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1 Product description

The Joystick handles with proportional encoder are designed for the substitution of standard Joystick handles.
The handles include a proportional rocker which can be used to pilote electronical circuits, e.g. in order to operate proportional solenoid functions. The proportional encoder consists of a common hall sensor with standard output signals (0 .. 5VDC). The position of this proportional encoder is designed as to be operated with one finger.

In addition to the proportional encoder the handle includes four pushbutton switches suitable for further electrical functions in the application.

1.1 Application

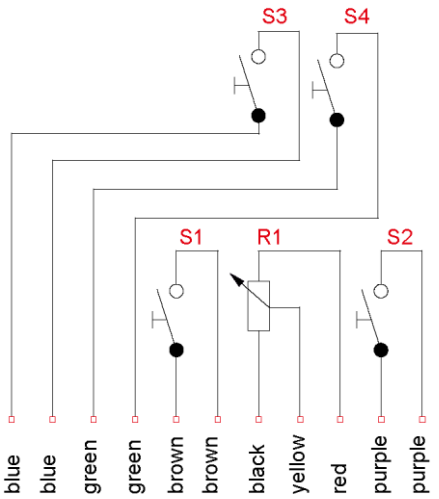
Applications in machines which require electrical-proportional functions in a hydraulic system.

1.2 Mounting location

As a substitute of the standard handle. Different adaptors for standard joysticks are included.

2 Function

The rocker is generally operated with the thumb of the hand working the joystick handle. The electrical function of the proportional encoder is similar to a potentiometer. Power supply (5 VDC) and GND are connected to the device. According to the position of the rocker the output signal is between 0.5 .. 2.5 .. 4.5VDC. Idle position is 2,5VDC.
In a range of 2,5° around the idle position the signal voltage remains constant at 2,5VDC.
All connections of the encoder and of the pushbutton switches are drawn out in the wire harness.



Connection assignment

3 Technical Data

Mechanical (proportional encoder)	
Initial force from idle position	5.6N
Deflection force	7.6N
Maximum permissable deflection force	649.4N
Maximum mechanical deflection	40° (±20°)
Service lifetime	10 million cycles
Material	Glass fiber reinforced nylon
Handle function	Spring centering

Environmental	
Operating temperature range	-40°C to 85°C
Environmental temperature range	-40°C to 85°C
Protection class	IP67
EMV noise immunity	IEC 61000-4-3:2006
EMV noise emission	IEC 61000-4-8:2009
ESD	IEC 61000-4-2:2008

Electrical (Sensor)	
Resolution	1.22mV
Supply voltage	5. 00V±0.01V
Reverse polarity protection max.	-10V
Surge Protection max.	20V
Output signal	0.5 .. 4.5VDC
Output impedance	2 Ω
Reproducibility center position	±200mV initial
Power consuption	13mA per sensor

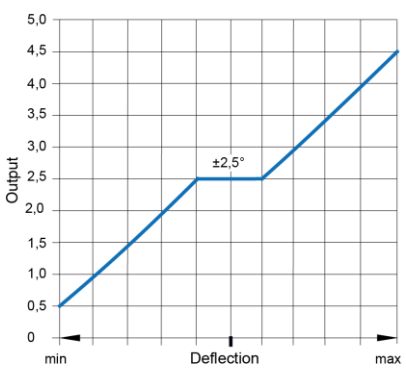
Standard pushbutton charakteristics	
Max. current / voltage with resistive load	400mA 32VAC – 100mA 50VDC – 125mA 125VAC
Low Level	10mA@ 30mV
Service lifetime with maximum electrical load	500,000 cycles
Mechanical service lifetime	1 million cycles
Protection class	IP67
Function	Pushbutton switch
Actuation force	7N±3N
Total actuating	1,9mm

3.1 Output signal

At an input voltage of 5.0 VDC, the output signal is between 0.5 VDC and 4.5 VDC. The voltage ranges 0.0 to 0.5 VDC and 4.5 to 5.0 VDC are never be used because some controllers use these areas for monitoring short circuit and open circuit.

3.2 Analog Deadband

The analog deadband eliminates very effectively the typical joystick error of the precision of return to the center position. In the range of ± 2.5° around the center position the signal voltage remains constant at 2.5VDC.



4 Ordering Information

4.1 Versions currently available

The versions listed below are available as standard. Further versions as part of the options given on the type code can be configured upon request.

Designation	Part No.
ACT-1N 1P 4S - Joystick-Handle with 1 proportional rocker and 4 pushbutton switches	000.040.615.9
ACT-1N 0P 6S - Joystick-Handle with 6 pushbutton switches	000.040.616.9

5 Installation

The joystick handle is mounted in place of the existing handle to a hydraulic joystick. There are three different adapters. The handle is attached to the adapter via a swivel joint and can be locked in any position.

At the joystick handle the following electrical components are available:

One electrically-proportional encoder (Hall sensor): **R1**
Four electric switches: **S1 .. S4**

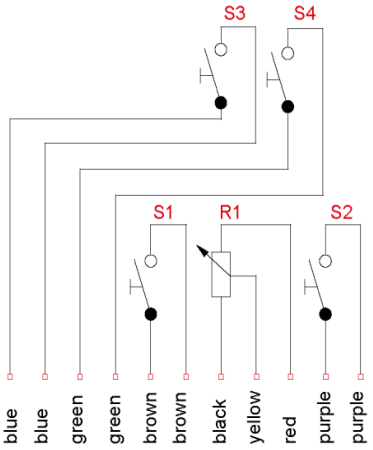
All contacts of the electrical components are drawn out in the wire harness. The components are therefore to be used independently.

The proportional encoder is connected with three lines:

RED	Supply voltage 5.0 VDC
BLACK	GND (0 VDC)
YELLOW	Signal 0.5 .. 2.5 .. 4.5 VDC

The pushbutton switches are connected with two lines (same colour) each. The polarity is irrelevant.

ATTENTION It is essential to ensure that the harness is routed that kind that the cable is never under tension during movement of the joystick (cable break)



Connection schematic

5.1 Views

Joystick Handle with proportional encoder and four pushbutton switches
Front View Rear View

Joystick Handle with six pushbutton switches
Front View Rear View

Connection assignment	
button	wires color
R1	black,yellow,red
S1	2x brown
S2	2x purple
S3	2x blue
S4	2x green

Connection assignment	
button	wires color
S1	2x purple
S2	2x brown
S3	2x blue
S4	2x green
S5	2x orange
S6	2x grey

6 Accessories

Three adapters for mounting the joystick handle on various joysticks are included:

- M 12
- M 14
- M 14x1,5