

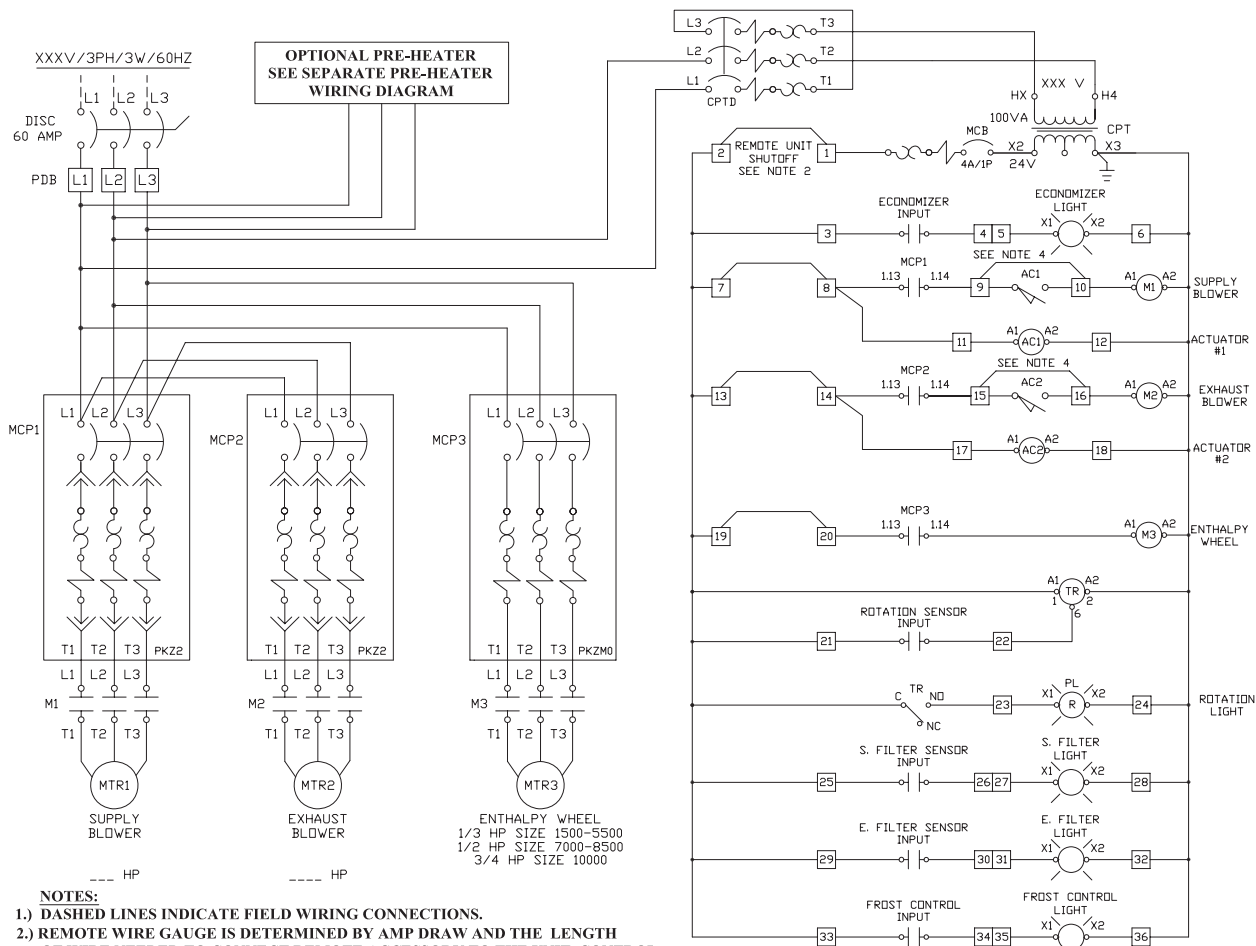


INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

This publication contains supplemental wiring instructions for standard units of the ERV-Energy Recovery Ventilators. Carefully read this publication prior to any installation or maintenance procedure.

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NOTES:

- 1.) DASHED LINES INDICATE FIELD WIRING CONNECTIONS.
- 2.) REMOTE WIRE GAUGE IS DETERMINED BY AMP DRAW AND THE LENGTH OF WIRE NEEDED TO CONNECT REMOTE ACCESSORY TO THE UNIT CONTROL PANEL. REFER TO N.E.C. AND LOCAL CODE REQUIREMENTS TO DETERMINE TYPE OF WIRE AND WIRE GAUGE.
- 3.) MAIN DISCONNECT TO BE PROVIDED BY INSTALLER, MUST BE UL LISTED CIRCUIT BREAKER OR FUSIBLE DISCONNECT SWITCH.
- 4.) OVERCURRENT PROTECTION MUST BE PROVIDED IN ACCORDANCE WITH N.E.C. ARTICLE 430-53(C)
- 5.) THE WORKSPACE FOR ELECTRICAL EQUIPMENT MUST BE IN ACCORDANCE WITH N.E.C. ARTICLE 110-26.

- 6.) REMOVE JUMPER BETWEEN TERMINALS 1 & 2 IF REMOTE START IS REQUIRED
- 7.) ALL OF THE 36 CONTROL TERMINALS SHOWN ARE PROVIDED IN THE PANEL EVEN WHEN THE OPTIONAL CONTROLS WERE NOT PROVIDED. THE TERMINALS ARE PRESENT TO ALLOW FOR UNIT CONTROL UPGRADES. IF THERE ARE NO WIRES GOING TO THESE CONTROL TERMINALS, THEN THE NOTED OPTION WASN'T PROVIDED.
- 8.) 100 VA (4.17A @ 24 VOLT) N.E.C. CLASS 1 CIRCUIT

| CONTROL TERMINALS (SEE NOTE 7) | |
|--------------------------------|---------------------------------------|
| TB | |
| 1 | REMOTE UNIT SHUTOFF (SEE NOTE 6) |
| 2 | ECONOMIZER INPUT (BY COOK) |
| 3 | ECONOMIZER LIGHT (OPTIONAL) |
| 4 | REMOTE START MOTOR (1) |
| 5 | ACTUATOR #1 LIMIT SWITCH (OPTIONAL) |
| 6 | ACTUATOR #1 MOTOR CONTACTOR (AC1) |
| 7 | REMOTE START MOTOR (2) |
| 8 | ACTUATOR #2 LIMIT SWITCH (OPTIONAL) |
| 9 | ACTUATOR #2 MOTOR CONTACTOR (AC2) |
| 10 | ENTHALPY WHEEL 1/3 HP SIZE 1500-5500 |
| 11 | ENTHALPY WHEEL 1/2 HP SIZE 7000-8500 |
| 12 | ENTHALPY WHEEL 3/4 HP SIZE 10000 |
| 13 | REMOTE START MOTOR (3) FOR ECONOMIZER |
| 14 | ROTATION SENSOR INPUT (BY COOK) |
| 15 | ROTATION LIGHT (OPTIONAL) |
| 16 | SUPPLY FILTER SENSOR INPUT (BY COOK) |
| 17 | SUPPLY FILTER LIGHT (OPTIONAL) |
| 18 | EXHAUST FILTER SENSOR INPUT (BY COOK) |
| 19 | EXHAUST FILTER LIGHT (OPTIONAL) |
| 20 | FROST CONTROL INPUT (BY COOK) |
| 21 | FROST CONTROL LIGHT (OPTIONAL) |

