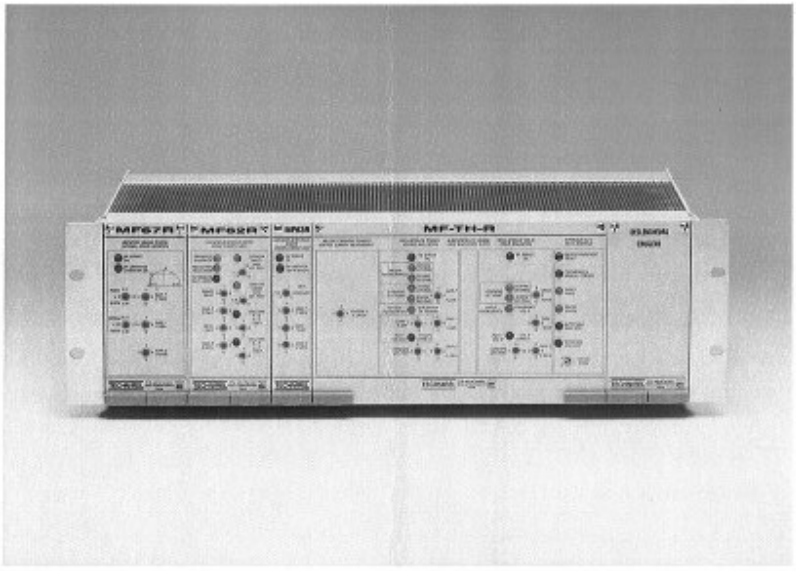
ANALOGUE REGULATOR SYSTEM

RG 600

Main AVR module : MF-TH-R or 3F

Secondary modules : MF61 - MF62 - MF63 - MF64 - MF65 - MF67



The ultimate in Electrical regulation systems

TECHNIREL

CONTENTS

INTRODUCTION

A power station, comprising one or more generators operating in parallel with an electric power utility supply system, or running as a separate system can only reach optimal performance by using a fast, accurate and continuous acting regulation and field supply control system ensuring stable voltage set point and (or) reactive load sharing between generators or (and) between the generators and the network.

RG600 regulation system meet the operating criteria defined above by adapting to the different types of excitation used with generators :

- ☐Direct excitation to the generator field winding
- ☐Indirect excitation via the field winding of a dc exciter
- ☐Indirect excitation via a rotating diode exciter

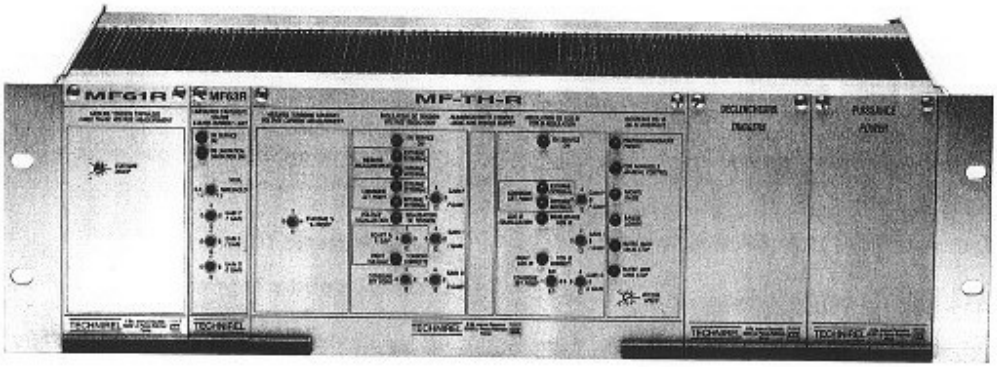
Using its exceptional experience (several thousands regulators for synchronous machine excitation sold over a period of more than 50 years), TECHNIREL has developed and perfected the RG600 regulation system paying particular attention to :

- ☐the compact design of the equipment (19"rack)
- ☐the modularity of its functions (to accommodate the variety of applications)
- ☐Operational displays and ease of set point to assist commissioning.

DESCRIPTION

An RG600 system is made up of 5 main parts as follows :

- ☐The MF-TH-R modular analogue regulator comprising at least one main regulator (together with 1 or more complementary regulators if necessary)
- ☐The trigger module
- ☐The single-phase or three-phase rectifier bridge mixed or complete in module or plate construction
- ☐A 3U high 19" rack or case for mounting in the cubicle, containing the regulator, trigger module and possibly rectifier bridge module
- ☐The step down transformer



MAIN REGULATOR MF-TH-R

The MF-TH-R together with its secondary modules, provides all regulation supervision and limitation functions necessary for generator excitation.

The MF-TH-R module comes in 2 models (2 or 3F) providing 1 or 2 regulation modes

→ Stator voltage regulation mode (base regulation) where the error signal comes from the comparison between the value of a voltage reference and that of the controlled generator voltage.

→Power factor regulation mode (available only in the 3F model of the MF-TH-R) where the error signal comes from the comparison between the power factor reference value and that of the controlled generator power factor.

<u>These two regulation modes supervise :</u>

→the operation of a single generator with a constant voltage.

→the stable operation of several generators in parallel with natural reactive power sharing (voltage droop)

→the stable operation of a power station connected to a substantial network (of which the power is at least 5 times greater than that of the generator to be controlled)
This is achieved following several successive regulation sequences
**A voltage maching sequence (before coupling) and generator power factor regulation sequence (after coupling)
**Synchronisation sequences, phase alignment and coupling are carried out by RG400 series regulators.

STATOR VOLTAGE REGULATION MODE

The MF-TH-R main regulator acts upon generator excitation following a **P**roportional, **I**ntegral and **D**ifferential (PID) regulation principle. This type of control allows permanent, rapid and precise regulation of the generator stator voltage.

The MF-TH-R acts upon the generator excitation in three modes of operation

→Internal voltage set point

*Single generator : in this configuration, this function provides the generator voltage set point from an internal voltage reference adjusted using a thumbwheel switch on the front plate.

*Generators in parallel : in this configuration in order to obtain full-load stable operation of the generators operating in parallel on the same busbar, the internal voltage set point is automatically corrected by a coefficient function dependent upon the reactive power exported and the droop slope, set using a thumbwheel switch on the front plate ($V = KI \sin \varphi$)

→Voltage matching

The MF-TH-R provides rapid and continuous generator stator voltage matching prior to connection to a busbar. In this case, the voltage regulation set point comes from the busbar voltage and the level of the no load generator voltage is matched by variation of the machine excitation. Voltage matching is achieved when the difference between voltage levels is less than the difference set on the thumbwheel switch on the front plate.

→**External error signal :**

In this mode of operation, the power factor regulation error signal of the MF-TH-R is supplied by the external complementary module MF-65-R providing either voltage matching between the generators busbar voltage and the network voltage, or busbar voltage regulation of an isolated power station according to a voltage set point reference (without droop).

The voltage regulation operating modes, and its permanent state (correct voltage) are displayed by LEDs on the MF-TH-R front plate.

Voltage regulation operating modes are controlled via external contacts to the MF-TH-R or by their logical combination.

MACHINE POWER FACTOR REGULATION MODE

This regulation mode is only available with the MF-TH-R main regulation module, 3F model. This module comes into action once connection to the network has been achieved and in such a way as to allow the rapid and precise permanent adjustment of the generator power factor. In this mode the MF-TH-R 3F regulator controls the generator excitation by continuous **P**roportional, **I**ntegral and **D**ifferential (PID) action.

The MF-TH-R 3F acts upon excitation in 3 operating modes :

→Internal power factor reference set point (local) :

In this operating mode, a fixed power factor value is assigned to the generator. The reference set point is adjusted by a thumbwheel switch on the frontplate.

→External power factor reference set point (remote) :

In this operating mode, a fixed power factor value is assigned to the generator by a potentiometer external to the MF-TH-R 3F

This operating mode allows for either the application of the reference set point to another regulation loop or to any parameter, or the remote control of the fixed machine power factor reference set point.

→External error signal :

In this operating mode, the power factor regulation error signal is supplied to the MF-TH-R 3F from an external secondary module MF-65-R, which providing control of the reactive power interchanges with a power utility.

→Reactive power sharing :

The MF-TH-R 2 or 3 F allows for the natural sharing of the overall reactive power supplied by a group of generators operating in parallel on the same busbar thanks to the front plate adjustment of the voltage droop characteristic.

The power factor regulation operating mode and its permanent state (correct power factor) are displayed by LEDs on the MF-TH-R 3F front plate.

Operating modes of power factor are controlled by contacts external to the MF-TH-R or by their logical combination.

