

User Manual

INTERIOR ELECTRICAL DISTRIBUTION SYSTEM (IEDS) SOFTWARE

IEDS

Interior Electrical Distribution Design System Calculations

Version 4.4



U.S. Army Corps of Engineers
R. Newlin CESWF-EC-DE



US Army Corps of Engineers
Fort Worth District

1 Aug 2006
Richard L. Newlin

IEDS Interior Electrical Distribution System

Preface:

The following information is provided as a general guide for the program and to aid in providing the necessary data and provide an explanation of data to be used where it may not be clear what is required. An explanation of all data is not provided as some information is considered to be self-explanatory.

Description:

Utilized to perform load, protective device, and size calculations for panels, switchboards, motor control centers, transformers, motors, distribution feeders, and fault analysis in english and metric units.

Data is entered by utilizing menus and forms for the various types of calculations.

Reports and schedules are output to Microsoft Excel files to be included in analysis and for adding schedules in CADD file.

Installation:

Program is to be installed by executing setup.exe. Program files will be installed in C:\ieds folder. Icon will be provided in the windows start menu under Electrical heading.

Files:

The following files are installed in the C:\ieds folder when program is installed:

Ieds.exe – Executable program (Compiled Visual Basic 6.0)

ieds.mdb – Microsoft Office Access Database used as template to store project data. File is copied and renamed by adding project code to filename ****ieds.mdb when a new project is created.

iedsproj.mdb - Microsoft Office Access Database used to store project data for all projects.

iedsstnd.mdb - Microsoft Office Access Database used to store standard data for equipment and wiring for use by program. Data_Table_Info table in database provides description of other tables in the database. Standard data is based on manufacturer's data, various standards, and the National Electrical Code.

pnlsch.xls - Microsoft Office Excel Spreadsheet used as a template to store panel schedules created by program. File is copied and renamed by adding project code to filename (****pnlsch.xls) when a new project is created.

sched.xls - Microsoft Office Excel Spreadsheet used as a template to store transformer and feeder schedules created by program. File is copied and renamed by adding project code to filename (**** sched.xls) when a new project is created.

iedsexpt.mdb - Microsoft Office Access Database used as a template to store project information for exporting and importing. Iedsexpt.mdb is copied to iedsxpnt.mdb at export path selected.

iedsarch.mdb - Microsoft Office Access Database used to store project information for archived and backed up projects.

Main Menu

Project



New project – Creates a new project.

Select Project – Selects previously created project for calculations.

Backup Project – Creates project backup. Project files are copied to a new folder under C:\ieds. New folder name is based on project code for the specific project. Project files remain in current projects.

Restore/Delete Backup – Restores or deletes project backup files created by Backup Project.

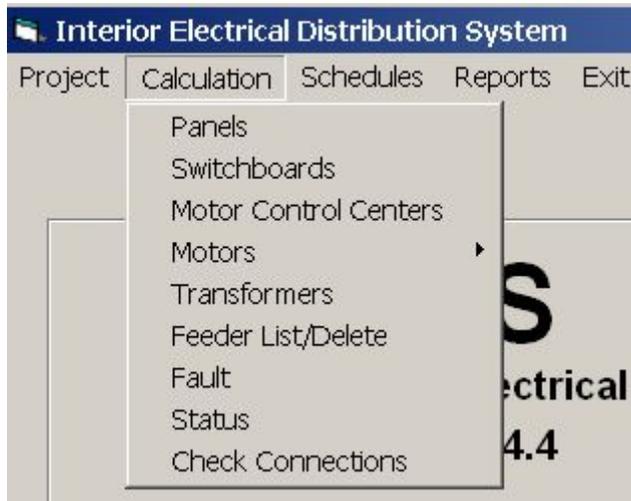
Archive – Archives or unarchives project. Project files are moved to a new folder under C:\ieds and are deleted from the “Select Project Menu”. New folder name is based on project code for the specific project.

Export Project – Moves project data to folder selected by user, deletes project files from C:\ieds folder, and removes project from the “Select Project Menu”.

Import Project – Imports project for files exported by “Export Project”. Adds project files to C:\Ieds folder and the “Select Project Menu”.