| LEGEND | | | |
|--------------|--|-------|----------------------|
| ABBREVIATION | DESCRIPTION | MOTOR | |
| MCP1 | STARTER, COMB. SELF PROTECTED (SUPPLY BLOWER MOTOR) | MTR1 | SUPPLY BLOWER MOTOR |
| MCP2 | STARTER, COMB. SELF PROTECTED (EXHAUST BLOWER MOTOR) | MTR2 | EXHAUST BLOWER MOTOR |
| MCP3 | STARTER, COMB. SELF PROTECTED (WHEEL DRIVE MOTOR) | MTR3 | WHEEL DRIVE MOTOR |
| MCB | SUPPLEMENTARY PROTECTION CONTROL TRANSFORMER SECONDARY | | |
| CPT | CONTROL TRANSFORMER (SEE NOTE 8) | | |
| M1 | SUPPLY BLOWER MOTOR CONTACTOR | | |
| M2 | EXHAUST BLOWER MOTOR CONTACTOR | | |
| M3 | WHEEL DRIVE MOTOR CONTACTOR | | |
| CPTD | CIRCUIT PROTECTOR CONTROL TRANSFORMER PRIMARY | | |
| AC1 | SUPPLY DAMPER ACTUATOR (OPT.) | | |
| AC2 | EXHAUST DAMPER ACTUATOR (OPT.) | | |

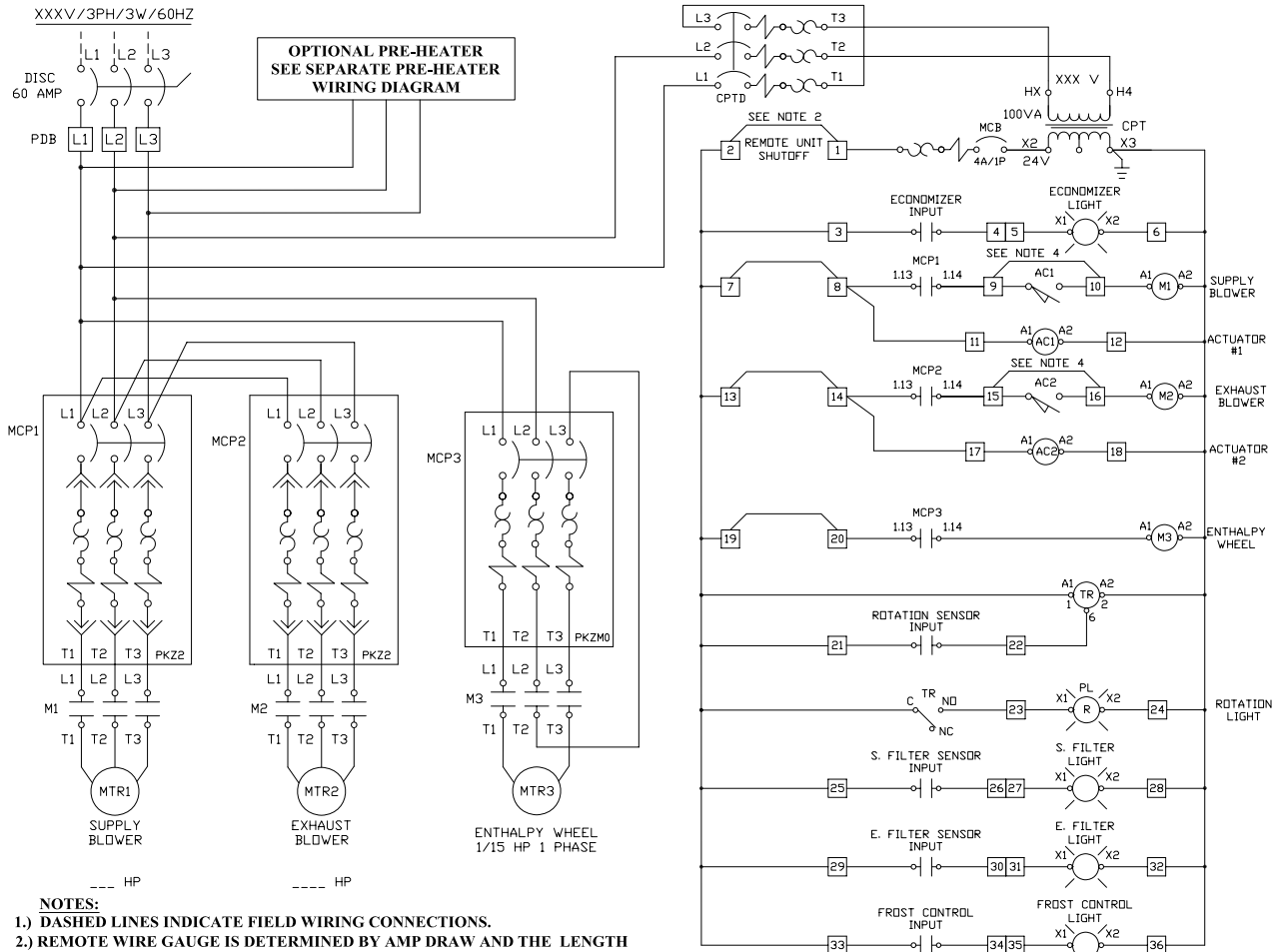


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- NOTES:**
- 1.) DASHED LINES INDICATE FIELD WIRING CONNECTIONS.
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 - 5.) THE WORKSPACE FOR ELECTRICAL EQUIPMENT MUST BE IN ACCORDANCE WITH N.E.C. ARTICLE 110-26.

- 6.) REMOVE JUMPER BETWEEN TERMINALS 1 & 2 IF REMOTE START IS REQUIRED
- 7.) ALL OF THE 36 CONTROL TERMINALS SHOWN ARE PROVIDED IN THE PANEL EVEN WHEN THE OPTIONAL CONTROLS WERE NOT PROVIDED. THE TERMINALS ARE PRESENT TO ALLOW FOR UNIT CONTROL UPGRADES. IF THERE ARE NO WIRES GOING TO THESE CONTROL TERMINALS, THEN THE NOTED OPTION WASN'T PROVIDED.
- 8.) 100 VA (4.17A @ 24 VOLT) N.E.C. CLASS 1 CIRCUIT

