



MAINS DISTRIBUTION UNIT

MDU12-Pxx

16/32 Amp Models

Television Systems Limited.

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SAFETY

1.0 Installation.

Unless otherwise stated TSL equipment may be installed at any angle or position within an ambient temperature range of 5° ~ 30° C.

The RJ45 connector is for use only with an Ethernet 10/100 system.

All TSL equipment conforms to the EC Low Voltage Directive:

EC Low Voltage Directive (73/23/EEC)(OJ L76 26.3.73)(LVD). Amendment: (93/68/EEC) (OJ L220 30.8.93).

CAUTION:

Always disconnect equipment connected to a powered MDU before performing any maintenance. Potentially hazardous voltages are present even after the operation or removal of a fuse, unless the front panel circuit breaker is set to OFF.

Earthing/Grounding

In all cases, the frame of the equipment must be earthed on installation. Connection to an earthed strip running the length of the frame is ideal.

The earth pin on the mains inlet connector is connected to the metal frame of the equipment, to 0 volts on the internal DC PSU and to signal ground, unless otherwise stated. All metal panels are bonded together. Rack mounted equipment must be earthed (grounded).

Mounting

Careful consideration of the equipment location and mounting in racks must be made. In particular, consideration must be given to the stability of free-standing racks by mounting heavy equipment low in the rack. The rear of the unit should be supported in the rack.

Power

No power supply cord is provided with this equipment but the inlet connector is. Use only correctly rated 3 core cable according to the rating of the MDU.

Ensure the supply is fed from a correctly rated breaker with a switched removable output. Ensure all wiring conforms to local electrical installation regulations.

This equipment is designed for installation in any position in a rack.

Consideration must be given to the supply circuit loading and switch on/fault surges that will affect overcurrent protection trips and switches etc.

Check that the fuse rating is correct for the local power (mains) supply. Replacement fuses must be of the same rating and type for continued protection against fire risk.

For individual high loads ensure that outputs are distributed evenly across the rear of the MDU.

Do not exceed the individual rating of 10A for each outlet.

The overall equipment rating is shown on the rear panel.

Do not switch on until all connections are made.

Ventilation

Due consideration for cooling requirements must be given when mounting the equipment. The equipment contains an internal temperature sensor.

General

If equipment is installed in a closed unit, consideration must be given to providing forced air cooling in order that the maximum recommended temperature is not exceeded.

WARRANTY, MAINTENANCE AND REPAIR

All TSL equipment is guaranteed for one year from the date of delivery to the customer's premises. If the equipment is to be stored for a significant period, please contact TSL concerning a possible extended warranty period.

Failure during warranty

If any TSL product should fail or become faulty within the warranty period, first please check the PSU fuses.

All maintenance work must be carried out by trained and competent personnel.

If equipment has to be returned to TSL for repair or re-alignment, please observe the following overleaf:

Technical support information

E-Mail address: support@tsl.co.uk

Telephone Support Number: +44 (0) 1628 670000

TSL Returns Procedure

Please telephone +44 (0)1628 676200 (Fax: +44 (0)1682 676299) and ask for Sales who will provide a Returns Number. This will enable us to track the unit effectively and will provide some information prior to the unit arriving.

For each item, this unique Returns Number must be included with the Fault Report sent with the unit.

A contact name and telephone number are also required with the Fault Report sent with the unit.

Fault report details required.

- Company:
- Name:
- Address:
- Contact Name:
- Telephone No:
- Returns Number:
- Symptoms of the fault (to include switch setting positions, input signals etc):

Packing

Please ensure that the unit is well packed as all mechanical damage is chargeable. TSL recommends that you insure your equipment for transit damage.

The original packaging, when available, should always be used when returning equipment.

If returned equipment is received in a damaged condition, the damage should be reported both to TSL and the carrier immediately.



EC DECLARATION OF CONFORMITY

Application of Council Directives Nos:
EC Low Voltage Directive (73/23/EEC)(OJ L76 26.3.73)(LVD).
Amendment: (93/68/EEC) (OJ L220 30.8.93).
Conformity Standards Declared:
EN 60950

EMC Directive: 89/336/EEC, Amended 92/31/EEC.
Conformity Standards Declared:
EN 50081-1, EN 50082-1

Manufacturer's Name: Television Systems Ltd
Manufacturer's Address: Vanwall Road
Maidenhead, SL6 4UB
England
United Kingdom

Type of Equipment: Mains Distribution Unit

Model No MDU12-PA, MDU12-PAi, MDU12-PM, MDU12-PMi, MDU12-PA-32A,
MDU12-PAi-32A, MDU12-PM-32A, MDU12-PMi-32A

Part Number: TSLP- MDU12-PA, TSLP- MDU12-PAi, TSLP- MDU12-PM,
TSLP- MDU12-PMi, TSLP- MDU12-PA-32A, TSLP- MDU12-PAi-
32A, TSLP- MDU12-PM-32A, TSLP- MDU12-PMi-32A

Date CE Mark Affixed: 11

I, the undersigned, declare that the equipment specified above conforms to the quoted Directives and Standards.

Place: Maidenhead, England

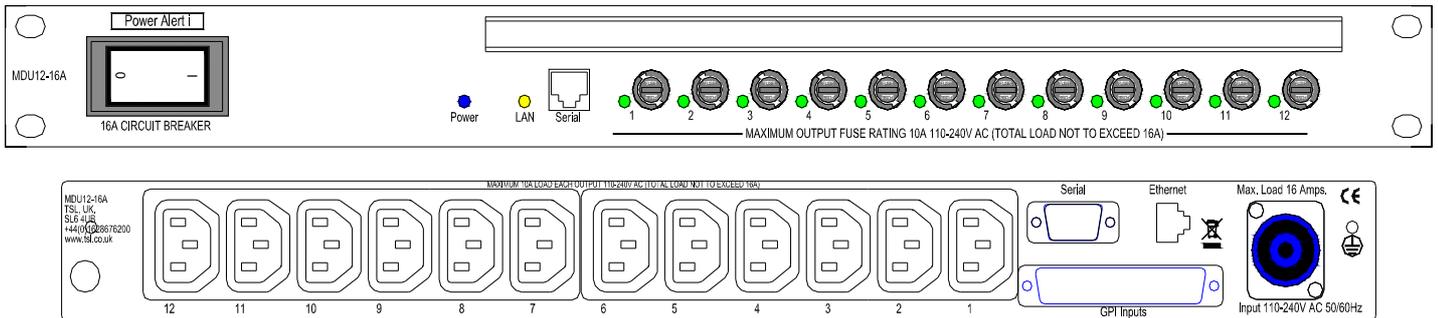
Signature: _____

Date: 01/04/11

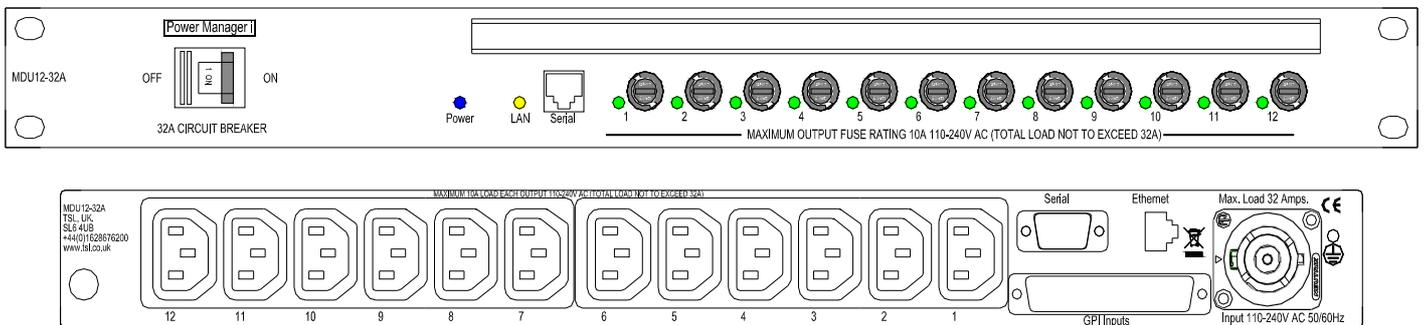
Print: A J Mackinder

Position: PRODUCT MANAGER

Power Alert & Power Manager Mains Distribution Units



16 Amp version front & rear.



32 Amp version front & rear.

2.0 Description

MDU part number definitions:

MDU12-PA-32A	32 Amp Power Alert with output monitoring & SNMP alarms over IP networks.
MDU12-PA	16 Amp Power Alert with output monitoring & SNMP alarms over IP networks.
MDU12-PAi-32A	32 Amp Power Alert with current sense & associated alarms over IP networks.
MDU12-PAi	16 Amp Power Alert with current sense & associated alarms over IP networks.
MDU12-PM-32A	32 Amp Power Manager as PA IP monitoring with output relays for full output control over IP networks.
MDU12-PM	16 Amp Power Manager as PA IP monitoring with output relays for full output control over IP networks.
MDU12-PMi-32A	32 Amp Power Manager as PM with current sense & associated alarms over IP networks.
MDU12-PMi	16 Amp Power Manager as PM with current sense & associated alarms over IP networks.

Full feature comparison chart available in Appendix 2

Features:

PA and PM Variants:

- 19" 1RU.
- 16Amp Double Pole Breaker /32A Single Pole Breaker (dependant on model)
- 12 Fused IEC outlets.
- LED Indication
 - Power - Blue - Power applied to the unit.
 - LAN - Flashing Amber LAN connected & active
 - Output LEDs 1-12
 - Green - Circuit on and fuse OK
 - Amber – Circuit off and fuse OK.

-
- Red – Circuit off and fuse failed.
 - Off – Circuit on but fuse has failed
 - Serial D9 & RJ11 set up ports.
 - Cable tie bar.
 - Ethernet SNMP status reporting and Email alerts for:
 - Each mains circuit (“i” Models).
 - 16 Opto-isolated GPI inputs via D37 connector.
 - Input mains failure.
 - Access to unit configuration and SNMP data via secure web browser interface.

PM Variants only:

- Relay controlled outputs with delayed power up.
- Latching relays are fitted to reduce internal heat dissipation as they draw no current once set.
- Outputs can be controlled via SNMP, or the secure web browser interface (which also provides SNMP control lockout per output if required).
- Start up can be immediate, sequential, or individual delay.

This 1RU unit is designed to fit into a rack in any position. The inlet is via a Neutrik Powercon connector NAC3FCA (16A) or NAC3FC-HC (32A). A free cable mounted connector is supplied with each unit.

Inputs:

16A Models: 16A MCB is fitted to the input.

32A Models: 32A MCB is fitted to the input

The rear 12 IEC outlets are via 10A fuses located on the front panel.

The MDU can accept up to 16 opto isolated GPI alarms on a D37F connector.

There is a rear D9F and front RJ11 port for TCP/IP programming requirements and a standard CAT5 RJ45 Ethernet socket for network connection.

3.0 Introduction

The MDU12 is available in both 16Amp and 32Amp versions of all models PA, PAi, PM and PMi. A full feature comparison list is available in Appendix 2.

The unit presents three control interfaces; web interface (http), SNMP interface, and the serial port on the rear of the unit.

The default IP address from the factory is 192.168.100.235, with a subnet mask of 255.255.255.0. The serial port interface can be used to set a new IP configuration and also to set a user name and password (needed to access the web pages). The power must be cycled after this operation for changes to take effect. Refer to section 5 p15 for initial configuration settings.

4.0 Operation

Upon connecting the unit to power it will go through a quick boot up procedure with the LEDs on PM units going from Red to Amber to Green and PA units lighting Green. When connected to a valid LAN the LAN LED will flash Amber.

On connection via an internet browser e.g. Windows Explorer using the IP address below the following screen will be seen. The unit is now on-line.

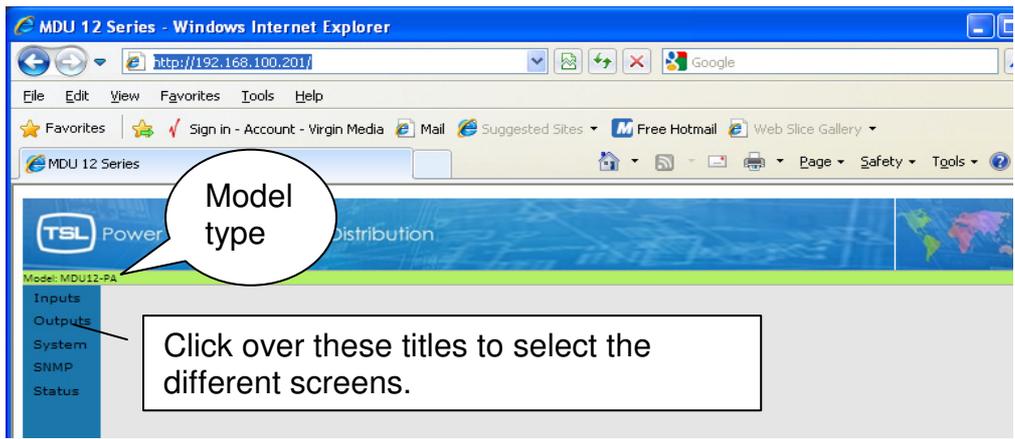
The default IP address is 192.168.100.235

The Username is <<root>>

The Password is <<telsys>>

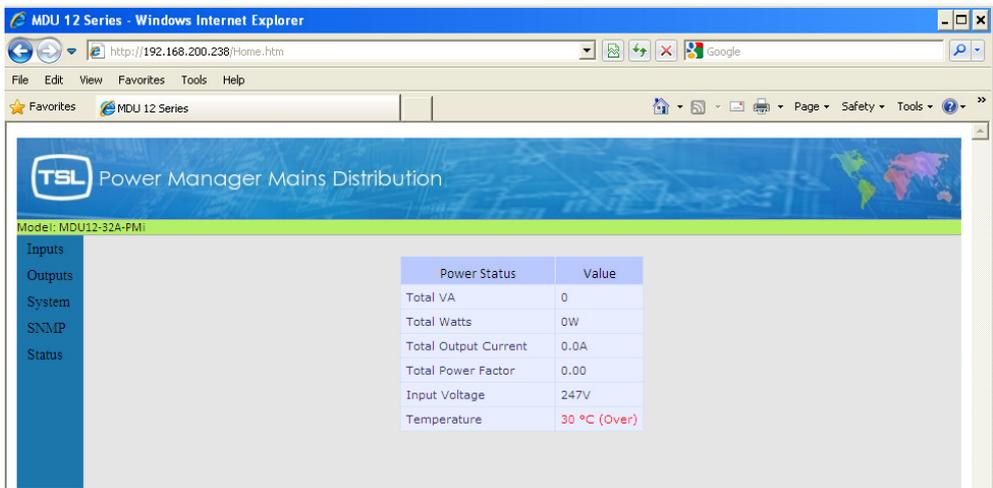


4.1 The Home Screen- PA & PM units.



This is the home screen for non "i" , (no current sense) versions of the PA/PM distribution units.

