

LINTRONIC



**The New
Generation of Electronics**

Digital Microprocessor Technology

Knowledge and expertise



Linde – the pioneer
Linde products have been leaders in the field of mobile hydraulics for years.

Our customers rely on our know-how. Many thousand pieces of equipment have been equipped with Linde technology.

Linde electronics engineers are masters of their craft – whether it's a matter of improved power utilization, or the best possible interaction among the components in the system as a whole, or user friendliness and safety.

The interaction of Linde's hydraulic and electronic components goes far beyond pump and diesel management – it opens up the option of managing the entire vehicle or piece of equipment:

Hydraulic components + electronic components from Linde = complete vehicle management through the complete Linde system.

The electronic load-limiter controls the whole range of load on the diesel engine. The maximum power of the diesel engine is available at any instant during its cycle. This will maximize the engine's performance while minimizing oversizing of the engine.

Linde offers electronic systems for open and closed loop hydraulic applications.

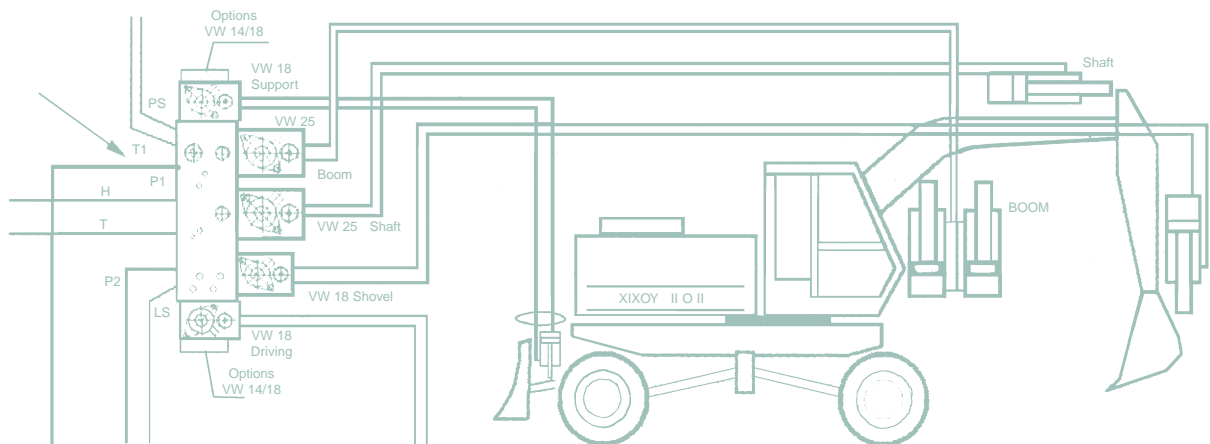


Become a world market leader with Linde hydraulics and electronics

Linde – the pioneer in mobile hydraulics – discovered and perfected hydrostatics as the ideal type of actuation for mobile machinery. Since 1959, Linde has equipped more than two million vehicles in the fields of

- Construction equipment
- Agricultural machinery
- Forestry equipment
- Municipal vehicles
- Materials-handling technology

with hydrostatic driving and working actuation systems. The use of this actuating system in our own fork lift trucks made Linde the **world market leader!** And our **electronics** played an important part in doing that.



Application Areas



Electronic control unit for closed loops



CED electronic driving control unit for closed loops with accelerator pedal for diesel speed control by means of electrohydraulic or electric motor (EMR) diesel actuator

With the CED electronic control unit, hydrostatic systems can be used for the widest possible range of applications. The CED can be used in construction equipment, agricultural machinery, forestry equipment, municipal vehicles and materials-handling equipment.

