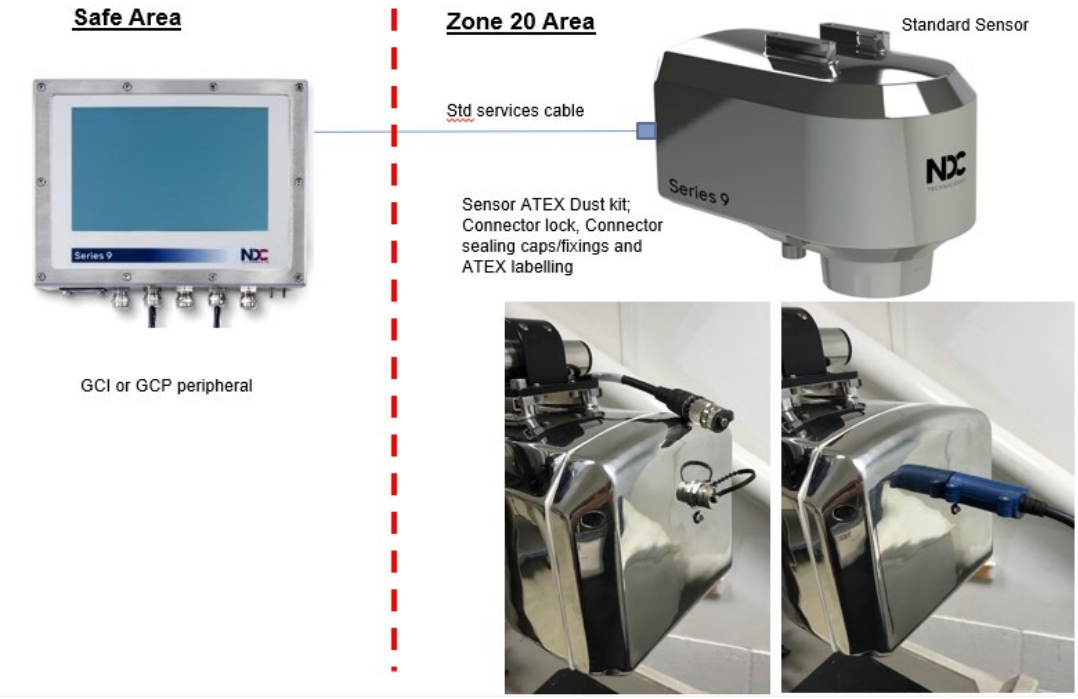
ATEX Dust Supplement

Series 9 IR Gauge

Publication Reference: 120/16303-01

Issue B



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Proprietary Notice

ATEX Dust Supplement – Series 9 IR Gauge

Part Number: 120/16303-01

Revision: B

Date of Release: 5 July 2023

Last Revised: 5 July 2023

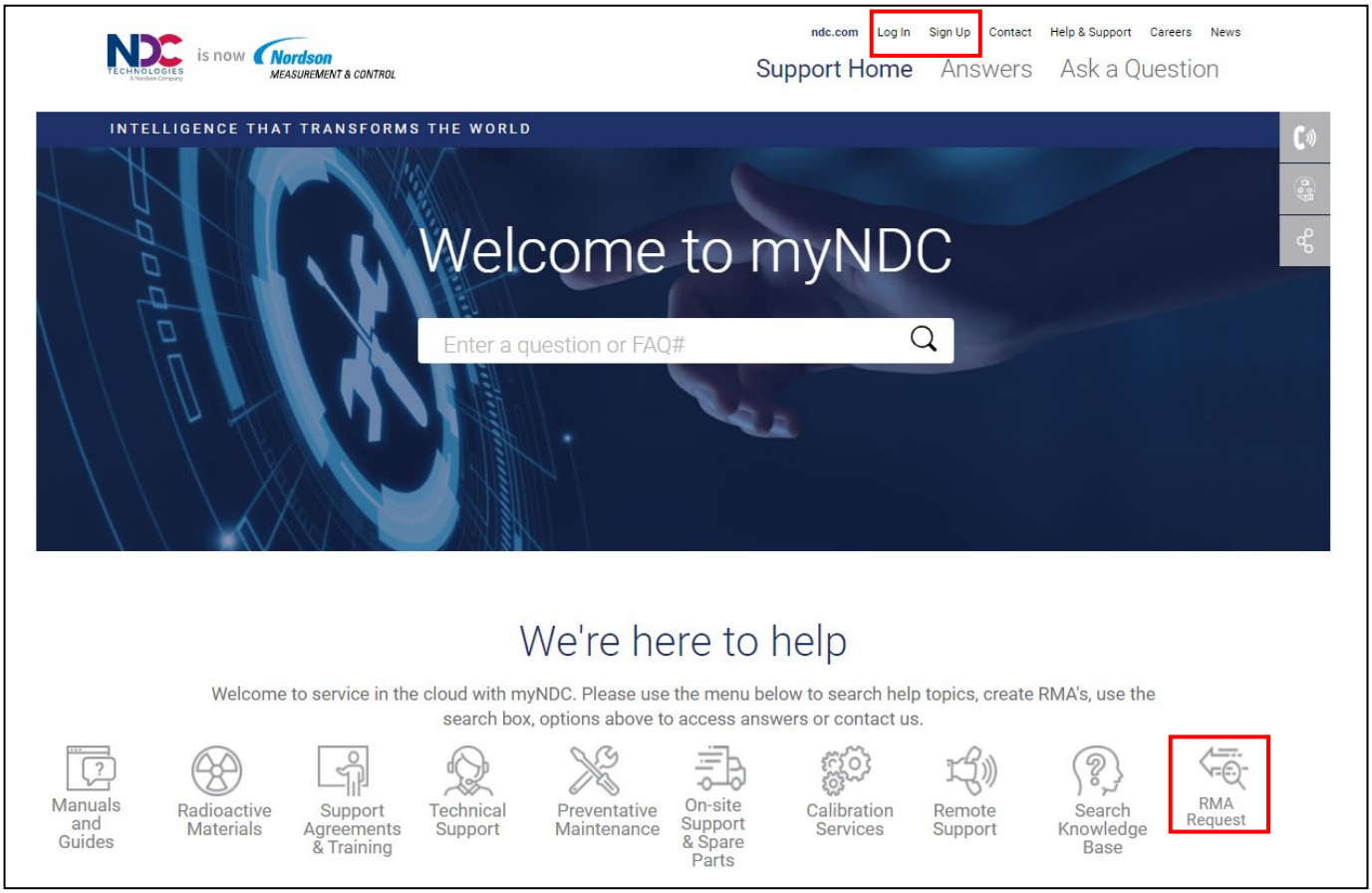
1 Contact Nordson

Online Support

You can access the Nordson Customer Support portal, my**NDC** at https://ndc.custhelp.com.

myNDC is a cloud-based portal that allows you to get product support by phone, ask a question, provide feedback, submit an RMA request or access information in our on-line knowledge database. You can browse the myNDC site or create a myNDC account.

