

INSTALLATION INSTRUCTIONS

AUTOTEST MODULE

MAINTAINED MODULE FOR OPERATION OF BOTH T5 HIGH EFFICIENCY ('HE') AND T5 HIGH OUTPUT ('HO') FLUORESCENT LAMPS FROM NiCd OR NiMH BATTERY PACKS. CONTAINING 4 POLE C/O RELAY GIVING COMPLETE ISOLATION OF LAMP FROM BALLAST IN EMERGENCY MODE AND BALLAST SUPPLY DISCONNECT/DELAY CIRCUITRY

Module:	Reference	Cells	Rating	Duration	Lamps	
	AST504	5	4 Ah	3 hours	14W, 21W, 28W	T5 High Efficiency
	AST504/M1	5	1.5 Ah	1 hour	as above	
	AST505	6	4 Ah	3 hours	14W, 21W, 28W, 35W	T5 High Efficiency
	AST505/M1	6	1.5 Ah	1 hour	as above	
	AST506	6	4 Ah	3 hours	{ 24W, 39W, 49W, 54W	T5 High Output
	AST506/M1	6	1.5 Ah	1 hour	{ 22W, 40W, 55W, 60W	T5 Circular
					(18W, 36W, 58W	T8
	AST680	6 cells	4 Ah	3 hours	80W	T5, 70w T8

Battery cells: 5 cells or 6 cells: 4 Ah NiCd or NiMH for 3 hour duration, 1.5 Ah NiCd or 1.6 Ah NiMH for 1 hour duration.

GENERAL DESCRIPTION

The module comprises battery charger, solid state circuit operating changeover relay, electronic ballast live disconnect and delayed reconnect circuitry, deep discharge protection circuit and LED charge indicator. A pre-programmed microprocessor system routinely tests all functions of the emergency circuits reporting status through the LED. The method of connection is by terminal block and a quick release mechanism is fitted so that leads may easily be removed. Wires of cross sectional area 0.5 – 2.5mm² may be connected by pushing a solid conductor into the connection or operating the release mechanism to insert a stranded conductor. Earthing is achieved via the fixing screws.

EMERGENCY START-UP ('WARM START') AND RUNNING

When switching to emergency, a short delay occurs before the lamp strikes (1.5 seconds). This preheating of the cathodes in accordance with lamp manufacturers recommended start-up procedures. Cathode heating is also applied whilst the lamp is running. Together these features ensure optimum switching and service life from the lamp.

REMOTE MOUNTING OF MODULES

The ST range of modules has been specifically designed in a slim cross-section to enable integral conversion of most luminaires. If in special circumstances an integral conversion cannot be performed, the maximum length of the high voltage leads must not exceed 0.5m. The low voltage lead length must not exceed 2m. It is recommended that the inter-connecting conduit is constructed from individual conductors to reduce capacitive effects, which can attenuate the high frequency output voltage. **MINERAL INSULATED CABLES MUST NOT BE USED IN ANY CIRCUMSTANCE.**

TEMPERATURE

The ambient temperature range for the module is 0 – 55°C but in any event the centre side of can should not exceed 60°C.

BATTERIES

Mackwell supply a wide range of high quality battery packs for use with our products. They have all been designed to provide the 4 year life required by BS EN 60598-2-22 and ICEL 1001, when operated within the temperature range specified. The maximum operating temperature of Mackwell battery packs is detailed in our web site. This should not be exceeded, or the operational life of the cells will be reduced.

DEEP DISCHARGE PROTECTION

The module is fitted with a deep discharge circuit, which disconnects the battery after the cell voltage has dropped below the end of discharge level (1 volt per cell) and the circuit will remain inert until the supply is restored. This will protect the battery against the dangers of full and deep discharge.

