46-1/4	22	11	11										
260	185-3/4	191-1/2	50-3/8	83-1/4	9-3/4	60-7/8	168	36	22-3/4	34	160	61-1/2	44-1/4	9-1/2	18-1/4	60-7/8	45-1/2	30	54-1/2	22	11	11										
290	185-3/4	191-1/2	51	95-1/4	9-1/4	61-7/8	168	38	23-3/4	36	160	63-1/2	44-1/4	9-1/2	20-1/2	60-7/8	45-1/2	30	58-1/2	22	11	11										
320	186-1/2	191-1/2	52	97-1/4	9-3/8	63-7/8	168	40	24-3/4	38	160	65-1/2	44-1/4	9-1/2	21-3/4	60-7/8	45-1/2	30	58-1/2	22	11	11										
350	186-1/8	191-1/2	53-1/4	100-1/4	9	66-7/8	168	43	25-1/4	41	160	68-1/2	44-1/4	9-1/2	23-1/4	60-7/8	45-1/2	30	61-1/2	22	11	11										

NOTES: (CONTINUED ON PAGE 7)

- DIMENSIONS IN INCHES - DO NOT SCALE. DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED. DIMENSIONS SYMMETRICAL AROUND C, EXCEPT AS SHOWN.
- OVERALL DIMENSIONS SHOWN DO NOT INCLUDE EXTERNAL PIPING. PIPING CLEARANCES MUST BE PROVIDED AS REQUIRED. SERVICE CLEARANCE MUST BE PROVIDED AS FOLLOWS: 24" AT REAR, END AND OVERHEAD; 36" AT FRONT. TUBE REMOVAL SPACE AS SHOWN IN SYSTEM DIMENSIONS MUST BE PROVIDED AT EITHER END OF UNIT.
- NO SPECIAL FOUNDATION REQUIRED. FLOOR MUST BE LEVEL WITHIN 1/4", CAPABLE OF CARRYING THE LOADINGS SHOWN UNDER PHYSICAL DATA FOR STANDARD, LEVEL ADJUSTING, SPRING TYPE ISOLATORS.
- HEIGHT OF FACTORY ASSEMBLED UNIT - ADD 6" FOR SHIPPING SKIDS.
- SQ. FT. INTERNAL SURFACE = SQ. FT. EXTERNAL SURFACE X C (C = 0.236 FOR HT90-130; C = 0.293 FOR HT150-600).
- HEIGHT OF SHELL (LARGEST PIECE WHEN SHIPPED SEPARATELY) INCLUDES 6" SKIDS AND SHIPPING CLOSURES. DIM. "E" IS TO TOP OF DRESSER COUPLING FOR MODELS HT90 THRU 230. MODELS HT260 THRU 350. DIM. "E" IS TO TOP OF MOTOR COOLING DRAIN CONNECTION. WIDTH WILL BE DIMENSION "B". FOR SHELL WEIGHT - SEE PHYSICAL DATA.

WATER NOZZLE ARRANGEMENTS AND DIMENSIONS MODELS HT90 THRU 350



NOZZLE ARRANGEMENTS *		
	CONDENSER	COOLER
	IN - OUT	IN - OUT
1 PASS	B - E	J - M
	E - B	M - J
2 PASS	A - C	H - K
	F - D	K - H
		L - N
		N - L
** 3 PASS	A - D	H - L
	F - C	L - H

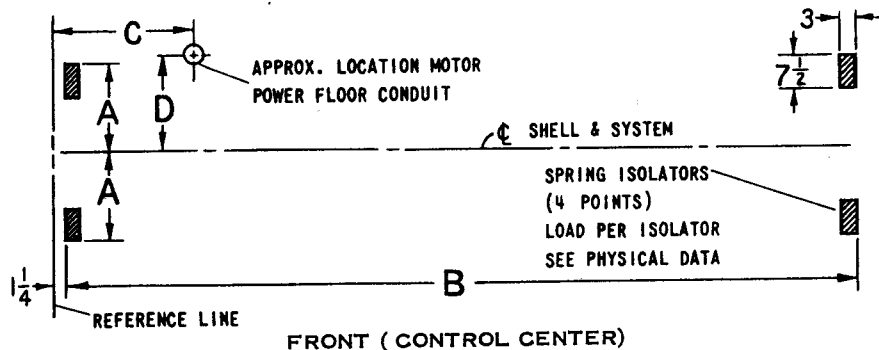
* NOTE: NOZZLE ARRANGEMENTS ARE AVAILABLE ONLY IN PAIRS SHOWN. ANY PAIR OF COOLER NOZZLES MAY BE USED WITH ANY PAIR OF CONDENSER NOZZLES.

** 3-PASS CONDENSER IS NOT AVAILABLE ON MODELS HT150 THRU 350.

MODEL HT	P A S S	NOZZLE PIPE SIZE NOTE		NOZZLE ARRANGEMENT DIMENSIONS							
		CONDENSER	COOLER	P	R	S	T	U	V	W	X
90 100 110 120 130	1	6	6	10-3/4	—	26-3/8	—	—	3-1/2	—	—
	2	4	4	10-3/4	23-5/8	—	29-1/8	1-1/4	—	8-1/8	7
	3	4	4	10-3/4	23-5/8	—	29-1/8	1-1/4	—	8-1/8	7
150 170	1	6	6	10-3/4	—	27	—	—	2-7/8	—	—
	2	6	6	10-3/4	24-1/8	—	29-7/8	2-1/8	—	7-3/4	7
	3	—	6	10-3/4	—	—	—	—	—	—	7
200 230	1	8	8	10-1/4	—	28-1/8	—	—	2-3/4	—	—
	2	6	6	10-1/4	25-1/4	—	31	2-1/4	—	7-3/4	7-3/4
	3	—	6	10-1/4	—	—	—	—	—	—	7-3/4
260	1	8	8	11-1/4	—	29-1/4	—	—	3-1/2	—	—
	2	6	6	11-1/4	26-1/4	—	32-1/4	1-3/4	—	8-3/4	8-1/4
	3	—	6	11-1/4	—	—	—	—	—	—	8-1/4
290	1	8	8	11-1/2	—	31-1/4	—	—	4	—	—
	2	6	6	11-1/2	28-3/8	—	34-1/8	1	—	8-7/8	8
	3	—	6	11-1/2	—	—	—	—	—	—	8
320	1	10	8	11-3/4	—	31-3/8	—	—	3-3/4	—	—
	2	8	8	11-3/4	27-3/4	—	35	2-1/2	—	10	10
	3	—	8	11-3/4	—	—	—	—	—	—	10
350	1	10	10	13	—	34-3/4	—	—	4-3/8	—	—
	2	8	8	13	31-1/4	—	38-1/4	1-5/8	—	10-1/2	8-7/8
	3	—	8	13	—	—	—	—	—	—	8-7/8

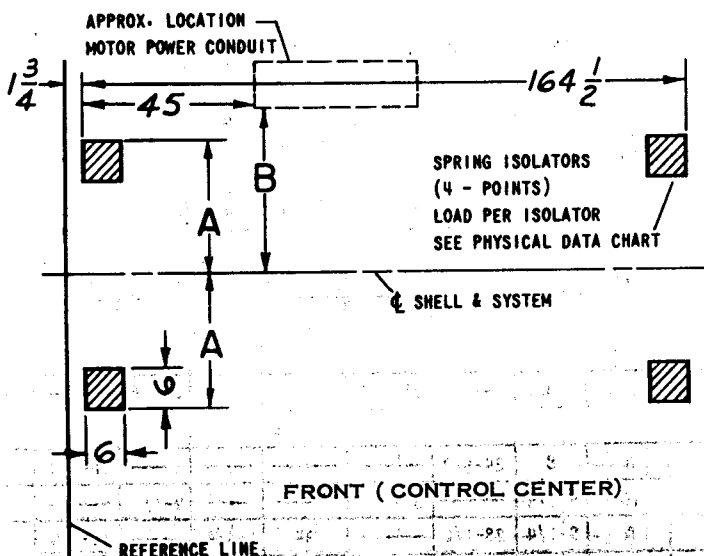
NOTE: STANDARD WATER NOZZLES ARE FURNISHED AS WELDING STUBOUTS WITH GROOVES, ALLOWING THE OPTION OF WELDING OR USE OF VICTUALIC COUPLINGS.

