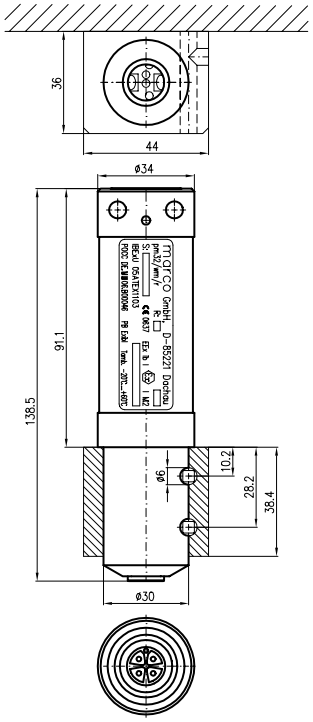


Using infrared signals, *pm32/wm* is able to localise the position of devices. With the relevant upgrade, *pm32/wm/* also allows two-way data exchange between two devices. The transmitter (*pm32/wm/b*) and the receiver (*pm32/wm/r*) face each other. The transmitter (*pm32/wm/b*) and receiver (*pm32/wm/r*) have to be positioned so that they are opposite of and within sight of one another. There is a window for the optical signals at the front (IR receiver/transmitter, status LEDs).

The transmitter *pm32/wm/b* should be mounted in a protected environment (e.g. XP box on the shearer). The receiver is to be mounted in the shield. The transmitter (*pm32/wm/b*) and receiver (*pm32/wm/r*) are designed to be mounted in a welded sleeve for example. The brackets are welded onto the machine. It should be ensured that the vertical channel for the fixing staple is on the right when looking at the window on the front (see figure top left). Transmitter and receiver must be parallel in their axes and point towards one another. Angled fittings specific to the machine should be constructed for this purpose.

Picture: *pm32/wm/.* Infrared transmitter/receiver

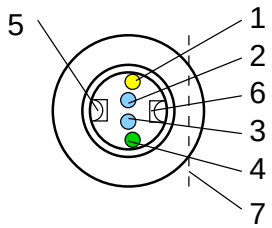
Application

The primary function of pm32/wm/r is to recognise IR signals which are emitted from an IR transmitter. The transmitter is usually mounted on a shearer and the receivers in the shields. The latter are connected to the controller.
When the shearer goes past, the shield controllers recognise the mining machine and can trigger the relevant shield functions after the shearer run. Two sensors in the receiver recognise the direction of the IR beam and can specifically target the position of the shearer.

Software version 1.6 and 1.7

In this version, a fixed pattern is transmitted from the transmitter to the receiver; the receiver then codes the "seen" information into analogue values.

LEDs



1: yellow status LED
2: infrared transmitting LED
3: infrared transmitting LED
4: green LED
5: infrared receiver
6: infrared receiver
7: vertical channel of fixing staple on right-hand side

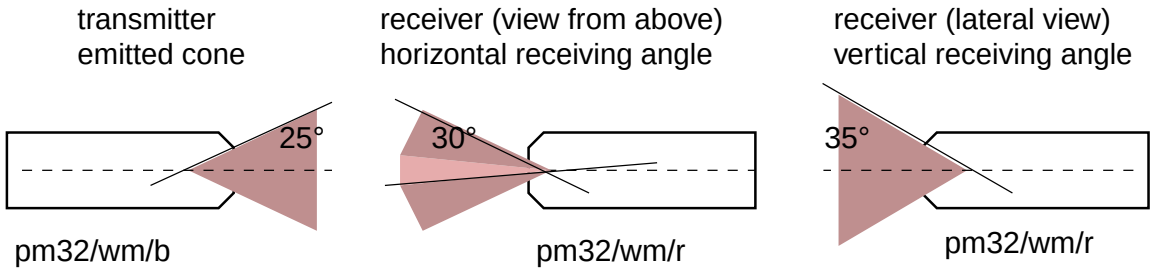
LED 4 appears green and flashes orange every 2.5 seconds on the transmitter *pm32/wm/b*
LED 4 remains statically green on the receiver *pm32/wm/r*

Functional principle

With a distance of 3 m between transmitter and receiver where they are positioned in

parallel axes, the following applies:

- The transmitter sends infrared signal in a cone with a 25 ° beam angle.
- The receiver reacts to infrared signals in a horizontal range of ± 30°.
- The receiver reacts to infrared signals in a vertical range of ± 35°.
- To ensure that the infrared signals can be reliably detected, the distance between transmitter and receiver can be varied between 0 and 3.5 m.



Mounting

When mounting the device, please see that the following instructions are followed:

- The transmitter and receiver axes point as accurately as possible towards one another. For this purpose, suitable angled elements should be used to put between the bracket and shield or shearer if necessary.
- There should be no shadowing between transmitter and receiver within the active range of horizontal ± 35° -- otherwise when the shearer passes by, the detected shearer position could briefly jump back if the infrared transmitter on the shearer penetrates a shadowed area.
- All receivers should be mounted in the same way in the shields -- it is particularly important that **all** receivers are mounted so that
  - -- the transmitting LED row is vertical and
  - -- the yellow status LED is the top LED in this row.

LEDs on the transmitter:

LED	Colour	Display
1	yellow	flashes
2, 3	infrared	not visible
4	green orange	on flashes every 2.5 seconds

LEDs on the receiver:

LED	Colour	Display	State	Output
1	yellow	flashes every 1.5s short on, long off long on, short off flashes 1:1	no signal sees signal from the right sees signal from the left signal centred	4.7 V 3.3 V 2.3 V 1.5 V
4	green	on		
5, 6			IR receiver	

Power supply:

Current	typ. 10 mA
Voltage	nom. 12 V max. 16 V min. 8 V (receiver) min. 10 V (transmitter)

Connector assignment:

Pin	Colour	Function
1	white	+ UB
2	brown	analogue/digital output
3	green	digital input
4	yellow	0V ground

pm32/wm/. ATEX approval	EX I M2 EEx ib I, IBExU05ATEX1103
Maximum input parametres	U_i = 13.2 V, I_i = 2 L_i = 0, C_i = 22µF in series with 120Ω
Other approvals	MSHA, MA (China) pending
pm32/wm/. GOST approval	РОСС DE.ГБ05.В02014 NANIO CCVE PPC 00-25498 Rostekhnadzor

Order Number	Release	Description
pm32/wm/./r	1.0	Infrared receiver
pm32/wm/b	1.0	Infrared transmitter

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