



**PRODUCT DRAWING**

YORK INTERNATIONAL CORPORATION  
P.O. Box 1592, YORK, PA 17405

New Release

FORM 160.81-PW7 (501)

**REMOTE MOTOR STARTER SPECIFICATIONS  
MAXE™ YR (STYLE A)  
ROTARY SCREW CHILLER  
WITH OPTIVIEW™ CONTROL CENTER**

CONTRACTOR \_\_\_\_\_  
ORDER NO. \_\_\_\_\_  
YORK CONTRACT NO. \_\_\_\_\_  
YORK ORDER NO. \_\_\_\_\_

PURCHASER \_\_\_\_\_  
JOB NAME \_\_\_\_\_  
LOCATION \_\_\_\_\_  
ENGINEER \_\_\_\_\_

REFERENCE      DATE \_\_\_\_\_       APPROVAL      DATE \_\_\_\_\_       CONSTRUCTION      DATE \_\_\_\_\_

**JOB DATA TO BE FILLED IN BY YORK INTERNATIONAL REPRESENTATIVE**

Motor starters for use with YORK Rotary Screw Liquid Chilling Units must be furnished in accordance with the requirements of YORK Engineering Standard R-1131 (1200) to ensure proper functioning of unit and its associated controls.

THE STARTER(S) TO BE FURNISHED BY \_\_\_\_\_

- a. QUANTITY \_\_\_\_\_      b. MANUFACTURER \_\_\_\_\_
- c. SIZE AND/OR MODEL NUMBER OF STARTER \_\_\_\_\_
- d. STARTER TYPE:  ACROSS-THE-LINE
  - PRIMARY REACTOR \_\_\_\_\_ % TAP
  - PRIMARY RESISTOR \_\_\_\_\_ % TAP
  - AUTO-TRANSFORMER, CLOSED TRANSITION \_\_\_\_\_ % TAP
  - STAR-DELTA, OPEN TRANSITION     STAR-DELTA, CLOSED TRANSITION
  - OTHER \_\_\_\_\_
- e. TYPE ENCLOSURE – NEMA \_\_\_\_\_ (NEMA-1 UNLESS OTHERWISE SPECIFIED)
- f. TYPE MOUNTING:  FLOOR     WALL
- g. YORK UNIT MODEL NO. YR \_\_\_\_\_
- h. POWER SUPPLY \_\_\_\_\_ VOLTS – 3-PHASE – \_\_\_\_\_ HERTZ
- i. HERMETIC MOTOR: FULL LOAD AMPERES (FLA) \_\_\_\_\_  
MOTOR LOCKED ROTOR AMPERES (LRA) \_\_\_\_\_ FULL VOLTAGE  
MAXIMUM INRUSH AMPERES \_\_\_\_\_ REDUCED VOLTAGE
- j. TYPE CONTROL CENTER: MICROCOMPUTER
- k. POWER FACTOR CORRECTION CAPACITORS (WHEN REQUIRED) FULL LOAD PF  
\_\_\_\_\_ UNCORRECTED, \_\_\_\_\_ CORRECTED, OR \_\_\_\_\_ KVAR REQUIRED AT \_\_\_\_\_ VOLTS
- l. "MAIN CONTACTORS WILL DROP OUT WITHIN 4 CYCLES OF REMOVAL OF 115 VOLT "RUN" SIGNAL."  
(This note to appear on starter wiring diagram.)
- m. AMMETER REQUIRED:  YES \_\_\_\_\_ ( SINGLE-PHASE,  THREE-PHASE),  NO
- n. CONTROL POWER TRANSFORMER REQUIRED: YES (1.5 NET KVA)
- p. CODE APPROVAL REQUIRED    U.L.  YES,  NO      cU.L.  YES,  NO  
(Note: A U.L. or cU.L. listed starter must be supplied with a U.L. or cU.L. listed chiller)
- q. REQUIRED APPROVAL, ACCESSORIES AND MODIFICATIONS: (DETAIL) INCLUDE CUSTOMER SPECIFICATIONS, AS REQUIRED.

