

TECHNICAL NOTE

Noise Monitoring Terminal Nor1545 and Nor1545/B

The Nor1545 noise-monitoring terminal is a robust and efficient solution for outdoor noise monitoring. The cabinet is normally supplied as a complete kit including Nor145 and outdoor microphone, combined with a variety of hardware options to customize the system for the most demanding application.

It offers easy connectivity to NorCloud but may also be used as a stand-alone unit. The Nor1545 is designed for semi- and permanent installations.

The cabinet can be sold without instrument and outdoor microphone when the customer already owns this equipment.

There are two versions of the cabinet;

Nor1545 and Nor1545/B.



Nor1545 – Weatherproof cabinet for Nor145 with mains input.

The cost-effective solution for fixed installations, where the instruments internal battery will keep the system running for 4-7 hour in case of a mains power failure, depending on modem traffic and eventual use of microphone heating.

With an 12Vdc power connector installed (option 1), an external power source can be used. This is a “fixed” connection, meaning that there is no interrupt free switching between 12V and mains. An alternative is also to connect an external power source directly to the Nor145 power input running the cable thru the cabinets cable gland mainly used for the microphone cable.

The Nor145 is mounted inside the cabinet’s door using a special tripod screw. This solution offers an excellent signalstrength on the LTE/4G modem as well as for the WiFi and GPS. But if the cabinet is mounted in remote areas with low signal strength, external antennas (option 4) will further improve the connectivity.

The cabinet can be delivered with mast mounting brackets (Option 2), but can also be attached directly to a wall with 4 simple screws.

Nor1545/B – Weatherproof cabinet for Nor145 - advanced applications

This cabinet supports the use of multiple power sources simultaneously, Noise Compass (Nor1297), weather station and digital I/O.

The cabinet can be powered from mains, 12Vdc external power from a battery or a solar panel directly and be fitted with an internal Tracer 22Ah LiPo battery. Or, a combination of these power sources for full redundancy.

The Tracer battery, Nor344 - not included, will keep the system running for typically three days. The battery is charged when mains is connected, this also applies to the Nor145s own battery. A solar panel or other 12vdc power source may also be connected directly to the 12Vdc input terminal block, or the 7 pin Binder connector placed in the bottom of the cabinet if option 1 is installed (Pin 1 is plus and pin 2 is negative/ground).

Two configurable inputs actions and one digital output are also available.



Figure 1: Nor1545



Figure 2: Nor1545/B

The Nor145 is mounted on a quick release tripod mount. This solution offers an excellent signal strength on the LTE/4G modem as well as for the WiFi and GPS. But if the cabinet is mounted in remote areas with low signal strength, external antennas (option 4) will further improve the connectivity.

The cabinet can be delivered with mast mounting brackets (Option 2), but can also be attached directly to a wall with 4 simple screws.

Status LED and Operating switch

The green **CHARGING LED** is turned on when the internal Tracer battery is charging.

The red **FAULT LED** is turned on if the temperature is outside the allowed charge limit 0 - 40 °C.

The **REVERSED POLARITY LED** is turned on if the external 12 V/Solar panel is connected with reversed polarity.

For storage, turn the **OPERATING** switch to 0 and then disconnect the Tracer battery. If not, a small current will flow and empty the battery. This can damage the battery.



Figure 3: Status LEDs and Operating switch

Connection of mains power, 12 V, solar panel and auxiliary equipment

There is a built-in interrupt free switching between available power sources. The switching between the instrument's own battery, the optional internal Tracer battery, external 12 Vdc or solar panel and mains is uninterrupted and is performed with the following priority sequence;

Solar panel > Mains > External 12 Vdc > Internal Tracer battery > Nor145's own battery.

A "power alarm" is sent to NorCloud if mains or external 12 Vdc disappears, and a "battery alarm" is registered when the Instrument starts to operate from its own internal battery. I.E. when there is no external power available.

To access the 12 Vdc input, Noise compass connector, weather station terminal block and Digital I/O, remove the cover shown in figure 4. The cover is mounted with two Torx # 10 screws.

Mains.

