



Questions and answers
concerning the system introduction





FieldBusPlug: Questions and answers concerning the system introduction



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Questions concerning the marketing

Q: *What are the benefits from using FBP for me or for my customer?*

A: My benefits are:

- Market acceptance through innovative products, flexibility to satisfy customer requirements, products from one of the major providers in the field of automation, world-wide service organization.
- Expansion of the sales volume through shorter throughput times, higher product throughput and more efficient manpower assignment as well as better possibilities for human resource planning.
- Better commercial result through cost savings in the fields of design and project planning, standardized products, flexibility through free choice of the used bus, standardization of the own products through modular design of machine parts.
- Reduction of error sources during the production process by the usage of complete devices, reduced wiring times, serial production of machine modules.
- Reduction of mounting times and error sources during the production process through plug-connection of machine modules.
- Shorter commissioning times through standardized hard- and software functions, better diagnostic functions (module, bus plug, via bus to PLC).
- Reduced need for service because the machines are handed over in an error-minimized condition.
- Shorter service times through replaceable standard components.
- Quicker detection and location of errors through extensive diagnostic functions. Service and diagnostic functions up to an individual function can be accessed via modem - PLC - bus.
- Minimum storage expenditure through fewer individual components by using complete devices.

The benefits for my customer are:

- Shorter delivery times result in reduced capital lockup and an earlier start of production which altogether results in an earlier payback through products.
- Better availability of the systems or machines resulting in higher productivity, reduced price per part, reduced error rates, less service expenditure and less repairs.
- Shorter repair times.
- Usage of the same switching devices all over the world.

Q: *What kind of support can I obtain for the training of my service or sales teams?*

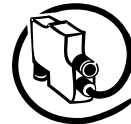
A: The technology itself is easy to handle.

In addition, we offer funded training courses (also application-based), local support, a competent HelpLine (phone +49 6221-701 1444), application-based documentation, modules master data on CD-ROM, CAD macros, a catalog CD-ROM, tender to contract template texts, example configurations and Internet help.

Q: *What kind of documents has ABB available for my own customer sales presentations? Is it possible to obtain support by ABB?*

A: We offer presentation aids, sales brochures, a technical-oriented sales documentation, application examples, system presentation overhead-foils on CD-ROM or already printed as well as sales support.

We support you with customer advisers, competent sales personnel and advisers for firms of consulting engineers.



Questions concerning the marketing (continued)

Q: *What about approvals, standards or certifications (e.g. UL/CSA, BMV)?*

A: The system will meet all important approval criteria (CE, GL, CSA, UL, nautical registration, etc.).

Additionally it is used by ABB all over the world. Particular ABB customer advisors have close contact to users in order to negotiate the acceptance to the BMV (Betriebsmittelvorschrift = regulations for appliances).

Q: *How do I stand out against my competitors?*

A: The FBP system allows the usage of all common standard bus systems. There is only one (bus-neutral) switching device for all bus systems resulting in a higher flexibility to satisfy customer requirements.

Furthermore, I can achieve smaller control cabinets due to the compact construction, cost advantages and advantages in product price as well as shorter delivery times through flexible production (standardization).

Q: *What about the integration to the existing situation?*

A: We have got a collection of application and usage examples which is continuously growing. If this does not provide an approach to solve your task, you can inform us about your requirements and we will help you to work out approaches.

The system can be used in such a flexible manner that practically all applications can be realized.

Nevertheless, please do not hesitate to contact our system experts if you are in doubt. Our customer advisers, sales support staff and advisers for firms of consulting engineers will help you gladly.

Q: *Why should I use new technology although I'm satisfied with the proven technology?*

A: Technical innovations provide benefits to the user, e.g. the usage of only **one** switching device for all busses.

Further positive features for the project planning are: The possibility to use it with all common bus systems, more flexible mounting, modularization of machine and system components, extensive diagnosis functions (such as preventive diagnosis, e.g. switching cycles count), a higher volume of process information or the standardized functions on the individual devices (motor controller functions on MF121-FBP or UMC22-FBP).

