

EFP 系列电子脚踏阀

EFP Series of electronic foot pedal

➤ 产品介绍 Product Description

EFP双联电子脚踏主要用于履带式挖掘机的行走和转向控制。

The Electronic Foot Pedal with double-axis is mainly dedicated to the travel and steering control of tracked excavators.

基于高强度机械结构和先进电子设计,新的霍尔效应脚踏阀适合严苛环境和安全应用。

Based on high-strength mechanical structure and advanced electronic design, the new hall effect foot pedal is suitable for harsh environments and safety-related applications.

机械和电子寿命达3百万次。

The mechanical and electronic lifespan can reach 3 million cycles.

内置阻尼器最大限度的减小踏板复中位时的振动。
The integrated dampers minimize the oscillations when the pedal returns to neutral.

电路部分完全灌封,防护等级IP67/IP69K。

The electronics is completely poured up to protection level of IP67/IP69K.

EFP输出信号可以是CAN总线或者PWM。

EFP is available in versions of CAN or PWM signal.

对于PWM和CAN, EFP高可靠性的软硬件架构可以满足控制系统安全等级PLc或PLd。

For PWM and CAN, the EFP hardware & software architecture increases its reliability to match the requirements for integration in safety-related parts of control systems up to PLc or PLd.



➤ 产品特点及定制选项 Features and Options

- 非接触式霍尔效应传感器
Contactless hall effect sensors
- 单联踏板PWM冗余输出
redundant PWM outputs on each axis
- 单联踏板单通道或双通道CAN输出,以提高可靠性或降低总线负荷。
Outputs on 1 to 2 CAN channels on each axis to increase the reliability level of the systems or reduce the load of the bus
- 使用寿命高达300万次
Life expectancy up to 3 millions cycles
- 内置阻尼器
Integrated dampers
- 出色的电子部件防护, IP67等级
Excellent protection of the electronic part up to IP67
- 适合高安全要求应用场合
For high safety-related requirements applications
- 脚踏板可选
Variety of pedals are optional

> **主要技术参数 Technical Specifications**
机械性能 Mechanical characteristics

旋转角度	Actuation angle	$\pm 12^\circ$
机械中位精度	Centre mechanical accuracy	0.5°
操作力矩	Actuation torque	6~12Nm
最大允许一次性负载	Maximum permissible at the operating element with an exceptional, one time loading	200Nm
使用寿命	Life time	200 万次
重量	Weight without pedal	1.2kg
缓冲器	Damper	Standard

电气性能 Electrical characteristics – signal PWM

输出信号	Signal	redundant PWM
供电电压	Power supply	$5 \pm 10\%$ VDC
最大电流消耗	Maximum current consumption at 5 V supply	56mA
占空比	duty cycle	Full stroke towards 1+ or 2+, $95 \pm 2.7\%$ Neutral, $50 \pm 2.7\%$ Full stroke towards 1- or 2-, $5 \pm 2.7\%$
PWM 频率	PWM Signal frequency	500 ± 75 Hz
高压信号	High voltage signal	4 ... 5V
低压信号	Low voltage signal	0 ... 1V
最小上拉/下拉电阻	Minimum pull up or pull down resistor	2k Ω
反接保护	Protection against polarity reversal	Outputs protected between 0 and 32 V
短路保护	Protection against short circuits	Yes
保险	Fuse	1A
EMC	Magnetic field according to ISO 11452 part2	200 MHz ... 1 GHz: 140V/m 1 GHz ... 2.7 GHz: 50
	Current injection according to ISO 11452 part 4	1 MHz ... 400 MHz: 120mA
	Conducted / Radiated emission CISPR25	150 kHz ... 30 MHz : Class 3
	Direct electrostatic discharge	± 8 KV
	Electrostatic discharge in the air	± 15 KV

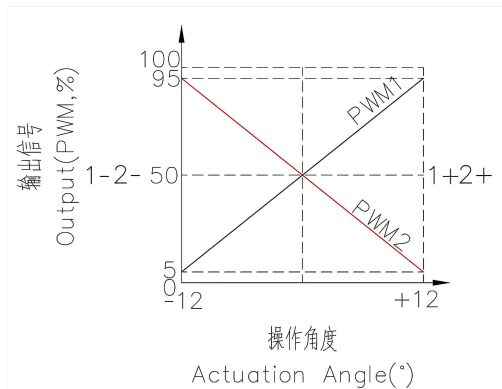
电气性能 Electrical characteristics – signal CAN

输出信号	Signal	double CAN
供电电压	Power supply	7~36 VDC
最大电流消耗	Maximum current consumption at 14 V supply	55mA
比例信号	Proportional signal	0 ... 255 digits (1 byte)

总线速率	Bus speed	encoding)
CAN 协议	Protocol CAN (see protocol chapters)	Neutral 0%, Full stroke, ±100%
反接保护	Protection against reverse polarity	250, 500, 1000KBds
短路保护	Protection against short circuit	2.0 A or 2.0 B
		36V for 60 seconds
		Connections towards machine protected from 0 to 32 V

