

### ➔ Application

- power supply of serial current circuits for signal lights at airports and heliports

### ➔ Certificate basis

- FAA AC 150/5345-10E, specification L-829
- MAK

### ➔ Description/Properties

- thyristor regulation
- air cooled transformer 4-30 kVA
- multi-processor control system
- entering of data and display of operational values with use of push buttons and multi-functional LCD display
- current system 6,6 A or 8,3 A (switchable)
- regulation with 3/5/7 degrees of luminous intensity
- over-current and over-voltage protection with remote and local signalling
- remote and local control
- measuring insulating state of loops (module EFD)
- measuring the number of defective lamps
- comprehensive diagnostics of regulators with use of the AMS system
- all components and connection points are accessible from the front, which enables placing of regulators with back right to the wall
- easy repairs with use of quickly replaceable modules
- single and double execution
- execution for 2, 3, 4, and 5 output loops with the module LCS (for TCR.2.04 and TCR.2.10)
- the possibility of power optimization
- regulator operates in the range of 0–100% of the nominal performance

### ➔ Mechanical parameters TCR

- protection (in operating condition) IP 20
- temperature range from -25 (optionally -45) to 55 °C
- storage temperature - 40/+60 °C
- dimensions 575x540x1330 mm
- color gray / dark gray, gray baking enamel
- surface finish RAL 7035/RAL 7030
- weight TCR.2.04 = 126 kg
- weight TCR.2.04+04= 195 kg
- weight TCR.2.10 = 173 kg
- weight TCR.2.20 = 225 kg
- weight TCR.2.30 = 268 kg



single execution



double execution

### ➔ Elektrical parameters TCR

- supply voltage 380–400 V or 208–240 V
- tolerance of supply voltage +10 %/-15 %
- frequency 50/60 Hz
- tolerance of output current  $\pm 0,1$  A
- current system (max. output current) 6,6/8,3 A
- current regulation 3/5/7 deg. of lumin. intens.
- over-current protection (6,6 A) 6,95 A
- over-current protection (8,3 A) 8,75 A
- output power TCR.2.04 4 kVA
- output power TCR.2.10 10 kVA
- output power TCR.2.20 20 kVA
- output power TCR.2.30 30 kVA
- efficiency min 95 % at rated power
- over-voltage (output) protection 110 % of rated power

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# 3.1

# TCR



Regulator TCR is identified by the manufacturer's label, which contains information about type output of regulator, input supply voltage and installed extending modules.

**Example:** TCR . 2 . 04 . 400 . D E L S2 C1

**Rated output**

04	4 kVA
10	10 kVA
20	20 kVA
30	30 kVA
04+04	4 kVA + 4 kVA

**Input supply voltage**

400	380-400 VAC
230	208-240 VAC

**Remote control module (COM)**

(not listed)	it is not installed
D	DAP 128TC
R	RS-485
Bx	contact control, where „x" gives control voltage

**Module for measuring of circuit insulation state (EFD)**

(not listed)	it is not installed
E	module EFD is installed

**Module for indication of number of defective lamps (LFD)**

(not listed)	it is not installed
L	module LFD is installed

**Module for switching of output loop circuits (LCS)**

(not listed) it is not installed  
**Sxy** Sxy module LCS is installed, where „xy" gives number of loop circuits and functions of switches (module can be installed only into regulator with rated output 4 and 10 kVA)

**Function of switching circuits**

(not listed)	alternative function
0	simultaneous function, by default it is switched off
1	simultaneous function, by default it is switched on

**Number of switched output loop circuits**

2	2 loop circuits
3	3 loop circuits
4	4 loop circuits
5	5 loop circuits

**Identification of language version (Country Code)**

Cx where „x" identifies language version (1=Czech, 2=English, 3=German, 4=Spanish, 5=Russian)

**Note 1:** constant current regulators TCR have identical solution for current systems 6,6 A and 8,3 A. Current system can be changed by replacement of the module IDK (supply contains IDK modules for both current systems).

