Railway signal type M02

Trackside visual signal devices are designed to display light signals as specified in Signalling Manual [1] Ie-1 (E-1) and are used to organise railway operations.
They are one of many system components and are not operated independently. Their additional purpose to transfer of light signals is also transfer of other visual information installed below the signal head. They are in the form of boards specified in relevant manuals and named „indicators".

New type railway signals M02 by MONAT are available in three options:

- fixed head signal MS,
- moving head signal MR,
- dwarf signal MK.

They are available in standard execution for the right-hand track and custom execution for the left-hand track.
All railway signals by MONAT meet technical requirements concerning railway signals used at railway lines, pursuant to Manual Ie-117.

SPECIFICATIONS

Light signals by MONAT comprise three components:

- steel box foundation,
- mast with a platform (tall railway signals) or the platform alone (dwarf railway signals),
- head.

Selection of head execution variant suggests also the variant of mast with a platform (platform only for dwarf signals) and the variant of box foundation. The Employer may select individual components of signal light or custom configuration of colours in the signal lamp.
The whole structure (the foundation box and the mast) is hot galvanized and powder coated, producing a protective coat that extends the product's lifecycle. All remaining steel components are hot galvanized and powder coated. The order shall be attached with certificate of compliance for protective coats.
Canopies, background screen, highlight strip and locks are executed in stainless steel, which eliminates the risk of corrosion and seizure.
The whole signal is made of quality steel with enhanced strength S355; Bolts and nuts used in joints are at least class 8.8.
Head housing divided into chambers is made of materials resistant to weather conditions (black ABS), in order to reduce maintenance and coating and upgrade the protection grade to double (signal light housings do not require earthing or connection). Integrated optical assemblies are used (lenses, filters, assembly rings, adjusting holders of light bulbs) to ensure that accurate and labour-consuming operations are performed earlier under workshop (laboratory) conditions instead of at height, next to the overhead power line and railway track with rail traffic. The method of mounting of background screen, canopies and optical assemblies enables replacement of individual optical assembly without dismantling other components of the signal head. Chamber transformers are also executed in protection grade II and embedded in epoxy resin so as to enhance their resistant to weather conditions and to improve the safety of operation.
Signal light may be adjusted horizontally, by rotating the whole mast (by 8 degrees), and vertically, by tilting the signal lamp and the platform (by 7 degrees). The use of adapters enables mounting any type of indicator or light strip on the mast. On customer request, the manufacturer provides signal device service tools (spanners, levers,) suitable for lead sealing.

CERTIFICATE

Załącznik do decyzji Prezesa Urzędu Transportu Kolejowego z dnia 28 czerwca 2019 r. nr DTW-WRIK.8001.13.2019.RT

RZECZPOSPOLITA POLSKA
PREZES
URZĘDU TRANSPORTU KOLEJOWEGO
Ignacy Góra

Warszawa, dnia 28 czerwca 2019 r.

ŚWIADECTWO

NR: PL 59 2019 0058

dopuszczenia do eksploatacji typu

Rodzaj i typ urządzenia: sygnalizator świetlny typu M02.

Producent lub jego upoważniony przedstawiciel: Wielobranżowa i Projektowa spółka z ograniczoną odpowiedzialnością „MONAT".

Charakterystyka urządzenia: W skład sygnalizatora kolejowego typu M02 wchodzą głowica sygnalizatora i maszt sygnalizatora. W zależności od konfiguracji głowica składa się od 1 do 5 komór, w tym wariant jak dla tarczy przejazdowej TOP składający się z czterech komór. Głowica może zostać wykonana jako głowica ruchoma (MR) umieszczana na specjalnym maszcie umożliwiającym jej opuszczenie, głowica stała (MS) umieszczana na maszcie rurowym lub głowica karzełkowa (MK) umieszczana bezpośrednio na fundamencie bez masztu. Pojedyncza komora światła głowicy jest wyposażona w standardowy układ optyczny z soczewkami Fresnella i żarówką oraz standardowym transformatorem sygnałowym typu REJ.

