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**WORK INSTRUCTIONS FOR INSTALLING THE MHCT400CXE BALLAST (I4009460)  
AS A REPLACEMENT IN: TITAN 180-series, TITAN 300-series and TITAN 400-series**

**PREVIOUSLY USING BALLASTS:**

**180-Watt Systems**

I3000148 - Warner 70-223201

I300120 - Excelitas-Perkin Elmer PS175-2

**300-watt systems**

I3000097 - Warner 70-223221

**400-watt systems**

I4009405 - Warner 70-40000

**WARNINGS**

The MHCT400CXE Ballast (I4009460) is a UNIVERSAL BALLAST and therefore must be pre-set for the installation into which it will be installed.

**Incorrect settings of the amperage jumpers PRIOR to the unit being powered on for the first time after installation may result in lamp damage and/or explosion; therefore, all power-on operations must be performed with the COVER ON and operators are to wear eye protection when installing and testing the ballast.**

Replacement units will be shipped pre-set and tested; the above warnings serve as an additional check prior to field installation.

Persons installing replacement ballast must be familiar with common electrical medical device safe wiring practices.

The installer assumes all responsibility for confirming correct installation per these instructions and ensuring the device is conformant to all original specifications and safety regulations.

Work on the illuminator from the REAR for ease of references in this instruction.

## TITAN OLD BALLAST REMOVAL

Disconnect power cord.

Remove top cover.

Retain screws to reinstall top cover.

Make sure power cord is disconnected and discharge capacitor as follows:

### EXERCISE CAUTION:

**Ensure power is off and unit is disconnected from power feed.**

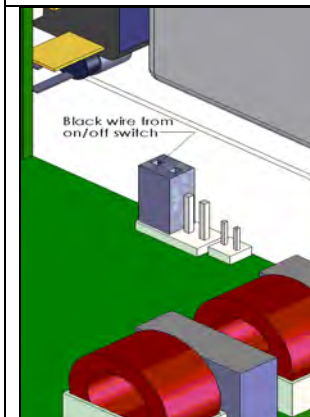
**Discharge the ballast capacitor by shorting the lamp power pins safely by holding the INSULATED PORTION of an insulated screwdriver, where metal part of screwdriver is to make a momentary contact with both pins on the ballast.**

Compare the Kit Model Number on the underside of the Ballast against the Product Model Number on the rear placard and confirm using Attachment 1 that the correct Ballast has been supplied for your installation. If this is incorrect, contact Sunoptic Technologies® Customer Service for assistance.

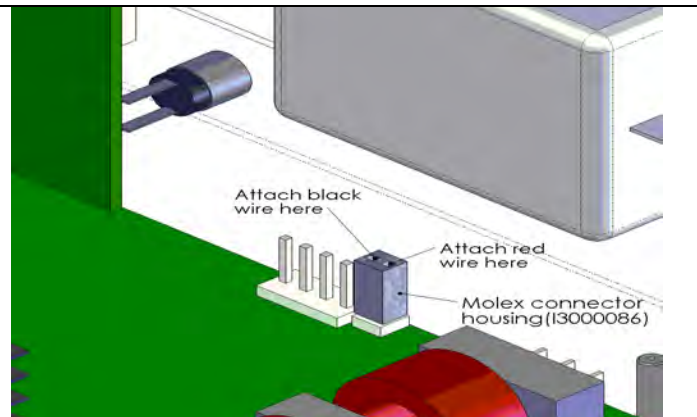
Remove large white wires connecting ballast with the lamp and discard them.

Study this picture then read on:

Accessory Power connection on Warner PS



Light Enable connector on Warner PS



Note that the existing "Accessory Power Circuit" has Molex pin (I2000022) on 25" red wire from NO (normally open) position on limit switch and is inserted into Molex connector housing (I2000021) and black wire with Molex pin (I2000022) in same Molex connector housing (I2000021). Reference to J7 connection point on the ballast board made by Warner.

