

martin®



REMOTE MONITORING FOR BELT CLEANERS

Operating Instructions

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Language: ENG
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1 General



NOTE

Before starting work these operating instructions must be read and understood completely

1.1 About these operating instructions

These operating instructions apply solely for the N2[®]-System and are intended for those persons who install the N2[®]-System, commission them, and monitor their usage.

The operating instructions must be kept for the lifetime of the N2-System and must be made available in an orderly condition to all persons entrusted with work with and on the N2[®]-System.

1.2 Illustrations in the operating instructions

In these operating instructions simplified representations of the N2-System are used. The illustrations serve to clarify the described facts. The described facts are generally valid for the N2[®]-System and their different designs and types.

Therefore, the illustrations are to be understood as typical representations which are valid for all variants of the N2-System.

1.3 General information N2[®]-System



The N2[®] system indicates the condition of Belt Cleaners for Conveyor belts. It consists of three main components:

- N2[®] – Position Indicators for Belt Cleaners (PI)
- N2[®] – Gateway (GW)
- N2[®] – Martin[®] Smart Device Manager Mobile Application (App)

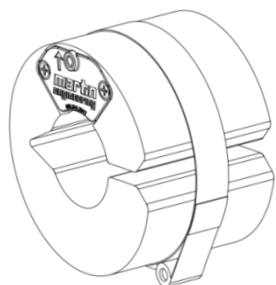
The data is transferred through and stored via a data cloud solution.

1.4 N2[®] – Position Indicators (PI) for belt cleaners

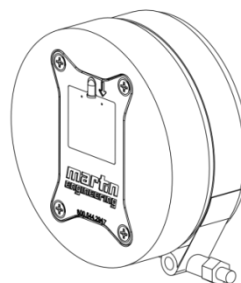
The Position Indicator will be attached to the mainframe of the belt cleaners. It consists of

- a sensor that monitors rotation, vibration and temperature
- batteries that provide the required power
- electronic components that monitor the condition of the batteries, convert the signal from the sensor into data
- a radio transmitter that connects to the Gateway
- an enclosure from Polyurethane that clamps around the cleaner mainframe.

The position indicator also alerts in the event of excessive belt cleaner movement. The Position Indicator is monitored and setup using the Martin Smart Device Manager.



For mainframes with 48 mm diameter
e.g. for Pit Viper, QC1 HD



For mainframes with 76 mm diameter
e.g. for XHD QC1

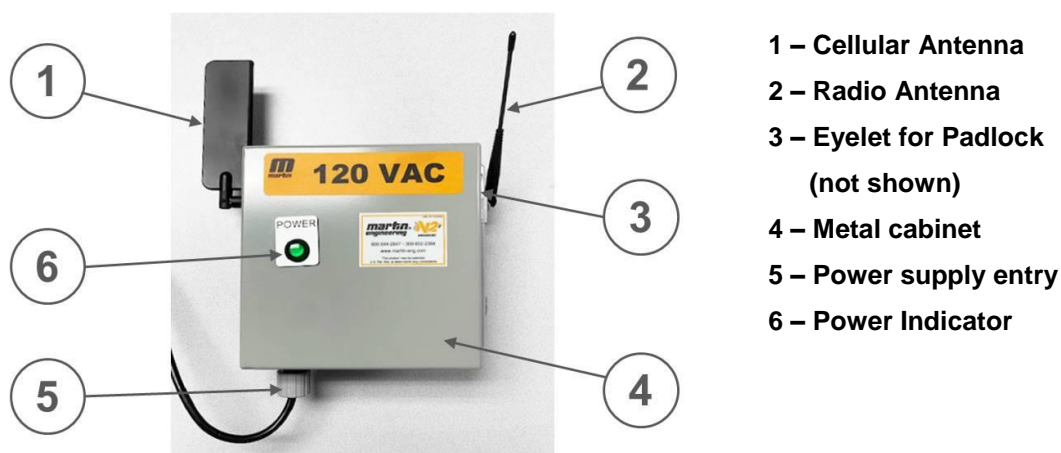


1.5 N2[®] – Gateway (GW)

The Gateway will be installed in the plant in the vicinity of the belt conveyors. It is a stand-alone unit that just requires an electrical power supply.

The Gateway receives information from the Position Indicators, converts the data and sends those via a GSM Module to the Data cloud.

A large number of Position Indicators can connect to one The Gateway at the same time.



1.6 N2[®] - Martin[®] Smart Device Manager Mobile Application (App)

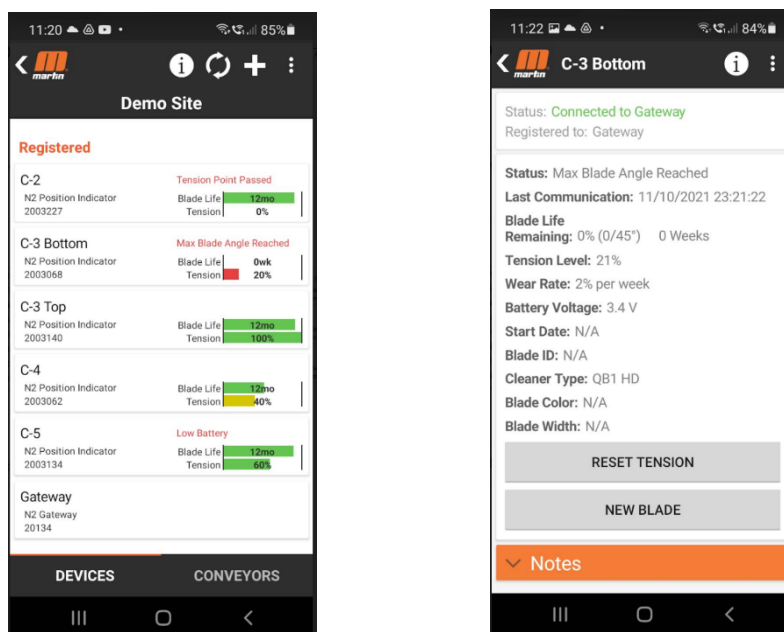
Remark We are continuously developing the app. Therefore, future versions of the app may have different information or design.

The Martin[®] Smart Device Manager Mobile Application (App) used on mobile devices using Android or IOS on Apple devices.

It allows user to register, view, and operate smart products. The data from the Position Indicators get analysed and displayed by the App on mobile devices.

It allows user to understand the condition of the belt cleaners and their blades. Also Alerts will be provided in case of the need to take physical action at the belt cleaners.

Below are two screen prints from the App.



The App can be downloaded from Google PlayStore or from App Store or requested through

<https://forms.monday.com/forms/049a3c693e916f7cc8aa105c61aabc49?r=use1>

1.7 Intended usage

The N2[®]-System is designed to monitor the condition of belt cleaners on belt conveyors for bulk materials.

The N2[®]-System can be used on belt cleaners with round mainframe ends in combination with Polyurethane blades and a rotation movement of the mainframe during the wear life of the blades.

They may only be used:

- in the industrial area above ground
- according to the technical data in the documentation
- in the installation position as described in the documentation.

The door of the gateway is only to be opened for the wiring and then always kept closed.

The usage of the N2[®]-System is only considered to be as intended if the following conditions are also fulfilled:

- Before starting initial work, the personnel must have been instructed on the work on the system and on all relevant issues of occupational health and safety
- Any personal protective equipment required must be worn
- The provisions of the operating instructions must be observed in full.

The N2[®]-System must not be used in potentially explosive areas.

Operation of the N2[®]-System under deviating conditions and unauthorised modification of the N2[®]-System is considered as improper usage

1.8 Personnel qualification

Only authorised and qualified personnel may be entrusted with work with and on the N2-System.

Persons are considered qualified if they have the qualification of a skilled worker and meet all the following requirements:

- completed professional training or at least 5 years of professional experience in the field
- technical experience
- knowledge of the relevant occupational health and safety regulations.

The persons must

- be able to assess the tasks and risks assigned to them
- be able to recognise potential dangers in advance
- be physically and cognitively able to operate the conveyors and cleaners safely
- have been trained and instructed appropriately
- have read and understood these operating instructions.

Work on earth connections (Protective Bonding Kits), cabling, switching, control, regulation, automation and all electrical components may be carried out only by trained electricians.

Minimum required Qualifications

Activity	Position Indicator	Gateway	App
Unloading / Unpacking / Transporting	1	1	
Starting and stopping of conveyor			
Assembling the Position Indicator	1	1	
Mounting the Position Indicator	2	2	
Assembling the Gateway	3	3	
Mounting the Gateway	3	3	
Installing the App	4	4	4
Functional trials	3+4	3+4	
Connecting Power source	3	3	
Registering the Gateway	4	4	
Calibrating	2or3	2or3	
Troubleshooting at site (mech.)	2	2	
Troubleshooting at site (electrical)	3	3	
Troubleshooting at site (IT)	4	4	
Troubleshooting remote			
Regular Inspections / Cleaning	1	1	
Maintaining / Servicing	Same as Troubleshooting		
Cleaning + Changing cleaner blades	1	1	
Shutting down / Disconnecting	3		
Disassembling / Recycling / Disposing	2+3	2+3	

Legend

- X Applies
- (X) Only basic description, as this is responsibility of customer
- 1 Trained or instructed for mechanical work in industrial environments
- 2 Qualification certificate in mechanical engineering
- 3 Qualification certificate in electrical engineering
- 4 Authorised user. Customer has to authorise persons.