Mains is connected to a 4-pin Binder connector, mounted in the bottom of the cabinet. Power consumption is max 60W. Pin 1 is L, pin 2 is N and pin 4 is GND.

Internal Battery

The internal battery to be used in the Nor1545/B cabinet is the Tracer 2 Ah-12 V Lithium Polymer battery pack. The battery is normally not a part of the delivery and should be sourced locally.

Caution! No other LAN equipment than the Noise Compass must be connected to this connector. If Nor145 needs to be connected to a LAN network, the LAN connector located on the Nor145 itself must be used. The use of a router is required when a Noise Compass shall be used together with the LAN network. **Caution!** The Tracer battery cannot be sent as airfreight or brought onto an air plane as hand luggage. IATA has set a maximum limit for energy level in lithium batteries to 100 Wh. The tracer battery is 264 Wh. This applies also if the battery is discharged to a level below 100 Wh.

12 VDC

External 12 Vdc from a car battery or similar must be connecte to the 12 Vdc connector terminal located to the right in figure 4, or if option 1 is installed via the 7 pin Binder connector. Voltage input range is 9 - 28 Vdc. Strap must be mountedn in lower position (pin 2 - 3).

Solar Panel

The solar panel must be connected to the 12 Vdc connector terminal located to the right in figure 4, or if option 1 is installed via the 7 pin Binder connector. A built-in solar panel controller will charge the internal batteries with up to 3 ampere. Any solar panel with an idle voltage of less than 30 V can be used.

The cable for the solar panel or the external 12Vdc can be run through the microphone cable gland located in the bottom of the cabinet. The external 7 pins Binder connector (Option 1) could be more suitable if the cabinet is used for mobile applications.

Strap must be mounted in uppers position (pin 1-2) for Solar panel.

Caution! Only one external 12Vdc source must be connected. You must either connect the external DC source to the 12Vdc input terminal in figure 4 or to the Binder 12V connector in figure 2 (if applicable). I.E. To simultaneously use both a solar panel and an external battery is not possible.

7 pin cinder connetction

Pin 1 = 9-28 V. Pin 2 = GND

Nor1297 – Noise compass

Connect the Norsonic Noise Compass to the LAN plug as shown in figure 4. This LAN connector has a passive power over LAN feature supplying the Noise Compass with a 12 Vdc.

Caution! No other LAN equipment than the Noise Compass must be connected to this connector. If Nor145 needs to be connected to a LAN network, the LAN connector located on the Nor145 itself must be used. The use or a router is required when a Noise Compass shall be used together with the LAN network.

Weather Station

Nor1545/B supports the weather station Thies Clima US model 4.920x.00.000. The weather station can be connected to the terminal block as shown in the left picture in figure 5. If option 6 is installed it can also be connected using a 8 pin Lemo contact that you then will find just above the connector panel, shown to the right in figure 4.