The housing is attached to 12VDC power terminal and secured with wire tie.

The existing "Light Enable Circuit" has Molex housing (I3000086) and pins

(I3000085). Reference to J8 connection point on the ballast board made by Warner.

After disconnecting Molex connectors from “Accessory Power Circuit” and “Light Enable Circuit”, cut off Molex housings and and discard. It is important to keep these wire pairs separate, as both pairs will be attached to a new harness via Quick Connectors.

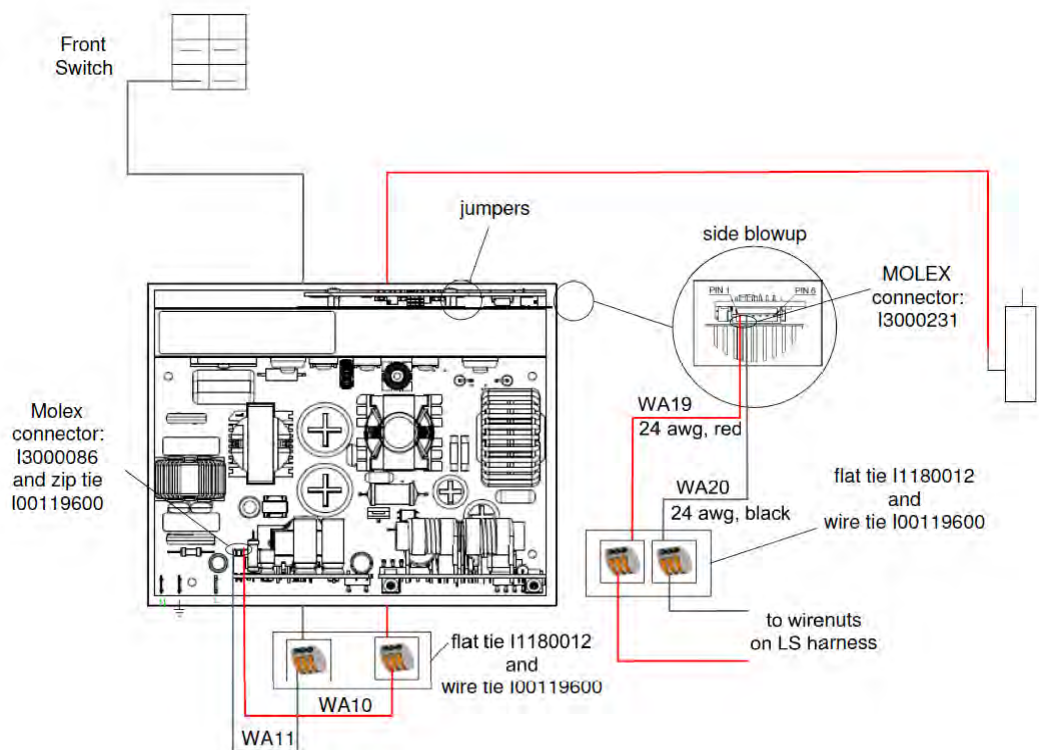
Unscrew bottom standoffs and pull power supply with aluminum plate out of the housing. Save the screws for remounting the new ballast later.

Discard the standoffs.

Disposition the ballast and dispose according to applicable electrical waste regulations for your jurisdiction.

