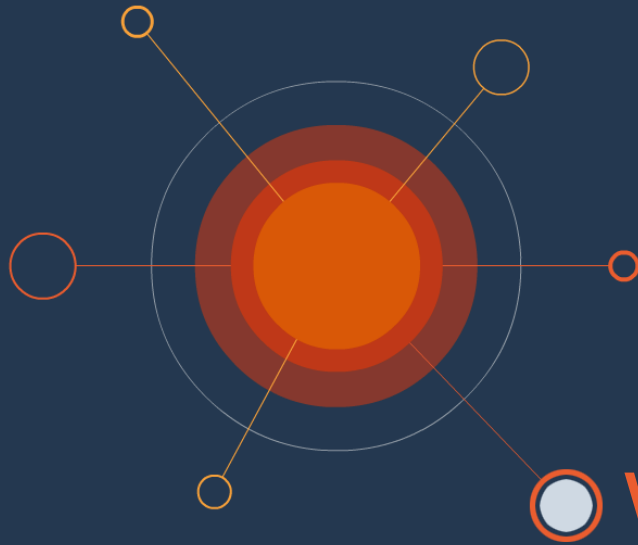




VAC Sales USA

Current Sensor Products

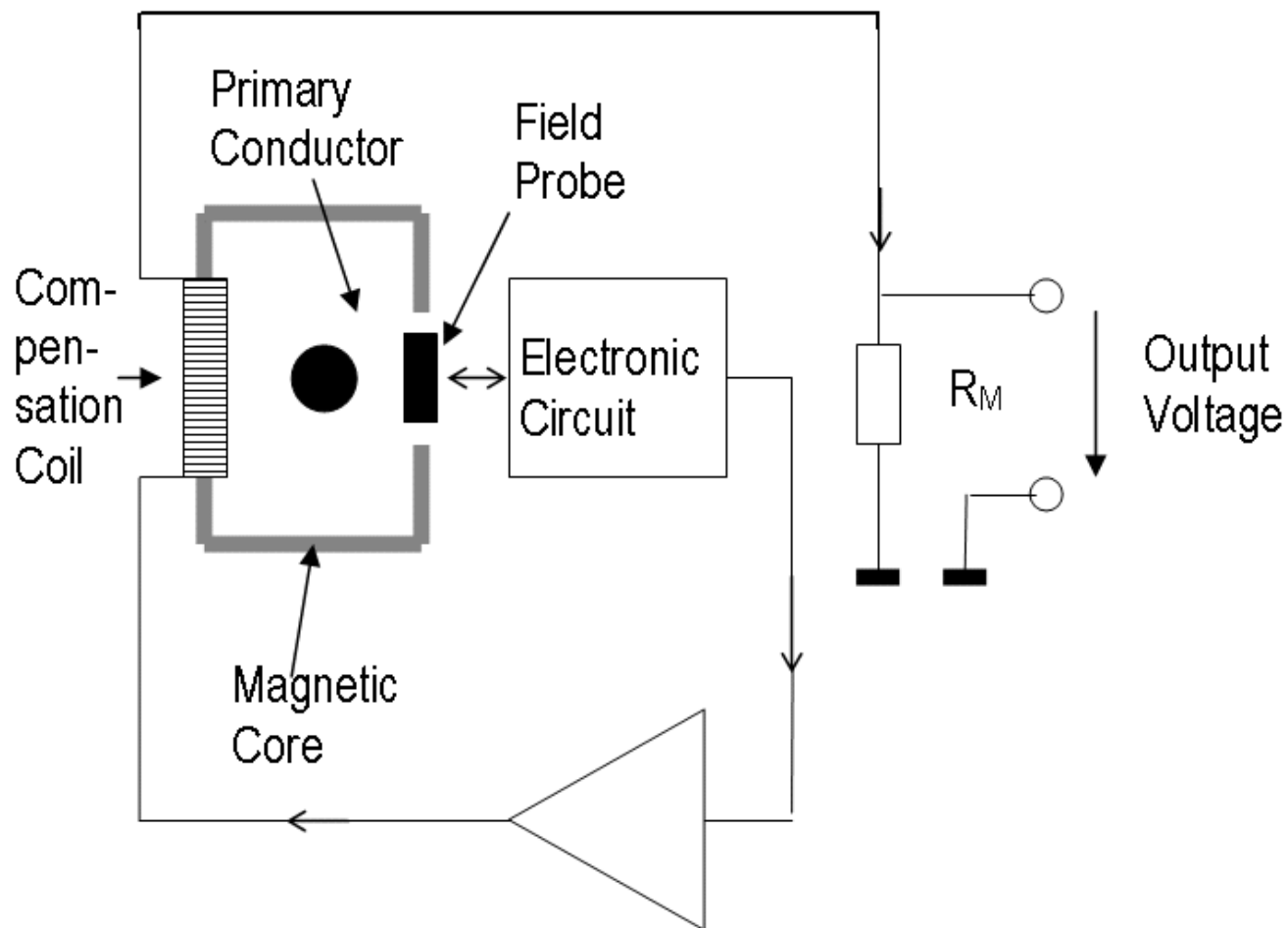
Mark Rine
Product Manager
Elizabethtown, Kentucky

