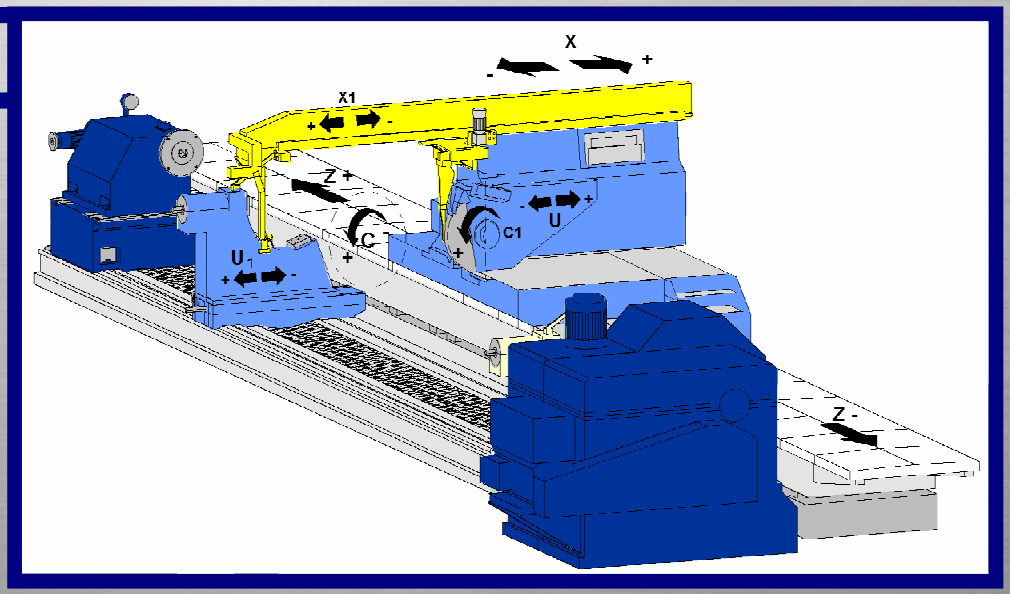
# GPC Retrofit

## Grinding Process Control for Roll Grinding Machines

GPC 2 by KLEINKNECHT



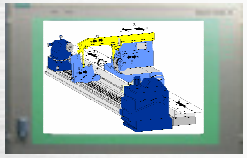
# Roll Grinder Retrofit

| **modular Retrofit in individual Phases**<br><br>e.g. |  <br>CNC / PLC<br>KLEINKNECHT<br>electronic und software |  <br>Switchgear incl. digital Servodrive Technology |  <br>AC/DC-Motors |  <br>Measuring Equipment |  <br>Mechanical Revamp |
|---|---|---|---|---|---|
| Phase 1 | X | | | | |
| Phase 2 | X | X | | | |
| Phase 3 | X | X | X | | |
| Phase 4 | X | X | X | X | |
| Phase 5<br>⋮<br>Phase n | X | X | X | X | X |

# Control System Configuration

KLEINKNECHT

**OPERATION & MONITORING**



HOST INTERFACE TO „ROLLSHOP MANAGEMENT“

PRINTER

OPERATOR PANEL 1

OPERATOR PANEL 2 (OPTION)

**CONTROL SYSTEM**

CNC

INTERFACE - Ethernet - Serial - Parallel

PROFIBUS INTERFACE

COUNTER INTERFACE

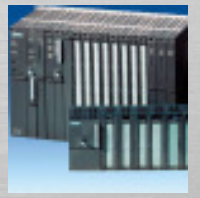
PLC

SERIAL INTERFACE

PROFIBUS INTERFACE

DIGITAL I/O‘s

ANALOG I/O‘s



DIGITAL AC AXLE DRIVE

DIGITAL MAIN-SPINDLE-MODULE

DIGITAL MAIN DRIVE AC / DC DRIVE

**MACHINE**

DRIVES

EXTERNAL SYSTEMS (OPTION)

- ROUGHNESS MEASUREMENT
- HARDNESS MEASUREMENT
- CRACK CHECK DEVICE
- DATA PROCESSING

MACHINE-MEASUREMENT SYSTEMS

ANALOG SIGNALS

- DISC LOAD
- POTENTIOMETER

CONTROL & FIELD DEVICE

- LIMIT SWITCHES
- PRESSURE SWITCHES
- TEMPERATURE SWITCHES
- VALVES

- Industrial-PC with INTEL Processor
- Communication between the modular off-the-shelve Hardware via standard data transfer: Industrial Ethernet and Profibus-DP
- Latest Software Version for New- and Retrofit Machines
- Low Cost Components, extendable
- Operator-PC based on QNX or Windows
- High mechanical Strength, Operating Temperature +5°C to +45°C
- User-friendly Operation and Monitoring
- Tele-Service
- Worldwide Spare Part Service
- international approvals: EMV, EN, IEC, CE, FCC, UL and CSA

