TECHNIREL

ICE

PROTECTIONS
CONTRÔLE
&
REGULATION

Digital Controller For synchronous motors

RG 730MSQ

Applications :

The digital controller **RG 730MSQ** was specially designed to control the excitation of large & medium size synchronous motors .
The digital controller **RG 730MSQ** belongs to the **RG 700** series of digital controllers of **ICE** dedicated to the control of synchronous machines

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RG 730MSQ

1. Regulation purposes :

The digital controller **RG 730MSQ** performs 3 regulation functions & acts on the rectifier in order :

- To maintain the If rotor current value on its set point during the starting phase .
- To maintain the power factor value of the motor on its set point whatever are the load conditions .
- To maintain on its set point the value of the reactive power absorbed by the motor .

2. Limitation purposes :

- **Rotor current Limitation :**

  Thanks to this function the **RG 730 MSQ** controller allows the motor to sustains a sudden & short overload , while minimizing the rotor heating .

3. Fonctionnal description :

Basically the **RG 730MSQ** performs the following controls functions :

- **Regulation functions :**
  - Field current regulation.
  - Machine power factor control.
  - Reactive power regulation
  - Manual regulated control of excitation
  - Bumpless transfer from auto mode to manual mode.

- **Limitation function :**
  - Limitation of If rotor.

- **Regulation & limitation functions activation :**

  Regulation & limitations modes are activated by switching on external contacts.

4. Displays :

Regulation & limitation modes selections are displayed by led's illumination on the front face of the **RG 730MSQ**.

- Regulation modes indicating led's have yellow colour.
- Limitation modes, microprocessors alarms, communication port operation indicating LED's have red colour.
- Stabilized regulation condition indicating Led's have green colour.

5. Settings:

- The settings of internal set points, the scalling of the measurements, the selection of the PID parameters are performed through the communication port located on the front face by using the PC Terminal.

6. Measurements :

All measurements are filtered.

- 2 voltages sensings through PT's with 100 V secondary :
    - 1 stator voltage sensing
        - (U 1,2)
    - 1 voltage sensing for thyristors synchronisation.
        - (U 1,2)
- 1 current sensing through CT's with 5 Amps secondary .
    - 1 stator current sensing
        - (I3)
- 1 excitation current sensing through an Hall effect probe.
    - If rotor / I excitation

7. Regulation & limitation functions activation :

Regulation & limitation modes are activated by switching on external contacts galvanically isolated by the means of optic couplers.

8. Description :

The digital controller **RG 730MSQ** uses 1 microprocessor 16 bits type 80C196KB- 12 MHZ.

This microprocessor is in charge of:

- Communication management : serial ports 1 & 2
- Binary data input & output management.
- Regulations & limitations functions as well as the control of the triggers

The **RG 730MSQ** hardware is made of 3 PCB's fitted in a 9,5 '' wide rack 3 units high suitable for flush mounting.

9. SAFETY :

The microprocessor has a watchdog equipped with an alarm signalling contact hardwired on terminal.

All parameters used by the regulation are safeguarded in SRAM Memory safeguarded by 3V lithium battery having a 1year autonomy duration when out of supply.

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10. Communication :

The **RG 730MSQ controller** is basically devoted to control & communication.

Communication function uses 2 serial dedicated ports

- Port n° 1 is dedicated to the man/machine dialogue needed by comissionning operation. **RG 730MSQ PRO V2.0 :**

- Port n° 2 is dedicated to communication with supervisory system.

- Port n°1 characteristics :

  Link type : RS 232
  Speed : 9600 Bauds
  Protocol : private TECHNIREL ICE property
  Plug in connexion: on the front panel . DB9 plug in type
  Terminal suitable: PC / Windows XP .

  RG 730MSQ PRO V2.0 Software facilities :
  - Measurements display
  - Set points& PID parameters generation or modification.
  - Alarms & Signals Display
  - Set points & parameters are protected by passwords
  - Capabilty diagram situation display

- Port n°2 characteristics :

  Link type :
  - RS 232
  - Current loop 0-20 mA

  Speed : 300 to 19200 Bauds

  Protocol : Modbus / Jbus slave

  connexion: on rear terminal (screw connexion)

