# Grounding/Shielding Recommendation

Our general recommendation for field installation is based on cabinet build systems. Such installations typically have long cable length (distance from sensors to systems). For such installations we recommend using double shielded cables and to have a grounding concept with 3 different grounds (ME - Measurement Ground, SE – Shield Ground, PE – Protective Ground) as shown from picture below.
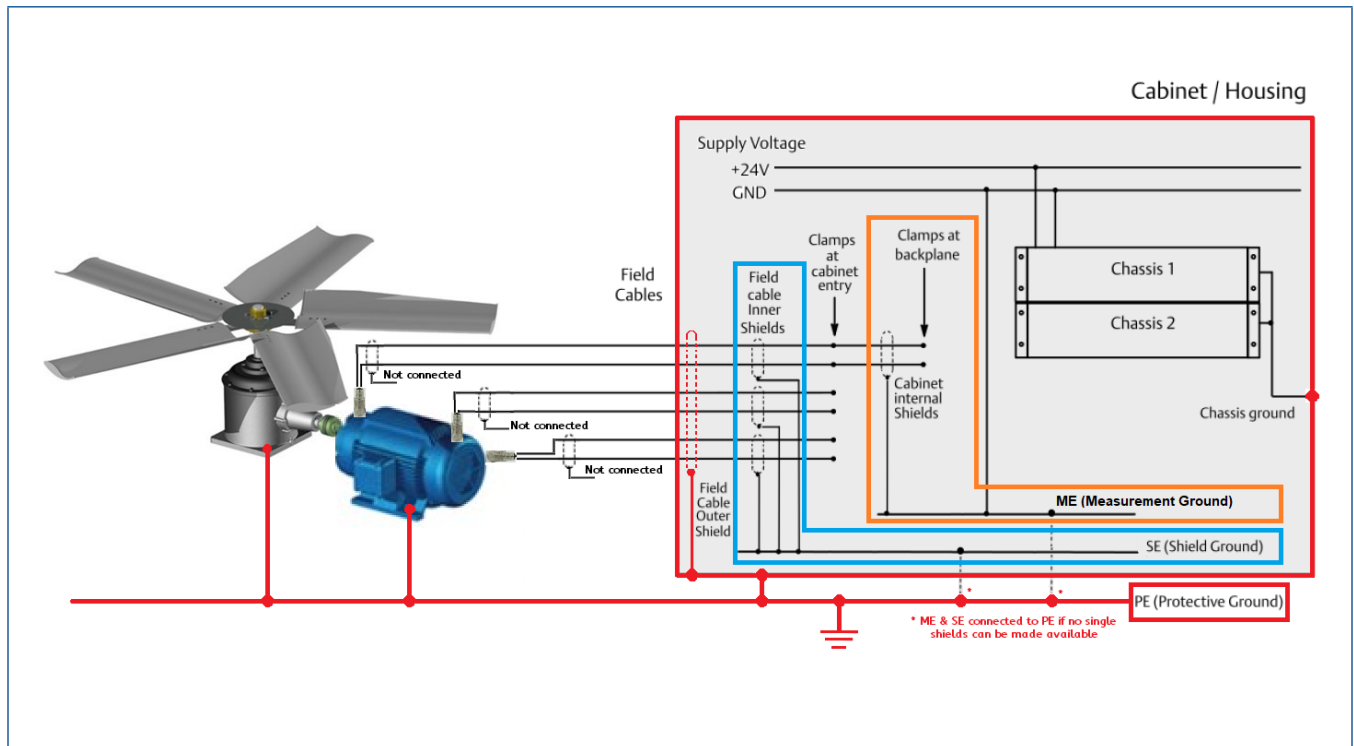
This general recommendation shows how we expect that EMI (Electromagnetic Influences) can be managed as best as possible for reduction of influences to signals, caused by EMI. Spoken from experience, most sites only provide two shields which finally combines ME (Measurement Ground) and SE (Shield Ground) to be one potential. This finally means for cabinets which are usually built to support all three Grounds, ME & SE are linked within the cabinet.

