# Mixed Occupancy Pro 1-Line 2023

# Instructions for Excel 2007



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# MIXED OCCUPANCY PRO 1-LINE 2023

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The **Mixed Occupancy Pro 1-Line 2023** software is a spreadsheet template software program for calculating main service switchboard, sub panels, feeder sizes and Mixed Occupancy Pro 1-Line drawings. This program may be used for multifamily dwelling loads.

The **Mixed Occupancy Pro 1-Line 2023** software is for reference purposes only, and Durand & Associates cannot assume any responsibility for the accuracy of the program contents. In using this program the user agrees to hold harmless and wave all claims against Durand & Associates.

# SOFTWARE REQUIREMENTS

Mixed Occupancy Pro1-Line 2023 was created with Microsoft Excel 2007. To use these templates you must have Microsoft Excel, Version 2007 or later, installed on your computer.

# INTRODUCTION

The **Mixed Occupancy Pro 1-Line 2023** software is a spreadsheet template program. The program was designed for use in conjunction with Microsoft Excel on the Windows platform. The program should also work on other platforms that can read and write Microsoft Excel XLSX file formats.

# LOADING THE PROGRAM

Insert the CD in your drive and follow the setup instructions.

The installation of Mixed Occupancy Pro 1-Line will create the following folder on your C drive.

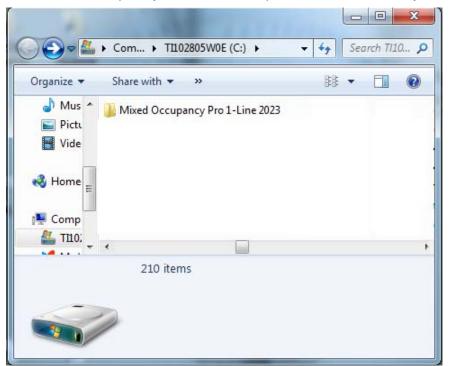
C:\Mixed Occupancy Pro 1-Line 2023

## EXPLORING THE PROGRAM

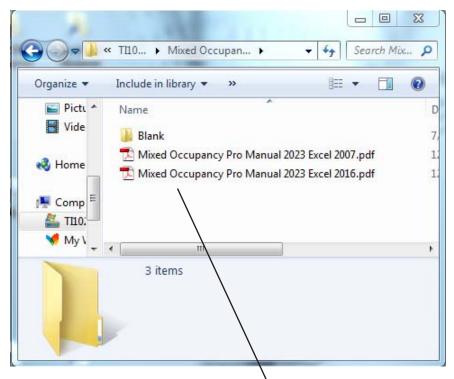
Mixed Occupancy Pro 1-Line software is a complex spreadsheet template program. The program uses 112 files which link to one another. DO NOT CHANGE THE FILE NAMES. If a file name is changed the template can become corrupt.

# LOCATING THE PROGRAM FILES

The Mixed Occupancy Pro 1-Line templates are located on your C: drive.



If you double click on the Mixed Occupancy Pro 1-Line folder, you will find 2-files & 1-folder.



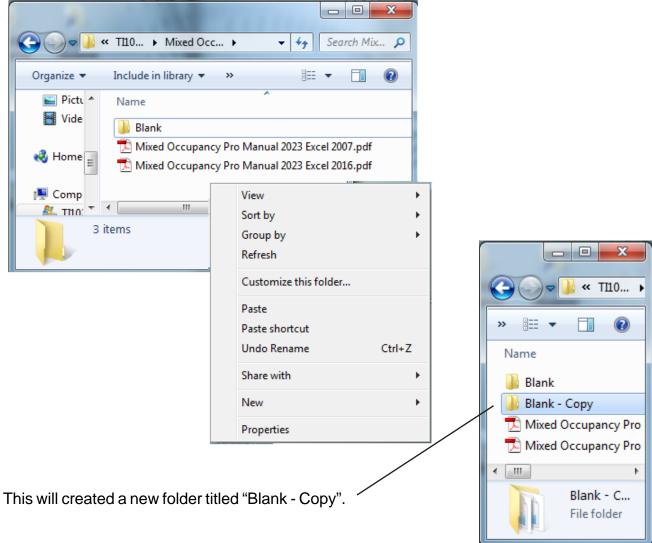
NOTE: Please double click on the "Mixed Occupancy Pro Manual" file and print the instructions.

# STARTING A NEW PROJECT

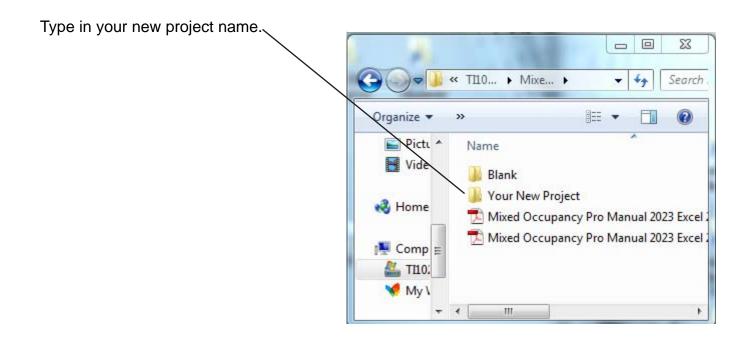
If you want to start a new project, RIGHT CLICK on the blank folder and select COPY.

	Open	
	Open in new window	
	Share with	•
Q	WinZip	•
	Restore previous versions	
15	Combine supported files in Acrobat	
	Include in library	•
	Scan	
1	Shred	
	Send to	•
	Cut	
	Сору	
	Create shortcut	
	Delete	
	Rename	
	Properties	

Then RIGHT CLICK on the white area of the window and select PASTE.



