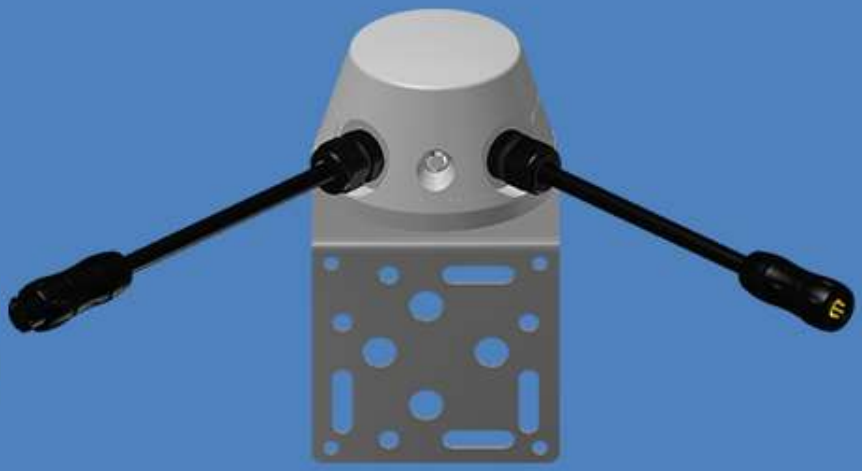
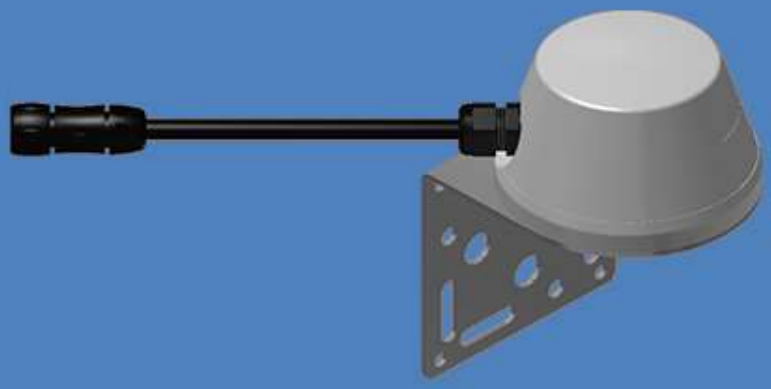
CAS GPS Node II

PROD1116





imagination at work

User Manual

DOCU0142

Rev D

Wabtec Digital Mining Technology
PO Box 5107
Fountaindale, New South Wales
Australia, 2261
t +61 2 4336 1800
f +61 2 4336 1888
www.getransportation.com/mining

CONTENTS

1 DOCUMENT REVISION

Amendment Log			
Issue No.	**Date**	**Modified By**	**Details**
DRAFT	25/06/2018	Neil Mosley & Mike Kelly	Submitted for review
Rev A	16/07/2018	Mike Kelly	Initial external release
Rev B	29/04/2019	Neil Mosley	Updated Part Nomenclature
Rev C	04/07/2019	Akshat Shrey	Updated with optional node(No-ToF) variant codes
Rev D	14/01/2020	Abhijeet D	Remove reference of “Contains FCC ID: SIF-NANOPAN5375V1” in FCC DoC

Document Approval	
Creator(s):	CREATED: By Abhijeet Deshmukh at 11:48 am, Jan 14, 2020
Reviewer(s):	REVIEWED: By Akshat Shrey at 12:19PM, Jan 14, 2020
Approval Signature:	APPROVED: By Nagendra at 1:58 pm, Jan 14, 2020

Copyright Notice

Disclaimer

These materials are provided for information purposes only, "as is," without express or implied warranty of any kind. WABTEC makes no EXPRESSED OR IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESSED OR IMPLIED WARRANTY REGARDING ANY PRODUCTS DESCRIBED in these materials. To the maximum extent permitted by law, WABTEC disclaims any and all implied warranties that might otherwise arise or apply, including any implied warranty of merchantability or of fitness for a particular purpose. WABTEC further makes no representation or warranty of accuracy of these materials and WABTEC will have no responsibility or liability for any error or omission in these materials.

1 WARNINGS

Installation should be in accordance with the installation procedures defined by Wabtec Digital Mining Technology and must only be performed by authorized and qualified installers.

The CAS product is a driver's aid and should not be relied upon as the primary means of reducing the risks of high potential interactions. Interactions include between Heavy Vehicles, Light Vehicles, infrastructure and personnel.

GPS based proximity detection may not operate when satellites are not fully visible in the sky (e.g. in a deep mining pit near a high-wall or under a workshop roof). CAS-GPS products are available with RF proximity detection and visual aids to assist in GPS black spots.

There are no user serviceable parts within the CAS-GPS Node products. Servicing of the product including replacement of batteries must be carried out by an authorized service agent of Wabtec Digital Mining Technology

Alarm logic should be determined via site specific risk assessment based on the end-users specified high risk interactions.

Do not weld on ROPs!

Do not drill through ROPs!

Proximity to Electric Detonators

The CAS-GPS system consists of various components including an in-vehicle unit and personnel tag all of which are equipped with multiple radio transmitters. AS2187-2:2006 table I1, recommends a safe operating distance from any designated blasting area as greater than **20 meters**. AS2187-2:2006 table I1 is an Australian Standard and operators and users should have regard to all relevant and applicable standards which may apply within the country of use. Operators and users should also have regard to all detonator and blasting contractor and manufacturer recommendations and all applicable safety and operational procedures applicable at the site where the CAS-GPS System is used and which relate to safe operating distances. Details of operating frequency and output power of the various CAS-GPS System components are set out in the CAS-GPS specification and user documentation. Operators and users should make their own assessment in this regard

2 MANUFACTURER DETAILS

Wabtec Industrea Mining Technology
3 Co-Wyn Close, Fountaindale,
NSW, 2261, Australia
P: +612 4336 1800
F: +612 4389 2355
E enquiriesIMT@geindustrea.ge.com
W www.getransportation.com/mining

3 SCOPE

This user manual covers the following variants of the CAS-GPS node product range. All PROD1116 products are electrically equivalent with differences residing in available connection methods to suit the various installations of the product.