CONTROL TERMINALS (SEE NOTE 7)

| | | | |
|----|-------------------------------------|----|---------------------------------------|
| 1 | REMOTE UNIT SHUTOFF (SEE NOTE 6) | 19 | REMOTE START MOTOR (3) FOR ECONOMIZER |
| 2 | ECONOMIZER INPUT (BY COOK) | 20 | ROTATION SENSOR INPUT (BY COOK) |
| 3 | ECONOMIZER LIGHT (OPTIONAL) | 21 | ROTATION LIGHT (OPTIONAL) |
| 4 | REMOTE START MOTOR (1) | 22 | SUPPLY FILTER SENSOR INPUT (BY COOK) |
| 5 | ACTUATOR #1 LIMIT SWITCH (OPTIONAL) | 23 | SUPPLY FILTER LIGHT (OPTIONAL) |
| 6 | ACTUATOR #2 LIMIT SWITCH (OPTIONAL) | 24 | EXHAUST FILTER SENSOR INPUT (BY COOK) |
| 7 | | 25 | EXHAUST FILTER LIGHT (OPTIONAL) |
| 8 | | 26 | FRIST CONTROL INPUT (BY COOK) |
| 9 | | 27 | FRIST CONTROL LIGHT (OPTIONAL) |
| 10 | | 28 | |
| 11 | | 29 | |
| 12 | | 30 | |
| 13 | | 31 | |
| 14 | | 32 | |
| 15 | | 33 | |
| 16 | | 34 | |
| 17 | | 35 | |
| 18 | | 36 | |

| LEGEND | | | |
|----------------|--|------|--|
| ABBREV. SYMBOL | DESCRIPTION | MTR1 | |
| MCP1 | STARTER, COMB. SELF PROTECTED (SUPPLY BLOWER MOTOR) | MTR1 | SUPPLY BLOWER MOTOR |
| MCP2 | STARTER, COMB. SELF PROTECTED (EXHAUST BLOWER MOTOR) | MTR2 | EXHAUST BLOWER MOTOR |
| MCP3 | STARTER, COMB. SELF PROTECTED (WHEEL DRIVE MOTOR) | MTR3 | WHEEL DRIVE MOTOR |
| M1 | SUPPLY BLOWER MOTOR CONTACTOR | MCB | SUPPLEMENTARY PROTECTION CONTROL TRANSFORMER SECONDARY |
| M2 | EXHAUST BLOWER MOTOR CONTACTOR | CPT | CIRCUIT PROTECTOR CONTROL TRANSFORMER PRIMARY |
| M3 | WHEEL DRIVE MOTOR CONTACTOR | CPTD | CIRCUIT PROTECTOR CONTROL TRANSFORMER PRIMARY |
| | | AC1 | SUPPLY DAMPER ACTUATOR (OPT.) |
| | | AC2 | EXHAUST DAMPER ACTUATOR (OPT.) |

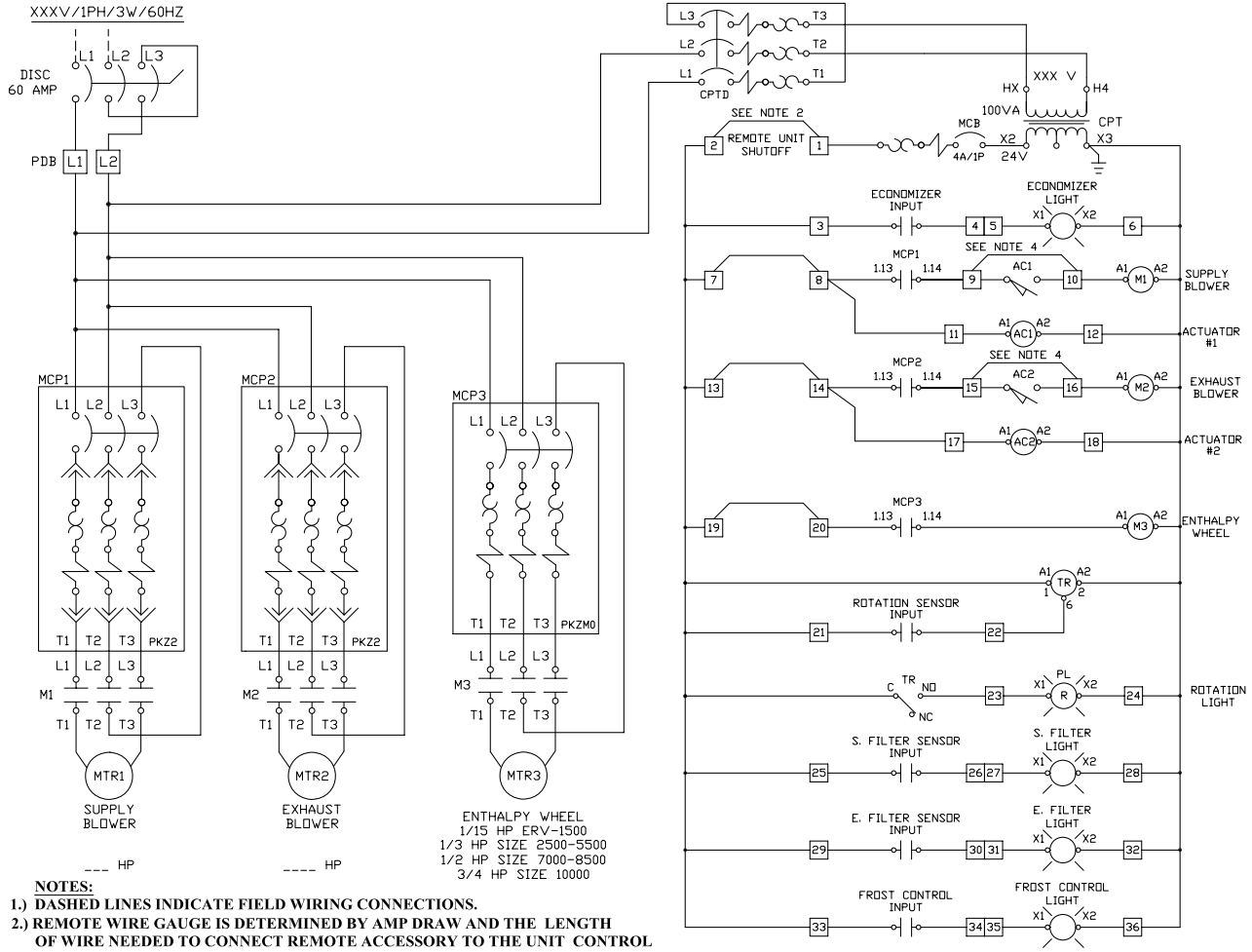


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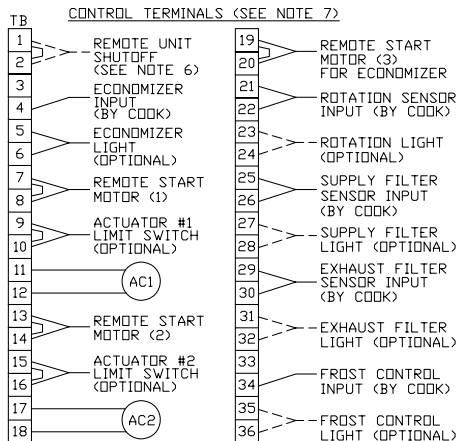
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- 6.) REMOVE JUMPER BETWEEN TERMINALS 1 & 2 IF REMOTE UNIT SHUTOFF IS REQUIRED
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- 8.) 100 VA (4.17A @ 24 VOLT) N.E.C. CLASS 1 CIRCUIT



