NEO®

NE9100 Wire Drawing Machine Dedicated Inverter

User Manual

1. Dedicated Function Codes for Wire Drawing Machine

Function	Name	Setting Range	Minimum Unit	User Setting	Editable
Wire drawing machine dedicated function code					
E5.00	Wire Drawing Control Selection	0: Disabled 1: Wire Drawing Control Mode	1	1	×
E5.01	Mechanical Transmission Ratio	0.01 ~ 300.00	0.01	0.55	○
E5.02	Maximum Coil Diameter	1 ~ 10000mm	1mm	400mm	×
E5.03	Coil Diameter 1	1 ~ 10000mm	1mm	220mm	×
E5.04	Coil Diameter 2	1 ~ 10000mm	1mm	100mm	○
E5.05	Coil Diameter Filter Time	0.0~100.0s	0.1s	10.0s	○
E5.06	Current Coil Diameter	1 ~ 10000mm	———	———	○
E5.07	Line Speed Input Source	0：No Input 1：VI 2：CI 3：Reserved 4：PULSE Input 5：Communication Setting	1	2	○
E5.08	Maximum Line Speed	0.1 ~ 6500.0m/Min	0.1m/Min	2500m/Min	○
E5.09	Minimum Line Speed for Coil Diameter Calculation	0.1 ~ 6500.0m/Min	0.1m/Min	800.0m/Min	○
E5.10	Actual Line Speed	0.1 ~ 6500.0m/Min	———	———	○
E5.11	Proportional Gain P2	0.0 ~ 100.0	0.1	7.0	○
E5.12	Integral Time I2	0.01 ~ 10.00s	0.01s	3.00s	○
E5.13	Derivative Time D2	0.000 ~ 1.000s	0.001s	0.15s	○
E5.14	PID Parameter Auto-Adjustment Basis	0: Only use the first set of PID parameters 1: Adjust according to the winding diameter 2: Adjust according to the operating frequency 3: Adjust according to the line speed	1	2	○

Function	Name	Setting Range	Minimum Unit	User Setting	Editable
E5.15	PID Upper Limit	0~100%	1%	20%	○
E5.16	Synchronous Speed Gain	- 50.0 ~ + 50.0%	0.1%	-3.0%	○
E5.17	Disconnection detection lower limit	0~20%	1%	10%	○
E5.18	Disconnection detection start delay	0~20s	1s	6s	○
E5.19	Minimum frequency of disconnection detection	0.00~20.00Hz	0.01Hz	10.00Hz	○
E5.20	Disconnection detection judgment delay	0.0~5.0s	0.1s	2.0s	○
E5.21	Disconnection detection method	0: No detection 1: Detect based on disconnection proximity switch signal 2: Detect based on PID feedback (swing rod signal)	1	1	○
E5.22	High and low gear ratio	0.01~100.00	0.01	1.00	○
E5.23	Brake signal output frequency	0.00~50.00Hz	0.01Hz	1.50Hz	○
E5.24	Braking time	0.1~100.0s	0.1s	6.0s	○
E5.25	Set length reaching action selection	0: No action 1: Shutdown	0.1s	6.0s	○
E5.26	Fine-tuning coefficient setting source	0: VI setting 1: CI setting 2: Reserved	1	0	○
E5.27	coefficient	0 ~ 65535	1	19052	○
E5.28	Transformer turns	0.0~100.0	0.1	5.0	○
E5.29	Automatic reset option for disconnection fault	0: Invalid 1: Valid	1	0	○
E5.30	Automatic reset interval for disconnection fault	0.0~99.9s	0.1s	6.0s	○
E5.31	Inching action selection during operation	0: No action 1: Free stop and output brake signal	1	1	○

Function	Name	Setting Range	Minimum Unit	User Setting	Editable
E5.32	Cable detection function selection	0: Invalid 1: Valid	1	0	○
E5.33	排线检测最低频率	0.00~20.00Hz	0.01Hz	10.00	○
E5.34	信号无效判断时间	0.1~20.0s	0.1s	10.0s	○
E5.35	信号有效判断时间	0.1~20.0s	0.1s	5.0s	○
E5.36	Disconnection action selection	0: Alarm and free stop 1: Alarm after deceleration stop 2: Only disconnection output terminal is activated	1	0	○
E5.37	Reel diameter 1	1 ~ 10000mm	1mm	220mm	×
E5.38	Reel diameter 2	1 ~ 10000mm	1mm	100mm	○
New functions of input terminals					
P3.00	DI1 terminal function selection	51: Shift switch 52: Initial winding diameter selection terminal 1 53: Initial winding diameter selection terminal 2 54: Winding diameter reset 55: Wire arrangement signal 56: Wire break proximity switch input 57: PID action direction inversion terminal			×
P3.01	DI2 terminal function selection				×
P3.02	DI3 terminal function selection				×
P3.03	DI4 terminal function selection				×
P3.04	DI5 terminal function selection				×
New functions of output terminals					
P4.01 ~ P4.05	Switch output terminal function selection	42: Wire break detection output 43: Brake signal output (reserved)	1	31	×
P4.06	FMP output selection	44: PULSE input 2 (reserved)			

2. Debugging Instructions for Wire Drawing Machines

1. Set P3.16 and P3.17 based on the highest and lowest feedback voltages of the dancer arm (assuming PID feedback is selected as A11). This ensures the dancer arm stays in the middle position when PID is set to 50%.