PROD1116-τv(X)(xx)

PROD1116 variants are defined by first two-digit suffix 'τv' indicating product type (**τ**) and V2V operating frequency (**v**), third optional character to specify an extended operating temperature range (**X**) as detailed below and fourth optional characters (xx) to specify the optional ToF Variant for time of flight RF ranging functionality.

3.1 CAS-GPS NODE TYPE VARIANTS (τ)

The CAS-GPS Node family of products are available in the following types. The Type variant is specified by the first suffix character of the part number.

PROD1116-**τ**v	Product Type	Available Interfaces
PROD1116-**E**v	Light Vehicle Expandable Node	2 x RS232 ports, 2 x Digital Inputs
PROD1116-**L**v	Light Vehicle Node	1 x RS232 port, 2 x Digital Inputs
PROD1116-**P**v	Type P Node	2 x Digital Inputs, 1 x Digital Output
PROD1116-**S**v	Type S Node	1 x CAN Bus port, 1 x RS485 port

3.2 CAS-GPS NODE V2V VARIANTS (v)

The CAS-GPS Node family of products are available in geographic specific Vehicle to Vehicle (V2V) configurations for compliance with localized radio regulations. The V2V variant is specified by the second suffix character of the part number.

PROD1116-τ**v**	V2V Frequency	Radio Power	Available Markets
PROD1116-τ**1**	869.525 MHz	100mW	RSA, Europe, Ghana, Mozambique
PROD1116-τ**2**	920.000 MHz	100mW	Brazil, USA Canada, PNG, Australia, Mexico Peru, Chile, Colombia
PROD1116-τ**4**	866.000 MHz	100mW	India
PROD1116-τ**5**	864.500 MHz	25mW	Russia
PROD1116-τ**7**	924.000 MHz	100mW	Indonesia

3.3 CAS-GPS NODE TEMPERATURE VARIANTS (X)

The CAS-GPS Node family of products are available in the following operating temperature ranges. The Temperature variant is specified by the optional third suffix character of the part number.

PROD1116-τv**(X)**	Charging Temperature Range	Discharging Temperature Range	Recommended Operating Temperature Range
PROD1116-τv	-0°C to +50°C	-10°C to +60°C	-10°C to +60°C
PROD1116-τv**X**	-30°C to +70°C	-40°C to +70°C	-40°C to +70°C

3.4 CAS-GPS NODE ToF VARIANTS (xx)

The CAS-GPS Node family of products are also available with optional high accuracy Time-of-Flight (ToF) RF proximity detection.

PROD1116-τv(X)(xx)	ToF/NO-ToF Variant
PROD1116-τvX	Extended operating temperature with ToF
PROD1116-τvXNT	Extended operating temperature with No- ToF
PROD1116-τv	Standard operating temperature with ToF
PROD1116-τvNT	Standard operating temperature with NO- ToF

3.5 ABBREVIATIONS

Abbreviation	Meaning
IVU	In Vehicle Unit
GPS	Global Positioning System
CAS	Collision Avoidance System
PAN	Personal Area Network
Wi-Fi	Wireless Communication Medium
GSM	Global System for Mobile Communications
OEM	Original Equipment Manufacture
ToF	Time of Flight Distance Measurement Radio
V2V	Vehicle to Vehicle Radio Telemetry
RF	Radio Frequency
PDA	Personnel Digital Assistant also referred to as the Display

3.6 DEFINITIONS

Term	Definition
“system”	Refers to the assembled and installed operational elements which together perform the desired functionality.
“system components”	Refers to the individual single elements which when assembled together at the point of installation form the “system”. Each of these elements has a unique part number.

4 TRANSPORT

All possible precautions are taken to protect the equipment against damage or losses during shipment, however before accepting delivery, check all items against the packing list or Bill of Lading. If there are shortages or evidence of physical damage, notify Wabtec Digital Mining Technology immediately.

Notify Wabtec Digital Mining Technology within 7 days (maximum) in case of shortages or discrepancies, according to the packing list. This action will help ensure a speedy resolution to any perceived problems. Keep a record of all claims and correspondence. Photographs are recommended.

Where practicable do not remove protective covers prior to installation unless there are indications of damage. Boxes opened for inspection and inventory should be carefully repacked to ensure protection of the contents or else the parts should be packaged and stored in a safe place. Examine all packing boxes, wrappings and covers for items attached to them, especially if the wrappings are to be discarded.

The CAS-GPS NODE products contain lithium batteries with no more than 5Ah of capacity as well as several radio transmitting components. It is mandatory that products be fully discharged or placed into ‘transit mode’ before shipping via air freight.

5 STORAGE

Where the equipment is not to be installed immediately, proper storage is important to ensure protection of equipment and validity of warranty.

All equipment should be stored indoors, protected from the elements in a cool dry area. If storing on the ground, ensure that the storage area is not an area where water will collect.

The recommended temperature while in storage is -20^0C to 60^0C

6 UNPACKING OF EQUIPMENT

When unpacking the equipment:

- Check for damage during transit.
- Confirm that all the components required are present.

If the set of components received is incomplete or damaged contact WABTEC in a timely way to minimize delays.

Take care when unpacking the equipment to avoid damage.

7 INSTALLATION

Installation should be in accordance with the vehicle manufacturers instructions, national regulations and the installation procedures defined by Wabtec Digital Mining Technology. The installations must only be performed by authorized and qualified installers.

8 TEST & COMMISSION

At installation time, the system must be checked against the installation test procedure (ITP) to verify the system is correctly installed and functioning as required. After passing its final installation test, the system is then ready for use after which inbuilt self- diagnostic testing combined with daily user monitoring ensures that any faults can be acted upon.

