

Operating Instructions: Transformer Switching Relay TSRDF

EMEKO Engin.
office

Country of Origin: **BRD**

The TSRDF is a control module which can be used as a controlling element in connection with external thyristors or semiconductor relays to form a fast acting transformer switching relay. Both three-phase transformers and combinations of three individual single-phase transformers can be switched-on in a three-phase network without inrush currents arising. The TSRDF is connected with a solid state controlling element between the mains and the transformer.

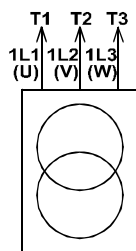
The required application is selected using DIP-switches. In the case of applications N and L the transformer core type must be selected at TP1 (transformer type)

The TSRDF has a Message Display Output (Message 1). Depending on the DIP-switch selections four different conditions can be displayed. The DIP-switches should be set only when the power is off.

Applications

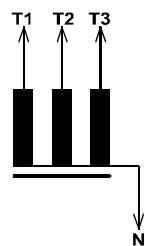
Application D

Three-phase transformer, primary side delta or star config. without N (neutral) (arbitrarily loading). Winding direction important for transformer connection.



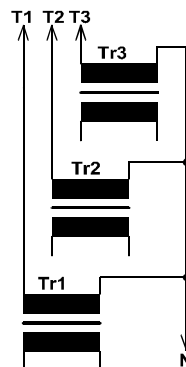
Application S

Three-phase transformer, primary side star config. with N (neutral) (arbitrarily loading). Winding direction important for transformer connection.



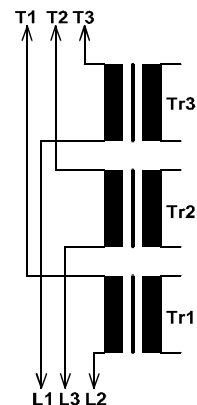
Application N

3 single-phase transformers having the same core (arbitrarily loading). The core type is set at TP1.



Application L

3 single-phase transformers having the same core (arbitrarily loading). The core type is set at TP1.

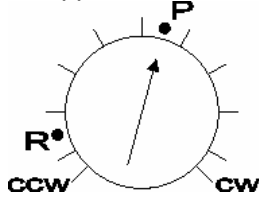


DIP-Switch:

No.	Function	Position		
1	Error handling	Off		No automatic restart
		On		Automatic restart after an error
2	Rotation direction recognition	Off		Switched-on for clockwise phase-sequence
		On		Switched-on for clockwise and anticlockwise phase-sequence
3	Control input 1 (Remote-on input)	Off		Control input enabled for external control signal
		On		Switched-on without external control signal
4	Control input 2	Off		Control input enabled for additional external control signal
		On		Switched-on without external control signal
5/6	Message Display 1	5	6	Function Message Display 1:
		Off	Off	Fully-on message
		On	Off	OK-Message
		Off	On	Error-message
		On	On	Bypass contactor control
7/8	Applications	7	8	Application type:
		Off	Off	D, Three-phase transformer, delta or star config. without MP
		On	Off	S, Three-phase transformer, star configuration with MP
		Off	On	N, 3 Single phase transformer between phase and N
		On	On	L, 3 Single phase transformer between two phases

Setting the premagnetisation on the trimming potentiometer depending on transformer type:

On the trimmer potentiometer TP1 the transformer core type of the single-phase transformer being used for application N or L must be set. For applications D and S the trimmer function does not apply.



Toroidal core transformers:

set to position R

Coil form (shell) transformers (stack-core transformers):

set to position P (factory setting)

The correct position for stack-core transformers (P) can vary between the "10- and 2 o'clock " position.

Strip-wound cut core transformers:

Potentiometer setting between the "P" and "R" settings

3. Messages:

Message Display 1:

The LED „Message Display 1“ (yellow) is illuminated, when the relay contact between the terminals 23 and 24 is closed. The Message Display1 can be applied for various functions.

„Fully-on-Message“

The relay contact is closed, as soon as the connected transformer has been fully switched-on by the TSRDF when the premagnetisation (remnance setting) is completed.

„OK-Message“:

The relay contact is closed after power is supplied to the TSRDF and initialisation is complete . On malfunction the contact is opened.

„Error Message“:

On malfunction the contact is closed.

„Bypass-contactor control“:

The relay contact is used to control a bypass contactor, used to bridge the control elements.

OK- LED:

The LED OK (green) is illuminated when the TSRDF is in the 'OK' status. Malfunctions are indicated by different flashing rates.

