System Design and Overview Document

Power Calculations:

This is one the most important tasks when designing your system. You must add up **worst case** *current draw of your system. The power supply contained in eMerge must not exceed the output of the standard power supply. Be aware that you will lose voltage in your wiring. Several considerations are:*

Power supply for Electronics and Readers

1. **Calculate the controller and application card current requirements:**

eMerge Controller (Models 50, 440, and 5000) =	*250 mls*
EXN Panel =	*250 mls*
ACM Reader Blade =	*225 mls*
Output Blade =	*125 mls*
Input Blade =	*100 mls*

Multiply the current draw of each board multiplied by the number of blades in each housing.

Example

eMerge Controller (Models 50, 440, and 5000) =	*250 mls * 1 = 250*
ACM Reader Blade =	*225 mls * 3 = 675*
Total eMerge hardware current requirements =	*925 mls*

Review each manufacturer's specification documentation to determine maximum draw for each device in the system

2. *Calculate reader power requirements: Note: eMerge provides 12 volts DC for readers.*

*Reader Model _____ = Current draw * Number of units = Total reader power*

Example

*AWID 2400 = 35mls * 6 readers = 210 mls*

Each eMerge housing includes a 12 volt power supply and plug in transformer. This configuration produces 2.5 amps at 12 volts. (2500mls) Add the above product current draw requirements and subtract from the provided supply output.

Example

eMerge System Power (Standard) =	*2500 mls*
Above System requirements =	*1135 mls*

Remaining Expansion board and reader power = 1365 mls

System design does not need to be modified for power

If when you add up your power consumption and it exceeds the output of the system:

IEI offers an additional board level and transformer option.

The PG1224-3 mounts directly to 4 metal stand offs in the can and provides an additional 2.5 amps 12 or 24 volts DC. (1-PG1224-3, 1-PIP24VAC) If still the current requirements exceed the output options provided you will need to source a separate power supply from a different manufacture to supply this portion of the system.

Note: IEI does offer a hard wire models that provides enough power for a fully loaded panel (all blades installed) and power for each reader. (14 readers 250mls max for each)

Optional: Add on Power supply for Locks, REX, Annunciators, etc.

eMerge does not provide power for additional integrated products. How should I power these devices? First be sure to identify and calculate your power requirement.

1. *Calculate all other components power requirements: (Locks, REX, Annunciators, etc.) Note: Lock power can vary in voltage, validate the lock power voltage is 12 volts.*

*Lock Model _____ = Current draw * Number of units = Total lock power at 12 volts*
Example
*Dortronics XXX = 250 mls * 6 locks = 1500 mls at 12 volts*
*REX Motion XXX = 35mls * 6 units = 210 mls at 12 volts*

