



## OPERATING INSTRUCTIONS **FRIAMAT BASIC ECO**

[www.friatools.com](http://www.friatools.com)

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# 1. Preliminary remarks

## 1.1 Safety instructions and hints

In these operating instructions, the following symbols with warnings are used:

Symbol	Meaning
	Danger to people. Failure to comply can result in death or serious injury.
	Danger to people. Failure to comply can result in minor or moderate injury.
	Danger to objects. Failure to comply can result in objects damage.
	Application hints and other useful information. Failure to comply can not result in personal injury or objects damage.

## 1.2 Intended use

FRIAMAT fusion units are designed to apply a maximum fusion voltage of 48 V on the following:

- FRIALEN® safety fittings with HDPE pressure pipes (SDR 17-7),
- FRIALEN® XL large pipe installations with HDPE pressure pipes (SDR 17-7), and
- FRIAFIT® sewage fittings with HDPE sewage pipes (SDR 17-33).

FRIAMAT fusion units can also be used on fittings from other manufacturers when these components bear a 24 digit barcode complying with ISO 13950:2007-03. The power ratings and technical data of both the fittings and the FRIAMAT fusion unit must be observed (see also Section 3.14 “Technical data”).

Intended use also includes adherence to:

- all of the instructions in these operating instructions,
- the general and specific processing specifications for electrofusion fittings, and
- the applicable accident prevention regulations, the environmental regulations, the statutory rules, the pertinent safety provisions, and all standards, laws, and directives applying in the country of use.

## **2. Safety**

### **2.1 Functional reliability**

FRIAMAT fusion units are state of the art, built in accordance with the requirements under ISO 12176-2 and the acknowledged safety standards and fitted with the required safety devices. Prior to delivery, FRIAMAT fusion units are tested for correct and safe functioning. Failure to operate or otherwise use the equipment properly will pose a danger to:

- the health of the operator,
- the FRIAMAT fusion unit or other property of the user, or
- the efficiency of work with the FRIAMAT fusion unit.

Safety considerations forbid the following:

- modifications and changes to the FRIAMAT fusion unit and
- working with FRIAMAT fusion units with broken lead seals. Failing to
- observe the above makes all warranty claims void.

### **2.2 The operator's obligations**

Only trained personnel may work with the FRIAMAT fusion unit. In the work area, the operator is responsible for all third parties. The owner is obliged:

- to make the operating instructions accessible to the operator and
- to ensure that these instructions have been read and understood.

The operating instructions must be kept at all times at the device's place of use (ideally in the mesh pocket on the transport box). They must be accessible to the operator at all times.

## 2.3 Sources of danger



### **Electric shock from live parts! Danger of death!**

- Never leave the FRIAMAT fusion unit unattended.
- Immediately replace damaged housings, connecting lines, and extension cables. Stop using the FRIAMAT fusion unit.
- Before all care and maintenance work, pull out the plug connecting the equipment.
- Maintenance and repair work must be performed by authorised FRIATEC service stations only.
- Supply FRIAMAT fusion units only with the operating voltage specified on the ratings plate.
- Fit a residual current protective device (RCD) when this is prescribed.
- Do not remove or otherwise put safety installations out of operation.
- Immediately eliminate identified defects.



### **Danger of fire and explosion from highly flammable materials and potentially explosive atmospheres!**

- Keep away from flammable liquids and gases.
- Do not use in potentially explosive atmospheres (e.g. in areas where flammable gases, solvent vapours, or ignitable dusts can accumulate).
- Never leave the FRIAMAT fusion unit unattended.

## 2.4 Mains operation

Out of doors (building sites), power outlets must be fitted with residual current protective devices (RCDs). The regulations governing RCDs must be observed here.

### **NOTE**

**Before commencing fusion, check the input voltage. The FRIAMAT fusion unit is designed for an input voltage range of 190-250 V!**

## 2.5 Generator operation

### **NOTE**

**Only those generators must be used that have been designed for industrial use on building sites. The operating instructions for the generator must be observed!**

The use of generators must comply with DVGW work sheet GW308, VDE 0100 Part 728, and the specifications and guidelines applying in the country of use.