- To create a myNDC account, click **Log In** or **Sign Up**. After creating the account, you will be immediately logged in. To log in on subsequent visits to myNDC, click **Log In**, enter your user name and password, and then click **LOG IN**.
- To submit an RMA, click on **RMA Request** and follow the on-screen instructions.



Nordson Contact Numbers

Please have your sales order number at hand before contacting Nordson.

Americas	+1 626 939 3855
Asia Pacific	Nordson Asia Pacific Customer Service Toll-free contact numbers: • Thailand: 1800 012 048 • Indonesia: 00 1803 016 4969 • Korea: 00 7981 420 30749 • Malaysia: 1800 81 9290 • Taiwan: 00 801 128 027 • India: 000 800 0402 514 Singapore non toll-free number: +65 6579 2411 Email ID: osc-apac@ndc.com
Japan	+81 (0)3 3255 8157
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EMEA (Europe, Middle East, Africa)	Germany: 0800 1123194
	Italy: +39 0331 454 207
	All other countries (English speaking): +44 1621 852244 Please select option 2 to be connected to the service team

2 Table of Contents

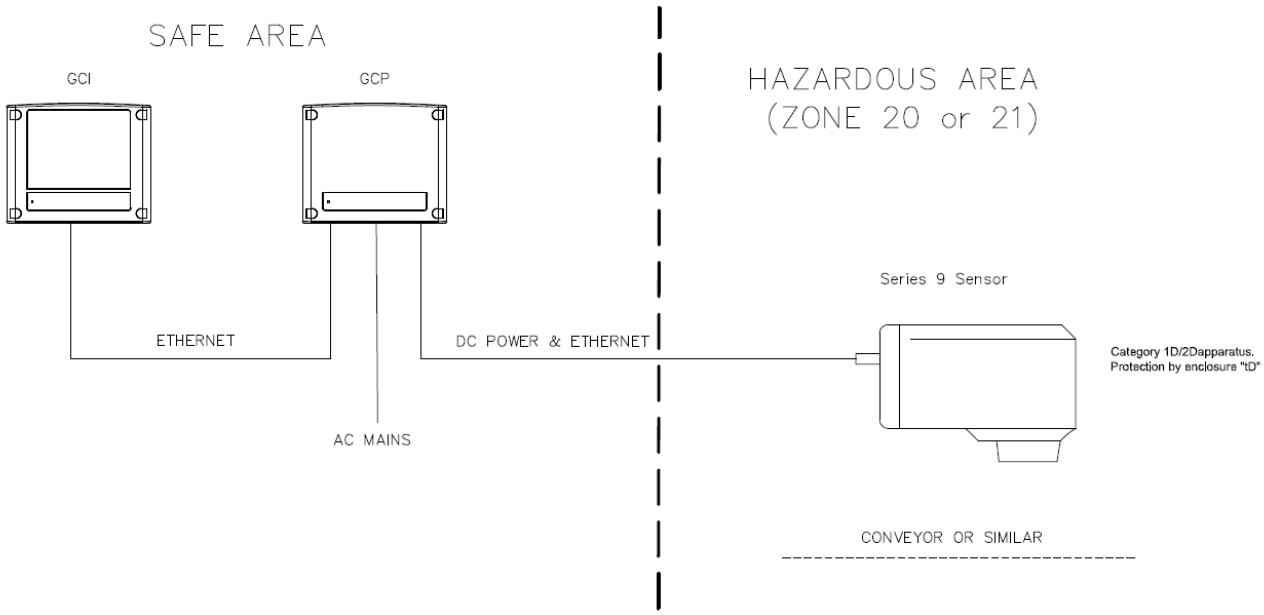
3 Introduction

The following ATEX supplement is intended to cover the special aspects of the Series 9 gauge that make it safe for use in potentially explosive DUST environments and should be read in conjunction with the main User guide for the equipment. Its intended as a guide and assumes that the user fully understands the safety requirements for the intended Hazardous Area where the equipment is being installed, operated and maintained and takes full responsibility to ensure the requirements are met.

The Series 9 gauge is certified through EC Type testing by Intertek (notified body) to comply with the following standards; EN60079-0:2018 and EN60079-31:2014 Dust ignition protection by enclosure "t" with the Sensor rated as Cat.1D suitable for dust Zone 20 and Cat.1D suitable for dust Zone 21 as per marking.

The certification also covers IECEX and UKEX as shown on the nameplate of the Series 9 gauge

The Series 9 gauging system layout is shown below with respect to the Hazardous area locations.



Limitations warnings (X):

Although the Sensor is fitted with a Sapphire viewing window (ten times tougher than glass), it must be located in an area where there is low risk of impact due to its viewing window.

If the DC Power & Ethernet cable is disconnected from the Sensor, the captive dust tight caps must be fitted over the connectors.

