electrical Data Processing Program: Powerful Support to Plant Electrical Engineering !

e-DPP 2011 (ver.4.0)

Product Overview

Engineering software e-DPP for electrical facilities in industrial plants is the packaged software developed in the technical cooperation with major engineering companies. The rich knowledge and experiences cultivated by a number of foreign and domestic plant constructions have been integrated into e-DPP.

e-DPP powerfully supports consistent engineering and maintenance from the master plan of the plant electrical facilities, the design, procurement of electrical equipment and materials, and up to field-erection.

e-DPP produces a wide range of products through the various calculation functions and the data exchanges based on the centralized database for electrical equipment.

10 years passed since e-DPP beta version was released in 2001. e-DPP has been of service to many customers for these 10 years. We are pleased to provide you with the release of e-DPP version 4.0 (name e-DPP 2011).

e-DPP 2011 Major Features
Import External User Data
Setting Default Data and Data Filling
Creating Electrical Load List
Creating Cable List
Creating Datasheet for Equipment Procurement
Load Summary & Lumped Motor Calculations
Power Cable Sizing
Creating Cable Sizing Chart
Cable Drum Schedule
MCC Schedule and Control Signal Matrix
Conduit & Cable Gland Selection
Editing Equipment Library
Template Design
Revision Control
ETAP Interface
Ground Fault Calculation (Note: Optional Module)

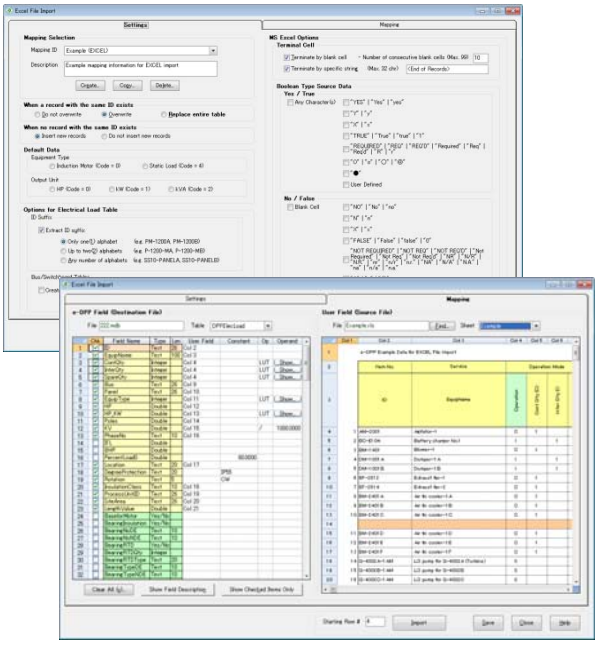
Import External User Data

- It is not required for e-DPP users to enter data from scratch when creating a new project database. You can start with importing an external electrical load list or motor list that the other disciplines usually have generated and already available. The external files that can be imported in e-DPP are MS Excel or MS Access.

- In general, the way of data expression in external user files is different from that of e-DPP. For example, the unit of rated voltage is either “volt” or “kV”, how to express (abbreviate) operation mode of each load (continuous, intermittent, spare), etc. e-DPP absorbs such differences by means of “Look Up Table” function. Consequently, it is not required so much for users to modify their own data file prior to the data import operation.

- In addition, Boolean type data such as “Yes/No” are usually expressed using various symbols on MS Excel sheet. e-DPP auto converts such user symbols to the Boolean data.

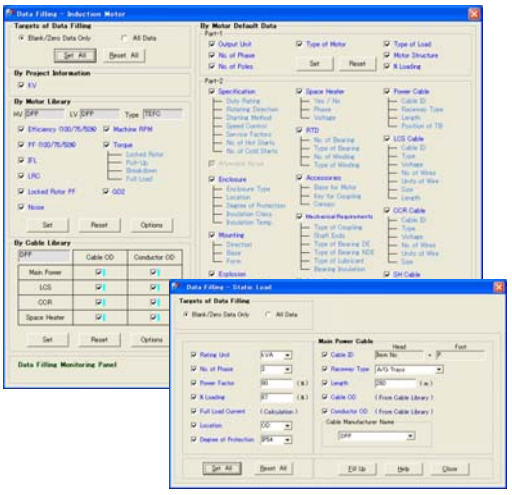
- e-DPP data import covers cables, panels, lumped loads, buses and local control stations in addition to electrical loads such as motors.



