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Switching Mode Power Supply for Magnetron use

Dual – Power-Supply
PPS-MWS-3000-4500-CAN2H

TECHNICAL DATA

PPS-MWS-3000-4500-CAN2H DUAL pulsed Magnetron Power Supply with Heat-Regulation

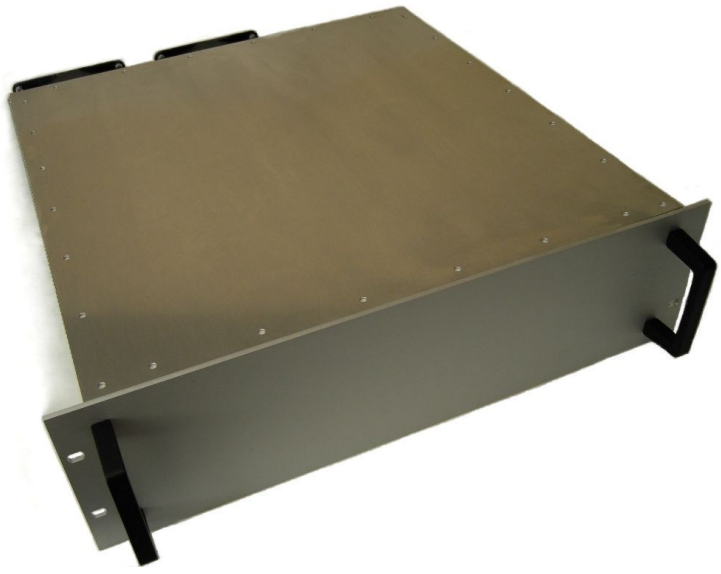
2x 3000W/4500W (continuous / pulse-peak)
MicroWave-/HF-Power
Magnetron-Type: **3.0 kW / 2450 MHz**
Adjustable Power from 10 % - 100 %
Standard Ripple

CAN-Bus controlled (CAN01 or CanPH02c)
CAN01 -Protocol
or *CanPH02c-Protocol (coming soon)*

Dimensions: 19'' rack (plug-in-case)
3 units height
648 mm depth (incl. Fan's, without handles)

Air- and water-cooled: water-cooled (5 l/min; 4 bar)
Input POWER: **3-ph 400V~** 47-63 Hz (max 15,0 A/ph)
Input-AUX-PWR: **230V~** 47-63 Hz

2x Magnetron – Heater – Regulation (optional) Leading edge phase controlled heat-regulation



Delivered with all needed device connectors:

- Interlock	- connector	1x
- 3x 400 V~ / 3 phase	- connector	1x
- 1x 230 V~	- connector	1x
- MW-Head	- connector	2x
- HV -LEMO (10 kV)	- connector	2x
- Reflected-Power	- connector	1x

Not included:
- Water-IN /-OUT - flexible tube (e.g.: FESTO ,PUN 10 x 1.5')
- CAN-Bus - connector

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.

