

1
2
3

ASR

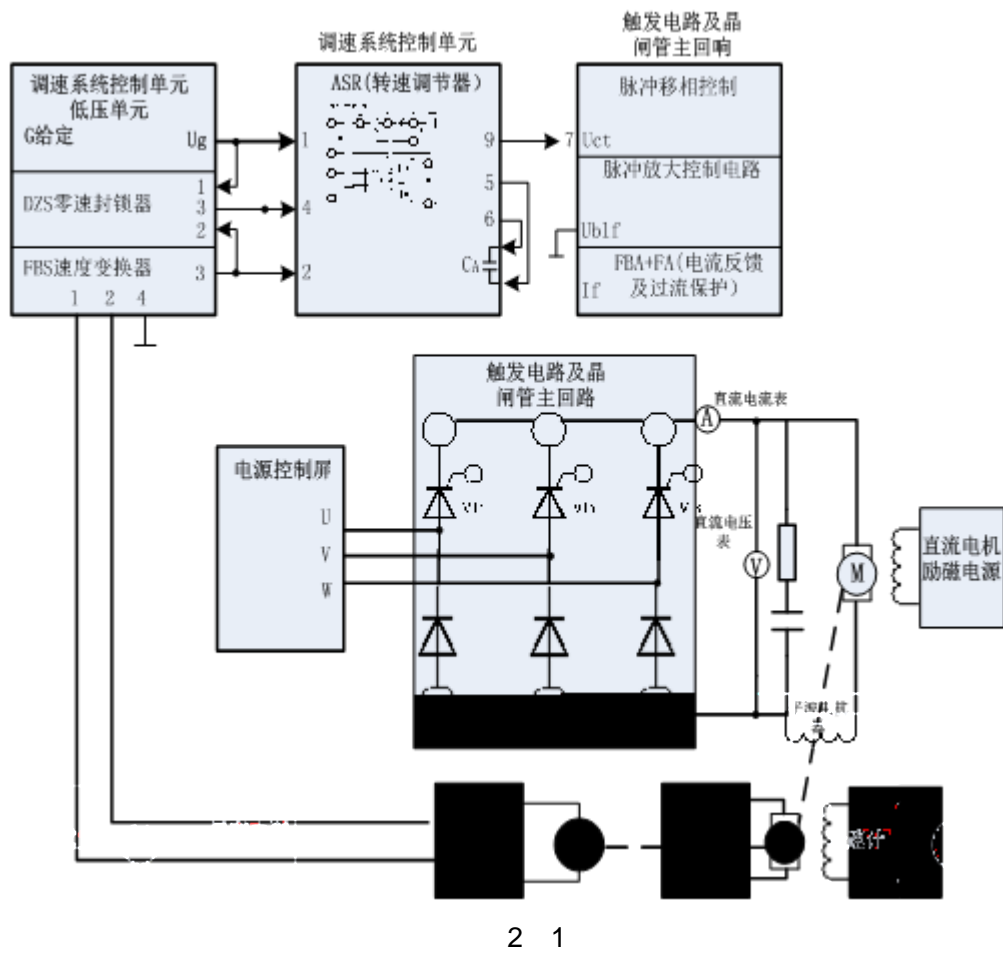
1
2

—

—

2 1

- 1) NMCL-32/MEL-002T
- 2) **L** NMCL-331
- 3) **Rd** NMEL



1
3
5
7

2
4
6

1
2
3
4
5
6
7

ASR

ASR "5" "6"

ASR RP3

1A

7 μ F

U_g

" "

1

a 60° 6 " 1V 2V

b $U_g=0$ " " Ub " 1" a 150°
 " U" " U" 180°

c ASR DZS S " " ASR
 " 3" " 5" " 6" 7uF,
 ASR PI ASR " 2" 1V Ug
 ASR RP1,PR2, " 3" $\pm 5V$

2

a ASR "9" U_{ct} G U_{ct} U_g

b " " " " " " U V

W $220V$

c U_g $n_0=1500 /$
 M01 600
 3 5

U_d i_d n

| | | | | | |
|---------|--|--|--|--|--|
| i_d A | | | | | |
| U_d V | | | | | |
| n r/min | | | | | |

3

a G U_{ct} $n=1500r/m$ FBS
 FBS 5V G U_{ct} ASR
 "9" U_{ct} ASR "5" "6"

b

c U_g $n_0=1500 /$ ASR

RP₃ 2 3 5

U_d i_d n

| | | | | | |
|-----------|--|--|--|--|--|
| i_d A | | | | | |
| U_d V | | | | | |
| n r/min | | | | | |

