

1  
2  
3

ASR

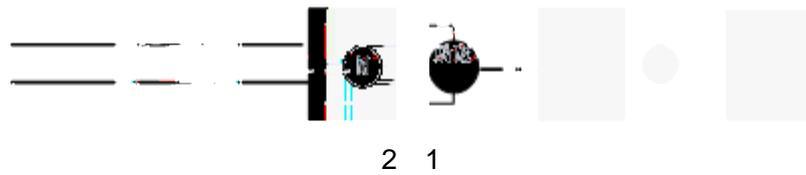
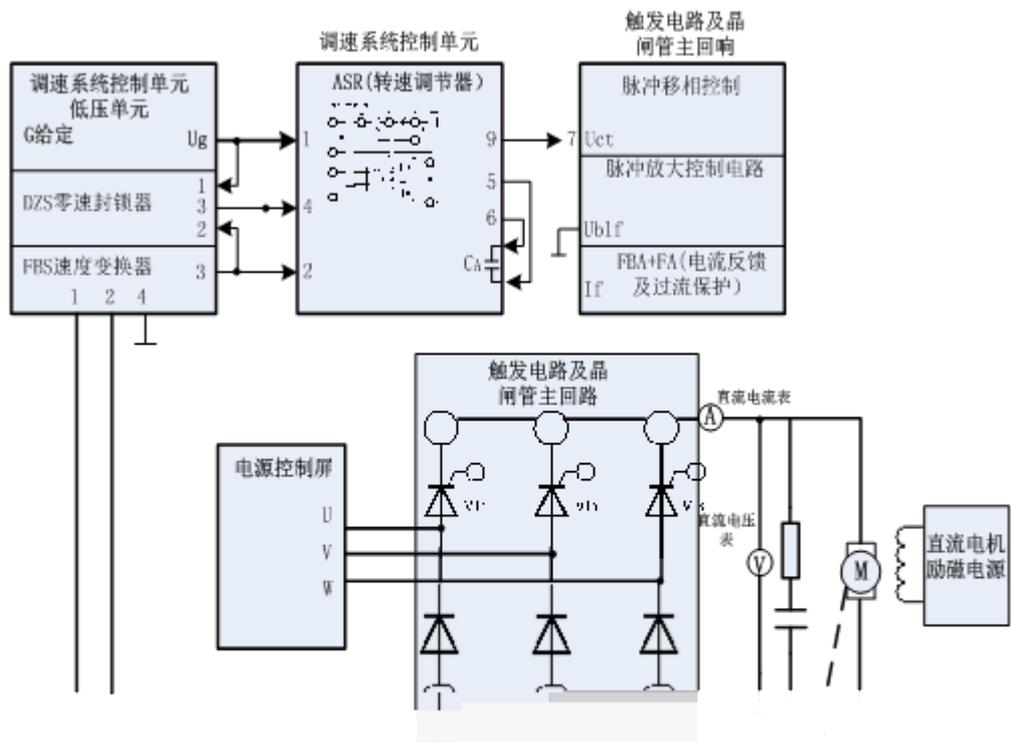
1  
2

—

—

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 $\mu$ F

$U_g$

" "

1

a  $60^\circ$  6 " 1V 2V

b  $U_g=0$  " " Ub " 1" a  $150^\circ$   
 " U" " U"  $180^\circ$

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

RP<sub>3</sub> 2 3 5

$U_d$   $i_d$   $n$

$i_d$ A					
$U_d$ V					
$n$ r/min					

4

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

b

$U_g$   $n_0=1500$  /  
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<sub>g</sub>