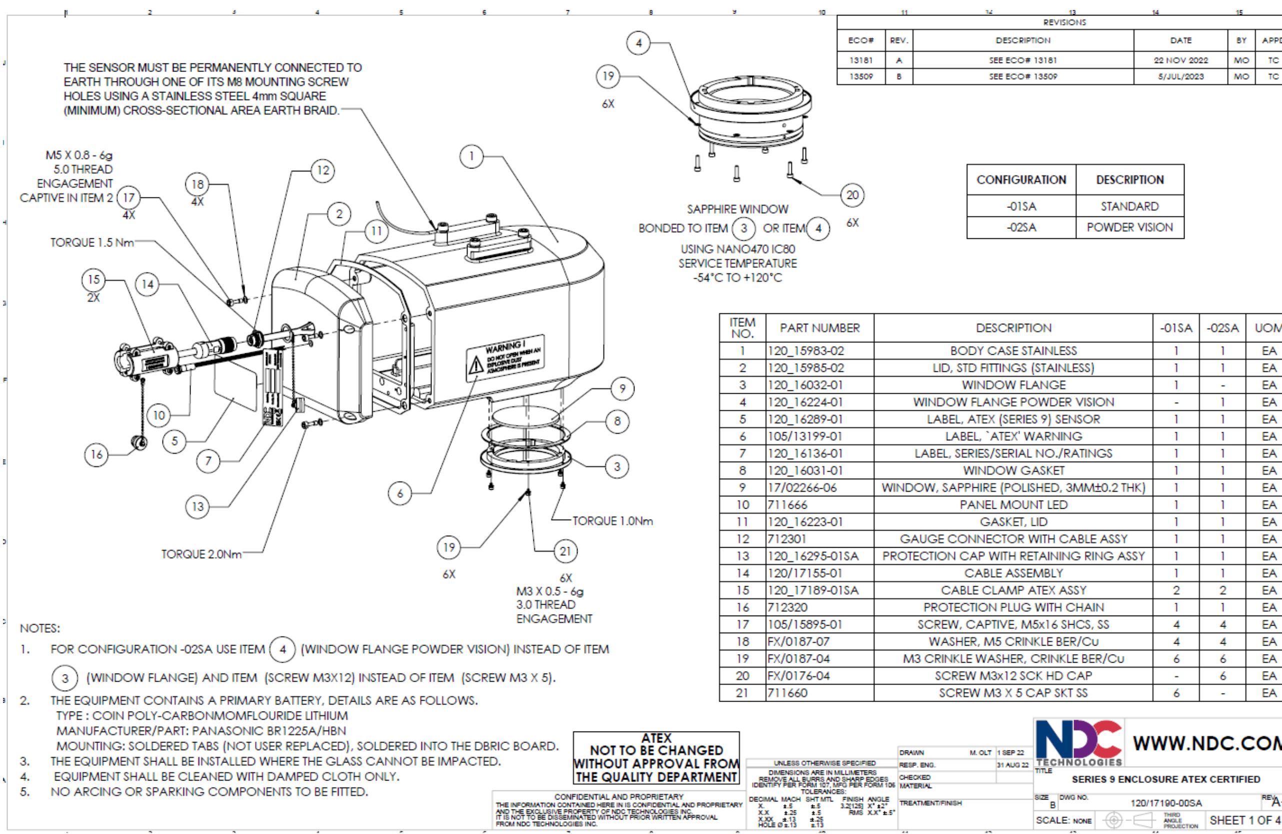
4 Protection employed

Note that the ATEX Series 9 Sensor is adapted from standard with add-ons to make suitable for a DUST Hazardous area and will be marked accordingly. Please check that the Hazardous area marking is in place before installing and putting into service.

The hazardous area protection employed is for combustible dust and uses protection type “t” which is a rugged dust tight enclosure, comprising the following key features:

- Stainless Steel 316 body and lid with elastomer seals to form a dust tight enclosure to IP6X
- Impact resistant Sapphire window.
- Plug/socket connector clamp with warning label “WARNING – DO NOT SEPARATE WHEN ENERGISED”
- Dust tight caps that are fitted when the connectors are left disconnected.
- Warning label “WARNING – DO NOT OPEN WHEN EXPLOSIVE ATMOSPHERE IS PRESENT”

These key features can be seen in the Sensor exploded view below along with the Hazardous Area markings label:

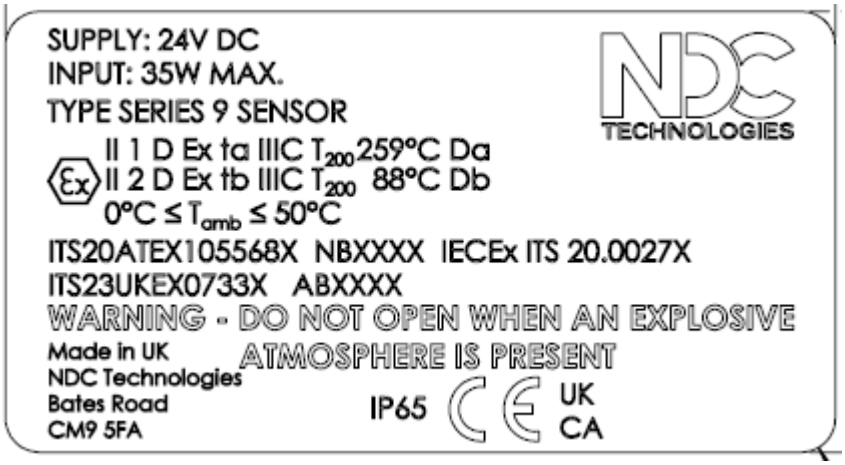


REVISIONS					
ECO#	REV.	DESCRIPTION	DATE	BY	APPD
13181	A	SEE ECO# 13181	22 NOV 2022	MO	TC
13509	B	SEE ECO# 13509	5/JUL/2023	MO	TC

CONFIGURATION	DESCRIPTION
-01SA	STANDARD
-02SA	POWDER VISION

ITEM NO.	PART NUMBER	DESCRIPTION	-01SA	-02SA	UOM
1	120_15983-02	BODY CASE STAINLESS	1	1	EA
2	120_15985-02	LID, STD FITTINGS (STAINLESS)	1	1	EA
3	120_16032-01	WINDOW FLANGE	1	-	EA
4	120_16224-01	WINDOW FLANGE POWDER VISION	-	1	EA
5	120_16289-01	LABEL, ATEX (SERIES 9) SENSOR	1	1	EA
6	105/13199-01	LABEL, `ATEX' WARNING	1	1	EA
7	120_16136-01	LABEL, SERIES/SERIAL NO./RATINGS	1	1	EA
8	120_16031-01	WINDOW GASKET	1	1	EA
9	17/02266-06	WINDOW, SAPPHIRE (POLISHED, 3MM±0.2 THK)	1	1	EA
10	711666	PANEL MOUNT LED	1	1	EA
11	120_16223-01	GASKET, LID	1	1	EA
12	712301	GAUGE CONNECTOR WITH CABLE ASSY	1	1	EA
13	120_16295-01SA	PROTECTION CAP WITH RETAINING RING ASSY	1	1	EA
14	120/17155-01	CABLE ASSEMBLY	1	1	EA
15	120_17189-01SA	CABLE CLAMP ATEX ASSY	2	2	EA
16	712320	PROTECTION PLUG WITH CHAIN	1	1	EA
17	105/15895-01	SCREW, CAPTIVE, M5x16 SHCS, SS	4	4	EA
18	FX/0187-07	WASHER, M5 CRINKLE BER/Cu	4	4	EA
19	FX/0187-04	M3 CRINKLE WASHER, CRINKLE BER/Cu	6	6	EA
20	FX/0176-04	SCREW M3x12 SCK HD CAP	-	6	EA
21	711660	SCREW M3 X 5 CAP SKT SS	6	-	EA

Marking for 1D and 2D:



Where the ATEX Notified Body number is NB 2575 and UKEX Approved Body number is AB 0359.

Special Conditions of Use:

- The dust covers, which are provided with the equipment, shall be fitted to the gauge connector when the plug, supplied from the GCI, is not fitted.
- Potential electrostatic hazard – equipment shall only be cleaned with a damp cloth.
- The equipment shall be installed where the sapphire window cannot be impacted.

4.1 Battery warning

Note that the sensor contains a 3v Primary battery as per the details below:

Type: Coin Poly-Carbonmonoflouride Lithium with solder tags
Manufacturer/Part No.: Panasonic BR1225A/HBN
Mounting: Soldered into the DBRIC board.

