



D51

DUST MONITOR

Revision 05

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INTRODUCTION

The D51 Dust Monitor is the latest design in dust monitoring available on the market which is specifically designed to measure Particulate Matter below 10 micrometers (<10µm) which are potentially airborne pollutants. This need to measure <10µm arose because of environmental impact on human health for pollutant particulate matter 10µm and below has been proven to cause medical difficulties in the respiratory functions of the human body leading to serious ill-health conditions.

With leading-advanced technological designs which have been adopted in the D51 Dust Monitor; the D51 Dust Monitor can accurately measure Particulate Matter 10µm and below by filtering the PM sizes captured and digitally quantifying the percentage of <10µm after PM separation which has been made possible by the D51 separation chamber.

HMI

The Human Machine Interface (HMI) element of the D51 Dust Monitor is adaptable, configurable and user friendly based on the on-board features in design such as the Real-Time Dust Monitoring (RTDM) unit display which will display the current readings of dust measurement, alarm indications, time/date.

Local data storage on the D51 is also a function (on certain models) for long term observation monitoring points where the user can plug in a USB device and download the data information from the field device if the wired or wireless communication to SCADA system is not adopted.

D51 SCADA

If the D51 SCADA software is adopted into your system of working, then the Human Machine Interface between the D51 Dust Monitor and the D51 SCADA software is a simple user friendly operator platform designed to enable the D51 Dust Monitor to communicate with the PC based SCADA to retrieve Real-Time Dust data (RTD).

With a few HMI inputs, the quick installation of the D51 SCADA Software and easy configuration of the RS485 communications (or wirelessly on some models); the D51 Dust Monitor will quickly be displaying its critical information such as Particulate Matter (PM) levels including the D51 unit information such as serial number, date/time, calibration information and alarm levels which can be set by the user.

Figure 1 - D51 SCADA Screenshot



WARRANTY

The D51 carries a one-year limited warranty on all parts and labour.

Please note that the D51 does not contain any replaceable components for the end user, **only the manufacturer (Ningi Manufacturing (PTY) Ltd. Authorized personnel are permitted to open, inspect, service or repair the D51 Dust Monitor, any Warranty will be rendered invalid if any part of the D51 is tampered with or opened by an unauthorized person**.

SAFETY INFORMATION

Dangerous voltages can occur on any of the connections during electrical installation.

Only a certified electrician can carry out the electrical installation.

Breaking the seal on device will result in loss of warranty.

Electrical safety regulations must always be followed.

The unit is sealed during the production process and should under no circumstances be opened (**See Warranty**).

SENSORS

The sensors on-board the D51 are as follows;

D51 Dust Sensor

High quality sensors are used to ensure long term reliability and accurate measurements. The sensor has an effective measurement range of 0.39 to 16 μm

Specifications

- Sensor Range 0.39 to 16 μm
- Software bins 16
- Detection limits (PM10) 0.01 to 1500 mg/m³
- Operating temperature range -20°C to 50°C
- Response time < 60 sec

MODELS

The following models of the D51 Dust Monitor are available;

- D51 – EX iA (IS) - Approved for use in hazardous locations including underground mines. Operating voltage range is 9 to 20VDC powered from an Intrinsic Safe power supply.
- D51 - Non-IS – Non-Intrinsic Safe version* for use in non-hazardous locations.

The non-Intrinsic Safe version is available with an operating range of 9 – 48VDC or 115/240VAC

*See ordering information

Ordering information

Model	Intrinsic safe	Operating Voltage	Part No
D51 Ex ia	Yes	9 to 20VDC	D51Exia
D51 non-IS	No	9 to 48VDC	D51nonExia
D51 Mains	No	85 to 265VAC	D51Mains

APPROVALS

The D51 EX iA (IS) model is approved for Intrinsic Safe applications

The D51 non-IS model is NOT APPROVED for Intrinsic Safe applications

The following certification applies to the EX iA (IS) model only:

MARKING:

(IS) Marking available only on the EX iA model.