FLOOR LAYOUT DIMENSIONS MODELS HT90 THRU 350



MODEL HT	FLOOR LAYOUT DIMENSIONS		MOTOR POWER CONDUIT	
	A	B	C	D
90, 100, 110 120, 130	16-1/4	141-1/2	26-3/4	19
150 & 170	16-1/4	165-1/2	31-1/2	19
200 & 230	17-1/4	165-1/2	31-1/2	20
260	18-1/4	165-1/2	30	21
290	19-1/4	165-1/2	30	22
320	20-1/4	165-1/2	30	23
350	21-3/4	165-1/2	30	24-1/2

MODELS HT390 THRU 600



MODEL HT	FLOOR LAYOUT DIMENSIONS		MOTOR POWER CONDUIT
	A	B	C
390-430	27	164-1/2	30
470-510	28-1/2	164-1/2	31-1/2
560-600	30	164-1/2	33-1/2

PHYSICAL DATA

PHYSICAL DATA

SYSTEM MODEL	COMPR. MODEL (NOTE 1)	MOTOR MAX. KW	SHELL		CONDENSER		COOLER			INSULATION (SQ. FT.) (NOTE 7)		CHARGE		SHIPPING WT. (LB)		OPERATING WEIGHT INCLUDING WATER, REFRIGERANT, OIL, AND INSULATION (LB)	
			NOM. DIA. INCH.	TUBE LGTH. FT.	NO. OF TUBES	SQ. FT. EXTERNAL SURFACE (NOTE 5)	NO. OF TUBES	SQ. FT. EXTERNAL SURFACE (NOTE 5)	SHELL	COOLER LIQUID HEADS	R-11 (LB)	OIL (GAL)	TOTAL INCL. REFRIG.	SHELL LESS REFRIG.	TOTAL	FLOOR LOADING LBS./ISOLATORS	
90	MTD53	99	30	12	78	577	80	592	104	10	400	5	7150	3805	7170	1795	
100	MTD53	99	30	12	86	636	88	651	104	10	400	5	7250	3905	7290	1825	
110	MTD53	99	30	12	94	695	98	725	104	10	400	5	7330	3985	7390	1850	
120	MTD59	119	30	12	102	754	108	799	104	10	400	5	7420	4075	7500	1875	
130	MTD59	119	30	12	112	828	116	858	104	10	400	5	7510	4165	7610	1905	
150	MTD67	145	30	14	120	834	106	736	118	10	600	9.5	8840	4615	9070	2267	
170	MTD67	145	30	14	136	945	118	820	118	10	600	9.5	9000	4775	9180	2295	
200	MTD76	193	32	14	160	1111	142	986	125	12	625	9.5	9770	5500	10130	2532	
230	MTD76	193	32	14	184	1278	163	1132	125	12	625	9.5	10020	5740	10375	2594	
260	MTD85	245	34	14	210	1459	188	1306	135	12	650	11.5	11420	6000	11945	2986	
290	MTD95	245	36	14	232	1611	211	1466	141	13	700	11.5	12170	6700	12840	3210	
290C	MTD85	245	36	14	232	1611	211	1466	141	13	700	11.5	12170	6700	12840	3210	
290M	MTD95	284	36	14	232	1611	211	1466	141	13	700	11.5	12240	6700	12910	3210	
320	MTD95	284	38	14	258	1792	230	1598	148	14	750	11.5	12930	7225	13610	3402	
350	MTD95	284	41	14	294	2042	313	2174	155	15.5	850	11.5	13845	8140	14725	3681	
390	MTD108	378	*54	14	314	2180	276	1917	172	19	1185	20	18490	9100	19520	4880	
430	MTD108	378	*54	14	347	2410	304	2111	172	19	1185	20	18750	9400	19850	4963	
470	MTD108	378	*57	14	378	2625	332	2305	186	21	1270	20	19520	10040	20780	5195	
470C	MTD120	378	*57	14	378	2625	332	2305	186	21	1270	20	19520	10040	20780	5195	
470CM	MTD120	489	*57	14	378	2625	332	2305	186	21	1270	20	19670	10040	20930	5233	
510	MTD120	489	*57	14	408	2833	360	2500	186	21	1220	20	19970	10390	21310	5328	
550	MTD120	378	*57	14	408	2833	360	2500	186	21	1220	20	19820	10390	21160	5290	
560M	MTD120	489	*60	14	450	3125	396	2750	200	24	1340	20	20990	11330	22520	5630	
600	MTD120	489	*60	14	450	3125	396	2750	200	24	1340	20	22840	11330	22370	5592	
600M	MTD120	489	*60	14	492	3416	430	2986	200	24	1290	20	21310	11710	22950	5738	
600M	MTD120	378	*60	14	492	3416	430	2986	200	24	1290	20	21160	11710	22800	5700	

* MAXIMUM DIMENSION INDICATED; 36 X 54, 39 X 57, AND 42 X 60 INCHES.

NOTE 1: -- HERMETIC COMPRESSOR NOMENCLATURE

HERMETIC COMPRESSOR

INTERNAL GEARS

DESIGN CHANGE

M T D

INSTALLATION

GENERAL

This Instruction describes the installation of a MODEL HT Hermetic Liquid Chilling System. The system is normally shipped as a single factory assembled, piped, wired and refrigerant charged package requiring a minimum of field labor to make chilled water connections, condenser water connections, refrigerant atmospheric relief connections (if required), and electrical power connections.

Systems can also be shipped dismantled when required by rigging conditions, but generally it is more economical to enlarge access openings to accommodate the factory assembled unit. Turbopaks shipped dismantled MUST be field assembled under the supervision of a YORK representative, but otherwise installation will be as described in this instruction.

Construction drawings are furnished for each job as noted in Table 1. These drawings should be carefully followed and used in conjunction with this installation instruction, to insure proper installation of the unit. In event of any differences between drawings and this instruction, the drawings shall govern.

The services of a YORK representative will be furnished to check the installation and supervise the initial start-up and operation of all Hermetic Turbopaks installed within Continental United States.

CAUTION - THE YORK WARRANTY WILL BE VOIDED IF THE FOLLOWING RESTRICTIONS ARE NOT OBSERVED.

1. NO VALVES OR CONNECTIONS SHOULD BE OPENED UNDER ANY CIRCUMSTANCES BECAUSE SUCH ACTION WILL RESULT IN

LOSS OF THE FACTORY REFRIGERANT CHARGE OR NITROGEN CHARGE ON UNCHARGED UNITS.

2. DO NOT DISMANTLE OR OPEN THE SYSTEM FOR ANY REASON EXCEPT UNDER THE SUPERVISION OF A YORK REPRESENTATIVE.
3. WHEN UNITS ARE SHIPPED DISMANTLED, NOTIFY THE NEAREST YORK OFFICE IN AMPLE TIME FOR A YORK REPRESENTATIVE TO SUPERVISE RIGGING THE UNIT TO ITS OPERATING POSITION AND THE ASSEMBLY OF COMPONENTS.
4. DO NOT MAKE FINAL POWER SUPPLY CONNECTIONS TO THE COMPRESSOR MOTOR STARTER, COMPRESSOR MOTOR OR CONTROL CENTER.
5. DO NOT CHARGE THE COMPRESSOR WITH OIL.
6. DO NOT ATTEMPT TO START THE SYSTEM.

SHIPMENT

The Hermetic Turbopak is shipped in the following forms:

- Form 1. - Complete with motor and refrigerant charge.
- Form 2. - Complete with motor and not charged with refrigerant, but with a holding charge of nitrogen. Refrigerant shipped in 650 lb, 200 lb, and 100 lb drums.
- Form 3. - Complete with motor, but dismantled. Refrigerant shipped in 650 lb, 200 lb, and 100 lb drums.

TABLE 1— CONSTRUCTION DRAWINGS AND CORRESPONDING FIGURE NUMBERS

MODELS	PRODUCT DWG. FORM NO.	FIG. NO.	PAGE NO.	DESCRIPTION
HT90 - HT350	160.42-PA1.1(T)	—	6, 8, 9	DIMENSIONS AND PHYSICAL DATA
HT390 - HT600	160.42-PA1.2(T)	—	7, 8, 9	DIMENSIONS AND PHYSICAL DATA
HT90 - HT600	160.42-PA2.1(T)	SEE FORM 160.42-W1		WIRING DIAGRAM - ELECTRONIC CONTROL PANEL
HT90 - HT350	160.42-PA3.1(T)			DIAGRAM FIELD WIRING CONNECTIONS
HT390 - HT600	160.42-PA3.2(T)			DIAGRAM FIELD WIRING CONNECTIONS
HT90 - HT600	160.42-PA4.1(T)	WIRING DIAGRAM AND STARTER SPECIFICATIONS		OPTIONAL (FIELD CONTROL MODIFICATIONS)
HT90 - HT600	160.42-PA5.1(T)			MOTOR STARTER SPECIFICATIONS
HT90 - HT350	160.42-PA6.1(T)		22	INSULATION REQUIREMENTS
HT390 - HT600	160.42-PA6.2(T)	12	23	INSULATION REQUIREMENTS

Factory Assembled Unit

1. Hermetic motor compressor assembly mounted on top of a single shell which combines the cooler, condenser and refrigerant flow control, with all necessary interconnecting piping assembled. Purge system mounted and connected on shell. Control center - electronic or pneumatic, as required, mounted on the system. Complete unit factory leak tested, evacuated and either fully charged with Refrigerant-11 or charged with nitrogen gas, as specified in factory order.
2. Miscellaneous material - Four (4) spring type isolators with leveling screws and (Forms 2 or 3 shipment) necessary refrigerant in 650, 200 and 100 lb drums; initial oil charge; and compressor tools.

