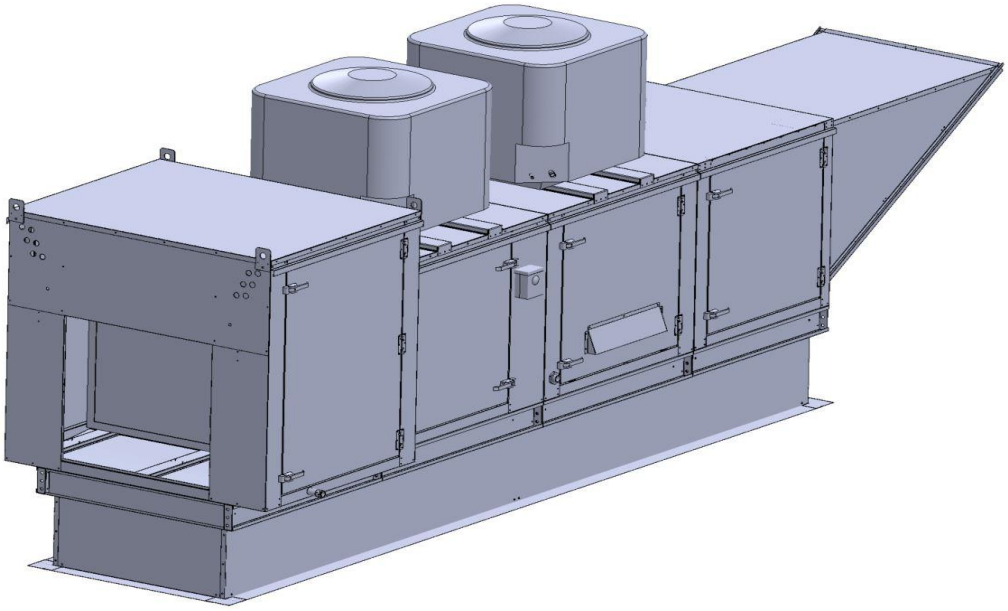
NORTH AMERICAN KITCHEN SOLUTIONS INCORPORATED

Gas-Fired Tempered Make-Up Air Unit / DX

Model:

TK2-DX-1PH-FF

1-Phase, 230V, 3.00 HP, Belt driven with Motorized Damper and 15” Blower. MAX 3800 CFM’s



MADE IN U.S.A.

C ETL LISTED US Intertek

NAKS Inc
172 Reaser Ct
Elyria, OH 44035

Tel: (440) 365-4567
Fax: (440) 365-2100
www.naksinc.com

TK2-500 Direct Fired MPU (1706 lbs./134 curb)

Supply Motor:
Model DTP0034, 3.000 HP, 3 Phase, 230 V, 60Hz, 13.7 FLA, ODP, Premium (E-Plus3) Eff.

Supply Motor Pulleys:

Part Type	Qty	Browning #	Turns Out
Belt	2	BX50	
Blower Pulley	1	2BK60H	
Bushing	1	H-1	
Motor Pulley	1	2VP42 x 1 1/8	4.0

Burner:
Min Output BTU: 18,000 BTU/Hr
Max Output BTU: 550,000 BTU/Hr
Size: 12" long
Gas Type: Natural

Supply Performance:
Volume: 3800 cfm Volume Range: 2700-3800 cfm
RPM: 1037
TS: 4072 ft/min
SP: 0.991" w.g.
0.500" Ext. + 0.060" Int. + 0.431" Opt.
BHP: 2.513

Heating Schedule:
Altitude: 0'
Winter Entering Air Dry Bulb Temp: 0°F
Temp Rise: 100°F
Output BTU: 410400
Input BTU: 446087
BTUs BASED OFF STANDARD AIR DENSITY

Cooling Schedule:
DX Coil Entering Dry Bulb Temperature: 90°F
DX Coil Entering Wet Bulb Temperature: 72°F
DX Coil Leaving Dry Bulb Temperature: 76°F
DX Coil Leaving Wet Bulb Temperature: 67°F
DX Coil Total Capacity: 69.1 MBH
DX Coil Sensible Capacity: 56.6 MBH
DX Coil Latent Capacity: 12.5 MBH
Temperature drop calculations are based on tested data.