4

a ASR "5" "6" "5" "6" $7\mu F$ ASR
PI —

b
2

U_g $n_0=1500 /$
3 5

| | | | | | |
|-----------|--|--|--|--|--|
| i_d A | | | | | |
| U_d V | | | | | |
| n r/min | | | | | |

1

ASR

2

n_0

U

3

n_0

U_g

4

- 1
- 2
- 3
- 4

- 1
- 2
- 3
- 4
- 5

3-1

ASR,ACR

ASR

ACR

ASR

, ACR

ACR

a_{min}

b_{min}

U_g

ASR

$U_g=U_{fn}$

ASR

1
2
3
4
5

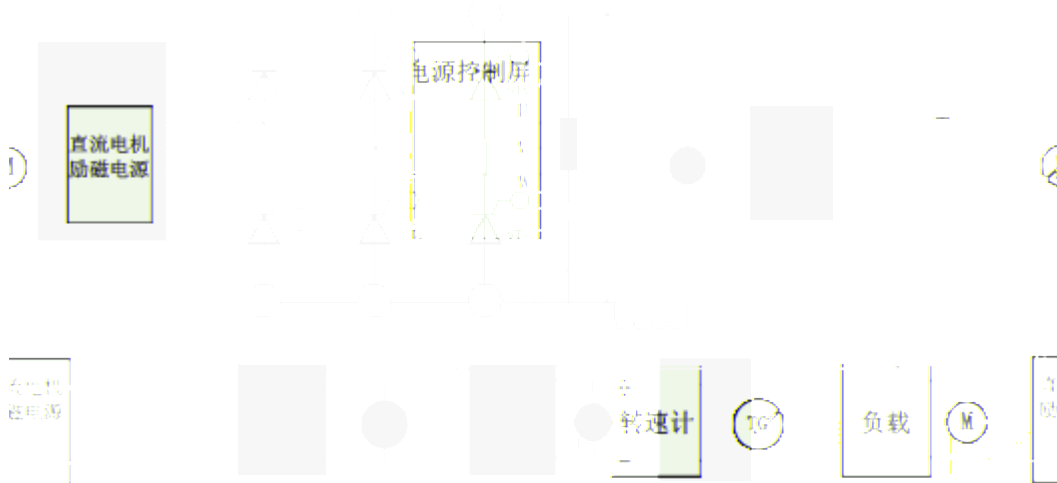
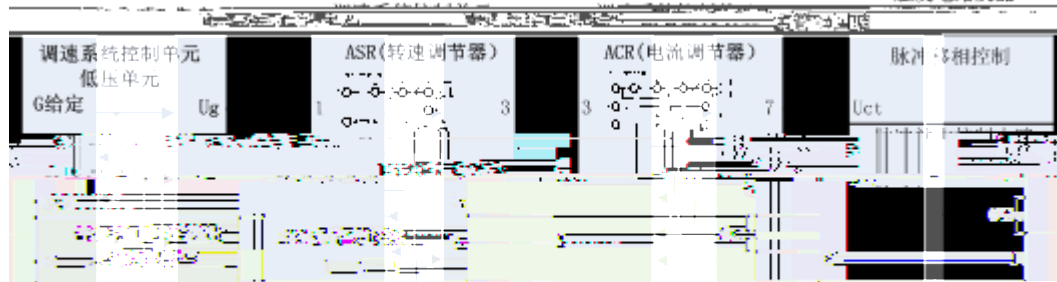
U_g

“ ”

