

**Manual** 

## **Off-line Filter**

FNS 040





## Safety and operating instructions

#### Read safety and operating instructions before use.

**Note:** The indicated data only serve to describe the product.

Specifications regarding the use of this product are only examples and suggestions.

Catalog specifications are no guaranteed features.

The information given does not release the user from his / her own assessments and inspection.

Our products are subject to a process of natural wear and aging.

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The picture on the title page shows a configuration example.

The delivered product may thus differ from the illustration.

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#### 1.1 Applicability of this documentation

This documentation is applicable for the following product:

> Off-line Filter FNS 040

This documentation is written for technicians, operators, service engineers and system operators.

This document contains important information for safe and appropriate assembly, transport, activation, operation, usage, servicing, dismantling and simple troubleshooting.

> Read this document completely and in particular Chapter 2, "Safety Instructions", before you work with the product.

#### 1.2 Required and supplementary documentation

Do not commission the product until you have received the documentation marked with the book icon  $\square$  and before you have understood and complied with the information therein.

Title	Number of document	1.2.1 Document type
Data sheet	80.25	PDF

Table 1: Required and supplementary documentation

#### 1.3 Presentation of information

So that this document can help you to work quickly and safely with your product, we use standardized safety instructions, symbols, terms and abbreviations. For better understanding, these are explained in the following sections.

#### 1.3.1 Safety instructions

In this documentation, safety instructions are faced with a sequence of actions which would result in the danger of personal injury or damage to equipment. The measures described to avoid theses hazards must be observed.

**DANGER** 



#### Type and source of danger

- > Consequences of the danger
- > Escaping or averting the danger
- > Rescue (optional)
- > Warning signal: draws attention to the danger
- > Signal word: indicates the severity of the danger
- > Type and source of danger: specifies the type and source of danger
- > Consequences: describes the consequences in the event of non-compliance
- > Action: indicates how the danger can be avoided

Warning sign, signal word		Meaning
DANGER		Indicates a dangerous situation which results in death or serious injury if not avoided.
WARNING Indicates a dangerous situation which may result in death or serious bodily injury if r		Indicates a dangerous situation which may result in death or serious bodily injury if not avoided.
CAUTION Indicates		Indicates a dangerous situation which may result in light to moderate injury if not avoided.
NOTE		Indicates property damage: The product or surrounding could be damaged.

Table 2: Meaning of the warning signs

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## 1.3.2 Symbols

The following symbols indicate notes which are not safety-relevant but increase the intelligibility of the documentation.

Symbol	Meaning
i	If this information is not observed, the product cannot optimally be used or operated
>	Singular, independent action step / instruction
1. 2. 3.	Numbered instruction The numbers indicate that the action steps follow one another
$\wedge$	This symbol indicates danger to equipment, material and environment
$\triangle$	This symbol indicates the risk of personal injury (minor injury).
This symbol indicates the risk of personal injury (death, serious bodily injury).	
	This symbol specifies that protective gloves should be worn.
	This symbol specifies that safety shoes should be worn.
	This symbol specifies that protective goggles should be worn.
	This symbol specifies that the unit should be disconnected from the power supply.

Table 3: Meaning of symbols

#### 1.3.3 Terms

In this documentation the following terms are used:

Term	Meaning

Table 4: Terms

#### 1.3.4 Abbreviations

In this documentation the following abbreviations are used:

Term	Meaning
FNS	Off-line filter with flow control valve

Table 5: Abbreviations

#### 2. Safety instructions

#### 2.1 About this chapter

This product was manufactured according to the generally recognized standards of engineering. Nevertheless, there is a danger of injury or damage if you do not observe this chapter and the safety instructions in this documentation.

- Read this document thoroughly and completely before working with the product.
- > Retain this document and ensure that it is available for all users at all times.
- Always include the necessary documentation when passing the equipment along to a third party.

#### 2.2 Intended use

This product is a hydraulic component.

You may use the product for the following:

> for filtration of hydraulic fluids in the bypass flow on machines and systems, taking the technical data into account.

This product is intended for professional use only, and not for private use.