Supply Installation Information:
Gas Inlet Pressure: 7 in. w.c. - 14 in. w.c.
Insurance: No Insurance Requirement (ANSI)
Unit Main Input: 22.5 Amps MCA, 35 Amps MOP, 208 V, 10 AWG Wire Min.
Condenser #1: 27.5 Amps MCA, 40 Amps MOP, 208-230, 8 AWG Wire Min.
Condenser #1: 16.8 Amps MCA, 25 Amps MOP, 208-230, 10 AWG Wire Min.
Supply Unit Voltage: 1 phs 230 V 60Hz via VFD

Construction Features
Housing constructed of heavy duty G90 galvanized steel • Forward curved centrifugal blower wheel • Vibration isolation • Adjustable drive assemblies • Adjustable motor mount • Ball bearing motors • Heavy duty, pre-lubricated bearings rated for 200,000 hours of operation • Static resistant belts • 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" forward curved, centrifugal blower. Pillow Block ball bearings. Galvanized finish. 1" x 27-1/8" Shaft. 2000-7500 CFM. 1800 max. RPM. Used in heated and non-heated supply fans.

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

Intake:
Sloped Filtered Intake for Size #2 Modular Heater. 26.813" Wide X 53.625" Long X 31.313" High. Includes 2" MV EZ Kleen Metal Mesh Filters.

Filters:
3x MV EZ Kleen Metal Mesh Filter. 20"x 25"x 2" Used for heater and supply fan intakes. (3416)

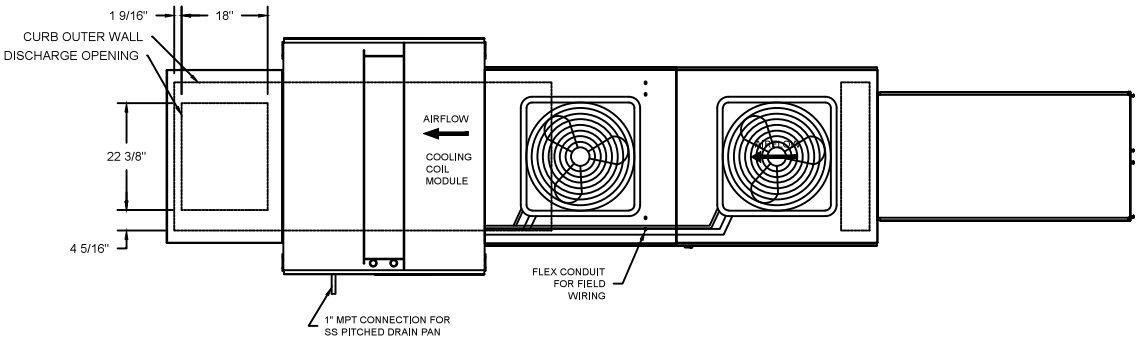
Curb & Supports:
RAIL - 6" Width X 31" Length X 20" Height
ROOF CURB - 31" Wide X 79" Long X 20" High, Insulated. For the # 2 Modular Heater.