The Home Screen- PAi & PMi units.



This screen is shown only on "i" , current sense units and shows the temperature of the MDU, total power consumed by the MDU in Watts, VA, and current in amps with the power factor.

Should a unit exceed one of the user configurable threshold values the text will show in red with an indication as to the nature of the alarm. In the above example the temperature threshold has been set to 29 degrees Celsius in the System screen. The current temperature of the unit is 30 degrees and thus an alarm is triggered. The text displays red and the word "Over" appears in brackets beside the value indicating that the temperature is currently over the desired threshold.

To navigate back to this page from any other, click on the TSL Logo at the top LHS of screen.

4.2 The Input Screen

This page allows the user to configure all the GPI alarms for the MDU.

All items in the boxes may be changed for this screen.

Model: MDU12-32A-PMI

Yellow highlights screen currently in use.

Index	Input Name	Active/Inactive	Polarity
1	GPI 1	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
2	GPI 2	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
3	GPI 3	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
4	GPI 4	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
5	GPI 5	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
6	GPI 6	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
7	GPI 7	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
8	GPI 8	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
9	GPI 9	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
10	GPI 10	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
11	GPI 11	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
12	GPI 12	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
13	GPI 13	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
14	GPI 14	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
15	GPI 15	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed
16	GPI 16	OK	<input checked="" type="radio"/> Normally Open <input type="radio"/> Normally Closed

Update

The Input names may be changed from the default. Highlight the text & type new text as in any Windows style application.

The input circuit polarity may be set at either Normally Open, or Normally Closed as indicated.

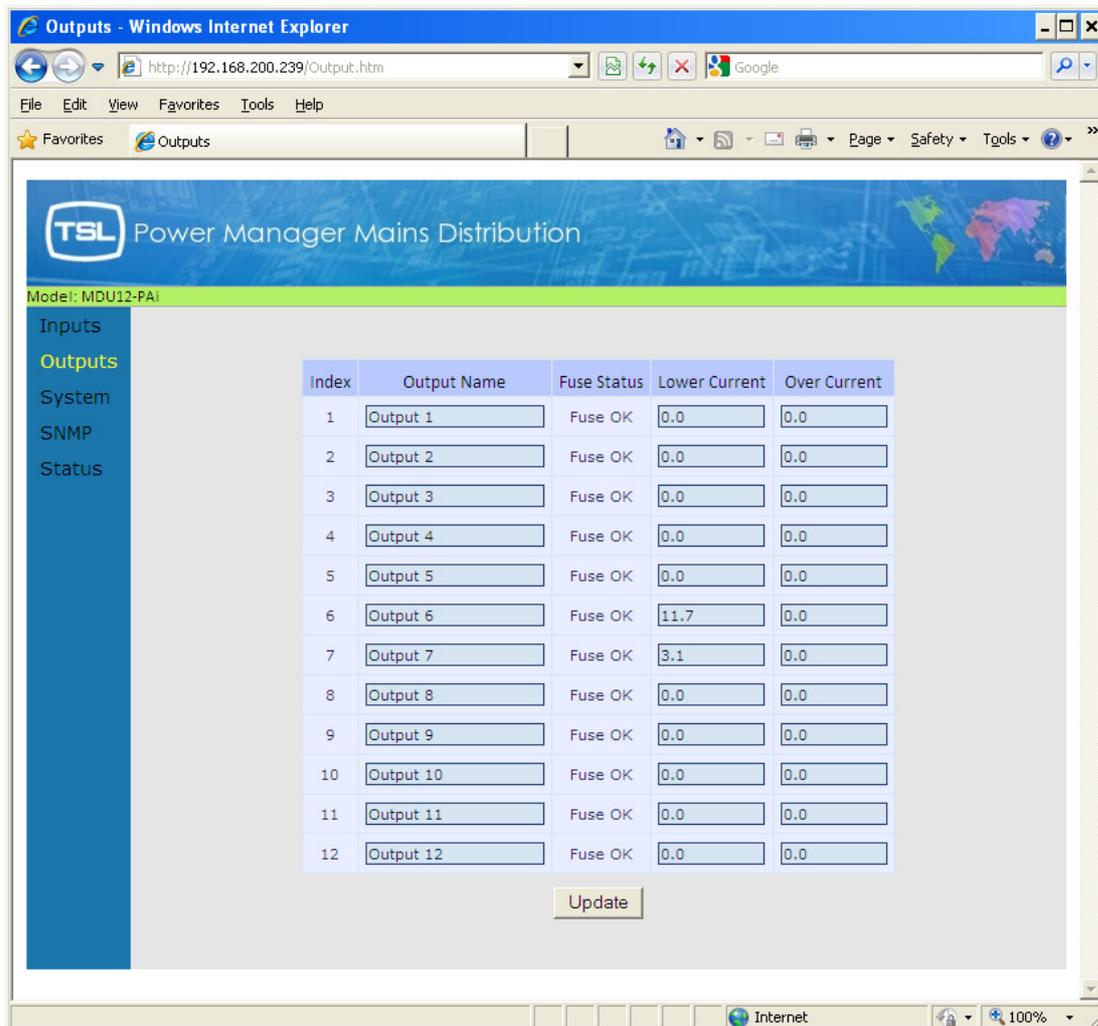
Press << **Update** >> when done.

NB Allow the page to refresh before cycling the power to check the settings.

4.3 The Output Screen

All items in the boxes may be changed for this screen.

