

# RT100 Multi-axis Joystick Controller

## Product Features

- Single axis, dual axis or 3 axis control;
- Potentiometer sensor or Hall sensor;
- Available with various shape multifunction grips;
- Mechanical spring-return to center or Friction-hold operation;
- Excellent analog proportional control output or switch signal output;
- Easy to install, flexible operation, uniform texture, maintenance-free;
- CE approved, RoHS 2011/65/EU, Annex II, including (EU) 2015/863 compliant.

## Application

RunnTech 100 series industrial multi-axis joystick controller is mainly used in hydraulic proportional control, variable frequency motor control, remote control or electro-hydraulic applications such as Rotary table (drilling rig), Crane, Aerial work platforms, Forklift trucks, Mobile hydraulics, Shield tunneling machine, Hoist, Marine, Construction machinery, Civil engineering, Military vehicles, Cabin vehicles, Military robotics, Precision machine tools, Material handling equipment, etc.

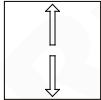
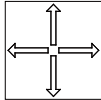
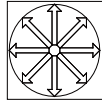


## Technical Information

Environment Parameter		
Storage Temperature	-50°C...+80°C	
Operating Temperature	-40°C...+80°C	
Protection Grade	IP64	
Vibration	Amplitude±3g, Frequency: 10Hz-200Hz	
Impact	20g, 6ms, Semi-sinusoidal	
EMC Anti-interference Rank	100V/m, 30MHz to 1GHz, 80% sine-wave modulation, meet EN50082-2 (1995) standard	
EMC Emission Rank	Rank B, 150KHz to 30MHz, meet EN50081-2 (1993) standard	
ESD Anti-interference Rank	Rank 4, 8KV contact discharge, 15KV air discharge, meet IEC61000-4-2 standard	
Mechanical Parameter		
Mechanical Angle	Potentiometer: ±32°, Hall sensor: ±20°	
Operating Torque	5N (50N max)	
Mechanical Life	5 million	
Mechanical Error	± 0.5°	
Electrical Parameter		
Hall Sensor	Power Supply Voltage	5±0.5V DC
	Power Supply Current Consumption	6.5mA/hall sensor

Hall Sensor	Resolution Ratio	infinite
	Maximum Voltage	15VDC
	Reversed Polarity Maximum Voltage	14.5VDC
	Load Resistance	5KΩ
	Median Voltage (no-load)	48 - 52%Vs
Potentiometer	Power Supply Voltage	DC24V
	Power Supply Current	<20mA
	Resolution Ratio	infinite
	Resistance (10%)	5KΩ and 10KΩ
	Electrical Angle	±32°
	Output Voltage Range (relative voltage)	0...100%; 10...90%
	Median Voltage	48%...52%
	Potentiometer Maximum Load Voltage	32VDC
	Maximum Power Consumption (25°C)	0.25W
	Switch Direction	switch position ±3°