Dismantled Unit

1.
 - a. Hermetic motor compressor assembly.
 - b. Shell assembly.
 - c. Necessary factory fabricated interconnecting refrigerant piping and couplings.
 - d. Purge unit.
 - e. Refrigerant-11 charge (650, 200, 100 lb. drums).
2. Control Center - electronic or pneumatic, as required with interconnecting wiring.
3. Miscellaneous Material - same as Factory Assembled Unit plus necessary nuts, bolts and gaskets; and purge unit mounting hardware and material for connections to system.

When more than one Turbopak is involved, the major parts of each unit will be marked to prevent mixing of assemblies.

INSPECTION—DAMAGE—SHORTAGE

The system shipment should be checked on arrival to see that all major pieces, boxes and crates are

received. The system should be checked on the trailer or rail car when received, before unloading, for any visible signs of damage. Any damage or signs of possible damage should be reported to the transportation company immediately for their inspection. YORK WILL NOT BE RESPONSIBLE FOR ANY DAMAGE IN SHIPMENT OR AT JOB SITE OR LOSS OF PARTS (Refer to Shipping Damage Claims, Form 50.15-NM).

SYSTEM DATA PLATE

A System Data Plate is mounted on the compressor - motor assembly of each unit, giving system model number; design working pressure; water passes; serial numbers; and motor power characteristics and connection diagrams.

When received at the job site all containers should be opened and contents checked against the packing list. Any material shortage should be reported to YORK immediately. (Refer to Shipping Damage Claims, Form 50.15-NM).

RIGGING

The complete system assembly (or shell assembly and compressor-motor assembly of units shipped dismantled) is shipped on skids to facilitate handling and rigging. When necessary the skids may be removed and riggers skates used under the unit end sheets to reduce overall height.

Each unit has in the end sheets four lifting holes which should be used to lift the unit.

Care should be taken at all times during rigging and handling of the system to avoid damage to the unit and its external connections. Lift only using holes provided. Do not lift the unit with slings around motor-compressor assembly or by means of eye-bolts in the tapped holes of the compressor motor assembly. Do not turn a unit on its side for rigging.

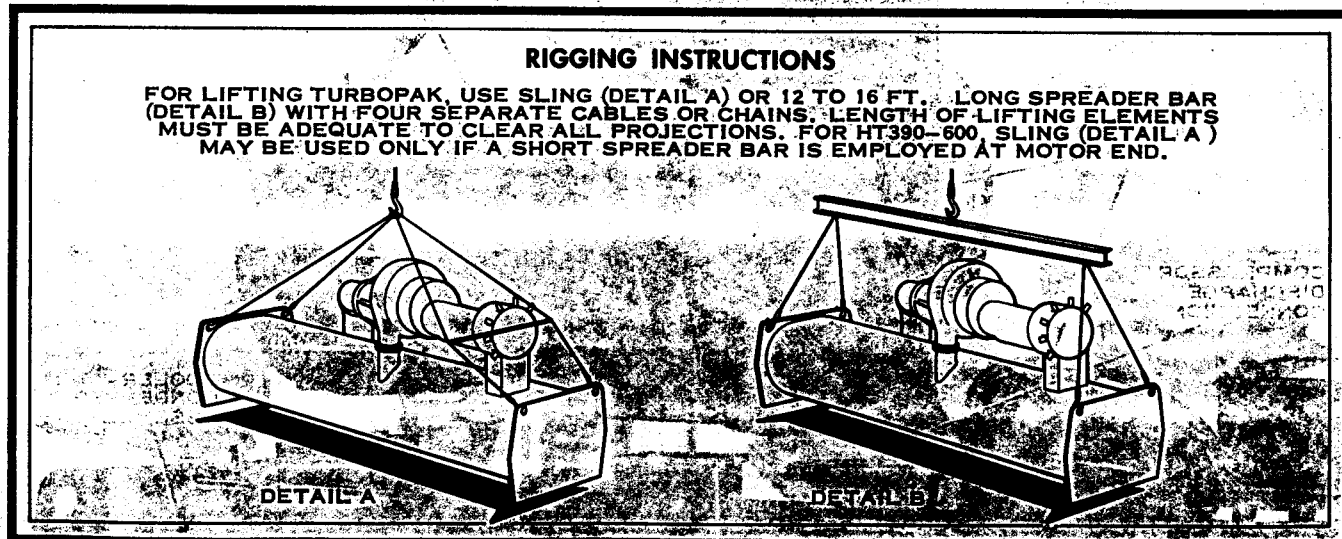
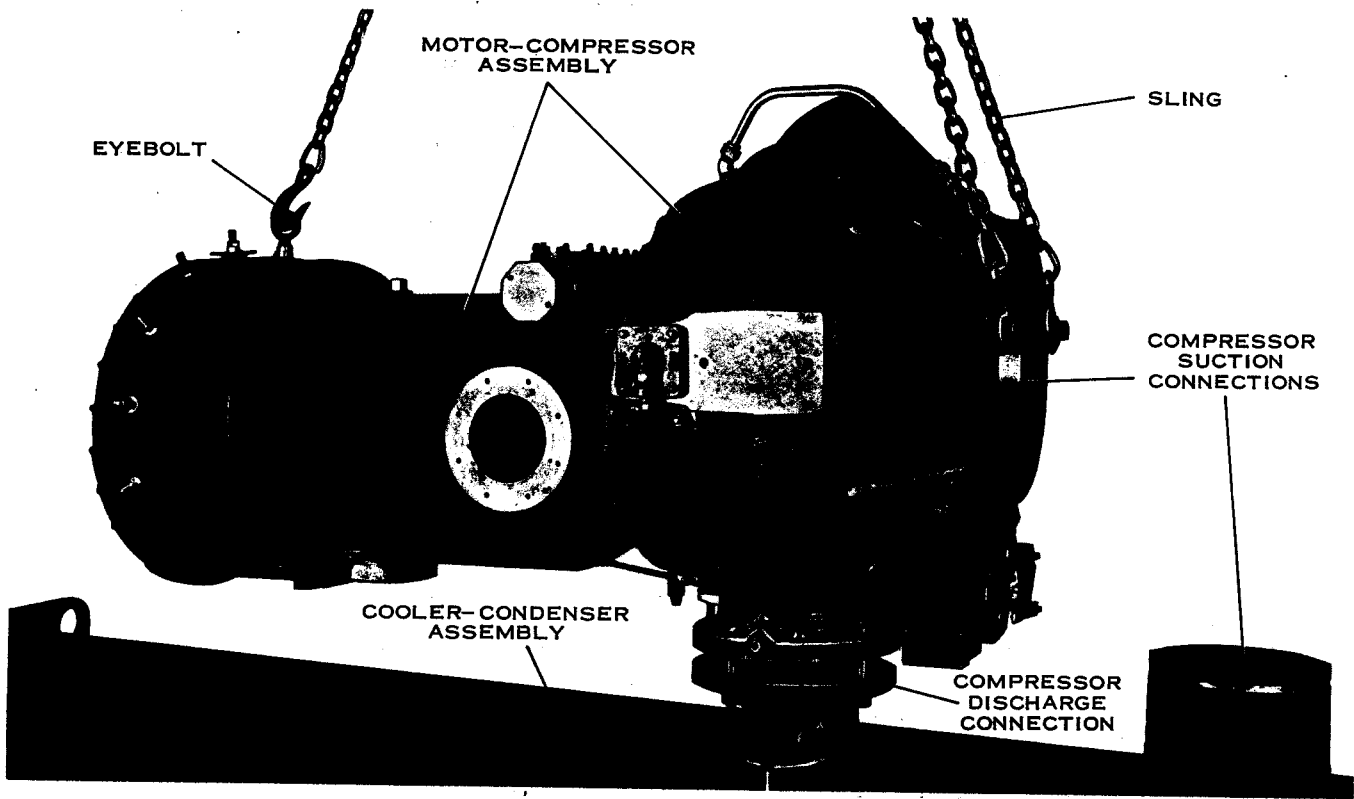