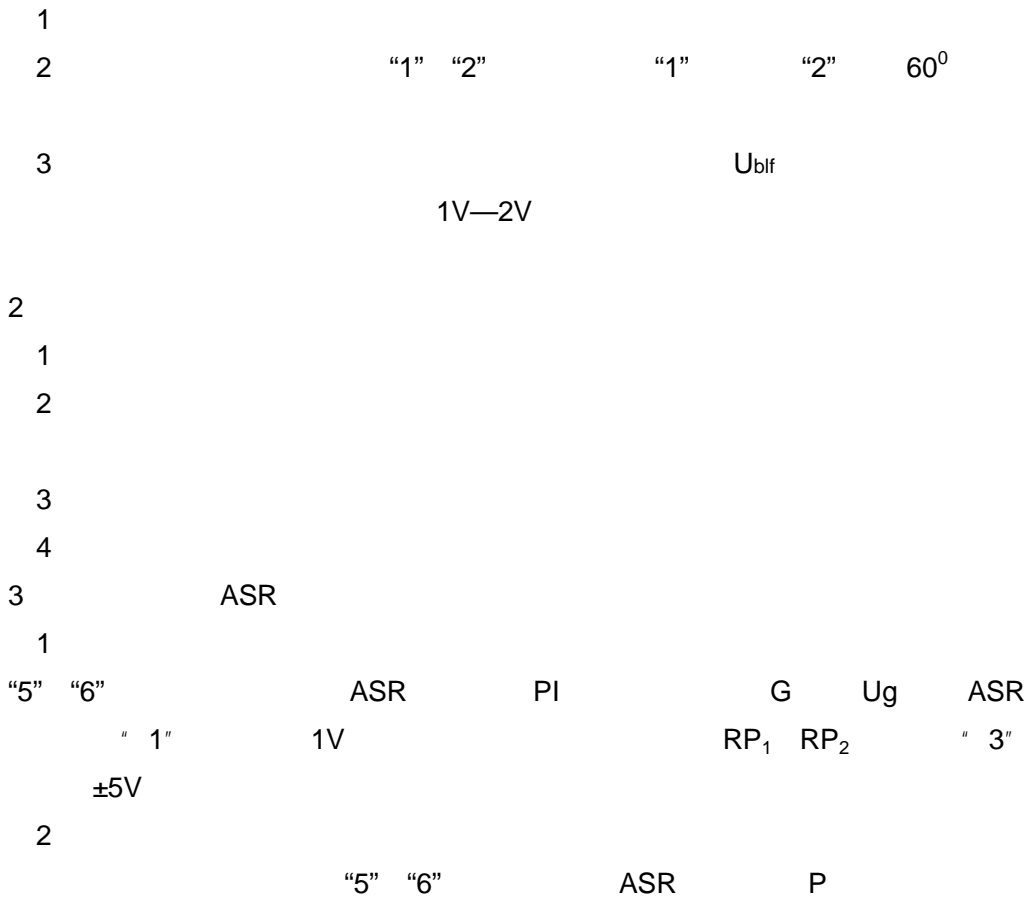
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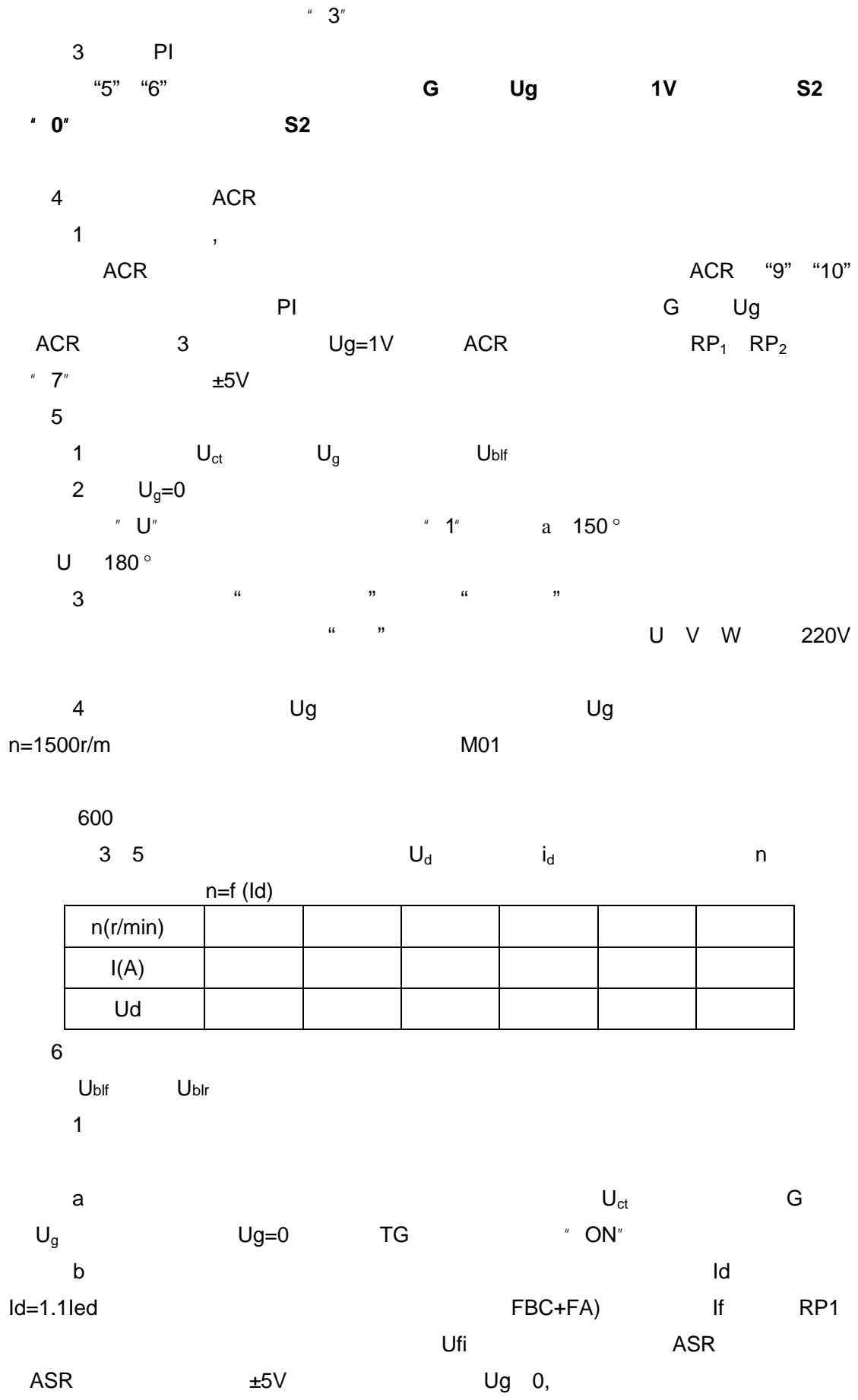
1