"Intended use" also includes that you have completely read and understood this documentation, in particular Chapter 2

"Safety Instructions".

#### 2.3 Improper use

Any other use than the intended use described, is improper and inadmissible.

If unsuitable products are installed or used in safety-related applications, unintended operating states may occur in the application, which may cause personal injury and / or property damage.

Therefore only use this product in safety-related applications if this use is explicitly specified and permitted in the product documentation, e.g. in explosion protection areas or in safety-related parts of a control system (functional safety).

ARGO-HYTOS GMBH assumes no liability for damages resulting from improper use. The risks associated with improper use are solely with the user.

#### 2.4 Reasonably foreseeable misuse

The delivery of the following media is forbidden:

> others than listed in Chapter 10 "Technical data"

in particular:

- > flammable liquids such as petrol or thinner (explosion hazard)
- foodstuffs
- > oil sludge and residues

The device is not suitable for sucking sludge and sediment.

The operator alone is liable for damages resulting from improper use.

#### 2.5 Qualification of personnel

The operations described in this document require fundamental knowledge of mechanics and hydraulics as well as knowledge of the appropriate technical terms. In order to ensure safe use, these operations may therefore only be carried out by a correspondingly skilled worker or an instructed person under the guidance of a skilled worker.

A skilled worker is someone who can - based on his / her technical education, knowledge and experience as well as knowledge of the respective regulations of the jobs assigned to him / her - recognize possible dangers and ensure appropriate safety measures. A skilled worker must observe the relevant technical regulations.

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#### 2.6 General safety instructions

- Observe the valid regulations for accident prevention and environmental protection.
- > Observe the safety regulations and requirements of the country in which the product is used / applied.
- > Only use ARGO-HYTOS products that are in technically perfect condition.
- > Observe all instructions on the product.
- > People who assemble, operate, disassemble or maintain ARGO-HYTOS products may not do so under the influence of alcohol, other drugs or medications that affect the responsiveness.
- Only use manufacturer-approved accessories and spare parts, in order to prevent personal danger due to unsuitable spare parts.
- Observe the technical data and ambient specifications specified in the product documentation.
- If unsuitable products are used or installed in safety-relevant applications, unintended operating states may occur in the application, which can cause personal injury and / or material damage. Therefore only use the product in safety-relevant applications if this use is explicitly specified and permitted in the product documentation.
- > You may only put the product into operation, when it has been established that the final product (e.g. a machine or system), into which the ARGO-HYTOS products have been installed, complies with the country-specific regulations, safety regulations and standards of the application.

#### 2.7 Product and technology related safety instructions



#### CAUTION



#### Leaked hydraulic oil

Environmental hazard / risk of slipping.

- > In case of spills, cover the oil-covered surface immediately with an oil-binding medium.
- > Then immediately dispose of the oil-binding medium according to the national environmental regulations.



#### **Ignition hazard**

Risk of electrostatic charge by poorly conducting hydraulic fluid.

• If the electrical conductivity of the hydraulic fluid is not known, please contact the manufacturer of the hydraulic fluid.



#### Risk of burns

Contact temperatures according to DIN EN563 (3) and DIN EN13202 (4) may be exceeded during operation.

> Allow the filter unit to cool down before touching it.

#### For prevention of material damage and product damage



#### **CAUTION**



## Danger due to improper handling

#### **Property damage**

> The filter unit may only be used in accordance with Section 2.2, "Intended use".

#### Leakage or spillage of hydraulic fluid

Environmental pollution and ground water contamination.

> Use oil binding agents in order to bind leaked hydraulic oil.



#### Risk of burns

Contact temperatures according to DIN EN563 (3) and DIN EN13202 (4) may be exceed during operation.

> Allow the filter unit to cool down before touching it.

#### Contamination due to fluids and foreign bodies

Premature wear - malfunction - risk of damage - property damage.