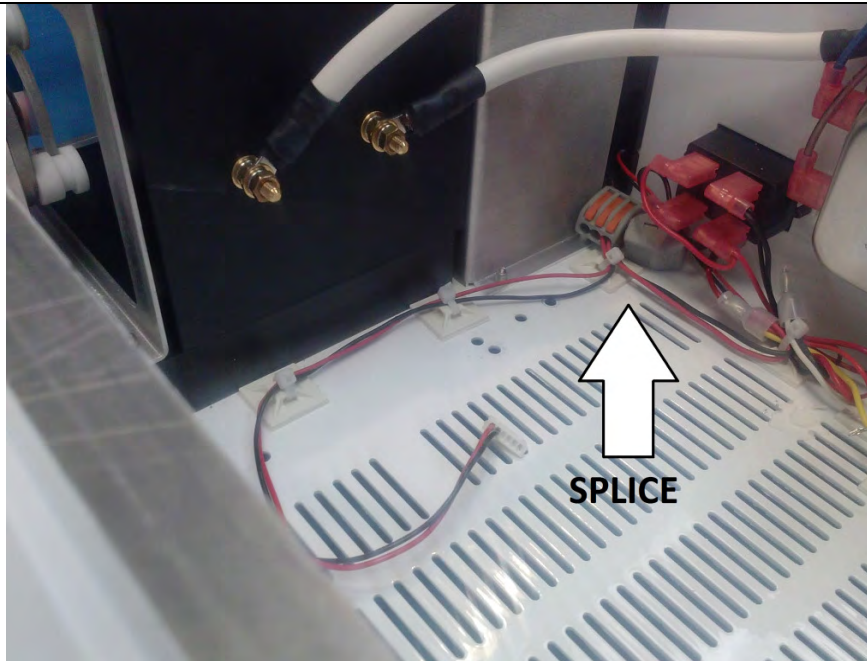
## TITAN NEW BALLAST INSTALLATION

In installation of new Ballast it is necessary to have wire spliced as per next schematic:



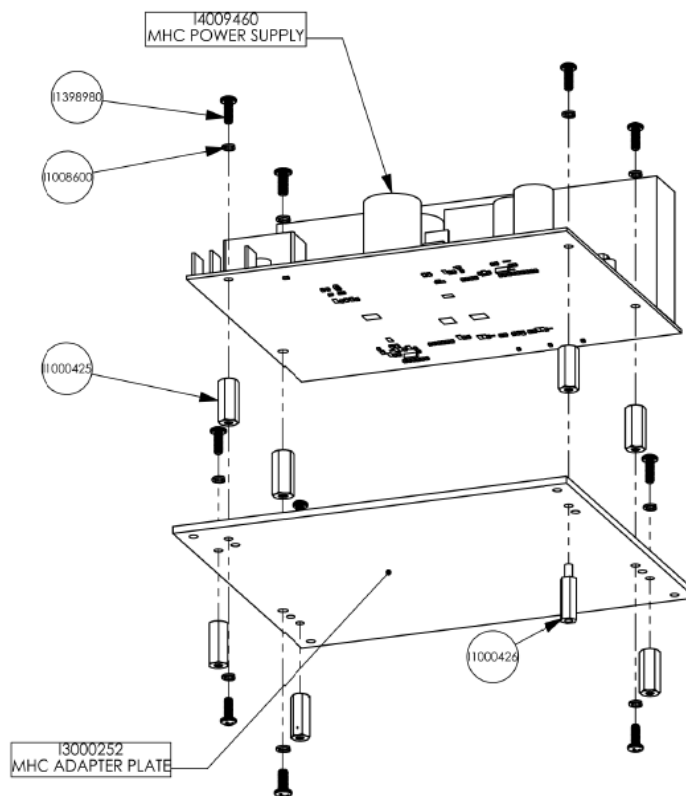
Using Quick Connectors splice WA19 and WA20 with Red and Black wires in Light Source harness leading to wire-nuts.

Secure Quick Connectors to the enclosure bottom using supplied Flat Tie Holder (I1180012) and Plastic Wire Tie (I001196000) and route the wires bellow and away of lamp connectors.



