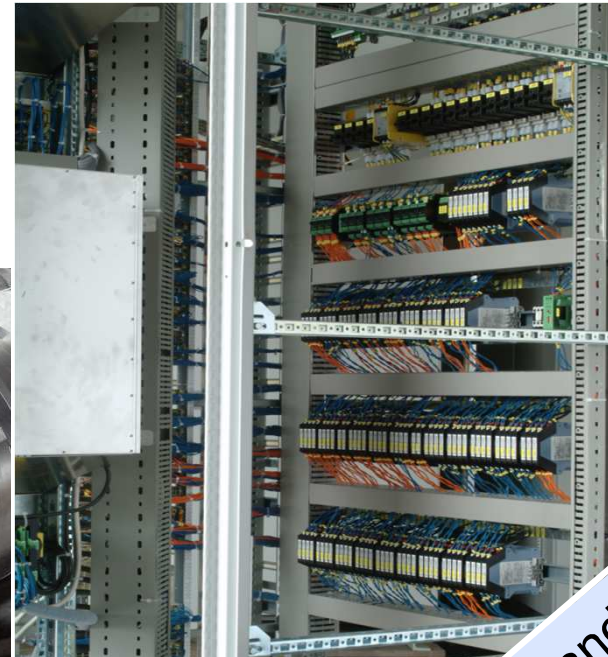





Isolation Amplifier Application Examples

Isolation Amplifier Applications



Cold and Hot Rolling Mills Strip Processing Lines



Application Details	Remark	Standard Signals	Universal U / I	Temperature Isolated Supplies
<ul style="list-style-type: none"> Control cabinets for rolling mills Various signals like temperature, speed, tension/force, position et cetera are measured & galvanically isolated 	<ul style="list-style-type: none"> hot rolling mills typically need much higher isolation amplifier quantities as compared to cold rolling mills 			

Isolation Amplifier Applications



Urban Transport Traction Network Protection



Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Power supply for metros, streetcars, ...
- Current & voltage measurement as input for protection relay → tripping of high-speed circuit breakers

Remark

- High CMRR
- High isolation levels (600 to 3000 V DC working voltage)



(P27000), P40000

Isolation Amplifier Applications



Photovoltaic Power Plants

Central Inverters
String Monitoring



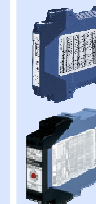
Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- String voltage ≤ 1000 VDC, Safe Isolation
- Currents (e.g. ≈ 500 A) at inverter input precisely measured via shunt resistor
- Testing of frequency inverters

Remark

- Competes with multiple string current (≈ 10 A) measurement \rightarrow more expensive but also more information.



P41000, P42000, P27000

Isolation Amplifier Applications

Fossil Power Generation Isolation of sensor inputs & control outputs



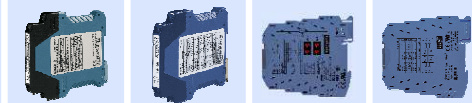
Application Details

- Galvanic isolation of standard signals
- Conversion of sensor (transducer) output to appropriate control input
- Temperature measurement

Remark

- High reliability and precision required
- High number of measurements
- Large quantities of isolation amplifiers used

Standard Signals
Universal U / I
Temperature
Isolated Supplies



B13000, P15000, A26000, P27000, P32000, A20210, A20300 (signal doubler)

Isolation Amplifier Applications



Water Power



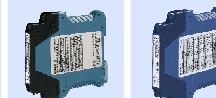
Application Details

- Galvanic isolation of standard signals for turbine control system
- Measurement of DC link currents and voltages (if Inverter / DC link is used)

Remark

- High reliability and precision required

Standard Signals
Universal U / I
Temperature
Isolated Supplies



B13000, P15000, P27000

Isolation Amplifier Applications



Wind Power



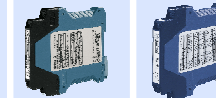
Application Details

- Testing of wind turbines
- Testing of frequency inverters
- Standard signal isolation
- Current measurement of electric generators (via shunt)

Remark

- High reliability required due to high costs for test repetition
- Testing applications; so far no applications in serial wind power product.