- > Ensure cleanliness during installation in order to prevent foreign bodies, such as welding beads or metal chips, from entering the hydraulic lines, leading to premature wear or malfunction.
- Make sure that connections, hydraulic lines and attachment parts (e.g. gauges) are free of dirt and chips.
- > Prior to commissioning, check that all hydraulic and mechanical connections are connected and tight, and that all gaskets and seals of the plug connectors are correctly assembled and undamaged.
- > For removal of lubricants and other contaminants, use residue-free industrial wipes.
- > Make sure that all connections, hydraulic lines and attachment parts are clean.
- > Ensure that no contaminants enter when closing the connections.
- Make sure that no detergents enter the hydraulic system.
- > Do not use cotton waste or faying cleaning rags for cleaning.
- > Do not use hemp as sealing agent.



#### Improper cleaning

Premature wear, malfunctions! Risk of damage! Property damage.

- > Close all openings with appropriate protective fittings to prevent penetration of detergents.
- > Do not use aggressive cleaning agents for cleaning. Clean the product with a suitable cleaning fluid.
- > Do not use a high pressure cleaner.
- > Do not use compressed air to clean function interfaces such as seal areas.

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## 4. Scope of delivery

The package includes:

- > 1 Off-line Filter FNS 040
- > 1 Operating manual

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#### 5.1 Performance specification

The off-line filter FNS 040 is a device for filtration of hydraulic fluids and lubricants in the bypass flow.

A separate installation in the bypass or cooling circuit for fine filtration and discharge of the full flow filter is just as possible as the filtration of fresh oil and the cleaning (flushing) of polluted systems for wear protection of components and systems. The volume flow is dependent on the flow control valve used (see Chapter 8 "Technical data")

The operating temperature is in the range of -30° C to +100° C.

#### 5.2 Component overview

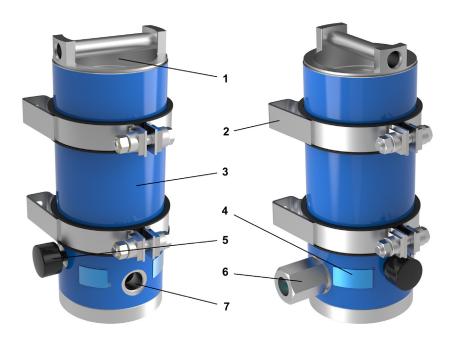


Fig.1: Component overview

- 1 Filter cover
- 2 Mounting clips
- 3 Filter housing with filter element
- 4 Nameplate

- 5 Clogging indicator
- 6 Connection pressure side / flow control valve
- 7 Return connection

#### 5.3 Identification of the product

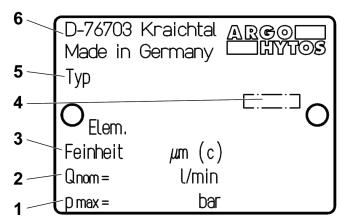


Fig. 2: Nameplate

- 1 Max. pressure
- 2 Nominal volume flow
- 3 Filter fineness

- 4 Year of manufacture
- 5 Type designation
- 6 Address

#### NOTE

Nameplates are documents which must not be changed or removed.

> Damaged or lost nameplates have to be replaced true to the original.

#### 6.1 Transport

The filter can be taken manually to the site due to its low weight of 7 kg.

#### 6.2 Storage

The off-line filter FNS 040 should be stored in an enclosed area to protect it from humidity and condensation.



#### CAUTION



#### Risks related to chemical reactions

Risk of injury

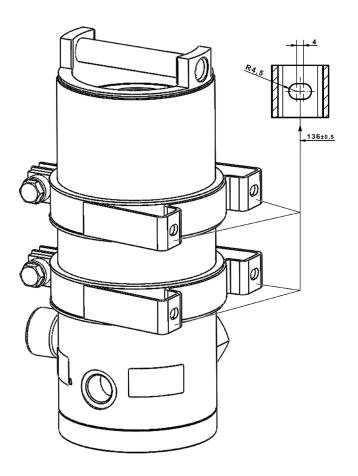
- Chemical substances in the immediate vicinity of the filter unit may react and lead to destruction of the device and to injuries of persons who are in the immediate vicinity of the device
- > Storage in the immediate vicinity of chemically active substances such as acids, alkalis, salts, organic solvents and rechargeable batteries is prohibited.