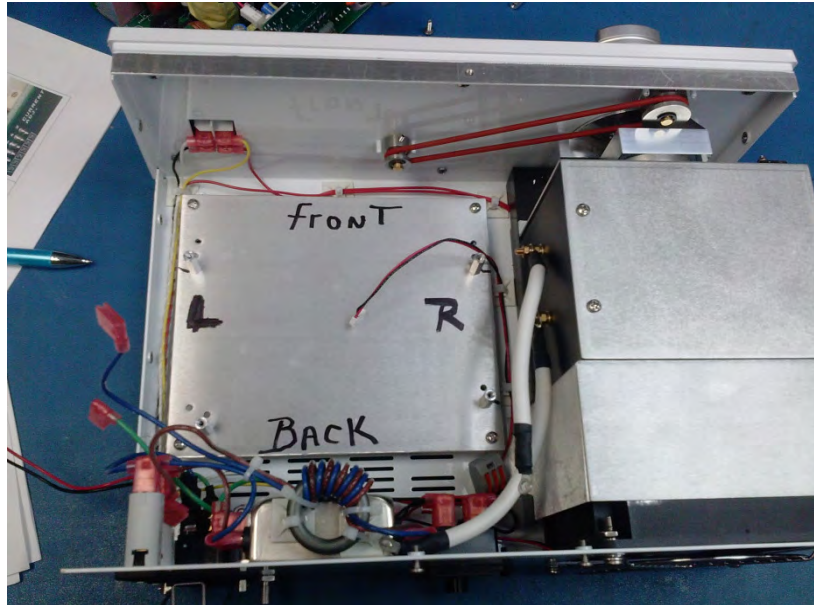
Install ballast plate in to the LS housing using saved mounting screws per schematic:

### MHC POWER SUPPLY ASSEMBLY

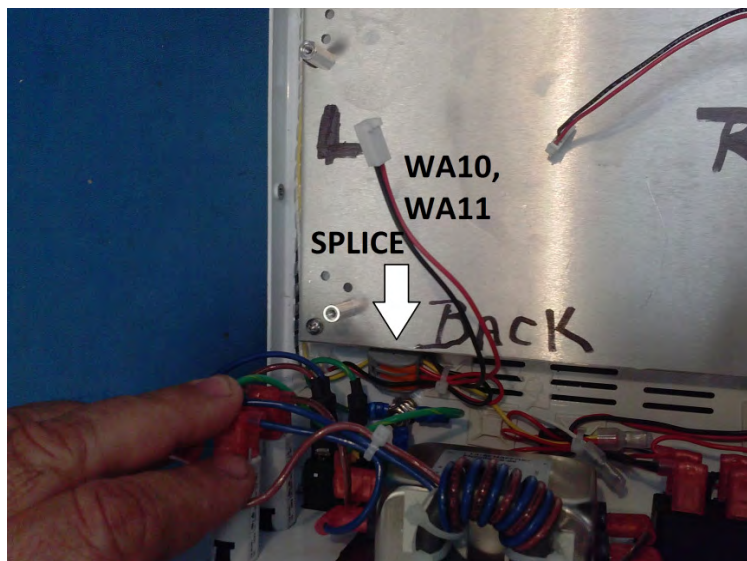




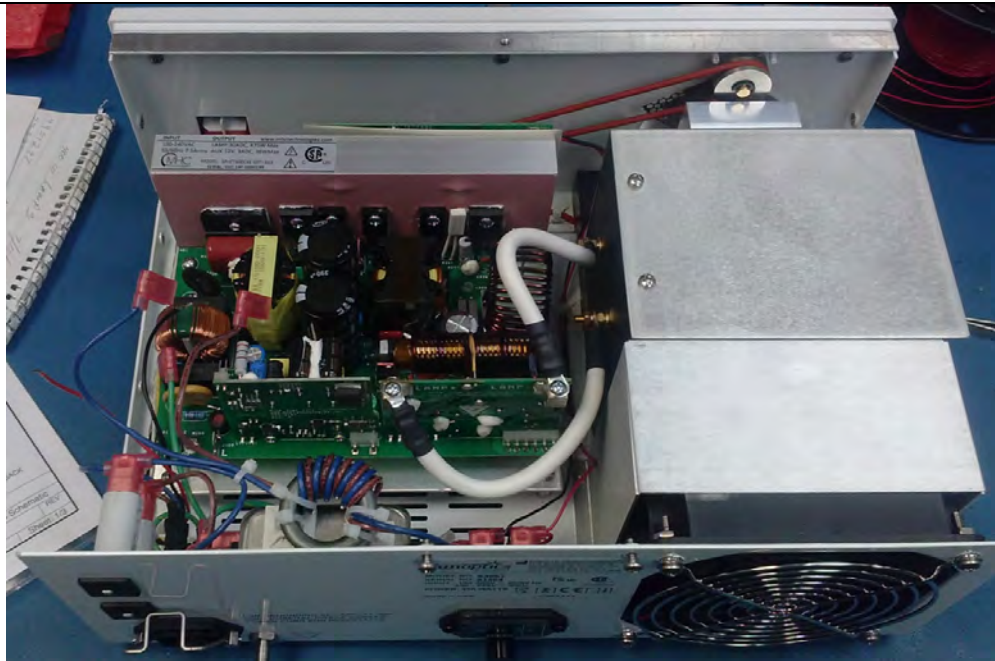
Note "FRONT" and "BACK" markers on the plate as on next picture:



Using Quick Connectors splice WA10 and WA11 with Red and Black wires in the Light Source leading to Lamp Door Switch and Front Switch. Secure the splice to the housing bottom as on next picture:

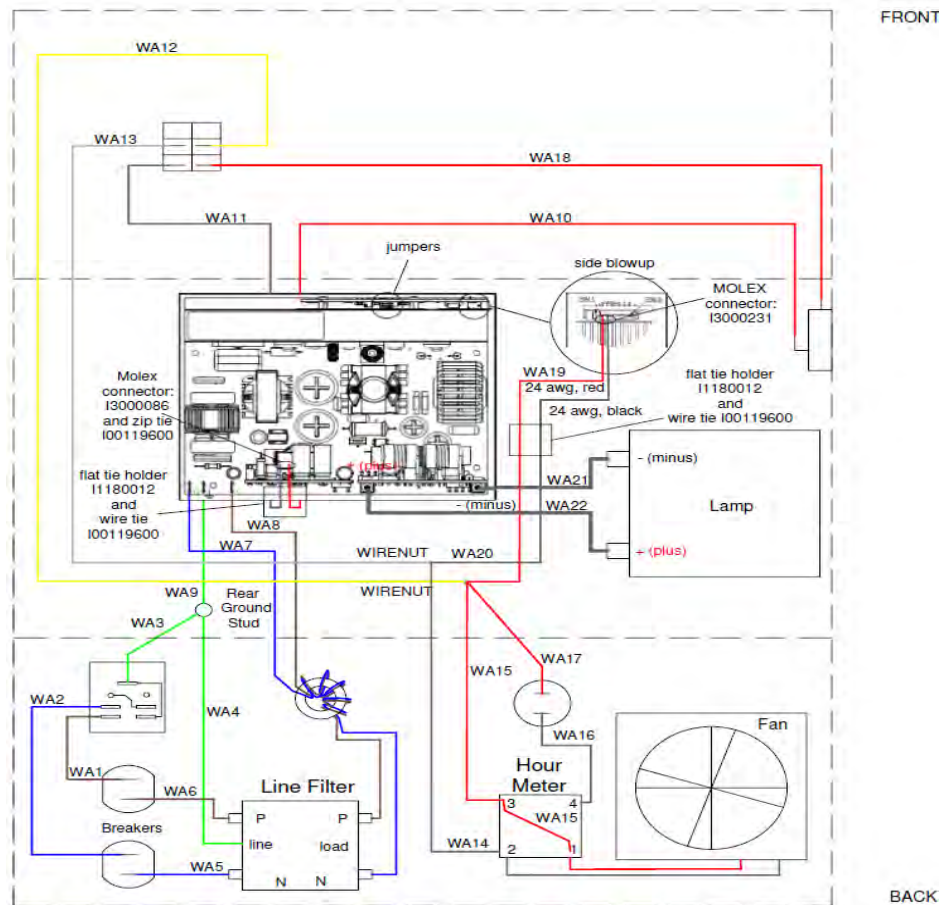


Install ballast on to the plate per previous schematic with the ballast heatsink to the FRONT of the cabinet.