CHANGEOVER FEATURE

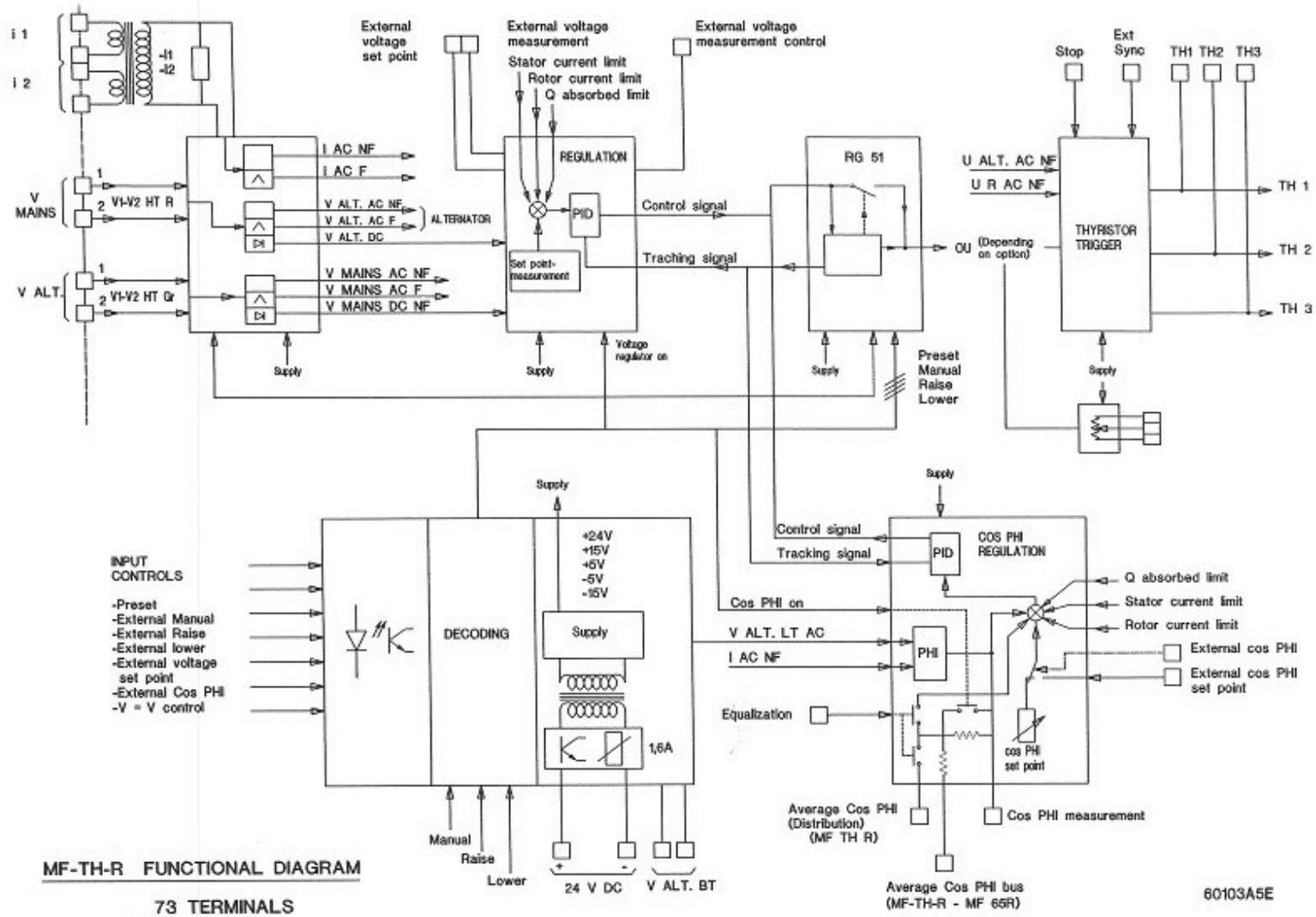
MF-TH-R regulators are equipped with a changeover feature ensuring that the transfer between the different regulation operating modes is smooth.

PRESET

In preset mode, the generator excitation may be fixed at a predetermined value.
The preset value is set using the "PRESET" thumbwheel switches behind the MF-TH-R front plate. Its use is displayed by an LED.

MANUAL CONTROL

The MF-TH-R regulator can control the generator excitation in the presence of a manual order, "MANU", followed by "UP" or "DOWN" orders given by external contacts.
In this case, all regulation is inhibited.
The rate of change of the set point is adjusted a potentiometer on the front plate.
The control orders are displayed by LEDs.



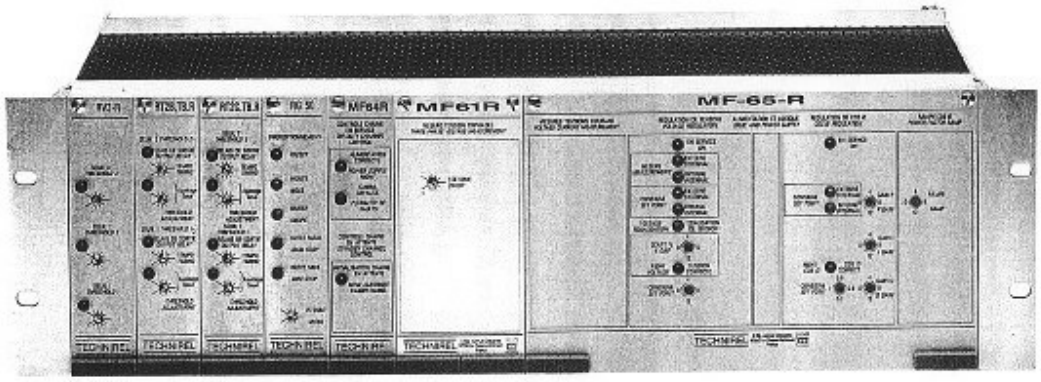
MF-TH-R FUNCTIONAL DIAGRAM

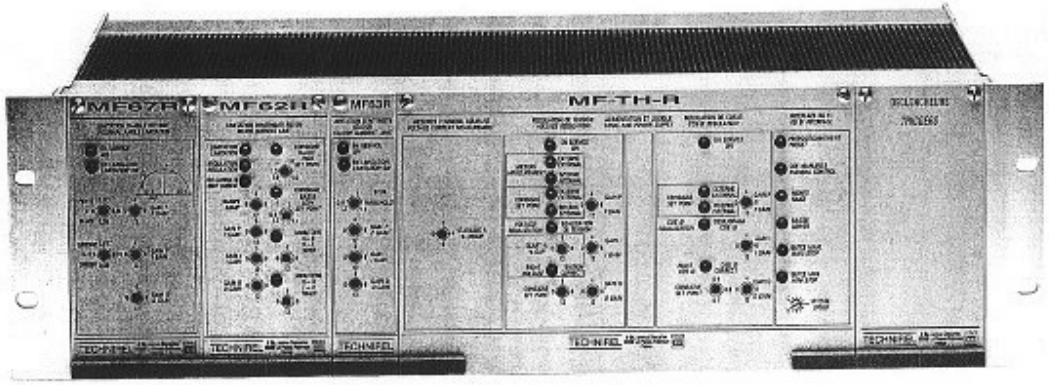
73 TERMINALS

MF-TH-R
MAINS HT 100 V
PH1 PH2
ALTERNATOR HT 100 V
PH1 PH2 S2 S1
II ALTERNATOR
S1 S2 PH1 PH2
I2 ALTERNATOR
ALTERNATOR LT 100 V
EXTERNAL SET POINT POTENTIOMETER
Mostly
V + V CONTROL
COS PHI CONTROL
EXTERNAL COS PHI SET POINT CONTROL
EXTERNAL VOLTAGE SET POINT CONTROL
V - V RIGHT CONTROL
COS PHI REGULATOR CONTROL SIGNAL OUTPUT
4/0
EXTERNAL RG 51 CONTROL
EXTERNAL REGULATION RETURN
EXTERNAL REGULATION SIGNAL
OUTPUT POTENTIOMETER
AVERAGE COS PHI BUS (MF66R)
COS PHI MEASUREMENT
EXTERNAL COS PHI SET POINT
EXTERNAL COS PHI SET POINT
COS PHI EQUALIZATION CONTROL
ALTERNATOR COS PHI SET INTPUT
ALTERNATOR COS PHI SET POINT OUTPUT
EXTERNAL LOWER CONTROL
EXTERNAL RAISE CONTROL
EXTERNAL MANUAL CONTROL
PRESET CONTROL
UNIT SUPPLY (BATTERY)
EXTERNAL ALTERNATOR VOLTAGE MEASUREMENT CONTROL
EXTERNAL ALTERNATOR VOLTAGE MEASUREMENT
ALTERNATOR VOLTAGE SET POINT OUTPUT
ALTERNATOR VOLTAGE SET POINT INPUT
VOLTAGE REGULATOR CONTROL SIGNAL OUTPUT
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
IND
B
07/07/94
27/01/94
DATE
UP-DATED
Cancels and replaces diagram 22023/A
MODIFICATION
TECHNIREL
MF-TH-R CONNECTIONS
N°22021BE
Drawing by G.Y.
Date: 24/05/93

SECONDARY MODULES

- RG600 regulation modules are override regulation systems designed to work in open loop, which means that,next to the MF-TH-R main regulator one or more secondary modules may be added, in order to clearly define capability area of a generator.

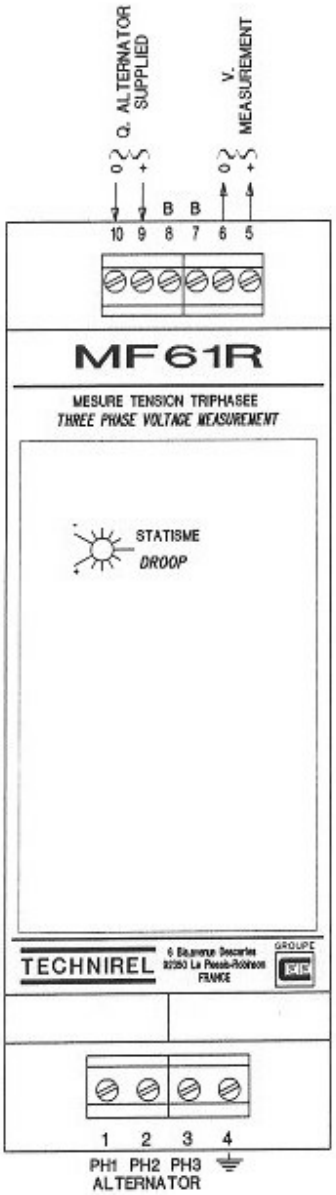




MF-61-R Three phase voltage measurement module

Application

The MF-61-R module measures the three phase to neutral voltages from the generator stator. It transmits a mean voltage output signal, with the facility of adjusting the droop depending on the reactive power Q as set by a thumbwheel switch on the front plate.