} 200 – 600V: 80%, 65% or 57.7%

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This standard, defining the requirements of materials to be furnished or services to be performed, is not subject to interpretation.

## 1. SCOPE

1.1 This standard covers the special purchasing requirements of remote E-M motor starters for use with York MAXE™ Screw Chillers, Models YR TATAT0 through YR ZFZFT5 with semi-hermetic motors.

## 2. RELATED STANDARDS

- 2.1 a. ANSI/IEEE Standard C57.13, Requirements for Instrument Transformers
- b. National Electrical Code (N.E.C.), ANSI/NFPA-70
- c. Underwriters Laboratories Standard U.L. 508
- d. NEMA Standards, Industrial Controls and Systems, Pub. No. ICS
- e. NEMA Standards, Motors and Generators, Pub. No. MG1

## 3. REQUIREMENTS

3.1 Starters supplied under this standard must comply with the requirements of N.E.C., ANSI/IEEE C57.13, and any additional codes or standards referenced on the Purchase Order.

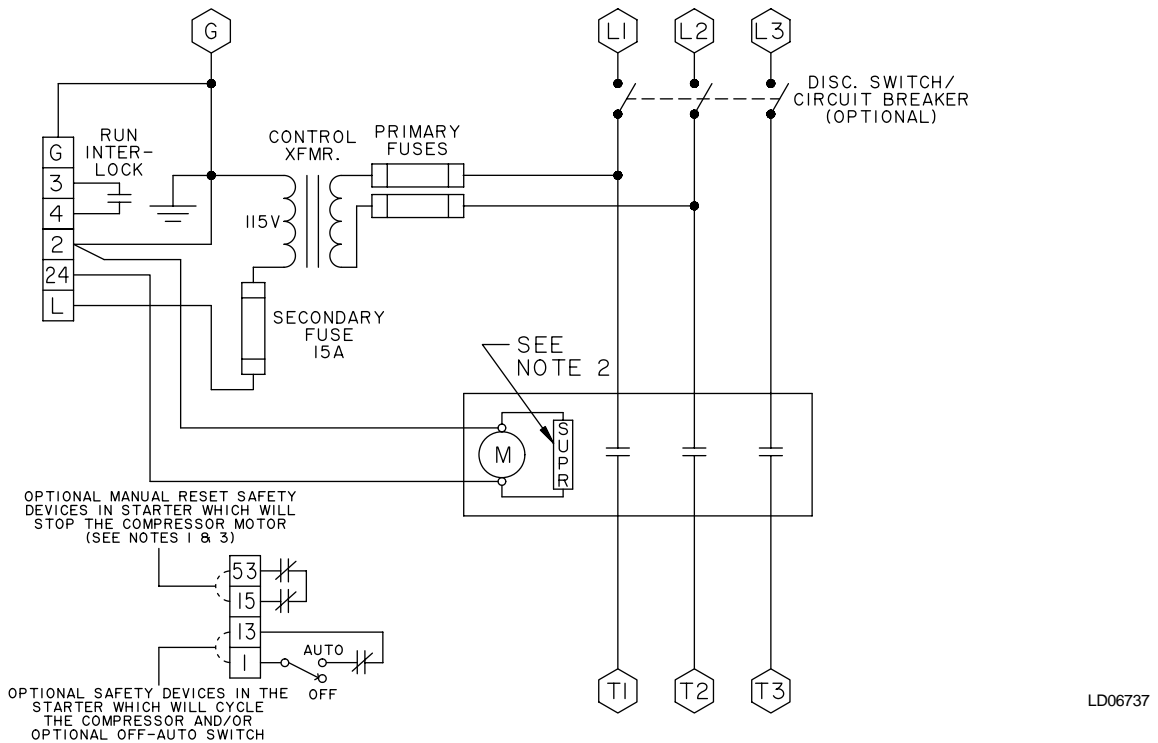
3.2 On points of difference with the above referenced standards and codes, the requirements of this standard shall prevail. The starter circuit must be approved by ESG Engineering.

