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OPERATING INSTRUCTIONS

MPB 1400 LED

Mobile roadworks traffic light system · quartz controlled · GPS synchronised



Applies to: Art. 7810340 MPB 1400 LED traffic light system, 2 signal heads · Art. 7810339 MPB 1400 LED traffic light, 1 signal head · Art. 7810341 MPB 1400 infrared handbox
Read these instructions before installation and keep them with the equipment.

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1. Introduction

Safety requirements for installing, operating and servicing the MPB 1400 LED, and an overview of the system.

1.1 Safety instructions

⚠ WARNING: RISK OF INJURY FROM INSUFFICIENT QUALIFICATION

Improper handling can cause serious personal injury and damage to property. All work may only be carried out by qualified personnel.

⚠ WARNING: RISK OF INJURY FROM MISSING PERSONAL PROTECTIVE EQUIPMENT

Wear personal protective equipment before and during all work on and with the traffic light system. Depending on legal requirements and the employer's occupational safety instructions, this includes safety shoes, protective gloves, a hard hat and, for everyone in the area of public traffic, high-visibility clothing.

⚠ WARNING: RISK OF CRUSHING ON MOVING COMPONENTS

Body parts can be crushed while the traffic light system is being installed. Carry out installation, maintenance and troubleshooting with particular care and wear protective equipment against crushing.

⚠ WARNING: BATTERY ACID

Handling batteries carries a risk of severe chemical burns. Wear safety goggles and gloves. Do not touch leaking liquid. On skin contact, rinse immediately with plenty of water. If liquid gets into the eyes, rinse with water for at least 10 minutes and seek medical attention immediately. Remove leaking liquid with a suitable absorbent cloth and dispose of it in an environmentally responsible way. Acid-resistant battery protection trays, into which the complete battery is placed, prevent acid leakage.

⚠ WARNING: HYDROGEN GAS

Hydrogen gas can escape from batteries. Do not smoke. Keep all ignition sources (open flames, heat sources, non-explosion-proof electrical equipment) away. Do not weld, cut or grind nearby.

Basic information on rechargeable batteries

- Never reverse the polarity of batteries or short-circuit them.
- Charge batteries only according to the battery manufacturer's instructions, in dry, well-ventilated rooms.
- Clean the battery terminals regularly with a terminal brush to prevent contact resistance and voltage loss. Grease the terminals again after cleaning to prevent corrosion.
- Check the acid level from time to time with an acid lifter, especially before and during the cold season, and after every charge. Top up with distilled water if necessary.
- Dispose of used batteries properly. Most of the raw materials they contain can be recycled.

1.2 Product description

The MPB 1400 LED is a cost-effective mobile roadworks traffic light system. The standard version controls alternating one-way traffic. By adding further identical signal heads it can also control T-junctions and crossroads, where national regulations permit.

All settings are made with a coded infrared handbox that is protected against unauthorised access. One handbox programs any number of identical signal heads. The handbox asks for the required parameters in a dialogue: enter the red and green times for each traffic light separately (up to 999 seconds), transfer the data, and the system runs.

The handbox is supplied with a language package of three menu languages, chosen when ordering, from German, English, French, Italian, Spanish, Dutch and Turkish. Other languages are available on request.

In addition to GPS-synchronised quartz operation, manual operation with continuous red, continuous green, flashing amber as a warning and lamps off can be selected, for example for tree felling or special traffic situations that require manual intervention.

Reverse polarity protection, undervoltage protection, night-time dimming and data buffering during battery change are standard. The signal heads are fitted ex works with energy-saving LED technology, photometrically tested to DIN EN 12368, with automatic night-time dimming. An optional red countdown display can be installed above the red chamber at the factory, or retrofitted later, to show road users the remaining red time to the second.

Sturdy but light aluminium battery stands on solid rubber wheels make transport easy. The modular signal head housing keeps repair costs low, because only the defective part needs replacing.

1.3 System overview and scope of supply



Signal head on aluminium stand and battery casing



Infrared handbox (Art. 7810341)



Optional red countdown display (Art. 7810350)

Article	Description	Scope of supply
7810340	MPB 1400 LED traffic light system, 2 signal heads	2 flat LED signal heads with control housing, 2 aluminium mounting tubes, 2 aluminium battery casings
7810339	MPB 1400 LED traffic light, 1 signal head	1 flat LED signal head with control housing, aluminium mounting tube, aluminium battery casing
7810341	MPB 1400 infrared handbox	Handbox with language package of 3 menu languages, 9 V block battery
7810350	MPB 1400 red countdown display (option)	Countdown display for fitting above the red chamber, fixed-time operation only
7810351	Connection socket kit for countdown display	Required when retrofitting the countdown display

Not included

12 V batteries are not included. Use any 12 V battery that fits the battery casing, or an N1-type power supply unit. The handbox is required to operate the system and is sold separately.