### **INFORMATION**

**The rated power output required from the generator depends on the level needed for the largest fusion fitting, the connection conditions, the ambient conditions, the generator type, and its control characteristics. Generators from different series exhibit highly diverse control characteristics. The suitability of a specific generator, therefore, cannot be safeguarded even when it provides the required rated power output according to its technical data sheet.**

**In cases of doubt, e.g. when acquiring new equipment, contact our service hotline +49 (0)621 486-1533!**

Use only those generators that operate with frequencies within 44-66 'Hz.

First start the generator, and let it run for half a minute. If necessary, adjust the no-load voltage, limiting it to the voltage specified in the technical data. The generator (mains) fuse must be at least 16 A (slow blow).

### **NOTE**

**During fusion, do not operate any other consumer from the same generator!**

On finishing fusion work, first pull out the plug connecting the device to the generator, and then switch off the generator.

## 2.6 Extension cable

When using an extension cable, make sure it has an adequate conductor cross section:

- 2.5 mm<sup>2</sup> up to 50 m in length or
- 4 mm<sup>2</sup> up to 100 m in length.

### NOTE

#### **Danger of overheating in the extension cable!**

The extension cable may be used only when it has been completely unwound and stretched out.

## 2.7 Opening the device



#### **Electric shock from live parts! Danger of death!**

- Never open the FRIAMAT fusion unit when it is supplied with operating voltage!
- FRIAMAT fusion units may be opened only by specialised personnel from an authorised FRIATEC service station!

## 2.8 Safety measures at the installation site

The connecting and fusion cables must be protected against sharp edges. Do not expose the FRIAMAT fusion unit to heavy mechanical loads.

FRIAMAT fusion units are splash proof. They may not, however, be immersed in water.

## 2.9 Emergency

In emergencies, immediately set the main switch to OFF, and disconnect the FRIAMAT fusion unit from the voltage supply.



### 3. Basic information

#### 3.1 Layout/parts



- 1 Main switch
- 2 Fusion cable with reader wand or barcode scanner
- 3 Front foil with display and function keys
- 4 Service interface (USB) with protective cap

- 5 Ventilation slots (air outlet)
- 6 Adapter bag
- 7 Power cable
- 8 Ventilation slots (air intake)

## 3.2 Function keys explained



### 1 Function keys

The three blue function keys let you access the function key symbols shown on the display.

### 2 Direction keys

The direction keys (left/right/up/down) let you move the cursor through the menu structure. The selection is confirmed with OK or one of the function keys.

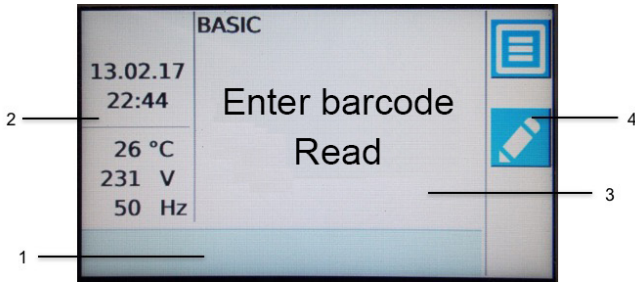
### 3 START key

The START key is used to start a fusion procedure. This key is also used to confirm messages on the display.

### 4 STOP key

The STOP key is used to abort a fusion procedure, to close sub- or individual menus, and to cancel an input (without saving).

### 3.3 Display



#### 1 Function status symbols

Symbols appear representing the functions that can be activated at this time. See also Section 3.5. Also shown is the next due maintenance (see also Section 6.2).

#### 2 View ambient details

Key ambient details are shown (date, time, ambient temperature, voltage, and frequency).








#### 3 Main window

The main window presents all inputs and details in each of the menus.


#### 4 Guide key symbols

This presents the functions that are activated at each of the blue guide keys. The symbols shown vary depending on the menu selected (see also Section 3.4).

### 3.4 Function key symbols explained

Symbol	Designation	Description
	Menu key	This opens the main menu
	Input / emergency input key	This lets you input a barcode manually, e.g. when it cannot be read. This opens a virtual keypad.
	Confirm key	Depending on the context: OK, Confirm, Apply, Save, Select (a menu item)
	Cancel key	This ends an input and closes the dialog without saving
	Back key	This takes you one step back in a menu, sequence, or input (without changes)
	Next key	This takes you to the next step in a sequence or input
	Backspace key	This virtual key (emergency inputs) deletes the character to the left of the cursor.