| LEGEND | | | |
|--------------|--|------|---|
| ABBREV SYMBO | DESCRIPTION | MTR1 | SUPPLY BLOWER MOTOR |
| MCP1 | STARTER, COMB. SELF PROTECTED (SUPPLY BLOWER MOTOR) | MTR1 | SUPPLY BLOWER MOTOR |
| MCP2 | STARTER, COMB. SELF PROTECTED (EXHAUST BLOWER MOTOR) | MTR2 | EXHAUST BLOWER MOTOR |
| MCP3 | STARTER, COMB. SELF PROTECTED (WHEEL DRIVE MOTOR) | MTR3 | WHEEL DRIVE MOTOR |
| | | MCB | SUPPLEMENTARY CONTROL TRANSFORMER SECONDARY |
| | | CPT | CONTROL TRANSFORMER (SEE NOTE 8) |
| M1 | SUPPLY BLOWER MOTOR CONTACTOR | CPTD | CIRCUIT PROTECTOR CONTROL TRANSFORMER PRIMARY |
| M2 | EXHAUST BLOWER MOTOR CONTACTOR | AC1 | SUPPLY DAMPER ACTUATOR (CPT.) |
| M3 | WHEEL DRIVE MOTOR CONTACTOR | AC2 | EXHAUST DAMPER ACTUATOR (CPT.) |

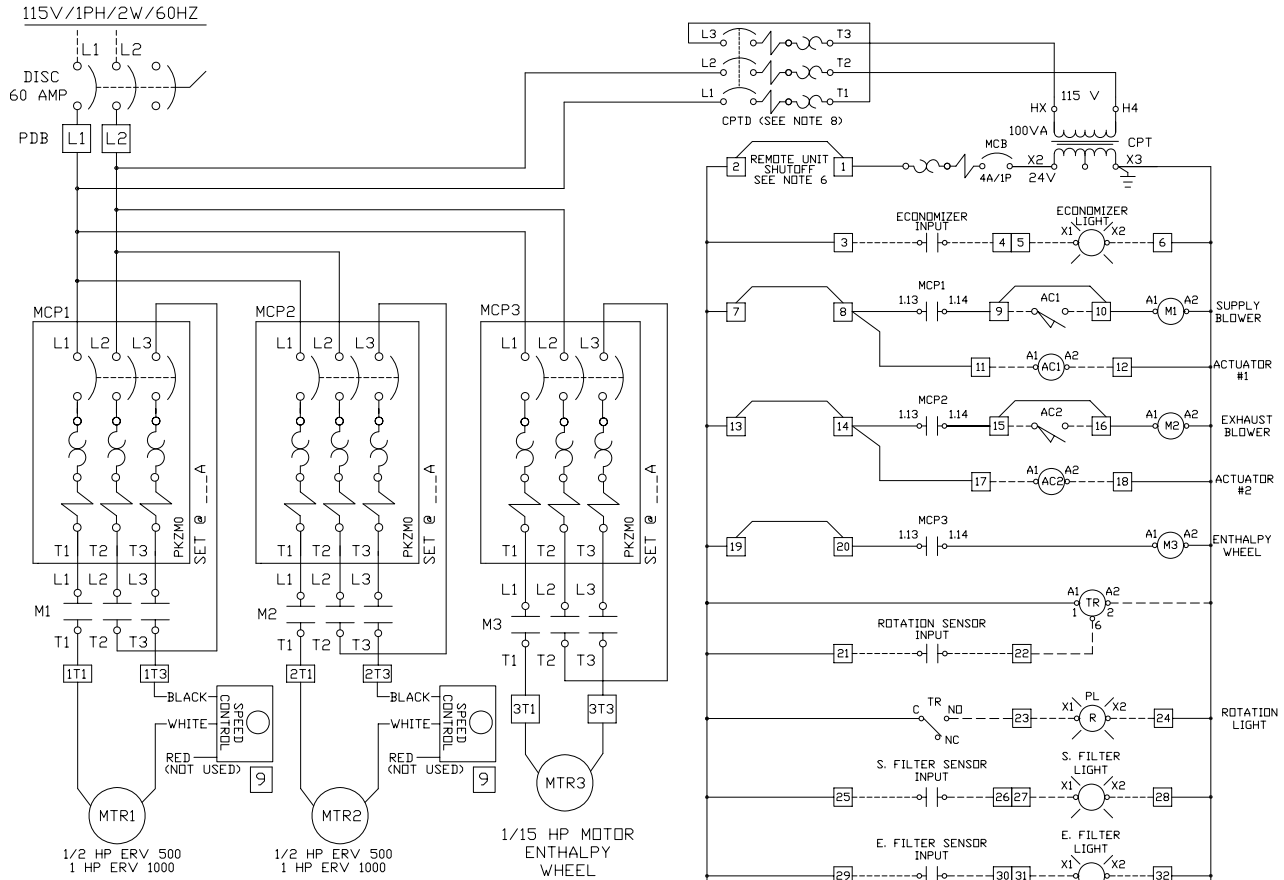


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- 8.) 100 VA (4.17A @ 24 VOLT) N.E.C. CLASS 1 CIRCUIT
- 9.) FSC'S ARE INSTALLED BY CUTTING BOTH WIRES TO EACH BLOWER MOTOR AND WIRING THE FSC'S INLINE. USE HEAVIER GAUGE WIRE FOR LONG RUNS.

| POWER TERMINALS | TB | CONTROL TERMINALS (SEE NOTE 7) |
|-----------------|----|--------------------------------|
| TB2 | 1 | 19 |
| 1T1 | 2 | 20 |
| 1T3 | 3 | 21 |
| 2T1 | 4 | 22 |
| 2T3 | 5 | 23 |
| 3T1 | 6 | 24 |
| 3T3 | 7 | 25 |
| | 8 | 26 |
| | 9 | 27 |
| | 10 | 28 |
| | 11 | 29 |
| | 12 | 30 |
| | 13 | 31 |
| | 14 | 32 |
| | 15 | 33 |
| | 16 | 34 |
| | 17 | 35 |
| | 18 | 36 |

| LEGEND | | | |
|---------------------|--|------|------|
| ABBREVIATION SYMBOL | DESCRIPTION | MTR1 | MTR2 |
| MCP1 | STARTER, COMB. SELF PROTECTED (SUPPLY BLOWER MOTOR) | | |
| MCP2 | STARTER, COMB. SELF PROTECTED (EXHAUST BLOWER MOTOR) | | |
| MCP3 | STARTER, COMB. SELF PROTECTED (WHEEL DRIVE MOTOR) | | |
| M1 | SUPPLY BLOWER MOTOR CONTACTOR | | |
| M2 | EXHAUST BLOWER MOTOR CONTACTOR | | |
| M3 | WHEEL DRIVE MOTOR CONTACTOR | | |
| | | AC1 | AC2 |
| | | CPT | |
| | | CPTD | |
| | | MCB | |
| | | TR | |