2. Operation

The handbox, commissioning, programming for alternating one-way traffic, T-junctions, crossroads and parallel signal heads, and the manual operating modes.

2.1 Handbox

The handbox is used for quick and easy programming of the MPB 1400 LED. It asks for the necessary inputs and guides you through the menu. Your national language is set when the handbox is delivered.

Changing the language

With the handbox switched off, press **1** + **2** + **4** + **ON** at the same time and hold for 5 seconds until the handbox introduces itself and the language menu appears. Select the language with **1** or **3** and confirm with **4**. Other languages are available on request.

Button functions

Button	Function
ON	Switches the handbox on. Press and hold for 2 s to switch the display backlight on.
1	Moves left in the menu or decreases values.
3	Moves right in the menu or increases values.
2	Moves backwards in the menu.
4	Moves forwards in the menu or confirms inputs.
Man.	Activates manual mode.
OK	Start button and special functions.

Handbox battery

The handbox is powered by a 9 V block battery. Fit a new high-quality alkaline battery when the display shows **Battery old**. Replace it at the latest when the display shows **Battery flat**.

2.2 Commissioning and alternating one-way traffic

The quartz-controlled MPB 1400 LED controls traffic at roadworks with alternating one-way traffic, at T-junctions or at crossroads. The red and green phases can be set to the second for every signal. GPS synchronisation ensures an exact phase cycle at all times.

Initial commissioning

1. Supply the signal head with 12 V DC by placing the battery or an N1-type power supply unit in the battery casing. Observe correct polarity. The signal head switches on automatically (electronic on/off switch).
2. The signals now show flashing amber.
3. If the signal heads stand next to each other for commissioning, space them approx. 3 m apart, so the infrared signal of the handbox is received by one signal head only.

Data can be entered in the handbox at any time, also away from the signal heads.

Programming alternating one-way traffic

1. Press **ON** to switch the handbox on. Press **ON** again for 2 s to switch on the backlight if needed. The handbox introduces itself, then shows **Choose < > One-way**. Use **1** and **3** to change values or make a selection, **2** to go back and **4** to go forward and confirm.
2. At first commissioning, use **2** to check the national settings for the red-amber and amber phases (for example RdYe = 1 s, Yell = 4 s). These are saved as basic values for all future inputs and normally do not need to be changed again. Press **4** several times to return to **Choose**.
3. In **Choose**, select the type of control with **1** or **3**, for example "one-way" for alternating one-way traffic at a bottleneck.
4. Confirm with **4**. Set the red phase **RED 1 = > 16 s** with **1** and **3**. As a guide, allow at least 12 s of red per 100 m of roadworks length at a clearance speed of 30 km/h (see table 3.6). On gradients or difficult ground, set different values for RED 1 and RED 2.
5. Press **4** to go to **RED 2** and enter the red phase in the same way.
6. Press **4** to go to **GREEN 1 = > 20 s**. Recommendation: light traffic 15 to 20 s, medium traffic 30 to 40 s, heavy traffic 50 to 70 s. Different green times can be set for each direction. Set GREEN 2 in the same way and confirm with **4**.

Transferring the data

The display shows **Start 1 >ok<**. Go to the signal head that is to be signal 1. Hold the front of the handbox approx. 1 m from the control housing under the green chamber, facing it, and press **OK**. The LED in the control housing flickers on reception, signal 1 starts its program and the display shows **Started? yes >ok<**.

If signal 1 has started, confirm with **OK**. If not, press **2** to go back one step and start programming signal 1 again. Reducing the distance or improving the angle to the signal head can help.

After confirming, you have up to 15 minutes to program the second signal. The display shows **Start 2 >ok<**. Program signal 2 in the same way and confirm **Started? yes >ok<** with **OK**. Then switch the handbox off with **Box off? >ok<**. Alternating one-way traffic control is now running, and the handbox can be used to program other MPB 1400 systems elsewhere.