If now looking to AMS Asset Monitor, the expected field installation situation is completely different to a cabinet build system since we expect field wiring cable length being short distance (up to 10m) and single shielded (no multipair). AMS Asset Monitor is expected to be installed directly at, or close to the Asset itself.

For this reason, AMS Asset Monitor does not have the ME (Measurement Ground) available and does not need this for reason that there is no internal wiring within AMS Asset Monitor. Cable wires driven into the AMS Asset Monitor are directly connected to the CHARM terminals.

Further to this and for reason that we expect sensor cables, driven into AMS Asset Monitor, being short distance and thus single shielded, AMS Asset Monitor does not have a general need for SE (Shield Ground) terminals.

Resulting from the non-existing need for having SE & ME ground potentials with localized systems like AMS Asset Monitor, we expect and recommend connecting all shields and Box housings to PE (Protective Ground) finally.

Our general recommendation, as described from the manual as well, is to connect cable shields on machine end to PE and leave shields unconnected on AMS Asset Monitor side. Shielding at machine side to PE brings the advantage that EMI will not be driven to the data processing system.
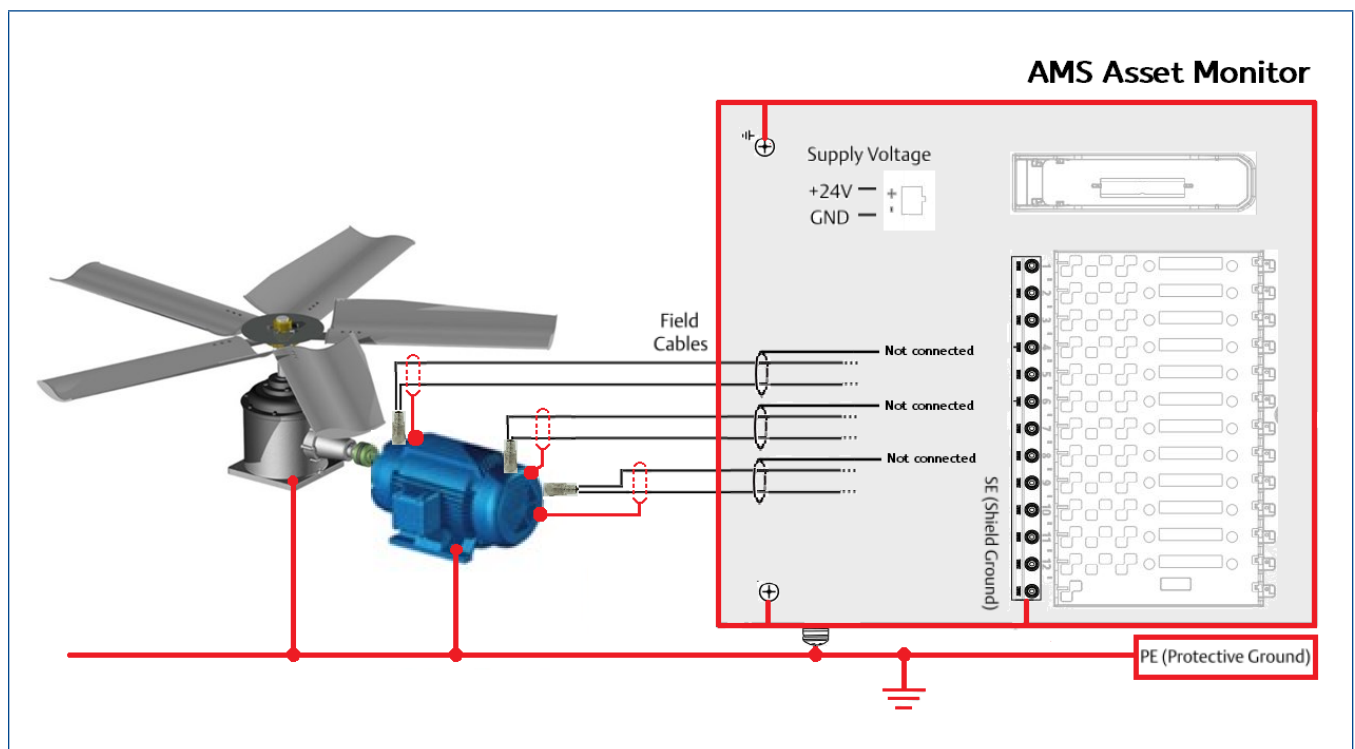
In case that internal grounding is required, AMS Asset Monitor has an internal terminal bar available directly below the CHARM terminal connectors. This bar is connected to the AMS Asset Monitor Box housing and thus it is connected to the external & internal grounding terminal screws (see below from picture in red).