→ **Description of functions**

- current regulation is based on the principle of phase control by thyristors
- output current circuit is galvanically separated by transformer
- multi-processor system for control of regulator ensures control, measurement and stabilization of output current in accordance with specified luminous intensity degree
- values of current for individual luminous intensity degrees are selected in compliance with the respective regulations and they are stored in memory of the control unit
- optional number of luminous intensity degrees
- continuous measurement with use of independent circuits enables evaluation of failure states (disagreement between required and true current, over-current, power overload ...)
- contactor disconnects primary winding of power transformer when any protection is activated
- regulator remembers the latest selected state in case of power failure or remote control failure

→ **Tables of currents**

- two standard and two user configurable tables of currents
- configuration of user table is made with use of push buttons and display on the module DSP
- all the settings remain in the regulator even after it is switched off and cut-off from its supply voltage

output currents for 5 luminous intensity levels

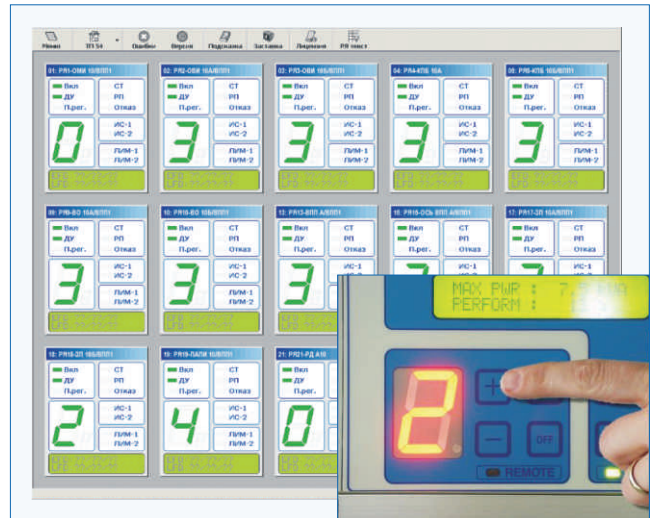
Luminous intensity level	Output current	
	System 6,6 A	System 8,3 A
TEMP	1,3 A	1,6 A
1	2,8 A	4,3 A
2	3,4 A	4,9 A
3	4,1 A	5,7 A
4	5,2 A	6,8 A
5	6,6 A	8,3 A

output currents for 7 luminous intensity levels

Luminous intensity level	Output current	
	System 6,6 A	System 8,3 A
TEMP	1,3 A	1,6 A
1	2,2 A	3,5 A
2	2,8 A	4,3 A
3	3,4 A	4,9 A
4	4,1 A	5,7 A
5	5,2 A	8,3 A
6	6,4 A	7,8 A
7	6,6 A	8,3 A

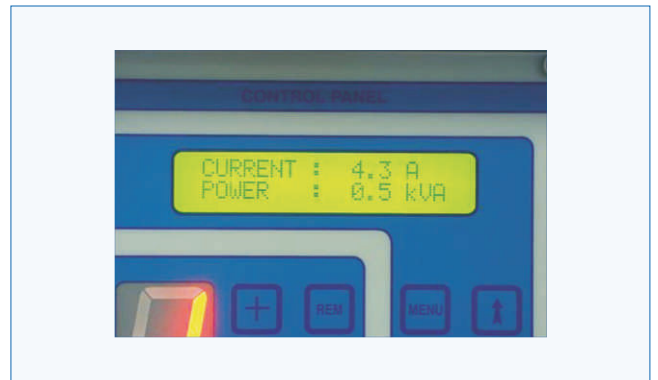
### → Local and remote control

- there are three possibilities of remote control
  - via data transfer system DAP 128 TC (COM-DAP)
  - via serial line RS-485, prot. MODBUS (COM-RSC)
  - via contact inputs / outputs (module COM-BIN)
- change of system of remote control by simple replacement of the module COM
- local control with use of push buttons on the module DSP



### → Data representation

- all important information about operation is displayed on control panel
- it is possible to choose with use of control push buttons from rich menu of displayed data, to calibrate and set regulator's parameters



