MCAC 808 All-digital AC servo driver

Introduction

MCAC808 all-digital AC servo drive system adopts high-performance digital signal processor (DSP) and integrated circuit, and come out to be a cost effective product with simple circuit, high integration, easy operation, and strong practicability. MCAC808 provide three feedback loops: position loop, velocity loop and current loop. Three work control mode: position, velocity and torque. MCAC808 matches with AC servo motor under 80V and 400W.

Features

Position control: light isolate input PULSE/DIRECTION or CW/CCW signal;
Speed control: input simulate 0-3.3V voltage signal (speed input by P1);
Torque control: input simulate 0-3.3V voltage signal (torque input by P1);
Light isolation servo reset input interface ERC;
Light isolation servo failure alarm output interface ALM;
Width of current loop (-3dB) 2KHz (standard);
Width of velocity loop: 500 Hz (standard);
Width of position loop: 200 Hz (standard);
Quadrature encoder input interface at motor side: differential input (26LS32);
Perfect protection against overload, I2T, over-voltage, over current, overheating, short circuit, circuit interruption, chip damage;
Green light for on, red light for protected mode or offline.

Specification

Input DC voltage range 30—80v(standard);
Continuous Output power:400W;
Continuous output current: 8A ,20KHz PWM;
Overload output current: 24A(3s);
Protection:

- Over current initiated peak value: 50A±10%;
- Overload I2T current initiated value: 300% 5s;
- Overheating initiated value: 80℃;
- Over voltage initiated value: 90V;
- Under Voltage initiated value: 24V;

Maximum pulse input frequency:300K;
Maximum RS232C speed: 19.6Kbps (an extra transfer interface required);
Working environment:

- No dust, no oil mist and no corrosive air;
- Working temperature: 0-50℃;
- Storage temperature: -20--+80℃;
- Humidity:40-90RH;

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Cooling method: natural air cooling and forced air cooling;

Dimension: 140 x 97 x 48 mm

Weight: about 500g

SW1-SW7 SETTING

SW1-SW3 is used to set the max current, max current is the 2.5 times of rated current. SW4-SW7 is used to set the mode.

Rated currentRMS(A)	SW1	SW2	SW3
1.8	OFF	OFF	OFF
2.6	ON	OFF	OFF
3.5	OFF	ON	OFF
4.4	ON	ON	OFF
5.3	OFF	OFF	ON
6.2	ON	OFF	ON
7.1	OFF	ON	ON
8.0	ON	ON	ON

SW7 MUST BE OFF

MODE SETTING	SW4	SW5	SW6
POSITION MODE PULSE/DIRECTION	OFF	OFF	OFF
POSITION MODE PULSE/ INVERSE DIRECTION	OFF	OFF	ON
SPEED MODE	ON	OFF	OFF
TORQUE MODE	OFF	ON	OFF
POSITION MODE	ON	ON	OFF

Parameter adjusting and setting

(potentiometer adjusting, CCW to minimize value, CW to maximize value)

A) Four pins on the Circuit Board for control mode setting, 1, 2, 3, 4 respectively from the outer side.

1. no plug in, position mode is pulse/direction;
2. plug in 1, speed control, speed input by P1;
3. plug in 2, torque control, torque input by P1;
4. plug in 1 and 2, position control for positive pulse/negative pulse input;
5. plug in 3, position control pulse/direction, but converse running direction.

B) 11 scale on the potentiometer, CCW to minimize the value to 0, CW to maximize the

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value to 10, and 5 in the middle.
P1 : Position Feed-forward Control
P2: position proportional gain control
P3: position differential control
P4 : velocity proportional gain control

Servo system includes three feedback loop: position, velocity and torque(current). The inner loop responses with the fastest speed, and the middle loop must responses faster than the outer loop. A vibration will happen when the rule has not been followed. Customer need adjust the parameter of position loop and velocity loop only. Parameters of system would restrict each other, the output of position feedback would be unstable when just only the position feedback gains, which would lead to an unstable result of the whole servo system. Customer might take the following adjustment procedure as a reference:

1. set P1 and P3 to (3) on the potentiometer, set the P2 and P4 to (3), and then increase the P4 slowly till a vibration happens, then return 0.5 to 1 scale.
2. increase the P2 till a vibration happens, and then increase the P3 till the vibration disappears.
3. increase the P1 to fulfill a minimum lag and overshoot.
4. decrease the P4 properly when a vibration happens during the motor operation.
5. decrease the P2 or increase the P3 properly when a vibration happens when the motor stop.
6. decrease the current properly when a magnet noise happens.