Additionally, complete motor starters are available (MSD11-FBP and MSR22-FBP). These devices have extremely compact dimensions and thus only require a minimum of space in the control cabinet. This particularly applies to the MSR22-FBP (Motor Starter Reverse).

Another advantage is the reduction of the project planning efforts due to the standardized software functions and the macros for drawing up the wiring diagram.

Q: *And where is my added value?*

A: **Added value without an expansion:**

The reduced work time needed for the production of the control cabinets allows a more effective planning of the manpower assignment. At the same time, the risks caused by outage times are minimized.

Added value by expansion:

In addition to the items mentioned above, one more aspect is to be considered: The higher product throughput per unit of time allows an expansion of the company activities without any additional staff costs.

The staff which becomes vacant can thus be used for additional projects. Additional factory buildings which are normally required for an expansion are not required.



Questions concerning the marketing (continued)

Q: *What are possible rationalization effects?*

A: Reduced capital lockup due to shorter supply times.

An earlier start of the production results in an earlier payback through products.

A higher availability of the production systems and machines results in ...

... a higher productivity and lower costs per part,

... reduced error rates,

... less service efforts,

... a reduced repair frequency with shorter repair times.

Extensive diagnosis functions are available: Integrated LEDs on the devices indicate the device state and LEDs on the field bus plugs indicate the states of the device and the bus.

The preventive diagnosis allows a preventive maintenance of MFI21-FBP and UMC22-FBP.

Furthermore, all information are transferred to the connected PLC or guidance system via the bus. Which data are transferred depends on the performance data of the chosen bus system.

Thus, these diagnosis information can also be transferred via data networks or via modem.

The storage of spare parts is reduced because it is only necessary to keep a stock of a few complete devices.



Questions concerning the economic efficiency

Q: *Where is the breakeven point where the FBP system is more beneficial than the CS31 bus with remote modules?*

A: Assuming that the aspired goal can actually be reached in an identical quality by both alternatives, the costs must be compared for each individual case.

In order to obtain an objective estimation, further aspects, such as the expenditures for planning and programming, commissioning as well as the service during the operation, must be considered in addition to the pure costs of the device.



Questions concerning the product range

- Q:** *Do all upcoming ABB switching devices have an FBP connection?*
- A:** For all new devices it is investigated whether a linkage via FBP is technically and economically meaningful for the user. Then the decision is made correspondingly.
- The FBP technology is open for co-operations within and outside of ABB.
- Q:** *Will you offer the same devices with and without an FBP connector?*
- A:** Here, we have to distinguish between three groups of devices:
1. Devices which are not functional without FieldBusPlug because they can only be controlled via the bus (e.g. MSD11-FBP, MSR22-FBP). It goes without saying that these devices will not be offered without FBP connection.
 2. Devices which are primarily used with FieldBusPlug but which can also be used in stand-alone mode because they can also be controlled via corresponding signal inputs (e.g. UMC22-FBP). If the usage in stand-alone is most likely a rare case, a variant without an FBP connection will not be produced.
 3. Devices (supplied by ABB or other manufacturers) which are already offered without a FBP connection but which will be later equipped with an FBP connection by further or new development efforts. Here, it is a question of the demand whether both variants will be offered in the future.
- Q:** *Where can I obtain AS-Interface components, such as repeaters, extenders, AS-Interface power supplies, cables longer than 5 meters, etc.?*
- A:** Repeater, extenders and other AS-Interface accessories are offered by manufacturers, such as our co-operation partner „Lumberg“. The accessories required for making longer cables are offered by us.
- Q:** *What has to be done in the PLC that AS-Interface or DeviceNet works correctly? How much time is needed for programming and how much are the costs for this?*
- A:** For the common PLC systems we offer function blocks (e.g. example programs) which allow a quick, easy and comfortable programming. Thus, the time needed is low.
- Q:** *Can the front labels of the FBP plugs be replaced with the labels from the catalogue or do you offer specific labels?*
- A:** We offer specific front labels in a frame.
- Q:** *Why do two types of AS-Interface plugs exist?*
- A:** It's due to reasons of costs. In general, the ASP22-FBP was sufficient but it is too expensive to connect only proximity switches, for example.
- Q:** *Will the FBP system become a standard?*
- A:** We think so. Sure, it is still a vision at the moment, but due to the tremendous potential of the system this already seems to be very concrete ...
- Q:** *Will the FBP system still exist in 10 years?*
- A:** Definitely yes. It is the basis for a long term product line, and subject to a continuous development.
- Q:** *When will a complete product range be available?*
- A:** Counter-question: When is a product range complete?
- A product range will almost never be complete because ABB and its co-operation partners will always offer new modules with new functions for implementation into the FBP system.
- In any case it is a fact that it will grow continuously!