2. Set E5.01 (Transmission Ratio – Motor Speed/Load Speed) according to the mechanical setup. Configure E5.08 (Maximum Line Speed – corresponds to the line speed when the input analog signal reaches 10V).

3. During startup, place the dancer arm at the lowest position. Adjust E5.15 (PID Limit) and E5.16 (Synchronous Speed Gain) to control the rising speed and delay of the dancer arm.

4. Monitor E5.06 (Coil Diameter Value). Adjust E5.08 if deviations occur.

5. Adjust PID parameters for low-speed (small coil) and high-speed (large coil) operations.

6. Reset the coil diameter when changing coils.

3. Wire Break Detection Function

- When E5.21 is set to 1:
  The inverter detects wire breaks using a proximity switch signal. If the operating frequency exceeds E5.19 and the startup time exceeds E5.18, the system triggers wire break detection. Upon detection, the inverter reports an E-80 fault, performs a free-stop, and outputs a brake signal.
- When E5.21 is set to 2:
  The inverter detects wire breaks via PID feedback (dancer arm signal):
  - E5.17 (Wire Break Detection Lower Limit): If the feedback value falls below this threshold, the system considers it a potential wire break.
  - E5.18 (Wire Break Detection Start Delay): The system only begins detection after this delay time has elapsed.
  - E5.19 (Minimum Frequency for Wire Break Detection): Detection activates only when the inverter's output frequency exceeds this value.
  - E5.20 (Wire Break Judgment Delay): After the above three conditions are met, the system waits for this additional delay before confirming a wire break and issuing a signal.

By properly configuring these four parameters, the wire break detection can be disabled during initial startup, allowing adjustments for optimal sensitivity and reliability.

Once a wire break is detected, the inverter:

- Reports an E-80 fault,
- Performs a free-stop,
- Outputs a brake signal.

4. Brake Control

1. **During Wire Break Detection**:
   - When the inverter detects a wire break, it **outputs a brake signal**.
   - The brake remains engaged for the duration set in **E5.24** before releasing.
2. **During Normal Shutdown**:
   - When the inverter decelerates to the frequency set in **E5.23**, it **outputs a brake signal**.
   - The brake holds for the time configured in **E5.24** before releasing.

Note:

- **All run commands are ignored** while the brake signal is active.

5. High/Low Gear Switching

The gear switching terminal allows adjustment of the line speed ratio. On certain wire drawing machines, switching between high and low gears is necessary when processing different wire types. By setting the **gear ratio (E5.22)**, the system automatically adapts for smooth winding in both modes.

Parameter Setup:

"First, configure the parameters based on one reference gear (standard setting). If the gear switching terminal is inactive, the system will operate according to the preset parameters. Function code E5.21 is the gear ratio coefficient, which should be set as the ratio between the maximum line speed of the alternate gear and the maximum line speed of the standard gear. When the gear switching terminal is active, the inverter will automatically calculate and adjust the corresponding speed relationships."

6. Wiring detection function

Used to detect whether the wiring is normal. If the detection is abnormal, the inverter will report E-80 (external fault)

The wiring part is installed with a proximity switch. The wiring signal is valid once per cycle. According to the time set by function code E5.34 and E5.35

Judge whether the wiring is normal. E5.34 is used to detect whether the wiring stops moving, and E5.35 detects whether the proximity switch is invalid.

7. Communication control function (refer to NE-9000 communication protocol)

Stop/run parameter part

Parameter address	Parameter description
1000	Communication setting value (-10000~10000 (decimal)
1001	Operating frequency
1002	Bus voltage
1003	Output voltage
1004	Output current
1005	Output power
1006	Output torque
1007	Operating speed
1008	DI input flag
1009	DO output flag
100A	AI1 voltage
100B	AI2 voltage
100C	AI3 voltage
100D	Count value input
100E	Length value input

100F	Load speed
1010	PID setting
1011	PID Feedback
1012	PLC Steps
1013	

Note:

The communication setting value is a percentage of the relative value, 10000 corresponds to 100.00%, -10000 corresponds to -100.00%.

For frequency dimension data, the percentage is the percentage relative to the maximum frequency (P0.05); for torque dimension data, the percentage is F9.26 (torque upper limit digital setting)

Control command input to the inverter: (write only)

Command word address	Function
200	0001: Forward operation
	0002: Reverse operation
	0003: Forward jog
	0004: Reverse jog
	0005: Free stop
	0006: Deceleration stop
	0007: Fault reset

Read inverter status: (write only)

Status word address	Status word function
3000	0001: Forward operation
	0002: Reverse operation
	0003: Stop

8. This specialized model is equipped with customized functions specifically designed for the requirements of dual-frequency wire drawing machines. Other unrelated functions of the NE9000 are not restricted. This is hereby clarified.

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