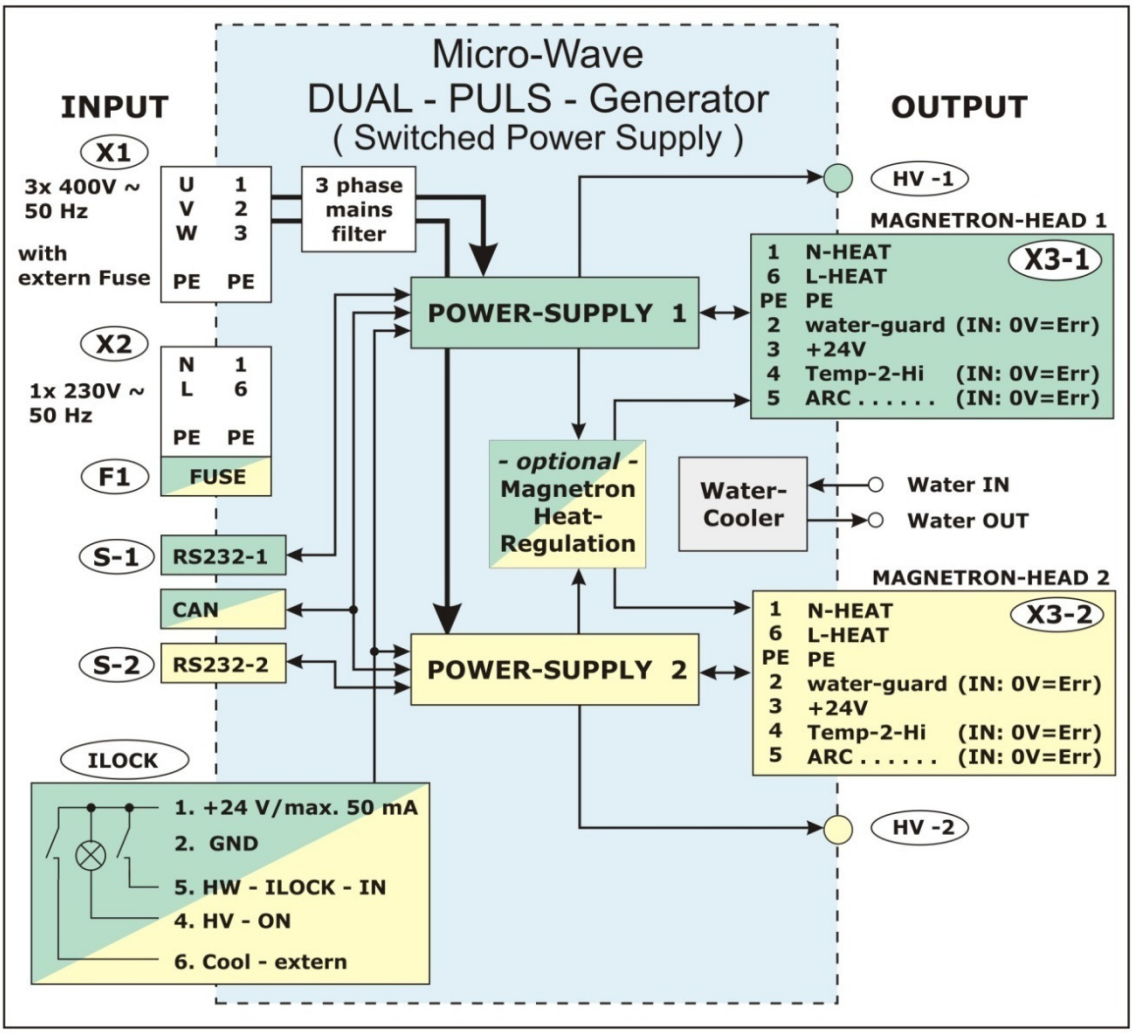
1 General Description / Block Diagramm

The PPS-MWS-3000-4500-CAN2H power supply could be controlled over CAN-Bus

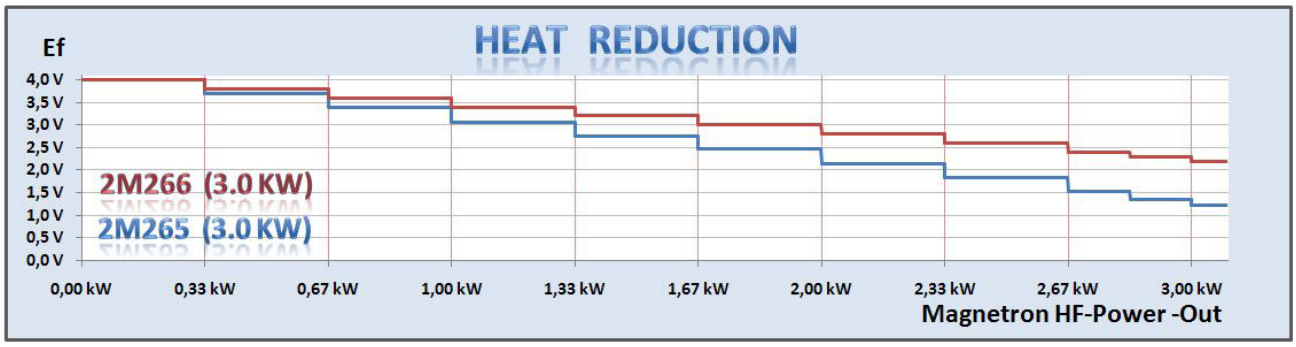
Either with the **CAN01** – Protocol
or with the CanPH02c – Protocol *(coming soon)*

