
A4.1. Accionaments que no requereixen velocitat regulable
A4.1.1. SRM 12/8 (3 fases i convertidor Unipolar)

```

A. SRM 12/8 UNIPOLAR Mètode Pseudoinductància de fase ( velocitat de treball 12 MHz)
MAX1 EQU 30H
MAX2 EQU 31H
MAX3 EQU 32H
FORZA EQU 33H
INDUC EQU 34H
CSEG AT 0000H
LJMP MAIN
CSEG AT 0200H
MAIN: CLR P1.0
      CLR P1.1
      CLR P1.2
      MOV FORZA,#00H
      MOV MAX3,#00H
      MOV DPTR,#1000H
SALT0: SETB P1.0
      CLR P1.1
      CLR P1.2
      LCALL RETARD
      CLR P1.0
      SETB P1.1
      CLR P1.2
      LCALL RETARD
      CLR P1.0
      CLR P1.1
      SETB P1.2
      LCALL RETARD
      SJMP SALT0
CSEG AT 0300H
MAX: PUSH ACC
      PUSH PSW
      MOV A,#00H
      MOVX @DPTR,A
BUC1: JB P1.4,BUC1
      MOVX A,@DPTR
      MOV MAX1,A
      CLR C
      CJNE A,#28H,BUC2
BUC2: JNC BUC3
      MOV MAX2,#17H
      SJMP BUC
BUC3: CJNE A,#48H,BUC4
BUC4: JNC BUC80
      MOV MAX2,#0FH
      SJMP BUC
BUC80: CJNE A,#68H,BUC81
BUC81: JNC BUC5
      MOV MAX2,#09H
      SJMP BUC
BUC5: CJNE A,#88H,BUC6
BUC6: JNC BUC7
      MOV MAX2,#04H
      SJMP BUC
BUC7: CJNE A,#0A8H,BUC8
BUC8: JNC BUC9
      MOV MAX2,#03H

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    SJMP BU
BUC9: CJNE A,#0C8H,BUC10
BUC10: JNC BUC11
        MOV MAX2,#02H
        SJMP BUC
BUC11: MOV MAX2,#01H
BUC:   MOV A,MAX3
        CLR C
        ADD A,MAX2
        MOV MAX3,A
        CJNE A,#0FFH,BUC70
        MOV MAX3,#00H
BUC70: MOV A,MAX3
        ORL A,#0C0H
        MOV P3,A
        MOV B,MAX3
        MOV A,INDUC
        CLR C
        CJNE A,B,BUC64
BUC64: JNC BUC65
        MOV FORZA,#01H
BUC65: POP PSW
        POP ACC
        RET
CSEG AT 0800H
RETARD: PUSH ACC
        PUSH PSW
        MOV A,P1
        ANL A,#0E0H
        CJNE A,#00H,SAL1
        MOV INDUC,#0D8H
        SJMP SAL8
SAL1: CJNE A,#20H,SAL2
        MOV INDUC,#0DCH
        SJMP SAL8
SAL2: CJNE A,#40H,SAL3
        MOV INDUC,#0E0H
        SJMP SAL8
SAL3: CJNE A,#60H,SAL4
        MOV INDUC,#0E3H
        SJMP SAL8
SAL4: CJNE A,#80H,SAL5
        MOV INDUC,#0E6H
        SJMP SAL8
SAL5: CJNE A,#0A0H,SAL6
        MOV INDUC,#0E9H
        SJMP SAL8
SAL6: CJNE A,#0C0H,SAL7
        MOV INDUC,#0ECH
        SJMP SAL8
SAL7: CJNE A,#0E0H,SAL8
        MOV INDUC,#0F0H
SAL8: LCALL MAX
        MOV A,FORZA
        CJNE A,#01H,SAL8
        MOV FORZA,#00H
        MOV MAX3,#00H
        POP PSW
        POP ACC
        RET
END

```