Flashing rate	Malfunction
continuous	OK- state
10 Hz	A remote-on signal has been applied, and no automatic resetting after malfunction (DIP1=Off)
5 Hz	Three-phase network is counter-clockwise, and switching-on only for clockwise phase-sequence (DIP2=Off)
1 Hz	The supply voltage is outside the limiting voltage values (-20/+15% of U_{rated})
10 Hz	Internal error

4. Additional Information:

Bypass-Contactor:

To protect the safety coil it is recommended to connect an RC-element parallel to the coil.

General safety instructions:

The TSRDF should be installed and connected without applied voltage only by trained electrotechnical personnel. In addition initial operation and commissioning should also be carried out only by suitably trained electrotechnical personnel.

Potential separation does not occur during switching of the TSRDF as additional RC elements are connected between the input and the output thyristor clips.

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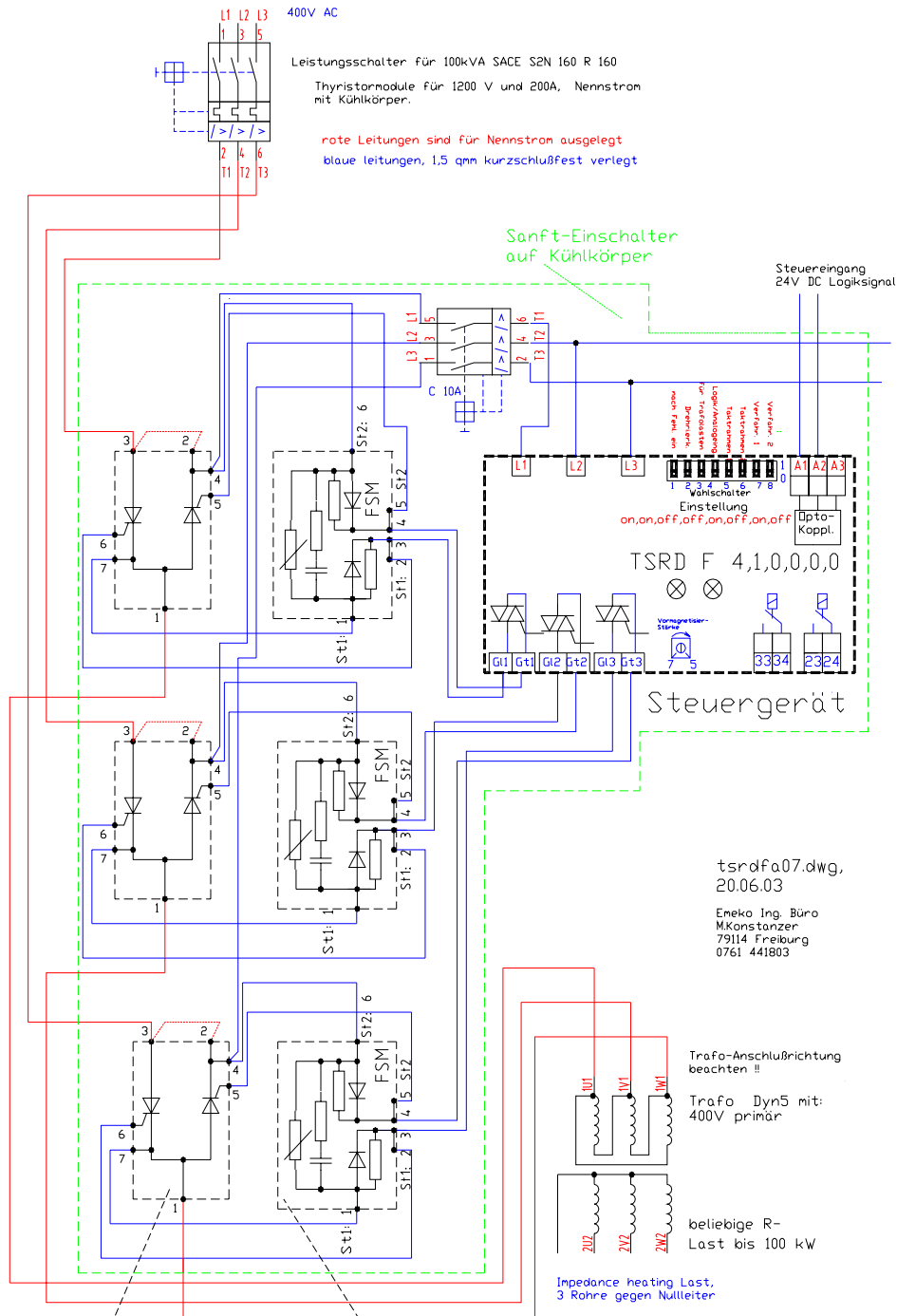
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TSRDF connection diagram for external Thyristors

Schalteneinheit zum einschaltstromstoßfreien takten mit Pulsgruppen von Heiztransformatoren mit 100 kVA.