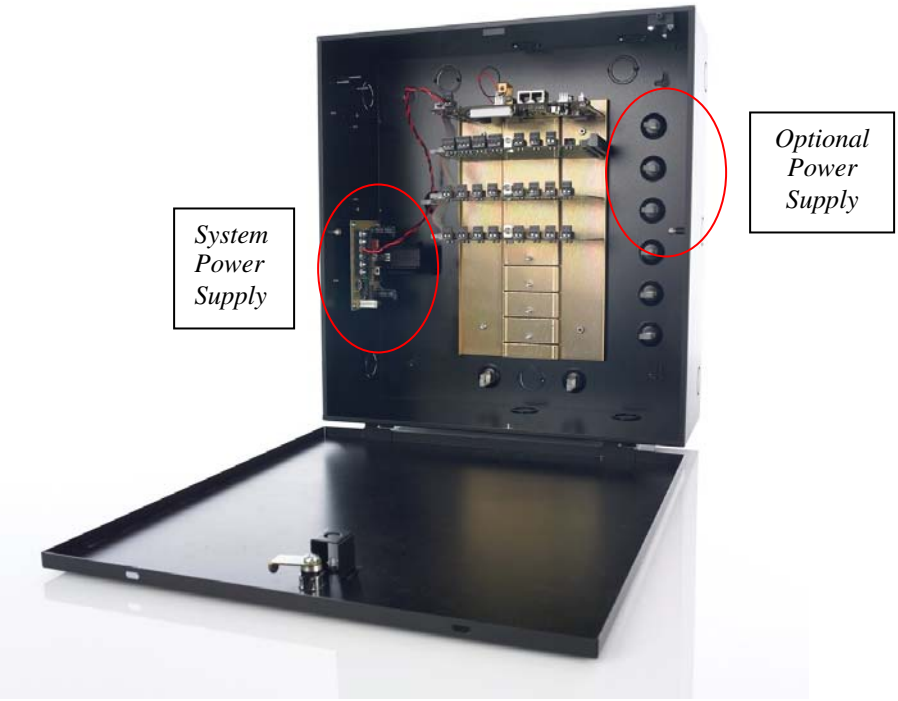
Option 1: eMerge provides metal standoffs for the additional mounting of a 2.5 AMP 12 or 24 volt power supply. This option was described above also as a reader power option. If you did not use for other purposes this easy to mount and wire option provides a cost effective method to power additional devices. If the additional devices required exceed the products power output then you will need to source a secondary supply that will meet your requirements.

Power supply work sheet:

Let's add up your requirements for the system power supply.

1. *Panel and associated hardware* _____
2. *Readers* *(+)* _____
   Total Current *(=)* _____

If yes do nothing
< 2.5 amps or 2500 mls = no addition components required
If no you will need additional components
> 2.5 amps < 4.0 amps 12 Volts = eMerge4ampt (hardwire transformer)
> 2.5 amps < 5.0 amps 12 Volts = PG1224-3, PIP24VAC (Plug in transformer requires readers to wire separately)
>2.5 amps and the above options do not satisfy requirements you will need to source an additional power supply.



Total system power supply work sheet.

1. *Panel and associated hardware*		_____
2. *Readers*	*(+)*	_____
Total System Power	*(=)*	_____
1. *Locking Devices*		_____
2. *Annunciators*	*(+)*	_____
3. *REX Devices*	*(+)*	_____
Add on power requirements	*(=)*	_____

A. Battery Back up and how long: *Take the total current number and divide it by amps. This will provide the total required current per hour required for 1 hour of battery back up. If your battery is a 7 amp-hour and your system draws .5 amps or 500 ml's the system will operate a minimum of 14 hour when power is lost.*

II. Cable / Wiring Requirements:

Reader Cabling - *Wiring to the front ends to the ACM requires the following:*
Shielded 6 Conductor cable, Stranded is better than solid (Reduces chances of breaks)

Distance(Ft) from reader to ACM		
250	*22 AWG*	*22 AWG*
500	*18 AWG*	*18 AWG*

Inputs – *Use minimum of 22 AWG 1000'*
Outputs / Powered Devices *(Locking devices, enunciators, etc.) – Select the appropriate gauge wire based on the current draw and distance of the device to be powered / controlled*