Setting Default Data and Data Filling

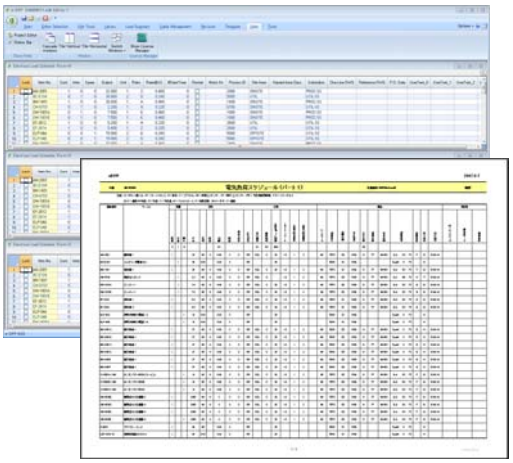
- Even after you have imported external user data and/or entered principal data manually in e-DPP, a number of other data items will be still left blank. e-DPP provides with a function to fill out those blank data automatically using the library database and/or the predefined default datasets.

- After the automatic data filling operation completes, approx. 90% of load property data will be filled out. Thus, you will be able to execute the power cable sizing or the load summary calculation (Note) immediately and that could speed up an initial stage of engineering remarkably. (Note: In order to execute the load summary calculation, it is required to import or enter connection information as well.)



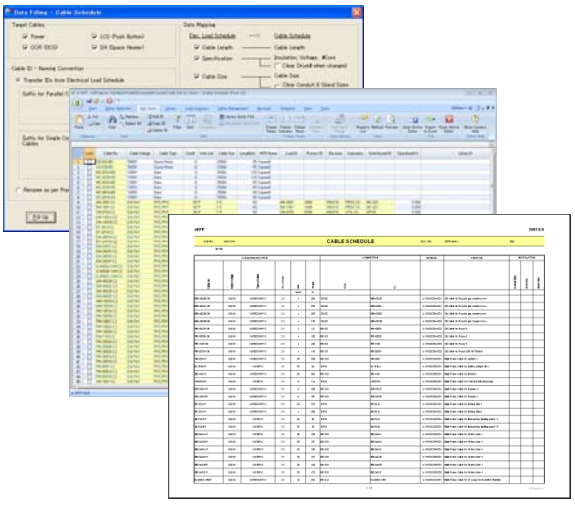
Creating Electrical Load List

- An electrical load list created through the processes of external data import and automatic data filling with default data is able to be output to any of several MS Excel forms that are predefined by e-DPP. As those forms had been designed collecting ample of engineering know-how from the plant engineering companies, you can immediately apply them to your daily engineering works.
- The MS Excel forms can be newly defined or customized by users as they like by means of “Template Design” feature described later.



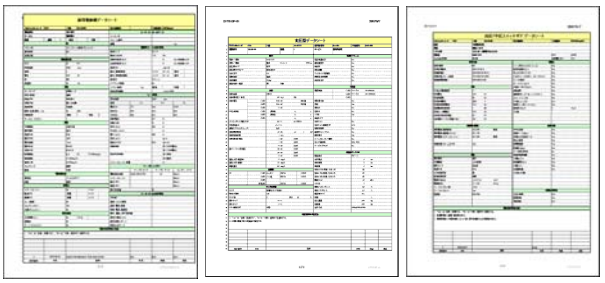
Creating Cable List

- A cable list is also able to be output to any of MS Excel forms predefined by e-DPP as well as an electrical load list.
- The cable list is created by retrieving and modifying the relevant data of power and control cables included in the electrical load list. Other cable data which are not included in the electrical load list are able to be imported from an external file (e.g. MS Excel) as well.
- When extracting the cable data from the electrical load list to the cable list, users are allowed to specify various settings in details such as cable naming convention, etc.
- On the cable list, the functions of conduit or cable gland sizing and editing the cables based on the key field “Cable Drum” are also provided.



Creating Data Sheet for Equipment Procurement

- Data sheets of electric motors, power transformers, switchgears, MCCs and local control stations for procurement are created.
- A data sheet is a form of single sheet in which all the property data of single equipment are indicated. As the data source is the same database as that the load list or MCC schedule refers to, the consistency of data are always maintained.

