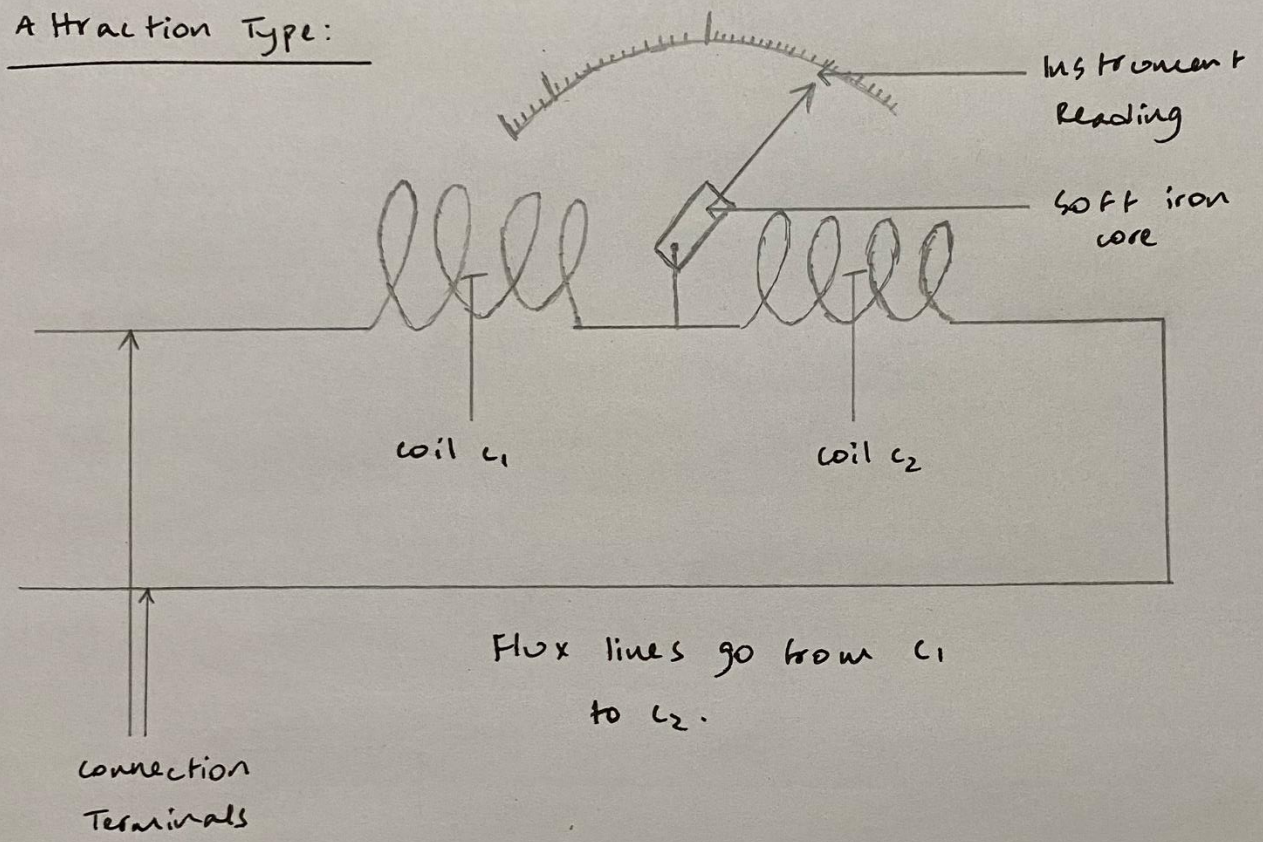
# MI Instruments

MI stands for moving iron, which is the primary component for the operation of these instruments. There are 2 types of moving iron instruments - attraction and repulsion type.