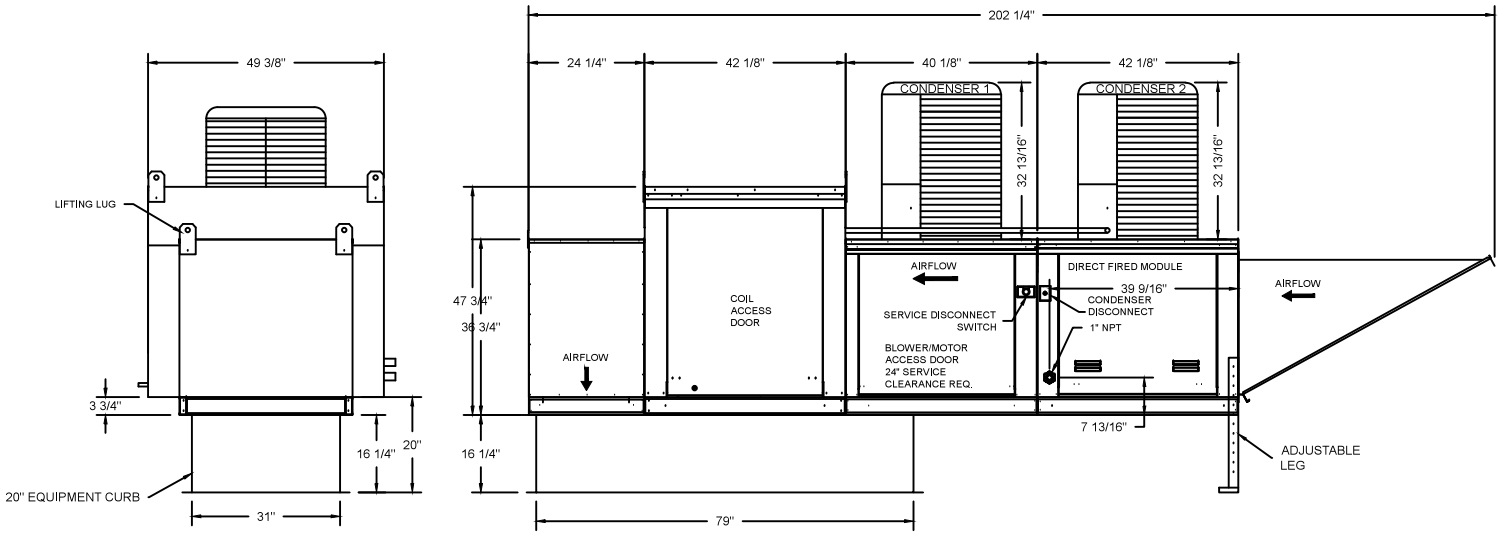
Selected Options:
- Motorized Back Draft Damper 22.75" X 24" for Size 2 Standard & Modular Heater Units w/Extended Shaft, Standard Galvanized Construction, 3/4" Rear Flange, Low Leakage, LF120S Actuator Included
- Low Fire Start. Allows the burner circuit to energize when the modulation control is in 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
- DX Cooling Intake Air Thermostat and Relays Mounted in Unit - Set Point For Thermostat Should Be 85°F.
- 7.5 Ton, Dual Circuit (2.5/5) Modular Packaged Cooling Option for Size 2 Modular Packaged Unit. Includes Condenser, DX Coil, Filter/Dryer Kit, Hard Start Kit, Thermal Expansion Valve, R410A Refrigerant, and Refrigerant Piping. (2,700 to 4,500 cfm) NOT BUILT WITH OPPOSITE SIDE CONTROLS OR OPPOSITE AIRFLOW DIRECTION. CONDENSERS REQUIRE SEPARATE 208V, 1 PHASE POWER SUPPLY UNLESS ORDERED WITH SINGLE POINT CONNECTION. Coil = 3EZ1101C
- Downturn Plenum for Size 2 Cooling Coil Module - Required for Down Discharge Cooling Coil Applications

- VAV (Variable-Air-Volume) Wiring Package for Commercial Fans. Manual Speed Control Variable Frequency Drive Included
- Supply Variable Frequency Drive - 3 HP Max., 200/240 V, Single or Three Phase Input, 9.6 A Max., NEMA 1 Enclosure, (Default is Shipped Loose for Field Installation) PART NEEDS PROGRAMMING
- Profile Plate Configuration for size 2 Direct Fired Unit for low cfm applications.
- VFD factory mounted and wired on unit control panel.