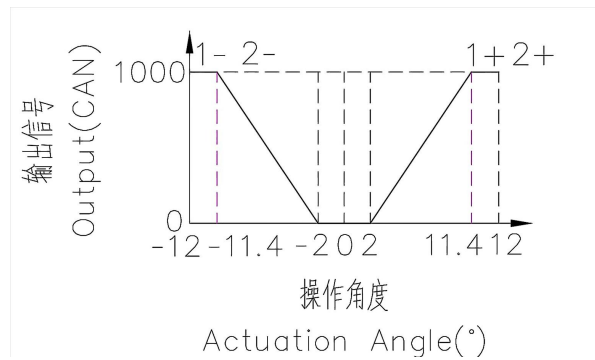
环境耐受 Environmental practices

储存温度	Storage temperature range	-40~+85°C
工作温度	Operation temperature range	-20~ +85°C
抗振动	Resistance to vibrations	20 ... 2000Hz (11.2 g RMS)
抗冲击	Resistance to shocks	50 g within 11 ms
防护等级	Protection level	IP67 below the machine's floor IP55 upside the machine's floor



输出曲线

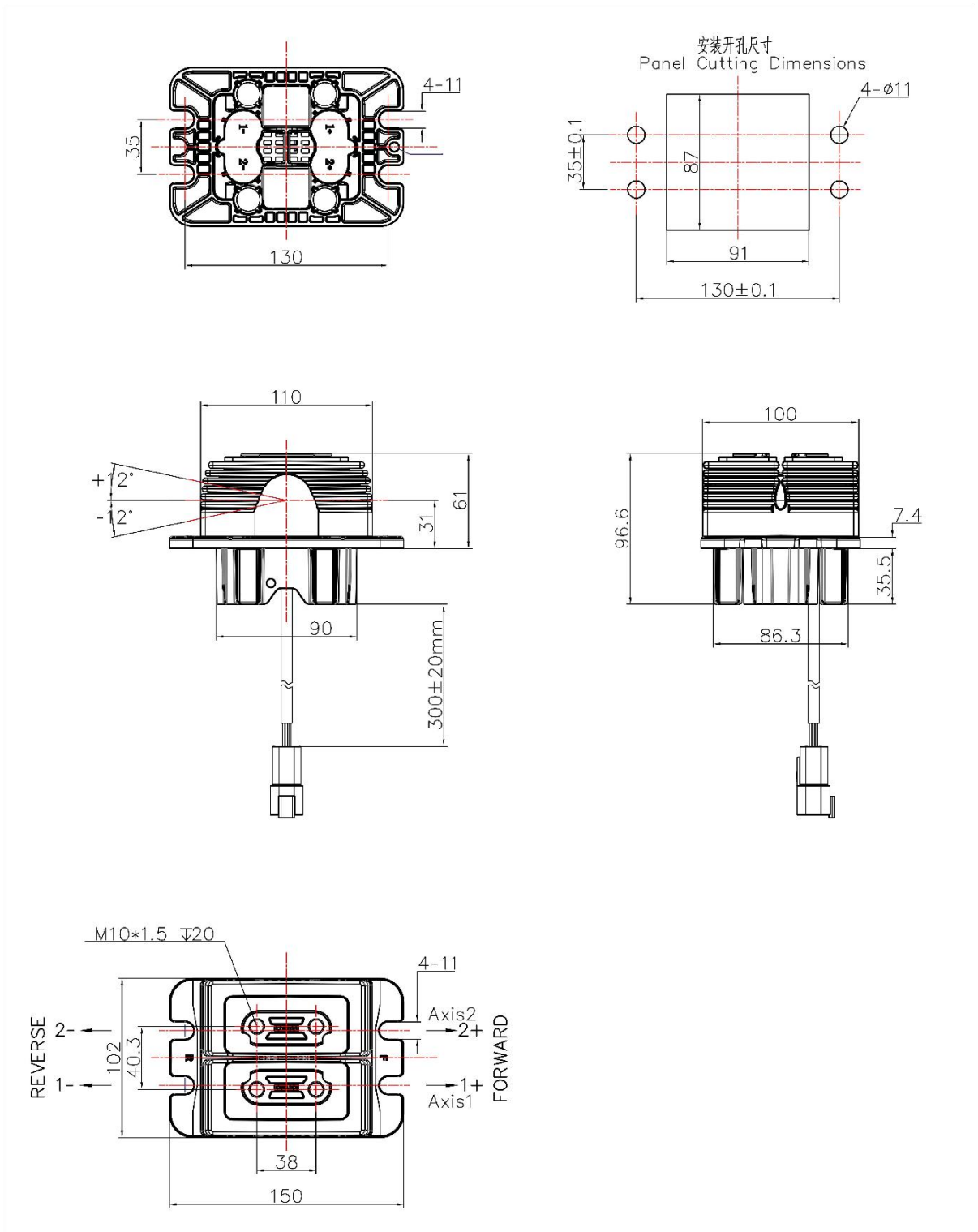
Output characteristic-signal PWM



输出曲线

Output characteristic-signal CAN

➤ 外形&安装尺寸 **Mechanical Dimensions(mm)**



➤ **编号规则Product Code Reference**

EFP <i>产品</i>	4 <i>轴数</i>	-	SW <i>输出信号</i>	-	N <i>阻尼</i>	-	00 <i>踏板</i>
<i>Product</i>	<i>Axis number</i>		<i>Type of output</i>		<i>Dampening</i>		<i>Pedal type</i>
EFP	4- 2 axis		SW- Signal PWM (performance level PLd capable)		N- with dampening		00- w/o pedal
	2- 1 axis		D- CAN (application in safety-related parts of control systems up to PLd)		Blank- w/o dampening		01- pedal 01
			C- CAN (application in safety-related parts of control systems up to PLc)			02- pedal 02	