RENAME THE FOLDER		Open	
		Open in new window	
You can RIGHT CLICK on the new folder and select the RENAME command.		Share with WinZip Restore previous versions Combine supported files in Acrobat	
		Include in library	+
		Scan	
		Shred	
		Send to	•
		Cut	
		Сору	
$\sim$		Create shortcut	
		Delete	
		Rename	
		Properties	



Use this method to create a new project each time you start a new Mixed Occupancy Pro 1-Line. Now that you have created a new folder close all windows.

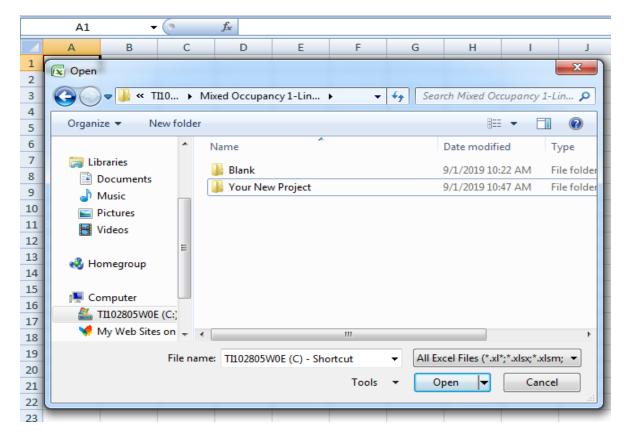
# USING THE PROGRAM

Go to your START MENU, select and select EXCEL.



This will start your Excel spreadsheet program.

Select the FILE OPEN command and locate the Mixed Occupancy Pro 1-Line 2023 folder on your C: drive. Double click the Mixed Occupancy 1-Line Pro 2023 folder to display the contents.



Now displayed are two (2) folders.

- 1. Blank
- 2. Your New Project (This is the folder you just created.)

Double click on "Your New Project".

# EXPLORING THE SAMPLE PROJECT

Compute	er ▶ TI102805W0E		cupancy Pro 1-cin				✓ <sup>4</sup> → Search I	Starrik	
Organize ▼ New folder 🕅 🔞									
📳 Recent Places 🔺	CP1.XLSX	🗐 DP8.XLSX	🗐 DP25.XLSX	🔊 DP42.XLSX	🗐 DP59.XLSX	🗐 DP76.XLSX	🗐 DP93.XLSX	DP110.XLSX	
〕 Downloads	🗐 CP2.XLSX	DP9.XLSX	DP26.XLSX	DP43.XLSX	DP60.XLSX	DP77.XLSX	🗐 DP94.XLSX	DP111.XLSX	
📑 Google DriveFS	🗐 CP3.XLSX	DP10.XLSX	DP27.XLSX	🔄 DP44.XLSX	DP61.XLSX	🔄 DP78.XLSX	🚳 DP95.XLSX	🔄 DP112.XLSX	
_	🗐 CP4.XLSX	DP11.XLSX	DP28.XLSX	DP45.XLSX	DP62.XLSX	🔄 DP79.XLSX	🗐 DP96.XLSX	🔄 DP113.XLSX	
词 Libraries	CP5.XLSX	DP12.XLSX	DP29.XLSX	DP46.XLSX	DP63.XLSX	DP80.XLSX	DP97.XLSX	DP114.XLSX	
Documents	CP6.XLSX	DP13.XLSX	DP30.XLSX	DP47.XLSX	DP64.XLSX	DP81.XLSX	DP98.XLSX	DP115.XLSX	
J Music	🗐 CP7.XLSX	DP14.XLSX	DP31.XLSX	DP48.XLSX	DP65.XLSX	🔄 DP82.XLSX	🗐 DP99.XLSX	🔄 DP116.XLSX	
Pictures	CP8.XLSX	DP15.XLSX	DP32.XLSX	DP49.XLSX	DP66.XLSX	DP83.XLSX	DP100.XLSX	DP117.XLSX	
Videos	🗐 CP9.XLSX	DP16.XLSX	DP33.XLSX	DP50.XLSX	🔄 DP67.XLSX	🔄 DP84.XLSX	🚳 DP101.XLSX	🔄 DP118.XLSX	
=	🗐 CP10.XLSX	DP17.XLSX	DP34.XLSX	DP51.XLSX	DP68.XLSX	DP85.XLSX	DP102.XLSX	🔄 DP119.XLSX	
🝓 Homegroup 🦷	🛯 DP1.xlsx	DP18.XLSX	DP35.XLSX	DP52.XLSX	🔄 DP69.XLSX	🔄 DP86.XLSX	DP103.XLSX	🗐 DP120.XLSX	
	🗐 DP2.XLSX	DP19.XLSX	DP36.XLSX	DP53.XLSX	M DP70.XLSX	🔄 DP87.XLSX	🚳 DP104.XLSX	👜 House Panel.xlsx	
🖳 Computer	🗐 DP3.XLSX	DP20.XLSX	DP37.XLSX	DP54.XLSX	DP71.XLSX	🔄 DP88.XLSX	DP105.XLSX	🗐 Main Panel.xlsx	
🏭 TI102805W0E (C:)	🗐 DP4.XLSX	DP21.XLSX	DP38.XLSX	DP55.XLSX	🔄 DP72.XLSX	🔄 DP89.XLSX	🗐 DP106.XLSX		
💘 My Web Sites on	🗐 DP5.XLSX	DP22.XLSX	🗐 DP39.XLSX	🗐 DP56.XLSX	🔄 DP73.XLSX	🔄 DP90.XLSX	DP107.XLSX		
	DP6.XLSX	🔄 DP23.XLSX	DP40.XLSX	DP57.XLSX	🔄 DP74.XLSX	🔄 DP91.XLSX	🚳 DP108.XLSX		
🗣 Network	🗃 DP7.XLSX	🗃 DP24.XLSX	🗃 DP41.XLSX	🗃 DP58.XLSX	🗃 DP75.XLSX	🗃 DP92.XLSX	🗐 DP109.XLSX		
File <u>n</u> a	ame:						✓ All Excel	Files (*.xl*;*.xlsx;*.xlsm;	

The files in this folder are MAIN PANEL, HOUSE PANEL, CP1-CP10 and DP1-DP120

# DO NOT RENAME THESE FILES (This will corrupt the files).

# WORKING WITH THE MAIN PANEL

Double click on the MAIN PANEL file to display the Main Panel Template

This may take a few seconds to open as Excel updates the links to the other files.