→ CAN-Bus-Protocol about the **CAN01** (and CanPH02c) - Protocol
placed in the **CAN01** / CanPH02c – **Manual**

Block – Diagram



Heat Regulation (*optional*)



2 Technical Data

Suggested Magnetron Type.....	Waveguide R26 / WR340 --- **2M265 (3.0 kW)**
Preheating Time.....	Magnetron heating-time included
Input Voltage.....	**3x 400V~** +/- 10 % (359 V~ ... 438 V~) / **47 – 63 Hz, 3 phase**
Input current.....	**< 15,0 A rms / phase** @ full load
Input Protection.....	3-phase-Fuse must be provided externally: → 3-ph Fuse 16A T (time lag), 400V~
Input (auxiliary) Voltage.....	**1x 230V~** +/- 10 % (200V~ ... 265 V~) / **47 – 63 Hz, 1 phase**
Input current.....	< 2 A rms @ 230 Vac @ full load
Input Protection.....	1-ph-Fuse/automatic circuit breaker implemented in device – positioned on back-side: → 1-ph Fuse 2A T (time lag), 230 V~
Auxiliary Power…….....	**24 V_{DC}**, 50 mA – Output ……. Magnetron-Head-1 -Connector
	24 V_{DC}, 50 mA – Output ……. Magnetron-Head-2 -Connector
	24 V_{DC}, 50 mA – Output ……. ILOCK/HV-ON -Connector
Output Power.....	2x 4.600 W (magnetron input power @ max CW)
	2x 3.000 W HF-Power continuous
Output current.....	output current regulation
	2x 50 mA to 900 mA (900 mA @ continuous 3.000 W HF-Power) ,
	2x 50 mA to 1.350 mA (1.350 mA @ pulse-peak 4.500 W HF-Power)
Output current ripple.....	**Standard Ripple**
Output polarity.....	– 4.900 V to – 5.300 V, negative in respect to ground potential
Harmonic Distortion.....	Meets EN 61000-3-2 for class A
Transient overvoltage.....	Meets EN 61000-4-4 for class B
EMI Filtering.....	Meets EN 55022 for class B
Output current signal.....	POWER-OUT over CAN-Status - message
Output voltage signal.....	POWER-OUT over CAN Status – message

CONTROL – Signals → from extern into device

CAN-Bus . . COMMAND – Messages

ILOCK-Connector – INPUT - signal's:

```
INTERLOCK . . 0V /not connected = error/ Ilock opened , 24V = okay / Ilock closed
COOL-Extern . 0V /not connected = error/ NO cooling   , 24V = okay / cooling
```

MAG-HEAD-Connector – INPUT - signal's:

```
WATER-Guard . 0V /not connected = error/ no cooling   , 24V = okay / water cooling
Temp-2-High . 0V /not connected = error/ Temp-2-High  , 24V = okay / Temp okay
ARC-detect  . 0V /not connected = error/ ARC detected , 24V = okay / NO ARC
```

STATUS – Signals → from device to extern

CAN-Bus . . STATUS – Messages

ILOCK-Connector – OUTPUT – signal's:

```
HV-ON . . . . connection of  lamp/LED  (24 V) possible
                If HV = ON → HV-ON-Pin connected to ground
```