FIG. 1— Rigging

FIG. 2— Rigging the Motor Compressor Assembly

COMPRESSOR RIGGING FOR MODELS HT90 THRU 350



COMPRESSOR RIGGING FOR MODELS HT390 THRU 600

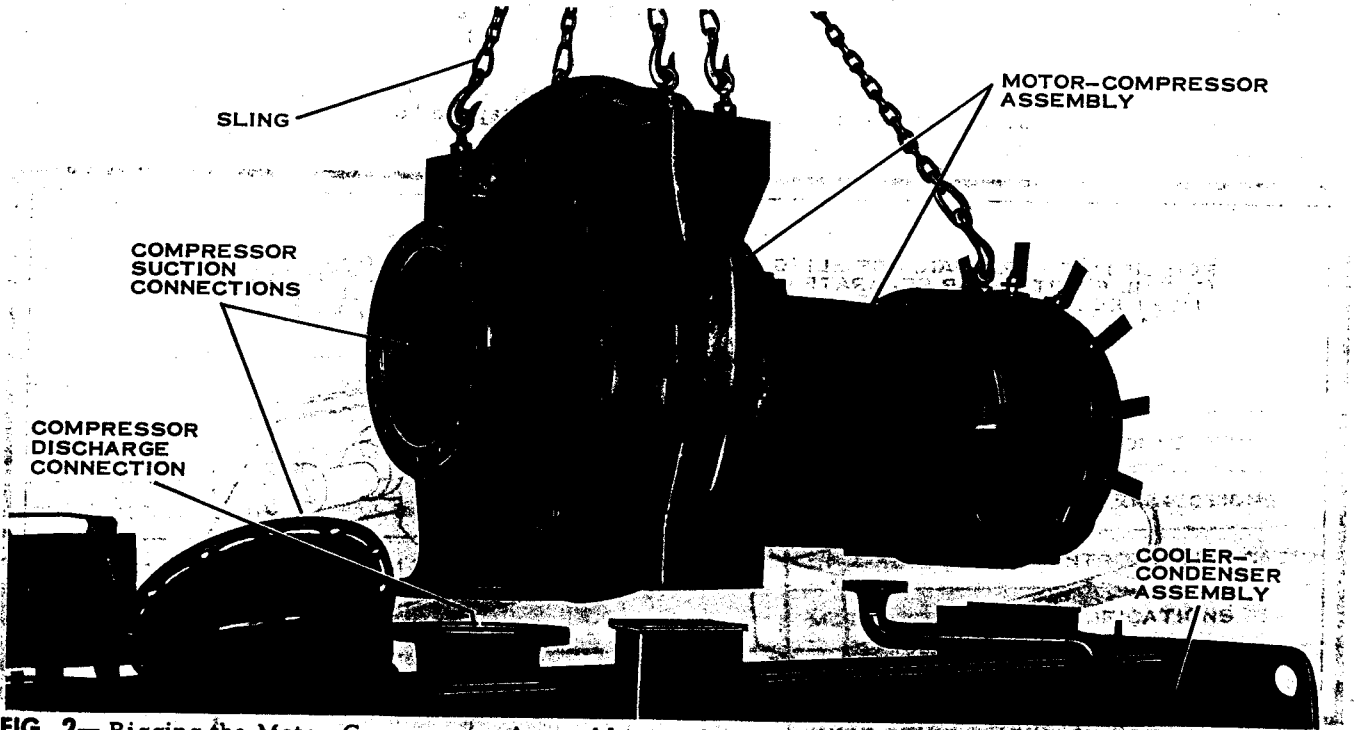


FIG. 2— Rigging the Motor Compressor Assembly

USE OF SLINGS (See Fig. 1 for proper use of slings in rigging)

To lift the Motor Compressor assembly of a dis-assembled unit, use a sling and eye bolts as shown in Fig. 2.

If necessary to rig the system by one end to permit lifting or dropping through a vertical passage-way, such as an elevator shaft, contact York for special rigging instructions.

The shipping and operating weights and overall dimensions of MODEL HT system; and weights and dimensions of the shells of dismantled units; are given in dimensions and physical data as a guide in determining the clearances required for rigging. Add 6" to overall height for skidded unit.

LOCATION

YORK Hermetic Turbopaks are practically vibration free, and are furnished with high efficiency spring type vibration isolators. As a result these units may be located at any floor level providing the floor is capable of supporting the total system operating weight (See Dimensions and Physical Data).

Sufficient clearance to facilitate normal service and maintenance work should be provided all around and above the unit, and particularly space provided at either end to permit cleaning or replacement of cooler and condenser tubes - see dimensions and physical data or product drawings Form 160.42-PA1.1(T) and 160.42-PA1.2(T). A doorway or other sufficiently large opening properly located may be used.

FOUNDATION

A level floor, mounting pad or foundation must be provided by others, capable of supporting the operating weight of the system (See Dimensions, Note: 3 page 6.)

CLEARANCE

Clearances should be adhered to as noted on the Dimensions (Note: 2 page 6.)

INSTALLATION

Rig the unit to its final location on the floor or mounting pad, lift the unit (or shell assembly) off its shipping skids by means of an overhead lift. Remove the skids, and lower the unit down to its mounting position.

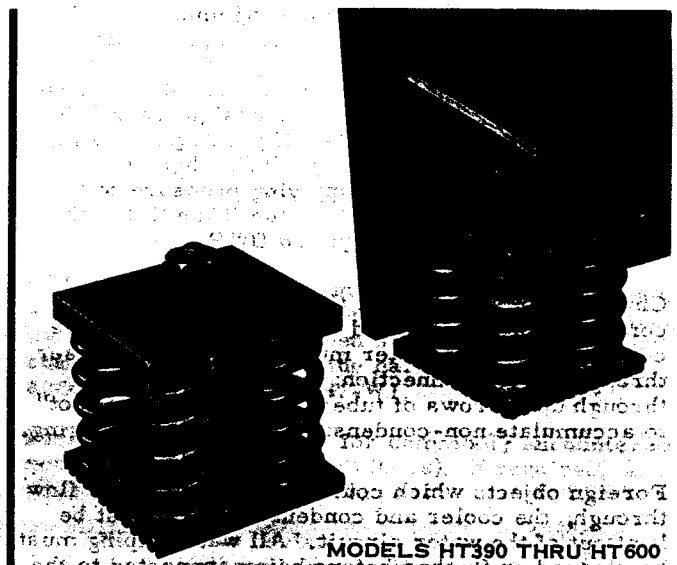
NOTE: At this point units shipped dismantled should be assembled under the supervision of a YORK representative.

The four (4) high efficiency spring type vibration isolator assemblies furnished with the unit should now be placed in position beneath their mounting brackets at the inside corners of the shell end sheets (See Fig. 3). The threaded jacking screw in each isolator assembly should be backed up out of the isolator assembly until the extended head of the screw fits snugly in its support bracket.

The jacking screws should now be tightened one(1) turn at a time, in sequence, until the unit end sheets are about 1/4" off the floor or foundation, and the unit is level. The longitudinal alignment of the unit should be checked by placing a level on the top center of the shell under the compressor-motor assembly. Transverse alignment should be checked by placing a level on tops of both end sheets.

If the jacking screws are not long enough to level unit due to an uneven or sloping floor or foundation, steel shims (grouted, if necessary) must be added beneath the isolator assemblies as necessary.

After the unit is leveled, wedge and shim under each corner to solidly support the unit in this position while piping connections are being made, pipe hangers adjusted and connections checked for alignment (See below). Then the system is filled with



MODELS HT90 THRU HT350

MODELS HT390 THRU HT600

FIG. 3— Spring Isolators

water and checked for leaks. The jacking screws should now be finally adjusted until the wedges and shims can be removed. The unit should now be in correct level position, clear of the floor or foundation and without any effect from the weight of the piping. When the unit is properly supported, spring isolator installed height will be 4-1/2 to 4-3/4 inches.

PIPING CONNECTIONS

After the unit is leveled and wedged in place, the piping connections may be made up; chilled water, condenser water, and refrigerant relief. The piping should be arranged with offsets for flexibility, and adequately supported and braced independently of the system to avoid strain on the unit and vibration transmission. Hangers must allow for alignment of pipe. Isolators (by others) in the piping and hangers are highly desirable, and may be required by specifications, in order to effectively utilize the vibration isolation characteristics of the high efficiency spring mounts of the unit.

Check for piping alignment - Upon completion of piping, a connection in each line as close to the unit as possible should be opened, by removing the flange bolts or coupling and checked for piping alignment. If any of the bolts are bound in their holes, or if the connection springs out of alignment, the misalignment should be corrected by properly supporting the piping or by applying heat to anneal the pipe.

NOTE: If the piping is annealed to relieve stress, the inside of the pipe must be cleaned of scale before it is finally bolted in place.

COOLER AND CONDENSER WATER PIPING

The cooler and condenser liquid heads of standard Hermetic Turbopak systems have nozzles of schedule 40 pipe which are grooved, suitable for welding or the use of Victaulic couplings. As an additional cost option, units may be provided with factory installed 150 lb. USA standard raised face flanges.

The nozzles and water pass arrangements are furnished in accordance with the job requirements (See Forms 160.42-PA1.1(T) and 160.42-PA1.2(T) or Dimensions pages 8 and 9) and cannot be changed in the field. Standard units are designed for 150 psig DWP on the water side. If job requirements are for greater than 150 psig DWP, check the system data plate before applying pressure to cooler or condenser to determine if the Turbopak has provisions for the required DWP.

Chilled water must leave the cooler through the connection which is fitted with water temperature controls. Cooling water must enter the condenser through the top connection; i.e., coolest water through upper rows of tubes creating a "cold spot" to accumulate non-condensibles for proper purging.

