# Electric Pilot Devices

Joysticks

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# 1 Overview electric pilot devices

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|  | X | up to 5 | up to 2 | up to 4 |

# 2 Joystick analogue FGE type 1

- Spring centered
- Robust and compact design
- Reverse voltage protected

## 2.1 Description

The FGE type 1 joystick is an analogue operating lever for 2 axes. He is compact and robust. The handgrip is spring-centered.

## 2.2 Technical data

| General characteristics | Unit | Value |
|---|---|---|
| Supply voltage | V DC | 8…32 (for $U_N$ = 9 V) |
| Temperature range | °C | -40…+85 |
| Enclosure protection | | IP 65 |
| Weight | kg | 1 |
| Actuation angle | ° | ± 20 |
| Plug connection | Hirose Conn Header 12 Pos (DF1112DS2C(05)) | |

## 2.3 Dimensions
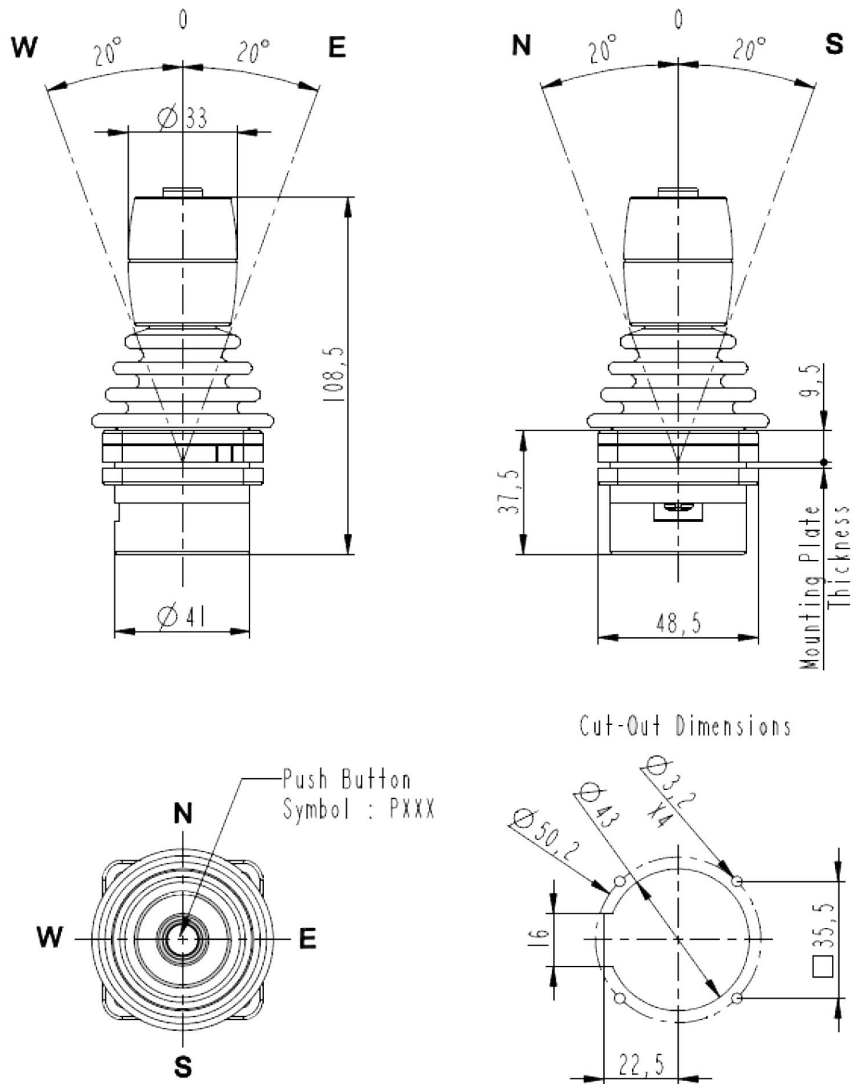


## 2.4 Order informations

| Description | Type | Ordering code |
|---|---|---|
| Joystick for 2 axes, without shifting gate, with 1 push button | FGE*-MT1T0XXXX | Assigned when the order is placed. |

