



Electronic Equipment

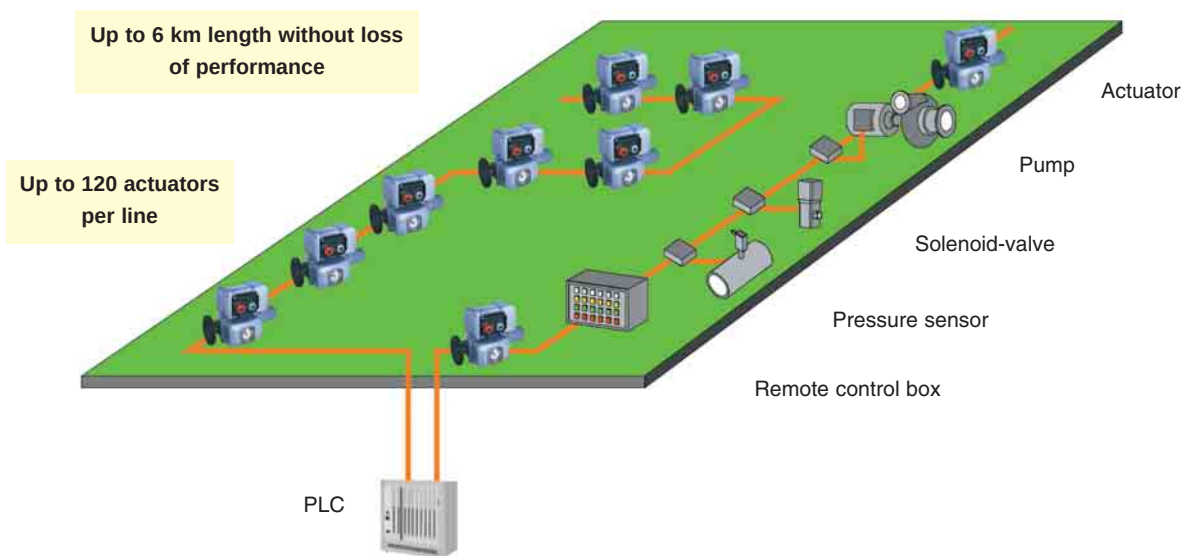
Profibus DP fieldbus control

Connection to a Profibus fieldbus

The complete range of BERNARD actuators can be connected to a PROFIBUS DP fieldbus. The PROFIBUS DP interfaces are designed to be easily fitted into the Integral+ or the Intelli+ control boxes.

A basic PROFIBUS DP line can control up to 30 actuators. Extra line repeaters are required to increase the number of actuators connected to the same line up to 120 total.

In the same way, the maximum basic line length is 1.2 km (0.75 mile) and can be extended by the use of repeaters to 6 km (3.75 mile).



Advantages of the fieldbus technology :

- reduced cable installation costs on site
- the two-wire connection on actuators is simple and fast
- connection of an extra actuator to the installed bus line is easy
- the number of actuator commands and signalling information available is huge compared to conventional installations

Profibus DP for Integral+ controls

Within this configuration, the following type of data can be exchanged with the PLC :

- **ACTUATOR COMMANDS**
- **SIGNALLING**
- **SYSTEM FAULT FLAG**
- **POSITIONER CONTROL AND FEEDBACK** (for modulating actuators)

Please refer to the "Profibus DP for Integral+ controls features" table for a detailed list of available commands, signalling and default reporting.

Profibus DPV1 for Intelli+ controls

As per the INTEGRAL+ version, the following data can be exchanged with the PLC :

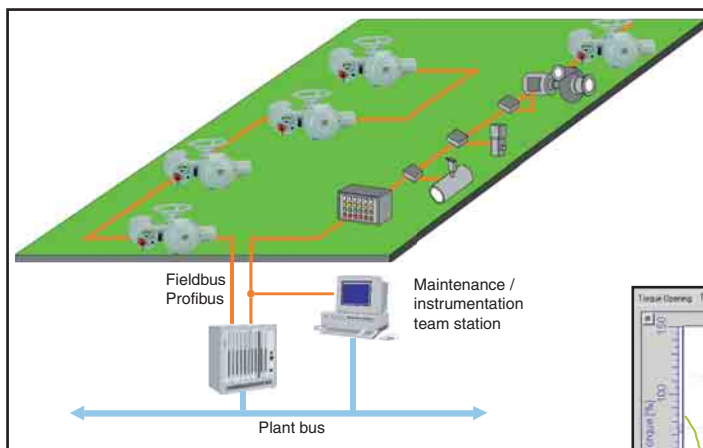
- **ACTUATOR COMMANDS**
- **SIGNALLING**
- **SYSTEM FAULT INFORMATION**
- **POSITIONER CONTROL** (for modulating actuators)

Additionally, the INTELLI+ digital intelligent control PROFIBUS interface uses the DPV1 protocol, thus bringing additional features specifically for preventative maintenance activities:

- **AUXILIARY COMMANDS** (for external devices dry contact control).
- **SYSTEM FAULT DIAGNOSTIC INFORMATION**
- **EMERGENCY SHUTDOWN COMMAND**
- **MAINTENANCE DATA**
- **REMOTE CONFIGURATION**

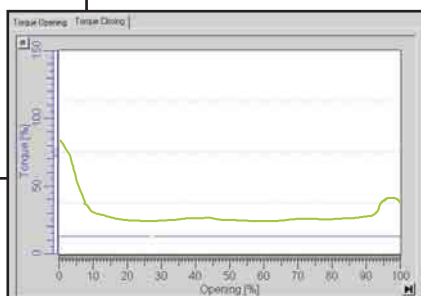
Please refer to the “Profibus DPV1 for Intelli+ features” table for a detailed list of available commands, signalling, default reporting and maintenance data.

