

# NEMA Adaptor Handbook For Stratos Outstation 667/HB/52250/001

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## SAFETY INFORMATION



IT IS RECOMMENDED THAT DUE TO THE HAZARDS PRESENT WITHIN THE STRATOS OUTSTATION ALL POWER TO THE UNIT IS DISCONNECTED BEFORE WORKING ON THE UNIT (EXTERNAL MONITORED SUPPLIES MAY STILL BE CONNECTED WHEN THE UNITS MAINS SUPPLY HAS BEEN ISOLATED). WHERE A RISK ASSESSMENT AND METHOD STATEMENT FOR THE WORKS TO BE COMPLETED AND / OR THE INSTRUCTIONS FOR THE OEM EQUIPMENT BEING INSTALLED OR REMOVED ALLOWS, LIVE WORKING MAY BE CONSIDERED.

This equipment is intended only for installation in a RESTRICTED ACCESS LOCATION.

### Safety of Maintenance Personnel

In the interests of health and safety, when using or servicing this equipment the following instructions must be noted and adhered to:

Only skilled or instructed personnel with relevant technical knowledge and experience, who are also familiar with the safety procedures required when dealing with modern electrical/electronic equipment are to be allowed to use and/or work on the equipment. All work shall be performed in accordance with the Electricity at Work Regulations 1989 or the relevant local, state and government regulations.

Such personnel must take heed of all relevant notes, cautions and warnings in this Handbook and any other Document or Handbook associated with the equipment including, but not restricted to, the following:

The equipment must be correctly connected to the specified incoming power supply.

The equipment must be disconnected / isolated from the incoming power supply before removing any protective covers or working on any part from which the protective covers have been removed.

Any power tools must be regularly inspected and tested.

Any ladders used must be inspected before use to ensure they are sound and not damaged.

When using a ladder, before climbing it, ensure that it is erected properly and is not liable to collapse or move. If using a ladder near a carriageway, ensure that the area is properly coned and signed.

Any personnel working on site must wear the appropriate protective clothing, e.g. reflective vests, etc.



There are various RJ45 connectors used to connect to peripheral boards within the Stratos Outstation. Most are **not** Ethernet ports (See Figure 2-6) and should not be connected to other equipment, including PCs to avoid damage to the Stratos Outstation or user equipment.

The configuration process should only be carried out by persons who are adequately trained, have a full understanding of the needs of the county or region where the unit is to be used and are experienced in the tasks to be undertaken.

### Safety of Road Users

It is important that all personnel are aware of the dangers to road users that could arise during repair and maintenance of traffic control equipment.

Ensure that the working area is coned and signed as necessary to warn motorists and pedestrians of any dangers and to help protect the personnel working on the site.

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## INFORMATIONS RELATIVES À LA SÉCURITÉ



EN RAISON DES RISQUES QUE PRÉSENTE LA STATION EXTÉRIEURE STRATOS, TOUTES LES ALIMENTATIONS ÉLECTRIQUES DE L'APPAREIL DOIVENT ÊTRE COUPÉES AVANT D'INTERVENIR (UNE ALIMENTATION EXTERNE SURVEILLÉE PEUT RESTER BRANCHÉE SI L'ALIMENTATION PRINCIPALE DE L'APPAREIL A ÉTÉ ISOLÉE). SI UNE ANALYSE DES RISQUES ET UNE DESCRIPTION MÉTHODOLOGIQUE CONCERNANT LES TRAVAUX À RÉALISER ONT ÉTÉ EFFECTUÉES OU SI LES INSTRUCTIONS DU FABRICANT DE L'APPAREIL À INSTALLER/ DÉMONTER L'AUTORISENT, UNE INTERVENTION AVEC L'APPAREIL SOUS TENSION EST ENVISAGEABLE.

Cet appareil doit être installé dans un ENDROIT À ACCÈS RESTREINT.

**Sécurité du personnel de maintenance**

Dans un souci de sécurité et de protection de la santé du personnel, veuillez lire et respecter les consignes suivantes lorsque vous utilisez ou réparez cet appareil :

L'utilisation, l'entretien et la réparation de l'appareil sont réservés à un personnel qualifié ou formé possédant l'expérience et les connaissances techniques nécessaires et informé des procédures de sécurité relatives aux appareils électriques et électroniques récents. Respectez la réglementation relative à l'électricité sur les lieux de travail (*Electricity at Work Regulations 1989*) ou la réglementation locale, régionale et nationale en vigueur.

Le personnel intervenant doit respecter les remarques, avertissements et avis de danger contenus dans ce manuel et tout autre document relatif à l'appareil, notamment les consignes suivantes :

L'appareil doit être correctement raccordé à la source d'alimentation électrique spécifiée.

L'appareil doit être débranché/isolé de l'alimentation électrique avant de démonter un des caches de protection ou d'intervenir sur un de ses composants, après avoir démonté les caches de protection.

Les outils électriques doivent être contrôlés et testés régulièrement.

Les échelles doivent être contrôlées avant leur utilisation pour s'assurer qu'elles sont solides et en bon état.

Si vous utilisez une échelle, vérifiez qu'elle est correctement posée et qu'elle ne risque pas de tomber ou de glisser. Si vous utilisez une échelle à proximité d'un lieu de passage, vérifiez que l'emplacement est correctement signalé à l'aide de cônes et de panneaux.

Le personnel travaillant sur le chantier est tenu de porter les vêtements de protection appropriés (P.ex. gilet réfléchissant, etc.).



Plusieurs connecteurs RJ45 permettent de connecter des cartes périphériques dans la station extérieure Stratos. La plupart de ces connecteurs **ne sont pas** des ports Ethernet (voir Figure 2-6) et ne doivent pas être raccordés à un autre appareil, tel qu'un ordinateur, pour éviter d'endommager la station extérieure Stratos et les appareils de l'utilisateur.

La procédure de configuration doit être confiée à une personne dûment formée, comprenant parfaitement les exigences du pays ou de la région où l'appareil sera utilisé, et ayant une expérience dans les tâches à accomplir.

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## Sécurité des usagers de la route

Il est primordial que l'ensemble du personnel ait conscience des dangers encourus par les usagers de la route pendant les opérations de réparation et de maintenance d'un équipement de régulation de la circulation.

Vérifiez que la zone d'intervention est correctement délimitée par des cônes et des panneaux pour avertir les automobilistes et les piétons des risques éventuels et pour protéger le personnel intervenant.

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# 1 INTRODUCTION

## 1.1 Overview

This handbook details the configuration and operation of the Stratos Outstation operating as an adaptor between SCOOT UTC and traffic controllers meeting the NEMA controller standard with A, B, C connectors.

## 1.2 Contact Us

If you have any comments on this handbook, or need any further information, you can contact us at [trafficwebmaster.stc@siemens.com](mailto:trafficwebmaster.stc@siemens.com).

## 1.3 Related Documents

No.	Part Number	Document Title
1.	667/HB/46000/004	UTMC OTU Handbook (for ST950 and Stratos Outstation)
2.	667/HU/46000/000	User Interface Handbook (for ST950 and Stratos Outstation) NB: Includes web interface, licensing, Ethernet and firmware update.
3.	667/HB/52250/000	Installation, Commissioning and Maintenance Handbook for the Gemini 3 Stratos Outstation

## 1.4 Change History

Version	Date	Summary of Changes
1	16-May-2015	First full release.

## 1.5 Electronic Document

The latest electronic version of this handbook can be found on the Siemens website [www.siemens.co.uk/traffic](http://www.siemens.co.uk/traffic) under > **Downloads - Handbooks**.

## 1.6 Abbreviations

AC	Alternating Current
ASCII	American Standard Code for Information Interchange
Bit	Binary Digit
BOOTP	Bootstrap Protocol
CPU	Central Processing Unit
CRB	MOVA Controller Ready Bit
CSI	Controller Serial Interface
CSV	Comma Separated Value
DC	Direct Current
DCE	Data Communication Equipment
DDNS	Dynamic DNS

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DNS	Domain Name System
DSL	Digital Subscriber Line
DST	Daylight Saving Time
FLASH	Non-volatile memory that may be programmed under software control
Full UTC	Full UTC MIB v1.0, also known as UTC type 2 or UG405 (UTMC ref: TS004.004:2008UM/008, Full UTC MIB)
GMT	Greenwich Mean Time
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
GVP	Generic Versatile Platform software layer
IO	Input and Output
ICMP	Internet Control Message Protocol
IP	Internet Protocol
JFFS2	Journaling Flash File System Version 2
LAN	Local Area Network
LED	Light Emitting Diode
LMU	Lamp Monitoring Unit
MD5	Message Digest 5
NEMA	National Electrical Manufacturers Association (USA)
MIB	Management Information Base
MIB-II	Management Information Base II (Two)
NTP	Network Time Protocol
OS	Outstation
OSE	On Street Equipment
OSS	Outstation Support Server
OTU	Outstation Transmission Unit
PAP	Password Authentication Protocol
PC	Personal Computer
PCB	Printed Circuit Board
PIN	Personal Identification Number
PPP	Point-to-Point Protocol
PSTN	Public Switched Telephone Network
PSU	Power Supply Unit
RAM	Random Access Memory
ROM	Read Only Memory
ROMFS	ROM File System
RS232	EIA Data Communications Interface - Level based serial communications standard
RS485	EIA Differential Data Communications Interface - Differential serial communications standard
SCOOT	Split Cycle Offset Optimisation Technique
SHA-1	Secure Hash Algorithm 1
Simple UTC	Simple UTC MIB v0.2, also known as UTC type 1 (UTMC ref: TS004.004:2008 UM/004, Simple UTC MIB)
SNMP	Simple Network Management Protocol
Telnet	Telnet Protocol
TFTP	Trivial File Transfer Protocol
TMA	Traffic Management Act
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
UTC	Urban Traffic Control
UTC type 1	See Simple UTC
UTC type 2	See Full UTC
UTMC	Urban Traffic Management and Control
UVMS	Urban VMS

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VMS	Variable Message Sign
VPN	Virtual Private Network
WRM	Walk Rest Modifier (NEMA controller input signal)
XML	Extensible Markup Language
ZXO	Mains Zero Crossover

## 1.7 Third Party Information

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## 2 INTRODUCTION

### 2.1 Overview

A Stratos Outstation is installed in each controller cabinet to operate as the interface between the UTC/SCOOT instation and the NEMA traffic controller.

SCOOT vehicle data is passed in real-time to the UTC instation, where the SCOOT adaptive algorithm runs to optimise the traffic flow. The resultant requests for particular traffic movements are passed from SCOOT back to the outstation and so used to influence the phase change decisions made in the controller.

