

# **General specifications**

**for work equipment, plant and machinery**

**B.PRO GmbH**

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## 1 General

All work equipment must comply with the defined specifications. The General specifications contain B.PRO's general requirements that apply for work equipment. The manufacturers or distributors are obliged only to offer and supply work equipment that complies with the requirements of these specifications.

Furthermore, the conditions of purchase shall apply as well as any other written agreements, and in particular the enclosure with the works-specific definition of the component manufacturers and any specifications for particular plants.

### 1.1 Area of applicability

These specifications apply for B.PRO GmbH, referred to in the following as B.PRO.

### 1.2 Confidentiality clause

The provider / contractual partner shall treat as confidential any and all of the knowledge and experience, both technical and non-technical, made known to him and any documents and samples handed over in good faith, and not to pass them on or otherwise make them accessible to any third parties.

In the event of conversions and extensions, the contractor shall obtain the necessary information on the state of the plant, machinery and facilities, including the full documentation, before submitting an offer. Any documents given to the contractor shall not be copied or made available to third parties or otherwise used or evaluated without the client's permission.

### 1.3 Agreement in the event of deviation from the instructions by B.PRO

Variations from the General specifications shall be confirmed specifically and in writing by the project manager.

### 1.4 Site rules

The current version of B.PRO 's site rules shall be taken into account and observed.

## 2 Safety definitions and requirements

The laws, directives, regulations, guidelines, generally accepted rules of technology and standards for the prevention of risk to humans, animals, the environment, buildings and systems that apply in the Federal Republic of Germany for this work equipment at the time of handover to B.PRO shall be observed. Particular attention should be paid to the efficient use of all energy sources. The following requirements apply for:

### 2.1 New work equipment, plant and machinery

- New or used machinery after substantial modification in the European economic area
  - New or used machinery that is imported into the European economic area.
- In the event of the absence of any harmonised European standards for the ordered machinery, the contractor shall observe the German standards and technical specifications issued by the Federal Government in the Machinery Index of the Devices Safety Act.

In the event of deviation from the harmonised European standards or German standards and technical specifications, evidence shall be provided and documented that the same level of safety has been achieved by other means.

This commitment includes the presence of:

- the **CE mark**, applied to any ready-to-use plant, machinery or tools,
- For a machine/system and tools with CE marking, an **EC Declaration of Conformity** has been issued in the German language and is enclosed,
- a **Declaration of Incorporation** is attached to a machine that is not ready for use and for a machine in accordance with Appendix II B Machinery Directive **a certificate from an approved testing or certification authority** is provided (proof of EC type examination if necessary),
- the **operating instructions** and **technical documentation** in accordance with the following specifications.

## 2.2 Documentation

The complete and final documents are to be provided to the client at least 14 days before the final takeover, printed on paper and on a data carrier (CD or DVD in the formats 3D-CAD, PDF and ProE).

The documents are to be indexed and put in DIN A4 folders.

At least the following sections of the technical documentation are to be included in the delivery of the machine and provided in triplicate in German and on CD:

- **Operating instructions** in acc. with Appendix I Machinery Directive and DIN EN 82079-1 and maintenance instructions during commissioning at the latest
- Risk assessment in accordance with DIN EN ISO 12100
- Working documents such as electronics, maintenance, pneumatics and hydraulic plans, mechanical drawings, component descriptions, interfaces and equipment layout plan
- Item lists with the manufacturers' designations and names
- Machine data sheet with the connected values for the energy and media supply
- Confirmation of adherence to B.PRO 's list of banned substances and substances to be avoided (when using raw materials and supplies)
- An offer or list for spare and wear parts with details of the suppliers and type designations, plus the delivery times
- The documentation for the initial commissioning for components if required (e.g. power-driven doors, pressure reservoir).
- The documentation for purchased parts is to be provided in electronic form (e.g. PDF documents).