ELECTRICAL SPECIFICATIONS

	Min	Typical	Max	Unit
Operating voltage non-IS model	100	115/230	240	Vac
Operating voltage IS model	9	12	24	VDC
Communication channel 802.15.4 (MODBUS RTU)		9600		Bps

COMMUNICATIONS

For communications related to SCADA/Modbus applications; the registers and values/parameters are listed as below;

Modbus RTU

All sensor readings and configuration settings are available via the RS485 Modbus RTU network. The default baud rate is 9600.

Coils 10 000

Register	Description
00010	Slave Reset
00016	Save Settings

Holding register 40 000

Registers	Description	Min	Max	Default	R/W
0001-32	User defined	-	-	-	-
40099	D51 Address	0	247	247	R/W

Input register 30 000

Registers	Description	Min	Max	Divide	Unit
30001-32	User defined	-	-	-	-
30100	Status	0	65535	-	-
30102	Communication Counter	0	255	-	-
30188	Next Calibration Date High	0	65535	-	Unix H
30189	Next Calibration Date Low	0	65535	-	Unix L
30190	Hour Meter 1	0	65535	-	-
30191	Hour Meter 2	0	65535	-	-
30192	Last Service Date High	0	65535	-	Unix H
30193	Last Service Date Low	0	65535	-	Unix L
30200	Model Number	0	65535	-	-
30201	Version Number	0	65535	-	-
30202	Serial Number High	0	65535	-	-
30203	Serial Number Low	0	65535	-	-
30220	PM _{1.0}	0	65535	100	ug/m3
30221	PM _{2.5}	0	65535	100	ug/m3
30222	PM ₁₀	0	65535	100	ug/m3
30262	PM Total	0	65535	100	ug/m3

MAINTENANCE PROCEDURES

The D51 includes no user serviceable parts and the warranty will be rendered void if the unit is opened or tampered with in any way.

The IS certification will be rendered void if the unit is opened by anyone other than the manufacturer, or if there is physical damage to the unit.

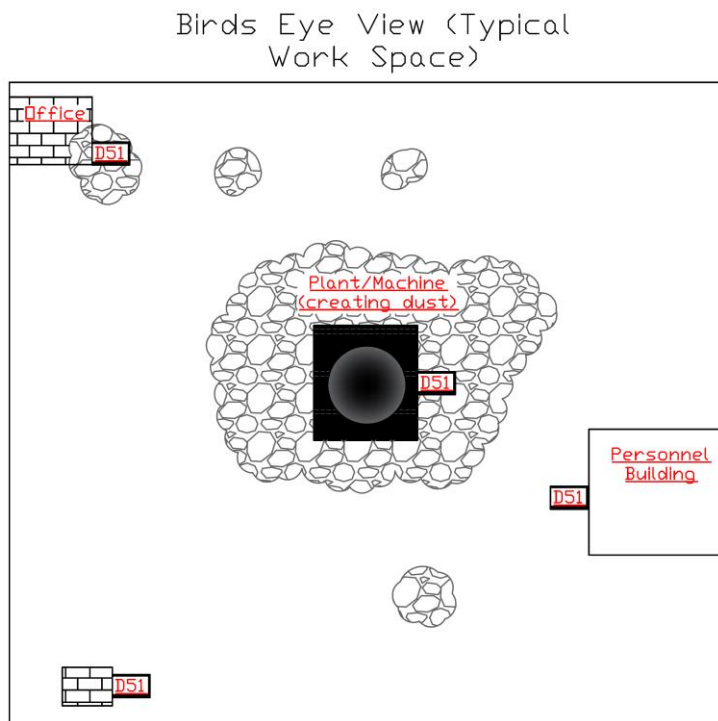
The only maintenance and care that can be done on the unit is to wipe it down with a damp lint free cotton cloth.

BEST INSTALLATION PRACTICE

For the full details on the best practice for correct installation of the D51 Dust Monitor then please refer to the “*D51 Dust Monitor Installation Manual*”.

For the purpose of guideline only, the below information indicates a typical installation scenario for the best practice for installation of your D51 Dust Monitor/s.