### Product Configuration

No.	Item	Content																
1	Serial Number	RT100 series multi-axis joystick controller																
2	Operation Mode	<b>T</b> - spring return to center <b>M</b> - friction hold (only single axis) <b>MS</b> - friction hold + zero interlock (only available with HD5 grip for single axis or 2 axis cross direction)																
3	Limiter Plate	   <b>1</b> - Y axis <b>2</b> - Y/X axis cross direction <b>3</b> - Y/X axis full direction																
4	Electrical Output Form	<table border="1"> <tr> <td rowspan="4">Hall Sensor</td> <td><b>HV1:</b> DC 5V, 0...2.5...5V (rail to rail)</td> </tr> <tr> <td><b>HV2:</b> DC 5V, 0.5...2.5...4.5V</td> </tr> <tr> <td><b>HV3:</b> DC 5V, 1.0...2.5...4.0V</td> </tr> <tr> <td><b>HV4:</b> DC 5V, 1.25...2.5...3.75V</td> </tr> <tr> <td rowspan="8">Potentiometer</td> <td><b>P1:</b> Simple 2 directions output (potentiometer with dead zone)</td> </tr> <tr> <td><b>P2:</b> Simple 1 direction output (potentiometer without dead zone)</td> </tr> <tr> <td><b>V1:</b> DC24V, -10V...0...+10V (voltage output)</td> </tr> <tr> <td><b>V2:</b> DC24V, +10V...0...+10V (voltage output)</td> </tr> <tr> <td><b>V3:</b> DC24V, -5V...0...+5V (voltage output)</td> </tr> <tr> <td><b>V4:</b> DC24V, +5V...0...+5V (voltage output)</td> </tr> <tr> <td><b>V5:</b> DC24V, 0...+10V (voltage output)</td> </tr> <tr> <td><b>V6:</b> DC24V, 0...+5V (voltage output)</td> </tr> <tr> <td><b>I1:</b> 4 wire 4mA...12mA...20mA (current output)</td> </tr> <tr> <td><b>I2:</b> 4 wire 20mA...4mA...20mA (current output)</td> </tr> </table>	Hall Sensor	<b>HV1:</b> DC 5V, 0...2.5...5V (rail to rail)	<b>HV2:</b> DC 5V, 0.5...2.5...4.5V	<b>HV3:</b> DC 5V, 1.0...2.5...4.0V	<b>HV4:</b> DC 5V, 1.25...2.5...3.75V	Potentiometer	<b>P1:</b> Simple 2 directions output (potentiometer with dead zone)	<b>P2:</b> Simple 1 direction output (potentiometer without dead zone)	<b>V1:</b> DC24V, -10V...0...+10V (voltage output)	<b>V2:</b> DC24V, +10V...0...+10V (voltage output)	<b>V3:</b> DC24V, -5V...0...+5V (voltage output)	<b>V4:</b> DC24V, +5V...0...+5V (voltage output)	<b>V5:</b> DC24V, 0...+10V (voltage output)	<b>V6:</b> DC24V, 0...+5V (voltage output)	<b>I1:</b> 4 wire 4mA...12mA...20mA (current output)	<b>I2:</b> 4 wire 20mA...4mA...20mA (current output)
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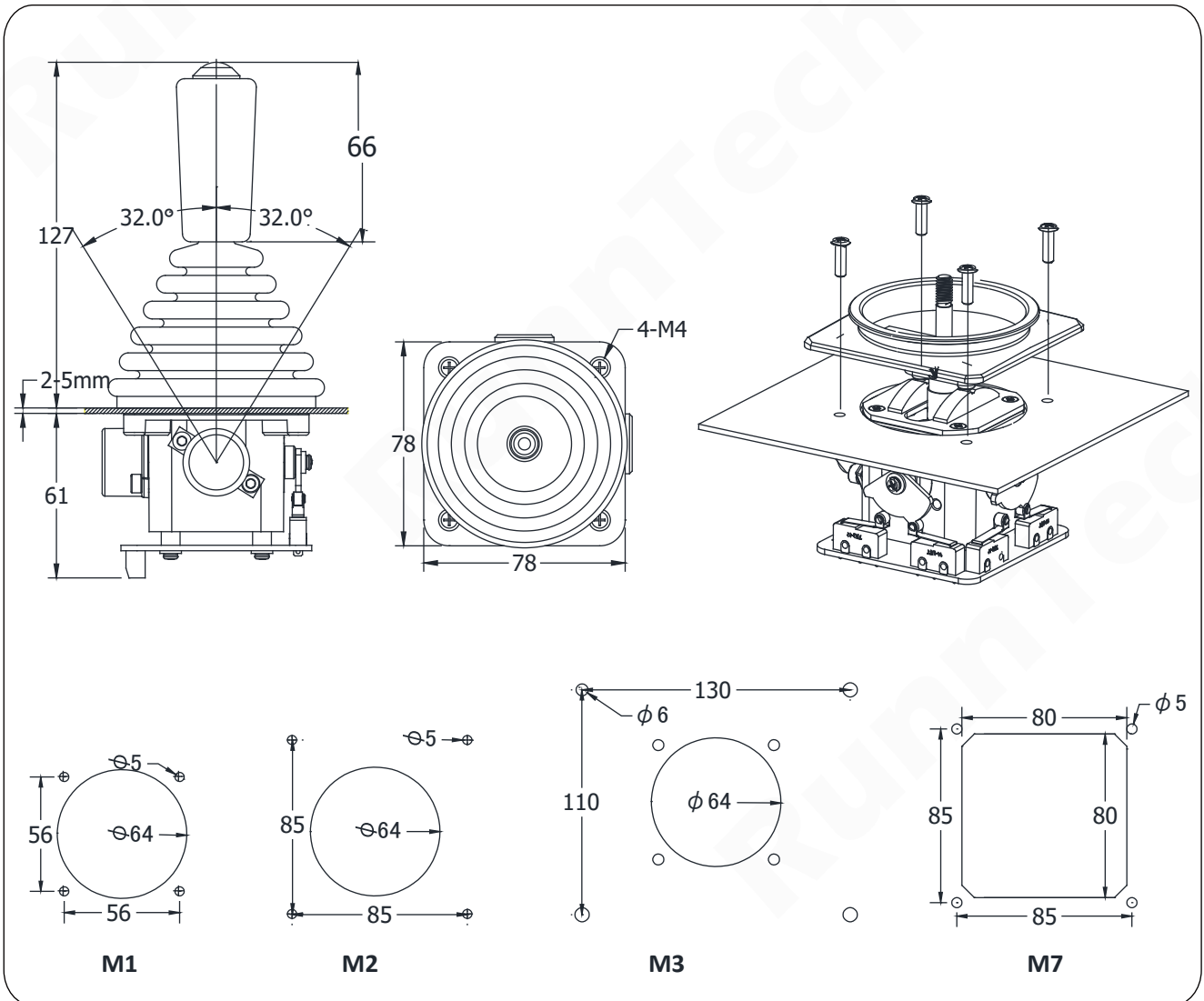
5	Potentiometer Type	<b>1K, 2K, 5K, 10K, 20K</b> or <b>H</b> (Hall sensor)
6	Quantity of Switch Signal	<b>01, 02</b> or <b>03</b> (the quantity of directional switch signal in each axis)
7	Switch Signal Closed Position	Refer to Table 4-3 <b>Directional Switch Signal Closed Position</b> (Page: 11)
8	Handle Grip Style	<b>HD1, HD2, HD4, HD5, HD7, HD8, HD10, HD15, HD26</b> and <b>HD80</b> (Page: 04...09)
9	Mounting Dimensions	<b>M1</b> : 56x56, central hole 63 <b>M2</b> : 85x85, central hole 63 <b>M3</b> : 130x110, central hole 63 <b>M7</b> : 85x85, central hole 80x80