### Requirements for all documents:

Abbreviations are to be avoided in the documents if at all possible. Any abbreviations that are used should be sensible and appropriate (observe standards).

### Circuit diagram:

- Circuit plans are to be prepared to DIN EN 61082-1.
- Subpages (e.g. 126a, 126.1) are not permitted. Reasonable spaces are to be left between the individual paragraphs of the circuit diagrams for future extensions.
- The circuit diagram is to include all the earthing, screening and insulating measures required for trouble free operation or by the equipment manufacturers.
- Signal exchanges with other plant, machinery and facilities or higher systems, including the external connections, are to be summarised, displayed and described.

## 2.3 Responsibility for conformity

If we apply or attach significant parts of the machine by agreement with the contractor, then unless otherwise agreed responsibility for conformity shall remain with the contractor.

If the contractor is the manufacturer of components for a complex system and the supplier of the main machine or the major part of the individual machines, then unless otherwise agreed, he shall have the overall responsibility for conformity. All component manufacturers shall at our request provide information on the compatibility of their machinery (or components) with others insofar as this is required in order to assess the safety of a complete machine.

## 2.4 Used machinery in the EEA constructed before 1.1.1995

On accepting the contract, the contractor undertakes to observe the following definitions or requirements:

- Operational safety regulations (BetrSichV)
- Other national definitions, and in particular the accident prevention regulations (BGV)
- Environmentally relevant EU guidelines, national laws and directives.

## 3 Planning

A central handover point shall be created for the supply lines (gas, compressed air, vacuum, water, electricity and data lines) for the overall system.

### 3.1 Documents

The following documents shall be provided for internal planning on completion of the construction and depending on the status of production:

- The necessary drawings shall be presented to the client for approval.
- Layout plan in a scale of 1:100 and as an AutoCAD/DXF file.
- Measurements and weights of the individual components on delivery for positioning in their final locations
- Installation dimensions, weight, connection points for energy and media supply
- Performance data
- The load chart based on the electrical power consumption
- Foundation drawings

## 3.2 Machine environment

- Temperature resistance to an ambient temperature of 42°C.
- Ambient air humidity 0-90° non-condensing (observe the information provided by the item manufacturer)
- The machine is to be designed so that it does not exceed the legal limits.
- The noise level emitted from the machine during proper use at full load must not exceed  $L_E = 78$  dB(A). The maximum peak  $L_{C,Peak\ max}$  must not exceed 130 dB(C). In the event of any noise levels being exceeded, the manufacturer must inform B.PRO of this on submission of the proposal. Measures on how best to lower the noise levels are proposing optional. Outside de  $L_E$  must not exceed higher than 40 dB(A).
- Protection against possible radiation exposure (e.g. cover)
- Information concerning tolerance of forceful bumps and vibrations or bumps and vibra-tions emitted from the machine

## 3.3 Installation site

The contractor will be solely responsible for unloading the machine from the transporter to the intended area. The client's project manager is to be informed if any lifting equipment, forklifts or personnel are required.

For floor-standing machines, confirmation is required of the relevant requirements, in particular its load-bearing capacity and the levelness of the floor.

If any foundations are required, then the bidder is to calculate them and indicate the positions on the foundation drawings.

The bidder is responsible for including the machine in the planning. Details of where the interfaces for energy and media supplies are to be must be provided, as are the necessary details for infeeding (size of individual components, weights etc.). Detailed information must be given of any services to be provided by the client. The necessary areas for waste disposal, material supplies and removal are to be stated.

The required protection zones, retention of fire-fighting water and necessary measures for the adherence to environmental EU guidelines, national laws and directions, unless implemented by the contractor, are to be stated.

The required information is to be provided no later than on placement of the order.

## 4 Machine/plant functions

The functions and tasks will be laid down in a separate specification.

If any plant or machinery is to be used for the direct processing of B.PRO products, then it must not damage these products in any way.

## 5 Machine components

Heavy and cumbersome work equipment must be fitted with suitable lifting lugs or openings for lifting equipment in order to facilitate safe transportation.