2.3 T-junctions

1. In **Choose < > T-junct.**, select "T-junction" with **1** or **3**.
2. Confirm with **4**. Set the red phases RED 1 to RED 3 with **1** and **3**.
3. Confirm with **4** and set the green phases GREEN 1 to GREEN 3 in the same way, confirming each with **4**.

Then program the three signal heads as described in 2.2, "Transferring the data".

2.4 Crossroads

In **Choose < > crossrds**, select "crossroads". Enter the red and green phases as described above, this time four values each: RED 1 to RED 4 and GREEN 1 to GREEN 4. Then program the four signal heads as described in 2.2.

2.5 Parallel signal heads

Parallel signal heads are used for repeater signals on the left-hand side of the road, or for two synchronised signals facing each other. They can be programmed for alternating one-way traffic, T-junctions and crossroads.

1. After switching the handbox on, press **2** to go back in the menu until the display shows **par.sig. no**.

2. Press **3** to activate parallel signal heads (**1** deactivates it again). The display shows **par.sig.
yes**.
 3. Press **4** and enter the phase times as described above.
 4. Assign up to a maximum of 9 synchronised parallel signals to the groups, for example **Group 1
SigHd 2**.
 5. Program each signal head according to your allocation. The display shows **Start
1H1 >ok<**, where "1H1" means group 1, head 1. Press **OK** to transfer the data to each signal head and confirm **Started?
yes >ok<** as described above.
- Press **OK** to switch the handbox off.

2.6 Special operating modes

With the handbox switched off, press **Man.** and **ON** at the same time to open the special operating modes. With the handbox switched on, hold **Man.** for at least 5 seconds. The display shows **Manual
Op.**. Use **3** to scroll through the selection and **1** to return to it.

Flashing mode

Select **Flashing
>ok<**. The selected signal head flashes amber. Repeat the input at the other signal head. To end flashing mode, return to Automatic.

Lamps off (dark)

Select **Dark
>ok<**. All lamps of the selected signal head go off or stay dark, for example at night. Repeat the input at the other signal head. To end dark mode, return to Automatic.

Continuous red

Select **Red
>ok<**. The selected signal head switches to continuous red, for example to move a vehicle within the roadworks or when felling trees.

⚠ CAUTION: DEFINED STATUS AT ALL SIGNAL HEADS

Always set a defined status at every signal head to avoid misunderstandings in the roadworks traffic. If you switch signal 1 to red, set signal 2 to red or green as well. To end continuous red, return to Automatic.

Continuous green

Select **Green
>ok<**. The selected signal head switches to continuous green, for example to clear a traffic jam.

⚠ CAUTION: SET THE OTHER SIGNAL TO RED FIRST

Before switching signal 1 to green, set signal 2 to red. Repeat the input at the other signal head. To end continuous green, return to Automatic.

Automatic

To leave manual mode, press **OK** at every signal head with **Auto
>ok<**. Then switch the handbox off: go to **Box off?
>ok<** with **2** or **4** and confirm with **OK**.

3. General information

3.1 LED status display

The control housing of every signal head contains multi-coloured LEDs that show the following:

LED	Meaning
Amber off	Battery full
Red, amber, green running	GPS signal is being received
Amber continuous	Battery warning, from approx. 10.5 V
Amber flashing fast	Battery flat, signal dark. Change the battery within 5 minutes, otherwise the programmed data is deleted.
Amber flashing slowly	Manual mode, flashing amber
Red continuous	Manual mode, continuous red
Red flashing	Fault in the red chamber. Check and replace the red LED circuit.
Red and green (orange)	Manual mode, dark (lamps off)

When the signals change from green to amber, the green LED flashes once on the signal head programmed as signal 1, twice on signal 2, three times on signal 3, and so on. This shows how each signal head has been programmed.

3.2 Battery change

When the battery voltage falls to approx. 10 V, the signal head switches its lamps off. Replace the flat battery with a fully charged 12 V battery in the battery casing. The system continues to run normally after the change.

⚠ 5-MINUTE LIMIT

A battery change must not take longer than 5 minutes. Otherwise the signal heads must be programmed again.

3.3 Interrupting operation

Temporary interruption

To take the system out of operation temporarily without deleting the program, set all signal heads to "Dark" first. Do not disconnect the batteries. The program continues to run internally on the connected power supply.

Longer interruption

For longer periods, disconnect the batteries in all battery casings. The system switches off five minutes after the batteries are disconnected, and the fast-flashing amber LED goes out. The system must be programmed again before the next use.