Current Sensors / Function

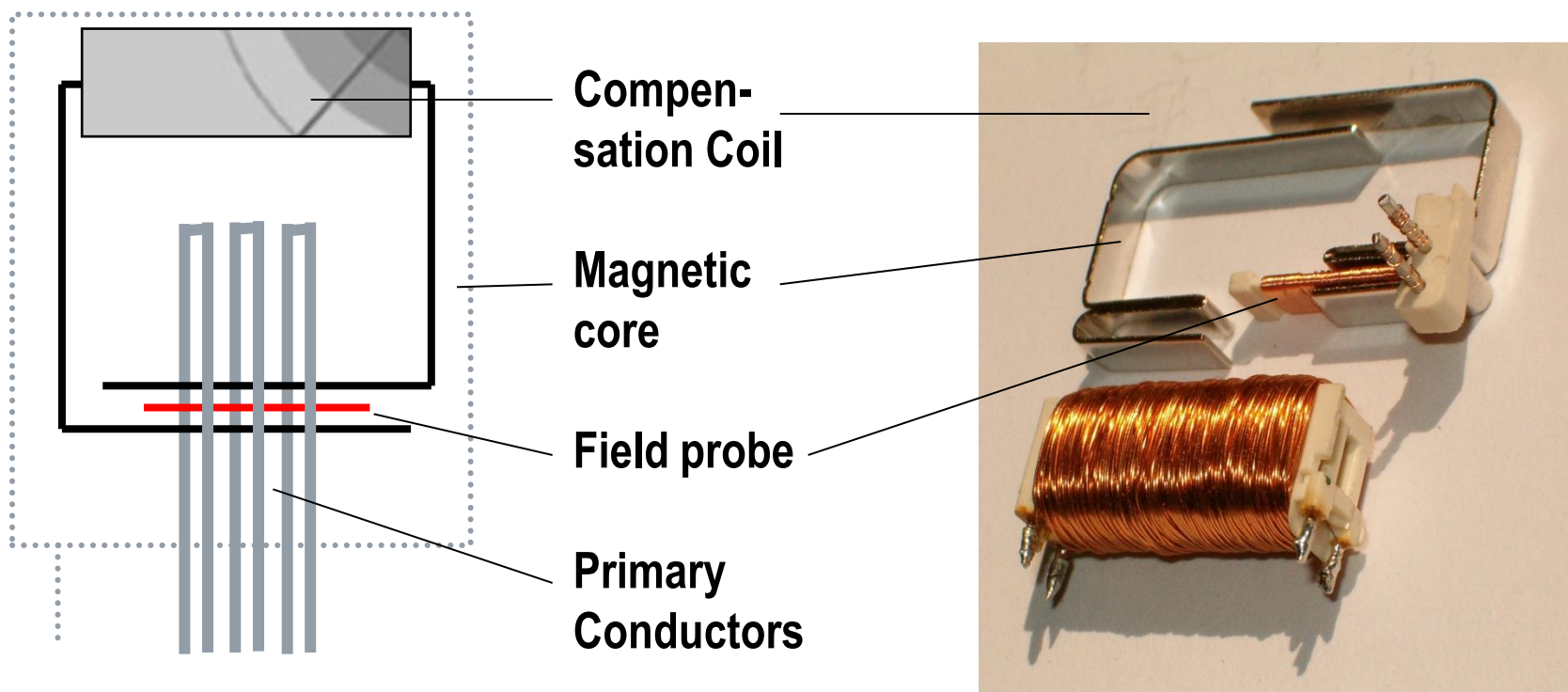
- Measure currents from DC up to high frequencies (approximately 200 kHz)
- Contain a galvanic separation between the primary circuit and the output signal (e.g. according to EN 50178 or EN 61800)
- Typical currents range from a few amperes up to several hundred amperes full range. Some sensor types can measure more than 1000 ampere peak current.
- Their accuracy lies in the range of $<1\%$ of the nominal current.