3.3 **Type of Starter** – The basic type of starter (across-the-line, auto-transformer, wye-delta, etc.) covered by this standard shall be as specified on the Purchase Order.

- a. For auto-transformer, primary resistor and primary reactor starters, the design output voltage during starting shall not be less than 57.7% of unit nameplate voltage. Refer special cases to York, PA ESG Marketing.

3.4 **Enclosure** – Enclosure for the starter must be NEMA Type 1, General Purpose, unless otherwise specified on the Purchase Order.

3.5 **Control Circuit Wiring** – Control circuit wiring and terminal blocks shall be as shown in Figure 3.5 for 200 to 600VAC motor starters.



### NOTES:

- 1 – Connect the contacts of any voltage sensitive safety device(s) in circuit 13-1 rather than circuit 53-15. Any safety device(s) in the starter which may dropout due to loss of power must reset automatically when power is restored.
- 2 – Each 115V inductive load: i.e., motor starter coil, relay coil, etc., shall have a transient suppressor wired in parallel with its coil, physically located at the coil. Transient suppressor shall be a series RC device, 0.1 µf, 100 ohms, 250VAC, U.L. approved - Rifa P/N PMR210ME6100M100 or Electrocube P/N RG-1782-6 or equal.
- 3 – The jumper between terminals 53 & 15 in the chiller control panel must be removed when electromechanical starter overloads and/or safety devices are used.

**FIG. 3.5 – TYPICAL ACROSS-THE-LINE STARTER - 200 THRU 600VAC**

3.6 **Power Terminal Marking** – Starter line and load terminals must be identified by suitable markers.

3.7 **Nameplate Marking** – Nameplate shall be marked as follows:

“Volts, Phase, Hertz, FLA, LRA, for refrigeration and air conditioning duty only per ESG Standard R-1131”. Also “U.L. or cU.L. listed under File No. “ when specified on the Purchase Order. NOTE: A U.L. or cU.L. Listed starter must be supplied with a U.L. or cU.L. Listed chiller.

3.8 **Starter Control Circuit**

- a. Start-Stop Signal – The starter control circuit is actuated by a 115V ± 10%, single phase, 50 or 60 Hertz “Run” signal (1 amp full load, 10 amp inrush maximum) applied across terminals “24” and “2” from the York Control Center. If either the starter control voltage or current exceeds this rating, a separate additional control relay of proper rating shall be furnished within the starter. The “Stop” function is accomplished by terminating the “Run” signal.
- b. All ungrounded conductors of the starter control circuit shall be protected by an overcurrent device rated not more than 300% of the current rating of the conductors or control relay contacts.
- c. Control circuit must be designed to open main contactors within four (4) cycles (66.7 milliseconds) after removal of the 115V “Run” signal (including the dropout time of any control relay added per Paragraph 3.8(a)).

3.9 Solid State Overload protection is provided in the York Control Center. See Table 3.9 for overload trip settings.

Type of Starting	Percent Voltage	Percent LRA		Overload Relay Trip Time (Sec.)
		Line	Load	
Across-The-Line	100	100	100	8-10
Wye Start-Delta Run**	100+	33	33	45-56
Auto-Transformer	80	64	80	18-22
	65	42.3	65	33-41
	57.7	33	57.7	45-56
	50*	25	50	*
Primary Resistor Primary Reactor	80	80	80	18-22
	65	65	65	33-41
	57.7	57.7	57.7	45-56
	50*	50	50	*

+ For Wye Start, line voltage is 100%, motor phase is 57.7%.  
\* Refer all cases for 50% tap to York, PA ESG Marketing for approval.

3.10 **Current Transformers Supplying Current Signal to Optional Ammeter** – The turns ratio shall appear in a readily visible location. The current transformer(s) shall be sized to provide 2.4 to 4 amperes at motor full load current and have an accuracy class of 0.6 and burden rating of B-0.1 with continuous thermal current-rating factor of 1.0 at 30°C. See Paragraph 3.14.

