

## Gas-Fired Tempered Make-Up Air Unit

Model:

TK1DD-1PH-FF

1-Phase, 230V, 1.50 HP, Direct Drive, Premium (E-Plus) Eff. Motor with Motorized Damper and 15" Blower. MAX 2000 CFM's



TK1-250-15D Direct Fired Direct Drive (649 lbs.)



Direct Gas Fired Heated Make Up Air Unit with 15" Direct Drive Fan

**Supply Motor:**

Model DTP1/54, 1.500 HP, 3 Phase, 230 V, 60Hz, 4.0 FLA, ODP, Premium (E-Plus3) Eff.

**Burner:**

Min Output BTU: 18,000 BTU/Hr  
Max Output BTU: 275,000 BTU/Hr  
Size: 6" long  
Gas Type: Natural

**Supply Performance:**

Volume Range: 1000-2000 cfm  
RPM: 2092  
TS: 8215 ft/min  
SP: 0.576" w.g.  
0.500" Ext. + 0.045" Int. + 0.031" Opt.  
BHP: 1.404

**Heating Schedule:**

Altitude: 0'  
Winter Entering Air Dry Bulb Temp: 0°F  
Temp Rise: 100°F  
Output BTU: 216000  
Input BTU: 234783  
BTUs BASED OFF STANDARD AIR DENSITY

**Supply Installation Information:**

Gas Inlet Pressure: 7 in. w.c. - 14 in. w.c.  
Insurance: No Insurance Requirement (ANSI)  
Unit Main Input: 16.1 Amps MCA, 25 Amps MOP, 230 V, 12 AWG Wire Min.  
Supply Unit Voltage: 1 phs 230 V 60Hz

**Construction Features**

Housing constructed of heavy duty G90 galvanized steel • Vibration isolation • Ball bearing motors • Heavy duty, pre-lubricated bearings rated for 200,000 hours of operation • Service doors on both sides • Horizontal & down discharge • Large intake area ensures low pressure drop across unit • Spring loaded profile plates automatically adjust for any airflow - no manual setting required! • Weatherproof safety disconnect switch • Modular design provides design flexibility • Fully insulated casing

**Blower:**

15 Inch Mixed Flow Plenum Fan for size 1 MOD. Hub specified to match motor shaft.

**Temp Control:**

RTC Solutions • 40-90°F Discharge Temp Control • Field Wired On/Off Start Command

**Intake:**

Sloped Filtered Intake for Size #1 Modular Heater. 21.813" Wide x 44.375" Long x 23.375" High. Includes 2" MV EZ Kleen Metal Mesh Filters.

**Filters:**

3x MV EZ Kleen Metal Mesh Filter. 16"x 20"x 2" Used for heater and supply fan intakes. (3412)