B. SRM 12/8 UNIPOLAR Mètode Inductància de fase (velocitat de treball 20 MHz).

```
MAX1 EQU 30H
MAX2 EQU 31H
MAX3 EQU 32H
MAX4 EQU 33H
MAX5 EQU 34H
MAX6 EQU 35H
MAX7 EQU 36H
MAX8 EQU 37H
FORZA EQU 46H
INDUC EQU 47H
CONV0 EQU 48H
CONV1 EQU 49H
GIR EQU 4AH
CSEG AT 0000H
LJMP MAIN
CSEG AT 000BH
LJMP TEMPO0
CSEG AT 001BH
LJMP TEMPO1
CSEG AT 0200H
MAIN: CLR P1.0
      CLR P1.1
      CLR P1.2
      SETB P1.4
      MOV MAX1,#00H
      MOV MAX4,#00H
      MOV MAX5,#00H
      MOV MAX6,#00H
      MOV MAX7,#0FFH
      MOV MAX8,#00H
      MOV R2,#00H
      MOV R3,#00H
      MOV R7,#00H
      MOV CONV0,#00H
      MOV CONV1,#06H
      MOV GIR,#00H
      MOV MAX3,#00H
      MOV MAX2,#00H
      MOV FORZA,#00H
      MOV DPTR,#1000H
      MOV IE,#8AH
      MOV IP,#02H
      MOV TMOD,#22H
      MOV TL0,#0A8H
      MOV TH0,#0A8H
      MOV A,P1
      ANL A,#80H
      CJNE A,#00H,SENTINV
      MOV R6,#03H
      MOV R5,#32H
SALT2: MOV R0,#020H
SALT1: CLR P1.2
      SETB P1.0
      LCALL INICIO
      MOV A,GIR
      CJNE A,#01H,SALT4
      SJMP MAIN
SALT4: CLR P1.0
      SETB P1.1
```

```

    LCALL INICIO
    MOV A,GIR
    CJNE A,#01H,SALT5
    SJMP MAIN
SALT5: CLR P1.1
    SETB P1.2
    LCALL INICIO
    MOV A,GIR
    CJNE A,#01H,SALT6
    SJMP MAIN
SALT6: DJNZ R0,SALT1
    DEC R5
    CJNE R5,#30H,SALT2
MOV CONV0,#00H
    MOV CONV1,#06H
    MOV TL0,#9CH
    MOV TH0,#9CH
SALT7: CLR P1.2
    SETB P1.0
    LCALL RETARD
    MOV A,GIR
    CJNE A,#01H,SALT8
    AJMP MAIN
SALT8: CLR P1.0
    SETB P1.1
    LCALL RETARD
    MOV A,GIR
    CJNE A,#01H,SALT9
    AJMP MAIN
SALT9: CLR P1.1
    SETB P1.2
    LCALL RETARD
    MOV A,GIR
    CJNE A,#01H,SALT7
    AJMP MAIN
SENTINV: MOV R6,#03H
    MOV R5,#32H
SALT12: MOV R4,#01H
SALT11: MOV R0,#20H
SALT10: CLR P1.1
    SETB P1.0
    LCALL INICIO
    MOV A,GIR
    CJNE A,#01H,SALT13
    AJMP MAIN
SALT13: CLR P1.0
    SETB P1.2
    LCALL INICIO
    MOV A,GIR
    CJNE A,#01H,SALT14
    AJMP MAIN
SALT14: CLR P1.2
    SETB P1.1
    LCALL INICIO
    MOV A,GIR
    CJNE A,#01H,SALT15
    AJMP MAIN
SALT15: DJNZ R0,SALT10
    DJNZ R4,SALT11
    DEC R5
    CJNE R5,#30H,SALT12

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```

MOV CONV0,#00H
    MOV CONV1,#06H
    MOV TL0,#9CH
    MOV TH0,#9CH
SALT16: CLR P1.1
    SETB P1.0
    LCALL RETARD
    MOV A,GIR
    CJNE A,#01H,SALT17
    AJMP MAIN
SALT17: CLR P1.0
    SETB P1.2
    LCALL RETARD
    MOV A,GIR
    CJNE A,#01H,SALT18
    AJMP MAIN
SALT18: CLR P1.2
    SETB P1.1
    LCALL RETARD
    MOV A,GIR
    CJNE A,#01H,SALT16
    AJMP MAIN
CSEG AT 0400H
INICIO:  PUSH ACC
        PUSH PSW
    LOOP0: LCALL INICI1
        MOV A,FORZA
        CJNE A,#01H,LOOP0
        MOV FORZA,#00H
        MOV MAX3,#00H
        MOV MAX2,#00H
        MOV MAX7,#0FFH
        POP PSW
        POP ACC
        RET
CSEG AT 0500H
INICI1:  PUSH ACC
        PUSH PSW
        MOV TCON,#10H
    UC0: MOV A,#00H
        MOVX @DPTR,A
    UC1: JB P1.4,UC1
        MOVX A,@DPTR
        MOV MAX1,A

        INC CONV0
CLR C
    CJNE A,#0A0H,UC20
    UC20: JNC UC15
        MOV A,R5
        MOV R1,A
MOV A,MAX1
    CLR C
    CJNE A,#00H,UC3
    MOV MAX1,#01H

