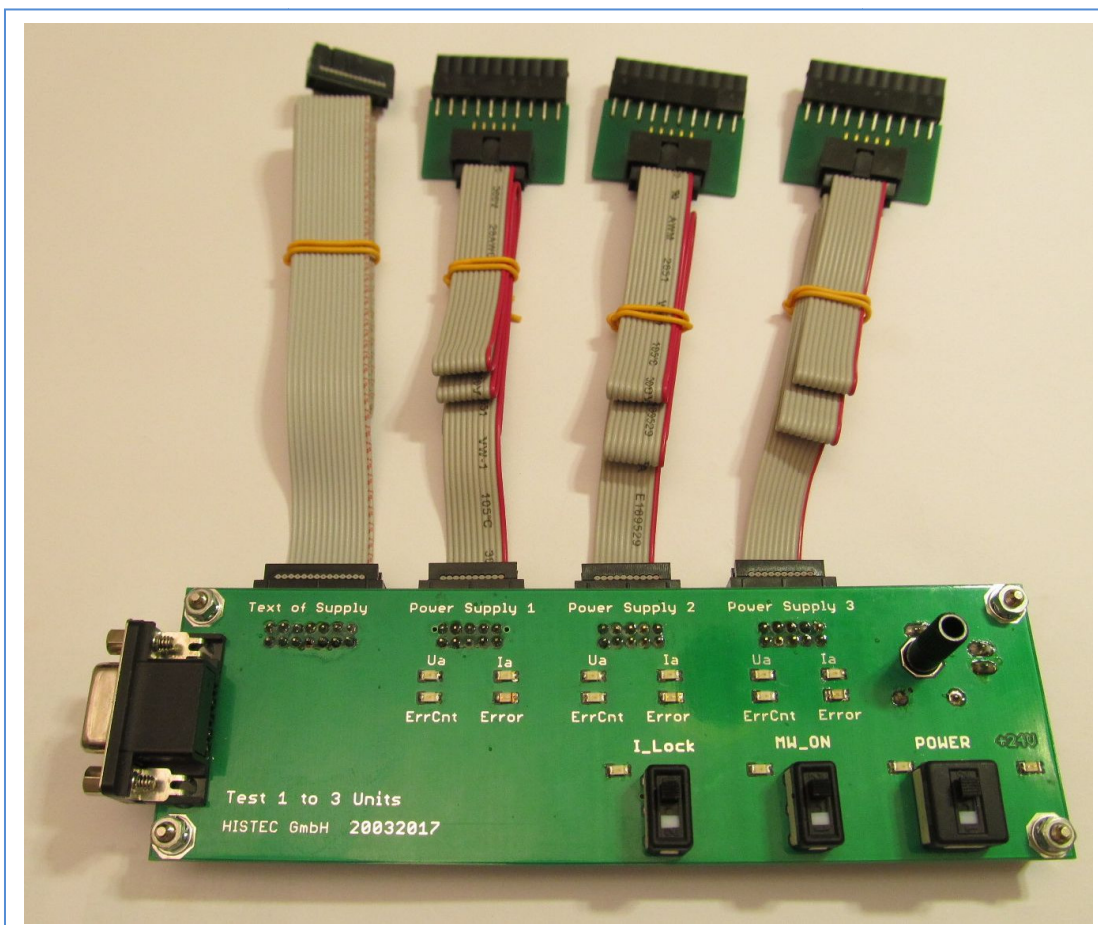


HMI (Human Machine Interface)**SNT-MW-1000-HMI****for Magnetron Power Supply****>>> Manual control of ...****SNT-MW-1000-2****SNT-MW-1000-3****SNT-MW-1200**

SNT-MW-1000-2	Power-Supply for 1.000 W magnetron:	1.0 kW (or 2.0 kW)
SNT-MW-1000-3	Power-Supply for 1.000 W magnetron:	1.0 kW (or 3.0 kW)
SNT-MW-1200	Power-Supply for 1.200 W magnetron:	1.2 kW

TECHNICAL DATA**>>> STEP - by - STEP ... look at page 4 <<<****Attention: -- Microwaves and High-Voltage are dangerous --**

Very important to avoid any injury :

Use INTERLOCK -Switch(es) to prevent any microwave output, if microwave-system is not complete closed. Responsible for the correct interruption of the microwave energy production is the constructor of the complete microwave-system.