IND	DATE	MODIFICATION	

TECHNIREL — TECHNIQUES DE LA REGULATION ELECTRIQUE — GROUPE

MF61R CONNECTIONS
THREE PHASE VOLTAGE MEASUREMENT

N°22041A

Dessine par: H.D.

Date: 03/06/94

6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 00 telex : 631601F

MF-62-R Rotor current limiter module

Application

The MF-62-R module enables the generator to react to an accidental overload reducing rotor overheating as much as possible.

The MF-62-R module acts upon the internal set point of voltage regulation or power factor in response Proportional, Integral and Differential (PID) current regulation principle. The MF-62-R module acts upon the main regulator in 2 operating modes :

→Rotor current regulation

- Internal current set point (Local)

*in this operating mode the rotor current has a fixed value controlled by an internal set point generated by a potentiometer inaccessible from outside.

- External current set point (remote)

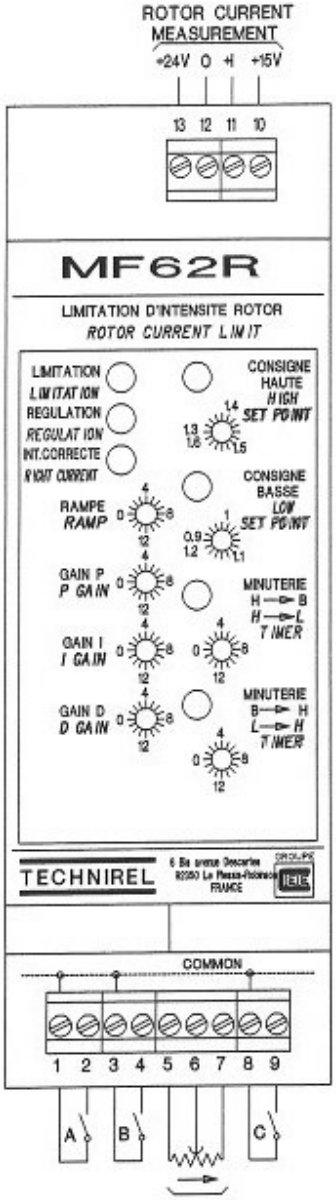
*In this operating mode, a fixed value is assigned to the generator rotor current by a potentiometer external to the MF-62-R.

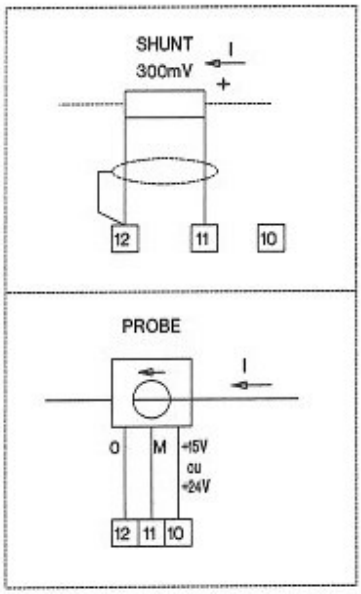
→Rotor current limit

*In this operating mode, a variable value is assigned to the rotor current set point two set point values, high and low are fixed using 2 thumbwheel switches on the front plate. These set points are activated or de-activated for an adjustable time from when the two current thresholds set by internal potentiometers are crossed going up or down. The change from one set point to another is governed by a ramp which is adjustable on the front plate.

The limit and regulation mode, as well as their permanent state, correct current low/high set point, as well as the operation of the timers are dispayed by LEDs the front plate.

The operating modes of the rotor current regulator are selected using contacts external to the MF-62-R or by their logical combination.





A : 0 = OFF
1 = ON

B : 0 = REGULTION
1 = LIMITATION

C : 0 = VARIABLE SET POINT (2 THRESHOLDS)
1 = FIXED SET POINT (INTERNAL : J8 on A)
(EXTERNAL : J8 on B)

EXTERNAL FIXED SET POINT
POTENTIOMETER (J8 on b)

FAV 12061

IND	DATE	MODIFICATION	N°22028A

TECHNIREL
TECHNIQUES DE LA REGULATION ELECTRIQUE
GROUPE

MF 62/R
(ROTOR CURRENT LIMITATION)

Dessine par B.D. | Date: 08/07/93

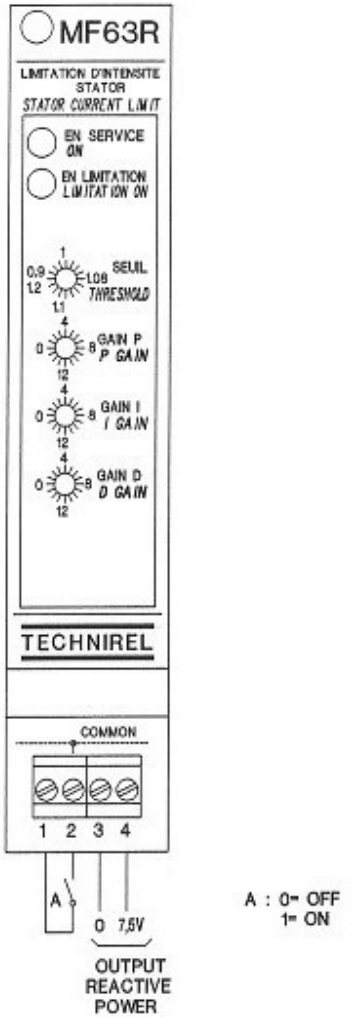
6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F

Module MF-63-R Stator current limitation module

Application

THe MF-63-R protects the generator stator from overloads resulting from reductions or increases in network voltage

The MF-63-R module lets a generator coupled to a network function with stator current limitation. The MF-63-R acts directly upon the internal voltage or power factor regulation set point of the MF-TH-R (follows a Proportional, Integral and Differential (PID) regulation principle)
The limitation threshold upon which regulation is based is adjusted using a thumbwheel switch on the front plate.



FAV 06040

IND	DATE	MODIFICATION	

TECHNIREL
GROUPE
TECHNIQUES DE LA REGULATION ELECTRIQUE

MF 63/R CONNECTION
STATOR CURRENT LIMITATION

N° 22029A

Dessine par B.D. | Date: 08/07/93

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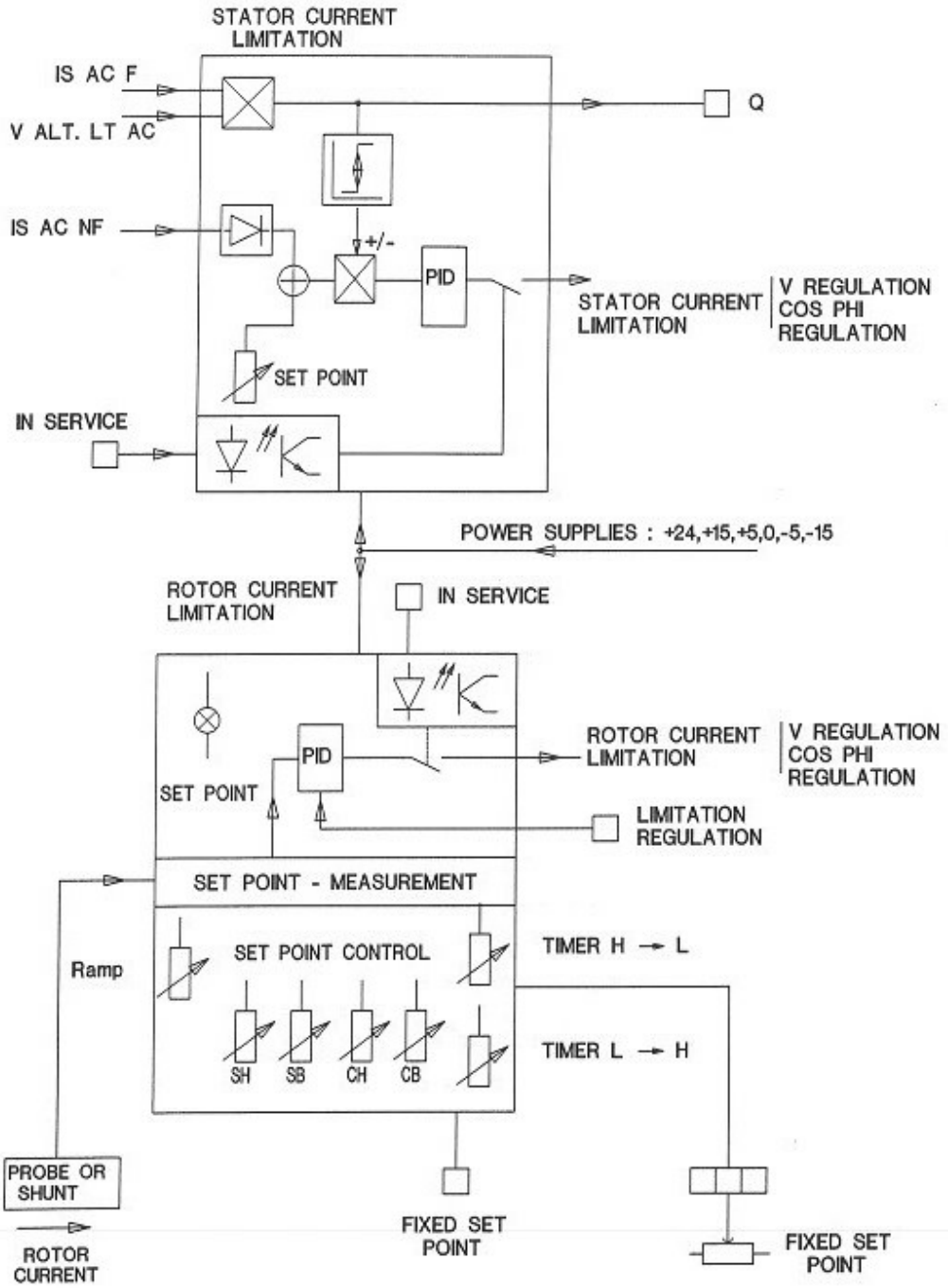