As said before, grounding the shields within AMS Asset Monitor is not recommended but optionally.

Resulting from the non-existing need for having SE & ME ground potentials with localized systems like AMS Asset Monitor, we expect and recommend connecting all shields and Box housings to PE (Protective Ground) finally.
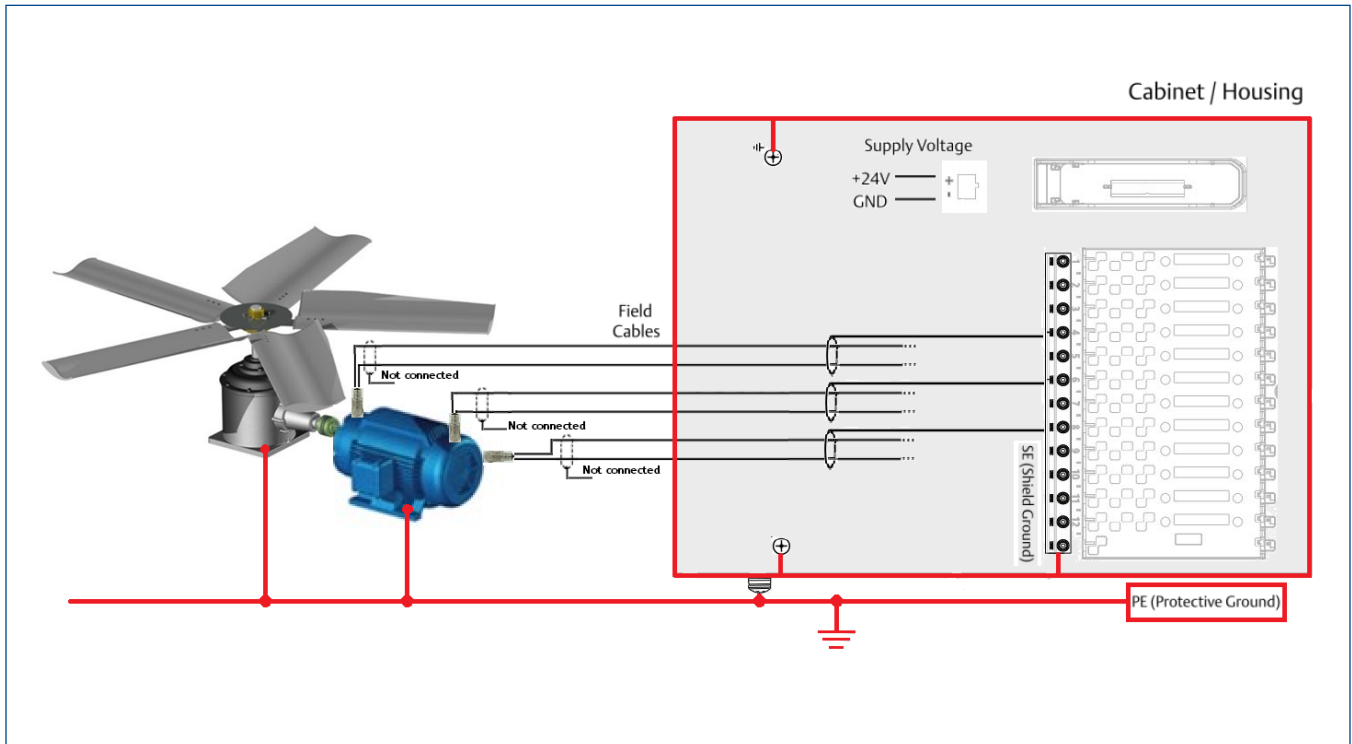
When now thinking about the general installation concept of an AMS Asset Monitor with having needs to provide +24V power to the AMS Asset Monitor itself but potentially having needs to supply sensors and converters externally you may need to consider an additional field box for installation of such equipment. The picture below shows the wiring and grounding in this case but also describes how potentials may be set automatically by using CHARMs.