3.4 Automatic photocell and night-time dimming

MPB 1400 LED signal heads have automatic photocell-controlled night-time dimming. This extends the interval between battery changes several times over.

3.5 User code

To prevent other users from tampering with your MPB 1400 while it is running, set a personal user code from 0 to 999. After switching the handbox on, press **2** to go to the "User code" menu and select your number with **1** and **3**. From then on, the signal heads must always be programmed with the same user code, or with a handbox set to the same code.

To change the code, disconnect the batteries from the signal head and wait approx. 5 minutes until the fast-flashing amber LED goes out. The system then accepts any code. On delivery the code is 0 and can be overwritten with any number.

3.6 Recommended red phases

Red phase t_{red} in seconds, including a 4 s safety phase:

Roadworks length	18 km/h	30 km/h	40 km/h	50 km/h
50 m	14	10	9	8
100 m	24	16	13	12
150 m	34	22	18	15
200 m	44	28	22	19
250 m	54	34	27	22
300 m	64	40	31	26
350 m	74	46	36	30
400 m	84	52	40	33
450 m	94	58	44	37
500 m		64	49	40
600 m			58	48
700 m			67	55

Columns show the clearance speed. $t_{red} = \text{roadworks length [m]} / \text{clearance speed [km/h]} \times 3.6$, plus 4 s safety phase.

4. Service and technical data

4.1 Replacing the control board

Open the control housing under the green chamber: unscrew the two Phillips screws on the front about two thirds of the way, then carefully pull the front cover away by holding the two screws.

Refitting the front cover

Make sure the seal in the control housing is seated correctly. Before tightening the two Phillips screws, press the front cover at the four corners with your fingertips so that it seals properly onto the housing.

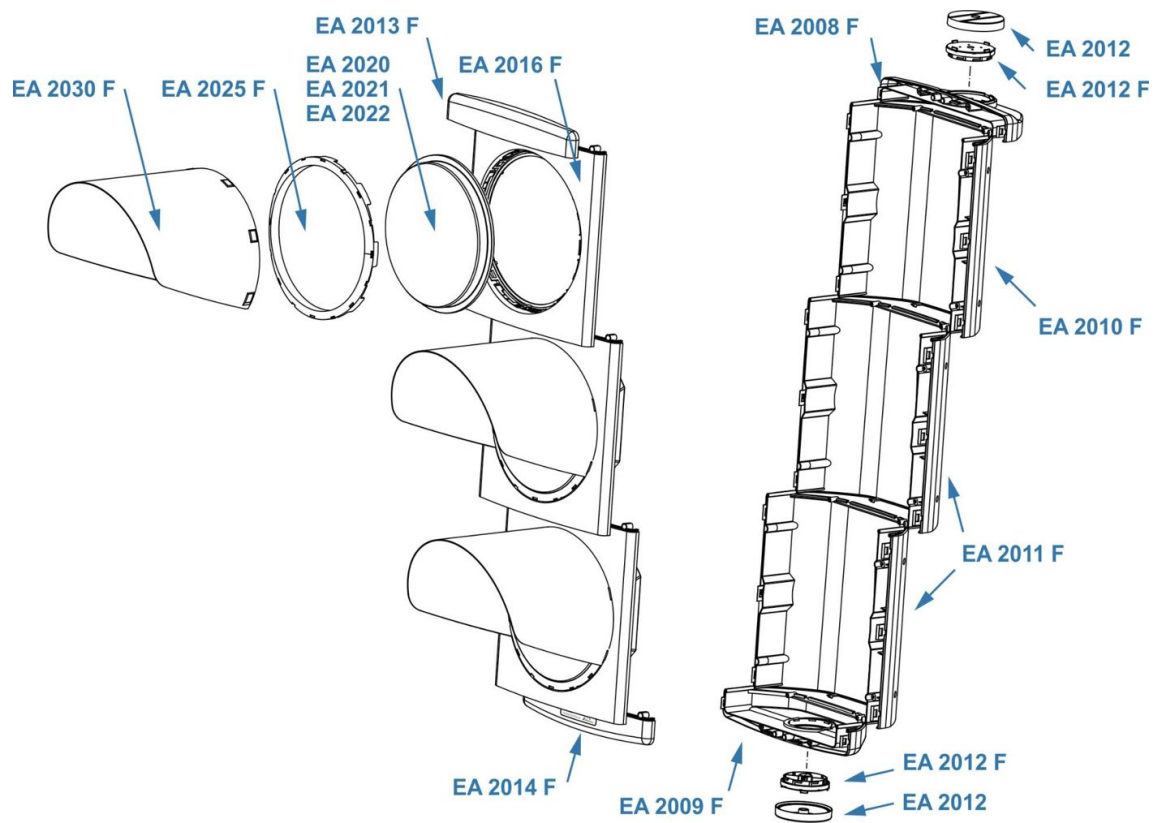
Before replacing the control board, disconnect the batteries in the battery casing. Disconnect the lead from the control board to the signal head by pulling the plug terminal upwards; the cables do not need to be unscrewed. Fit the new control board observing correct polarity.