Maximize the P2 under the condition of none overshoot and no vibration. And then minitrim the P4, P1 and P3 till a perfect setting.

Ports detail

X1: control signal input / output (D9 male)

Terminal block	Sign	Name	Note
1	DIR+	Positive direction input	Active-high
6	DIR-	Negative direction input	Active-low
2	PUL+	Pulse positive input	Active-high
7	PUL-	Pulse negative input	Active-low
3	ERC+	Positive servo reset input	Active-high
8	ERC-	Negative servo reset input	Active-low
4	ALM	Alarm output signal	Open collector output
5	INPOS	In position Output signal	Open collector output
9	EGND	Output ground	Open collector output ground

X2: feedback signal input of encoder(D15 female)

Terminal block	Sign	Name	shuoming

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1	GND	Output power ground	
2	VCC	Output power	50mAh
3	PW+	Positive input of magnet W phase	Single end connection
4	PV+	Positive input of magnet V phase	Single end connection
5	PU+	Positive input of magnet U phase	Single end connection
6	PZ+	Positive input of encoder Z phase	
7	PB+	Positive input of encoder B phase	
8	PA+	Positive input of encoder A phase	
9			
10	PW-	Negative input of magnet W phase	
11	PV-	Negative input of magnet V phase	
12	PU-	Negative input of magnet U phase	
13	PZ-	Negative input of encoder Z phase	
14	PB-	Negative input of encoder B phase	
15	PA-	Negative input of encoder A phase	

X3: power

Terminal block	Sign	Name	Note
1	W	Motor terminal W	
2	V	Motor terminal V	
3	U	Motor terminal U	
4	VDC	DC power input	
5	GND	Power input ground	

Control signal connection:

Single terminal connection

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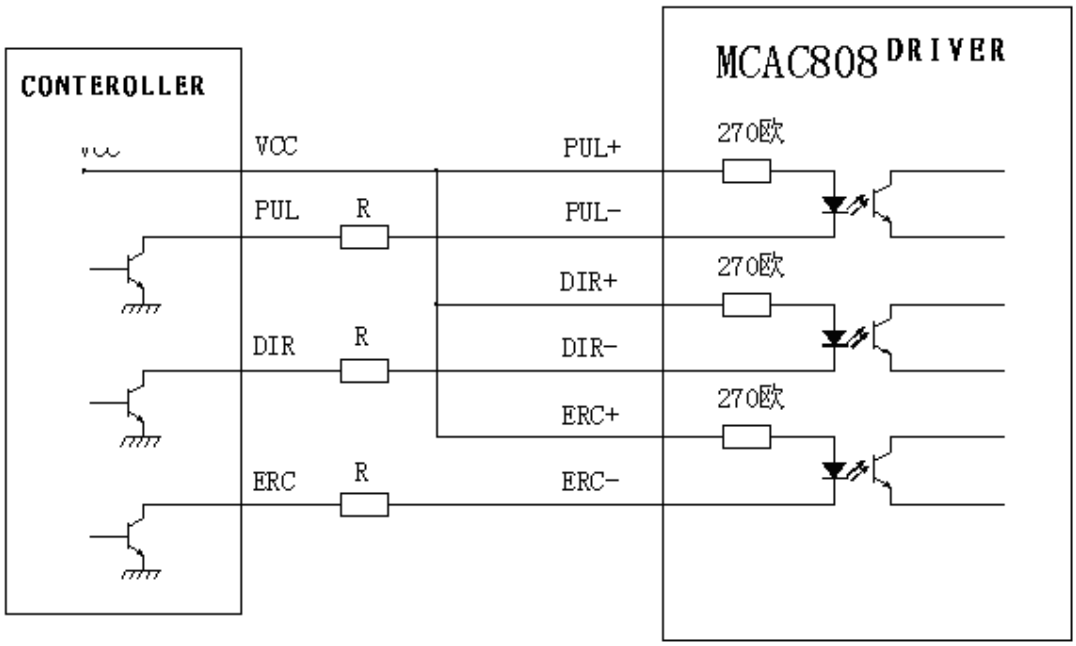
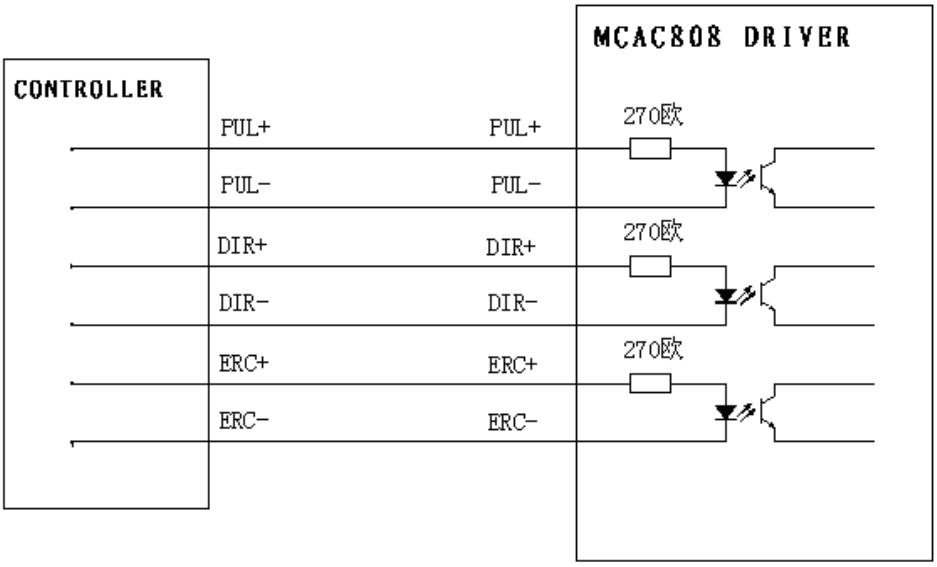