    UC3: MOV A,#0FFH
        CLR C
        SUBB A,MAX1
        CLR C
        ADDC A,MAX2

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MOV MAX2,A
JNC UC4
INC MAX3
UC4: MOV A,MAX1
MOV B,R1
MUL AB
MOV MAX4,A
MOV MAX5,B
MOV A,B
CLR C
CJNE A,MAX3,UC10
UC10: JNC UC11
Sjmp UC12
UC11: CLR C
SUBB A,MAX3
JNZ UC7
MOV A,MAX4
MOV B,MAX2
CLR C
CJNE A,B,UC5
UC5: JNC UC7
UC12: MOV A,MAX7
MOV B,MAX3
CLR C
CJNE A,B,UC13
UC13: JNC UC14
Sjmp UC15
UC14: CLR C
SUBB A,B
JNZ UC7
MOV A,MAX6
MOV B,MAX2
CLR C
CJNE A,B,UC6
UC6: JNC UC7
UC15: MOV A,CONV0
CLR C
CJNE A,#03H,UC28
UC28: JC UC26
ADDC A,R6
CLR C
CJNE A,CONV1,UC25
UC25: JC UC26
MOV CONV1,CONV0
MOV CONV0,#00H
MOV FORZA,#01H
Sjmp UC7
UC26: MOV FORZA,#01H
MOV GIR,#01H
UC7: MOV A,MAX3
ORL A,#0C0H
MOV P3,A

POP PSW
POP ACC
UC8: CJNE R7,#00H,UC9
Sjmp UC8
UC9: MOV MAX7,MAX3
MOV MAX6,MAX2
MOV R7,#00H
RET

```

```

CSEG AT 0700H
MAX:   PUSH ACC
        PUSH PSW
        MOV TCON,#10H
BUC0:  MOV A,#00H
        MOVX @DPTR,A
BUC1:  JB P1.4,BUC1
        MOVX A,@DPTR
        MOV MAX1,A
INC CONV0
        MOV A,CONV0
        CJNE A,#0C8H,BUC40
        AJMP BUC15
BUC40: CLR C
        CJNE A,#30H,BUC20
BUC20: JC BUC29
        CJNE A,#64H,BUC26
BUC26: JC BUC28
        MOV R2,#0AH
        SJMP BUC29
BUC28: MOV B,#02H
        DIV AB
        CLR C
BUC22: SUBB A,#16H
        MOV R3,A
        MOV A,INDUC
        CLR C
        SUBB A,R3
        MOV R2,A
        SJMP BUC25
BUC29: MOV R2,INDUC
BUC25: MOV A,MAX1
        CLR C
        CJNE A,#00H,BUC3
        MOV MAX1,#01H
BUC3:  MOV A,#0FFH
        CLR C
        SUBB A,MAX1
        CLR C
        ADDC A,MAX2
        MOV MAX2,A
        JNC BUC4
        INC MAX3

BUC4:  MOV A,MAX1
        MOV B,R2
        MUL AB
        MOV MAX4,A
        MOV MAX5,B
        MOV A,B
        CLR C
        CJNE A,MAX3,BUC10
BUC10: JNC BUC11
        SJMP BUC12
BUC11: CLR C
        SUBB A,MAX3
        JNZ BUC7
        MOV A,MAX4
        MOV B,MAX2
        CLR C
        CJNE A,B,BUC5

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```

BUC5: JNC BUC7
BUC12: MOV A,MAX7
        MOV B,MAX3
        CLR C
        CJNE A,B,BUC13
BUC13: JNC BUC14
        SJMP BUC15
BUC14: CLR C
        SUBB A,B
        JNZ BUC7
        MOV A,MAX6
        MOV B,MAX2
        CLR C
        CJNE A,B,BUC6
BUC6: JNC BUC7
BUC15: MOV A,CONV0
        CLR C
        ADDC A,#28H
        CJNE A,CONV1,BUC30
BUC30: JC BUC31
        MOV CONV1,CONV0
        MOV CONV0,#00H
        MOV FORZA,#01H
        SJMP BUC7
BUC31: MOV GIR,#01H
        MOV FORZA,#01H
BUC7: MOV A,MAX3
        ORL A,#0C0H
        MOV P3,A
POP PSW
        POP ACC
BUC8: CJNE R7,#00H,BUC9
        SJMP BUC8
BUC9: MOV MAX7,MAX3
        MOV MAX6,MAX2
        MOV R7,#00H
        RET
CSEG AT 0900H
TEMPO0: ANL TCON,#0CFH
        MOV R7,#01H
        RETI
CSEG AT 0980H
TEMPO1: PUSH ACC
        ANL TCON,#3FH ;ABANS MOV TCON,#40H
        MOV R6,#01H
        POP ACC
        RETI
CSEG AT 0A00H
RETARD: PUSH ACC
        PUSH PSW
        MOV A,P1
        ANL A,#60H
        CJNE A,#00H,SAL1
        MOV INDUC,#19H
        SJMP SAL4
SAL1: CJNE A,#20H,SAL2
        MOV INDUC,#1DH
        SJMP SAL4
SAL2: CJNE A,#40H,SAL3