Figure 2 - D51 Typical Application

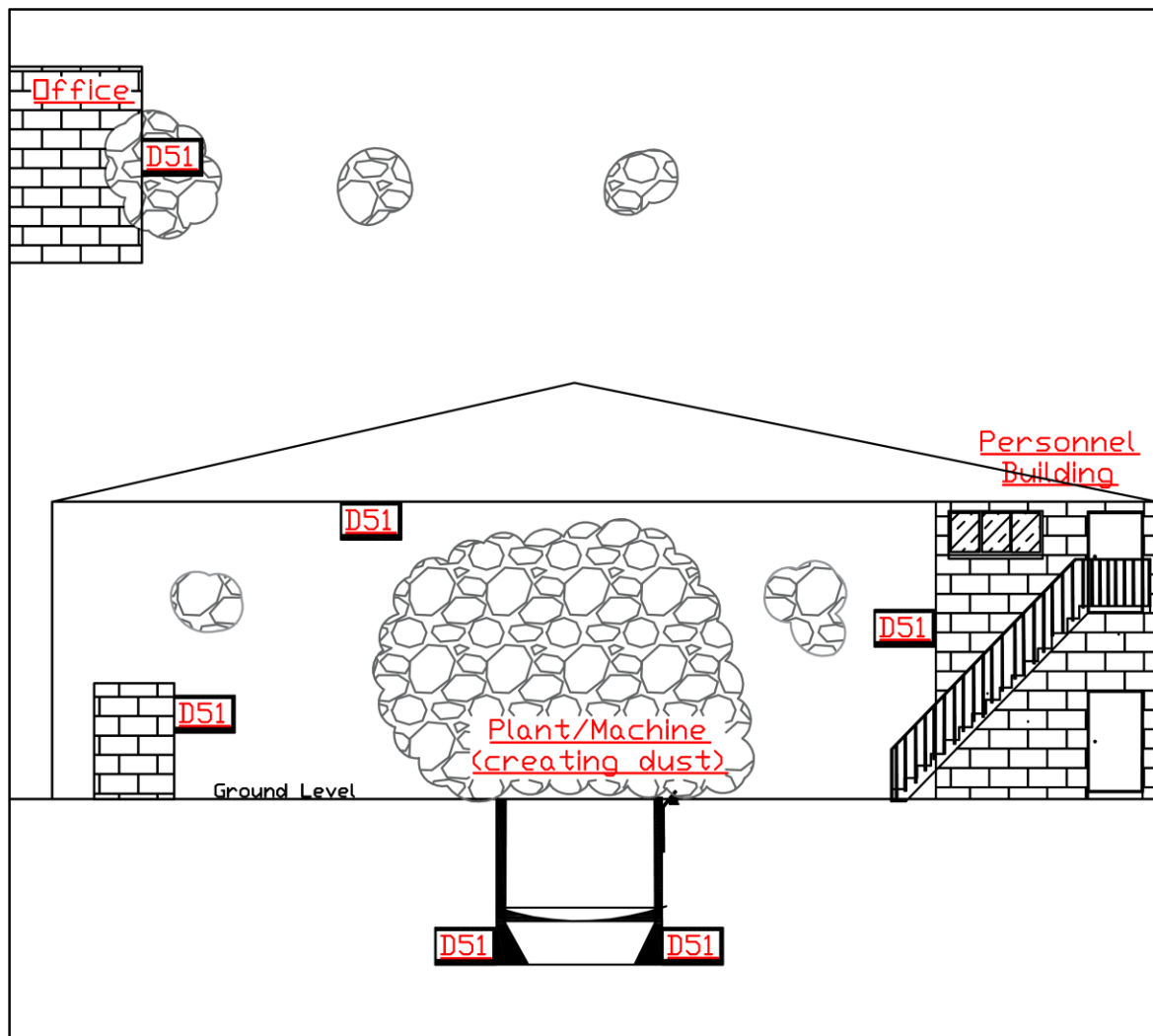


Installation of the D51 may involve large or small areas to monitor dust levels, in large area's typically a D51 would be installed directly near the plant or machinery which is creating the dust, as well as installing multiple

units further afield to monitor personnel area's (exposure levels), and fall-out area's (for very large installations where continuous long-term monitoring is required).

Figure 3 - Typical D51 Installation in a Work Shop Area

Cross Section (Typical Work Space)



As indicated above in Figure 2, it should be noted that to measure correctly for a workshop or large open work site that multiple units may be required, typically in personnel area's (high risk to exposure).

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