

SYNERJI TRAILING EDGE BELL-PRESS LED DIMMER DATA SHEET

- ✓ MINI-T-LED-125W
- ✓ SDIM-T-LED-500W
- ✓ SDIM-T-LED-800W

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 230VAC, 50Hz, IP20



1. TECHNICAL SPECIFICATIONS – BELL-PRESS

ELECTRICAL SPECIFICATIONS

Normal Operating Voltage	190-253VAC, 50Hz ±5%
Dimming Method	Trailing Edge
Minimum Operating Voltage	100VAC ⁽³⁾
Max. Wire Resistance (bell-press control)	50kΩ
Minimum Load Power ⁽⁴⁾	125W, 500W and 800W models
• Resistive	2W
• Inductive	Not Compatible
• Electronic Transformer	2W ⁽¹⁾
Maximum Load Power	See table below
Retain Memory After Power Failure	Yes ⁽²⁾
Brown-Out Protection	Yes
High Frequency AC transient protection	Yes
Surge Protection	Yes (in accordance with IEC61000)

LOAD COMPATIBILITY AND MAXIMUM RATINGS

Model	Dimming Method	Wire Wound & Inductive Loads	230VAC, Resistive & Electronic low voltage	230VAC & 12V LED ^(5/6)	Fluorescent & CFL
MINI-T-LED-125W	Trailing	NOT Compatible	125VA (230VAC) 0.55A rms	YES	NOT Compatible
SDIM-T-LED-500W	Trailing	NOT Compatible	500VA (240VAC) 2.1A rms	See Shuttle LED compatibility chart	NOT Compatible
SDIM-T-LED-800W	Trailing	NOT Compatible	800VA (240VAC) 3.3A rms	See Shuttle LED compatibility chart	NOT Compatible

ENVIRONMENTAL

Operating Temperature	-5 - +45°C
Storage Temperature	-30 - +80°C
Maximum Housing Temperature	80°C
Relative Humidity	90% (non condensing)
Enclosure	125W - 36 x 36 x 12mm Plastic 500W - 42 x 42 x 13mm Black Aluminium 800W - 42 x 42 x 13mm Black Aluminium

SOFTWARE FEATURES

Microprocessor Control	Yes
Soft Start and Soft Off	Yes
Bell-press Control	<i>Continuous cycling</i>
Minimum Intensity Control	Yes
Memory	<i>Yes, returns to previous dimming level when turned on, except after a power failure⁽²⁾</i>

CONFORMITY

EMC	SANS 215, CISPR 15:2009 SABS CISPR 22:2008
Safety	IEC 60669-1:2007, SANS 60669-1: 2007 IEC 60669-2-1:2009, SANS 60669-2-1:2009
Immunity	SANS 61000-4-4 (2011), IEC 61000-4-5 (2011) Electrical Fast Transient / Burst
Quality Management	KIWA ISO 9001:2008
SABS/NRCS Approval	1407115

- (1) *Most electronic transformers require a minimum load of at least 20W, but it could be higher depending on manufacturer*
- (2) *If the dimmer was on during a power failure, it will turn on at 50% intensity when power is restored, irrespective of dimming level before the power failure. If the dimmer was off during a power failure, it will remain off when power is restored.*
- (3) *Incandescent load. Minimum operating voltage with electronic transformer is dependant on the specific transformer's specifications. Continuous operation at supply voltages below the normal operating voltage is not recommended*
- (4) *Minimum load depends on type of load*
- (5) *Only compatible with low voltage dimmable LED lamps with manufacturer approved electronic transformers*
- (6) *Please refer to Shuttle document "SDIM Maximum load theory" and associated compatibility chart*

2. DIMMER MAXIMUM LOAD RATING

Incandescent and halogen lamps normally have a unity power factor and the maximum dimmer load is then equal to the dimmer rating. However, some loads might have a lower power factor which imposes a limitation on the maximum dimmer load.