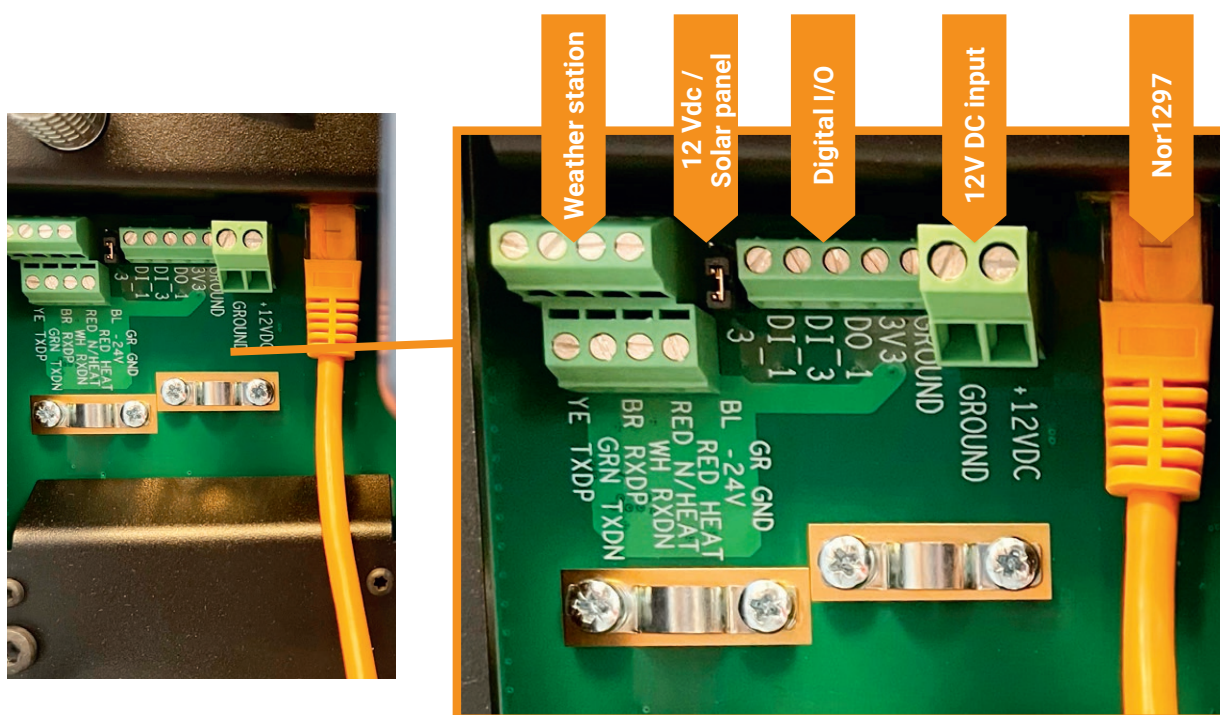


Figure 4: Connection terminals

The Thies Clima US (figure 6) is equipped with a heating element of 24 ohm, which is needed then operating where temperatures are below 0 °C. This heating can be switched on/off in NorCloud or using the Thies control software. By default factory settings the Thies Clima is set to turn on heating at +5 °C . To get full effect of the heater, the weather station must be powered with 24 Vdc. With option 5 installed a 24 Vdc power output is supplied, but only if powered on mains.

It is recommended to power the weather station with 12 Vdc to save power and to enable battery/solar panel operation whenever heating is not required. The cable to the weather station must be configured accordingly. Either connect the power to the 12 Vdc on the terminal block / Lemo connector, or to the 24 Vdc. Ref. table 1 and 2 for detailed information.

The cable Nor4638, should be used when the terminal block is used to connect the weather station. When using a Lemo connector (option 6), the cable Nor4639-12 V must be ordered for 12 Vdc output, and Nor4639-24 V for a 24 Vdc output.

When the weather station is connected to a 12V power supply and the heater is turned on, only a ¼ of the heating power is available (I.E: 6 Watt).



Figure 6: Thies weather station

Digital output

Nor1545/B has one digital output available on the connection block shown in figure 4. The digital output is configured from NorCloud. Typical application is to turn on an alarm lamp or similar in case of an event. The maximum current the digital output can supply is 30 mA. Output voltage for logical "1" is 3.3 V. The digital output is referred to DO-1 in the Nor145 instruction manual. A Solid-state relay or similar should be added to isolate the Nor1545 / Nor145 from the auxiliary equipment.

Digital input

Nor1545/B has two digital inputs available on the connection block shown in figure 4. The digital input is configured from NorCloud. Typical application is to connect a digital signal, such as a switch, to indicate an alarm or event. The digital inputs are 3.3 V CMOS signals. The voltage level shall be within 0 to +5 V. Voltage range 0 to 0.6 V will be accepted as logical "0" and voltages above 2.5 V will be accepted as logic "1". The input impedance is 100k ohm connected to the 3.3 V supply. An open input will therefore be treated as logic "1".

The 3.3 V and the GND on the digital I/O connector block is for the digital I/O purpose only. The 3.3 V is limited to supply maximum 100 mA.