9 THE CAS GPS NODE PRODUCT FAMILY

9.1 PRINCIPLE OF SYSTEM OPERATION

The CAS-GPS Intelligent multi-purpose NODE is the front-end transponder for enabling situational awareness of fleet vehicles, infrastructure and personnel. The NODES form an integral component of the CAS-GPS system when paired with one of the CAS-GPS host devices such as the light vehicle display or the heavy vehicle rugged IVU running the CAS-GPS user interface software.

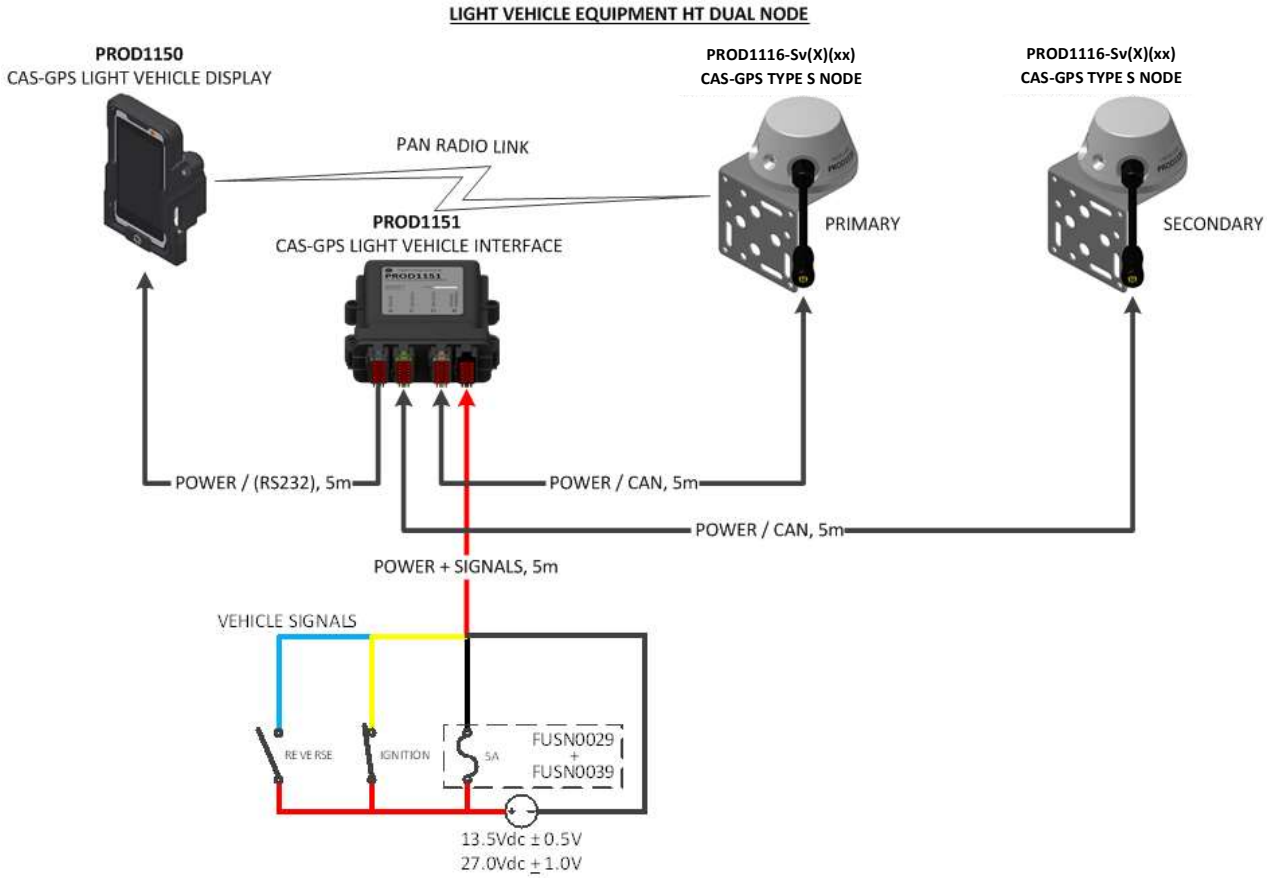
Nodes will be required to operate in several modes during its daily operation. As a key component of the CAS system, it will remain powered in all modes of operation unless powered down by the system display/controller. All nodes have an internal battery & provided that the battery is within acceptable temperature limits will continue to operate in a low power mode after isolation from vehicle supply. The node's internal battery will continue to be charged until the system detects that the supply voltage has dropped below the pre-determined threshold and then stop. This will prevent the vehicle's battery from being depleted below the vehicle's ability to re-start its engine.

The CAS-GPS Nodes are comprised of a high-performance GPS receiver, Vehicle to Vehicle (V2V) radio transceiver, optional high accuracy Ranging RF transceiver (ToF), CAN bus, RS-232 and RS-485 wired communication ports, Digital Inputs (2) and Digital Output (1), Personal Area Network wireless technology and internal rechargeable battery backup that is available within the following configurations:

9.2 NODE VARIANTS

9.2.1 PROD1116-Sv(X)(xx) – Type S Node

The Type S Node is suitable for a fixed installation in light or heavy vehicles and machinery. The Type S Node can act as your primary fleet monitoring radio in light vehicles and enables automatic real-time functional health monitoring of a primary system on any vehicle type without the requirement for a remote Test Station or operator interaction. The Type S Node communicates with the CAS-GPS user interface via a dedicated CAN bus connection and can be powered from a 12 or 24Vdc automotive supply.