### 3.5 Function status symbols explained

Symbol	Description
	Maintenance date: This is the next due maintenance shown in days.

### 3.6 Type plate

The type plate lists the details specific to the FRIAMAT fusion unit and its unique device number.

### 3.7 Reader wand

To read in fusion barcodes and traceability barcodes, place the reader wand under a slight angle (like a pencil) in front of the barcode on the fitting. Now move the reader wand quickly over the whole label and a little beyond. Barcodes can be read in from right to left or vice versa. When the barcode has been read in correctly, the device emits an acoustic signal to confirm this. If the barcode cannot be read in the first time, repeat the procedure, this time under a different angle or at a different speed.

#### **NOTE**

**Protect the tip of the reader wand from dirt and damage!**

The condition of the reader wand tip has a direct effect on the legibility of barcodes.

### 3.8 Barcode scanner

The barcode scanner reads in fusion barcodes and traceability barcodes without physical contact. All you need to do is aim at the barcode and press the read button. The barcode is scanned by means of a red light strip that must cross over the whole barcode, whenever possible at the centre. The barcode is not detected properly when the red light strip does not cross the whole barcode.

The optimal read results are obtained when the scanner is positioned at a small distance over the barcode. When the barcode is read in successfully, the device emits an acoustic signal.

#### **NOTE**

**Protect the reading window from dirt and scratches!**

The condition of the reading window has a direct effect on the capabilities of the FRIAMAT barcode scanner.

### 3.9 Protective cap for data interface

The USB port is found directly behind the protective cap. This data interface functions as a service port. The protective cap for the data interface must be screwed on at all times to prevent contaminants and moisture from reaching it.

### 3.10 Temperature probe

FRIAMAT fusion units can be used only on electrofusion fittings bearing a barcode. When this is read in, the microprocessor controlled FRIAMAT fusion unit regulates and monitors the supplied energy fully automatically and defines the fusion time as a function of the ambient temperature. This ambient temperature is continuously measured by the temperature probe on the fusion cable.

Make sure that both the temperature probe and the fusion fitting are exposed to the same ambient temperatures. Avoid adverse processing situations, e.g. where the probe is exposed to intense sunlight and the fitting is in the shade. The temperature probe must be protected against damage.

### 3.11 Fan functionality

How the fans function depends on the temperatures measured at the heat sink inside the FRIAMAT fusion unit. The fans switch ON automatically when the heat sink reaches a certain temperature. And this not only during, but also between fusion sessions, or after reactivation, depending on the load levels. This safeguards reliable operations in continuous duty and during fusion on large dimensions.

#### **INFORMATION**

##### **Reduce cooling times!**

In particular during series fusion work or work on fittings requiring high power levels, leave the FRIAMAT fusion unit switched ON after each fusion. The fans can then reduce the heat sink temperature.

### 3.12 FRIAMAT preCHECK function

Before every fusion process, the FRIAMAT calculates from the fitting parameters, the current device status, and the ambient temperature whether this fusion can be executed to the end. Not until then can the fusion be started, and performance related fusion stops are reliably prevented as a result.

### 3.13 Signalling devices

FRIAMAT fusion units confirm certain sequences of operations by emitting an acoustic signal (1, 2, 3, or 5 beeps). These signals mean the following:

- 1 beep means: Read barcode confirmed.
- 2 beeps mean: Fusion procedure ended.
- 3 beeps mean: Supply voltage too low / too high.
- 5 beeps mean: Error! See display!

#### **INFORMATION**

##### **Adjust the volume!**

The volume of these signals can be set to “high” or “low” in the “Basic Settings” menu. See also Sections 5.1.