Supporting legs must be fitted with levelling devices.

The components must be purchased from the manufacturers listed **in the company or works-specific plant.**

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Any deviations are to be stated by the bidder, and will require our written acceptance before allocation of the order.

## 5.1 Locking and security system

If any locking systems are to be used, then they must be appropriate to the type of risk.

### 5.1.1 Protection against electrical hazards

Any electrical equipment that is fitted with a locking system must be secured with a size 3 double bit key to DIN 43668.

### 5.1.2 Protection against mechanical hazards

Any other hazardous points that are protected by safety housings that may only be removed for maintenance or repair purposes must be secured with systems that cannot be opened with basic tools (screwdriver, Allen key etc.) or that have obviously and clearly been removed on removal of the safety systems (e.g. covers must not remain in place by their own weight).

### 5.1.3 BPRO locking system

Any areas that require a special level of safety must be fitted with B.PRO 's locking system. Some systems may also require safety in the form of staff identity cards. Special arrangements are to be made on allocation.

## 5.2 Electrotechnology

An operating mode selector is required.

### 5.2.1 Control cabinet

- No backplane wiring in the control cabinet (behind the assembly plate)
- No hydraulic or pneumatic devices inside the electronic control cabinet

### 5.2.2 Electronic motor

#### General requirements

- Faults and interruptions in the circuits must not lead to inadmissible or dangerous operating conditions. A safe speed monitor is required in areas where speed variations may occur, and a resulting variation of the permitted speed could cause damage.
- Permanent, clearly visible marks (e.g. zero point etc.) are required for position controls and position signals. The details are to be discussed with the client.
- Simultaneous operation of two motors in parallel on a frequency converter is not permitted.
- Motor connection from 7.5 KW star-delta switch. Machines with heavy starting (e.g. extractors with large fans, compressors) are to be fitted with a frequency converter or, following approval, optionally with a soft-starting device (provide additional charge for frequency converter)
- If a system consists of several components, then the circuit cabinet is to be planned so that the components can be all connected to this central point, which must also contain the connection for the overall supply.

- Every system and circuit cabinet must have an integrated main switch; Cekon plugs are not suitable as main switches.

## Motor criteria

- All motors must be maintenance-free.
- Motors must be appropriate to the characteristics and design of the working conditions, and suitable for a duty cycle of 100%. The output is to be such that the motor works to a maximum of 85% of its range.
- Motor arrangement and installation rooms
- The motor and terminal boxes must be easily accessible for maintenance purposes, and protected against dirt and penetration by liquids or vapours. They are to be designed so that they can be replaced easily and without necessitating the removal of any components with the exception of protective devices.
- The directions of rotation must be applied permanently and clearly beside the motor.
- Type labels are to be positioned so that they are easy to see after removal of the protective device.
- The motors must at least fulfil the requirements of IEC 60034-30 and be suitable for use with frequency converters.

## 5.2.3 Circuit cabinet wiring

Electrical connection:	400V/230V in acc. with DIN EN 60038 / DIN VDE 0100 ff
Control voltage:	230V AC / 24V DC
Phase sequence:	L1 – L2 – L3 (clockwise rotating field)
Main current	black
Control current AC	red
Control current DC	blue
Parasitic current circuit	violet or orange

- All control wires to be flexibly laid in cable channels
- Protective earth connection to be removed individually
- Control cables to be placed individually on their own terminal blocks
- All clamps, terminal blocks, equipment and single conductors are to be clearly labelled

## General

- A working socket is to be included.
- Forced ventilation / cooling is to be provided if the heat ratings or specifications exceed 42°C. This must be confirmed by the contractor. A fan will be switched on by a thermostat inside the circuit cabinet.
- The dimensions of circuit cabinets are to be such that 20% space remains inside the system on completion for devices, terminal blocks and wiring.