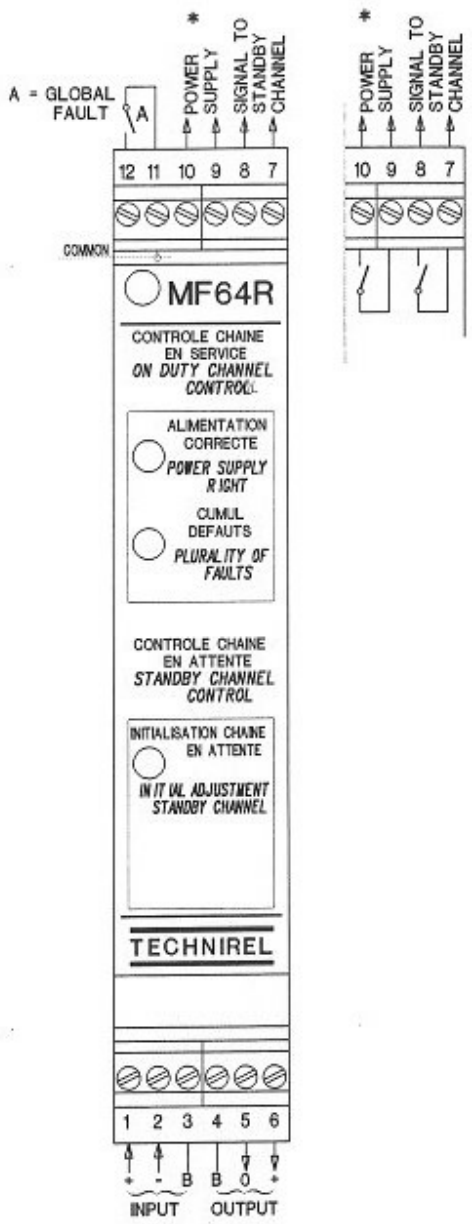
MF-TH-R / MF63R STATOR CURRENT
AND MF62R ROTOR CURRENT LIMITATION CARDS
FUNCTIONAL DIAGRAM

Module MF-64-R Dual channel regulation module

Application

The MF-64-R module increases the operational continuity of supply of generation plant by maintaning redundancy between 2 MF-TH-R modules.

The MF-64-R supervises the MF-TH-R module power supply through normal channels, and constantly copies orders and set points which control its operation upon the MF-TH-R module of the standby channel. It takes accounts of an overall fault input, upon detection of a power supply or external fault, initiates the automatic transfer of the regulation from the normal channel to the standby channel.



IND	DATE	MODIFICATION	N° 22043A

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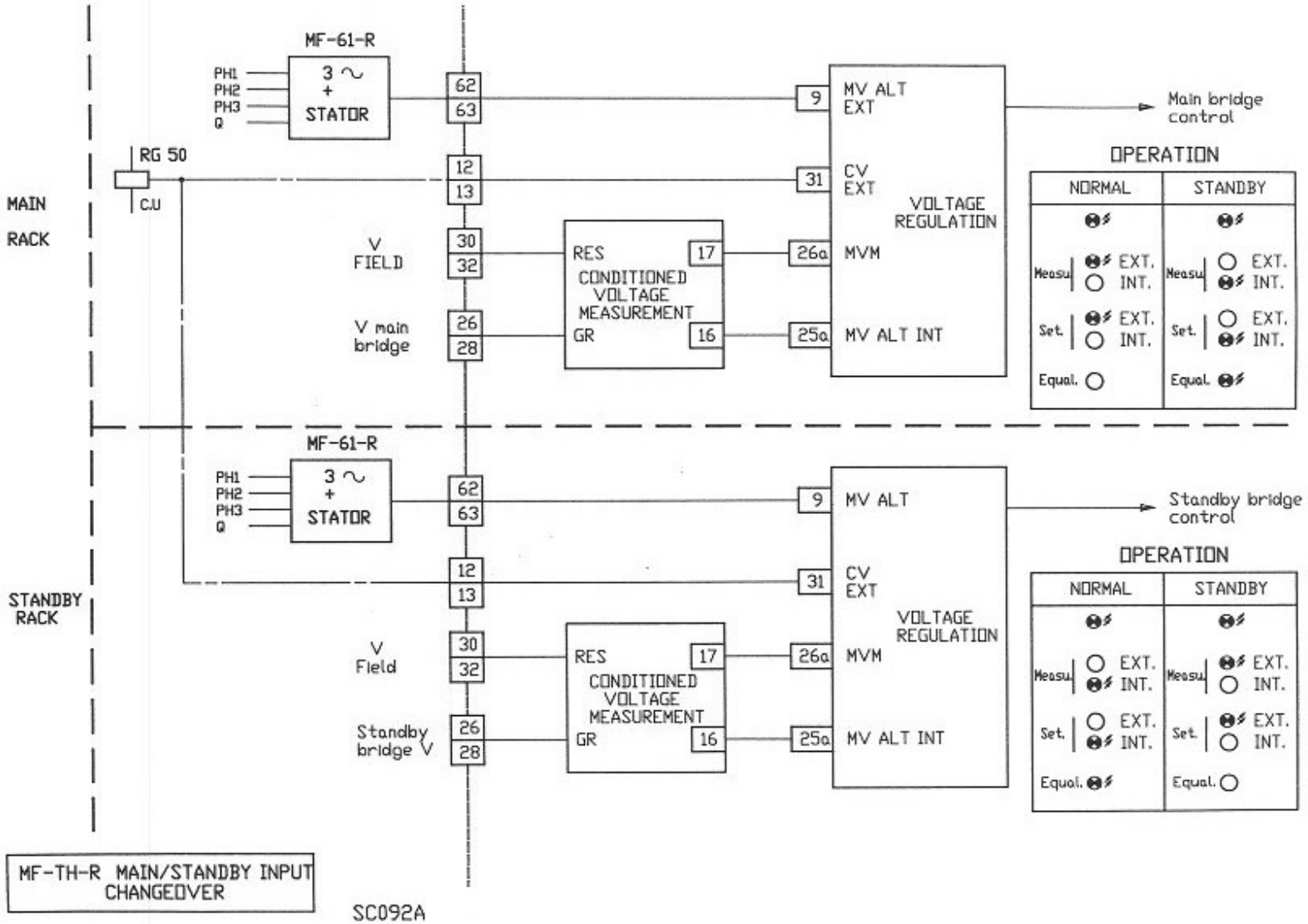
TECHNIQUES DE LA REGULATION ELECTRIQUE

MF64R CONNECTION POWER SUPPLY MONITORING

Dessine par B.D. | Date: 04/06/94

6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F


MF-61-R
PH1
PH2
PH3
Q
3 ~
+
STATOR
62
63
12
13
30
32
26
28
RG 50
CJU
MAIN
RACK
V
FIELD
V main
bridge
RES
CONDITIONED
VOLTAGE
MEASUREMENT
GR
17
16
9
31
26a
25a
MV ALT
EXT
CV
EXT
VOLTAGE
REGULATION
MVM
MV ALT INT
Main bridge
control
OPERATION
NORMAL
STANDBY
Measu.
Set.
Equal.
EXT.
INT.
MF-61-R
PH1
PH2
PH3
Q
3 ~
+
STATOR
62
63
12
13
30
32
26
28
STANDBY
RACK
V
Field
Standby
bridge V
RES
CONDITIONED
VOLTAGE
MEASUREMENT
GR
17
16
9
31
26a
25a
MV ALT
CV
EXT
VOLTAGE
REGULATION
MVM
MV ALT INT
Standby bridge
control
OPERATION
NORMAL
STANDBY
Measu.
Set.
Equal.
EXT.
INT.
MF-TH-R MAIN/STANDBY INPUT
CHANGEOVER
SC092A

- **MF-65-R** **Grid power factorcontrol module**

1. Application

The MF-65-R module provides all of the regulation, supervision and control functions needed when an electrical power station operates in parallel with a power distribution supply system.

To this end, the MF-65-R produces an error signal which it sends to the MF-TH-R voltage or power factor regulation devices installed on the generators in the power station.

This mode of regulation supervises :

*The matching of the busbar voltage with the network voltage at the same time as power factor sharing between the generators.

*Stand alone operation with busbar voltage regulation and power factor sharing between the generators.

*Operation at a fixed power factor value for the overall comprising several generators permanently connected to a utility network, whatever the load condition (inductive or capacitive) and the direction of reactive energy exchange (import or export to the network).

2. Voltage regulation

The MF-65-R module produces an error signal which it sends to the PID voltage regulator in the MF-TH-Rs.
The error signal is produced by comparing the value of a control voltage to that from the power station busbar.
The MF-65-R acts upon the voltage regulation of the MF-TH-R in 2 operating modes :

***Voltage matching**

The MF-65-R compares the electric power utility voltage to that form the power station busbar. The MF-TH-R provides rapid and continuous equalisation of the generators with the network due to its simultaneous control of the generators excitation.

*Voltage reference set point

In this mode, the power station is isolated from the electric power utility. The MF-65-R compares the voltage reference set point adjusted by the "set point control" thumbwheel switch on the MF-65-R front plate to that of the voltage from the power station busbar.