■ CONNECTION OF AN INSTRUMENTATION / MAINTENANCE TEAM STATION



Information regarding the operation of the motorised valves can be retrieved on the maintenance/instrumentation team station.

This feature is of particular interest as far as **preventative maintenance** is concerned. In fact, information such as the valve torque curve or the number of starts can easily be displayed.



PDM software : example of torque curve display

Connection of the station can be done either directly on the Profibus fieldbus line or on the plant bus.

Our system is using the Siemens SIMATIC PDM software technology.

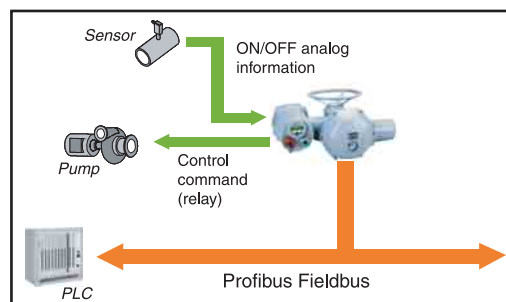
Please contact us for further information.

■ CONTROL OF EXTERNAL DEVICES

The Intelli+ controls can be used as an interface between the fieldbus and some devices installed in the plant.

Up to 4 devices (i.e pumps) can be controlled by the plant PLC through the actuator Profibus interface and 4 relays located in the Intelli+ housing.

Up to 5 “on-off” pieces of informations (i.e coming from sensors, switches) can be relayed by the Intelli+ electronics to the Profibus fieldbus system.



Profibus DPV1 for Intelli+ features

COMMANDS	SIGNALLING	DEFAULTS REPORTING	MAINTENANCE DATA
Open Close Stop AUX1 and AUX2 commands (configurable) : Local/Remote selection or Opening inhibit or Closing inhibit or On/Off or Positioner selection or ESD (Emergency Shutdown) R1 to R4 external device control relay commands Option for additional R5 to R7 external device control relays. Remote access and modification of configuration parameters : Torque limit values, AUX1&2 assignments, Local control enabled, Temporisation parameters, Dead band (positioner), Failsafe position in case of loss of bus signal, Opening/Closing priority, By-pass of thermal protection in case of ESD, Torque set to 100% in case of ESD, User password, Valve tag number. Remote access (read only) to configuration parameters : Actuator serial number, Actuator release date, Software version, Actuator Class, Gear reduction or stroke unit data, Closing mode (on position or on torque) Timer for jammed motor. For modulating actuators : Positioning command (0.1% resolution)	Valve open Valve closed Valve position in % Current torque value in % Actuator opening Actuator closing Opening torque limiter tripped, Closing torque limiter tripped, Local/Remote switch set to Local, Local/Remote switch set to Remote, Local/Remote switch set to Off, Handwheel operated since last electric motor travel S1 to S5 external device input signals ESD received	Opening max. breakout torque exceeded Tight closing max. torque exceeded Max. opening torque exceeded Max. closing torque exceeded System fault (global) Jammed motor in opening Jammed motor in closing Thermal protection tripped Loss of phase supply (3ph) Actuator overtravel fault Opening in wrong direction Closing in wrong direction Faulty position sensor Faulty torque sensor	Number of starts (last 12 hours) Total number of starts (lifetime) Number of starts (partial resettable counter) Total operating time (lifetime) Opening torque curve Closing torque curve

Profibus

Profibus DP for Integral+ features

COMMANDS	SIGNALLING	DEFAULTS REPORTING
Open Close Stop Local command inhibit For modulating actuators : Positioning command (8 bits - 256 positions)	Valve open Valve closed Power-on R1-R2-R3-R4 relays remote configuration For modulating actuators : Valve position in % (8 bits)	System fault (configurable)

Technical data

	INTEGRAL+ PROFIBUS DP	INTELLI+ PROFIBUS DPV1
Link type	RS485	RS485
Communication protocol	PROFIBUS-DP slave-cyclic	PROFIBUS-DPV1 slave cyclic and/ acyclic
Cable specifications :	Profibus certified cable only	Profibus certified cable only
Line connections :		
Actuators per line without repeater	30 max.	30 max.
Line length without repeater	1.2 km max. (0.75 mi)	1.2 km max. (0.75 mi)
Number of repeaters per line	4 max.	4 max.
Actuators per line with 4 repeaters	98 max.	120 max.
Line length with 4 repeaters	6 km max .(3.75 mi)	6 km max. (3.75 mi)
Scan speed (30 units & 1.2 km)	0.1s (bus at 93.75 kbit/s)	0.1s (bus at 93.75 kbit/s)
Transfer speed	9.6 kbit/s up to 12 Mbit/s	9.6 kbit/s up to 1.5 Mbit/s
Power Supply	Internal via INTEGRAL+ transformer.	Internal via INTELLI+ transformer or by an external 24VDC supply.
Technical approval	Operability approved by PNO (Profibus Nutzer Organisation)	Operability approved by PNO (Profibus Nutzer Organisation)

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