1 General Description

SNT-MW-1000-2 is a small switching **magnetron power supply** (MW – output-power = 1.000 W)
 ... to connect to a **1.0 kW Magnetron** (2M247 or NL10305) ... or ...
 ... to connect to a **2.0 kW Magnetron** (2M259 or NL10250) together with **2nd SNT-MW-1000-2**
 ... to produce **High-Ripple** MicroWave HF-Power (if 50 Hz main-frequency: High-Ripple with 100 Hz)
 ... to produce **Lower-Ripple** MicroWave HF-Power in 2.0 kW usage (**2nd SNT-MW-1000-2 on other 230V phase**)
 ... needs **AC 230V~** and aux-voltage **DC 24V=** ... cooled by air (fan)

SNT-MW-1000-3 is a small switching magnetron power supply (MW – output-power = 1.000 W)
 ... to connect to a **1.0 kW Magnetron** (2M247 or NL10305) ... or ...
 ... to connect to a **3.0 kW Magnetron** (2M265 or 2M266) together with **2nd and 3rd SNT-MW-1000-3**
 ... to produce **High-Ripple** MicroWave HF-Power (if 50 Hz main-frequency: High-Ripple with 100 Hz)
 ... to produce **Lower-Ripple** MicroWave HF-Power in 2.0 kW usage (all SNT-MW-1000-3 on separate **230V phase**)
 ... needs **AC 230V~** and aux-voltage **DC 24V=** ... cooled by air (fan)

SNT-MW-1200 is a small switching magnetron power supply (MW – output-power = 1.200 W)
 ... to connect to a **1.2 kW Magnetron** (1M137)
 ... to produce **High-Ripple** MicroWave HF-Power (if 50 Hz main-frequency: High-Ripple with 100 Hz)
 ... needs **AC 230V~** and aux-voltage **DC 24V=** ... cooled by air (fan)

SNT-MW-1000-2
SNT-MW-1000-3
SNT-MW-1200

- ➔ with large fan
- ➔ with small fan
- ➔ connector side

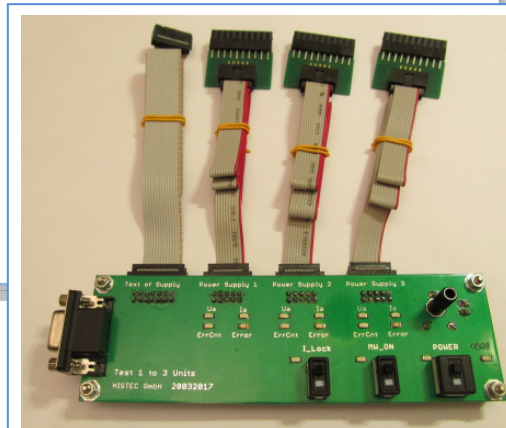


SNT-MW-1000-HMI is a small board for **manual control** of
 1, 2 or 3 switching magnetron power supply/supplies