Questions concerning the product range (continued)

Q: *Will devices for the activation of actors (e.g. valves) also be offered?*

A: Yes, they will.

Q: *Can single parts of a module, e.g. the mounting plate, the electronics part, the integrated motor protection switch or the integrated contactor also be obtained individually?*

A: No. Due to warranty reasons, defective devices must be repaired at the supplier.

Q: *When will I be able to connect the modules together with my I/O modules to the CS31 bus rather than to AS-Interface or DeviceNet.*

A: A CS31 FieldBusPlug is planned for the end of 2002.

Q: *Are there bus cables for special applications available, e.g. trailing cables, underground cables, etc.?*

A: If there are special cables for a field bus available on the market, these cables can also be used for the FBP system.



Questions concerning the technology

- Q:** *Why is the MSD11-FBP only able to switch 12 A, the contactors normally can switch 16 A?*
- A:** This is based in the specification of the contactors (data sheet B7, refer to main catalogue). The contacts of the used contactors can switch a maximum load of 12 A (for 700.000 switching cycles) at a nominal voltage of 400 V (three-phase system with earthed neutral) when they are used for AC3 applications (connection of motors).
- Q:** *The motor protecting switch together with an MFI21-FBP exceed the standard dimensions; they do not fit onto a 54 mm standard adapter ...*
- A:** The overall width (MFI + MS 325) is 90 mm. This is a standard dimension (2 x 45 mm).
- Q:** *Why is the MFI21-FBP based on an other design principle than the MSD11-FBP/MSR22-FBP? Why is it broader?*
- A:** MSD11-FBP and MSR22-FBP are integrated complete solutions. The combination of the MFI21-FBP together with the MS325 and contactors represents an open solution and thus enables its usage for many new applications. The MFI21-FBP makes the MS 325 (motor currents of up to 25 A!) intelligent and enables its use with a bus. Furthermore, for such high motor outputs, often star-delta starting is used. For this purpose, three contactors are needed which are broader than the combination of a MFI21-FBP with an MS 325.
- Q:** *How do I have to wire an EMERGENCY OFF when FBP components are used?*
- A:** Using our motor branch components MSD11-FBP/MSR22-FBP, supplemented and wired with additional switching devices, category 2 of EN954-1 can be reached.
- Q:** *MFI21-FBP and UMC22-FBP allow free wiring which enables to reach higher categories.*
- A:** The application must be designed to comply with the regulations applicable for the corresponding application.
- Q:** *Is it planned to support an optical fibre bus with FBP (for higher noise immunity)?*
- A:** No. All versions of the FBP system are designed for high noise immunity. Most of the standard busses cannot be used with optical fibres. One example is the AS-Interface bus which is at the same time supplied with 24 volts via the bus.
- Q:** *Which specifications must a bus cable meet?*
- A:** A bus cable must meet the data given by the corresponding field bus standard. Such cables are obtainable on the market.
- Q:** *How fast is the AS-Interface bus? What are its reaction times on full capacity utilization?*
- A:** The maximum cycle time is 5 ms when 31 slaves are connected, and max. 10 ms when 62 slaves are connected. Additionally, the cycle time of the PLC has to be added to the reaction time.
- Q:** *Does the usage of DeviceNet provide any advantages in speed compared with AS-Interface?*
- A:** DeviceNet is designed to handle higher data volumes. But it does not provide any speed advantages compared to AS-Interface with its lower data volume.
- Q:** *How many I/O points can be handled by an AS-Interface coupler when the maximum number of subscribers (62) is connected?*
- A:** $62 * 7 = 434$ I/O points, these are 248 inputs and 186 outputs.