English/Metric Conversion – Converts existing project data between English and Metric units (Feeder Lengths & Motor Sizes).

Calculation



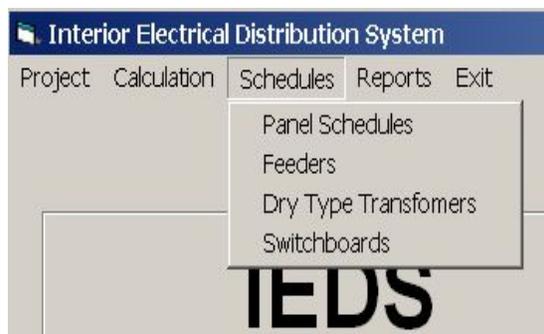
Panels, Switchboards, Motor Control Centers, Motors, Transformers, & Fault select calculations for the respective selection.

Feeder List/Delete – Provides list of existing feeder calculations with provision to delete.

Status - Checks calculations to determine if revisions to loads, mains, feeders and transformers are made to affected equipment based on dates changes were made to the specific equipment.

Check Connections – Checks data to verify if connections are made for all equipment.

Schedules & Reports



Creates Microsoft Excel Spreadsheet for the selected schedule or report.

Calculation Sequence

1. Prior to entering any other data, a new project must be created from the project menu or an existing project used. Current project information is displayed on the main screen for the current project. Another previous project may be selected from project menu unless the project has been archived or exported.
2. Generally calculations would be done the same way that you would accomplish manual calculations, by starting at the lowest system level and adding equipment for each level above in sequence to the main transformer.
3. Load Categories: Load categories are utilized to provide load information for each category and allow demand factor and load factor (multiplying factor utilized to calculate minimum size for equipment such as continuous load @ 125%) to be applied to each category. Load categories for the following are included:

- Lighting
- Duplex Receptacles
- Motors
- Other
- Spare/Space
- Subfeed (Downstream panel)
- Transformer

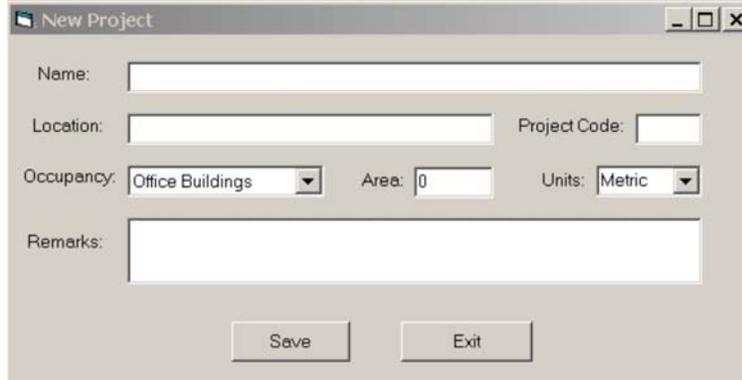
Load categories may be added by using the “Loads” tab for panel, switchboard, or mcc calculation. Categories may be added at any time prior to use for entering circuit data.

4. Motors: It is preferable to do motor calculations prior to entering circuit data as motor circuits are added by selecting a particular motor from pull down menu in circuit calculations. If motor does not currently exist, motor calculation will need to be done by selecting “Add Motor” from circuit calculation and then returning to circuit calculation.
5. Feeders: Feeders should be calculated after all subfeed panels and transformers are sized for loads since over current protection is entered automatically for upstream equipment when the feeder is sized for the downstream equipment. An arbitrary value based on load is entered in upstream equipment when circuit data is entered.
6. It is recommended that “Check Connections” and “Status” be executed after all data is entered to insure that all equipment is connected in system and all revisions are current.
7. Fault calculations should be accomplished after all equipment and feeder calculations are completed and before panel schedules are created since fault values from the calculations are included in the panel schedules.