Badania techniczne urządzenia: zostały przeprowadzone przez Instytut Kolejnictwa, co potwierdzają następujące dokumenty „Certyfikat zgodności typu nr CZT IK – 054/2016 – 03" z 7 maja 2019 r., a także „Opinia techniczna po badaniach eksploatacyjnych dotycząca sygnalizatora świetlnego typu M02" Instytut Kolejnictwa, praca nr 000346-02/10, Warszawa, 15 marca 2019 r.

Warunki techniczne eksploatacji: Sygnalizator świetlny typu M02 musi być zgodny z następującymi dokumentami: „Warunki Technicznego Wykonania i Odbioru. Sygnalizator typ: M02, nr WTWiO – M", marzec 2018 r., oraz „Dokumentacja techniczno-ruchowa. Sygnalizator typ M02", zmiana „a" z 6 lipca 2018 r.

Świadectwo jest ważne: na czas nieokreślony.

Świadectwo wydano na wniosek: Wielobranżowa i Projektowa spółka z ograniczoną odpowiedzialnością „MONAT".

Podstawa prawna: *Ustawa z dnia 28 marca 2003 r. o transporcie kolejowym (tekst jednolity: Dz. U. z 2019 r. poz. 710, z późn. zm.)*

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Ignacy Góra
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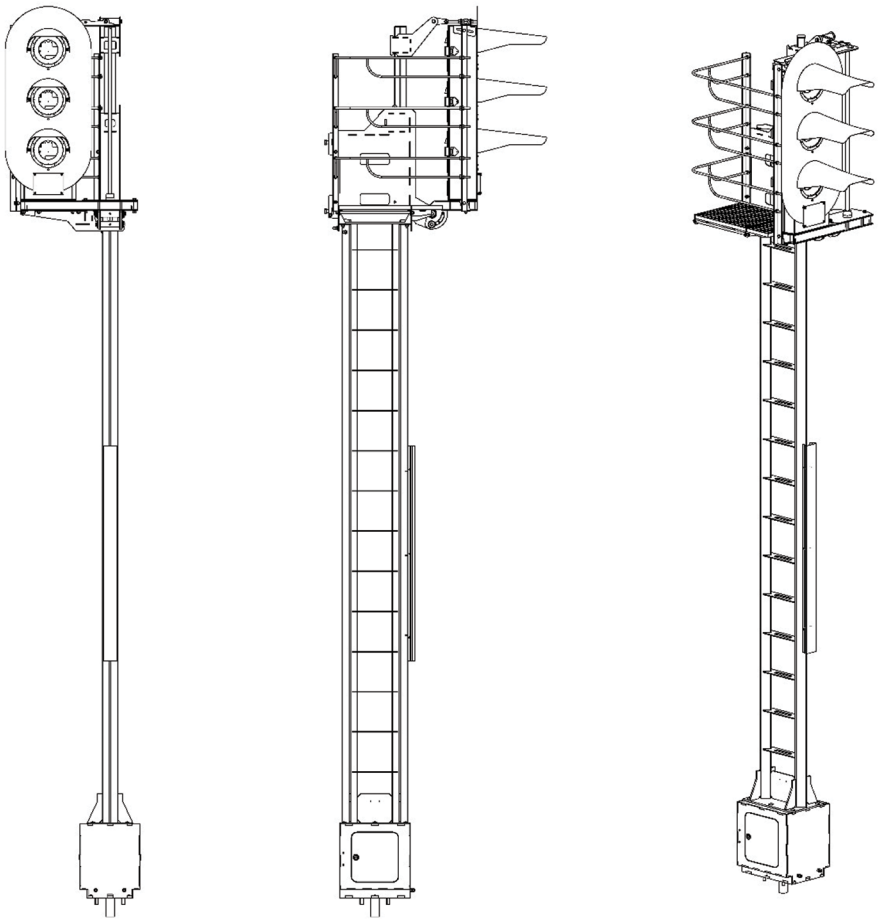
(podpis)