Do not attempt to replace the battery – please consult Nordson.

4.2 Connector clamp – fitting and removal

To prevent the sensor plug/socket from being easily disconnected without a tool, the connector clamp must always be fitted as shown in the photo above as follows:

Insert the cable connector socket into the sensor plug and tighten the screw ring lock in a clockwise motion. The connector clamp can then be fitted, located on the connector nut and secured in place by tightening the 4 x captive screws with a 3mm Allen key. Ensure the clamp is securely in place by observing no gap between the two halves.

Ensure the warning label “Warning! Do not separate when energised” is in place.

If the connectors are to be separated for any reason, make sure that power is removed and isolated first from the Sensor’s GCI/GCP before removing the connector clamp and separating, then fit the sealing caps as shown in the second photo by screwing in place until tight which will prevent ingress and a possible short circuit.

4.3 Sensor lid seal - Fitting and removing the Sensor chassis

The Sensors Chassis is held in place using the 4 x M5 captive screws located in the lid (item 11 in the exploded Sensor view) and must all be tightened to a torque of 2.0Nm to ensure a good seal.

If the chassis needs to be removed for servicing, do this only when the explosive atmosphere is NOT present.

The chassis is removed by first disconnecting the services connector as per previous section and loosening the 4 X captive screws using an 4mm Allen Key. The Chassis can then be carefully slid out of the enclosure.

Fitting is the reverse procedure but first check the seal (item 8) for any damage before fitting and if necessary replace with a new seal as per the steps below. Tighten all 4 x screws to a torque of 2Nm using a 4mm Allen Key torque wrench.

1. Remove the old seal by peeling away from the lid flange.

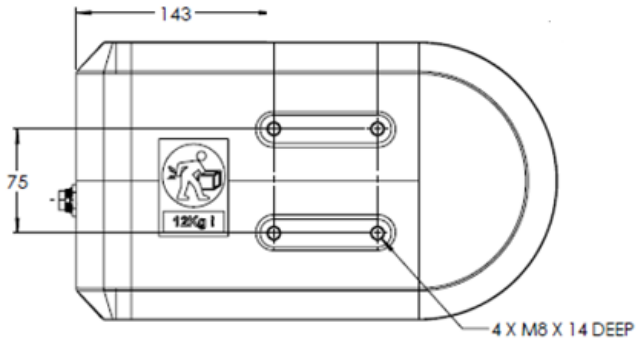
2. Remove any residual adhesive with a solvent (IPA) from the lid flange.

3. Take the new seal (Part No. 120/16223-01), remove the backing tape and carefully align with the lid flange ensuring the mounting bosses are central in the cut outs and the edge is flush before pressing firmly in place.

5 Electrical

5.1 Earthing the Sensor and GCI/GCP

The Sensor must be permanently connected to earth through one of its M8 mounting screw holes indicated below using a 4mm square (minimum) cross-sectional area earth braid with M8 ring terminal and Stainless Steel M8 fixing and star washer to hold in place.



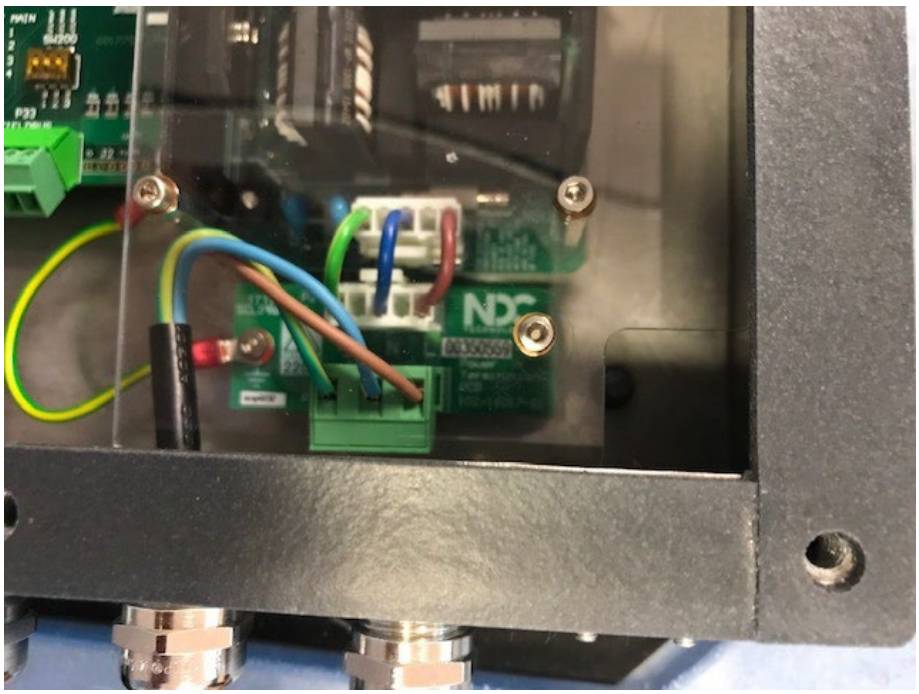
5.2 Mains power/cable connection to the GCI/GCP

The GCI/GCP includes a 24vdc power supply and requires a 100W single phase mains supply 85-264vac 50/60Hz which should be routed through a lockable isolation switch to prevent power from being applied during maintenance.

The power cable is intended to be supplied by the user, and must be 3-core mains cable, double insulated, 18 AWG (minimum) wire gauge with an outside diameter in the range Ø6.0mm to Ø10.0mm to ensure it will seal in the cable gland.

The cable must be routed through the gland fitted, closest to the power terminals as shown in the photo below, terminated from left to right; 1. Green (Earth) 2. Blue (Neutral) 3.Brown (Live) following the legend on the termination board.

To clamp the cable securely and form a good seal, the gland nut must be tightened with a 20mm A/F torque wrench to 3.5Nm.