- 1) NMCL-32/MEL-002T
- 2) **L** NMCL-331
- 3) **Rd** NMEL-03/4 NMCL-03
- 4) **G** **Ug** NMCL-31 NMCL-31A SMCL-01
- 5) Uct NMCL-33 NMCL-33F
- 6) NMCL-33 NMCL-33F
- 7) ACR ASR NMCL-18
- 8) TG
- 9) NMEL-13A/F/C
- 10) NMCL-32 NMEL-18/2
- 11) M01 NMEL-13A
- 12) M M03



3-1





c Ug Uct Ug ACR "3" If ACR 1
 ACR "7" Uct PI ACR
 ACR "9" "10" 1.5μF Ug ASR
 +5V 1.1led Id
 If Ufi Id<1.1led Id<led
 Ug 0,
 2

a Ug Uct Ug Ug 0,
 TG " ON" Ug n=1500r/min
 FBS RP 5V
 Ug=0

b ASR Ug
 ASR 2 ASR 3 Uct Ug Ug
 Ug

4 ASR,ACR PI
 ASR "5" "6" 1.5μF ACR 7μF RP1 RP2
 ±5V

1 n=f Id
 a Ug 1500 r/min
 M01
 600
 3 5
 Ud Id n n=f

Id

| | | | | | | |
|----------|--|--|--|--|--|--|
| n(r/min) | | | | | | |
| I(A) | | | | | | |