Refer DOCU0145, CAS-GPS Light Vehicle HT Installation Manual for full installation Instructions

9.2.1.1 Type S Node - Standby Mode

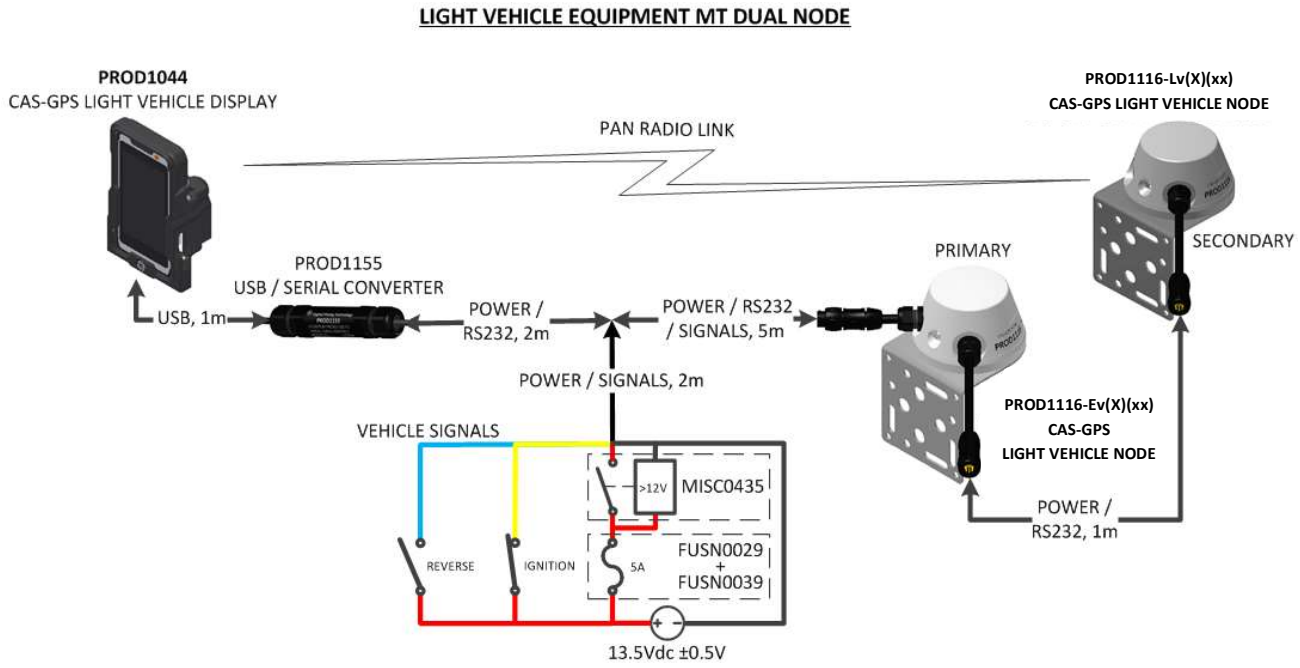
Standby Mode is a low power state which is activated shortly after the PDA has shutdown. A configurable amount of time (default 15 minutes) after the vehicle ignition has been switched off, the light vehicle display will be shutdown. A few minutes after that, the CAS-GPS system will enter Standby Mode. The CAS-GPS system will return to full power operation once the vehicle ignition has been switched on. In Standby Mode, the Nodes will operate as normal but transmit at a slower rate. They will also only periodically reacquire a GPS lock.

9.2.2 PROD1116-Lv(X)(xx) - Light Vehicle Node

The Light Vehicle Node is suitable for a fixed installation on light vehicle types. The Light Vehicle Node can act as your primary fleet monitoring radio in light vehicles where self-test functions are not required. As a secondary Node this product enables automatic real-time functional health monitoring of a PROD1116-Ev(X)(xx) NODE without the requirement for a remote Test Station or operator interaction. The Light Vehicle Node communicates with the CAS-GPS user interface via a Personnel Area Network wireless connection and can be powered from a 12 or 24Vdc automotive supply. This model accepts 2 digital inputs for ignition and reverse used for power management and directional orientation on your CAS-GPS user interface software.