### 3.14 Technical details

Technical details*	FRIAMAT basic cco
Input voltage range	AC 190 V – 250 V
Frequency range	44 Hz...66 Hz
Stromaufnahme	AC 16 A max.
Input current	3,5 kW
Generator rated output for fittings d 20 – d 160 d 180 – d 900	~ AC 2,4 kW ~ AC 5,0 kW
Unit fuse	16 A slow blow
Housing	international protection IP 54 DIN EN 60529 protection class I DIN EN 60335-1
Connecting cable	5 m with contoured plug
Fusion cable	4 m with fittings plug, ø 4 mm
Barcode type	code 2/5 interleaved according to ANSI HM 10.8 M-1983 and ISO CD 13950/08.94
Operating temperature range**	20°C...+50°C**
Fusion current monitoring	short circuit 110 A short circuit 1.70 x IN interrupt 0.25 x IN
Fusion voltage	max. DC 48V
Service port	USB

Languages	Bulgarian, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Hungarian, Italian, Latvian, Lithuanian, Polish, Portuguese, Romanian, Russian, Slovakian, Slovenian, Spanish, Swedish, Turkish
Dimensions W x D x H	260 x 500 x 340 mm
Weight	approx. 18 kg
Accessories	operating instructions, transport box
Overvoltage classification	Category II
Certificate/quality	CE, ISO 9001, WEEE Reg. No. DE 49130851, RoHS, REACH

\*: Specifications subject to change.

\*\*: Fusion work on fittings from other manufacturers must comply with their respective working temperature ranges!

### 3.15 Automatic activation of maintenance interval

The maintenance interval stored in the FRIAMAT fusion unit (default: 12 months, see also Section 7.2) is not activated automatically until after the first fusion.

#### **INFORMATION**

**The leading maintenance date is always shown on the display and may differ from the details on the service label attached to the FRIAMAT fusion unit!**

### 3.16 Transport/storage/dispatch

The FRIAMAT fusion unit is delivered in a transport box. This transport box keeps it dry and protected against moisture. The box should always be used to transport the device. The temperature range for storage is -20 °C to +70 °C.



## 4. “Fusion” sequence

### 4.1 Siting, connection, and startup

Before every use, you should check that the FRIAMAT fusion unit is not damaged and operates properly within the specifications. All parts must be correctly installed and all conditions fulfilled. Only then can the device operate properly.

The FRIAMAT fusion unit can be sited and operated out of doors when it is protected against rain and moisture.

1. The FRIAMAT fusion unit must be sited on level ground.
2. Prepare the fitting and pipes for fusion in compliance with the assembly instructions.
3. Make sure that the fitting’s contact pins are accessible for connection to the fusion plugs.

#### **NOTE**

##### **Danger of overheating in the cables!**

Before use, all cables must always be unwound completely. This applies to the device, fusion, and extension cables.

4. Connect the device to the power supply (mains or generator).  
To do so, insert the device’s plug into the socket.
5. If necessary, use an extension cable. Make sure that the conductor cross section is adequate (see also Section 2.6).
6. When operating with a generator, make sure that it is fused with at least 16 A (slow blow, see also Section 2.5).
7. When operating with a generator, first start the generator and let it warm up for 30 s.
8. Switch ON the FRIAMAT fusion unit at its main switch.

## NOTE

### **Danger of scorching!**

The contact areas on the fusion plugs and fitting must be clean. Soiled contacts can cause the plug to overheat, damaging it.

- If necessary, wipe clean of any contaminants.
- You must always protect the plugs against soiling.
- When a deposit has formed that cannot be removed completely, the fusion plugs must be replaced.
- First examine the fusion plugs and the fitting's insert contacts for soiling, then connect them.



**Only original FRIATEC fusion plugs (art. no. 624529) may be used!**

9. Connect the fusion plugs to the contact pins on the fitting.
10. The fusion plugs must be attached completely to the fitting's pins, i.e. over their whole internal contact length.

## **4.2 Reading in the barcode**

1. Read in the barcode: use exclusively the barcode affixed to or provided with the contacted fitting.
2. If the barcode label is missing or damaged, you can use the barcode on an identical fitting from the same manufacturer and the same charge. In cases of doubt, contact the fitting manufacturer's hotline.

## NOTE

**It is forbidden to read in a replacement barcode on a different fitting!**

3. Read in the barcode with a reader wand or barcode scanner (see also Sections 3.7 and 3.8).
4. A correctly read barcode is confirmed with an acoustic signal.

## INFORMATION

**When an acoustic signal is not emitted, examine the reader wand or barcode scanner for soiling or damage. If necessary, you can also perform the fusion in emergency input mode (see Section 5.3)!**

### 4.3 Starting the fusion procedure



#### **Danger of burning injury!**

In rare cases, hot PE melt can exit when the fusion sequence malfunctions. A safety distance of at least 1 m must be kept from the fusion site.