PROJECT NAME ADDRESS	SAMPLE PROJECT 123 MAIN ST	
CITY/STATE/ZIP	SOMEWHERE, CA 95620	
hase & Voltage		
CODE YEAR	2008	
PHASE	3Y	
HIGH VOLTAGE	208	
LOW VOLTAGE	120	
lain Breaker & House Panel		
	VES	
MAIN BREAKER MINIMUM SER∀ICE SIZE	YES 100	

# GENERAL INFORMATION

- Project Name (Enter the project name)
- Address (Enter the address)
- City/State/Zip (Enter the city, state, and zip code)
- Code Year (Select the Code Year from the pulldown menu)
- Phase (Select the phase from the pulldown menu)
  - 1 = 1-Phase
  - 3Y = 3-Phase Wye)
- High Voltage (Enter high voltage)
- Low Voltage (Enter low voltage)
- Main Breaker (Select YES or NO)

You must have a main breaker when your have seven (7) or more meters.

- Minimum Service Size (Enter the minimum amps)

The minimum amps is the smallest size allowed for the service. If the load exceeds the minimum amps, the program will automatically size the service to the correct size.

- House Panel (Select YES or NO)

# **GENERAL INFORMATION (continued)**

Voltage Drop, Fault Current & Ufer Ground		
VOLTAGE DROP CALCS FAULT CURRENT CALCS	YES YES	
SHOW UFER GROUND	YES	

- Voltage Drop Calcs (Select YES or NO)
- Fault Current Calcs (Select YES or NO)
- Show Ufer Ground (Select YES or NO)

Service Entrance Feeder				
SERVICE FEEDER SIZING	AUTO			
FEEDER TYPE	CONDUIT			
LENGTH	50'			
FAULT CURRENT AT SERVICE POINT	65000			
WIRE CU/AL	AL			
WIRE TEMP	75° C			
% FACTOR	0%			
GROUND WIRE	NO			
WIRE TYPE	THHN			
CONDUIT TYPE	PVC-40			
OVERHEAD UNDERGROUND	OVERHEAD			

# SERVICE FEED IN AUTO MODE

When auto mode is selected, the program will automatically calculate the feeder size. If the design load exceeds 1,200 amps, you will have to use the manual mode.

- Service Feeder Sizing (Select AUTO or MANUAL)
- Feeder Type (Select CONDUIT, SER, or MC)

	CONDUIT	-
CONDUIT		
SER		
MC		

- Length (Enter the length of the conduit or cable run)

# SERVICE FEED IN AUTO MODE (continued)

FAULT CURRENT AT SERVICE POINT WIRE CU/AL WIRE TEMP % FACTOR GROUND WIRE WIRE TYPE CONDUIT TYPE OVERHEAD UNDERGROUND	65000 AL 75° C 0% NO THHN PVC-40 OVERHEAD	
OVERHEAD UNDERGROUND	OVERHEAD	

# - Fault Current at Service Point (Enter fault current)

If you have an overhead service, enter the fault current at the service point. The service point would be at the top of your service riser at the service cap.

If you have an underground service where the utility pulls cable to the meter, enter the fault current at the meter.

- Wire CU/AL (Select CU or AL)
- Wire Temp (Select 60, 75 or 90)
- % Factor (Enter % Factor)

Enter the % factor. This will increase the design load by the percentage. Example: If the calculated load is 90 amps and you enter 20%, the program will add 18 amps to the calculated load giving you a design load of 108 amps.

- Ground Wire (Select YES or NO)

This option only appears when you are using a conduit feeder.

- Wire Type (Select Wire Type)

This option only appears when you are using a conduit feeder.

- Conduit Type (Select Conduit Type)

This option only appears when you are using a conduit feeder.

- Overhead Underground (Select OVERHEAD or UNDERGROUND)

# SERVICE FEED IN MANUAL MODE (continued)

Service Entrance Feeder		
SERVICE FEEDER SIZING	MANUAL	
OVERHEAD UNDERGROUND	OVERHEAD	
TYPE THE FEEDER DESCRIPTION		
LINE 1 LINE 2 LINE 3 LINE 4 LINE 5	2" EMT 3#2 THHN 1-#6 GND	
UFER GROUND SIZE	#2 CU	
FAULT CURRENT AT SERVICE POINT	28,875	

- Service Feeder Sizing (Select AUTO or MANUAL)
- Line 1 (Feeder Description)
- Line 2 (Feeder Description)
- Line 3 (Feeder Description)
- Line 4 (Feeder Description)
- Line 5 (Feeder Description)
- Ufer Ground (Enter Ufer Ground Size)
- Fault Current at Service Point (Enter fault current)

If you have an overhead service, enter the fault current at the service point. The service point would be at the top of your service riser at the service cap.

If you have an underground service where the utility pulls cable to the meter, enter the fault current at the meter.

# NUMBER OF DWELLINGS (continued)

Number of Dwelling Units						
# OFUNITS	30					

Enter the number of dwellings.

# UPDATE DWELLING PANELS

If the Main Pane Voltage or Phase change, the Dwelling Panels may need updating. When this condition is present the dwelling panel display turns orange.