## 5.2.4 Machine cabling

Oil-resistant numbered cable

Metal pipes and single conductors are not to be used on control or load lines.



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## 5.3 Information technology (IT)

### 5.3.1 Requirements

- Blanc + Fischer IT Services (BFITS) must be involved in the planning from an early stage.
- Connectivity of the machine terminals
- Allocation of network addresses as required by B.PRO (BFITS)
- Supplier contact for network/IT issues

### 5.3.2 Controller terminal

If any PCs or terminals are integrated in the machine, then they must be accommodated inside an appropriate housing, or else be a unit of at least safety class IP 54.

Memory retention and protection:

- Non-volatile and re-writable memory media are to be used as standard. Power sag protectors are to be used to ensure that no data is lost in the event of network fluctuations or failure. This means that the PC will automatically shut down. The design is to be agreed with B.PRO. A support contract must be taken out with the manufacturer of the machine.

### 5.3.3 Software

The following points are to be observed in order to ensure data consistency:

- If any workplace PCs require software, then it must operate under Windows 7 SP1 or higher, and servers under Windows 2008 server operating system or higher, or the current version of SLES.
- If a Windows operating system is used on the system computer, then B.PRO's anti-virus program is to be loaded on it. This does not apply to computers that are not connected to B.PRO 's network.
- It must be possible to backup the program data on standardised data memory devices (external USB hard drive / USB stick).
- The entire software is to be provided with the original manuals required for installing, operating, maintaining and servicing the machines, systems and settings, such as programming and system software, source codes, drivers, software certificates, software protection (e.g. authorisation disk, dongle etc.), component parameters including the necessary hardware (e.g. cables, interface cards, converters). No other software (e.g. SPS Software, ProTool etc.) is to be included in the delivery. All the software and documentation is to be provided in German.
- B.PRO is to be provided with the software tools for maintenance, data backups and test functions.
- If a database is to be installed centrally on B.PRO 's network, then only the following two database systems are to be used:
  - Oracle from version 11.2
  - Microsoft SQL Server from version 2012
- Software interfaces for all software-based control components (e.g. interfaces of frequency converters, safety SPS etc.) must be available at a central point.

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If a PC is integrated in the machine/system, then it must be possible to access it through it. Otherwise a central point is to be created by agreement.

- If possible, the programming is to be presentable in KOP or FUP. If necessary, it can also be programmed in structured text.

## 5.3.4 Data / maintenance connection for machines

- It must be possible to update the machine with BDE/MDE data acquisition as an option.
- Machines are connected to the B.PRO IP network via a min. Cat6 network cable.
- BFITS will provide the manufacturer with an IP address space to match the number of required terminals.
- A virtual network will be set up (VLAN) and access lists to separate the machine from the B.PRO network routers.
- If there are several terminals, they must be connected by an internal switch.
- Remote access will be possible via a browser-based VPN solution (SSL VPN Box from Juniper). This will allow the manufacturer / support to access the terminals and their ports after activation by BFITS.
- If the access is little used and for maintenance purposes, use also the remote maintenance software Teamviewer.

## 5.4 Pneumatics

Generally designed for an operating pressure of 6 bar.

The Iso-cylinders and valves in the appendix are to be used.

## 5.5 Hydraulics

The Iso-cylinders and valves in the appendix are to be used.

## 5.6 Water cooling

With regard to machines with internal and/or external cooling circuits, any items that come into contact with the cooling water (e.g. distributors, valves etc.) are only to be made of non-corroding materials such as plastic, stainless steel or brass; they are not to be made of aluminium. No different materials that may have an adverse effect or damage each other may be used within one system. Detailed information on water quality and, if necessary, stabilisation measures must be given.

## 5.7 Lubrication systems

Lubrication systems are to be easily accessible and clearly marked. Preference is to be given to automatic lubrication system (see components list). Can not be excluded, that lubricating and other equipment coming into contact with the products, approved food products should be used or suggest in the manual.