Standard Signals
Universal U / I
Temperature
Isolated Supplies



P27000, P15000

Isolation Amplifier Applications

Nuclear Power Generation



Application Details

- Galvanic isolation of standard signals
- Conversion of sensor output signals to appropriate control input signals
- Temperature measurement

Remark

- special products with KTA approval for safety related applications
- products offered after individual agreement

Standard Signals
Universal U / I
Temperature
Isolated Supplies



P15000, P27000, P32000

Isolation Amplifier Applications



Power Distribution

AC measurements in power grids



Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- AC to DC conversion
- Transformers reduce AC currents / voltages, e.g. 10,000 V AC -> 100 V AC → AC/DC-converters for RMS value determination → standard signal output

Remark

- standardized application
- power grid operators also install transducers



IsoTrans 600 series

Isolation Amplifier Applications



Power Distribution Control of Power Distribution Grids



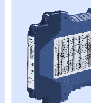
Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Bipolar standard signal isolation and signal conversion

Remark

- High surge requirements



A47, B10000, P27000

Isolation Amplifier Applications



Power Distribution HVDC Transmission



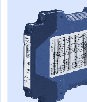
Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- DC and AC voltage measurement on HVDC transmission system (e.g. 500 kV DC)

Remark

- External voltage divider (fig.)
- high cutoff frequency



Isolation Amplifier Applications



Systems for Transmission of Mechanical Power



Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Systems for transmission of large amounts of mechanical power (mechanic, electric, hydrodynamic power transmission)

Remark



P15000

Isolation Amplifier Applications

Marine / Ship Building



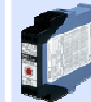
Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Galvanic isolation of standard signals
- Conversion of sensor output signals to appropriate control input signals
- Temperature measurement

Remark

- GL approval required (GL=GermanLloyd, e.g. vibration testing)
- Pod Diesel-electric drives
- Propeller adjustment



P15000, P27000, P40000

Isolation Amplifier Applications

Cement Industry

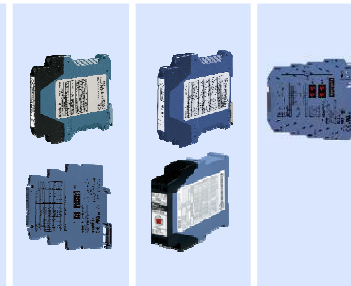


Application Details

- Galvanic isolation of standard signals
- Conversion of sensor output signals to appropriate control input signals
- Temperature measurement

Remark

Standard Signals
Universal U / I
Temperature
Isolated Supplies



A47, B10000, B13000, P15000, P27000, A20210, P32000

Isolation Amplifier Applications

Steel Production and Steel Processing



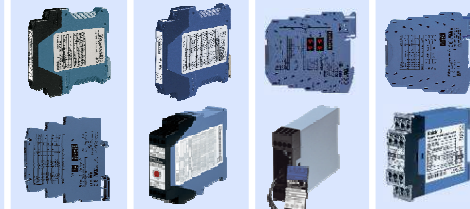
Application Details

- Galvanic isolation of standard signals
- Conversion of signals
- Supply of loop-powered sensor with repeater power supply
- Temperature measurement

Remark

- Thermocouple sensors for measurement of high temperatures with remote transducer