The ambient temperature during storage of the off-line filter FNS 040 should be between +5 °C and +30 °C at a humidity of max. 80 %.

Before storage over a period of more than 6 months, the unit should be filled with oil in order to preserve it against corrosion.

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Assembly is carried out by mounting the off-line filter on site.



Proceed with the following steps:

- 1. Attach the off-line filter FNS 040 as shown vertically in close proximity to the operation site by four screws M8 and matching washers ø 8,4.
- 2. Assemble the inlet and outlet hoses to the respective G ¾" connections (see 15.1 "Dimensions").

## 8. Commissioning

## 8.1 Before commissioning

- > Be sure to read and understand the operating manual before putting the device into operation.
- > The information for intended use, the operating conditions and the technical specifications must be adhered to.
- > The filter must be mounted in vertical position.
- > Cables and hoses must be outside of the movement range of the operating personnel (tripping hazard).
- > The oil to be filtered must be compatible with the previously filtered hydraulic oil. If this is not the case, the filter unit must be cleaned and the filter element is to be replaced (see filter element change).
- > Properly close the cover of the filter housing.
- Manually turn the cover until it stops; a gap between cover and housing may remain visible (see Figure 3).

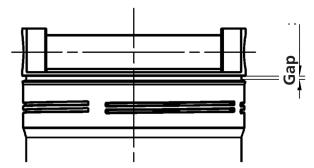


Fig. 3: Gap at the filter cover

#### 8.2 After switching on

> Check the filter unit for leaks.

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# Exposure to spilled oil Injury / risk of slipping

• If oil leaks, the oil-covered area must be shut of immediately and covered with an oil binding medium (risk of slipping).



## Static charge Sparking

> There is a risk of static charge when using poorly conducting hydraulic or lubricating oils. In this case, please consult the manufacturer.

#### 9.1 Filtering liquids in the bypass flow

> Using the clogging indicator, check the element for clogging at operating temperature of the medium used.

#### **NOTE**

#### Reaching the maximum cleaning performance

In order to prevent a short circuit of the oil flow, the distance between the suction and pressure connection should be kept as large as possible.

The operation of the off-line filter FNS 040 is depending on the machine / system, in which the off-line filter is integrated and thus cannot be further described here.

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## **CAUTION**



#### Risks related to chemical reactions

#### Risk of injury

- > Chemical substances in the immediate vicinity of the filter unit may react and lead to destruction of the device and to injuries of persons who are in the immediate vicinity of the device
- > Storage in the immediate vicinity of chemically active substances such as acids, alkalis, salts, organic solventsand rechargeable batteries is prohibited.



#### Hydraulic oil spills

#### Environmental hazard / risk of slipping

- > Before maintenance and repair work, completely drain the unit.
- > In case of spills, cover the oil-covered surface immediately with an oil-binding medium.
- > Then immediately dispose of the oil-binding medium according to the national environmental regulations.



#### **Ignition hazard**

Risk of electrostatic charge by poorly conducting hydraulic fluid.

> If the electrical conductivity of the hydraulic fluid is not known, please contact the manufacturer of the hydraulic fluid.



#### Risk of burns

Contact temperatures according to DIN EN563 (3) and DIN EN13202 (4) may be exceeded during operation.

> Allow the filter to cool down before touching it.

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#### 10.1 Maintenance

#### 10.2 Maintenance overview

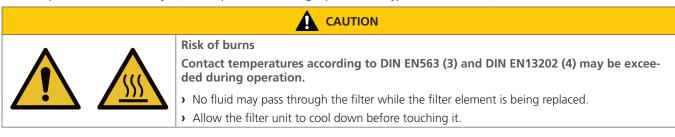
Except from the filter element and the suction strainer, the filter is maintenance-free.

