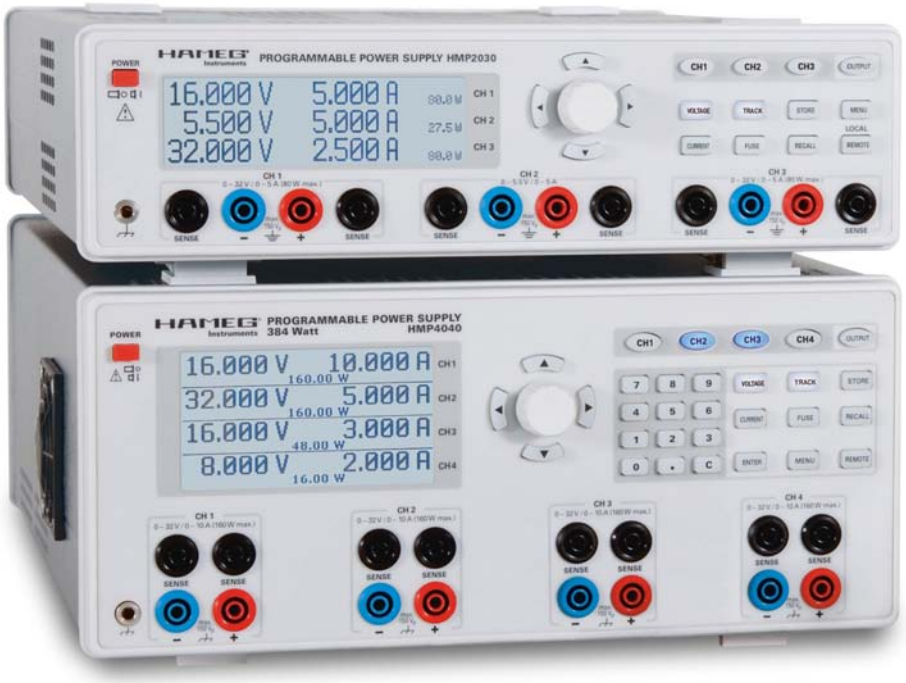
HAMEG
Power Supplies

Laboratory Power Supplies – more than just voltage and currents stabilizers



HMP power supply series with 188 W and 384 W outputs

Every electronic laboratory has power supplies which deliver the voltages and currents required by the test circuits. Voltage and current adjustment features, the number of channels and the price are the standard selection criteria when buying decisions are to be made. However, often the practical application when powering modern microelectronics will reveal that a whole set of additional properties will be required. First, the residual ripple will be obvious which should not exceed the ripple of the power supply in the series product. The ripple is mostly specified in the data sheet and it is dependent on the design. The HAMEG power supplies use standard power transformers, preregulators and precision linear series regulators in order to achieve minimum ripple. This combination yields residual ripple voltages of 150 µV even up to 10 A and a higher efficiency than possible with linear regulators only. The higher efficiency is transparent to the customer because the built-in fan will mostly remain almost inaudible in the background. Next to the residual ripple the adjustment and back-reading resolution will be important when powering modern electronic circuits. Of course, any voltage and current may be measured with precision digital multimeters. However, it is more practical and definitely more cost-effective if this multimeter function is already incorporated in the power supply. This requires the use of high resolution A/D converters at the output channels of the power supplies the results of which can be displayed. The HMP4040 e.g. uses 8 such A/D converters which resolve up o 32,000 digits with an accuracy of typically 0.05 %. This yields a resolution of 1 mV and 1 mA, at lower currents down to 100 µA allowing the user precise control of his test set-up.

During the design phase in the lab as well as during production tests often diverse scenarios of voltage supplies are required in order to test the behaviour of the test object with respect to voltage variations. In order to prevent the destruction of the test object by inadvertent false programming, it is necessary to set an upper limit for the voltage. This „Overvoltage Protection OVP" feature is provided in the HMP power supplies: the maximum voltage can be set and the feature may be activated for each channel separately. Thus it is impossible to exceed the maximum voltages set, irrespective of the voltage settings on the power supply. Of course, this is also possible for currents by using the integrated electronic fuse function.

If a multi-channel power supply powers a test object with several modules, it may occur that one module malfunctions and „blows" the electronic fuse of the power supply. Often, in such constellations, the modules are directly

interdependent. If e.g. the channel 1 of the power supply powers the control module of 2 motors of a coordinate table while the channels 2 and 3 power the motors, it is evident that in case of a malfunction of the control module also the power to the motors must be switched off. On the other hand, if one motor malfunctions, the control module must remain powered while the complementary motor must be switched off. The HMP series allows to program the electronic fuses in such a manner that blowing the fuse of channel 1 will also switch channels 2 and 3 off. This ensures that a malfunction of the control unit can not cause any damage by the motors remaining powered. At the same time it is possible to program that any malfunction in channel 2 or 3 will cause switching off of only the complementary branch while the supply of the control unit will remain unaffected. This property is called „FuseLink".

In addition to the protective circuits and their combinations it is today often required to freely program the sequence of voltages and currents, e.g. in order to emulate the recovery of a circuit from the Low Power status. The HMP series offers arbitrary voltage and current programming on all channels and thus allows the user maximum flexibility. The programming may be performed directly on the instrument or by a free PC software. The applications described in this article are but a small portion of today's variety of applications, they show that modern power supplies must have many more features than just voltage and current regulation.