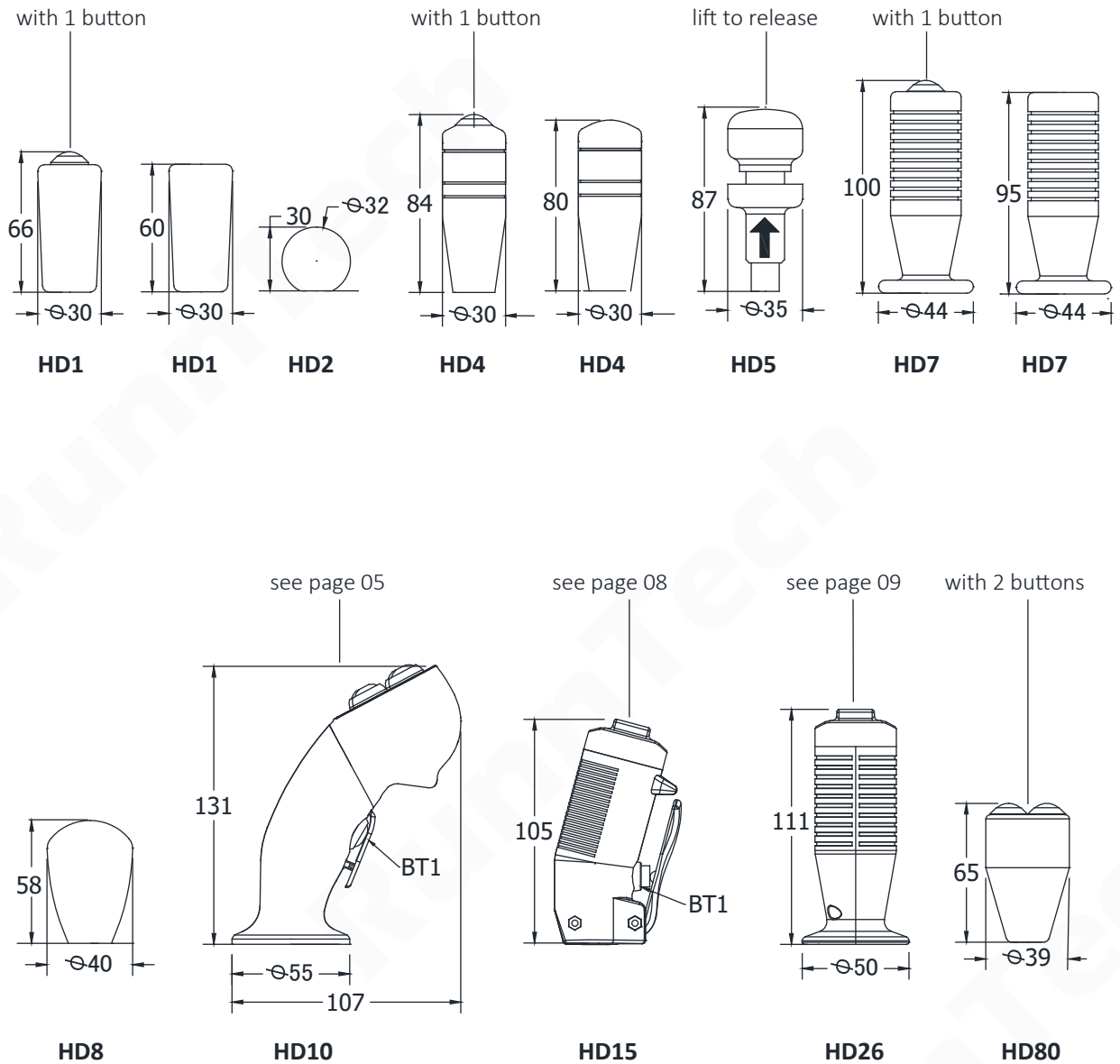
**RT100 - T - 2 - P1 (10K) - 02 (89) - HD1 - M1**