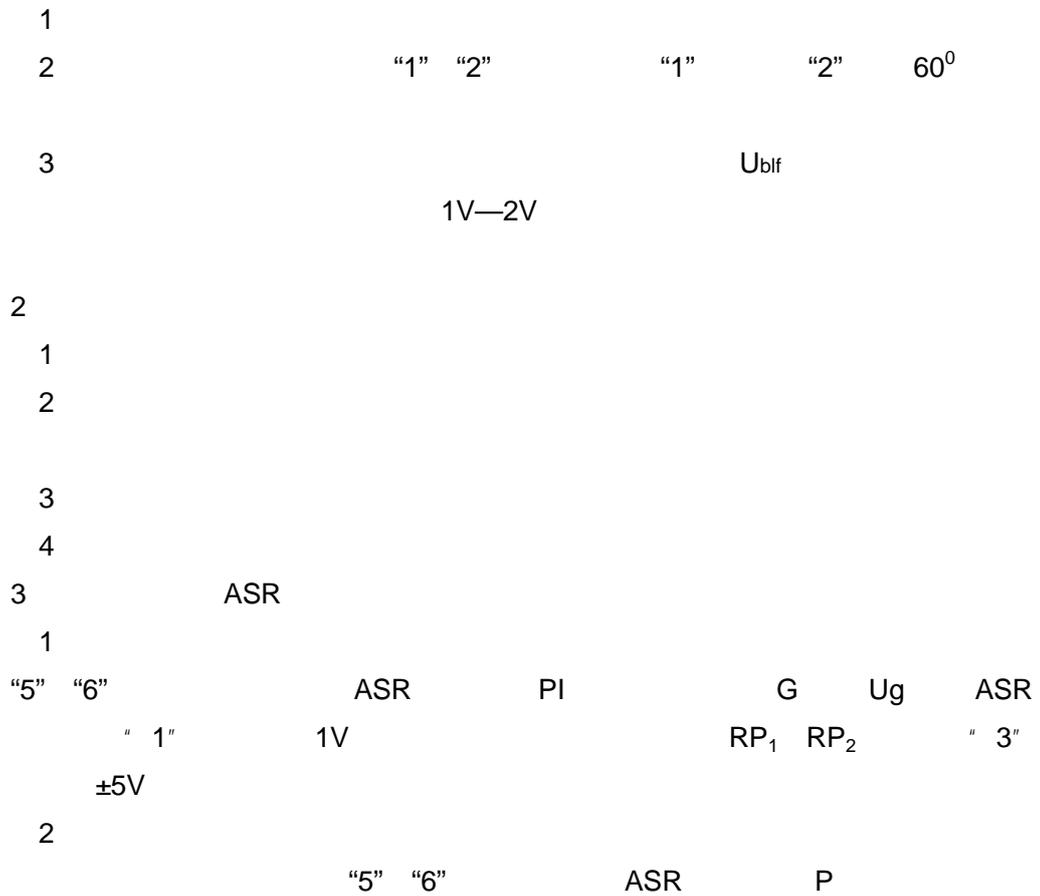
“ ”