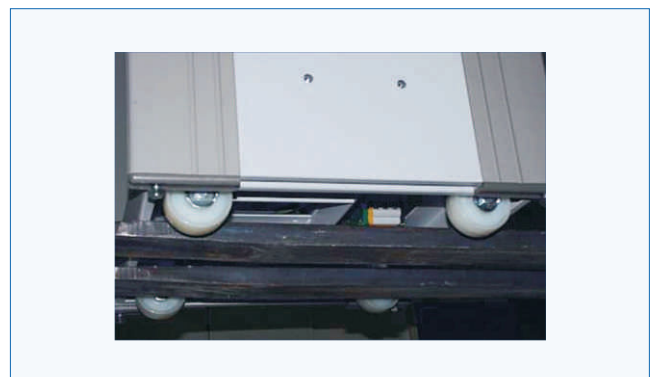
### → Service

- easy and rapid replacement of regulator's modules in its front side
- setting of configuration remains unchanged during repair



### → Mechanical mounting

- installation of racks in one row closely each to other, rear side right to the wall
- four wheels at the rack's bottom part make handling easy
- all connection points are accessible from the front side after removal of the front cover sheet



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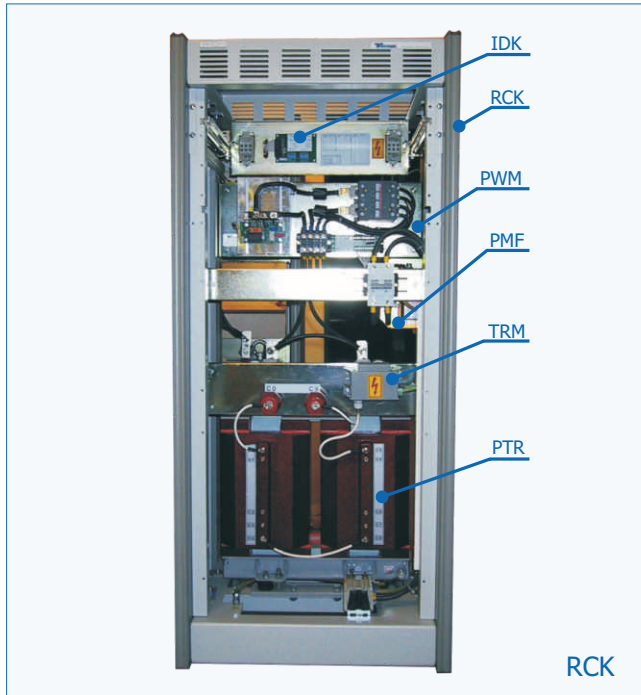
# 3.1

# TCR



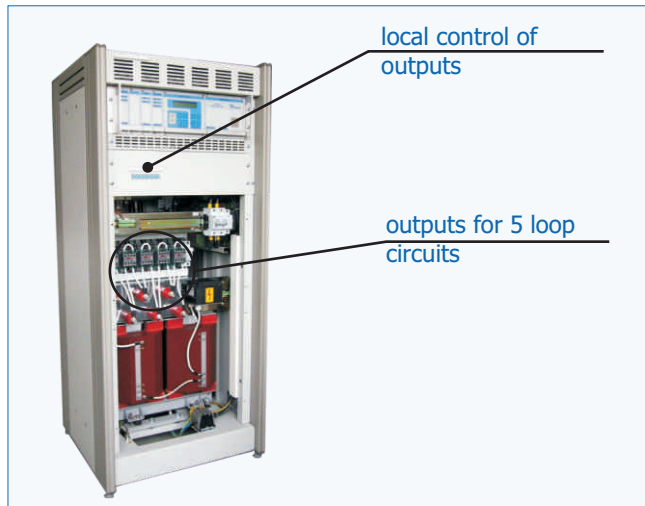
→ **Basic RACK- RCK**

- basic rack of regulator
- steel/aluminum structure
- access to all components from the front side



→ **Module LCS**

- switching of several loop circuits of serial current circuit, which are connected to one regulator (e.g. taxiways, stop bars, guidance systems, approach lights PAPI, extended axis of taxiways, etc.)
- installation into regulators TCR.2.04 and TCR.2.10
- switching of max. five loop circuits
- alternative or simultaneous execution
- alternative execution enables switching of one from max. five connected loop circuits (each loop circuit has max. output corresponding to regulator's rated output)
- simultaneous execution enables switching of any combination of connected loop circuits (with total output corresponding to regulator's rated output)