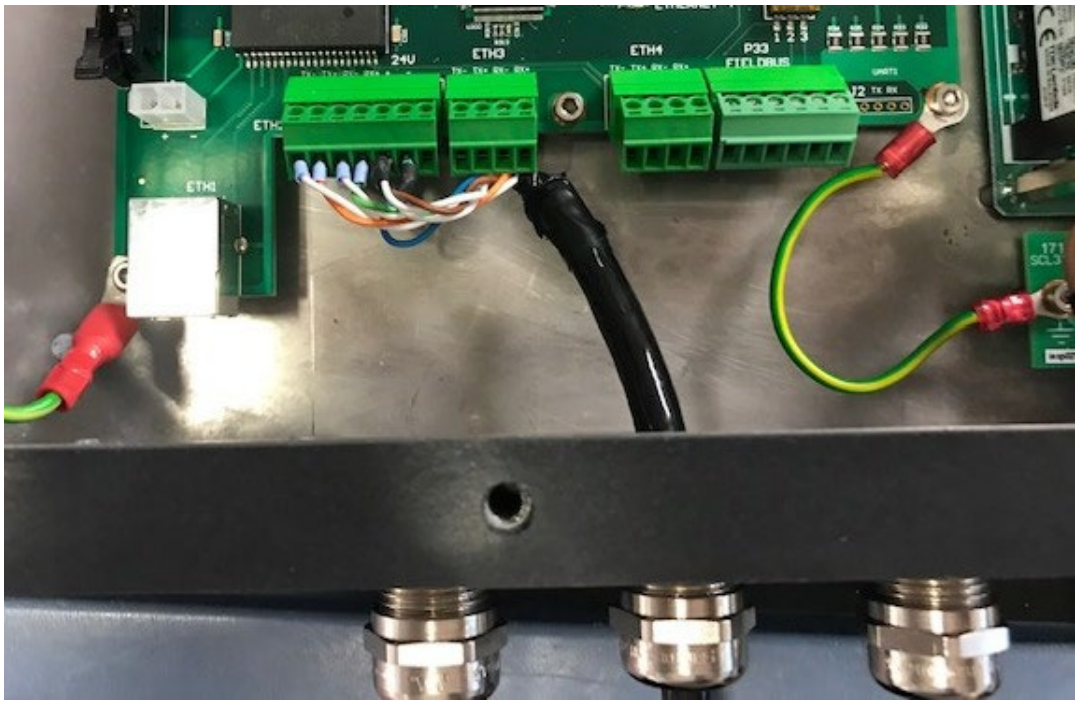


5.3 Sensor Services cable connection to the GCI/GCP

The Series 9 Sensor is connected to the GCI/GCP through the services cable supplied with the sensor.

The cable must be routed through the gland fitted, closest to the “ETH2 24v” screw terminal connector as shown in the photo below with terminations as given in the following table.

Wire Colour	“ETH2 24v” terminal	Function
Pair 1 White	Tx-	Ethernet Tx-
Pair 1 Orange	Tx+	Ethernet Tx+
Pair 2 White	Rx-	Ethernet Rx-
Pair 2 Green	Rx+	Ethernet Rx+
Pair 3 White	+	Power output +24Vdc
Pair 3 Brown	+	Power output +24Vdc
Pair 4 White	-	Power output 0Vdc return
Pair 4 Blue	-	Power output 0Vdc return

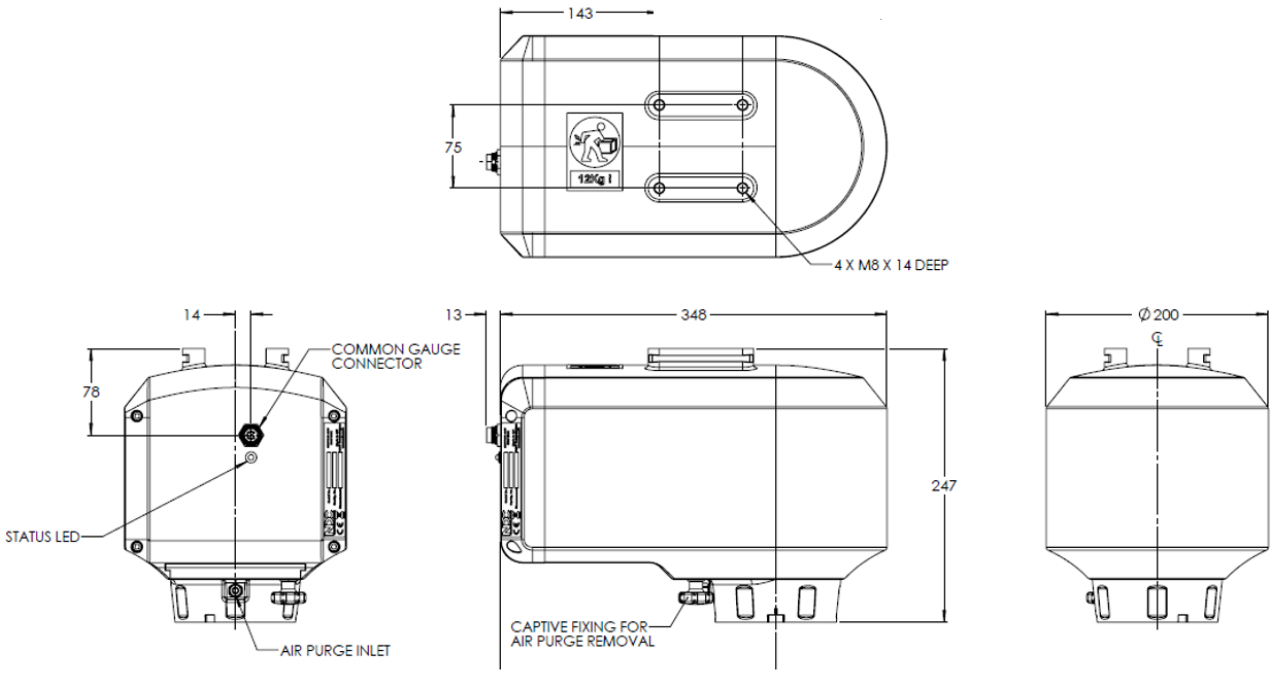


To clamp the cable securely and form a good seal, the gland nut must be tightened with a 20mm A/F torque wrench to 3.5Nm.