Dwelling Uni	t Lables		
0.04		.	
DP1	DP		<< UPDATE
DP2	DP		<< UPDATE
DP3	DP		<< UPDATE
DP4	DP		<< UPDATE
DP5	DP		<< UPDATE
DP6	DP		<< UPDATE
DP7	DP		<< UPDATE
DP8	DP		<< UPDATE
DP9	DP		<< UPDATE
DP10	DP		<< UPDATE

NOTE: To update dwelling panels simply open the file. Example: Open the DP3 file and the file is automatically updated.

Dwelling Uni	t Lables			
DP1 DP2	DP DP	<< UPDATE << UPDATE	1	
DP2 DP3	DP	 SS OPDATE		— File is Updated
DP4	DP	<< UPDATE		·
DP5	DP	<< UPDATE		
DP6	DP	<< UPDATE		
DP7	DP	<< UPDATE		
DP8	DP	<< UPDATE		
DP9	DP	<< UPDATE		
DP10	DP	<< UPDATE		

# NUMBER OF COMMERCIAL PANELS

Number of Commercial Units		
# OFUNITS	10	

Enter the number of dwellings.

# UPDATE COMMERCIAL PANELS

If the Main Pane Voltage or Phase change, the Commercial Panels may need updating. When this condition is present the commercial panel display turns orange.

CP1	CP	<< UPDATE
CP2	CP	<< UPDATE
CP3	CP	<< UPDATE
CP4	CP	<< UPDATE
CP5	CP	<< UPDATE
CP6	CP	<< UPDATE
CP7	CP	<< UPDATE
CP8	CP	<< UPDATE
CP9	CP	<< UPDATE
CP10	CP	<< UPDATE

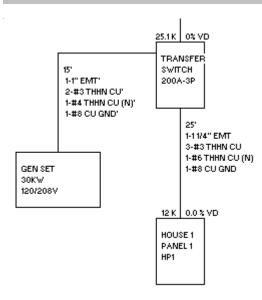
NOTE: To update dwelling panels simply open the file. Example: Open the CP3 file and the file is automatically updated.

velling Unit	Lables		
CP1	CP	<< UPDATE	
CP2	CP	<< UPDATE	
CP3	СР		File is Updated
CP4	СР	<< UPDATE	
CP5	CP	<< UPDATE	
CP6	CP	<< UPDATE	
CP7	CP	<< UPDATE	
CP8	CP	<< UPDATE	
CP9	CP	<< UPDATE	
CP10	CP	<< UPDATE	

# BACKUP POWER SOURCE

You may have a backup power source for the house panels. This can provide emergency for elevators, lighting, and fire pumps. If you select yes a backup power source and transfer switch will appear on the 1-Line drawing.

BACKUP POWER SOURCE	YES	
DESCRIPTION	GEN SET	
DESCRIPTION	30KW	
DESCRIPTION	120/208V	
TRANSFER SWITCH AMPS	200	



# BACKUP FEEDER DESCRIPTION

You may also describe the backup feeder descriptions

LENGTH IN FEET	15	
DESCRIPTION	1-1" EMT	
DESCRIPTION	2-#3 THHN CU	
DESCRIPTION	1-#4 THHN CU (N)	
DESCRIPTION	1-#8 CU GND	
DESCRIPTION		
DESCRIPTION		

# DWELLING PANEL ERRORS

If a Dwelling Panel contains an error, the ERROR will be displayed.

Dwelling Unit Lables				
DP1	DP			
DP2	DP			
DP3	ERROR IN SUB PANEL			
DP4	DP			
DP5	DP			
DP6	DP			

To correct this error open the Dwelling Panel File and correct the error.

# CODE CHECK RANGES

The program automatically checks the Code requirements for ranges. If an error is detected, it will display the error and solution.

#### Code Check Ranges

THIS PROGRAM CALCULATES THE MULTIFAMILY SERVICE SIZE PER NEC 220.84

NEC SECTION 220.84(A)(2) REQUIRES THAT EACH DWELLING HAVE ELECTRIC COOKING EQUIPMENT.

YOUR SERVICE CONFIGURATION HAS 30 DWELLING UNITS, HOWEVER, ONLY 1 OF THE DWELLINGS HAVE A RANGE. CHECK EACH DWELLING AND MAKE SURE AT LEAST ONE (1) RANGE IS ENTERED

IF ANY OF THE DWELLINGS DO NOT HAVE A RANGE YOU WILL NEED TO ENTER 1 RANGE AT 8 KW. THIS WILL MEET THE REQUIREMENTS OF NEC 220.84(A)(2) EXCEPTION

# CODE ELECTRIC HEATING OR COOLING

The program automatically checks the Code requirements for heating & cooling. If an error is detected, it will display the error and solution.

Code Check Electric Heating or Air Conditioning

THIS PROGRAM CALCULATES THE MULTIFAMILY SERVICE SIZE PER NEC 220.84

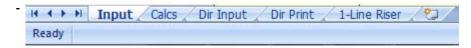
NEC SECTION 220.84(A)(3) REQUIRES THAT EACH DWELLING HAVE ELECTRIC HEATING OR AIR CONDITIONING.

YOUR SERVICE CONFIGURATION HAS 30 DWELLING UNITS, HOWEVER, ONLY 1 OF THE DWELLINGS HAVE A HEATING OR AIR CONDITIONING LOADS. CHECK EACH DWELLING AND MAKE SURE EACH DWELLING HAS A HEATING OR AIR CONDITIONING LOAD.

IF ANY OF THE DWELLINGS DO NOT HAVE A HEATING OR AIR CONDITIONING LOAD YOU WILL NEED TO ENTER A LOAD. THIS WILL MEET THE REQUIREMENTS OF NEC 220.84(A)(3)

# PRINTING

To print your load, voltage drop, or fault current calculations click on the Calcs Tabs.