Standard Signals
Universal U / I
Temperature
Isolated Supplies

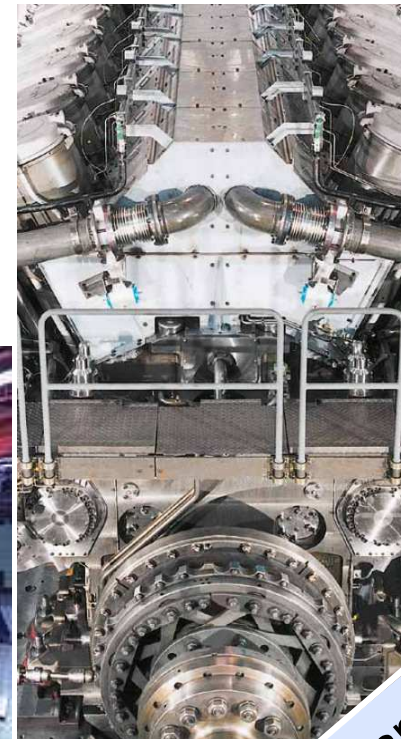


B10000, P15000, A26000, P27000, P32000, A20100

Isolation Amplifier Applications



Diesel Engine Construction Motor control / SCADA



Application Details

- Galvanic isolation of standard signals

Remark

- Giant engines for ships, power generation, et cetera

Standard Signals
Universal U / I
Temperature
Isolated Supplies

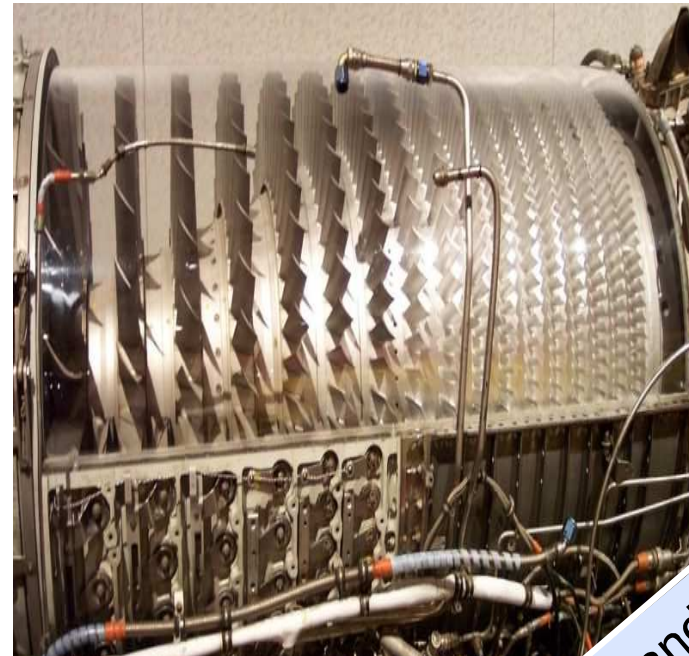


VariTrans B13000

Isolation Amplifier Applications



Gas Turbines, Gas Motors

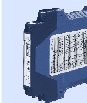


Application Details

- Galvanic isolation in control systems for gas turbines and gas motors

Remark

Standard Signals
Universal U / I
Temperature
Isolated Supplies



VariTrans P27000

Isolation Amplifier Applications



Rectifiers / DC Power Supply
e.g. for electrolysis,
electroplating



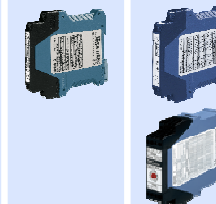
Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Measurement of DC voltages and currents (via shunt)

Remark

- Low to high DC voltages
- High DC currents

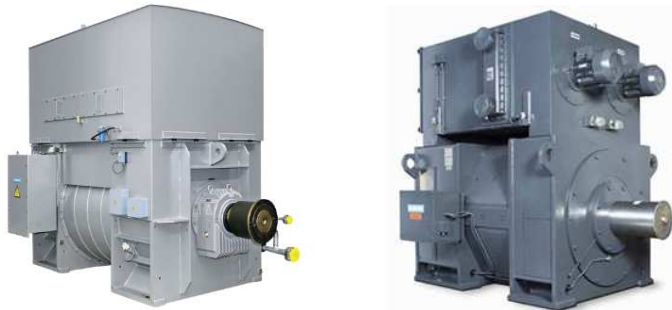


B13000, P15000, P27000, P40000

Isolation Amplifier Applications



Electric Drives



Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Galvanic isolation of unipolar and bipolar standard signals
- Control of electric drives

Remark

■ Photo: 3 MW / 12 phase asynchronous motor (left) powered by DC-link inverter to drive coal grinding mill (right)

