

Claims

1. A sensor comprising:
a magnetic field source,
at least one flux conducting soft magnetic element with at least one air gap and
at least one magnetic field sensor located in the air gap and measuring a change
of the magnetic field of the magnetic field source,
wherein
the flux conducting soft magnetic element consists of 35 % by weight $\leq$ Ni $\leq$ 50
% by weight, 0 % by weight $\leq$ Co $\leq$ 2 % by weight, 0 % by weight $\leq$ Mn $\leq$ 1.0
% by weight, 0 % by weight $\leq$ Si $\leq$ 0.5 % by weight and 0.5 % by weight $\leq$ Cr $\leq$
8 % by weight and/or 0.5 % by weight $\leq$ Mo $\leq$ 8 % by weight, wherein (Mo+Cr)
 $\leq$ 8, the rest iron and unavoidable impurities.
2. A sensor according to claim 1, wherein
the magnetic field source comprises a direct current or an alternating current
which generates a magnetic field.
3. A sensor according to claim 1 or 2, wherein
the sensor further comprises at least one winding wound around the flux
conducting soft magnetic element.
4. A sensor according to any of claims 1 to 3, wherein
the sensor is a current sensor.
5. A sensor according to claim 1, wherein
the magnetic field source comprises a permanent magnet movable relative to the
flux conducting soft magnetic element.
6. A sensor according to claim 5, wherein
the permanent magnet is mounted on a rod.

7. A sensor according to claim 5 or 6, wherein the permanent magnet comprises a plurality of areas with alternating directions of magnetisation.
8. A sensor according to any of claims 1 and 5 to 7, wherein the sensor is a position sensor.
9. A sensor according to any of the preceding claims, wherein the flux conducting soft magnetic element forms a magnetic circuit with at least one air gap.
10. A sensor according to any of the preceding claims, wherein the flux conductor has one or more slots, each of which provides an air gap.
11. A sensor according to any of the preceding claims, characterised by
$$38 \% \text{ by weight} \leq \text{Ni} \leq 45 \% \text{ by weight}.$$
12. A sensor according to any of the preceding claims, characterised by
$$1 \% \text{ by weight} \leq (\text{Cr} + \text{Mo}) \leq 8 \% \text{ by weight}.$$
13. A sensor according to any of the preceding claims, characterised by
$$0 \% \text{ by weight} \leq \text{Co} \leq 0.5 \% \text{ by weight}.$$
14. A sensor according to any of claims 1 to 11, wherein the magnetic field sensor comprises a strip of amorphous soft magnetic material.
15. A sensor according to any of the preceding claims, wherein the magnetic field sensor is a Hall probe.
16. A sensor according to any of the preceding claims, wherein two or three magnetic field sensors are provided.

17. A sensor substantially as described herein with reference to, and as illustrated in, the accompanying drawings.