Foreign objects which could lodge in, or block flow through, the cooler and condenser tubes must be kept out of the water circuit. All water piping must be cleaned or flushed before being connected to the Hermetic Turbopak, pumps or other equipment.

Permanent strainers (by others) are recommended, and usually are required, in both the cooler and condenser water circuits to protect the Turbopak as well as the pumps, tower spray nozzles, chilled water coils and controls, etc.

When the application requires a Turbopak to operate with evaporator temperature below 34 F, a strainer, meeting York specifications, is required to be installed in the entering chilled water line, directly up-stream of the Turbopak.

Water piping circuits should be arranged so that the pumps discharge through the Turbopak, and should be controlled as necessary to maintain essentially constant chilled and condenser water flows through the unit at all load conditions. If pumps discharge through the Turbopak, the strainer should be located upstream from pumps to protect both pump and Turbopak. (Piping between strainer pump and Turbopak must be very carefully cleaned before start-up). If pumps are remotely installed from Turbopak strainers should be located directly upstream of the Turbopak. For proper operation of the unit, condenser pressure must be maintained above cooler pressure. To maintain adequate pressure differential entering condenser water temperature must be maintained equal or higher than entering chilled water temperature. If operating conditions will fulfill this requirement, it is recommended that no attempt be made to control condenser water temperature by means of automatic valves, cycling of the cooling tower fan or other means; since Hermetic Turbopaks are designed to function more satisfactorily and efficiently when cooling water is allowed to seek its own temperature level at reduced loads and off-peak seasons of the year. However, if entering condenser water temperature can go below entering chilled water temperature, condenser water temperature must be maintained equal to or higher than entering chilled water temperature. Stop valves may be provided (by others) in the cooler and condenser water piping adjacent to the system to facilitate maintenance. Thermometer wells and pressure taps should be provided (by others) in the piping as close to the unit as possible to facilitate operating checks.

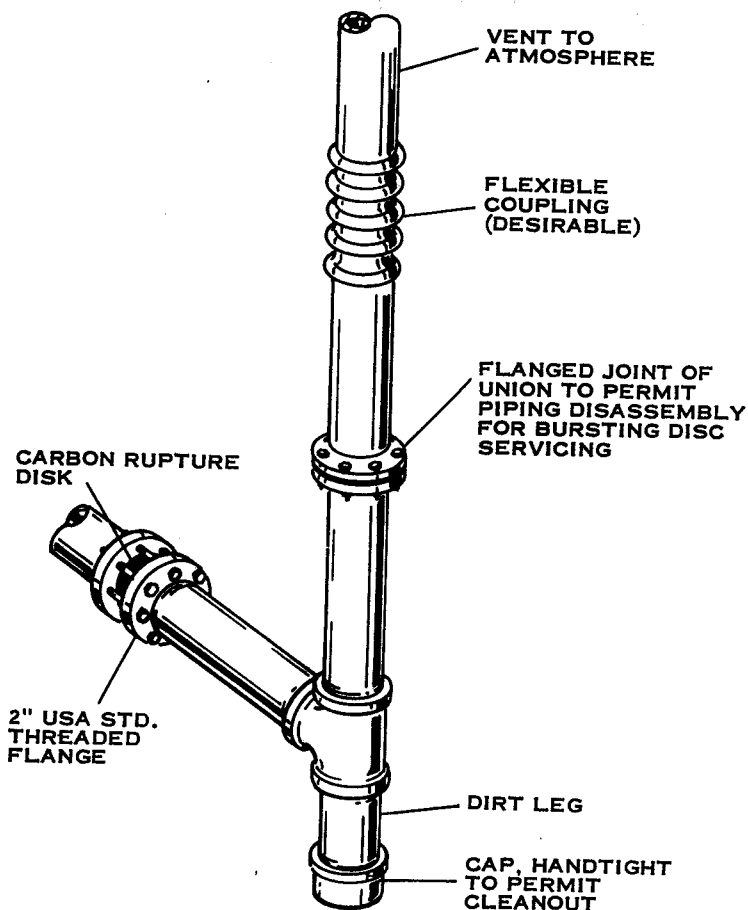
A flow switch or pressure differential control in the chilled water line(s) adjacent to the unit, and/or a chilled water pump starter interlock must be furnished (by others) for connection to the control center. If a flow switch is used, it must be directly in series with the Turbopak and sensing only water flow through the Turbopak.

Drain and vent valves (by others) should be installed in the connections (1/2" NPT) provided in the cooler and condenser liquid heads. These connections may be piped to drain if desired.

After the water piping is completed, but before any insulation is applied, tighten the nuts on the liquid head flanges. Gasket shrinkage and handling during transit cause nuts to loosen. If water pressure is applied before this is done, the gaskets may be damaged and have to be replaced. Fill the chilled and condenser water circuits, operate the pumps manually and carefully check the cooler and condenser liquid heads and piping for leaks. Repair leaks as necessary.

Before initial operation of the system both water circuits should be thoroughly vented of all air at the high points, and the unit water circuits should be vented.

160.42-PA1.1(T) and 160.42-PA1.2(T)



CAUTION:

1. PIPING SHOULD BE PROPERLY SUPPORTED. TO PREVENT ANY STRAIN ON BURSTING DISC MOUNTING.
2. BE CAREFUL NOT TO PUNCTURE BURSTING DISC WHEN THREAD PROTECTOR IS REMOVED.

FIG. 4— Refrigerant Relief Vent Piping

REFRIGERANT RELIEF PIPING

Each system is equipped with a frangible carbon bursting disc assembly for the purpose of quickly relieving excess pressure of the refrigerant charge to the atmosphere as a safety precaution in case of an emergency, such as fire. The bursting disc is furnished in accordance with the ASME Code for Unfired Pressure Vessels, and is set to relieve at 15 psig. In models HT 90 - 350 it is located on the compressor suction connection. In models HT-390 to 600, it is located in the end sheet on the motor end of the unit. See Dimensions pages 6 and 7.

Refrigerant relief vent piping (by others) from the bursting disc to outside is required by code in many areas, and is desirable in all cases. The vent line should be sized in accordance with the ASME Code, or local code, but should never be smaller than the 2" bursting disc connection. The vent line must include a dirt trap in the vertical leg to intercept and permit cleanout of bursting disc fragments in the event of disc rupture and to trap any vent stack condensation (See Fig. 4). The piping MUST be arranged to avoid strain on the bursting disc, using a flexible connection, if necessary and must be removable for replacement of bursting disc.

DO NOT LOOSEN FLANGES THAT CONTAIN BURSTING DISC ASSEMBLY. Otherwise, refrigerant will be lost or moisture will enter the system. The YORK WARRANTY will thus be voided. Do not

hit or contact the carbon bursting disc with any object. The bursting disc will break causing refrigerant to escape and moisture to enter the system.