9.2.3 PROD1116-Ev(X)(xx) – Light Vehicle Expandable Node

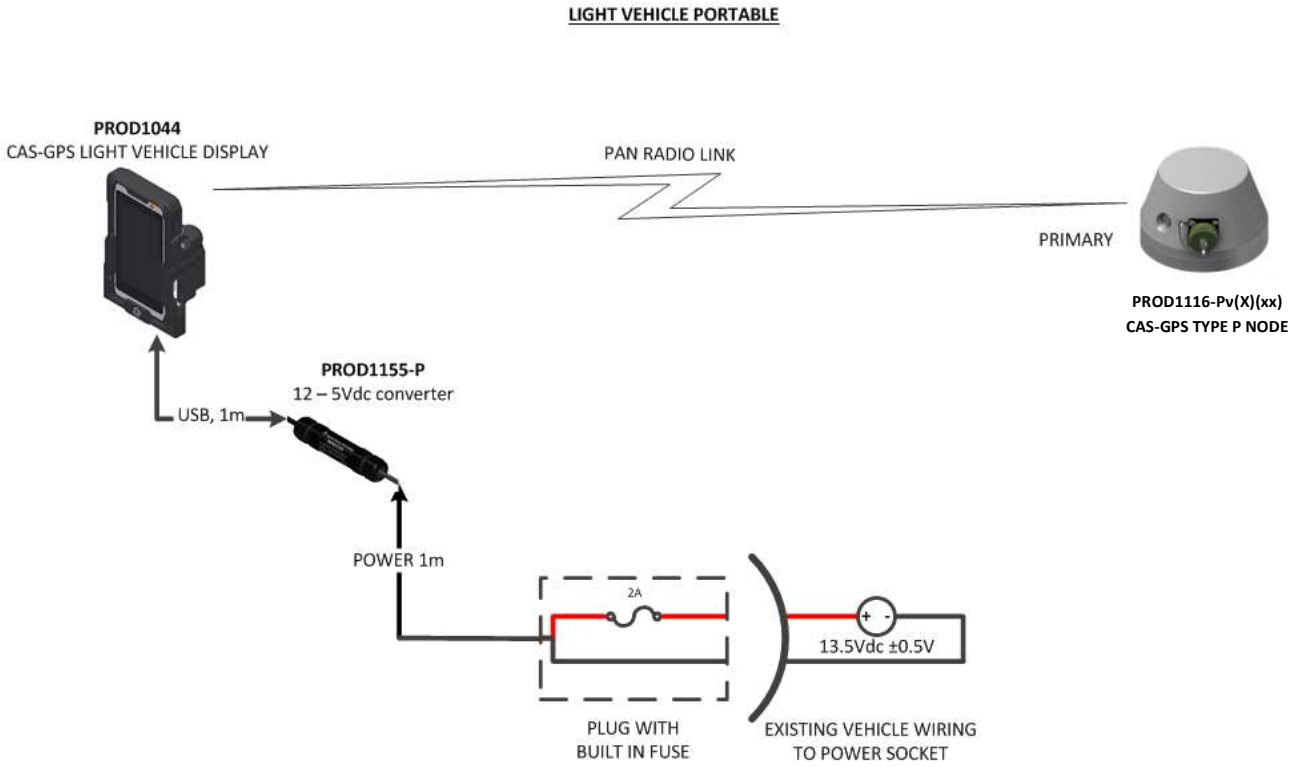
The Light Vehicle Expandable Node is suitable for a fixed installation on light vehicle types. The Light Vehicle Expandable Node acts as your primary fleet monitoring radio in light vehicles and is suitable for connecting a secondary Node PROD1116-Lv(X)(xx) on its output port. The Light Vehicle Expandable Node communicates with the CAS-GPS secondary Nodes via dedicated serial data connections and can be powered from a 12 or 24Vdc automotive supply. Primary communication to the user interface is via a Personal Area wireless connection. This model accepts 2 digital inputs for ignition and reverse used for power management and directional orientation on your CAS-GPS user interface software.

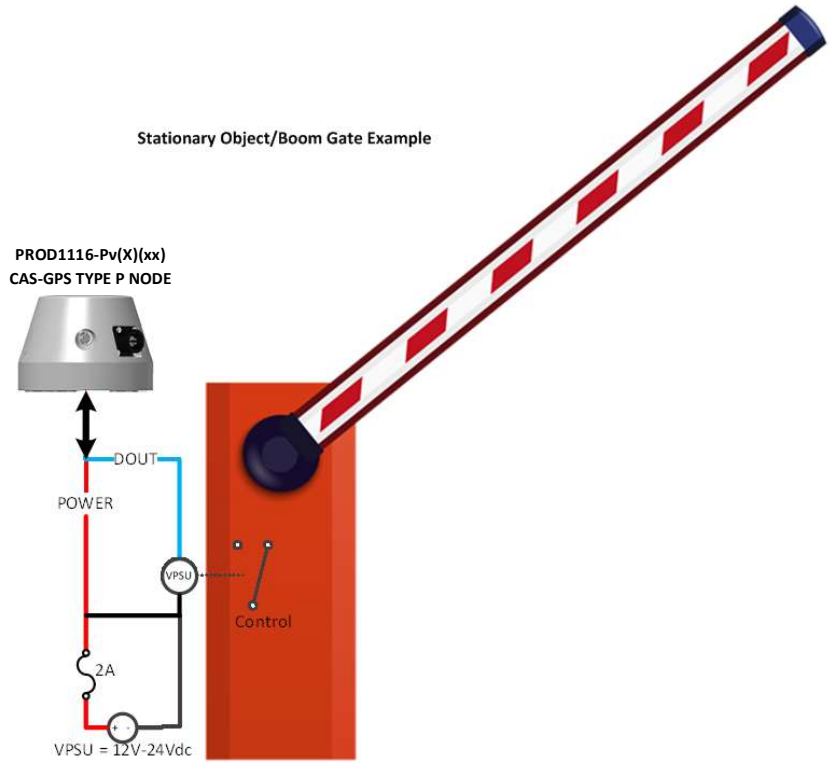


Refer DOCU0146, CAS-GPS Light Vehicle MT Installation Manual for full installation instructions

9.2.4 PROD1116-Pv(X)(xx) – Type P Node

The Versatile Type P Node contains a magnetic base which communicates with the CAS-GPS User Interface via wireless Personal Area Network connection. The unit is battery powered for mobile use or can be wired to a 12V-24Vdc power supply for fixed position installations. For mobile use in Light Vehicle mobile installations, this unit can be deployed on a daily basis with a fully charged battery. For Fixed position use, this unit can provide a digital output for triggering devices based on fleet proximity such as lights or entry gates.