The functions of the CED driving control unit

- Driving function (e.g., automotive)
- Preselection of travel direction
- Inch function
- Braking behavior
- Zone spreading (resolution)
- Preselection of types of operation
- Diesel speed control
- Pressing regulation
- Type programming
- Various options available
- 12V – 24V operation
- Diagnostics (ISO interface)
- Speed control (Tempomat)
- Transmission ratio control

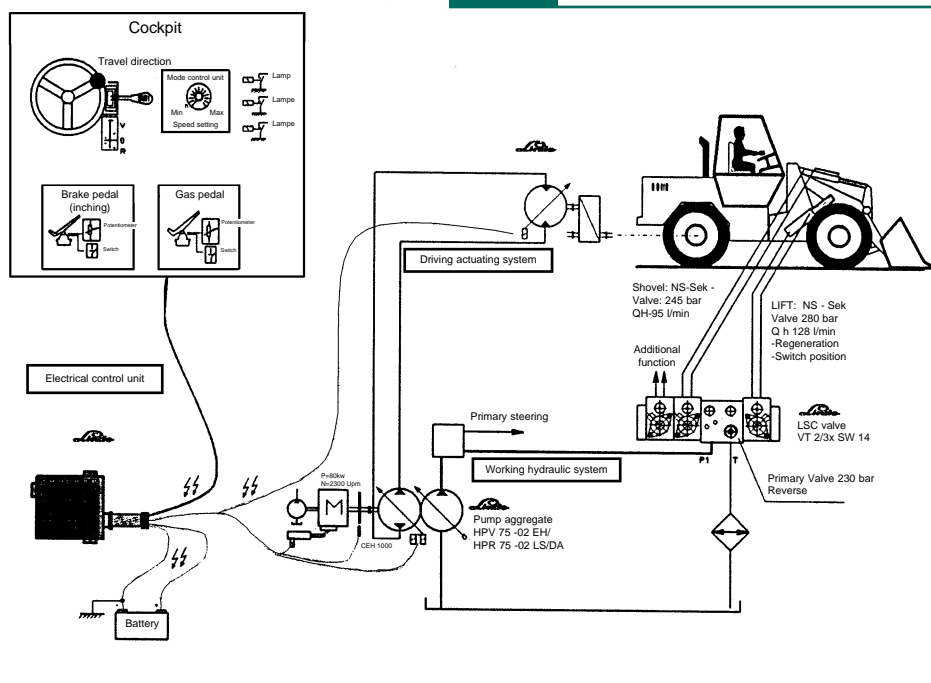
Linde CED electronic control unit for closed hydraulic loops

1. Basic version / components

- CED electronics box
- Accelerator pedal (including switch)
- Diesel speed sensor
- Travel direction switch

2. Options / components

- Selector switch for type of operation
- Inch pedal (including switch)
- Electrohydraulic diesel actuator; alternative: electric servomotor (EMR)
- Pressure switch (for increasing engine speed)
- Additional potentiometer (e.g., for v limitation)
- Vehicle speed sensor
- Temperature switch, cooling water/hydraulic oil
- Pressure sensor (high pressure)
- Auxiliary inputs (e.g., for brake lights)
- ISO interface for diagnostics
- Can be used with 12V or 24V electrical system
- Work hydraulics included in the control system logic



- Outputs
- Driving pump
- Driving motor
- Engine speed control
- Alternative Diesel engine
- Switch outputs, max 3A
- Pilot valve
- Auxiliary outputs
- Trouble lamp
- Brake light
- Backup lamp
- Backup light

Electronic control unit for closed loops

CED



High reliability and availability

High operational reliability, resulting from experience and hard use in construction machinery.

Management of the complete hydrostatic system of actuating motor and hydrostatic driving hydraulic system by just one single electronic control unit

Best possible utilization of engine power into driving performance. High functional reliability. Maximum available motor power can be used (pressing regulation). Dynamic driving behavior optimized.

Improvement of driving characteristics

Nearly the same driving characteristics with and without load, no change in speed when driving and working at the same time (e.g., lifting), i.e., compensation for the increase in speed of the diesel engine when working.

Precise engine speed control at lower and upper idle (digital speed control)

Hardly any effort to adjust and service, no subsequent speed adjustment required.