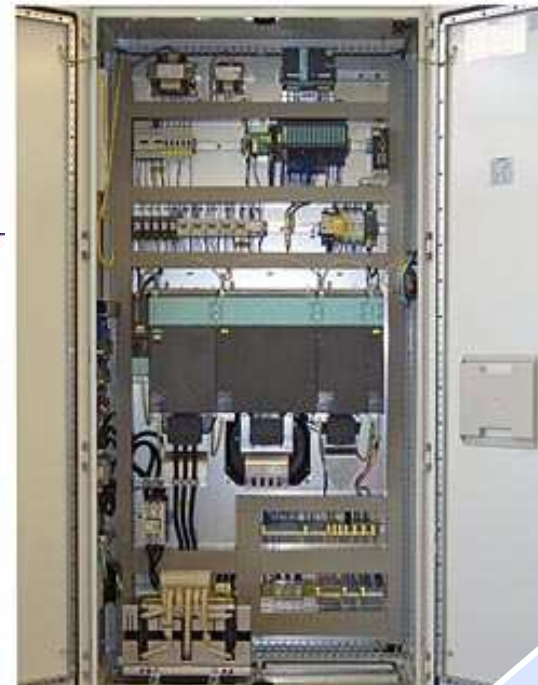


B13000, P15000, A26000

Isolation Amplifier Applications



Frequency Inverters / Power Converters



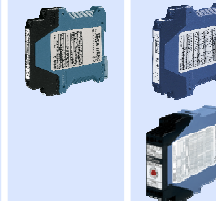
Application Details

- DC link voltages / currents
- Galvanic isolation of analog signals (interface to control / SCADA systems)

Remark

- E.g. for drives, motion control, reactive power compensation, et cetera

Standard Signals
Universal U / I
Temperature
Isolated Supplies



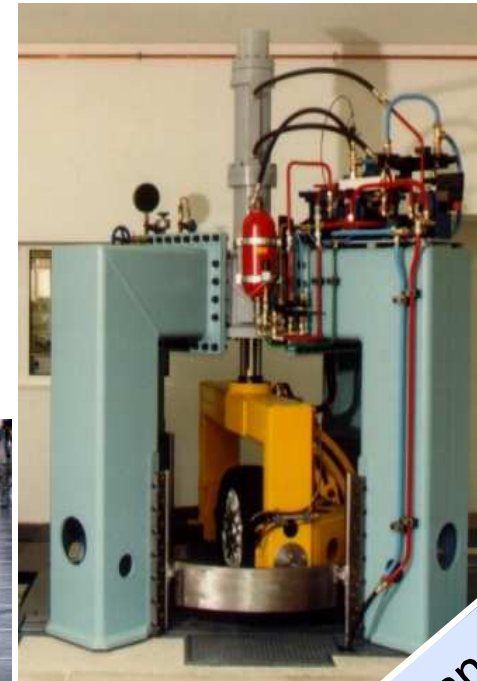
B13000, P15000, P27000, P40000





Isolation Amplifier Applications



Test Stands for Routine or Type Testing

- Motor Testing
- Electrical Apparatus Testing
- Automotive Components Testing



Application Details	Remark	Standard Signals	Universal U / I	Temperature	Isolated Supplies
<ul style="list-style-type: none"> ■ Galvanic isolation of standard signals ■ Conversion of sensor output signals to appropriate control input signals ■ Temperature measurement 	<ul style="list-style-type: none"> ■ Test stands need adjustment to tasks ■ Flexible products with calibrated switching ■ High precision required 		 		

P15000, P27000, P32000, P40000

Isolation Amplifier Applications



Battery Chargers



Application Details

- Current measurement (via shunt) of battery charging currents
- Voltage measurement of charging system, cell voltage (groups)

Remark

- Battery supply systems
- Uninterrupted power supplies (UPS)

Standard Signals
Universal U / I
Temperature
Isolated Supplies



P27000, P40000

Isolation Amplifier Applications



Drilling Towers

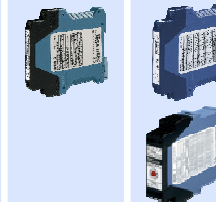


Application Details

- Galvanic isolation of standard signals
- Measurement of currents / voltages
- Interface to control system / SCADA

Remark

Standard Signals
Universal U / I
Temperature
Isolated Supplies



P15000, A26000, P27000, P40000

Isolation Amplifier Applications



Crane Construction



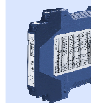
Application Details

- Galvanic isolation of signals
- E.g. load measurement

Remark

- High precision required

Standard Signals
Universal U / I
Temperature
Isolated Supplies



VariTrans A26000

Isolation Amplifier Applications



Dragline Construction



Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Measurement of voltages and currents for hoist control

Remark

- Improvement of hoist control increased efficiency (reduced spill)