SYSTEM PIPING

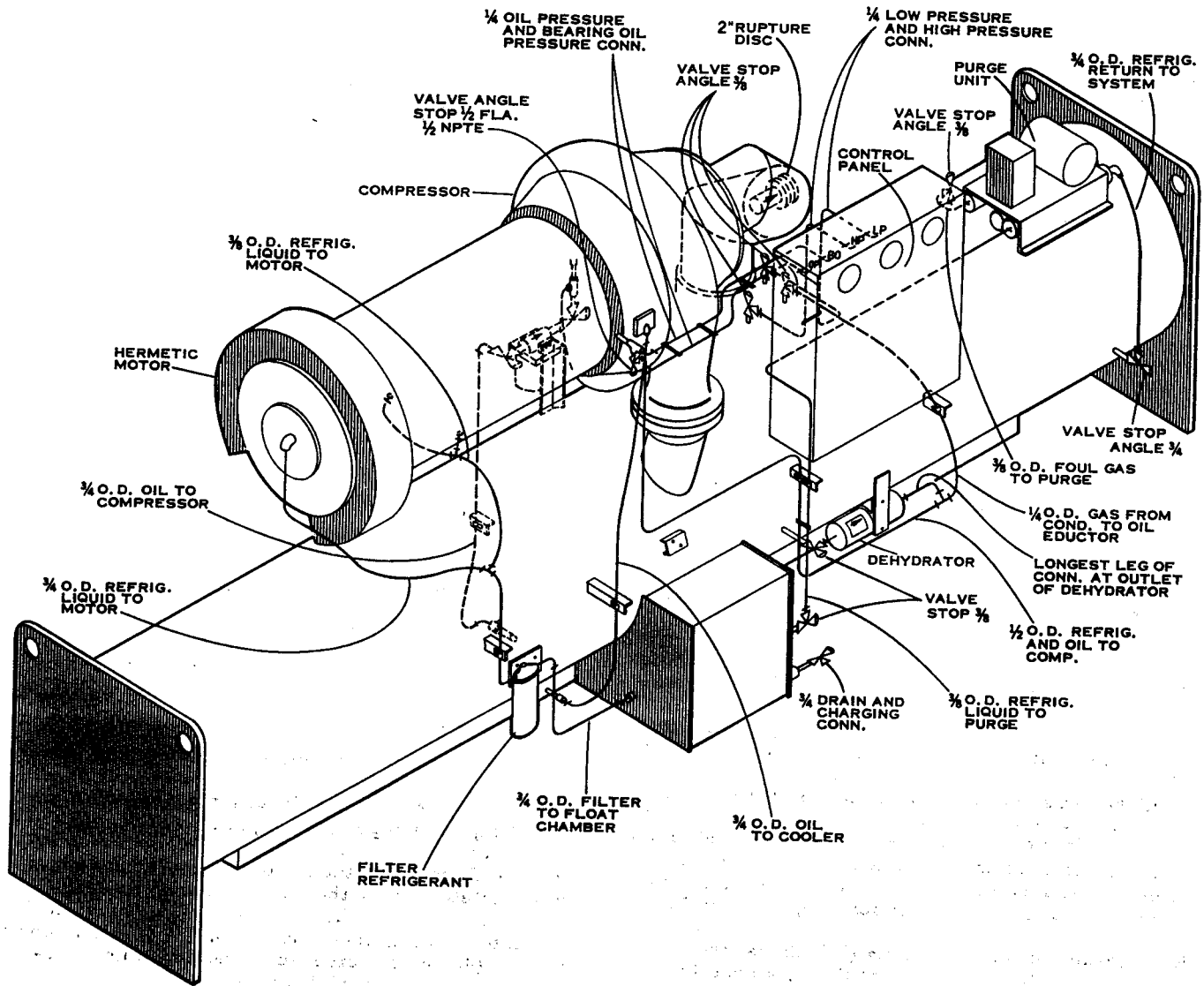
Hermetic Turbopak system external piping, purge unit piping and gauge piping are shown in Figs. 5 and 6. Compressor lubricant piping, system external piping and purge unit piping are factory installed on all units shipped assembled. On units shipped dismantled the following operations should be completed under the supervision of the YORK representative. (1) The lubricant piping to oil cooler, (2) motor cooling feed and drain, (3) gage and control piping, (4) system oil return and purge unit connections using material furnished.

CONTROL WIRING - On units shipped disassembled, after installation of the control panel, control wiring must be completed between system components and control panel, using wiring harnesses furnished, according to Form 160.42-W1.

Field wiring connections for commonly encountered non-standard controls (by others), if required, are shown on Form 160.42-W1.

NOTE: No deviations in system wiring from that shown on drawings furnished shall be made without prior approval of the YORK REPRESENTATIVE.

SYSTEM REFRIGERANT PIPING MODELS HT90 THRU 350



LEGEND

- LP - LOW PRESSURE GAUGE AND CUTOUT
- HP - HIGH PRESSURE GAUGE AND CUTOUT
- BO - BEARING OIL GAUGE
- OP - OIL PRESSURE CUTOUT

NOTES

1. PULL ALL PIPE THREADS TOGETHER WITH SEALER "LOCTITE" GR. AVV.
2. BRAZE ALL COPPER TO COPPER SLIP JOINTS WITH SIL-FOS-5.
3. SUPPORT ANGLES AND BARS TO BE TRIMMED TO SUIT AT ASSEMBLY.
4. TORQUE OF 18 FT. / LBS. TO BE APPLIED UNIFORMLY TO EACH CAP SCREW OF BURSTING DISK ASSEMBLY.

FIG. 5—System Piping HT 90-350

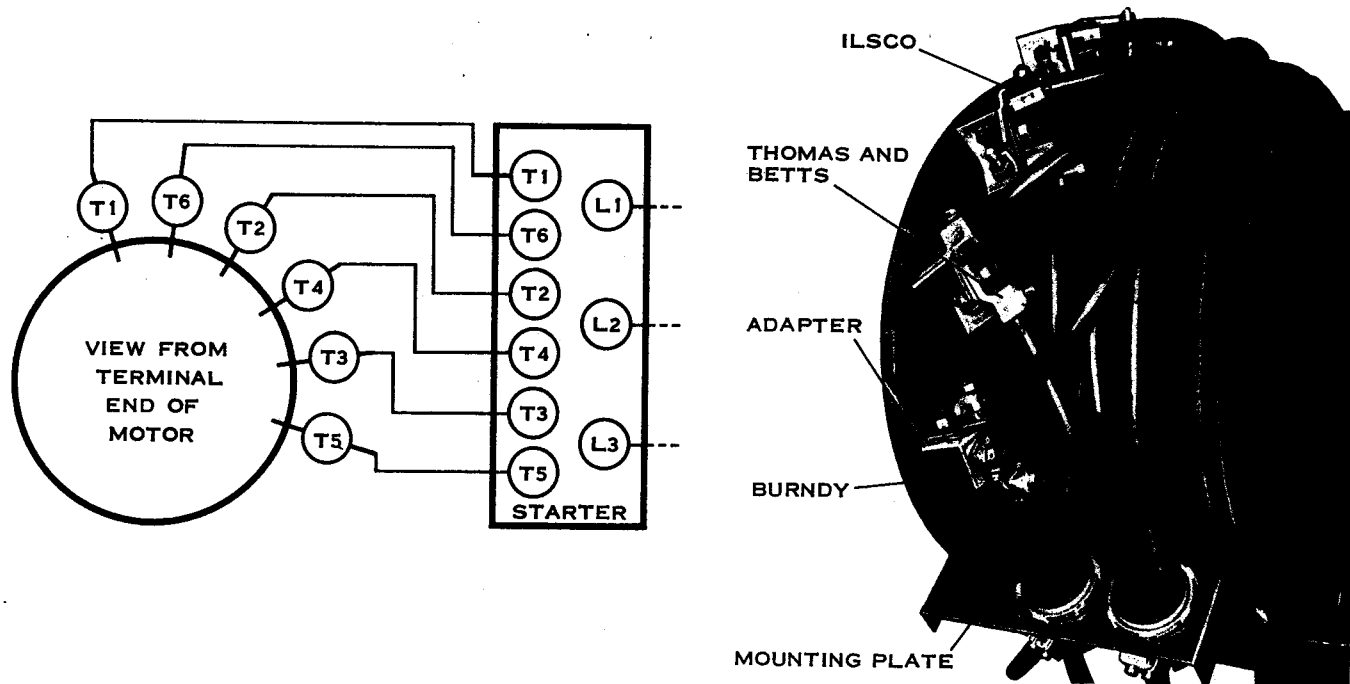


FIG. 7— Typical Motor Connections - Six Lead Starting (Star-Delta)

POWER WIRING

A 120 volt - single phase - 60 cycle power supply of 30 amperes must be furnished to the control center, from a separate fused disconnect source (with disconnect located adjacent to compressor motor starter disconnect); or from a control transformer (3.0 KVA required) included with the compressor motor starter. DO NOT make final power connections to control center until approved by YORK supervisor.

NOTE: Starters from Hermetic Turbopak must be furnished in accordance with YORK Standard R787-Product Drawing Form 160.42-PA5.1(T) or Wiring Diagram Form 160.42-W1. To provide the features necessary for the starter to function properly with the YORK control system.

Each Hermetic Turbopak system is furnished for a specific power supply as stamped on the System Data Plate, which also details the motor connection diagrams.

NOTE: To insure proper motor rotation the starter power input and starter to motor connections must be checked with a phase sequence indicator in the presence of the YORK supervisor.

DO NOT cut wires to final length or make final connections to motor terminals or starter power input terminals until approved by the YORK supervisor.

Compressor motors are furnished with six (6) motor terminals radially located toward the front of the motor housing as shown in Fig. 7 to permit star-delta (six lead) starting. Each terminal is furnished with a copper adapter to which can be attached standard terminal lugs or pressure type connectors (furnished by others) to receive the starter to motor leads. Fig. 8 illustrates the use of three different types of standard connectors (Burndy, Thomas and Betts, and IlSCO) with twelve leads of 500 MCM wire. Motor terminal lugs are not furnished by York due to the wide variations in numbers and sizes of wires which may be used.

When orders specify that a three lead type of starting (across-the-line, auto-transformer or primary reactor) is to be used, copper jumper bars are furnished to connect the pairs (T1 & T6, T2 & T4, T3 & T5) of terminals (See Fig. 8). The terminal adapters were used in the Star-Delta hookup to attach the motor lead connectors.

For HT90-350 motor lead wire conduits must enter the terminal box through the mounting plate shown in Fig. 8. Up to four (4) 3" conduits can be received by the mounting plates, two thru the plate at the top of the motor and two at the bottom, as necessary. Flexible final connections should be used to provide vibration isolation.

HT390-600 motor lead wire conduits must enter the terminal box thru the side wall facing the compressor as shown in Fig. 9 up to (8) 3" conduits can be received by this wall. Flexible final connections should be used to provide vibration isolation.