Integrated additional functions (switch outputs), for brake lights, backup flashers, etc.

These functions are preprogrammed.

Adjustable driving behavior, parameterization via Linde test module or laptop

Adaptation of the driving characteristics to special usage conditions or customer requests.

Operating parameter diagnostic capability via Linde test module or laptop

Simple, trouble-free monitoring of operating data.

Optimum encapsulation of the electronics

Heat, dust, oil, moisture and water do not harm the control unit.

Water-tight connector plugs; each connection line is individually sealed when in the connected state

High operating reliability, dependability and service life, even under unfavorable environmental conditions.

Linde safety concept – 2 processors:

Function processor and safety processor

The greatest possible functional safety, no unwanted driving functions if signals arrive incorrectly.

Linde system concept

Hardware + software + hydrostatics come from a single source and are optimally matched to each other.

Strict testing procedures for Linde electronic equipment

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Strict test procedures are indispensable in ensuring the proper and safe functioning of the electronic components

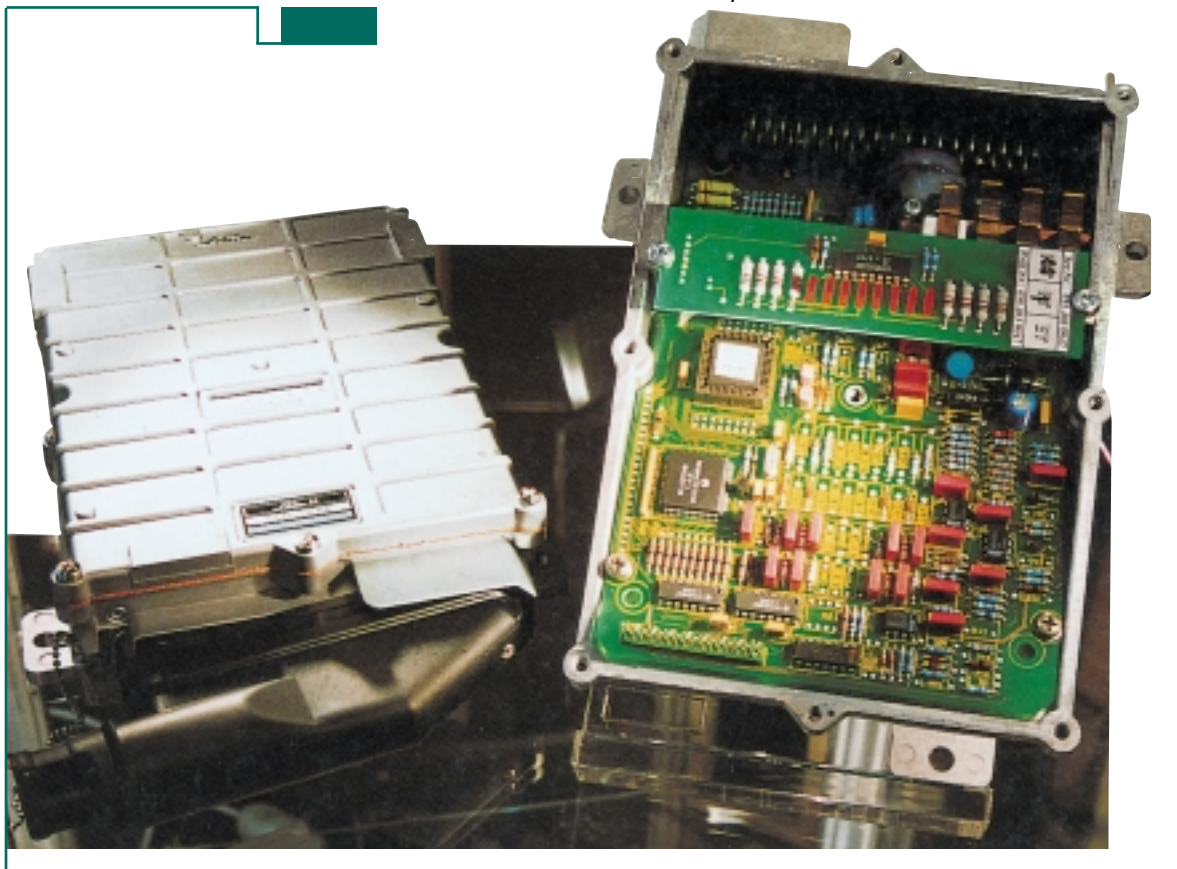
This is important in the case of well-proven components, but it is absolutely essential with electronic control units. The electronic brain contains the widest possible variety of information concerning its surroundings and transmits appropriate instructions in return.