① serial number  
② operation mode  
③ limiter plate  
④ electrical output form  
⑤ potentiometer type  
⑥ quantity of switch signal  
⑦ switch signal closed position  
⑧ handle grip style  
⑨ mounting dimension

### Product Installation



**Table 1-1 Handle Grip Style**



**Remark:**

RT100 series, if need center-lock, it is only available with **friction-hold with center-lock** by HD5 grip:

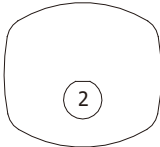
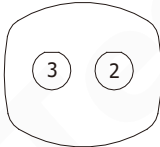
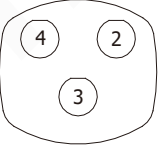
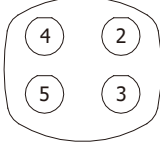
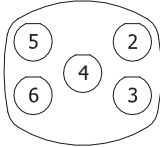
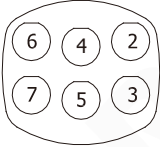
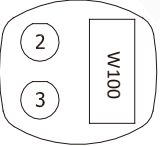
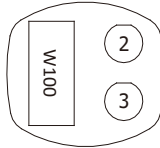
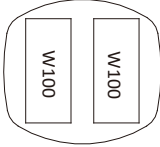
**MS-1:** single-axis control, friction-hold with center-lock.

**MS-2:** dual-axis, cross direction control, friction-hold with center-lock.

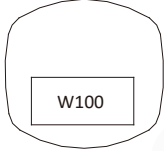
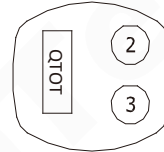
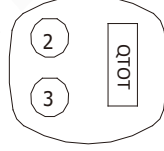
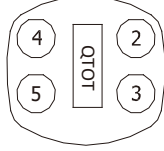
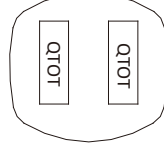
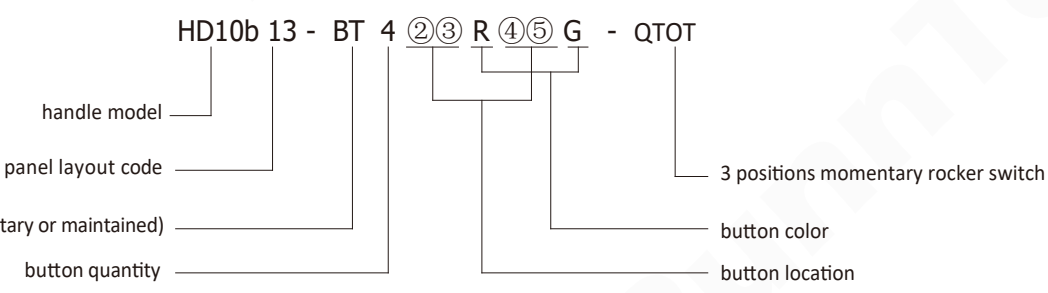
**Table 1-5 Handle HD10**