6 Physical Size and ratings

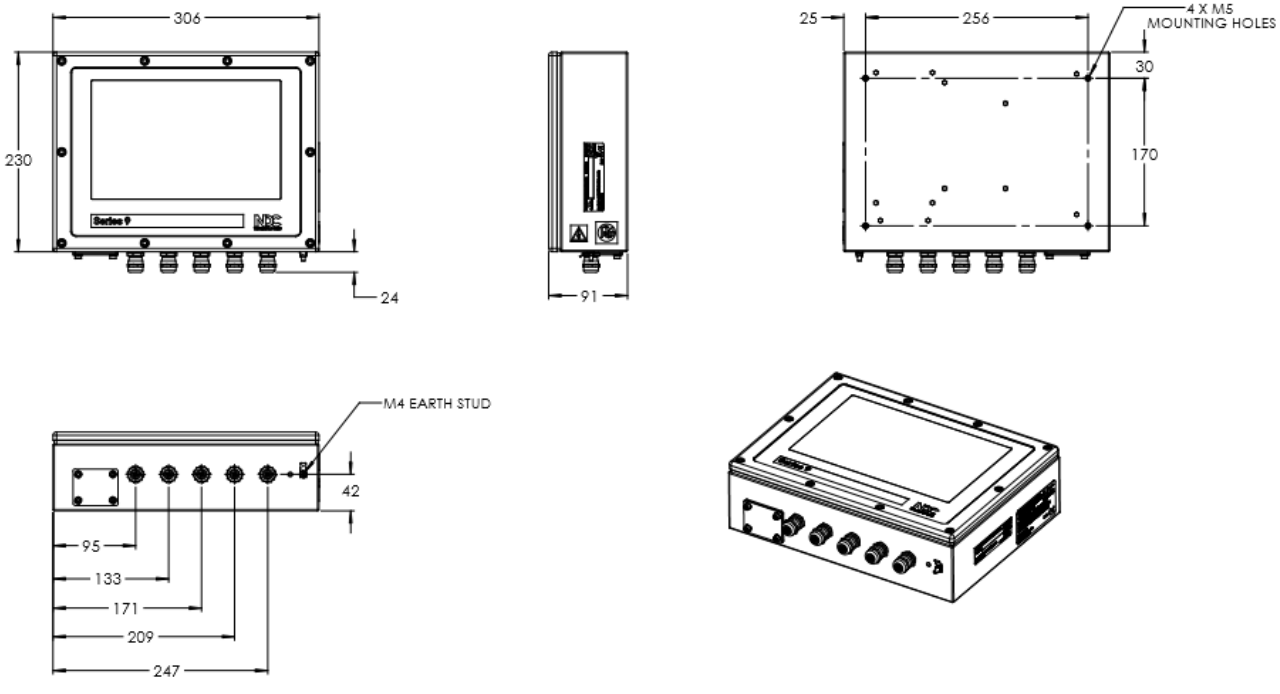
Series 9 Sensor

DC input:	24Vdc +10% -20%, 35W
Digital communications:	Ethernet TCP/IP
Mounting:	Top face through 4 x M8 threaded holes
Environmental sealing:	IP67
Maximum surface temperature:	tba
Ambient temperature range:	0°C to 50°C
Storage temperature range:	-30°C to 70°C
Relative Humidity:	80% over full temperature range
Weight:	12.5Kg
Pollution degree:	Degree 1
Working distance:	230 mm +/- 100 mm (beam patch 60 mm diameter) 180 mm +/- 50 mm (beam patch 25 mm diameter) 120 mm +/- 25 mm (beam patch 10 mm diameter)
Air Purge:	Instrument quality compressed air, Ø6.0mm o/d tube, 20L/minute.
Dimensions:	See outline drawing below



GCI (Gauge Control Interface)/GCP (Gauge Control Port)

AC input:	85-264Vac 50/60Hz, 100W (includes Sensor)
DC output:	24Vdc, 50W
Mounting:	Wall mounted using M5 screws into the back of the unit
Digital communications:	Ethernet TCP/IP
Environmental sealing:	IP67
Ambient temperature range:	0°C to 50°C
Storage temperature range:	-30°C to 70°C
Relative Humidity:	80% over full temperature range
Weight:	6Kg
Pollution degree:	Degree 1
Dimensions:	See outline drawing below



7 Maintenance

7.1 Warnings and cautions

When carrying out any maintenance on the system, observe the following to avoid injury to personnel and damage to the equipment.

- If the gauge has been operating in very high temperature environment, allow adequate time for it to cool before handling.
- Compressed air can be dangerous. Isolate the Air Purge unit compressed air supply before working on a gauge.
- Do not power up the gauge when the case is open. The filter wheel rotates at very high speed and could cause injury.
- Gauge maintenance must be carried out in a clean room away from the working area of the equipment.
- While the gauge case is open, take care not to touch any optical surfaces.
- When working on any system components, observe standard anti-static precautions.

7.2 General cleaning

External surfaces of gauges and other system components should be cleaned periodically with a damp non-abrasive cloth only.

Keep cables and connectors free from contaminants that could cause chemical damage.

Clean gauge windows as described below.

Caution: If solvents are needed to remove contamination, it is essential to consult the Customer Care Department of Nordson or their agent first, giving precise details of the solvent.

7.3 Cleaning gauge windows

Clean the gauge window using a soft lint-free cloth.

Where necessary, use warm water and a mild detergent. Do not use abrasive cleaners of any kind.
If a solvent is needed to remove contaminants, contact Nordson or their agents first.

7.4 Replacing the gauge source lamp assembly

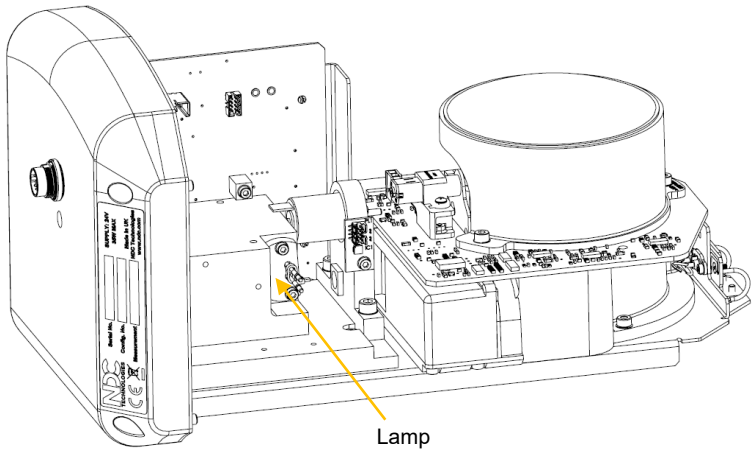
Remove power from the gauging system and ensure the explosive atmosphere is NOT present.

Remove the connector clamp from the services cable, disconnect from the Sensor and fit the sealing caps to the connectors.

Using 4mm Allen key, undo the 4 fixings screws with in the corners of the sensor lid and carefully slide the chassis out from the enclosure.

Place the Chassis looking downwards on a flat clean surface.

Locate the lamp, as indicated in the picture below.



Unplug the two lamp assembly leads.

Undo the two lamp fixing screws with 2.5mm Allen key and withdraw the lamp assembly from its mount.

Fit the new lamp (part number 120/16107-01SA) and reassemble the sensor using the reverse of this procedure. Take care not to touch the lamp glass as this may cause lamp failure.

If accidental contact is made, clean the glass with isopropyl alcohol (IPA).

Switch the gauge on and allow 2 hours for it to reach full operating temperature, then auto-reference the gauge.