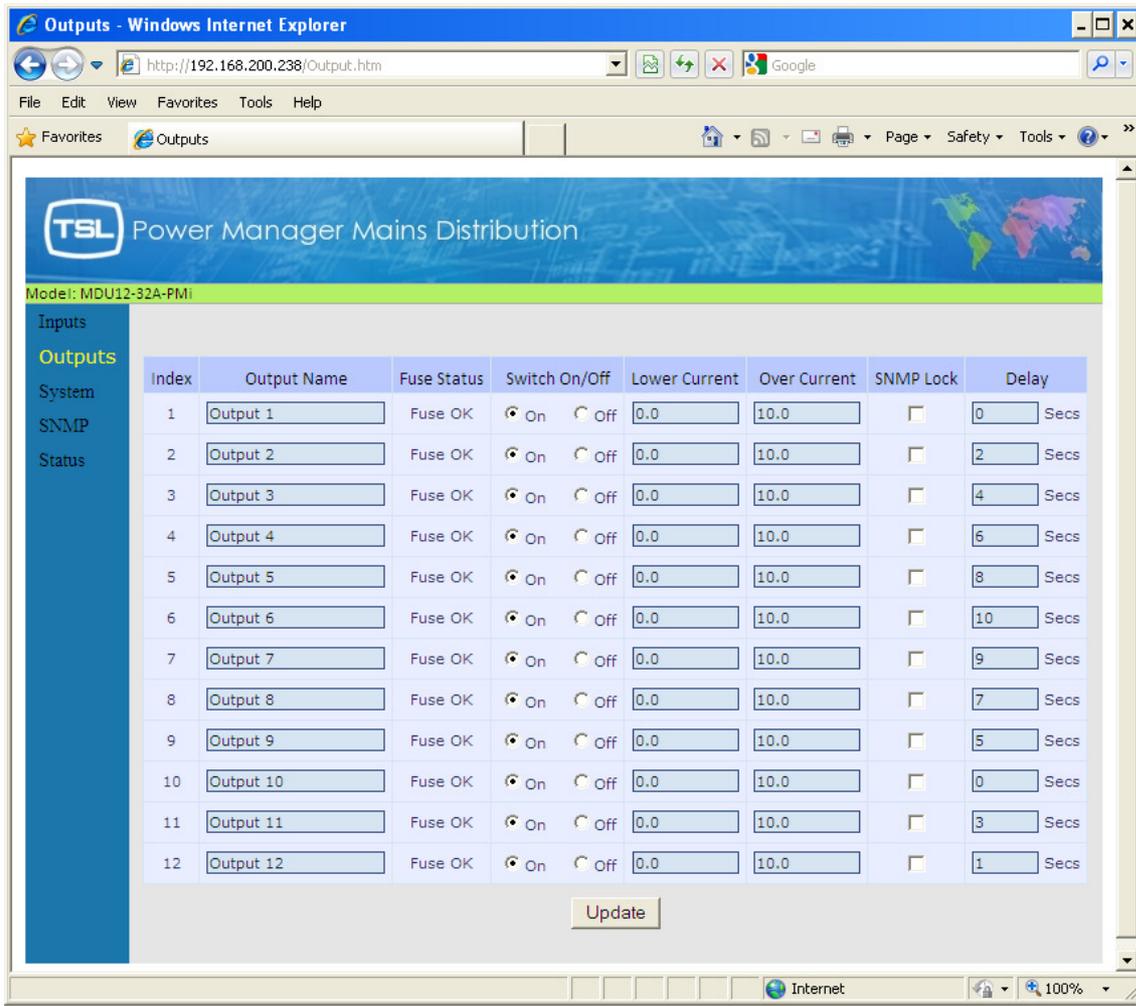
PA Models:



This is showing the individual output status. The output names may be changed.

- "Lower Current" and "Over Current" only available on "i" models.

PM Models:



This is showing the individual output status. The output names may be changed.

- o "Lower Current" and "Over Current" only available on "i" models.

Individual circuits may be remotely switched on or off.

The Delay column figures are enabled by selecting Delay in the Mode check box on the System page. This ranges from 0-256 seconds.

NB These delays are only effective on initial powering of the unit.

The SNMP Lock box if checked disables remote control access for that channel via SNMP protocol.

Press << **Update** >> when done.

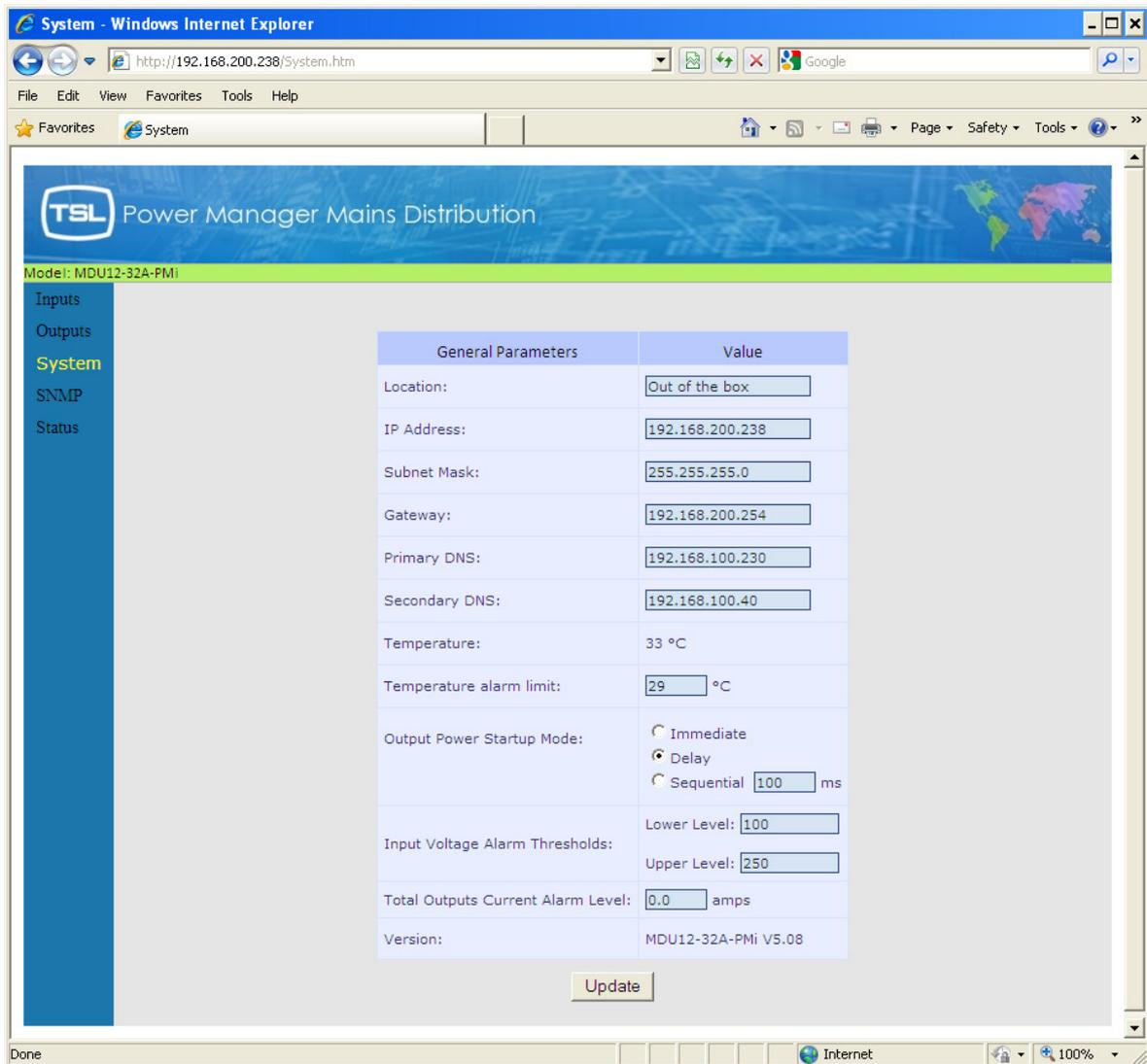
NB Allow the page to refresh before cycling the power to check the settings.

Front Panel LED Indications:

- LED Indication
 - o Power - Blue - Power applied to the unit.
 - o LAN - Flashing Amber LAN connected & active
 - o Output LEDs 1-12
 - Green - Circuit on and fuse OK
 - Amber - Circuit off and fuse OK.
 - Red - Circuit off and fuse failed.
 - Off - Circuit on but fuse has failed

4.4 The System Screen

All items in the boxes may be changed for this screen.



Mode (PM and PMi only):

- **Immediate** will switch on all circuits immediately.
- **Delay** will enable the Delay set in the Outputs screen
- **Sequential** will allow circuit by circuit delay as set in the box.

Lower and upper voltage alarm thresholds can be set from this page. If the input voltage breaks either threshold then an SNMP alarm, and email alert is generated.