This means that if having a Tach CHARM installed, Pin 2 of the Tach CHARM Terminal is automatically connected to System GND thus we recommend to not jumper box power supply (+24V) GND to converter power supply (-24V) separately within the field box for not building ground loops if a Tach CHARM is used.

Further to this, if no Tach CHARM is installed but using Voltage CHARMs with Eddy Current Measurement Chains, we recommend to jumper Box Power Supply (+24V) GND to Converter Power Supply (-24V) individually.

Finally, if not using eddy current measurement chains or other sensors that require external power supply, AMS Asset Monitor power supply (GND) is isolated to ME/SE & PE and needs to be connected individually where required.
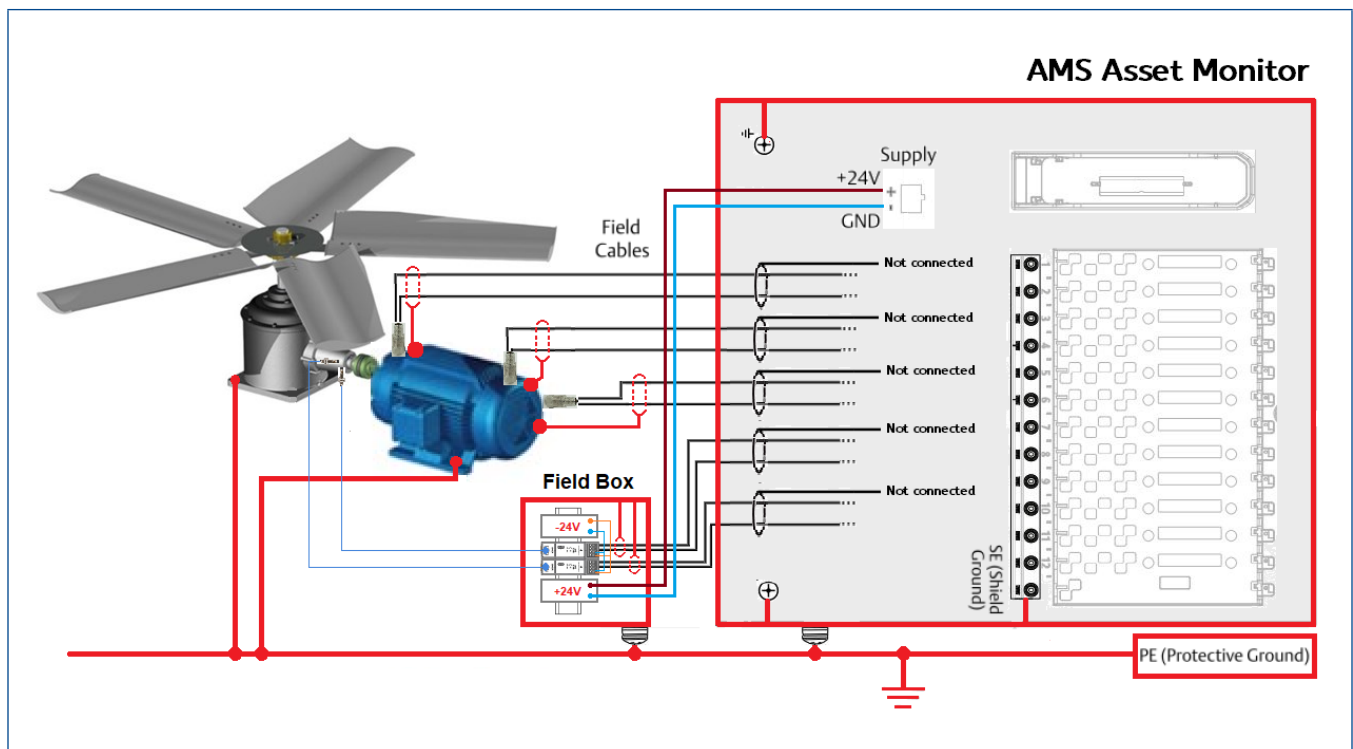
Conclusion