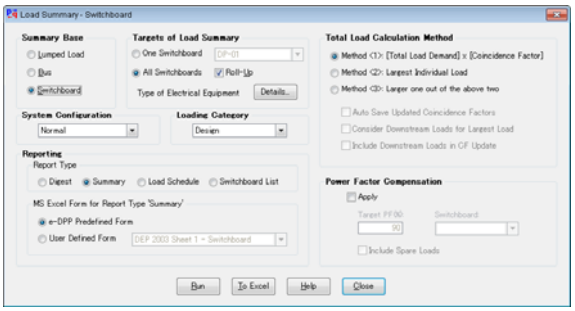


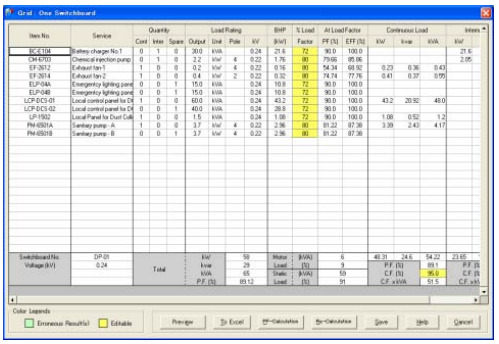
<Motor> <Transformer> <Switchgear>

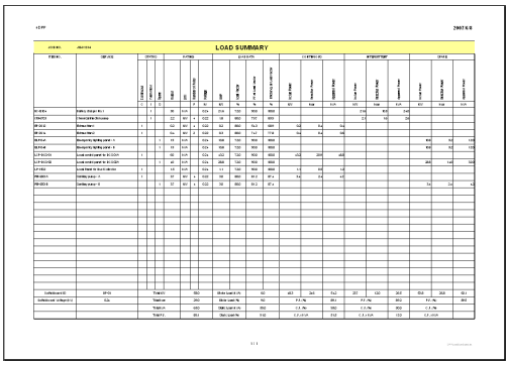
Load Summary & Lumped Motor Calculations

e-DPP provide with a powerful load summary feature.

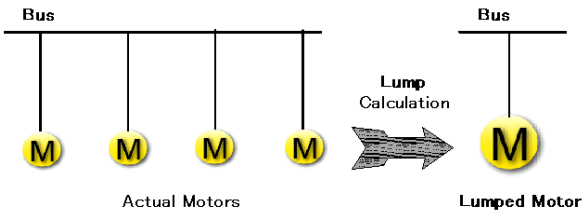
- A summary base is selectable from 3 options; 1) Panel (Switchgear/MCC), 2) Bus and 3) Lumped Load for exporting to ETAP.
- So called “Stack Up” (drill-down) calculation to include loads in the download system is available.
- The operation modes of loads are divided into “Continuous”, “Intermittent” and “Spare” and the coincidence factor particular to each operation mode is multiplied to a load group of each operation mode. The coincidence factors are defined and can be varied for each summary base.
- Convenient editor dialogs are provided for allocating each load to each summary base by mouse operation only.
- You can review the results of load summary calculation with both “Summary” forms that presents the results for one summary base in a sheet and “Digest” form that presents all over results at a glance. Those 2 resultant forms are able to be output to MS Excel as well.
- “Loading Category”
  “Loading Category” enables users to specify different loading factors. As the maximum 3 loading categories can be defined, users are allowed to specify different factors to individual loads, for instance, in normal operation time, summer season or winter season.
- “User-Defined Forms”
  User is able to customize a form of load summary report in addition to e-DPP predefined forms. Any form that is specified by the client or as a company standard is also customizable. The new e-DPP predefined form in which the result of PF compensation calculation is indicated was also added.