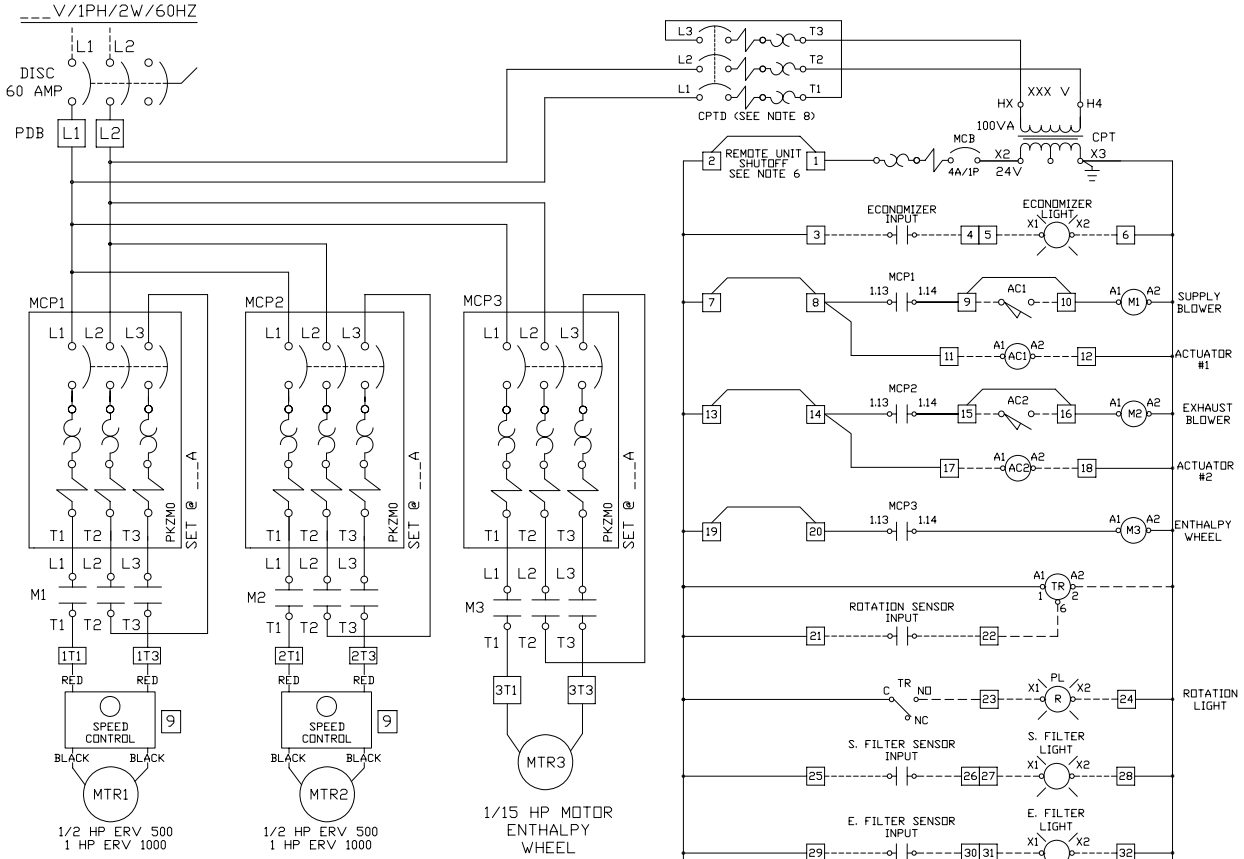


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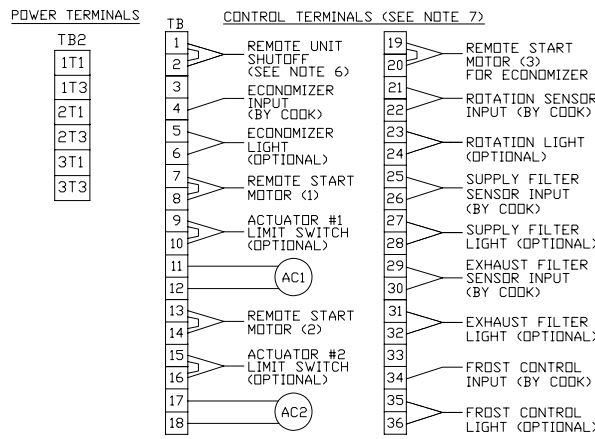
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| LEGEND | | |
|----------------|--|--|
| ABBREV. SYMBOL | DESCRIPTION | |
| MTR1 | SUPPLY BLOWER MOTOR | |
| MCP1 | STARTER, COMB. SELF PROTECTED (SUPPLY BLOWER MOTOR) | MTR2 EXHAUST BLOWER MOTOR |
| MCP2 | STARTER, COMB. SELF PROTECTED (EXHAUST BLOWER MOTOR) | MTR3 WHEEL DRIVE MOTOR |
| MCP3 | STARTER, COMB. SELF PROTECTED (WHEEL DRIVE MOTOR) | MCB SUPPLEMENTARY PROTECTION CONTROL TRANSFORMER SECONDARY |
| M1 | SUPPLY BLOWER MOTOR CONTACTOR | CPT CONTROL TRANSFORMER (SEE NOTE 8) |
| M2 | EXHAUST BLOWER MOTOR CONTACTOR | CPTD CIRCUIT PROTECTOR CONTROL TRANSFORMER PRIMARY |
| M3 | WHEEL DRIVE MOTOR CONTACTOR | AC1 SUPPLY DAMPER ACTUATOR (OPT.) |
| | | AC2 EXHAUST DAMPER ACTUATOR (OPT.) |