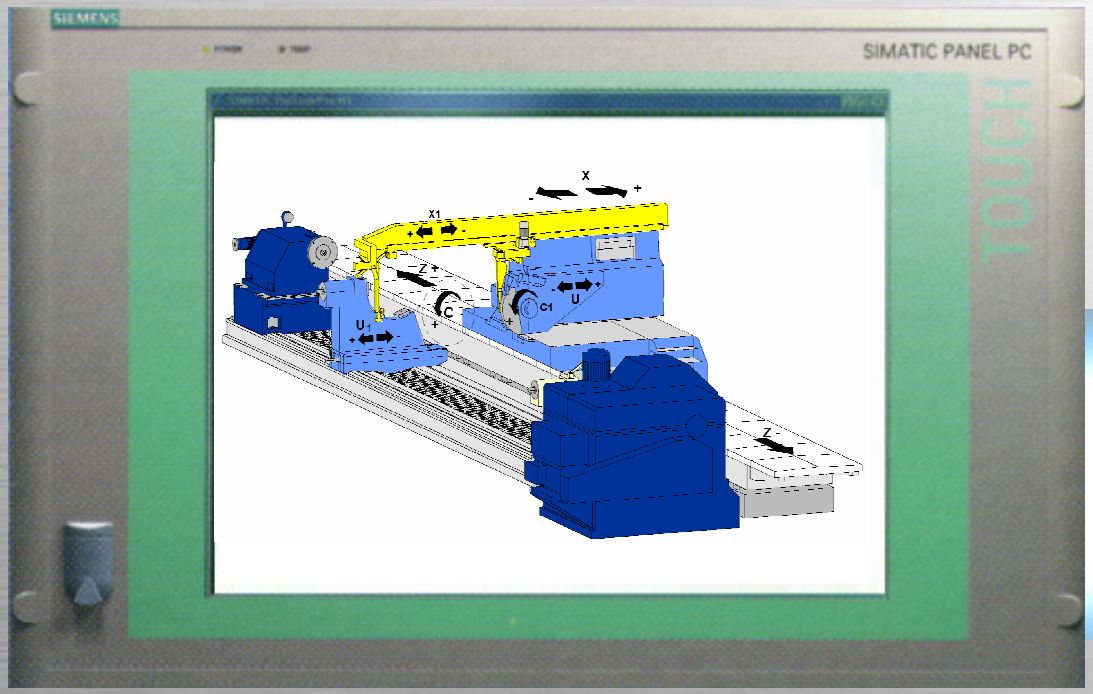
## SIEMENS Rack PC 847 B


| | |
|---|---|
| Type | SIEMENS 19"-Industrial PC<br>4 height units, IP 41 (Front) |
| Processor | INTEL Celeron 1,86 GHz |
| Main Memory | 512MB DDR SDRAM<br>5G shock resistant |
| Disc Drives | hard disk SATA 80 GB<br>CF-memory card<br>DVD-ROM<br>MO-drive 640 |
| Interfaces | COM1(TTY), COM2, LPT1, VGA,<br>PROFIBUS-DP<br>(12Mbit/s) |
| CNC - Kernel | Real Time GP-Applications<br>CNC as Technology Master |
| Safety approvals | EN 60950<br>UL 60950 und cUL 60950<br>WEEE / RoHS |
| Ambient temp. | 5 bis 50°C full Power |

# GPC - System Components

CNC SIMATIC PC 847

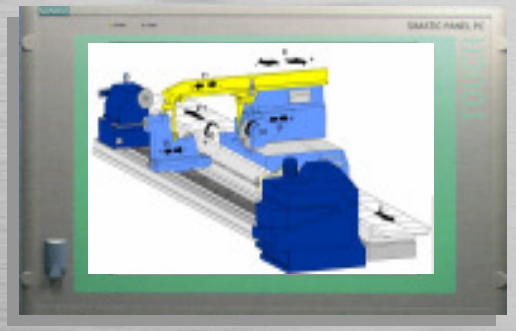
## SIEMENS Panel PC 677 B




| | |
|---|---|
| Main Board | SIEMENS Mobile All-in-one-Board |
| Processor | INTEL Celeron 1.5GHz |
| Main Memory | 512MB SDRAM<br>(extendable up to 2MB) |
| Disc Drives | HDD SATA: ≥ 40GB<br>DVD-ROM<br>1,44MB FDD option |
| Graphic (AGP) | Onboard Graphic |
| Interfaces | 2 Ethernet onboard<br>USB and V24<br>Profibus DP |
| Power Supply | 85 - 264V AC |
| Operating System | QNX or Windows |
| Display | 15" TFT (optional Touch Screen) |
| Safety approvals | UL for USA and Canada<br>EN 61000-6/4<br>DIN ISO 9001<br>EMV and EGB |