<h1 style="text-align: center;">HD10 Handle</h1>		
	<p>HD10 handle is ergonomically designed to provide a high degree of comfort, highly integrated, the handle can be installed with a variety of accessories: self-resetting (momentary) push button, self-locking push button, analog thumbwheel controller (W100) or rocker switch (QTOT).</p> <p>We also can customize special technical parameters to meet your requirements.</p> <p>HD10 handle use PA66 + 305GF, to achieve excellent high temperature performance and can be installed in RT100, RT200, RT300 RT01 or RT02 series joysticks to achieve multi-axis control.</p> <p>Operation Temperature: -40-85 C                      Storage Temperature: -40-85 C                      Meet IEC68 part 2-20                      Protection Grade: IP64/65</p>	
		
Model Selection	Style	Description
HD10a		without Deadman trigger
HD10b		with Deadman trigger

**Table 1-6 Handle HD10 Panel Layout**

Layout Code	Layout	Description (all functions selection refer to the Table 2-1)
1		1 momentary button (BT) / maintained button (BS)
2		2 momentary button (BT) / maintained button (BS)
3		3 momentary button (BT) / maintained button (BS)
4		4 momentary button (BT) / maintained button (BS)
5		5 momentary button (BT) / maintained button (BS)
6		6 momentary button (BT) / maintained button (BS)
7		1 proportional thumbwheel (W100) and 2 momentary button (BT) / maintained button (BS)
8		1 proportional thumbwheel (W100) and 2 momentary button (BT) / maintained button (BS)
9		2 proportional thumbwheel controller (W100)

**Table 1-6 Handle HD10 Panel Layout**

Layout Code	Layout	Description (all functions selection reference Table 2-1)
10		1 proportional thumbwheel controller ( <b>W100</b> )
11		1 rocker switch ( <b>QTOT</b> ) and 2 momentary button ( <b>BT</b> ) / maintained button ( <b>BS</b> )
12		1 rocker switch ( <b>QTOT</b> ) and 2 momentary button ( <b>BT</b> ) / maintained button ( <b>BS</b> )
13		1 rocker switch ( <b>QTOT</b> ) and 4 momentary button ( <b>BT</b> ) / maintained button ( <b>BS</b> )
14		2 rocker switch ( <b>QTOT</b> )
* we also can customize special panel layout.		
<div style="text-align: center;"> <p>HD10b 13 - BT 4 ②③ R ④⑤ G - QTOT</p>  <p>button selection refer to Table 2-1</p> </div>		

**Table 1-8 Handle HD15**

# HD15 Handle



HD15 handle is ergonomically designed to provide a high degree of comfort, highly integrated, the handle can be installed with one deadman trigger and rocker switch (QTOT).

We also can customize special technical parameters to meet your requirements.

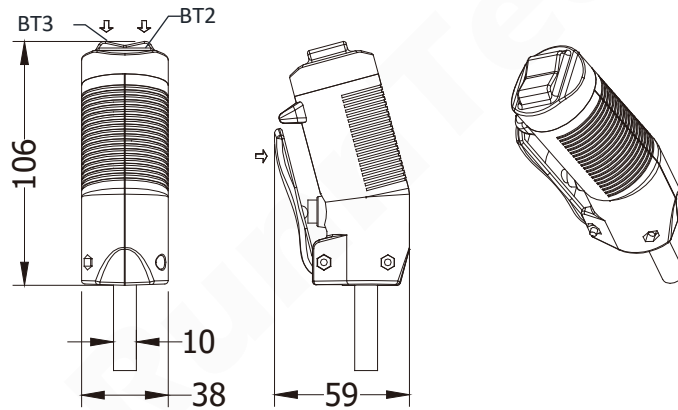
HD15 handle use PA66 + 305GF, to achieve excellent high temperature performance and can be installed in RT100 series joysticks to achieve multi-axis control.

Operation Temperature: -40-85 °C

Storage Temperature: -40-85 °C

Meet IEC68 part 2-20

Protection Grade: IP64/65



HD15 - BT1 - QTOT


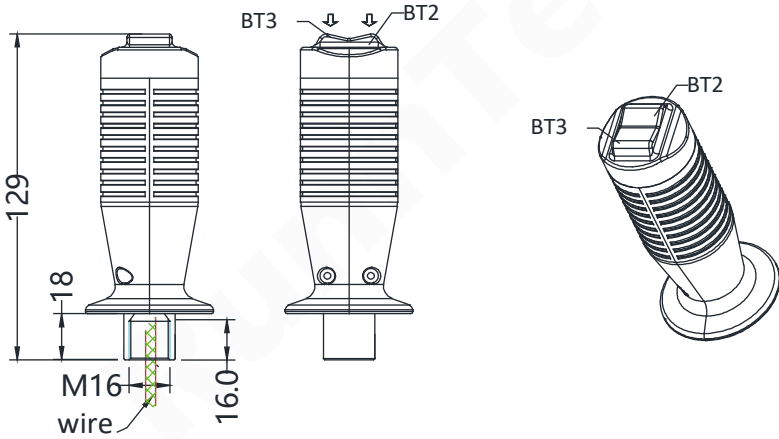
handle model

Deadman trigger (250V2A)