Then select the File Print Command

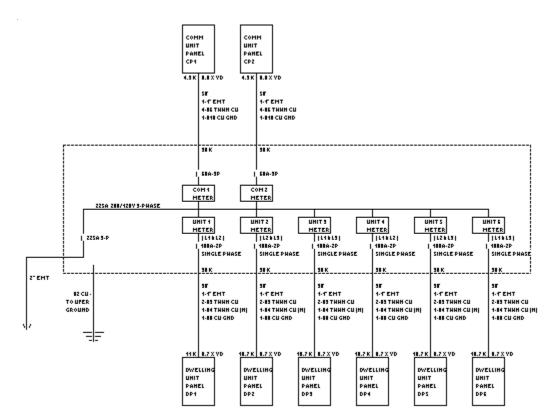
9	Menus	Home	Insert	Page L	ayout	Formulas	Data
File 🔻	Edit -	View *	Insert *	Format *	Tools *	Data 🔹 🕅	Window
	New			459 ĝ	*	🔁 🛍 • <	1
2	<u>O</u> pen				-	Genera	al - §
	Close					T	oolbars
	<u>C</u> lose All						
	<u>S</u> ave						
B	Print <u>A</u> rea			*			
	Print Previe	ew					
٠	Print			_			
2	Pr <u>e</u> pare						
x	Exit Excel						

If the calculations print on more than one page, go to the "File Page Setup Command" and reduce the percentage.

Page Setup
Page Margins Header/Footer Sheet
Orientation       Orientation       Image: A state of the state
<ul> <li>▲djust to: 77 → % normal size</li> <li>Fit to: 1 → page(s) wide by 1 → tall</li> </ul>
Paper size: Letter
Print guality: 600 dpi
Fi <u>r</u> st page number: Auto
Print Preview Options
OK Cancel

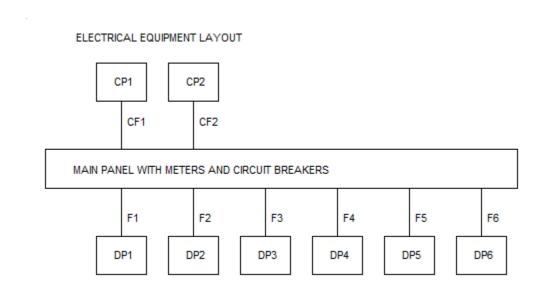
# PRINTING THE 1-LINE

To print your 1-Line Drawing click on the 1-Line Tab.



Then select the File Print Command

You can also print the Layout



# PRINTING OTHER SCHEDULES

#### SAMPLE PROJECT

#### DWELLING PANEL FEEDER SCHEDULE

F1	1-1'' EMT	2-#3 THHN CU	1-#4 THHN CU (N)	1-#8 CU GND
F2	1-1'' EMT	2-#3 THHN CU	1-#4 THHN CU (N)	1-#8 CU GND
F3	1-1'' EMT	2-#3 THHN CU	1-#4 THHN CU (N)	1-#8 CU GND
F4	1-1'' EMT	2-#3 THHN CU	1-#4 THHN CU (N)	1-#8 CU GND
F5	1-1" EMT	2-#3 THHN CU	1-#4 THHN CU (N)	1-#8 CU GND
F6	1-1" EMT	2-#3 THHN CU	1-#4 THHN CU (N)	1-#8 CU GND

#### SAMPLE PROJECT

#### NON-DWELLING FEEDER SCHEDULE

CF1	1-1" EMT	4-#6 THHN CU	1-#10 CU GND	
CF2	1-1" EMT	4-#6 THHN CU	1-#10 CU GND	

FEEDER	VOLTAGE DROP	VOLTAGE DROP PERCENTAGE
MAIN PANEL TO DP1	( 2 X 30' L X 0.2450 R X 95 A ÷ 1,000 X 1 ) = 1.4 VD	( 1.4 VD ÷ 208 V X 100 ) = 0.7 % VD
MAIN PANEL TO DP2	( 2 X 30' L X 0.2450 R X 95 A ÷ 1,000 X 1 ) = 1.4 VD	( 1.4 VD ÷ 208 V X 100 ) = 0.7 % VD
MAIN PANEL T0 DP3	( 2 X 30' L X 0.2450 R X 95 A ÷ 1,000 X 1 ) = 1.4 VD	( 1.4 VD ÷ 208 V X 100 ) = 0.7 % VD
MAIN PANEL TO DP4	( 2 X 30' L X 0.2450 R X 95 A ÷ 1,000 X 1 ) = 1.4 VD	( 1.4 VD ÷ 208 V X 100 ) = 0.7 % VD
MAIN PANEL TO DP5	( 2 X 30' L X 0.2450 R X 95 A ÷ 1,000 X 1 ) = 1.4 VD	( 1.4 VD ÷ 208 V X 100 ) = 0.7 % VD
MAIN PANEL T0 DP6	( 2 X 30' L X 0.2450 R X 95 A ÷ 1,000 X 1 ) = 1.4 VD	( 1.4 VD ÷ 208 V X 100 ) = 0.7 % VD