P27000, P40000

Isolation Amplifier Applications

Control Cabinets / Electrical Panels

Measuring and control / automation

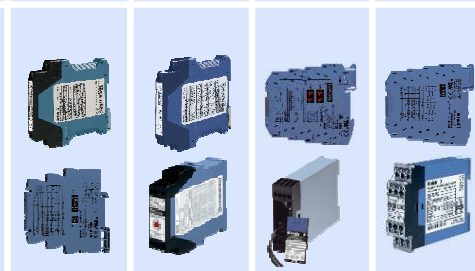


Standard Signals
Universal U / I
Temperature
Isolated Supplies

- Measurement, galvanic isolation and conversion of analog standard signals going to and coming from control systems (PLC, DCS, ...)

Remark

- Various small to large enterprises offering measurement, control and automation engineering



B10000, P15000, A26000, P27000, P40000, P32000, A20100, ...

Isolation Amplifier Applications

Electrical Engineering Switchgear Construction



Application Details

- Galvanic isolation and Conversion of standard signals going to and coming from control systems (PLC, DCS, ...)
- Measurement of DC currents and voltages
- Measurement of AC currents and voltages - RMS
- Measurement of AC currents and voltages - TrueRMS
- Temperature measurement

Standard Signals

Universal U / I

Temperature

Isolated Supplies



B10000, P15000, A26000, P27000, P40000, P32000, A20100

Isolation Amplifier Applications

Paper Manufacturing



Application Details

- Galvanic isolation of standard signals
- Conversion of sensor output signals to appropriate control input signals
- Temperature measurement

Remark

- Special paper
- Recycling paper

Standard Signals
Universal U / I
Temperature
Isolated Supplies



P15000, A26000, P27000, P32000

Isolation Amplifier Applications

Security / Defense



Application Details

- Galvanic isolation of analog signals
- Conversion of sensor output signals to appropriate control input signals

Remark

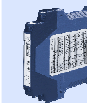
- High precision
- High MTBF / reliability
- Vibration testing (GL)

Standard Signals

Universal U / I

Temperature

Isolated Supplies



VariTrans P27000

Isolation Amplifier Applications



Water Works
Water purification



Application Details

- Galvanic isolation of standard signals

Remark

Standard Signals
Universal U / I
Temperature
Isolated Supplies



B10000, B13000, P15000, A20300

Isolation Amplifier Applications

Sewage Plants



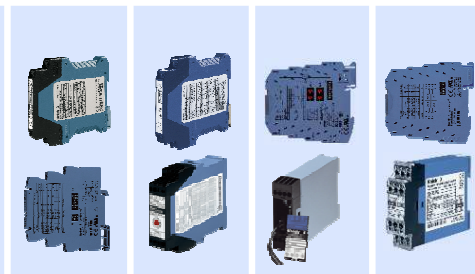
Application Details

- Galvanic isolation of standard signals

Remark

- Local sewage plant operators
- Sewage plant construction

Standard Signals
Universal U / I
Temperature
Isolated Supplies



B10000, B13000, P15000, A20300

Isolation Amplifier Applications



Chemical Industry / Process Industry



Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- Hazardous area separation (barriers) / galvanic isolation in chemical plants
- Power supply for loop-powered sensors (pressure, temperature, analytical, ...)

Remark

- Second tier focus for Knick isolation amplifiers



WG21, 36/37, WG25, 205/206, 210/211

Isolation Amplifier Applications



Various Special Applications in Industrial Production, Science, Material Processing, ...

- Welding: current measurement (P40000)
- Temperature measurement / high working voltage (205/206, 210/211)
- Galvanic isolation: coffee roasting machines (A20000, A20100)
- Radiation measurement devices (P27000)
- Insulation testing: pacemaker electrodes (P40000)



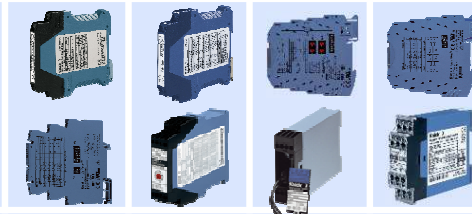
Standard Signals
Universal U / I
Temperature
Isolated Supplies

Application Details

- DC or AC voltage/current measurement

Remark

- Whole product range
- High working voltages



P15000, A26000, P27000, P40000, P32000, A20100, ...