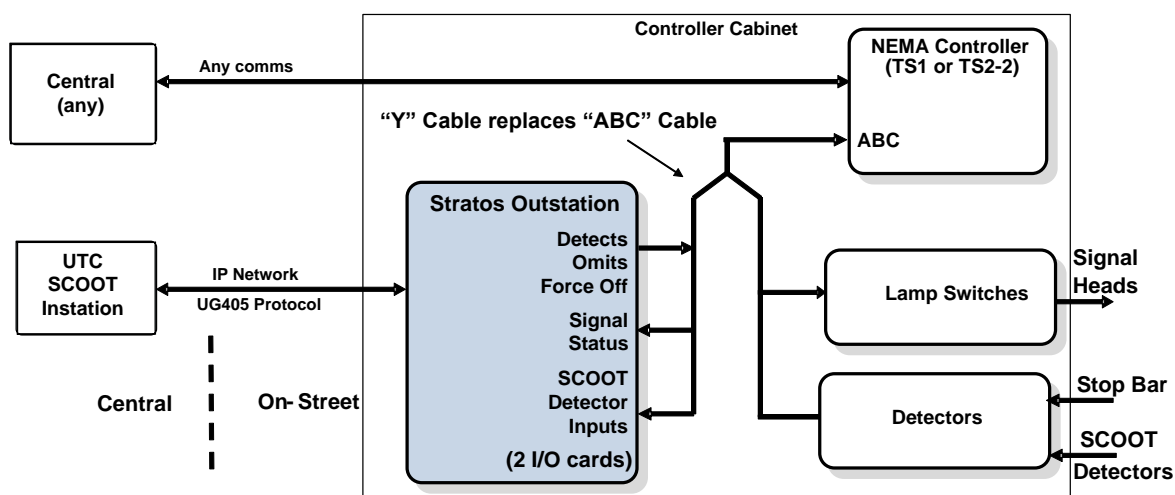


Figure 2-1 : Equipment Overview



Figure 2-2 : Stratos Outstation 7" Enclosure

The top and bottom plates of the enclosure are perforated to providing a degree of protection for the electronics while still allowing sufficient ventilation. The end plates can be reversed for alternative mounting arrangements.

In a typical controller cabinet, the Outstation would be mounted on the controller shelf.

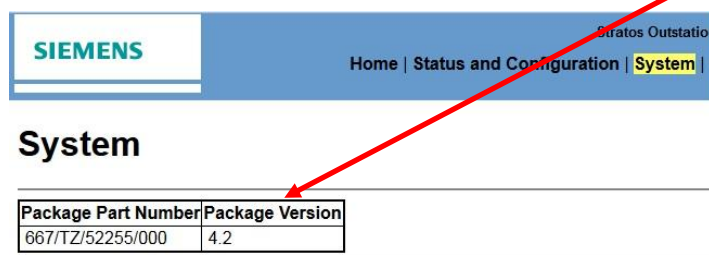
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**Figure 2-3 : Stratos Outstation 7" Enclosure – Initial Version**

Initial versions of the NEMA Outstation had blue front panels, whereas production versions have black front panels. The two versions are functionally the same.

The software facilities required to translate between SCOOT control/reply bits and NEMA controller I/O signals are included in the Stratos Outstation software package **667/TZ/52255/000 issue 4.2** and above.



**Figure 2-4 : Minimum Software Version**

## 2.2 Stratos Outstation NEMA Variants and Spares

The following variants of the Stratos Outstation product have been created specifically for interfacing to NEMA Controllers.

Part Number	Description	Notes
667/1/52250/807	Stratos Outstation (NEMA OTU 7" rack)	Enclosed 7" rack with PSU, CPU and 2 I/O cards, NO BATTERY.
667/1/52250/812	Stratos Outstation (NEMA OTU 12" rack)	Enclosed 12" rack with PSU, CPU, 2 I/O cards and space for 4 SLD4 detector cards, NO BATTERY.

### Spares

Part Number	Description
702/4/08540/000	NEMA IEC Power Cordset
667/1/50076/004	Stratos Outstation I/O PCB Kit (With Black front panel)
667/1/30607/000	Aux I/O Cable (15-way)

See 667/HB/52250/000 (ref 1.3. 3, appendix B) for standard Outstation spares list.

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## 2.3 Stratos Outstation Main Interfaces

The main interfaces on the Stratos Outstation are shown below. Detailed descriptions of all interfaces are contained in the Stratos Outstation Handbook 667/HB/52250/000 (ref 1.3. 3, section 4).

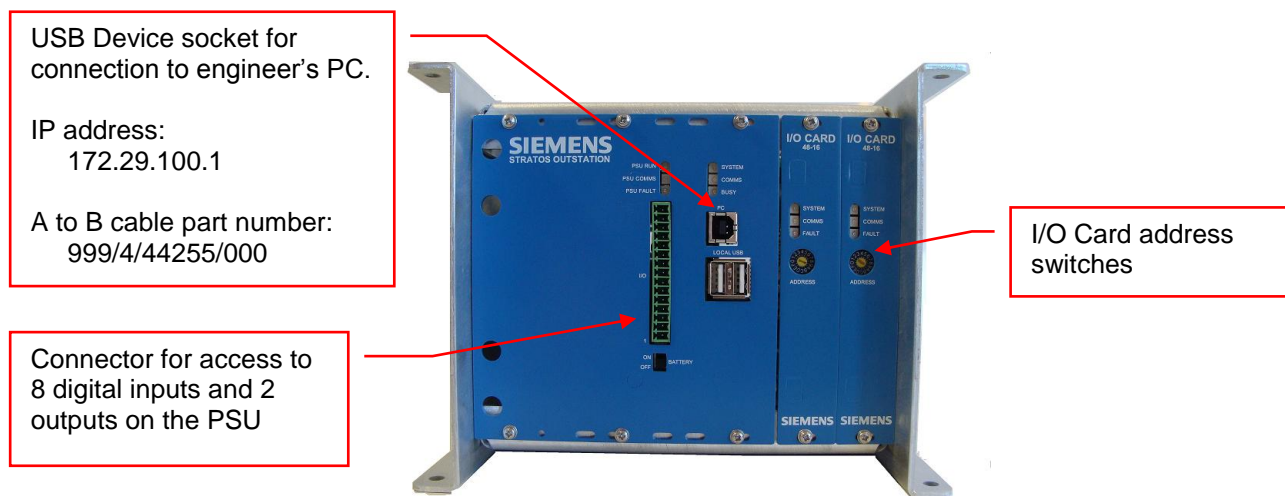


Figure 2-5 : Stratos Outstation Front – Main Interfaces

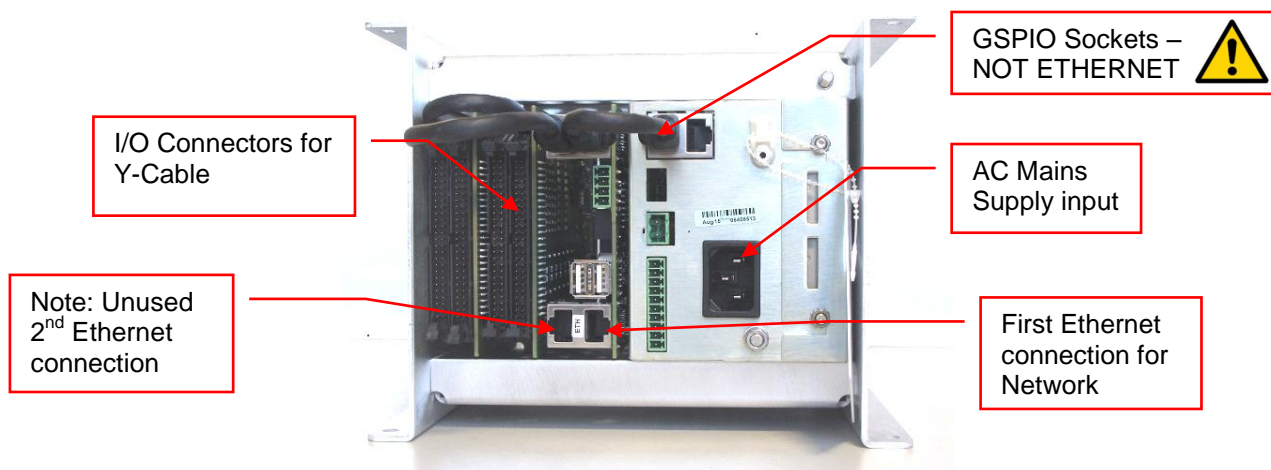
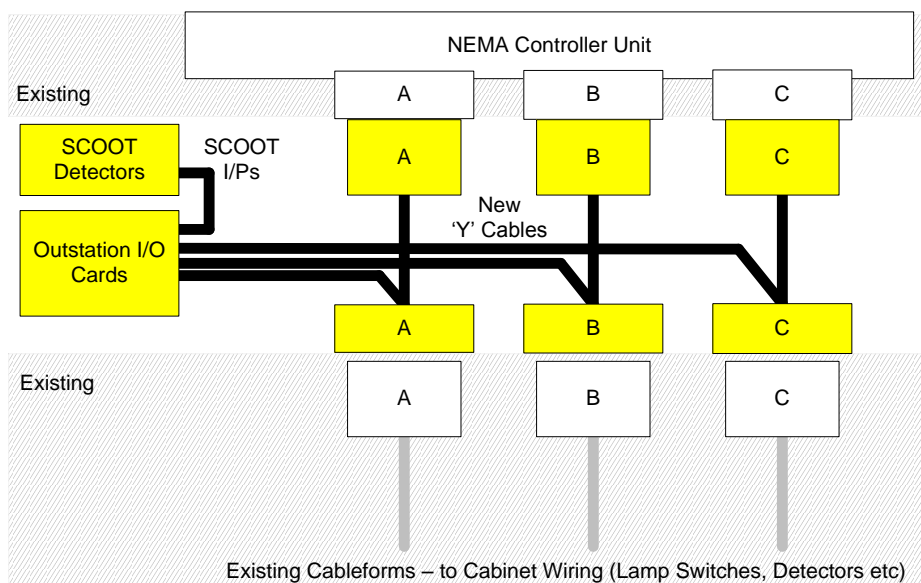


Figure 2-6 : Stratos Outstation Rear – Main Interfaces

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## 2.4 Controller Interface

The physical interface to the NEMA controller unit is via 'Y' cables on the A, B, C connectors.



**Figure 2-7 : Stratos Outstation Y-Cable Overview**

The Y-cable passes all the signals through from the plugs on the existing controller cableforms to the sockets on the NEMA controller via continuous wires. In addition, a number of the signals are also routed through to the outstation I/O cards and these allow UTC SCOOT to control the junction.

The Y-Cable provides inputs and outputs for the following signal functions to the Outstation:-

- Monitoring of the controller status and control of phase servicing, via the ABC connectors
- Vehicle detection inputs for SCOOT, via dedicated cable connections. The number of SCOOT detector inputs available on the Y-cable may vary, depending on the cable variant.
- Inputs for Remote Reconnect, Hurry Call, Manual Control and Priority Vehicle, via dedicated cable connections.
- 4 unallocated inputs. The input use can be dependent on the site configuration e.g. for Bus Detection.
- Up to 8 count / queue / occupancy detection inputs.