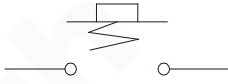
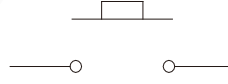
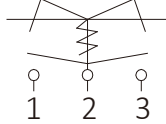
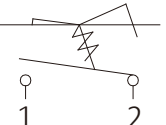
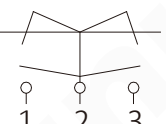
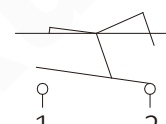
3 positions momentary rocker switch (BT2 and BT3)



**Table 1-9 Handle HD26**

<h1>HD26 Handle</h1>	
	<p>HD26 handle is ergonomically designed to provide a high degree of comfort, highly integrated, the handle can be installed with one rocker switch (QTOT).</p> <p>We also can customize special technical parameters to meet your requirements.</p> <p>HD26 handle use PA66 + 305GF, to achieve excellent high temperature performance and can be installed in RT100 series joysticks to achieve multi-axis control.</p> <p>Operation Temperature: -40-85 °C                  Storage Temperature: -40-85 °C                  Meet IEC68 part 2-20                  Protection Grade: IP64/65</p>
	
<p>HD26 - QTOT</p> <p>handle model  </p> <p>3 positions momentary rocker switch (BT2 and BT3)  </p>	

**Table 2-1 Accessories**

No.	Type	Description	Parameter	Remark
1	<b>BT</b>	momentary button 	24V2A	button color: Red - <b>R</b> Blue - <b>BU</b> Black - <b>BK</b> Yellow - <b>Y</b> Green - <b>G</b> White - <b>W</b>
2	<b>BS</b>	maintained button 	24V2A	button color: Red - <b>R</b> Blue - <b>BU</b> Yellow - <b>Y</b> Green - <b>G</b>
3	<b>QTOT</b>	3 positions momentary rocker switch 	3 pins 250V15A	
4	<b>QTO</b>	2 positions momentary rocker switch 	2 pins 250V15A	
5	<b>QSOS</b>	3 positions maintained rocker switch 	3 pins 250V15A	
6	<b>QSO</b>	2 positions maintained rocker switch 	2 pins 250V15A	
7	<b>QSOT</b>	3 positions, one side momentary another side maintained rocker switch	3 pins 250V15A	
8	<b>W100</b>	proportional thumbwheel (Hall Sensor)	input 5V DC	Please keep far away from the magnetic object

**Table 4-3 Directional Switch Signal Closed Position**

<p>Entity on behalf of the switch is closed</p>		
<p>Analog output refer to the following figure</p>		
<p>Electrical Output Form</p>	<p>Hall Sensor</p>	<p><b>HV1:</b> DC 5V, 0...2.5...5V (rail to rail)</p>
		<p><b>HV2:</b> DC 5V, 0.5...2.5...4.5V</p>
		<p><b>HV3:</b> DC 5V, 1.0...2.5...4.0V</p>
		<p><b>HV4:</b> DC 5V, 1.25...2.5...3.75V</p>
	<p>Potentiometer</p>	<p><b>P1:</b> Simple 2 directions output (potentiometer with dead zone)</p>
		<p><b>P2:</b> Simple 1 direction output (potentiometer without dead zone)</p>
		<p><b>V1:</b> DC24V, -10V...0...+10V (voltage output)</p>
		<p><b>V2:</b> DC24V, +10V...0...+10V (voltage output)</p>
		<p><b>V3:</b> DC24V, -5V...0...+5V (voltage output)</p>
		<p><b>V4:</b> DC24V, +5V...0...+5V (voltage output)</p>
		<p><b>V5:</b> DC24V, 0...+10V (voltage output)</p>
		<p><b>V6:</b> DC24V, 0...+5V (voltage output)</p>
		<p><b>I1:</b> 4 wire 4mA...12mA...20mA (current output)</p>
	<p><b>I2:</b> 4 wire 20mA...4mA...20mA (current output)</p>	