Differential connection



Note: Vcc=5V, R=0

Vcc=12V, R=1K, >1/8W;

Vcc=24V, R=2K, >1/8W.

Resistor must be connected on the terminal of control signal.

Connection interface and installation dimension

Provides encoder +5V and a maximum 80mA power supply. Servo motor pulses per turn equal to four times of encoder resolution.

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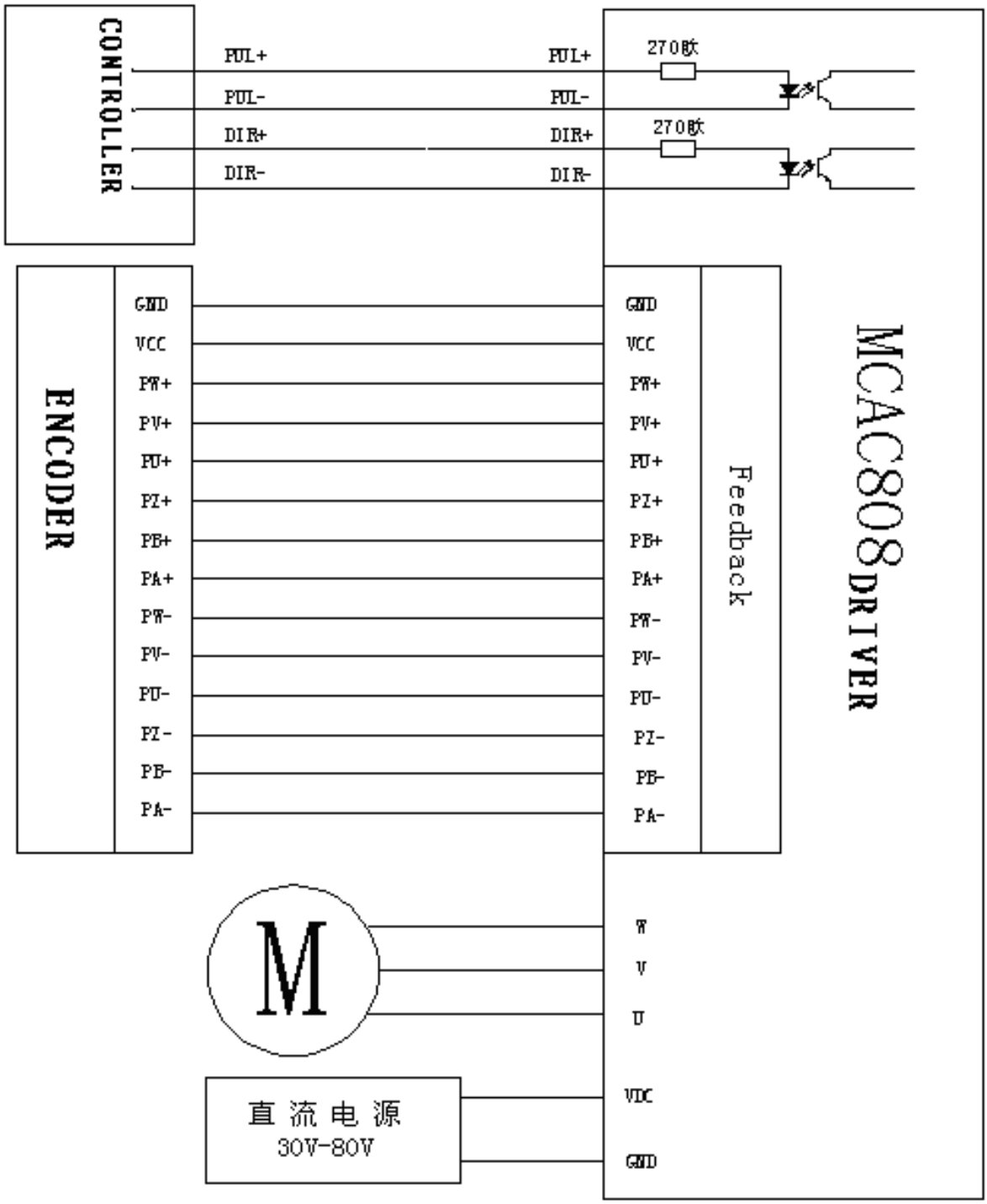