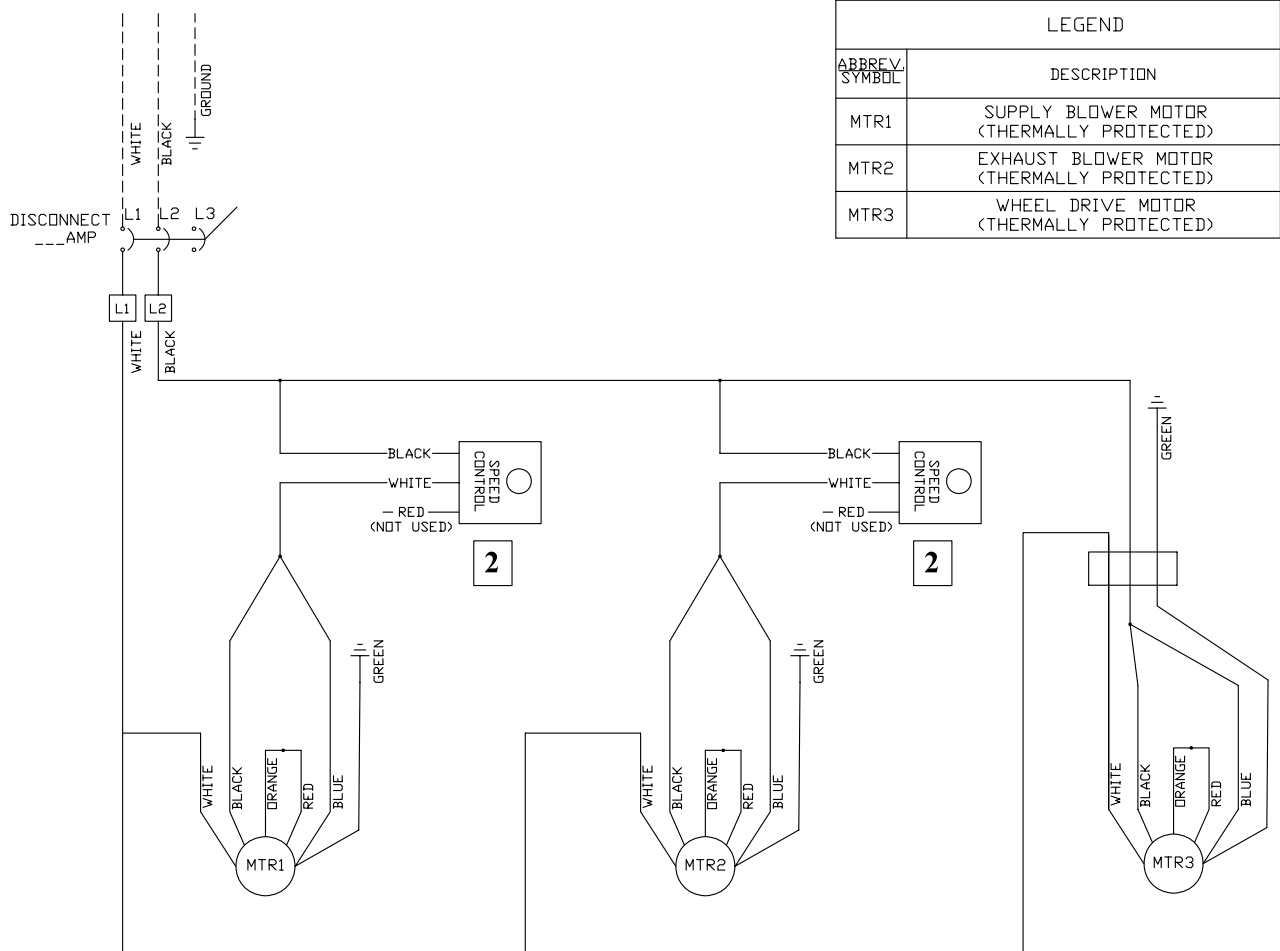


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2. WIRING DIAGRAM SHOWS PREWIRED FSC'S. IF UNIT WAS NOT ORDERED WITH PREWIRED FSC'S THEN THE FSC'S ARE INSTALLED BY CUTTING THE BLACK WIRES THAT RUN TO EACH BLOWER MOTOR AND WIRING THE FSC'S IN-LINE. FOR LONG RUNS OF WIRE, USE A HEAVIER GAUGE WIRE.

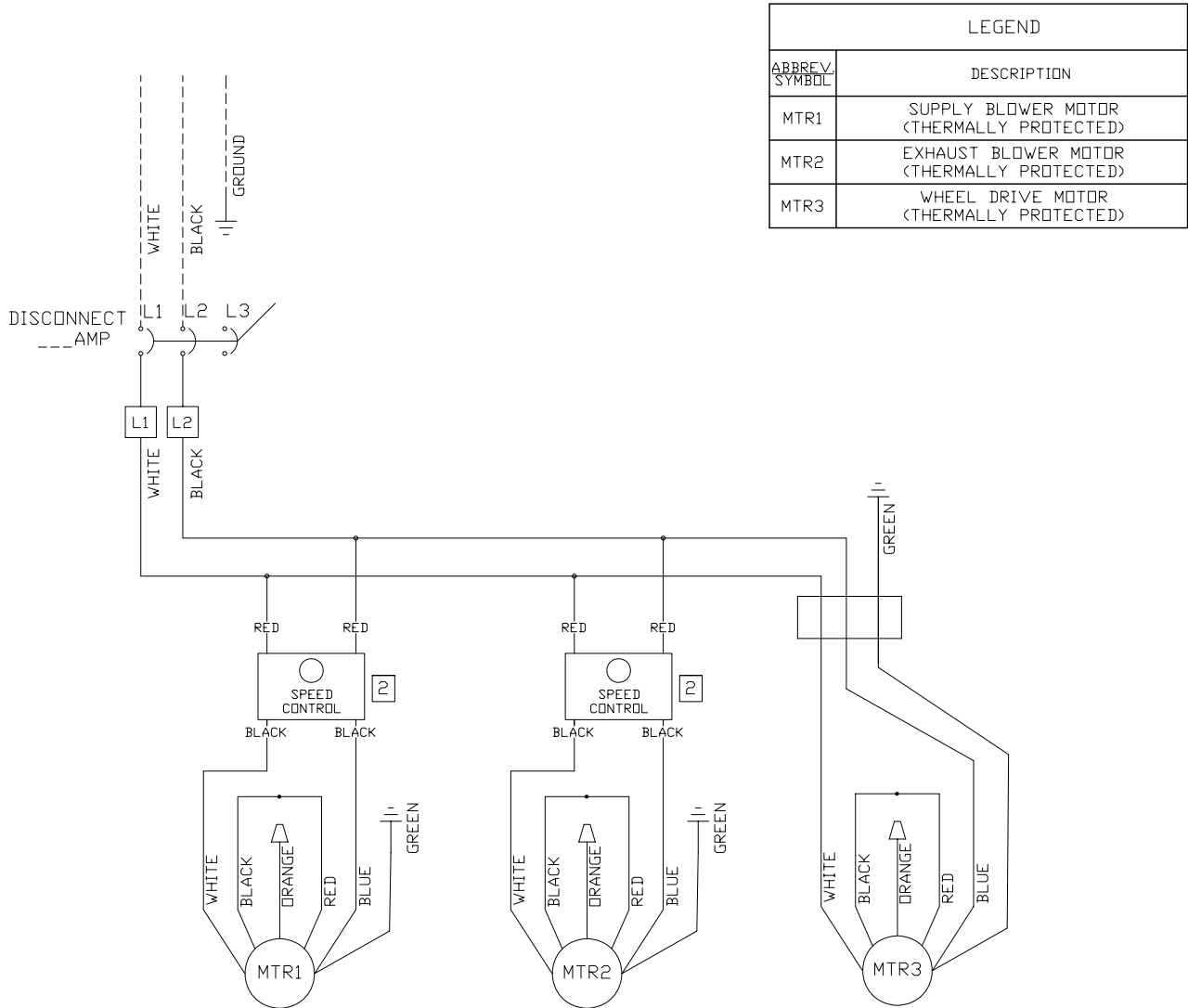


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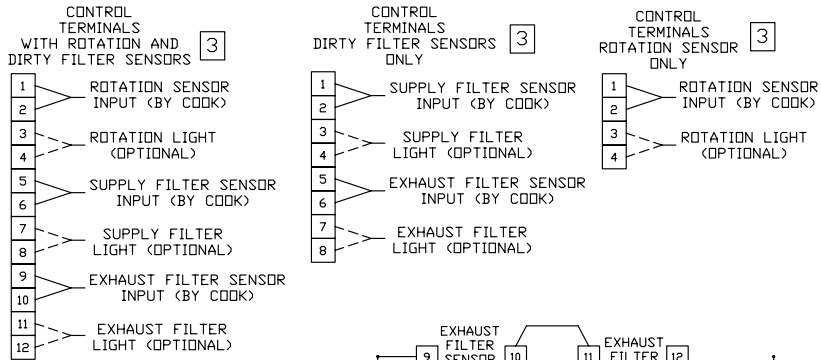