12 VDC supply to auxiliary equipment

The 12 V on the connector block for the weather station may be used to supply auxiliary equipment, such as an IP camera. However, great care should be taken not to overload the power supply, causing it to shut off. The total current available to supply all the connected electronics (Nor145, Weather station, battery charging

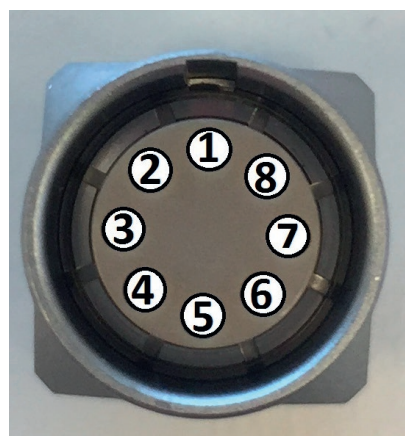
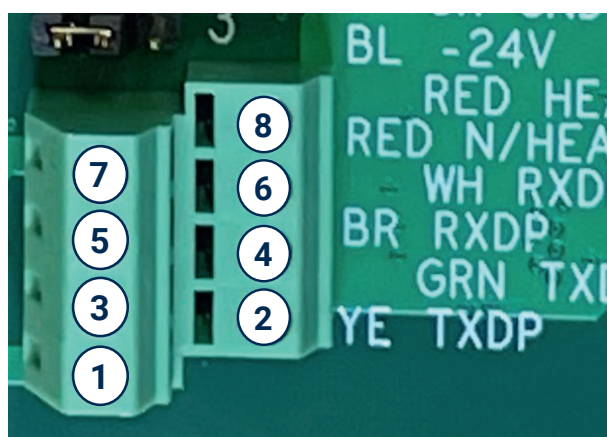


Figure 5: Weather station connection. Terminal block (left), and Lemo connector (option 1 – right)

Table 1: Connection of weather station to connector block

Pin no.	Connector block naming	Comment
1	Yellow, TXD+, RXD+ (HD)	RS422
2	Green, TXD-, RXD- (HD)	RS422
3	Brown, RXD+(full duplex)	RS422
4	White, RXD-(full duplex)	RS422
5	Red, (12 V, ¼ heating power)	12 V power to weather station. Use this pin if no heating is needed. If heating is turned on, only ¼ of the heating power (=6 W) will be dissipated due to the 12 V power. <i>Note. Either pin 5 or 6 must be connected. Not both !</i>
6	Red, (24 V Full heating)	24 V power to weather station. Use this pin if heating is required. <i>Note. This requires that option 5, 24 VDC supply is installed (option 5).</i> <i>Note. This supply works only if the Nor1545/B is powered from mains. If battery operation is required, connect to pin 5 instead.</i> <i>Note. Either pin 5 or 6 must be connected. Not both !</i>
7	Blue, - 24 V (GNB)	Ground
8	Grey, GND	Ground

Table 2: Connection of weather station to Lemo connector

Pin no.	Naming in Thies instruction manual	Comment
1	Brown, RXD+(full duplex)	RS422
2	White, RXD-(full duplex)	RS422
3	Red, (12 V, ¼ heating power)	12 V power to weather station. Use this pin if no heating is needed. If heating is turned on, only ¼ of the heating power (=6 W) will be dissipated due to the 12 V power. <i>Note. Either pin 3 or 4 must be connected. Not both !</i>
4	Red, (24 V full Heating,)	24 V power to weather station. Use this pin if heating is required. <i>Note. This requires that option 5, 24 VDC supply is installed (option 5).</i> <i>Note. This supply works only if the Nor1545 is powered from mains. If battery operation is required, connect to pin 3 instead.</i> <i>Note. Either pin 3 or 4 must be connected. Not both !</i>
5	ReGrey, GND	Ground
6	Blue, (GND)	Ground
7	Yellow, TXD+, RXD+ (HD)	RS422
8	Green, TXD-, RXD- (HD)	RS422

of the internal battery, Noise compass etc) is 3 ampere. The charging of the battery is automatically adjusted to use the remaining current when all connected equipment has been supplied. How much power that is available for the auxiliary equipment depends on power consumptions of the connected equipment. See **table 3**.

A recommended guideline is to connect equipment that draws maximum 5 W.