FIXED HEAD RAILWAY SIGNAL MS

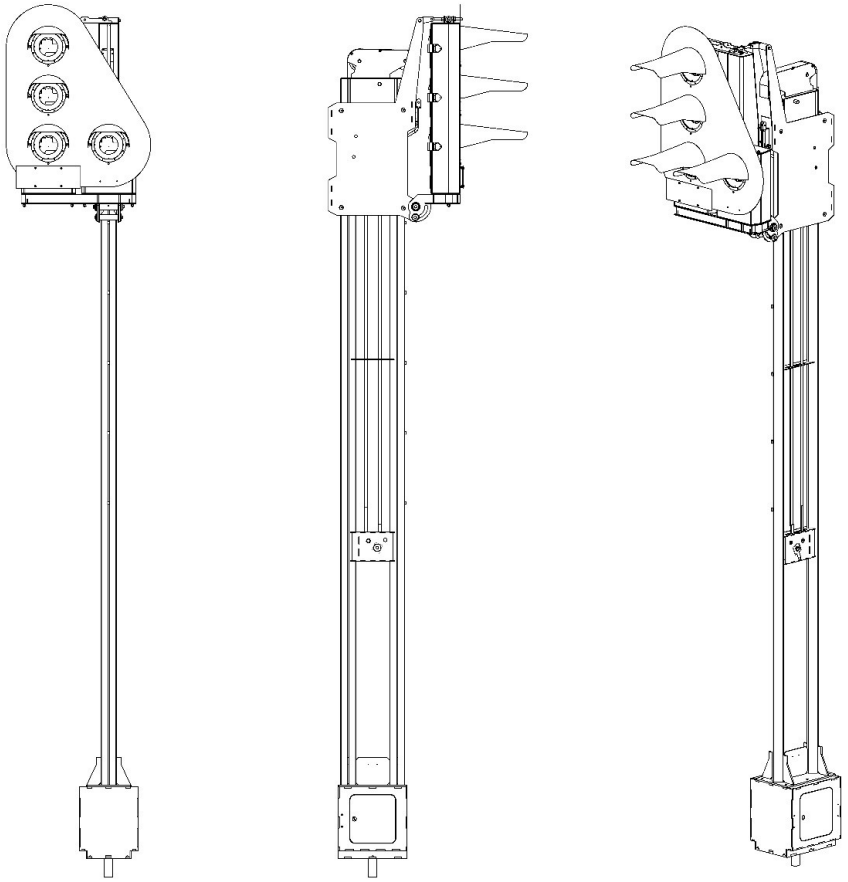
Brackets connecting two legs of the mast make stable ladder for service operations at heights. Hinge of the outrigger has a limit stop that enables only vertical adjustment of the signal light beam angle. A platform secured with a barrier is integrated with the platform. Platform floor is made as tilted grate type, with the option to lock in horizontal or vertical position using a padlock. Such a solution enables convenient access to the platform and securing it in a the position preventing unauthorized access to the light head. In order to facilitate and reduce the scope of service works at height for this railway signal execution, transformers were moved form light chambers of the head to the mounting board of the platform. Therefore, despite the absence of head tilting option, also in this case voltage can be monitored and adjusted without climbing the mast. Mounting board also features terminals for external cables and empty space for couplers to enable splitting multi-core cables and abandoning of intermediate components, such as „pots".



Example drawing of railway signal with fixed 3-chamber head (M02.1.3)