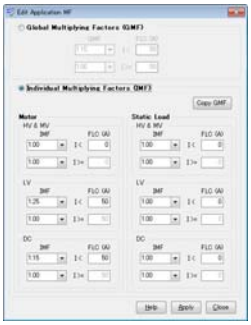


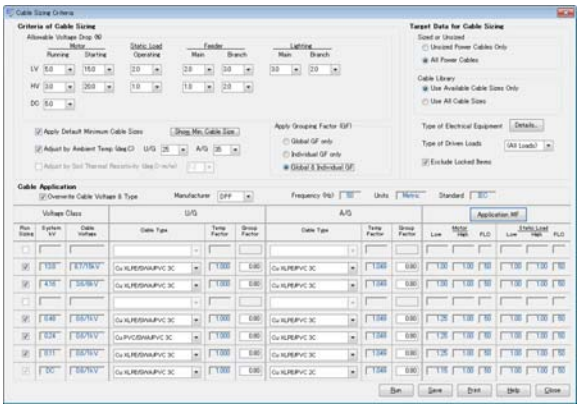
- Auto Calculation of Lumped Motor Parameters
  When you carry out analysis calculation for a large power system, modeling a huge number of motors one by one will make it difficult to converge the calculation and not contribute to accuracy so much. By modeling several motors as single representative motor, the power system can be simplified without sacrificing the accuracy.
  Motor lumping calculation takes motor rated voltages, outputs, inertia time constants H and number of poles into account. The lumped representative motors are exported to ETAP via ETAP interface program and detail dynamic models required for ETAP Transient Stability calculation can be established.
  In addition, the parameters required for ETAP Parameter Estimation calculation are produced at the same time.



Power Cable Sizing

- e-DPP provides with a batch sizing feature of power cables for electrical loads. Once-sized cables can be reflected on a cable list with simple operation and then output to MS Excel.
- The sizing criteria such as individual allowable voltage drop (%) or allowable derated ampacity can be set as per the categories, e.g. HV or LV loads. rotating machines (motors) or static loads.
- In addition, different ampacity derating factors can be specified for individual loads. That enables users to size cables depending on special cable installation conditions.
- Several parameters required for performing the cable sizing are stored in e-DPP cable library. Users are allowed to add new data to or modify the existing data in the cable library.
- In case cable types are unknown yet, the predefined default types may be adopted as a temporary measure for performing the cable sizing calculation just for reference.
- User is allowed to alter the individual cable sizes that have been once determined by the cable sizing algorithm (Re-calculation function). When performing this operation, voltage drop ratio, current margin and maximum cable runs (m), etc. are re-calculated based on the newly selected cable size.
- You can size a power cable for a particular load by changing an ampacity derating factor and application multiplying factor (MF).
- 3 options are available, i.e. (1) globally applying a grouping factor specified for each voltage class, (2) applying a particular grouping factor to each load, or (3) both of them.
- You can specify 2 different MFs for loads of which rated FLC (A) is less than the specified boundary current, and equal or greater than that.

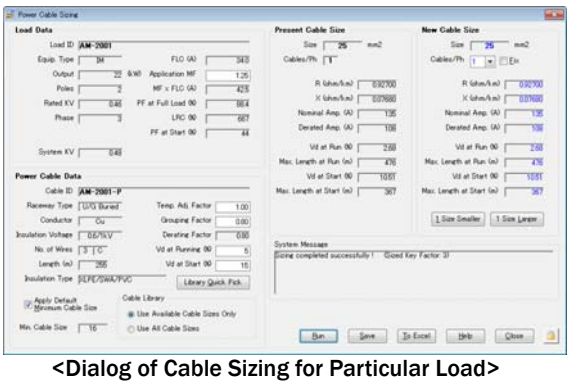




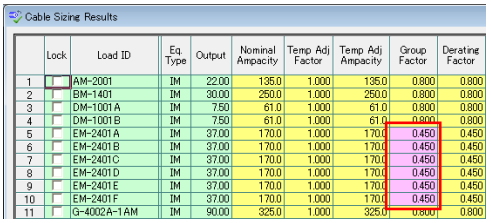
<Cable Sizing Dialog>

Derated Ampacity	% Vd at Running	Max. Length Run	% Vd at Starting	Max. Length Start	FLA / Temp Amp	Minimum Size	Final Selected Size	Re-Calc	Calculated Size
102.92	0.68	429	5.93	663	0.35	16	50		50
187.46	1.63	74	0.00	0	0.51				95
102.92	2.87	630	11.97	459	0.29	25			50
34.61	2.85	253	14.46	150	0.18				6
30.63	2.80	331	10.71	261	0.27	6	10	Go	6
30.63	2.83	331	10.83	261	0.27	6			6
19.16	1.69	982	8.69	594	0.04		2.5		2.5
25.37	1.76	846	10.50	441	0.04		4		4
47.59	1.95	36	0.00	0	0.58		6		10
63.45	1.35	56	0.00	0	0.43		10		16
98.28	2.00	387	7.92	300	0.42	35	16		35