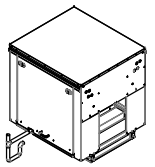
TK2 DIRECT FIRED HEATER WITH DX COOLING
1. DIRECT GAS FIRED HEATED MAKE UP AIR UNIT WITH 15" BLOWER
2. INTAKE HOOD WITH EZ FILTERS
3. DOWN DISCHARGE - AIR FLOW RIGHT -> LEFT
4. MOTORIZED BACK DRAFT DAMPER 22.75" X 24" FOR SIZE 2 STANDARD & MODULAR HEATER UNITS W/EXTENDED SHAFT, STANDARD GALVANIZED CONSTRUCTION, 3/4" REAR FLANGE, LOW LEAKAGE, LF120S 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. FULL CRATING FOR COMMERCIAL HEATERS FOR SHIPPING.
9. DX COOLING INTAKE AIR THERMOSTAT AND RELAYS MOUNTED IN UNIT - SET POINT FOR THERMOSTAT SHOULD BE 85°F.
10. 7.5 TON, DUAL CIRCUIT (2.5/5) MODULAR PACKAGED COOLING OPTION FOR SIZE 2 MODULAR PACKAGED UNIT. INCLUDES CONDENSER, DX COIL, FILTER/DRYER KIT, HARD START KIT, THERMAL EXPANSION VALVE, R410A REFRIGERANT, AND REFRIGERANT PIPING.
11. DOWNTURN PLENUM FOR SIZE 2 COOLING COIL MODULE - REQUIRED FOR DOWN DISCHARGE COOLING COIL APPLICATIONS
12. PROFILE PLATE CONFIGURATION FOR SIZE 2 DIRECT FIRED UNIT FOR LOW CFM APPLICATIONS.

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.

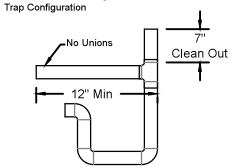




Typical Drain Trap Install



Recommended Cooling Coil Drain Trap Configuration



Notes:
1) 1" diameter PVC Pipe only
2) Use only low profile couplings
3) Add clean out as shown

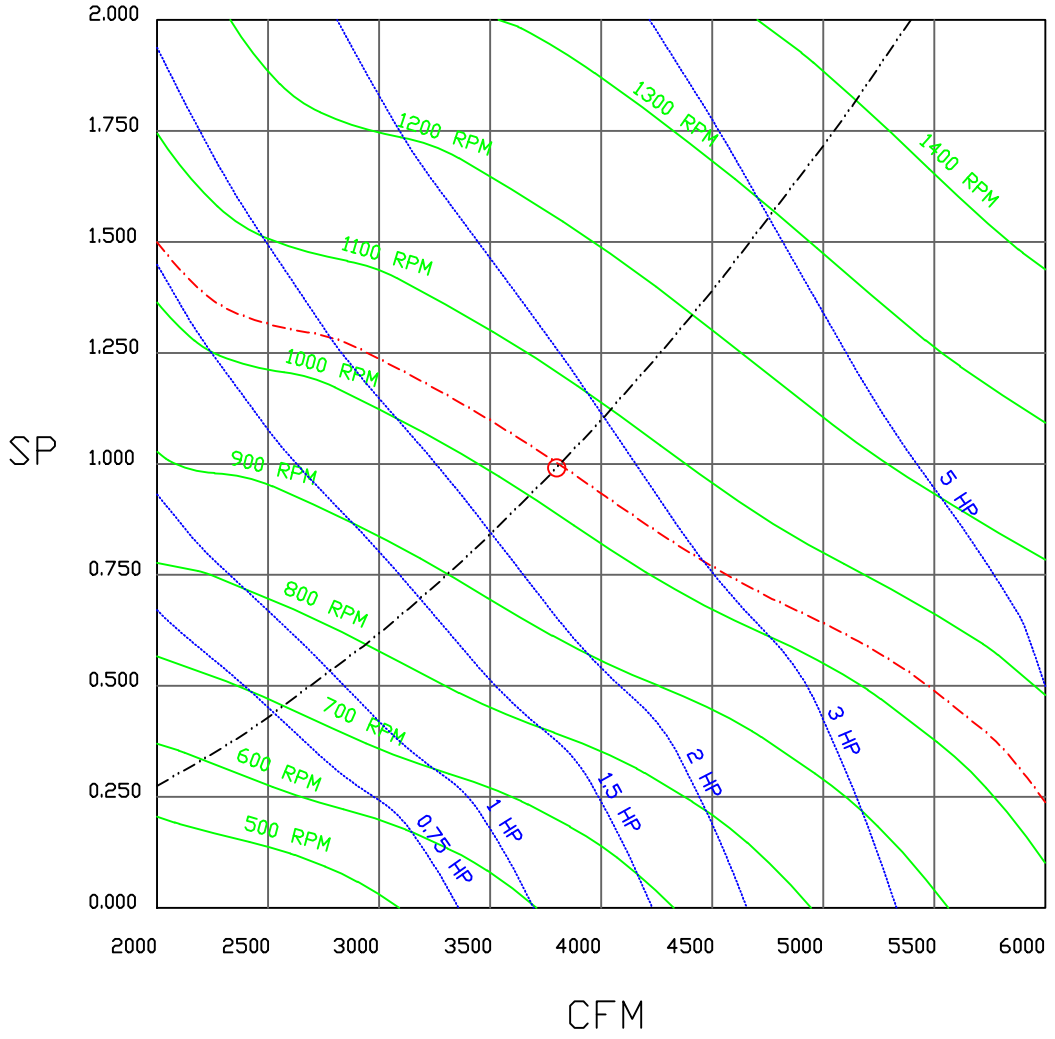
JOB	
LOCATION	
DATE 8/1/18	JOB #
DWG #	DRAWN BY
REV.	SCALE