1.9 Technical data

Basic data		Position Indicator	Gateway		Remarks
Environmental temperature	min.	-40	-40	°C	
	max.	70	70	°C	
Moisture cont. of air	min.	10	10	%	
	max.	95	95	%	
Altitude	max.	2.000	2.000	m	
Site conditions		Outdoor	Outdoor		
Distance Position Indicator to Gateway	max.	800	800	m	
No. of Position Indicator per Gateway	max.	n/a	200	(-)	
Range of rotation	min.	0	n.a.		
	max.	360			
Degree of Protection (IP)		[to be verified]	IP66	(-)	
Pollution degree	Max.	3	3		

Power Supply		Position Indicator	Gateway		Remarks
Power Supply Voltage	min.	2,8 VDC	100 VAC		
	max.	3,6 VDC	240 VAC		
Power Supply Voltage Fluctuations	min.	10	0	%	
	max.	10	0	%	
Power Supply Frequency	min.	0	50	Hz	
	max.	0	60	Hz	
Over voltage category		n.a.	2 3		If installed after circuit breaker If installed before circuit breaker
Power Consumption	min.	30uA	2,2*	W	
	max.	120mA	13	W	
Power supply cable OD	max.	n.a.	10mm	mm	
Power supply cable Spec.		n.a.	SJTW		
Batteries Spec.		2x AA L91	n.a.		Lithium Ion
Expected life time of battery		Up to 1-2	n.a.	years	

*Minimum power consumption depends on no of PI connected to gateway, GSM signal strength & Standby

Radio data	Position Indicator	Gateway		Rem.
Protocols	LoRa	LoRa; CAT-M1		
Frequencies	868	868MHZ, LTE-M/NB-IoT LTE-FDD: B1[2100], B2[1900] B3[1800], B4[1700], B5[850], B8[900], B12[700], B13[700], B18[850], B19[850], B20[800], B26[850], B28[700] LTE-TDD: B39[1900] (LTE-M only) GSM, EDGE, GPRS 2G Frequency Bands: GSM850, EGSM900, DCS1800, PCS1900	MHz	
Speed	1 Kbps	375Kbps Download/375Kbps Upload		
SIM size	n.a.	micro (3FF)		

Installation, Maintenance, Repair	Position Indicator	Gateway		Remarks
Size of product	D 121	919	mm	
	78	393	mm	
		237	mm	
Weight of product	1,4	3,8	kg	Gateway mass excludes mounting structure and hardwares.
Size of box	200	1000	mm	
	200	300	mm	
	200	200	mm	
Weight of product + box	1,5	4,5	kg	

Storage data		Position Indicator	Gateway		Remarks
Environmental temperature	min.	-40	-40	°C	
	max.	100	100	°C	
Moisture cont. of air	min.	10	10	%	
	max.	95	95	%	
Altitude	max.	3.000	3.000	m	
Storage duration	max.	365	1.825	days	

1.10 Requirements for the usage site

The operator must organise the responsibilities of the personnel according to the specifications of these operating instructions. In doing so, the different requirements within the life phases must be taken into account and qualified persons must be determined. (See chapter "Minimum required qualifications").

The operator must observe and implement the accident prevention and occupational health and safety regulations applicable at the site of operation.

The operator must prepare plant-specific operating instructions based on existing national regulations on accident prevention.

The operator must not initiate or carry out any changes, additions or conversions without approval.

1.11 Scope of supply

The following items are part of the scope of supply:

N2® – Position Indicators for Belt Cleaners (PI)

- 1 Housing (orange coloured polyurethane)
- 1 Battery compartment
- 2 Batteries
- 1 Clamp
- 1 Operating Instructions (Hard Copy)

N2® – Gateway (GW)

- 1 Gateway with housing, electronic components and holding construction
- 1 Antenna (flat design) for GSM connection (Cellular Antenna)
- 1 Antenna (round design) for PI connection (Radio Antenna)
- 1 Bag with fixing material (4 brackets, screws, nuts, washers)
- 4 Mounting plates
- 1 Set of stickers
- 1 Operating Instructions (Hard Copy)

2 Safety

2.1 General safety instructions



Be sure to also observe the documentation and the safety instructions for the belt cleaners !



DANGER

Entanglement in moving or rotating parts e.g. of the conveyor

Body parts and/or clothing may get caught and pulled in by moving or rotating parts and cause serious or fatal injuries.

Tensions may be released in the conveyor belt and cause movement of the bulk material without prior detection.

- *Do not carry out any work on the conveyor belt while it is in operation or reach into the moving conveyor belt!*
- *Before any installation or maintenance work is carried out, ensure that all power sources to the conveyor belt system and its accessories are switched off and secured against inadvertent switching on.*
- *Apply Log-Out / Tag-Out / Try-Out (LOTOTO) Procedures*
- *Apply warning signs*
- *Install suitable Barrier Guards to prevent access to the infeed section!*
- *Ensure that the Barrier Guards are properly mounted in the frame of the inspection doors.*
- *Ensure that the Barrier guards and all components are always in good condition.*
- *Ensure that the Barrier Guards are not bent and can be easily installed.*



DANGER

Risk of explosions or fire

Explosions due to non-recognition of potentially explosive areas / ATEX Areas !

- *Do not use the N2 System or its components in potentially explosive areas / ATEX Areas !*



DANGER

Electrical voltage !

Electric shock due to touching live components inside the Gateway

- *Disconnect the power supply before opening the door. Disconnect all poles of the system from the mains (switch off the circuit breaker or main switch).*
- *Secure against being switched on again: Accidental switching on of the system must be prevented (e.g. by means of special locks).*
- *Check that there is no voltage: The absence of voltage at all poles must be determined with a suitable measuring device (two-pole voltage tester).*



WARNING

Electrical voltage !

Electrical defects, risk of short circuit on the Gateway and electrical shock due to vibration

- *Mount the gateway so that no vibrations occur there !*



WARNING

Working in confined spaces

Areas in which cleaners are installed are often difficult to access and include confined spaces. It is often necessary to work in difficult positions.

- *Determine whether occupational safety measures are necessary that go beyond the usual measures!*



WARNING

Risk of falling down

N2-Systems are often mounted and operated in heights. There may be a risk of falling down.

- *Therefore, use a fall protection device when installing in higher working areas!*



WARNING

Danger of injury due to unapproved component parts

Unapproved parts can directly or indirectly cause personal injury or damage to property.





- *Only use accessories and spare parts that are distributed by the manufacturer or are explicitly approved (in writing)!*

2.2 Safety markings on the system

The safety markings on the N2-System must be kept in good condition and clearly visible at all times. If parts of the system are replaced, ensure that the spare parts are or will be provided with appropriate warning signs.

2.3 Personal protective equipment

Persons carrying out work on cleaners must wear suitable personal protective equipment. Minimum requirements:

Symbol	Meaning
	Wear head and eye protection
	Wear at least ankle-high foot protection
	Use gloves
	Use fall protection, if required

3 Preparations before installation

3.1 Checking the operating conditions

Before installation, check whether the N2-System is suitable for the application. For this purpose, it must be ensured that:

- the available space allows unobstructed installation, maintenance and repair of the N2[®]-System,
- the N2[®]-System meets the requirements for the respective operation (ambient conditions, operating mode of the conveyor, properties of the bulk material, fire protection, explosion protection, etc.)
- a supported GSM signal is available at the location of the Gateway
- The power supply for the Gateway will have a continuous uninterruptible source of electricity.

3.2 Finding the correct installation position



NOTE

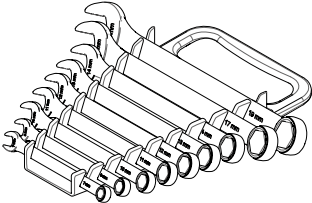
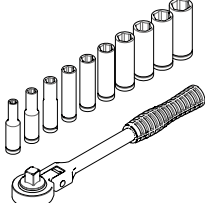
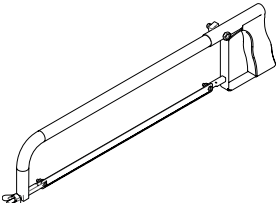
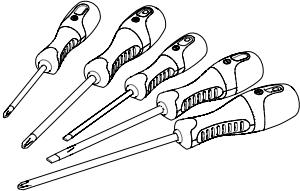
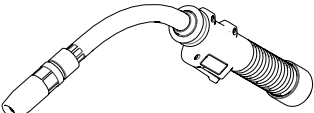
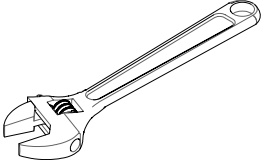
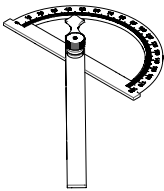
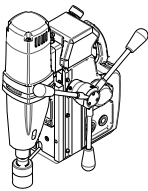
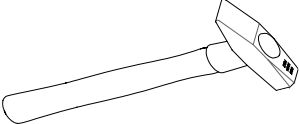
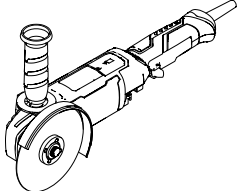
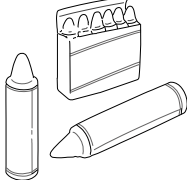
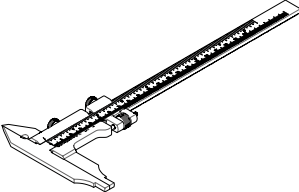

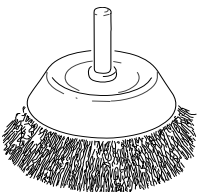
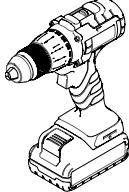
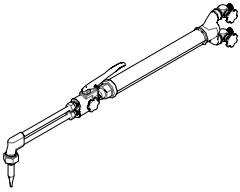

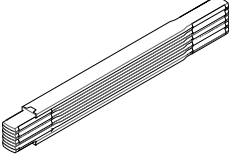
- To install a Position Indicator on the cleaner mainframe a minimum of 75 mm protrusion is required.
- If this is not the case, extension adaptors for the cleaner mainframes are available as an option.
- The Position Indicator must not be installed near magnets, otherwise the results may be falsified



NOTE

- Mount Gateway at highest elevation nearest the center of all Position Indicators.
- Install all sensors within 800m of sensor, no closer than 3 m of the Gateway.

3.3 Required maximum of tools and materials

3.4 Accessories and other materials

The below mentioned Accessories and other materials are not within the scope of supply but might be helpful or required for the installation and use of the N2-System.

Cellular Network Analyser

The GSM signal should be checked and ensured where Gateways should be installed. Therefore a Cellular Network Analysing device is useful. Suitable products are e.g. Siretta Ltd “Snyper” devices. Please contact Martin Engineering for more details.



Cleaner Mainframe extension adaptors

To install a Position Indicator on the cleaner mainframe a minimum of 75 mm protrusion is required. If this is not the case, extension adaptors for the cleaner mainframes are available as an option. Please contact Martin Engineering for more details.

3.5 Check GSM availability

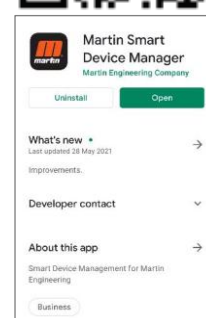
The functionality of the N2 system is based on cellular data connections. Therefore ensure a GSM signal is available at the location of the Gateway.

Prior to installing the Gateway the GSM signal should be checked and ensured at all locations where the Gateways will be installed.