Total	**Voltage**	**AWG American Wire Gauges (minimum)**					
Amps	**AC or DC**	*12*	*14*	*16*	*18*	*20*	*22*
.250 A	**12 V**	*3000*	*2000*	*1200*	*750*	*450*	*300*
	24 V	*6000*	*4000*	*2400*	*1500*	*900*	*600*
.500 A	**12 V**	*1500*	*1000*	*600*	*375*	*225*	*150*
	24 V	*3000*	*2000*	*1200*	*750*	*450*	*300*
.750 A	**12 V**	*1000*	*600*	*375*	*250*	*150*	*100*
	24 V	*2000*	*1200*	*750*	*500*	*300*	*200*
1.00 A	**12 V**	*800*	*500*	*300*	*200*	*100*	*75*
	24 V	*1600*	*1000*	*600*	*400*	*200*	*150*
1.25 A	**12 V**	*600*	*380*	*240*	*150*	*90*	*60*
	24 V	*1000*	*600*	*400*	*250*	*160*	*100*
1.75 A	**12 V**	*460*	*275*	*170*	*100*	*70*	*40*
	24 V	*920*	*550*	*340*	*200*	*140*	*80*
2.00 A	**12 V**	*400*	*240*	*150*	*90*	*60*	*35*
	24 V	*800*	*480*	*300*	*180*	*120*	*70*
2.25 A	**12 V**	*350*	*200*	*130*	*80*	*50*	
	24 V	*700*	*400*	*260*	*160*	*100*	
2.50 A	**12 V**	*300*	*190*	*120*	*75*		
	24 V	*600*	*380*	*240*	*150*		
2.75 A	**12 V**	*280*	*170*	*100*	*70*		
	24 V	*560*	*340*	*200*	*140*		
3.00 A	**12 V**	*260*	*160*	*100*	*60*		
	24 V	*520*	*320*	*200*	*120*		

Total distance in feet (maximum)

II. Select your Electric Locking Device

What type of locking device are you going to use? *Magnet lock (Surface)/ Magnetic lock (Shear)/ Door Strike/ Electric Bolt/ Delayed egress lock*

What mode will the device be in when power is removed?
-Non Fail Safe/ Secure (locked) or Fail- Safe (Unlocked)

Operating Voltage? *12 or 24 volts*
Most Voltage Type? *AC or DC*
**Magnetic locks require DC voltage. If you used AC voltage on a door strike it will "buzz" and DC voltage operation is silent.*

Door Strikes / Chose duty cycle:
_____*Continuous Duty: Power is applied more than one minute of operation (Failsafe)*
_____*Intermittent Duty: Power is applied for less than one minute of operation*

Door contact? Recessed / Surface / Built into lock
*Color*_____
Normally open or normally closed

Other Options:

Request to Exit Device: *Motion sensor / Push button / mechanical exit bar*
*Other*_____
Annunciator : *Surface-mount Siren, Flush-mount Siren, Strobe, Integration*
Remote Release: *Push button, Wireless remote, Other*_____

III. Door Hardware Planning / Overview:

Door / Portal Name:_____
Identify existing door hardware:
Type: Standard Mortise Cylindrical Rim Style Dead Bolt

Exit Device: Concealed Vertical Rod Surface Vertical Mortise Rim Style
Brand Name (Model):_____

Dimensions: ANSI_____ **Other:**_____

Latch: _____*½"* _____*5/8"* _____*¾"*

_____**Off-Set Latch** _____**No Off-Set Latch**

Door material:
*Wood Metal Glass Other:*_____

Frame material and dimensions:
Material: _____*Steel (Specify Squared corner strike)*
_____*Aluminum (Specify rounded corner strike)*

_____*Wood*
_____*Other*

Door Finish: *Duranotic (Bronze) Aluminum Other:*_____

Door Type:
Single Double in-swing Medium Hgt Turnstile Full Hgt Turnstile
*Optical Turnstile Parking Gate Other:*_____

Door Type:
Employee Visitor Employee/Visitor Fire Exit
*Other:*_____

Misc. Door Info:
Exterior Interior Fire Rated Required Fire Exit
*Other:*_____

System integration: (NFPA)
*Fire System? Manufacture?*_____
*Mounting location for system by pass pull station?*_____
** Note in most applications Fire code requires free egress. You will be required to integrate an output to release some locking devices. (Magnetic Locks) Check with your local authority having jurisdiction or NFPA code*

*Required Hardware Changes:*_____
_____

IV. Reader Mounting Options:

Surface Flush Interior Exterior Weatherized Handicapped
*Other:*_____
Mounting Surface:
Brick/Stone Glass Pedestal Mullion
*Other:*_____