naks NORTH AMERICAN KITCHEN SOLUTIONS INCORPORATED

(MPU 3800 3HP/1PH-230V) - HEATER PERFORMANCE CURVES.

3800 CFM, 0.991 SP @ 1037 RPM and 2.513 BHP at 0 feet and 100 deg F

* Please note that these curves were adjusted for job specific temperature and altitude.



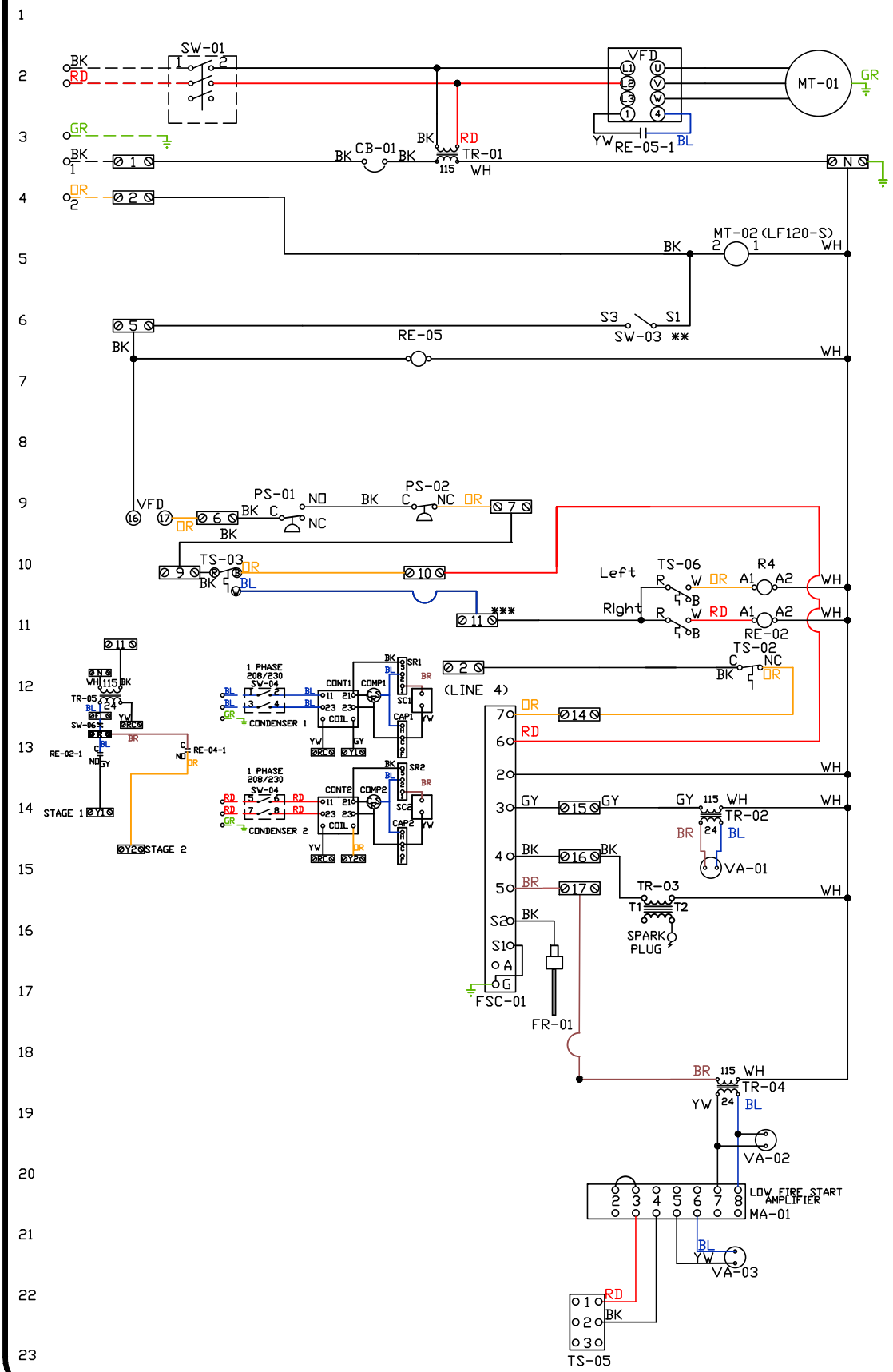
naks NORTH AMERICAN KITCHEN SOLUTIONS INCORPORATED