The dimmer maximum load rating can be calculated as follows:

$$\text{Max load} = (\text{Dimmer VA rating}) \times (\text{Load power factor})$$

For example, if a 500W dimmer model is used and the load power factor is 50%, then the maximum allowable load is 250W.

Please note: if the load current waveform has a high harmonic content under dimming conditions (most dimmable LED lamps) the guidelines in Shuttle document "SDIM Maximum load theory" must be followed to calculate the maximum permissible load.

MORE THAN ONE DIMMER PER WALL BOX

There is no allowance in the IEC or SABS/SANS specifications for dimmers to be tested or qualified for more than one dimmer per wall box. It is however often desired to install more than one dimmer per switch box. In these cases it must be kept in mind that a dimmer does heat up the air inside a closed space and two or more dimmers in the same closed space will hence influence each other's maximum load and temperature ratings. Ideally the additional dimmers should be installed remotely (in the ceiling or roof), or the dimmers should be de-rated.

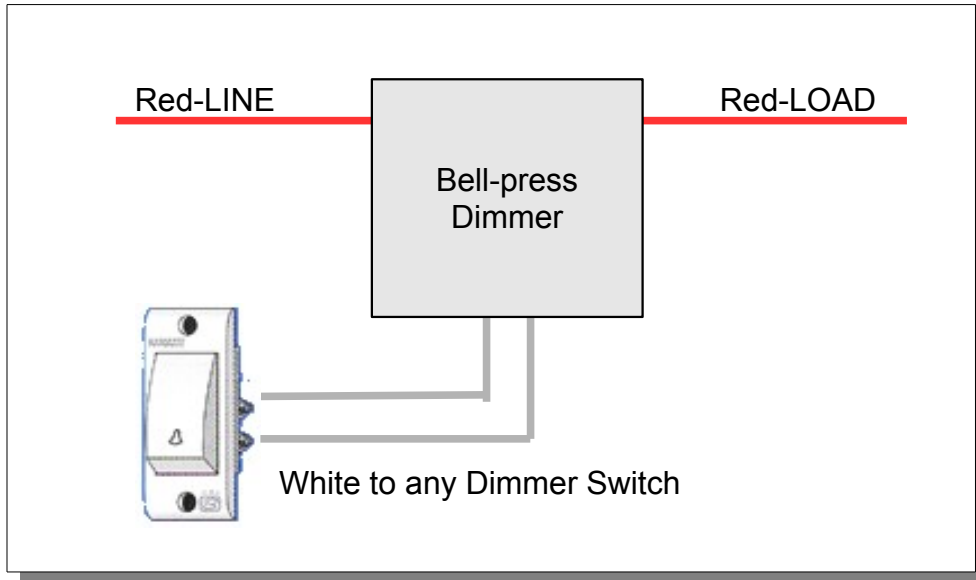
There is no de-rating factor available from the international specifications, but Shuttle recommends that the maximum dimmer VA rating (or maximum load per dimmer) be de-rated by 1.15 times the number of dimmers inside the same enclosure, as follows:

$$\text{Dimmer reduced VA(max load) rating} = \frac{\text{Dimmer VA rating (calculated max load)}}{1.15 \times (\text{Number of dimmers})}$$