<Cable Size Re-Calculation Dialog>



<Dialog of Cable Sizing for Particular Load>

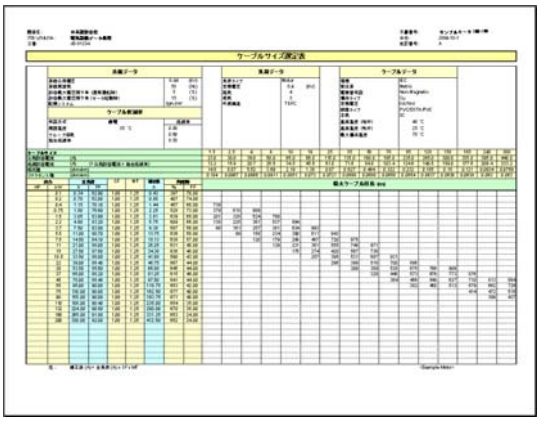


	Lock	Load ID	Eq. Type	Output	Nominal Ampacity	Temp Adj Factor	Temp Adj Ampacity	Group Factor	Derating Factor
1		AM-2001	IM	22.00	135.0	1.000	135.0	0.800	0.800
2		BM-1401	IM	30.00	250.0	1.000	250.0	0.800	0.800
3		DM-1001A	IM	7.50	61.0	1.000	61.0	0.800	0.800
4		DM-1001B	IM	7.50	61.0	1.000	61.0	0.800	0.800
5		EM-2401A	IM	37.00	170.0	1.000	170.0	0.450	0.450
6		EM-2401B	IM	37.00	170.0	1.000	170.0	0.450	0.450
7		EM-2401C	IM	37.00	170.0	1.000	170.0	0.450	0.450
8		EM-2401D	IM	37.00	170.0	1.000	170.0	0.450	0.450
9		EM-2401E	IM	37.00	170.0	1.000	170.0	0.450	0.450
10		EM-2401F	IM	37.00	170.0	1.000	170.0	0.450	0.450
11		G-4002A-1AM	IM	90.00	325.0	1.000	325.0	0.800	0.800

<Screen of Cable Sizing Results>

Creating Cable Sizing Chart

- In addition to the batch cable sizing function as described above, e-DPP provides with ability to create a cable sizing chart.
- As the calculation formulas used in the cable sizing chart are the same as those in the batch cable sizing, the created chart can be used as an attachment material to the cable sizing report to be submitted to the client.
- As the cable data referred by the sizing chart is e-DPP cable library as the same as the batch cable sizing, the calculation results always match each other.



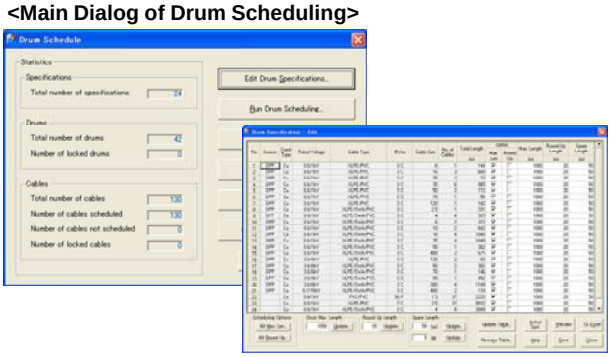
<Excel Output of Cable Sizing Chart>

Cable Drum Schedule

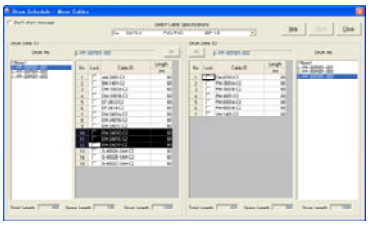
- e-DPP drum scheduling module was developed with the abundant knowledge, experiences and know-how on the real scheduling processes for cable drums obtained from the several plant engineering companies and is a rather practical program. As well as to the implemented auto scheduling function, several user-friendly and flexible functions are realized:

1) User can define a full naming convention for drum tag numbers.
2) Fine tuning for the batch and partial scheduling
3) Mouse operation oriented user interface for editing individual drums.
4) Consistencies check function between a cable list and drum data.