Always make sure that all installation requirements, as shown from the "AMS Asset Monitor – Installation Guide" are taken into consideration. This includes to only operate the AMS Asset Monitor with closed box cover for reduction of EMC/EMI effects. Further to this, always try to keep input signals clean which means to take care of proper shielding, shorten the cable to minimum length required, avoid signal & power cables being installed close to each other, etc. …

Wherever GND connections (e.g. System GND to PE) need to be established manually, we recommend providing those within the field box where the Power supplies and converters are located. This allows easy access and adding additional terminals by using DIN-rail terminal blocks where needed.

CHARM Grounding Details (How to access GND where required)

As described above, per default PE (Protective Ground) and System Ground (Supply GND) are separated if having no CHARMs connected to the AMS Asset Monitor. From listing below you can see the isolation resistances of the different CHARMs and how to access GND where required.

PE Protecting Ground Terminals:

- **AMS Asset Monitor Box chasse**
  - Use external- & internal screws and (SE) shield bar for connection

System Supply (Instrument) Ground at CHARM Terminals:

- **VI Piezo CHARM (with power ON, single-ended)**
  - Terminal 2 is connected to Instrument Ground

- **VI Piezo CHARM (with power OFF)**
  - Input is floating with resistance of 200-500kOhm
  - Use Terminal 2 to be connected to Instrument Ground if needed (recommended)

- **VI Voltage CHARM**
  - Input is floating with resistance of 200-500kOhm
  - Terminal 2 could be connected to Instrument Ground if needed (recommended)

- **VI Tach CHARM**
  - Terminals 2 & 4 are connected to System (Supply) Ground per design
  - Where required use Pin 4 to access System (Supply) Ground within AMS Asset Monitor

- **RTD CHARM**
  - Terminals are galvanically isolated to System (Supply) Ground

- **TC CHARM**
  - Terminals are galvanically isolated to System (Supply) Ground

- **AI CHARM**
  - Input Terminal 2 is connected to System (Supply) Ground with resistance of 250 Ohm

- **DI CHARM**
  - Input Terminal 2 is connected to System (Supply) Ground with resistance of 4800 Ohm

- **DO CHARM**
  - Input Terminal 2 is directly connected to System (Supply) Ground

- **Address Plug**
  - Isolated Terminals +/- for external voltage distribution (don`t use for GND connections)

NOTE:

The zero (-) Pin of Power Supply relates to System Supply (Instrument) Ground. Wherever GND connections (System Supply Ground to PE) need to be established manually, we recommend providing those within the field box (external) where the Power supplies and converters are located. This allows easy access and adding additional terminals by using DIN-rail terminal blocks where required.

Technical Support

Emerson provides a variety of ways to reach your Product Support team to get the answers you need when you need them:

Phone	Toll free 800.833.8314 (U.S. and Canada)
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Email	**Guardian.GSC@Emerson.com**
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