FAULT CURRENT CALCULATIONS	PROJECT NAME	SAMPLE PROJECT
AFC AT MAIN PANEL	30,000 AFC	
MAIN PANEL TO DP1	(( 30,000 AFC X 1.1 UA ) + 0.0 MC ) X (	1 ÷ (1 + (2.000 X 30 L X ((30,000 AFC X 1.1 UA) + 0.0 MC)) ÷ (4,774 C X 1 N X 208 V))) = 11,022 CLC
MAIN PANEL TO DP2	(( 30,000 AFC X 1.0 UA ) + 0.0 MC ) X (	1 ÷ (1 + (2.000 X 30 L X ((30,000 AFC X 1.0 UA) + 0.0 MC)) ÷ (4,774 C X 1 N X 208 V ))) = 10,666 CLC
MAIN PANEL TO DP3	(( 30,000 AFC X 1.0 UA ) + 0.0 MC ) X (	1 ÷ (1 + (2.000 X 30 L X ((30,000 AFC X 1.0 UA) + 0.0 MC)) ÷ (4,774 C X 1 N X 208 V ))) = 10,666 CLC
MAIN PANEL TO DP4	(( 30,000 AFC X 1.0 UA ) + 0.0 MC ) X (	1 ÷ (1 + (2.000 X 30 L X ((30,000 AFC X 1.0 UA) + 0.0 MC)) ÷ (4,774 C X 1 N X 208 V ))) = 10,666 CLC
MAIN PANEL TO DP5	(( 30,000 AFC X 1.0 UA ) + 0.0 MC ) X (	1 ÷ (1 + (2.000 X 30 L X ((30,000 AFC X 1.0 UA) + 0.0 MC)) ÷ (4,774 C X 1 N X 208 V ))) = 10,666 CLC
MAIN PANEL TO DP6	(( 30,000 AFC X 1.0 UA ) + 0.0 MC ) X (	1 ÷ (1+ (2.000 X 30 L X ((30,000 AFC X 1.0 UA) + 0.0 MC)) ÷ (4,774 C X 1 N X 208 V ))) = 10,666 CLC

# **DWELLING UNIT TEMPLATES**

# **GENERAL ENTRIES**

PANEL NAME	DP
SELECT PHASE	1
ENTER TOTAL SQUARE FOOTAGE	700
APPLIANCE CIRCUITS ( 2 OR GREATER )	2
LAUNDRY CIRCUITS ( ZERO OR GREATER )	1

Enter panel name.

PANEL NAME PHASE TOTAL SQUARE FOOTAGE APPLIANCE CIRCUIT LAUNDRY CIRCUITS

Select 1 or 3Y. Enter the total square footage of the dwelling. Enter the number of appliance circuits. (Minimum 2) Enter the number of laundry circuits.

FEEDER	
FEEDER TYPE	CONDUIT
LENGTH	50'
WIRE CU/AL	AL
VVIRE TEMP	75° C
MINIMUM AMPS	100
% FACTOR	0%
GROUND WIRE Y/N	YES
SELECT WIRE TYPE	THHN
CONDUIT TYPE	EMT

FEEDER TYPE	Select CONDUIT, SER, or MC
LENGTH	Enter total length of wire from service cap to panel.
WIRE CU/AL	Select CU or AL.
WIRE TEMP	Enter wire temperature 60, 75, or 90.
MINIMUM AMPS	Enter the minimum amps.
% FACTOR	Enter the % factor. This will increase the design load by the percentage. Example: If the calculated load is 90 amps and you enter 20%, the program will add 18 amps to the calculated load giving you a design
	load of 108 amps.
	NOTE: Increasing the % factor forces the program to increase the wire size thus reducing the voltage drop.
GROUND WIRE Y/N	NOTE: Increasing the % factor forces the program to
GROUND WIRE Y/N SELECT WIRE TYPE	NOTE: Increasing the % factor forces the program to increase the wire size thus reducing the voltage drop. Enter YES or NO. This option only appears when

# GENERAL ENTRIES (continued)

MAJOR APPLIANCES		
DESCRIPTION	QTY	KVA (EA)
RANGE(S) & OVEN(S)	1	8
CLOTHES DRYER(S)	1	5
WATER HEATER(S)		

RANGE(S) & OVEN(S)

Enter number of ranges, ovens, and KVA rating.

CLOTHES DRYER(S) Enter number of dryers and KVA rating.

WATER HEATER(S) Enter number of water heaters and KVA rating.

#### HEATING/COOLING

1.	ENTER THE TOTAL NAMEPLATE RATING KVA OF AIR CONDITIONING	ENTER KVA
	AND COOLING EQUIPMENT.	4
		· · · · · · · · · · · · · · · · · · ·
2	ENTER 100% OF THE NAMEPLATE RATING(S) OF THE HEAT PUMP WHEN THE HEAT PUMP	ENTER KVA
2.		
	IS USED WITHOUT ANY SUPPLEMENTAL ELECTRIC HEATING.	0
3	ENTER 100% OF THE NAMEPLATE RATING(S) IN KVA OF THE HEAT PUMP	ENTER KVA
Υ.	COMPRESSOR.	
	COMPRESSOR.	
	ENTER 100% OF THE SUPPLEMENTARY ELECTRIC HEAT USED WITH THE HEAT PUMP.	ENTER KVA
	NOTE: PROGRAM WILL AUTOMATICALLY ADJUST THIS AMOUNT TO 65%.	0
4	ENTER 100% OF THE NAMEPLATE RATING(S) OF ELECTRIC SPACE HEATING IF LESS THAN	ENTER KVA
	FOUR SEPARATELY CONTROLLED UNITS.	
	NOTE: PROGRAM WILL AUTOMATICALLY ADJUST THIS AMOUNT TO 65%.	
_		
	ENTER 100% OF THE NAMEPLATE RATING(S) OF ELECTRIC SPACE HEATING IF FOUR OR	ENTER KVA
	MORE SEPARATELY CONTROLLED UNITS.	0
	NOTE: PROGRAM WILL AUTOMATICALLY ADJUST THIS AMOUNT TO 40%.	
6	ENTER 100% OF THE NAMEPLATE RATING(S) OF ELECTRIC THERMAL STORAGE	ENTER KVA
0.		
	AND OTHER HEATING SYSTEMS WHERE THE USUAL LOAD IS EXPECTED TO BE CONTINUOUS	
	AT THE FULL NAMEPLATE VALUE. SYSTEMS QUALIFYING UNDER THIS SELECTION SHALL NOT	
	BE CALCULATED UNDER ANY OTHER SELECTION IN 220.82(C).	