CAN-01 - Pulse - Timing

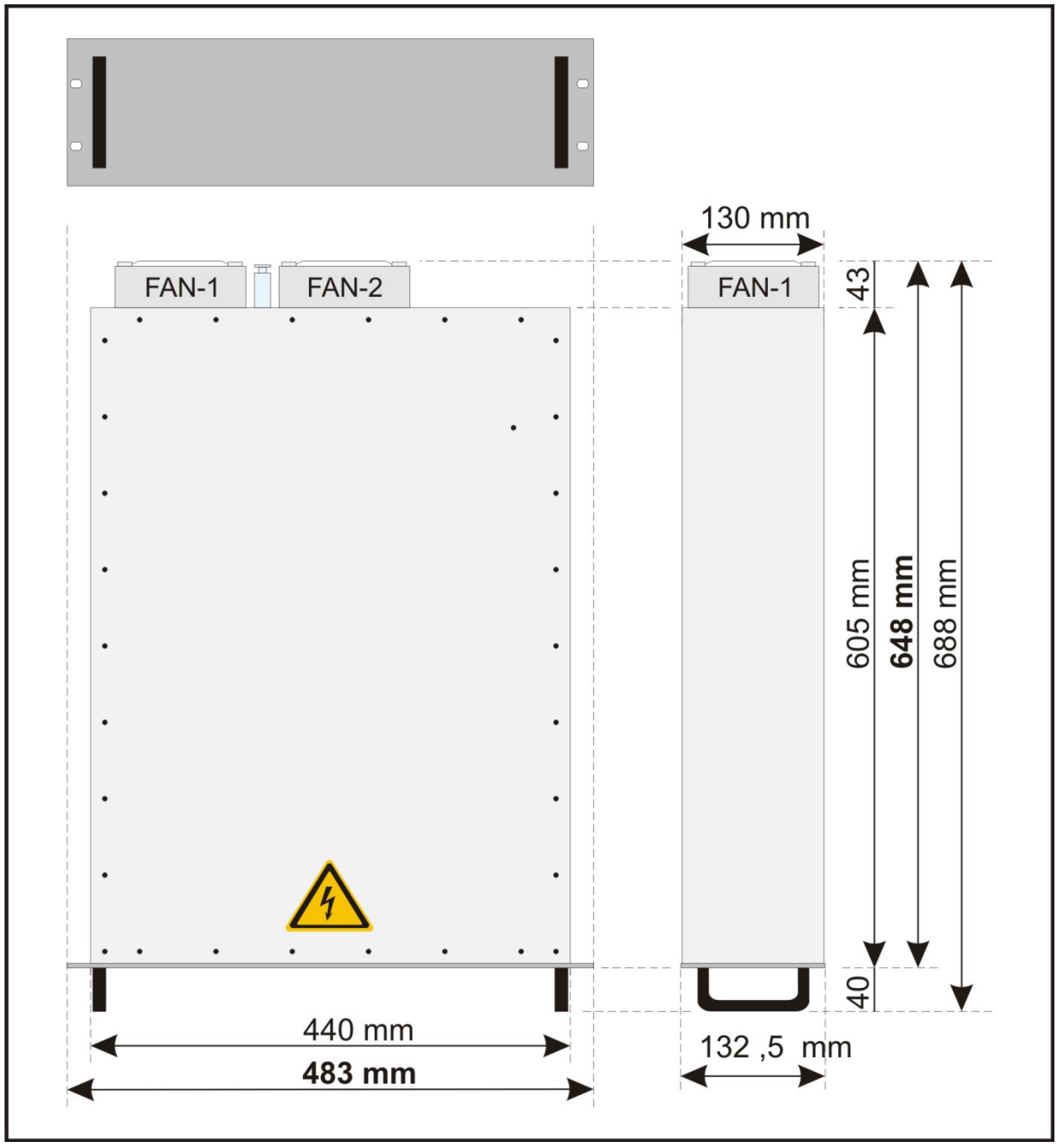
```
ON_TIME    ( Pulse-Hi -Duration )  1 ms   . .  24 ms
OFF_TIME   ( Pulse-Low-Duration )  1 ms   . . 250 ms     Max. Pulse-Frequency f= 500 Hz
```