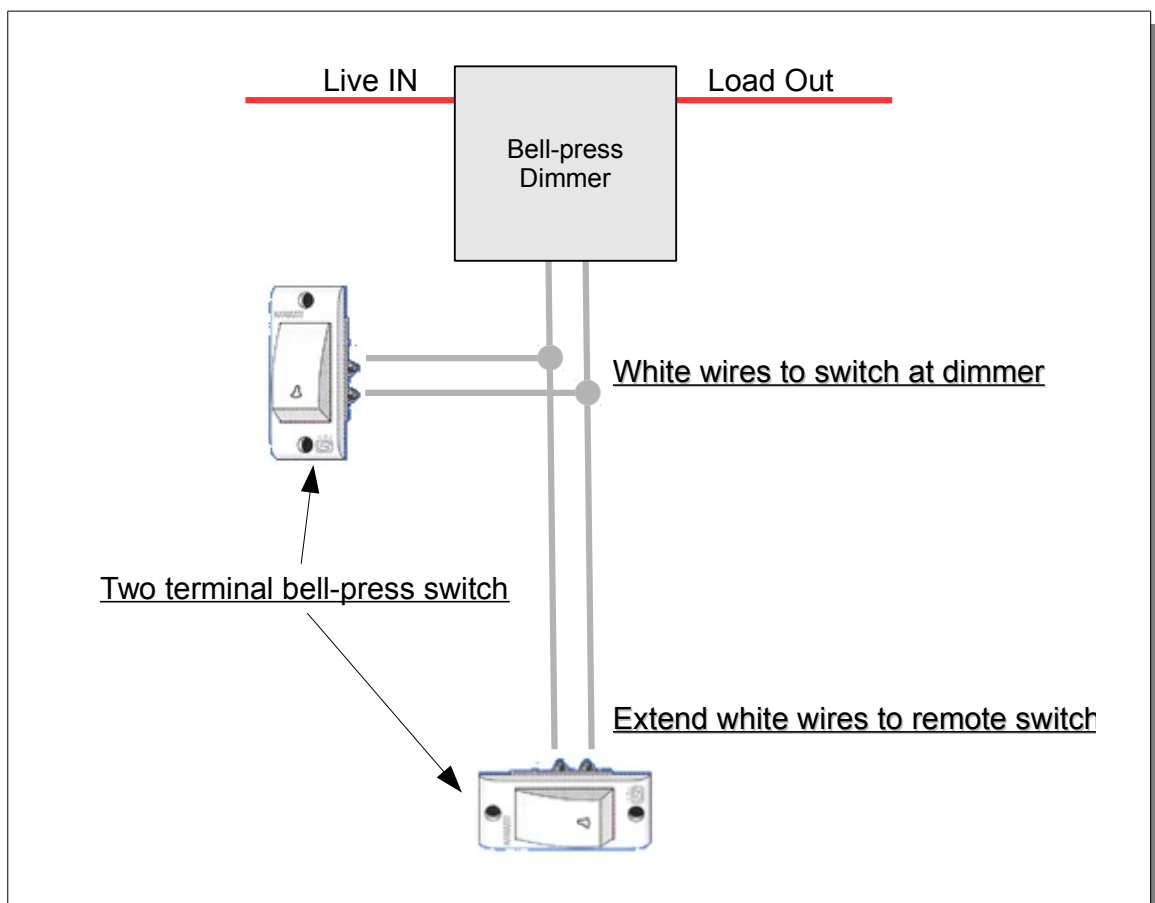
For example, if two 500W dimmers are being installed in the same wall box, each dimmer's VA rating is de-rated to 217VA each. Similarly for three 500W dimmers, each dimmer is de-rated to 145VA. The normal dimmer maximum load for non-unity loads must however still be obeyed. Hence in the example of the three dimmers, if one load has a unity power factor, that dimmer's wattage rating is 145W and if the other two loads have a 50% power factor, each of the corresponding dimmers will have a maximum load rating of 73W.

3. WIRING DIAGRAMS

SINGLE SWITCH INSTALLATION



MULTIPLE SWITCH INSTALLATION



4. INSTALLATION INSTRUCTIONS

- Installation must be carried out by a qualified and registered electrician
- Installation must be carried out in accordance with the local code of practice
- Wire the mains connections according to the relevant wiring diagram and connect a mains rated normally open (N.O.) bell-press switch to the two white wires
- Never connect the white control wires to mains live, neutral or earth
- Install only one dimmer per wall box
- Internal use only
- Do not install or operate close to flammable materials
- For two or multiple way switching: connect the two white wires to the other switch(es) - NO mains live, neutral or earth should be connected to any of the switches