# GPC - System Components

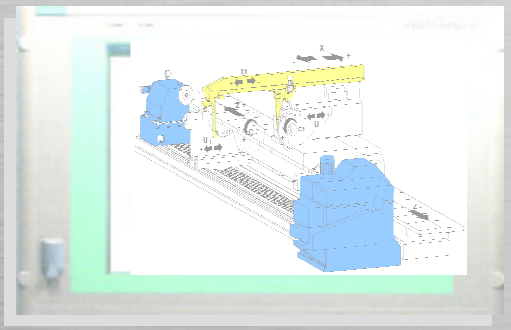
**Panel PC 677**



Industrial Ethernet

CNC SIMATIC PC 847

# GPC - System Components



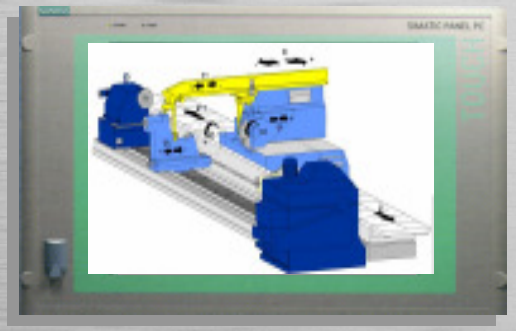
## S7/S5-CPU

- compact and modular design
- low cost modules
- standard interface to GPC-System
- PLC as profibus-coordinator

**PLC: SIMATIC S7/S5-CPU with Profibus-DP Interface**

# GPC - System Components

**Panel PC 677**



Industrial Ethernet

CNC SIMATIC Rack PC 847

Profibus-DP

S7/S5-CPU

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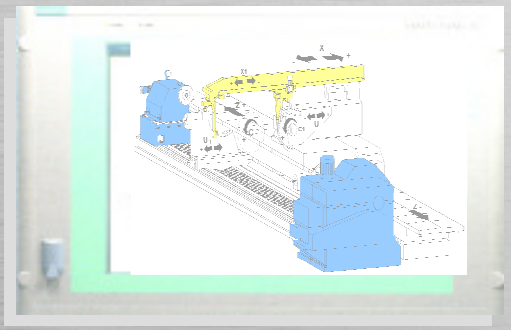


## Grinding wheel, headstock and axis-drives

### Digital Drive Interface

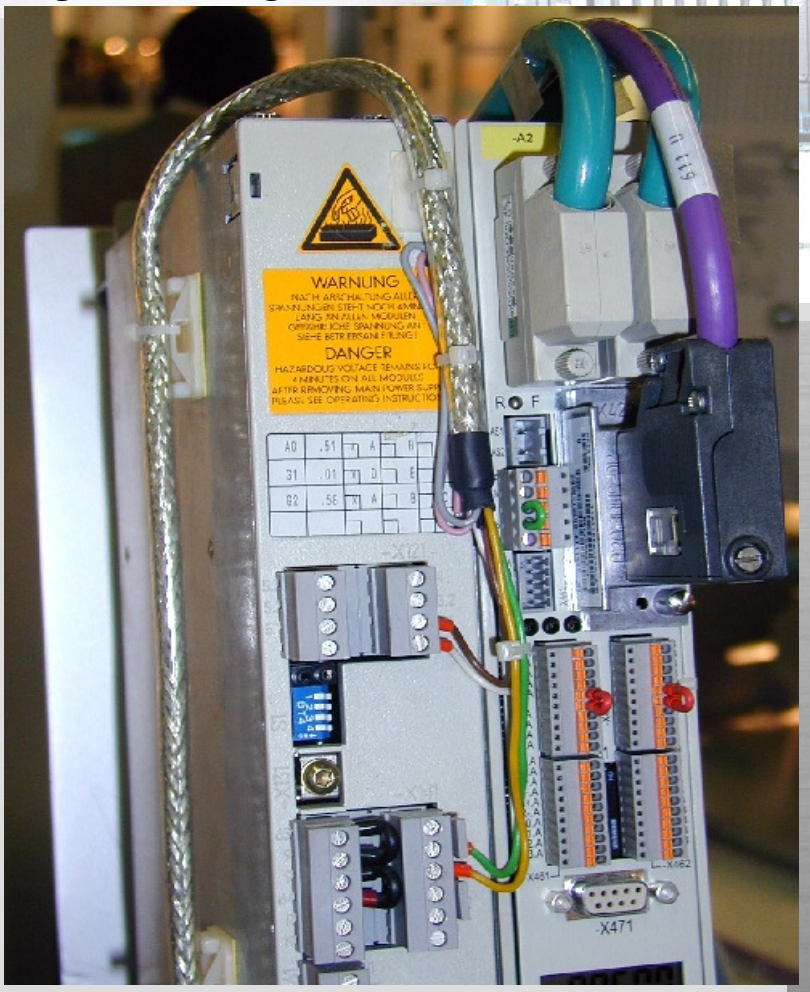
- digital drive technology 1FT6/1FT7 and Simoreg
- Profibus-DP interface to GPC-System
- axle positioning via motor encoder