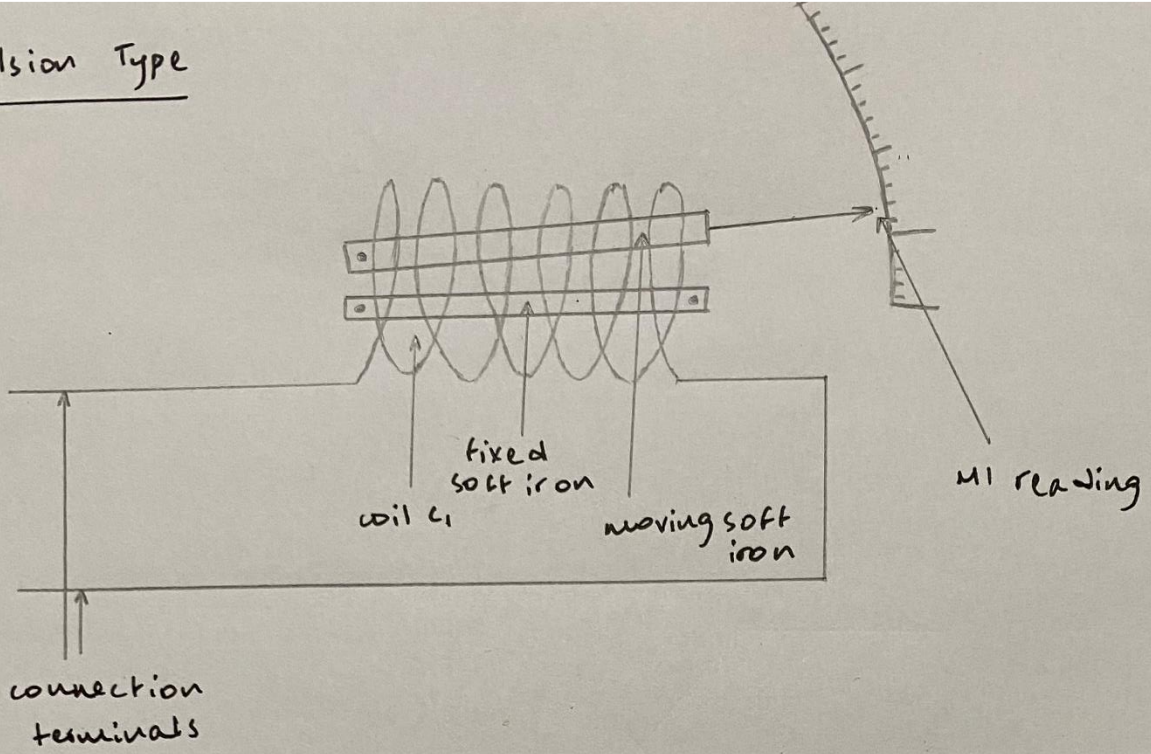
## Attraction Type:




Since flux lines go from $C_1$ to $C_2$, the soft iron is attracted towards $C_2$, giving the deflection that can be measured.

The soft irons pointer is connected with a spring, which counters the deflection. When the torque of deflection equals the torque that the spring exhibits, the pointer will be at equillibrium. Since the deflection of the pointer depends on the current and the iron core is being attracted by the strength of the flux, this an attraction type MI instrument.

## Repulsion Type




As flux is created through the coil $C_1$, a north and south pole are created, in reaction to this, the soft iron cores will start to repel each other since they are aligned with the flux lines. The fixed soft iron cannot move, and only one side of the movable soft iron is free. This side moves and gives a reading. The repulsion force is proportional to the square of the current. Because the soft iron cores are repelling, this is the repulsion type of MI instrument.

PMMC vs. MI instrument Differences

| Aspect | PMMC | MI |
|---|---|---|
| working Principle | The conductor coil is used to measure | A soft iron core influenced by the coils is used to measure |
| current Type | can only measure DC. | can measure AC and DC. |
| Damping Type | uses air or liquid type damping. But commonly eddy current damping | Mostly uses air or fluid damping |
| Deflection with current | Deflection is proportional to current | Deflection is proportional to current squared. |