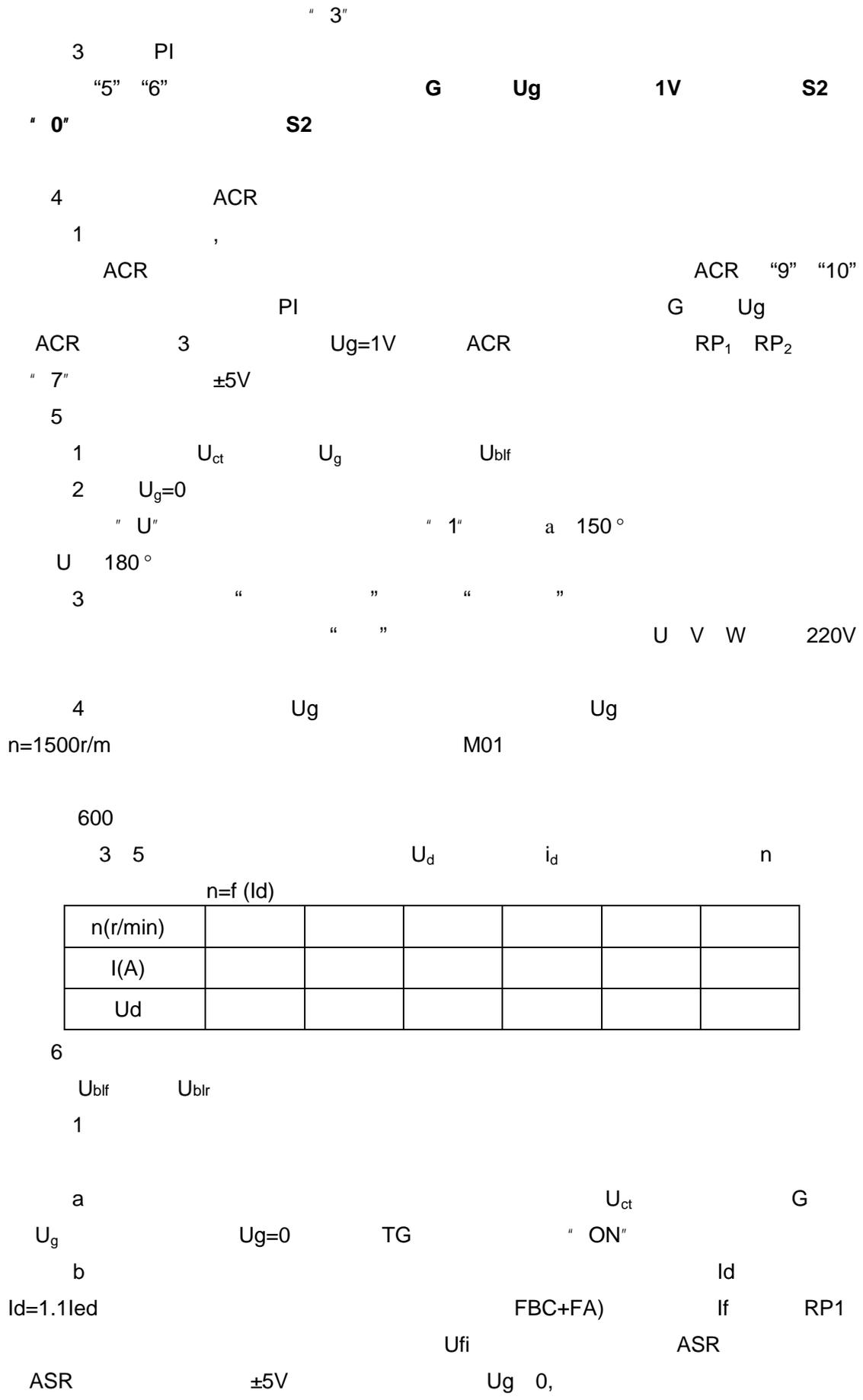
.

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

5 1

PWM

IGBT

H

UPW

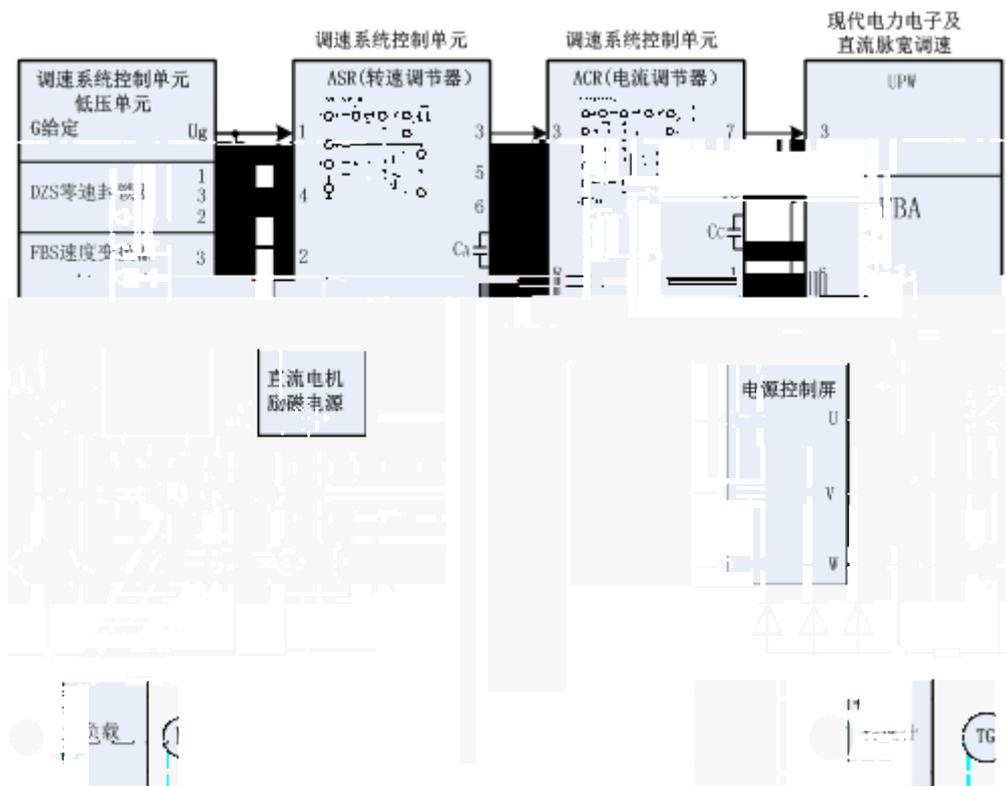
DLD

GD

MOS

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 $\mu$ F

1A

U<sub>g</sub>

" "

