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<b>Service Technician Instruction</b>	<b>ST-216</b>	18 March 2019

Engine type                **J312, J316 & J320**

Subject                    **Sensor Package**  
**Retrofitting various sensor modules**

The Service Technician Instruction ST-216 describes how to retrofit the sensor modules for automated detection and utilisation of the crankcase pressure, blow-by filter differential pressure, air filter differential pressure, mixture cooler differential pressure, and oil filter differential pressure.

#### **PURPOSE OF THIS BULLETIN / NEED FOR ACTION**

No proactive action is necessary, i.e. ST-216 can be used as an aid for organising and carrying out the work when the sensor package or one of the sensor modules are to be retrofitted to an engine.

#### **AFFECTED ENGINES / SCOPE OF THIS BULLETIN**

Type J312, J316, and J320 engines with the DIA.NE XT, DIA.NE XT3 or XT4 engine management system, which have not yet been fitted with the above-mentioned sensors and to which the complete sensor package or individual sensor modules are to be retrofitted.

#### **Note:**

This document is not a basis for ordering the spare parts necessary for the conversion. Jenbacher provides a complete conversion package which can be requested from your local customer service representative or seller.

#### **Note:**

In the following Service Technician Instruction, Type J312, J316 and J320 engines are referred to as J3xx for simplicity.

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## 1 GENERAL / OVERVIEW

This Service Technician Instruction deals with the retrofitting of various sensors to J3xx engines.

The complete package consists of the following sensor modules:

- Crankcase pressure sensor module
- Blow-by filter differential pressure sensor module
- Air filter differential pressure sensor module
- Mixture cooler differential pressure sensor module
- Oil filter differential pressure sensor module

Advantages of the sensor package:

- Direct monitoring of pressures
- Individual components can be monitored better
- Improved alarm management
- Better maintenance prognoses

Each sensor module includes the necessary sensor(s), all mechanical and electrical parts for installation and connection, and any necessary software and parameter matching or activation, depending on the engine management system in question.

### 1.1 Overview of assembly and part numbers

Module	Engine	Assembly
Crankcase differential pressure	J312/J316/J320	8050098
Blow-by-filter differential pressure	J312/J316/J320	8000943
Air filter differential pressure	J312/J316/J320	8000955
Mixture cooler differential pressure	J312/J316/J320	8000944
Oil filter differential pressure	J312/J316/J320	8050117

**Table 1: Assemblies and part numbers**



## 1.2 Overview of the assemblies

The following Table gives an overview of the modules used for each engine version.

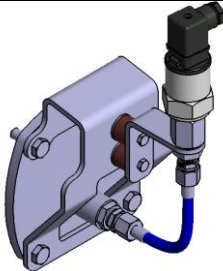
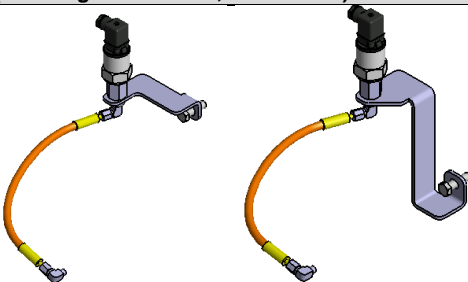
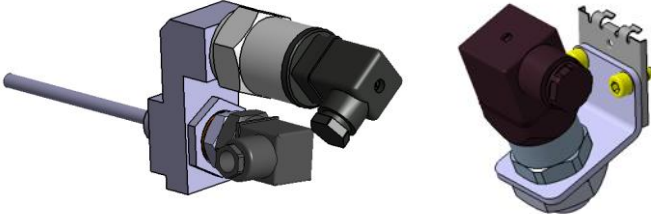
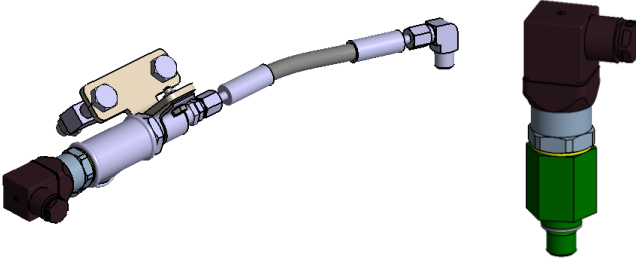
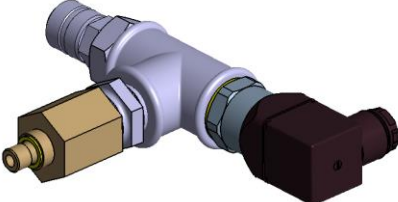
Assemblies	J3xx (P&ID tag: E.00-PI-025) – TL8050098
Crankcase pressure module	
	J3xx (P&ID tag: E.08-PI-011, E.08-PI-012) – TL8000943
Blow-by filter differential pressure module	
	J3xx (P&ID tag: M.05-PI-100, M.05-PI-001) – TL8000955
Air filter differential pressure module	
	J3xx (P&ID tag: E.08-PI-002 and E.08-PI-004) – TL8000944
Mixture cooler differential pressure module	
	J3xx (P&ID tag: M.03-PI-002) – TL8050117
Oil filter differential pressure module	