Maintenance work	Order No.	Maintenance interval
		Once the clogging indicator changes to the red range at a permissible viscosity

Table 6: Maintenance overview

#### 10.3. Replacing the filter element

1. Pump the filter element dry - (see Chapter 9.2 "Filtering liquids in the bypass flow" Point 7)



#### 10.3.1 Removing the filter element



Fig. 4: Removing the filter element

- 1. Turn the housing cover (1) counterclockwise.
- 2. Carefully remove the cover (1) with the filter element (2) from the filter tube. (The filter element is attached to the cover. Let the draining oil drip off into the housing.)

#### 10.3.2 Removing the filter element from the cover



Fig. 5: Removing the filter element from the cover

- 1. Push the filter element at the cover in arrow direction 1 and remove it in arrow direction 2.
- 2. Dispose of the filter element according to the national environmental legislation (Waste code: Oil filter 16 01 07).

#### 10.3.3 Attaching the filter element



Fig. 6: Attaching the filter element

- 1. Check the filter element type number.

  Does the load inscription on the filter element match with the indications on the type plate or in the operating manual?
- 2. Attach the filter element in arrow direction 2 and lock it in arrow direction 1.

## 10.3.4 Installing the filter element



Fig. 7: Installing the filter element

- 1. Carefully insert the cover (1) with the filter element (2) into the filter tube.
- Screw in the cover manually until it stops.
   A gap between cover and filter pipe may remain visible (see Chapter 8.1 "Before commissioning" / Fig. 3)

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## 11. Decommissioning

The off-line filter is a device which does not have to be taken out of operation.

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## 12. Disassembly

The off-line filter is a device which does not have to be dismantled.

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## 13. Disposal

- > Careless disposal of the filter FNS 040 and the hydraulic fluid can lead to environmental pollution.
- > Therefore, dispose of the filter unit and the hydraulic fluid in accordance with the national regulations of your country.
- > Dispose of hydraulic fluid residues according to the applicable safety data sheets for these hydraulic fluids.

## 14. Troubleshooting

#### 14.1 How to proceed

- Get an overview on the function of the product in connection with the overall system.
- > Try to find out whether the product had provided the required function in the overall system before the error occurred.
- > Try to detect changes in the overall system, into which the product has been installed:
  - » Have the operating conditions or the operating range of the product changed?
  - » Have modifications (e.g. conversions) or repairs been carried out at the overall system (device / unit, electrics, control) or at the product? If so, which modifications?
  - » Has the product or the device been operated correctly?
  - » How does the fault tend to show?
- > Get a clear impression about the cause of trouble. Possibly consult the direct operator or machine operator.

#### 14.2 Fault table

Problem / fault	Possible cause	Elimination
Volume flow is clearly too low	> Filter element contaminated	▶ Replace the filter element
	<ul><li>Viscosity too high</li></ul>	Warm up the medium
	› Leak on the suction side	<ul> <li>Replace suction hose or seal connection points (re-tighten them)</li> </ul>

Table 7: Fault table

## 15.1 Device dimensions

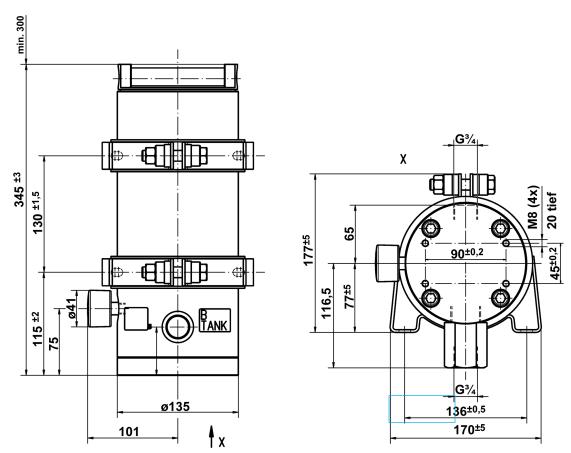


Fig. 8: Device dimensions

#### 15.2 Technical data

		i .	
Nominal flow rate		FNS 060.1520	VSK-M2-55/S/M 2 l
Flow control valve		FNS 060.1530	VSK-M2-100/S/M 3 l
		FNS 060.1540	VSK-M2-120/S/M 4 I
		FNS 060.1550	VSK-M2-160/S/M 6 I
Max. operating pressure	bar	320	
Min. operating pressure	bar	10	
Filter element		V7.1220	(3 μm)
		V7.1220-13	(3 μm)
		Y7.1220-05	(7 μm)
		V7.1220-06	(10 μm)
Clogging indicator		Pressure gauge Dogreen: 0 - 2,7 barred: from 2,7 bar	
Tare weight	kg	approx. 7	
Dimensions (length x width x height)	mm	320x560 / 572x2	70 (400)