Terminal	Wire colour
GND LED	Violet + grey + grey/pink
Lamps +	Black + white + pink
Green (minus)	Green
Amber (minus)	Yellow
Red (minus)	Red
Input (minus)	Blue
+12 V DC	Brown

Buffer batteries

The control board carries non-rechargeable buffer batteries that keep the program while the main battery is changed. For your safety, replace them about once a year with high-quality alkaline AAA micro batteries.

4.2 Signal head, exploded view



Flat LED signal head, type Austria, 210 mm. Part numbers refer to the spare parts list in 4.4.

4.3 Aluminium traffic signal stand



Similar illustration

Component	Function
Sealing cap	Closes the top of the mounting tube
Fastening straps (2)	Hold the signal head on the mounting tube
Mounting tube	2-piece aluminium tube, adjustable in height
Battery casing	Aluminium chequered-plate casing for 1 or 2 batteries, with door, lockable with padlock (not included)
Wheels with hub caps	Solid rubber wheels for transport

4.4 Spare parts list

Order spare parts from Nordic Traffic Safety GmbH, quoting the part number. Where an NTS article number is shown, the part can also be ordered directly in the NTS webshop.

Part no.	Description	NTS Art.
ESP 770	Control board for MPB 1400 (with GPS module and buffer batteries)	7810220
EP 6048	Control housing with seal, without holder	on request
EP 6047	Holder for control housing	on request
EP 6047 M	Rubber seal for control housing	on request
PB 1450	Handbox (infrared remote control)	7810341
ESP 760	Circuit board for handbox	on request
PB 1451	Handbox housing with keypad, without electronics	on request
N 14508	Signal head MPB 1400 LED, flat housing, black front, fully wired, connection lead for an existing control housing; without control, mounting tube and battery cable	on request
EA 2012	Cover cap for signal head type Austria flat, upper and lower cover, orange	on request
EA 2012 F	Insert with M8 thread, without hole, black	on request
EA 2008 F	Signal head rear part, upper cover	on request

Part no.	Description	NTS Art.
EA 2010 F	Signal head rear part, one piece, for red chamber, with M20 cable gland	on request
EA 2011 F	Signal head rear part, one piece, for amber or green chamber	on request
EA 2009 F	Signal head rear part, lower cover	on request
EA 2013 F	Front panel type Austria flat, black, upper part	on request
EA 2016 F	Front housing type Austria flat, black, for red, amber and green	on request
EA 2014 F	Front panel type Austria flat, black, lower part	on request
EA 2020	Lens red, type Austria, 210 mm	on request
EA 2021	Lens amber, type Austria, 210 mm	on request
EA 2022	Lens green, type Austria, 210 mm	on request
EA 2025 F	Retaining ring for lenses	on request
EA 2030 F	Sun visor type Austria flat, 210 mm	on request
WEA 232 S	Housing for LED circuit, black	on request
WEA 234 K	LED lens, clear	on request
EH 2185 RT	LED circuit board red	7810360
EH 2185 GE	LED circuit board amber	on request
EH 2185 GN	LED circuit board green	on request
EE 0004 G	Aluminium mounting tube, 2-piece, for MPB 1400 LED	7810210
EE 0014 A	Cover cap for mounting tube	on request
EK 0003	Battery cable, black, 2 x 2.5 mm ² , with ring eyelet, without battery terminals	on request
EI 0041 M	Battery terminal (+), red	on request
EI 0042 M	Battery terminal (-), blue	on request
A 49590	Aluminium battery casing for 1 battery	7810200
A 49600	Aluminium battery casing for 2 batteries	7810205
EE 0009	Linch pin for battery casing	on request
EE 0006	Wheel, solid rubber	on request
EE 0003	Cover cap for wheel	on request
EE 0005	Wing screw M10 x 30	on request
	Red countdown display (option)	7810350
	Connection socket kit for red countdown display	7810351