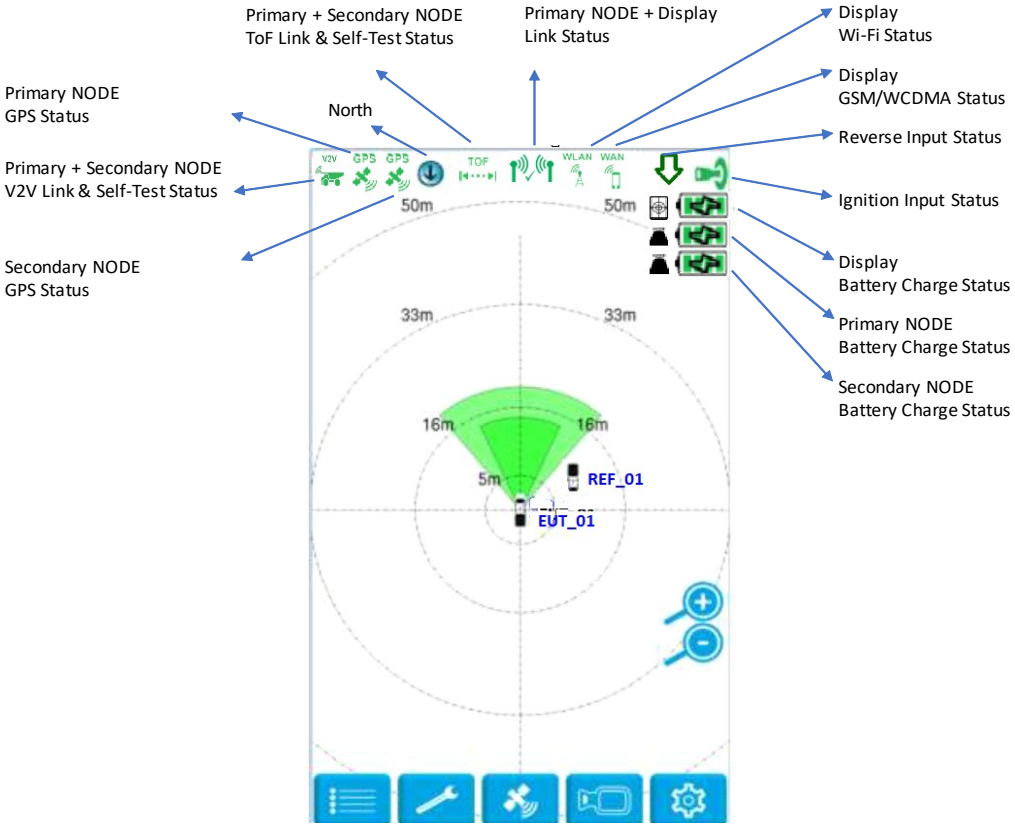
Refer DOCU0149, CAS-GPS Stationary Object/Boom Gate Installation Manual for full installation instructions

9.3 CAS-GPS NODE OPERATION

9.3.1 On System Start-up

Immediately after starting the system and before putting it into service, perform a quick check of the CAS-GPS user interface status ICONs. Check that none of the icons are Red indicating a fault condition, if so your CAS-GPS system is not functioning correctly and its operation and your visibility within the fleet cannot be assured! The icon for the ToF Link will be disabled for node variants without ToF ranging functionality.

Stationary Objects without a permanent display should have functions regularly checked on a temporarily paired CAS-GPS user interface display as detailed in the installation manual for the stationary object.



If any of the CAS Icons are red the system may not be operating correctly and the fault must be reported for action to the fleet manager.

Depending on your system configuration at startup, the GPS will assume you are facing 'North' until a heading has been established by forward movement. Heading may be determined without forward movement when self-test functionality is installed.

If a nearby vehicle's beams are overlapping your vehicles beam an audible alarm will be sounded within the CAS-GPS application. Only when your vehicle is stationary may you silence the alarm by touching anywhere on the screen.

9.3.2 Vehicle in Motion

When your vehicle is moving, you can operate using your normal safe operating procedures. The Display will sound an alarm to gain your attention if there is another vehicle that is getting too close. A quick glance at the display will show the location, type, ID, heading and speed of other vehicles.

You cannot silence the alarm whilst your vehicle is in motion.

9.3.3 Positional Tracking

The system uses the latest precision point GPS technology which gives accurate location-based tracking.

For the GPS to work accurately the Node must have clear line of sight to the sky. Obstructions such as machine structure, work roof or deep pit may affect the accuracy or operation of the GPS.

9.4 NODE STATUS INDICATOR LAMP

All Node variants will report their status via the multi-function lamp:

Node status indicator

Indication		Node Status
	Off	Off
	Red	Failed Battery
	Amber	Battery out of service temperature range
	Green	On, Not Charging
	Alternating Green/Cyan*	On, Charging
	Cyan	On, Fully Charged
	Magenta Flashing 1 / 30 seconds	On, Standby Mode
	Magenta	On. Acquiring new position in Standby Mode

*In this mode the lamp will cycle between the two colors at approximately 1Hz

9.5 TYPE P NODE INSTALLATION

The Type P Node is attached to the vehicle using a magnetic base. The Node must be installed on the vehicle such that:-

- It has a flat smooth and clear surface to fix to
- It does not protrude from the vehicle or in a position where it may be damaged
- It does not obstruct the driver's view
- It has a clear line of sight to the sky
- It is a minimum of 200mm away from any other communication antenna
- Magnets should be kept clean from dust for maximum effect.
- It is mounted in a position so that all 3 magnets are positively attached to a ferromagnetic vehicle surface
- This node is mounted no less than 200mm from vehicle occupants to limit maximum permissible exposure to electromagnetic radiation generated by the radio components
- Ensure that the dust-cap with chain is secured to the connector on the Roof Unit.

For the GPS to work accurately the Node must have clear line of sight to the sky. Obstructions such as machine structure, work roof or deep pit may affect the accuracy or operation of the GPS.

WARNING

The PROD1116-Pv(X)(xx) variant is often attached to the vehicle by magnets & as such is subject to dislodgement when mis-treated. The following recommendations should be observed:

- *Recommended maximum speed of 80 km / h*
- *Portable System is intended for Light Vehicles only on a mine site and not intended for use on public roads at high speed*
- *Portable System is designed for short-term operation (e.g. 1 shift) with daily recharging and not intended for permanent use*
- *Avoid harsh braking whilst in use to minimize the chance of the node becoming dislodged in a dangerous manner.*

9.6 SYSTEM CHARGING WARNINGS

	Only use charge cables provided.
	Charging can be plugged into a normal vehicle 12V accessory power outlet. Charging can be carried out during operation. Do not pass charging cable through vehicle doors or windows.
	Do not use damaged power cords or plugs. Do not bend or damage the power cord. Do not touch the power cord with wet hands or disconnect the charger by pulling the cord. Do not Short-Circuit the Charger or the Battery. Do not drop or cause impact to the charger or battery. Do not charge the battery with chargers that are not approved by the manufacturer.
	Incompatible batteries and chargers can cause serious injuries or damage to your device.
	Do not handle a damaged or leaking lithium Ion battery. Handle and dispose of batteries and chargers with care. Never crush or puncture the battery. Avoid exposing the battery to high external pressure, which can lead to an internal short circuit and overheating.
	The CAS-GPS Nodes contain no user serviceable parts. Batteries should be replaced every 1 to 2 years by a suitably qualified and trained technician. Only replace batteries with OEM supplied parts.
	Never dispose of batteries or devices in a fire. Follow all local regulations when disposing of used batteries or devices. Never place batteries or devices on or in heating devices, such as microwave ovens, stoves, radiators, or in an engine bay.
	Avoid exposing your device and batteries to very cold or very hot temperatures. Extreme temperatures can cause the deformation of the device and reduce the charging capacity and life of your device and batteries.