Press <<**Update**>> when done.

NB Allow the page to refresh before cycling the power to check the settings.

4.5 The Status Screen

PM/PA Models

Model: MDU12-PM

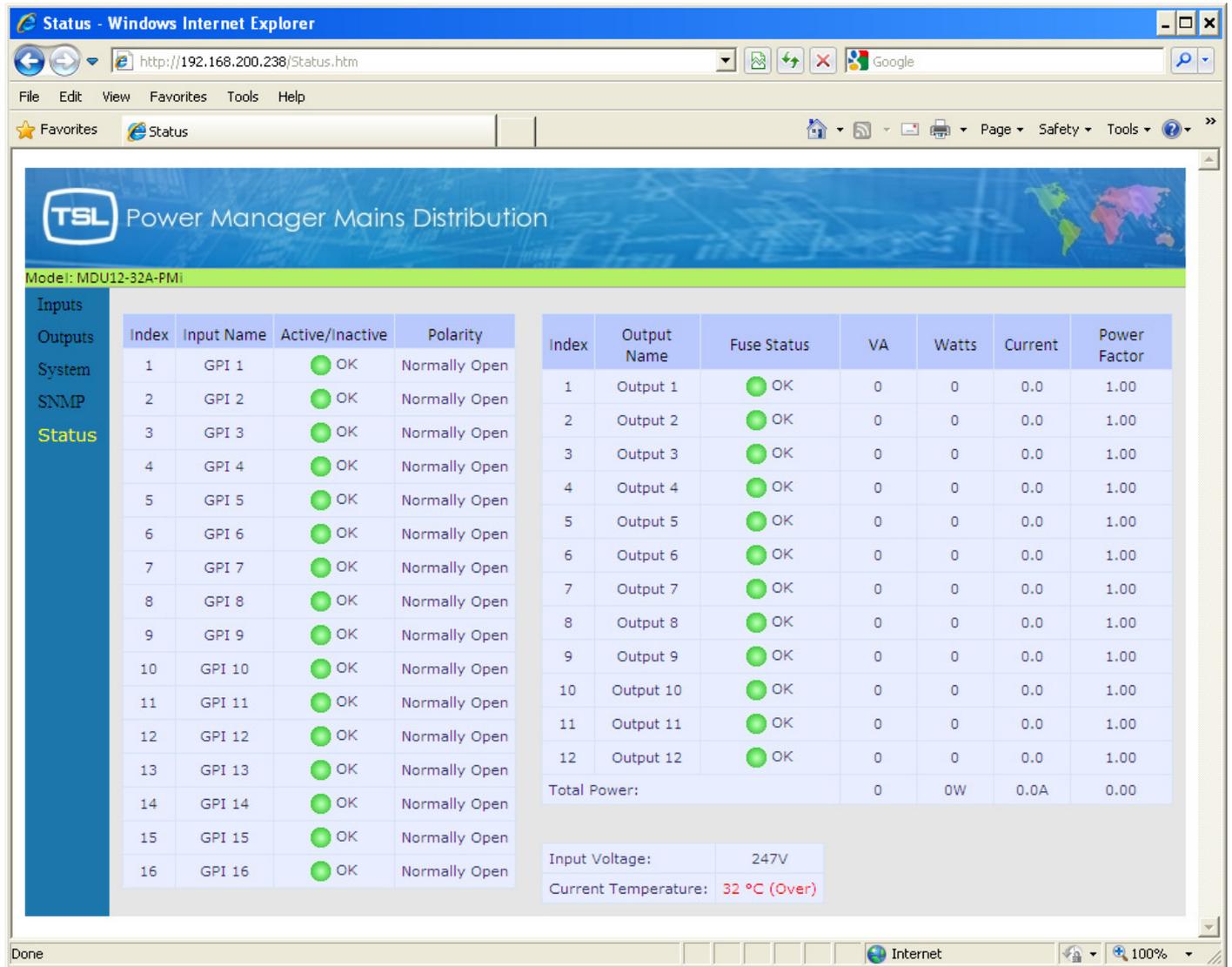
Index	Input Name	Active/Inactive	Polarity
1	GPI 1	OK	Normally Open
2	GPI 2	OK	Normally Open
3	GPI 3	OK	Normally Open
4	GPI 4	OK	Normally Open
5	GPI 5	OK	Normally Open
6	GPI 6	OK	Normally Open
7	GPI 7	OK	Normally Open
8	GPI 8	OK	Normally Open
9	GPI 9	OK	Normally Open
10	GPI 10	OK	Normally Open
11	GPI 11	OK	Normally Open
12	GPI 12	OK	Normally Open
13	GPI 13	OK	Normally Open
14	GPI 14	OK	Normally Open
15	GPI 15	OK	Normally Open
16	GPI 16	OK	Normally Open

Index	Output Name	Fuse Status
1	Transcoder 1	OK
2	Output 2	OK
3		OK
4		OK
5		OK
6		OK
7		OK
8		OK
9		OK
10		OK
11		OK
12		OK

Current Temperature: 32 °C

This page shows the overall alarm status for the unit and refreshes every 10 seconds.

PMi/PAi Models



Status page for current sense (i) versions

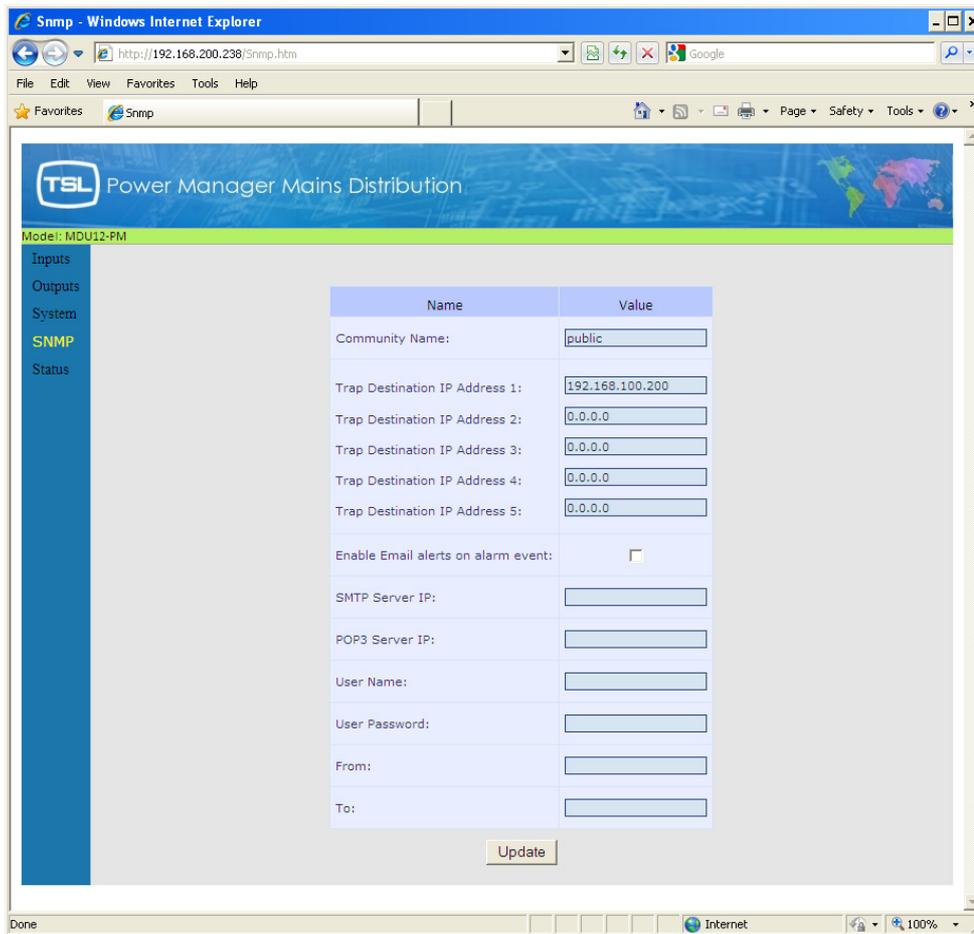
The current sense option gives the user the additional capability to monitor the output current in Amps, the power in watts & VA, and the power factor for each output with the total shown for the MDU at the bottom.