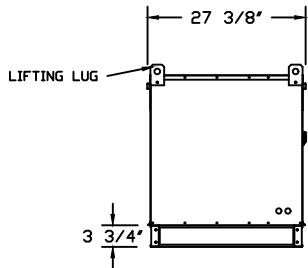
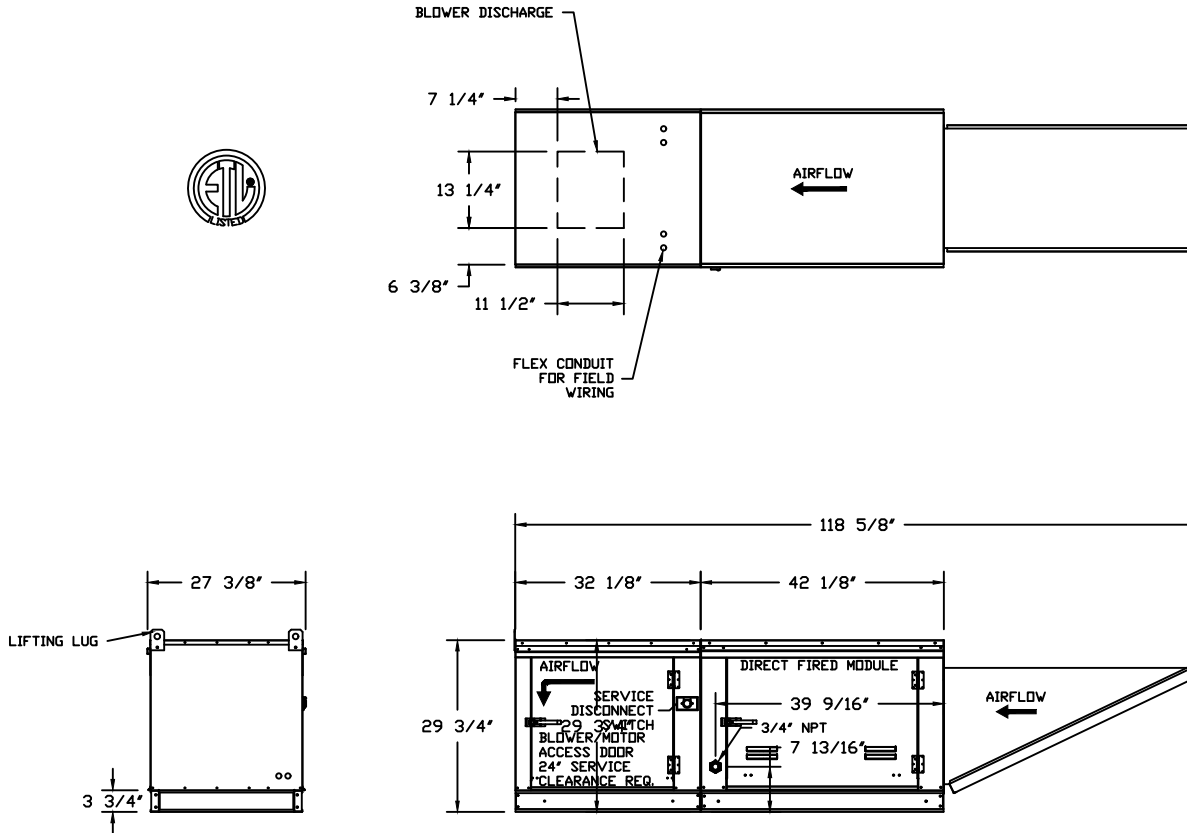
**Selected Options:**

- Motorized Back Draft Damper 16" X 18" for Size 1 Standard & Modular Heater Units w/Extended Shaft, Standard Galvanized Construction, 3/4" Rear Flange, Low Leakage, TFB120S Actuator Included
- Low Fire Start. Allows the burner circuit to energize when the modulation control is in a low fire position.
- Gas Pressure Gauge, 0-35", 2.5" Diameter, 1/4" Thread Size
- Gas Pressure Gauge, -5 to +15 Inches Wc., 2.5" Diameter, 1/4" Thread Size
- VAV (Variable-Air-Volume) Wiring Package for Commercial Fans. Manual Speed Control Variable Frequency Drive Included
- Supply Variable Frequency Drive - 1-1/2 HP Max., 200/240 V, Single or Three Phase Input, 6.0 A Max., NEMA 1 Enclosure, (Default is Shipped Loose for Field Installation) PART NEEDS PROGRAMMING
- VFD factory mounted and wired on unit control panel.

**TK1-250-15D DIRECT FIRED HEATER**

1. DIRECT GAS FIRED HEATED MAKE UP AIR UNIT WITH 15' DIRECT DRIVE FAN
2. INTAKE HOOD WITH EZ FILTERS
3. DOWN DISCHARGE - AIR FLOW RIGHT -> LEFT
4. MOTORIZED BACK DRAFT DAMPER 16" X 18" FOR SIZE 1 STANDARD & MODULAR HEATER UNITS W/EXTENDED SHAFT, STANDARD GALVANIZED CONSTRUCTION, 3/4" REAR FLANGE, LOW LEAKAGE, TFB120S ACTUATOR INCLUDED
5. LOW FIRE START, ALLOWS THE BURNER CIRCUIT TO ENERGIZE WHEN THE MODULATION CONTROL IS IN A LOW FIRE POSITION.
6. GAS PRESSURE GAUGE, 0-35", 2.5" DIAMETER, 1/4" THREAD SIZE
7. GAS PRESSURE GAUGE, -5 TO +15 INCHES WC., 2.5" DIAMETER, 1/4" THREAD SIZE
8. VAV (VARIABLE-AIR-VOLUME) WIRING PACKAGE FOR COMMERCIAL FANS.
- MANUAL SPEED CONTROL VARIABLE FREQUENCY DRIVE INCLUDED
9. VFD FACTORY MOUNTED AND WIRED ON UNIT CONTROL PANEL.