## 6 Colour and identification

- Unless other colours are specified, then the components are to be coated in RAL 5002 (ultramarine) and RAL 7035 (light grey).
- All markings attached for safety reasons must correspond to DIN EN ISO 7010 "Safety colours and safety signs" or ASR A 1.3 "Safety and health signs in the workplace".

- Containers must be labelled in accordance with the GHS (Globally Harmonized System of Classification and Labelling of Chemicals) or CLP. Labelling in accordance with the Hazardous Substances Ordinance is no longer permitted.
- Pipes must be labelled in accordance with DIN 2403 "Marking of pipes according to fluid transported"; concerning hazardous substances, hazard symbols as stipulated by the GHS or CLP must also be used.
- No manufacturer's signs (logos) are to be applied to the systems.

## 7 Training

All operating and maintenance staff are to be given instruction in German in the machine, plant and settings. This instruction and any necessary training documents are included in the delivery. The number of training sessions and dates are to be agreed with the client in good time.

Operating and maintenance staff must be trained in the following:

- Principles, machine functions and where they are used
- Programming training and instructions in operating
- Machine/plant maintenance and repairs
- Particular hazards when using the plant
- Potential/existing environmental effects of the activities being carried out.

The scope of the training is determined by the complexity of the machine/plant, and is to be decided together. Records of the training are to be kept. These are to be confirmed by signature (trainer and trainee).

## 8 Additives and operating fluids/pollutants/waste products

- If additives and operating fluids are used in the machine/system (hydraulic oil, lubricating oils/greases, cooling or refrigerant additives, abrasives), the corresponding safety data sheets must be promptly provided. The types and properties of additives and operating fluids must be detailed in order to use alternative substances if necessary (reduction of material diversity).
- For emissions that arise during the machine process, a corresponding suction and filter system must be designed by the provider in order to ensure permanent compliance with the workplace exposure limits.
- If, in relation to this, the German Technical Instructions on Air Quality Control (TA-Luft) are to be observed, a suitable and easily accessible sampling point must be available.
- The appropriate disposal concept is to be prepared for any waste products that occur during the operation of the plant, and in particular for any auxiliary and operating materials. The disposal has to be clarified before starting the system.
- The appropriate safety devices are to be in place for the event of any operating materials that may harm the environment escaping during operation or in the event of any disturbances.

## 9 Technical efficiency and warranty

The machine (plant) must achieve a high level of technical efficiency. Downtimes will include regular and random maintenance work.

The supplier is to construct and design the machine (plant) to permanently achieve at least 98% technical efficiency.

Complex plant is to include availability even after failure of an individual system component (e.g. a robot on an interconnected system as soon as the intended use is no longer given.

The basis for measurement of the level of efficiency is a machine logbook in accordance with B.PRO requirements. It will start on the final takeover of the machine (plant, and applies for the period of 12 months with no shift limitations.

In the event of the level of efficiency falling below 98%, we shall have the right to improvement. Following improvement, confirmation of the technical level of efficiency can be provided for a further six months.

If the level of efficiency is not reached, then we shall have the right to withdraw from the contract.

The guarantee and warranty period is 24 months with no shift limitations. It shall extend by any periods of time for improvements or additional deliveries by the supplier starting from the receipt of our notification of defects and continuing until the supplier's written declaration of the end of the measure or refusal of further improvement or additional delivery in writing.

## **10 Maintenance, repairs and service**

### **10.1 Maintenance**

Descriptions of maintenance tasks and their intervals, re-fill quantities and any necessary auxiliary and operating materials are to be provided. All maintenance points are to be easily accessible and clearly marked.

### **10.2 Service**

The contractor shall have a qualified service technician available between the hours of 07.30 and 16.30. Should it prove impossible to solve a problem by telephone or data line, a qualified service technician is to be at the machine/plant within 4 hours of a telephone call (plus travel time). An emergency number is to be provided for use outside these hours (07.30 - 16.30), and the service technician must be on-site at the start of the next shift.