Ug=0

5 ASR,ACR PI
 ASR "5" "6" 1.5μF ACR 7μF RP1 RP2
 ±5V
 ASR " 1" ACR " 1"

1
 2

3

Ug 0

- 1
- 2
- 3
- 4

- 1
- 2 PWM SG3525
- 3 H PWM
- 4

- 1 PWM SG3525
- 2
- 3
- 4
- 5
- 6 H PWM

IGBT H UPW 5 1 DLD PWM GD MOS

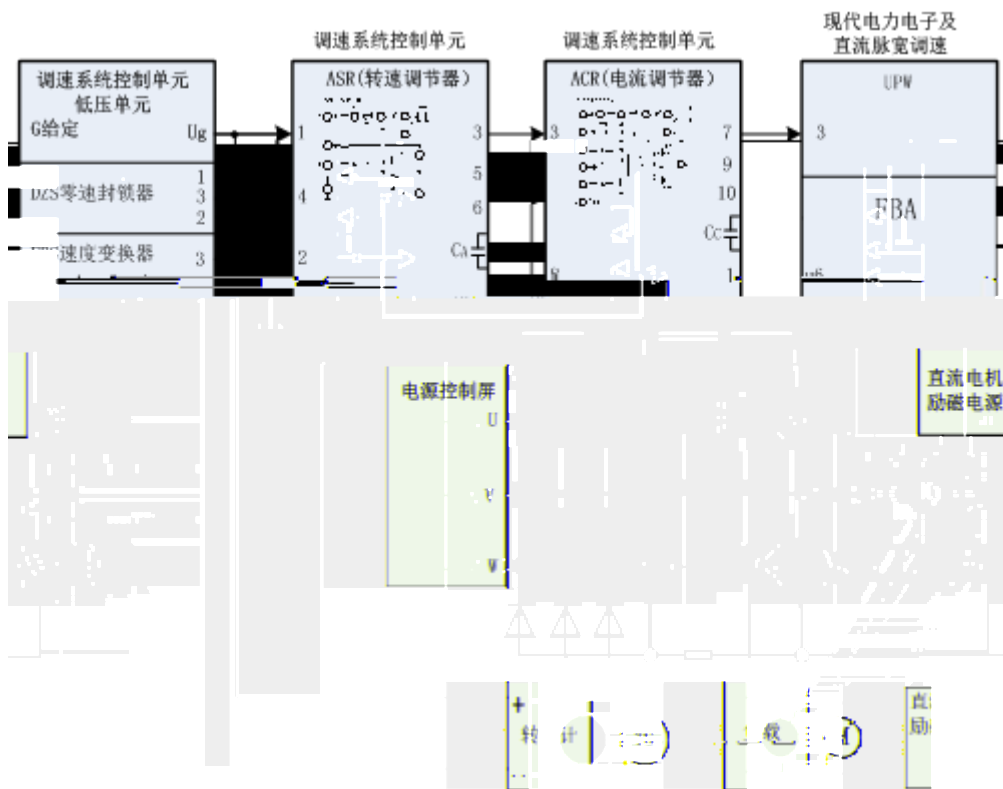
FA
UPW

Silicon General
PWM

SG3525

5 1

- 1) NMCL-32/MEL-002T
- 2) **L** NMCL-331
- 3) **Rd** NMEL-03/4 NMCL-03
- 4) **G Ug** NMCL-31 NMCL-31A SMCL-01
- 5) UPW,FBA NMCL-22
- 6) TG
- 7) NMEL-13A/F/C
- 8) NMCL-32 NMEL-18/2
- 9) M01 NMEL-13A



5 1

- 1
- 2
- 3
- 4

5
6
7
8

1
2
3
4
5
6
7

ASR

ASR "5" "6"

ASR RP3

7 μ F

1A

U_g

" "

1 SG3525

1

UPW "1"

UPW" 4

$t_{dVT1.VT2} =$

$t_{dVT3.VT4} =$

3

5 1

G

Ug

UPW"3"

Ug

UPW " 8"

UPW"2"

DLD"1"

1

a

b

1000r/min

M01

600

1A

c

"FBA"

"g"

2.5V

2

1000r/min

"FBS"

5V

3

1000r/min

3—5

n

i_d

n=1400r/min

| | | | | | | | |
|-----------|--|--|--|--|--|--|--|
| n(r/min) | | | | | | | |
| i_d (A) | | | | | | | |

n=800r/min

n=500r/min

n=800r/min

| | | | | | | | |
|-----------|--|--|--|--|--|--|--|
| n(r/min) | | | | | | | |
| i_d (A) | | | | | | | |
| M(N.m) | | | | | | | |

n=500r/min

| | | | | | | | |
|-----------|--|--|--|--|--|--|--|
| n(r/min) | | | | | | | |
| i_d (A) | | | | | | | |
| M(N.m) | | | | | | | |

S_1

" "

4

5 1

ASR ACR

PI

1
 a RP3
 b "5" "6" 5 μ F
 c RP₁ RP₂ $\pm 2.5V$
 2
 a RP3
 b "5" "6" 5 7 μ F
 c **G** **Ug** S₂ " " S₁
 RP₁ ACR ACR RP₁
 DLD "2"
 S₁ " " RP₂ ACR
 ACR RP₂ DLD "2"
 5

- 1
- 2
- 3
- 4

- 1
- 2
- 3

| | | | | |
|-------|-------|------|-------|-------|
| | | | (ACR) | (ASR) |
| (FBC) | (FBS) | (GT) | | |
| 2-1 | | | | |

6 1

- 1) NMCL-32/MEL-002T
- 2) M09/M08
- 3) **Rd** NMEL-03/4 NMCL-03
- 4) **G Ug** NMCL-31 NMCL-31A SMCL-01
- 5) Uct NMCL-33 NMCL-33F
- 6) NMCL-33 NMCL-33F
- 7) ACR ASR NMCL-18
- 8) TG
- 9) NMEL-13A/F/C