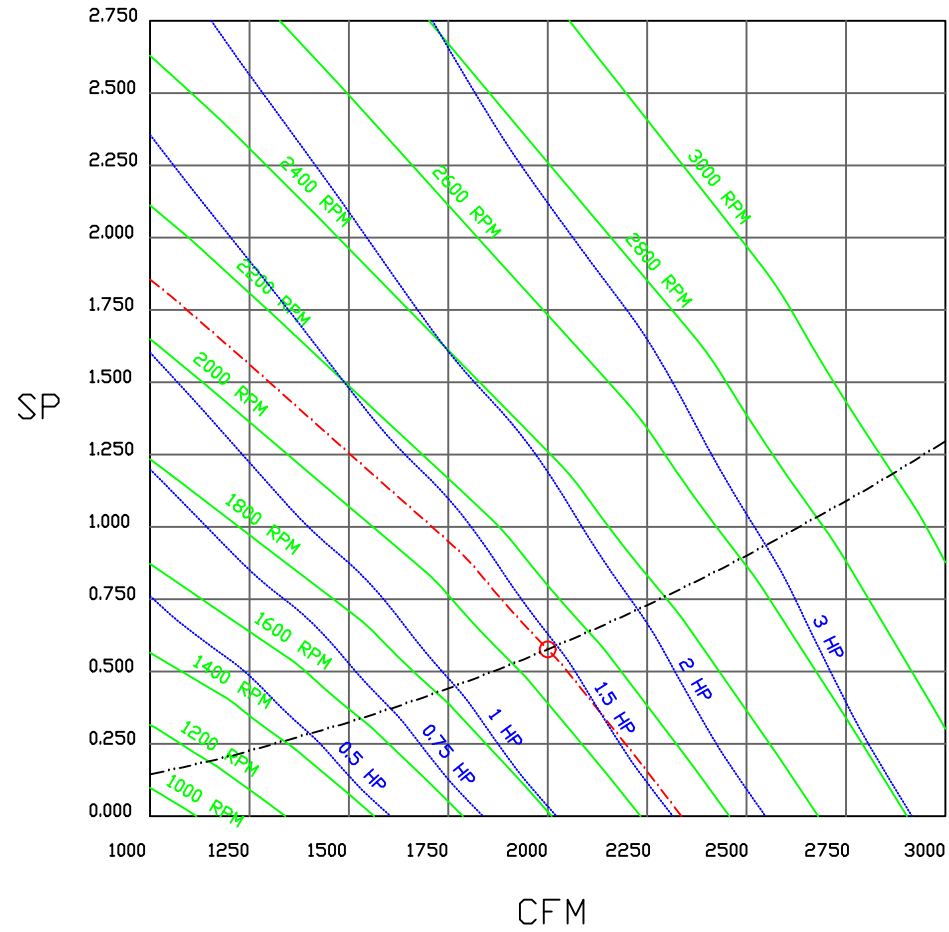
NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE UNLESS OTHERWISE SPECIFIED. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT.



JOB	
LOCATION	
DATE 2/22/2019	JOB #
DWG #	DRAWN BY
REV.	SCALE 3/8" = 1'-0"

(2000 1.5HP/1PH-230V) - HEATER PERFORMANCE CURVES.

2000 CFM, 0.576 SP @ 2092 RPM and 1.404 BHP at 0 feet and 100 deg F  
 \* Please note that these curves were adjusted for Job specific temperature and altitude.



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# Direct Fired Heater Wiring