MOVING HEAD RAILWAY SIGNAL MR

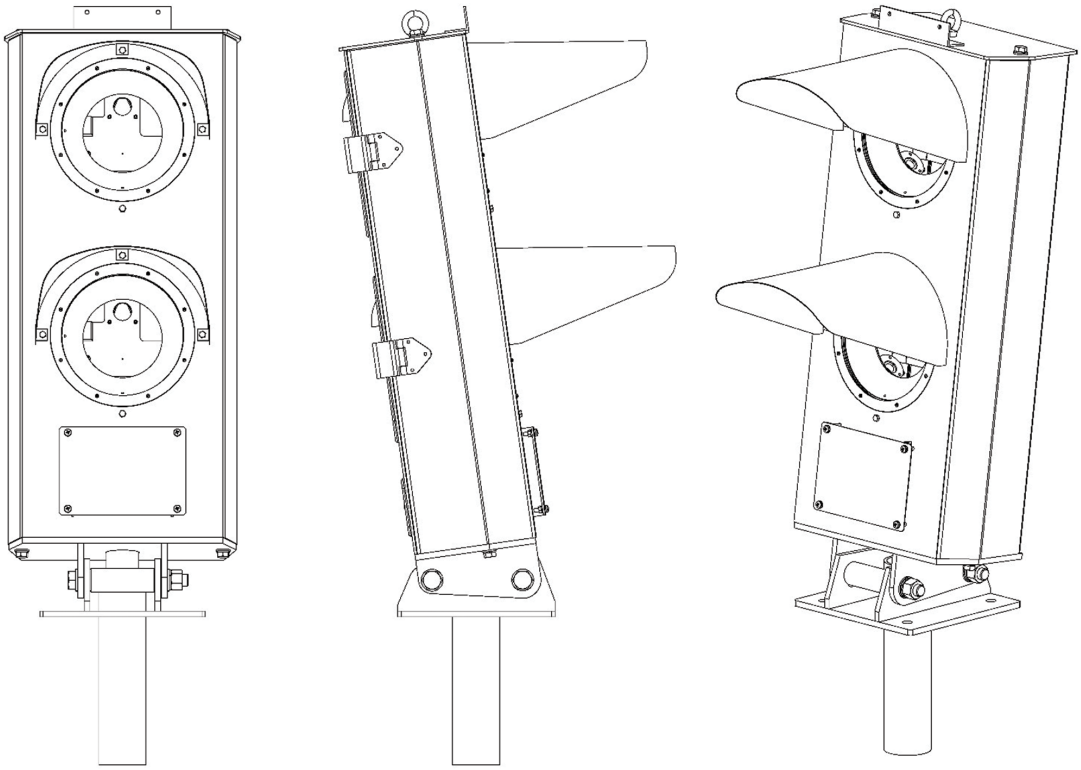
Tall mast for this head has a design that enables vertical movement of head outrigger in order to reduce or eliminate service and maintenance work at heights, near live overhead power line. Manual crank drive or powered via battery drill located inside the mast box foundation. The drive utilises a worm gear and a string. In the working mode of the signal (head raised) the head is resting on mechanical bolts, and the string and the worm gear are not loaded. MR head has a hinge which enables tilting the signal light with background screen form vertical position to horizontal position. Such a solution has been adopted to reduce the collision range with permitted clearance of the rolling stock and facilitate access to chambers. Lowered head with lowered signal light is no longer similarly resistant to wind load and vibrations (generated by rolling stock operating on nearby tracks) as in normal working position, thus operations on adjacent tracks should be temporarily suspended or re-routed. Tilting of the signal light facilitates and reduces duration
service works and eliminates works at heights. Installation of the head car drive inside the box foundation prevents installation of transformers on mounting plate. However, there are terminals for external cables and empty space for couplers to enable splitting multi-core cables and abandoning of intermediate components, such as „pots", there. Visual inspection of electrical connections conditions does not require unearthing of „pots".



Example drawing of railway signal with moving head TOP (M02.2.6)

DWARF RAILWAY SIGNAL MK

Should site conditions prevent the use of light signals on tall masts, and should the requirements of the Manual [1] Ie-1 (E-1) be satisfied, signals without masts and background screens, mounted on foundation box using the small inclined base — or dwarf signals. Signal lights made of black ABS reduce the scope of maintenance coating work. In such a small base there is no space for mounting plate, and thus „pots" in external connections are required; such connections have to be made directly on strips in chambers.