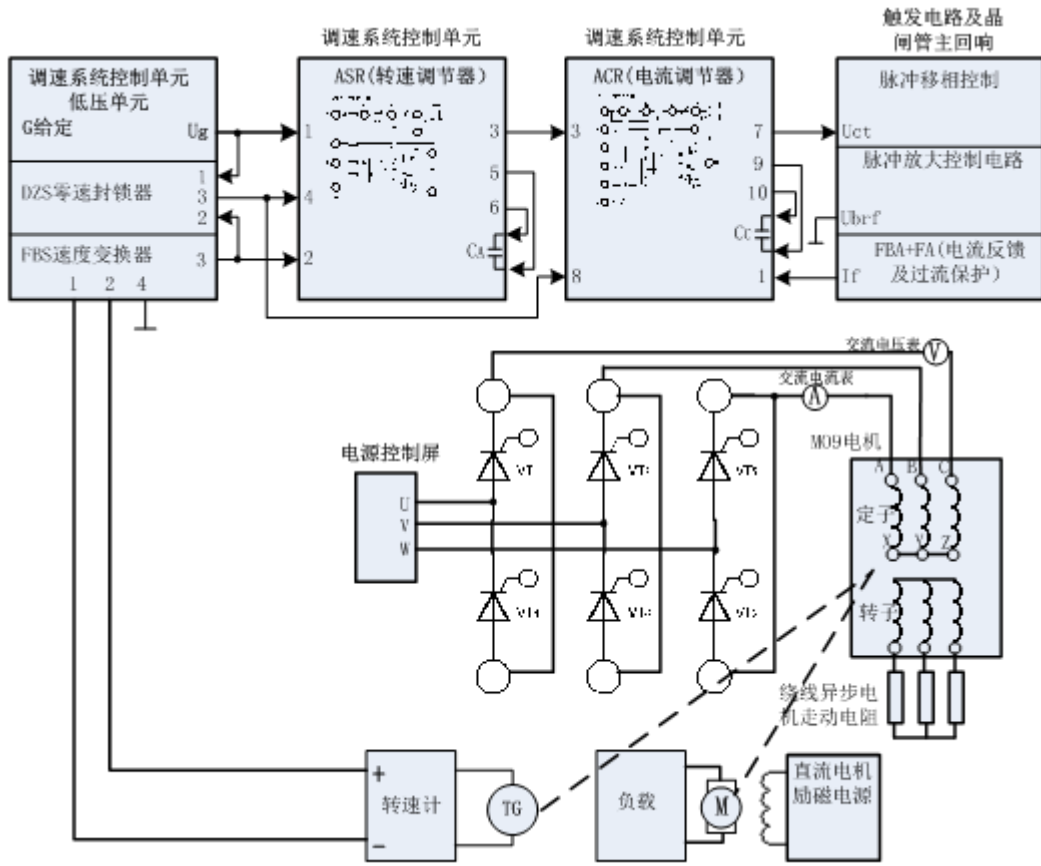
10)

NMCL-32 NMEL-18/2

11)

M01

NMEL-13A



6 1

- 1
- 3
- 5
- 8

- 2
- 4
- 7

1 ASR

ASR RP3

ASR "5" "6"