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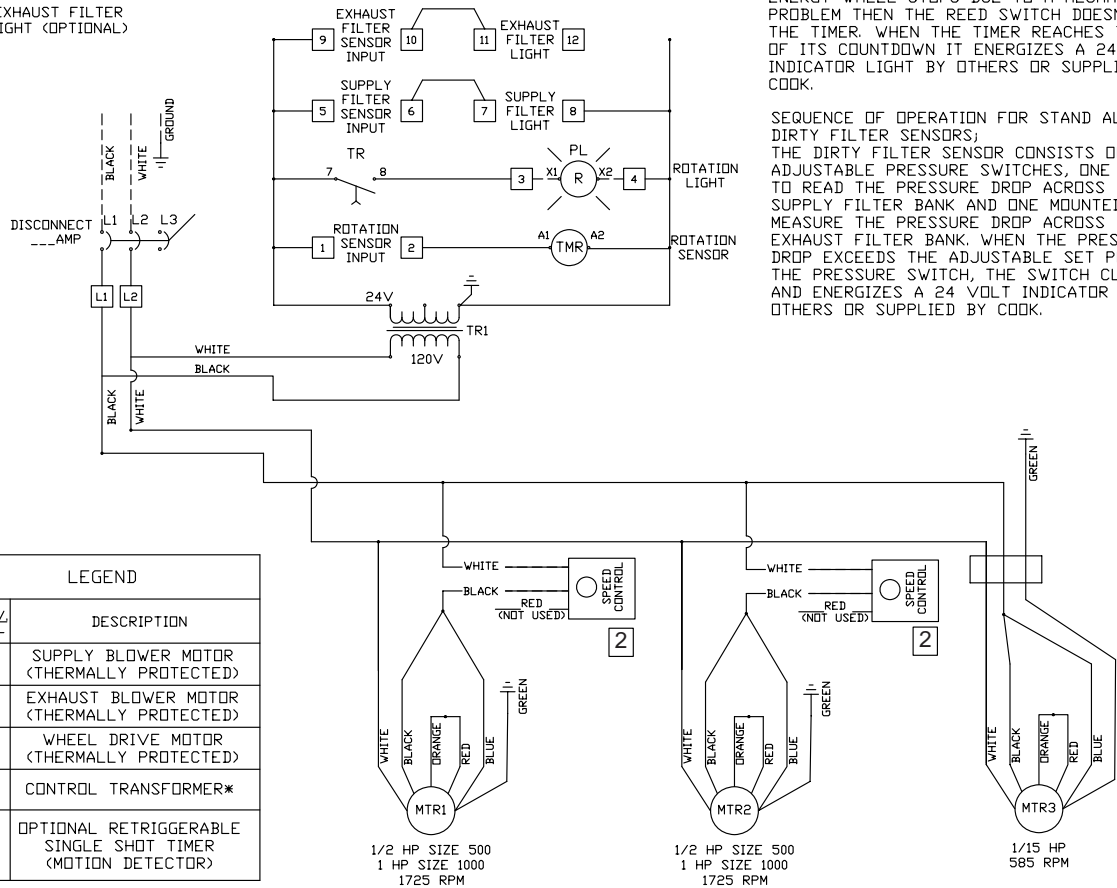
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CENSOR CONSISTS OF A MAGNET ATTACHED TO THE ENERGY WHEEL, A MAGNETIC REED SWITCH THAT MOUNTS TO THE OUTSIDE PERIMETER OF THE ENERGY WHEEL CASSETTE, AND A TIMER THAT MOUNTS IN THE UNIT ELECTRICAL COMPARTMENT. WHEN THE MAGNET MOUNTED ON THE ENERGY WHEEL PASSES BY THE REED SWITCH IT MOMENTARILY CLOSSES THE CONTACTS ON THE REED SWITCH. WHEN THE CONTACTS CLOSE ON THE REED SWITCH THE TIMERS' ADJUSTABLE COUNTDOWN IS RESET AND THE TIMER COUNTDOWN BEGINS AGAIN. IF THE ENERGY WHEEL STOPS DUE TO A MECHANICAL PROBLEM THEN THE REED SWITCH DOESN'T RESET THE TIMER. WHEN THE TIMER REACHES THE END OF ITS COUNTDOWN IT ENERGIZES A 24 VOLT INDICATOR LIGHT BY OTHERS OR SUPPLIED BY COOK.

SEQUENCE OF OPERATION FOR STAND ALONE DIRTY FILTER SENSORS:
THE DIRTY FILTER SENSOR CONSISTS OF TWO ADJUSTABLE PRESSURE SWITCHES, ONE MOUNTED TO READ THE PRESSURE DROP ACROSS THE SUPPLY FILTER BANK AND ONE MOUNTED TO MEASURE THE PRESSURE DROP ACROSS THE EXHAUST FILTER BANK. WHEN THE PRESSURE DROP EXCEEDS THE ADJUSTABLE SET POINT ON THE PRESSURE SWITCH, THE SWITCH CLOSSES AND ENERGIZES A 24 VOLT INDICATOR LIGHT BY OTHERS OR SUPPLIED BY COOK.



| LEGEND | |
|----------------|--|
| ABBREV. SYMBOL | DESCRIPTION |
| MTR1 | SUPPLY BLOWER MOTOR (THERMALLY PROTECTED) |
| MTR2 | EXHAUST BLOWER MOTOR (THERMALLY PROTECTED) |
| MTR3 | WHEEL DRIVE MOTOR (THERMALLY PROTECTED) |
| TR1 | CONTROL TRANSFORMER* |
| TMR | OPTIONAL RETRIGGERABLE SINGLE SHOT TIMER (MOTION DETECTOR) |

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- 3. LOW VOLTAGE WIRING DIAGRAM SHOWS BOTH THE ROTATION AND DIRTY FILTER SENSOR OPTIONS. IF BOTH OPTIONS WERE NOT PROVIDED, REFERENCE THE CONTROL TERMINALS FOR JUST THE ROTATION SENSOR OR JUST THE FILTER SENSOR AND DISREGARD WHAT WAS NOT PROVIDED ON THE LOW VOLTAGE WIRING DIAGRAM.**



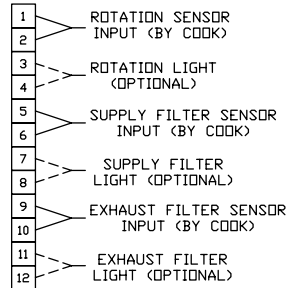
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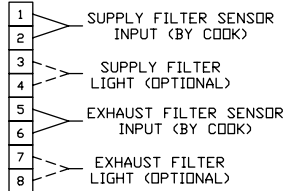
Loren Cook catalog, ERV, provides additional information describing the equipment, fan performance, available accessories, and specification data. For additional safety information, refer to AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans.