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## 3 Outstation Installation

This section describes the general sequence of operations to be carried out when installing the Stratos Outstation within a NEMA controller cabinet. There are a large number of cabinet types and equipment arrangements, so it is likely that the procedure will need to be adapted for each individual junction.

### 3.1 Qualifications

Only skilled or instructed personnel with relevant technical knowledge and experience, who are also familiar with the safety procedures required when dealing with modern electrical/electronic equipment, are to be allowed to use and/or work on the equipment. All work shall be performed in accordance with the electricity regulations of the relevant local, state and government.

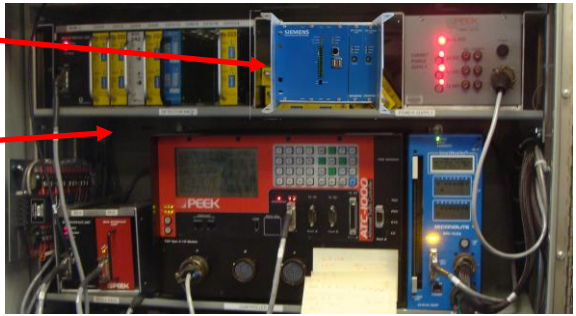

### 3.2 Installation Pre-Requisites

Ensure that all of the following activities have been completed before starting the installation procedure.

1. Ensure that the Stratos Outstation handbooks listed in section 1.3 are available for reference.
2. The Outstation unit is installed in the controller cabinet and connected to the controller via the Y-cable.
3. Any required SCOOT detectors are installed and connected into the Outstation via the Y-cable.

### 3.3 Step 1: Mounting the Stratos Outstation

The Stratos Outstation can be mounted in a number of ways depending on the cabinet type and the space available.

Enclosure & Mounting Option	Photo
<p>Shelf mounted 7" 3U enclosure.</p> <p>Alternatively, the unit can be secured to the underside of a suitable shelf.</p>	
<p>Shelf mounted 12" 3U enclosure, shown fitted with optional SLD4 detectors.</p> <p>The 12" enclosure can accommodate up to 4 SLD4 detectors, with either standard backplanes or an intelligent backplane.</p>	

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The end plates are provided with top and bottom mounting holes in order to accommodate a number of different fixing options.

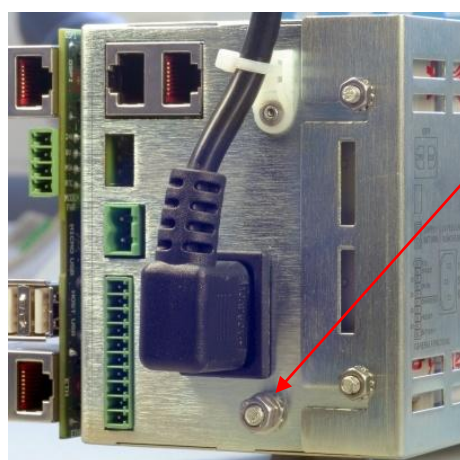
The end plates of the enclosure can be reversed if required in order to reduce the width of the unit.

### 3.4 Step 2: Power Supply Connection

Ensure a suitable separate protected supply (fuse or breaker) is available and suitably rated. The unit consumes 60W maximum.

Use the power supply cordset to connect the protected supply into the rear of the unit.

The cordset can be secured to the rear of the unit with the supplied cable tie, as shown below.

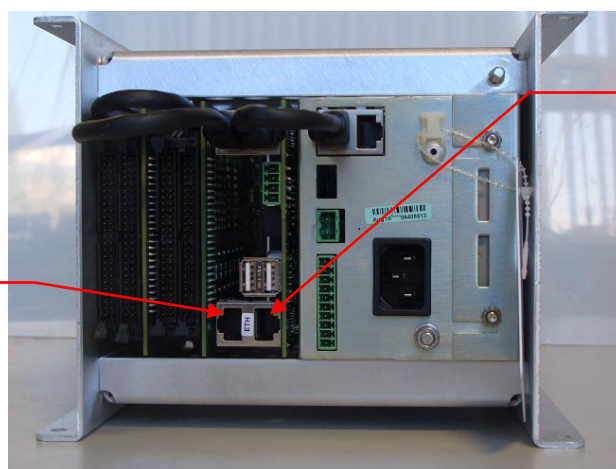


For separate earth connection, use the earth cable 667/1/27079/073 and connect to the rear earth stud.

**Figure 8 – Stratos Outstation Mains Lead & Earth Stud**

### 3.5 Step 3: Network IP Communications

The correct system IP address must be programmed into the Stratos Outstation before connecting it to the network to ensure that no IP conflicts occur and that the unit is on the correct subnet. See 667/HU/46000/000, ref 1.3.2, section 3.5 for more information on Ethernet configuration.



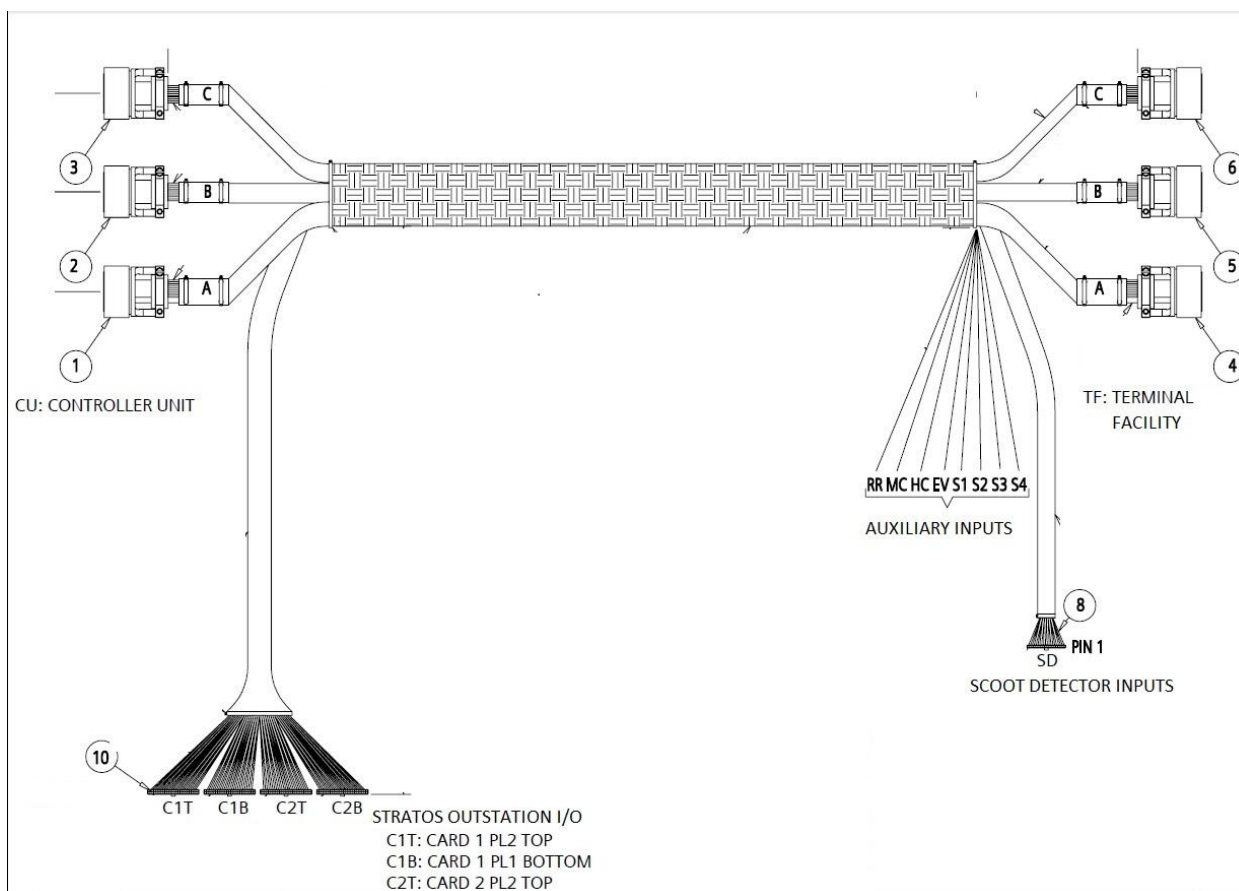
Connect the Ethernet cable to RJ45 socket closest to the CPU card.

Note: Unused 2<sup>nd</sup> Ethernet connection

**Figure 9 – Network Ethernet Socket**

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## 3.6 Step 4: Fitting the Y-Cable



**Figure 10 – Y-Cable Layout**

NOTE: Later version cable-forms have an additional 8 auxiliary input wires for count, queue and occupancy functions.

- Ensure the mains supply to the controller unit is switched off and that the junction is in a safe state.
- Unplug the ABC cabinet connectors from the front of the controller unit.
- Plug the Y-cable plugs Figure 2-1 (1), (2) and (3) into the ABC connectors on the front of the controller unit.
- Plug the ABC cabinet connectors into the Y-Cable connectors Figure 2-1 (4), (5) and (6).
- Ensure the Y-Cable is supported securely and routed so that none of the cables will foul the door or other equipment.

## 3.7 Step 5: Y-Cable connection to SCOOT Loops

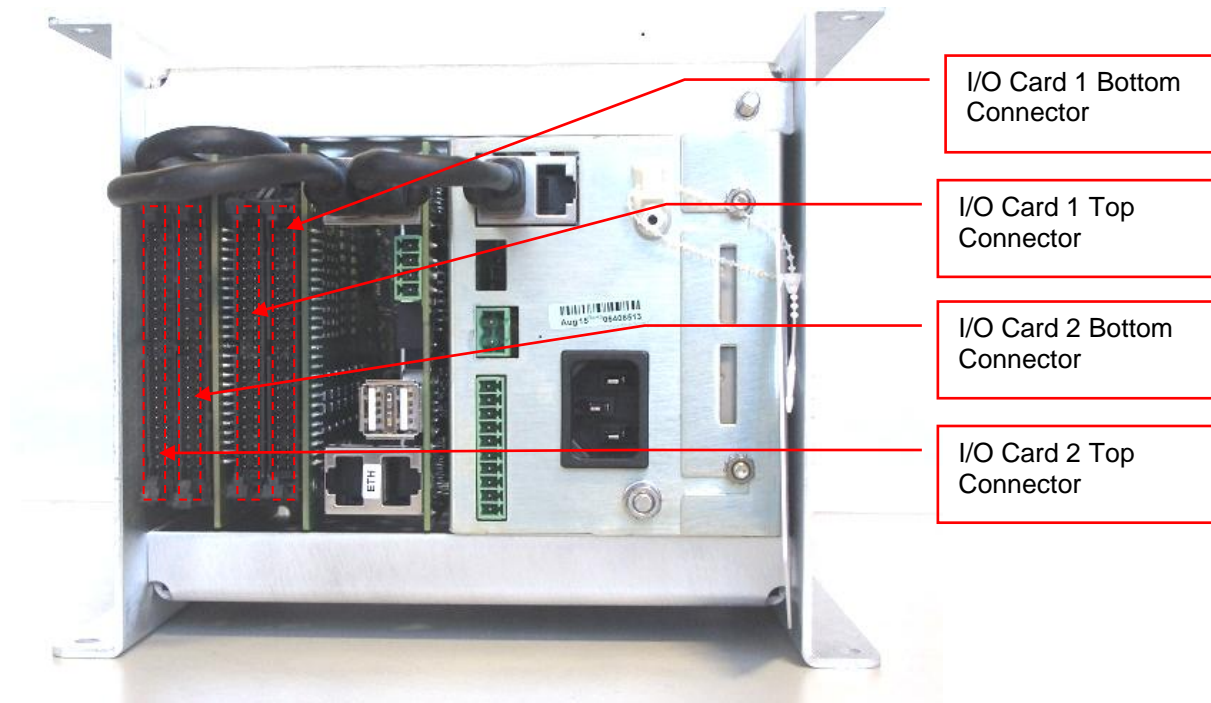
Connect the SCOOT cable Figure 2-1 (8) to the SCOOT detector outputs. If the socket on the detector rack is not compatible with the supplied connector, it will be necessary to remove the connector and wire to each SCOOT detector output separately. In this case, take care to identify each wire before removing the connector.