JOB	
LOCATION	
DATE 8/27/2018	JOB #
DWG #	DRAWN BY
REV.	SCALE 3/8" = 1'-0"

Modular Package Unit Wiring

JOB: NAKS DIRECT FIRED MPU		
DRAWING NUMBER	SHIP DATE	MODEL: **TK 1-4 Series**

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



Installed Options

Field Wired Single Switch Control
Motorized Back Draft Damper

Discharge Temp. Control

Cooling Thermostat and Relay

Component Identification

Label	Description	Location
CB-01	Circuit breaker (2amp)	[3]
FR-01	Flame rod	[16]
FSC-01	Fireye 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-02	Stage 1 Heat/Cool Relay	[11][13]
RE-04	Stage 2 Cooling Relay	[11][13]
RE-05	VFD Start Relay	[3][6]
SW-01	Main disconnect switch	[2]
SW-03	Damper end limit switch	[4]
SW-04	40 Amp Rotary Disconnect	[12-14]
SW-06	Overflow Switch	[12-13]
TR-01	Power transformer(200va)	[3]
TR-02	Power transformer(20va)	[12]
TR-03	Ignition transformer	[14]
TR-04	Power transformer(20va)	[17]
TR-05	Cond Transformer(40va)	[12]
TS-02	High temp limit switch	[10]
TS-03	Intake Air Sensor	[10]
TS-05	Discharge Air Sensor	[21]
TS-06	Cooling Thermostat	[16]
VA-01	Pilot gas valve	[13]
VA-02	Main gas valve	[18]
VA-03	Modulating gas valve	[20]

MOTOR INFO

SUPPLY 3HP-230V-3P-13.7FLA
VFD PART: ESV222N02YXB

ELECTRICAL INFORMATION

MOTOR/CTRL CIRCUIT MCA: 22.5A
MOTOR/CTRL CIRCUIT MOP: 35A
COND1 MCA = 16.8A COND1 MOP = 25A
COND2 MCA = 27.5A COND2 MOP = 40A