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 $\mu$ F  
 c RP<sub>1</sub> RP<sub>2</sub>  $\pm 2.5V$   
 2  
 a RP3  
 b "5" "6" 5 7 $\mu$ F  
 c **G** **Ug** S<sub>2</sub> " " S<sub>1</sub>  
 RP<sub>1</sub> ACR ACR RP<sub>1</sub>  
 S<sub>1</sub> " " RP<sub>2</sub> ACR  
 ACR RP<sub>2</sub> 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

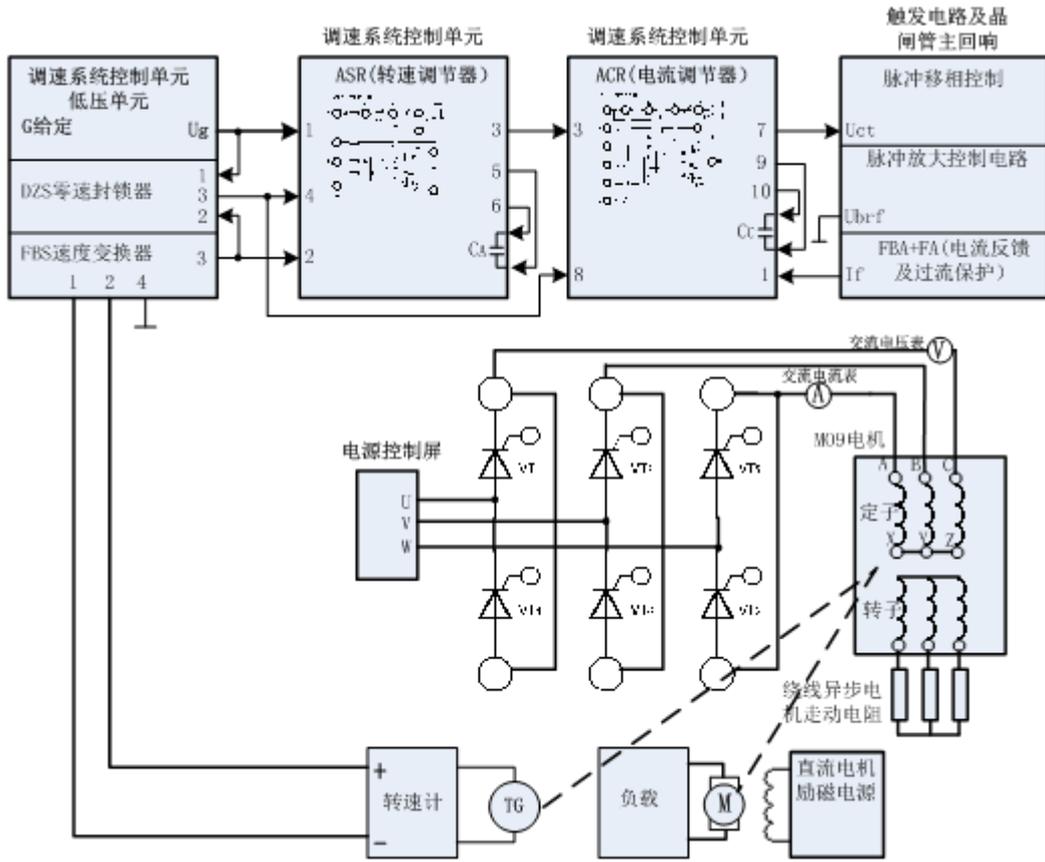
10)

NMCL-32 NMEL-18/2

11)