Other times may be agreed for essential machines/plant on allocation.

## **11 Acceptance**

Acceptance shall be in writing. B.PRO 's acceptance protocol shall be used.

The preliminary acceptance shall be carried out on the bidder's premises as closely as possible to production conditions.

The safety inspection is carried out before the start of series production by the team A&U.

Acceptance features / specimens shall be defined by B.PRO.

The results will be assessed by B.PRO, and may be compared with reference measurements.

The final acceptance shall take place at the B.PRO works. Prerequisites for the final acceptance are total completion, operational readiness with no faults, and the complete documentation in German. The final acceptance shall be based on the process capability and other agreed parameters (please refer to the particular specifications.

## 11.1 To be observed when using contact-free safety light curtains:

- When using contact-free safety light curtains, the item is to be tested before initial commissioning in accordance with the specification of ZH1/597, or ZH1/281 for presses, with the manufacturer of the contact-free safety light curtains. The contractor shall be responsible for the coordination.
- A report/document confirming the faultless initial commissioning of the contact-free safety light curtain is to be handed over no later than on the final acceptance (integral part final acceptance; final acceptance shall not be completed without this document).

## 12 Connection to the central building control system

Energy supply systems and facilities are to be designed for connection to the central building control system.

The following are to be included unless the client states in writing that they are not required:

- Ethernet interface (protocol: TCP7IP)
- 2-pole selector switch, Manual / Off / Automatic / GLT with switch positions H, 0, A, central building control system
- Potential-free switchover contact for collective alarms
- Measuring devices for individual energy types and the corresponding wiring to the control cabinet
- Operating hours meter
- Zero-potential switchover contacts are to be included for temperature / humidity / leakage detectors.

## 13 Energy consumption

- The systems are to be designed for the lowest possible energy consumption.
- The energy efficiency ratings of the various components used and their energy consumption, plus the entire energy consumption of the system under various operating conditions, are to be included in the offer (during the planning and design stages, before implementation).
- Suggestions for further possible energy optimisations are to be included with the offer as an option.

## Plant component list B.PRO GmbH

Component	Manufacturer
<b>Electrotechnology control cabinet</b>	
Control cabinet / cooling	Rittal
Contactors	Siemens
Command and signalling units	Siemens
Limit switch	Siemens
Safety switch with special	Euchner / Schmersal
Motor circuit-breaker	Möller
Main switch	Möller
Inductive/capacitive switch	IFM Elektronik (pluggable)
Safety light barrier/button	IFM Elektronik (pluggable)
Clamps	Phönix
Relays / couplers	Murrelektronik
Two-hand relay	Pilz GmbH
Emergency off safety relay	Pilz GmbH
Safety light curtains (BWS)	Sick
Time relays	Siemens
Plug connection	Harting / Han E or identical
Two-hand console	to be decided in the event of an order
<b>Electrotechnology - automation units</b>	
Simatic S7	Siemens
Compact controller	Siemens
Control units	Siemens
<b>Electrotechnology - axle control / frequency converter</b>	
	to be agreed in the event of an order
<b>Electrotechnology - control cabinet wiring</b>	
Busbar distribution system	Rittal
Mounting fuses in control cabinet	Rittal
<b>Pneumatics</b>	
Maintenance units, cylinders, plug connections, sound insulators	Festo
Valves	Festo (type to be agreed)
Proportional pressure control	Festo
<b>Hydraulics</b>	
Hydraulic units	Bosch-Rexroth
Hydraulic cylinders	Bosch-Rexroth / Parker
Hydraulic valves	Bosch-Rexroth / Vickers
Hydraulic pipes	Parker / Bosch-Rexroth
Plug connections	Parker / Ermeto
<b>Lifting equipment</b>	
Lifting equipment on machines	ABUS / Stahl
<b>Lubrication systems</b>	
Automatic lubrication	perma-tec