JOB NAKS Direct Fired Direct Drive MUA

DRAWING NUMBER

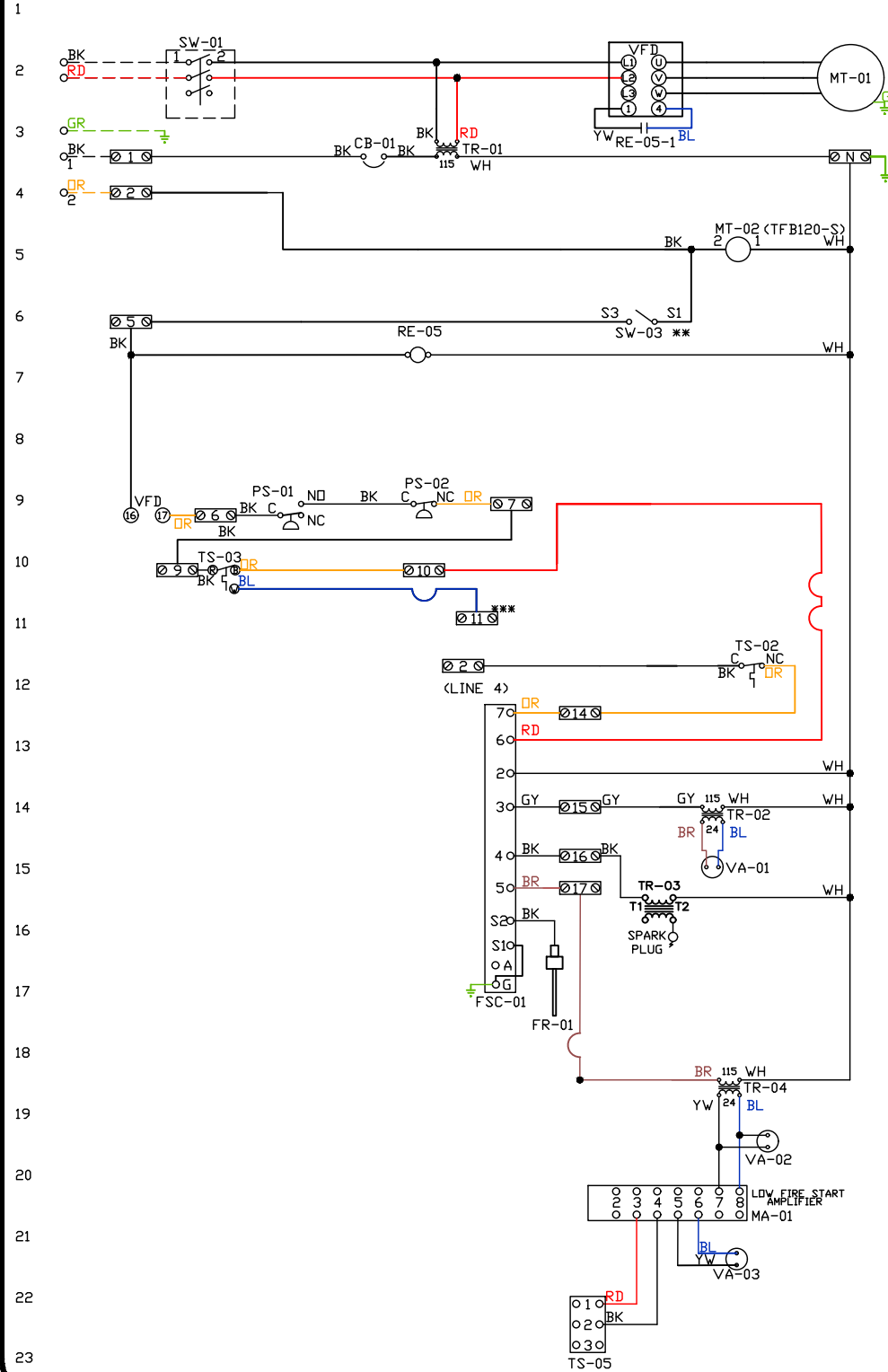
SHIP DATE

MODEL TK 1-5 Series Direct Drive

ATTENTION ELECTRICIAN!  
 DROP FDR DISCONNECT CONNECTION  
 IS FACTORY SUPPLIED  
 CONNECT POWER TO THE DROP

Installed Options  
 Field Wired Single Switch Control  
 Motorized Back Draft Damper

Discharge Temp. Control



Label	Component Identification Description	Location
CB-01	Circuit breaker (2amp)	[3]
FR-01	Flame rod	[16]
FSC-01	Fireeye FSC	[11-14]
MA-01	Modulating amplifier	[19]
MT-01	Supply motor	[2]
MT-02	Damper motor	[5]
PS-01	Low AirFlow Switch	[9]
PS-02	High AirFlow Switch	[9]
RE-05	VFD Start Relay	[3][6]
SW-01	Main disconnect switch	[2]
SW-03	Damper end limit switch	[4]
TR-01	Power transformer(200va)	[12]
TR-02	Power transformer(20va)	[12]
TR-03	Ignition transformer	[14]
TR-04	Power transformer(20va)	[17]
TS-02	High temp limit switch	[10]
TS-03	Intake Air Sensor	[10]
TS-05	Discharge Air Sensor	[21]
VA-01	Pilot gas valve	[13]
VA-02	Main gas valve	[18]
VA-03	Modulating gas valve	[20]