Table 8: Technical data

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#### NOTE

#### Note maximum operating pressure

> The maximum operating pressure of 320 bar is only possible when using the above mentioned flow control valves. When using the off-line filter without flow control valve, the maximum operating pressure is limited to 10 bar.

#### 15.3 Operating conditions

Permissible temperature range	Hydraulic fluid °C	-30 +100
	Ambient temperature °C	0 50

#### **CAUTION**





Risk of burns

Contact temperatures according to DIN EN563 (3) and DIN EN13202 (4) may be exceeded during operation.

› Allow the filter unit to cool down before touching it.

#### **NOTE**

#### Varying viscosity behavior

> Viscosities of a medium are always temperature-dependent.

#### 15.4 Hydraulic circuit diagram

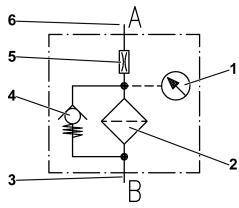


Fig. 9: Hydraulic circuit diagram

- 1 Clogging indicator
- 2 Filter
- 3 Outlet "B"
- 4 Pressure limiting valve
- 5 Flow control valve
- 6 Inlet "A"

## 16.1 Spare parts list

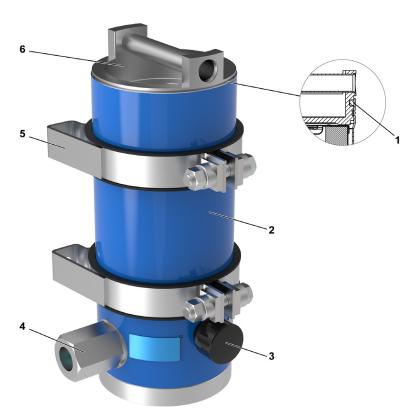


Fig. 10: Spare parts drawing

Pos.	Designation	Pcs.	Order No.	Remark
1	O-Ring	1	N007.1175	D117, 48 x 5,3
2	Filter element	1	V7.1220	(3 μm)
			V7.1220-13	(5 μm)
			Y7.1220-05	(EXAPOR®AQUA 7 μm)
			V7.1220-06	(10 μm)
3	Pressure gauge	1	DG 200-06	
4	Flow control valve	1	FNS 060.1520	VSK2-M2-55/S/M 2 l
			FNS 060.1530	VSK2-M2-100/S/M 3 l
			FNS 060.1540	VSK2-M2-120/S/M 4 I
			FNS 060.1550	VSK2-M2-160/S/M 6 l
5	Assembly kit	1		consisting of 2 clips
6	Cover complete	1	FNA 008.1250	incl. Pos. 1

Table 9: Spare parts list

# Einbauerklärung

## Installation declaration



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Die Einbauerklärung gilt für folgendes Gerät: The installation declaration applies

to the following unit:

Nebenstromfilteraggregat Off-line filter unit

## **FNS 040**

Wir bestätigen die Übereinstimmung mit den wesentlichen Anforderungen der europäischen Richtlinie(n):

Maschinenrichtlinie 2006-42-EG

EMV Richtlinie 2004/108/EG

We declare the conformity according to the essential requirements of the European directive(s):

Machinery Directive 2006/42/EC

EMC Directive 2004/108/EC

Folgende Norm(en) wurde(n) angewandt:

The following standard(s) was (were) applied:

DIN EN 809 DIN EN 60204-1 (VDE 0113-1: 2007-06

Zator, 22.11.2016

(Ort und Datum der Ausstellung)

(Place and date of issue)

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