10 SERVICE, MAINTENANCE & DISPOSAL

10.1 EQUIPMENT SERVICE

10.1.1 Display Unit

- Clean screen surface with a clean dry soft cloth - **Do not** use solvents or cleaners on the screen surface!
- Check for physical damage to screen surface.
- Check the cable is securely connected to the display.
- Check the mounting bracket is secure – finger tighten only if loose.

10.1.2 System

- Check visually that all Nodes are in good condition and the cables (where applicable) are securely connected.
- Check visually that no cables are loose or damaged.
- Verify that the system is working correctly prior to starting the vehicle and during operations.

10.1.3 Scheduled System Servicing

It is recommended that the system undergo preventative scheduled maintenance and inspections. These should be carried out by trained and authorized personnel every 6 months or 1500hrs (whichever occurs first).

10.2 EQUIPMENT MAINTENANCE

If the system is not functioning as expected and a fault cannot be resolved, please contact your nearest authorized representative.

It is essential that no attempt be made to repair the equipment (other than replacement of system components). Opening equipment enclosures should never be attempted and will void any warranty and could compromise the safe operation of the system. Replacing System Components will require the system to be re-configured as per the associated installation manual to suit your system setup.

10.3 DECOMMISSIONING

- Removal of the system should only be performed if authorized by the owner of the vehicle.
- Removal should be performed by a qualified person.
- All system components and wiring should be removed.
- All vehicle wiring should be restored back to original condition.
- Dispose or store removed system in accordance with this manual.

10.4 DISPOSAL

The electronic equipment discussed in this manual must not be treated as general waste. By ensuring that this product is disposed of correctly, you will be helping to prevent potentially negative consequences for the environment and human health which could otherwise be caused by incorrect waste handling of this product.

The system should be disposed of in accordance with local regulations.

The system contains a Lithium Ion Battery and should be disposed of in accordance with local regulations.

11 AUTHORIZED REPRESENTATIVES

Brazil

GE Transportation
a Wabtec company

GE Transportes Ferroviários S.A
Avenida General David Sarnoff, n 4600
Cidade Industrial
Contagem, MG 32210-
110 Brazil
P: +55 31 2103 5348
F: +55 31 2103 5100
www.getransportation.com/mining

Sub Sahara Africa

Probe IMT
INTEGRATED MINING TECHNOLOGIES

Probe Integrated Mining Technologies (PTY) Ltd
245 Albert Amon Road
Meadowdale
Germiston
1614
P: +27 11 453 0924
www.probebattery.co.za

Indonesia

INTECS

PT Intecs Teknikatama Industri
Jl. Ciputat Raya No. 18D Kebayoran Lama Selatan
Jakarta 12240 .
P: +62 21 729 3351
F: +62 21 729 3352
www.intecs.co.id

Canada

Wabtec
CORPORATION

Wabtec Transportation Canada Inc
199 Bay Street, Suite 5300, Commerce Court West
Toronto, Ontario M5L 1B9
P: +1 416 435 1152
www.ge.com

North America

GE Transportation
a Wabtec company

General Electric Company, Mining
2901 East Lake Road, Erie,
Pennsylvania, 16531, US
P: +1 480 264-2063
F: +1 480 264-6402
www.getransportation.com

Australia

GE Transportation
a Wabtec company

GE Industrea Mining Technology
3 Co-Wyn Close, Fountaindale,
NSW, 2261, Australia
P: +612 4336 1800
F: +612 4389 2355
www.getransportation.com

Mexico

COMINSA

COMERCIALIZADORA MINERA DEL NORTE, S.A. DE C.V.
Ave. H. Colegio Militar No. 2000-
B Col. Las Fuentes
Piedras Negras, Coahuila
México. C.P. 26010.
P: +52(878)783-8215 / +1 (830) 352-5519
F: +52(878)783-8218
www.cominsa.com.mx

India

GE Transportation
a Wabtec company

GE Global Sourcing India Private Ltd.
A-18, First Floor
Okhla Industrial Area Phase
II New Delhi – 110020, India
P: +91 124 4808776
F: +91 124 490 6933
www.getransportation.com

12 WARRANTY TERMS

Equipment and Parts:

15 months from delivery, or 12 months from when system is placed in service (whichever occurs first). Modifications to this product without written consent from the manufacturer or its designated authorised representatives will void all warranty obligations.