alternatively (dependant on customer requirements):

### Analog Drive Interface

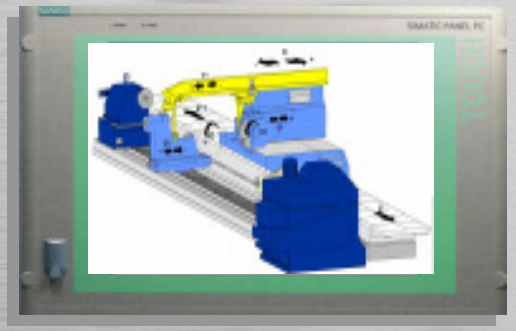
- analog drive technology 1FT5 and Simovert
- cable link to GPC-System
- axle positioning via existence measurement systems

### Digital/Analog Drive Interface



# GPC - System Components

**Panel PC 677**



Industrial Ethernet

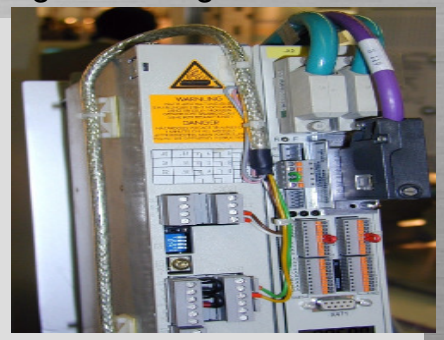
CNC SIMATIC Rack PC 847

Profibus-DP

S7/S5-CPU

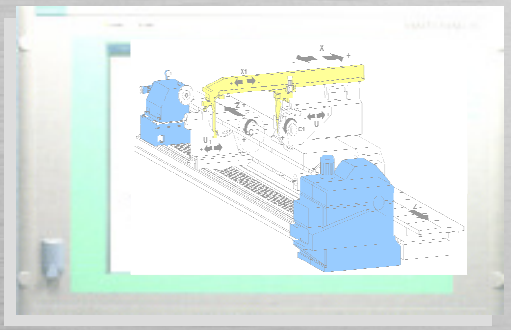
Profibus-DP

Digital/Analog Drive Interface



# GPC - System Components

Panel PC 677

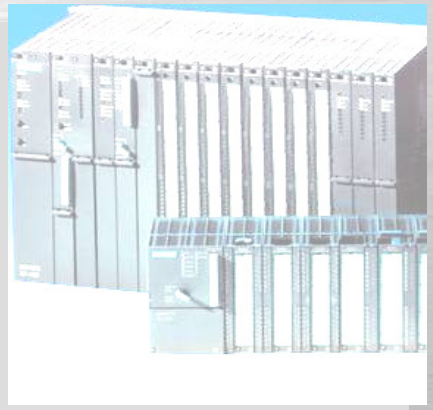


Industrial Ethernet

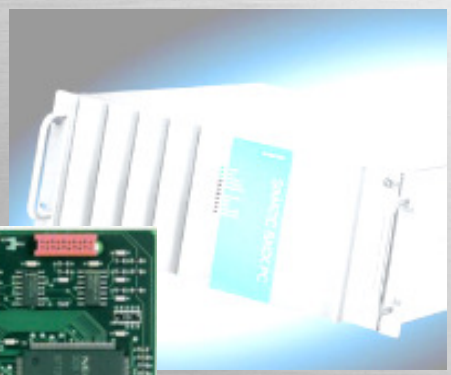
CNC SIMATIC ... PC 847

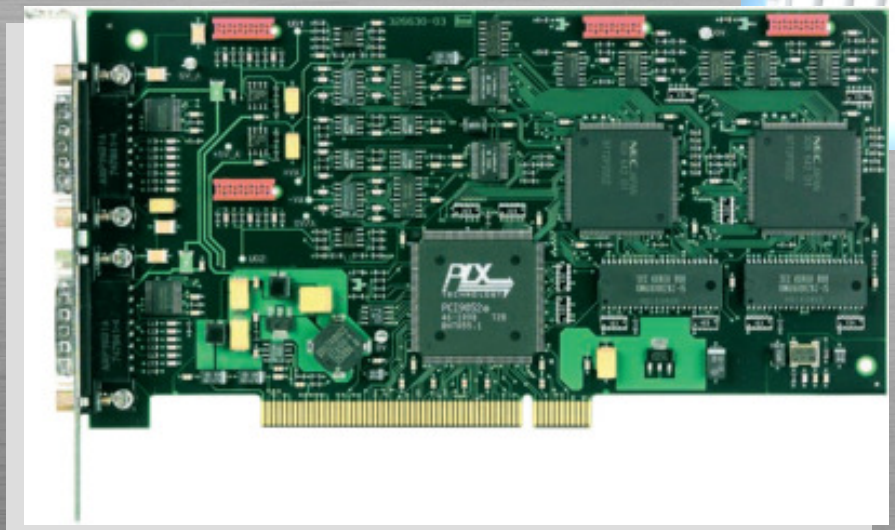
Profibus-DP

S7/S5-CPU



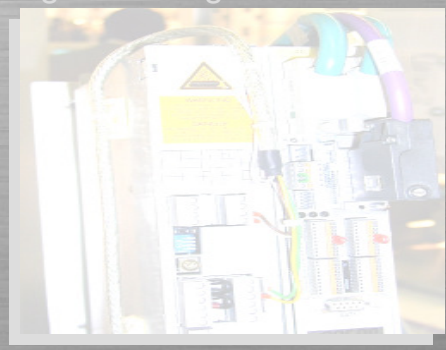
**PC - Counter Interface**
**Heidenhain IK220**





Profibus-DP

Digital/Analog Drive Interface