Table 2: Overview of the assemblies/sensors used in J3xx engines



## 1.3 Positions / locations of the installed modules

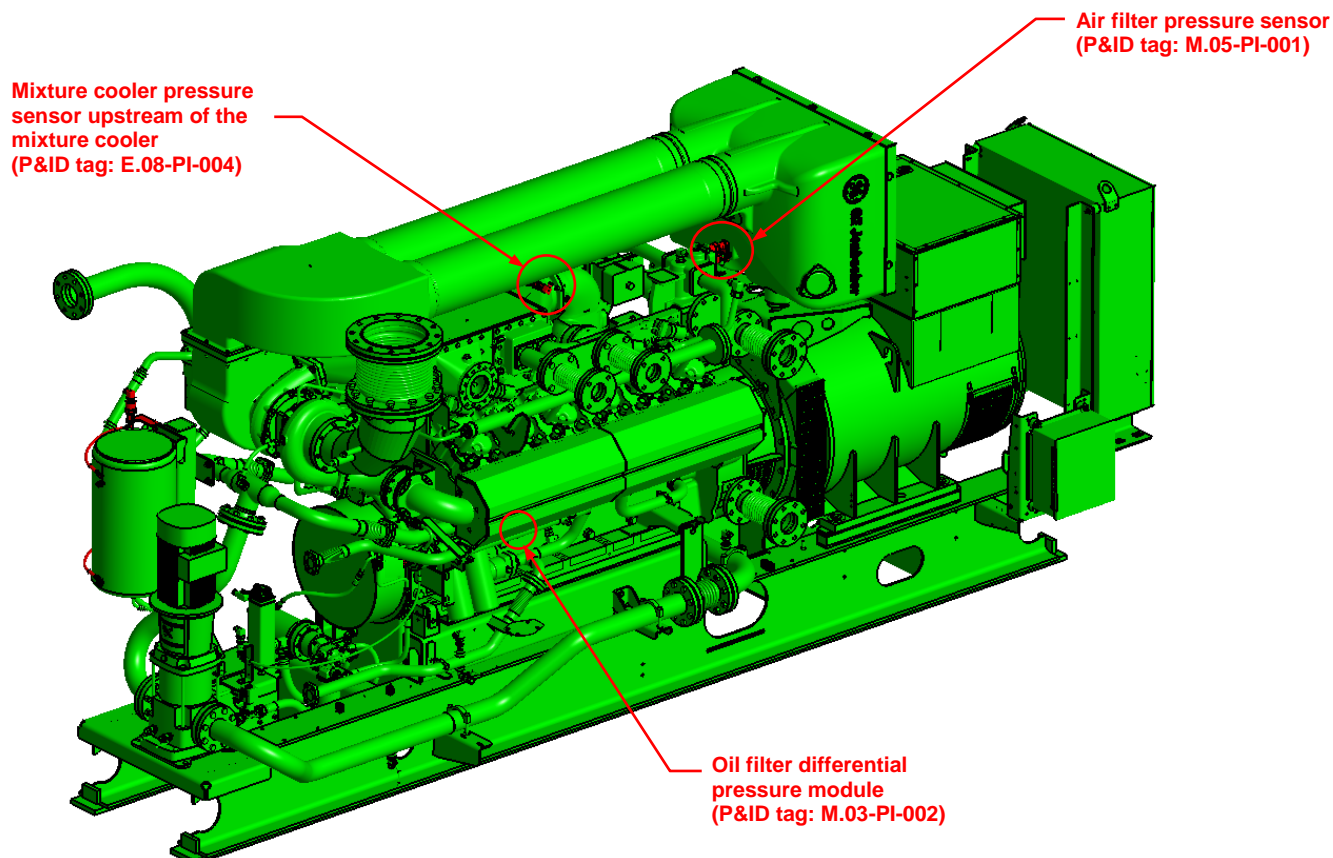


Figure 1: General overview of the modules (1) – J312

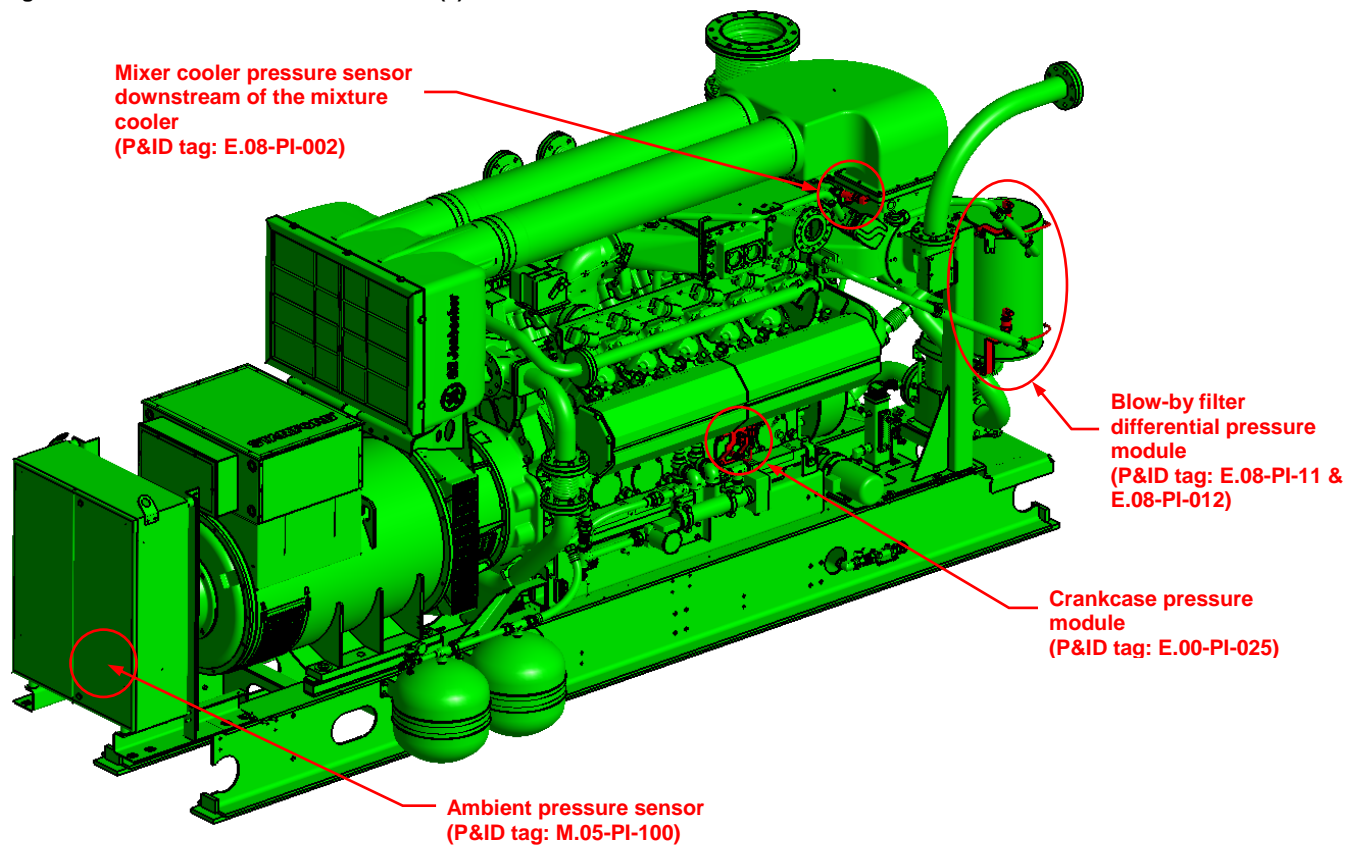


Figure 2: General overview of the modules (2) – J312



## 2 PROCEDURE FOR RETROFITTING

The retrofitting of the various sensors is described in more detail in the following sections.

### 2.1 Retrofitting the crankcase pressure module



Shut down the engine in accordance with Technical Instruction No. 1100-0105 and secure it against inadvertent restarting in accordance with TA 2300-0010. Observe the safety and hazard advice in the safety instructions (TA 2300-0005) and wear the appropriate personal protective equipment.

#### 2.1.1 Basic description

The purpose of the crankcase pressure sensor is to measure the pressure in the crankcase. This allows the crankcase pressure to be ascertained continuously, which gives an indication of the condition of the system as whole.

#### 2.1.2 Fitting the new crankcase pressure module

Figure 3 shows the crankcase pressure module when installed. The new bracket is mounted on the crankcase. Two rubber buffers are mounted on this bracket, which in turn are fastened to the mounting for the crankcase pressure sensor by two hexagon-head bolts. The ribbed hose is connected to the crankcase cover at one end and to a union at the other, screwed into the nipple on the mounting. The pressure sensor is screwed on to the other side of the nipple.