13 REGULATORY INFORMATION

Warning: Modifications to this product without written consent from the manufacturer or its designated authorised representatives could void the user's authority to operate the equipment

13.1 DECLARATION OF CONFORMITY WITH FCC RULES FOR ELECTROMAGNETIC COMPATIBILITY

Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information

MAKE:	**CAS-GPS NODE**
FCC ID:	**YIY-PROD11162**
Unique Identifier:	**PROD1116-L2, CAS-GPS LIGHT VEHICLE NODE REGION 2** **PROD1116-E2, CAS-GPS LIGHT VEHICLE EXPANDABLE NODE REGION 2** **PROD1116-S2, CAS-GPS TYPE S NODE REGION 2** **PROD1116-P2, CAS-GPS TYPE P NODE REGION 2** **PROD1116-L2X, CAS-GPS LIGHT VEHICLE NODE REGION 2 XTD** **PROD1116-E2X, CAS-GPS LIGHT VEHICLE EXPANDABLE NODE REGION 2 XTD** **PROD1116-S2X, CAS-GPS TYPE S NODE REGION 2 XTD** **PROD1116-P2X, CAS-GPS TYPE P NODE REGION 2 XTD** **PROD1116-L2NT, CAS-GPS LIGHT VEHICLE NODE REGION 2 NO ToF** **PROD1116-E2NT, CAS-GPS LIGHT VEHICLE EXPANDABLE NODE REGION 2 NO ToF** **PROD1116-S2NT, CAS-GPS TYPE S NODE REGION 2 NO ToF** **PROD1116-P2NT, CAS-GPS TYPE P NODE REGION 2 NO ToF** **PROD1116-L2XNT, CAS-GPS LIGHT VEHICLE NODE REGION 2 XTD NO ToF** **PROD1116-E2XNT, CAS-GPS LIGHT VEHICLE EXPANDABLE NODE REGION 2 XTD NO ToF** **PROD1116-S2XNT, CAS-GPS TYPE S NODE REGION 2 XTD NO ToF** **PROD1116-P2XNT, CAS-GPS TYPE P NODE REGION 2 XTD NO ToF** **PROD1151, CAS-GPS LIGHT VEHICLE INTERFACE** **PROD1044, CAS-GPS ACTIVE SCREEN 5"** **PROD1155, LV DISPLAY MICRO USB TO SERIAL CABLE ASSEMBLY** **PROD1155-P, LV DISPLAY MICRO USB POWER SUPPLY** **PROD1150, CAS-GPS LIGHT VEHICLE DISPLAY UNIT**

All PROD1116 Models contains FCC Approved Module: FCC ID: PVH0965, Model No.: ODIN-W262, Stand-alone IoT Gateway module (Bluetooth©/WLAN)

Responsible Party:	**GE Digital Mining** **2901 East Lake Road** **Erie, PA** **16531** **(814) 875-2234**

FCC Compliance Statement:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

13.1.1 FCC Interference Statement for Class B devices.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

13.1.2 Federal Communication Commission (FCC) - Radiation Exposure Statement

To comply with FCC RF exposure limits for general population / uncontrolled exposure, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

13.2 INDUSTRY CANADA COMPLIANT

This Class B digital apparatus complies with Canadian ICES-003. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

13.2.1 Concerning Radio Transmitters

This device complies with Industry Canada's licence-exempt RSSs.

Operation is subject to the following two conditions:

(1) This device may not cause interference; and
(2) This device must accept any interference, including that may cause undesired operation of the device.

13.2.2 Industry Canada - Radiation Exposure Statement

To comply with Industry Canada RF exposure limits for general population / uncontrolled exposure, the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

13.2.3 Industrie Canada – Déclaration sur l'exposition aux radiations

Afin de respecter les limites d'exposition pour l'ensemble de la population/l'exposition non contrôlée de la FCC/IC RF, les antennes utilisées pour cet émetteur doivent être installées de manière à offrir une distance de séparation minimum de 20 cm les personnes et ne doivent pas être utilisées en conjonction avec d'autres antennes ou émetteurs.

13.2.4 Conforme aux normes d'INDUSTRIE CANADA

Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003. Les changements ou les modifications non approuvés expressément par la partie responsable de la conformité pourraient annuler l'autorisation de l'utilisateur de faire fonctionner l'équipement.

13.2.5 Au sujet des émetteurs radio

Ce dispositif est conforme à la partie 15 des règles de la Federal Communications Commission (FCC) des États-Unis et d'Industrie Canada (IC) exempts de licence RSS norme(s).

Son fonctionnement est assujetti aux deux conditions suivantes:

(1) Ce dispositive ne doit pas provoquer de brouillage préjudiciable, et
(2) il doit accepter tout brouillage reçu, y compris le brouillage pouvant entraîner un mauvais fonctionnement.

13.3 AUSTRALIAN RADIO COMMUNICATIONS EQUIPMENT - RADIATION EXPOSURE STATEMENT

The equipment complies with the Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2014 for General Public Exposure, Non-Aware User, for a Compliance Level 2 Radiocommunications Equipment, when the minimum safety distance of 20cm is adhered to and shall bear the RCM.

13.4 ANATEL RESOLUTION 506 STATEMENT

This equipment operates on a secondary basis and, consequently, must accept harmful interference, including from stations of the same kind, and may not cause harmful interference to systems operating on a primary basis.

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

13.5 LIFE SUPPORT POLICY

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Wabtec Digital Mining Technology customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Wabtec Digital Mining Technology from any and all damages resulting from such improper use or sale.

13.6 ELECTROMAGNETIC INTERFERENCE / COMPATIBILITY

Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed, or otherwise configured for electromagnetic compatibility.

To avoid electromagnetic interference and/or compatibility conflicts, do not use this device in any facility where posted notices instruct you to do so. In aircraft, use of any radio frequency devices must be in accordance with applicable regulations. Hospitals or health care facilities may be using equipment that is sensitive to external RF energy.

With medical devices, maintain a minimum separation of 15 cm (6 inches) between pacemakers and wireless devices and some wireless radios may interfere with some hearing aids. If other personal medical devices are being used in the vicinity of wireless devices, ensure that the device has been adequately shielded from RF energy. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

13.7 POTENTIALLY EXPLOSIVE ATMOSPHERES

The products listed in this document are not designed for use in explosive atmospheres. Turn off your electronic device before entering an area with potentially explosive atmosphere. It is rare, but your electronic device could generate sparks. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fuelling areas, such as petrol station, below deck on boats, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

CAUTION! Electrostatic Sensitive Device. Pre-caution should be used when handling the device in order to prevent permanent damage.