# GPC - System Components

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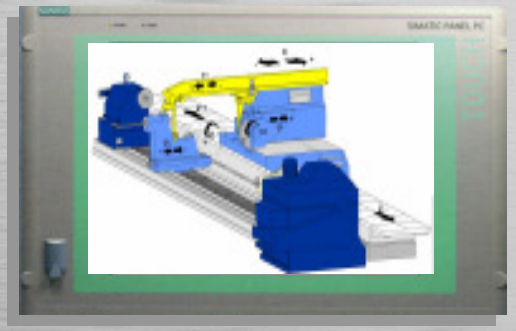


Industrial Ethernet

CNC SIMATIC Rack PC 847

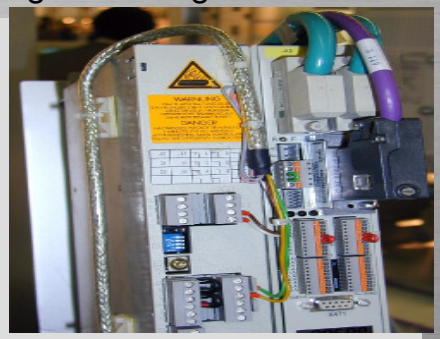
Profibus-DP

S7/S5-CPU

PC - Counter Interface
Heidenhain IK220

Profibus-DP

Digital/Analog Drive Interface



# The History of Kleinknecht Roll Grinding Experience:

**1946 – 1984** = **approx. 800 Grinding Control Systems** (incl. retrofits)

**1984 – to date** = **over 250 CNC based Grinding Control Systems, i.e.**

| CNC based Machines | No. of Systems | End-Customer | CNC-Type | Delivery |
|---|---|---|---|---|
| Roll Grinding Machine | **(83 systems)** | worldwide | MMC | 1984 – 1994 |
| Roll Grinding Machine | **(78 systems)** | worldwide | GPC 1 | 1994 – 1999 |
| Roll Grinding Machine | **(95 systems)** | worldwide | GPC 2 | 1999 – to date |

**In Total =** **256 Roll Grinding Control Systems based on CNC** (to date)

**46 of which have been retrofits with GPC2**