Enter heating & cooling loads listed above.

# GENERAL ENTRIES (continued)

IISC. 120 VOLT LOADS		AMPS
DESCRIPTION	QTY.	EACH
1 DISHWASHER	1	11.5
2 DISPOSAL	1	6.5
3 MICROWAVE OVEN	1	9.8
4		
5		

Enter the description, number of units, and the amps for each item.

MISC. 208 OR 240 VOLT LOADS		AMPS	
DESCRIPTION	QTY.	EACH	PHASE
1 WELL PUMP	1	18	1
2			
3			
4			
5			
6			
7			
8			
9			
10			

Enter the description, number of units, amps, and the phase for each item.

NOTE: Phase column only appears when using a 3-Phase panel.

# USING HOUSE PANEL TEMPLATE

# USING THE TABS

The template has twelve (12) tabs.

A-1P	LIGHTING		нјс	1,60	0  L1	0	3						26	
			6		12	6	2						28	
Inpu	ut / Schedule / Calcs / D	Directory	γζE	rrors /	S-Input	/ S-Sche	dule	K	S-Calos /	S-Directory 🏑	( S-Erro	ors 🗸	CopyPaste	(CAD /

The first five tabs are for the Panel and the second five tabs are for the Sub Panel.

Each tab has a special purpose:

#### Panel Tabs

Input - This sheet is used to enter information. Schedule - This sheet is used to review and print the panel schedule. Calcs - This sheet is used to review and print load calculations. Directory - This sheet is used to review and print the circuit directory. Errors - This sheet is used to review and print the errors.

#### Sub Panel Tabs

S-Input - This sheet is used to enter information.

S-Schedule - This sheet is used to review and print the panel schedule.

S-Calcs - This sheet is used to review and print load calculations.

S-Directory - This sheet is used to review and print the circuit directory.

S-Errors - This sheet is used to review and print the errors.

## Misc. Tabs

Copy/Paste - This sheet explains the Paste Values command for Excel.

CAD - This sheet explains how to use the Copy Picture command and paste into a CAD program.

# USING COMMERCIAL PANEL TEMPLATES

# USING THE TABS

The template has Seven (7) tabs.

Input / Schedule / Calcs / Directory / Errors / CopyPaste / CAD /

Each tab has a special purpose:

#### Panel Tabs

Input - This sheet is used to enter information.

Schedule - This sheet is used to review and print the panel schedule.

Calcs - This sheet is used to review and print load calculations.

Directory - This sheet is used to review and print the circuit directory.

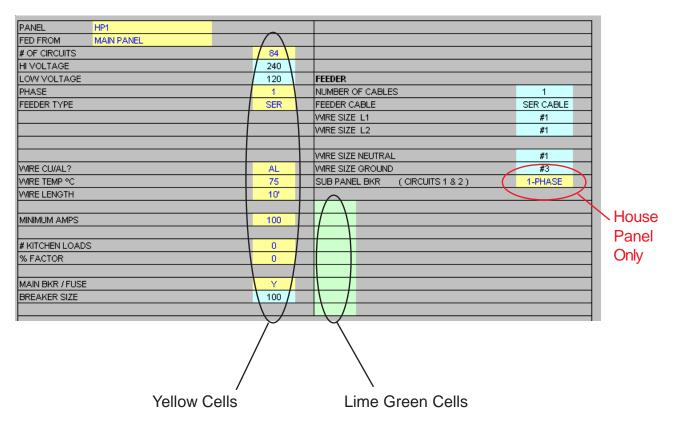
Errors - This sheet is used to review and print the errors.

Copy/Paste - This sheet explains the Paste Values command for Excel.

CAD - This sheet explains how to use the Copy Picture command and paste into a CAD program.

# GENERAL ENTRIES

Some cells in the template files are protected. You may only enter information into certain cells. If you are using a color monitor, these cells are yellow or lime green.



Each unprotected yellow cell requires a user entry. If an invalid entry is made, a RED error message will appear to the left of the entry or an error message will appear in a pop up box.



When you select a cell a hint box will appear.

	THHN V THW RHW
You may also use - the pulldown menu	THHN XHHW THW-CA THHN-CA XHHW-CA

# GENERAL ENTRIES (continued)

Below is a list of valid entries for the general information section of the panel schedule.

PANEL	P1	Enter the panel name such as LPA. If entry is too long it may be cut off when printed. (As a general rule 22 characters are allowed.)
# OF CIRCUITS	30	Enter number of circuits. (Even number from 6 to 84) or use the pulldown menu.
PHASE	3Y	Enter phase. Note: You may put a 1-Phase panel on a 3-Phase source.
GND WIRE Y/N	Y	Enter Y or N. If you enter Y, an equipment ground conductor will be added to the feeder conduit(s).
WIRE TYPE	THHN	Select the wire type.
WIRE CU/AL?	CU	Enter CU or AL.
WIRE TEMP	75	Enter the wire insulation temperature.
WIRE LENGTH	20	Enter wire length.
CONDUIT TYPE	EMT	Select conduit type.
MINIMUM AMPS	100	Enter minimum amps. If the load exceeds the minimum amps, the program will automatically size the wire for Code requirements.
KITCHEN LOADS	5	Enter the number of kitchen loads.
% FACTOR	20	Enter percentage factor. Example: If you enter 20, the program will provide 20% spare capacity for future loads. You may also use this factor to adjust for voltage drop.
MAIN BKR / FUSE	Y	Enter Y or N. If you enter Y the program will size the main breaker.