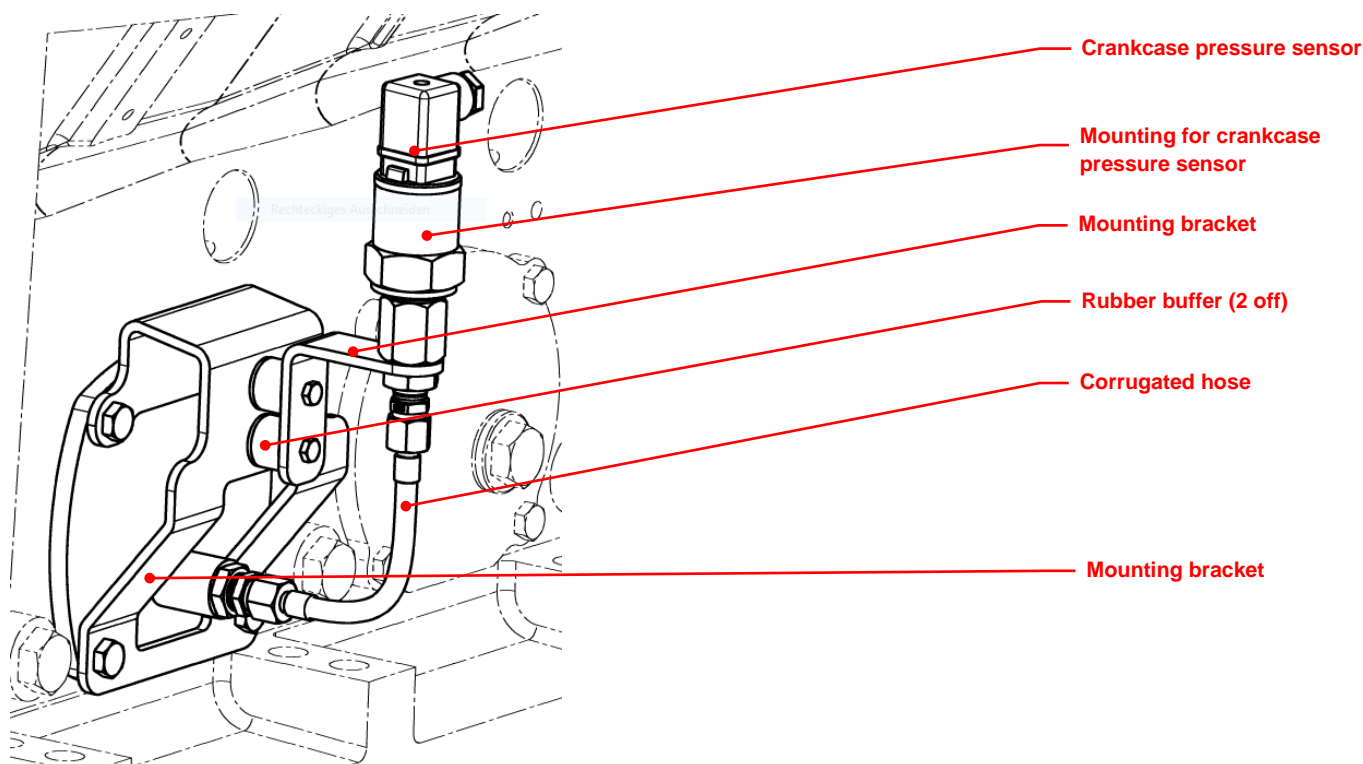


Figure 3: Mounting for the new crankcase pressure module



**Note:**



When fitting the individual components, make sure to wrap the threads on the components in Teflon tape before screwing them in.



**Figure 4: Pressure sensor**

Figure 4 shows the pressure sensor to be used.

**Note:**



Group the pressure sensor cables to give a single cable run. It is advisable to bundle these cables with other existing cables (using cable ties).



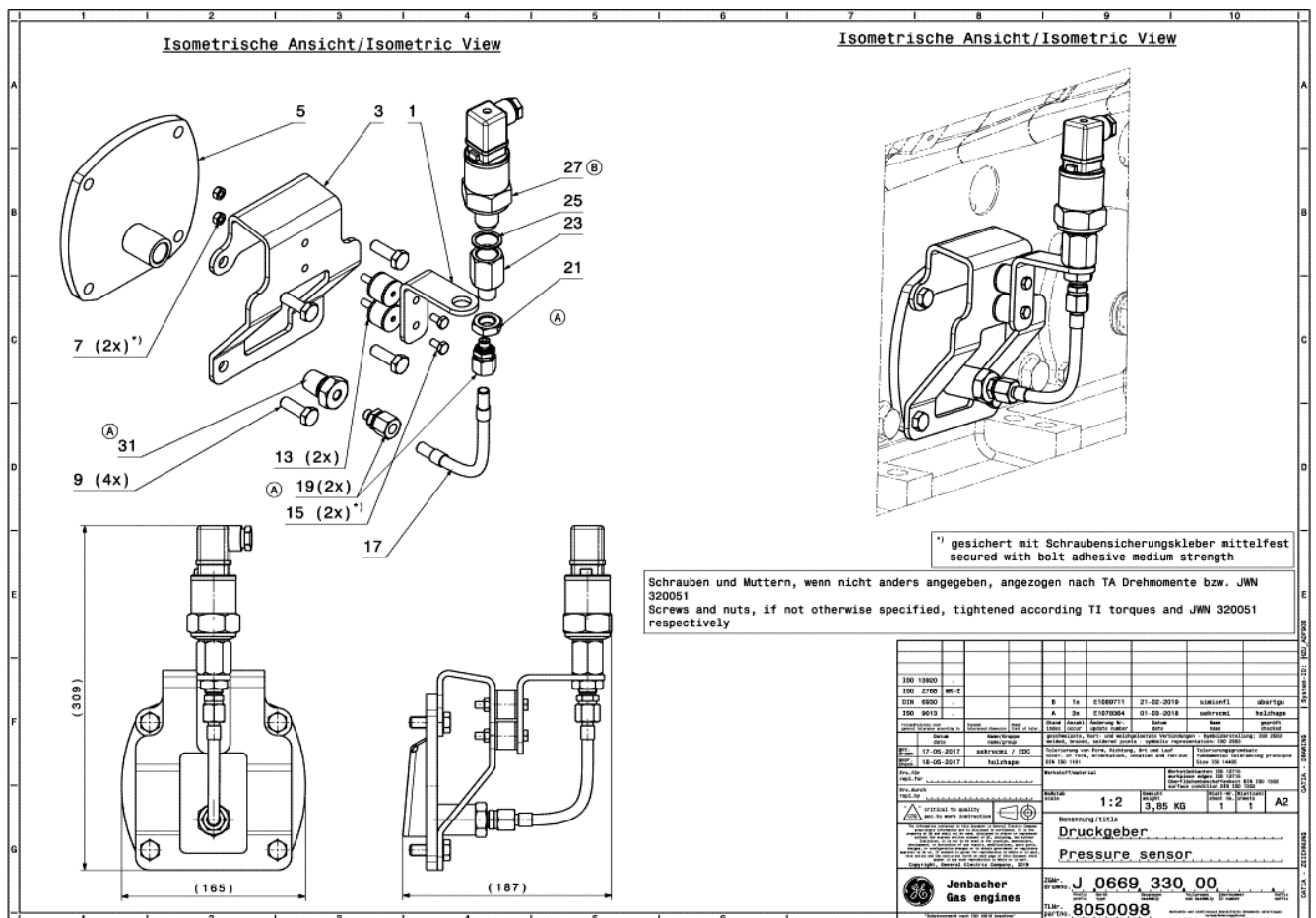


Figure 5: Drawing – Crankcase pressure module – PN8050098

Figure 5 shows the drawing for the crankcase pressure module. This is intended to act as an aid during installation. The parts list for this module is available in the INNIO Customer Portal (<https://customer.innio.com/en/customer/dashboard>) as an Excel file together, with this document.