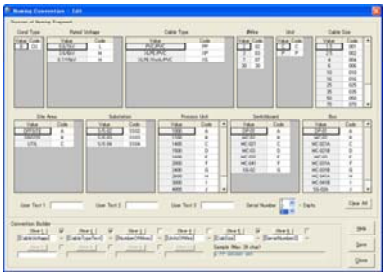
<Main Dialog of Drum Scheduling>



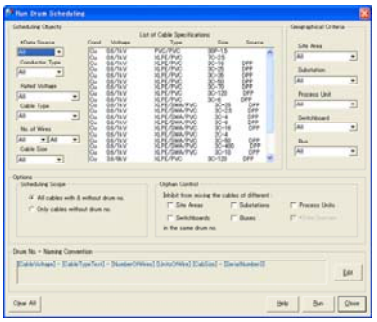
<Cable Drum Specification (Cable Summary)>



<Dialog for Moving Cables between Drums>



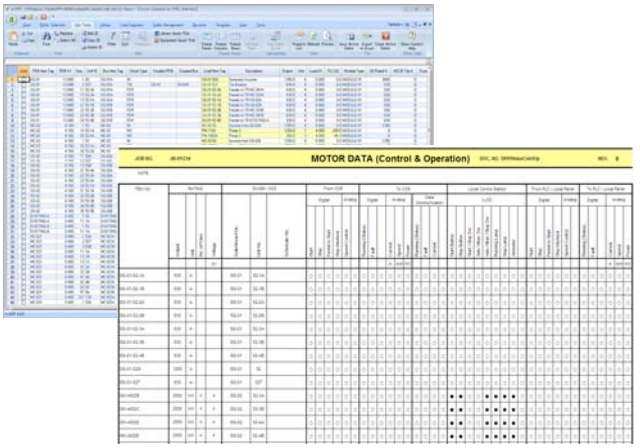
<Dialog of User-Defined Naming Convention>



<Execution Dialog of Drum Scheduling>

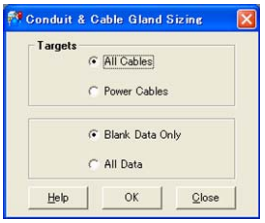
MCC Schedule and Control Signal Matrix

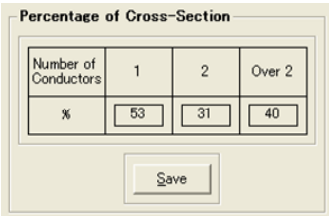
- MCC schedule is generated by expanding a load schedule and the same amount of MCC units as loads are created. Spare units or incoming units that are not associated with loads can be added here.
- Control signal matrix containing interface signals between instrument room, substations and fields is generated and output to MS Excel.

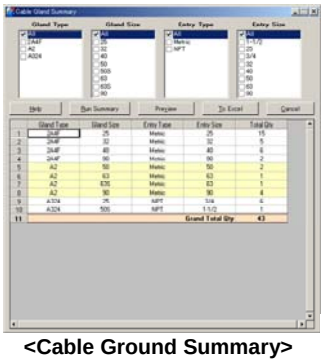


Conduit & Cable Gland Selection

- Size of conduits and cable glands used for each cable are automatically selected on the cable list.
- Specify %Fill of conduits conforming to NEC （National Electric Code） for conduit sizing.
- Sizing of cable glands compares an outer diameter of cable conductor with a gland size and selects the optimal size from e-DPP cable gland library.
- The selected size of cable glands are listed by the menu “Tools” -> “Gland Summary” for users to confirm and output them to MS Excel.





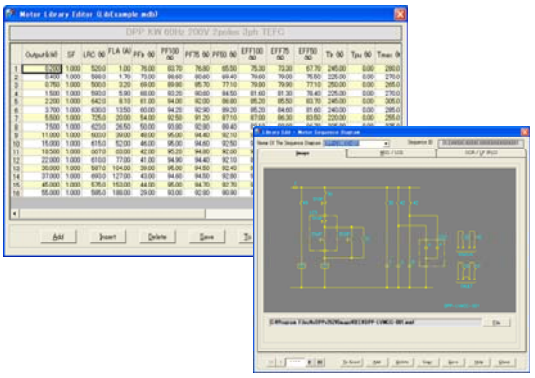


<Cable Ground Summary>

Editing Equipment Library

- e-DPP provides with rich libraries of equipment and cables. The data in the library are indeed customizable and can be added by users as they wish.
- The types of equipment and materials stored in the e-DPP library database are motors, cables, conduits, cable glands, circuit breakers, fuses, MCCB, circuits of local control stations, motor control sequences and static loads.