**MOTOR INFO**  
 SUPPLY 1.5HP-230V-3P-4.0FLA  
 VFD PART: ESV112N02YXB

**ELECTRICAL INFORMATION**  
 MOTOR/CTRL CIRCUIT MCB: 16.1A  
 MOTOR/CTRL CIRCUIT MDP: 25A

**NOTES**  
 - - - - DENOTES FIELD WIRING  
 \_\_\_\_\_ DENOTES INTERNAL WIRING

\*\* TERMINALS S4 AND S6 USED ON NF & AF SERIES ACTUATORS  
 \*\*\* TERMINAL 11 PROVIDES COOLING CONNECTION

WIRE COLOR	SOCKET STYLE "COLDW" RELAY
BK-BLACK	NO 4   3   1
BL-BLUE	NC 2   1   1
GR - GREEN	COM 8   7   7
BR - BROWN	COM 6   5   5
GY - GRAY	
RD - RED	
WH - WHITE	
PK - PINK	
DR - DRANGE	
PR - PURPLE	

VFD Wiring

JOB NAKS Direct Fired Direct Drive MUA

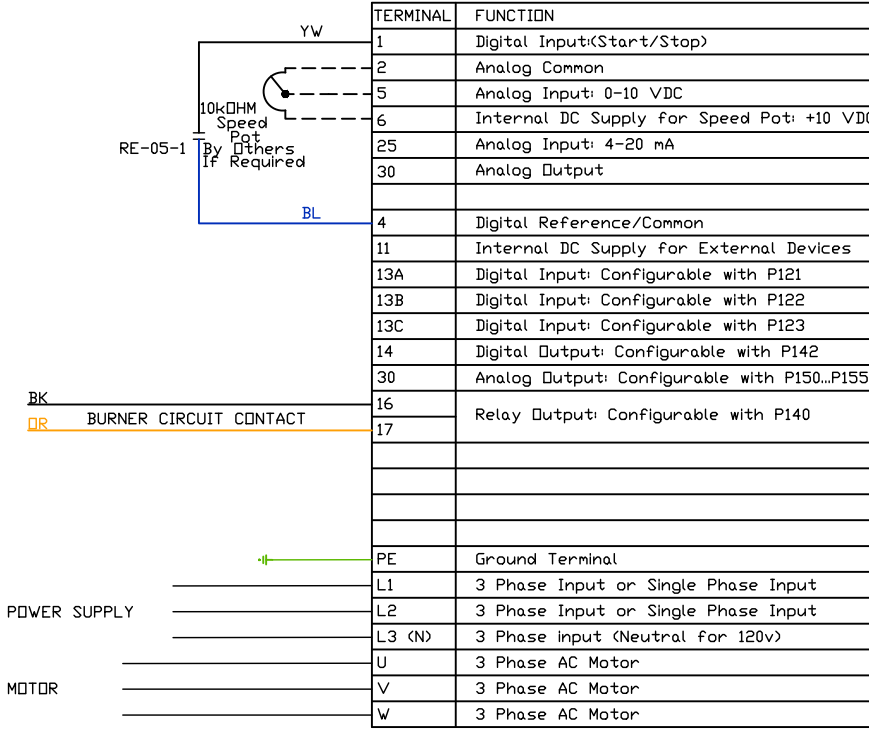
DRAWING NUMBER

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MODEL TK 1-5 Series Direct Drive

SMV SERIES VARIABLE FREQUENCY DRIVE

Installed Options  
Manual Control



Component Identification

RE-05 VFD Start relay [2]

SUPPLY DRIVE PARAMETER SETTINGS\*

All external control wires to motor speed control should be 16-20 AWG shielded multiconductor cables and must not be run in the same conduit or raceway with any high power wiring. Ground Shielded Cable at the drive chassis ONLY.

EPH PROGRAM: VAV\_MAKUSE LG\_HP EPH IF >= 15HP)  
 P100 (Start Source) = 01 (Terminal Strip)  
 P102 = ##Minimum Frequency (Hz)  
 P103 = ##Maximum Frequency (Hz)  
 (P103 is based on max wheel RPM)  
 P110 (Start Method) = 03 (Auto Re-start)  
 P140 (Form A (NO) Relay) = 01 (Run)  
 P144 (Relay Inversion) = 00 (None)  
 P166 (Carrier Frequency) = 00 (4 kHz)  
 P171 (Current Limit) = 150 (% of Max I)

PG. 11 OF THE DRIVE MANUAL DESCRIBES THE PROPER INSTALLATION PROCEDURE

PG. 19 OF THE DRIVE MANUAL DESCRIBES THE PROGRAMMING PROCEDURE OF THE DRIVE

PG. 23 OF THE DRIVE MANUAL DESCRIBES THE PARAMETER SETTINGS OF THE DRIVE

\*NOTE: THE DEFAULT PASSWORD FROM THE FACTORY REQUIRED TO PROGRAM THE DRIVE IS '225'.