## 2.2 Retrofitting the blow-by filter differential pressure module

### 2.2.1 Basic description

The two sensors of the blow-by filter differential pressure module measure the pressures upstream and downstream of the blow-by filter. The differential pressure across the blow-by filter is measured from these two pressures and gives an indication of the condition of the filter element.

### 2.2.2 Fitting the blow-by filter differential pressure module

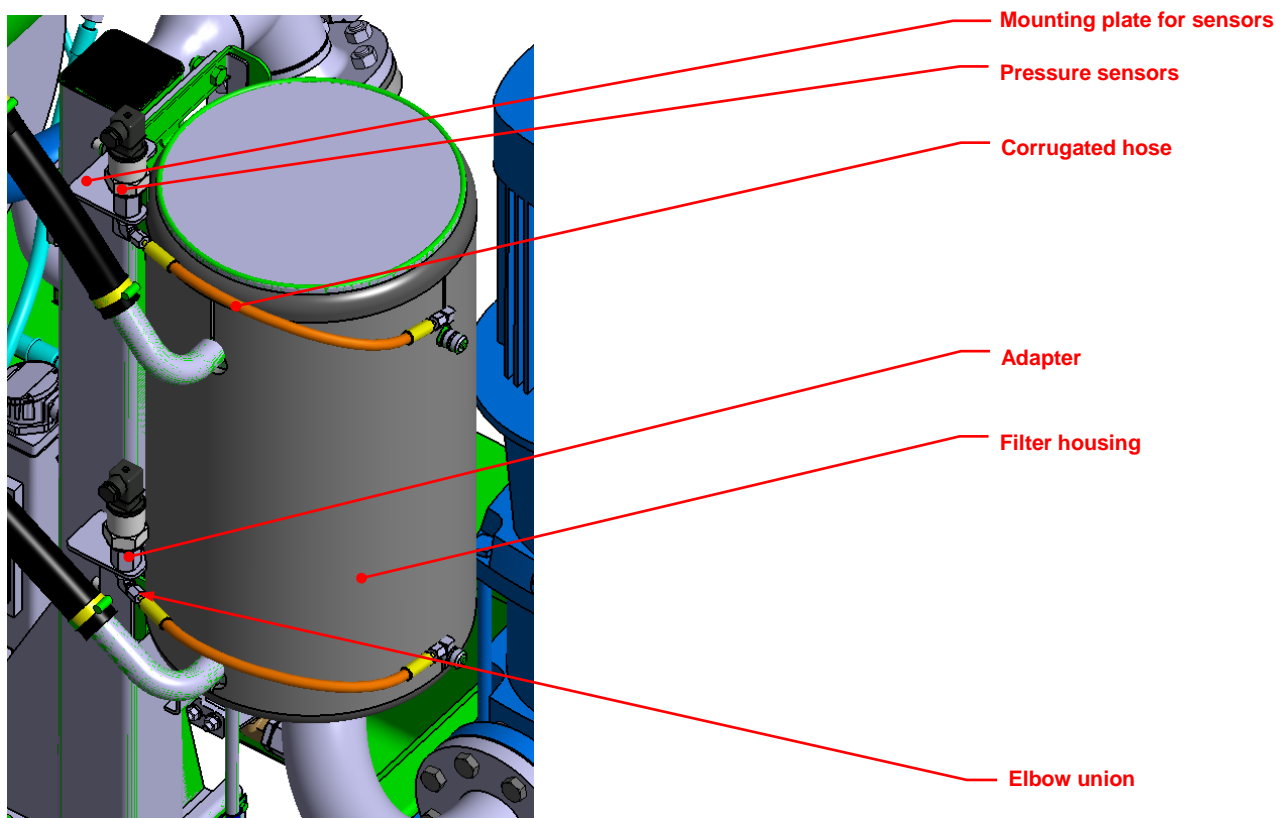


Figure 6: Fitting the blow-by filter differential pressure module

Figure 6 shows the installation of the blow-by filter differential pressure module. The pressure sensors are mounted on corresponding mounting plates. These plates are mounted on the frame for the blow-by filter. The pressure sensors are fitted with sealing rings and screwed into an adapter.

**Note:**

The cabling for the pressure transducers should be grouped together on the engine with other cables or protective cable sleeves to obtain a single cable or sleeve run.

**Note:**



When connecting the ribbed hoses make sure that the hoses are not kinked and are not in contact with other components, such as filter housings or blow-by hoses, as this can lead to chafing in operation resulting in possible failure of the components!

**Note:**



When fitting the individual components, make sure that the threads on the components are wrapped in Teflon tape before screwing in if no sealing ring is used (to seal the thread).