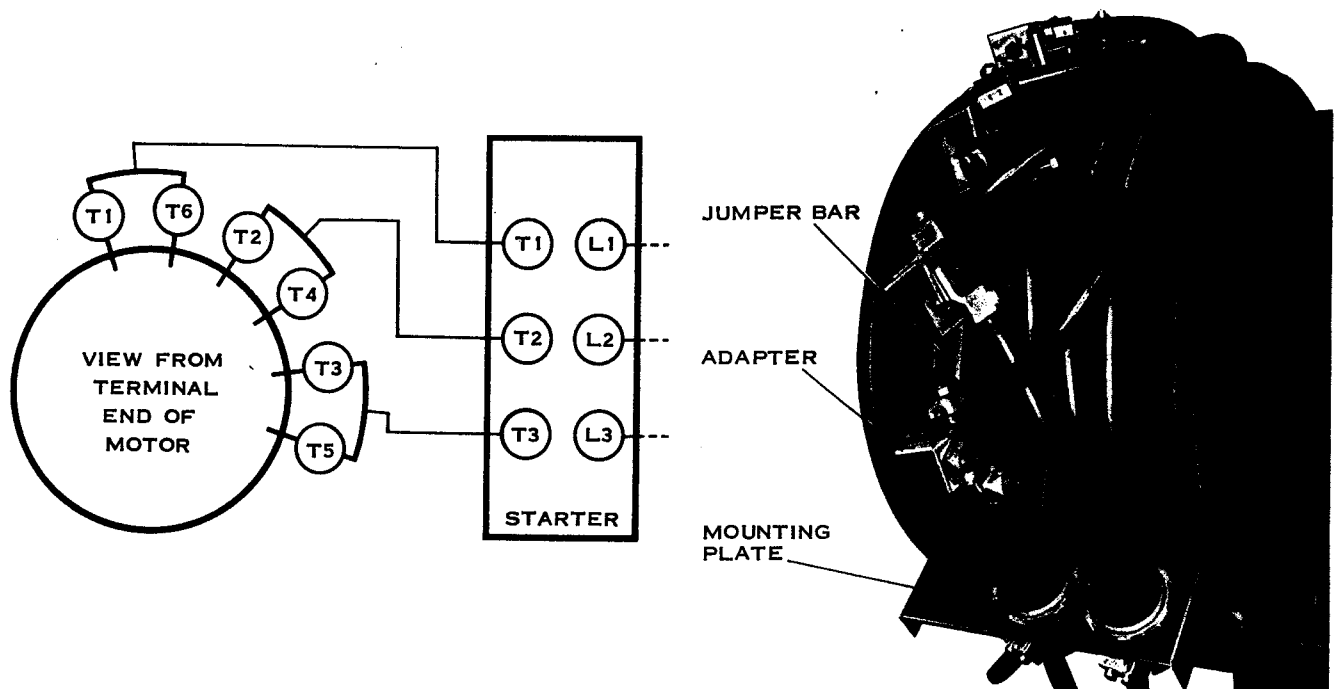


FIG. 8— Typical Motor Connections - Three Lead Starting (Across-the-line, Auto-transformer, Primary Reactor)

Motor lead wire size must be in accordance with the National Electrical Code (NEC) or other applicable codes, for the motor full load amperes (FLA) given on the System Data Plate. The 3" conduit will accommodate a maximum of 3-500 MCM wires (one from each phase to prevent overheating). Where larger than 500 MCM wire is required, a multiple of smaller wires must be used. Conduits should contain an equal number of wires from each phase. The motor terminal adapters are sized to permit attachment of multiple or multiwire lugs or connectors (by others).

INSULATION

Insulation of the type specified for the job, or minimum thickness to prevent sweating of 30 F surfaces, should be furnished (by others) and applied to the Hermetic Turbopak shell, end sheets, float chamber, compressor suction connection, and cooler liquid heads connections. The liquid head flange insulation must be removable, to allow head removal for tube maintenance. Details of areas to be insulated are given on Pages 22 and 23. Figs. 10 and 11.

Units are furnished factory anti-sweat insulated on order at additional cost. This includes all low temperature surfaces except cooler liquid heads (2) (See Forms 160.42-PA6.1(T) and 160.42-PA6.2(T) and pages 22 and 23. Figs. 10 and 11.

DO NOT field insulate until the system has been leak tested under the supervision of the YORK representative.

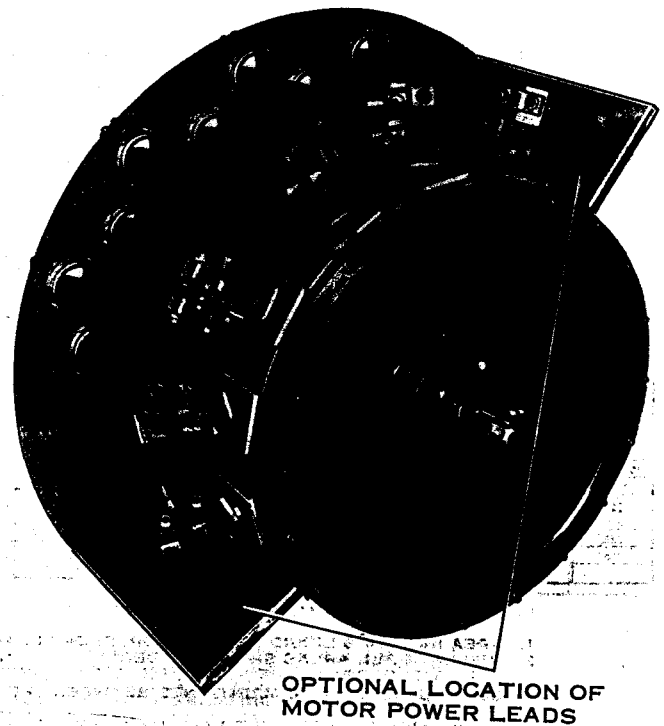
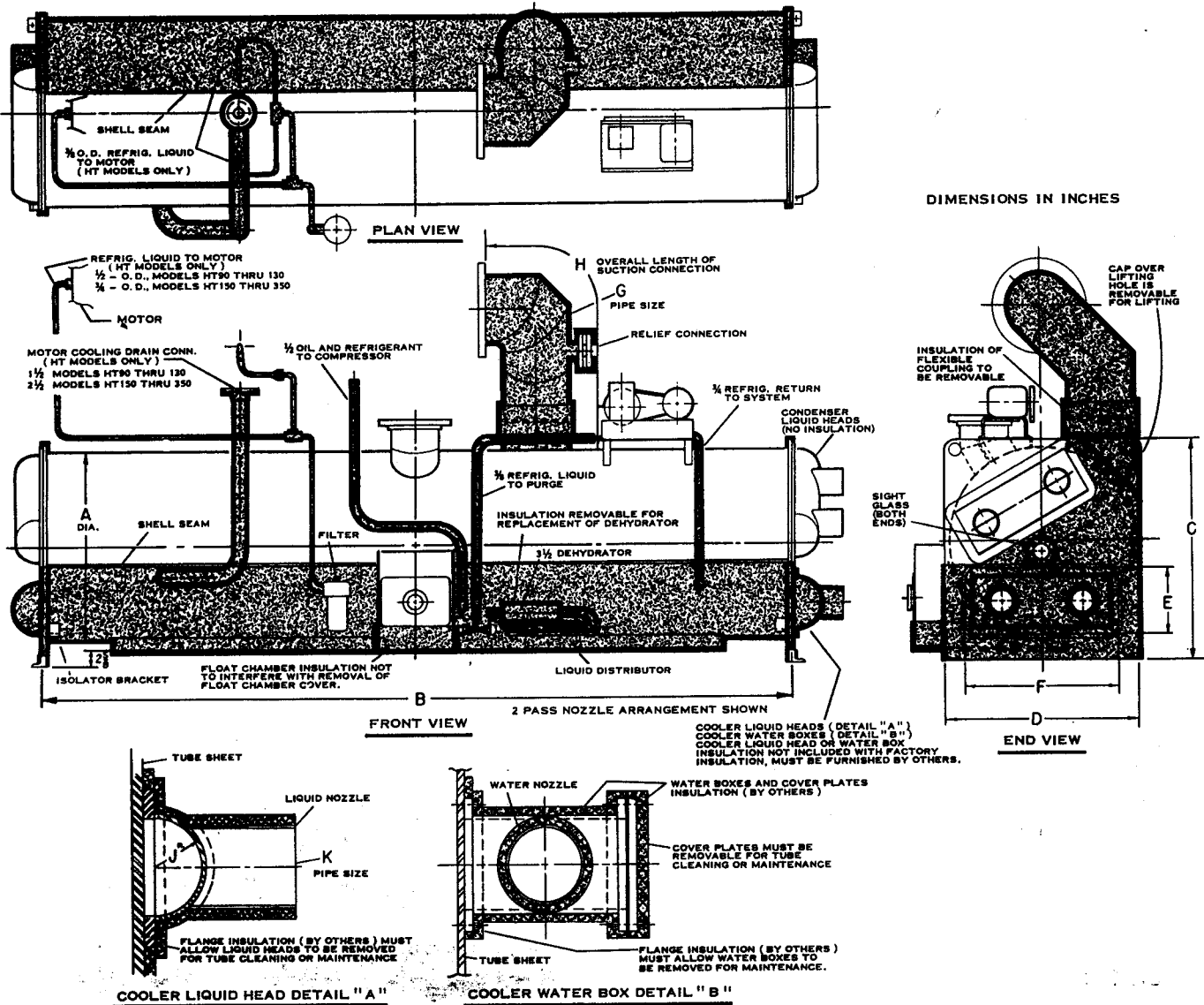