        MOV INDUC,#20H
        SJMP SAL4

```



```
SAL3: CJNE A,#60H,SAL4
      MOV INDUC,#24H
```

```
SAL4: LCALL MAX
      MOV A,FORZA
      CJNE A,#01H,SAL4
      MOV FORZA,#00H
      MOV MAX3,#00H
      MOV MAX2,#00H
      MOV MAX7,#0FFH
```

```
POP PSW
POP ACC
RET
END
```

A4.1.2. SRM 8/6 (4 fases i convertidor Unipolar)

SRM 8/6 UNIPOLAR. Mètode Inductància de fase (velocitat de treball 40 MHz)

```
CSEG AT 0000H
LJMP MAIN
CSEG AT 000BH
  ANL TCON,#0CFH
  MOV R7,#01H
  RETI
CSEG AT 0200H
MAIN: SETB P1.0
      SETB P1.1
      SETB P1.2
      SETB P1.3
      SETB P1.4
      MOV R1,#00H    ;R1=Ireal
      MOV R2,#00H    ;R3R2 = (U - Ri)
      MOV R3,#00H
      MOV R4,#00H    ;R5R4 = L * i
      MOV R5,#00H
      MOV R6,#00H    ;MENYS 200RPM
      MOV R7,#00H    ;TEMPORITZADORS
      MOV R0,#00H    ;NOMBRE CONVERSIONS PER FASE ACTUAL=wreal
      MOV DPTR,#1000H
      MOV IE,#8AH
      MOV IP,#02H
      MOV TMOD,#12H
      MOV TL0,#0C6H
      MOV TH0,#0C6H
SALT0: SETB P1.3
      CLR P1.0
      LCALL MAX
      SETB P1.0
      CLR P1.1
      LCALL MAX
SETB P1.1
      CLR P1.2
      LCALL MAX
SETB P1.2
      CLR P1.3
      LCALL MAX
      SJMP SALT0
```

```

        CSEG AT 0400H
MAX:   MOV TCON,#10H
        BUC0: MOV A,#00H
            MOVX @DPTR,A
        BUC1: JB P1.4,BUC1
            MOVX A,@DPTR
            MOV R1,A
CJNE A,#00H,BUC2
        MOV R1,#01H
BUC2:  MOV A,#0FFH
        CLR C
        SUBB A,R1
        CLR C
        ADDC A,R2
        MOV R2,A
        JNC BUC3
        INC R3
BUC3:  INC R0
        MOV A,R0
        CLR C
        CJNE A,#03H,BUC9
BUC9:  JC BUC8
        MOV DPTR,#0700H
BUC11: MOV C A,@A+DPTR
        ;MOV A,#48H
        MOV B,R1
        MUL AB
        MOV R4,A
        MOV R5,B
        MOV A,B
        MOV B,R3
        CLR C
        CJNE A,B,BUC5
        BUC5: JC BUC7
SUBB A,R3
        JNZ BUC8
        MOV A,R4
        MOV B,R2
        CLR C
        CJNE A,B,BUC6
        BUC6: JNC BUC8

        BUC7: CJNE R7,#01H,BUC7
            MOV R7,#00H
            MOV R0,#00H
            MOV R3,#00H
            MOV R2,#00H
            MOV R6,#00H
            RET
BUC8:  CJNE R7,#01H,BUC8
        MOV R7,#00H
        AJMP MAX
CSEG AT 0700H
        DB 48H,48H,48H,48H,48H,48H,48H,48H ;7
        DB 48H,48H,48H,48H,48H,48H,48H,48H ;15
        DB 48H,48H,48H,48H,48H,47H,47H,47H ;23
        DB 47H,47H,47H,46H,46H,46H,46H,46H ;31
        DB 45H,45H,45H,45H,44H,44H,44H,43H ;39
        DB 43H,42H,42H,41H,41H,40H,40H,3FH ;47
        DB 3FH,3EH,3DH,3CH,3BH,3AH,3AH,39H ;55

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```

DB 38H,38H,37H,37H,36H,36H,35H,35H ;63
DB 34H,34H,33H,33H,32H,32H,31H,31H ;71
DB 30H,30H,2FH,2FH,2EH,2EH,2DH,2DH ;79
DB 2CH,2CH,2BH,2BH,2AH,29H,28H,27H ;87
DB 26H,25H,24H,23H,22H,21H,20H,1FH ;95
DB 1EH,1EH,1DH,1DH,1CH,1CH,1BH,1BH ;103
DB 1BH,1AH,1AH,19H,19H,18H,18H,17H ;111
; FONS D'ESCALA DE 4.355A (a 40.8us)

```

END

A4.2. Accionaments que requereixen velocitat regulable.

SRM 12/8 (3 fases i convertidor Miller). Mètode Inductància de fase (velocitat de treball 40 MHz). (Por funcionar també com a Unipolar però sense regulació de velocitat).