In conjunction with that, the electronic control unit is dependent on reliable information from the outside in order to give out correct and reliable instructions.

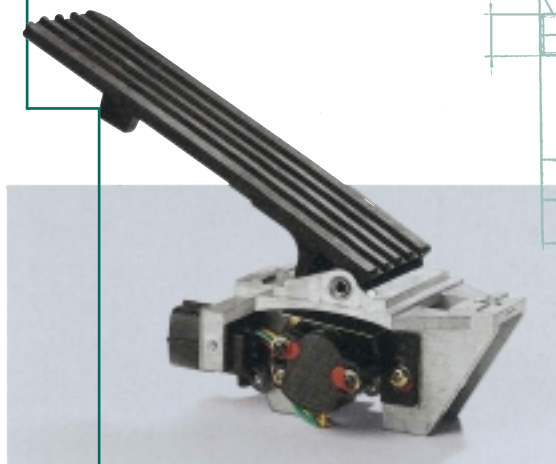
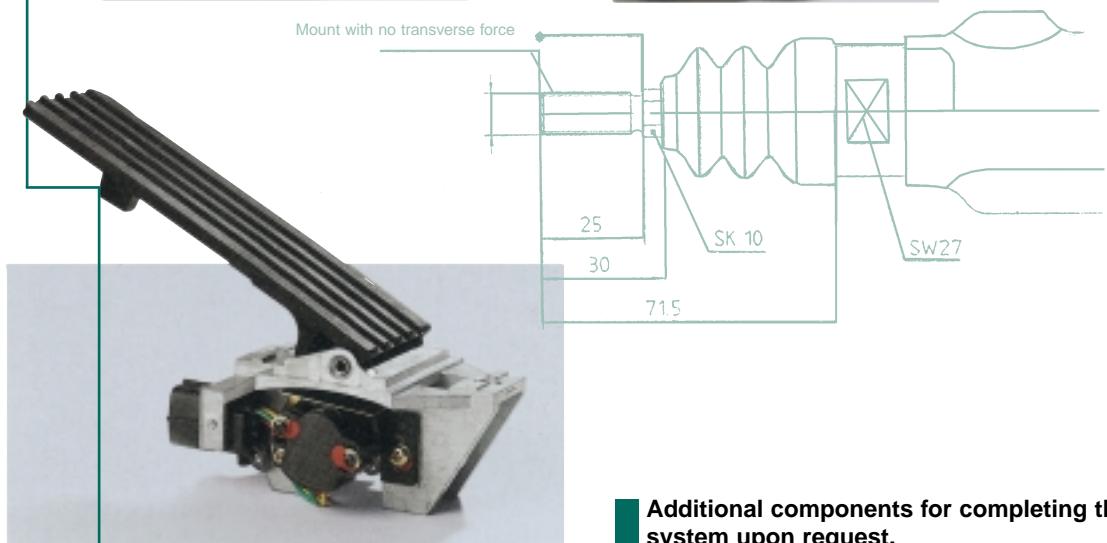
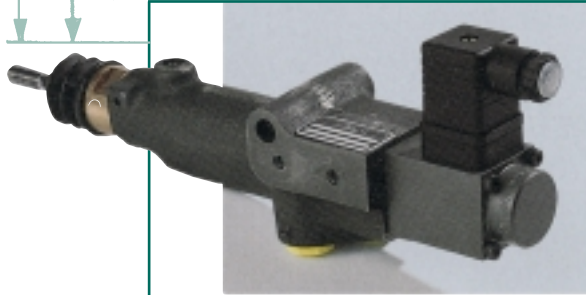
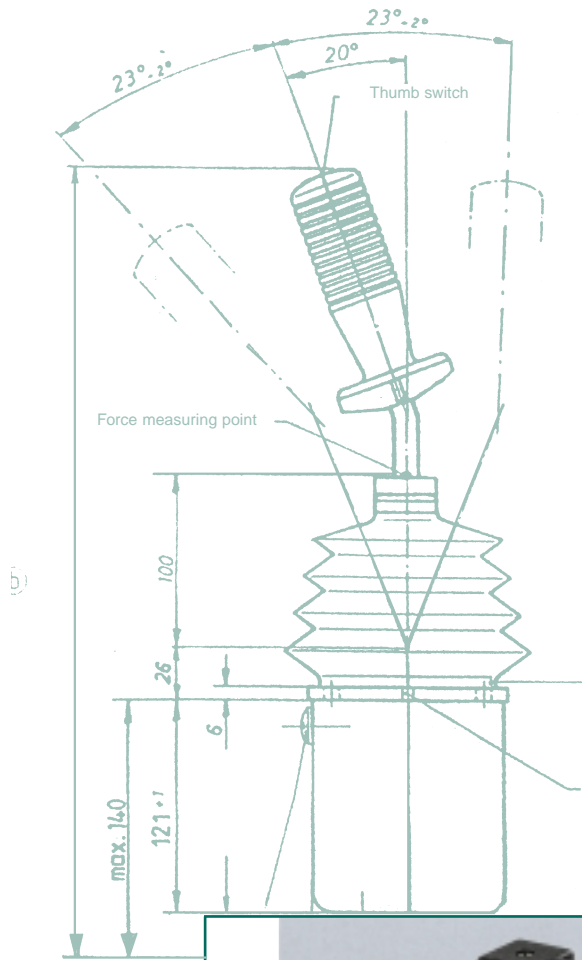
Linde observes all of the relevant regulations that result in extensive testing procedures.