Where SLD4 detectors and standard backplanes are fitted, the SCOOT cable is wired into the respective detector output terminals.

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## 3.8 Step 6: Y-Cable connection to Stratos Outstation I/O

Connect the Outstation cables Figure 2-1 (10) to the I/O card sockets on the rear of the Stratos Outstation.



**Figure 11 – I/O Connector Identification**



The I/O card numbers are set by the address switch on the front of each card. Check that the I/O card address switch closest to the CPU is set to address 1, and the other is address 2.

## 3.9 Step 7: Y-Cable connection to Auxiliary Inputs

Where required, connect the Remote Reconnect (RR), Hurry Call (HC), Manual Control (MC) and Emergency Vehicle (EV) inputs on the Y-Cable to the appropriate wiring points within the controller cabinet.

Where functions have been allocated to the 4 spare inputs (S1 to S4), connect these to the appropriate wiring points within the controller cabinet.

Where count, queue or occupancy functions are required, connect the allocated Y-cable input (Q1 to Q8) to the appropriate detector outputs within the controller cabinet.

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### 3.10 Step 8: Connection to Auxiliary Digital Outputs

Where required, connect the digital outputs on the front panel (pins 1 to 6 below) to the appropriate wiring points within the controller cabinet, using I/O cable 667/1/30607/000. See section 4.6 for configuration.

PSU Front Panel Inputs and Outputs – 15 Way 3.5mm pitch					
Pin	Function	Card/Port	Bit ID	Cable 667/1/30607/000 Loom Colours	
15	Input 8	Gspi15.in.0	8	Brown	Green
14	Input 7		7	Pink	Pink
13	Input 6		6	Grey	Grey
12	Input 5		5	Orange	Orange
11	Input 4		4	Violet	Violet
10	Input 3		3	Brown	Brown
9	Input 2		2	Yellow	Yellow
8	Input 1		1	Blue	Blue
7	0V I/P Common	-	-	White	White
6	N.C. O/P 2	Gspi15.out.1	2	Orange	Grey
5	Com O/P 2			Blue	White
4	N.O. O/P 2			Blue	Orange
3	N.C. O/P 1		1	White	Orange
2	Com O/P 1			Red	White
1	N.O. O/P 1			Red	Orange

Figure 3-12 : Stratos Outstation Auxiliary Outputs

N.C. O/P – “Normally Closed”. This contact is connected to common via 22 Ohms when the output is OFF (i.e. deactivated or unpowered). The contact is open-circuit when the output is ON.

Com. O/P – “Common”. This is the common contact for N.C and N.O.

N.O. O/P – “Normally Open”. This contact is open-circuit when the output OFF (i.e. deactivated or unpowered). The contact is connected to common via 22 Ohms when the output is ON.

The outputs are isolated change-over solid state relay contacts which are TR2523 compliant:-

1. Maximum ON resistance of 50 Ohms
2. When ON, an output is rated at 50mA maximum
3. When passing 50mA, the output drop is less than 2.5V
4. When OFF an output will withstand 75V DC maximum continuous
5. When OFF the output resistance is greater than 100k Ohms

### 3.11 Step 9: Powering Up

Before powering the unit for the first time, ensure that the mains supply is correctly protected and wired. Switch the unit on and check that the appropriate LEDs illuminate on the front panel – each green SYSTEM or RUN LED should be flashing.

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## 4 Outstation Commissioning

This section describes the typical sequence of operations to be carried out when commissioning the Stratos Outstation.

### 4.1 Commissioning Pre-Requisites

Ensure that all of the following activities have been completed before starting the commissioning.

1. The Outstation unit is installed in the controller cabinet and connected to the controller via the Y-cable, including SCOOT detector wiring and any auxiliary inputs required (see section 3).
2. The IP network has been set up and is operating reliably; with the appropriate IP ports opened through to the instation. See 667/HB/46000/004 UTM C OTU Handbook, ref 1.3.1, section 2.2.1 for port numbers used and for the general network requirements.
3. The junction data has been set up at the UTC instation and the "CSV" file has been exported. The CSV file defines the control and reply bit functions required on the UTM C OTU.
4. The controller is configured for dual entry operation and the pedestrian configuration is set up as required (see section 4.11).

### 4.2 Preparation Checks

Complete the following checks to prepare for the main commissioning procedure.

1. Connect to the outstation web pages using a Firefox browser, either at the configured Outstation network address or via front panel USB port (address 172.29.100.1).  
NB: For connecting the PC to the front USB port, use USB cable – 1m (A to B), part number 999/4/44255/000.
2. Check that the outstation has been configured with a network IP address, net mask etc as defined by the network administrator.
3. Set the outstation time zone for the location:-

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## 4.3 Step 1: Enable the NEMA Adaptor

Stratos Outstation: NORTH 42 St, User: pme Ethernet Hi-vis

Home | Status and Configuration | System | System Log | Fault Table | Site Log

**UG405 UTC - NEMA Adaptor**

Default	Item	Value
<input type="checkbox"/>	Enable NEMA Adaptor ?	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Inhibit Vehicle Recycling ?	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Inhibit Pedestrian Recycling ?	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Demand Highest Stage ?	<input type="checkbox"/>
<input type="checkbox"/>	Inter-stage timeout (sec) ?	20

Save Reload

Select **NEMA Adaptor** from the **Status and Configuration – UG405 UTC** menu.

Enable the NEMA Adaptor.

Click Save to apply the new setting.

## 4.4 Step 2: Configure Stages and Demand-Dependence

Stratos Outstation: NORTH 42 St, User: pme Ethernet Hi-vis

Home | Status and Configuration | System | System Log | Fault Table | Site Log

**UG405 UTC - NEMA Adaptor - Stages**

Stage	Demand-dependent?	Phase Greens?	Ped. Window Time?
1	<input checked="" type="checkbox"/>	2,5	10
2	<input type="checkbox"/>	2,6	10
3	<input checked="" type="checkbox"/>	3,7	10
4	<input checked="" type="checkbox"/>	3,8	10
5	<input checked="" type="checkbox"/>	4,7	10
6	<input type="checkbox"/>	4,8	10
7	<input checked="" type="checkbox"/>	1,5	10
8	<input checked="" type="checkbox"/>	1,6	10

Save Reload Previous Next 12 rows

Select the **Stages** configuration page.

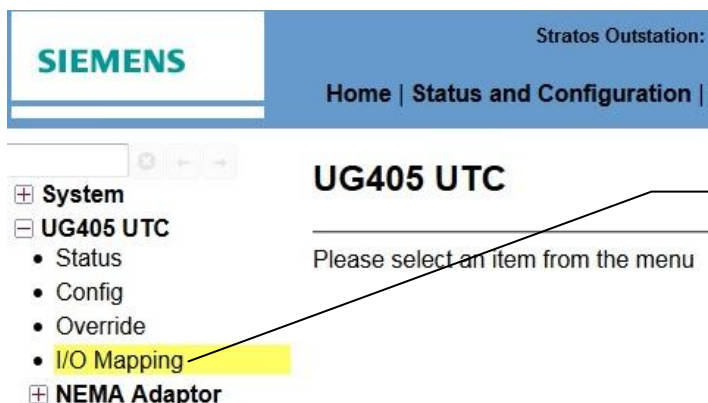
Enter the phase greens active in each stage.

Tick the box for each stage which is to be treated as demand dependent by UTC.

Click Save to apply the new settings.

## 4.5 Step 3: Import CSV File

The CSV file is generated at the UTC instation and defines the UTC control and reply bit functions available on the Outstation.



**Stratos Outstation:**  
Home | Status and Configuration |

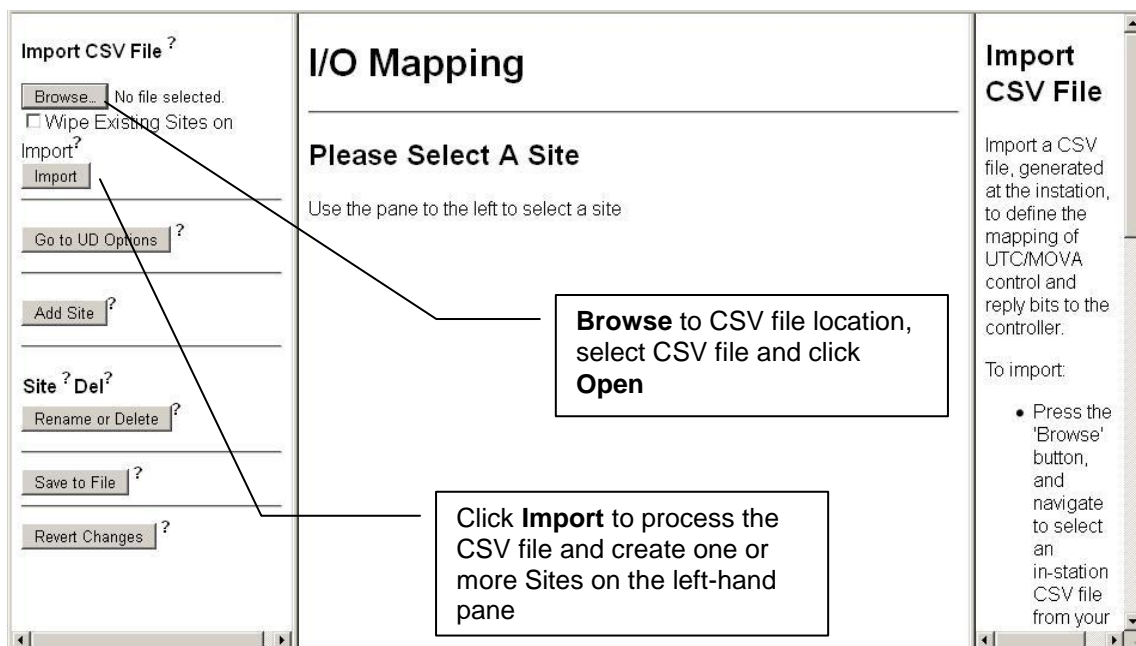
**UG405 UTC**  
Please select an item from the menu

- System
- UG405 UTC
  - Status
  - Config
  - Override
  - I/O Mapping**
- NEMA Adaptor

Select I/O Mapping from the **Status and Configuration – UG405 UTC** menu. The I/O Mapping screen opens in another tab or window.