7.5 Replacing the filter wheel motor

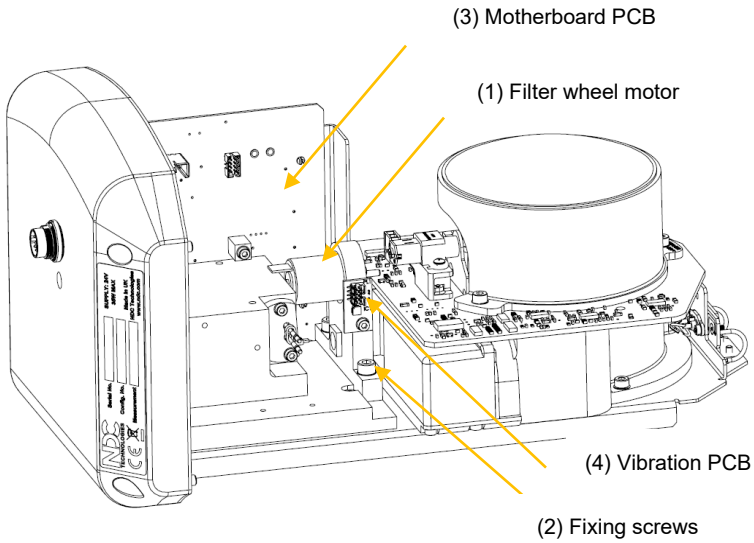
Remove power from the gauging system and ensure the explosive atmosphere is NOT present.

Remove the connector clamp from the services cable, disconnect from the Sensor and fit the sealing caps to the connectors.

Using 4mm Allen key, undo the 4 fixings screws in the corners of the sensor lid and carefully slide the chassis out from the enclosure.

Place the Chassis looking downwards on a flat clean surface.

Locate the filter wheel motor (1), as indicated in the picture below.



Unplug the filter wheel motor ribbon cable connector from the motherboard PCB (3).

Unplug the vibration PCB (4) ribbon cable connector.

Undo the filter wheel motor assembly fixings screws (2) with a 4mm Allen key

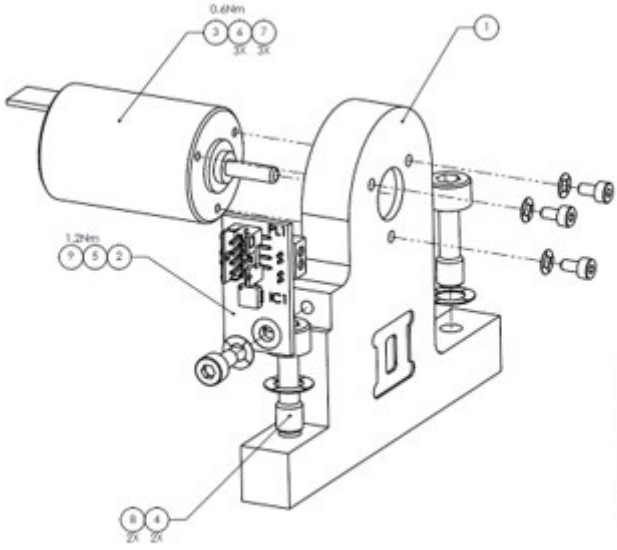
Lift the filter wheel assembly away from the Chassis. Do not touch the optical surfaces of the filter wheel. If accidental contact is made, clean the optical surfaces with isopropyl alcohol (IPA).

Note the orientation of the filter wheel, with the bush containing the grub screw towards the end of the motor shaft.

Loosen the grub screw and carefully withdraw the filter wheel from the motor shaft.

If the filter wheel does not come off easily, do not attempt to pull it off as this may damage the motor bearings. Instead, grip the wheel by its edges and use a small Allen key or similar tool to push the motor spindle out from the wheel.

Remove the 3 x motor fixing screws using 1.5mm Allen key as shown in the picture below.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	UOM
1	120_16282-01	MOTOR MOUNTING BRACKET 16 FILTER	1	EA
2	6817e9	VIBRATION/SYNC BOARD ASSEMBLY	1	EA
3	CS MO/0387-06	MOTOR, BRUSHLESS (DIA 22mm) (24V)	1	EA
4	105/15895-01	SCREW, CAPTIVE, M5x16 SHCS, SS	2	EA
5	FX/0176-01	SCREW, M3x0.5 x 6mm LG., SHCS SS	1	EA
6	FX/17119-01	SCREW M2 X 4 SKT HD SS	3	EA
7	FX/0187-02	WASHER, M2 CRINKLE BER/Cu	3	EA
8	FX/0187-07	WASHER, M5 CRINKLE BER/Cu	2	EA
9	FX/0187-04	M3 CRINKLE WASHER, CRINKLE BER/Cu	1	EA

If the instrument is within the warranty period, return the faulty motor to Nordson for replacement. If not, discard the motor.

Fit the filter wheel to the new motor (MO/0387-06).

If the wheel is a tight fit, do not attempt to push it on while holding the motor. Place the back end of the motor shaft against a hard surface and then push the filter wheel on as far as it will go.

Tighten the filter wheel grub screw.

Fit the motor assembly and reassemble the Sensor as a reversal of the previous steps.

Switch the gauge on and allow 2 hours for it to reach full operating temperature, then auto-reference the gauge.

7.6 Replacing the referencing motor

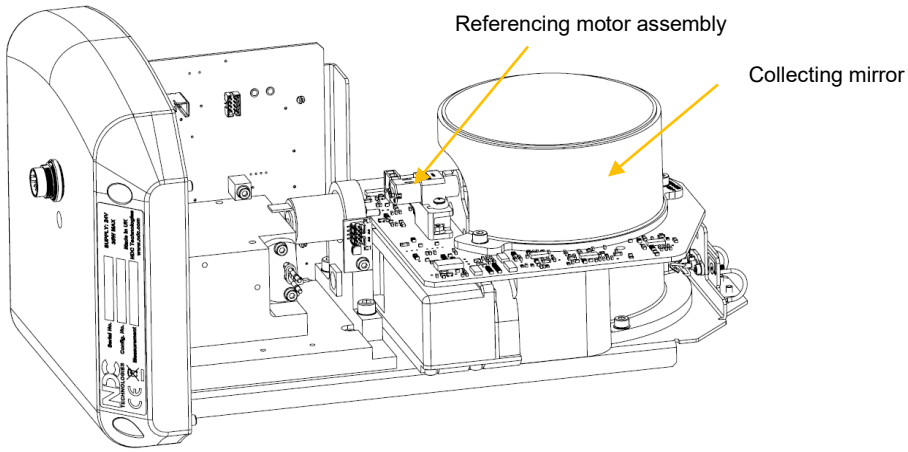
Remove power from the gauging system and ensure the explosive atmosphere is NOT present

Remove the connector clamp from the services cable, disconnect from the Sensor and fit the sealing caps to the connectors.