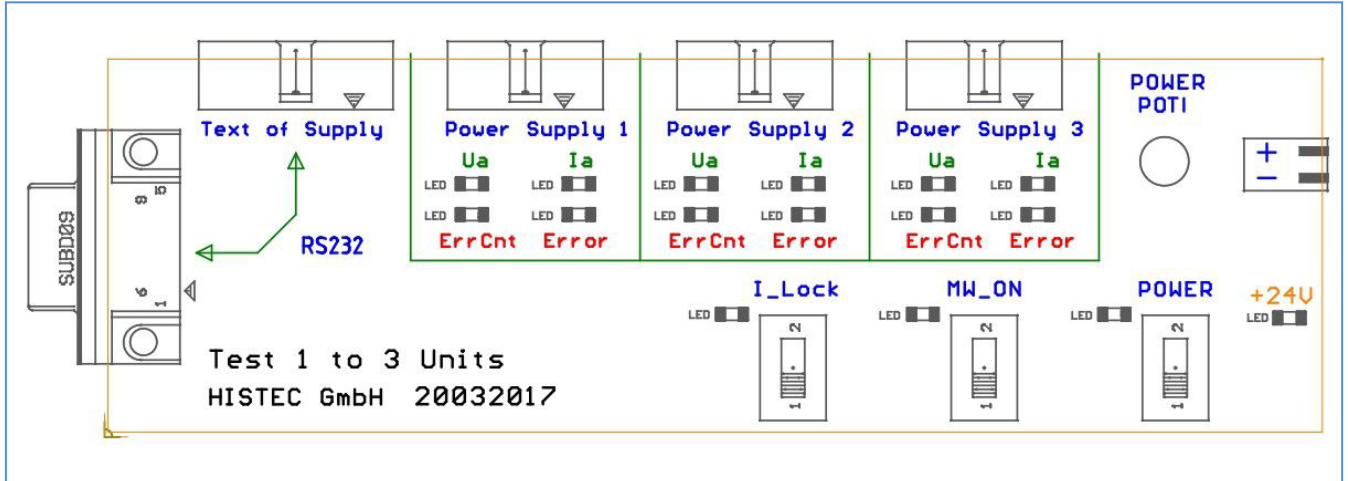
SNT-MW-1000-2 or
SNT-MW-1000-3 or
SNT-MW-1200

... 1x HMI - board with 3x switches POWER, MW-ON, I-LOCK (+ LED's)
 with 1x power-poti 0 .. 10 V
 with 4x status-LED's / power supply
 with 3x power-supplies-connectors
 with 1x RS232 connector
 for connection of power-supplies
 for connection of serial-interface
 for adapting cable to power supply
 ... 3x cable
 ... 1x cable
 ... 3x adapter-boards
 ... 1x Vin-connector
DC 24V= voltage for HMI-board
I = 0,5 A for each power supply needed !

SNT-MW-1000-HMI



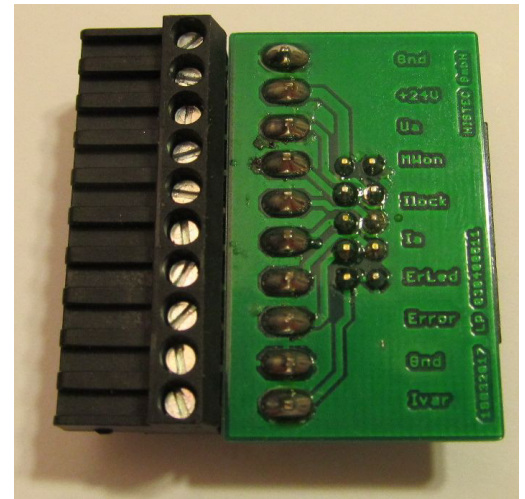
2 SNT-MW-1000-HMI ... connection



SNT-MW-1000-HMI ...

for manual control of power-supply:

