

## 2 and 3-axis joystick with power, signal or CANbus outputs

### Description

Two and three axis FABER-COM proportional joysticks can be used in a large variety of applications where is necessary to have a simple and reliable user interface to control construction machinery.

**JS** (with signal outputs, available also in ratiometric version) can only be used together with a logic control unit (PLC) or a power control device (PWM driver).

**JP** (with PWM outputs) can directly control hydraulic devices (pumps, distributors, dump valve) becoming often the only control unit of the whole machine.

**JC** thanks to its inputs, can collect a large numbers of control signals and transmit them through a CANbus network.

Designed and specifically conceived to reduce the amount of installation work, FABER-COM joysticks are manufactured with top quality parts.

The **control electronics** is located inside the housing and **completely sealed** to assure extreme tightness.

Joystick movements are derived from the measurement of the magnetic field produced by permanent ferromagnets; the measurement is taken through redundant Hall effect probes. This kind of probes are not subject to deterioration.

The configuration and calibration easiness makes these joysticks suitable for different applications.

The push button panel is completely customizable.

Here are some of the **available options** for the three models:

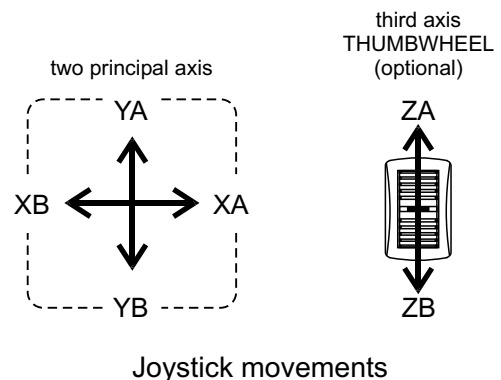
- "virtual cross" to forbid diagonal movements.
- linear or parabolic output curve.
- standard or capacitive dead man switch.
- adjustable dead band, independently for each semiaxis.
- Thumbwheel, for third prop. axis (not available in Danfoss version)
- Outputs lock if the hand-grip is not in neutral position at joystick turn on.
- Dump valve output with delayed turn off, to avoid high pressure spikes in the hydraulic circuit.
- Offset to compensate the hydraulic distributor dead band.
- Auxiliary output activated with logic and command levels user defined (software configurable).
- Two or three speed sets allow to regulate speed according to the machine configuration.
- Combination with only one proportional PWM output with many directional ON/OFF outputs.
- Tracked machines driving function, to directly control two pumps of an hydraulic driven machine with the up/down and left/right joystick movements (virtual 45° axis rotation).
- Dead man switch functionality active only with joystick in neutral position.
- Auxiliary inputs/outputs can be active high or active low (software configurable).

All the joystick have a FAULT output which is driven low if a failure occurs. The LEDs on the bottom side helps the user to check the correct joystick functionality and connections.

Analog current outputs are feedback controlled. ON/OFF outputs are protected against short-circuits.

All the joysticks have a serial port to connect PRG2 serial programming keyboard (provided apart) to configure and calibrate the product.

All the joysticks are provided by default with 50 cm unpluggable cable but it is possible to require a customized wiring.