The NEMA Adaptor must be enabled (as in step 1) **before** the CSV import is performed, in order for the correct NEMA Adaptor default mappings to be applied.



**I/O Mapping**  
Please Select A Site  
Use the pane to the left to select a site

**Import CSV File ?**  
Browse... No file selected.  
☐ Wipe Existing Sites on Import?  
Import  
Go to UD Options ?  
Add Site ?  
Site ? Del ?  
Rename or Delete ?  
Save to File ?  
Revert Changes ?

**Import CSV File**  
Import a CSV file, generated at the instation, to define the mapping of UTC/MOVA control and reply bits to the controller.  
To import:  

- Press the 'Browse' button, and navigate to select an in-station CSV file from your

Browse to CSV file location, select CSV file and click **Open**

Click **Import** to process the CSV file and create one or more Sites on the left-hand pane

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## Example Site List after CSV Import

Site Jxxxx1 contains the Junction control and reply bits.

Click **Edit** to examine the bit mapping for a site – see example in section 6.4.

Site Fxxxxn defines Special Facility “n”.

Site Xxxxx0 defines SCOOT reply bits.

## 4.6 Step 3A: Map Special Facility Outputs if required

If any Special Facility bits are required to control digital outputs, I/O Mapping will need to be modified:-

### I/O Mapping

Site Name ? : F02232

Edit Site Contents: ?

Func?	No.?	UTC Offset?	Direction?	Card/Port?	Bit?	Invert?
SF	1	20	Output	gspio15.out.1	1	<input type="checkbox"/>
SC	1	20	Input	gspio2.in.3	5	<input type="checkbox"/>

Select port gspio15.out.1

Enter 1 for output 1, or 2 for output 2.

The SC confirm bit may or may not be present, depending on the UTC configuration

Where SC bit is used, map it to the input port and bit which confirms the SF output has been actioned.

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## 4.7 Step 4: Map SCOOT Detectors to Intelligent Backplane if Fitted

Where the intelligent detector backplane is equipped, the default mapping of the SCOOT detectors will need to be modified, to match the I/O address switch setting on the intelligent backplane.

Each intelligent backplane can accommodate 4 detectors, giving a total of 16 loops. Where the address switch is set to 3, for example, the 16 inputs are arranged as 8 input bits on port gspio3.in.0 and 8 input bits on port gspio3.in.1. See 667/HB/52250/000, ref 1.3.3, section 4.9 for more information on the intelligent detector backplane.

The screenshot shows the 'Edit Site Content' window. On the left, there are options for 'Freestanding' and 'Semi-Integral' (selected), a 'Wipe Existing Sites on Import?' checkbox, an 'Import' button, a 'Go to UD Options' button, an 'Add Site' button, a list of sites (J02231, F02235, F02231, F02232, F02234, X02230) with 'Edit' buttons, a 'Rename or Delete' button, a 'Save to File' button, and a 'Revert Changes' button. The main area is titled 'Edit Site Content' and contains a table with columns: Func?, No.?, UTC Offset?, Direction?, Card/Port?, Bit?, and Invert?. The table lists 8 sites (VS 1 to VS 8) with their respective UTC offsets and directions. The 'Card/Port?' column shows a pull-down menu with 'gspio3.in.0' selected. The 'Bit?' column shows a pull-down menu with '1' selected. Below the table is an 'Add Bits Table?' section with a 'No Description Set' label and a table with columns: Func?, No.?, UTC Offset?, Direction?, Card/Port?, and Bit?. The 'Card/Port?' pull-down menu is set to 'gspio3.in.0' and the 'Bit?' pull-down menu is set to '1'. A 'Submit' button is at the bottom. Annotations include: 'Click Edit for site X..... to display and modify the SCOOT loop mapping' pointing to the 'Edit' button for site X02230; 'Select the intelligent backplane port from the pull-down list. In this example, the address switch of the intelligent backplane has been set to "3".' pointing to the 'Card/Port?' pull-down menu; and 'Click Submit to enter the new values' pointing to the 'Submit' button.

## 4.8 Step 5: Save the I/O Map Settings

The screenshot shows the 'Save to File' button in the 'Edit Site Content' window. An annotation points to the button with the text: 'Click Save to File to activate and save the new settings.'

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## 4.9 Step 6: Check Outstation is on UTC Control

When the UTC application is running and receiving correct SNMP messages from the instation then the green **COMMS** LED will be illuminated, flashing off each time an SNMP message is received. If the **COMMS** LED is not illuminated, it means that there is a communications problem with the instation (refer to 667/HB/46000/004, ref 1.3.1, section 2.5 for more information on fault finding).

### Example UTC Status Screen

This screen displays the current status and transmission statistics for UTC.

Stratos Outstation: NORTH 42 St, User: pme Ethernet Hi-vis

Home | Status and Configuration | System | System Log | Fault Table | Site Log

### UG405 UTC - Status

Default	Item	Value
<input type="checkbox"/>	Type 2 UTC connection status ?	UTCCONTROL
<input type="checkbox"/>	Type 2 UTC reply By exception Active ?	true
<input type="checkbox"/>	Type 2 UTC Good Set Messages ?	42228
<input type="checkbox"/>	Type 2 UTC Bad Set Messages ?	0
<input type="checkbox"/>	Type 2 UTC Good Get Messages ?	7255
<input type="checkbox"/>	Type 2 UTC Bad Get Messages ?	0
<input type="checkbox"/>	Type 2 UTC Good Inform Messages ?	428734
<input type="checkbox"/>	Type 2 UTC Bad Inform Messages ?	25
<input type="checkbox"/>	Type 2 UTC synchronisation via NTP ?	true

Reload

javascript:void(0);

Check that the connection status is **UTCCONTROL**.

Check that NTP synchronisation is **true**.

## 4.10 Step 7: Outstation Commissioning Complete

Once it has been confirmed that the outstation is on-control, the junction commission procedure can continue with SCOOT detector checking, UTC control and reply bit checking, UTC or SCOOT plan execution etc.

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## 4.11 Controller Configuration for UTC/SCOOT Control

Before commissioning an outstation and controller, the controller should be checked to ensure that the following configuration settings are applied.

Controller Facility	NEMA Spec TS2-2003 Section	Configuration
Dual Entry	3.5.1.5	A dual ring controller should be configured for dual entry operation, to ensure that there is always an active phase on each ring, except when moving between phases. If dual entry operation is not configured, then UTC could report long intergreen faults if one of the rings remains in the all-red state for too long.
Pedestrian Walk Rest Modifier	3.5.5.5 item 13	Where PV operation (section 5.3.2.3) is required to control termination of the pedestrian walk and start of clearance, then the pedestrian phases affected should be configured for CNA (Call to Non-Actuated) operation and rest in don't-walk. Ensure that when not under UTC control, the pedestrians rest in the walk state (if this is the required behaviour).
Pedestrian Termination on Min	3.5.3.2 items 2 and 3	Where pedestrian phase termination on min (section 5.3.2.2) is required, then the phase will need to be configured for no CNA operation and the pedestrian configured for rest in don't-walk.

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## 5 NEMA Adaptor Facilities

The following sections describe the NEMA Adaptor facilities and their operation.

### 5.1 UTC Control Facilities

Control Facility	UTC Bits	Description
Forcing Stages (demand dependent)	Fn	If one stage force bit is active, the controller will move to and hold the stage if there is a vehicle demand for the any phase in the stage. If more than one force active then hold the stage which is running and forced.
Forcing Stages (non-demand dependent)	Fn	Move to and hold the stage (irrespective of street demands). If more than one force active then hold the stage which is running and forced.
Demanding Stages	Dn	Activation of the demand bit for a stage is the equivalent of inserting street demands (or calls) and/or extensions for each of the vehicle phases in the stage. The effect of a demand (e.g. calling or calling and extending) will be the same as that configured on the controller. NB: These demands are generally treated as latched demands by the controller.
Common Demand	DX	Activation of the DX control bit will insert the equivalent of street demands (or calls) and/or extensions for all actuated vehicle phases. NB: Only vehicle phases are called, not pedestrians.
Gap Out	GO	Activating this bit allows to controller to move between multiple forced stages. If GO is not set and multiple stage forces are active, then the controller will be held in the first of these stages that it reaches. NB: GO does not inhibit max timers. If longer max timings are required, this could be introduced via a special facility.
Pedestrian Window	-	Where the pedestrian is demand dependent and can appear at any time during the stage, the appearance can be inhibited a fixed time after the start of the stage - the pedestrian window time. See 5.3.1.
Pedestrian Termination	PV	Where the controller can be configured to support the "rest-in-walk" input, then UTC can signal the termination of the walk a fixed delay prior to the expected end of the SCOOT stage.
Special Facility - Disabling Phases	SFn	The phases being disabled are usually demand dependent. Typically this would be used to skip turning movements during quieter periods of the day. The purpose is to allow SCOOT (or fixed time plans) to introduce shorter cycle time. The activation of the signal would need to be synchronised with the introduction of the appropriate plan at the UTC instation. See 6.3 and 6.3.1 for configuration.
Special Facility - Introduce Alt Max Timings	SFn	This is typically used to increase the max time of the left turn arrow phases e.g. so that the arrow can run together with the opposite direction left arrow and then with the same direction straight ahead movement. A single SF bit controls the Max II input for each ring i.e. inputs A/GG and B/z.
Select Free Mode	Fn,Dn,DX	On controllers which are configured for coordination mode, the controller needs to be switched into "free" mode while under UTC control, so that it will service the UTC forces and demands. This is achieved by using the "Free" input on the controller (B/y). If UTC comms fails or the junction is isolated, the controller will revert to coordination mode automatically.

**Table 1 – UTC Control Facilities**

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## 5.2 UTC Reply Facilities

The following table shows the UTC reply bits and their usage.