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## 3 Joystick  FSE-DP2-02/JG0-M4-02



- Fully on-board electronics
- USB interface for configuring the joystick
- Minimal installation space required
- Reliable zero position
- Hall sensor technology

### 3.1 Description

This rugged joystick has been designed for professional use in off-road, construction, agricultural and forestry machines as well as industrial materials-handling trucks. The electronics, which directly control two proportional directio-nal valves by means of PWM, are fully integrated into the joystick. For operating On/Off-valves, 4 switches and a rocker are available.

### 3.2 Technical data

| Parameters | Min. | Type | Max. | Unit | Note |
|---|---|---|---|---|---|
| Electrical power supply | | | | | |
| Supply voltage | 8 | - | 30 | V DC | Reverse-polarity and overvoltage protection up to +/- 48 V DC |
| Current consumption (standby) | - | 20 | - | mA | |
| Current consumption (max.) | - | 10 | - | A | |
| PWM output | | | | | |
| Voltage, power output | | $V_{cc}$ | | | Short-circuit protected |
| Current, power output | 0,3 | - | 2,5 | A | |
| Dither frequency | 33 | 200 | 400 | Hz | |
| Ramp time | 10 | 100 | 9999 | ms | |
| Deadband setting | 10 | 10 | 40 | % | Defines the deflection range beyond which the outputs are switched on |
| Auxiliary output | | | | | |
| Voltage, auxiliary output | | $V_{cc}$ | - | | For deflection in positive or negative X direction -> $V_{aux} = V_{cc}$ |
| Current, auxiliary output | - | - | 2,5 | A | |
| Delay, auxiliary output | 0 | 0 | 9 | sec | |
| Toggle switch and rocker switch outputs | | | | | |
| Switching current | | | 5 | A | If the rocker switch and the the toggle switches on the keypad are used to directly control solenoids or re-lays, make sure that the solenoids or relays are equipped with suppression diodes. |
| max. switching operations, mech. | | | 10 mio | | |
| max. switching operations, elec. | | | 2.5 mio | | @ 0.5 A DC |
| General characteristics | | | | | |
| Plug connection | Sub-D 15-pin | | | | |
| Enclosure  protection | IP 65 | | | | |
| Operating temperature | -40 | - | +80 | °C | |

## 3.3 Dimensions



Mounting dimensions

212mm

50mm

63mm
70mm

57mm

57mm

63mm cut out    5mm
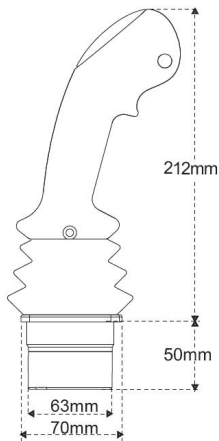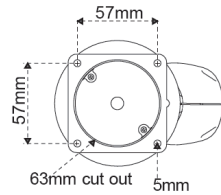
## 3.4 Order informations

| Description | Type | Ordering code |
|---|---|---|
| Joystick without shifting gate, 4 front buttons, 1 rear button | FSE-DP2-02/JG0-M4-02 | 100034394 |

## 3.5 Connection diagram

Supply voltage
6 V - 30 V

FSE-DP2 Sub-D Buchse (B)

| Vcc +12/24 V | NC | Ground | NC | NC | X-AuxOut | USB PWR | USB D + | USB D - | Y-AuxOut | X Out + | X Out - | Y Out + | Y Out - | NC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Seat valve
Y axis

Seat valve
X axis

Ground

Directional valve
Y axis

Directional valve
X axis

## 3.6 Pin assignment



switch 1    switch 2
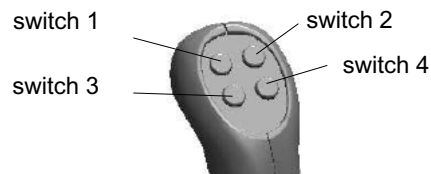
switch 3    switch 4