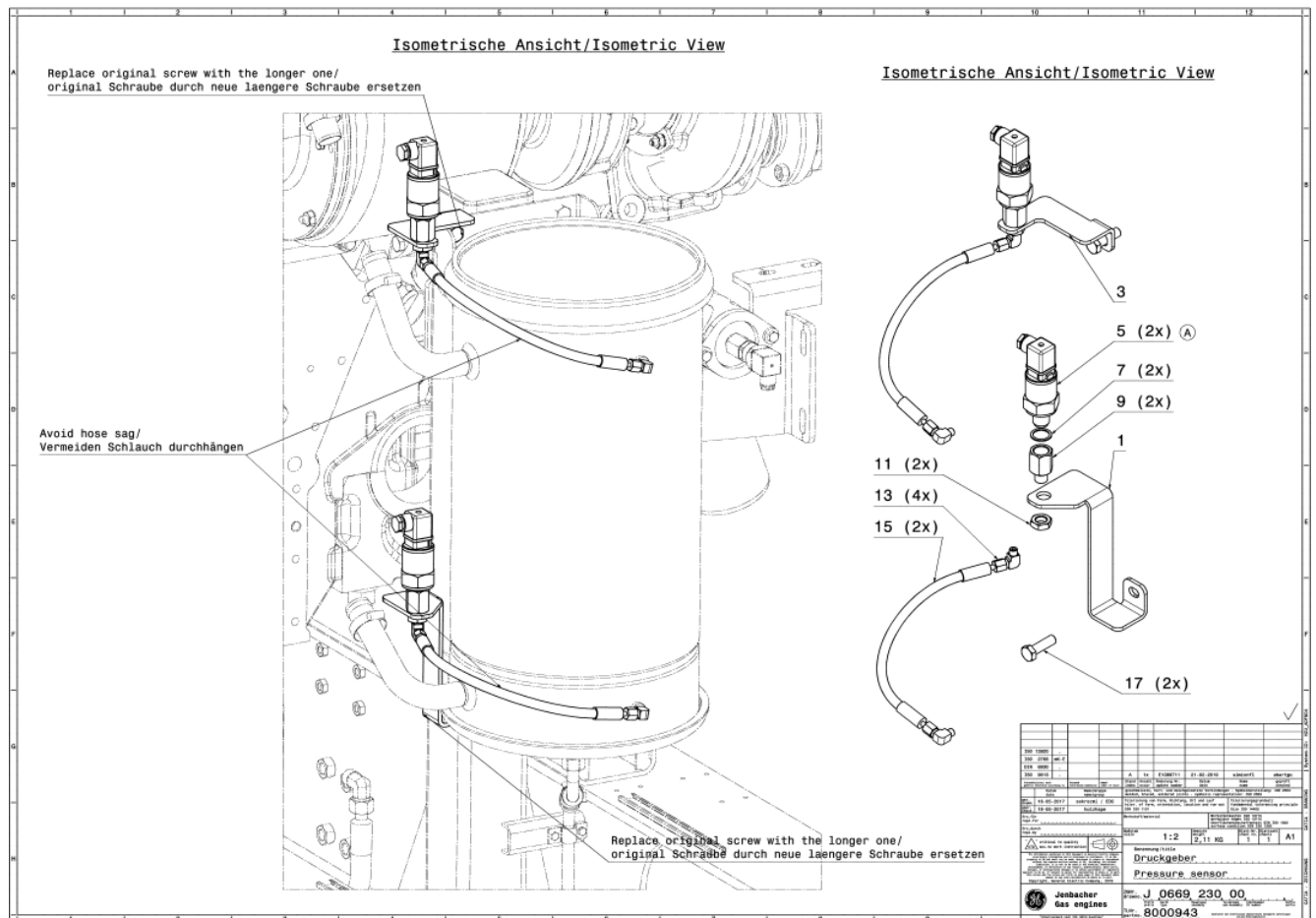


Figure 7: Drawing – Blow-by-filter differential pressure module – PN8000943

Figure 7 shows the drawing for the crankcase pressure module. This is intended to act as an aid during installation. The parts list for this module is available in the INNIO Customer Portal (<https://customer.innio.com/en/customer/dashboard>) as an Excel file together, with this document.



## 2.3 Retrofitting the air filter differential pressure module

### 2.3.1 Basic description

The pressure sensor downstream of the air filter and ambient pressure sensor allows the differential pressure across the air filter to be ascertained. The condition of the air filter can then be calculated later.

### 2.3.2 Air filter sensor installation

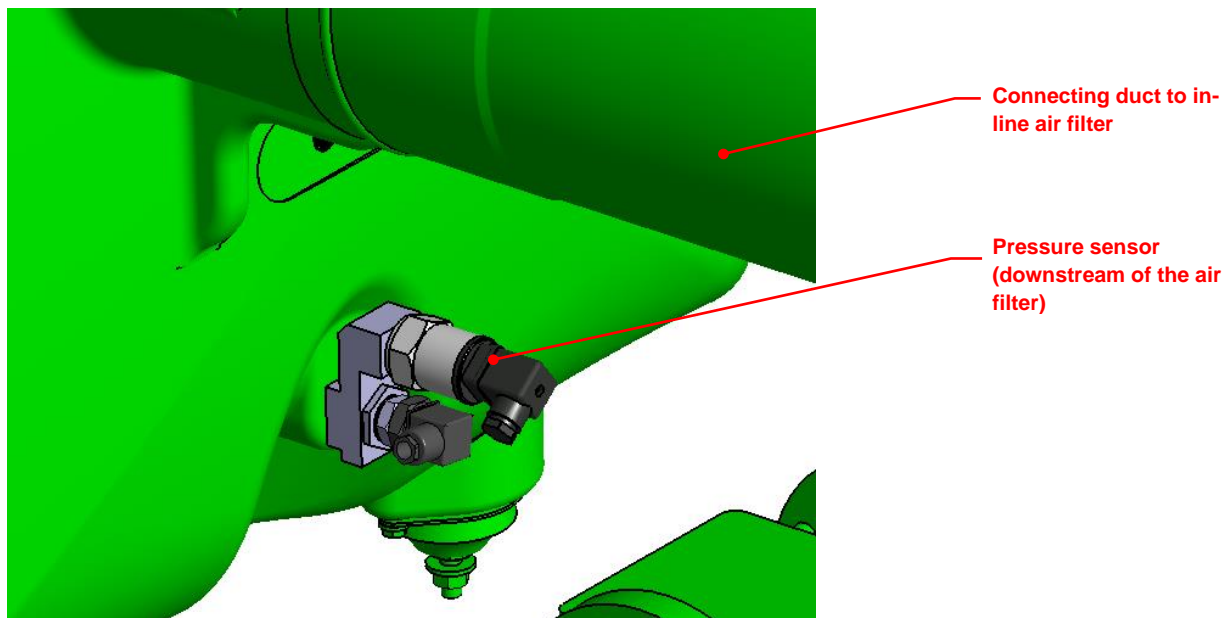


Figure 8: Air filter differential pressure sensor installation

Figure 8 shows the installation and position of the air filter pressure sensor. It is screwed into the nipple provided for the purpose on the connecting duct between the two in-line air filters.

**Note:**



When connecting the ribbed hoses make sure that the hoses are not kinked and are not in contact with other components, such as filter housings or blow-by hoses, as this can lead to chafing in operation resulting in possible failure of the components!

**Note:**



Group the pressure sensor cables to give a single cable run. It is advisable to bundle these cables with other existing cables (using cable ties).