Reply Facility	UTC Bits	Description
Confirming Stages	Gn	The stage green confirm is activated while all the vehicle phases configured in the stage are at green. The UTC instation uses the stage confirm bits to check that the controller is responding as expected to the UTC force bits (plan compliance checks). As a configuration option, the pedestrian greens can also be required in order to activate the stage green confirm. Using this option ensures that the stage confirm will be deactivated as soon as the controller starts responding to a change of force bits.
Confirming Demands	Dn	The stage demand confirm is activated based on the phase demand check signals for any of the phases in the stage. See section 5.6.
SCOOT Loop Samples	VS <sub>n</sub>	The SCOOT detectors are sampled 4 times per second and the data transmitted to the instation for UTC SCOOT.
Remote Reconnect	RR	When activated, this input isolates the junction from SCOOT/UTC control. Usually wired to a switch in the cabinet. The outstation only supports a single RR bit.
Manual Control	MC	When activated, this input indicates that the controller is under manual control. As for RR, it isolates the junction from SCOOT/UTC control. The outstation only supports a single MC bit. The input is wired to a suitable signal in the cabinet.
Hurry Call	HC	This input is activated while the controller is responding to a hurry call request and so is not obeying the UTC forces. The outstation only supports a single HC bit. The input is wired to a suitable signal in the cabinet.
Emergency Vehicle	EV	This input is activated while the controller is responding to an emergency vehicle request (e.g. from nearby fire engine depot) and so is not obeying the UTC forces. The outstation only supports a single EV bit. The input is wired to a suitable signal in the cabinet.
Controller Fault	CF	This reply bit is activated when the Fault Monitor (pin A/A) or Voltage Monitor (pin A/C) inputs are active. The fault condition is then flagged up to the UTC operator and/or maintenance team. See section 5.10.1
Vehicle Count	VC	This reply bit provides UTC with vehicle count information. The count is scaled at the outstation so that each change of state typically represents 16 vehicles. See 6.5.
Vehicle Queue	VQ	This reply bit is activated when the detector input has been active for longer than the configured "call" time. See 6.5.
Vehicle Occupancy	VO	This reply bit changes state when a certain vehicle occupancy has been accumulated, determined by the configured weighting factor. See 6.5.

**Table 2 – UTC Reply Facilities**

### 5.2.1 Outstation Response to a Non-Demand-Dependent Force

When the outstation receives a non-demand-dependent stage force bit, it will:-

- Activate demands for the phases in the forced stage.
- Activate omits for phases which do not appear in the forced stage.
- Activate force-off, so that any extension timings for phases currently at green are curtailed.  
However, if the stage is already running then the force-off is not required and is inhibited.

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When the stage is confirmed, it will:-

- De-activate the force-off, if it was active.

### 5.2.2 Outstation Response to a Demand-Dependent Force

When the Outstation receives a demand-dependent stage force bit, it will:-

- Activate omits for phases which do not appear in the forced stage.
- Activate force-off, unless the stage is already running.

When/if the stage is confirmed, it will:-

- De-activate the force-off, if it was active.

### 5.2.3 Outstation Response to Multiple Forces

When the Outstation receives multiple stage force bits, it will:-

- Activate omits for phases which do not appear in any of the multiple forced stages.
- Activate force-off. However, if one of the forced stages is already running then the force-off is not required and is inhibited.

When/if a forced stage is confirmed and the gap out bit (GO) is **not** active, it will:-

- De-activate the force-off, if it was active.
- Activate omits for phases which do not appear in the confirmed stage  
NB: This is to prevent any further movements. If this was not done, then the controller could make further stage changes which would cause UTC compliance problems and phase intergreen or min timings could then delay the response to new UTC forces.

When/if a forced stage is confirmed and the gap out bit (GO) **is** active, it will:-

- De-activate the force-off, if it was active.
- Keep the omits unchanged i.e. omits are only active for phases which do not appear in any of the multiple forced stages  
NB: This allows the controller to make further stage changes to other forced stages as long as the gap out bit remains set. The controller movement will be dependent on the normal vehicle actuated movement conditions i.e. expiry of mins, presence of demand and expiry of vehicle extensions or max timer expiry.

## 5.3 Pedestrians

### 5.3.1 Pedestrian Appearance Window

Demand dependent pedestrians will only be allowed to start for a configurable window period, which is timed from the start of the stage green. This will prevent the pedestrian being called or recalled just before a subsequent UTC stage change is due.

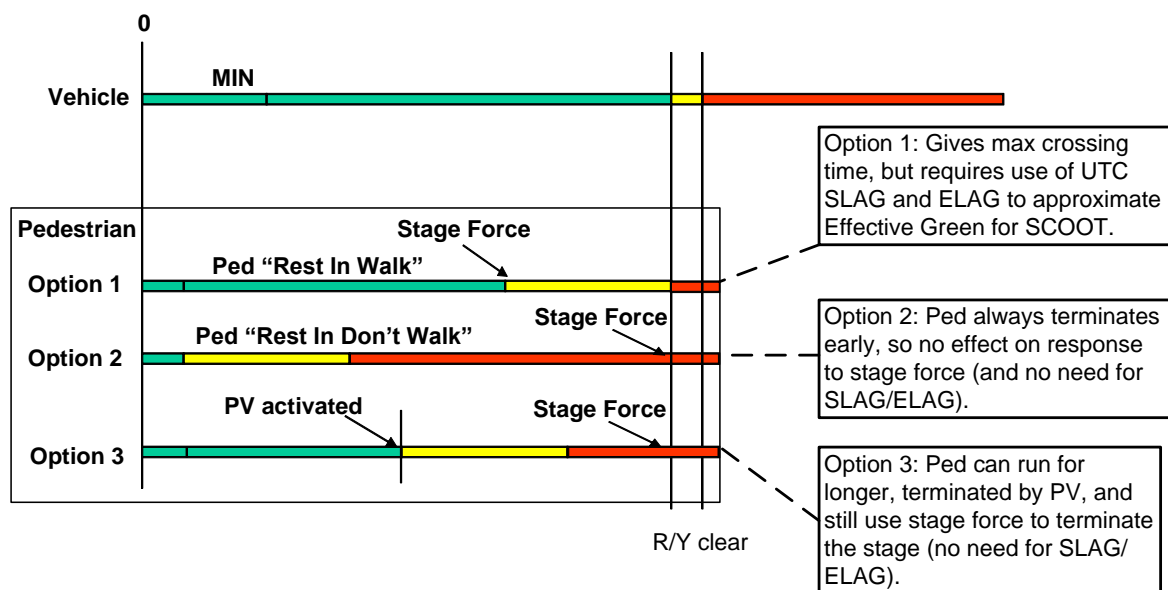
Pedestrian demands registered after the window timer expires will be latched in the controller and serviced the next time the pedestrian is allowed to run.

### 5.3.2 Pedestrian Termination

The control of pedestrian phases often involves a compromise between the conflicting objectives of maximum pedestrian crossing time and maximum UTC/SCOOT flexibility in serving vehicle traffic.

There are three main options available under UTC (or SCOOT) control as summarised in the following figure.

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Typical Vehicle MIN for Phases 2 and 6 are 15 seconds (no Actuation Loops on the Main Road)

Typical Pedestrian MIN for Phases 2 and 6 are 7 seconds WALK with 18+ seconds FLASHING DONT WALK

Figure 5-1 : Pedestrian termination options under UTC

### 5.3.2.1 Pedestrian Termination Option 1 (Rest In Walk):

The pedestrian rests at walk along with traffic phase green so that the pedestrian green time is extended as the SCOOT stage time increases. Then when SCOOT tries to terminate the stage, the ped clearance extends the traffic green for the configured pedestrian clearance time. Although the traffic phase continues at green the outstation has to drop the green confirm so that the UTC instation does not generate a plan compliance error. It is also necessary to define end lags in SCOOT in order to model the traffic flow, which continues past the stage end point.

The outstation can be configured to terminate the stage confirm when the pedestrian walk terminates by associating the stage with the pedestrian phase rather than with the vehicle phase. This option should only be used where the pedestrian always appears (since the stage green confirm back to UTC will not be activated until the pedestrian green is active).

### 5.3.2.2 Pedestrian Termination Option 2 (Rest In Don't Walk):

The pedestrian walk terminates at the configured minimum time, so that when UTC changes the stage forces the controller will respond straight away. The disadvantage is that the pedestrians have less opportunity to cross, especially if the stage time is very long.

### 5.3.2.3 Pedestrian Termination Option 3 (PV control):

This option uses an enhancement to the UTC/SCOOT plan definition to terminate the pedestrian walk at a fixed delay before the end of the stage, so that the pedestrian clearance period can run and be completed before SCOOT changes stage via the stage force bits.

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The UTC PV bit is used by the Outstation to control the state of the Walk Rest Modifier signal to the controller. PV is set inactive at the start of each stage. Then PV is activated by the SCOOT plan during the stage to terminate the walk and initiate ped clearance.WRM signal.

The timing of the PV bit is normally defined as a configured delay time before the expected end of stage

e.g. for SCOOT plan {A 0; AV 25}1, {B 0}2 ...

The semi-colon indicates "end events" that are executed relative to expected end of stage. E.g. AV is sent 20 seconds before SCOOT stage is expected to finish.

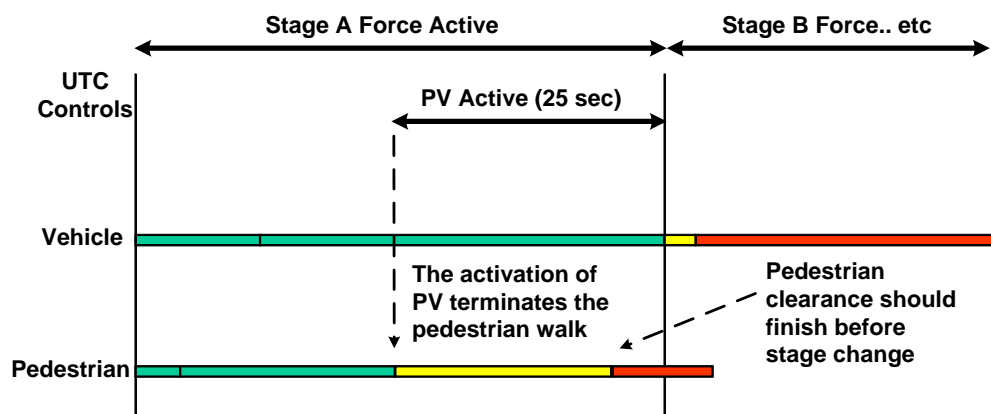


Figure 5-2 : Use of PV and Walk Rest Modifier to terminate Pedestrian during stage



In order to use the pedestrian termination facility, SCOOT version 34.1 or later is required.

In order for the WRM signal to have an effect on the controller, it will need to be configured to use the "call to NA" input on those phases (the Outstation will activate the "call to NA" signal for each ring while there are force or demand bits active).