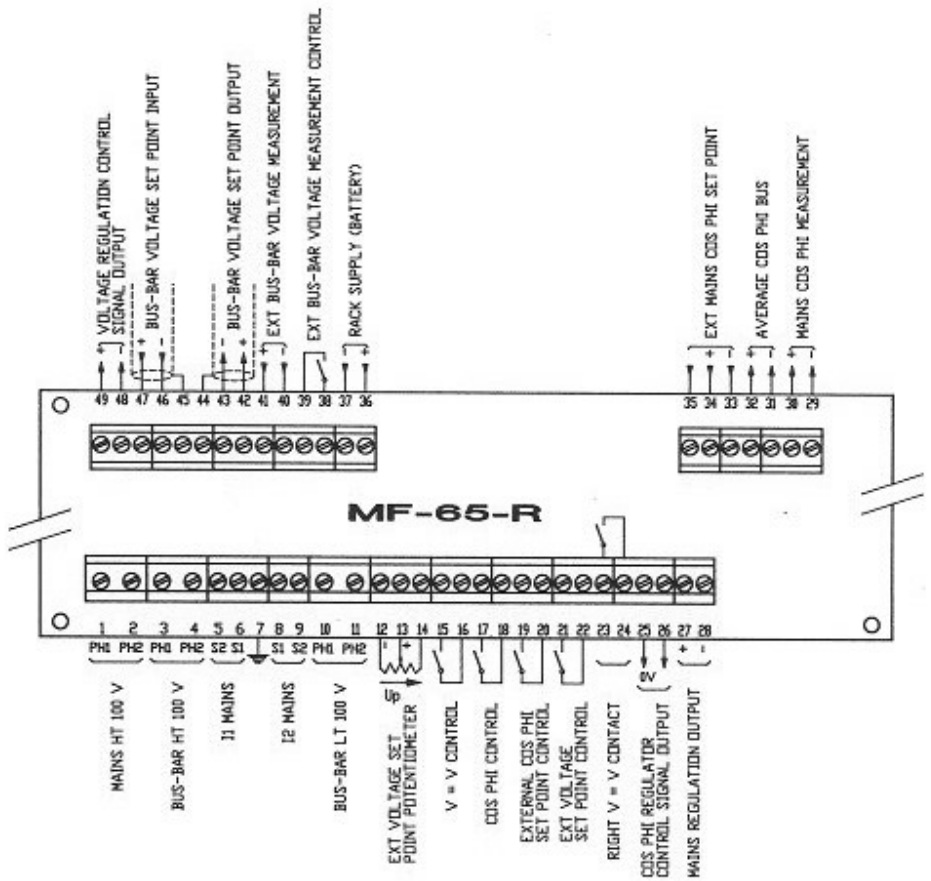
The MF-TH-Rs adjust the voltages of the generators to the reference value whilst maintaining power factor sharing between them.
The set point adjustment of the voltage and power factor gaps are made by thumbwheel switches.
The operating modes, the errors with respect to equalisation and correct equalisation are displayed by LEDs on the MF-65-R front plate.

The operating modes of the voltage regulator are selected via contacts connected to MF-65-R or by their logical combination.

3. Network power factor regulation

The MF-65-R produces an error signal which it sends to the power factor regulation in the MF-TH-Rs.

The MF-65-R acts upon MF-TH-R regulation in order to maintain the network power factor at the reference value. Depending on their application, the generators either import or export reactive power.



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TECHNIQUES DE LA REGULATION ELECTRIQUE
GROUPE

MF-65-R CONNECTION

N°22027/B

Dessiné par G.Y./J.P. | Date: 16/06/95

6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tél. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F

- **MF-67 Reactive power absorbtion limitation module**

Application

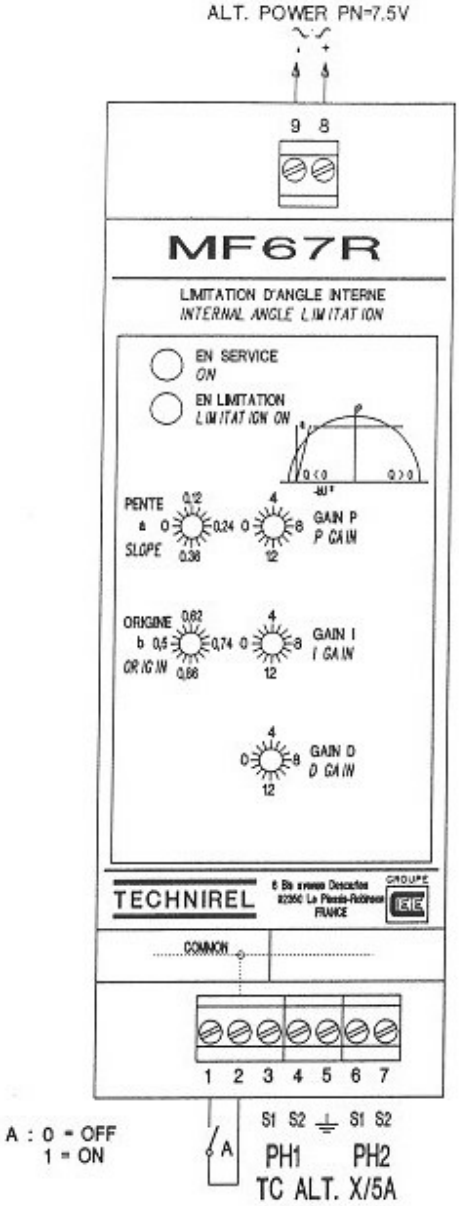
The MF-67 module allows a generator connected to a network to import reactive power, within acceptable limits for the machine.

The MF-67 module acts directly upon the voltage or power factor regulation internal set point of the MF-TH-R according to the **P**roportional, **I**ntegral and **D**ifferantial (PID) regulation principle expressed as $0 \geq A|P|-BU^2$, where the PQ diagram is the image and where :

Q = Reactive power	KVAR
P = Real power	kW
V = Voltage	Volt

A&B = machine stability coefficient set by 2 thumbwheel switches on the front plate.

Reactive power, Q, is measured by the MF-61-R module which always operates with the MF-67-R



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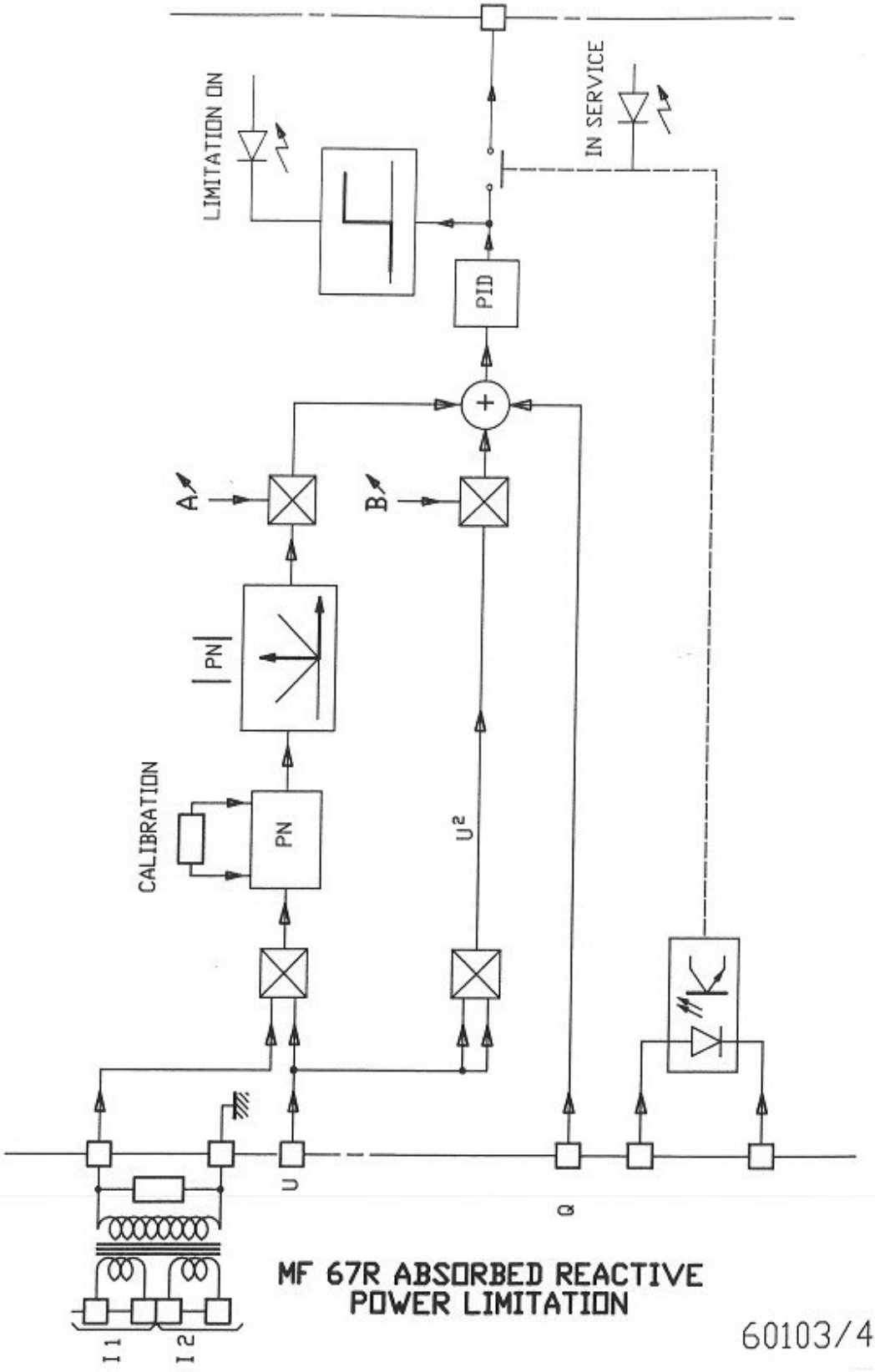
MF67R CONNECTION INTERNAL PHASE LIMITATION