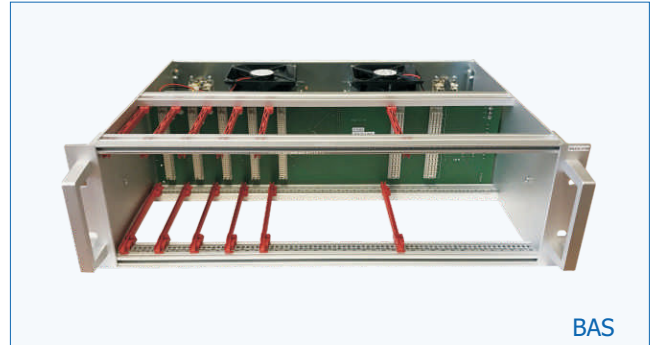
→ **Module IDK (ID KEY)**

- regulator's identification key
- module is accessible after removal of the control unit sub-rack from the regulator's rack
- setting of the address in data transfer system for remote control
- setting of used combination of branches on power transformer
- regulator's identification (output, number of luminous intensity degrees, etc.)
- selection of current system by simple replacement of the module (modules IDK for both current systems are comprised in the supply)



#### → Module BAS (BASIC UNIT)

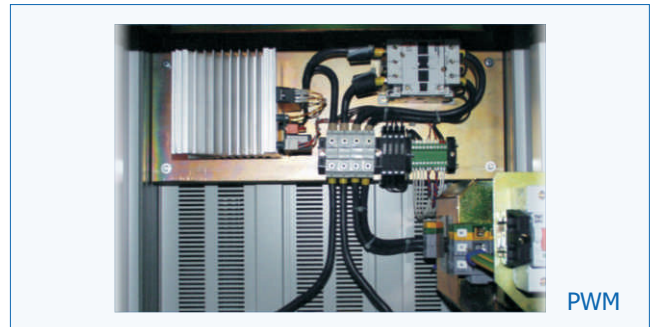
- 19" connector design with guides for easy insertion into the rack
- quick replacement of modules in case of failure
- module remembers after its removal the latest selected values
- it contains power circuits for outputs 4 and 10 kVA/400 V



BAS

#### → Module PWM (POWER MODULE)

- power part of regulator
- it contains contactor and power thyristor with cooler
- utilization for regulator outputs 20 and 30 kVA / 400 V and for the whole power line for 230 V
- easy replacement of the whole module in case of failure



PWM

#### → PMF (power mains filter)

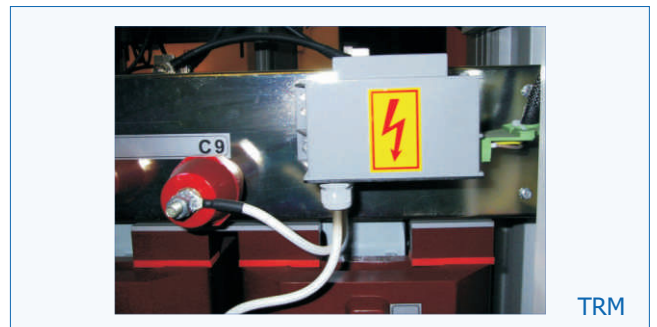
- input noise suppressing filter
- it suppresses undesirable regulator's radiation
- it suppresses interference in power supply mains



PMF

#### → Module TRM (measurement transformer)

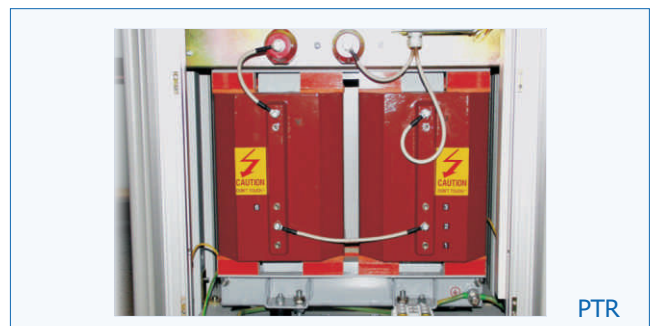
- transformer for measurement of output current in the loop circuit
- separating circuits of modules for checking of insulation state of output current circuit



TRM

#### → Module PTR (power transformer)

- power transformer
- universal for current systems 6,6 A and 8,3 A
- branches for optimization of regulator output



PTR