#### **NOTE**

**Do not connect any other consumers during fusion!**

You can stop the fusion procedure at any time by pressing the STOP key. Fusion can be resumed after the fusion joint has cooled completely (and all causes of the fault have been eliminated). Observe here the processing instructions from the fitting manufacturer.

#### **INFORMATION**

**When an acoustic signal is not emitted confirming the read-in process, examine the wand or barcode scanner for soiling or damage. If necessary, you can also perform the fusion in emergency input mode (see Sections 5.5 and 6.3)!**

#### Operating step

1. **“Pipe Processed?”** appears on the display. When applicable, confirm this with the (START) or the (Next) function key.
2. The fitting data then appear again. These must be checked and confirmed by the user.
3. Press the (START) key to initiate the fusion procedure. The ambient temperature is measured, and the resistance of the connected fitting determined ("Check" appears on the display). The connected fitting and the FRIAMAT preCHECK function are now checked. On positive results, fusion starts automatically. The display shows the fusion progress. This shows in seconds the duration of fusion and the fusion time left.
4. “Fusion successful” on the display means: Fusion procedure has ended. “Fusion time nom” and “Fusion time act” mean nominal and actual fusion time and must agree.
5. Note the fusion parameters on the pipe/fitting. This also serves to prevent double fusions.
6. “Fusion successful” with “Fusion time nom” and “Fusion time act” must always be acknowledged with OK or, alternatively, with the START or STOP key. The fusion procedure has ended, and the FRIAMAT fusion unit is ready for the next fusion.

## 5. FRIAMAT basic eco

### 5.1 “Basic settings” menu

The function key in the main menu opens the submenu “Basic settings”. Here you can edit the device settings.

Date and time

\* System language \*

Volume

1. Press the (Menu) function key. This opens the main menu.
2. Press the direction keys to open the “Basic Settings” submenu.
3. Press the (Confirm) function key or OK.
4. Use the direction keys to open the menu for Time, Date, Language, and Volume.
5. Press the (Confirm) function key or OK.
6. Use the function and direction keys to make your changes and edit the settings.
7. Press the (Confirm) function key or OK to save your changes.

#### ***INFORMATION***

**The “Basic settings” menu contains the item “System language” preceded and followed by two asterisks. This lets you find the system language settings menu when, for instance, the language was changed by accident.**

### 5.2 “Info” menu

The (Menu) function key in the main menu opens the submenu “Info”. Here you can view the device details.

Type

Device number

SW version

HW version

Maintenance Date

1. Press the (Menu) function key. This opens the main menu.
2. Press the direction keys to open the “Info” submenu.
3. Press the (Confirm) function key or OK.
4. All device details are shown.
5. Press OK or the START key to close the menu.

### 5.3 “Emergency Input” menu

The “**Emergency Input**” menu lets you enter the fusion barcode manually.

1. Press the (Input/Emergency Input) function key.
2. Enter each of the numbers in the barcode using the direction keys on the number pad now appearing. When finished, press OK.
3. Press the (Confirm) function key to save the entered numbers, the (Cancel) function key to abort the input, or the (Backspace) function key to delete preceding numbers.
4. The (Back) function key deletes the last input.
5. If entered correctly, the number on the display is the same as the barcode read in with the reader wand or scanner.

#### ***INFORMATION***

**No numbers are shown when this function is used for the first time.  
Afterwards, the last barcode entered manually is always shown!**

## 6. Warranty / maintenance / disposal

### 6.1 Warranty

FRIAMAT fusion units come with a 24 month warranty.

### 6.2 Maintenance and care

In accordance with DVS 2208 Part 1 and BGV A3 (“Electrical systems and equipment”), nonstationary electrical equipment must be subjected to repeat tests **at least once a year**. This maintenance can be performed at FRIATEC or one of its authorised service stations (see Section 8.1).

Also all connection adapters must be submitted for tests on the maintenance dates.

What?	When?	Who?
Clean the reader wand or barcode scanner, and check for damage.	Daily	Operator
Check function.	Before every use	Operator
Check, and, if necessary, clean or exchange contacts.	Before every use	Operator
Factory maintenance	Yearly	FRIATEC GmbH or authorised service stations

### 6.3 Disposal

The European Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) regulates the disposal of used electrical and electronic products. The WEEE Directive 2005 was implemented as the ElektroG on the German disposal sector. Under these laws, waste electrical and electronic equipment must be introduced to a proper disposal or recycling process. FRIAMAT fusion units fall under this European Directive and can be submitted for disposal to FRIATEC GmbH or one of its authorised service stations.

