LPA Group PLC
PROVIDING SOLUTIONS

WHY DO I HAVE TO DE-RATE MY CIRCUIT BREAKERS?

*Mike Raynor explains why **LPA Channel Electric** has included a range of **Hydraulic-Magnetic** miniature circuit breakers under the brand name of **HY-MAG** into their product portfolio.*

Are you Fed up with having to de-rate the circuit breakers that go into your equipment because of expected changers to ambient temperature in their working environment?

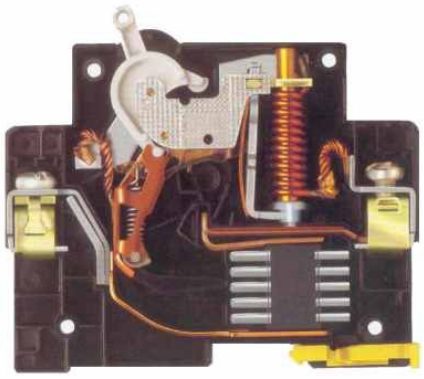
Well **LPA Channel Electric** has now introduced a product that does away with this inconvenience.

HYDRAULIC-MAGNETIC TECHNOLOGY

As stated above the **HY-MAG** range of circuit breakers operate on the **Hydraulic-Magnetic** principal which is extremely precise, making it invaluable for use in "modern" industrial equipment that can eventually find itself in any temperate zone in the world.
A **HY-MAG** circuit breaker consists of a magnetic frame comprising a series-connected solenoid coil wound around a hermetically sealed tube containing an iron core, a spring and hydraulic fluid. Mounted onto this magnetic frame is an armature, which when activated unlatches the trip latch of the circuit breaker. As the electrical current passing through the coil increases, the strength of the magnetic field around the magnetic frame also increases. As the current approaches the circuit breaker's rating, the magnetic flux in the coil produces sufficient pull on the core to overcome the spring tension and start it moving towards the pole piece. If the overload is of short duration, the core returns to its rest position once the overload disappears. However, if the overload persists, the core reaches the pole piece. The armature is now attracted to the pole piece, this in turn unlatches the trip latch causing the circuit breaker to trip, thereby opening the electrical contacts and stopping the flow of current. As there is now no current flowing in the circuit the core returns to its rest position.

25 Amp 13mm Q Frame HY-MAG

Internal View of a HY-MAG Circuit Breaker



Advantages of the HY-MAG's Hydraulic-Magnetic Principle

1. The current ratings are not affected by **Ambient Temperatures** between the temperature ranges of **-20ºC to +60ºC,** therefore **NO** de-rating is required. Its main rival, the Thermal-Magnetic circuit breaker is calibrated to operate at fixed temperatures only, which is 30ºC or 40ºC depending upon its specification. Above or below these temperatures they must be de-rated.

2. **NO** further **Group De-Rating** is required due to the effect of **Parasite Heating** when 2 or more circuit breakers are mounted side by side. It is recommended by some manufacturers of Thermal-Magnetic circuit breakers that they be de-rated by as much as another 20% to allow for the effects of **Parasite Heating.**

3. **No Thermal Memory.** Because the **HY-MAG** product does not rely on heat as its reference point for tripping, it can be reset immediately after the fault as been cleared, saving equipment down time.

4. Because the **HY-MAG** product does not have a Bi-Metal strip inside it constantly flexing during its lifetime it does not fail over time due to **Thermal Fatigue.**

5. The **HY-MAG** product has less moving parts, so they therefore carry a **10-year warranty** on their circuit breakers and **3-year warranty** on their RCD's**.**

6. On current ratings up to 25 Amps the **HY-MAG** range is only 13mm in width, saving you space and weight in your equipment.

7. **Lower Standard Ampere** ratings**. LPA Channel Electric** stock Ampere ratings as low as 1 Amp in this range.