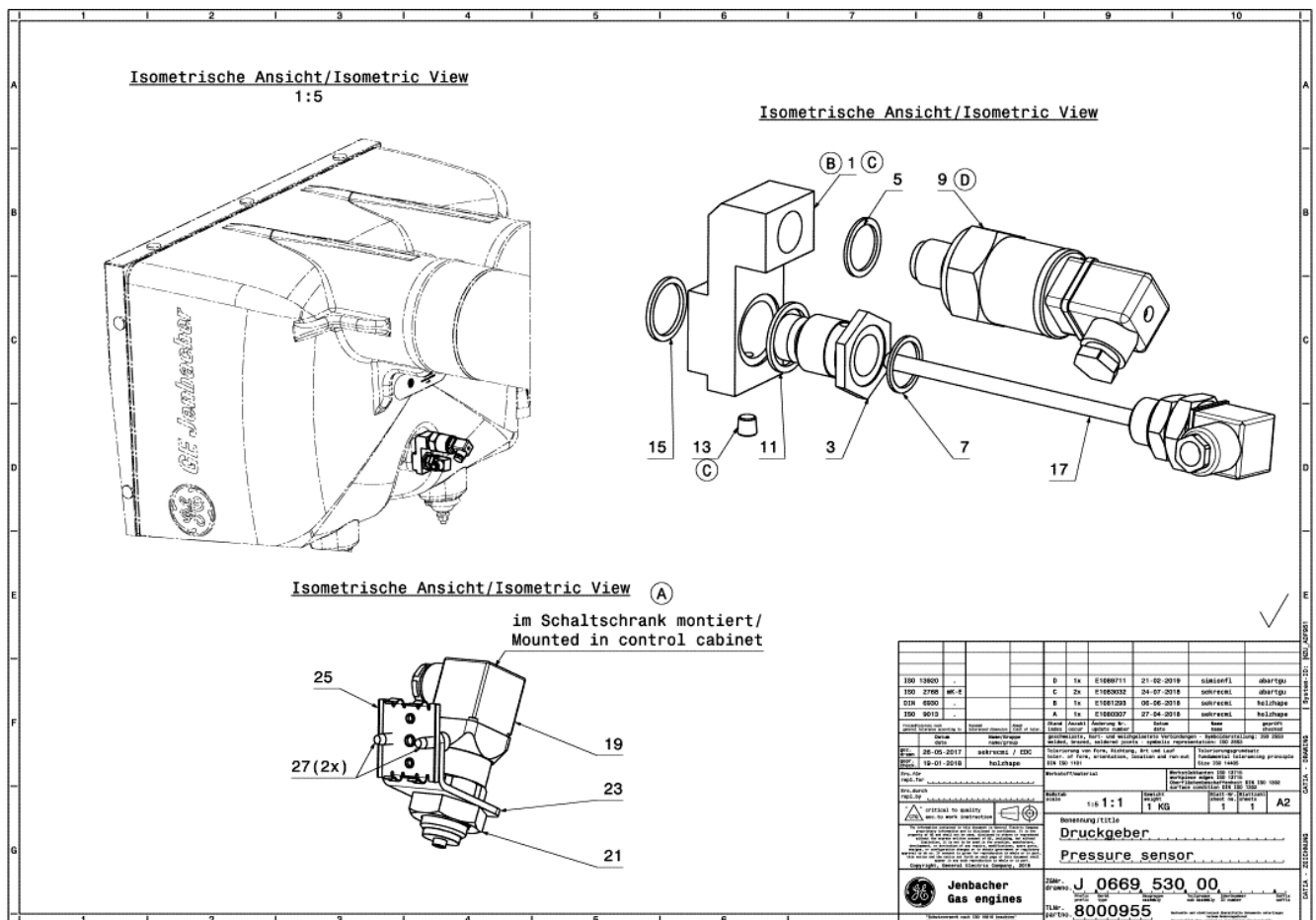


Figure 9: Drawing – Air filter differential pressure module – PN8000955

Figure 10 shows the drawing for the air filter differential pressure module. This is intended to act as an aid during installation. The parts list for this module is available in the INNIO Customer Portal (<https://customer.innio.com/en/customer/dashboard>) as an Excel file together, with this document.

### 2.3.3 Fitting the ambient pressure sensor

The ambient pressure is measured by a pressure sensor installed in the switchgear cabinet.

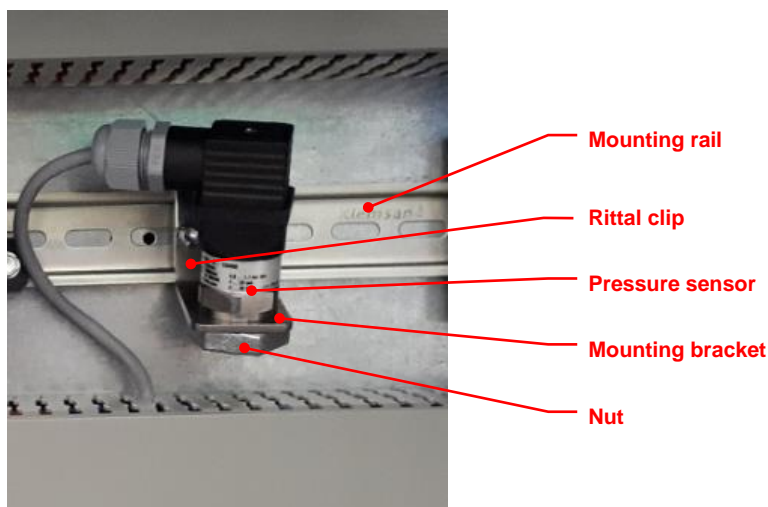


Figure 10: Ambient pressure sensor installation



The ambient pressure sensor is mounted on the rail in the switchgear cabinet by means of a bracket screwed to a Rittal clip. The cabling must be connected directly to the PLC without Wago terminals.

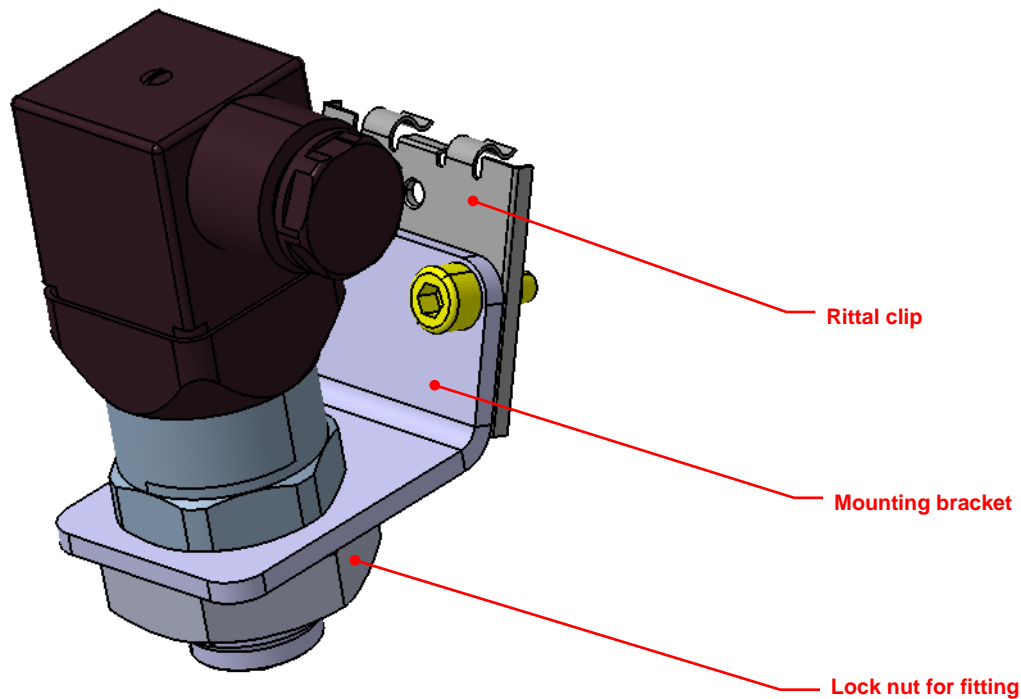


Figure 11: Ambient pressure sensor with bracket

Figure 11 shows how the pressure sensor is fastened to the bracket by means of the lock nut for the fitting. The bracket is mounted on the Rittal clip with the screws provided.

**Note:**



Group the pressure sensor cables to give a single cable run. It is advisable to bundle these cables with other existing cables (using cable ties).



## 2.4 Fitting the mixture cooler differential pressure module

### 2.4.1 Basic description

The two sensors of the mixture cooler differential pressure module measure the pressures upstream and downstream of the blow-by filter. The differential pressure across the mixture cooler can be calculated from these two pressures and gives an indication of the condition of the mixture cooler.

### 2.4.2 Fitting the mixture cooler differential pressure module

The pressure sensors are screwed into adapters, which have matching connection threads for screwing into the designated threads upstream and downstream of the mixture cooler respectively.