## TITAN WIRE CONNECTIONS

Refer to next electrical schematic closely before proceeding:



## POWER FEED:

Install Blue WA7 (for N) and Brown WA8 (for L) to the Ballast terminals N and L respectively and to the front power switch and route under the ballast and away from all moving parts.

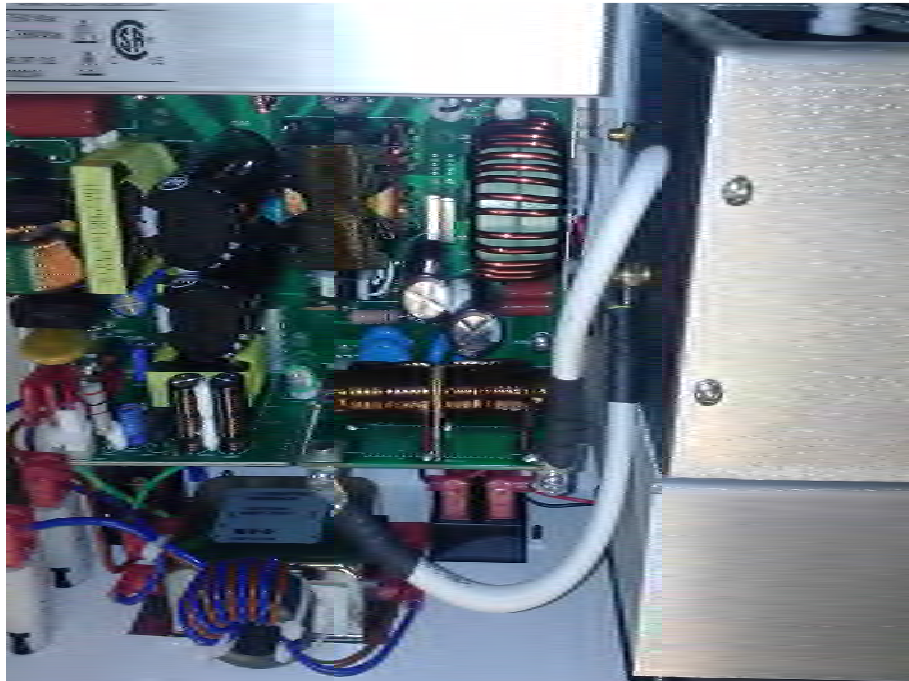
Reconnect the Green Ground Wire WA9 to the ballast at the GROUND indicator thereupon.

## LAMP POWER LEADS:

Install new lamp power leads (thick white wires) indicated as WA21 and WA22 as shown in the picture. Ensure LAMP + on the ballast connects to the rear/back orientation of the lamp terminal and the ballast LAMP – connects to the front lamp orientation of the lamp terminal as shown below.

**REVERSAL OF LAMP LEADS MAY DAMAGE BALLAST AND LAMP !**

### **FRONT OF ILLUMINATOR / LAMP HOUSING**



### **REAR OF ILLUMINATOR / LAMP HOUSING**

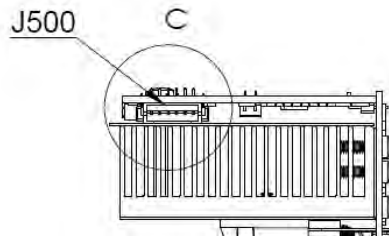


**ACCESSORY LEADS: FAN AND HOUR METER**

Plug in Connector on Black WA10 and Red WA11 to J401 on the new Ballast 12VD + and -, and secure it with Wire Tie.