Linde conducts the following tests for reliability and safety:

- Mechanical tests
- Electronic tests
- Function tests
- Safety tests
- System tests
- Field tests
- The following tests are carried out continuously during production of the system components:
 - *Visual inspection, IC test, check-sum test, run-in test*
 - *Visual inspections (100%) following assembly/installation of the electronic components and following the soldering operation*



Peripheral components *LINDE*



Additional components for completing the system upon request.

Here is how to reach us

directly

Would you like additional information concerning Linde electronics?
Talk with us! We're always there for you!

Direct route to Linde Hydraulics and Electronics

You can reach us

- **By telephone** 330-533-6801 (switchboard)
- **By fax** 330-533-8383
- **By e-mail** info@lindeamerica.com
- **By internet** <http://www.lindeamerica.com>
- **By mail**
Linde Hydraulics Corp.
5089 W. Western Reserve Rd.
P.O. Box 82
Canfield, Ohio 44406



THE NEW GENERATION OF ELECTRONICS



Linde AG, Werksgruppe Flurförderzeuge und Hydraulik
[Industrial Trucks and Hydraulics Division],
Plant 2, Aschaffenburg-Nilkheim

Linde AG
Werksgruppe Flurförderzeuge
und Hydraulik
Postfach 62.D-3736 Aschaffenburg
Telefon: (06021) 9-0
Telefax: (06021) 99-179

Linde Hydraulics Corp.
P.O. Box 82
5089 W. Western Reserve Road
Canfield
OH 44406
Phone (330) 533-6801
Fax (330) 533-8383
www.lindeamerica.com