## 5.4 Preventing Phase Recycling

### The Recycling Problem

When the gap out bit is activated together with multiple stage forces, then a phase can terminate and then re-appear later in the same UTC stage, depending on traffic conditions. This can cause problems when it happens near the end of the UTC stage because the phase minimum will still be running when UTC is trying to move to the next stage. A similar situation can also happen with pedestrians, where a pedestrian phase terminates and then re-appears later near the end of the stage.

### Recycle Inhibit

The outstation includes a recycling inhibit feature, which is enabled by default for both pedestrian and vehicle phases. The recycling inhibit operates as follows:

- If a phase runs for a period of time and then terminates, then it is inhibited from coming back on (recycling) via an omit signal from the outstation
- The inhibit condition is removed when the UTC plan changes to a force combination which prevents the phase from appearing.

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## 5.5 Interstage Timeout

With some controller configurations, all the phases on a ring can be set to red, leaving just one phase active on the other ring. This would cause the Outstation to return the interstage condition to UTC, since no stage pattern is being confirmed and the UTC system would report a long interstage error. To avoid this, the controller should be configured for dual entry operation as described in section 4.11.

If the interstage condition exceeds the configured interstage timeout then the Outstation returns stage green confirms for stage 1 and 2 (G1G2), as described in section 5.10.2.

## 5.6 Demand Confirms

Where Stage Demand bits are defined on UTC, there is generally a Stage Demand Confirm reply which is activated when a demand exists for the stage. In order to generate the demand confirms, the NEMA adaptor monitors the "Phase Check" (phase demand) output signals from the controller and used this information in combination with the stage-phase mapping.

A stage demand confirm reply bit is activated if either of the following conditions is true:-

- A. All phases in a stage are either demanded or at green and the stage is not active
- B. Only one phase in a stage is demanded & it is the highest\* numbered stage in which the phase appears and the phase is not already included in condition A.

\* As a configuration option, the user can switch the demand confirm algorithm to use the lowest numbered stage instead of the highest (see 6.1).

## 5.7 Disabling a Phase

A vehicle or pedestrian phase can be disabled using a UTC Special Facility bit. Typically this would be used to skip demand dependent turning movements during quieter periods of the day and thus allow SCOOT (or fixed time plans) to introduce shorter cycle times. The activation of the signal would need to be synchronised with the introduction of the appropriate plan at the UTC instation.

The phase being disabled would usually be demand dependent.



Care should be taken in assessing the effect of disabling a phase on the street traffic and also on the execution of the UTC plans, e.g. to avoid generating a "Demand not serviced" fault.



A phase can be disabled by time-of-day if required, by suitable configuration of the Special Facility at the UTC instation. The junction does not have to be running a plan in order for the phase disable to operate.

## 5.8 Activating Free Mode on the Controller (inhibit coordination)

While the Outstation is under UTC control and there are any force or demand bits active, then the Outstation will activate the "Free" input on the controller (B/y), so that it will ignore the coordination plan and instead service the UTC forces and demands. Conversely, if UTC comms fails or the junction is isolated, the Outstation will deactivate the "Free" input and the controller will revert to coordination mode and run the coordination plan, where this has been configured.

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## 5.9 Configuration Default I/O Mapping

When a CSV file import is performed on the Outstation web interface, the junction configuration generated at the UTC instation (in the .csv file) is loaded into the outstation and all the configured control and reply bits are given default allocations. When the NEMA adaptor is enabled, the default allocations are as shown in the following tables.

Control Facility	UTC Bits	Port	Bit	Notes
Stage Force	Fn	nap.force.out.1	n	The NEMA adaptor maps UTC stages to controller phases via the configuration data.
Stage Demand	Dn	nap.demand.out.1	n	The NEMA adaptor maps UTC stages to controller phases via the configuration data.
Common Demand	DX	nap.dx.out.1	1	
Gap Out	GO	nap.gap.out.1	1	This bit is used by the NEMA adaptor to determine the generation of phase omit signals.
Pedestrian Termination	PV	nap.pv.out.1	1	This bit controls the “rest-in-walk” input on the controller.
Special Facility	SF1	nap.sf.out.1	s	The selection of the facilities to be switched (phases to disable or alt max timing) is made on separate configuration web page.

Where n = stage number or facility number, s = last digit of site ID (UTC SCN).

**Table 3 – UTC Control Bits Default Mapping for NEMA**

Reply Facility	UTC Bits	Port	Bit	Notes
Confirming Stages	Gn	nap.stageconfirm.in.1	n	The NEMA adaptor maps from controller phases active to stage confirm bits using the configuration data.
Confirming Demands	Dn	nap.demandconfirm.in.1	n	The NEMA adaptor maps from controller phase check bits to stage demand confirm bits using the configuration data.
SCOOT Loop Samples	VS <sub>n</sub>	gspio1.in.X	Y	The Outstation inputs are wired to the SCOOT detectors
Remote Reconnect	RR	gspio2.in.3	1	From cabinet wiring
Manual Control	MC	gspio2.in.3	2	From cabinet wiring
Hurry Call	HC	gspio2.in.3	3	From cabinet wiring
Emergency Vehicle	EV	gspio2.in.3	4	From cabinet wiring
Controller Fault	CF	nap.cf.in.1	1	This reply bit is driven by Fault Monitor (pin A/A) and Voltage Monitor (pin A/C) inputs.
Vehicle Count	VC	gspio2.in.0	s	Up to 8 inputs are pre-allocated for count/queue/occupancy. The inputs are wired to the vehicle detectors.
Vehicle Queue	VQ	gspio2.in.0	s	
Vehicle Occupancy	VO	gspio2.in.0	s	

Where n = stage number or facility number, s = last digit of site ID (UTC SCN).

X and Y values are as shown in **Table 5**.

**Table 4 – UTC Reply Bits Default Mapping for NEMA**

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Signal Name	Port	Bit
SCOOT Loop 1	gspio1.in.0	1
SCOOT Loop 2	gspio1.in.0	2
SCOOT Loop 3	gspio1.in.0	3
SCOOT Loop 4	gspio1.in.0	4
SCOOT Loop 5	gspio1.in.0	5
SCOOT Loop 6	gspio1.in.0	6
SCOOT Loop 7	gspio1.in.0	7
SCOOT Loop 8	gspio1.in.0	8
SCOOT Loop 9	gspio1.in.1	1
SCOOT Loop 10	gspio1.in.1	2
SCOOT Loop 11	gspio1.in.1	3
SCOOT Loop 12	gspio1.in.1	4
SCOOT Loop 13	gspio1.in.1	5
SCOOT Loop 14	gspio1.in.1	6
SCOOT Loop 15	gspio1.in.1	7
SCOOT Loop 16	gspio1.in.1	8
SCOOT Loop 17	gspio1.in.2	1
SCOOT Loop 18	gspio1.in.2	2
SCOOT Loop 19	gspio1.in.2	3
SCOOT Loop 20	gspio1.in.2	4

Table 5 – SCOOT Bits Default Mapping for NEMA

## 5.10 Fault and Notification Reporting

### 5.10.1 Controller Fault/Disconnected

If the NEMA controller activates either of its fault outputs (Fault Monitor or Voltage Monitor), then the CF reply bit is activated, if configured, and an entry is placed in the outstation fault table:-

NEMA Controller Fault Output Set

Note that the fault outputs from the controller are active in the open-circuit state and are normally maintained short-circuit (at approximately 0V) when no faults are present. Thus disconnecting the controller from the outstation will cause the signals to appear active.

### 5.10.2 Controller Lamps Off/Flashing

If the NEMA controller remains with no greens showing for longer than the configured interstage timeout, then the G1G2 reply indication is returned to UTC, and an entry is placed in the outstation notification table:-

NEMA Controller: No greens detected

Note that this report is displayed in the notifications section of the fault table web page rather than the fault section, as it may be generated as a result of intended controller operation rather than a fault condition.

### 5.10.3 Initialisation/Configuration Errors

When the NEMA Adaptor software starts up a number of consistency checks are performed. If any of these fail, the the adaptor execution is aborted and an entry is placed in the outstation fault table:-

NEMA Adaptor initialisation error - check configuration

Additional information of the cause of the problem is included in the system log.

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## 6 Configuration data

The NEMA configuration data screens are shown in the following sections, together with descriptions of the items of data.

### 6.1 NEMA Adaptor Options

Figure 6-1 : NEMA Adaptor Top Level Configuration Web Page

#### Enable NEMA Adaptor

Enables or disables the NEMA Adaptor. The adaptor allows SCOOT UTC to control a traffic signal controller meeting the NEMA standard with A, B, C connectors.

#### Inhibit Vehicle Recycling

When selected, disables the re-appearance of a vehicle phase once it has been serviced during a UTC stage or sequence of stages during which the phase is allowed to appear.

#### Inhibit Pedestrian Recycling

When selected, disables the re-appearance of a pedestrian phase once it has terminated during a UTC stage or sequence of stages during which the pedestrian is allowed to appear.

#### Demand Highest Stage

When this options is selected, a demand for only one phase in a stage will generate a UTC demand confirm for the highest numbered stage in which the phase appears. Conversely, when not selected, the lowest numbered stage is confirmed.

#### Interstage timeout (sec)

The maximum time allowed for the all-red interstage state, in seconds.

If the controller is not showing any phase green signals for longer than this time, then the G1G2 stage confirms are returned to UTC to indicate that UTC control of the junction is no longer available.

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## 6.2 NEMA Adaptor Stage Configuration

Stage	Demand-dependent?	Phase Greens?	Ped. Window Time?
1	<input type="checkbox"/>	2,5	10
2	<input type="checkbox"/>	2,6P	10
3	<input checked="" type="checkbox"/>	3,7	10
4	<input checked="" type="checkbox"/>	3,8	10
5	<input type="checkbox"/>	4,7	14
6	<input type="checkbox"/>	4,8	10
7	<input checked="" type="checkbox"/>	1,5	10
8	<input checked="" type="checkbox"/>	1,6	10

“6P” means that phase 6 pedestrian walk will be used to report the stage green confirm.

Save Reload Previous Next 12 rows

Figure 6-2 : NEMA Adaptor Stage Configuration Web Page

### Demand-dependent

Select if the stage is demand-dependent under UTC control.

A demand-dependent stage will only be activated if the UTC stage force is active and there are street demands for one or more of the phases in the stage.

A non-demand-dependent stage will always be activated when the stage force is activated by UTC, since the outstation will automatically insert demands for all the vehicle phases associated with the stage.

### Phase Greens

The comma-separated list of NEMA controller vehicle phases (1-8) or the associated pedestrian (1P - 8P) allocated to this stage.

The UTC stage green confirm is only returned as active while all the allocated phases are showing green (walk for a pedestrian).

### Ped. Window Time

The time, in seconds, timed from the start of stage green, during which a pedestrian demand will be allowed. After this time, the appearance of the pedestrian is inhibited, by activation of the omit signal. Demands registered after the window timer expires will be latched in the controller and serviced when the vehicle phase next appears.

A value of 0 means that the pedestrian demand must be present at the start of the stage in order for it to appear.