**LAMP ENABLE LEADS:**

Plug in 6 pin Connector on WA19 and WA20 in to J500 on side of Ballast heatsink as on picture:



After reconnecting “Accessory Circuit” and “Light enable Circuit”, recheck its connections according to previous electrical schematic:

**TITAN  
NEW BALLAST  
PRESET  
CHECK**

ENSURE THAT THE CORRECT LAMP WATTAGE IS LISTED ON THE LAMP MODULE THAT IS TO BE USED IN YOUR ILLUMINATOR



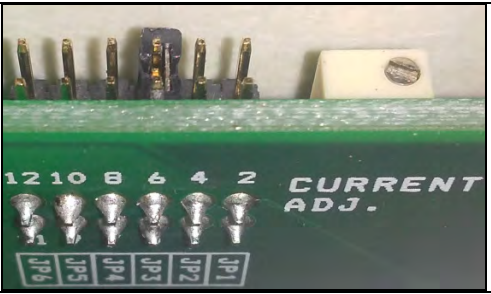
CROSS-CHECK THAT THE JUMPERS ON THE BALLAST PROVIDED MEET THE FOLLOWING TABLE FOR THE SERIES AND MODEL OF ILLUMINATOR YOU ARE WORKING WITH.

IF ANY OF THESE CROSS-CHECKS ARE INCORRECT CONTACT SUNOPTIC TECHNOLOGIES CUSTOMER SERVICE FOR INSTRUCTIONS TO CORRECT THE CONDITION.

JP300 Jumper table						
Jumpers Name	JP6	JP5	JP4	JP3	JP2	JP1
Titan 400				IN		
Titan 300			IN			
Jumper positions non marked mean its jumper is OUT						



The jumper in supplied new PS assembly on position :

<p>Titan 180 Jumper Position JP6</p> 	<p>Titan 300 Jumper Position JP4</p> 
<p>Titan 400 Jumper Position JP3</p> 	

## TITAN POWER-UP CHECK

Re-install cover and screw closed and make sure front switch and back power switch are in off position.

Connect the power cord to the rear of the unit.

Place the lamp inside illuminator.

Close the lamp door fully to engage lamp door switch.

Turn back power switch on.

Turn front power switch on.

Turn dimming knob fully counter clock wise.

The light source should be emitting light and back fan running.

If not, turn both power switches off, unplug the device, remove top cover and double check if wiring in the device matches the schematic and photos provided

## APPLICATION CHART

SERIES	ILLUMINATOR REAR PANEL MODEL NUMBER	POSSIBLE FORMER BALLAST	MHC REPLACEMENT
TITAN-180 (original)	TITAN 180		KIT-TITAN-WARNER-MHC-180
	TITAN 180-IND		
	TITAN 180-CMP		
	T-LS180130508		
	T-LS180130515	Excelitas (Perkin-Elmer)	
	T-LS180130522	PS175-12	
	S180T	I3000120	
	S180T-IND		
	S180T-CMP	Warner Power	
	T-LS180130408	70-223201	
	T-LS180130415	I3000148	
	T-LS180130422		
	T-LS180130422		
TITAN-300	S300T		KIT-TITAN-WARNER-MHC-300
	TITAN 300		
	S300T-IND		
	S300T-CMP		
	T-LS300130409		
	T-LS300130416	Excelitas (Perkin-Elmer)	
	T-LS300130423	PS300-12 (Y1864)	
		I3000064	
		Warner Power	
		70-223221	
	I3000097		
TITAN-400	S400T		KIT-TITAN-WARNER-MHC-400
	TITAN 400		
	IB6620240		
	S400T-IND		
	S400T-CMP		
	T-LS400130410		
	T-LS400130417		
	T-LS400130424	Warner Power	
	70-400000		
	I4009405		