```

; CONTROL SRM
CONV2 EQU 20H
WREF EQU 21H
HISTVEL EQU 22H
IREF EQU 23H
DIVIREF EQU 24H
INCIREF EQU 25H
IREFANT EQU 26H
CPABANT EQU 27H
CONV3 EQU 28H
CONV5 EQU 29H
CONV1 EQU 2AH
INFIREF EQU 2BH
DIFIREF EQU 2CH
CONV20 EQU 2DH
WWREF EQU 2EH
CONV10 EQU 2FH
CONV50 EQU 30H
CONV30 EQU 31H
CSEG AT 0000H
LJMP MAIN
CSEG AT 000BH
ANL TCON,#0CFH
MOV R7,#01H
RETI
CSEG AT 001BH
ANL TCON,#3FH
MOV R7,#01H
RETI
CSEG AT 0200H
MAIN: SETB P1.0
SETB P1.1
SETB P1.2
CLR P1.3
SETB P1.4
MOV R1,#00H ;R1=Ireal
MOV R2,#00H ;R3R2 = (U - Ri)
MOV R3,#00H
MOV R4,#00H ;R5R4 = L * i
MOV R5,#00H
MOV R7,#00H ;TEMPORITZADORS
MOV CONV2,#00H ;NOMBRE CONVERSIONS PER FASE ACTUAL=wreal
MOV R0,#00H ;CONV20=1,DETERMINA ms

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MOV R6,#00H ;PUNT TALL INDUCTANCIA
MOV WREF,#00H ;wref = n CONVERS
MOV HISTVEL,#00H ;HISTÈRESI VELOCITAT (5 CONVERS)
MOV INFIREF,#01H ;VALOR MÍNIM DE IREF
MOV IREF,#50H ;R1 = Ireal IREF = Iref
MOV DIVIREF,#00H
MOV INCIREF,#01H ;VALOR INCREMENTAL DE Iref
MOV IREFANT,#00H ;INDICADOR D'INCRE O DECRE Iref FASE ANT
MOV CPABANT,#00H ;INDICADOR a < b o a >= b FASE ANT
MOV CONV3,#00H ;DIFERÈNCIA CONVERSIONS FASE ANTERIOR I wref
MOV CONV5,#00H ;DIFERÈNCIA CONVERSIONS FASE ACTUAL I wref
MOV CONV1,#00H ;IGUAL CONV2 FASE ANTERIOR
MOV DIFIREF,#00H
MOV CONV20,#00H
MOV WWREF,#00H
MOV CONV10,#00H
MOV CONV50,#00H
MOV CONV30,#00H
MOV IE,#8AH
MOV IP,#02H
MOV TMOD,#22H
MOV TL0,#0A8H
MOV TH0,#0A8H
MOV TL1,#01H ;90
MOV TH1,#01H ;90
SALT0: SETB P1.2
CLR P1.0
LCALL RETARD
SETB P1.0
CLR P1.1
LCALL RETARD
SETB P1.1
CLR P1.2
LCALL RETARD
SJMP SALT0
CSEG AT 0400H
MAX: MOV TCON,#10H
BUC0: MOV A,#00H
MOVX @DPTR,A
BUC1: JB P1.4,BUC1
MOVX A,@DPTR
MOV R1,A
CJNE A,#00H,BUC2
MOV R1,#01H
BUC2: MOV A,P1
ANL A,#08H
CJNE A,#08H,BUC20
MOV A,R2
CLR C
SUBB A,R1
MOV R2,A
JNC BUC3
CJNE R3,#00H,BUC21
MOV R2,#00H
SJMP BUC3
BUC21: DEC R3
SJMP BUC3
BUC20: MOV A,#0FFH
CLR C
SUBB A,R1
CLR C

```

```

        ADDC A,R2
        MOV R2,A
        JNC BUC3
        INC R3
BUC3: MOV B,IREF
        MOV A,R1
        CLR C
        CJNE A,B,BUC22
        BUC22: JC BUC23
            SETB P1.3
            SJMP BUC24
BUC23: CLR P1.3
BUC24: INC CONV2
        MOV A,CONV2
        CJNE A,#00H,BUC4
        MOV CONV20,#01H
        BUC4: MOV A,R6      ;#4AH ,#32H
MOV B,R1
        MUL AB
        MOV R4,A
        MOV R5,B
        MOV A,B
        MOV B,R3
        CLR C
        CJNE A,B,BUC5
        BUC5: JC BUC7
SUBB A,R3
        JNZ BUC8
        MOV A,R4
        MOV B,R2
        CLR C
        CJNE A,B,BUC6
        BUC6: JNC BUC8
BUC7: CJNE R7,#01H,BUC7
        MOV R7,#00H
        RET
BUC8: CJNE R7,#01H,BUC8
        MOV R7,#00H
        AJMP MAX
CSEG AT 0880H
        DB 2DH,2CH,2BH,2AH,29H,28H,27H,26H
        DB 25H,24H,23H,22H,21H,20H,1FH,1EH
        DB 1DH,1CH,1BH,1AH,19H,18H
CSEG AT 0900H
        DB 43H,42H,40H,3FH,3DH,3CH,3AH,39H
        DB 37H,36H,34H,33H,31H,30H,2EH,2DH
        DB 2BH,2AH,28H,27H,25H,24H
CSEG AT 0A00H
RETARD:  MOV A,P1
        ANL A,#0E0H
        CJNE A,#00H,SAL1
        MOV WWREF,#00H
        MOV WREF,#9BH      ;550RPM
        MOV HISTVEL,#07H
        MOV R6,#80H
        SJMP SAL8
SAL1:  CJNE A,#20H,SAL2
        MOV WWREF,#00H