A Cellular Network Analyser can be useful.

3.6 Installing the App

1. Scan QR-code to download and install the Martin Smart Device Manager App.
2. Registration can be requested directly from the App once downloaded, otherwise contact N2admin@martin-eng.com for assistance
3. Follow on screen instructions to register position indicator and complete installation.



3.7 Unloading / Unpacking / transporting

When unpacking, all components must be checked for completeness and intactness.

4 Installation



DANGER

Entanglement in moving or rotating parts e.g. of the conveyor

Body parts and/or clothing may get caught and pulled in by moving or rotating parts and cause serious or fatal injuries.

Tensions may be released in the conveyor belt and cause movement of the bulk material without prior detection.

- *Do not carry out any work on the conveyor belt while it is in operation or reach into the moving conveyor belt!*
- *Before any installation or maintenance work is carried out, ensure that all power sources to the conveyor belt system and its accessories are switched off and secured against inadvertent switching on.*
- *Apply Log-Out / Tag-Out / Try-Out (LOTOTO) Procedures*
- *Apply warning signs*
- *Install suitable Barrier Guards to prevent access to the infeed section!*
- *Ensure that the Barrier Guards are properly mounted in the frame of the inspection doors. Only then switch on the machines or equipment.*
- *Ensure that the Barrier guards and all components are always in good condition.*
- *Ensure that the Barrier Guards are not bent and can be easily installed.*



WARNING

Heavy weight

The components may have weights that require handling by lifting devices. Handling such components by hand can cause serious skeletal injuries.

- *Use suitable aids if the load is > 25 kg per person!*
- *Identify the centre of gravity! Ensure that the components cannot tilt during the lifting process!*

4.1 Mounting the Gateway



CAUTION

Risk of Falling, Crashing, Stumbling

Mounting the gateway in this area prevents people from holding onto the railing.

- *Use alternative fixings of the gateway if blocking the handrail creates additional risks.*



CAUTION

Risk of injury

The gateway or components fall down and endanger persons

- *Always fix the gateway properly*
- *Use all available fixing brackets !*



1. Determine location for Gateway. The Gateway should be mounted in an elevated location nearest the center of all position indicators.
2. Mount Gateway using supplied mounting bracket and hardware.
3. Install antennas
4. Install a mains connection cable (voltage-free) at the gateway.

5. Clean the inside of the gateway. use compressed air if necessary. Make sure that no dust has accumulated.
6. Close the gateway door and secure it against opening.



NOTE

- The door of the gateway is only to be opened for the wiring and then always kept closed.

7. Connect the mains connection cable to the power supply.
✓ *Power light will be illuminated green if Gateway is receiving AC power.*

4.2 Registering the Gateway

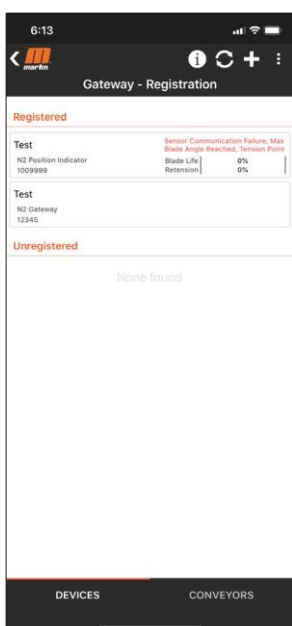


NOTE

- Registering the Gateway is only necessary if there is not a gateway present on this screen.
- Typically a Gateway will already be preregistered to a site.



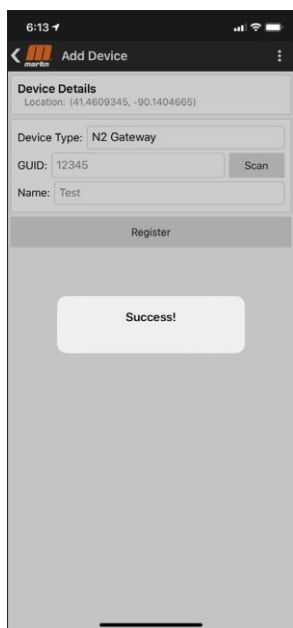
1. Open the app and choose your site



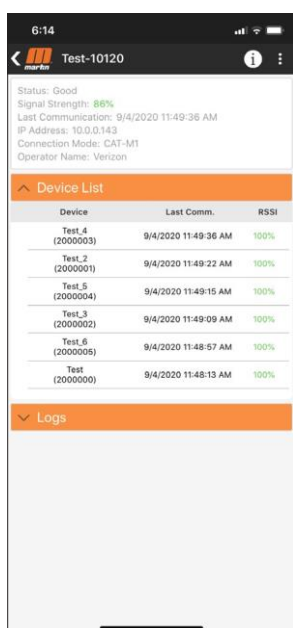
Typically a gateway will already be preregistered to a site.

Only necessary when there is not a gateway present on this screen:


2. Select “Devices” at the bottom of the screen and add “+”



3. Select Device Type and choose Gateway



4. Hit back arrow to return to "Site Page"

	<p>5. Gateway should show as a registered device</p>
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Remark We are continuously developing the app. Therefore, future versions of the app may have different information or design.

4.3 Assembling the Position Indicator



NOTE

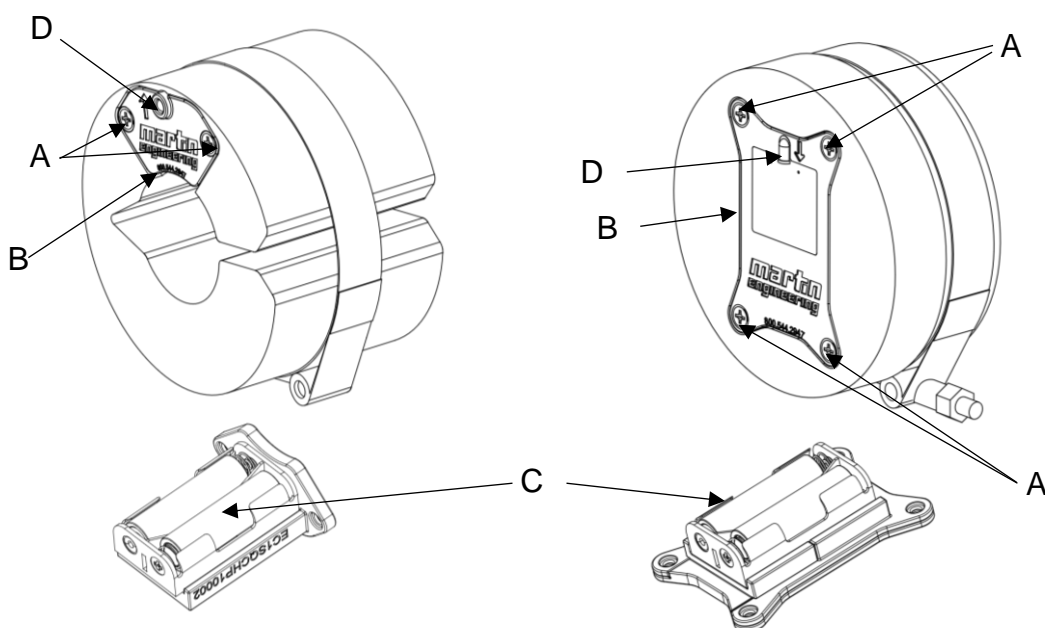
A Position Indicator is powered up by installing the Batteries.

Power up the Position Indicators one after one. Register a Position Indicator to the Gateway via the App first. When completed, power up the next Position Indicator.

Install Batteries

Remark You may receive PIs that already have batteries inserted. This means that the following steps are not necessary

1. Remove screws (A).
 2. Remove sensor assembly (B) from urethane mount.
 3. Install batteries (C) in sensor assembly.
 4. Reinstall sensor assembly in urethane mount.
 5. Tighten screws to 6,8 Nm.
- ✓ *LED indicator light (D) will blink solid for 1 second indicating power up; all subsequent short flashes indicate successful communication with Gateway.*



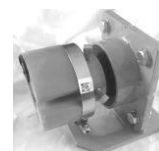
4.4 Mounting the Position Indicator

4.4.1 Position Indicator (HD and PV)

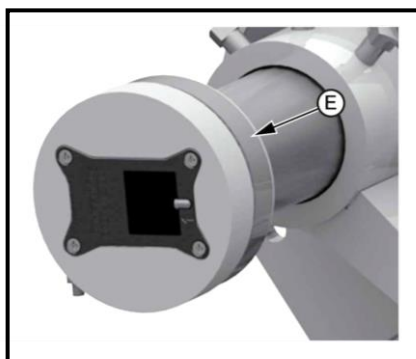


1. Determine mounting location for the Position Indicator. The Position Indicator can be mounted on inside or outside of chute wall.
2. For inside chute wall installations:
 - a. Remove nut from clamp (E).
 - b. Slide position indicator onto mainframe.
 - c. Install clamp onto position indicator.
 - d. Reinstall nut and tighten clamp (E) to avoid rotation.
3. For outside chute wall installations:
 - a. Slide position indicator onto mainframe.
 - b. Tighten clamp (E) to avoid rotation.

Remark: Tighten clamps only to the point where the position indicator cannot be rotated by hand. This is typically the case when the thread protrusion from the nut is 8 mm. 15 mm should not be exceeded. **OR:** Install the clamp further back, which means closer to the rear side of the urethane enclosure.