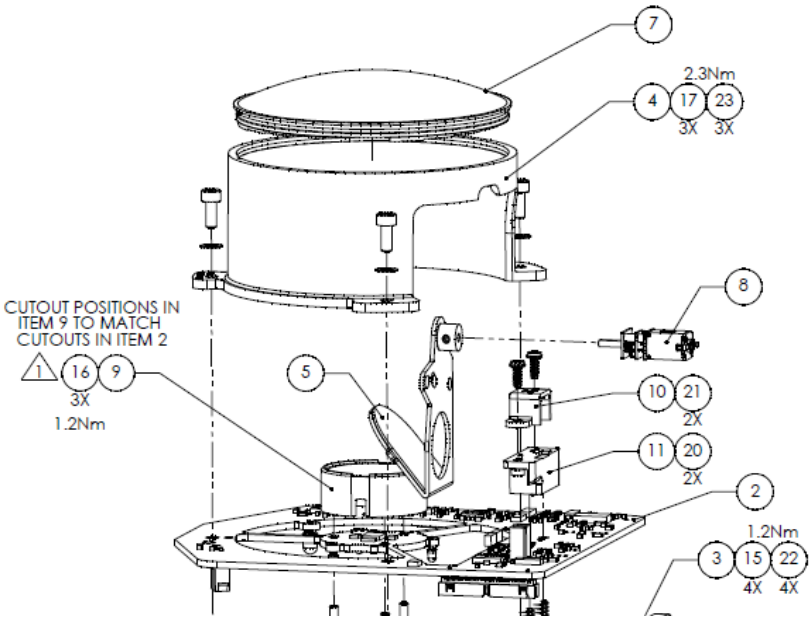
Using 4mm Allen key, undo the 4 fixings screws with in the corners of the sensor lid and carefully slide the chassis out from the main enclosure.

Place the Chassis looking downwards on a flat clean surface.

Locate the referencing motor, as indicated in the picture below.



Remove the collecting mirror by removing the 3 x M4 screws (item 17 below) with a 3mm Allen key and carefully lift away and store carefully.



Carefully unplug the motor lead and remove the two pozi drive screws securing the reference motor clamp (8,10,21) and lift away the motor and reference paddle (5).

Remove the reference paddle from the motor shaft by undoing the grub screw and sliding off the shaft.

Fit the reference paddle to the new motor, by sliding along the motor shaft until it bottoms out and tightening the grub screw.

Reassembly as a reversal of the previous steps.

Switch the gauge on and allow 2 hours for it to reach full operating temperature, then auto-reference the gauge.

8 Warranty

1. All sales of Nordson Measurement & Control products are subject to the contractual terms and conditions of the Order pursuant to which they were sold to Buyer, including Warranty terms. The following terms are a general summary of the contractual Warranty terms, NOT a revision or alternative to the contractual terms, and are presented as merely a point of reference for your information. The contractual Warranty is the complete and exclusive statement of all Nordson Measurement & Control warranties to Buyer. In the event the following terms are in conflict with any of the contractual Warranty terms, the contractual Warranty terms shall be deemed to control.

   The warranty terms contained herein are expressly in lieu of any and all other warranties, expressed or implied, including any warranty of merchantability or fitness for a particular purpose. In no event shall Nordson Measurement & Control be liable for any incidental, consequential or special damages, including but not limited to, any loss of business, income or profits, expenses incurred for time when the system is not in operation, and any labor costs relating to or arising out of the performance, functioning or use of the system.

   Purchaser assumes the risk for use of this product and agrees to indemnify and hold Nordson Measurement & Control harmless for any and all damage to person or to property resulting therefrom.

   Nordson Measurement & Control grants no license under any patent rights except the right, under only such patents as may be owned or acquired by Nordson Measurement & Control, to use the product sold hereby for the purpose for which it is sold. Nordson Measurement & Control does not warrant that the product or its use does not infringe any patent owned by persons other than Nordson Measurement & Control.

2. Nordson Measurement & Control guarantees all products to be free from defects in material and workmanship for the following periods[1]:

   - Product and peripherals – 2 years from shipment
   - Source lamp – 5 years from shipment
   - Filter wheel motor – 5 years from shipment
   - Spare parts – 1 year from shipment
   - Replacement lamps and motors supplied under warranty – 1 year or up to the original 5 year warranty from shipment of the sensor, whichever is longer

   [1] Refer to the contractual terms and conditions of the Order for usage of the warranty.

   During this period, Nordson Measurement & Control will repair or at its option replace, free of all charges for parts and labor, any Nordson Measurement & Control parts determined by it to have been broken or damaged due to causes other than improper application, abuse or negligence. Nordson Measurement & Control's obligation to repair or replace shall not extend to expendable parts which are subject to normal operating wear.

Nothing in this paragraph 2 will require Nordson Measurement & Control to make repairs or replacements where:

A. The product has been repaired, other than by an authorized Nordson Measurement & Control dealer or a Nordson Measurement & Control employee, or altered in any way without the prior written consent of Nordson Measurement & Control; or

B. The product has not been properly maintained in accordance with any operating and maintenance manual supplied therewith; or

C. The product has been damaged as a result of fire, flood, war, insurrection, civil commotion, acts of God or any other cause beyond the control of Nordson Measurement & Control or Buyer.

3. Nordson Measurement & Control's liability shall be limited to the obligations set forth in Paragraph 2. These shall be the Buyer's sole and exclusive remedies, whether in contract, tort or otherwise, provided, however, that in lieu thereof, Nordson Measurement & Control at its option may replace the entire product on an exchange basis or refund the purchase price against the return of the defective product.

4. Nordson Measurement & Control will not be responsible for failure to provide service or parts due to shortage of materials, labor or transportation strikes or delays, or any causes beyond Nordson Measurement & Control's control.

5. Unless otherwise specified by Nordson Measurement & Control, all warranty repairs will be made at Nordson Measurement & Control's facility. The customer shall be responsible for all expenses of packing, freight and insurance in connection with the shipment of products to Nordson Measurement & Control for repair. Nordson Measurement & Control will pay the cost of returning the equipment to customer.

   If it is mutually determined by the buyer and Nordson Measurement & Control that the examination, replacement or repair takes place at the buyer's facility, then the buyer will be responsible for Nordson Measurement & Control's travel and living expenses incurred in traveling to and from the buyer's facility, and during the time of the visit, as well as the cost of field labor and replacement parts unless the parts being repaired or replaced are determined to have been defective, in which event the cost of said repaired or replacement parts shall be borne by Nordson Measurement & Control. These travel and living expenses will be billed to the buyer at actual cost to Nordson Measurement & Control.

6. No person, including any Nordson Measurement & Control distributor, agent or representative, is authorized to assume any liability on behalf or in the name of Nordson Measurement & Control, and Nordson Measurement & Control shall not be bound to any understandings, representations, or agreements with respect to warranties except as set forth in this policy.

7. Nordson Measurement & Control requests immediate notification of any claims arising from damage in transit in order to determine if carrier responsibility exists. If damaged equipment arrives, save the shipping container for inspection by the carrier and telephone Nordson Measurement & Control as soon as possible.