7μF

2

0.55A

3

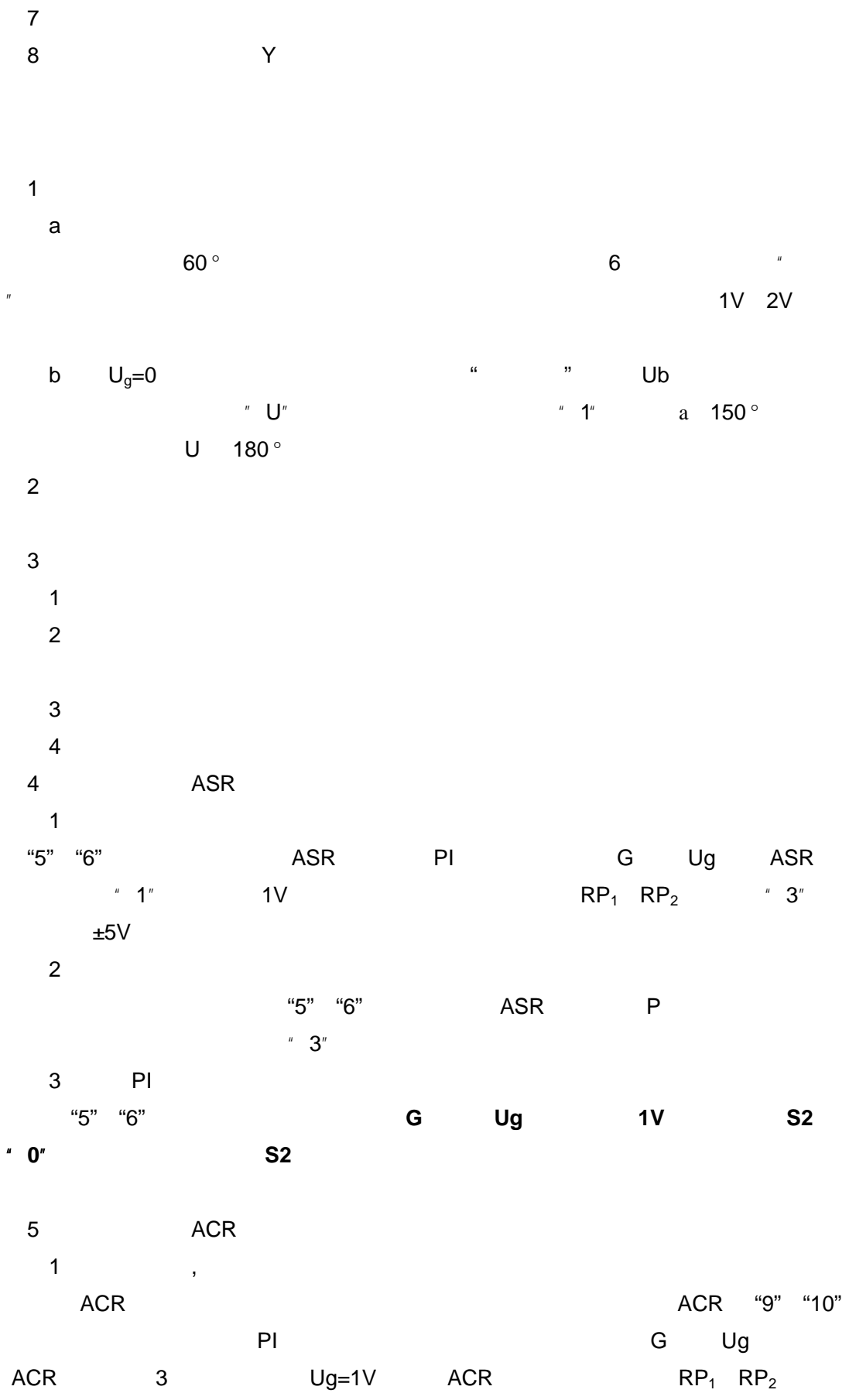
4

U_g

5

" "

6



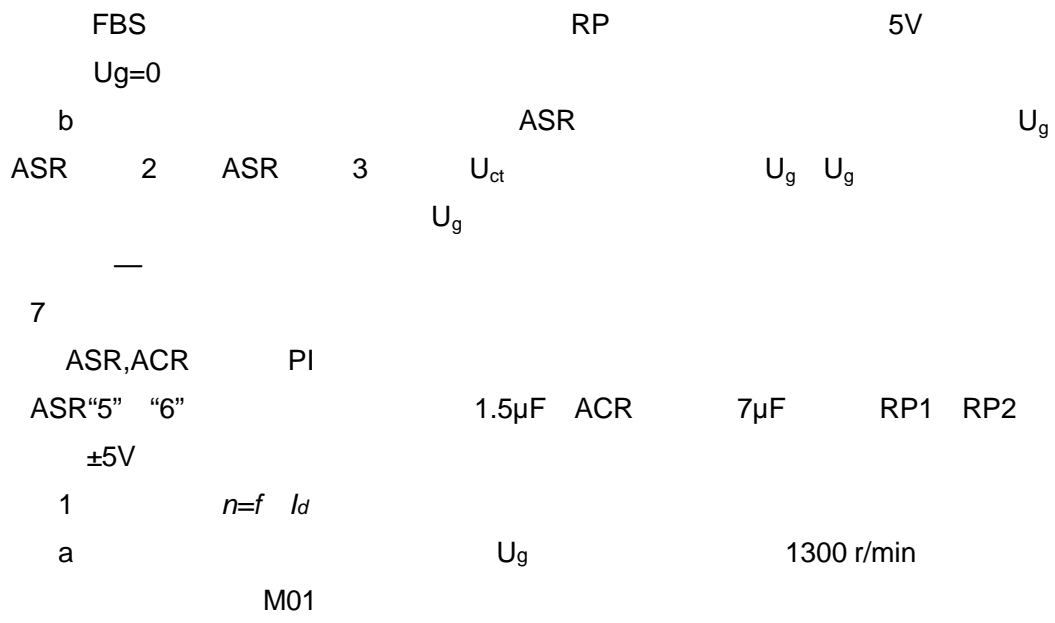
" 7" ±5V
 6
 1 U_{ct} U_g U_{bif}
 2 U_g=0
 " U" " 1" a 150°
 U 180°
 3 " " " "
 " " " " U V W 220V
 4 U_g U_g
 n=1400r/m M01