8. Schedules and reports should be accomplished after all calculations are complete and updated.

Forms

New Project



The image shows a 'New Project' dialog box with the following fields and controls:

- Name:
- Location:
- Project Code:
- Occupancy:
- Area:
- Units:
- Remarks:
- Buttons: Save, Exit

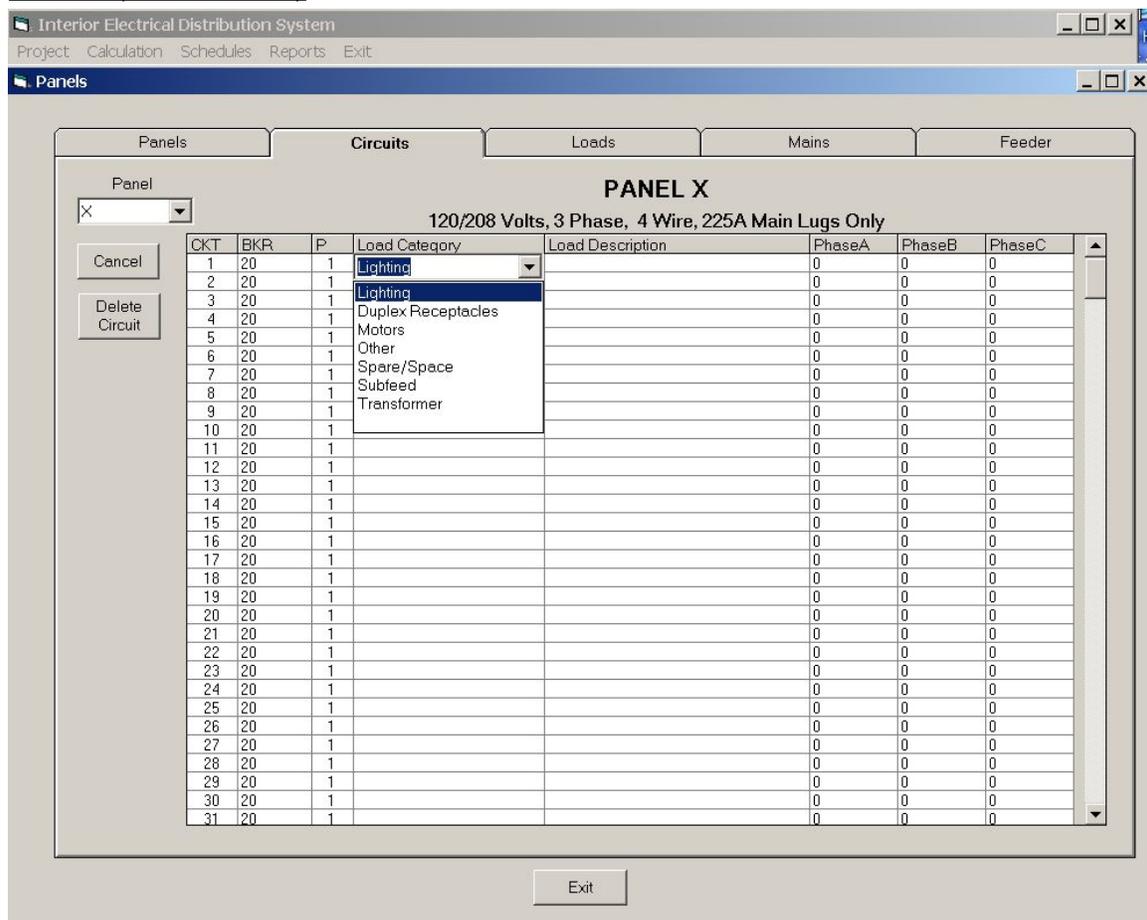
Name and Location should be included to adequately identify project.

Project Code is required entry to identify project data files. Code must be 3 or 4 characters.

Units need to be verified as English or Metric.

Occupancy, Area, and Remarks are optional. An occupancy not included in list may be entered by entering name in box.

Panels (Circuits Tab)



1. The appropriate panel should be selected from the pulldown menu or name entered into panel box if no panel is indicated or a different panel is to be circuited.
2. Circuit breaker(BKR) & no. of poles(P) are automatically sized for Lighting, Duplex Receptacles, Motors, Subfeed, and Transformer categories. If another category is to be used, the BKR & P should be selected first by clicking on the blank for the desired circuit and selecting the value from the pulldown menu. Otherwise, click on "Load Category" for the desired circuit number which displays pulldown selection menu and select desired load category.
3. After Load Category is selected, the next action will be apparent by program operation and will depend on the category selected.
4. Load Description may be entered or revised at any time by selecting the blank for the desired circuit no.
5. Circuits may be deleted by selecting "Delete Circuit" and then clicking on the circuit no. to be deleted..