Alarms for Voltage limits, Temperature, & overall unit current are set on the Systems setup page.

Alarms for over or under current for individual outputs can be set on the Output setup page.

This status page also shows a summary for all the alarms for the unit where Green indicates no alarm operating or Red shows an alarm condition.

4.6 The SNMP Screen



4.6.1 SNMP Alarms

The unit generates SNMP Trap Alarms to the IP addresses configured in the SNMP setup page when the following events occur:

- 1) A GPI input changes state.
- 2) A fuse fails or is replaced with a good fuse.
- 3) The internal unit temperature exceeds/drops below the threshold set in the SNMP web page.
- 4) An output goes Over Current or Under Current as set from the Output page (i Variants only).
- 5) The input voltage breaks the upper or lower threshold values as set on the system page.

For details of these and other SNMP features, see the supplied SNMP MIB file.

Press << **Update** >> when done.

NB Allow the page to refresh before cycling the power to check the settings.

4.6.2 Email Alerts

For each of the alarms as detailed above, the unit can send an email alert as well.

Check the box "Enable Email alerts on alarm event:"

Then put in the IP address of the email server, and the email address to where the alert should be sent.

Your IT manager will be able to help in setting this up.

Press << **Update** >> when done.

NB Allow the page to refresh before cycling the power to check the settings.

5.0 Initial Configuration

Consult your System Administrator for appropriate IP and subnet mask settings.

- Connect a terminal running at 9600, N, 8, 1, Flow control-None; to the serial port. (HyperTerminal for example)
- Power the unit.

The following ident string will display:

MDU12-XX FVX.XX

After a short delay the unit will then report:-

Ready

To program the parameters:

- Press <<Escape>> and wait for the prompt:

IPAddr?

- Enter the desired IP address, e.g. 192.168.0.1
- Then wait for the next prompt:

Subnet?

- Enter the appropriate mask e.g. 255.255.255.0
- Then wait for the next prompt:

User?

- Enter a username (max 12 characters). Factory default is <<root>>
- Then wait for the next prompt:

Pass?

- Enter a password (max 12 characters). Factory default is <<telsys>>

When these settings have been saved, the prompt <<**Updated**>> will appear.

- **For the new IP settings to take effect, cycle the power on the unit.**

Checking units for IP address via serial port

If you need to check an MDU's address then once the ready prompt has appeared type "?" and the current settings for IP Address; Subnet Mask; Gateway; & Mac Address will be shown on the screen.

5.1 Emergency soft reset via serial port.

In the event the MDU fails to respond to a Web command, or the internal software has hung up, the unit can be reset without having to power down.

Using the connections as above for a terminal connection via the serial port confirm you have access to the software using the "?" command. (See above)

Press <<Ctrl B>> the prompt returns "RST". This then will return the prompt "Ready" after about 40-60 seconds. To check the MDU is running type the "?" command to see the current settings.

The Web interface should now be accessible.

5.2 Web interface (http)

Using any browser (e.g. Microsoft Internet Explorer) you can browse to the IP address previously set. Use the username and password you have previously set to access the configuration pages.

6.0 Pin-outs

Input

Neutrik Powercon connector – L – Brown (Phase), N – Blue (Neutral), E – Green/Yellow (Earth or Ground)

Serial Connector RS232

SERIAL RS 232 CONNECTOR D9 SOCKET			
1	SCL-X	6	SDA-X
2	TX	7	-
3	RX	8	-
4	DTR	9	-
5	0v		

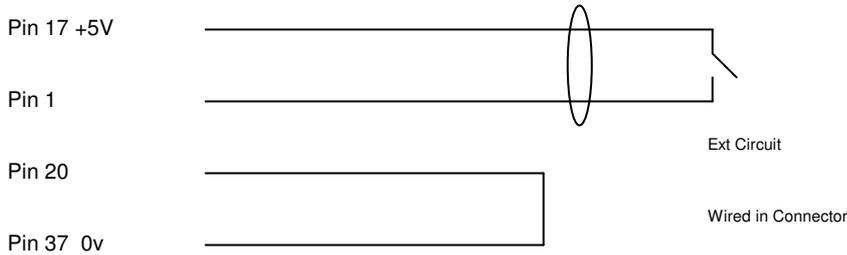
MDU12-PMi	MDU12-PMi		COMPUTER COMMS PORT	
Serial Port	Serial Port		AT	XT or PC
D 9 socket	RJ11 Front Panel		D 9 socket	D 25 socket
3	5	←	3	2
2	2	→	2	3
5	4	GND	5	7

GPI Connector – D37 F

GPI INPUT CONNECTOR D37 SOCKET			
1	Input 1	20	Input 1
2	Input 2	21	Input 2
3	Input 3	22	Input 3
4	Input 4	23	Input 4
5	Input 5	24	Input 5
6	Input 6	25	Input 6
7	Input 7	26	Input 7
8	Input 8	27	Input 8
9	Input 9	28	Input 9
10	Input 10	29	Input 10
11	Input 11	30	Input 11
12	Input 12	31	Input 12
13	Input 13	32	Input 13
14	Input 14	33	Input 14
15	Input 15	34	Input 15
16	Input 16	35	Input 16
17	+5V	36	+5V
18	0V	37	0V
19	0V		

Typical external wiring for Circuit 1

This shows the +5V supply as switched.



The circuit is not polarity conscious. The maximum input voltage without additional current limiting resistors is +12V. The internal resistors are 4K7 per circuit. Either the 0v or the +5V may be switched.

The Ethernet connector

A 1:1 cable should be used to connect to a hub as is normal practise.

7.0 Response Times

Remote Monitoring

The full unit status of the unit is sampled every 200mS. Any further delay is due to the SNMP agent compiling the trap and then sending it on the network interface.

Typically, agents give priority to analysing network traffic and then look at the trap queue when idle.

Start up delays

Maximum delay is 2.5 seconds between each relay in Sequential Start mode and up to 50 seconds delay per output in Delay Start mode.

8.0 Temperature Indications

The temperature reading is designed to assist in knowing the overall temperature in the rack, as the MDU is at the top of it.

The maximum recommended figure is 65° C.

Going over or under the preset threshold generates an SNMP trap alarm, as detailed in the MIB.