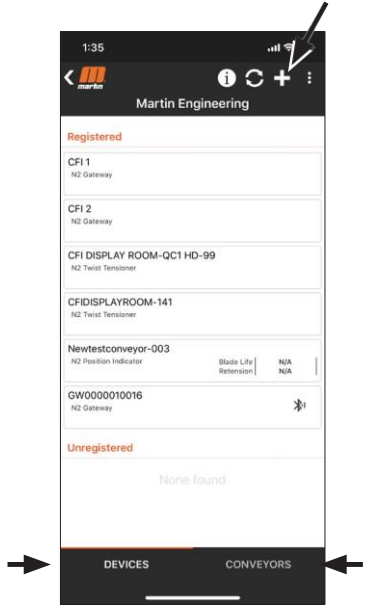
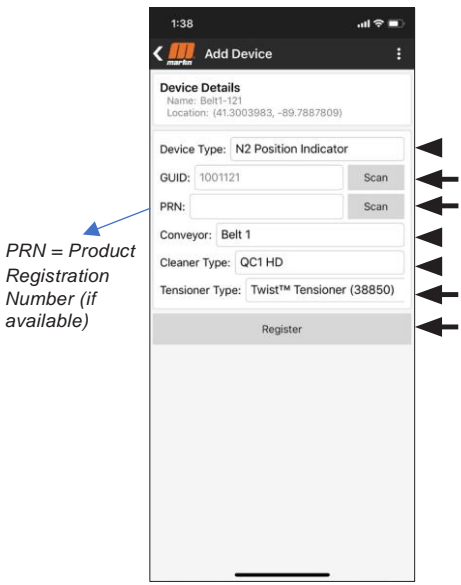
4.4.2 Position Indicator (HD Max and XHD)

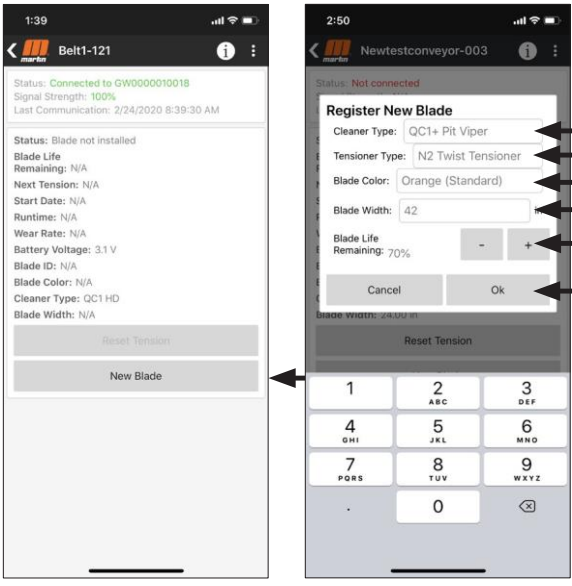


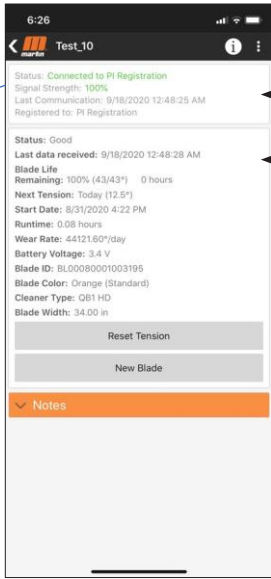
1. Determine mounting location for position indicator. Select end of cleaner closest to the Gateway.
2. Slide the Position Indicator onto mainframe.
3. Tighten clamp (E) to avoid rotation.

4.5 Registering the Position Indicator

Remark We are continuously developing the app. Therefore, future versions of the app may have different information or design.

	<p>1. Select “Devices” at the bottom of the screen and add “+”*</p> <p><i>* To add conveyor without add POSITION INDICATOR, choose conveyors and then the “+” sign.</i></p>
 <p>PRN = Product Registration Number (if available)</p>	<p>2. Choose Position Indicator</p> <ul style="list-style-type: none"> • Scan or type GUID • Choose remaining info from drop down list or by adding new information if not already loaded. • Then register

<p>note: setting head and tail locations performs a GPS grab so user should be in vicinity of location when performing</p> 	<p>3. Add all info about the conveyor</p> <ul style="list-style-type: none"> • Set head location • Set tail location (if applicable) • Register <p>Depending on the app version the row „tail location“ might not be displayed</p>
	<p>4. Select the device you just registered and hit “new blade”</p> <p>5. Add all fields, adjust Blade Life Remaining as necessary, choose ‘OK’*</p> <p><i>* When installing a new blade it is assumed tension has been adjusted prior to registering blade. If tension is added after blade is added “Reset Tension”</i></p>
<p>Sensor will connect within 6 hrs or through a manual reset (reset can be performed with a magnet touch above the arrow on sensor or with a power cycle by removing batteries and reinstalling)</p> 	<p>6. All the info should now show under that device</p>

<p>Fully connected sensor</p>  <p>The screenshot shows a mobile application interface for a sensor. At the top, it says 'Test_10'. Below that, the status is 'Connected to PI Registration' with a signal strength of 100%. The overall status is 'Good'. Other details include: Last data received: 9/18/2020 12:48:28 AM; Blade Life: 100% (43/43"); Remaining: 0 hours; Next Tension: Today (12.5"); Start Date: 8/31/2020 4:22 PM; Runtime: 0.08 hours; Wear Rate: 44121.60"/day; Battery Voltage: 3.4 V; Blade ID: BL00080001003195; Blade Color: Orange (Standard); Cleaner Type: O81 HD; Blade Width: 34.00 in. There are buttons for 'Reset Tension' and 'New Blade', and a 'Notes' section at the bottom.</p>	<h3>7. Fully Completed Position Indicator Installation</h3>
---	---

5 Operation



WARNING

Flying objects

Objects left on or in the conveyor can fly around uncontrollably when the conveyor is switched on and can hit and injure persons.

- *Before switching on the conveyor, remove all foreign objects such as tools, devices, etc. from the belt!*

5.1 Commissioning

Check all the entries for devices in the App are showing the required outputs:

1. Gateway status 'good' indicating it has power
2. Gateway signal strength indicating it has connection to IoT
3. For each Position Indicator also check status and signal strength.

5.2 Ready to operate

After successful registration of the gateway and the individual Position Indicators with the app, the N2[®] system is ready for operation.

The individual parameters can now be tracked and read in the app.

From a predefined tolerance range, an alarm is automatically triggered in the app if the cleaner blades have been worn too far.

5.3 Calibrating

The Position Indicator is factory calibrated. It does not require any calibration to know its relative angle to the ground.

When a new blade installation is set up through the app, the system takes the next angle it receives from the Position Indicator as the blade start angle.

5.4 Basic functions of the App

Login

Login to the App

Selection of desired site

From the home screen of the App select the desired site by tapping on that entry

Details of the installed devices

From the list showing all installed devices, select the device wished to view detail for

Data Listing

The screen shows current data listing for the device selected

Options for Cleaner Maintenance

This screen also contains the option for a service technician to 'Reset Tension' or change the existing blade for a 'New Blade'

Others

Once action or viewing completed the App can be navigated back to home screen by tapping the back button (the arrow at the top left of screen).

The App will keep the user signed in for a period of time and auto login the next time the App is accessed if not logged out under settings.

5.5 Notification and alerts on the App

Schedule Blade Change

Blade life is less than 25% remaining, ensure a blade is in stock or on order and look to schedule a convenient time to replace the blade. Replace the blade, retension the cleaner and add a “New Blade” on the app to clear the alert.

Replace Blade

Blade has hit its maximum travel angle. Blade is worn out and needs replacement. Pull a blade from stock and install the blade, retension the cleaner and add a “New Blade” on the app to clear the alert. See 6.6 Function New Blade

Schedule Retensioning

Blade tension is low, the belt cleaner should be scheduled for retensioning to optimise cleaning. Upon retensioning the belt cleaner, “Reset Tension” should be applied on the app in order to clear the alert

Retension Required

Belt Cleaner requires immediate retensioning as the cleaning performance will be poor until this occurs. Upon retensioning the cleaner, “Reset Tension” should be applied on the app in order to clear the alert. See 6.5 Function Reset Tensio.

Excessive Movement Triggered

Blade has moved away from the belt. The cleaner should be checked and adjusted for performance by performing the “Reset Tension” sequence in the App to clear the alert. Ensure the Position Indicator (PI) holder is secured to the mainframe; however, do not overtighten the clamp to the point where batteries may become disengaged in the PI sensor.

Blade Backed Off

Blade has been removed from service, by disengaging the cleaner from the belt by > 10 degrees. This condition may indicate the plant has other maintenance issues with the belt. The conveyor belt and the belt cleaner should be checked for condition prior to resuming normal operations. Once the belt cleaner is put back into service the “Reset Tension” sequence should be performed.

Blade Roll Through

The blade has worn to a point where a condition occurred whereby the blade was pulled through the area between the belt and the mainframe causing the cleaner to rotate. Upon receiving this alarm the cleaner should be checked carefully as the mainframe has likely been deflected and possibly bent in the process. The Owner/Operator manual should be consulted and the location of the blade in relation to the belt should be checked.

Schedule Battery Change

The battery voltage is below 3.05V. Schedule a battery replacement, utilizing AA lithium ion batteries for optimal battery life, Update the app with "New Blade"

Replace Batteries

The battery voltage is below 3.05V & the sensor has not communicated for 24 hours. Replace batteries with AA lithium ion batteries for optimal battery life. See 6.7. Replacement of batteries in the Position Indicator.

Waiting for Next Connection

Position Indicator has not connected to the gateway since the user selected "Reset Tension" and confirmed that tension was reset or selected "New Blade" and registered a new blade on the app. (includes setting a new % of blade life left). Clears when sensor has connected to gateway and gateway has communicated to system.

Sensor Communication Failure

The sensor has not communicated for 24 hours. If multiple sensors are down, ensure the gateway has power and antennas are connected, complete a hard reset of the system by powering down the gateway for a few minutes and repowering the gateway. The sensor can also be reset by bringing a magnet into contact with the casing of it for 5 seconds. The sensor will then power cycle and reconnect to the gateway once it has rebooted.

6 Maintenance / Servicing



DANGER

Entanglement in moving or rotating parts e.g. of the conveyor

Body parts and/or clothing may get caught and pulled in by moving or rotating parts and cause serious or fatal injuries.

Tensions may be released in the conveyor belt and cause movement of the bulk material without prior detection.

- *Do not carry out any work on the conveyor belt while it is in operation or reach into the moving conveyor belt!*
- *Before any installation or maintenance work is carried out, ensure that all power sources to the conveyor belt system and its accessories are switched off and secured against inadvertent switching on.*
- *Apply Log-Out / Tag-Out / Try-Out (LOTOTO) Procedures*
- *Apply warning signs*
- *Install suitable Barrier Guards to prevent access to the infeed section!*
- *Ensure that the Barrier Guards are properly mounted in the frame of the inspection doors. Only then switch on the machines or equipment.*
- *Ensure that the Barrier guards and all components are always in good condition.*
- *Ensure that the Barrier Guards are not bent and can be easily installed.*



DANGER

Electrical voltage !