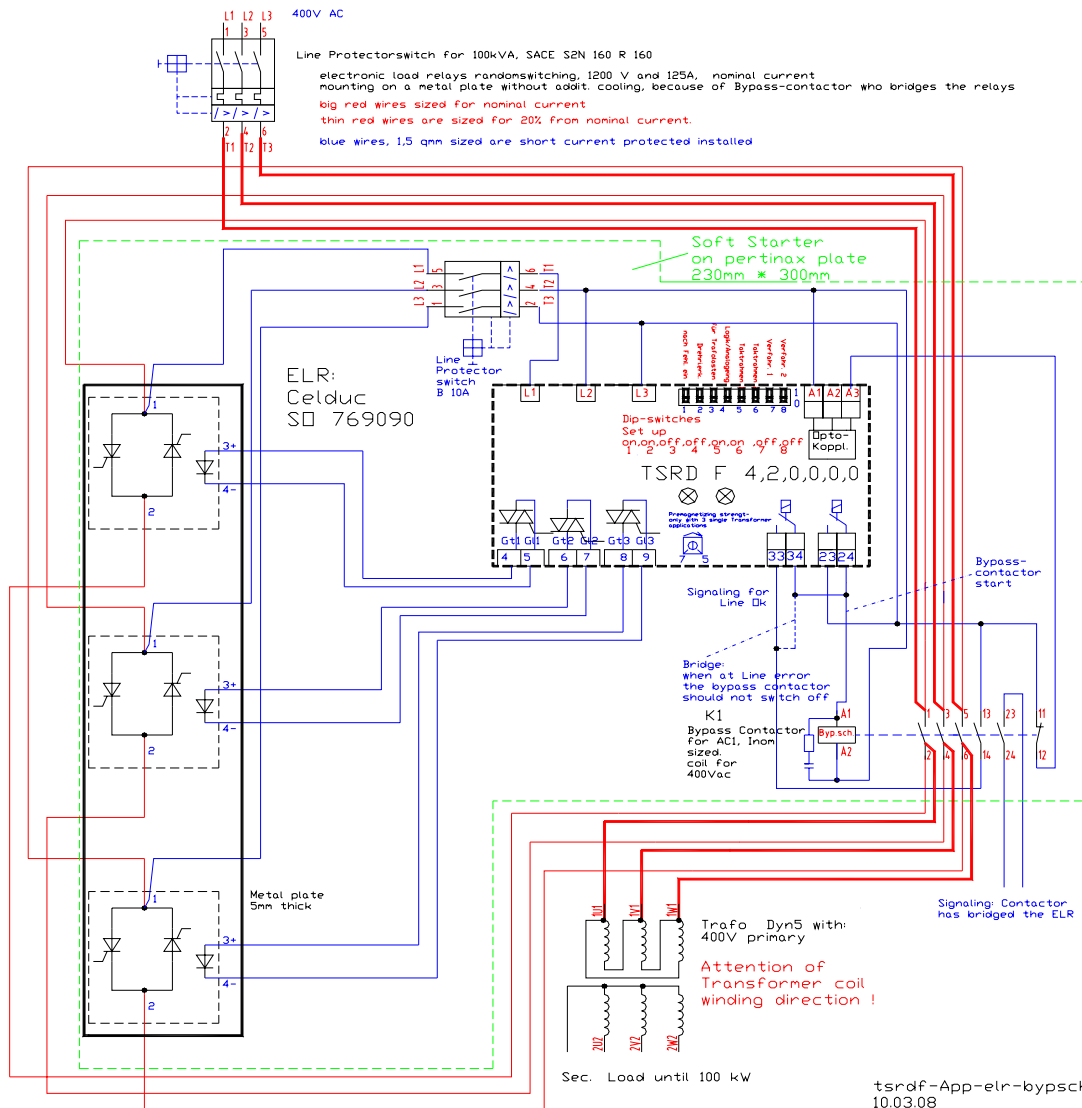
Thyristormodule Zündplatinen

Leistungsschalter, TSRDF mit Thyristormodulen und Zündplatinen, sitzt auf einem Kühlkörper mit 230 mal 300 mm der LS sitzt zusammen mit dem Sanfteinschalter auf einer pertinaxplatte mit 260 mal 675 mm. M12 Kunststoffschrauben dienen zur Befestigung auf einer Montageplatte.