M01

NMEL-13A

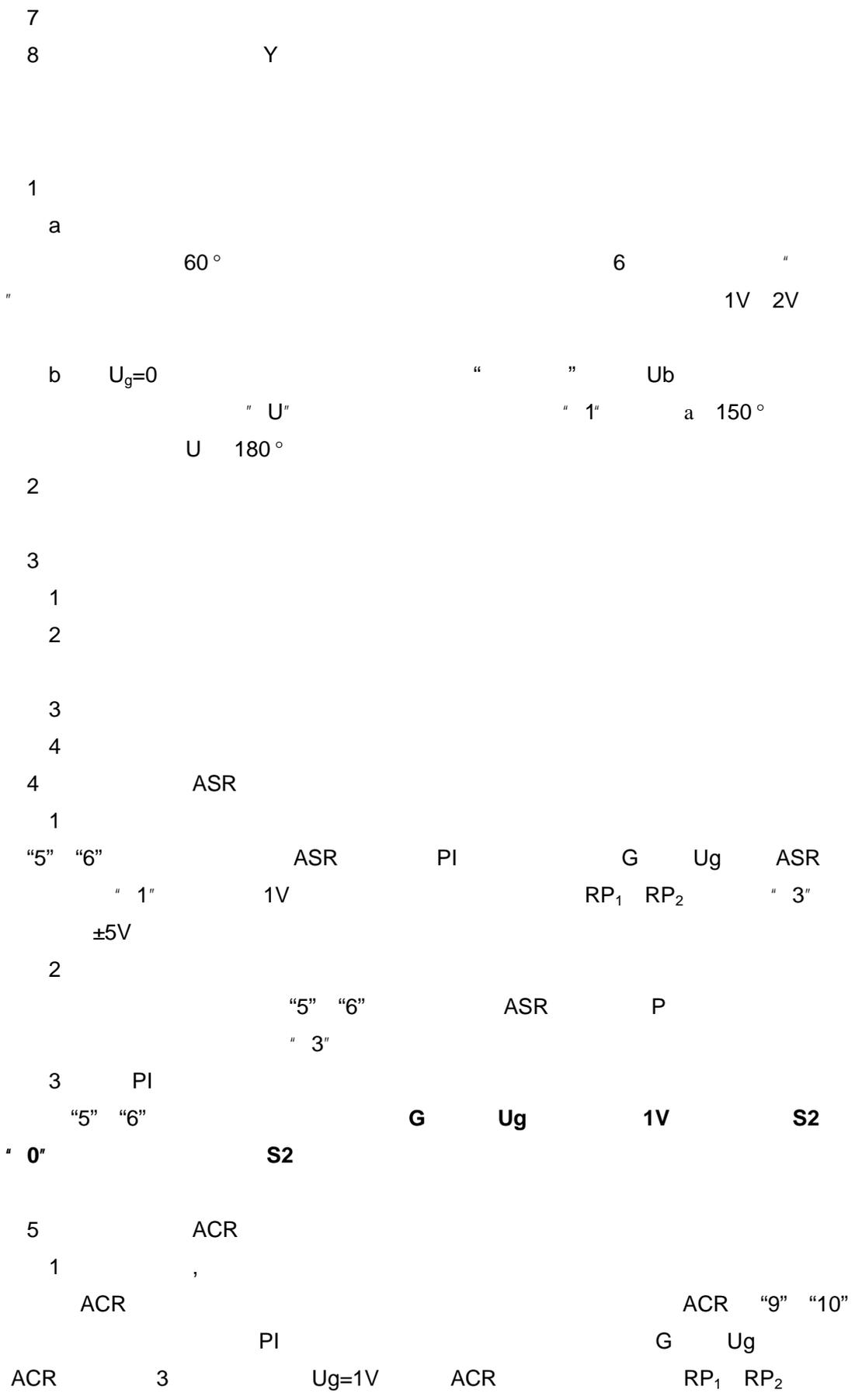


6 1

- 1
- 3
- 5
- 8

- 2
- 4
- 7

1	ASR		ASR	RP3
		ASR "5" "6"		7μF
2			0.55A	
3				
4		U <sub>g</sub>		
5			" "	
6				



" 7"  $\pm 5V$   
 6  
 1  $U_{ct}$   $U_g$   $U_{blf}$   
 2  $U_g=0$   
 " U" " 1" a  $150^\circ$   
 U  $180^\circ$   
 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<sub>d</sub>)