NOTES

- - - - - DENOTES FIELD WIRING
——— DENOTES INTERNAL WIRING

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

WIRE COLOR

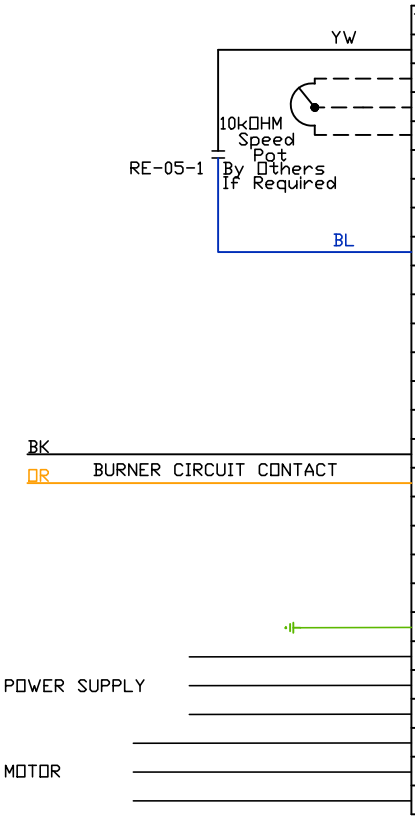
BK-BLACK	YW - YELLOW	RD - RED
BL-BLUE	GR - GREEN	WH - WHITE
BR - BROWN	GY - GRAY	PK - PINK
OR - ORANGE	PR - PURPLE	

SOCKET STYLE "CLION" RELAY

NO	4	3
NC	2	1
COIL	8	7
COM	6	5

VFD Wiring	JOB NAKS DIRECT FIRED MPU	
DRAWING NUMBER	SHIP DATE	MODEL **TK 1-4 Series**

SMV SERIES VARIABLE FREQUENCY DRIVE



TERMINAL	FUNCTION
1	Digital Input:(Start/Stop)
2	Analog Common
5	Analog Input: 0-10 VDC
6	Internal DC Supply for Speed Pot: +10 VDC
25	Analog Input: 4-20 mA
30	Analog Output
4	Digital Reference/Common
11	Internal DC Supply for External Devices
13A	Digital Input: Configurable with P121
13B	Digital Input: Configurable with P122
13C	Digital Input: Configurable with P123
14	Digital Output: Configurable with P142
30	Analog Output: Configurable with P150...P155
16	Relay Output: Configurable with P140
17	
PE	Ground Terminal
L1	3 Phase Input or Single Phase Input
L2	3 Phase Input or Single Phase Input
L3 (N)	3 Phase input (Neutral for 120v)
U	3 Phase AC Motor
V	3 Phase AC Motor
W	3 Phase AC Motor

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 chasis ONLY.

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".

SUPPLY DRIVE PARAMETER SETTINGS*

EPM PROGRAM: VAV_MANUSE LG_HP EPM 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)

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 FOR STANDARD DRIVE ONLY
P167 (Base Frequency) = Calculated Per Fan

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

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

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

GENERAL NOTES

Installed Options

Manual Control

Component Identification

RE-05 VFD Start relay [2]

MOTOR INFO

SUPPLY 3HP-230V-3P-13.7FLA
VFD PART: ESV222N02YXB

ELECTRICAL INFORMATION

MOTOR/CTRL CIRCUIT MCA: 22.5A
MOTOR/CTRL CIRCUIT MOP: 35A
COND1 MCA = 16.8A COND1 MOP = 25A
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NOTES

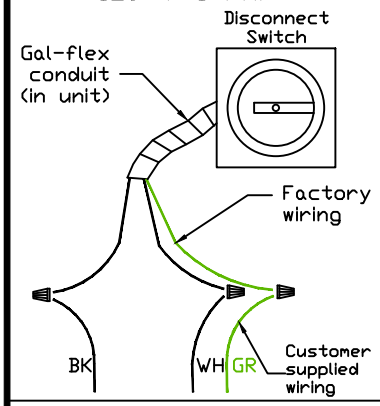
- - - - DENOTES FIELD WIRING
——— DENOTES INTERNAL WIRING

WIRE COLOR

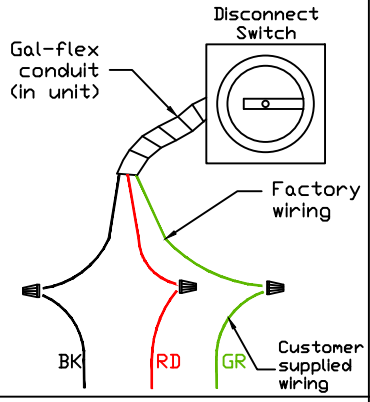
BK - BLACK	YW - YELLOW
BL - BLUE	GR - GREEN
BR - BROWN	GY - GRAY
OR - ORANGE	PR - PURPLE
RD - RED	PK - PINK
WH - WHITE	