Electric shock due to touching live components inside the Gateway

- *Disconnect the power supply before opening the door. Disconnect all poles of the system from the mains (switch off the circuit breaker or main switch).*
- *Secure against being switched on again: Accidental switching on of the system must be prevented (e.g. by means of special locks).*
- *Check that there is no voltage: The absence of voltage at all poles must be determined with a suitable measuring device (two-pole voltage tester).*



WARNING

Pulling in, Catching, Rubbing on rotating

Belt cleaner blades can get jammed on the belt or are completely worn out. This causes them to be "pulled through" and move the mainframe suddenly

- *Stop the conveyor before working on or touching the PI !*



WARNING

Flying objects

Objects left on or in the conveyor can fly around uncontrollably when the conveyor is switched on and can hit and injure persons.

- *Before switching on the conveyor, remove all foreign objects such as tools, devices, etc. from the belt!*

6.1 Cleaning

Heavily soiled components can falsify the measurement result. The components should be cleaned regularly with a damp cloth, depending on how dirty they are.

6.2 Retensioning of the belt cleaners

Button an App to be pushed

6.3 Cleaning + Changing cleaner blades

For the inspection, cleaning and changing the blades of the belt cleaners please refer to the Operating instructions (O&M Manual) of the Belt cleaners and tensioning devices.



NOTE

The Position Indicator measures and reports changes of the angle. The inspection, cleaning and changing the blades of the belt cleaners usually results in a change of the angle of the Position Indicator. This might lead to an alarm: "Excessive Movement Triggered"

6.4 Regular inspection

Interval	Component part	Activity
Monthly	Gateway	Visual inspection for damages
	Position Indicator	

6.5 Function 'Reset Tension'

The App offers the function 'Reset Tension'.

The function is to be used once the belt cleaner got retensioned by the site personnel.

Only when the function 'Reset Tension' was activated, the N2 System can provide an alert when the next retensioning activity will be required. Below is a guide to the sequence to follow:

1. When indicated by App that tension needs to be reset
2. Visit blade and visually inspect
3. If blade requires cleaning, back off and clean before resetting tension
4. Perform tension reset according to blade and tensioner operator instructions
5. Press the 'Reset Tension' button on the App for the blade that is being serviced, either at the time of service if safe and a smartphone is available, or later at the end of the maintenance shift in a safe location
6. The App will show alert 'Waiting for sensor to connect' status
7. Once the sensor reconnects to the gateway the tension will show 100%

6.6 Function 'New Blade'

The App offers the function 'New Blade'.

The function is to be used once the blade of the belt cleaner was replaced with a new one..

Only when the function 'New Blade' was activated, the N2 System can predict the remaining wear life and provide an alert when the next blade replacement activity will be required. Below is a guide to the sequence to follow:

1. When indicated by App that the blade needs to be replaced
2. Visit blade and visually inspect
3. If blade requires replacement, remove the old blade from the housing according to the blade and tensioner operating instructions
4. Fit the replacement blade according to the operating instructions and apply tension
5. Press 'New Blade' button on the App for the blade that is being serviced, either at the time of service if safe and a smartphone is available, or later at the end of the maintenance shift in a safe location. Confirm the % of the blade that is remaining if a part worn blade has been fitted.
6. The App will show alert 'Waiting for sensor to connect' status
7. Once the sensor reconnects to the gateway the tension will show 100% unless a lower % was entered in the case of a part worn blade being fitted.

6.7 Replacement of batteries in the Position Indicator

When alerted to replace the batteries, the following sequence should be followed:

1. When indicated by App that the batteries need to be replaced
2. Visit blade and visually inspect
3. Remove sensor from its housing according to operating instructions
4. Remove used batteries and replace with new ones to the correct specification as listed in the N2 PI Operators Manual
5. Refit the sensor into its housing and tighten back into place according to the operating instructions
6. The sensor will reboot and make a connection with the Gateway automatically resetting to the previous position before being removed from the housing.
7. Once the sensor reconnects to the gateway all reporting from the sensor will be as it was before the battery change.

6.8 Reset of the Position Indicator

The Position Indicator can be reset with the magnet.

The reset with the magnet function has the same effect as power cycling the PI (such as during a battery change sequence). It forces the PI to switch off and then reboot and then reconnect to the gateway.

7 Troubleshooting and Repair



DANGER

Entanglement in moving or rotating parts e.g. of the conveyor

Body parts and/or clothing may get caught and pulled in by moving or rotating parts and cause serious or fatal injuries.

Tensions may be released in the conveyor belt and cause movement of the bulk material without prior detection.

- *Do not carry out any work on the conveyor belt while it is in operation or reach into the moving conveyor belt!*
- *Before any installation or maintenance work is carried out, ensure that all power sources to the conveyor belt system and its accessories are switched off and secured against inadvertent switching on.*
- *Apply Log-Out / Tag-Out / Try-Out (LOTOTO) Procedures*
- *Apply warning signs*
- *Install suitable Barrier Guards to prevent access to the infeed section!*
- *Ensure that the Barrier Guards are properly mounted in the frame of the inspection doors. Only then switch on the machines or equipment.*
- *Ensure that the Barrier guards and all components are always in good condition.*
- *Ensure that the Barrier Guards are not bent and can be easily installed.*



WARNING

Pulling in, Catching, Rubbing on rotating

Belt cleaner blades can get jammed on the belt or are completely worn out. This causes them to be "pulled through" and move the mainframe suddenly

- *Stop the conveyor before working on or touching the PI !*



WARNING

Flying objects

Objects left on or in the conveyor can fly around uncontrollably when the conveyor is switched on and can hit and injure persons.

- *Before switching on the conveyor, remove all foreign objects such as tools, devices, etc. from the belt!*

Symptom	Remedy
Position Indicator does not connect to the Gateway prior to registration	Click on “Gateway” on the mobile app. Check if the GUID shows up in the device list. If not present, re-run the process “Registering the Position Indicator”, ensure PI Battery voltage is sufficient If a connection still cannot be made, bring a magnet close to the PI as a reset function.
Position Indicator does not connect to the Gateway after registration	Click on “Gateway” on the mobile app. Check if the GUID shows up in the device list. If not present, wait for 5min and refresh, then verify antennas are connected, verify cellular connection, power cycle Gateway, If present in Gateway device list check distance to Gateway If a connection still cannot be made, bring a magnet close to the PI as a reset function.
Position Indicator does not connect to the Gateway after registration	Verify sensor is on end of cleaner most directly pointing to Gateway If no connection could be established, repeat the test with an alternative Position Indicator just to be sure that the fault is with the Gateway rather than the Position Indicator. If a connection still cannot be made, bring a magnet close to the PI as a reset function. If a connection still cannot be made, call your local Martin engineering contact for guidance.

Remarks

GUID – Globally Unique Identifier. In this case: Identification of the Position Indicator

8 Shutting down / Disconnecting / Dismantling



DANGER

Entanglement in moving or rotating parts e.g. of the conveyor

Body parts and/or clothing may get caught and pulled in by moving or rotating parts and cause serious or fatal injuries.

Tensions may be released in the conveyor belt and cause movement of the bulk material without prior detection.

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- *Ensure that the Barrier guards and all components are always in good condition.*
- *Ensure that the Barrier Guards are not bent and can be easily installed.*

Shutting down / Disconnecting

1. Delete the position indicators and the gateways from the app
2. Disconnect the gateways from the power supply
3. Remove the batteries from the position indicators
4. If necessary, disassemble the position indicators and the gateways.

Dismantling

The dismantling of the position indicators and gateways is basically carried out in the reverse order to the assembly (chapter 4.1 and 4.3.).

9 Disassembly / Recycling / Disposal

1. Disassemble the N2[®]-System by material groups as far as possible.
2. Contact official bodies (disposal centres, authorities) and request information about proper disposal or recycling possibilities.
3. Recycle the different materials.

Only materials that cannot be reasonably recycled may be disposed of. Disposal must be carried out professionally.

Material groups that can be fed into a recycling process include:

- Sheet steel
- Steel profiles
- Plastics
- Rubber
- Non-ferrous metals
- Electrical cables
- Electrical components (with copper content)
- Lubricants

10 Product Conformity



EU Declaration of Conformity (DoC)

We

Company name: Martin Engineering GmbH
 Postal address: In der Rehbach 14
 Postcode: D65396
 City: Walluf
 Telephone number: +4961239782-0
 E-Mail address: info@martin-eng.de

declare that the DoC is issued under our sole responsibility and belongs to the following product:

Apparatus model/Product: N2® Gateway
 Type: EGC006XX05XX201
 Batch:
 Serial number:

Object of the declaration

N2® Gateway



The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Radio Equipment Directive 2014/53/EU EMC Directive 2014/30/EU
 RoHS Directive 2011/65/EU Low Voltage Directive (LVD) 2014/35/EU

The following harmonised standards and technical specifications have been applied:

Title, Date of standard/specification:

EN 61000-6-4 2007/A1:2011	EN 61000-4-4 E3.0 2012-04
EN 61000-3-2 2014	EN 61000-4-5 E3.1 2017-08
EN 61000-3-3 2013+A1: 2019	EN 61000-4-6 E4.0 2013-10
EN 61000-6-2 2005/AC:2005	EN 61000-4-8 E2.0 2009-09
EN 61000-4-2 E2.0 2008-12	EN 61000-4-11 E2.1 2017-05
EN 61000-4-3 E3.2 2010-04	EN 61010-1 2010/A1:2019

Notified body (where applicable): 4 digit notified body number:
 N/A N/A

Additional information:

Signed for and on behalf of:

Walluf, Germany.	2021-12-23	Robert Whetstone, VP EMEA Region
Place of issue	Date of issue	Name, function, signature



MARTIN ENGINEERING GMBH

In der Rehbach 14 ■ 65396 Walluf, Deutschland ■ Tel. +49 (0)6123 97820 ■ Fax +49 (0)6123 75533 ■ info@martin-eng.de ■ www.martin-eng.de
 ISO 9001 zertifiziert ■ Handelsregister: HRB 17619 Amtsgericht Wiesbaden
 Geschäftsführer: Robert Nogaj, Robert Whetstone ■ Ust Id Nr: DE 113863500
 Nassauische Sparkasse ■ BLZ: 510 500 15, Kto: 472 016 334 ■ IBAN: DE97 5105 0015 0472 0163 34, SWIFT BIC: NASS DE 55 XXX
 Commerzbank AG ■ BLZ: 510 800 60, Kto: 119 069 600 ■ IBAN: DE31 5108 0060 0119 0696 00, SWIFT BIC: DRES DE FF 510



EU Declaration of Conformity (DoC)

We

Company name: Martin Engineering GmbH
 Postal address: In der Rehbach 14
 Postcode: D65396
 City: Walluf
 Telephone number: +4961239782-0
 E-Mail address: info@martin-eng.de

declare that the DoC is issued under our sole responsibility and belongs to the following product:

Apparatus model/Product: N2® Position Indicator HD
 Type: EC1SQCH1SXX05211
 Batch:
 Serial number:

Object of the declaration

N2® Position Indicator HD



The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Radio Equipment Directive 2014/53/EU EMC Directive 2014/30/EU
 RoHS Directive 2011/65/EU ...