9.0 Specifications

Input	110-240V AC 50/60Hz Max load 16A or 32A (dependant on model) Power consumption 8W No load.
Connector 16A	Neutrik NAC3FCA 20 Amp 250 VAC
Connector 32A	Neutric NAC3FC-HC 32 Amp 250 VAC
Circuit Breaker 16A Approvals	Double pole thermal protection 16A. VDE, CSA, UL, BV, CCC.
Circuit Breaker 32A Approvals	MCB 32A, 1 pole, Tripping type B. BS EN60898, IEE.
Power Consumption	8W
Output	110-240V AC Max load 10A per outlet, fused on front panel.
Connectors	12 x IEC 3 pin
Ethernet	
Standard:	IEEE 802.3
Physical layer	10/100 Base-T
Data Rate:	10/100 Mbps (auto-sensing)
Mode	Full or half duplex (auto-sensing)
Connector	RJ45

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Appendix 1

MIB File information

TSL-MIB DEFINITIONS ::= BEGIN

IMPORTS

enterprises, Opaque
FROM RFC1155-SMI
OBJECT-TYPE
FROM RFC-1212
TRAP-TYPE
FROM RFC-1215;

-- MODULE-IDENTITY
-- FROM SNMPv2-SMI;

-- TSL_MIB; SNMP v1 agent definitions.

-- the following only allowed in SMIv2 (also 0 enumeration of integers)

-- As of 08/08/03, includes enterprise specific trap definitions (RFC1215)

-- As of 08/08/08, added current sense data

-- As of 08/08/09, added voltage measure and trap

-- As of 04/04/10, added currentAlarm to alarmType, new contact details

-- tsIMIB MODULE-IDENTITY
-- LAST-UPDATED "1004040000Z"
-- ORGANIZATION "Television Systems Ltd"
-- CONTACT-INFO "
-- Tony Orme
-- Television Systems Ltd
-- Vanwall Road
-- Maidenhead
-- Berkshire
-- SL6 4UB
--
-- Tel + 44 1628 676200
-- Email: tony.orme@tsl.co.uk"
-- DESCRIPTION "MIB module for all TSL products"
-- ::= { enterprises 6853 }

DisplayString ::= OCTET STRING

-- SMIv1 definition of module

tsIMIB OBJECT IDENTIFIER ::= { enterprises 6853 }

----- Winsoft specific MIB

-- DELETED for mdu12 hardware

----- generic alarm MIB (all TSL equipment capable of SNMP alarms)

alarm OBJECT IDENTIFIER ::= { tsIMIB 2 }

alarmIdent OBJECT-TYPE
SYNTAX DisplayString
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Equipment alarms description and version"
::= { alarm 1 }

----- alarm table

alarmTable OBJECT-TYPE
SYNTAX SEQUENCE OF AlarmEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"The table of alarm entries"
::= { alarm 2 }

alarmEntry OBJECT-TYPE
SYNTAX AlarmEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
" An alarm entry in the table"
INDEX { alarmTableIndex }
::= { alarmTable 1 }

AlarmEntry ::= SEQUENCE
{
 alarmTableIndex INTEGER,
 alarmType INTEGER,
 alarmIndex INTEGER,
 alarmText DisplayString,
 alarmState INTEGER,
 alarmPolarity INTEGER,
 alarmData Opaque
}

alarmTableIndex OBJECT-TYPE
SYNTAX INTEGER (1..28)
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The index into the table"
::= { alarmEntry 1 }

alarmType OBJECT-TYPE
SYNTAX INTEGER
{
 internal(1), -- general internal to equipment alarm
 gpi(2), -- from external GPI, alarmPolarity determines alarmState
 outputFail(3), -- eg MDU12 output fuse, etc
 psuFail(4), -- alarmData is text describing failure (eg rail values etc)
 currentAlarm(5) -- eg MDU12 output current
}
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Alarm type"
::= { alarmEntry 2 }

alarmIndex OBJECT-TYPE

SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Alarm type number"
::= { alarmEntry 3 }

alarmText OBJECT-TYPE

SYNTAX DisplayString
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Alarm description"
::= { alarmEntry 4 }

alarmState OBJECT-TYPE

SYNTAX INTEGER
{
 inactive(1),
 active(2)
}
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Alarm state"
::= { alarmEntry 5 }

alarmPolarity OBJECT-TYPE

SYNTAX INTEGER
{
 notApplicable(1),
 normallyOpen(2),
 normallyClosed(3)
}
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Alarm active polarity (notApplicable for non-gpi alarms)"
::= { alarmEntry 6 }

alarmData OBJECT-TYPE

SYNTAX Opaque
ACCESS read-only
STATUS optional
DESCRIPTION
"Additional alarm data of variable length, according to alarm type."
::= { alarmEntry 7 }

----- end of table

alarmTotal OBJECT-TYPE

SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of alarms in the table"
::= { alarm 3 }

alarmLocation OBJECT-TYPE

SYNTAX DisplayString
ACCESS read-write
STATUS mandatory
DESCRIPTION
"The physical location of the equipment generating the alarm"
::= { alarm 4 }

alarmEqptTemp OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS optional
DESCRIPTION
"Equipment temperature (in degrees Centigrade)"
::= { alarm 5 }

alarmEqptTempHi OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS optional
DESCRIPTION
"Equipment temperature alarm point (degrees Centigrade)"
::= { alarm 6 }

alarmTrap TRAP-TYPE
ENTERPRISE tsMIB
VARIABLES
{
 alarmTableIndex,
 alarmType,
 alarmIndex,
 alarmText,
 alarmState,
 alarmPolarity,
 alarmData
}
DESCRIPTION
"An entry in the alarm table has changed state"
::= 4

alarmEqptTempHiTrap TRAP-TYPE
ENTERPRISE tsMIB
VARIABLES
{
 alarmEqptTemp
}
DESCRIPTION
"The equipment temperature has exceeded the maximum allowed"
::= 5

alarmEqptTempOkTrap TRAP-TYPE
ENTERPRISE tsMIB
VARIABLES
{
 alarmEqptTemp
}
DESCRIPTION
"The equipment temperature is now within limits"
::= 6

----- MDU12 specific MIB

mdu12 OBJECT IDENTIFIER ::= { tsIMIB 3 }

mdu12Ident OBJECT-TYPE
SYNTAX DisplayString
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Equipment description and version"
::= { mdu12 1 }

mduPowerOn OBJECT-TYPE
SYNTAX INTEGER
{
 simultaneous(1),
 sequential(2),
 delayed(3)
}
ACCESS read-write
STATUS mandatory
DESCRIPTION
"MDU power-on output sequence"
::= { mdu12 2 }

mduSeqDelay OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Sequential mode delay between outputs"
::= { mdu12 3 }

mduOutputTable OBJECT-TYPE
SYNTAX SEQUENCE OF MduOutputEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
"Table of output controls"
::= { mdu12 4 }

mduOutputEntry OBJECT-TYPE
SYNTAX MduOutputEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION
" An entry in the output table"
INDEX {mduOutputIndex}
::= { mduOutputTable 1 }