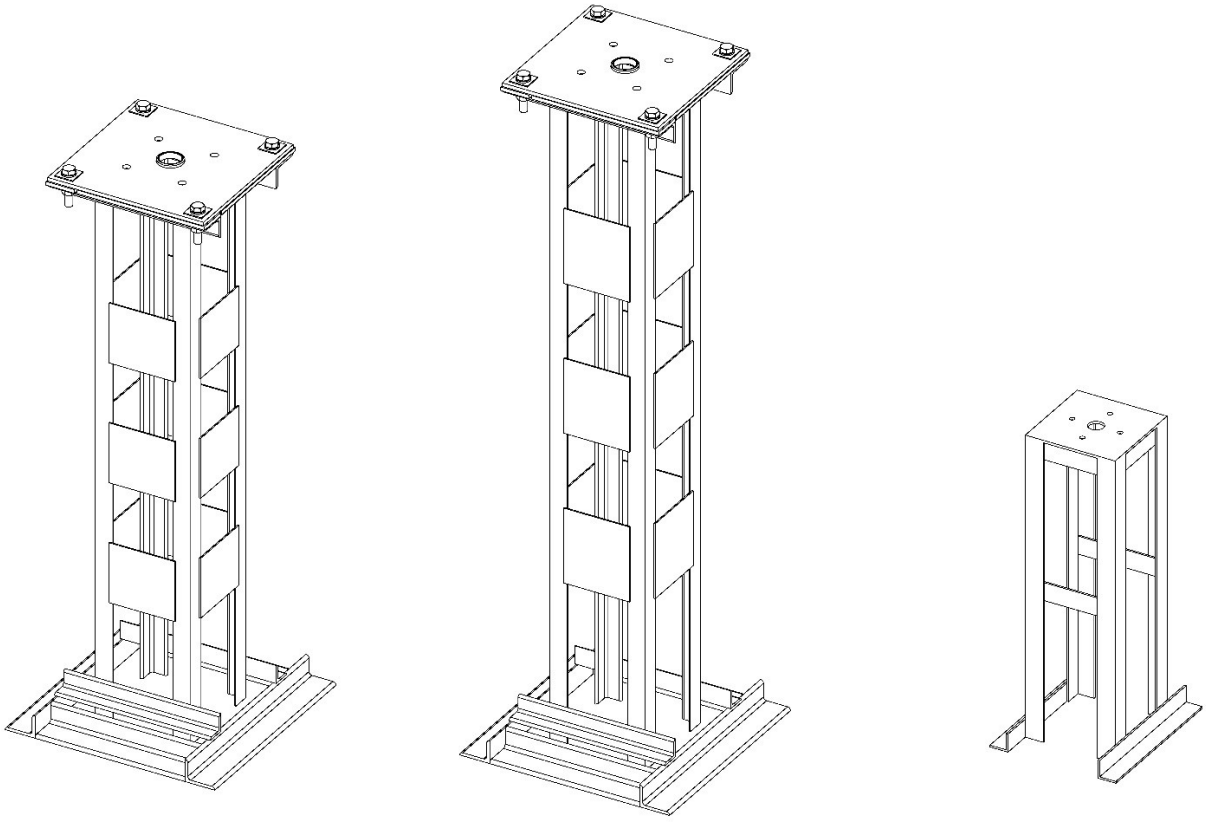
Example drawing of dwarf railway signal with 2-chamber head (K01.1.2)

RAILWAY SIGNAL FOUNDATIONS

Steel box foundation is designed to erect the railway signal in correct position against the track and the pavement. The signal is attached to its foundation box by means of four bolts. Foundation box P8-M is suited for installation of signals with max. signal lights in max. three chambers on tall masts. When the larger number of chambers is required – P10-M signal is recommended. Dwarf signal is mounted on foundation box K1-M.

The foundation box is made of angel sections and steel sheets joined permanently by welding. It is hot galvanized and coated to protect the structure against corrosion due to weather conditions and humidity from the soil. Foundation boxes P8-M and P10-M are delivered complete with isolating spacers (electrical isolation of the mast and the foundation box) and the mounting plate of the mast.

Parametr	P8-M	P10-M	K1-M
Wysokość	1800 mm	2200 mm	1000 mm
Głębokość	700 mm	700 mm	420 mm
Szerokość	700 mm	700 mm	500 mm
Waga	125 kg	140 kg	40 kg



Foundation boxes for railway signals – from the left P8-M, P10-M, K1-M