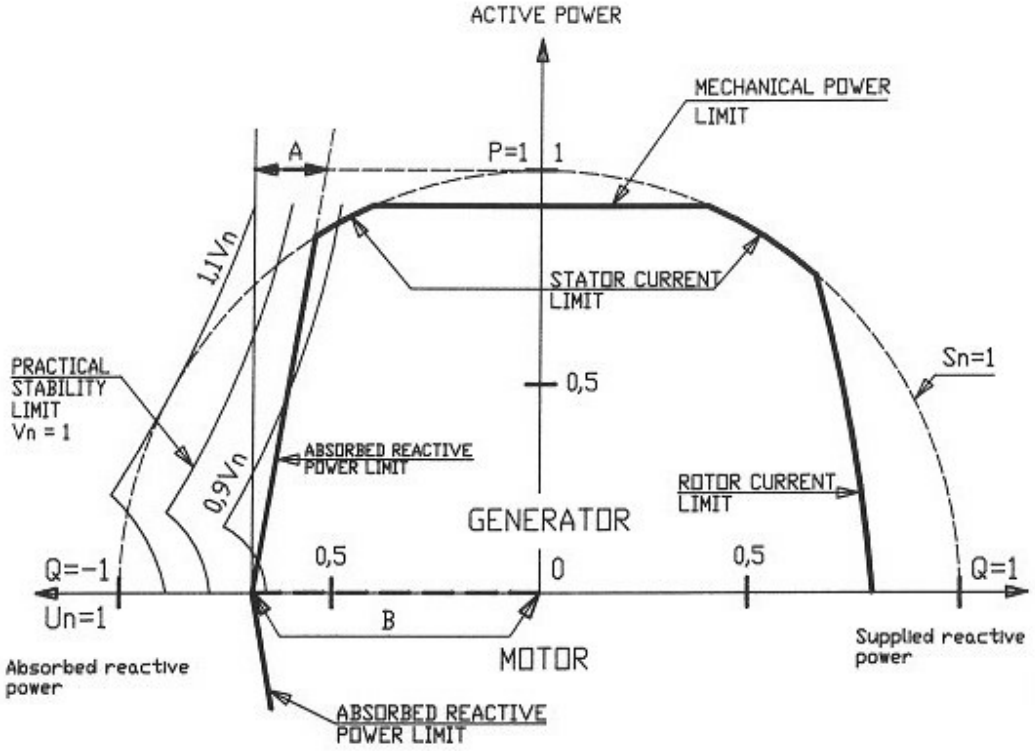
Dessine par B.D. | Date: 04/06/94

6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F



MF 67R ABSORBED REACTIVE POWER LIMITATION

60103/4



$$\frac{Q}{Sn} = A\frac{|P|}{Sn} + B\left[\frac{V}{Vn}\right]^2$$

ALTERNATOR P-Q DIAGRAM

P : (active power)
Q : (réactive power)

SC088A

TRIGGER MODULE

Functions :

The trigger module measures the voltage between the generator phases 1 and 2. When it exceeds a fixed threshold value adjustable between 60 and 70% of rated voltage, the trigger module switches the rectifier bridge supply from the field flashing source to the step down transformer source.

The trigger module generates trigger pulsations which modify the thyristors conduction angle and thus adjusts the voltage value produced by the rectifier bridge.

The standard trigger module can control a single or mixed three-phase rectifier bridge. A special version can control complete three-phase rectifier bridge.

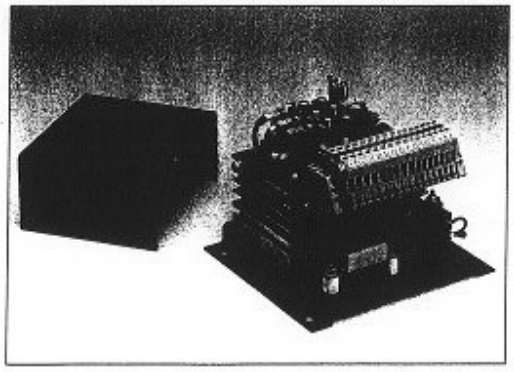
RECTIFIER BRIDGE UNIT

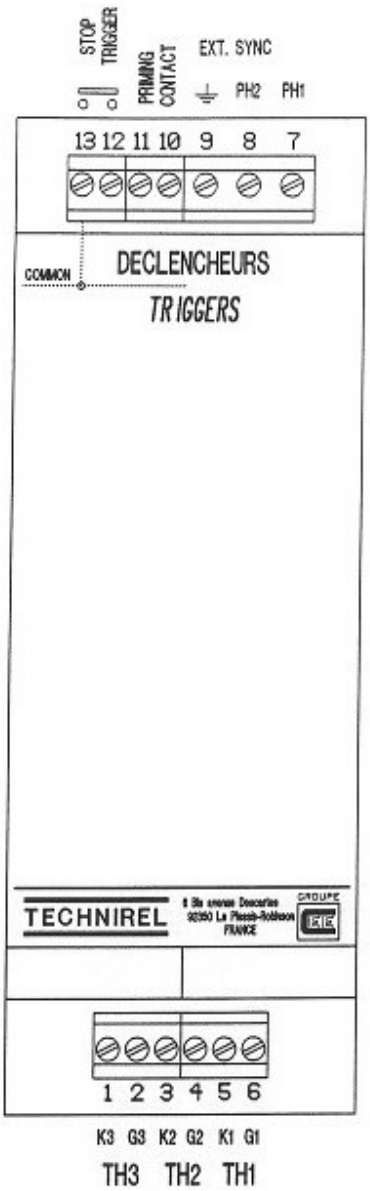
Functions

Controlled by the trigger module, the rectifier unit generates the Dc supply needed by machine excitation from the voltage supply taken from the terminals of step down transformer.

The rectifier bridge rating is normally matched to that of the excitation characteristics of the machine. In certain cases, for an excitation power of no more than 100V 16A single phase, it can be mounted in the regulation rack as a rectifier module.

TECHNIREL offers different types of rectifier bridge, covering the most important applications, single or three-phase, mixed to complete three-phase rectifier (all thyristors).





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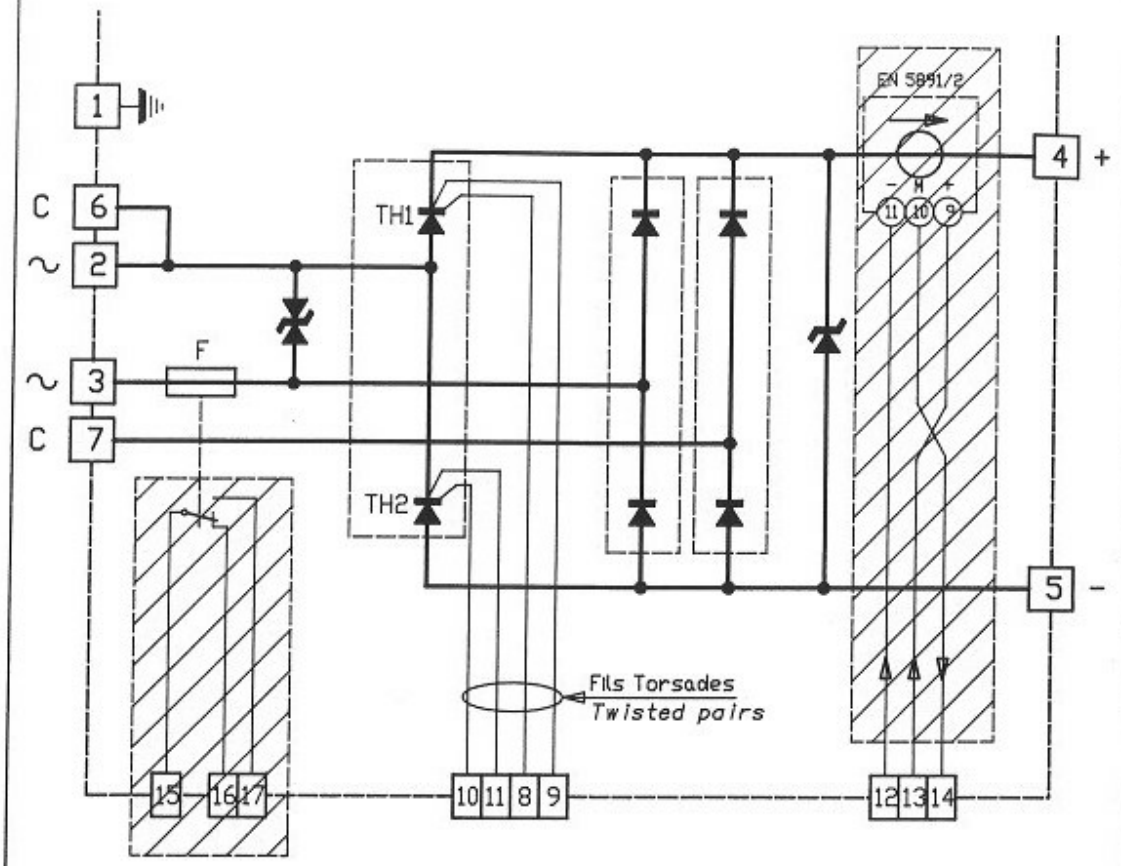
GROUPE