        MOV WREF,#0AAH    ;500RPM
        MOV HISTVEL,#07H
        MOV R6,#7EH

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```

    SJMP SAL8
SAL2: CJNE A,#40H,SAL3
    MOV WWREF,#00H
    MOV WREF,#0BDH ;450RPM
    MOV HISTVEL,#08H
    MOV R6,#7CH
    SJMP SAL8
SAL3: CJNE A,#60H,SAL4
    MOV WWREF,#00H
    MOV WREF,#0D4H ;400RPM
    MOV HISTVEL,#08H
    MOV R6,#7AH
    SJMP SAL8
SAL4: CJNE A,#80H,SAL5
    MOV WWREF,#00H
    MOV WREF,#0F3H ;350RPM
    MOV HISTVEL,#09H
    MOV R6,#78H
    SJMP SAL8
SAL5: CJNE A,#0A0H,SAL6
    MOV WWREF,#01H
    MOV WREF,#1BH ;300RPM
    MOV HISTVEL,#09H
    MOV R6,#76H
    SJMP SAL8
SAL6: CJNE A,#0C0H,SAL7
    MOV WWREF,#01H
    MOV WREF,#54H ;250RPM
    MOV HISTVEL,#0AH
    MOV R6,#74H
    SJMP SAL8
SAL7: MOV WWREF,#01H
    MOV WREF,#82H ;220RPM
    MOV HISTVEL,#0AH
    MOV R6,#72H
SAL8: LCALL MAX
CLR P1.3
    MOV TCON,#40H
    SJMP SAL950
SAL951: MOV A,CONV10
    CJNE A,#00H,SAL953
    MOV A,CONV2 ;CONV20=1 CONV10=0
    MOV B,CONV1
    CLR C
    CJNE A,B,SAL954
SAL954: JNC SAL955
    SUBB A,B
    CLR C
    CJNE A,#0F8H,SAL958
SAL958: JNC SAL959
    INC INFIREF
SAL959: AJMP SAL861

SAL955: SUBB A,B
    CJNE A,#07H,SAL956
SAL956: JC SAL957
    INC INFIREF
SAL957: AJMP SAL861
SAL953: AJMP SAL960 ;CONV20=1 CONV10=1
SAL952: MOV A,CONV2 ;CONV20=0 CONV10=1
    CLR C

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    CJNE A,#03H,SAL863
SAL863: JNC SAL867
    MOV CPABANT,#02H ;?
    AJMP SAL50
SAL867: MOV B,CONV1
    CLR C
    CJNE A,B,SAL961
SAL961: JNC SAL962
    SUBB A,B
    CLR C
    CJNE A,#0FEH,SAL965
SAL965: JNC SAL966
    MOV A,INFIREF
    CJNE A,#01H,SAL967
    AJMP SAL861
SAL967: DEC INFIREF
SAL966: AJMP SAL861
SAL962: SUBB A,B
    CJNE A,#02H,SAL963
SAL963: JC SAL964
    MOV A,INFIREF
    CJNE A,#01H,SAL968
    AJMP SAL861
SAL968: DEC INFIREF
SAL964: AJMP SAL861
SAL950: CLR C
    MOV A,CONV20
    CJNE A,#00H,SAL951
    MOV A,CONV10
    CJNE A,#00H,SAL952
    MOV A,CONV2 ;CONV20=0 CONV10=0
    CLR C
    CJNE A,#03H,SAL862
SAL862: JNC SAL960
    INC INFIREF
    MOV CPABANT,#02H
    AJMP SAL50
SAL960: MOV A,CONV2
    MOV B,CONV1
    CJNE A,B,SAL870
SAL870: JNC SAL871
    MOV A,INFIREF
    CJNE A,#01H,SAL872
    SJMP SAL861
SAL872: MOV A,CONV2
    SUBB A,B
    CLR C
    CJNE A,#0FEH,SAL882
SAL882: JNC SAL861
    DEC INFIREF
    SJMP SAL861
SAL871: SUBB A,B
    CJNE A,#07H,SAL881
SAL881: JC SAL861
    MOV A,INFIREF
    CJNE A,#01H,SAL1030
    SJMP SAL861
SAL1030: INC INFIREF
SAL861: MOV A,WWREF
    CJNE A,#00H,SAL903
    MOV A,CONV20

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    CJNE A,#01H,SAL902
MOV A,CONV2    ;WWREF=0,CONV20=1
    MOV B,WREF
    CLR C
    SUBB A,B
    MOV CONV5,A
    JC SAL904
    MOV CONV50,#01H
    AJMP SAL63
SAL904: MOV CONV50,#00H
    MOV B,HISTVEL
    CLR C
    CJNE A,B,SAL1470
SAL1470: JC SAL1471
    AJMP SAL63
SAL1471: AJMP SAL56
SAL903: MOV A,CONV20
    CJNE A,#00H,SAL902
    MOV A,WREF    ;WWREF=1,CONV20=0
    MOV B,CONV2
    CLR C
    SUBB A,B
    MOV CONV5,A
    JC SAL1010
    MOV CONV50,#01H
    SJMP SAL1012
SAL1010: MOV CONV50,#00H
SAL1012: MOV A,CONV10
    CJNE A,#00H,SAL906
    SJMP SAL1003
SAL906: MOV A,CONV1
    MOV B,CONV2
    CLR C
    SUBB A,B