6. All entries or changes will be automatically saved.

Panels (Loads, Mains, & Feeder)

1. The appropriate panel should be selected from the pulldown menu or name entered into panel box if no panel is indicated or a different panel calculation is required.
2. Category Loads will be displayed after calculation is accomplished.
3. Demand Factor or Load Factor may be changed after calculation is accomplished.
4. “Save” must be selected after calculation is complete to save the data.

Add Motor

Symbol: AHU-1
Description: AIR HANDLING UNIT

Volts/Phase
 460V/3 Phase
 200V/3 Phase
 115V/1 Phase
 200V/1 Phase

Load Quantity
 Single Motor
 Multiple Motors
 Combination Loads

Motor Type
 Non-Hermetic
 Hermetic

Load Units
 HP/KW
 VA
 Amps

OC Protection Type
 Circuit Breaker
 Fuse (D.E.)

KW: [] [Select]
FLA [] VA [] Str [-]
Feeder []
O.C. Protection(Amps) []

[Save] [Clear] [Exit]

1. Symbol is required to select motor for circuit or to revise motor.
2. Description is not required to save motor data. However, when the motor symbol is selected for a circuit, information is included in circuit data as “Description Symbol” (e.g. AIR HANDLING UNIT AHU-1). Number of characters allowed for description is automatically limited to insure information entered will fit into circuit data.
3. Data must be saved by selecting “Save”.

Revise/Delete Motor

Revise/Delete Motor

Symbol:

Description:

Volts/Phase

460V/3 Phase
 200V/3 Phase
 115V/1 Phase
 200V/1 Phase

Load Quantity

Single Motor
 Multiple Motors
 Combination Loads

Motor Type

Non-Hermetic
 Hermetic

Load Units

HP/KW
 VA
 Amps

OC Protection Type

Circuit Breaker
 Fuse (D.E.)

HP: FLA VA

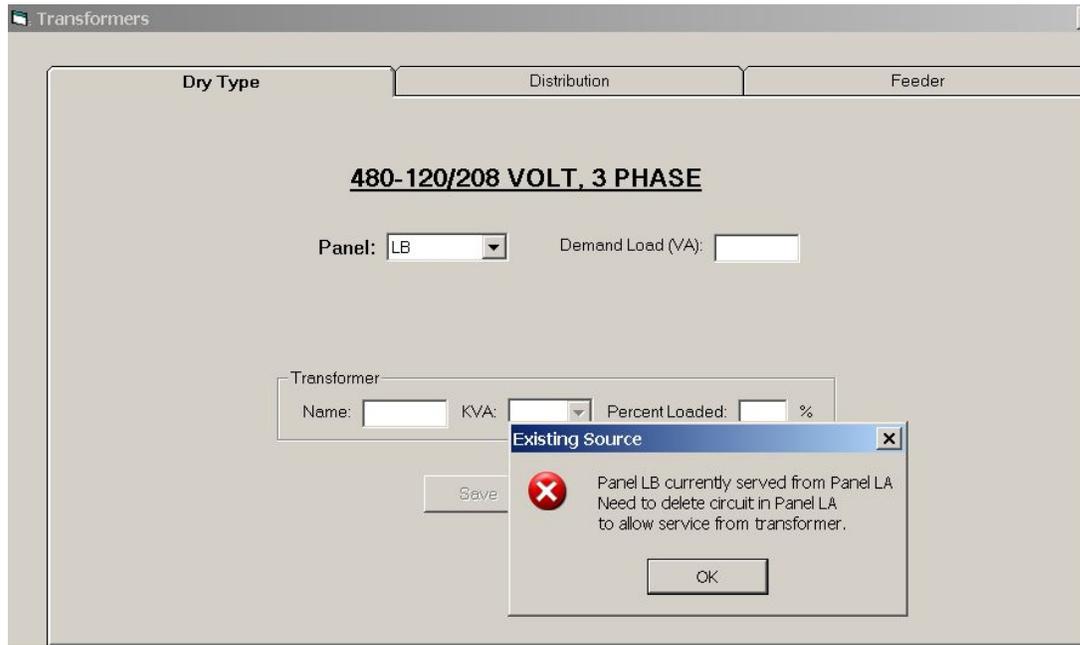
Str

Feeder

O.C. Protection(Amps)