MF-TH-R THYRISTOR TRIGGER CONNECTION

N° 22040A

Dessine par B.D. | Date: 02/06/94

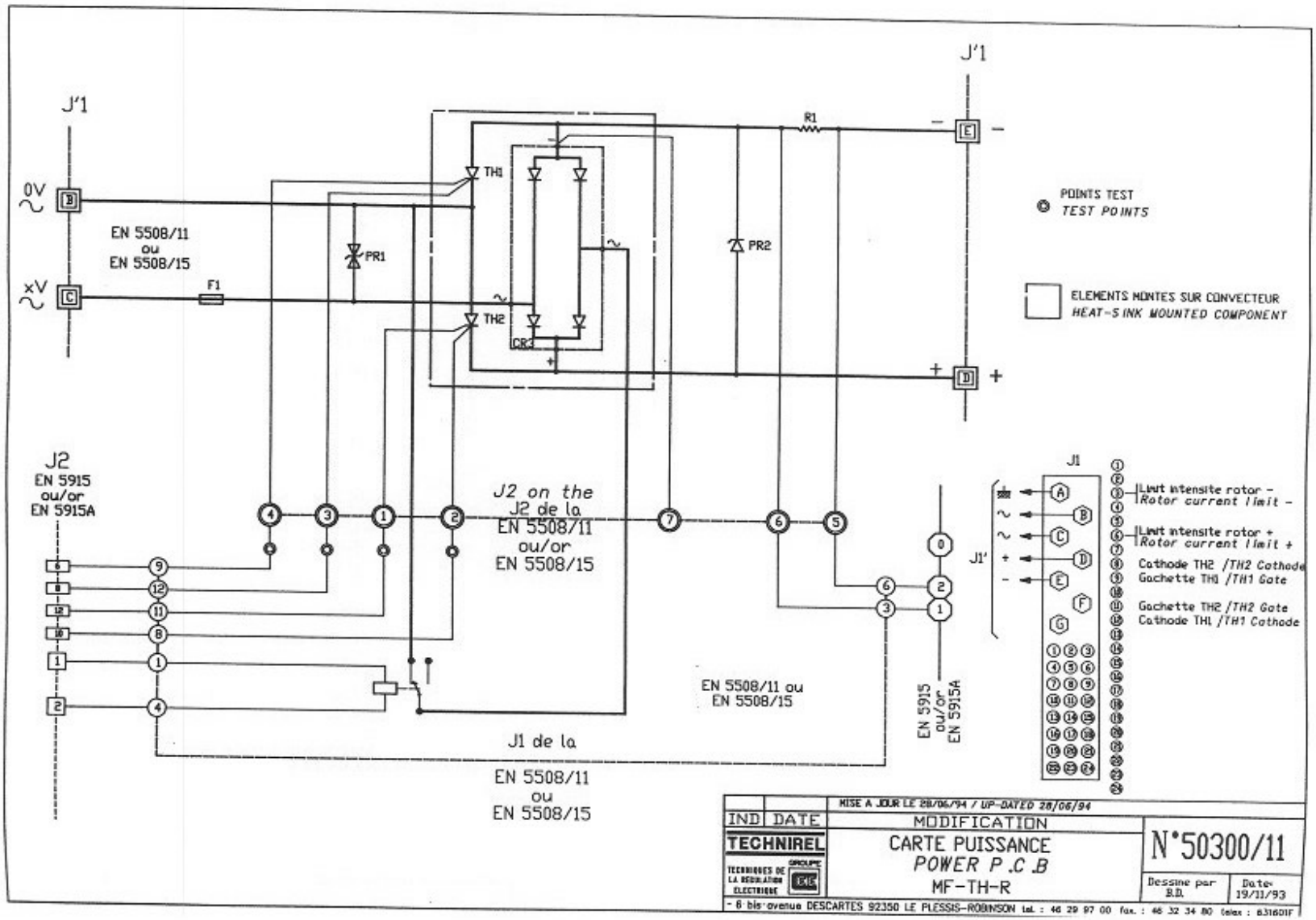
6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F

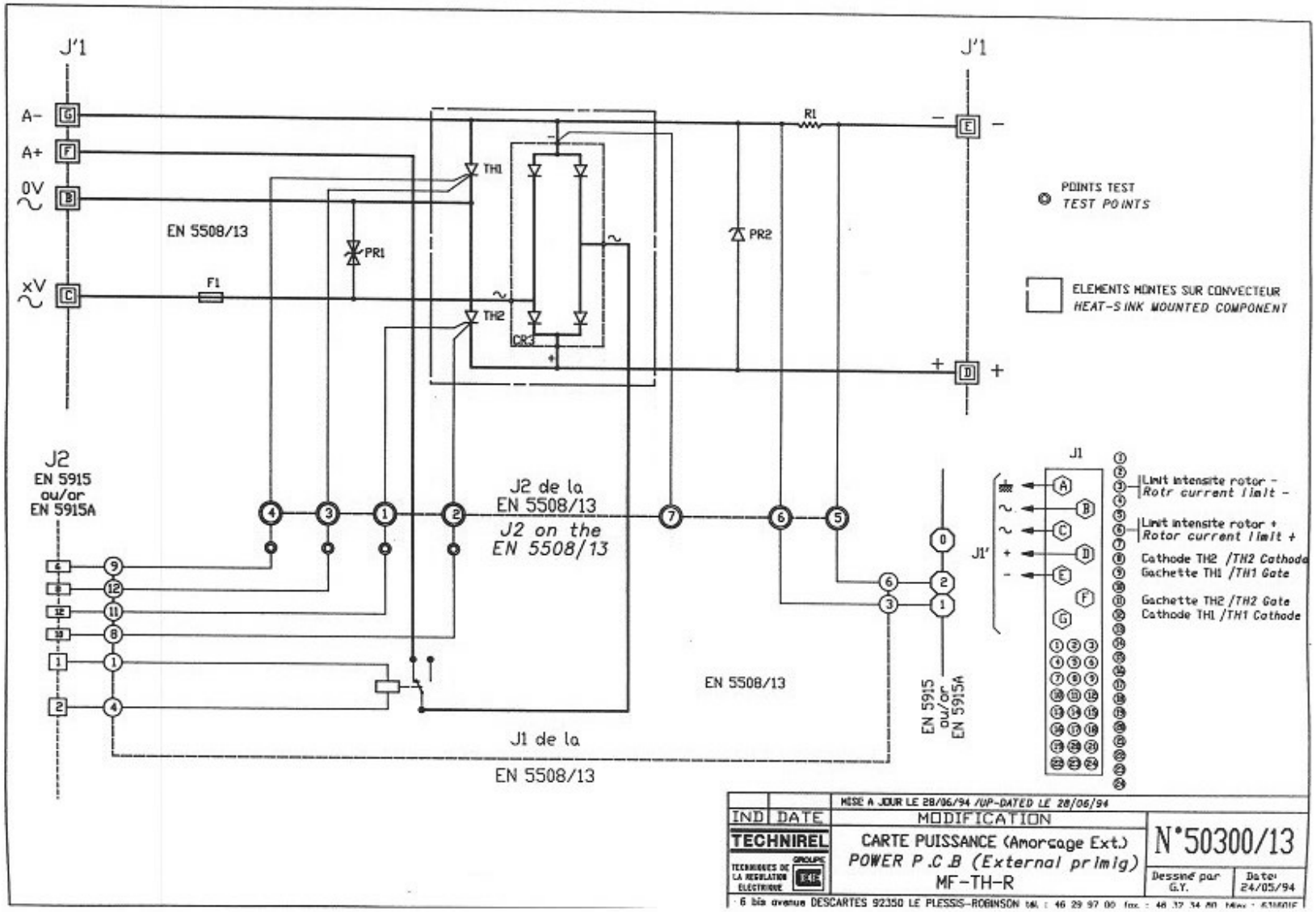


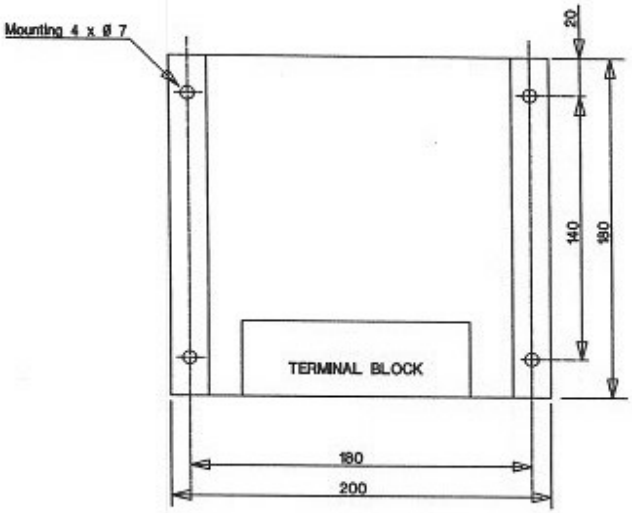
Suivant Option
Depending on option

	06/10/93	MISE A JOUR / *UP-DATED*	
IND	DATE	MODIFICATION	
TECHNIREL GROUPE TECHNIQUES DE LA REGULATION ELECTRIQUE		REDRESSEUR 2 STANDARD *STANDARD 2 RECTIFIER*	N°40477
			Dessine par G.Y. / Date 18/05/93

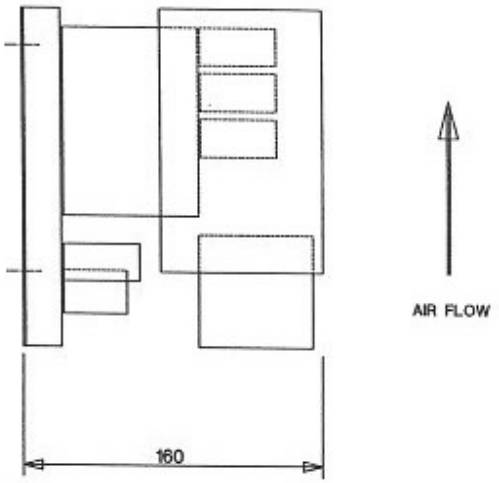
6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F