<Editor Dialog of Motor Library>

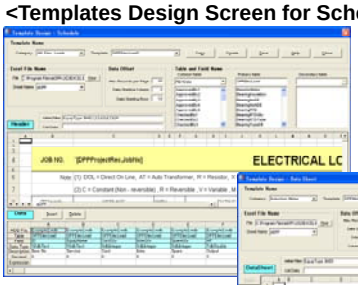


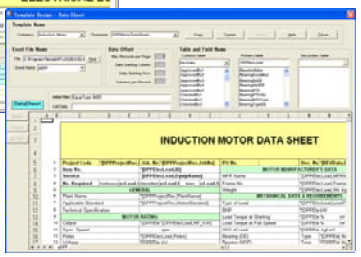
<Edit Dialog of Sequence Library>

Template Design

- The editor dialogs and MS Excel output forms for each type of equipment are related by media so called “Templates” in e-DPP. Users are allowed to create new templates as they like and link them with user-designed MS Excel forms.
- There are 3 types of output formats, i.e. “Schedule (spread)”, “Datasheet (single sheet)” and “Combined form” and customizable in the menu “Template Design”.

<Templates Design Screen for Schedule>

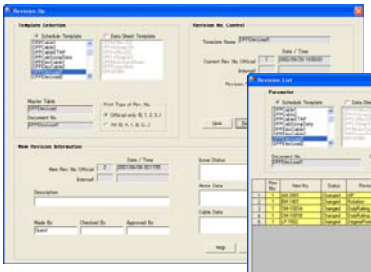




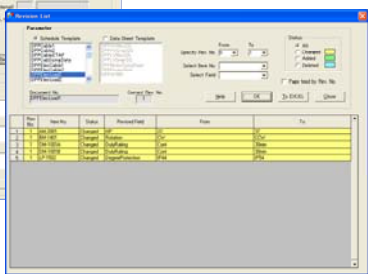
<Templates Design Screen for Data Sheets>

Revision Control

- Revision history of various types of e-DPP documents which are created and output by e-DPP are controlled individually. Revision numbers are counted up at convenient timing of each design stage.
- There is a function to compare and list up *changes* between the present and past revisions or between 2 different past revisions.



<Revision Up Dialog>



<Spread of Revision Data>

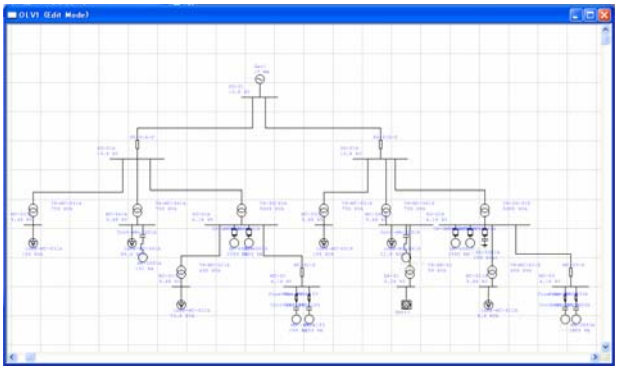
ETAP Interface

e-DPP provides with 3 types of interface to import from & export to a project database of the power system analysis program ETAP.

[Export – MS Access]

The database created in e-DPP is able to be exported directly to the power system analysis program ETAP. That means user does not have to enter the same data in ETAP as those already entered in e-DPP. (Note: In order to use this function, ETAP module "DataX e-DPP" is required additionally.)
ETAP draws a single line diagram on *a white canvas* automatically only by exporting e-DPP database to an ETAP new project.