Questions concerning the technology (continued)

Q: *What are the possible overall bus lengths for AS-Interface or DeviceNet?*

A: **AS-Interface:**

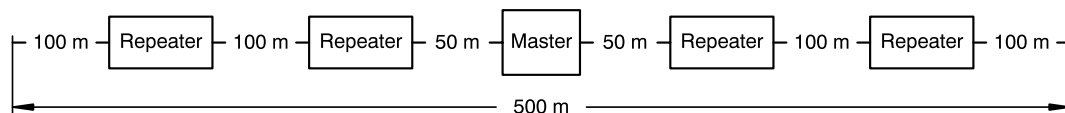
When using repeaters, the AS-Interface can handle a maximum bus length of 300 m beginning at the bus master. If two lines originate from the bus master, the maximum length is 250 m each (= 500 m total).

Without repeaters and extenders up to 100 m can be reached. The maximum permitted number of slaves (31 or 62) stays the same.

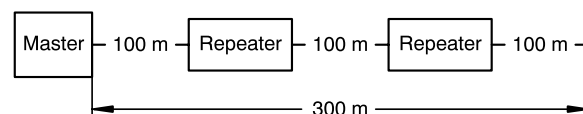
When using repeaters, a maximum of two repeaters can be connected in series to one rope on which all components can be placed to the individual segments as desired.

If the master is located **in the middle**, two ropes are connected in a star topology to repeaters in opposite directions. The maximum permissible distance between the master and the two repeaters is 100 m altogether. So, if two repeaters are used, 50 m can be bridged with each repeater. After each repeater, a new segment starts with a maximum line length of 100 m. Using two further repeaters, the network can be expanded by further 100 m on each side. This results in a maximum total line length of 500 m.

Star:



Line:



The repeaters are working as amplifiers. The slaves can be connected to all AS-Interface segments as desired. Each segment requires a separate power supply. Additionally, the segments are electrically isolated by the repeaters which increases the short-circuit selectivity.

Theoretically, more than two star-shaped ropes can be connected in parallel. This way, theoretically more than 500 m could be reached, but only with regard to the total line length and not with regard to the maximum permitted distance between two points.

DeviceNet:

The maximum permitted bus length is 100 m, depending on the transmission rate and the bus structure. Repeater are not permitted.

Common to all busses is that the cables which are permanently connected to the field bus plugs must be considered when calculating the bus cable length.

Q: *How many repeaters can be used maximally?*

A: AS-Interface: Two repeaters per rope
DeviceNet: Repeater are not permitted.

Q: *What is the difference between repeaters and extenders for the AS-Interface bus?*

A: In principle, they have the same function: to work as amplifiers in order to extend the AS-Interface by 100 m. The difference is that no slaves may be connected to the first part of the bus if extenders are used.

This is why extenders are only recommended if, for example, greater distances must be bridged between the control cabinet (where the master is located) and the system (where the slaves are located).



Questions concerning the technology (continued)

Q: *Which way are the FieldBusPlugs addressed?*

A: There are several possibilities for each field bus:

AS-Interface: Using an addressing unit or via the master, if it provides the required function.

DeviceNet: Address setting directly at the terminal device (e.g. MFI-21-FBP) or via the master.

Detailed information is provided in our FBP documentation.

Q: *What are the advantages of the FBP system compared with alternatives such as the CS31 bus with remote modules?*

A: Planning, wiring, test and commissioning are simplified. The FBP system is more modular than the CS31 range. To this extend there is a lot of potential for cost savings.

Q: *What are the power requirements for the separate AS-Interface bus power supply that delivers the 24 V supply voltage, if 62 modules are connected?*

A: This depends on the current consumption of the modules. Another aspect to consider are the voltage drops on the lines. For example, the MSD11-FBP consumes approx. 140 mA when it is supplied by the 24 V voltage via the bus.