5. GENERAL OPERATING AND PROGRAMMING INSTRUCTIONS

➤ TURNING THE LIGHT ON OR OFF

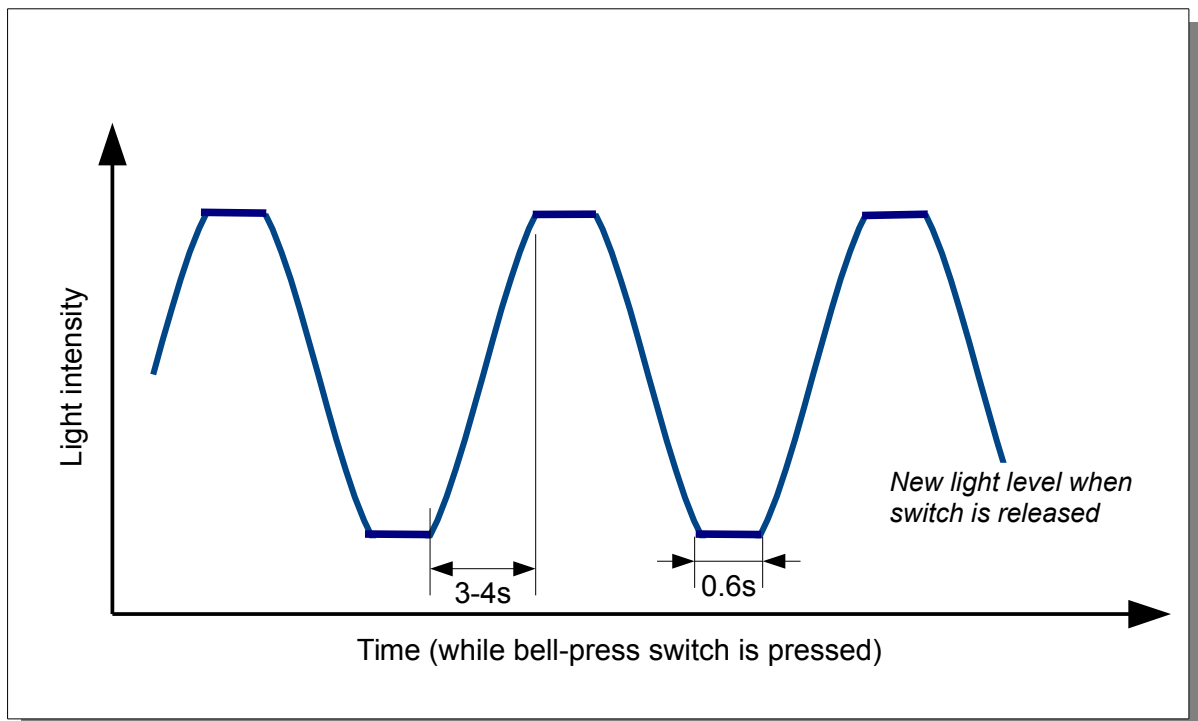
Press and release the bell-press switch once to turn the dimmer (light) on or off. The dimmer will remember the last dim level (light intensity) where it was turned off and return to the same light level when turning on again.

If the bell-press switch is pressed and not released when turning the dimmer on, the dimmer will turn the light on to it's previous level when it was turned off, wait for 1.5 seconds to ensure that the startup conditions are met and then start to dim until the switch is released as is described below.

➤ DIMMING UP OR DOWN

When the light is on, press the bell-press switch (do not release immediately, the dimmer will turn off). The light will dim either up or down, release the switch at the desired light level. Should the dimming direction be incorrect, release the bell-press switch momentarily and press and hold again, the dim direction will be reversed. This process can be repeated continuously should a very specific light level be desired.

If the bell-press switch is continuously pressed while the light is on, the light intensity will continuously cycle between minimum and maximum with a slight delay when maximum or minimum light intensity is reached (see diagram below). When the bell-press switch is released, the light level will remain at the intensity at the instance when the switch was released.