MduOutputEntry ::= SEQUENCE
{
 mduOutputIndex INTEGER,
 mduOutputState INTEGER,
 mduOutputDelay INTEGER,
 mduOutputlowerCurrent INTEGER,
 mduOutputupperCurrent INTEGER,
 mduOutputCurrent INTEGER,
 mduOutputpowerFactor INTEGER,
}

```

        mduOutputVA INTEGER,
        mduOutputWatts INTEGER,
        mduOutputCal INTEGER
    }

mduOutputIndex OBJECT-TYPE
    SYNTAX INTEGER(1..12)
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
    "Output number"
    ::= { mduOutputEntry 1 }

mduOutputState OBJECT-TYPE
    SYNTAX INTEGER
    {
        off(1),
        on(2),
        locked-Off(3), -- locked by admin web page, cannot change via SNMP
        locked-On(4)  -- locked by admin web page, cannot change via SNMP
    }
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
    "MDU Output status"
    ::= { mduOutputEntry 2 }

mduOutputDelay OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
    "Output on delay from power on (Delay mode only)"
    ::= { mduOutputEntry 3 }

mduOutputlowerCurrent OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
    "Lower current limit for output"
    ::= { mduOutputEntry 4 }

mduOutputupperCurrent OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-write
    STATUS mandatory
    DESCRIPTION
    "Upper current limit for output"
    ::= { mduOutputEntry 5 }

mduOutputCurrent OBJECT-TYPE
    SYNTAX INTEGER
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION
    "Output current"
    ::= { mduOutputEntry 6 }

mduOutputpowerFactor OBJECT-TYPE
    SYNTAX INTEGER

```

```

ACCESS read-only
STATUS mandatory
DESCRIPTION
"Output power factor"
::= { mduOutputEntry 7 }

mduOutputVA OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Output apparent power"
::= { mduOutputEntry 8 }

mduOutputWatts OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Output real power"
::= { mduOutputEntry 9 }

mduOutputCal OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Output current measure calibration data"
::= { mduOutputEntry 10 }

-- End of table

mduPowerStatus OBJECT-TYPE
SYNTAX INTEGER
{
    totalLoss(1),
    input1OK(2),
    input2OK(3),
    allOk(4)
}
-- note: a single input MDU would report allOk if power is present
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Status of MDU power inlets"
::= { mdu12 5 }

mduVoltageCal OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Voltage measure calibration data"
::= { mdu12 6 }

mduVoltage OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION
"Voltage measurement"
::= { mdu12 7 }

```

mduVoltageFloor OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Voltage lower limit"

::= { mdu12 8 }

mduVoltageLimit OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Voltage upper limit"

::= { mdu12 9 }

mduTotalCurrent OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Total current measurement"

::= { mdu12 10 }

mduCurrentLimit OBJECT-TYPE

SYNTAX INTEGER

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Current total limit"

::= { mdu12 11 }

mduAuxRly1 OBJECT-TYPE

SYNTAX INTEGER

{

off(1),

on(2)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Auxiliary Relay 1 state"

::= { mdu12 12 }

mduAuxRly2 OBJECT-TYPE

SYNTAX INTEGER

{

off(1),

on(2)

}

ACCESS read-write

STATUS mandatory

DESCRIPTION

"Auxiliary Relay 2 state"

::= { mdu12 13 }

mduPowerStatusTrap TRAP-TYPE

ENTERPRISE tsMIB

VARIABLES

{

mduPowerStatus

```
}  
DESCRIPTION  
"The power input to the MDU has changed state"  
 ::= 7
```

```
mduVoltageStatusTrap TRAP-TYPE  
    ENTERPRISE tsMIB  
    VARIABLES  
    {  
        mduVoltage  
    }  
    DESCRIPTION  
    "The voltage to the MDU has traversed a limit"  
    ::= 8
```

```
mduTotalCurrentStatusTrap TRAP-TYPE  
    ENTERPRISE tsMIB  
    VARIABLES  
    {  
        mduTotalCurrent  
    }  
    DESCRIPTION  
    "The total current through the MDU has traversed a limit"  
    ::= 9
```

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Appendix 2

Feature List by Model

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	Feature	Unit			
		PA	PAi	PM	PMi
Login	Login Box	•	•	•	•
Home Screen Display	Total VA		•		•
	Total Watts		•		•
	Total OP Current		•		•
	Total Power factor		•		•
	Input voltage		•		•
	Temperature		•		•
Home Alerts (Red text)	Total OP Current		•		•
	Input voltage		•		•
	Temperature		•		•
Inputs Screen	User definable: GPI Input Names	•	•	•	•
	Active/Inactive status	•	•	•	•
	Changeable polarity	•	•	•	•
	GPI alarm activated by contact closure	•	•	•	•
	Update	•	•	•	•
Outputs Screen	User definable: Output Names	•	•	•	•
	Fuse Status indication	•	•	•	•
	Individual outputs Switchable			•	•
	User definable: Lower Current Threshold		•		•
	User definable: Upper Current Threshold		•		•
	SNMP Lock			•	•
	User definable: Individual Startup delay			•	•
	Update	•	•	•	•
System Screen	User definable: Location	•	•	•	•
	User definable: IP Address	•	•	•	•
	User definable: Subnet Mask	•	•	•	•
	User definable: Gateway	•	•	•	•
	User definable: Primary DNS	•	•	•	•
	User definable: Secondary DNS	•	•	•	•
	Unit Temperature display	•	•	•	•
	User definable: Temperature Alarm Limit (Upper threshold)	•	•	•	•
	Output Power Activation Mode (Instant, delayed, sequential)			•	•
	User definable: Input Voltage Alarm Thresholds, Upper		•		•
	User definable: Input Voltage Alarm Thresholds, Lower		•		•
	User definable: Total Outputs Current Alarm Level		•		•
	Software Version display	•	•	•	•

	Feature	Unit			
		PA	PAi	PM	PMi
SNMP Screen	User definable: Community Name	•	•	•	•
	User definable: Trap Destination IP Address 1	•	•	•	•
	User definable: Trap Destination IP Address 2	•	•	•	•
	User definable: Trap Destination IP Address 3	•	•	•	•
	User definable: Trap Destination IP Address 4	•	•	•	•
	User definable: Trap Destination IP Address 5	•	•	•	•
	Enable Email alerts on alarm event check box	•	•	•	•
	User definable: SMTP Server IP	•	•	•	•
	User definable: POP3 Server IP	•	•	•	•
	User definable: User Name	•	•	•	•
	User definable: User Password	•	•	•	•
	User definable: Email From field	•	•	•	•
	User definable: Email To field	•	•	•	•
	Update	•	•	•	•
Status Screen	Individual GPI Input Name (as per Input screen)	•	•	•	•
	Individual GPI Active/Inactive (green/red) display light	•	•	•	•
	Individual Output Name	•	•	•	•
	Individual Fuse status light OK/Failed (green/grey)	•	•	•	•
	Individual VA		•		•
	Individual Watts		•		•
	Individual Current		•		•
	Individual Current alarm indication (red text, "under"/"over" readout)		•		•
	Individual Power Factor		•		•
	Total VA		•		•
	Total Watts		•		•
	Total Current		•		•
	Total Current alarm indication (red text, "Over" readout)		•		•
	Total Power Factor		•		•
	Input Voltage display		•		•
	Input Voltage alarm indication (red text, "under"/"over" readout)		•		•
	Temperature display	•	•	•	•
	Temperature alarm (red text, "Over" readout)	•	•	•	•
Email Alerts	Individual OP Over Current		•		•
	Individual OP Under Current		•		•
	Total OP Over Current		•		•
	Fuse Failure	•	•	•	•
	Temperature threshold exceeded	•	•	•	•
	GPI Alarm	•	•	•	•
	GPI OK	•	•	•	•
	Voltage Over Alert level		•		•
	Voltage Under Alert level		•		•

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	Feature	Unit			
		PA	PAi	PM	PMi
Activation	Immediate			•	•
	Delay			•	•
	Sequential			•	•