    JC SAL840
    MOV A,#0FFH
    SJMP SAL840
SAL902: MOV A,CONV2    ;WWREF=0,CONV20=0 WWREF=1,CONV20=1
    MOV B,WREF
    CLR C
    CJNE A,B,SAL18
SAL18: JC SAL20
    SUBB A,B
    MOV CONV5,A
    MOV CONV50,#00H
    MOV A,B
    ADD A,HISTVEL
    MOV B,A
    MOV A,CONV2
    CLR C
    CJNE A,B,SAL19
SAL19: JNC SAL150
    AJMP SAL56
SAL150: AJMP SAL63
SAL1000: MOV A,CONV10
    CJNE A,#00H,SAL1002
    AJMP SAL601    ;CONV20=1 CONV10=0
SAL1002: SJMP SAL1003    ;CONV20=1 CONV10=1
SAL1001: MOV A,CONV1    ;CONV20=0 CONV10=1
    MOV B,CONV2
    CLR C

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        SUBB A,B
        JC SAL840
        MOV A,#0FFH
        SJMP SAL840
SAL20: MOV A,WREF           ;WWREF=0,1 CONV20=0,1
        MOV B,CONV2
        CLR C
        SUBB A,B
        MOV CONV5,A
        MOV CONV50,#00H
SAL1020: MOV A,CONV20
        CJNE A,#00H,SAL1000
        MOV A,CONV10
        CJNE A,#00H,SAL1001
                ;CONV20=0,1 CONV10=0,1 WWREF=0,1
                ;CONV20=0 CONV10=0 WWREF=1
SAL1003: MOV A,CONV1
        MOV B,CONV2
        CLR C
        CJNE A,B,SAL420
SAL420: JC SAL442
        SUBB A,B
        JZ SAL442
SAL840: MOV B,#05H
        MUL AB
        MOV DIFIREF,A
MOV A,IREFANT
        MOV B,IREF
        CLR C
        CJNE A,B,SAL439
SAL439: JC SAL802
        SUBB A,B
        MOV B,DIFIREF
        CJNE A,B,SAL440
SAL440: JC SAL801
        AJMP SAL601
SAL801: MOV A,WWREF
        CJNE A,#01H,SAL1460
        MOV A,#0FFH
        MOV B,#11H
        DIV AB
        MOV R0,A
SAL1460: MOV A,WREF
        MOV B,#11H ;17CONV=500us
        DIV AB
        INC A
        ADD A,R0
        CLR C
        CJNE A,#15H,SAL1430
SAL1430: JC SAL1431 ;21x500us=10.5ms
        MOV A,#14H
SAL1431: MOV DPTR,#0880H
        MOVC A,@A+DPTR
        MOV DIVIREF,A
        MOV CPABANT,#02H
        AJMP SAL47
SAL802: MOV A,B
        MOV B,IREFANT
        CLR C
        SUBB A,B
        CJNE A,#15H,SAL804

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SAL804: JC SAL801
        MOV A,#14H
        SJMP SAL1431
SAL442: AJMP SAL601
SAL1100: MOV A,CONV30
         CJNE A,#00H,SAL1102
         SJMP SAL34          ;CONV50=1 CONV30=0
SAL1101: SJMP SAL27          ;CONV50=0 CONV30=1
SAL601: MOV DIVIREF,#2DH ;36H
        MOV A,CONV50
        CJNE A,#00H,SAL1100
        MOV A,CONV30
        CJNE A,#00H,SAL1101
SAL1102: MOV A,CONV5          ;CONV50=0,1 CONV30=0,1
         MOV B,CONV3
         CLR C
         CJNE A,B,SAL24
SAL24: JNC SAL34
        ; CONV5 < CONV3
SAL27: MOV A,CPABANT
        CJNE A,#00H,SAL28
        MOV CPABANT,#00H
        AJMP SAL50
SAL28: CJNE A,#01H,SAL29
        MOV CPABANT,#00H
        AJMP SAL50
SAL29: CJNE A,#02H,SAL94
        MOV CPABANT,#00H
        AJMP SAL50
SAL94: MOV CPABANT,#00H
        AJMP SAL47
;CONV5 >= CONV3
SAL34: MOV A,CPABANT
        CJNE A,#00H,SAL36
        MOV CPABANT,#02H
        AJMP SAL47
SAL36: CJNE A,#01H,SAL37
        MOV CPABANT,#02H
        AJMP SAL47
SAL37: CJNE A,#02H,SAL97
        MOV CPABANT,#02H
        AJMP SAL47
SAL97: CJNE A,#06H,SAL111
        MOV CPABANT,#02H
        AJMP SAL47
SAL111: MOV CPABANT,#02H
        AJMP SAL47
SAL47: MOV A,IREF
        MOV B,DIVIREF
        DIV AB
        INC A