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## 6.3 NEMA Adaptor Special Facilities

Facility	Alt Max?	Disable Phase?
1	<input type="checkbox"/>	6
2	<input type="checkbox"/>	7
3	<input type="checkbox"/>	
4	<input checked="" type="checkbox"/>	
5	<input type="checkbox"/>	
6	<input type="checkbox"/>	
7	<input type="checkbox"/>	
8	<input type="checkbox"/>	

Figure 6-3 : NEMA Adaptor Special Facilities Configuration Web Page

### Alt Max

If selected, then activating the UTC special facility bit will enable the alternative maximum timings on the controller (via the controller MAX II signals). More than one special facility can enable the alternative maximum timings.

### Disable Phase

If the UTC special facility bit is used to prevent a phase from appearing, then this is the vehicle phase (1-8) or pedestrian phase (1P - 8P) which is to be disabled.

The phases being disabled are usually demand dependent. Typically this would be used to skip turning movements during quieter periods of the day. The purpose is to allow SCOOT (or fixed time plans) to introduce shorter cycle time. The activation of the signal would typically need to be synchronised with the introduction of the appropriate plan at the UTC instation.



The UTC Special Facility number is determined by the last digit of the Site or SCN  
e.g. site F02204 would control Special Facility 4 (see section 6.3.1)

### Switching Outputs

UTC Special Facility bits can be used to switch unallocated digital outputs e.g. to control external devices. Where this facility is required, the configuration of the I/O Mapping is set up manually via the I/O Mapping web pages and is not handled by the NEMA Adaptor. See example 4.6.

Two outputs are available as described in section 3.10.

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## 6.3.1 Special Facility Numbering and I/O Mapping

The Siemens UTC instation will allocate each special facility to a separate Site (SCN) and the outstation effectively uses the last digit of the SCN as the special facility number. This is achieved on the I/O mapping screens - when a CSV import is performed, the last digit of the SCN is used to set the special facility bit number automatically. The example below shows a configuration with 4 special facilities, which will be numbered 1, 2, 4 and 5, corresponding to sites F02231, F02232, F02234 and F02235.

**I/O Mapping**

Go to UD Options ?

Add Site ?

Site ?	Del?	Edit
J02231	<input type="checkbox"/>	Edit
F02235	<input type="checkbox"/>	Edit
F02231	<input type="checkbox"/>	Edit
F02232	<input type="checkbox"/>	Edit
F02234	<input type="checkbox"/>	Edit
X02230	<input type="checkbox"/>	Edit

Site Name ? : F02234

Edit Site Contents: ?

Func?	No.?	UTC Offset Direction?	Card/Port?	Bit?
SF	1	21	Output	nap.sf.out.1

Each special facility is configured as a separate site.

The mapping to port nap.sf.out.1 bit **4** links F0223**4** to special facility **4** in the NEMA Adaptor.

The special facility instance number is always 1.

---

**I/O Mapping**

Site Name ? : Q11992

Queue:

Call Delay: 3 ? Cancel Delay: 3 ?

Func?	No.?	UTC Offset Direction?	Card/Port?	Bit?	Invert?	DFM Act? (min)	DFM Inact? (hrs)
VQ	1	16	Input	gpio2.in.0	<input type="checkbox"/>	0	0

Save to File ?

Revert Changes ?

Figure 6-4 : I/O Mapping of Special Facilities

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## 6.4 Example I/O Mapping

**Import CSV File ?**  
Browse... No file selected.  
☐ Freestanding  
☒ Semi-Integral  
☐ Wipe Existing Sites on Import?  
Import  
Go to UD Options ?  
Add Site ?

**Site ? Del?**  
J02231 ☐ Edit  
F02235 ☐ Edit  
F02231 ☐ Edit  
F02232 ☐ Edit  
F02234 ☐ Edit  
X02230 ☐ Edit  
Rename or Delete ?  
Save to File ?  
Revert Changes ?

**Site Name ? : J02231**  
**Edit Site Contents: ?**

Func?	No.?	UTC Offset Direction?	Card/Port?	Bit?	Invert?	
TC	-	0	Output	virtual.out.1	32	<input type="checkbox"/>
F	1	1	Output	nap.force.out.1	1	<input type="checkbox"/>
F	2	2	Output	nap.force.out.1	2	<input type="checkbox"/>
F	3	3	Output	nap.force.out.1	3	<input type="checkbox"/>
F	4	4	Output	nap.force.out.1	4	<input type="checkbox"/>
F	5	5	Output	nap.force.out.1	5	<input type="checkbox"/>
F	6	6	Output	nap.force.out.1	6	<input type="checkbox"/>
F	7	7	Output	nap.force.out.1	7	<input type="checkbox"/>
F	8	8	Output	nap.force.out.1	8	<input type="checkbox"/>
D	2	9	Output	nap.demand.out.1	2	<input type="checkbox"/>
D	3	10	Output	nap.demand.out.1	3	<input type="checkbox"/>
D	4	11	Output	nap.demand.out.1	4	<input type="checkbox"/>
D	5	12	Output	nap.demand.out.1	5	<input type="checkbox"/>
D	6	13	Output	nap.demand.out.1	6	<input type="checkbox"/>
D	7	14	Output	nap.demand.out.1	7	<input type="checkbox"/>
D	8	15	Output	nap.demand.out.1	8	<input type="checkbox"/>
DX	-	16	Output	nap.dx.out.1	1	<input type="checkbox"/>
GO	-	17	Output	nap.gap.out.1	1	<input type="checkbox"/>
PV	-	18	Output	nap.pv.out.1	1	<input type="checkbox"/>

**Getting Started**  
This screen allows...  
control and reply bits, and the controller interface.  
CSV files  
here, to define the bit mappings. Alternatively, a new...  
mappings entered individually.

UTC Force for stage 1 is mapped to port nap.force.out.1 bit 1

UTC Demand for stage 2 is mapped to port nap.demand.out.1 bit 2

UTC DX, GO and PV bits are mapped to their own specific ports

Figure 6-5 : Example Junction Site Bit Mapping: Control Bits

G	1	1	Input	nap.stageconfirm.in.1	1	<input type="checkbox"/>
G	2	2	Input	nap.stageconfirm.in.1	2	<input type="checkbox"/>
G	3	3	Input	nap.stageconfirm.in.1	3	<input type="checkbox"/>
G	4	4	Input	nap.stageconfirm.in.1	4	<input type="checkbox"/>
G	5	5	Input	nap.stageconfirm.in.1	5	<input type="checkbox"/>
G	6	6	Input	nap.stageconfirm.in.1	6	<input type="checkbox"/>
G	7	7	Input	nap.stageconfirm.in.1	7	<input type="checkbox"/>
G	8	8	Input	nap.stageconfirm.in.1	8	<input type="checkbox"/>
SD	2	9	Input	nap.demandconfirm.in.1	2	<input type="checkbox"/>
SD	3	10	Input	nap.demandconfirm.in.1	3	<input type="checkbox"/>
SD	4	11	Input	nap.demandconfirm.in.1	4	<input type="checkbox"/>
SD	5	12	Input	nap.demandconfirm.in.1	5	<input type="checkbox"/>
SD	6	13	Input	nap.demandconfirm.in.1	6	<input type="checkbox"/>
SD	7	14	Input	nap.demandconfirm.in.1	7	<input type="checkbox"/>
SD	8	15	Input	nap.demandconfirm.in.1	8	<input type="checkbox"/>
CF	-	16	Input	nap.cf.in.1	1	<input type="checkbox"/>
RR	-	17	Input	gs pio2.in.0	1	<input type="checkbox"/>

UTC Green confirm for stage 1 is mapped to port nap.stageconfirm.in.1 bit 1

UTC stage 2 demand confirm is mapped to port nap.demandconfirm.in.1 bit 2

UTC CF is mapped to its own specific port.

UTC RR (Remote Reconnect) is mapped to an input on I/O card 2 by default.

Figure 6-6 : Reply Bits

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## 6.5 Count / Queue / Occupancy Numbering and I/O Mapping

The Siemens UTC instation will allocate each count/queue/occupancy function to a separate Site (SCN) and the outstation effectively uses the last digit of the SCN as the facility number. On the I/O mapping screens, when a CSV import is performed, the last digit of the SCN is used to set the input bit number automatically.

The example below shows a configuration with 2 detector inputs, each of which is configured for count, queue and occupancy functions via sites D11991, D11992, Q11991 and Q11992.

**Import CSV File ?**  
Browse... No file selected.  
☐ Freestanding  
☒ Semi-Integral  
☐ Wipe Existing Sites on Import?  
Import  
Go to UD Options ?  
Add Site ?

**Site ? Del?**  
J11991 Edit  
Z11991 Edit  
Z11992 Edit  
Z11993 Edit  
D11992 Edit  
D11991 Edit  
Q11991 Edit  
Q11992 Edit  
X11990 Edit  
F11991 Edit  
Rename or Delete ?  
Save to File ?

**I/O Mapping**  
Site Name ? : D11992

**Counter**  
UTC Offset: ? 10 Weighting Factor: ? 5 Delete: ☐  
Func No. UTC Offset Direction Card/Port Bit Invert DFM Act DFM Inact Delete Row  
VC - - Input gpio2.in.0 2 ☒ 0 0 -  
VC - - Input Unused - ☐ 0 0 -  
VC - - Input Unused - ☐ 0 0 -  
VC - - Input Unused - ☐ 0 0 -

**Occupancy**  
UTC Offset: ? 11 Weighting Factor: ? 6 Delete: ☐  
Func No. UTC Offset Direction Card/Port Bit Invert DFM Act DFM Inact Delete Row  
VO - - Input gpio2.in.0 2 ☒ 0 0 -  
VO - - Input Unused - ☐ 0 0 -  
VO - - Input Unused - ☐ 0 0 -  
VO - - Input Unused - ☐ 0 0 -

The mapping to port gpio1.in.0 bit 2 links that input to the VC and VO functions on site D11992.

Each Count/Occupancy is configured as a separate site.

Figure 6-7 : I/O Mapping of Count and Occupancy

**Site ? Del?**  
J11991 Edit  
Z11991 Edit  
Z11992 Edit  
Z11993 Edit  
D11992 Edit  
D11991 Edit  
Q11991 Edit  
Q11992 Edit  
X11990 Edit  
F11991 Edit  
Rename or Delete ?  
Save to File ?  
Revert Changes ?

**I/O Mapping**  
Site Name ? : Q11992

**Queue:**  
Call Delay: 3 ? Cancel Delay: 3 ?  
Func? No.? UTC Offset Direction? Card/Port? Bit? Invert? DFM Act? DFM Inact?  
VQ 1 16 Input gpio2.in.0 2 ☒ 0 0

Each Queue unit is configured as a separate site.

The mapping to port gpio1.in.0 bit 2 links that input to the VQ function on site Q11992.

Figure 6-8 : I/O Mapping of Queue Function

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