600
 3 5 U_d i_d n

n=f(I_d)

| | | | | | | |
|----------------|--|--|--|--|--|--|
| n(r/min) | | | | | | |
| I(A) | | | | | | |
| U _d | | | | | | |

6
 U_{bif} U_{blr}
 1
 a U_{ct} G
 U_g U_g=0 TG " ON"
 b Id Id=1.1I_{ed} FBC+FA) If RP1
 U_{fi} ASR
 ASR ±5V U_g 0,
 c U_g U_{ct} U_g ACR "3" If ACR 1
 ACR "7" U_{ct} PI ACR
 ACR "9" "10" 1.5μF U_g ASR
 +5V 1.1I_{ed} I_d
 If U_{fi} Id<1.1I_{ed} Id<I_{ed}
 U_g 0,
 2
 a U_g U_{ct} U_g U_g 0,
 TG " ON" U_g n=1400r/min



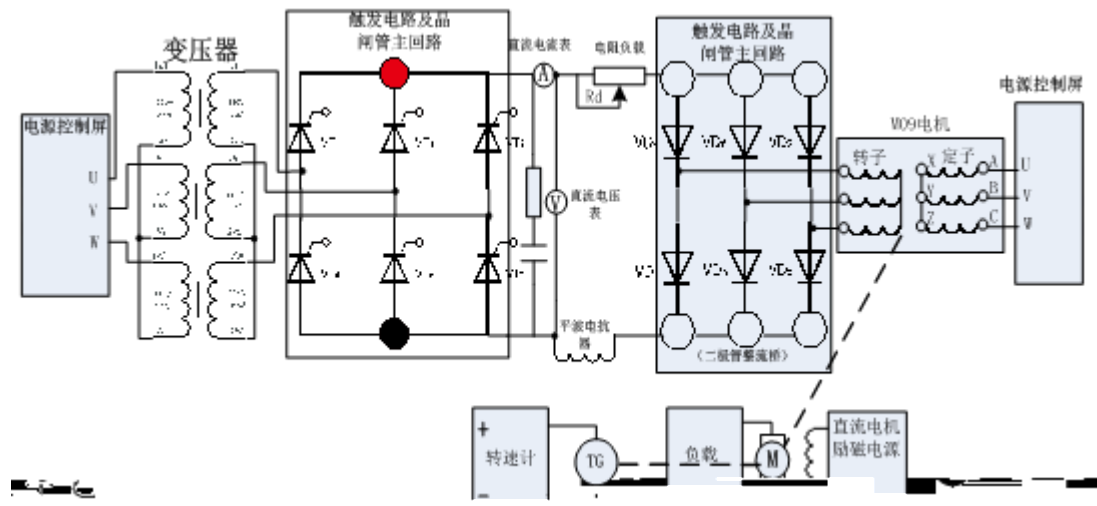
1
2
3

1
2
3

1
2
3
4

| ACR | GT | MF | FBS | ASR |
|-----|-----|----|-----|-----|
| | 5-1 | | 7 1 | FBC |

- 1) NMCL-32/MEL-002T
- 2) M09/M08
- 3) **Rd** NMEL-03/4 NMCL-03
- 4) **G Ug** NMCL-31 NMCL-31A SMCL-01
- 5) **Uct** NMCL-33 NMCL-33F
- 6) NMCL-33 NMCL-33F
- 7) **ACR ASR** NMCL-18
- 8) **TG**
- 9) NMEL-13A/F/C
- 10) NMCL-32 NMEL-18/2
- 11) **M01** NMEL-13A



7 1

| | | | |
|----|-----|----------------|---------|
| 1 | | 2 | |
| 3 | | 4 | |
| 5 | | 6 | |
| 7 | | 8 | |
| 1 | | | |
| | | min | |
| 2 | | 90° 150° | 90° |
| 3 | | 4 | 1 |
| 4 | ASR | | ASR RP3 |
| | | ASR "5" "6" | 7μF |
| 5 | | | 0.55A |
| 6 | | | |
| 7 | | U _g | |
| 8 | | " " | |
| 9 | | | |
| 10 | Y | | |

1

a

b

c

2

3

U_{brf}

U_b

$U_{ct}=0$

a

150°

1V 2V

90° a 150°

ASR

ASR

0V

$a=150^\circ$

ASR

RP1

$a=90^\circ$