➤ MEMORY AFTER POWER FAILURE

The dimmer has non-volatile memory which retains its settings during a temporary or prolonged (up to 10 years) power failure. Some operating mode information is stored in this memory (see also below), such as whether the dimmer is on or off. This enables the dimmer to mimic the behaviour of a mechanical toggle switch. Therefore if the light was off before a power failure, it will remain off when power is restored. Similarly, if the light was on before a power failure, the light will come on when power is restored again. However, to conserve energy, the light will always be restored to approximately 50% intensity, irrespective of the light level when the power failure occurred.

➤ SETTING THE MINIMUM DIM LEVEL (MINDIM^T) TO OTHER THAN FACTORY DEFAULT

It is often desirable not to dim the lights to the minimum that the dimmer allows. Some international dimmers are equipped with a method of adjusting the dimmer's minimum level, but this usually involves removing the switch or faceplate to adjust a mechanical screw. The Shuttle SDIM range of bell-press dimmers are however equipped with a patented simple and user friendly method of accomplishing this.

Dim the light to a comfortable or desired minimum light output. Press the bell-press switch eleven (11) times fairly quickly (between 0.2 and 0.3 seconds apart). The light will then immediately go to full brightness to indicate that the "programmed" minimum light level is stored to permanent memory (retained after prolonged power failure). When the light is now dimmed, the light level will not go below the stored level. To ensure that the user does not accidentally set a very high light level as the minimum, the dimmer will not allow a level above approximately 35% of the maximum light level to be saved. Should the switch be pressed 11 times if the light level is above the approximate 35% limit, the dimmer will store 35% as the new minimum level.

➤ SETTING THE MINIMUM DIM LEVEL (MINDIM^T) TO LOWER THAN FACTORY DEFAULT

As above, it is sometimes desirable to dim lower than the factory default as follows: dim the light to a low level and press the bell-press switch nine (9) times fairly quickly (between 0.2 and 0.3 seconds apart). The light will then immediately go to full brightness to indicate that the "programmed" minimum light level is stored to permanent memory (retained after prolonged power failure). When the light is now dimmed, the light level will dim lower than factory default.

TIP: If the new lower than default light level is possibly a bit too low, the minimum level can still be set with the 11-click method above.

➤ SETTING THE MAXIMUM DIM LEVEL (MAXDIM^T)

It is sometime desirable not to dim the lights to the maximum that the dimmer allows.

Dim the light to a comfortable or desired maximum light output. Press the bell-press switch seventeen (17) times fairly quickly (between 0.2 and 0.3 seconds apart). The light will then immediately go to minimum brightness to indicate that the "programmed" maximum light level is stored to permanent memory (retained after prolonged power failure). When the light is now dimmed, the light level will not go above the stored level. To ensure that the user does not accidentally set a very low light level as the maximum, the dimmer will not allow a level below approximately 35% of the minimum light level to be saved.

➤ RESTORING THE DIMMER TO FACTORY SETTINGS

If a user previously changed any setting and wishes to restore to factory default, the process is equally simple.

Press the bell-press switch thirteen (13) times fairly quickly (between 0.2 and 0.3 seconds apart). The light will then immediately go to full brightness to indicate that all settings are restored to factory default and stored to permanent memory (retained after prolonged power failure). If the dimmer was in Synerji LED compatibility mode, the lamps will turn off and turn on again when resetting to factory default (see section 7)

TIP: Before restoring the factory default, first dim the light down. This will make it easier to see that the light go to full brightness to indicate that the setting was restored.

6. DIMMABLE LOW VOLTAGE (MR16) LED MODE

Please note: this mode is only available in the SDIM-T-LED models and should NOT be used for incandescent, halogen or 230VAC dimmable LED lamps – it's application is limited to dimmable LEDs with conventional electronic transformers only. Please refer to Shuttle compatibility chart

Most dimmable low voltage MR16 LED lamps in combination with conventional (halogen) electronic low voltage transformers are generally compatible with trailing edge dimming technology due to the virtually implicit high power factor requirements of the transformers to operate the LED lamps. The SDIM-T-LED version of the Shuttle dimmers is thus ideally suited for this type of load which ensures 100% silent operation and eliminates the higher inrush currents associated with leading edge dimming methods, thereby ensuring very low EMI and RF, a high LED load capability and reduced stress in the LED electronic components.