n(r/min)						
I(A)						
U <sub>d</sub>						

6  
 $U_{blf}$   $U_{blr}$   
 1  
 a  $U_{ct}$  G  
 $U_g$   $U_g=0$  TG " ON"  
 b  $I_d$   
 $I_d=1.1I_{ed}$  FBC+FA)  $I_f$  RP1  
 $U_{fi}$  ASR  
 ASR  $\pm 5V$   $U_g$  0,  
 c  $U_g$   $U_{ct}$   $U_g$  ACR "3"  $I_f$  ACR 1  
 ACR "7"  $U_{ct}$  PI ACR  
 ACR "9" "10"  $1.5\mu F$   $U_g$  ASR  
 +5V  $1.1I_{ed}$   $I_d$   
 $I_f$   $U_{fi}$   $I_d < 1.1I_{ed}$   $I_d < I_{ed}$   
 $U_g$  0,  
 2  
 a  $U_g$   $U_{ct}$   $U_g$   $U_g$  0,  
 TG " ON"  $U_g$  n=1400r/min

FBS  
 Ug=0  
 b  
 ASR 2 ASR 3  
 —  
 7  
 ASR,ACR PI  
 ASR“5” “6” 1.5μF ACR 7μF RP1 RP2  
 ±5V  
 1 n=f Id  
 a Ug 1300 r/min  
 M01

RP  
 5V  
 $3+4\#082 \sim \tilde{O} \bullet 3\text{L}$   
 ASR  
 U<sub>ct</sub> U<sub>g</sub> U<sub>g</sub>  
 U<sub>g</sub>

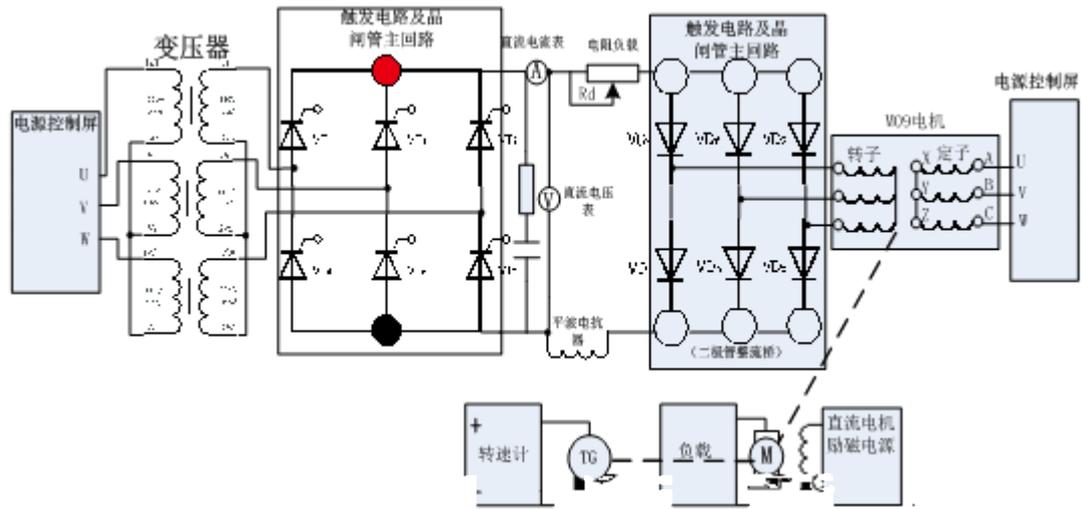
1  
2  
3

1  
2  
3

1  
2  
3  
4

ACR	GT	MF	FBS	ASR	FBC
	5-1		7 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



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 <sub>g</sub> |         |         |
| 8  |     |     |                | " "     |         |
| 9  |     |     |                |         |         |
| 10 | Y   |     |                |         |         |

1

a

b

c

2

3

$U_{brf}$

$U_b$

$U_{ct}=0$

a

$150^\circ$

1V 2V

$90^\circ$  a  $150^\circ$

ASR

ASR

0V

$a=150^\circ$

ASR

RP1

$a=90^\circ$

$U_g$     ACR     $RP_1$      $a=150^\circ$

ASR,ACR     $U_g$      $n_0=1300$  /

4

$U_g$      $n_0=1300$  /

3 5

$U_d$

$i_d$

n

n(r/min)						
$I_G$ (A)						
$U_G$ (V)						
M(N.m)						

5

1

n

i

$U_{gi}$

2

n, I,  $U_{gi}$

1

$n = f(M)$

2