3 Environment Conditions

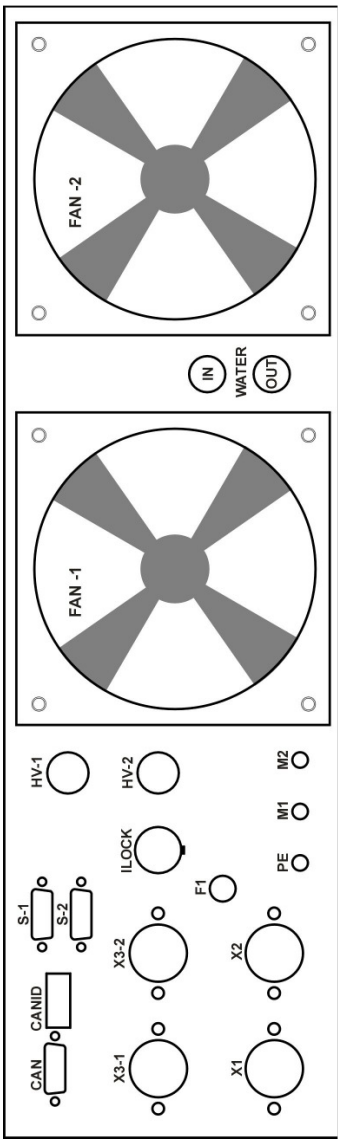
USE		INDOOR USE only
Temperature Air	(controlled per firmware: error if out-of-limits)	8 ° C .. to .. 46 ° C
Temperature Water	(controlled per firmware: error if out-of-limits)	5 ° C .. to .. 48 ° C

4 Mechanical Data

Dimension without handhold L x W x H	**648 x 483 x 132.5 mm^3** (length x width x height)
Dimension with handhold L x W x H	688 x 483 x 132.5 mm^3
	19'' rack (plug-in-case)
	3 rack-units height
Weight (approximately)	**20 kg**



5 Back-Side of Device / Connectors



>> Connectors <<

Abbreviations:
PS-1 ... Power-Supply-1
PS-2 ... Power-Supply-2

HV-1 > High-Voltage PS-1
HV-2 > High-Voltage PS-2

X1 > INPUT_: 3 phase ... 400 V~
X2 > INPUT_: 1 phase AUX 230 V~
X3-1 > OUTPUT: MW-Head-Output PS-1
X3-2 > OUTPUT: MW-Head-Output PS-2
X4 > INPUT : Reflected Power ***(new)***

PE > protective earth
M1 > Ground-1
M2 > Ground-2

ILOCK > Interlock – Connector
F1 .. > Fuse 230 V~ (AUX-Voltage)

WATER-IN > water-cooling IN
WATER-OUT > water-cooling OUT

FAN-1 > air-cooling PS-1
FAN-2 > air-cooling PS-2

Communication-Ports:
CAN > CAN-Bus-Port (SUBD9)
CANID > Can-Start-ID (Dip-Switches)

S-1 > Serial PS-1 (Firmware-Update)
S-2 > Serial PS-2 (Firmware-Update)

Back-Side: - NOTE -
X1 – bigger connector
X4 – missing text

6 Connectors Details & Pinning

6.1 Connectors Details

Needed Cable-Connectors included in delivery of new device:

Qty	Name		Definition		male	/female	Producer	Factory-Nr
1x	**X1**	3x 400V~	3x 400V~ /50Hz (47-63Hz) 3 Phase			female	Binder	**694.99-0710-00-05**
1x	**X2**	1x 230V~	1x 230V~ /50Hz (47-63Hz) 1 Phase			female	Binder	693.99-4226-00-07
2x	**X3-1**	MW-Head-1	**MW-Head-1**	**Power-Supply-1**	male		Binder	693.99-4225-00-07
	X3-2	MW-Head-2	**MW-Head-2**	**Power-Supply-2**				
1x	**X4**	Refl-Pwr	**Reflected-Power + Meas-Power-Ext.**			female	Binder	581.99-2022-02-06
1x	**ILOCK**	Interlock	ILOCK for both Power-Supplies		male		Binder	678.99-0617-00-06
2x	**HV-1**	Hi-Volt-1	HV-1 from	Power-Supply-1	male		LEMO	FFA.1Y.410.CLAC47
	HV-2	Hi-Volt-2	HV-2 from	Power-Supply-2			(-10kV)	

Connectors NOT included in delivery of new device:

Qty	Name		Definition		male	/female	Producer	Factory-Nr
1x	**CAN**	Can-Bus	To control	Power-Supply-1		female		
			And	Power-Supply-2				
2x	**S-1**	Serial-1	RS232 of	Power-Supply-1 …	male			
	S-2	Serial-1	RS232 of	Power-Supply-2 …				
2x	**WATER**	Water-IN	Cooling of	Power-Supply-1			FESTO	PUN10x1.5
		Water-OUT	and	Power-Supply-2				

6.2 Connectors Pinning

1. X1 400V~/50 Hz -- 3 Phase 1,5 mm²

Pin	Name	Definition
1	**U … (L1)**	400V~ / 50Hz (47-63Hz)… Phase-1
2	**V … (L2)**	400V~ / 50Hz (47-63Hz)… Phase-2
3	**W … (L3)**	400V~ / 50Hz (47-63Hz)… Phase-3
4	**N**	… not used
PE	**PE**	Protective Earth

2. X2 230V~/50 Hz -- 1 Phase 1,0 mm²

1	**N**	N - 230V~ / 50Hz (47-63Hz)
2	./.	
3	./.	
4	./.	
5	./.	
6	**L**	L - 230V~ / 50Hz (47-63Hz)
PE	**PE**	Protective Earth

3. X3-1 MW-Head-1 230V~ 1,0 mm²
X3-2 MW-Head-2 24V 0,75 mm²

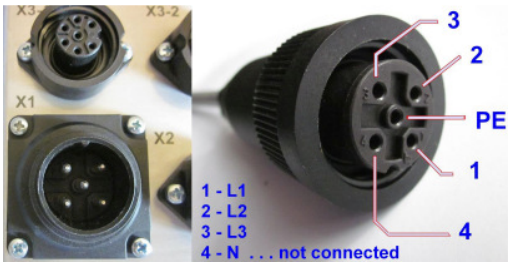
1	**N-HEAT**	N - 230V~ / 50Hz (47-63Hz)
2	**Water-guard**	IN: 0V=Err 24V=No Error
3	***+24V***	***Intern 24V power-supply***
4	**Temp-2-Hi**	IN: 0V=Err 24V=No Error
5	**ARC**	IN: 0V=Err 24V=No Error
6	**L-HEAT**	L - 230V~ / 50Hz (47-63Hz)
PE	**PE**	Protective Earth

4. X4 Reflected-Power 0,75 mm²

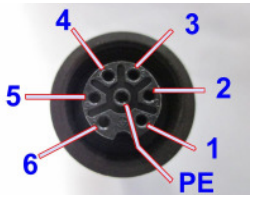
1	**Forward Power 1**	NOT connected at moment
2	**Reflected Power 1**	INPUT: 0 .. 10 V
3	./.	
4	**Reflected Power 2**	INPUT: 0 .. 10 V
5	**Forward Power 2**	NOT connected at moment
6	**GND**	Ground

5. ILOCK Interlock 0,75 mm²

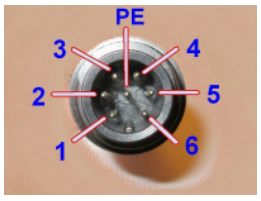
1	***+24V/max 50mA***	***Intern 24V power-supply***
2	***GND***	***Intern GND power-supply***
3		
4	**HV-ON**	Indicates HV-ON
5	**HW-ILOCK-IN**	Hardware-ILOCK extern connected
6	**Cool-extern**	Cool-Extern input for detection



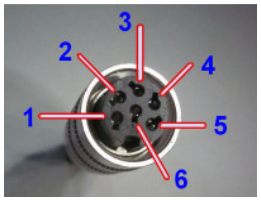
400V / 3 Phase



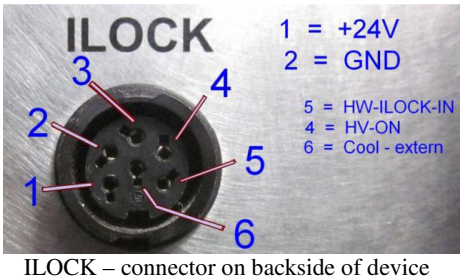
230V / 1 Phase



MW-Head



Reflected - Power



ILOCK – connector on backside of device