SUB PANEL BKR	3-PHASE	Select choice from pulldown menu. If you want a sub panel fed from this panel, select 1-Phase or 3-Phase.
	House Panel	NOTE: If you select 1-phase, the program will automatically place a 2-pole circuit breaker in circuit positions 1 & 3.
	Only	If this is a 3-phase delta panel feeding 1-phase sub panel, the program will automatically place a 3-pole circuit breaker in circuit positions 1, 3, & 5. In this case the 1-phase sub panel will be con- nected to L1 and L3.
		If you select 3-phase, the program will automati- cally place a 3-pole circuit breaker in circuit posi- tions 1, 3, & 5.

		- \
		- 2
DATED 2-1	1-06	
ABC ELEC	TRIC COMPANY	
FOR SERV	/ICE CALL (555) 626-1800	

You may enter any information in the green cells and it will appear on the panel schedule.

# DISPLAY ONLY

Also, in the general information section there are a group of cells displaying wire and conduit size information, these cells only display information when no errors are present in the template.

1	
SER CABLE	
#1	
#1	
#1	
#3	
	#1 #1 #1

# CIRCUIT ENTRIES

Once you have completed the general entries, you may begin making the circuit entries. Each circuit entry consists of the following:

BREAKER 7 20A-1P **JGHTING** 1,600 С 20A-1P IGHTING c 1,600 9 С 11 20A-1P LIGHTING 1,600 Enter breaker type.

CIR	CUIT DE	SCRIPTION	1			
7	20A-1P	LIGHTING		С	1,600	
9	20A-1P	LIGHTING		C	1,600	
11	20A-1P	LIGHTING		C	1,600	
					nter circ	uit description.

# LOAD IDENTIFIERS

# H (HARMONIC LOAD)

On 3-phase wye panels, loads subject to harmonic currents (such as electronic ballast and computer equipment) must be identified by placing an "H" in the harmonic identifier column.

_			_			
#	BKR	CIRCUIT DESCRIPTION		н	Ι	
1	20A-1P	LIGHTING		н	С	1,600
3	20A-1P	LIGHTING		н	С	1,600
5	20A-1P	LIGHTING		Н	С	1,600
		•	L			
						<b>F</b> inta

Enter "H" or a space (Space Bar)

# HOW THE PROGRAM CALCULATES HARMONIC LOADS.

When the harmonic load is 50% or more of the load (on 3-phase wye panels) the NEC requires the neutral conductor to be considered a current carrying conductor.

Therefore, the feeder conduit has four (4) current carrying conductors and the conductor ampacity must be derated to 80%. The program does this automatically.

# ENTERING CIRCUIT LOADS

# LINE TO NEUTRAL LOADS (1-Pole Breaker)

#	BKR	CIRCUIT DESCRIPTION	N	Н	Ι		
1	20A-1P	LIGHTING		н	С	1,600	L1
3				Н	С		L2
5				н	С		L3

Enter the VA (Volts X Amps) into the cell.

# LINE TO LINE LOADS (2-Pole Breaker)

Enter one half of the VA in each cell.

_							
#	BKR	CIRCUIT DESCRIPTION	N	н	Ι		
1	60A-2P	AC UNIT			М	6,000	L1
3	XXX	XXX			М	6,000	L2
5				н	С		L3

Example: (50 Amps X 240 Volts) = 12,000 VA (12,000 VA ÷ 2) = 6,000 VA in each cell

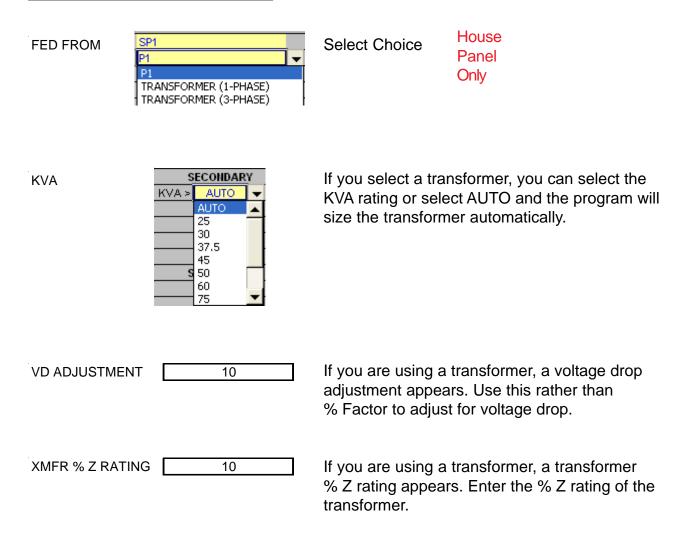
# LINE TO LINE LOADS (3-Pole Breaker)

Enter one third of the VA in each cell.

#	BKR	CIRCUIT DESCRIPTION	N	н	Т		
1	XXX	XXX			М	4,803	L1
3	50A-3P	AC UNIT			М	4,803	L2
5	XXX	XXX			М	4,803	L3
		-					

Example: (40 Amps X 208 Volts X 1.732) = 14,410 VA (14,410 VA ÷ 3) = 4,803 VA in each cell

# SUB PANEL GENERAL ENTRIES



# PRINTOUTS

Each panel schedule template is designed to print out four (4) sheets for the panel and four (4) sheets for the sub panel.

- Panel Schedule
- Load Calculation
- Directory
- Error Checking Report

Using the mouse, click on the tab to display the sheet you wish to print. When the sheet is displayed, use the FILE/PRINT command.

# NO COPY/PASTE

# Do not use the COPY and PASTE commands on this template as they can corrupt the file.

Each cell in this template has been formatted with error checking and performance codes. When you copy a cell and use the paste command, these formats and performance codes are pasted to the new location.

PASTE SPECIAL (Values Only)

To avoid corrupting the file use the COPY and the EDIT/PASTE SPECIAL command selecting VALUES from the paste special menu.