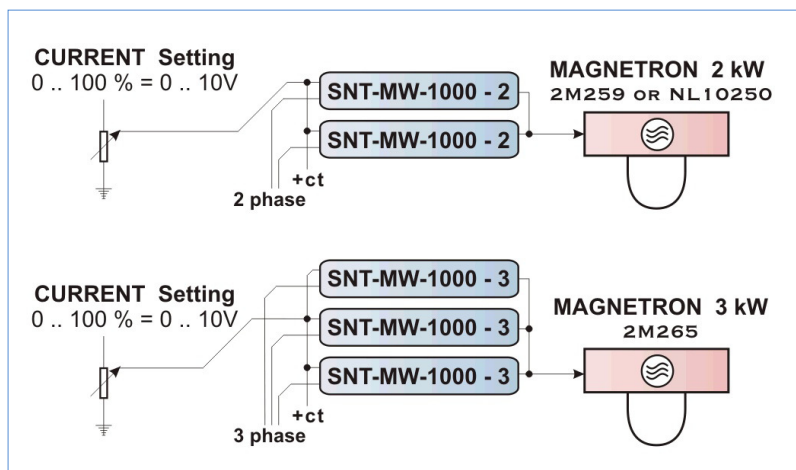
- connect **DC 24V** to control-board **SNT-MW-1000-HMI**
- connect **wanted power supplies** with cable and **adapter-board** (max. 3x magnetron power supplies simultaneously controlled)
- if wanted, connect wanted power supply to “Text of Supply” (connection over **RS232 to PC with terminal program**) (**RS232 / COM: 19.200 bps 8N1 – 8 data, No parity, 1 stop**)
- Dimension PCB - Board: **160 x 50 mm**
- Dimension with connectors: 170 x 53 x 25 mm
- 4x fixing hole positions: (x,y) = (4, 4 mm) (156, 4 mm)
(4, 46 mm) (156, 46 mm)



Adapter Board

from ribbon cable with pole connector
to RIA type 169-10 (311 691 10)

Increasing Output - Power



The combination of separate units to supply one magnetron makes it possible to build a system with larger output power and smaller output ripple (only for 3 kW System).

Because of current regulation, the output currents can be added to one load.

Status	Description
1 POWER - LED	... shows status POWER - Switch
2 MW_ON - LED	... shows status MW_ON - Switch
3 I_LOCK - LED	... shows status I_LOCK - Switch
4 ERROR - LED	... shows status ERROR (ERROR LED = OFF = no error) If ERROR ... occurred → ERR_CNT -LED = code on blinking LED
5 ERR_CNT - LED	Periodic-blink = normal operation (= NO error) fast/slow-blink = count slow-blink-times <i>>> look at Error-Code on next pages</i>
6 Ua - LED	... shows Anode voltage → MW-ON begins shining → power increase: LED shines stronger Ua = Anode voltage (Ua_Measure_Out) 0 ... +10V (0 .. 100 %), Ri= 1kOhm
7 Ia - LED	... shows Anode current → approx. 300 W LED begins shining → power increase: LED shines stronger Ia = Anode current (Ia_Measure_Out) 0 ... +10V (0 .. 100 %), Ri= 1kOhm

5 SNT-MW-1000-x - Electrical Connections

Needed Cable-Connectors (included in delivery of new device):

1. CONTROL Connector RIA connector: **AKL 169-10** (10 pole, 3.5 mm grid)



Pin 9	24V DC/0.5A	Aux-Volt. INPUT	- Voltage
Pin 2	GND		
Pin 10	GND		
Pin 6	INTERLOCK - 24V	INPUT	of Interlock-Security-Switches
Pin 7	MW-ON	INPUT	to switch microwave-power on/off
Pin 1	I_{variable}	POWER-Set	INPUT analog-value for wanted MW-POWER
Pin 5	I_{a_measure}	Anode Current	OUTPUT analog-value of output current
Pin 8	U_{a_measure}	Anode Voltage	OUTPUT analog-value of output voltage
Pin 3	ERROR	OUTPUT	ERROR-Pin (ERR= hi, NO_ERR= lo)
Pin 4	ERR_LED	OUTPUT	ERROR-Nr (look Error-section)

1. CONTROL Connector: Pinning 10 pole (3,5 mm grid):

Pin	Name	Definition	Description
1	I_{variable}	0 V... +10 V POWER-Setting	
2	GND	- Ground -	
3	ERROR	Error, 6 mA for LED or err-interpretation Error-Nr-Detection with ERR_LED-Signal	Connect LED-cathode to GND, and LED-anode to ERROR
4	ERR_LED	Periodic-blink = normal operation fast/slow-blink = count slow-blink-times >> look at Error	connect LED-cathode to GND, and LED-anode to ERR_LED
5	I_{a_Measure_Out}	I _a = Anode current 0 ... +10V (0 .. 100 %), R _i = 1kOhm	
6	+24V_I_Lock	INTERLOCK - connection	Area: +24V
7	MW-ON	Microwave ON/OFF	Area: +5V ... +24V
8	U_{a_Measure_Out}	0V ... +10V, R _i = 1kOhm	optional
9	+24V/0.5A	0.5 A (120 mm fan)	
10	GND	- Ground -	