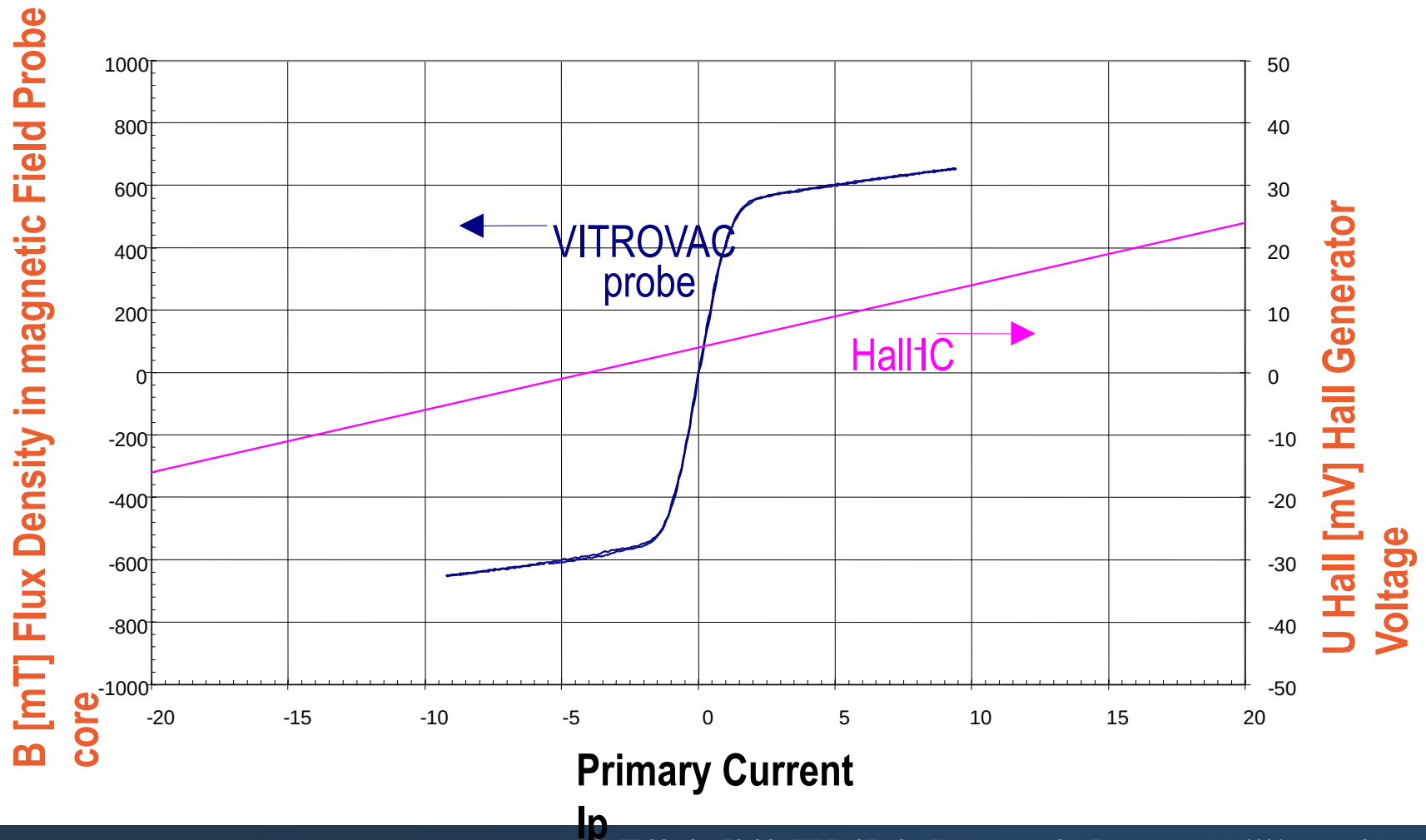
Block Diagram



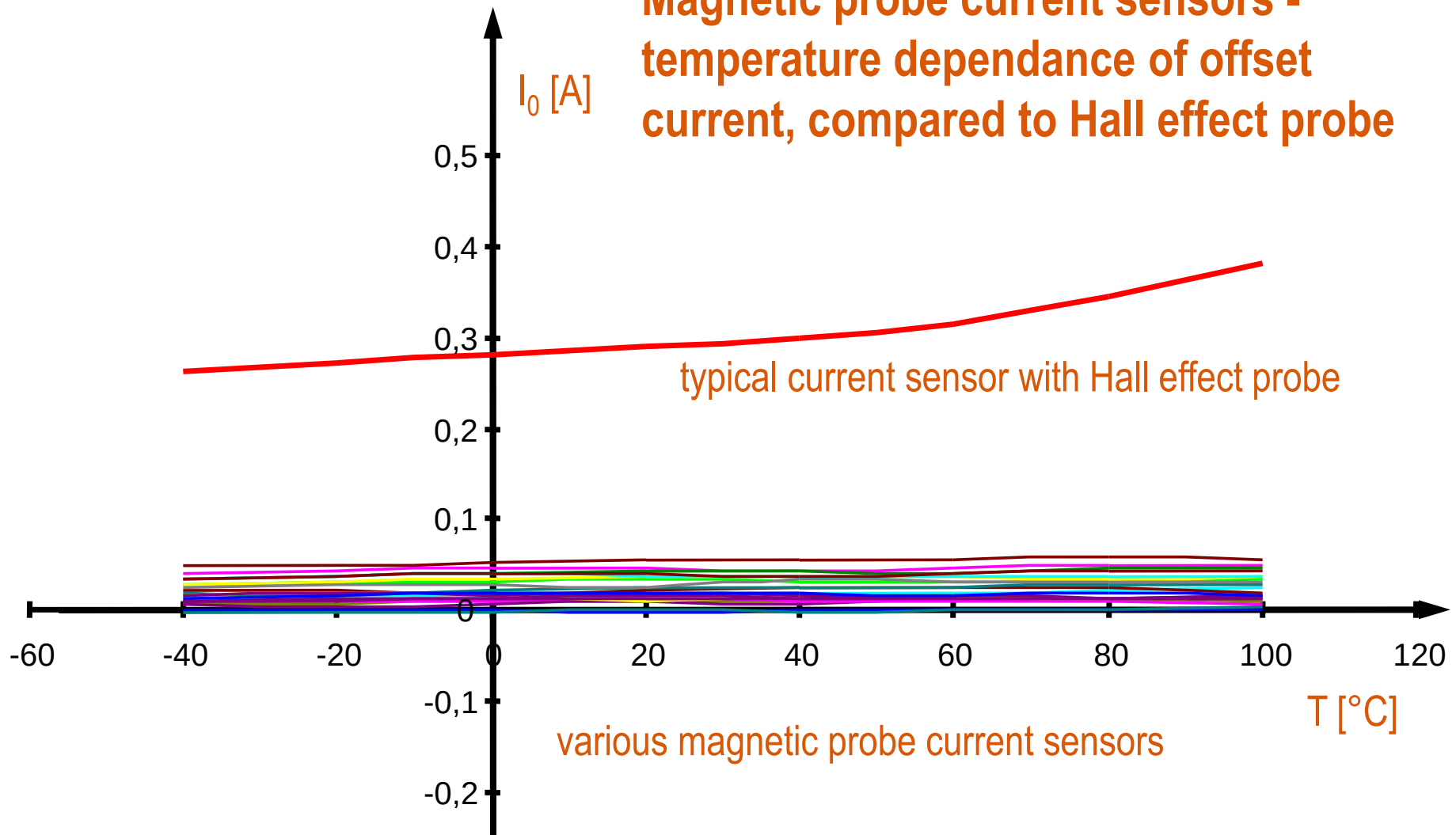
Schematic construction and key components of a magnetic probe current sensor



Magnetic Field Probe – Gain compared to Hall Effect Probe



Magnetic probe current sensors - temperature dependance of offset current, compared to Hall effect probe



Accuracy of open loop, closed loop Hall effect and closed loop magnetic probe sensors

Typical 25 A sensors, 5 Volts single supply, voltage output: non – compensable errors of gain and offset and their temperature drifts.

Sensor type	Total error	Total error
	+20 ... +85 °C	-25 ... +85 °C
VAC closed loop mag probe	1,0 %	1,4 %
closed loop Hall probe	2,0 %	2,9 %
open loop	7,6%	12,2 %

Current Sensor / Applications

Motor current monitoring in variable speed drives,

Battery- and output current sensing in uninterruptible power supplies,

Output current capturing in welding inverters,

Input-, output-, as well as fault-current detection in photovoltaic systems

Numerous other tasks in the field of switched-mode power conversion.