## 3.6.1　Plug A (male) switch functions

| Pin | Function | Wire colour | Description |
|-----|----------|-------------|-------------|
| 1 | Common switch connection | red | Common connection for all switches. The total current must not exceed 5 A. |
| 2 | Trigger switch | orange | Trigger switch, front (max. 5 A) |
| 3 | Switch 1 | green | Switch 1 (max. 5 A) (switch, top left) |
| 4 | NC | violet | - |
| 5 | NC | black | - |
| 6 | Switch 3 | brown | Switch 3 (max. 5 A) (switch, bottom left) |
| 7 | NC | yellow | - |
| 8 | Switch 2 | blue | Switch 2 (max. 5 A) (switch, top right) |
| 9 | NC | grey | - |
| 10 | Switch 4 | white | Switch 4 (max. 5 A) (switch, bottom right) |
| 11 | NC | green/white | - |
| 12 | NC | pink | - |
| 13 | NC | brown/white | - |
| 14 | NC | black/white | - |
| 15 | NC | red/white | - |

Note: If the rocker switch and the toggle switches on the keypad are used to directly control solenoids or relays, make sure that the solenoids or relays are equipped with suppression diodes.

### 3.6.2  Socket B (female) joystick functions

| Pin | Function | Wire colour | Description |
|---|---|---|---|
| 1 | +12/24 V (sensor 1) | red | power supply 12 V or 24 V |
| 2 | +12/24 V (sensor 2 unused) | green | unused |
| 3 | Ground (sensor 1) | green/white | ground |
| 4 | Ground (sensor 2 unused) | black | unused |
| 5 | NC | white | unused |
| 6 | X Axis Aux Out | violet | auxiliary output, X axis |
| 7 | USB-PWR | brown | USB power supply (only needed for parameterisation) |
| 8 | USB-D+ | brown/white | USB data line, positive (only needed for parameterisation) |
| 9 | USB-D- | pink | USB data line, negative (only needed for parameterisation) |
| 10 | Y-Axis Aux Out | blue | auxiliary output, Y axis |
| 11 | X-Axis Out+ | orange | solenoid 1 for the X axis (max. 2.5 A) |
| 12 | X-Axis Out- | yellow | solenoid 2 for the X axis (max. 2.5 A) |
| 13 | Y-Axis Out+ | black/white | solenoid 1 for the Y axis (max. 2.5 A) |
| 14 | Y-Axis Out- | grey | solenoid 2 for the Y axis (max. 2.5 A) |
| 15 | NC | red/white | unused |

## 3.7  Parametrization

The joystick is parameterised via the USB port using the JDBUtility application.
The JDBUtility application and a guide for configuring the joystick can be obtained directly from Bucher Hydraulics.

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# 4 Joystick digital FCE-…

## 4.1 Joystick digital FCE type 1



- Configurable grip
- Hall-sensor technology
- Reverse voltage protected

### 4.1.1 Description

The FCE type 1 joystick is a digital signal source for 4 axes.
The operating principle is non-contacting with Hall sensor-
technology.

### 4.1.2 Technical data

| General characteristics | Unit | Value |
|---|---|---|
| Supply voltage | V DC | 8…32 (for $U_N$ = 9 V) |
| Temperature range | °C | -40…+85 |
| Enclosure protection | | IP 67 |
| Weight | kg | 3 |
| Actuation angle | ° | ± 20 |
| CAN protocol | | CAN OPEN, 11 Bit Identifier |
| Plug connection | Deutsch 8 Pins (DT 0608SA) | |