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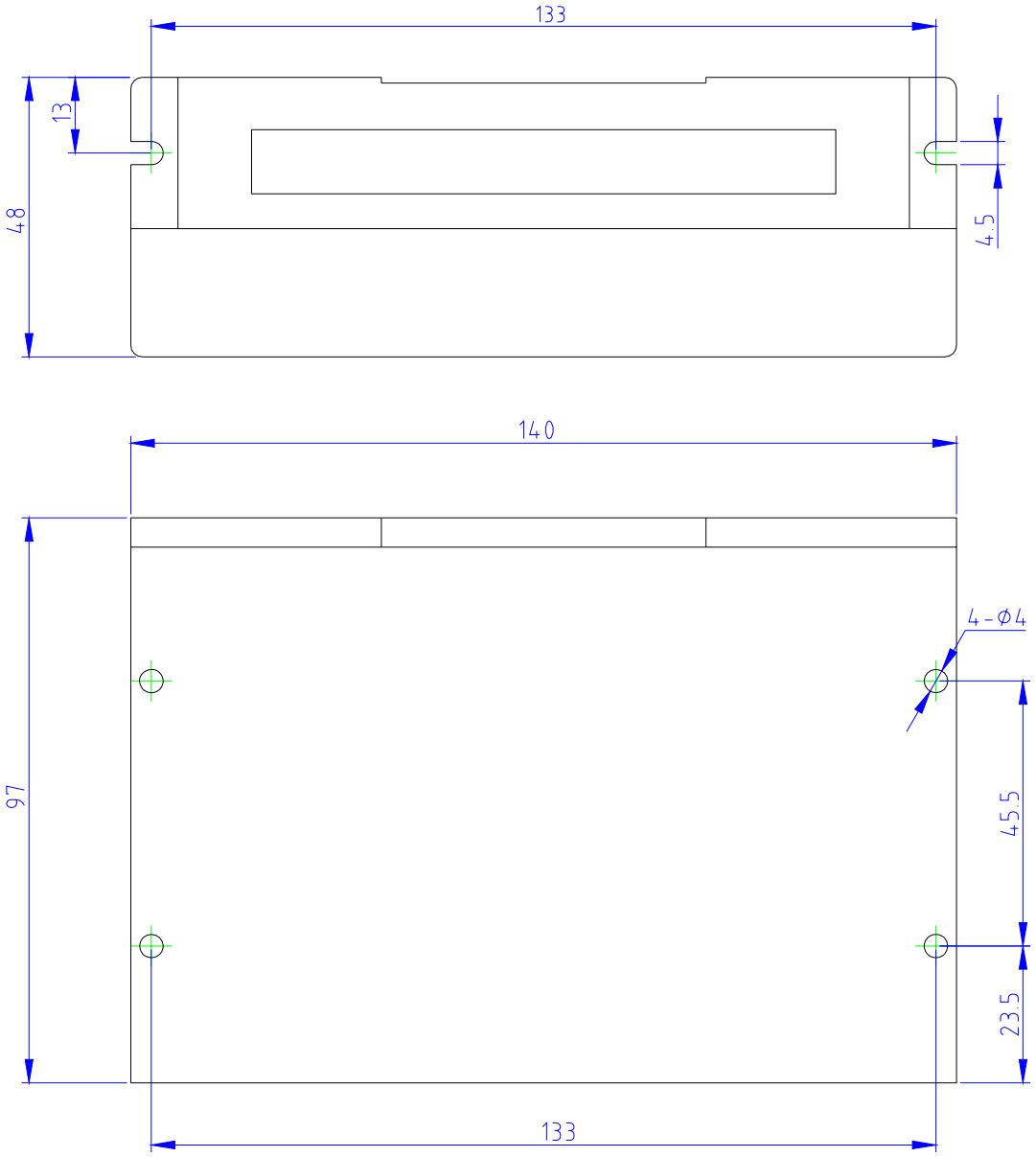