Installation Wiring	JOB NAKS Direct Fired MPU	
DRAWING NUMBER	SHIP DATE	MODEL **TK 1-4 Series**

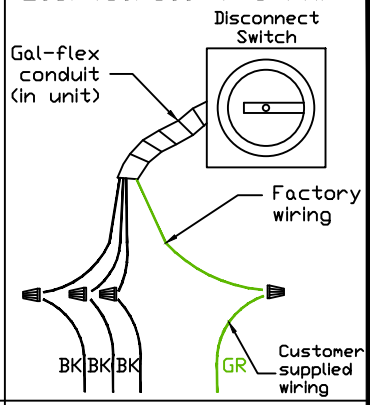
120 V 1 PH.



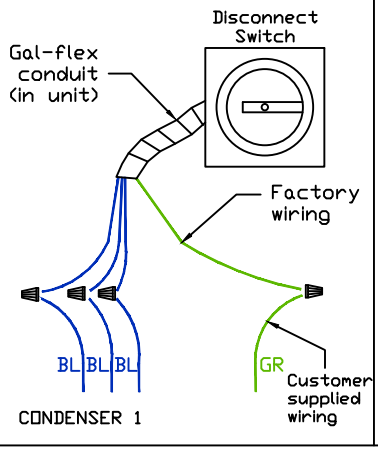
240 V 1 PH.



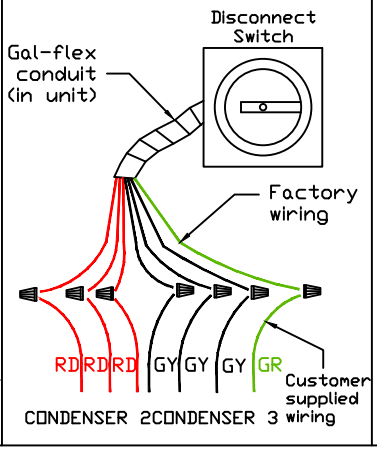
208/460/600 V 3 PH.



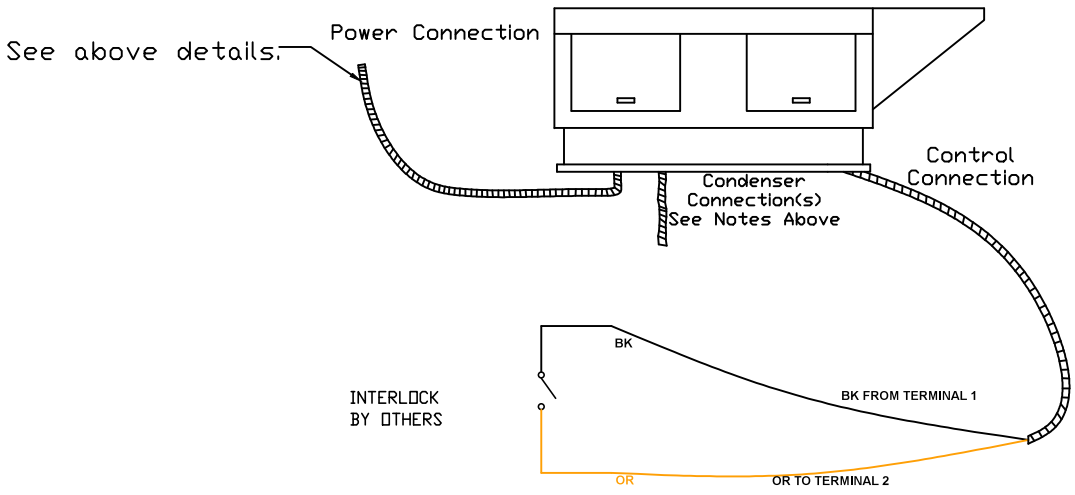
208/230V 3PH



208/230V 3PH



DO NOT CONNECT CONDENSER POWER DROPS TO KITCHEN CONTROL PACKAGE STARTERS OR VFDS



Installed Options

Field Wired On/Off Switch

NOTES

WIRE COLOR

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