## 4.1.3    Dimension
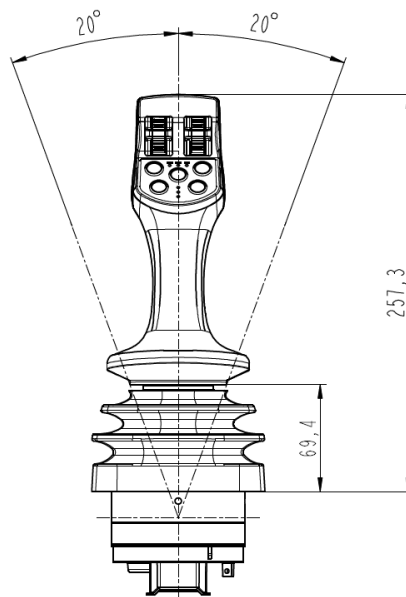


## 4.1.4    Order informations

| Description | Type | Ordering code |
|---|---|---|
| Joystick for 4 axes, without shifting gate, right handed version with 5 buttons and 3 thumbwheels | FCE*-MT5T0VVVMO125****03H | Assigned when the order is placed. |
| Joystick for 4 axes, without shifting gate, left handed version with 5 buttons and 3 thumbwheels | FCE2-MT5T0VVVMO125****03H | Assigned when the order is placed. |

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## 4.2 Joystick digital FCE type 2

- Spring centered
- Robust and compact design
- Reverse voltage protected

### 4.2.1 Description

The FCE type 2 joystick is a digital source for 3 axes. It is compact and robust. The handgrip is spring-centered.

### 4.2.2 Technical data

| General characteristics | Unit | Value |
|---|---|---|
| Supply voltage | V DC | 8…30 (for $U_N$ = 9 V) |
| Temperature range | °C | -40…+85 |
| Enclosure protection | | IP 65 |
| Weight | kg | 2 |
| Actuation angle | ° | ± 20 |
| CAN protocol | | CAN OPEN, 11 Bit Identifier |
| Plug connection | Cable 600 mm with plug M12 | |

## 4.2.3 Dimensions
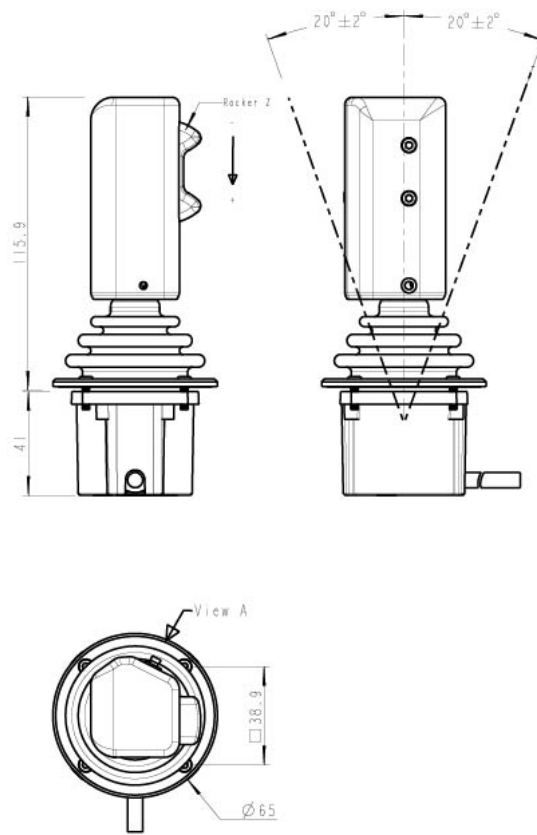


## 4.2.4 Order informations

| Description | Type | Ordering code |
|---|---|---|
| Joystick for 3 axes, without shifting gate, right handed version with 5 buttons an a thumbwheel | FCE*-RT5T0VRXXO125***03H | Assigned when the order is placed. |
| Joystick for 3 axes, without shifting gate, left handed version with 5 buttons and a thumbwheel | FCE*-LT5T0VRXXO125***04H | Assigned when the order is placed. |

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## 4.3   Joystick digital FCE - Typ 3

- Spring centered
- Robust and compact design
- Reverse voltage protected

### 4.3.1   Description

The FCE type 3 joystick is a digital signal source for 4 axes.
It is compact and robust. The handgrip is spring-centred.