J'1
J'1
0V
xV
B
C
EN 5508/11
ou
EN 5508/15
F1
PR1
TH1
TH2
CR3
R1
PR2
E
D
POINTS TEST
TEST POINTS
ELEMENTS MONTES SUR CONVECTEUR
HEAT-SINK MOUNTED COMPONENT
J2
EN 5915
ou/or
EN 5915A
J2 on the
J2 de la
EN 5508/11
ou/or
EN 5508/15
J1
J1'
Limit intensite rotor -
Rotor current limit -
Limit intensite rotor +
Rotor current limit +
Cathode TH2 /TH2 Cathode
Gachette TH1 /TH1 Gate
Gachette TH2 /TH2 Gate
Cathode TH1 /TH1 Cathode
EN 5508/11 ou
EN 5508/15
EN 5915
ou/or
EN 5915A
J1 de la
EN 5508/11
ou
EN 5508/15
MISE A JOUR LE 28/06/94 / UP-DATED 28/06/94
IND DATE
MODIFICATION
TECHNIREL
CARTE PUISSANCE
POWER P.C.B
MF-TH-R
N°50300/11
Dessine par
B.D.
Date
19/11/93
6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F


J'1
A-
A+
0V
xV
EN 5508/13
F1
PR1
TH1
TH2
CR1
R1
PR2
J'1
POINTS TEST
TEST POINTS
ELEMENTS MONTES SUR CONVECTEUR
HEAT-SINK MOUNTED COMPONENT
J2
EN 5915
ou/or
EN 5915A
J2 de la
EN 5508/13
J2 on the
EN 5508/13
EN 5508/13
J1 de la
EN 5508/13
EN 5915
ou/or
EN 5915A
J1
J1'
Limit intensite rotor -
Rotr current limit -
Limit intensite rotor +
Rotor current limit +
Cathode TH2 /TH2 Cathode
Gachette TH1 /TH1 Gate
Gachette TH2 /TH2 Gate
Cathode TH1 /TH1 Cathode
MISE A JOUR LE 28/06/94 /UP-DATED LE 28/06/94
IND
DATE
MODIFICATION
TECHNIREL
TECHNIQUES DE LA REGULATION ELECTRIQUE
GROUPE
CARTE PUISSANCE (Amorcage Ext.)
POWER P.C.B (External primig)
MF-TH-R
N°50300/13
Dessiné par
G.Y.
Date
24/05/94
6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON



FRONT VIEW
(simplified)



SIDE VIEW
(simplified)

IND	DATE	MODIFICATION	N°E981
TECHNIREL		OVERALL DIMENSIONS OF xFTH/R 16A to 30A POWER BLOCK	Dessiné par: G.L. Date: 21/09/93

TECHNIQUES DE LA REGULATION ELECTRONIQUE
6 bis avenue DESCARTES 92350 LE PLESSIS-ROBINSON tel. : 46 29 97 00 fax. : 46 32 34 80 telex : 631601F

CHARACTERISTICS

The following characteristics are common to the main and secondary RG600 modules :

- Supply : Main module MF-TH-R
  DC source 20-30 Vdc is required
  Secondary modules : supply from main module
- Burden : 10W mini to .... maxi (with options)
- Ambient : operating temperature range -10°C to +55°C
- Measurement inputs :

  ☐Voltage measurements require 100 or 110V-50 or 60Hz (to be defined at the time of order)

  ☐Current measurements 5A - 50 or 60Hz

  ☐Rotor current measurement (MF-62-R) shunt 0-300 mV, or sensor 0+15 from Hall effect transducer

- External set point input :

  ☐Potentiometer signal (for example, received from an RG50 module)

  *measurement burden : 2VA

  *control & signalling :

  ○Voltage freee contacts. Galvanic isolation by opto isolators
  ○Breaking capacity : 10mA - 24V

- Analogue outputs :

  ☐Power factor measurement +10V +90° reactive export
  0V 0°
  - 10V -90° reactive import

  ☐Reactive power measurement (MF-63-R) signal 0-7.5V

  ☐Real power measurement (MF-67-R) signal 0-7.5V

- Control and signalling outputs :

  ☐Voltage free contacts
  Breaking capacity : DC : 30V-8A
  100V-0.5A
  300V-0.3A

  AC : 2000VA at 220V

  - Regulation accuracy : ±0.5%

RACKS OR CASES

Functions :

To provide a physical layout accommodating the different modules comprising regulation package.

The racks or cases are 19" wide and 3U high.

Their capacity is 14 places 6T wide (84T in total)

Both flush mounting (rack type) or back of panel mounting (case type) are available.

The frame is made of an aluminium alloy complete with runners and fixing supports.

Each main or secondary module comprises a front plate, with one or more withdrawable cards and one rear motherboard with wiring connectors.
Their width varies.

Ribbon cables provide the interconnections between the rear motherboards.

The racks or cases provide a physical link between the various elements composing the modules.

Configuration : Table of dimensions

Item	Width	Number of places
19"rack or case	84T	14
MF-TH-R 2F	42T	7
MF-TH-R 3F	42T	7
Single trigger module	12T	2
Three-mixed trigger module	12T	2
Three-compl.trigger module	24T	4
Single converter 16A/100V	12T	2
max.12T	12T	2
MF-61-R	12T	2
MF-62-R	6T	1
MF-63-R	6T	1
MF-64-R	42T	7
MF-65-R	12T	2
MF-67-R	6T	1
MF-68-R	6T	1
RG50-R	6T	1

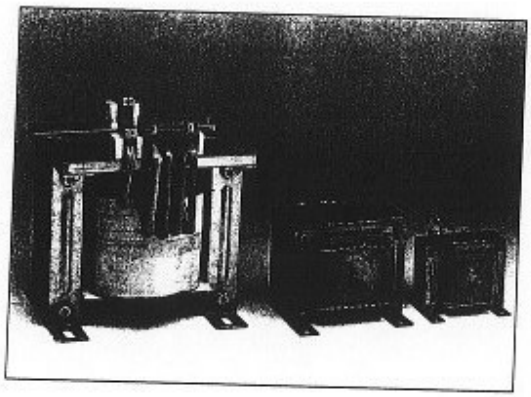
Modules : Modules
Boitier : Cases

STEP DOWN TRANSFORMER

Functions :

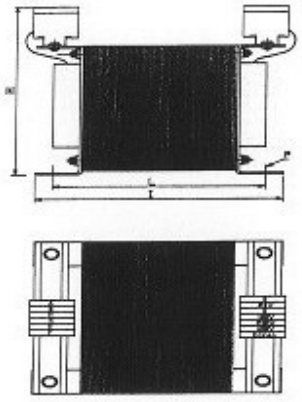
During normal running conditions, once the flashing sequence is over, this transformer converts the voltage of the available source of power to the input voltage of rectifier. In most cases, the supply voltage is taken from an auxiliary supply from the generator stator terminal (self excitation).

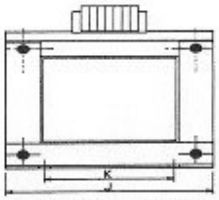
The step down transformer rating usually depends upon the characteristics of the excitation and the machine voltage. In all cases, it is external to the regulation rack. TECHNIREL, however, offers a standard range of small single-phase transformers with taps capable of dealing with common cases.



Range of standard single-phase LV step down transformers :

Power	Ref.	Frequency	Primary	Secondary	Tertiary
2500VA	T907	50/60Hz	0-100-230-400V	20-50-80V	24V-10V
2500VA	T938	50/60Hz	0-100-230-400V	20-50-80V	24V-10V
1500VA	T856	50/60Hz	0-100-230-400V	20-50-80V	24V-10V
750VA	T855	50/60Hz	0-100-230-400V	20-50-80V	24V-10V
750VA	T910	400Hz	0-100-230-400V	20-50-80V	24V-10V
500VA	T920	50/60Hz	440V	0-30-40-50-60Hz	24V-10V
450VA	T1013	50/60Hz	0-100-230-400V	20-50-80V	24V-10V
450VA	T1001	50/60Hz	0-100-230-400V	0-20-28-35V	24V-10V
200VA	T1000	50/60Hz	0-100-230-400V	0-7-11-15V	24V-10V
20VA	T1012	50/60Hz	0-100-230-400V	20-50-80V	24V-10V
100VA	T1011	50/60Hz	0-100-230-400V	20-50-80V	24V-10V





Type Type	Masse Weight	Encombrement Dimensions			Fixation Fixing		Ø	Circuit magnétique Magnetic Circuit
		H	I	J	K	L	P	
T 855	14 Kg	215	150	180	150	120	9x28	180x150x61
T 856	24,5 Kg	215	230	180	150	175	9x28	180x150x119
T 907	40 Kg	240	212	240	200	164	9x28	200x240x100
T 1011							9x28	
T 1012	4,8 Kg	110	110	126	104	90	6x18	126 x 105 x 42,5
T 1013	8,5 Kg	115	145	126	104	125	6x18	126 x 105 x 78
T 1014	25,2 Kg	215	230	180	150	170	9x28	180 x 150 x 120

Compliance to standards :

IEC 92-504 sect 3
IEC 68-2-6 Fc
IEC 68-2-30
IEC 801-3
IEC 801-5
IEEE 421-A
IEEE ST1

Leaflet N°5049A
Date of Edition : 25/10/1995