Further regulations, standards, and directives applying in the country of use must be observed.

## 7. Error messages / warnings / info

Irregularities during fusion cause error messages or warnings to appear on the display of the FRIAMAT fusion unit.

### **INFORMATION**

On the FRIAMAT basic eco, press the function key to view the displayed error message in plain text!

### **INFORMATION**

Should the FRIAMAT fusion unit output an error message or warning that is not listed in the following and that cannot be explained or remedied despite the plaintext description, contact our service hotline +49 (0)621 486-1533!

No.	Displayed text	Meaning/causes	Remedy
02	Temperature out of range	Ambient temperature outside of permitted range.	You may have to tent over or shield the fusion area
03	Resistance outside of tolerance	Fitting's electrical resistance outside of tolerance.	Check that contacts sit firmly and are clean. If necessary, clean contacts and replace the fitting.
04	Fitting's wire turn short circuited	Short circuit in the fitting's wire turn.	Replace fitting, and send it in for analysis.
05	Fitting's wire turn interrupted	Current flow interrupted	Check the connection between the fusion plug and the fitting. If OK, replace fitting, and send it in for analysis.

No.	Displayed text	Meaning/causes	Remedy
06	Voltage outside of tolerance	Deviation in fusion voltage too high.	Notify authorised service station.
08	Operating voltage out of range	Operating voltage outside of permitted range during fusion.	Extension too long, or cross section too small. Check voltage and connection conditions on the generator.
09	Frequency out of range	Frequency outside of permitted range during fusion.	Check frequency of generator voltage
10	Fusion stop	Fusion stopped at STOP key.	–
12	Device overheated	Protective function that prevents the device from overheating.	Let the device cool down. The fans reduce the temperature of the device when it is switched ON.
13	Operating voltage failure	Supply voltage interrupted (e.g. power failure during fusion) or too low.	Check connection conditions.
14	Power too low	Fitting's power input is too low. The FRIAMAT cannot provide such a low power.	Contact the FRIATEC service hotline: +49 (0) 621 - 486 1533
15	Power exceeded	The fitting's power input exceeds the capacity of the FRIAMAT.	Contact the FRIATEC service hotline: +49 (0) 621 - 486 1533
17 - 19	System error		Contact the FRIATEC service hotline: +49 (0) 621 - 486 1533
23	Generator error	Generator possibly not suitable for fusion.	Contact the FRIATEC service hotline: +49 (0) 621 - 486 1533
30	Fan blocked or defective		Contact the FRIATEC service hotline: +49 (0) 621 - 486 1533



Displayed text	Tip/remedy
Attention! Double fusion!	Message is displayed when a fitting has been tried to fuse once again. Nevertheless, if you intend double fusion on a fitting, you must disconnect the fusion unit's pins from the fitting after the first fusion, and let it cool down (see the processing instructions issued by the fitting manufacturer).
Defect/incorrect barcode	Use a new barcode on an identical fitting, or correct the entered code manually.
Let the device cool down.	Protective function that prevents the device from overheating. Let the device cool down. The fans reduce the temperature of the device when it is switched ON.
Fusion stop	Fusion stopped at STOP key.
End of fusion	Fusion finished.
Checks	Checks on the fitting data and FRIAMAT preCHECK function.
Voltage ... V; frequency ... Hz	Adjust generator, and acknowledge at STOP key.
Maintenance date exceeded	Have the device serviced by FRIATEC GmbH or an authorised service station.

## **8. Annex**

### **8.1 Authorised service stations**

Please contact the FRIATEC GmbH service hotline +49 (0)621 486-1533 for service stations worldwide.

### **8.2 Updates to these operating instructions**

The technical information contained in these operating instructions is examined regularly for currency. The date of the last revision is specified on every page.

The latest operating instructions can be viewed on the internet at [www.friatools.de](http://www.friatools.de). The download section can be accessed via the navigation bar. This provides our updated operating instructions in the form of PDF documents. We shall also be pleased to send you these.



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