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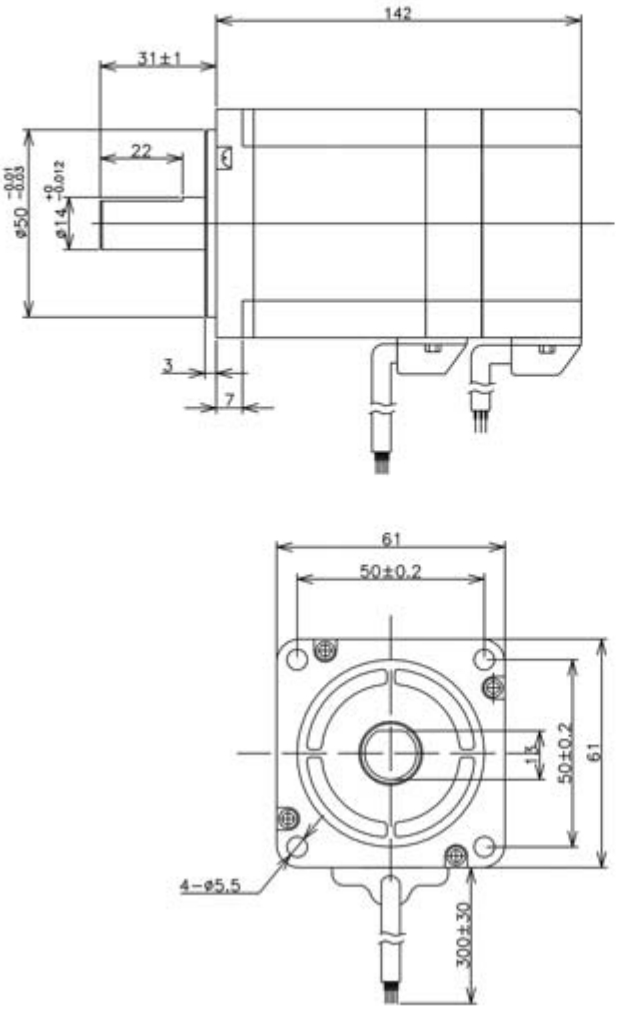
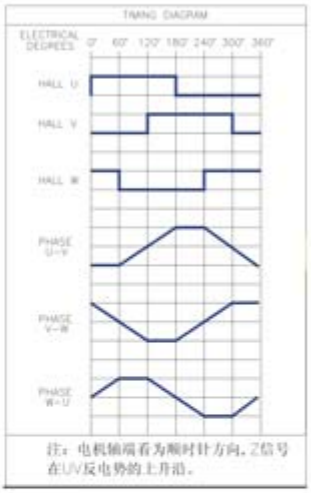
Brushless servo motor

电机型号(Model)	额定功率 (Shaftpower@ rated speed)	电压 (Rated voltage)	电流 (Current)	极数 (Number of poles)	额定转速 (Rated speed)	额定扭矩 (Torque@ rated speed)	峰值扭矩 (Pdak torque)	力矩常数 (Moment constant)	编码器分辨率 (Lines/r)	机身长度 (Length)	重量 (Weight)
	W	VDC	A	8	Rpm	N.m	N.m	N.m/A	/	mm	Kg
60JSF-4030DF-1000	400	72	9.3	8	3000	1.3	4.5	0.093	1000	142	1.8

外型尺寸：

60JSF-4030DF-1000





MOTOR CONNECTIONS		
	COLOR	SIGNAL
1	黄	U
2	绿	V
3	蓝	W

ENCODER CONNECTIONS		
	COLOR	SIGNAL
1	黑	GND
2	红	+5VDC
3	黄	HULL U
4	黄黑	HULL U-
5	绿	HULL V
6	绿黑	HULL V-
7	白	HULL W
8	白黑	HULL W-
9	棕	A
10	棕黑	A-
11	灰黑	B
12	灰	B-
13	橙	Z
14	橙黑	Z-

Motor connection

	Color	Signal
1	Yellow	U
2	Green	V
3	Blue	W

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Encoder connection

	Color	Signal
1	Black	GND
2	Red	+5VDC
3	Yellow	HULL U
4	Yellow-black	HULL U-
5	Green	HULL V
6	Green-black	HULL V-
7	White	HULL W
8	White-black	HULL W-
9	Brown	A
10	Brown-black	A-
11	Gray-black	B
12	Gray	B-
13	Orange	Z
14	Orange-black	Z-

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