6 Error Code

ERROR-Code on ERR_LED, countable LED-blinking and OUTPUT over serial UART-Interface
ERROR-Pin-Timing described on following page (chapter 7)

ERR - Name	Nr	Definition	Description
ERR_ILOCK	2	Interlock-error, $U_{ilock} < 2V$ with MW_on	Interlock not or wrong used
ERR_IVAR_IN_2_BIG	3	$I_{SETPOINT}^2 \geq 10,22 V$	"I_SETPOINT" from user too big
ERR_IACT_2_SMALL	4	$(I_{ACT}^1 + I_{delta_plus}) < I_{SETPOINT}^2$	I_ACT too small/big could be:
ERR_IACT_2_BIG	5	$(I_{ACT}^1 - I_{delta_minus}) > I_{SETPOINT}^2$	- too fast change of I_SETPOINT
ERR_SHORT_CIRCUIT	6	$(U_{ACT}^1 < U_{magn_min}) \& (I_{ACT}^1 > (0,1 \cdot I_{max}^3))$	Short circuit on HV could be: - short-circuit on wiring - Magnetron defect - Heat transformer defect - HV-part from power-supply defect
ERR_UACT_2_SMALL	7	$(U_{ACT}^1 < U_{magn_min}) \& (I_{ACT}^1 \leq (0,1 \cdot I_{max}^3))$	Reason of error could be: - Too fast switch MW-ON after switch AC-power ON - no phase power present - HV-part from power-supply not working
ERR_MAGN_NOT_HEAT	8	$(U_{ACT}^1 > U_{magn_max}) \& (I_{ACT}^1 < (0,03 \cdot I_{max}^3))$	Magn. NOT heated or NOT present
ERR_UACT_2_BIG	9	$(U_{ACT}^1 > U_{magn_max}) \& (I_{ACT}^1 \geq (0,03 \cdot I_{max}^3))$	Magn. Voltage > 5,6 kV abs.val.
ERR_IACT_2_BIG	10	$I_{ACT}^1 > 102,2 \% \quad (102,2\% \geq \text{overflow})$	I_ACT - Output Val. too big
ERR_TEMP0_2_SMALL	11	TEMP0 < 5° Celsius @ heat sink	5° C = TEMP0_MIN
ERR_TEMP0_2_BIG	12	TEMP0 > 45° Celsius @ heat sink	45° C = TEMP0_MAX
ERR_15V_2_SMALL	15	PLUS_15V < 14 V	15 V created from extern 24V/DC
ERR_15V_2_BIG	16	PLUS_15V > 16 V	- - - " - - -

¹ VAL_ACT... = actual val → value present at moment

² VAL_SETPOINT... = setpoint val → value wanted and given from user

³ I_max = 330 mA @ 1 kW Magnetron

I_max = 365 mA @ 2 kW Magnetron

I_max = 280 mA @ 3 kW Magnetron

7 Error-Pin-Timing: ERR_LED (Pin 4) and ERROR (Pin 3)

NOTE: The described error-pin-timing is valid from Software-Ver 2.17 !

Status	Pin 3/ERR Level	Pin4/ERR_LED	Duration of ...
ERROR	high	toggle and pause	error-cycle 340 ms
			(170 ms high, 170 ms low-level)
			error-pause 600 ms
No-ERR-operation / Normal-mode	low	toggle	normal-cycle 728 ms
			(364 ms high, 364 ms low-level)

In the 'ERROR-present' figure is shown ERR-Nr 2 (ERR_ILOCK).

If a higher error-number occurred, the count of error-cycles is accordingly higher.