4.5 EC declaration of conformity

An EC declaration of conformity has been issued for the transportable signal system type MPB 1400. It confirms that the product meets the protection requirements of the EMC Directive 2014/30/EU and the requirements of the Low Voltage Directive 2014/35/EU, and applies to all units of the MPB 1400 type series. The following harmonised standards were applied:

1. Generic standard, immunity: EN 61000-6-1, residential, commercial and light-industrial environments
2. Electromagnetic compatibility: EN 50293:2012
3. Signal safety: TL-LSA 97

A copy of the declaration (dated 01/07/2021) is available from Nordic Traffic Safety GmbH on request.

4.6 Warranty

MPB 1400 LED signal systems carry a 24-month warranty covering material and workmanship defects caused by faulty manufacture. Defective parts are repaired or replaced.

- The warranty does not cover wear, or damage caused by negligent or incorrect handling.
- The warranty is void if the customer or third parties make changes or repairs without prior consent.
- The warranty is void if the transport instructions in 4.7 are not followed.
- If warranty repairs are carried out on site at the customer's request, travel costs and travel time are not covered and are invoiced separately.

All other terms follow the General Terms and Conditions of Nordic Traffic Safety GmbH. Contact NTS before returning any equipment.

4.7 Transport

▲ TRANSPORT OF MOBILE TRAFFIC LIGHT SYSTEMS

Always transport the traffic lights standing upright on open vehicles, with the sun visors facing against the direction of travel. To prevent water damage, all signal head chambers and the control housing must always be closed properly, and the control housing must also be locked. Failure to follow these instructions voids the warranty.

4.8 Maintenance

Maintenance intervals according to VDE 0832, in months:

No.	Measure	Control and switching devices	Signal heads	Cable and line distributors	Supports and fastenings	Other request devices
1	Maintenance	As specified by the installer				
2	Cleaning	As needed	At latest after 6 ³⁾	At latest after 12	As needed	As needed
3	Changing lamps	-	At latest after 6 ⁴⁾	-	-	-
4	Inspection: check of safety-relevant signal times	8	-	-	-	-
5	Function check of the signalling	-	4	-	-	-
6	Function check of signal safety, simulating any one fault case	4	-	-	-	-
7	Function check of signal safety, simulating all fault cases ¹⁾	24 (12)	-	-	-	-
8	Function check of the residual current device	4	-	-	-	-
9	Function check of protection against excessive touch voltage	24	-	-	-	-
10	Visual check of protective conductor connections	At latest after 6	12	8	-	-

11	Insulation resistance test			As needed		
12	Check of covers over live parts	4	-	-	-	-
13	General function check	8	12	12	12	12

1) The 12-month interval applies to equipment whose signal safety does not at least meet DIN VDE 0832/04.75. 3) For signal heads, preferably the optical system. 4) Depending on the operator's availability requirements and the operating conditions of the signal system.

Note: for overhead cable runs according to section 8.2.2 with PVC control cables to DIN VDE 0250 part 405, these cables must be inspected after 6 months at the latest.

4.9 Technical data

Feature	Value
Operating voltage	approx. 10-14 V DC (electronic on/off switch, reverse polarity and undervoltage protection)
Current consumption	approx. 0.15 A on average per signal head (LED)
Light source	LED technology, photometrically tested to DIN EN 12368, with automatic night-time dimming as standard
Lenses	Red, amber, green, type Austria, 210 mm, flat 3-chamber signal head
Control	Precise quartz control, GPS synchronisation for an exact phase cycle at all times
Programming	Dialogue mode with the separately available infrared handbox. Red and green times up to 999 s, set separately for each traffic light, transferred by infrared
Control types	Fixed-time operation for alternating one-way traffic, T-junctions and crossroads; parallel signal heads (up to 9)
Manual modes	Continuous red, continuous green, flashing amber, lamps off
Data buffering	Program kept during battery change of up to 5 minutes
User code	0-999
Power supply	12 V battery (not included) or N1-type power supply unit
Directives and standards	2014/30/EU, 2014/35/EU, EN 61000-6-1, EN 50293:2012, TL-LSA 97
Warranty	24 months

5. Contact and support

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For spare parts, service and technical questions, please quote the article number and the signal head serial number if available.