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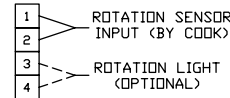
CONTROL TERMINALS WITH ROTATION AND DIRTY FILTER SENSORS [3]



CONTROL TERMINALS DIRTY FILTER SENSORS ONLY [3]

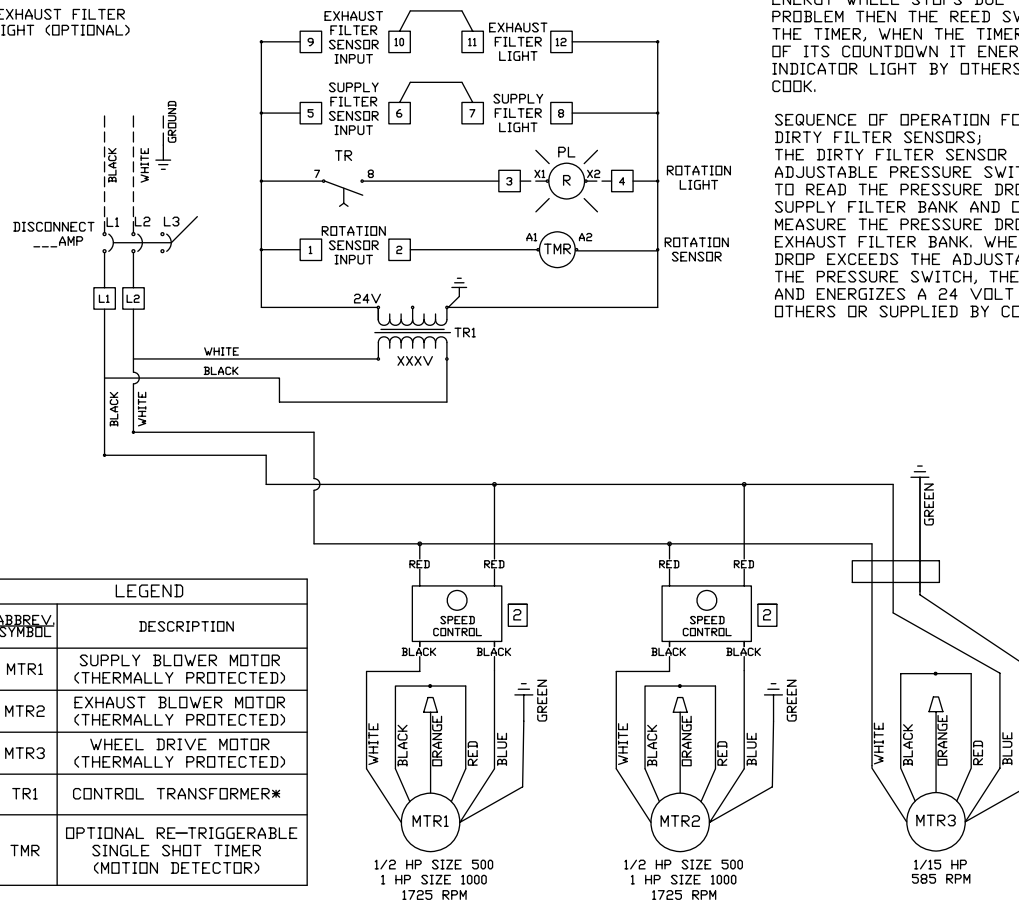


CONTROL TERMINALS ROTATION SENSOR ONLY [3]



SEQUENCE OF OPERATION FOR STAND ALONE ROTATION SENSOR;
THE ROTATION SENSOR CONSISTS OF A MAGNET ATTACHED TO THE ENERGY WHEEL, A MAGNETIC REED SWITCH THAT MOUNTS TO THE OUTSIDE PERIMETER OF THE ENERGY WHEEL CASSETTE, AND A TIMER THAT MOUNTS IN THE UNIT ELECTRICAL COMPARTMENT. WHEN THE MAGNET MOUNTED ON THE ENERGY WHEEL PASSES BY THE REED SWITCH IT MOMENTARILY CLOSES THE CONTACTS ON THE REED SWITCH. WHEN THE CONTACTS CLOSE ON THE REED SWITCH THE TIMERS ADJUSTABLE COUNTDOWN IS RESET AND THE TIMER COUNTDOWN BEGINS AGAIN. IF THE ENERGY WHEEL STOPS DUE TO A MECHANICAL PROBLEM THEN THE REED SWITCH DOESN'T RESET THE TIMER, WHEN THE TIMER REACHES THE END OF ITS COUNTDOWN IT ENERGIZES A 24 VOLT INDICATOR LIGHT BY OTHERS OR SUPPLIED BY COOK.

SEQUENCE OF OPERATION FOR STAND ALONE DIRTY FILTER SENSORS;
THE DIRTY FILTER SENSOR CONSISTS OF TWO ADJUSTABLE PRESSURE SWITCHES, ONE MOUNTED TO READ THE PRESSURE DROP ACROSS THE SUPPLY FILTER BANK AND ONE MOUNTED TO MEASURE THE PRESSURE DROP ACROSS THE EXHAUST FILTER BANK. WHEN THE PRESSURE DROP EXCEEDS THE ADJUSTABLE SET POINT ON THE PRESSURE SWITCH, THE SWITCH CLOSES AND ENERGIZES A 24 VOLT INDICATOR LIGHT BY OTHERS OR SUPPLIED BY COOK.



| LEGEND | |
|---------------------|---|
| ABBREVIATION SYMBOL | DESCRIPTION |
| MTR1 | SUPPLY BLOWER MOTOR (THERMALLY PROTECTED) |
| MTR2 | EXHAUST BLOWER MOTOR (THERMALLY PROTECTED) |
| MTR3 | WHEEL DRIVE MOTOR (THERMALLY PROTECTED) |
| TR1 | CONTROL TRANSFORMER* |
| TMR | OPTIONAL RE-TRIGGERABLE SINGLE SHOT TIMER (MOTION DETECTOR) |

NOTE: 1. DASHED LINES INDICATE FIELD WIRING CONNECTIONS

2. WIRING DIAGRAM SHOWS PREWIRED FSC'S. IF UNIT WAS NOT ORDERED PREWIRED THEN FSC'S ARE INSTALLED BY CUTTING BOTH OF THE WIRES TO EACH BLOWER MOTOR AND WIRING THE FSC'S IN-LINE. FOR LONG RUNS OF WIRE, USE A HEAVIER GAUGE WIRE.

3. LOW VOLTAGE WIRING DIAGRAM SHOWS BOTH THE ROTATION AND DIRTY FILTER SENSOR OPTIONS. IF BOTH OPTIONS WERE NOT PROVIDED, REFERENCE THE CONTROL TERMINALS FOR JUST THE ROTATION SENSOR OR JUST THE FILTER SENSOR AND DISREGARD WHAT WAS NOT PROVIDED ON THE LOW VOLTAGE WIRING DIAGRAM.