3.11 **Sequencing of Steps** – Sequencing of multiple step starters shall be a function of time. The starter manufacturer shall furnish timer(s) with an adjustable range of sixty (60) seconds, factory set by the starter manufacturer for a 42 ± 2 second final step, and with intermediate steps in proportion.

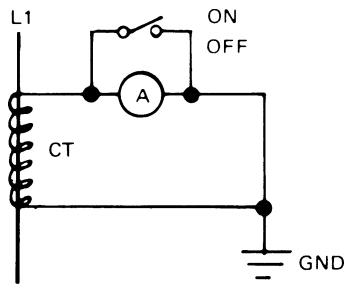
3.12 **Run Interlock** – All starters must be furnished with a normally open interlock which closes when full voltage is applied to the motor. The run interlock contact shall be pilot duty type, rated 125VA at 115 volts. The interlock contacts (terminals 3-4) must be suitable for reliable switching of 12 to 30VA at 115 volts AC.

3.13 **Control Power Transformer** – A control power transformer shall be standardly supplied complying with the following requirements:

- a. Capacity of the control transformer shall be 1.5 Net KVA.
- b. Primary shall be connected to power supply terminals through dual element fuses in both conductors which are sized for no more than 250% of the primary current.
- c. Secondary voltage output shall be 115 volts ± 10%, single phase, 50 or 60 Hertz as specified by the Purchase Order. The secondary windings shall be wired to control terminals “L” (line) and “2” (ground). A 15 amp dual element fuse shall be provided in the “L” (line) circuit.
- d. Circuit 2 (grounded circuit) shall be bonded to the starter enclosure for grounding. A No. 10-32 wire binding screw shall be provided adjacent to terminal 2. Circuit 2 shall be grounded at this point.
- e. Voltage regulation must be such that the output voltage is 100 - 130V with load variations of 25 -100% of rated load.

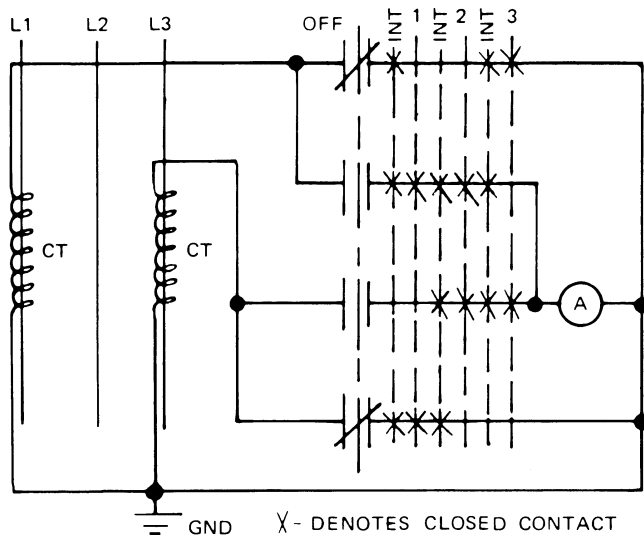
3.14 **Ammeters** – When specified by the Purchase Order, an ammeter shall be furnished to measure motor line current. The ammeter shall have a 5 ampere movement and a direct reading scale which indicates the actual motor current. Two (2) different arrangements are recommended as follows:

- a. Single-phase ammeter circuit - The ammeter is installed in series with a current transformer and a shorting switch is connected across the ammeter as shown in Figure 3.14(a).



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FIG. 3.14a – SINGLE PHASE AMMETER CIRCUIT



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FIG. 3.14b – 3-PHASE AMMETER CIRCUIT

- b. Three-phase ammeter circuit - Where indication of all three phase currents is specified on the Purchase Order, a 4-position selector switch shall be provided with a common ammeter. This is wired in conjunction with two CT's as shown in Figure 3.14(b).
- c. If both an ammeter and power factor correction capacitors are specified, the ammeter shall be located in the circuit to indicate motor current.