Due to the conductor cross sections and the load capacity of the FBP plug connections, the supply concept consisting of repeaters and separate power supplies must be built in that way that no power supplies greater than 4 A are required.

Furthermore, there is always the possibility to supply the devices via an external power supply what would relieve the 24 V supply voltage on the bus.

Q: *Is it possible to extend the interface between the terminal device socket and the FBP plug (e.g. when using plug-in technology)? If yes, which length can the extension cable have?*

A: From the technical point of view, such an extension can be realized. In any case the aspired solution must be investigated and validated with regards to EMC (depending on the used FBP device, the installation environment and the length of the required extension cable).

A solution for this is at the moment only discussed for UMC22-FBP. We will find a medium-term solution.



Questions concerning the availability

Q: *What is the degree of protection of the components?*

A: The FBP switching devices comply with IP 20, the FBP plugs comply with IP 65.

Q: *What does it mean that, if the supply comes from the bus, only the switching elements in the direct neighborhood may be feeded. What are the exact distances? When is an external feeding necessary?*

A: The exact distances? This applies to lines inside the application in the direct neighborhood (max. 0.5...1 m). It should be considered that the complete field bus is kept alive by the supply of the plugs via the bus. This means that one short-circuit can paralyze the complete bus. The purpose of the line length restriction is to keep the risk at a minimum!

For example, the length of the DeviceNet is restricted by the maximum permitted capacity per node of the 24 V supply.

Q: *Does a local switching from manual to automatic operation exist?*

A: This is mainly determined by the project planning. In principle, manual operation can be realized by wiring or the PLC program.



Questions concerning the compatibility

Q: *Is the system compatible to other manufacturers?*

A: For our systems, we use the standards and commitments for the individual field busses. This ensures the compatibility.

All devices with the neutral field bus interface must be compatible, independent of the manufacturer. The busses themselves are all standardized and specified.

Q: *Can I connect the FBPs to the PLCs of other manufacturers?*

A: Yes, of course, assumed that these PLCs provide couplers for the standard bus systems.

For each device, standardized software functions or function blocks (Siemens, Allan Bradley) are available which allow the control and diagnosis of the device.

Q: *I'm using variable-frequency inverters from ABB. Can I also use the control unit of these devices for the UMC22-FBP?*

A: Yes, it is the same control unit.

Q: *Will you offer control units with a neutral field bus interface?*

A: Yes, in future. Today there are control units for certain bus systems available on the market. These units are working independent from the FBP system. They can be combined with the FBP system without any problems.



Questions concerning the diagnosis and handling of faults

Q: *What are the possibilities for a remote diagnosis?*

A: This is determined by the guidance system and the functions available there. Remote diagnosis is normally performed via the PLC using corresponding couplers. The volume and the meaningfulness of the diagnosis data depends for the FBP on the devices (which data are available) and the selected bus (which data can be transferred via the used bus).

Q: *I'm not a programmer. What are my possibilities to recognize a defective module visually?*

A: This depends on the type of module. The instruction leaflet delivered with the device as well as the diagnosis information in the technical documentation give important information about this.

The diagnostic possibilities always depend on the intelligence of the device.

Extensive diagnosis functions are available. Integrated LEDs on the devices indicate the device state.

LEDs on the field bus plugs indicate the states of the device and the bus.

MFI21-FBP and UMC22-FBP allow the preventive diagnosis for a preventive maintenance.

Additionally, the operating data of the motor can be displayed on the operating panel of the UMC22-FBP.

Furthermore, all information are transferred via the bus to the connected PLC. Which information are transferred depends on the performance data of the chosen bus system.

This way, diagnosis information can also be transferred via data networks or via modem.



Informative questions

Q: *Where can I find the present components and configuration possibilities in the Internet.*

A: The information about existing and future devices can be found in the Internet under **www.abb.de/stotz-kontakt**

Q: *Is there a hotline and service available for the users of the FBP system?*

A: Yes, it is. This product is supported by the HelpLine (phone +49 6221-701 1444) at ABB STOTZ-KONTAKT GmbH.

Q: *What kind of support is available for the configuration of the FBP system?*

A: A configurator is currently being planned.



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