Element Types	
Induction Motor	2-Winding Transformer
Synch. Motor	3-Winding Transformer
MOV	HV Circuit Breaker
Static Load	LV Circuit Breaker
Capacitor	Fuse
Lumped Load	Contactor
Lumped Motor	Overload Heater
Cable	Bus

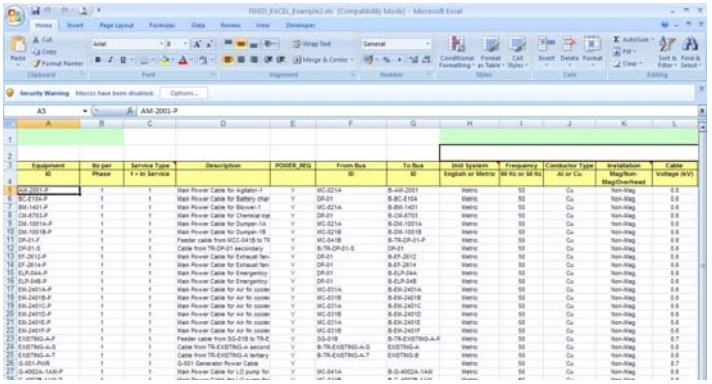


<ETAP Single Line Diagram Automatically Drawn>

[Export – MS Excel]

MS Excel Fix Format defined by ETAP new feature DataX MS Excel is created automatically. Users are allowed to modify the output data on MS Excel sheet. (Note: In order to use this function, ETAP module "DataX MS Excel" is required additionally.)

Element Types
Induction Motor
MOV
VFD
Static Load
Heater
2-Winding Transformer
3-Winding Transformer
Cable
Bus



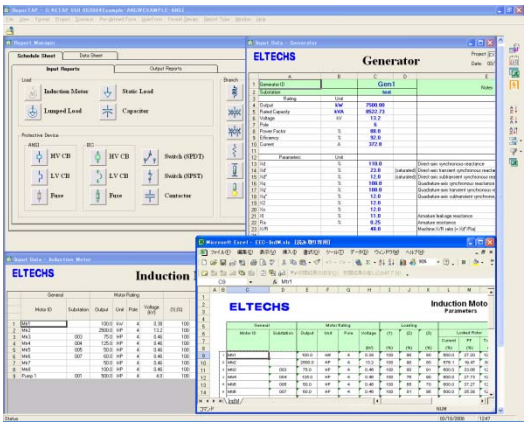
<ETAP Single Line Diagram Automatically Drawn>

As connection data among equipment are also exported at the same time, a single line diagram is automatically generated on ETAP.

[Import – MS Excel]

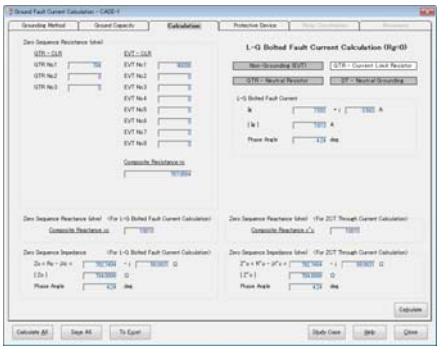
By using the optional module 「ReporTAP」, ETAP input data and results of analysis calculations can be imported to MS Excel. As the MS Excel data can be imported to e-DPP project database by means of "Import External Data" function, data consistency between e-DPP and ETAP can be always maintained.

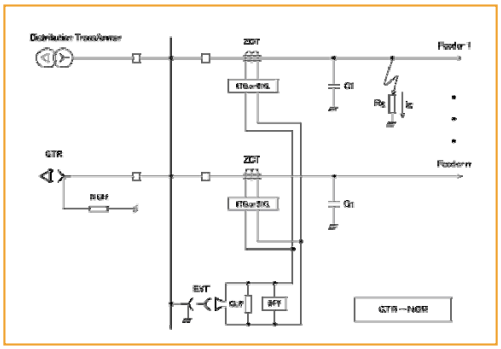
Element Types	
Induction Motor	2-Winding Transformer
Synch. Motor	3-Winding Transformer
Static Load	HV Circuit Breaker
Capacitor	LV Circuit Breaker
Lumped Load	Fuse
Reactor	Contactor
Cable	Impedance
Equipment Cable	Generator



Ground Fault Calculation

- Ground fault calculation program 「GFCalc」 calculates a ground fault current and GF relay sensitivity in an un-grounded high voltage power system. As the program refers to the cable data stored in e-DPP project & library database, it makes easy for users to set up a calculation model.





Should you have any queries on the details of new features of e-DPP 4.0, please feel free to contact Eltechs Engineering and Consulting (email address etap@eltechs.co.jp).

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