3.15 **Power Factor Correction Capacitors** – When PF correction capacitors are specified on the Purchase Order they shall be connected to the load side of the starter in all cases except for open-transition auto-transformer or wye-delta starting where they shall be connected to the line side per NEMA Std. MG-1, Part 20. See Paragraph 3.14(c) for other considerations.

3.16 **Voltage Limits** – Low voltage starters must operate properly within the voltage limits listed below.

Hz	Rated Voltage	Nameplate Voltage(s)	Dip Voltage (60 sec. min.)	Continuous Operation	
				Min. Vtg.	Max. Vtg.
60	200V	200-208V	170V	180V	220V
60	230V	220-240V	196V	207V	254V
60	460V	440-480V	391V	414V	508V
60	575V	550-600V	489V	518V	635V
50/60	380V	380V	323V	342V	402V
50	400V	400V	340V	360V	423V
50	415V	415V	353V	374V	440V

Starters rated at voltages not listed above must operate continuously with voltage variation  $\pm 10\%$  from nameplate voltage. They also must operate for at least sixty (60) seconds at 15% below nameplate voltage during start-up.

4. CERTIFICATION

4.1 The starter manufacturer must provide three (3) sets (or more as specified on the Purchase Order) of certified drawings, identified with job name and ESG Sales Order Number and showing dimensions and wiring diagram, as follows:

- a. Two (2) sets (or more as specified) to source of Purchase Order.
- b. One (1) set, for record purposes only, to Service Department 36BE, Engineered Systems Group, York International Corporation, York, PA 17405-1592.

5. PACKAGING AND MARKING

5.1 The container used in shipment of the starter must be identified with the ESG Purchase Order, Job Name and ESG Sales Order Number and any special markings specified.

6. PURCHASING

- 6.1 ESG Purchase Order is to specify:
- a. Quantity
  - b. Manufacturer
  - c. Size and/or Model Number of Starter
  - d. Type:
    - Across-The-Line
    - Wye-Delta (open or closed transition)
    - Auto-Transformer (closed transition) \_\_\_\_\_ % tap
    - Primary Reactor or Primary Resistor \_\_\_\_\_ % tap
    - Other

- e. Type Enclosure - NEMA \_\_\_\_\_
- f. Mounting (Floor or Wall)
- g. York Unit Model Number
- h. Power Supply, Volts, Phase, Hertz
- i. Rating Data: FLA, LRA, max. inrush amps.
- j. Motor Service Factor (if greater than 1.05)
- k. Power Factor Correction Capacitors (when required) Full Load PF \_\_\_\_\_ Uncorrected \_\_\_\_\_ Corrected \_\_\_\_\_ or KVAR @ \_\_\_\_\_ Volts
- i. Required Accessories and Modifications (detail) (include customer specifications, as required)
- m. Code Approval Required:
  - U.L. – \_\_\_\_\_ YES \_\_\_\_\_ NO
  - cU.L. – \_\_\_\_\_ YES \_\_\_\_\_ NO

- n. Job Name and ESG Sales Order Number
- o. ESG Part Number, when applicable for shipment into ESG plants
- p. ESG Standard R-1131
- q. "Main contactors will drop out within 4 cycles of removal of 115 volt "Run" signal". This note to appear on starter wiring diagram.

**EXAMPLE:**  
*One (1) Model ABC, Auto-Transformer, Closed Transition 65% Tap Starter, NEMA 1 enclosure, floor mounted, for use with York Model YR TATATO MAXE™ Screw Chiller at 460 Volts-3-60 with 176 FLA, 1015 LRA and 426 amps maximum inrush, per ESG Standard R-1131, 1.5 KVA (15 amp) control power transformer, door mounted ammeter and three (3) phase ammeter selector switch, U.L. listed, customer XYZ, ESG Sales Order Number 00-000000.*

**NOTE:** A U.L. or cU.L. Listed starter must be supplied with a U.L. or cU.L. Listed chiller.