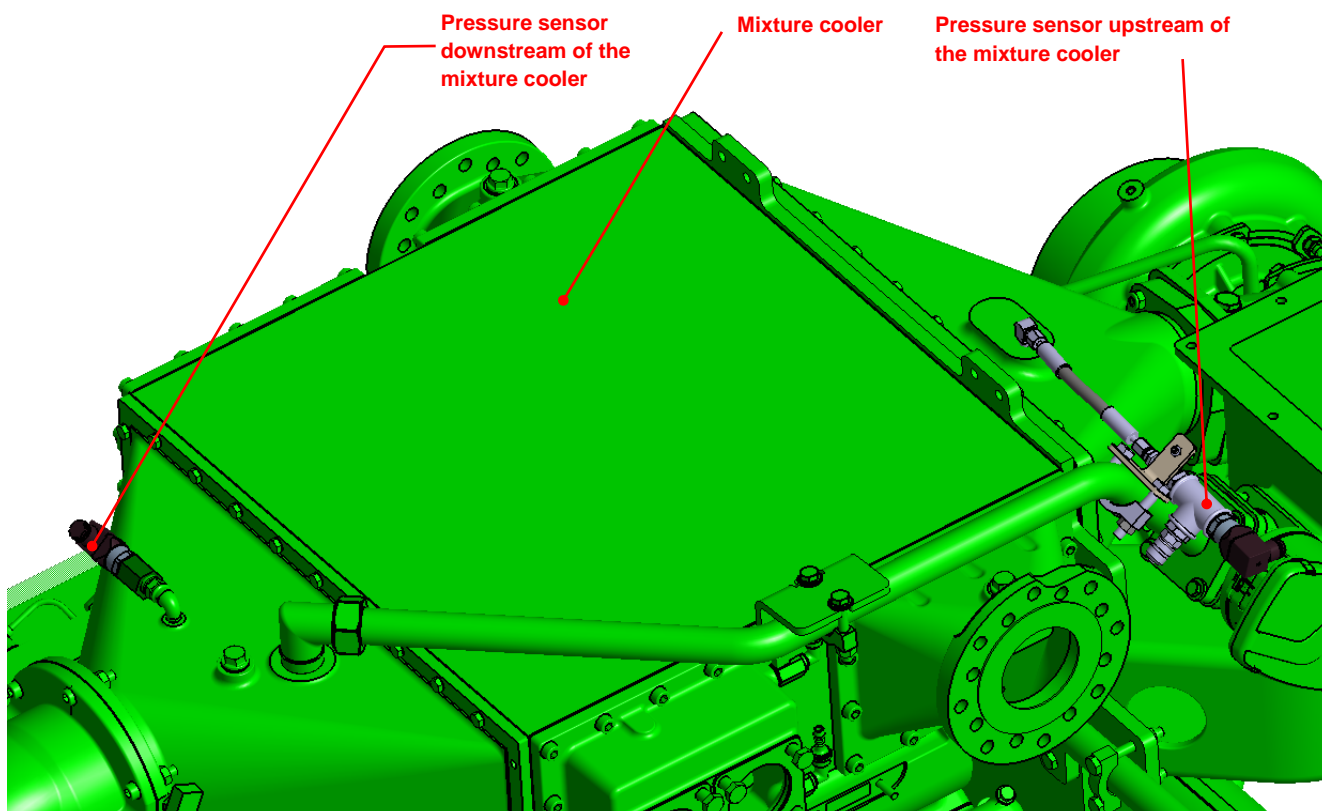


Figure 12: Installation of the pressure sensors on the mixture cooler

#### Pressure sensor upstream of the mixture cooler:

The pressure sensor upstream of the mixture cooler is screwed into a matching T-piece.

#### Pressure sensor downstream of the mixture cooler:

The pressure sensor downstream of the mixture cooler is screwed into an appropriate adapter.

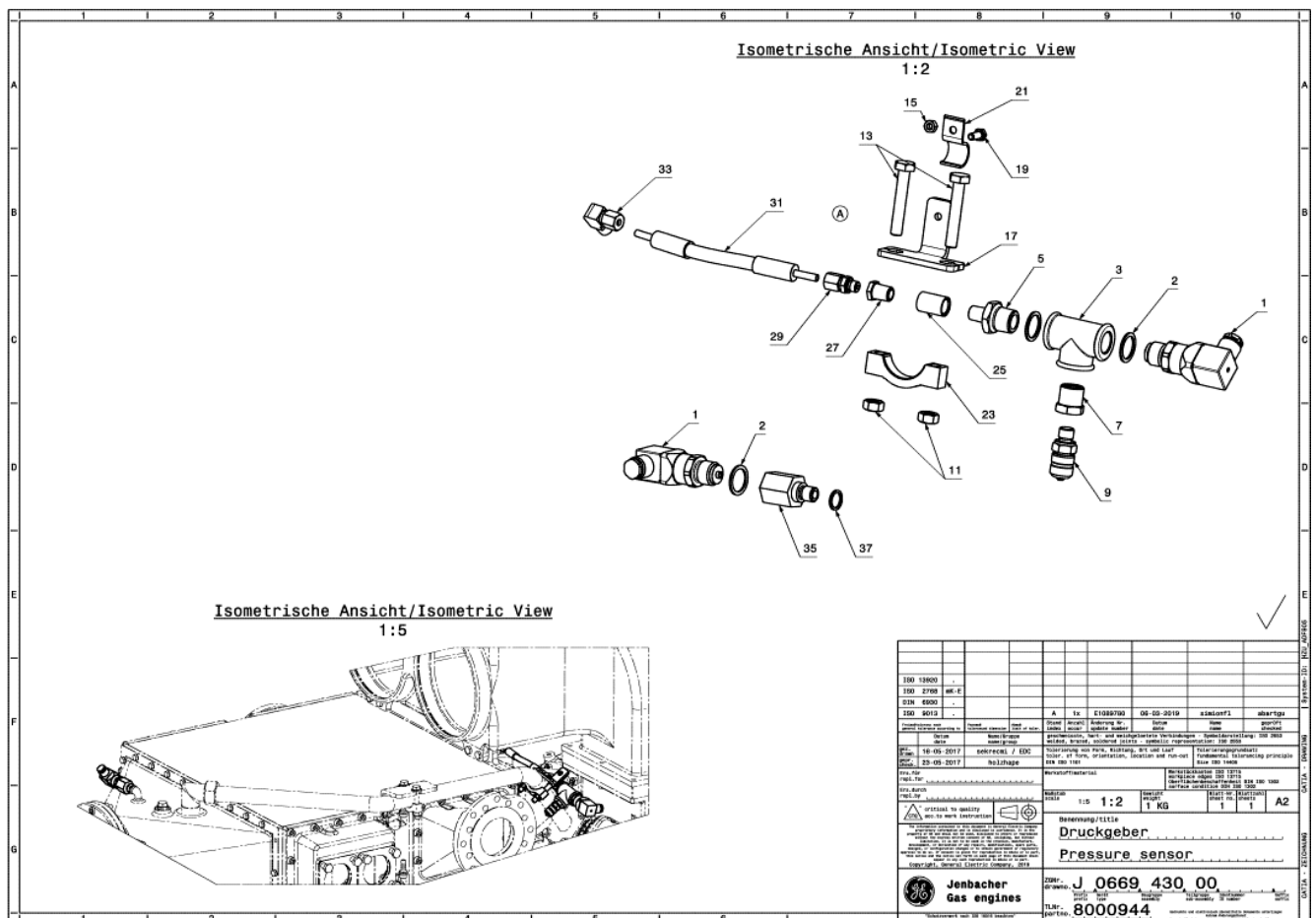


Figure 13: Drawing – Mixture cooler differential pressure module – PN8000944

Figure 13 shows the drawing for the mixture cooler differential pressure module. This drawing is intended to act as an aid during installation. The parts list for this module is available in the INNIO Customer Portal (<https://customer.innio.com/en/customer/dashboard>) as an Excel file together, with this document.