Adjust manually on all drives  
 P107 - 00 (If 120 or 208 VAC)  
 or 01 (If 230, 480 or 575 VAC)  
 P108 - Motor FLA x 100 / Drive Output Rating  
 P165 (Base Voltage) = Set to Motor Voltage (Preset@230V) P165 FDR STANDARD DRIVE ONLY  
 P167 (Base Frequency) = Calculated Per Fan  
 FDR KB PCU ONLY: P300 = 0

When Speed POT is Required the Following Parameters Must be Set:  
 P101 (Reference Source) = 01 (0-10 VDC)  
 P160 (Speed @ 0 VDC Signal) = Min Frequency  
 P161 (Speed @ 10 VDC Signal) = Max Frequency

MOTOR INFO  
 SUPPLY 1.5HP-230V-3P-4.0FLA  
 VFD PART: ESV112N02YXB

IT MAY BE REQUIRED TO FULLY POWER DOWN THE DRIVE AND TURN BACK ON IN ORDER TO INITIATE NEW PARAMETER SETTINGS.

##Min. and Max. Frequency Settings override all other Preset speeds/Parameters.

ELECTRICAL INFORMATION  
 MOTOR/CTRL CIRCUIT MCA: 16.1A  
 MOTOR/CTRL CIRCUIT MDP: 25A

NOTES

----- DENOTES FIELD WIRING  
 \_\_\_\_\_ DENOTES INTERNAL WIRING

WIRE COLOR

BK - BLACK YW - YELLOW  
 BL - BLUE GR - GREEN  
 BR - BRDN GY - GRAY  
 DR - ORANGE PR - PURPLE  
 RD - RED PK - PINK  
 WH - WHITE

GENERAL NOTES

# Installation Wiring

JOB NAKS Direct Fired MUA

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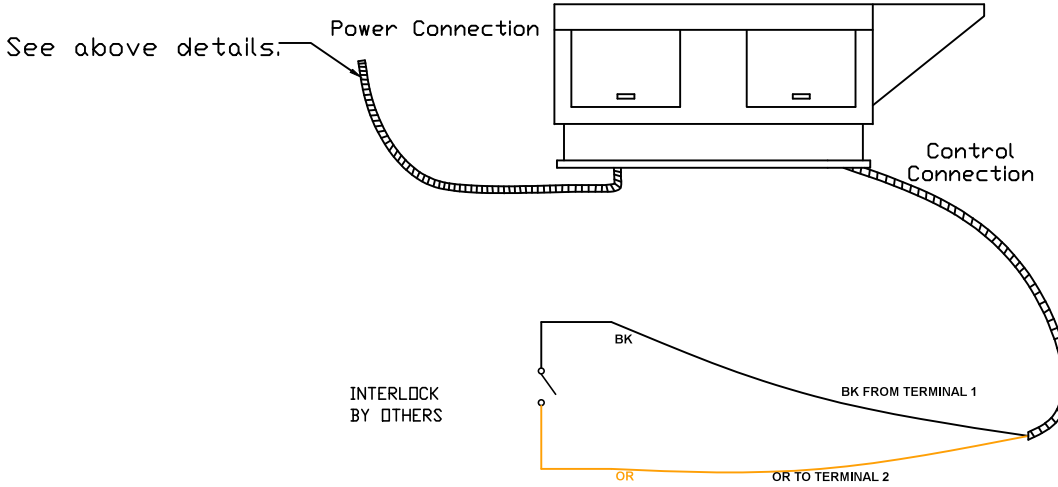
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MODEL TK 1-5 Series

Installed Options



Field Wired On/Off Switch



NOTES

- WIRE COLOR
- BK - BLACK
  - BL - BLUE
  - BR - BROWN
  - OR - ORANGE
  - RD - RED
  - WH - WHITE
  - YW - YELLOW
  - GR - GREEN
  - GY - GRAY
  - PR - PURPLE
  - PK - PINK