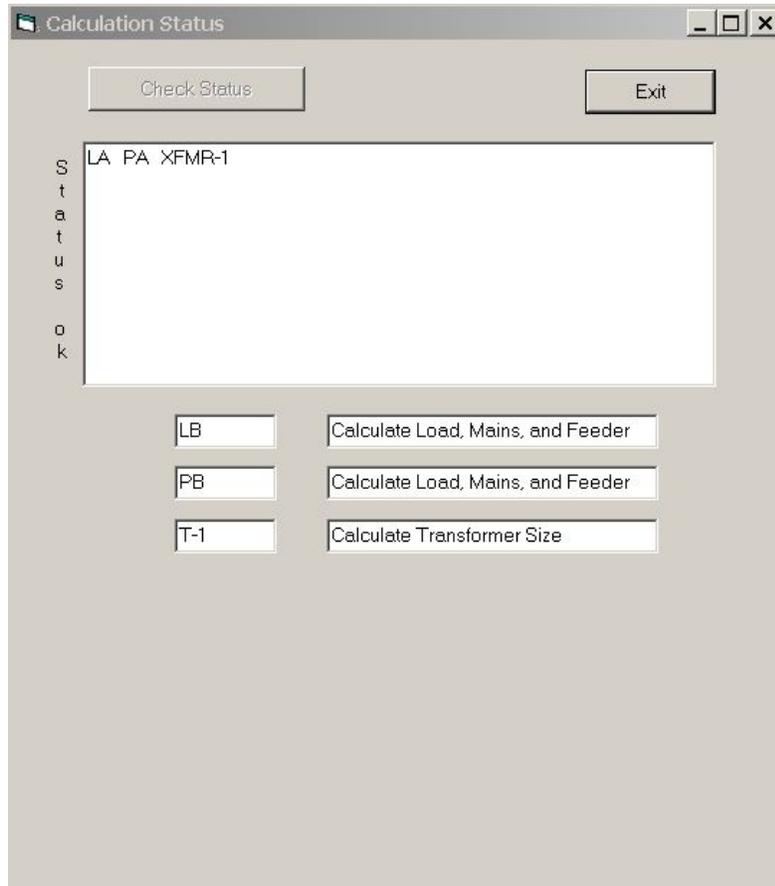
1. Motors are identified by the symbol used for the particular motor. The “Symbol” needs to be entered and then “Select” clicked to retrieve previous motor data before revisions are made or motor deleted.
2. Revisions of individual items for multiple motors or combination loads are not allowed. Multiple motors or combination loads will need to be deleted and new information created by “Add Motors” form.
3. Data must be saved by selecting “Save”.

Transformers



1. Transformer calculations are limited to a single system. (*Only one main transformer is allowed.*)
2. Transformer load is limited to a single load. Multiple loads connected directly to transformer cannot be served by a single transformer. If it is intended that a transformer is to serve direct connected multiple loads, a dummy panel could be included to serve the multiple loads.
3. Transformer size is based on the load selected from the “Panel” pulldown menu or name entered into panel box.
4. System is checked when load is selected to prevent the load from being served by more than one source. If the transformer already exists in system the load designation served for that transformer cannot be revised. The transformer will need to be deleted to change the load served. However the transformer size may be revised.
5. Transformer feeder calculations are limited to dry type transformers. Calculations for primary service to main transformer is not included.
6. Data must be saved by selecting “Save”. A transformer name is required.

Status



1. Status checks calculations to determine if calculations were made or that revisions to loads, mains, feeders and transformers are made to affected equipment based on dates changes were made to the specific data . By calculating the data indicated, the status will be updated to reflect the new date. If no revisions are indicated the equipment will be listed in the “status ok” area to indicate that calculations are up to date.