**Note:**



Group the pressure sensor cables to give a single cable run. It is advisable to bundle these cables with other existing cables (using cable ties).

**Note:**



After completing the installation of all the sensor modules, the measuring points must all be checked during operation. This leak test is carried out using a leak detection agent.





## 2.5 Fitting the oil pressure differential pressure module

### 2.5.1 Basic description

The additional installation of a pressure transducer (see Figure 14) allows the differential pressure across the oil filter to be measured. This gives an indication of the condition of the oil filter.

### 2.5.2 Installation of the module

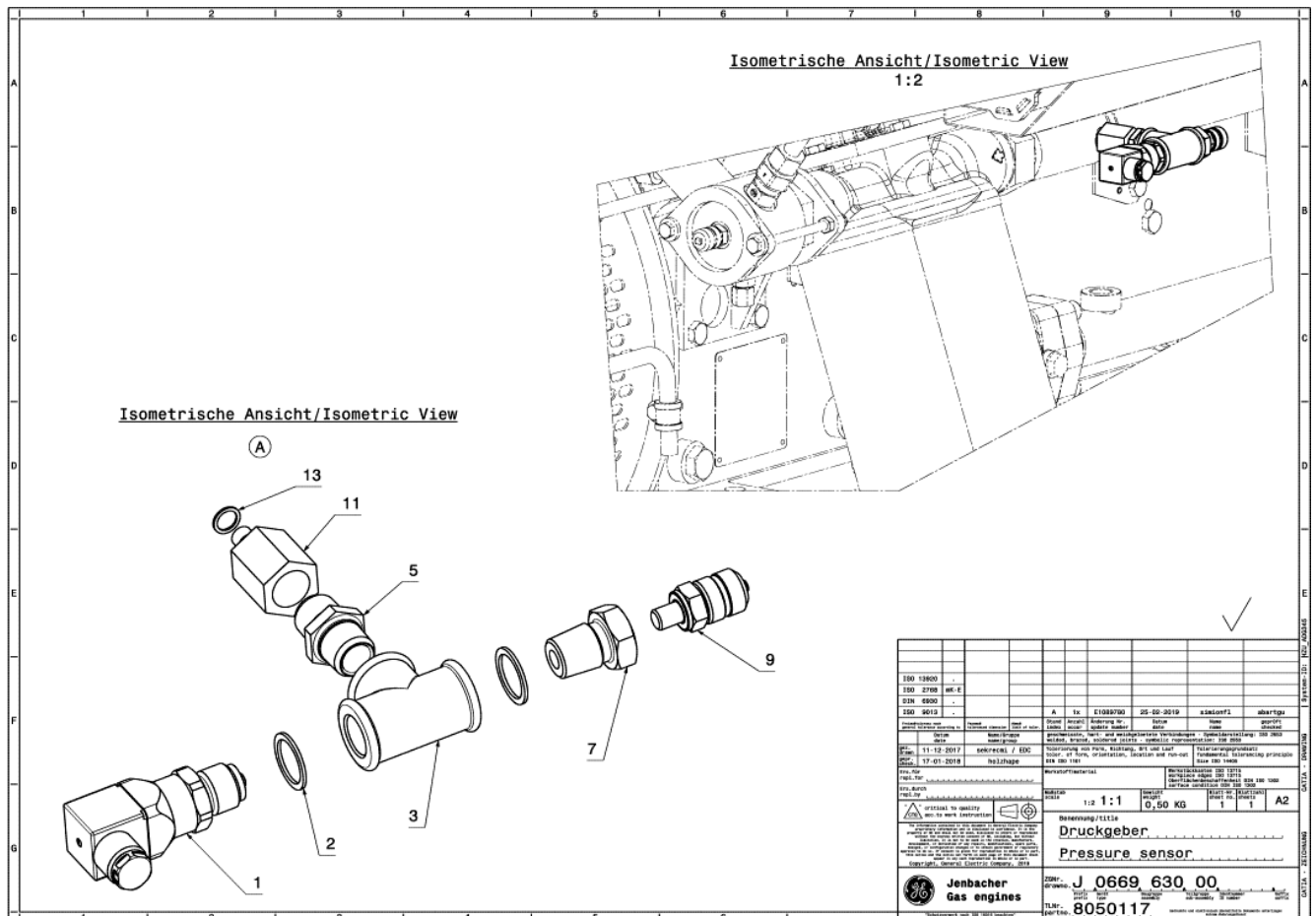


Figure 14: Drawing – Oil filter differential pressure module – PN8050117

Figure 14 shows the oil filter differential pressure module to be installed. After pre-assembly, the entire assembly is screwed into the provided thread. The screwing process is carried out via the adapter (pos. 11).

#### Attention:



After assembly, all connections / sealing points must be checked for their correct fit.

#### Note:



Group the pressure sensor cables to give a single cable run. It is advisable to bundle these cables with other existing cables (using cable ties).

#### Note:



After completing the installation of all the sensor modules, the measuring points must all be checked during operation. This leak test is carried out using a leak detection agent.



### 3 SOFTWARE

To be able to install the sensor package, at least DIA.NE XT, DIA.NE XT3 or DIA.NE XT4 must be installed.

**DIA.NE XT:**

If the sensor package is to be installed on engines equipped with DIA.NE XT, note that additional software must be installed.

**DIA.NE XT3:**

If the sensor package is to be installed on engines equipped with DIA.NE XT3, note that additional software must be installed.

**DIA.NE XT4:**

As from version 4.05, activation of individual parameters for recording measured data will be all that is required.



## 4 MISCELLANEOUS

### 4.1 Required time

The following table shows how much time should be allowed for retrofitting the sensor package for each J3xx engine.

ACTIVITY	ENGINE	REQUIRED TIME
Retrofitting the crankcase pressure sensor on 1 engine	J3xx	1 hour for 1 technician
Retrofitting the blow-by filter differential pressure module on 1 engine	J3xx	1 hour for 1 technician
Retrofitting the air filter differential pressure module on 1 engine	J3xx	1 hour for 1 technician
Retrofitting the mixture cooler differential pressure sensor module on 1 engine	J3xx	1 hour for 1 technician
Retrofitting the oil filter differential pressure module on 1 engine	J3xx	1 hour for 1 technician
Installing and testing the software	J3xx	Approx. 1 day for 1 technician

Table 3: Required time

### 4.2 Relevant documents

When working on Jenbacher modules, all applicable local regulations must be observed in addition to our documentation. In relation to this Service Technician Instruction we stress the fact that the following documents must also be observed:

- Technical Instruction TA 1100-0105: Engine shut-down
- Technical Instruction TA 1100-0111: General conditions - Operation & maintenance
- Technical Instruction TA 2300-0005: Safety instructions
- Technical Instruction TA 2300-0010: Guidelines for using the LOTO kit
- Technical drawing 8000943: Blow-by filter differential pressure module
- Technical drawing 8000944: Mixture cooler differential pressure module
- Technical drawing 8000955: Air filter differential pressure module
- Technical drawing 8050098: Crankcase pressure module
- Technical drawing 8050117: Oil filter differential pressure module

### 4.3 Revision history

INDEX	DATE	DESCRIPTION / REVISION SUMMARY
01	18/03/2019	First version of this document

Table 4: Revision history



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