The following harmonised standards and technical specifications have been applied:

Title, Date of standard/specification:

EN 61000-6-4 2007/A1:2011	EN 61000-4-4 E3.0 2012-04
EN 61000-3-2 2014	EN 61000-4-5 E3.1 2017-08
EN 61000-3-3 2013+A1: 2019	EN 61000-4-6 E4.0 2013-10
EN 61000-6-2 2005/AC:2005	EN 61000-4-8 E2.0 2009-09
EN 61000-4-2 E2.0 2008-12	EN 61000-4-11 E2.1 2017-05
EN 61000-4-3 E3.2 2010-04	EN 61010-1 2010/A1:2019

Notified body (where applicable): 4 digit notified body number:

N/A

Additional information:

Signed for and on behalf of:

Walluf, Germany.	2021-12-23	Robert Whetstone, VP EMEA Region
Place of issue	Date of issue	Name, function, signature



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EU Declaration of Conformity (DoC)

We

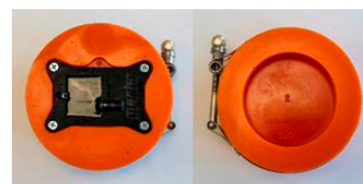
Company name: Martin Engineering GmbH
 Postal address: In der Rehbach 14
 Postcode: D65396
 City: Walluf
 Telephone number: +4961239782-0
 E-Mail address: info@martin-eng.de

declare that the DoC is issued under our sole responsibility and belongs to the following product:

Apparatus model/Product: N2® Position Indicator XHD
 Type: EC1SQCE1SXX05211
 Batch:
 Serial number:

Object of the declaration

N2® Position Indicator XHD Type 1



The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Radio Equipment Directive 2014/53/EU EMC Directive 2014/30/EU
 RoHS Directive 2011/65/EU ...

The following harmonised standards and technical specifications have been applied:

Title, Date of standard/specification:

EN 61000-6-4 2007/A1:2011	EN 61000-4-4 E3.0 2012-04
EN 61000-3-2 2014	EN 61000-4-5 E3.1 2017-08
EN 61000-3-3 2013+A1: 2019	EN 61000-4-6 E4.0 2013-10
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EN 61000-4-2 E2.0 2008-12	EN 61000-4-11 E2.1 2017-05
EN 61000-4-3 E3.2 2010-04	EN 61010-1 2010/A1:2019

Notified body (where applicable): 4 digit notified body number:

N/A N/A

Additional information:

Signed for and on behalf of:

Walluf, Germany.	2021-12-23	Robert Whetstone, VP EMEA Region
Place of issue	Date of issue	Name, function, signature



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EU Declaration of Conformity (DoC)

We

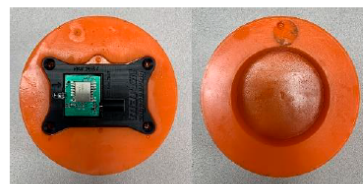
Company name: Martin Engineering GmbH
 Postal address: In der Rehbach 14
 Postcode: D65396
 City: Walluf
 Telephone number: +4961239782-0
 E-Mail address: info@martin-eng.de

declare that the DoC is issued under our sole responsibility and belongs to the following product:

Apparatus model/Product: N2® Position Indicator XHD
 Type: EC1SQCE3SXX05211
 Batch:
 Serial number:

Object of the declaration

N2® Position Indicator XHD Type 3



The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

Radio Equipment Directive 2014/53/EU EMC Directive 2014/30/EU
 RoHS Directive 2011/65/EU ...

The following harmonised standards and technical specifications have been applied:

Title, Date of standard/specification:

EN 61000-6-4 2007/A1:2011	EN 61000-4-4 E3.0 2012-04
EN 61000-3-2 2014	EN 61000-4-5 E3.1 2017-08
EN 61000-3-3 2013+A1: 2019	EN 61000-4-6 E4.0 2013-10
EN 61000-6-2 2005/AC:2005	EN 61000-4-8 E2.0 2009-09
EN 61000-4-2 E2.0 2008-12	EN 61000-4-11 E2.1 2017-05
EN 61000-4-3 E3.2 2010-04	EN 61010-1 2010/A1:2019

Notified body (where applicable): 4 digit notified body number:
 N/A N/A

Additional information:

Signed for and on behalf of:

Walluf, Germany.	2021-12-23	Robert Whetstone, VP EMEA1 Region
Place of issue	Date of issue	Name, function, signature



MARTIN ENGINEERING GMBH

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 ISO 9001 zertifiziert ■ Handelsregister: HRB 17619 Amtsgericht Wiesbaden
 Geschäftsführer: Robert Noga, Robert Whetstone ■ Ust Id Nr. DE 113863500
 Nassauische Sparkasse ■ BLZ: 510 500 15, Kto. 472 016 334 ■ IBAN: DE97 5105 0015 0472 0163 34, SWIFT BIC: NASS DE 55 XXX
 Commerzbank AG ■ BLZ: 510 800 60, Kto: 119 069 600 ■ IBAN: DE31 5108 0060 0119 0696 00, SWIFT BIC: DRES DE FF 510

11 Spare parts and Product Details

PART NUMBER	P/N ITEM 2	COUNTRY CODE	RADIO TYPE	ITEM	QTY.	DESCRIPTION	PART NUMBER
EC1SQCH1SBR02201	EC1SQCH2SBR02201	BR = BRAZIL	02 = 915 MHZ	1	1	N2 PI SENSOR URETHANE MOUNT	EC1SQCHP10001
EC1SQCH1SEU05211	EC1SQCH2SEU05211	EU = EUROPE	05 = 868 MHZ	2	1	N2 PI SENSOR CIRCUIT BOARD ASM	SEE CHART
EC1SQCH1SIN08211	EC1SQCH2SIN08211	IN = INDIA	08 = 865 MHZ				
EC1SQCH1SME05211	EC1SQCH2SME05211	ME = MIDDLE EAST	05 = 868 MHZ				
EC1SQCH1SUK05211	EC1SQCH2SUK05211	UK = UNITED KINGDOM	05 = 868 MHZ				
EC1SQCH1SUS02201	EC1SQCH2SUS02201	US = UNITED STATES	02 = 915 MHZ				

FRONT ISOMETRIC VIEW
SCALE 5:8

EC1SQCH1SUS02201 SHOWN

EC1SQCH1SBR02201 SHOWN

NOTES:

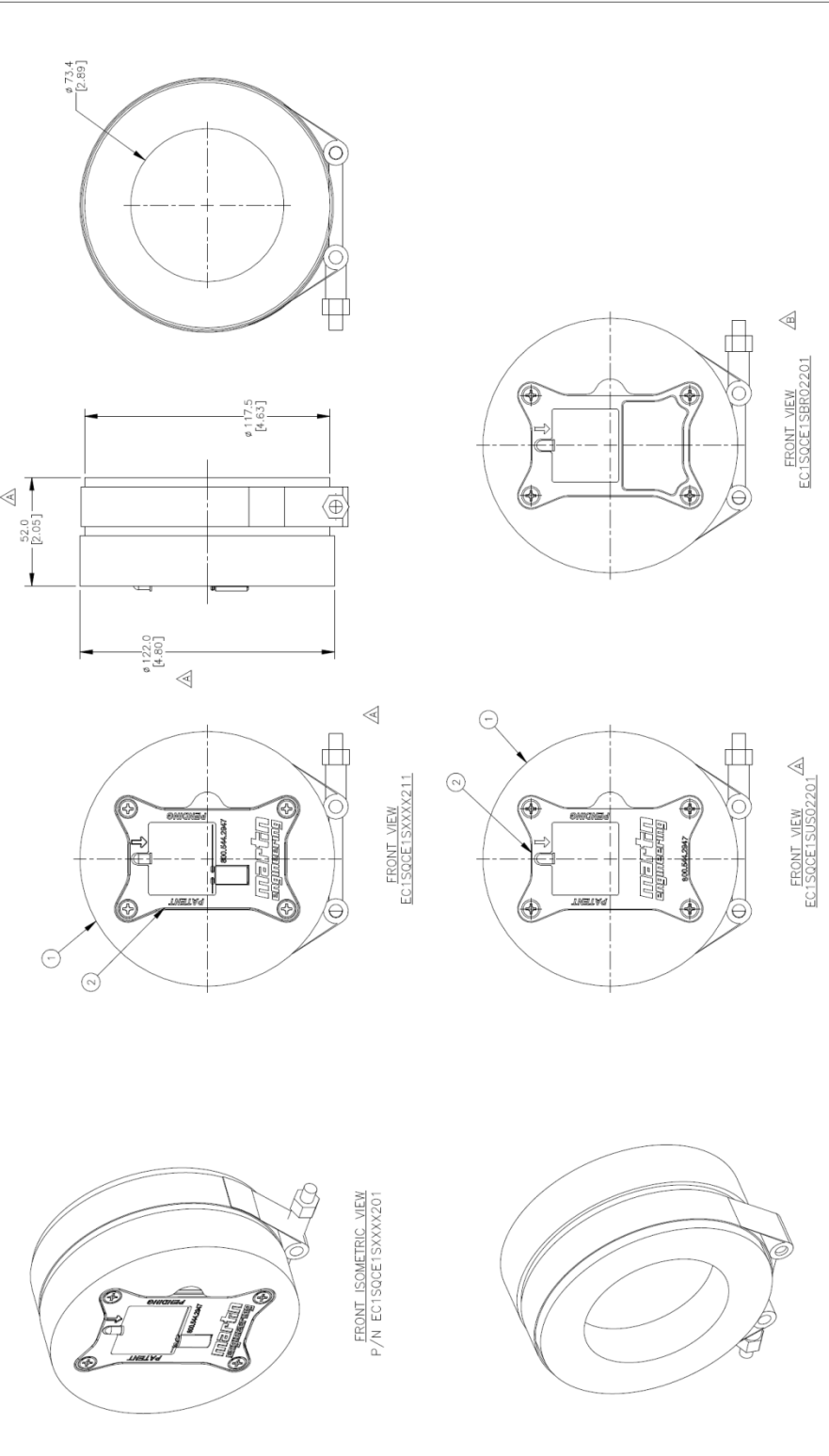
1) IN THE PART NUMBER THE EC1SQCH1S INDICATES THE PART IS THE POSITION INDICATOR SENSOR ASSEMBLY THE FIRST XX INDICATES THE COUNTRY CODE THAT THE CIRCUIT BOARD WAS MANUFACTURED FOR (SEE CHART) AND THE NEXT XX INDICATES THE CIRCUIT BOARD CONFIGURATION AND THAT THE CIRCUIT BOARD IS PROGRAMMED FOR A SPECIFIC RADIO TYPE (SEE CHART) THE 20 INDICATES THE YEAR CODE OF THE CIRCUIT BOARD EX: 20 = 2020 THE 1 INDICATES THE CIRCUIT BOARD IS VERSION 1.