Current Sensor Competitors / VAC Advantages

-Closed Loop Sensors

LEM (Switzerland)

Tamura (Japan)

VAC Advantages – Competition uses Hall Effect sensors. VAC uses soft amorphous core (magnetic probe) for sensing. VAC product is more accurate and accuracy is more stable over temperature changes.

-Open Loop Sensors

Multiple vendors.

VAC Advantage – Accuracy. Open loop are less expensive. VAC product can only be sold in applications requiring high accuracy (< 2-5%)

-Shunts

Multiple vendors

VAC Advantages – Dielectric separation and a loss free measurement system.

Current Sensor Sales Tools Brochure and VAC Website www.vacuumschmelze.com products/cores and inductive components/ applications / current sensors



New active current sensors for maximum accuracy

- Closed – loop sensors, using a patented soft – magnetic probe as the zero – field detector.
- three new type series for rated currents of 6 A to 100 A and peak currents up to ± 200 A in compact designs
- types for + 5 Volt power supply with voltage output, optionally internal or external reference voltage
- types for +/- 12 ... 15 Volt power supply with current output
- very good measuring accuracy, minimum DC offset with very low hysteresis
- negligible output noise or periodic signal at zero input
- very low temperature dependence and long-term drift of the output variable
- low rise time, wide frequency range
- low-cost constructions
- compatible dimensions and pinning
- VDE- and UL –approvals under preparation
- new reflow – solderable types (paste-to-pin)

Three new VAC current sensor series

VAC offers 3 new current sensor series for PCB mounting in which electronics and primary conductors are integrated.

The patented VAC principle of the closed – loop sensor with magnetic probe as a zero field detector is distinguished by maximum precision of the current detection. The electronics of the new VAC current sensors are concentrated almost entirely in a new IC, which is a common development with a leading semiconductor manufacturer.

Some of the new types are smaller than previous VAC sensors but all of them offer the detection of high maximum and continuous currents. The new VAC sensors can be used 1:1 in many customer applications without adaptations.

Typical applications

- Variable speed drives
- Uninterruptable power supplies
- Welding inverters
- Switched mode power supplies
- Photovoltaics



Current Sensor Sales Tools

Cross Reference

Tables



Cross-reference list

The sensors of the new VAC type series can replace competitive products in many cases and usually offer superior technical properties regarding accuracy, temperature drift and quality of the quiescent signal. The following table only lists the competitive types with which the new VAC types are electrically and mechanically compatible according to the data sheet comparison. The customer is responsible for the actual suitability in his specific application.

A large number of other competitive types can be replaced functionally but the user needs to make adaptations, e.g. change the circuit board layout. Please ask about these.

VAC item number Type T6040-N...	LEM	Honeywell	F.W. Bell	Tamura	Telcon	Remarks
	4646-X653	LTS 6-NP1		S22P006S05		(1) VAC - type with smaller centre hole
	4646-X652	LTS 15-NP1		S22P015S05		(1) VAC - type with smaller centre hole
	4646-X651	LTS 25-NP1		S22P025S05		(1) VAC - type with smaller centre hole
	4646-X653	LTSR 6-NP1				(1) VAC - type with smaller centre hole
	4646-X652	LTSR 15-NP1				(1) VAC - type with smaller centre hole
	4646-X651	LTSR 25-NP1				(1) VAC - type with smaller centre hole
	4646-X300	LA 25-NP	CSNE 151 CSNE 151-005 CSNE 151-007 CSNE 151-010	CLN 25 CLSM 25 1	HTP25NP	(2) F.W. Bell - type suitable for V_{OC} up to ± 18 V
	4646-X400	LAH 25-NP			HTP25CPT3 HTP25CPTH3,4	(3) VAC housing 3mm wider (4) Telcon - type with add. centre hole
	4646-X410	LAH 50-P/SP1			HTP50CPT3 HTP50CPTH3,4	(3) VAC housing 3mm wider (4) Telcon - type with add. centre hole
	4646-X412	LAH 50-P			HTP50CPT/2K3,4	(3) VAC housing 3mm wider (4) Telcon - type with add. centre hole
	4646-X412	LAH 100-P			HTP100CPT/2K3	(3) VAC housing 3mm wider
	4646-X413	LAH 100-P/SP3				
	4646-X450	LAS 50-TP				
	4646-X451	LAS 100-TP				