TECHNICAL SPECIFICATIONS	JS	JP	JC
Power Supply Voltage	10Vdc ÷ 30Vdc		
Max current absorption	60 mA + output load (max 2.5 A)	60 mA + output load (max 10A)	60 mA + ON/OFF output load (max 1.4A)
Working Temperature Range	-40 ÷ +70 °C		
Output Signals	<p>3 analog signals range 0 ÷ 2.5V ÷ 5V, 0 ÷ 5V ÷ 10V, 5V ÷ 0 ÷ 5V, 10V ÷ 0 ÷ 10V or 2 analog signals ratiometric (Danfoss) [only two axis available] I<sub>max</sub>: 10 mA</p> <p>6 directional outputs 1 DUMP VALVE output 1 FAULT output I<sub>max</sub>: 300 mA (for each output)</p>	<p>8 - 2.5A power outputs usable as:</p> <p>3 PWM pairs 1 BYPASS output 1 FAULT output - or - 1 PWM output 6 ON/OFF directional outputs 1 DUMP VALVE output</p> <p>PWM outputs: I<sub>min</sub>: 100 ÷ 2500 mA I<sub>max</sub>: 100 ÷ 2500 mA Freq: 50 ÷ 300 Hz</p>	<p>CANH - CANL CAN 2.0B up to 1 Mbps</p> <p>1 ON/OFF output controllable via CAN 700 mA max</p> <p>1 output for push button power supply voltage (5 Vdc stabilized) I<sub>max</sub>: 30 mA (usable also as 700 mA ON/OFF output)</p>
Input Signals	<p>1 ON/OFF input usable as:</p> <ul style="list-style-type: none"> <li>- speed selection input</li> <li>- movement enable (dead man switch)</li> <li>- X or Y axis commutation to the Z axis</li> </ul> <p>If not used, FAULT and BYPASS outputs can be used as ON/OFF inputs (they are bidirectional signals).</p>		<p>Via CAN transmittable:</p> <ul style="list-style-type: none"> <li>- 2 ON/OFF inputs (one usable as pickup input)</li> <li>- 5 analog inputs, range: 0V ÷ 4.5V, 2.5V centered, usable to read 5 push button or 5 bilateral buttons (two usable as 4-20mA analog inputs)</li> </ul>
Thumbwheel Input Signal	Range: 0.5V ÷ 4.5V		
Analog Inputs Impedance	-	-	11 kOhm towards 2.5V
Connections	Molex minifit Jr. 14 poles with 50 cm cable		<p>Molex minifit Jr. 4 poles with 50 cm cable (CAN and power supply)</p> <p>Molex minifit Jr. 10 poles with 50 cm cable for optional inputs/outputs</p>
Under Panel Size	diameter 80 mm - depth 90 mm		
Working Angle	+/- 18°		
Max force on handle	800 N		
Handle full stroke required force	14 N (optional 7 N)		
Electromagnetic Compatibility (EMC)	according to EN 13309 and EN ISO 14982 regulations		
Ingress Protection Rating	IP65		
Weight (approx.)	1150 g		

**JS Specifications:**

- customizable analog output signal range (ratiometric output also available)
- optional offset on the analog outputs (to compensate the hydraulic distributor deadband)
- 8 ON/OFF positive output at power supply voltage (300 mA max, protected against short-circuit)

**JP Specifications:**

- usable to control two or three proportional independent axis (4 or 6 PWM outputs) or just one proportional output (PWM) with 4 or 6 ON/OFF outputs
- up to three speed set, selectionable with two digital inputs
- one DUMP VALVE output, with delayed turn off
- one FAULT output
- independent regulation (for each semiaxis) of:
  - minimum current
  - maximum current
  - rise timeramp
  - fall timeramp
- PWM frequency adjustable from 50 to 300 Hz

**JC Specifications:**

- CAN V2.0B communication bus
- 5 analog inputs (2 of them software configurable as 4-20 mA inputs), 2.5V centered, usable to read 5 independent push buttons or 5 "rocker switch"-like push buttons
- 2 ON/OFF inputs (one of them can measure frequencies as PICK-UP input)
- 1 ON/OFF output
- push buttons power supply output, protected against to short-circuit
- serial port to configure and calibrate the joystick

The JC joystick is provided with the FABER-COM communication protocol.

On request it is possible to customize the communication protocol in order to link up the joystick to other customer CANbus devices.