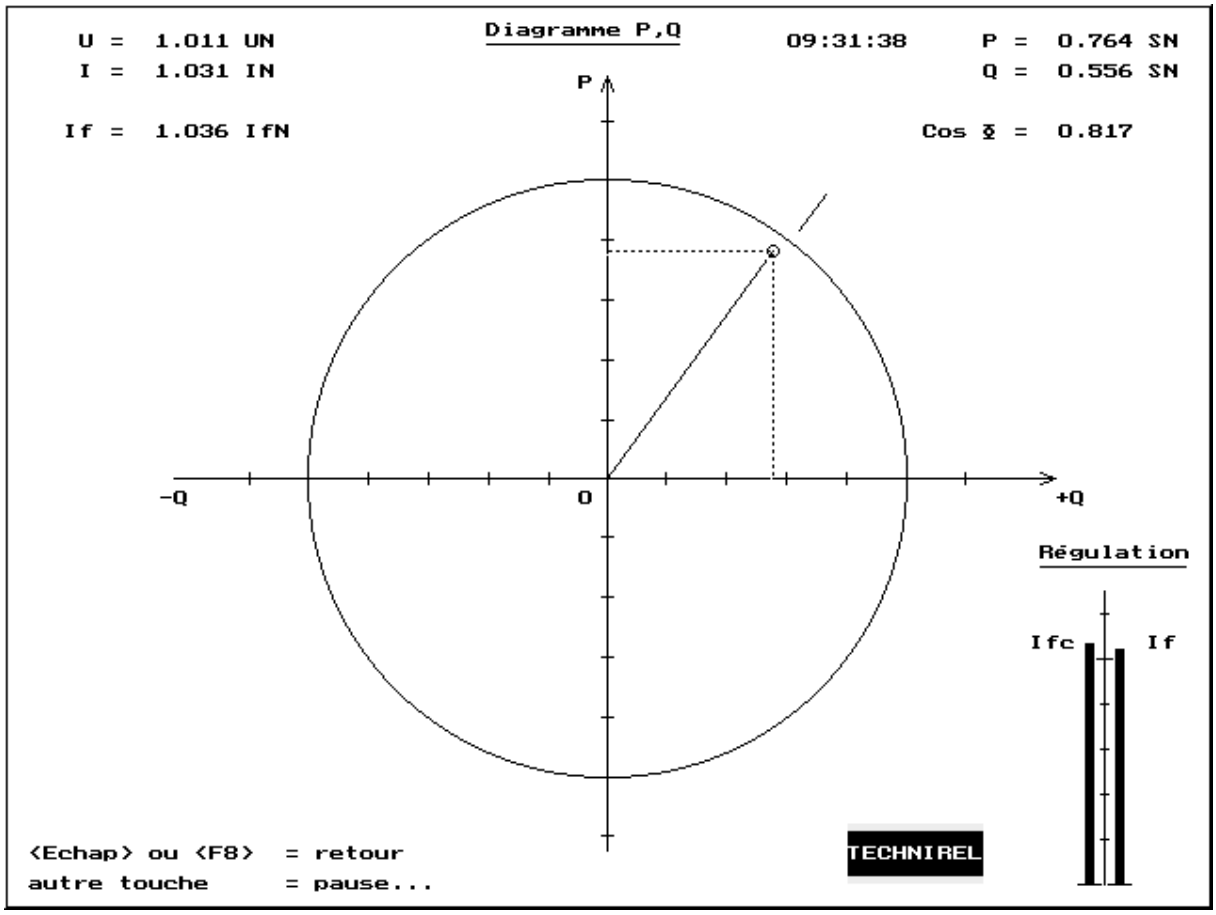
11. IHM RG 730MSQ PRO V2.0 :

- Software functions :
  - Display of measurements , set point & parameters adjustments.
  - Real time motor diagram capability display .
  - Set points & parameters protected by pass word .
  - Status & alarms display .

VIEW 1 : Diplays of measurements , set points, & PID gains

```
        MISE EN SERVICE     1 -        - 1      REGULATION If CORRECTE 09:17:43
      MANU DECLENCHEURS +---+ -        -  +---+ REGULATION U/COS CORRECTE
    REGULATION If ROTOR ¦Cos¦ -        -  ¦Cos¦ ANOMALIE
       CONSIGNE INTERNE ¦ Φc¦ -        -  ¦ Φ ¦ TERMINAL
                 MANUEL +---+ -        -  +---+
                  MONTE   0,9 -        - 0,9
                 BAISSE       -        -
           EN LIMITATION      -        -
-------------------------+     -        -     +---------------------------------
 Cos Φo auto =       1 AV¦     -        -     ¦U    =  5512 V  ¦Φc   =  36.9 °
 RampCosΦauto=      10°/s¦ 0,8 -     ---- 0,8 ¦I    = 121.0 A  ¦Φ    =  36.9 °
 RampCosΦmanu=      10°/s¦     ----  ----     ¦                 ¦
 ------------=       0---¦     ----  ----     ¦P    = 0.802 SN ¦Cos Φ= 0.800
 Ifo interne =     103 A ¦     -¦¦¦  ¦¦¦-     ¦Q    = 0.600 SN ¦Sin Φ= 0.600
 Ifc Min     =     6.1 A ¦     -¦¦¦  ¦¦¦-     ¦                 ¦
 Rampe If INT=      10%/s¦ 0,7 -¦¦¦  ¦¦¦- 0,7 ¦Uf   = 101.0 V  ¦
 ------------=       0---¦     -¦¦¦  ¦¦¦-     ¦If   = 108.2 A  ¦Ifmax= 108.3 A
 Ifmax H     =     150 A ¦     ----  ----     ¦α    =   0.0 °  ¦Fsyn =  50.1 Hz
 RampeIfmax H=      10%/s¦     -¦¦¦  ¦¦¦-     ¦Psi  =  90.0 °  ¦Falt =  50.1 Hz
-------------------------+     -¦¦¦  ¦¦¦-     +---------------------------------
¦Valeur Min         -1 AV¦ 0,6 -¦¦¦  ¦¦¦- 0,6                          ________
¦Valeur Max          1 AV¦     -¦¦¦  ¦¦¦-      COM1  9600    RGxxx    TECHNIREL
+------------------------+     -¦¦¦  ¦¦¦-
Consigne de régulation de Cos Φ, sans dimension, ex.= 0.8 pour un Cos Φ de 0.8
F1=Aide F2=Sauve F3=Envoy F4=Recev F5=EnvTs F6=RcvTs   F8=PQ F9=Scruter F10=Quit
```