C	ADDED	EC1SQCH1SME05211. (PR14192)	07/09/21	ACT
B	ADDED	EC1SQCH1SUK05211. ADDED VIEW FOR EC1SQCH1SBR02201 (PR14139)	2/25/21	ACT
A	ADDED	EC1SQCH1SEU05211. EC1SQCH1SBR02201 AND EC1SQCH1SIN08211. REDRAWN. DRAWING CHG'D 0120.9. ADD DIM 0116.0. TO EC1SQCH1SXXXX2X1 (PR14066B)	1/18/2021	ACT
REV	DESCRIPTION	ECN	DATE	BY
MATERIAL:		FINISH:	WEIGHT: 0.8 KG	
UNLESS OTHERWISE SPECIFIED		X = ±	SURFACE FINISH: ✓	
DIMENSIONS ARE IN MM [INCH]		XX = ±	ANGULAR: ±	
DIMENSIONS FOR REFERENCE ONLY		XXX = ±	DRAFT ANGLE: --	
SOLIDWORKS SUPERSEDES SAME SIZE DATED 05/07/20 DRAWING NUMBER EC1SQCH1SXXXX201				

MARTIN ENGINEERING NEPONSET, IL USA		DRAWN ACT
HD AND PV N2 POSITION INDICATOR ASSEMBLY		CHECKED
DRAWING NUMBER PR13993		ENG. 729
DATE: 02/01/21		DATE: 01/28/21
APPROVED 575		I.E. AVR/3
DATE: 02/01/21		SCALE 5:8

PART NUMBER	P/N 1	COUNTRY CODE	RADIO TYPE
EC150CE1SBRO2201	EC150CE2SBRO2201	BR = BRAZIL	02 = 915 MHz
EC150CE1SEU05211	EC150CE2SEU05211	EU = EUROPE	05 = 868 MHz
EC150CE1SIN08711	EC150CE2SIN08711	IN = INDIA	08 = 868 MHz
EC150CE1SME05211	EC150CE2SME05211	ME = MIDDLE EAST	05 = 868 MHz
EC150CE1SUK09211	EC150CE2SUK09211	UK = UNITED KINGDOM	09 = 868 MHz
EC150CE1SUS02201	EC150CE2SUS02201	US = UNITED STATES	02 = 915 MHz

ITEM	QTY.	DESCRIPTION	PART NUMBER
1	1	N2 PI SENSOR XHD URETHANE MOUNT	EC150CEP10001
2	1	N2 PI SENSOR XHD CIRCUIT BOARD ASM	SEE CHART



REV	DESCRIPTION	DATE	BY	CHKD	APP'D
A	ASSEMBLY	07/29/21	ACT	ACT	ACT
B	REVISION	02/25/21	ACT	ACT	ACT
C	REVISION	01/19/21	ACT	ACT	ACT

REV	DESCRIPTION	DATE	BY	CHKD	APP'D
1	ISSUED FOR	07/29/21	ACT	ACT	ACT
2	ISSUED FOR	02/25/21	ACT	ACT	ACT
3	ISSUED FOR	01/19/21	ACT	ACT	ACT

TITLE	DRAWING NUMBER	SCALE
POSITION INDICATOR ASM FOR 73.0mm [2.88"] PIPE	PR1393	3:4

DATE	BY	CHKD	APP'D
07/29/21	ACT	ACT	ACT
02/25/21	ACT	ACT	ACT
01/19/21	ACT	ACT	ACT

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NOTES:
 1) IN THE PART NUMBER THE EC150CE1S INDICATES THE PART IS THE XHD POSITION INDICATOR SENSOR ASSEMBLY. THE THREE XX INDICATES THE COUNTRY CODE THAT THE CIRCUIT BOARD IS PROGRAMMED FOR. THE NEXT XX INDICATES THE CIRCUIT BOARD CONFIGURATION AND THAT THE CIRCUIT BOARD IS PROGRAMMED FOR A SPECIFIC CIRCUIT BOARD. THE YEAR CODE OF THE CIRCUIT BOARD. EX: 20 = 2020
 THE 1 INDICATES THE CIRCUIT BOARD IS VERSION 1.

PART NUMBER	P/N ITEM 2	COUNTRY CODE	RADIO TYPE	ITEM	QTY.	DESCRIPTION	PART NUMBER
EC1SQCE3SEU05211	EC1SQCE2SEU05211	EU = EUROPE	05 = 868 MHZ	1	1	URETHANE MOUNT FOR 76.2MM [3.0] PIPE	EC1SQCEP10005
EC1SQCE3SIN08211	EC1SQCE2SIN08211	IN = INDIA	08 = 865 MHZ	2	1	N2 PI SENSOR XHD CIRCUIT BOARD ASM	SEE CHART
EC1SQCE3SME05211	EC1SQCE2SME05211	ME = MIDDLE EAST	05 = 868 MHZ				
EC1SQCE3SUK05211	EC1SQCE2SUK05211	UK = UNITED KINGDOM	05 = 868 MHZ				

REV	DESCRIPTION	ECN	DATE	BY	ACT
B	ADDED EC1SQCE3SIN08211, EC1SQCE3SME05211 (PR14232)	---	09/09/21	ACT	ACT
A	ADDED EC1SQCE3SUK05211. (PR14139)	---	03/02/21	ACT	ACT

TITLE	DRAWING NUMBER	SCALE
XHD N2 POSITION INDICATOR ASM FOR 76.2mm [3.0] PIPE	EC1SQCE3SXXXXX21	2:3

MATERIAL:	FINISH:	WEIGHT: 0.7 KG
UNLESS OTHERWISE SPECIFIED	TOLERANCES IN MM [INCH]:	SURFACE FINISH: 12.5
DIMENSIONS ARE IN MM [INCH]	.X = ± 1.5 [.06]	ANGULAR: ±1
[INCH] ARE FOR REFERENCE ONLY	.XX = ± .75 [.03]	DRAFT ANGLE: --
	.XXX = ± .125 [.005]	

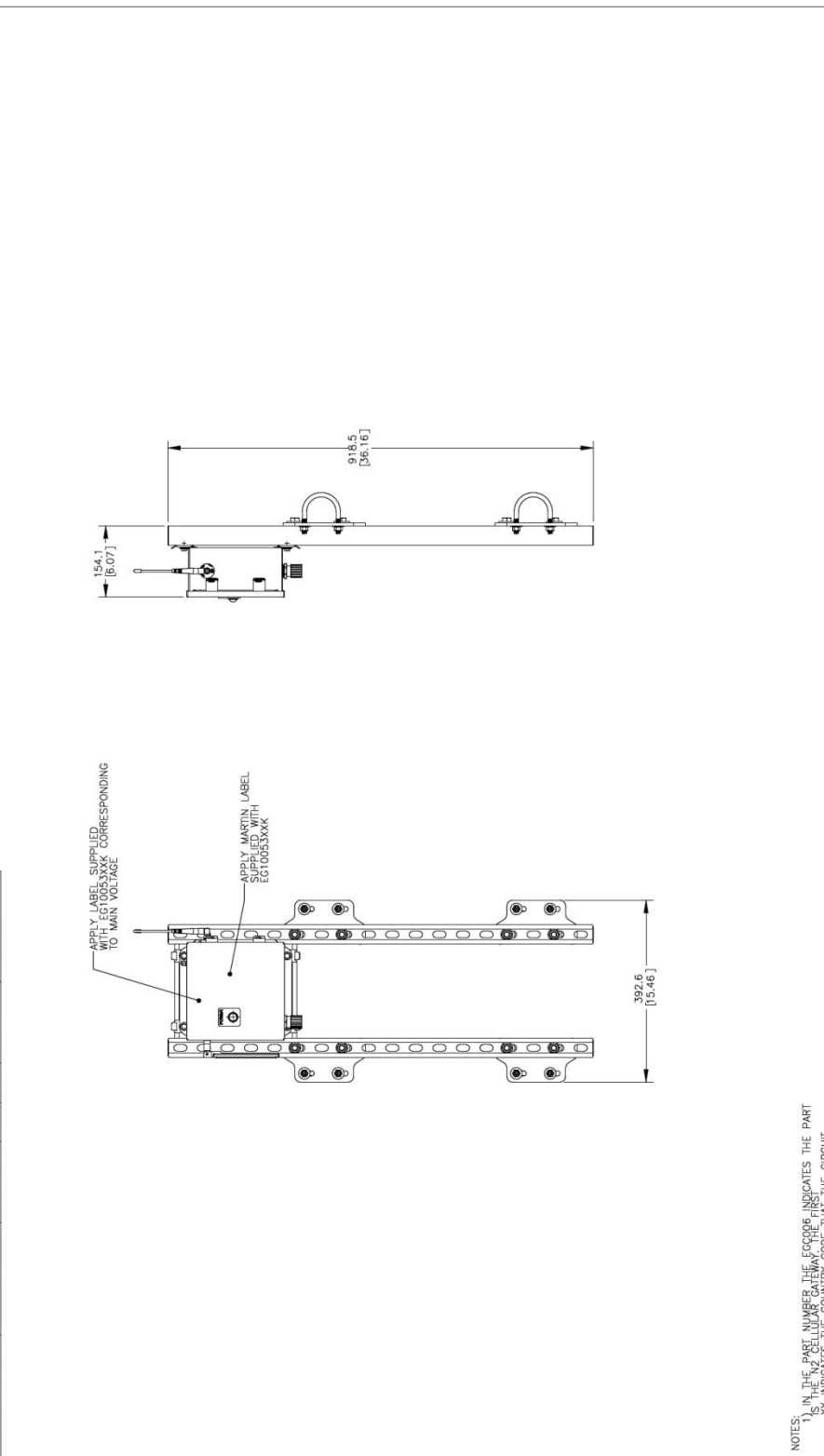
FRONT ISOMETRIC VIEW
SCALE 1:3

BACK ISOMETRIC VIEW
SCALE 1:3

NOTES:
1) IN THE PART NUMBER THE EC1SQCE3S INDICATES THE PART IS THE XHD POSITION INDICATOR SENSOR ASSEMBLY. THE FIRST XX INDICATES THE COUNTRY CODE THAT THE CIRCUIT BOARD WAS MANUFACTURED FOR (SEE CHART) THE NEXT XX INDICATES THE CIRCUIT BOARD CONFIGURATION AND THAT THE CIRCUIT BOARD IS PROGRAMMED FOR A SPECIFIC RADIO TYPE (SEE CHART). THE 21 INDICATES THE YEAR CODE OF THE CIRCUIT BOARD. EX: 21 = 2021. THE 1 INDICATES THE CIRCUIT BOARD IS VERSION 1.