The factory default settings of the SDIM-T-LED are compatible with most dimmable MR16 LED's, but there could be instances where it is desirable or perhaps necessary to activate a patented MR16 LED compatibility mode on this dimmer model (refer to Shuttle compatibility chart).

When in the MR16 LED compatibility mode, the dimmer will adjust the following parameters:

- Higher minimum light level
- Slower dimming at low light output
- With very little load, some transformers might not turn on properly, especially at low light level. In this mode, the dimmer will attempt to “force” trigger the electronic transformer.

When in the MR16 compatibility mode, there minimum dim levels can be set as described in the previous section. Restoring the dimmer to factory default will however restore (cancel) the MR16 compatibility mode to factory default as well.

➤ ACTIVATING THE MR16 COMPATIBILITY MODE

Irrespective of whether the light is on or off, press the bell-press switch fifteen (15) times fairly quickly (0.2 - 0.3 seconds apart). The light will then immediately go to full intensity to indicate that the MR16 mode is stored to permanent memory.

➤ RESTORING THE MR16 COMPATIBILITY MODE TO FACTORY SETTINGS

Please follow the instructions for restoring the dimmer to factory default.

7. SYNERJI LED COMPATIBILITY MODE

The factory default settings of the dimmers are compatible with most dimmable LED's, but a slight flicker or shimmer might be encountered when dimming some Synerji LED's. In such cases, the the dimmer can be programmed for "Synerji mode", as follows:

➤ **ACTIVATING THE SYNERJI COMPATIBILITY MODE**

Turn the light on and press the bell-press switch seven (7) times fairly quickly (0.2 - 0.3 seconds apart). The lamp will then immediately turn off and automatically turn on to full intensity to indicate that the Synerji mode is stored to permanent memory.

If the dimmer is already in the Synerji mode, pressing the bell-press switch 7 times again will have no effect.

➤ **RESTORING THE SYNERJI COMPATIBILITY MODE TO FACTORY SETTINGS**

Press the bell-press switch thirteen (13) times fairly quickly (between 0.2 and 0.3 seconds apart). The lamp will turn off and automatically turn on to full intensity to indicate that all settings are restored to factory default and stored to permanent memory.

When the dimmer is set to "Synerji mode", the maximum and minimum dim levels (9, 11 and 17 clicks) can be set if required, but the "MR16 compatibility mode" is disabled and is only assessable after resetting the dimmer to factory default.

8. SUMMARY OF DIMMER SETTINGS

- **2 x bell-presses**
Turn lamp on to 50% intensity, irrespective of previous state – mostly for use with Shuttle Master Zone Controller (MZC)
- **7 x bell-presses** (*1)
Auto setting for the Synerji LED's
- **9 x bell-presses** (*2)
Set the minimum dim level to lower than factory default
- **11 x bell-presses** (*3)
Set the minimum dim level to a user selected level
- **13 x bell-presses** (*2)
Reset all settings to factory default
- **15 x bell-presses**
Compatibility mode for certain electronic transformer/LED combinations
- **17 x bell-presses** (*4)
Set the maximum dim level to a user selected level

*(*1) Setting required if flickering of Synerji lamps are encountered. If the dimmer accepts the setting, the lamps will turn off and then automatically turn on*

*(*2) Tip – first dim to a low intensity. If the dimmer accepts the setting, the lamps will go to full intensity. If dimmer was in “Synerji” mode, the lamps will turn off and on again.*

*(*3) If the dimmer accepts the setting, the lamps will go to full intensity*

*(*4) If the dimmer accepts the setting, the lamps will go to minimum intensity*

9. CONTACT DETAILS

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