VIEW 2 : Machine capability diagram



12. ELECTRICAL CHARACTERISTICS :

- Auxiliary supply :
  - Galvanically insulated.
  - 24 Vdc
  - Power consumption : 10 W maxi.

- Measurement input characteristics :

  - Current input : 5 A – 50 / 60 Hz
    - Consumption per input : 10 VA
    - Insulated.
  - Voltage input : 100 – 50 / 60 Hz
    - Consumption per input : 10 VA
    - Isulated .

- Contacts input characteristiscs :
  - Dry contacts free of voltage,galvanically isolated.

- Contacts output characteristics:
  - Dry contacts free of voltage.
  - Breaking rate dc currents :
    - 30 V / 8 A – 100 V / 0,5 A – 300 V / 0,3 A .
  - Breaking rate ac currents :
    - 2000 VA / 220 V.

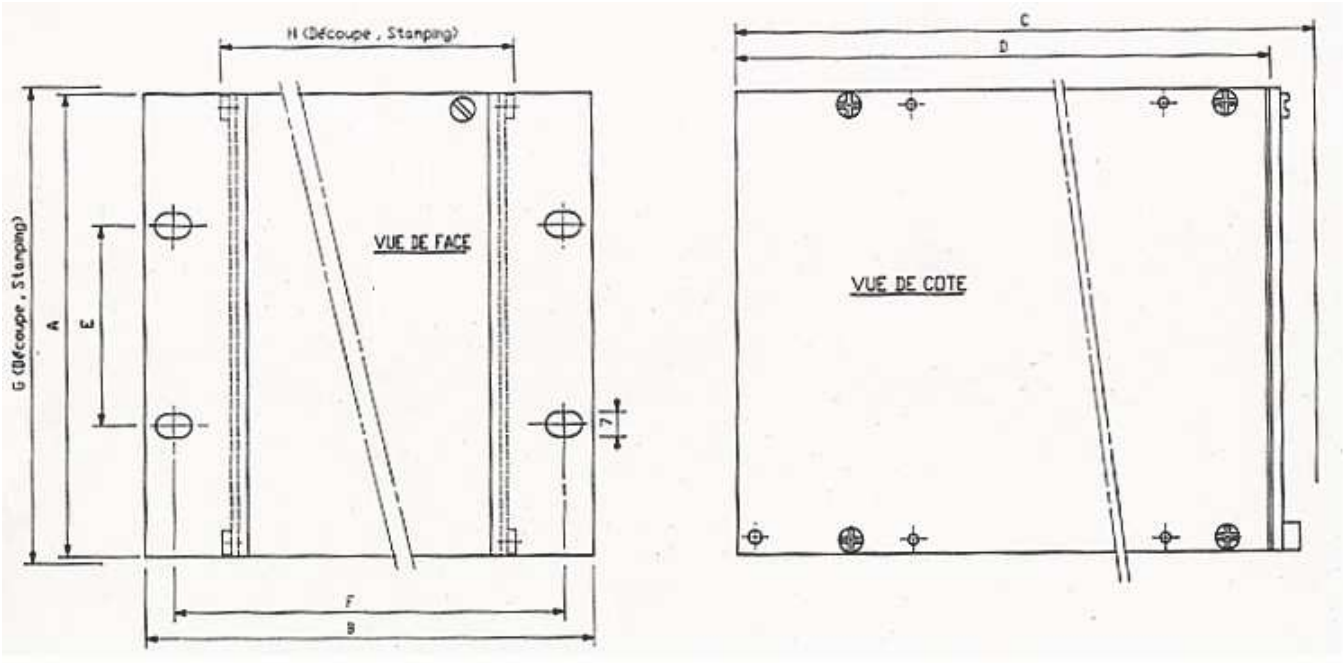
- Performances :
  - Regulation accuracy : + ou – 1 % .

- Environmental conditions :
  - Operating temperature : 0° C to + 50° C .
  - Storage temperature : - 20° C à + 70° C.
  - Relative humidity : 0 à 92 % non condensing .

13. MECHANICAL CHARACTERISTICS

- **Flush mounting housing :**

	Size(mm)
A	132,5
B	208,5
C	255,0
D	225,5
E	57,1
F	191,5
G	133,0
H	169,0



- Weigth : 3,5 Kg
- Raccordement : Screws terminal 51 positions