### 4.3.2   Technical data

| General characteristics | Unit | Value |
|---|---|---|
| Supply voltage | V DC | 7…28 (for $U_N$ = 9 V) |
| Temperature range | °C | -40…+85 |
| Enclosure protection |  | IP 65 |
| Weight | kg | 2 |
| Actuation angle | ° | ± 12 |
| CAN protocol |  | CAN OPEN, 11 Bit Identifier |
| Plug connection | cable, 600 mm with M12 plug | |

### 4.3.3 Dimensions
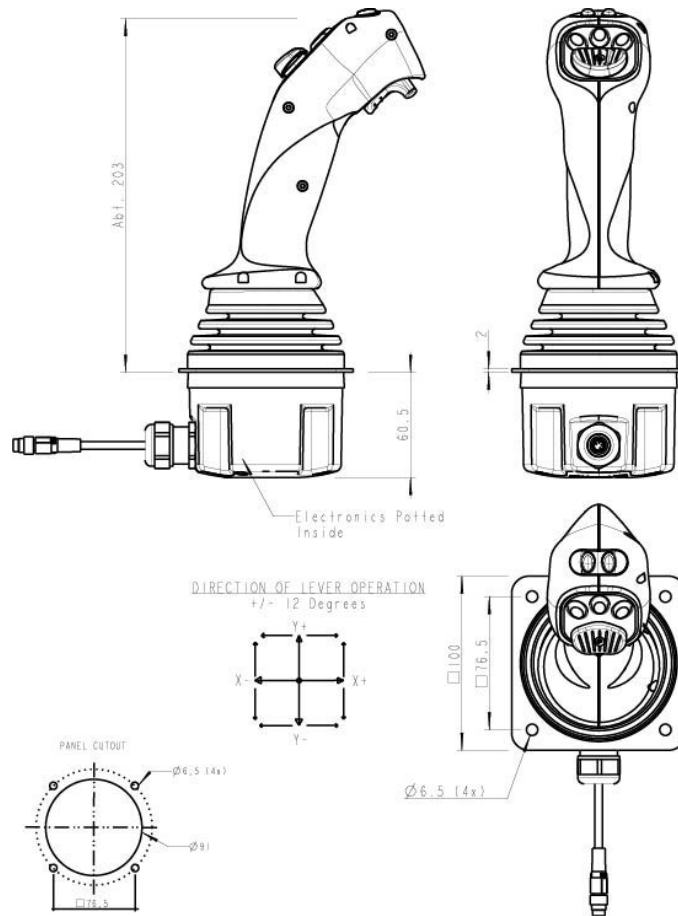


### 4.3.4 Order information

| Decription | Type | Ordering code |
|---|---|---|
| Joystick for 4 axis, without shifting gate, with 5 buttons and 2 thumbwheels | FCE*-MT5T0HMVMO125***03H | Assigned when the order is placed. |

## 4.3.5　Order information

| F | C | E | * | - | M | T4 | T1 | VL | XX | O | 125 | *** | 02 | H |

F = pilot devices

C = CAN

E = electrically

*  = without backdrop
2  = two axes S/N/O W

M = mid-position

T = front button
0…6 = number

T = back button
0…1 = number

**Switch layout front side**
VL = thumbwheel mounted vertically, position: front left
VR = thumbwheel mounted vertically, position: front right
VV = thumbwheel mounted vertically, position: front left and right
HM = thumbwheel mounted horizontally, front side
XX = no thumbwheel on the front side

**Switch layout back side**
VM = thumbwheel mounted vertically, back side
HM = thumbwheel mounted horizontally, back side
XX = no thumbwheel on the back side

J = J1939
O = CANopen

125 = baud rate 125 kbit/s
250 = baud rate 250 kbit/s

**** = place holder

02 = CAN-ID: 0…7F

H = hexadecimal