        CLR C
        MOV INCIREF,A
SAL65: MOV A,IREF
        CLR C
        SUBB A,INCIREF
        JC SAL499
        MOV IREF,A
        MOV B,INFIREF
        CJNE A,B,SAL498
SAL498: JC SAL499

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        SJMP SAL53
SAL499: MOV IREF,INFIREF
        SJMP SAL53
SAL50: MOV A,IREF
        MOV B,DIVIREF
        DIV AB
        INC A
        CLR C
        MOV INCIREF,A
SAL64: MOV A,IREF
        CLR C
        ADD A,INCIREF
        JC SAL51
        MOV IREF,A
        SJMP SAL53
        SAL51: MOV IREF,0FFH
SAL53: MOV R3,#00H
        MOV R2,#00H
        MOV INCIREF,#00H
        MOV CONV3,CONV5
        MOV CONV1,CONV2
        MOV CONV2,#00H
        MOV CONV10,CONV20
        MOV CONV20,#00H
        MOV IREFANT,IREF
        MOV CONV30,CONV50
        MOV R0,#00H
SAL54: CJNE R7,#01H,SAL54
        MOV R7,#00H
        RET
SAL850: MOV A,CONV10
        CJNE A,#00H,SAL852
        MOV A,CONV2      ;CONV20=1 CONV10=0
        MOV B,CONV1
        CLR C
        SUBB A,B
        JC SAL853
        MOV A,#0FFH
        SJMP SAL853
SAL851: SJMP SAL811      ;CONV20=0 CONV10=1
SAL56: MOV A,CONV20
        CJNE A,#00H,SAL850
        MOV A,CONV10
        CJNE A,#00H,SAL851
SAL852: MOV A,CONV2      ;CONV20=0 CONV10=0 ,CONV20=1 CONV10=1
        MOV B,CONV1
        CLR C
        CJNE A,B,SAL810
SAL810: JC SAL811
        SUBB A,B
        JZ SAL811
SAL853: MOV B,#05H
        MUL AB
        MOV DIFIREF,A
        MOV A,IREF
        MOV B,IREFANT
        CLR C
        CJNE A,B,SAL814
SAL814: JC SAL815
        SUBB A,B
        MOV B,DIFIREF

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    CJNE A,B,SAL817
SAL817: JC SAL816
    AJMP SAL811
SAL816: MOV CPABANT,#05H
SAL1440: MOV A,CONV20
    CJNE A,#01H,SAL1461
    MOV A,#0FFH
    MOV B,#11H
    DIV AB
    MOV R0,A
SAL1461: MOV A,CONV2
    MOV B,#11H
    DIV AB
    INC A
    ADD A,R0
    CLR C
    CJNE A,#15H,SAL1420
SAL1420: JC SAL1421
    MOV A,#14H
SAL1421: MOV DPTR,#0900H
    MOVC A,@A+DPTR
    MOV DIVIREF,A
    AJMP SAL50
SAL815: MOV A,B
    MOV B,IREF
    CLR C
    SUBB A,B
    CJNE A,#15H,SAL818
SAL818: JC SAL816
    MOV A,#14H
    SJMP SAL1421
SAL1130: MOV A,CONV30
    CJNE A,#00H,SAL1132
    SJMP SAL76 ;CONV50=1 CONV30=0
SAL1131: SJMP SAL70 ;CONV50=0 CONV30=1
SAL811: MOV DIVIREF,#43H ;36H
    MOV A,CONV50
    CJNE A,#00H,SAL1130
    MOV A,CONV30
    CJNE A,#00H,SAL1131
SAL1132: MOV A,CONV5 ;CONV50=0,1 CONV30=0,1
    MOV B,CONV3
    CLR C
    CJNE A,B,SAL61
    SAL61: JNC SAL76
SAL70: MOV A,CPABANT ; CONV5 < CONV3
    CJNE A,#03H,SAL74
    MOV CPABANT,#03H
    AJMP SAL47
SAL74: CJNE A,#04H,SAL75
    MOV CPABANT,#03H
    AJMP SAL47
SAL75: CJNE A,#05H,SAL103
    MOV CPABANT,#03H
    AJMP SAL47
SAL103: CJNE A,#06H,SAL114
    MOV CPABANT,#03H
    AJMP SAL50
SAL114: MOV CPABANT,#03H
    AJMP SAL50
SAL76: MOV A,CPABANT ; CONV5 >= CONV3

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```
CJNE A,#03H,SAL107
MOV CPABANT,#05H
AJMP SAL50
SAL107: CJNE A,#04H,SAL108
MOV CPABANT,#05H
AJMP SAL50
SAL108: CJNE A,#05H,SAL109
MOV CPABANT,#05H
AJMP SAL50
SAL109: MOV CPABANT,#05H
AJMP SAL50
SAL63: MOV CPABANT,#06H
;MOV DIVIREF,#0AH ;19H
;AJMP SAL50
AJMP SAL1440
END
```