Siehe auch Zeichnung: booster_zeichn2.dwg v. Emeko

TSRDF connection diagram for external semiconductor relays

3 Phase Transformer Softstarter with Bypass Contactor for 24-100kVA.



TSRDF with electronic load relays randomsw., and the small line protector, are fixed on the pertinax plate with 230 mal 300mm
The Bypass contactor and the Line protector switch and the Softstarter are fixed together on a Pertinaxplate mit 260 mal 675 mm.

tsrdf-App-elr-bypsch-e.dwg, 10.03.08

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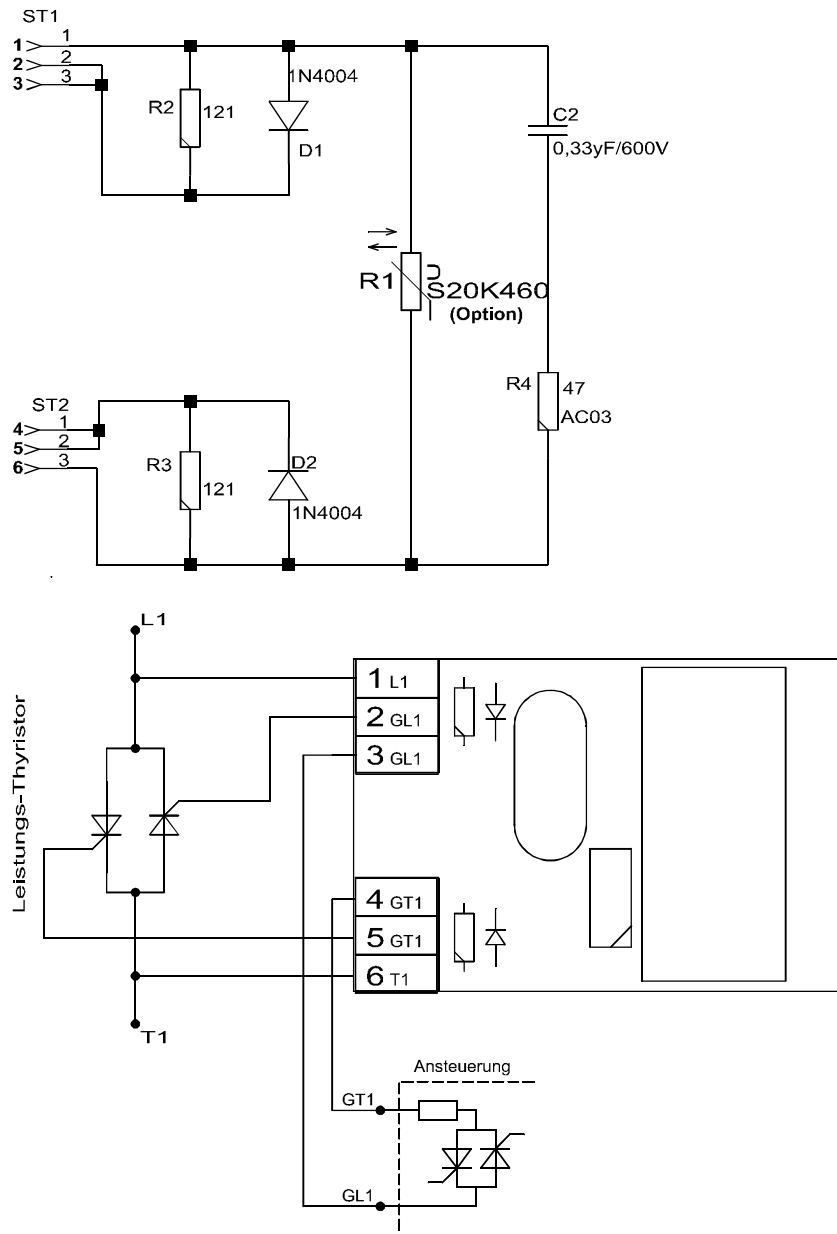
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Operating Instructions: RCP Board for Thyristors

EMEKO Engineering
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The RC-element and die Gate-cathode-wiring for a thyristor module or two antiparallel connected thyristors are present on the RCP-printed circuit board as control elements. Thus a thyristor module or two antiparallel connected thyristors either TSRLF or TSRDF can be controlled. Spring reversal clips are used on the RCP printed circuit board (clamping area 0.1–2mm²).



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