Table 3 Maximum power consumption @12 V

Nor145	Weather station	Nor1297	Available for Battery charge/ Auxiliary equipment
0.5 Amp 6 W Max	0,6 amp 7.2 W@12 V w/heater on)	0.15 Amp (1.8 W)	1.75 Amp

Connecting IP camera

An IP camera should preferable be connected to the Nor145's LAN socket. But if a Noise Compass is not connected, it could also be connected to the LAN connector for the Noise Compass and powered by the connector's passive 12 Vdc power over LAN.

 Please verify the IP cameras power consumption and voltage rating before connecting any equipment to this plug.

A router will be required if, at the same time, a Noise Compass shall be connected. In this case, connect the router to the Nor145's LAN connector and connect the IP camera and the cable coming from the Nor1545 to the router.

In this configuration the IP camera can be powered by the 12Vdc power supply from the weather stations terminal block, given that this is a suitable power level. If not, a separate power supply must be used.

Connectivity.

Nor145 comes with an internal LTE 4G modem. The antenna in the Nor145 offers good connection in most environments. But in areas with weak signal strength, the use of two external LTE antennas (option 4) is recommended for improved signal strength and diversity. Connect the external antennas to the two antenna interfaces on the Nor145 and select the use of external antenna in the instrument's setup menu (**SETUP > Communication > Cellular**).

Cabled LAN network is also supported. A simple LAN connection shall be connected directly to the Nor145. A router must be used when a cabled LAN network is used in combination with Noise Compass and/or IP camera. The LAN socket in the cabinet is reserved for the Noise Compass as it got a 12V power over LAN feature.



Figure 7: Nor1545B, Noise Compass and Weather station

Kit configurations

Nor1545/B-145-16: For advanced, fixed installations requiring microphone heating, with multiple solutions for power supply. Weatherproof cabinet Nor1545/B including; Nor145 with GPS, WiFi and 4G LTE, Nor1216 outdoor microphone with Nor1227 microphone cartridge and Nor1408A 5m microphone cable. Filters, triggers and audio recording is available only via NorCloud. Standalone SLM use of the Nor145 is therefore not possible without purchasing an upgrade Option; Nor1545/145-SLM. This cabinet support Noise Compass (Nor1297) and the weather station Thies Clima US (pn 4.920x.00.000). The internal Tracer battery is not included!

Nor1545/B-145-17: For advanced, semi-permanent installations not requiring microphone heating, with multiple solutions for power supply. Same as Nor1545/B-145-16 but with outdoor microphone Nor1217 instead of Nor1216.

Options:

Nor1545/145-SLM: Upgrade kit to give full access to use the Nor145 as a Sound Level Meter, includes 1/3 octave, time profile, audio recording and markers.

Option 1: External 12 V dc plug for connection of an external power source (battery / solar panel solution (Nor1545/B only))

Option 2: Mast mounting brackets

Option 3: Set of table top feet

Option 4: Set of two external antennas for full diversity

Option 5: 24 Vdc heating for weather station (only when connected to mains).

Option 6: Lemo connector for weather station.

Option 5 and 6 for Nor1545/B only.

Technical Specifications

Cabinet construction / material	High pressure molded fiberglass-reinforced
Weight Nor1545 (including Nor145)	3.3 kg
Nor1545/B (including internal battery and Nor145)	5.1 kg
Option 2, set of mast mounting brackets	650 g
Option 3, set of table top feet	950 g
Size (W x D x H)	200 x 132 x 400 mm
Enclosure class	IP66 (IP 67 with extra sealant added in the cable gland)
Enclosure class: Flammability rating (enclosure)	UL746C 5 inch flame test
Operational temperature	-20 to 50 °C
Recommended storage temperature	10 to 30 °C
Temperature range for battery charge	0 to 40 °C
Wall mounting	4x M5 or M6 screws in a 180 x 380 mm pattern
Electrical	88 to 264 Vac (47-63 Hz) / 125 – 373 Vdc
Mains	Approx 300 g with preamp microphone
12V input	9 - 28 Vdc
Power consumption (maximum rating)	48 W