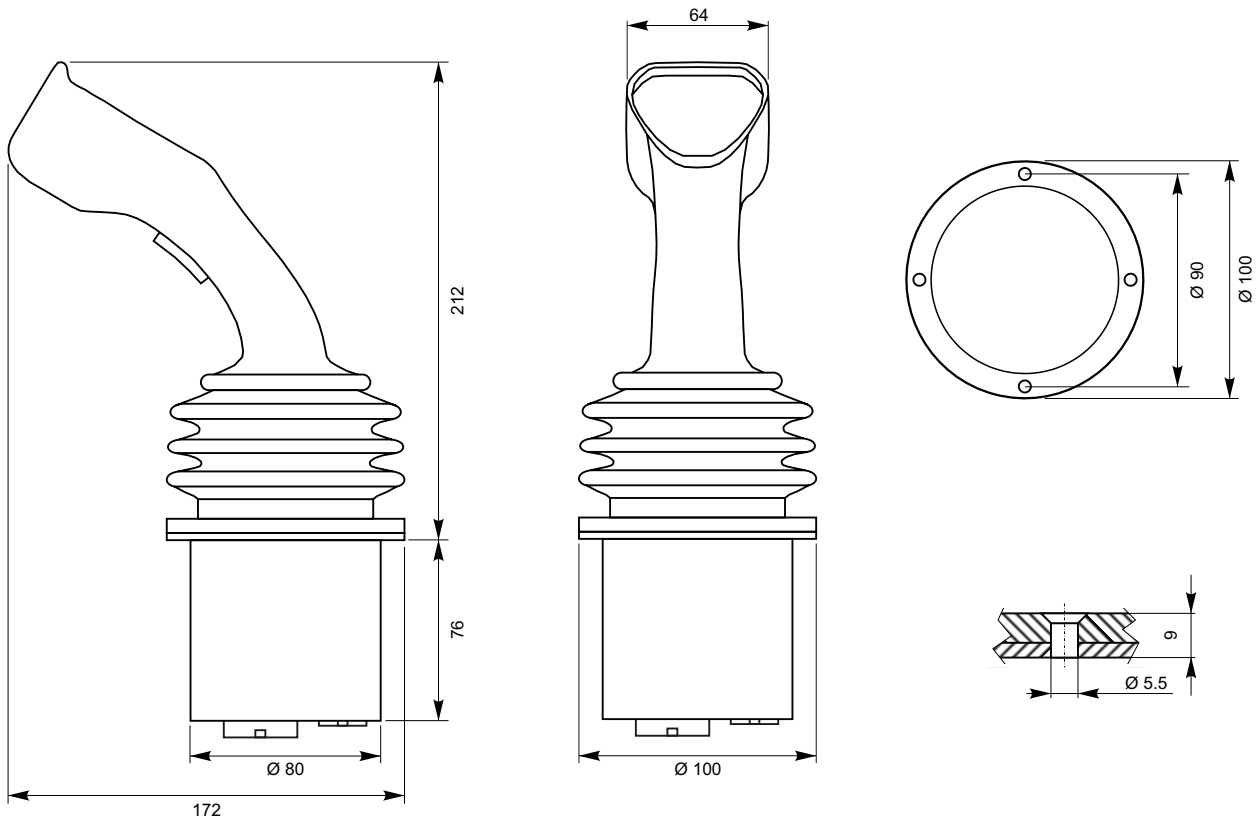
**Common characteristics**

The joysticks can be provided configured and calibrated according to customer requests. Otherwise the customer can directly configure and calibrate his joystick with a connection kit for personal computer (a serial adapter and an interface program for Windows® OS). The PC must have a serial port (direct or USB to RS232 converter).

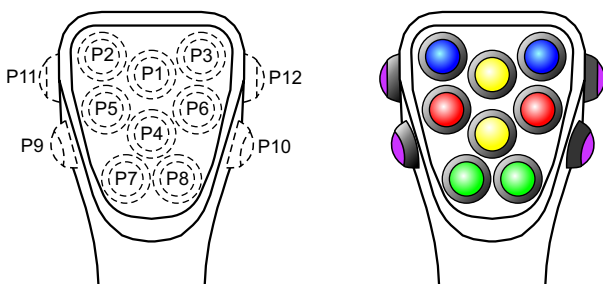
**Application examples**



- Joystick with safety dead man switch (the switch has to be pushed when the hand-grip is in neutral position, otherwise all the outputs will be locked).
- Control of machines equipped with an ON/OFF hydraulic distributor (using directional outputs) and one proportional solenoid valve for oil flow regulation.
- Control of machines with different speed sets, selectable by one or two switches (e.g.: telescopic boom with reduced speed when the boom goes high).
- Driving of tracked machines with hydrostatic traction and contra-rotating track function.
- Machine with a second auxiliary pump activated when one or more movements intensity exceed a specified threshold.

**Dimensions**



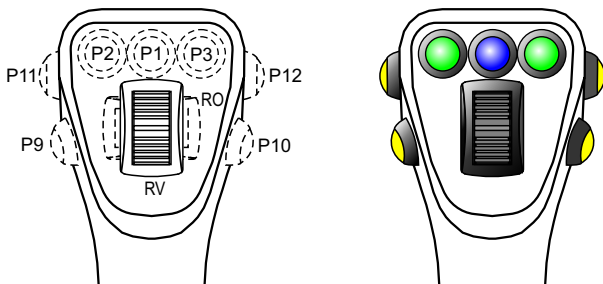
**Push button position and thumbwheel codification**



-  L type Push Button (low profile)
-  H type Push Button (high profile)

Available colours: yellow, orange, red, purple, blue, green.

All the possible configurations are available.



For each push button it is possible to choose the type (high or low) and the colour.

Thumbwheel can be mounted vertically (RV) or horizontally (RO).