FUSES

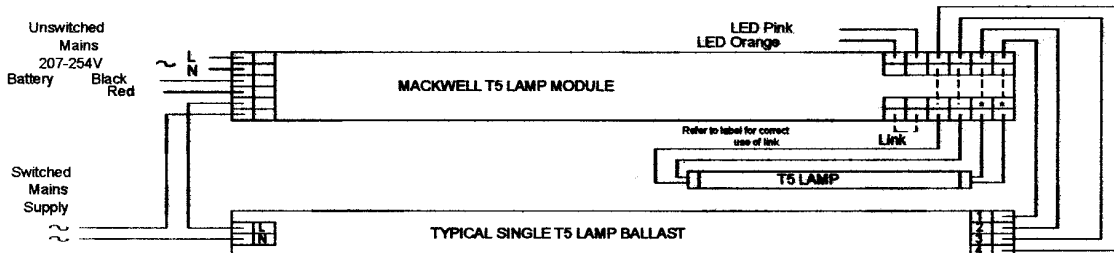
Battery A battery fuse is incorporated in the module to protect the battery from heavy discharge
 Charger Although the charger is already short circuit protected it may be desirable for isolation for isolation to include a 1A anti surge ('T' rated) fuse in the unswitched mains circuit



ELECTRICAL INSTALLATION

All units have a 4 + 1 pole changeover relay, which fully isolates the mains control gear from the module inverter. In addition the ballast disconnect switch ensures that the switched live feed to the ballast is switched off whenever the module operates in emergency mode. These features ensure total compatibility with all high frequency ballasts and compliance with EMC directive. **Compliance of the luminaire will be dependent upon wiring arrangement.** Lamp leads should be kept away from mains leads to avoid RFI transfer to the Live and Neutral connections. The fused terminal block should be situated so that the incoming mains leads are short. The polarity of the battery connections must be observed at all times, **irreversible damage to the module will occur if they are reversed.** To prevent premature lamp damage, after test the assembled luminaire should be energised for a minimum of 24 hours to fully charge the batteries. The un-switched supply should be left undisturbed during the commissioning and installation period, as otherwise lamp damage may occur.

CONNECTIONS



HIGH VOLTAGE WIRES FROM THE LAMP TO TERMINALS MARKED * SHOULD NOT EXCEED 0.5m

Module internal connections are shown dotted to illustrate the arrangement in 'mains healthy' mode. When electronic ballasts are being used, this will indicate the best connections to match high voltage leads and ensure critical lengths are not exceeded. Since this module features complete isolation of mains control gear from the inverter, the normal leads from mains gear to lamp should instead be connected to the 'ballast' terminals indicated on the label. Apart from keeping the cathode pairs together, orientation is unimportant. For diagrams showing the use of multi-lamp ballasts with our modules, please check our website www.mackwell.com or call our Technical Department.

OPERATION

The module routinely tests all functions of the emergency system and reports on status through the LED.

- A continuous green LED indicates**
- mains present and connected
 - battery present and in circuit
 - charge current satisfactory
- A flashing green LED indicates**
- lamp fault
- LED off indicates**
- battery fault or lack of mains

All fault indications persist until fault rectified and system reset.

The autotest system goes into self test mode within a period of 37 days from commissioning. The test schedule is programmed into the microprocessor during manufacture to ensure that no more than 15% of luminaires are on test in any one day. Tests are repeated on a 30 day time frame. **Three test durations are provided - 5 minutes/monthly - 60 minutes/6 monthly - 3 hours/12 monthly.**

- User reset facility**
- To reset the LED after the fault condition has been rectified, the user simply switches the switched or unswitched supply OFF/ON/OFF/ON within 10 seconds either external to or within the luminaire.
- Test report status**
- After each monthly test the memory status is incremented by one. The current status is displayed by the LED each time the mains are turned on. After a delay of 30 seconds the LED extinguishes (in groups of three to facilitate counting) to indicate the number of the next test to be carried out on an annual basis. The count is reset back to one after each annual test. In this way, users can be assured that essential monthly and annual tests have been carried out and compile any supporting records they may require.
- Audible alarm**
- An audible alarm will sound if a fault is found during a test. The alarm will sound 3 times every 35 minutes until the fault condition is rectified and the unit reset.

WARRANTY

All our electronic products are guaranteed for three years to cover both faulty workmanship and materials. This "Return to Base" warranty requires that the product is used within the terms and conditions stated above and in our literature, and in particular, modules must be used with the correct or approved battery pack. Items should be carefully checked thermally so that the specified temperatures are not exceeded under any conditions. Do not insulation test this product. Products returned to us under warranty must be carriage paid. Mackwell Electronics accept no liability for costs incurred. This does not affect your statutory rights.

Battery packs are guaranteed for one year, but when operating within the temperature specified in our web site have a design life in excess of four years as required by BS EN 60598-2-22.