FIG. 9— Model HT390 - HT600 - Typical Motor Connections

INSULATION MODELS HT90 THRU 350



MODEL HT & OT	SHELL		TUBE SHEETS						SUCTION CONN.			LENGTHS OF TUBULAR INSULATION								REMOVABLE COOLER LIQUID HEADS OR WATER BOXES W/REMOVABLE COVER PLATES (INSULATION BY OTHERS)				TOTAL SURFACE AREA SQ. FT. (LESS TUBULAR)					
	A	B	C	D	E	F	SURFACE AREA SQ. FT.	G	H	SURFACE AREA SQ. FT.	3/8	1/2	3/4	3-1/2	HT MODELS ONLY				J	K		L		WITH LIQUID HEADS	M				
															1-1/2	2	3/4	1/2		3/8	1	2	3		4	1 & 3	2	1 & 3	2
90,100,110 120,130	30	184	84	37-1/8	28	11-1/2	28-1/8	11	10	36	9	66	87	36	10	50	36	156	114	3-13/16	6	4	10	—	—	114	—	—	
150 & 170	30	188	88	37-1/8	28	11-1/2	27	11	12	32	12	66	87	21	10	50	—	109	87	116	3-13/16	6	6	10	23	17	128	181	136
200 & 220	32	198	101	38-1/8	28	12-1/8	30-1/2	12	12	32	12	66	88	23	10	50	—	107	88	116	4-11/16	8	6	12	26	20	137	183	145
280	32	198	106	41-1/8	30	12-3/8	32-3/8	13	14	36	16	69	90	24	10	52	—	106	90	117	4-8/16	8	6	12	30	21	167	186	156
280	32	198	110	43-1/8	30	12-3/8	32-3/8	15	14	36	16	71	92	26	10	53	—	110	92	119	4-15/16	8	6	13	30	22	184	171	163
320	32	198	118	45-1/8	30	12-3/8	32-5/8	17	14	36	16	72	93	27	10	56	—	111	93	120	4-5/8	8	6	14	32	23	182	180	171
350	41	198	119	48-1/8	33	12-5/8	34-1/8	20	14	36	16	75	95	29	10	56	—	113	95	122	5-3/8	10	8	16	30	26	171	182	181

NOTES: (APPLIES TO ALL UNITS HT90 THRU HT600 - SEE FIG. 11)

1. AREA INCLUDES LIQUID DISTRIBUTOR, FLOAT CHAMBER AND SHELL SURFACE BETWEEN TUBE SHEETS.
2. INSULATE ALL AREAS SHOWN SHADED.
3. ALL HT TURBOPAKS ARE FURNISHED WITH 3/4 ANTI-SWEAT INSULATION OF THE HERMETIC MOTOR HOUSING.
4. CLEARANCE MUST BE MAINTAINED BETWEEN THE FLOOR AND THE BOTTOM OF UNIT INSULATION.

SPECIFICATIONS: (APPLIES TO ALL UNITS HT90 THRU HT600 - SEE FIG. 11)

FIELD INSULATION: (BY OTHERS) TO BE OF TYPE AND THICKNESS SPECIFIED, APPLIED TO ALL AREAS INDICATED INCLUDING A SUITABLE VAPOR BARRIER AND FINISH.

FIG. 10— Application of Insulation to HT90 thru HT350.

INSTALLATION CHECK—REQUEST FOR START-UP SERVICE

After the system is installed, piped and wired as described in this Instruction, but before any attempt is made to start the system, the YORK Regional Office should be advised so that the start-up service, included in the contract price, can be scheduled. Notification to the YORK office should be by means of Hermetic Turbopak Installation Check List and Request, Form 160.42-CL, in triplicate. (See Fig. 12)

The services of a YORK representative will be furnished to check the installation and supervise the initial start-up and operation on all Hermetic Turbopaks installed within the Continental United States.

TABLE 2— COMPRESSOR WEIGHTS

COMPRESSOR MODEL	WEIGHT - LBS.
MTD53	2400
MTD59	2400
MTD67	3460
MTD76	3460
MTD85	4900
MTD95	4900
MTD108	7400
MTD120	7400

Form 160.42-CL

HERMETIC TURBOPAK MODEL HT	YORK	OPEN TURBOPAK MODEL OT
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INSTALLATION CHECK LIST AND REQUEST FOR AUTHORIZED START-UP ENGINEER

*To: _____ **JOB NAME:** _____
Branch Construction & Service Manager

_____ **LOCATION:** _____

_____ **CUSTOMER ORDER NO.** _____

YORK ORDER NO. _____ **YORK CONTRACT NO.** _____

TURBOPAK

MODEL NO. _____	SERIAL NO. _____
------------------------	-------------------------

The work (as checked below) is in process and will be completed by _____
Month Day Year

The following work must be completed in accordance with Installation Instructions, Forms 160.42-N, Model HT or 160.57-N, Model OT.

A. YORK TURBOPAK

- Unit assembled (if shipped dismantled and refrigerant piping installed under York Supervision)
- Motor mounted and rough aligned (Open Turbopak with customer furnished motor only)
- Spring isolators installed and adjusted so that unit is level, floating free of floor and springs equally depressed.

B. WATER PIPING

- Condenser water piping installed between condenser, pumps and cooling tower
- Chilled water piping installed between cooler, pumps and cooling coils
- Make-up and fill lines installed to cooling tower and chilled water system
- Thermometer wells and gauge connections installed in chilled and condenser water lines
- All water piping checked for strain—Piping should not spring when connections are broken at unit
- Water piping leak tested and flushed, and water strainers cleaned after flushing. Piping systems filled with water and trapped air vented
- Chilled and condenser water flow available to meet unit design requirements

C. REFRIGERANT RELIEF PIPING (where required)

- Refrigerant relief piping (with flexible connection) installed from unit to atmosphere (per local code)

D. ELECTRICAL WIRING

- Main and control power supply available
- Compressor motor starter furnished in accordance with York Standard R-787 (Form 160.42-PAS.1)
- Wiring completed from main power supply to starter—but not cut to final length or connected to starter
- Wiring completed from starter to compressor motor—but not cut to final length or connected to motor
- Jumper wire is not installed between terminals 24 and 25 located on Unit Control Center terminal strip

(DO NOT OPERATE COMPRESSOR MOTOR, FOR ANY REASON)

- 115 volt service completed to Control Center—but not connected
- External control wiring completed from Control Center to flow switch(es), pump motor starters, etc. in accordance with York Wiring Diagram
- Pneumatic control piping completed and air pressure available (if required)
- Power available and wiring completed to the following starters and motors, and the rotation of each checked:
NOTE: Do not check compressor motor rotation.
 (a) Chilled water pumps
 (b) Condenser water pumps
 (c) Cooling tower fan (if used)
- Meg-ohm meter available for checking motor windings.

E. TESTING, EVACUATION AND CHARGING (Under York Supervision if Unit Shipped Less Refrigerant or Dismantled).

- R-12 available for testing
- Nitrogen available for testing
- A high vacuum pump available for evacuation and dehydration of system
- Refrigerant-11 (Supplied by York available for charging)
- Unit (ready to be) (has been) pressure tested, evacuated, dehydrated and charged

F. CONDITIONS

- York oil for compressor on job
- Cooling load available for testing and operating unit
- Personnel available for final wiring connections
- Personnel available for start-up and testing
- Owners operating personnel available for instruction

Names: _____

With reference to the terms of the above contract, we are requesting the presence of your Authorized Representative at the job site on _____
Month Day Year
 to start the system and instruct operating personnel.

We understand that the services of the York Authorized Representative will be furnished in accordance with the contract for a period of not more than _____ consecutive normal working hours; and we agree that a charge of _____ per diem plus travel and living expenses will be made by us to York if services are required for longer than _____ consecutive normal hours or if repeated calls are required, through no fault of the York Division of Borg-Warner Corporation.

1. File pending return of (PMS) copy _____
 2. Forward to York E.M. Service Manager, York, Pa. _____
(Yellow copy)

Signed _____
 Title _____




FIG. 12— Installation Check List and Request for Authorized Start-Up Engineer

Subject to Change Without Notice

Printed in U. S. A.

COL 4M 568 .60 Code: S(J) - Int.
 Form 160.42-N