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PART NUMBER	P/N ITEM 1	P/N ITEM 2	QTY ITEM 4	QTY ITEM 5	QTY ITEM 6	FIELD REPLACEMENT P/N
EGC006B005S201X	EGC00600002ES201	EG10053BRK	0	0	1	EG10053BR
EGC006B005S201X	EGC00600004ES201	EG10053UK	0	0	1	EG10053UK
EGC006B005S201X	EGC00600005ES201	EG10053FK	0	0	1	EG10053FK
EGC006B005S201X	EGC00600006ES201	EG10053NK	0	0	1	EG10053NK
EGC006B005S201X	EGC00600007ES201	EG10053MEK	0	0	1	EG10053MEK
EGC006B005S201X	EGC00600008ES201	EG10053UKK	0	0	1	EG10053UKK
EGC006B005S201X	EGC00600009VZ201	EG10053UK	1	3	1	EG10053UK
EGC006B005S201X	EGC00600002ES201	EG10053UK	1	3	1	EG10053UK



ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	N2 GATEWAY SUBASSEMBLY	SEE CHART
2	1	COMPUTE MODULE 3+ 32GB - PROGRAMMED	SEE CHART
3	S/N	UNISTRUT FRAME W/HARDWARE	EGC009
4	S/C	POWER SUPPLY CORD 16/3 SJTW 9FT	EG10041
5	S/C	FORK TERMINAL 16-14 AWG #10 STUD VINYL INSULATED	EG10039
6	S/C	MANUAL OPERATORS N2 CELLULAR GATEWAY	IM4152

NS - NOT SHOWN
S/N - SEE NOTE
S/C - SEE NOTE

REV	DESCRIPTION	ENR	DATE	ACT
0	ADDED EGC006B005S201X AND EGC006B005S201X TO DRAWING. PARTS LIST UPDATED TO REFLECT THIS CHANGE.	1918	06/30/21	ACT

TITLE: N2 GATEWAY ASSEMBLY FOR 100-240VAC

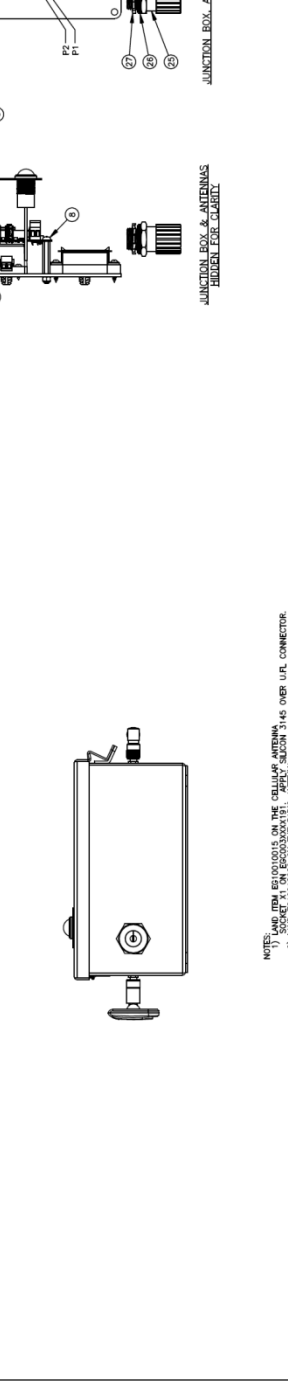
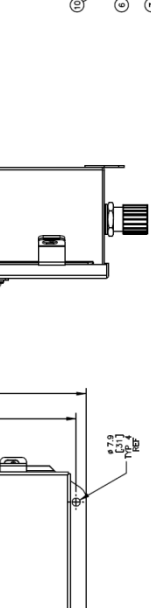
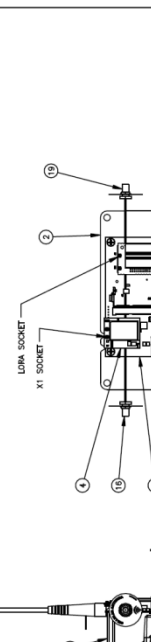
DRAWING NUMBER: EGC006B005S201X

SCALE: 1:8

NOTES:

- 1) IN THE PART NUMBER, THE EGC006B INDICATES THE PART IS A CELLULAR GATEWAY. THE XX INDICATES THE COUNTRY CODE THAT THE CIRCUIT BOARD WAS MANUFACTURED IN. (SEE CHART) IS PROGRAMMED FOR A SPECIFIC RADIO TYPE (SEE CHART). CARRIER THE CIRCUIT BOARD INDICATES THE YEAR CODE OF THE CIRCUIT BOARD. INDICATES THE CIRCUIT BOARD IS VERSION 1. THE LAST X INDICATES IF HARDWARE IS INCLUDED.
- 2) FOR FIELD WIRING CONNECT EG10039 TO EG10041. LAND GREEN LEAD TO GROUND, BLACK LEAD TO L (LINE) AND WHITE LEAD TO N (NEUTRAL).
- 3) APPLY LABELS EG013L AND EG024L (IF SUPPLIED) TO THE INSIDE OF EG10034. (SUPPLIED WITH EGC006B005S201X)

PART NUMBER	QTY	DESCRIPTION	PART NUMBER
1	1	JUNCTION BOX	BE10004
2	1	JUNCTION BOX SUB PANEL	BE10050P
3	1	CELLULAR MOUNT - CAT M1	BE10005
4	1	CELLULAR MOUNT - CAT M1	SEE CHMIT
5	1	BATTERY 3V LITHIUM	BE10059
6	1	POWER MODULE	BE10057
7	4	SCRW PHILIPS #4 X 1/2 TYPE A/UB ZP	BE10015
8	4	SCRW PHILIPS #4 X 0.7 X 8 BLK INCON	BE10054
9	4	NYLON HEX STAND OFF M4 X 3/16M	BE10056
10	4	NYLON HEX STAND OFF M4 X 3/16M	BE10055
11	1	RESISTOR TERMINAL BLOCK	BE10030
12	1	CLR ELASTIC TERMINAL BLOCK COVER	BE10065
13	4	SCRW ROUND HD TRIMMPS #8 X 3/4 TYPE A/UB ZP	BE10058
14	4	SCRW ROUND HD TRIMMPS #8 X 3/4 INI	BE10059
15	1	LABEL 3 POLE TERMINAL WIRE	BE10068L
16	1	ANTENNA CABLE ASM UFA TO SMA FEMALE 10MM	BE10010L3
17	1	ANTENNA CABLE ASM UFA TO SMA FEMALE 10MM	BE10010L2
18	1	ANTENNA CABLE ASM UFA TO SMA FEMALE 10MM	BE10010
19	1	ANTENNA CABLE ASM UFA TO RP-SMA MALE 200MM	BE10010Z0
20	1	LED PANEL MOUNT INDICATOR GREEN	BE10060
21	1	LABEL POWER NAMEPLATE	BE10069
22	2	PT THER FIGHT INDICIT	BE10037
23	1	SEALING RING 1/2	BE10035
24	1	SEALING RING 1/2	BE10036
25	1	CONDUIT LOCKWRT 1/2	BE10038
26	1	RING TERMINAL CRIMP ON #10 STD 16-12 AWG NYLON INSUL	MS008-02
27	1	RING TERMINAL CRIMP ON #10 STD 16-12 AWG NYLON INSUL	MS008-02
28	1	RING TERMINAL CRIMP ON #10 STD 16-12 AWG NYLON INSUL	MS008-02
29	1	RING TERMINAL CRIMP ON #10 STD 16-12 AWG NYLON INSUL	MS008-02
30	1	RING TERMINAL CRIMP ON #10 STD 16-12 AWG NYLON INSUL	MS008-02
31	1	RING TERMINAL CRIMP ON #10 STD 16-12 AWG NYLON INSUL	MS008-02



- NOTES:
- 1) DIMENSIONS ON THIS DRAWING ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - 2) DIMENSIONS ON THIS DRAWING ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
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 - 30) DIMENSIONS ON THIS DRAWING ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
 - 31) DIMENSIONS ON THIS DRAWING ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.

REV	DESCRIPTION	DATE	BY	CHKD
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LOCATION	ITEM	LENGTH	COLOR
LOCATION A	1	151	BLACK
LOCATION B	2	222.3	BLACK
LOCATION C	3	244.3	BLACK
LOCATION D	4	152.4	BLACK
LOCATION E	5	108.4	BLACK
LOCATION F	6	427	BLACK
LOCATION G	7	151	BLACK
LOCATION H	8	108.4	BLACK
LOCATION I	9	427	BLACK
LOCATION J	10	151	BLACK
LOCATION K	11	108.4	BLACK
LOCATION L	12	427	BLACK
LOCATION M	13	151	BLACK
LOCATION N	14	108.4	BLACK
LOCATION O	15	427	BLACK
LOCATION P	16	151	BLACK
LOCATION Q	17	108.4	BLACK
LOCATION R	18	427	BLACK
LOCATION S	19	151	BLACK
LOCATION T	20	108.4	BLACK
LOCATION U	21	427	BLACK

DATE: 06/16/21
 CHECKED: 06/16/21
 TITLE: MS CABINET ASSEMBLY KIT
 NO. 100-21/0AC-14/0R
 DRAWING NUMBER: EC00RXXXXXX201X
 SCALE: 1:1



Africa

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Die Heuwel,
Witbank,
1038

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